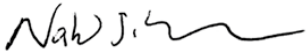


DECLARATION OF NABIL J. SARHAN, PH.D.,
UNDER 37 C.F.R. § 42.100 REGARDING
U.S. PATENT NOS. 8,310,540 AND 8,928,752

Declaration

I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: August 9, 2024

By:  _____

Nabil J. Sarhan, Ph.D.

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I, Nabil Sarhan, do hereby declare:

1. I am making this declaration at the request of Motorola Solutions, Inc. (“Motorola”) and Watchguard Video, Inc. (“Watchguard”) in the matter of the *Inter Partes* Reviews (“IPRs”) of U.S. Patent Nos. 8,310,540 (the ’540 patent) and 8,928,752 (the ’752 patent). I understand that Motorola is the Petitioner in these IPRs.

2. I am being compensated for my work in this matter at my standard hourly rate of \$390 for such consulting services. My compensation in no way depends on the outcome of this proceeding.

I. Qualifications

3. My qualifications generally are set forth in my *curriculum vitae*, which is submitted as Appendix A. Appendices A-NN cited herein are found in Exhibit 1041¹ and Appendices OO and PP are found in Exhibit 1052. Below, when referencing an appendix, I include a parenthetical indicating whether the appendix is found in Exhibit 1041 or 1052.

4. I received my Ph.D. and M.S. degrees in Computer Science and Engineering from the Pennsylvania State University (Penn State) in 2003 and a B.S. degree in Electrical Engineering from Jordan University of Science and Technology in 1995. Both my M.S. thesis and Ph.D. dissertation considered the design of

¹ Exhibit 1041 is the appendix to my declaration on U.S. Patent Nos. 7,593,034, 9,485,471, 8,692,882, and 9,912,914 filed in IPR2024-01205, 01206, -01207, and -01208.

computer systems for supporting multimedia. In particular, my Ph.D. dissertation dealt with the design of high-bandwidth I/O systems for multimedia applications, specifically video streaming. In this dissertation, titled “On the design of scalable and high-performance multimedia servers”, I proposed new methods to design multimedia systems in a way that maximizes the number of users that can stream videos at the same time.

5. I am an Associate Professor of Electrical and Computer Engineering (ECE) at Wayne State University and the Director of Wayne State Computer Systems and Deep Learning Research Laboratory. I am the Coordinator of the Interdisciplinary College of Engineering M.S. in AI Program and the Director of the Hardware and System Track. I served as the Graduate Program Director of Electrical and Computer Engineering and the Chair of the College of Engineering Faculty Assembly. I also served as the Director of the Wayne State Multimedia Computing and Networking Research Laboratory in the ECE department for approximately fifteen years. I am chairing the Computer Engineering Area in the ECE department, and I regularly teach undergraduate and graduate courses in computer architecture and computer networks and supervise Ph.D. and M.S. students.

6. I have been regularly teaching the senior-level Computer Architecture course (previously called Computer Organization and Design) since 2003. The course covers microprocessor design, memory hierarchy, and I/O. I have also been teaching the Computer Networks and Network Programming course, which includes coverage

of all network layers and different network protocols. Additionally, I taught multiple times the Advanced Computer Architecture course, which focuses on the design of parallel computer systems and covers microprocessor design, memory hierarchy, and I/O. I have recently developed a new mandatory course titled “Object-Oriented Programming for Electrical and Computer Engineering” and led the efforts to modernize the Introduction to Microcomputers course and lab by using ARM-based microcontrollers and the instruction set. Additionally, I taught the following advanced graduate courses: Scalable and Secure Internet Services and Architectures, Special Topics on Multimedia, Special Topics on Multimedia Networking, and Special Topics on Multimedia Systems and Networks. Furthermore, I taught the following undergraduate courses: “Microcomputer Systems and Programming”, and “Microprocessor Interfacing Lab”.

7. I am an internationally recognized expert on computer systems, particularly those for multimedia applications.

8. I supervised eight Ph.D. dissertations and four master theses related to computer systems. Seven of these Ph.D. dissertations and all four M.S. theses were focused on multimedia systems, with research areas including video streaming and automated video surveillance. Additionally, I am currently supervising three Ph.D. dissertations in computer systems. Furthermore, I served on 25 other Ph.D. dissertation committees and 10 other M.S. thesis committees.

9. I authored more than 55 refereed papers, including those in top journals and conferences in various areas including computer systems, multimedia, networking, deep learning, and I/O. I was awarded (with a collaborator) a grant from the National Science Foundation (NSF) to develop a reconfigurable hardware accelerator chip and system for deep learning and artificial intelligence. The project includes the design of inference-engine chips that are interconnected through PCI Express to build a scalable system supporting large neural models. Three of my other research projects were also sponsored by the NSF. One of these projects was on video streaming while another was on the design of a video camera security system, specifically an automated video surveillance system, for automatic detection of threats, utilizing cross-layer optimization. Another NSF-sponsored project was on reconfigurable high-performance cluster computing and medical engineering applications. Other research projects were sponsored by Silicon Mechanics and Sun Microsystems. These projects include “High Performance Computing Cluster” and “Sun’s Center of Excellence in Open Source Computing and Applications”. I published a book chapter: “Streaming Multimedia”, The Handbook of Computer Networks, John Wiley & Sons, Inc., November 2007.

10. I am the named inventor on U.S. Patent No. 9,313,463 related to the design of automated video surveillance systems. The system optimally controls a plurality of security cameras to achieve the best threat detection accuracy.

11. I served as the Chair of the Interest Group on Media Streaming of the Institute of Electrical and Electronics Engineering (IEEE) Multimedia Communication Technical Committee and as the Co-Director of the IEEE Multimedia Communication Technical Committee Review Board. I have been an Editor of the ERTI journal since 2017. I served as an Associate Editor of the IEEE Transactions on Circuits and Systems for Video Technology. I served as a Guest Editor and Reviewer for prestigious journals and magazines. I have been involved in the organization of numerous international conferences in various capacities, including General Chair, Chair, Technical Program Committee Co-Chair, Publicity Chair, Track Chair, Session Chair, and Technical Program Committee Member. For example, I served as Co-Chair of the Technical Program Committee of ACM SIGMM Workshop on Network and Operating Systems Support for Digital Audio and Video (NOSSDAV) in 2018. I participated as a Panelist in major international conferences.

12. I served as a Panelist for the National Science Foundation and the National Institute of Health and as a Site Review Panelist for the Natural Sciences and Engineering Research Council of Canada.

13. I have been extensively involved in internal and international educational reform, review, and accreditation activities. Specifically, I served as the chair of more than 20 international panels and as a member of seven international panels for the review and accreditation of institutions and undergraduate and graduate programs, including “electrical engineering”, “electrical and computer engineering”, “software

engineering”, “computer and network engineering”, “computer science”, and “information technology”. I was also an External Expert in reviewing and reforming computer science and computer engineering programs and courses in the U.S. and overseas. Furthermore, I am a Program Evaluator for the Accreditation Board for Engineering and Technology (ABET).

14. I received the IEEE SEM Outstanding Professional of the Year Award, the Wayne State University President’s Award for Excellence in Teaching, and the College of Engineering Excellence in Teaching Award. I was elevated to a Senior Member of the Institute of Electrical and Electronics Engineering (IEEE) in 2016.

15. I have recently been inducted into the WSU Academy of Teachers for having “a significant impact on the WSU undergraduate learning experience”, practicing “innovative pedagogy”, and demonstrating “instructional excellence.”

II. Relevant Legal Standards

16. I have been asked to provide my opinion as to whether the claims of the ’540 and ’752 patents would have been obvious to a person of ordinary skill in the art at the time of the invention, in view of the prior art.

17. I am an engineer by training and profession. The opinions I am expressing in this declaration involve the application of my knowledge and experience to the evaluation of certain prior art with respect to the ’540 and ’752 patents. My formal knowledge of patent law is no different than that of any lay person. Therefore, I have requested the attorneys from Jones Day, who represent Motorola and

Watchguard, to provide me with guidance as to the applicable patent law in this matter. The paragraphs below express my understanding of how I must apply current principles related to patent validity to my analysis.

18. It is my understanding that in determining whether a patent claim is obvious in view of the prior art, the Patent Office must apply the *Phillips* standard to construe the claim by giving the claim its plain and ordinary meaning, consistent with the specification and prosecution history. For the purposes of this review, I have construed each claim term in accordance with its plain and ordinary meaning under the *Phillips* standard, unless otherwise indicated.

19. I understand that claim terms may be drafted in means-plus-function (MPF) format where they recite a means for performing a function, and the corresponding structure for performing that function is identified in the specification.

20. I understand that, if a claim term uses the word “means,” it is presumed that it is a MPF term. If, on the other hand, a claim term does not use the word “means,” it is presumed that it is not a MPF term. However, this presumption may be overcome, and even a claim term that does not use the word “means” will be treated as a MPF term where it recites a function without reciting sufficient structure for performing that function. For example, if the term uses functional language and/or a nonce word that would have the same effect as though the word “means” was used instead, and does not provide sufficient structure, the presumption against MPF will be overcome.

21. If a claim term is a MPF term, the specification must supply the corresponding structure that the claim lacks. I understand that the scope of a MPF term is limited to the corresponding structure disclosed in the specification and equivalents thereof. If there is no corresponding structure in the specification, the term is indefinite.

22. It is my understanding that a claim is unpatentable under 35 U.S.C. § 103 if the claimed subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time of the invention. I understand that a person of ordinary skill in the art is a person with a level of experience, education, or training generally possessed by those individuals who work in the area or field of the invention at the time of the invention. A person of ordinary skill is also a person of ordinary creativity that can use common sense to solve problems. I also understand that an obviousness analysis takes into account the scope and content of the prior art, the differences between the claimed subject matter and the prior art, and the level of ordinary skill in the art at the time of the invention.

23. In determining the scope and content of the prior art, it is my understanding that a reference is considered analogous prior art if it falls within the field of the inventor's endeavor. In addition, a reference is analogous prior art if it is reasonably pertinent to the particular problem with which the inventor was involved. A reference is reasonably pertinent if it logically would have commended itself to an inventor's attention in considering his problem. If a reference relates to the same

problem as the claimed invention, that supports use of the reference as prior art in an obviousness analysis.

24. To assess the differences between prior art and the claimed subject matter, it is my understanding that 35 U.S.C. § 103 requires the claimed invention to be considered as a whole. This “as a whole” assessment requires showing that one of ordinary skill in the art at the time of invention, confronted by the same problems as the inventor and with no knowledge of the claimed invention, would have selected the elements from the prior art and combined them in the claimed manner.

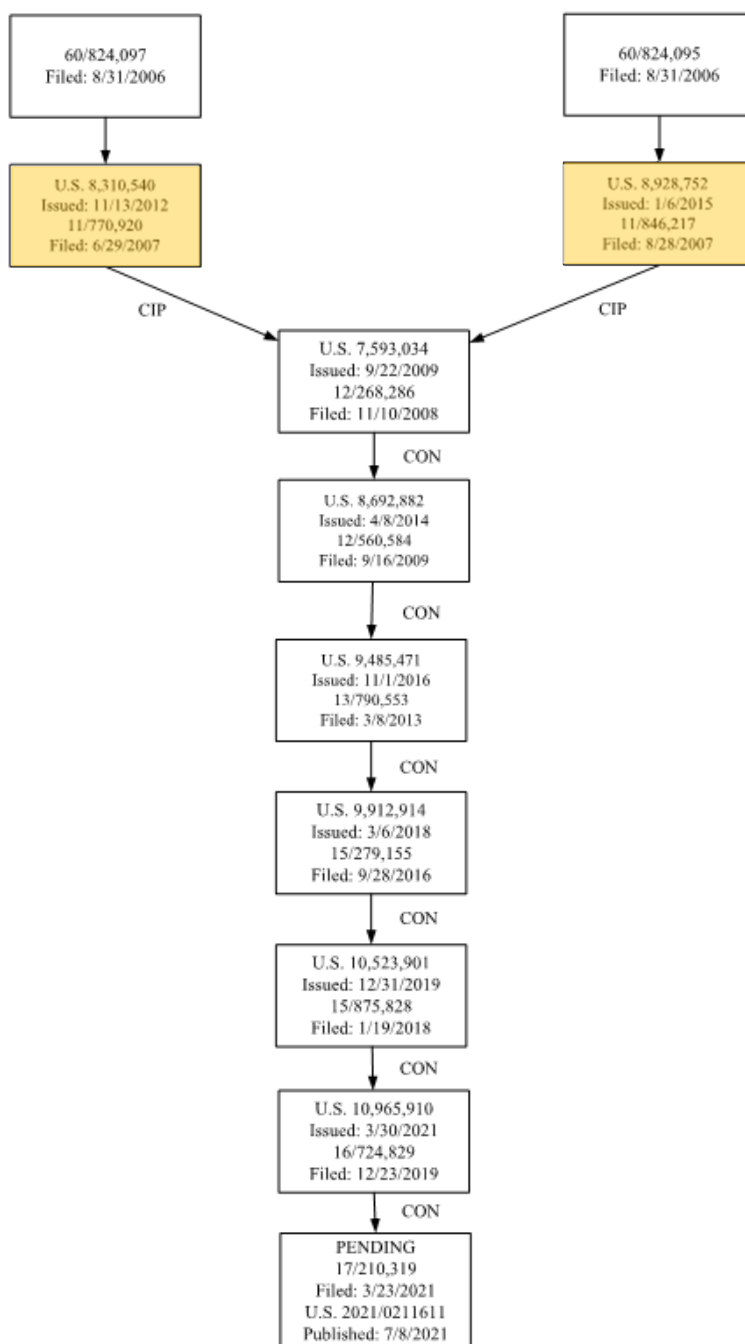
25. It is my further understanding that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of claimed subject matter. Some of these rationales include: combining prior art elements according to known methods to yield predictable results; simple substitution of one known element for another to obtain predictable results; a predictable use of prior art elements according to their established functions; applying a known technique to a known device (method or product) ready for improvement to yield predictable results; choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. As part of an obviousness analysis, I understand that I am to consider whether a reason existed at the relevant time that would have motivated a

person of ordinary skill in the art in the relevant field to combine the known elements in the way the claimed invention does. The reason could come from the prior art, the background knowledge of one of ordinary skill in the art, the nature of the problem to be solved, market demand, or common sense, for instance.

III. Person Of Ordinary Skill In The Art

26. It is my understanding that when interpreting the claims of the '540 and '752 patents, I must do so based on the perspective of one of ordinary skill in the art (a "POSITA") as of the relevant priority date. I understand that '540 and '752 patents are part of a patent family assigned to the Patent Owner:

Stellar Patent Family



27. As indicated above, it is my understanding that App. No. 11/770,920 (the '920 application) was filed on June 29, 2007, and eventually issued as the '540 patent on November 13, 2012. EX1018, Cover. The '920 application claims priority to U.S. Provisional App. No. 60/824,097, filed on August 31, 2006. *Id.*

28. For purposes of this IPR proceeding, I have been asked to apply June 29, 2007, as the priority date for the challenged claims of the '540 patent.

29. As indicated above, it is my understanding that App. No. 11/846,217 (the '217 application) was filed on August 28, 2007, and eventually issued as the '752 patent on January 6, 2015. EX1004, Cover. The '217 application claims priority to U.S. Provisional App. No. 60/824,095, filed on August 31, 2006. *Id.* For purposes of this IPR proceeding, I have been asked to apply August 28, 2007, as the priority date for the challenged claims of the '752 patent.

30. In my opinion, a person of ordinary skill in the art for the '540 and '752 patents as of the assumed priority dates (June 29, 2007 and August 28, 2007, respectively) would have been a person having at least a Bachelor's Degree in electrical engineering, computer science, or computer engineering, or undergraduate training in an equivalent field and at least two years of relevant experience in electronics technology. Additional graduate education could substitute for professional experience, and significant work experience could substitute for formal education.

IV. Technology Background

A. Introduction

31. The '540 and '752 patents are directed generally to “digital recording” (*see, e.g.*, '540 patent, 1:9) and “surveillance cameras” (*see, e.g.*, '752 patent, 1:9), and more specifically to systems and apparatuses in which an “area of ... memory is

preferably utilized as a circular buffer” for recording image data from a camera. ’752 patent at Abstract. Receipt of a “start signal” causes a portion of the circular buffer to be write protected to prevent that portion from being overwritten. *Id.*, 3:23-50. The protected portion can include video data recorded both before and after the start signal is received. *Id.*, 5:44-47.

32. As I explain in the sections that follow, all of these concepts described in the ’540 and ’752 patents were known in the art before the time of the purported inventions. I reach this conclusion based on Applicant’s own admissions and the prior-art teachings described below. More specifically, I provide below a summary of the state of the art as understood as of the assumed priority date for the ’540 and ’752 patents for the general subject matter of these patents. The information discussed below informed the background knowledge of a person of ordinary skill in the art at the time the ’540 and ’752 patents were filed, which I understand may be relevant in determining whether and how to combine references to achieve the claimed inventions.

B. State Of The Art And Admitted Prior Art

33. In the patents of the Stellar patent family, the inventors made admissions regarding the state of the art and admitted prior art. I note some of these admissions in the sections that follow. Applicant also made admissions in prosecuting the patents of the Stellar family, and these are likewise detailed below.

1. Admissions In The Stellar Patents

a) The '920 Application (U.S. Patent No. 8,310,540)

34. The '540 patent specification states that “[t]he field of the invention is in digital recording.” ’540 patent at 1:9. Before describing the alleged invention, the ’540 patent specification provides a description of the admitted state of the prior art in the following “BACKGROUND”:

Conventional camcorders use a variety of disk formats such as digital video cassettes, mini-DV cassettes and DVD-R discs that offer a limited amount of memory to store data. One of the major shortcomings of the existing camcorder technology is that the memory runs out too soon. How many times does one hear, “I have no tape left” while recording? Once a portion of the memory has been recorded, there is less memory available for further recording. Then when the memory is full, users have to return to their home/work computer or media station to transfer the recorded data from the camera to free up the memory. This creates inconvenience and inflexibility for recording on the go.

One solution is the technology of loop recording in which the camera is constantly recording. When it reaches the end of the memory it records from the beginning, erasing the earliest recorded data. Such technology is often employed with surveillance cameras for long and continuous recording without much or any supervision. However, the problem with such loop recording is that it will not distinguish or differentiate any data that is of importance. The user then will have to transfer the interested data to another storage media by stopping the recording and storing the

interested data onto another medium, or risk having the interested data be recorded over during loop recording.

Many surveillance recordings employ larger memory units to solve this problem. This then creates unnecessary long recordings that are not relevant or present any interest to the user. The portions of the interested data not only take up available memory for further recording but the entire loop has to be reviewed in order to select the most relevant portion. Again, this creates inconvenience and inflexibility for recording on the go.

Furthermore, users of the surveillance camera are not able to edit a given portion on the fly without stopping and replaying the image. The user must focus his or her attention on the viewfinder or display screen to keep the subject properly framed. This seriously hinders the operator's live enjoyment of the event being recorded since their attention is on the recording device and is not immersed in the sights and sounds of the event.

Id. at 1:13-52. The '540 patent alleges "there is still a need for a camera that provides better recording and editing functions." *Id.* at 1:53-54.

b) The '217 Application (U.S. Patent No. 8,928,752)

35. The '752 patent specification states that "[t]he field of the invention is surveillance cameras." '752 patent at 1:9. Before describing the alleged invention, the '752 patent specification provides a description of the admitted state of the prior art in the following "BACKGROUND":

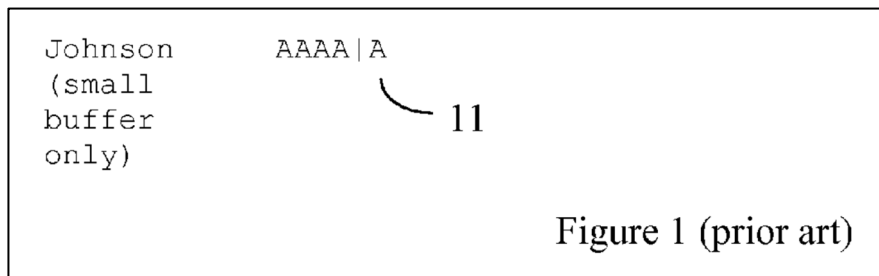
It is often desirable to record an unexpected event (automobile accident, baseball hit, quick kiss, facial expression, etc.), but by the time someone

pulls out a camera and focuses on the target, the moment is gone. This problem has long been addressed in the surveillance industry by recording continuously for long periods of time. It is not unusual, for example, for banks or other secure facilities to capture and maintain day after day of surveillance tapes. The downside, of course, is that continuous recordings are costly in terms of equipment, storage, bulkiness, and so forth. Moreover, continuous recording is especially unsuitable for small recording devices such as those carried on eyeglasses.

U.S. Pat. No. 6,163,338 to Johnson et al. (December 2000) focused on the problem of filming automobile accidents. Instead of trying to record millions of frames over long periods of time, Johnson tried to solve the problem by continuously storing the most recent images in a small looping (circular) memory. Upon actuation of a trigger, the system protects the most recently used portion of the memory, and overwrites an older portion. Thus, upon receiving a trigger signal from an accident, a 30 second memory might end up storing 20 seconds before and 10 seconds after the accident.

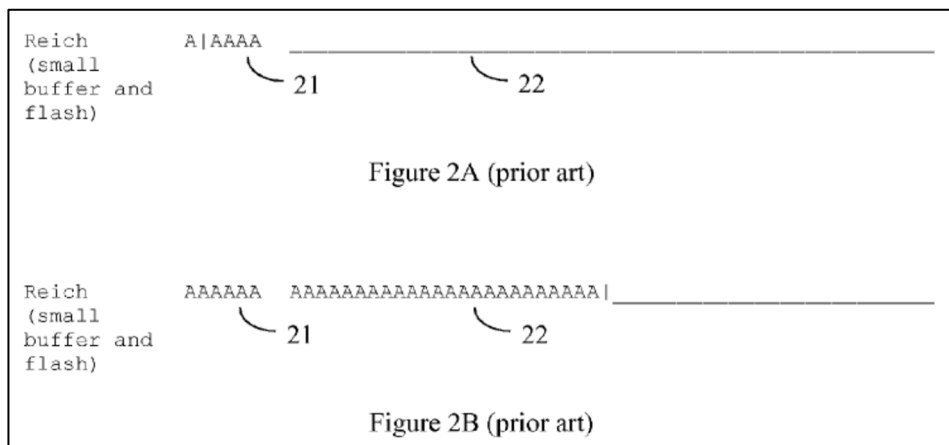
A looping memory of a device according to Johnson is depicted in prior art FIG. 1. There a small looping memory 11 records frames or other data from a data stream "A". Each character initiates a small time period, perhaps five seconds, with the "|" character designating the current writing position. When the memory finishes writing to the last position, it returns to the first position and over-writes previously stored data. Upon receipt of a start signal (such as by actuation of a trigger), the memory continues looping for some period of time (corresponding to perhaps a third of the

memory capacity), and then stops recording altogether. The recorded memory is protected until it is offloaded or reset.



US 2004/0033058 to Reich et al. (publ. February 2004) contemplates an improvement that tries to solve that problem by using two different memories, a small (900 frame) looping buffer and a larger flash memory. In Reich, the trigger signal (record button) causes the buffer to be completely filled, and then additional images to be written to the flash memory until a stop button is pushed.

The Reich system is depicted in prior art FIGS. 2A-2B. In FIG. 2A, a small looping buffer 21 records data from data stream “A”, with the current position marked with “|”. The “_” character is used to initiate memory that has not been used, or has been used but has been marked for overwriting. In FIG. 2B, a start signal has been received, and the system responded by filling the buffer, and then starting to fill a flash memory 22. Regardless of whether the flash memory is eventually filled, both the buffer 21 and the flash memory 22 are effectively locked (protected) upon receipt of a stop signal.



Id. at 1:13-2:4; FIGS. 1, 2A-2B.

36. The '752 specification further describes the purported problem with the prior art Johnson and Reich references as follows:

From FIGS. 1 and 2A-2B, one can readily appreciate that both Johnson and Reich can accommodate only a single time period. A user cannot record a second event without overwriting or offloading the stored data from a first event. In addition, both Johnson and Reich still contemplate that the looping portion memory should be very small, perhaps 30 seconds or less. Such devices are completely inadequate for storing long pre-start signal images, such as a five or ten minute period prior to a trigger signal.

Id. at 2:5-13.

37. The '752 patent specification alleges that “there is still a need for improvements in cameras and other surveillance devices that allow recordation of multiple events without overwriting or offloading, and that can include lengthy portions of data streams prior to start signal events.” 2:14-17.

c) The '286 Application (U.S. Patent No. 7,593,034)

38. U.S. Patent No. 7,593,034 (the '034 patent) states that “[t]he field of the invention is video camera recording technology.” '034 patent at 1:19-20. Before describing the alleged invention, the '752 patent specification provides a description of the admitted state of the prior art in the following “BACKGROUND”:

Conventional camcorders use a variety of storage formats including digital video cassettes, mini-DV cassettes, or DVD-R discs that offer a limited amount of memory to store data. One of the major shortcomings of the existing camcorder technology is that the memory runs out too soon. Once a portion of the memory has been recorded, there is less memory available for further recording. Then when the memory is full, users have to return to their home/work computer or media station to transfer the recorded data from the camera to free up the memory. This creates inconvenience and inflexibility for recording on the go.

WO 2006/044476 to Vanman describes an electronic camera mounted to a police vehicle with a circular buffer that is constantly recording. When the camera reaches the end of the memory it records from the beginning of memory, erasing the earliest recorded data. Such technology is often employed with surveillance cameras for long and continuous recording with little or no supervision. However, Vanman does not distinguish or differentiate any data that is of importance. To save data in the buffer, the user of the Vanman device needs to transfer important portions of the buffer wirelessly to a central office or physically to a DVD disc, or else risk having the interesting data be recorded over during loop recording.

Such transfers are processor intensive and may not be possible when the central office is out of range or an empty DVD disc is unavailable.

Id. at 1:24-41. The '034 patent specification alleges, however, that:

Vanman does not distinguish or differentiate any data that is of importance. To save data in the buffer, the user of the Vanman device needs to transfer important portions of the buffer wirelessly to a central office or physically to a DVD disc, or else risk having the interesting data be recorded over during loop recording. Such transfers are processor intensive and may not be possible when the central office is out of range or an empty DVD disc is unavailable.

Id. at 1:41-49. The '034 patent specification further describes the admitted state of the prior art as follows:

EP 1064783 to Mann describes a camera mountable to a pair of eyeglasses that continuously saves recorded images to a circular buffer in a computer on the user's waist. When a user wants to save a piece of recorded video, the user must stop recording and offload the data at another location before the user can record again. Mann also discusses streaming the images directly to a wireless memory that may have a larger capacity; however, this means that the camera does not work in the absence of a wireless connection.

U.S. Pat. No. 5,523,799 to Hattori et al. also describes storing data in a memory having an archival portion. However, Hattori fails to address sending data to a remote memory.

Id. at 1:56-67.

39. The '034 patent specification alleges that “there is still a need for a recording camera that provides better recording and editing functions.” *Id.* at 2:1-2.

2. Admissions In The Stellar Patents’ File Histories

40. During the prosecution of U.S. Patent Application No. 12/268,286, the applicant made additional admissions regarding the state of the art and certain prior art references. In an Accelerated Examination Support Document submitted to the USPTO on November 10, 2008, the applicant identified “the references most closely related” as WO 2006/044476 (Vanman), EP 1,064,783 (Mann), and US 5,523,799 (Hattori). EX1013, 84-93. The applicant provided tables admitting that these prior art references disclosed many of the claim limitations (*id.*):

The Limitation that is disclosed	WO 6,044,476 to Vanman	EP 1,064,783 to Mann	US 5,523,799 to Hattori
1	x	x	x
2	x	x	x
3	x	x	X
4		x	x
5	x		
6	x	x	x
7			x
8	x	x	x
9			
10	x	x	
11	x	x	
12	x		
13	x		
14	x	x	
15	x		

Limitation 1 - a surveillance apparatus

Limitation 2 - a camera that has an image capturing component that captures images

Limitation 3 - a camera that has a converting component that converts the images into at least one data stream

Limitation 4 - a local memory functionally connected to the camera

Limitation 5 - a wireless transmitter functionally connected to the local memory

Limitation 6 - a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory

Limitation 7 - a protecting facility that responds to a signal to record by designating a segment of the circular buffer as a write-protected portion

Limitation 8 - a pre-recorded subset of the segment is recorded before the signal is received

Limitation 9 - a sending facility that uses the transmitter to wirelessly transmit the write-protected portion to a remote memory

Claim 2. The apparatus of claim 1, wherein the pre-recorded subset is at least 5 seconds long.

Limitation 10 - the pre-recorded subset is at least 5 seconds long

Claim 3. The apparatus of claim 1, wherein the recorded segment is at least 10 seconds long.

Limitation 11 - the recorded segment is at least 10 seconds long

Claim 4. The apparatus of claim 1, further comprising a sensor that automatically initiates the signal to record, wherein the sensor operates upon content in at least one of the images captured from the camera.

Limitation 12 - a sensor that automatically initiates the signal to record

Limitation 13 - the sensor operates upon content in at least one of the images captured from the camera

Claim 5. The apparatus of claim 1, further comprising an interface through which a human can initiate the signal.

Limitation 14 - an interface through which a human can initiate the signal

Claim 6. The apparatus of claim 1, further comprising an interface through which a human can designate a length of time of at least one of the pre-recorded subset and the post-recorded segment.

Limitation 15 - an interface through which a human can designate a length of time of the pre-recorded subset

The Limitation that is disclosed	WO 6,044,476 to Vanman	EP 1,064,783 to Mann	US 5,523,799 to Hattori
16	x		
17			
18			
19			
20	x	x	
21		x	
22			
23	x	x	x
24	x	x	x
25	x	x	x
26			x
27	x	x	x
28			
29			
30			
31			
32	x		
33	x	x	
34			
35	x		x
36			
37			
38			
39			

Limitation 16 - an interface through which a human can designate a size of the post-recorded segment

Claim 7. The apparatus of claim 1, wherein the remote memory is located on a mobile phone.

Limitation 17 - the remote memory is located on a mobile phone

Claim 8. The apparatus of claim 1, wherein a mobile phone receives the recorded segment from the wireless transmitter and forwards the recorded segment to the remote memory.

Limitation 18 - a mobile phone receives the recorded segment from the wireless transmitter

Limitation 19 - a mobile phone forwards the recorded segment to the remote memory

Claim 9. The system of claim 1, further comprising a mount for the camera.

Limitation 20 - a mount for the camera

Claim 10. The system of claim 9, wherein the mount is a pair of wearable glasses.

Limitation 21 - the mount is a pair of wearable glasses

Claim 11. The system of claim 1, further comprising an electronic index that references addresses of the write-protected portion.

Limitation 22 - an electronic index that references addresses of the write-protected portion

Claim 12. A method of processing imaged data from a camera, comprising the following steps:

receiving a stream of the imaged data;

recording the stream into available portions of a circular buffer;

responding to a signal by write-protecting a newly recorded portion of the buffer, wherein

a subset of the newly recorded portion is recorded before the signal is received

indexing write protected portions of the buffer during the step of recording; and

wirelessly transmitting at least one of the write-protected portions of the circular buffer to a remote memory.

Limitation 23 - a method of processing imaged data from a camera

Limitation 24 - receiving a stream of the imaged data

Limitation 25 - recording the stream into available portions of a circular buffer

Limitation 26 - responding to a signal by write-protecting a newly recorded portion of the buffer

Limitation 27 - a subset of the newly recorded portion is recorded before the signal is received

Limitation 28 - indexing write protected portions of the buffer during the step of recording

Limitation 29 - wirelessly transmitting at least one of the write-protected portions of the circular buffer to a remote memory

The Limitation that is disclosed	WO 6,044,476 to Vanman	EP 1,064,783 to Mann	US 5,523,799 to Hattori
16	x		
17			
18			
19			
20	x	x	
21		x	
22			
23	x	x	x
24	x	x	x
25	x	x	x
26			x
27	x	x	x
28			
29			
30			
31			
32	x		
33	x	x	
34			
35	x		x
36			
37			
38			
39			

Claim 13. The method of claim 12, further comprising storing the write-protected portions as separate files.

Limitation 30 - storing the write-protected portions as separate files

Claim 14. The method of claim 12, further comprising recording the stream into physically dis-contiguous parts of the circular buffer.

Limitation 31 - recording the stream into physically dis-contiguous parts of the circular buffer

Claim 15. The method of claim 12, wherein the signal to save a recording comprises a signal to start recording and a signal to stop recording.

Limitation 32 - the signal to save a recording comprises a signal to start recording and a signal to stop recording

Claim 16. The method of claim 12, further comprising receiving the signal to save a recording through at least one of a manually operated switch and an audio signal.

Limitation 33 - receiving the signal to save a recording through a manually operated switch

Limitation 34 - receiving the signal to save a recording through an audio signal

Claim 17. The method of claim 12, further comprising configuring the size of the pre-recorded subset.

Limitation 35 - configuring the size of the pre-recorded subset

Claim 18. The method of claim 12, further comprising removing write-protection from a transmitted write-protected portion after transmission.

Limitation 36 - removing write-protection from a transmitted write-protected portion after transmission

Claim 19. The method of claim 12, further comprising sending a warning to a user before the newly recorded portion of the buffer is fully recorded.

Limitation 37 - sending a warning to a user before the newly recorded portion of the buffer is fully recorded

Claim 20. The method of claim 19, further comprising extending a length of the newly recorded portion in response to at least one of a manually operated switch and an audio signal.

Limitation 38 - extending a length of the newly recorded portion in response to a manually operated switch

Limitation 39 - extending a length of the newly recorded portion in response to an audio signal

**a) Applicant's Admissions Regarding
WO 2006/044476 (Vanman)**

41. The applicant described WO 2006/044476 (Vanman) as follows (EX1014, 93-94):

Vanman teaches a video camera mounted on a police car that continuously records data to a circular buffer on a hard drive, and that can then retroactively save video streams by writing those video streams from the hard drive to a DVD. Vanman also teaches attaching a wireless Ethernet device to the microcontroller to wirelessly transmit encoded audio and video to a central office. Vanman, however, does not teach designating a segment of the circular buffer as a write-protected portion. The entire hard drive is being written to at all times, segments of the circular buffer could be easily overwritten before a video stream is saved to a DVD or a central office.

42. The applicant admitted that WO 2006/044476 (Vanman) discloses many of the claim limitations (*id.*, 94-100):

Claim Limitation	WO 2006/044476 (Vanman)
Limitation 1 - a surveillance apparatus	Satisfied. Vanman teaches a system that records video and audio. (<i>See</i> para [0024])
Limitation 2 - a camera that has an image capturing component that captures images	Satisfied. Vanman teaches a system that captures images from a video camera and processes the signal to create a digital video signal. (<i>See</i> para [0024])
Limitation 3 - a camera that has a converting component that converts the images into at least one data stream	Satisfied. Vanman teaches a system that captures images from a video camera and processes the signal to create a digital video signal. (<i>See</i> para [0024])

Claim Limitation	WO 2006/044476 (Vanman)
Limitation 5 - a wireless transmitter functionally connected to the local memory	Satisfied. Vanman teaches a wireless Ethernet interface functionally connected to the hard drive. (See para [0034] and corresponding Figure 1, elements 80 and 145)
Limitation 6 - a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory	Satisfied. Vanman teaches a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory. The entire hard drive of Vanman is an “available portion” that is continuously overwritten. (See para [0058])
Limitation 8 - a pre-recorded subset of the segment is recorded before the signal is received	Satisfied. Vanman teaches responding to an event by selecting a data stream that was recorded ten minutes prior to the event start point. (See para [0040])
Limitation 10 - the pre-recorded subset is at least 5 seconds long	Satisfied. Vanman teaches responding to an event by selecting a data stream that was archived ten minutes prior to the event start point. (See para [0040])
Limitation 11 - the recorded segment is at least 10 seconds long	Satisfied. Vanman teaches responding to an event by selecting a data stream that was archived ten minutes prior to the event start point. (See para [0040])
Limitation 12 - a sensor that automatically initiates the signal to record	Satisfied. Vanman teaches automatically initiating the signal to record through an event trigger. (See para [0039], [0051])
Limitation 13 - the sensor operates upon content in at least one of the images captured from the camera	Satisfied. Vanman teaches automatically initiating the signal to record through external emergency lights that are probably captured by the video camera on the squad car. (See para [0024], [0051])
Limitation 14 - an interface through which a human can initiate the signal	Satisfied. Vanman teaches initiating the signal to record by an operator pressing a RECORD key on a control panel. (See para [0051])
Limitation 15 - an interface through which a human can designate a length of time of the pre-recorded subset	Satisfied. Vanman teaches a setting in a user-interface menu that can be used to determine how much of the video data stream to include

Claim Limitation	WO 2006/044476 (Vanman)
	before and after the event markers. (See para [0052])
Limitation 16 - an interface through which a human can designate a length of time of the post-recorded segment	Satisfied. Vanman teaches a setting in a user-interface menu that can be used to determine how much of the video data stream to include before and after the event markers. (See para [0052])
Limitation 20 - a mount for the camera	Satisfied. Vanman teaches that the camera is mounted on a vehicle. (See para [0002][0004], [0065])
Limitation 23 - a method of processing imaged data from a camera	Satisfied. Vanman teaches encoding and decoding imaged data from the camera. (See para [0024]-[0029])
Limitation 24 - receiving a stream of the imaged data	Satisfied. Vanman teaches receiving a data stream of the imaged data. (See para [0024] - [0029])
Limitation 25 - recording the stream into available portions of a circular buffer	Satisfied. Vanman teaches recording the stream into available portions of a circular buffer. The entire hard drive of Vanman is an “available portion” that is continuously overwritten. (See para [0058])
Limitation 27 - a subset of the newly recorded portion is recorded before the signal is received	Satisfied. Vanman teaches archiving a data stream that was recorded ten minutes prior to the event start point. (See para [0040])
Limitation 32 - the signal to save a recording comprises a signal to start recording and a signal to stop recording	Satisfied. Vanman teaches record triggers that act as signals to save a recording with an event to start recording an event to stop recording. (See para [0040], [0043], [0054])
Limitation 33 - receiving the signal to save a recording through a manually operated switch	Satisfied. Vanman teaches receiving a signal to save a recording through an operator pressing a RECORD key on a control panel. (See para [0052])
Limitation 35 - configuring the size of the pre-recorded subset	Satisfied. Vanman teaches configuring how much of the video data stream to include before and after the event markers. (See para [0052])

**b) Applicant's Admissions Regarding
EP 1,064,783 (Mann)**

43. The applicant described EP 1,064,783 (Mann) as follows (EX1015, 100):

Mann teaches a portable electronic camera system that is wearable on the body, specifically eyeglasses. The camera has a memory with a circular buffer that is constantly recording, and a user can record data recorded 5 minutes in the past by activating a chording keyboard on the user's belt. The camera can also wirelessly transmit data to a television or a computer device. Mann, however, fails to teach protecting segments of the circular buffer or overwriting only unprotected segments of the circular buffer. When the record function is activated, the camera must either wirelessly transmit the data, or the buffer will be overwritten. Additionally, it appears that the system of Mann has a memory that is wirelessly connected to the camera instead of locally attached to the camera.

44. The applicant admitted that EP 1,064,783 (Mann) discloses many of the claim limitations (*id.*, 100-106):

Claim Limitation	EP 1,064,783 (Mann)
Limitation 1 - a surveillance apparatus	Satisfied. Mann teaches a wearable camera. (<i>See</i> para [0015], [0017], [0049])
Limitation 2 - a camera that has an image capturing component that captures images	Satisfied. Mann teaches recording images and processing digital signals, which implicitly teaches capturing those images with an image capturing component. (<i>See</i> para [0015], [0017], [0051]-[0052])
Limitation 3 - a camera that captures images and converts the images into a data stream	Satisfied. Mann teaches recording images and processing digital signals, which implicitly teaches converting those images into a data stream. (<i>See</i> para [0015], [0017], [0051]-[0052])

Claim Limitation	EP 1,064,783 (Mann)
Limitation 4 - a local memory functionally connected to the camera	Satisfied. Mann teaches a storage device on a computer that is functionally connected to the camera. (<i>See</i> para [0058], [0065], [0077])
Limitation 6 - a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory	Satisfied. Mann teaches a recording facility that continuously records a data stream from the camera into available portions of a circular buffer in the storage device. (<i>See</i> para [0058], [0065])
Limitation 8 - a pre-recorded subset of the segment is recorded before the signal is received	Satisfied. Mann teaches that the recorded segment contains a recording starting from 5 minutes prior to the time the record button was pressed. (<i>See</i> para [0065])
Limitation 10 - the pre-recorded subset is at least 5 seconds long	Satisfied. Mann teaches that the pre-recorded subset is 5 minutes long. (<i>See</i> para [0065])
Limitation 11 - the recorded segment is at least 10 seconds long	Satisfied. Mann teaches Mann teaches that the pre-recorded subset is 5 minutes long. (<i>See</i> para [0065])
Limitation 14 - an interface through which a human can initiate the signal	Satisfied. Mann teaches an Emacs interface through which a human can initiate the signal to record. (<i>See</i> para [0063]-[0065])
Limitation 20 - a mount for the camera	Satisfied. Mann teaches that the camera could be mounted on a pair of eyeglasses. (<i>See</i> para [0007], [0039], [0047], [0056]-[0060], [0098] and corresponding Figures 1 and 6)
Limitation 21 - the mount is a pair of wearable glasses	Satisfied. Mann teaches that the camera could be mounted on a pair of eyeglasses. (<i>See</i> para [0007], [0039], [0047], [0056]-[0060], [0098] and corresponding Figures 1 and 6)
Limitation 23 - a method of processing imaged data from a camera	Satisfied. Mann teaches recording images and processing digital signals from a camera. (<i>See</i> para [0015], [0017], [0051]-[0052])
Limitation 24 - receiving a stream of the imaged data	Satisfied. Mann teaches recording images and processing digital signals, which implicitly teaches converting those images into a data stream. (<i>See</i> para [0015], [0017], [0051]-[0052])

Claim Limitation	EP 1,064,783 (Mann)
Limitation 25 - recording the stream into available portions of a circular buffer	Satisfied. Mann teaches recording the data stream into available portions of a circular buffer. The entire memory of Mann seems to be the circular buffer. (<i>See</i> para [0017], [0058], [0065])
Limitation 27 - a subset of the newly recorded portion is recorded before the signal is received	Satisfied. Mann teaches that the recorded portion was recorded 5 minutes before the signal to record is received. (<i>See</i> para [0065])
Limitation 33 - receiving the signal to save a recording through a manually operated switch	Satisfied. Mann teaches that the signal to save a recording is received through a chording keyboard worn on the wearer's waist. (<i>See</i> para [0064])

**c) Applicant's Admissions Regarding
US 5,523,799 (Hattori)**

45. The applicant described US 5,523,799 (Hattori) as follows (EX1016, 106):

Hattori teaches an image memory apparatus that continuously writes new images into a circular buffer. A user can write-protect parts of the circular buffer that has been previously recorded to prevent the device from overwriting those portions of the buffer. Hattori, however, does not teach that there is a wireless transmitter that transmits write-protected portions to a remote memory.

46. The applicant admitted that US 5,523,799 (Hattori) discloses many of the claim limitations; in the applicant's own words (*id.*, 106-112):

Claim Limitation	US 5,523,799 (Hattori)
Limitation 1 - a surveillance apparatus	Satisfied. Hattori teaches an apparatus that records images. (<i>See</i> C2/L8-50)

Claim Limitation	US 5,523,799 (Hattori)
Limitation 2 - a camera that has an image capturing component that captures images	Satisfied. Hattori teaches a camera that captures images and converts the analog stream into a digital stream. (See C3/L21-31)
Limitation 3 - a camera that has a converting component that converts the images into at least one data stream	Satisfied. Hattori teaches a camera that captures images and converts the analog stream into a digital stream. (See C3/L21-31)
Limitation 4 - a local memory functionally connected to the camera	Satisfied. Hattori teaches a multi-port random access memory functionally connected to the camera. (See C3/L26-28 and corresponding Figure 2, element 12)
Limitation 6 - a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory	Satisfied. Hattori teaches a recording facility that continuously records the data stream into available portions of a ring memory in the memory. (See C3/L57-C4/L11, and corresponding Figures 1 and 2)
Limitation 7 - a protecting facility that responds to a signal to record by designating a segment of the circular buffer as a write-protected portion	Satisfied. Hattori teaches a protecting facility that responds to a signal to record by designating a recorded segment of the ring memory as a write-protected portion. (See C3/L62-C4/L2)
Limitation 8 - a pre-recorded subset of the segment is recorded before the signal is received	Satisfied. Hattori teaches that the segment is recorded before the signal to record is received. (See C3/L62-C4/L2)
Limitation 23 - a method of processing imaged data from a camera	Satisfied. Hattori teaches a method of processing imaged data from a camera. (See C2/L8-50)
Limitation 24 - receiving a stream of the imaged data	Satisfied. Hattori teaches receiving a stream of the imaged data. (See C3/L21-31)
Limitation 25 - recording the stream into available portions of a circular buffer	Satisfied. Hattori teaches recording the data stream into available portions of a ring memory. (See C3/L57-C4/L11, and corresponding Figures 1 and 2)

Claim Limitation	US 5,523,799 (Hattori)
Limitation 26 - responding to a signal by write-protecting a newly recorded portion of the buffer	Satisfied. Hattori teaches responding to a signal to protect data by write-protecting a previously recorded portion of the ring memory. (<i>See</i> C3/L62-C4/L2)
Limitation 27 - a subset of the newly recorded portion is recorded before the signal is received	Satisfied. Hattori teaches that the protected segment is recorded before the signal to record is received. (<i>See</i> C3/L62-C4/L2)
Limitation 35 - configuring the size of the pre-recorded subset	Satisfied. Hattori teaches that the size of the memory address area for the ring memory can be arbitrarily set. (<i>See</i> C4/L1-2)

d) Other Admissions Made By The Inventors During Prosecution Of The Stellar Patents

47. During the prosecution of U.S. Patent Application No. 12/268,286, the applicant further described the invention being claimed as follows (EX1013, 112):

The current invention is directed to a method and apparatus for continuously recording image information so that a user can both save recorded segments in the circular buffer and also offload the recorded segments wirelessly to a second memory. This dual utility is very important because while it's preferable to wirelessly offload recorded segments to a second memory location, it's not always feasible to do so when wireless connections are sporadic and inconsistent in certain areas. Therefore, it is very important that when a wireless connection is unavailable that the user of the camera can prevent certain portions of the circular buffer from being overwritten.

48. The applicant further admitted during the prosecution of U.S. Patent Application No. 12/268,286 that a host of claim features and limitations were “not separately patentable” (*id.*, 89-92):

Claim 2 limits the surveillance apparatus of claim 1 to further comprise having a pre-recorded subset that is at least 5 seconds long. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 3 limits the surveillance apparatus of claim 1 to further comprise having a pre-recorded subset that is at least 10 seconds long. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 4 limits the surveillance apparatus of claim 1 to further comprise a sensor that automatically initiates the signal to record that triggers based upon content in one or more images captured from the camera. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 5 limits the surveillance apparatus of claim 1 to further comprise an interface through which a human can initiate the signal. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 6 limits the surveillance apparatus of claim 1 to further comprise an interface through which a person can designate how long either the pre-recorded section is, or the post-recorded segment is. This claim is

considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 9 limits the surveillance apparatus of claim 1 to further comprise a mount for the camera. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 10 limits the surveillance apparatus of claim 9 to further comprise that the mount is a pair of wearable glasses. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 15 limits the method of claim 12 to further comprise that the signal comprises a signal to start recording and a signal to stop recording. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 16 limits the method of claim 12 to further comprise receiving the signal to save a recording through at least one of a manually operated switch and an audio signal. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

Claim 17 limits the method of claim 12 to further comprise configuring the size of the pre-recorded subset. This claim is considered to be not separately patentable beyond the limitations contained in the parent claim.

3. Pre-Event Recording Or Record-After-The-Fact Was Well Known In The Art

49. Prior to the alleged invention, it was known in the art to use a ring or circular buffer to record pre-event data such as shown in the following exemplary references:

U.S. 5,996,023 (“Winter”) (EX1005), issued November 30, 1999:

The parent patent application discloses an additional strategy, referred to as pre-alarm buffering, which also promotes efficient use of limited signal storage capacity. The basic concept is that the respective video streams generated by some or all of the cameras connected to the recorder are not usually selected for permanent storage. Instead, a ring buffer is provided to record the signal streams at a given (perhaps shared) field rate for a limited period of time, say one minute. If a significant event is detected, such as tripping of an alarm sensor, actuation of an alarm condition by a human operator, or detection of a predetermined characteristic of an incoming image stream by machine analysis of the image stream, then the video signal stream in the ring buffer, which would normally have been overwritten, is preserved for permanent storage. Pre-alarm buffering represents a desirable compromise which avoids devoting permanent storage capacity to large quantities of uninteresting information, while increasing the likelihood that significant information will be permanently recorded. The present application is concerned with techniques for efficiently managing pre-alarm buffering operations.

Winter at 1:50-2:4.

According to a first aspect of the invention, there is provided a video data storage apparatus, including a plurality of video cameras, each generating a respective stream of video signals; conversion circuitry, connected to the plurality of video signals, for selectively converting the streams of video signals into respective streams of video data signals; a circular data buffer for selectively storing ones of the streams of video data signals subject to overwriting by more current video data signals; a main data store for selectively storing ones of the streams of video signals and for writing the video data signals in the main data store to a removable archive recording medium; a detection circuit for detecting an alarm condition; and a control circuit for selecting between a first process and a second process different from the first process, on the basis of the alarm condition detected by the detection circuit, the first and second processes both being processes for transferring a stream of video data signals from the circular data buffer to the main data store. According to this aspect of the invention, the circular data buffer and the main data store may respectively include first and second portions of a hard disk drive. Moreover, the first process may include reading the stream of video data signals to be transferred from the circular data buffer and rewriting that stream of video data signals to the main data store, and the second process may include designating the first portion of the hard disk to be a portion of the main data store.

Id. at 2:12-38.

U.S. 2003/0151663 (“Lorenzetti”), attached as Appendix B (included in EX1041), published August 14, 2003:

An in-car video apparatus and method is provided where a real time (i.e., “live”) continuous video stream supplied by a vehicle-mounted camera is processed for storage in a memory in a time-sequential manner for a pre-set time interval to create a time-delayed video stream. Upon activation by a law enforcement officer (which occurs at an arbitrary reference time), a vehicle-mounted recording device records the time-delayed video stream to create a video recording of the events captured by the video camera. Because the time-delayed video stream is recorded rather than the real time video stream, the start time of the video recording precedes the reference time by the pre-set time interval. The invention thus provides an ability to record an event after it has already occurred.

Lorenzetti at [0009].

The invention provides many advantages. By buffering the real time video and audio streams to create the time-delayed video and audio stream, the officer has a period of time equal to the pre-set time interval to react to a witnessed event, such as a traffic infraction, and activate the video recorder. For example, if the time-delay is six seconds, then the officer is provided with up to six seconds in which to activate the video recorder and still be able to record the witnessed event on videotape. Accordingly, the invention provides a complete record of a police-citizen encounter, including the initial incident, event or behavior that captured the officer’s attention in the first place. The odds that evidence supporting probable cause is contained in the videotaped record are thus greatly enhanced.

Lorenzetti at [0012].

50. Furthermore, “the big selling point for digital video is a feature with the mundane name of ‘pre-event recording.’” Special Report: The Patrol Video Project, LAW and ORDER, July 2004 at 2 (EX1007).

Here’s your scenario: you are sitting at a traffic light, car in drive and brain in neutral, when the light changes to green for traffic in your lane. You start to move forward when Maladroit Leadfoot blows through the intersection two seconds behind the red light, giving you the one finger salute as he passes by. You shift the lightbar into Christmas Time, go after and catch Maladroit, but wouldn’t it be grand if his performance in the intersection was available for the traffic court judge to see? Well, on reviewing the recording that was initiated when you turned on the lightbar, for example, you find that it begins with 20 seconds or so of dull intersection-watching, when Mr. Leadfoot makes his breathtaking entrance, and your brief pursuit and stop follows. How can this be?

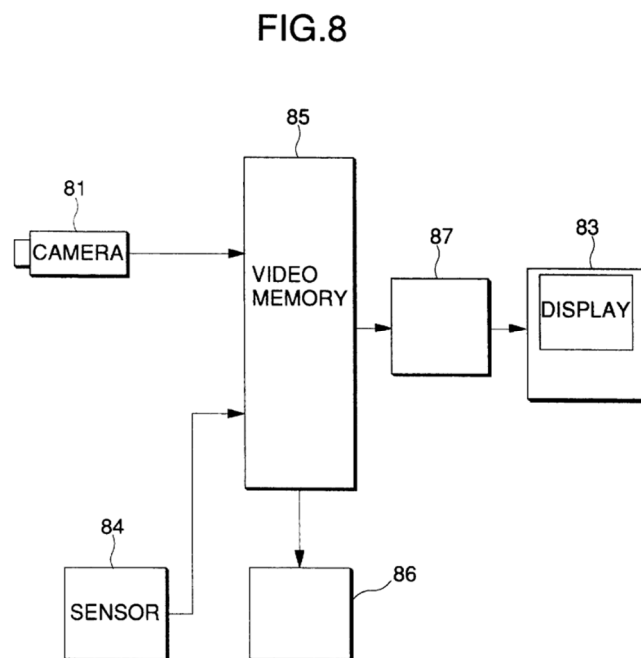
Most of the new digital patrol video systems are in a passive recording mode whenever there is power to the system. The recording is captured by a solid-state memory chip with a capacity of anywhere from 10 seconds to five minutes, depending on the system setting and the manufacturer. This means the last 10 seconds to five minutes is always available to the system.

When the officer puts the system into record mode, the contents of that memory device are dumped to the recording medium, and everything else that follows is appended to the end of that sequence. Thus, any recording made by the officer will actually start 10 to 600 seconds before he commands the system to record. The sudden lane change of the DUI, the

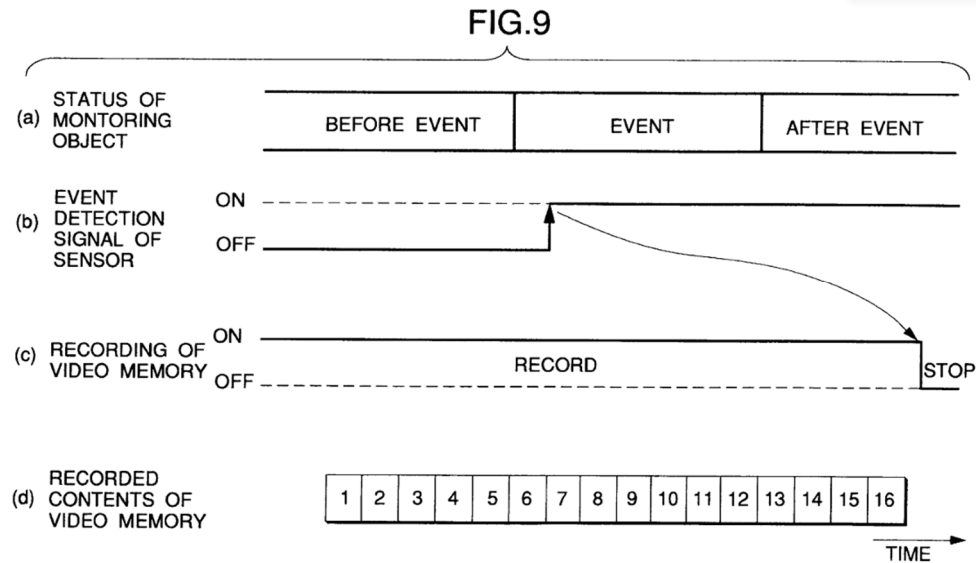
suicidal pedestrian who walks out in front of you, the idiot who blows through the red light are all recorded for introduction in court. It's a beautiful thing.

Id.

51. Further, U.S. 6,167,186 (“Kawasaki”) (EX1008) explains that “FIG. 8 is a block diagram of a video recording device disclosed in JP-A-2-132599.” Kawasaki at 1:29-30. “FIG. 9 is a timing chart of the operation of the device.” Kawasaki at 1:30-31.



Id. at Fig. 8.

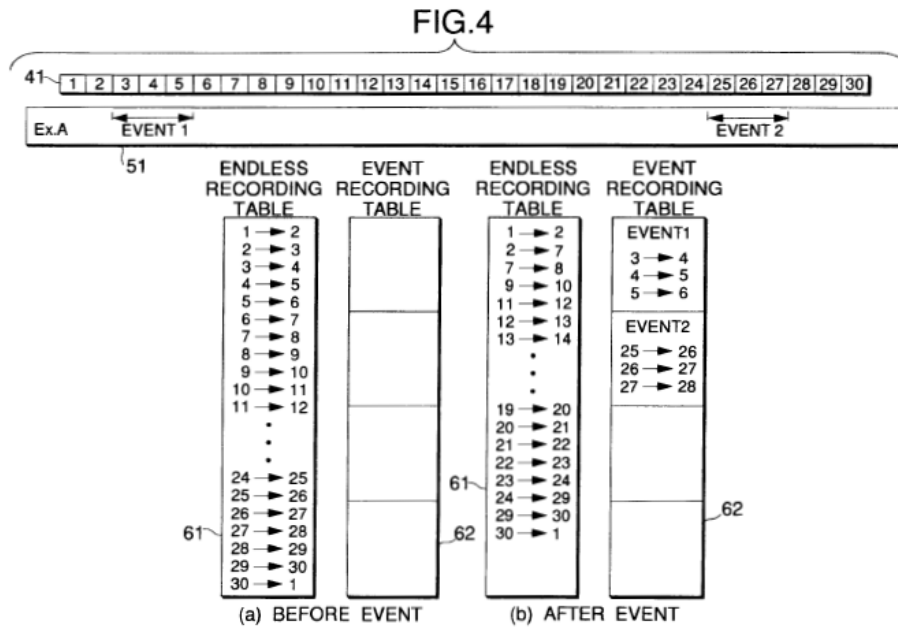


Id. at Fig. 9. “In this video recording device, a video image inputted from a camera is recorded in a video memory 85 and the recording of the video memory 85 is stopped at a timing responding to an input from a sensor 84, and the video image before and after the sensor 84 produces an event detecting signal that can be displayed.” *Id.* at 1:31-36. “However, since the recording is stopped in response to the signal from the sensor, when the next events occur successively, the video image before and after the event cannot be stored.” *Id.* at 36-39. “Although the device disclosed in JP-A-2-132599 can review the status before and after the event, it cannot deal with another subsequent event since it stops recording during the period.” *Id.* at 1:59-62. “The [Kawasaki] invention has been accomplished to solve the above problem and intends to provide a device which can always record the video image inputted in real time and reproduce the image recorded last without stopping the recording.” *Id.* at 1:65-2:2. It further discloses “a system which can preserve the video image (recorded event image) before and after the

event recorded in the video recording device has occurred, as historical record of video information for a long time.” *Id.* at 2:6. Specifically, “[i]n the video recording device, the successive recording control unit records the video data from the temporary memory unit in endless recording mode and in accordance with an external event signal, it excludes a recording area correlated with the event signal from the area subjected to the endless recording so that it is managed as an event recording area.” *Id.* at 2:15-21.

Now referring to FIG. 4, an explanation will be given of a method of the processes of recording and reproducing in the successive recording control unit 6. Reference numeral 41 shows the state where the successive recording unit 5 is divided into a plurality of blocks (30 blocks in this example) labeled block numbers (pointers), respectively. Reference numeral 51 denotes a time zone of events which have occurred during the successive recording. The successive recording control unit 6 includes an endless recording table 61 and an event recording table 62, and manages the numbers of the blocks on which the digital video image is to be recorded as shown in part (a) of FIG. 4. The notation “1-2” in the part (a) represents that the recording block successive to block No. 1 is block No. 2. By provision of such a recording table, the blocks are overwritten in order from the block with an older record.

Id. at 4:30-45.



Id. at Fig. 4. “Next, an explanation will be given of the operation when the successive recording control unit 6 receives an event signal from the event signal inputting unit 7.”

Id. at 4:39-48. “Now it is assumed that the event signal is inputted while the recording is made at the position of block No. 4.” *Id.* at 4:48- 50. “In this case, the video image from block No. 3 with a previously recorded image to block No. 6 with a video image after the event will be managed as an event video image.” *Id.* at 4:50-53.

Since the present invention always executes the recording in a manner of endless recording, the video image inclusive of the video image prior to inputting of the event signal can be managed as an event video image. Thus, event No. 1 will be managed on the event recording table as shown in part (b) of FIG. 4. Event No. 2 will be managed similarly. Now if only the event recording table is updated as it is, the event video images are overwritten to disappear at a period of endless recording. For this reason, the endless recording table must be also modified. As shown in the part (b), notation “2-7” represents that the block Nos. 3, 4, 5 and 6 are

excluded from the loop of the endless recording. Likewise, notation “24-29” saves the event video image of event No. 2 from the endless recording. In this way, in the endless recording area, the recording area correlated with the event signal will not be thereafter used as an endless recording and not overwritten so that the event video image will be held for a longer period than the endless recording period.

Id. at 4:53-5:4. “Since the event video image when an event occurs needs not to be transferred to a separate area, the access time in the successive recording unit can be efficiently used so that the event video image can be reproduced with a sufficient allowance.” *Id.* at 7:4-9.

52. Additionally, U.S. 7,804,426 (“Etcheson”), attached as Appendix C (included in EX1041), disclosed a “System and method for selective review of event data” including “pre-event data”:

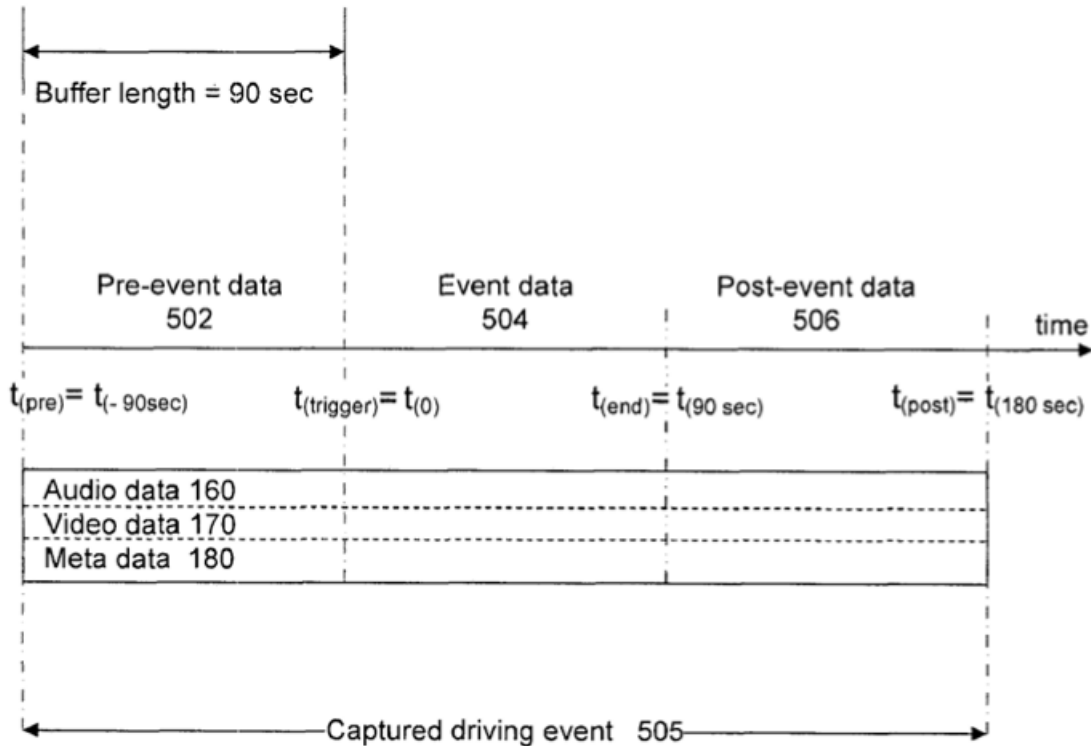
Systems and methods for computer assisted cueing and selective reviewing of driving data in order to save time in the data review process are provided. The method allows identifying essential portions of the data, selecting the essential portions, reviewing the selected data and retrieving additional data leading to the event if necessary. At least one event capture device continuously captures data into a buffer. The data are sent to an event detector communicatively coupled to the event capture device only when the event detector requests them. After receiving the data, the event detector selects and indexes a pre-event portion, during-event portion and post-event portion, combines the portions of captured data into a single driving event record and sends the

driving event record to the evaluation server. From the server, the driving event record is sent to the analysis station for review and analysis.

Abstract.

In one embodiment, the event detector is configured to create metadata tags, and use those tags to index the beginning and the end of the pre-event data, event data and post-event data. For example, the beginning of the pre-event data can be indexed with a pre-event time tag set to the beginning of the pre-event data, whereas the end of the pre-event data can be indexed with a trigger time tag set to the end of the pre-event data. Similarly, the beginning of the event data can be indexed with the trigger time tag set to the beginning of the event data, whereas the end of the event data can be indexed with an end time tag set to the end of the event data. Correspondingly, the beginning of a post-event data can be indexed with the end time tag set to the beginning of the event data, whereas the end of the post-event data can be indexed with a post-event time tag set to the end of the post-event data.

Id. at 5:49-63.



In the embodiment illustrated in FIG. 4, a captured driving event or driving event record 505 comprises three consecutive buffers of collected data. Each buffer is indexed using metadata tags and then concatenated to form the event 505. More specifically, the pre-event data 502 was collected during a period of time which started at a “pre time” (indicated as $t_{(pre)}$) and ended at the trigger time (indicated as $t_{(trigger)}$). Similarly, the event data 504 was collected during a period of time which started at the trigger time (indicated as $t_{(trigger)}$) and ended at an “end time” (indicated as $t_{(end)}$). Correspondingly, the post-event data 506 was collected during a period of time which started at the end time (indicated as $t_{(end)}$) of the event data and ended at a “post time” (indicated as $t_{(post)}$). Then, the pre-event data 502 was concatenated with the event data 504 and with the event data 506.

Id. at 6:1-15.

53. As another example, U.S. 2006/0077256 to Silvernail (“Silvernail ’256”) discloses a “High Resolution Pre-Event Record System” that uses a circular buffer to record pre-event data:

The High Resolution Pre-Event Record system is an innovative means for collecting audio, video, and meta-data in a mobile vehicle platform and continuously recording this information stream to a high-capacity storage device at different levels of data resolution based upon the status of a trigger event. The occurrence of a trigger event will cause the system to store higher resolution data to an on-board high-capacity storage device prepended by a configurable amount of high resolution data previously recorded into a pre-event data buffer. The data stream may later be downloaded to an external storage device for future review and analysis.

Silvernail ’256 at Abstract.

Simultaneously, a high-resolution data information stream is being recorded from Camera 1 201 through data encoding means within a DSP 100 and into a circular buffer of configurable length, called the Pre-event buffer 310. The length of the buffer may be set to store between 1 and n number of seconds (n is typically between 30 and 180) of data information stream files based upon the needs of the user. This guarantees that only a fixed amount of storage in the HCS 300 will be consumed by the larger data information stream files generated by high-resolution recording. When the end of the data buffer 310 is reached, the data information stream files are written to the beginning of the buffer 310 once again, overwriting the previous data information stream files and progressing through the buffer 310 once again in circular fashion.

Id. at [0024].

54. U.S. 2007/0035632 to Silvernail (“Silvernail ’632”) is entitled “Mobile Digital Video Recording System” and likewise discloses a circular buffer for recording pre-event data:

In normal mode, the low-resolution integrated data stream is saved to the on-board high-capacity storage device in non-erasable data files, and the high-resolution integrated data stream is saved to a portion of the high-capacity storage device that has been constructed as a ring buffer with a configurable storage limit. The storage limit may be set to hold between 1 and 180 seconds of continuous recording of the high-resolution integrated data stream. At the end of the configurable storage limit, the data stored at the beginning of the buffer is overwritten with the most current data from the integrated data stream. This process continues with the most current data overwriting the next position in the buffer such that the buffer always contains the most recent recording of the integrated data stream. This circular buffer therefore contains the most recent 1 to 180 seconds of the high-resolution integrated data stream.

Silvernail ’632 at [0010].

55. Prior to the alleged invention, it was known in the art to use a record after-the-fact feature such as the following exemplary references:

U.S. 2002/0131768, published September 19, 2002 (“Gammenthaler 1”), attached as Appendix D, and U.S. 2004/0201765 (“Gammenthaler 2”), attached as Appendix E (both included in EX1041), published October 14, 2004:

However, the embodiment of FIG. 2 has the additional capability to record after-the-fact events which the officer may have missed because the record mode was not on when the event occurred. This is provided by the use of a hard disk 60 which stores all compressed video and audio data output by the compression process or the optional anti-tampering circuit at all times regardless of whether tape recording mode is on or off. This system also has the ability to record data from either of two-different video cameras, one of which may be wireless, and either of which may be selected and the ability to record audio from either of two different microphones, one of which may be wireless, and either of which may be selected.

Gammenthaler 1 at [0046]; *see also* Gammenthaler 2 at [0045]; U.S. 7,190,882, filed March 19, 2001.

All the data on line 100 is continuously recorded on a 15 gigabyte hard drive 60 which is used as a FIFO memory. Data can be archived off the hard disk 60 to the digital video tape recorder 52 via bus 102. After the fact recording to tape can be accomplished using the system controller. If an officer wants to record to tape all the events that happened in the last 10 minutes or starting from some particular time of day he remembers to be before a significant event, he can give a command via control panel 20 to the system controller 54. Part of the data continuously recorded on hard disk 60 is time of day data supplied by clock 104 and/or a frame count signal.

Gammenthaler 1 at [0055]; *see also* Gammenthaler 2 at [0054].

The system controller 55 can be controlled in this embodiment by the officer via control panel 20 to send a command to the hard disk 51 to cause it to playback all recorded data starting from a specific frame number or a specific time of day or going back from the present time by a specified number of minutes on output 57 to be archived by tape recorder 52. The hard disk then finds the appropriate data in any way and outputs it on line 57. In some embodiments, the hard disk has a cache memory in which frame number and time of data data are recorded along with the track and sector or block number on the hard disk where the corresponding video, audio and status data for that frame number and/or time of day were recorded. This provides an after-the-fact recording capability in case the officer did not have the in-car video system in record mode when some significant event happened. In alternative embodiments, since the hard disk 51 is used as a FIFO and will be overwritten when it reaches its capacity, the system controller can be programmed to automatically cause the digital video tape recorder to record all data on line 53 when the hard disk reaches capacity.

Gammenthaler 1 at [0060]; *see also* Gammenthaler 2 at [0059].

56. Additionally, U.S. 6,389,340 (“Rayner”), attached as Appendix I (included in EX1041), issued May 14, 2002 discloses using a loop buffer to capture pre-event data:

Under control of CPU 34, digital signals representing the video imagery are stored in dynamic random-access memory (DRAM) 38 that is configured as a continuous-loop buffer. CPU 34 or associated address counter circuitry defines the continuous-loop scheme by employing wrap

around memory addressing, in which the highest memory location in a predetermined addressing sequence is adjacent or next to the lowest. Incoming digitized data signals are written to memory locations in DRAM 38 in accordance with the addressing sequence until all allocated locations have been written to, at which time the data signals stored at the next location in the sequence are overwritten with further incoming data signals.

Rayner at 4:9-21.

CPU 34 monitors the digitized signals representing the acceleration data to which G-force sensors 40 and 42 are responsive. If CPU 34 determines that the acceleration data exceed a predetermined threshold that is believed to be indicative of a collision or other event that would warrant investigation, it copies data from the buffer memory to a more permanent non-volatile memory 56, such as Flash memory. Memories 38 and 56 thus together define a two-tier system, in which the first tier records data in a continuous-loop fashion, and the second tier provides more permanent storage for data in the first tier in response to a triggering event. Data stored in memory 56 in accordance with this scheme are not overwritten unless the entire system is reset by an operator. Preferably, device 10 includes security measures to prevent inadvertent or unauthorized resetting, such as placing the button (not shown) or other sole means for resetting device 10 inside enclosure 18 or in another relatively inaccessible location.

Although in the illustrated embodiment a change in acceleration data that exceeds a predetermined threshold is defined as the triggering event that causes CPU 34 to terminate data acquisition and copy the contents of

DRAM 38 to memory 56, in other embodiments a change in any other monitored sensor signal can similarly be defined as the triggering event. Also, although data acquisition can be terminated upon occurrence of the triggering event, in other embodiments data acquisition may continue after occurrence of the triggering event for some predetermined time interval. Thus, so long as a sufficient amount of pre-event data are retained and not overwritten, additional frames of video data or other sensor data can be gathered during and after the collision and stored in memory 56 following the pre-event data.

Id. at 4:57 – 5:22.

57. U.S. 6,421,080 (“Lambert”), attached as Appendix J (included in EX1041), issued July 16, 2002 discloses reusing cache memory to capture pre-event data and marking data for preservation:

The image data stored in the temporary memory just prior to detection of a triggering event qualifies as pre-event activity, and will be copied to the long-term memory along with contemporaneously or post-event image data to advantageously provide an image record of events occurring just prior to a triggering event in combination with those generated after the triggering event. This allows the image recording arrangement of the present invention to reduce the amount of image data which needs to be stored without compromising the potential usefulness of the stored image record.

Lambert at 4:41-51.

Referring now to FIG. 3, as indicated at block 202, system 12 automatically reuses the cache memory when storing data into the cache

if the list of dynamic frames has become full. More specifically, system 12 is programmed to reuse the cache by overwriting the oldest dynamic frame with a new image file when the cache is full. As shown in block 204, the last image stored in the cache is tagged to indicate that the image has not yet been copied to disk, and has not yet been marked for storage. Then, at block 206, a determination is made as to whether any ongoing enabled or triggering events use the camera that generated the latest image. If so, the image is tagged “marked for storage” at block 208. Otherwise, the process proceeds to block 210 and determines on an image by image basis whether there are currently any images stored in the cache that have been “marked for storage” but not yet stored to disk. If such an image is found, the image is then copied or written to disk, and the image file in the cache is tagged as “stored” as denoted at block 212.

Id. at 5:18-36.

58. U.S. 6,088,635 (“Cox”), attached as Appendix K (included in EX1041), issued July 11, 2000, discloses using RAM memory to capture pre- and post-event data:

The operation of the monitoring unit 400 is similar to the monitoring unit 100 with a few exceptions. The video information obtained by the camera 420 is digitized and continuously stored in RAM of the PC 410. A certain portion of the PC’s RAM will be allocated to continuous video storage and information will be continuously stored (and written over previously stored video information). The PC 410 will detect activity from the horn and brake sensor 440 and 442 and lock down (terminate) the storage of incoming video information after a predetermined period of time set by

a timer in the PC 410. This is similar to the VCR lock down operation described above, except that the PC can do this digitally in order to capture video information for a predetermined period of time associated with a railroad crossing (potential accident) event. Consequently, the RAM of the PC 410 will contain the video information of the scene for a period of time before, during and after the activity which necessitated the blowing of the horn and application of the railroad vehicle brakes.

Cox at 5:4-22.

59. U.S. 2004/0252193 (“Higgins”), attached as Appendix L (included in EX1041), published December 16, 2004, discloses a video capture buffer (e.g., RAM, RAM-disk, tape, and so on) used to record data before and after events occur:

A system for monitoring and reporting incidences of traffic violations at a traffic location is disclosed. The system comprises one or more digital still cameras and one or more digital video cameras system deployed at a traffic location. The camera system is coupled to a data processing system, which comprises an image processor for compiling vehicle and scene images produced by the digital camera system, a verification process for verifying the validity of the vehicle images, an image processing system for identifying driver information from the vehicle images, and a notification process for transmitting potential violation information to one or more law enforcement agencies. The video camera system is configured to record footage both before and after the offense is detected. The video camera system includes a non-stop video capture buffer that records the preceding few seconds of violation. The buffer holds a number of seconds of video data in memory. When an offense is

detected, a timer is started. At the end of the timer period a video clip of the current buffer contents is recorded. The resulting video clip is incorporated with the conventional evidence set comprising the digital still images of the offense with the identifying data of the car and driver.

Higgins at Abstract.

FIG. 14 is a block diagram that illustrates the main components of video camera system 122. In system 1400, video camera 1402 is a digital video camera that produces video data in PAL, NTSC or other format, which can then be processed to produce streaming video in compressed form such as MPEG, MPEG2, Quicktime, AVI, or similar formats. In one embodiment, the video camera shoots non-stop video footage of the location. The digital video data is stored in a buffer 1404, which can be any type of memory (e.g., RAM, RAM-disk, tape, and so on) that is sufficient to hold at least a portion of the video footage shot by the camera. A detection system 1406 is coupled to the video camera 1402. Upon detection of an offense, a timer 1408 is started. The timer is programmed to stop after a predetermined period of time. At the end of the timer period a clip or “snapshot” of the buffer contents is taken by video clip recorder 1410. The video clip recorder takes the video clip recorded by the video camera for the time period of the timer plus a period of time prior to detection of the offense. The buffer and video clip recorder are used to provide a clip of the offense plus moments immediately before and after the offense. Thus, in order to catch, for example, six seconds prior and six seconds after an offense is detected, the buffer 1404 holds at least twelve seconds of footage in memory. When an offense is detected, the system starts a six second timer, at the

end of which it takes a video clip of the current buffer contents and stores it to a persistent memory, such as hard drive 1412. This storage (hard drive) can also be used to store the still images of the offense. Thus, the resulting video record can be incorporated with the conventional evidence set provided by the still cameras.

Id. at [0090].

FIG. 15 is a flowchart illustrating the steps of capturing a video clip of a detected offense, according to one embodiment of the present invention. In step 1502, the video camera 1402 records a non-stop loop of video of the monitored location. This video data is buffered in buffer 1404, step 1504. The detection system 1406 detects a traffic offense, step 1506. The detection of an offense triggers a timer 1408 to start for a set period of time, step 1508. After the timer period, the timer stops, step 1510. In step 1512, the video clip recorder 1410 captures and clips from the buffer a video clip running from a set time prior to the offense to the end of the timer period. The video clip is then stored in a memory, such as hard drive 1412, and associated with the still camera data of the offense, step 1514.

Id. at [0091].

60. US 2004/0150717 (“Page”), attached as Appendix M (included in EX1041), published August 5, 2004, discloses a memory buffer that is used to record pre-event data:

A digital video surveillance system for a law enforcement vehicle comprises a video camera mounted on the law enforcement vehicle and positioned to view an incident. A memory buffer records video signals

from the video camera. A controller generates record and playback signals to record and to display the video signals. A digital video recorder is responsive to the record signal to record the video signals from the memory buffer on an optical medium and to the playback signal to reproduce video signals recorded on the optical medium. A vault encloses the digital video recorder. A battery provides backup power to the digital video surveillance system. The optical medium may be a DVD disk. A watermark may be included with the digital recording.

Page at Abstract.

The digital video surveillance system of the present invention includes a video server in a law enforcement vehicle which allows recording to various digital optical media including DVD RAM disks. Recording to these media in a moving vehicle and in all-weather conditions is possible by shock-mounting the drives and providing environmental assistance for heating and cooling a lockable protective enclosure in which the drives are encased. This system includes a memory buffer that is recording at all times. When the recorder is activated, the memory buffer contents, including video and audio, will be recorded onto the DVD RAM disk. This ensures that the activity occurring just prior to the activation of the system is recorded as well. The system further provides a method to capture or receive snapshots and output them to or receive them from a wireless transmitter such as a cellular modem for missing persons or suspect identification, for example. Forward-facing and interior cameras are mounted inside an overhead console to reduce the obstruction to the driver and to eliminate the chance of interfering with a passenger side air bag.

Id. at [0005].

The video server board 46 includes from 4 to 512 megabytes of RAM, which is used as a history buffer. The system constantly stores information from the cameras and audio input in the RAM on the video server board 46 which stores seventeen to thirty seconds of video history for a 4 Mb history buffer and up to three minutes or more for a 512 Mb history buffer depending on the resolution of the video recorded, for example. The history buffer is a circular FIFO buffer which allows events to be recorded that occurred prior to the system receiving the record command. When the record function is activated, the history buffer prior to activation is transferred to the DVD RAM drive to record the incident up to the point when the record signal was received. Data in the history buffer is transferred to the DVD RAM disk at a data rate of approximately 2.7 Mb per second. If the history buffer is full when recording starts, this transfer occurs in approximately three minutes, for a 512 Mb history buffer. Thereafter, video and audio data is collected in the history buffer before being transferred to the DVD RAM disk in packets. When the stop recording command is received, the final five to six seconds of data in the history buffer is transferred to the DVD disk and recording on the disk is stopped. Data continues to accumulate in the history buffer after recording stops.

Id. at [0046].

4. Body-Worn Cameras Were Known In The Art

61. Prior to the alleged invention, it was known in the art to use a body-worn camera in conjunction with an in-car video system. For example, the CopCam by

Semco Corporation included a body-worn camera that is worn at chest level. POLICE VIDEO Up Close and Personal, LAW and ORDER, August 1999 (“Police Video”) at 1-2, attached as Appendix N (included in EX1041). “CopCam...uses technology developed in military applications. *Id.* at 1. “Semco brought the system to law enforcement with the idea of recording not just a car-mounted view but also what the officer was seeing.” *Id.* “[T]he in-car video system is actually a combination of two separate video systems that interact with each other.” Sheriff Baca Introduces In-Car Video System and “Cop-Cam,” County Digest (Country of Los Angeles), March 2000 (“Cop-Cam”) at 7, attached as Appendix O (included in EX1041). “The first is the ‘Car-Cam’ system, in which the video camera is mounted in the patrol vehicle, taping the incident through the front windshield.” *Id.* “The second is the ‘CopCam’ system, in which the video camera is mounted on the deputy’s chest, videotaping the incident from the deputy’s viewpoint.” *Id.* “When activated, this system has the ability to tape incidents as they happen, regardless of where they occur in relation to the patrol car.” *Id.*

62. “[Sgt. Craig Carter, Escondido, CA Police Department] explained, ‘The unit we have has a camera in the car and a camera on the lapel of the officer. The officer can switch between the cameras. The result is, you use the system more often than if it was just in the car. For instance, in a domestic violence situation, you can go into a house and transmit back to the car’” Police Video at 1. “The camera lens is

now attached to the lapel of the shirt, and there's a vest with transmitter and battery worn under the shirt." *Id.*



Id. at 1-2.

Here's how the new system could work in a real world example. An officer spots a car being operated in an erratic manner. The in-car camera starts to record the driver's actions. As the car stops, the officer taps a button to activate the auto-zoom feature. The unit zooms in, focuses on the vehicle's license plate, and then zooms back out to record the full scene as the officer approaches. ... At the driver's window, the officer can choose to activate his body camera. If he does so, the recording unit in the patrol car automatically switches to receive the signal of the camera worn by the officer. The camera, worn at roughly chest level, records a clear picture of the faces of vehicle occupants as well as the interior of the car.

Let's assume that the officer obtains consent from the driver to search the car (all recorded on tape) and, as a result, finds a hand gun under the front seat which turns out to be stolen.

The value of this type of information is obvious. “I had a case where I had a consensual search but the suspect later recanted in court” Carter said. “When you can show it on video, it really helps. The same thing applies to traffic tickets. Once I’m at the window, I have a picture of the driver’s face and I have a recording of anything he says.”

Id. at 2. “If we go into a house looking for a suspect, as in the service of a search warrant, that’s different and the videotape can be invaluable.” *Id.* at 3.

63. Another example is the Deja View Camwear Model 100. Deja View Camwear Model 100, CARPE’04, October 15, 2004, Attached as Appendix P (included in EX1041). The Camera 100 is a wearable, hands-free camcorder used to capture and save events. *Id.* at 1. The small size of the camcorder allows for “easy attachment to eyeglasses or the bill of a hat.” *Id.* at 1. The Camwear Model 100 has an “always-on scanning feature feeds a continuous video stream into the control unit. Although users may not have been ready for the action that had just taken place, they can still capture up to 30 seconds of the previous action by hitting the ‘record’ button after-the-fact!” *Id.* at 1.



Id. at 2.

5. Various Memory Options For Storing Events Were Known In The Art

64. US 2005/0088521 (“Blanco 2”), attached as Appendix Q (included in EX1041), published April 28, 2005, discloses that prior systems included:

Vehicle-mounted surveillance systems, also termed in-car video systems, are seeing increased use in the security industry and law enforcement community as an effective means to provide an indisputable video and audio record of encounters involving officers and citizens. In these systems, a video camera is typically mounted on the police car’s dashboard or windshield and is generally arranged to have a field of view of the area to the immediate front of the car. The field of view approximately corresponds to what an officer would see when seated in the car’s front seat.

The video camera is operably coupled to a video recorder, such as a video cassette recorder (“VCR”) or digital video recorder (“DVR”), mounted in the police car, often in the trunk. A video recording may be started manually by the officer, or in some systems, the video recording is started

automatically when, for example, the officer activates the police car's emergency systems (such as overhead lights and/or sirens), or when a vehicle speed-measuring radar unit is operated.

Blanco 2 at [0002]-[0003].

While current in-car video systems perform very well in many applications, recording media currently used with in-car video systems, including analog video tape and digital storage media like hard disk drives, are bulky and may present storage and other logistical issues in managing the recording media. The size of recording media and associated video recorders can present space utilization issues in some vehicle models as well.

Id. at [0007]. The video resolution contributes to the file size as “[l]arge resolutions greatly inflate the size of the file that contains their information.” Special Report: The Patrol Video Project, LAW and ORDER, July 2004 (EX1007) at 22. Video resolutions of 320x240 pixels and 640x480 pixels were known in art in the context of in-car mobile video recorders. *Id.* at 5, 17. “A 640x480 image contains four times as many pixels as a 320x240 image.” *Id.* at 22.

65. Blanco 2 described the benefit of using solid state memory devices such as Flash:

An inventive system and method is provided by an in-car video system that uses a type of electrically erasable programmable read-only memory known as flash memory to store video of an incident or event. In an illustrative embodiment of the invention, a digital video recorder and

video camera are fixably mounted in a vehicle such as a police cruiser. An event of interest is captured by a camera and the resulting video stream is converted into a form that writable to a flash memory. The video recorder writes the video to flash memory to thereby store a record of the event on the flash memory as a storage medium.

Id. at Abstract. “The type of flash memory preferentially used in the illustrative embodiment of the invention is known as a CompactFlash card.” *Id.* at [0011].

Advantageously, the invention creates a robust in-car video system having a large amount of video storage combined with enhanced system packaging that is enabled through the very small form factor of the flash memory. Since flash memory is a solid state device using no moving parts, (i.e., the memory relies on the use of electronics instead of mechanical systems) it is inherently reliable.

Id. at [0012].

Flash memory may endure extreme temperatures and retains data even without a continuously applied power source. Users may easily insert and remove flash memory from the video recorder and store additional flash memory card in the vehicle in a small amount of space. Because of its extremely small size, flash memory provides efficient and dense storage and is ideal as a removable media for archiving video recordings in a storage area away from the vehicle. The use of flash memory as the recording media may also help to reduce the costs of maintaining in-car video systems because relatively fragile and complex VCRs and DVRs are eliminated from the inventive in-car video system.

Id. at [0013].

Particular advantage may be realized in many applications of the invention by using “flash memory” which is a special type of EEPROM that can be erased and reprogrammed in blocks instead of one byte at a time. This feature makes flash memory generally “faster” than other types of non-volatile memories. In accordance with the invention, flash memory is well suited to in-car video system applications as a result of this fast speed at which data can be stored and accessed.

Id. at [0021].

6. Wireless Transmission Of Files To A Remote Memory Was Known In The Art

66. Prior to the alleged invention, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory. As an example, the '034 patent characterizes WO 2006/044476 to Vanman as disclosing that in order to “save data in the buffer, the user of the Vanman device needs to transfer important portions of the buffer wirelessly to a central office or physically to a DVD disc.” '034 patent at 1:35-45. Additionally, a person of ordinary skill in the art would have known, for example, that wireless transmission of important data allows for preservation of the data while freeing up memory on the device for subsequent recordings. It also allows for summoning immediate assistance to the scene of an incident. Furthermore, particularly in law enforcement applications, it is desirable for evidence preservation to remove human interaction from the transfer of data from a recorder to a central evidence repository.

67. U.S. Pat. No. 8,350,907 (“Blanco”), attached as Appendix R (included in EX1041), “is related generally to surveillance systems, and more particularly to a method of storing digital video captured by an in-car video system.” Blanco at 1:6-8. “Referring to FIG. 1, which provides a simplified block diagram of a first method of long term video storage, a large digital storage medium 110 (for example, a hard disk drive having storage capacity of greater than 50 gigabytes) is utilized in a vehicle 120, such as a police cruiser, to record and store many hours of video.” *Id.* at 3:45-50. “The occurrence of external triggers or incidents markers such as the emergency Lights, Siren, Car door opening, etc., that may be part of the video record, may also be searched in some applications of the invention.” *Id.* at 4:37-40.

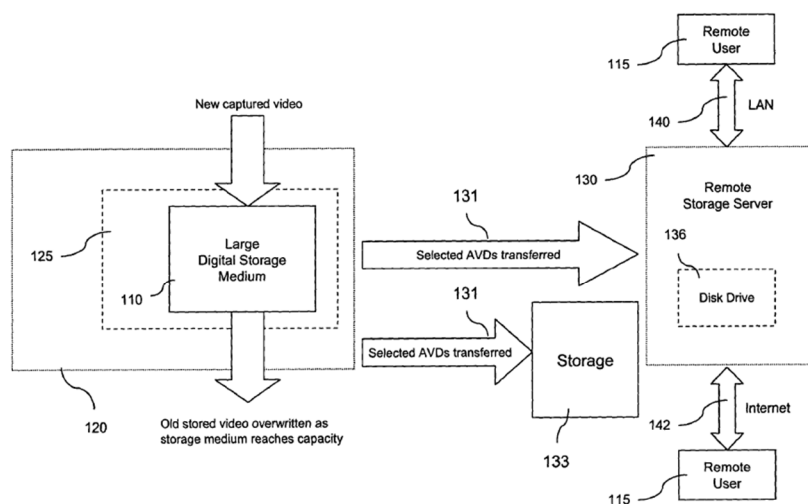


FIG 1

Id. at Fig. 1. “Typically, the large digital storage medium 110 would be incorporated into an in-car video system, designated by reference number 125 in FIG. 1 which typically includes a DVR, camera, microphone, control unit and monitor (not shown in FIG. 1).” *Id.* at 3:50-54. “Once the large digital storage medium 110 reaches its

maximum capacity, the oldest video is erased (i.e., overwritten) and its space is taken by the newest video as shown in FIG. 1.” *Id.* at 3:57-60. “[S]elected video recordings, for example those designated as being of interest or of other importance, may be transferred to conventional storage media...(collectively designated by reference numeral 131 in FIG. 1).” *Id.* at 3:62-64. Figure 3 depicts that “the removable media may be replaced with a wireless link, enabled for example, through the use of a wireless transmitter 310 as shown.” *Id.* at 4:41-44.

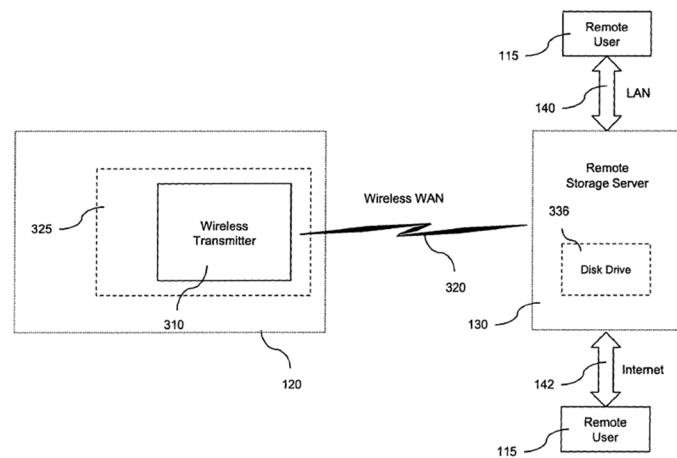
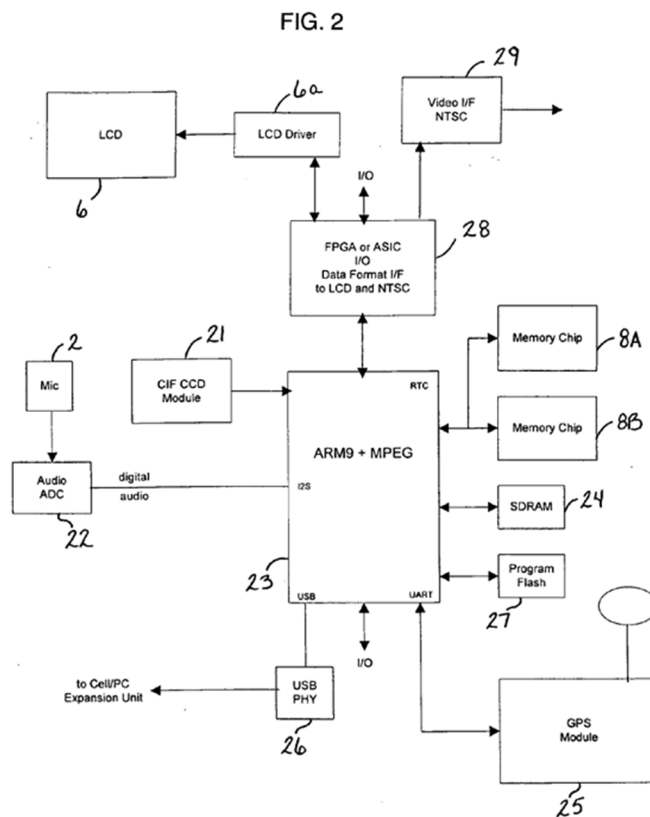


FIG 3

Id. at Fig. 3. “The video data is transferred to a storage server 130 coupled to the WAN.” *Id.* at 4:46-47. “The third method [Fig. 3] described above is often the most advantageous in many applications.” *Id.* at 4:50-51. “It often requires the least amount of interaction from the officer which can be desirable from the viewpoint of training reduction and enhanced evidence preservation.” *Id.* at 4:51-54. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

68. U.S. Pub. No. 2004/0008255 (“Lewellen”) (EX1019) is another example of wireless transmission of files to a remote memory.

69. U.S. Pub. No. 2005/0078195 (“Van Wagner”), attached as Appendix U (included in EX1041), discloses “a mobile recording device including: a flexible camera head for capturing video stream data in real time, a microphone for capturing audio data in real time, a circular buffer for continuously storing the video stream data and the audio data; and a wireless transceiver for transmitting the video and audio data in real time to a remote location.” Van Wagner at [0009]; Figs. 2, 4B.



Van Wagner at Fig. 2. “The wireless card slot utilizes existing wireless technologies, like PCcard cellular modems and 802.11 cards, to transmit video and audio as a data

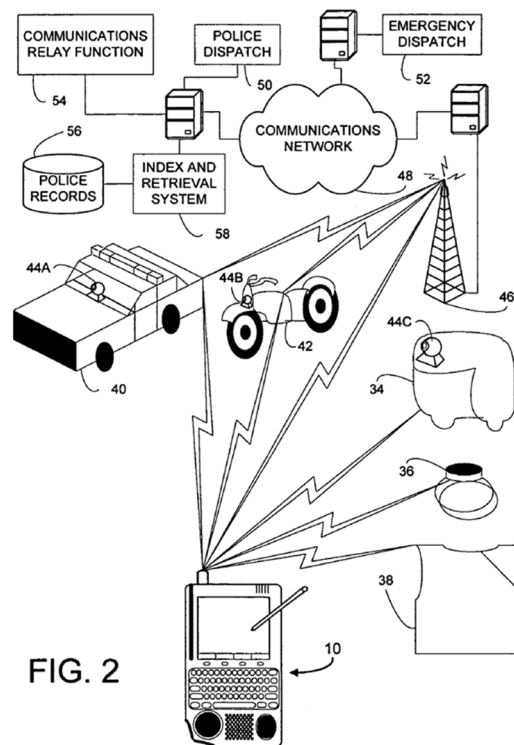
stream to a remote monitoring facility.” *Id.* at [0092]. “In one embodiment, the cellular capability is provided via an expansion module pluggable to the main unit.” *Id.* at [0071]; Fig. 3. “In this embodiment, the MPEG stream is received from the main unit via a USB interface 31 (or other interface) by the expansion module, as shown in FIG. 3.” *Id.* Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

70. U.S. Pat. No. 6,995,668 (“Junqua”), attached as Appendix V (included in EX1041), discloses “a wearable, computerized apparatus for use with law enforcement has an evidence collector adapted to collect evidentiary information of a type collected according to law enforcement procedures and useful for identification of a suspect.” 1:36-40. “A wireless communications link communicates the evidentiary information and the safety information to a centralized component of a distributed communications system to assist in identifying suspects and dispatching assistance.” *Id.* at 1:42-46. “A vehicular component having an on-site camera can receive data from the wearable, computerized component via a wireless connection, automatically activate the camera at times of stress and/or distress, and forward collected information off-site to a centralized, dispatch facility via a wireless connection. *Id.* at 1:42-52-58.

Another way that apparatus 10 can communicate with other components of the system is by using a mid-range wireless link, such as radio wave. This mid-range wireless link can be used to communicate with a

vehicular component of the system, such as a police car 40 or motorcycle 42. Thus, suspect biometric data, sensed officer reactions, stimuli, scanned input, text input, voice input and/or sounds and images from various on-site cameras 44A–C can be communicated to and from various on-site components of the distributed communications system.

Junqua at 3:12-21; Fig. 2.



Junqua at Fig. 2. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

71. U.S. Pub. No. 2001/0005217 (“Hamilton”), attached as Appendix W (included in EX1041), discloses a “device for remote information download and transfer for downloading a secure, permanent record of criminal activity and/or accident evidence relating to a vehicle for evidentiary purposes which may be ...

saved directly onto the downloading device. Hamilton at Abstract. Hamilton “contemplates an off-board downloading device for accessing information on a Recording System and for viewing and/or transferring that information to an off site location.” Hamilton at [0101]. Hamilton further discloses “the information recorded from certain monitors and transducers located on the Recording System can be downloaded by the interface 18 from hard drive 34 located on the Recording System and superimposed on recorded video information also downloaded from hard drive 34 located on the Recording System.” Hamilton at [0030]. “In a preferred aspect, the remote downloading device has at least one transceiver for accessing, downloading, and remotely transmitting information to an off site location, such as a base station, a hospital, an insurance company, law enforcement, a rescue vehicle, or the like.” Hamilton at [0015]. “The transceiver receives signals from a remote unit, such as a Recording System, which allows the device to transmit recorded and/or stored information directly from the safe box or hard drive located on the Recording System to an off site location and/or instantaneously as it is generated.” *Id.* Hamilton further discloses that the “transceiver 40 can comprise a direct satellite uplink, RF radio, modem, cell phone, or the like.” Hamilton at [0026].

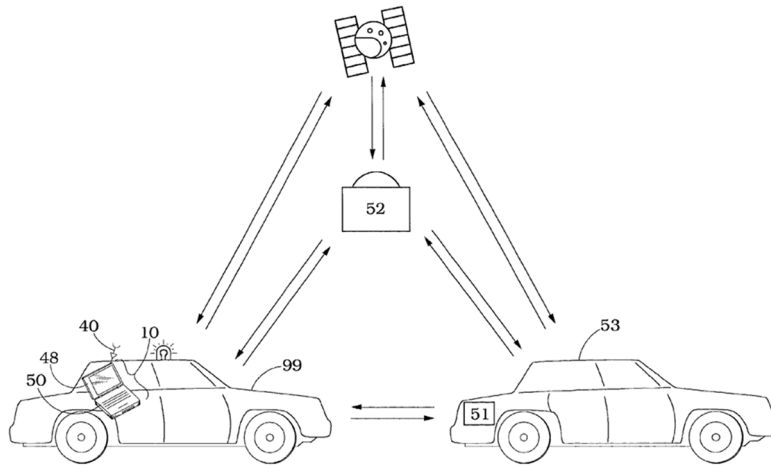


FIG. 2

Hamilton at Fig. 2. In Fig. 2, “the download device 10 is implemented in a form that is similar to that of a laptop computer with a visual display monitor 48 and keyboard 50.” Hamilton at [0031]. “The download device 10 may be self-contained with, for example, a phone jack and/or a modem hooked to a mobile phone or SET for direct satellite transmission via transceiver 40.” *Id.* “In the depicted embodiment, the Recording System 51 is located in a vehicle 53, and the download device 10 is located remotely from the Recording Systems 51 such as, for example, in a police cruiser 99.” *Id.* Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

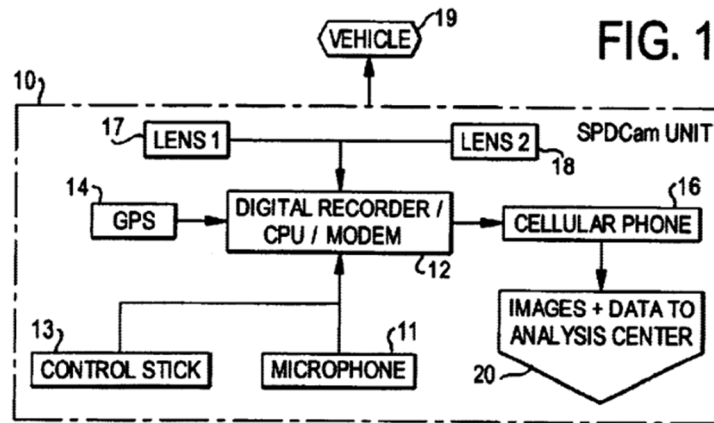
72. PCT Pub. No. WO2004/036926 (“Pearlson”), attached as Appendix X (included in EX1041), discloses “methods and systems for acquiring, storing, and distributing video and telemetry.” Pearlson at 1:28-29. “One embodiment is a recording and transmission system comprising: a recorder mountable in a police vehicle configured to record video and meta-data synchronized with the video,

wherein the recorded video includes a plurality of segments having fixed lengths, the recorder including a wireless transmitter configured to wirelessly transmit the recorded video segments and meta-data, wherein the meta-data includes: data related to vehicle status; subjective time information; objective time information; serial data.” Pearlson at 2:1-6. “One embodiment of the recorder 100 provides event-based recording that enables users to activate a recording session by either pressing a button or activating another device used as an event trigger such as a vehicle light bar, or an alarm contact or other sensor.” Pearlson at 10:3-9. “In one example embodiment, a ring buffer in a recorder, such as recorder 100, captures video, audio and data until an instruction or trigger to start the recording process occurs.” Pearlson at 8:18-21.

73. “The system includes a mobile video/audio data recorder 100 which records high quality video/audio and serial data telemetry while simultaneously transmitting specially formatted live video/audio and information to personnel using a variety of reception devices or terminals.” Pearlson at 7:3-7; Fig. 1. For example, access to and display of videos and meta-data can be provided using a standard browser...and a standard media player...executing on a personal or server computer, personal digital assistant, cell phone, and the like, thereby lowering the client cost and easing maintenance. Pearlson at 5:14-18. Pearlson further discloses that “the frame rate, bit rate and resolution for transmission can be selected based on the wired or wireless network and the receiving terminal.” Pearlson at 7:23-24. “For example, some devices, such as palm-held personal digital assistants (PDAs) and hybrid cell

phones may have limited display resolution and processor power.” Pearlson at 7:24-26. “In applications where such devices are used to view the video, such as by remote field personnel performing surveillance, the recorder 100 maintains compatibility with the target device by optionally formatting video specifically for the target device.” Pearlson at 7:26-29. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

74. U.S. Pat. No. 6,690,294 (“Zierden”), attached as Appendix Y (included in EX1041), discloses “a method for capturing images of a vehicle and/or vehicle operator suspected of a traffic violation, determining the time and geographic location of the suspected violation, transmitting the images and other data to an analysis center, issuing citations to violators and deriving revenue therefrom.” Zierden at 1:17-23. “The SPDCam system comprises a color digital imaging device (SPDCam device) connected to a global positioning satellite (GPS) system and a cellular telephone network.” *Id.* at 3:31-33. “Referring now to the detail in the drawings, FIG. 1 is a block diagram of a digital imaging device (SPDCam device) 10 for capturing the image of a target vehicle 19 that is suspected of violating a traffic law.” *Id.* at 4:11-15.



Id. at Fig. 1. “The SPDCam device 10 comprises two cameras, identified as lenses 17 and 18....” *Id.* at 4:15-16.

In operation, the lenses 17 and 18 constantly record images, with the most recent time period, e.g., 120 seconds, of images being retained in the computer memory at any given time. As new images are acquired, older ones are erased. When a target vehicle is identified, the system operator activates an ‘Event’ on the SPDCam device 10 to begin collecting data for the target vehicle. When the ‘Event’ is initiated, the prior 120 seconds of images are permanently stored, and subsequent images of the target vehicle are continuously captured and stored in the computer memory until the operator ‘Ends’ the event. GPS data and the entirety of the audio recording is retained from the start of the event to the end thereof, and stored with the images.

Id. at 5:8-20. “[S]witches may be provided for selecting between the video mode and the photographic mode of operation.” *Id.* at 5:24-25.

75. “The computer 12 processes, stores, and transmits the images and the geographic and audio data to an analysis center 20 via a cellular telephone 16.” *Id.* at

4:24-26. For example, “[a]n ‘Event’ key permanently stores the most recent 120 seconds of images while continuing to record until an ‘End/Store’ key is pressed to stop the recording of the images.” *Id.* at 5:30-33. “All the images are stored in the memory of the computer 12.” *Id.* at 5:33-34. “A ‘Submit’ key activates the cellular telephone 16 connected to the computer 12 which transmits the images and other collected data to the analysis center 20.” *Id.* at 5:39-42. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

76. U.S. Pat. No. 6,831,556 (“Boykin”), attached as Appendix Z (included in EX1041), discloses “[a] surveillance system includes a device for capturing video, audio, and data information.” Boykin at Abstract. “The device is provided in a first location, such as a vehicle.” *Id.* “A server is provided for integrating and storing the captured information in the vehicle.” *Id.* “The captured data is stored in onboard hard drives, or other storage facilities, such as flash memory, solid state memory, etc.” *Id.* at 1:50-53. “The server may be a mobile server which is capable of transmitting the captured information from the vehicle to a second location, such as a building.” *Id.* at Abstract. Boykin discloses that “data is digitally captured and processed from any one or all of the cameras for integration and storage in the mobile server 200 (see FIG. 2) of the CMDIS unit 150.” *Id.* at 3:14-17.

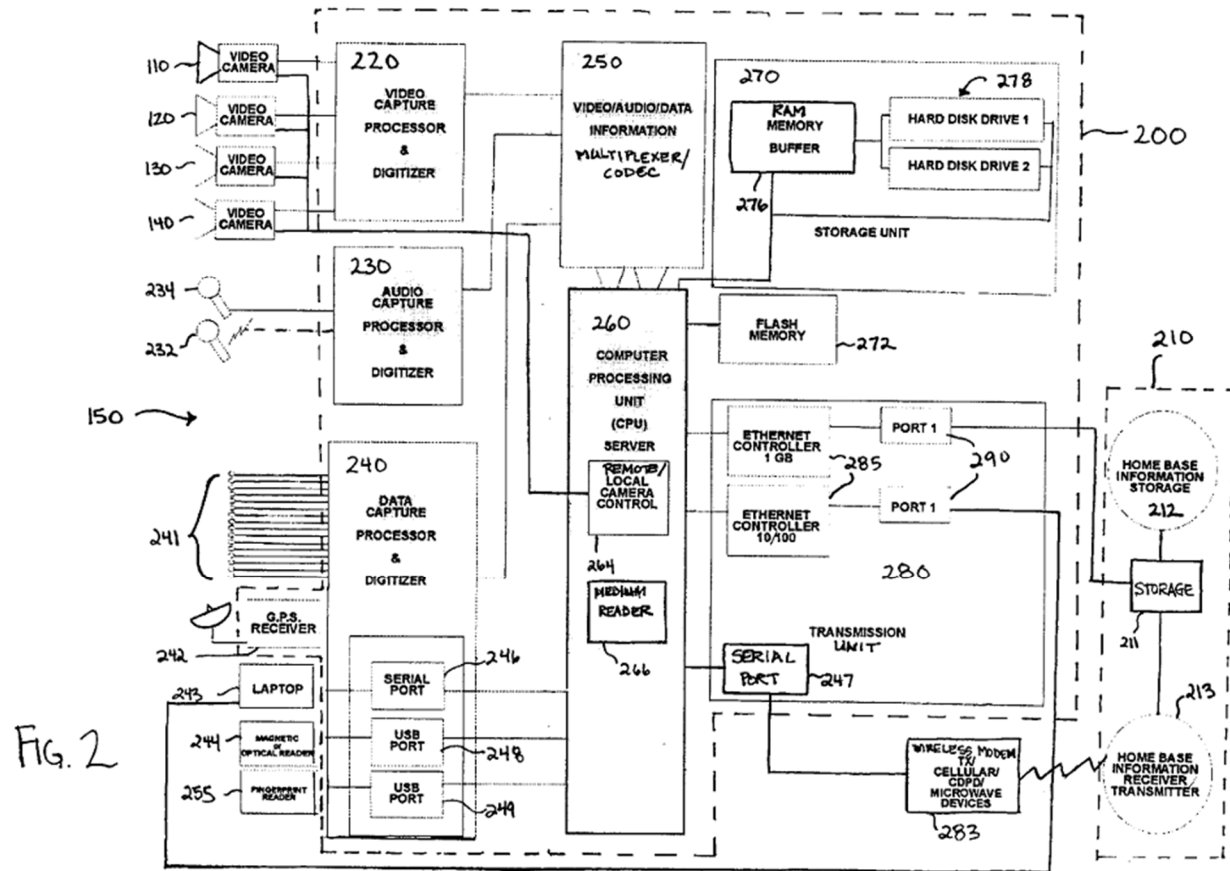


FIG. 2

Id. at Fig. 2.

77. “More specifically, the processor CPU 260 commands the RAM memory buffer 276 to transmit the stored information to the permanent storage memory, e.g., the hard drive 278, upon the triggering of a particular event.” *Id.* at 5:15-18. “Such an event may include, but is not limited to, the activation of a siren on the police car 100, the removal of a gun from its gun rack, sudden acceleration of the vehicle, etc.” *Id.* at 5:18-21. “All of the information which was recorded during the specified time and saved to the RAM memory buffer 276 is then digitally saved to the permanent storage memory, e.g., one of the two onboard hard disk drives 278.” *Id.* at 5:21-25. “Thus, the surveillance system records an event, as well as a specified time before the

event.” *Id.* at 5:25-26. “The present invention is not limited to the use of hard disk drives.” *Id.* at 5:38-39. “Solid state memory or other types of non-volatile, non-rotating memory devices may be substituted for the hard disk drives, e.g., flash, etc.” *Id.* at 5:39-41. “The invention may utilize any type of memory buffer, or may be a flash memory, etc.” *Id.* at 5:43-44.

78. “During recording and playback of the recorded data, digital coding provides tags for future search parameters.” *Id.* at 3:7-8. “For instance, searchable identification code may be embedded in the data which is associated with a particular event.” *Id.* at 3:9-10. “Thus, the data can be easily retrieved for evidentiary purposes at a later time without necessitating labor intensive searches of the recorded material.” *Id.* at 3:11-13.

79. Boykin further discloses that a “serial port 247 can be connected to receiving/transmitting device 283 (one of a variety of wireless modem, cellular, satellite, and microwave devices) that sends radio signals back to the home base or precinct 210.” *Id.* at 4:13-17. For example, “[w]hen the vehicle 100 returns to the home base 210, it is connected via a high-speed, high-capacity Ethernet controller 285 (such as a 3COM 1 GB controller) to the home base server 211 via port 290 and the digitally stored video/audio/ related information (i.e., data stream) is data dumped to a home base master storage repository 212.” *Id.* at 6:4-9. “The data can be dumped through copper wire, wireless transmission, fiber optics, laser or other means.” *Id.* at 6:9-11. “With current systems, at the end of a shift the officer is required to remove

all videotapes and turn them into a storage facility.” *Id.* at 8:5-7. “However, with the present invention, the digitally stored material is data dumped via various download devices including wireless transfer, without human contact.” *Id.* at 8:7-10. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

80. “The Patrol Video Project,” LAW and ORDER, July 2004 article describes the Ranger digital video recorder for patrol cars from Sequent. Special Report: The Patrol Video Project at 10-12. “Sequent’s system records digital video data onto a dedicated computer and hard drive located in the vehicle’s trunk.” *Id.* at 10.



Id. at 11.

They park the cars in their motor pool lot, and a 2.4 GHz Wi-Fi access point (one of three at Riverside PD) senses the presence of the car. The system queries the car’s server to see if there is video data to offload, and if the data is present, the files are downloaded wirelessly to an assembly

server located in a room adjacent to the motor pool. If the download is interrupted by the car moving out of range again, it just resumes when the car comes back again.

Once the video files have been transferred and verified, the assembly server tells the mobile unit to delete the files from its hard drive.

Sgt. Jim Walters at Riverside PD maintains that the process is smooth and requires no intervention by the officer, and that it has yet to lose any video.

Id. “Sequent is routinely transferring an hour of video from cars to the server, wirelessly, in under five minutes.” *Id.* at 12. Therefore, as of at least July 2004, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

81. U.S. Pat. Pub. No. 2002/0191952 (“Fiore”) (EX1009) is another example of wireless transmission of files to a remote memory.

82. Silvernail ’256 and Silvernail ’632 likewise disclose use wireless transmission of files to a remote memory:

Moving saved data files from the on-board HCS 300 to an exterior High-capacity storage 970 is accomplished when the mass transit vehicle stops at a facility equipped with a Transicam Video Management Server (TVMS) and high-capacity storage equipment. This transfer is accomplished in one of two methods; (1) physically removing the on-board HCS 300 from the mass transit vehicle or (2) transmitting the saved

data files from the on-board HCS 300 to the TVMS over wired or wireless data communication means.

Silvernail '256 at [0029]; *see also id.* at [0031].

The IMVDR communicates stored data files to an external high-capacity storage and retrieval server through wired or wireless communication channels. In wired mode, a user may attach an Ethernet cable to an Ethernet port integrated into the front or rear panel of the IMVDR or, optionally, retrieve the removable on-board high-capacity storage device. If an Ethernet connection is established, data files are transmitted from the on-board high-capacity storage device to the external server, which then saves the files to the high-capacity storage device on the external server. If the removable on-board high-capacity storage device is removed it is then docked with the external server and the files downloaded into the high-capacity storage device on the external server. In wireless mode, the IMDVR establishes a network communication path with an external server through the use of an integral wireless modem. Once the wireless communication path is established, data files are transmitted from the on-board high-capacity storage device to the external server, which then saves the files to the high-capacity storage device on the external server.

Silvernail '632 at [0013]. Therefore, it was known to have a wireless transmitter functionally coupled to a local memory used to transmit files to a remote memory.

7. Treating Memory Loop as a Single File Was Known In The Art

83. Prior to the alleged invention, it was known to treat a memory loop as a single file. Utilizing multiple files can be more time consuming than using a single

file, and using a single file has been found to be well-suited for implementing a circular storage buffer and for storing video data. U.S. Pub. No. 2002/0191952 (“Fiore,” EX1009) is an example of treating a memory loop as a single file. In Fiore, a single “memory mapped file...has a memory mapped architecture that combines the access speed of the RAM memory with large storage capacity of a disk file.” Fiore at [0065]. “The memory mapped architecture allows the playback from the circular storage buffer to be independent from recording into the buffer so that such recording is uninterrupted by the playback.” *Id.* “Because the circular storage buffer is implemented via a memory mapped file 110 which is preferably a single contiguous disk file, reads and writes to adjacent virtual memory locations are insured to be physically adjacent on the disk drive. In this manner, the circular storage buffer cannot become fragmented on the disk drive” *Id.* at [0071].

84. As the patents of the Stellar patent family recognize, it was known to continuously store images in a looping (circular) memory, and upon receiving a trigger signal, protect a portion of the memory. *See e.g.*, ’752 patent at 1:35-46. During prosecution of the ’034 patent, the application admitted that having “a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory” was known and disclosed by Vanman (WO 6,044,476). EX1013, 93-100. Specifically, the applicant stated that “Vanman teaches a recording facility that continuously records the data stream into available portions of a circular buffer in the local memory.” *Id.* at 94-95.

85. U.S. Pat. No. 6,578,070 (“Weaver”), attached as Appendix DD (included in EX1041), discloses “[a] method and system for storing a continuous feed of video.” Weaver at Abstract. “According to one aspect of the invention, the continuous feed is encoded in a digital video format to produce a digital data stream.” *Id.* “A series of content files is created by repeatedly performing the steps of (1) storing the digital data stream in a current file, and (2) establishing a new file as the current file when the current file satisfies a predetermined condition.” *Id.* “If the series of content files satisfy a particular deletion criteria, then a particular content file that satisfies a particular deletion criteria is deleted.” *Id.* “In certain aspects, tag information that indicates information about frames contained in the digital data stream is generated.” *Id.* “The tag information is used to identify a location in the digital data stream that corresponds to the relative time.” *Id.* “The digital data stream is then transmitted to the client beginning at the location in the digital data stream that corresponds to the relative time.” *Id.*

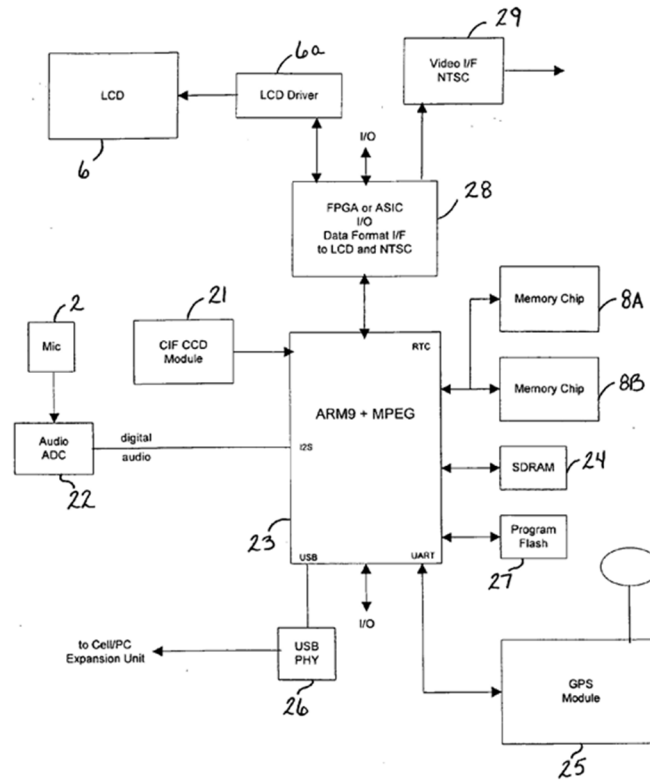
In order to have continuous buffer of data, for instance the last 24 hours of Lifetime, Television for Women, older content needs to be deleted along with the corresponding tags. Various approaches may be used to implement such a continuous buffer. With respect to the content data, the simplest approach to implement a continuous buffer is to create a single file large enough to hold 24 hours of footage. The file is then treated as a circular buffer. Specifically, after the creation of the initial 24 hour file, the MDS server 110 would establish the beginning of the file as the current “insertion point”. The MDS server 110 would then

store new content data over the old data at the insertion point, and move the insertion point to the end of the new data. When the insertion point hits the end of the file, it wraps around again to the beginning of the file.

Id. at 17:9-25. Therefore, it was known to treat a memory loop as a single file.

86. U.S. Pub. No. 2005/0078195 (“Van Wagner”) states “[t]he present invention provides an improved method and system for a personal mobile digital recording system (MDRS) to capture activities of, for example, a law enforcement officer.” Van Wagner at [0005]. Specifically, “a mobile recording device including: a flexible camera head for capturing video stream data in real time, a microphone for capturing audio data in real time, a circular buffer for continuously storing the video stream data and the audio data; and a wireless transceiver for transmitting the video and audio data in real time to a remote location.” Van Wagner at [0009]; Figs. 2, 4B.

FIG. 2

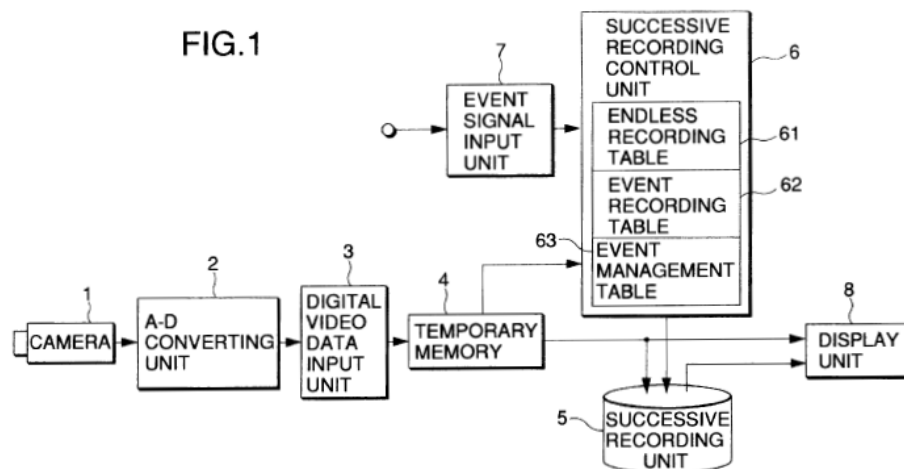


Van Wagner at Fig. 2. “In one embodiment, the single replaceable memory module includes a single image file configured as a circular buffer.” *Id.* at [0084]. “The single replaceable memory module is then operated as a circular buffer, in which the video, audio, and other data is being continuously recorded in the single replaceable memory module in a circular manner.” *Id.* “In one embodiment, video, audio, date and time, GPS overlay channel, electronic compass bearing channel, and biometric data overlay channel are encoded in an MPEG data stream.” *Id.* at [0035]. “The MPEG data stream is written and saved on replaceable memory modules.” *Id.* “In one embodiment, the image files created on the SD memory card are named according to the following format: YYMMDDHHMMI.mp4 (YY=Year, MM=Month, DD=Day, HH=Hour,

MI=Minute).” *Id.* at [0084]. Therefore, it was known to treat a memory loop as a single file.

87. U.S. Patent No. 7,158,167 (“Yerazunis”) (EX1017) is another example of treating a memory loop as a single file. I explain this in further detail below.

88. U.S. Patent No. 6,167,186 (“Kawasaki”) (EX1008) discloses “a video recording device for recording a digitized video image inputted from a camera into a digital storage memory, and more particularly to a video recording device which is capable of retroactively reproducing a video image (event video image) generated when any event occurs while it records a video image monitored in real time.” Kawasaki at 1:8-14.

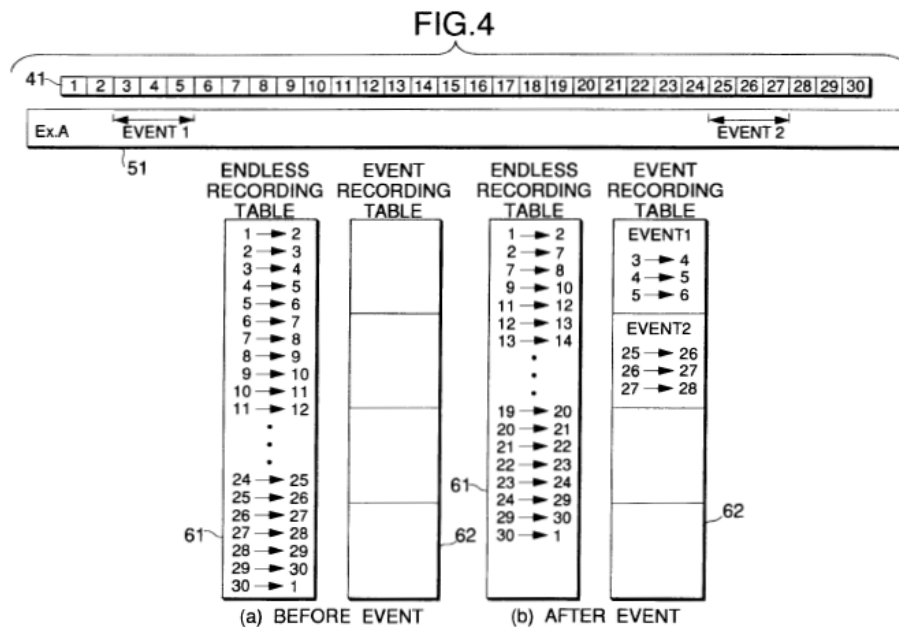


Id. at Fig. 1.

Now referring to FIG. 4, an explanation will be given of a method of the processes of recording and reproducing in the successive recording control unit 6. Reference numeral 41 shows the state where the successive recording unit 5 is divided into a plurality of blocks (30 blocks

in this example) labeled block numbers (pointers), respectively. Reference numeral 51 denotes a time zone of events which have occurred during the successive recording. The successive recording control unit 6 includes an endless recording table 61 and an event recording table 62, and manages the numbers of the blocks on which the digital video image is to be recorded as shown in part (a) of FIG. 4. The notation “1-2” in the part (a) represents that the recording block successive to block No. 1 is block No. 2. By provision of such a recording table, the blocks are overwritten in order from the block with an older record.

Id. at 4:30-45.



Id. at Fig. 4. “Next, an explanation will be given of the operation when the successive recording control unit 6 receives an event signal from the event signal inputting unit 7.”

Id. at 4:39-48. “Now it is assumed that the event signal is inputted while the recording is made at the position of block No. 4.” *Id.* at 4:48- 50. “In this case, the video image

from block No. 3 with a previously recorded image to block No. 6 with a video image after the event will be managed as an event video image.” *Id.* at 4:50-53.

Since the present invention always executes the recording in a manner of endless recording, the video image inclusive of the video image prior to inputting of the event signal can be managed as an event video image. Thus, event No. 1 will be managed on the event recording table as shown in part (b) of FIG. 4. Event No. 2 will be managed similarly. Now if only the event recording table is updated as it is, the event video images are overwritten to disappear at a period of endless recording. For this reason, the endless recording table must be also modified. As shown in the part (b), notation “2-7” represents that the block Nos. 3, 4, 5 and 6 are excluded from the loop of the endless recording. Likewise, notation “24-29” saves the event video image of event No. 2 from the endless recording. In this way, in the endless recording area, the recording area correlated with the event signal will not be thereafter used as an endless recording and not overwritten so that the event video image will be held for a longer period than the endless recording period.

Id. at 4:53-5:4. “Since the event video image when an event occurs needs not to be transferred to a separate area, the access time in the successive recording unit can be efficiently used so that the event video image can be reproduced with a sufficient allowance.” *Id.* at 7:4-9. Therefore, it was known to treat a memory loop as a single file.

8. Allowing Editing of Imaged Data in Memory Loop

89. Prior to the alleged invention, it was known to allow editing of imaged data in a memory loop. For example, releasing protected portions of memory from protection, after transferring to a more permanent memory, frees up memory loop space for subsequent recording. *See e.g.*, Kawasaki at 6:3-7. Furthermore, protecting additional portions of memory can be advantageous to preserve additional image data associated with an event.

90. In my analysis of the '540 patent claims, I explain how U.S. Patent No. 7,158,167 ("Yerazunis") (EX1017) and U.S. Patent No. 5,982,418 ("Ely") (EX1020) disclose allowing editing of imaged data in a memory loop. But this feature was taught in many other prior-art references, including, for example, U.S. 5,465,120 ("Schultheiss"), attached as Appendix OO (included in EX1052), which discloses:

A spiral buffer for a non-linear editing system digitizes and stores an input video signal as it is simultaneously being cataloged by an operator. The digitized video signal is stored in a circular buffer of a random access non-linear storage device, such as a disk recorder, with the oldest video being overwritten by the newest video when the buffer is full so long as the oldest video has not been marked by the cataloging process to be kept. The marked video is edited, further pruning the video in the buffer. The pruning of the video in the circular buffer results in a spiral shrinking of the buffer.

Schultheiss at Abstract.

A linear editing system uses a linear video source, such as a camera or video tape recorder. As the video is played from the linear video source, an operator, either with manual annotations and/or computer assisted annotations, catalogs the material presented by the video. Cataloging is a process by which the operator identifies segments of the video that are to be kept or discarded. After the video has been cataloged, then the editing process is used to sort, order, crop and otherwise alter the video that has been kept by the cataloging process. In this manner a large amount of video may be reduced to a desired time frame, for example, reducing five hours of video to a twenty-four minute situation comedy episode.

Id. at 1:10-22. “Accordingly the present invention provides a spiral buffer for non-linear editing that minimizes the amount of storage space required.” *Id.* at 1: 57-59.

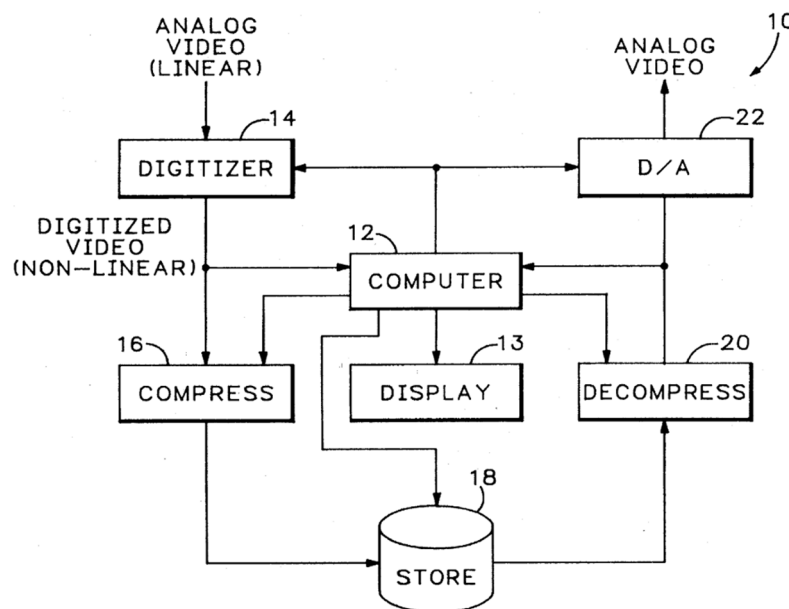
As an operator performs a cataloging step for an input video source, everything is converted from a linear to a non-linear form automatically, commonly called video capture. A circular buffer of user configurable size on a random access video disk storage medium is used to store this material. The space in the circular buffer occupied by the least recently used video material is reclaimed as more space is needed. Any video material that the operator marks during the cataloging step as “in” is marked as not discardable and retained. In this way the circular buffer shrinks as the editing production grows, “spiraling” into a smaller size.

Id. at 1:59-2:2.

Referring now to the Figure an editing system 10 includes a computer 12 that controls the editing process and with which an operator interfaces.

Analog video from a linear source, such as a camera or video tape recorder, is processed by a digitizing circuit 14 to produce a digital signal while it is simultaneously viewed on a display 13 by an operator for cataloging and conversion into a non-linear form for storage, i.e., video capture. The digital signal is processed by the computer 12 for automatic annotations, such as scene changes and the like. The computer 12 also provides a mark for the digital signal in response to an operator catalog input which indicates whether the particular segment is to be kept or discarded. The digital signal may be processed by a compression algorithm 16 and then stored on a random access non-linear storage device, such as a disk recorder 18. The computer 12 maintains a list of the locations for each video segment together with the associated catalog mark, the list having a storage start address, length and catalog mark. Where the segment is broken into smaller pieces for storage, the list includes a point to the next piece of the segment.

Id. at 2:25-44.



Id. at Fig. 1.

All of the incoming video material, whether analog or digital, is captured as it is being cataloged by the operator. A circular buffer, configurable in size by the operator, within the disk recorder 18 is used for storing the captured video signal as a nonlinear signal. As the circular buffer is filled up, the oldest video segments are subject to being overwritten by the newest video segments. However the computer 12 only overwrites the oldest video segments which are not marked during the cataloging process by a “save” indication. In this manner the circular buffer need not be so large as to store the entire video signal to be edited, but only the marked video segments. The operator may recall any segment from the disk recorder 18 and further edit it by pruning it, breaking it up into lesser segments, some of which are kept, and the like. As the “weeding” continues the circular buffer shrinks in size to hold only those segments that are retained. At the conclusion of the editing process the segments are read from the disk recorder 18 in a sequence that produces a final linear video product that may be stored on a linear storage device.

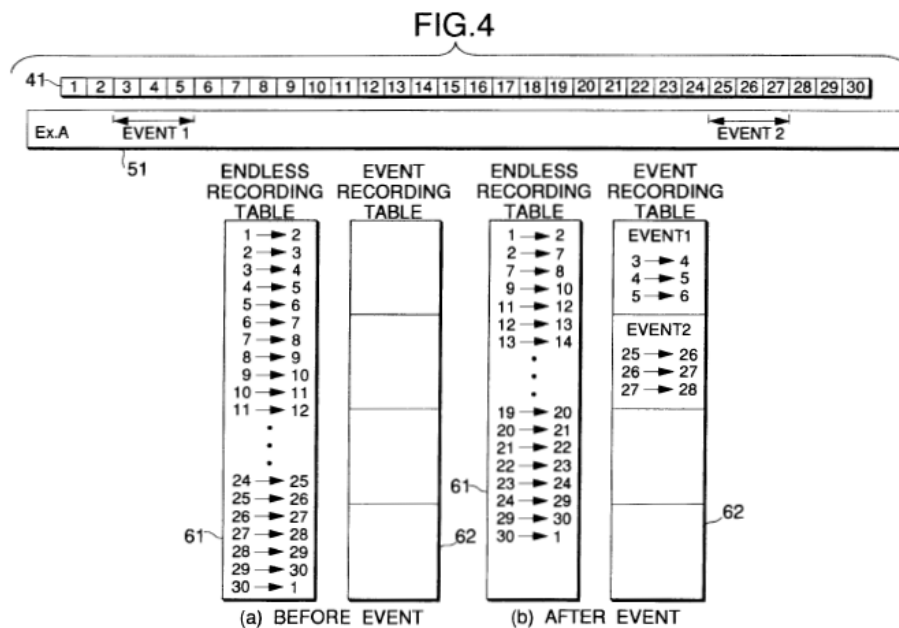
Id. at 2:56-3:8. Therefore, it was known to allow editing of imaged data in a memory loop.

91. For example, U.S. Patent No. 6,167,186 (“Kawasaki”) (EX1008) describes a successive recording control unit:

Reference numeral 41 shows the state where the successive recording unit 5 is divided into a plurality of blocks (30 blocks in this example) labeled block numbers (pointers), respectively. Reference numeral 51 denotes a time zone of events which have occurred during the successive

recording. The successive recording control unit 6 includes an endless recording table 61 and an event recording table 62, and manages the numbers of the blocks on which the digital video image is to be recorded as shown in part (a) of FIG. 4. The notation “1-2” in the part (a) represents that the recording block successive to block No. 1 is block No. 2. By provision of such a recording table, the blocks are overwritten in order from the block with an older record.

Id. at 4:30-45.



Id. at Fig. 4. Kawasaki explains that, “assum[ing] that the event signal is inputted while the recording is made at the position of block No. 4, “the video image from block No. 3 with a previously recorded image to block No. 6 with a video image after the event will be managed as an event video image.” *Id.* at 4: 39-48, 50-53.

Since the present invention always executes the recording in a manner of endless recording, the video image inclusive of the video image prior to

inputting of the event signal can be managed as an event video image. Thus, event No. 1 will be managed on the event recording table as shown in part (b) of FIG. 4. Event No. 2 will be managed similarly. Now if only the event recording table is updated as it is, the event video images are overwritten to disappear at a period of endless recording. For this reason, the endless recording table must be also modified. As shown in the part (b), notation “2-7” represents that the block Nos. 3, 4, 5 and 6 are excluded from the loop of the endless recording. Likewise, notation “24-29” saves the event video image of event No. 2 from the endless recording. In this way, in the endless recording area, the recording area correlated with the event signal will not be thereafter used as an endless recording and not overwritten so that the event video image will be held for a longer period than the endless recording period.

Id. at 4:53-5:4. “Moreover, in the video recording device according to the present invention, the successive recording control unit monitors the recording capacity of the endless recording area from which the event recording area is excluded, and when the recording capacity is short for the recording period of the endless recording, it restores the event recording areas as endless recording areas successively in order of older setting or lower priority.” *Id.* at 2:32-39. “Still further, the video recording device according to the present invention further comprises a long-term storage unit, and in that the recording contents of the event recording area is transferred to the long-term storage unit so that the event recording area is restored as an endless recording area.” *Id.* at 2:40-44.

The first to third embodiments described above have an advantage that it has only to operate the management table to manage the invent video image. However, if events occur frequently, as shown in part (c) of FIG. 5, the area to be registered for event recording may increase so that the endless recording area cannot be assured. In order to obviate such a failure, the event management table 63 manages the area for event recording to decide whether or not the endless recording time can be assured. In this case, if the endless recording time cannot be assured, the event video images which are older or have lower holding priorities can be removed in order from the event recording table, thereby restoring the corresponding areas as endless recording areas.

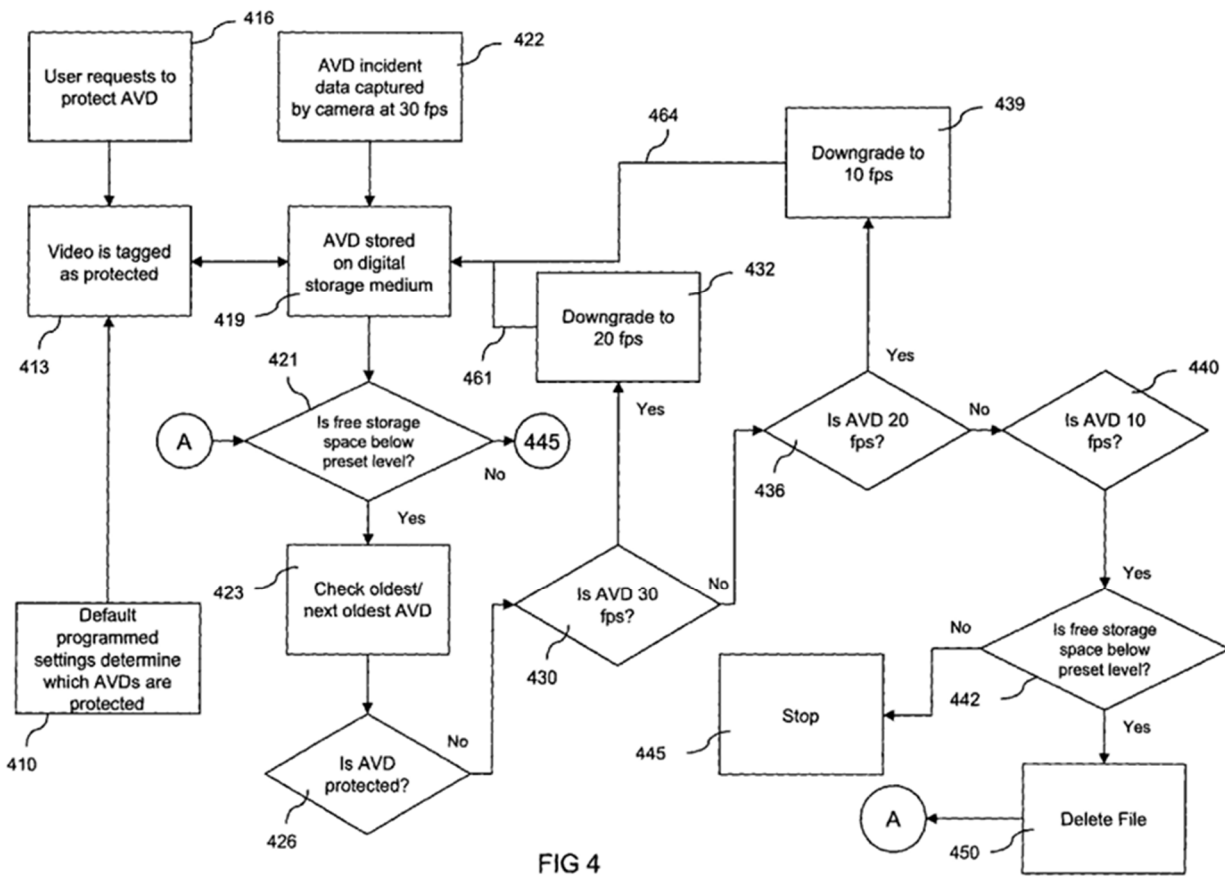
Id. at 5:62-6:7. Therefore, it was known to allow editing of imaged data in a memory loop.

92. U.S. Pat. No. 8,350,907 (“Blanco”) discloses a system where “[o]nce the large digital storage medium 110 reaches its maximum capacity, the oldest video is erased (i.e., overwritten) and its space is taken by the newest video as shown in FIG. 1.” *Id.* at 3:57-60. “[S]elected video recordings, for example those designated as being of interest or of other importance, may be transferred to conventional storage media...(collectively designated by reference numeral 131 in FIG. 1).” *Id.* at 3:62-64. “The original video clip may then be overwritten or erased to thereby reduce the storage space requirements for the downgraded video clip by approximately the percentage reduction in downgraded frame rate.” *Id.* at Abstract. “To maintain the desired free space on the digital storage medium, in an illustrative example, the oldest

video clip is converted from 30 fps to an arbitrary lower rate (for example, 15 fps or less as may be determined by the agency).” *Id.* at 5:54-57.

Returning back to FIG. 4, as shown at block 423-426, if the oldest AVD is not protected (via the tagging process described above), then process control passes to block 430. If the AVD is currently at 30 fps, then as shown in block 432, the AVD is downgraded to 20 fps and the downgraded AVD is written to the digital storage medium as indicated by line 461. The original AVD (i.e., the version on which the downgraded version is based) is then marked as free to be overwritten (for example, by downgraded AVDs or new video recordings) or erased from the digital storage medium as indicated by block 450 if additional space is required to maintain the preset level on the digital storage medium.

Id. at 6:1-12.



Id. at Fig. 4. Therefore, it was known to allow editing of imaged data in a memory loop.

93. PCT Pub. No. WO2004/036926 (“Pearlson”) discloses “[o]ne embodiment of the recorder 100 provides event-based recording that enables users to activate a recording session by either pressing a button or activating another device used as an event trigger such as a vehicle light bar, or an alarm contact or other sensor.” Pearlson at 10:3-9. “In one example embodiment, a ring buffer in a recorder, such as recorder 100, captures video, audio and data until an instruction or trigger to start the recording process occurs.” Pearlson at 8:18-21. “Once the files have been transferred and verified, the assembler 120 notifies the recorder 100 that the file

upload is complete, and instructs the recorder 100 to clear its record volume for new recordings.” Pearlson at 10: 17-19. Therefore, it was known to allow editing of imaged data in a memory loop.

94. U.S. Pat. No. 6,624,611 (“Kirmuss”), attached as Appendix PP (included in EX1052), “addresses the prior art problems by providing in-vehicle video recording with buffering for capturing video prior to a trigger event.” Kirmuss at 4:3-5.

Thus, in one aspect the present invention is directed to a mobile event-recording device that includes distributed elements within, attached to or otherwise mounted to a mobile vehicle, with the principal elements being: a first camera providing a real-time video signal that corresponds to an observed outboard live-motion scene; and a digital video recorder receiving the video signal provided by the camera and recording the video signal in response to a trigger signal (e.g., an activation switch for a light bar or siren, an air bag sensor signal indicating air bag deployment, or depression of an emergency button or a dedicated recording activation switch). The video recorder uses a buffer to receive and store the video signal so as to preserve the video signal during a programmable sliding (or rolling) time interval prior to the triggering event.

Id. at 6:19. “In one example, the resulting system includes a built-in video ring buffer illustrated in FIG. 6B that allows the system to capture pre-incident, pre-siren/chase-light activation video, video, and this video is then captured and stored on the hard disk with the actual running of the alarm/siren/chase-light, as well as for a period after these devices are turned off. In this embodiment, the system provides critical information

before, during and after an incident.” *Id.* at 33:48-54. “The device further supports a general-purpose programmable computer terminal for controlling operation of the video recorder, generating trigger signals and/or providing text overlay data.” *Id.* at 4:42-45. “With regard to data overlay in element 151, input text data may be converted into bitmap format and then superimposed on the input video signals 102, while input binary signals (e.g., for siren on/off) may be first converted to text (e.g., “Siren On”) and then converted to bitmap format and superimposed in element 151.” *Id.* at 13:56-61. “Moreover, unlike conventional videocassette recorders, a system of the present invention preferably can provide for: (i) index-based searching of specific portions of the audio/video based on the recorded input signals such as ‘siren on’, or ‘chase lights on’ or ‘brakes on’.” *Id.* at 14:28-32.

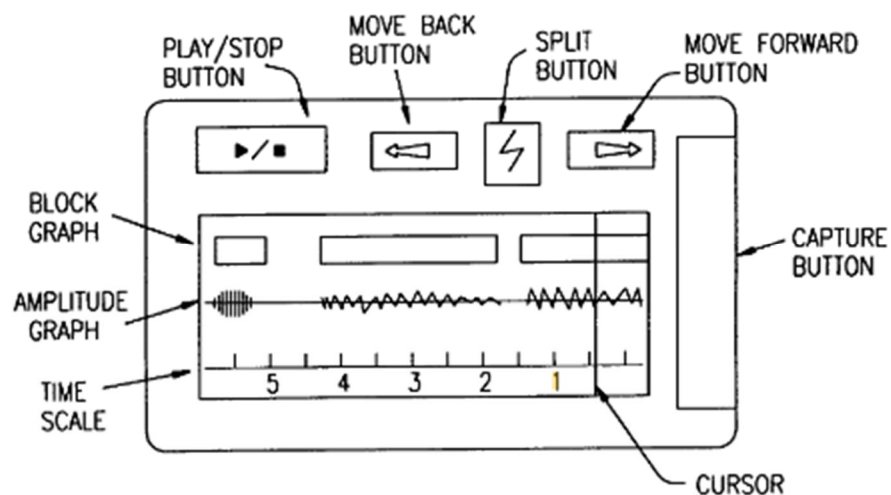
In addition, recorded incident triggers such as activation of the chase lights, may also be used to search the video and audio data, rather than just “fast rewind/fast play” of video as is traditional with VCR technology. Incident triggers not only start and stop the recording, with pre- and post-alarm video capture if so programmed, but if the system is in continuous record mode, the addition of these alarm/system input sensors preferably marks the video, and when in playback mode with password authorization, all video corresponding to these “events” may be easily retrieved in the order that they were collected.

Id. at 35:53-56. Therefore, it was known to allow editing of imaged data in a memory loop.

95. As another example, U.S. 2002/0131768 (“Gammenthaler 1”) and U.S. 2004/0201765 (“Gammenthaler 2”) disclose a record after the fact feature which allows the user to preserve additional image data associated with an event. Gammenthaler 1 describes a system where data is “continuously recorded on a 15 gigabyte hard drive” that “can be archived off the hard disk 60 to the digital video tape recorder 52 via bus 102.” Gammenthaler 1 at [0055]; *see also* Gammenthaler 2 at [0054]. “After the fact recording to tape can be accomplished using the system controller. If an officer wants to record to tape all the events that happened in the last 10 minutes or starting from some particular time of day he remembers to be before a significant event, he can give a command via control panel 20 to the system controller 54.” *Id.* Gammenthaler 1 further describes that “the officer via control panel 20 to send a command to the hard disk 51 to cause it to playback all recorded data starting from a specific frame number or a specific time of day or going back from the present time by a specified number of minutes on output 57 to be archived by tape recorder 52.” Gammenthaler 1 at [0060]; *see also* Gammenthaler 2 at [0059]. “This provides an after-the-fact recording capability in case the officer did not have the in-car video system in record mode when some significant event happened.” *Id.* Therefore, it was known to allow editing of imaged data in a memory loop.

96. For example, U.S. Pat. No. 5,845,240 (“Fielder ‘240”) discloses “[a] recording method and apparatus enabling a user to select for recall and preservation portions of audio, video or other data that have been continuously recorded on a finite

extent of recording medium, thereby enabling the effective recording and reproduction of events that transpired before the decision to record or reproduce them was made.” Fielder ‘240 at Abstract. The Fielder ‘240 invention is “achieved by recording events on a finite extent of recording medium in a continuous logical loop (i.e., overwriting the earliest recorded data with new data whenever the end of the medium used for this continuous recording is reached), and playing back and/or permanently preserving (capturing) portions of the recorded data as selected by the user.” *Id.* at 2:49-55. Fielder ‘240 further describes that “pressing Capture once may capture the most recent minute, pressing it twice in rapid succession may capture the most recent two minutes, and so on.” *Id.* at 9:5-8. Additionally, Fielder ‘240 discloses that “Controls (buttons) are provided for manipulating the cursor, playing back portions of recorded blocks, and capturing blocks.” *Id.* at 8:11-13. Figure 3 shows one embodiment of the device:



Id. at Fig. 3. The “Capture” button “[t]oggles the capture state of the current block (as indicated by the visible cursor)” and “[m]ay be pressed at any time to capture the current block.” *Id.* at 8:38-44. Therefore, it was known to allow editing of imaged data in a memory loop.

9. Increasing Duration of Protected Segment Was Known In The Art

97. Prior to the alleged invention, it was known to have a system that “responds to a second signal received after the first signal by increasing the duration of the protected segment of the buffer prior to the first signal.” For example, increasing the duration of the pre-event recording allows for the preservation of important data that may have been missed using the default pre-event recording time.

98. For example, U.S. Pat. No. 5,845,240 (“Fielder ‘240”) discloses an invention that records events in a “continuous logical loop” by “overwriting the earliest recorded data with new data whenever the end of the medium used for this continuous recording is reached” and that allows the user to “play[] back and/or permanently preserving (capturing) portions of the recorded data as selected by the user.” *Id.* at 2:49-55. By “pressing Capture once” the user “may capture the most recent minute, pressing it twice in rapid succession may capture the most recent two minutes, and so on.” *Id.* at 9:5-8. There are “Controls (buttons)” that are used to “manipulat[e] the cursor, play[] back portions of recorded blocks, and captur[e] blocks.” *Id.* at 8:11-13.

99. The “Capture” button “[t]oggles the capture state of the current block (as indicated by the visible cursor)” and “[m]ay be pressed at any time to capture the current block.” *Id.* at 8:38-44.

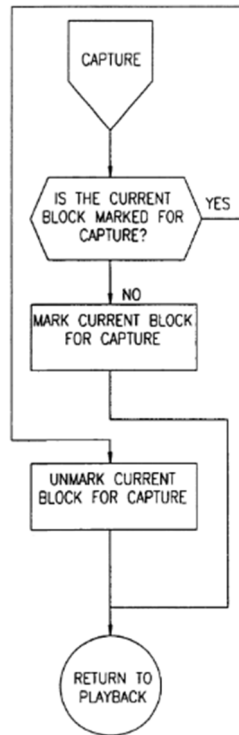


FIG. 9

Id. at Fig. 9. Therefore, it was known to respond to a second signal received after the first signal by increasing the duration of the protected segment of the buffer prior to the first signal.

100. U.S. Pat. No. 6,804,638 (“Fiedler ’638”) is another example of increasing the duration of the protected segment.

101. U.S. Publication No. 2002/0131768 (“Gammenthaler 1”) and U.S. Publication No. 2004/0201765 (“Gammenthaler 2”) describe an in-car video system with inputs from video cameras. Gammenthaler 1 at Abstract; Gammenthaler 2 at

Abstract. Gammenthaler discloses that “the embodiment of FIG. 2 has the additional capability to record after-the-fact events which the officer may have missed because the record mode was not on when the event occurred.” Gammenthaler 1 at [0046]; Gammenthaler 2 at [0045]. “This is provided by the use of a hard disk 60 which stores all compressed video and audio data output by the compression process or the optional anti-tampering circuit at all times regardless of whether tape recording mode is on or off.” Gammenthaler 1 at [0046]; Gammenthaler 2 at [0045]; *see also*, Gammenthaler 1 at [0056], [0060]; Gammenthaler 2 at [0055], [0059]. “If an officer wants to record to tape all the events that happened in the last 10 minutes or starting from some particular time of day he remembers to be before a significant event, he can give a command via control panel 20 to the system controller 54.” Gammenthaler 1 at [0055]; Gammenthaler 2 at [0054]. Therefore, it was known to respond to a second signal received after the first signal by increasing the duration of the protected segment of the buffer prior to the first signal.

102. U.S. Pat. No. 6,167,186 (“Kawasaki”) “relates to a video recording device for recording a digitized video image inputted from a camera into a digital storage memory, and more particularly to a video recording device which is capable of retroactively reproducing a video image (event video image) generated when any event occurs while it records a video image monitored in real time.” Kawasaki at 1:7-14. “Furthermore, in the video recording device according to the present invention, the recording area correlated with the event signal is defined as a recording area from

a predetermined time before to a predetermined time after the event signal is inputted.” *Id.* at 2:22-26. Kawasaki further discloses that “[t]he event recording time may be changed according to the kind of events in a such a fashion that a long recording time is given to a slowly changing event whereas a short recording time is given to an instantaneous event.” *Id.* at 5:15-19. “Further, in the above embodiment, although the block immediately before the event signal occurs has been held as the event video image, the block to be held as the event video image may be further retroactive according to an event circumstance.” *Id.* at 5:23-28. Therefore, it was known to respond to a second signal received after the first signal by increasing the duration of the protected segment of the buffer prior to the first signal.

V. The Alleged Inventions Of The '540 and '752 Patents

A. The '540 Patent

103. The '540 patent discloses “methods and systems of storing discrete segments of imaged data in a camera by using a sensor in the camera to capture image data; using multiple portions of a memory as a loop in which to record the segments in approximately real time; and protecting the multiple portions from being overwritten by subsequent recording [in] the loop.” EX1018, 2:66-3:3. Figure 5, below, illustrates one such system in which camera 410 is coupled to recorder 450 via wires 470. *Id.*, 6:15-34, 6:45-50. Also depicted is remote activating device 440 “attached to the hand as a finger ring” and a separate external copying device 460. *Id.*, 6:15-21.

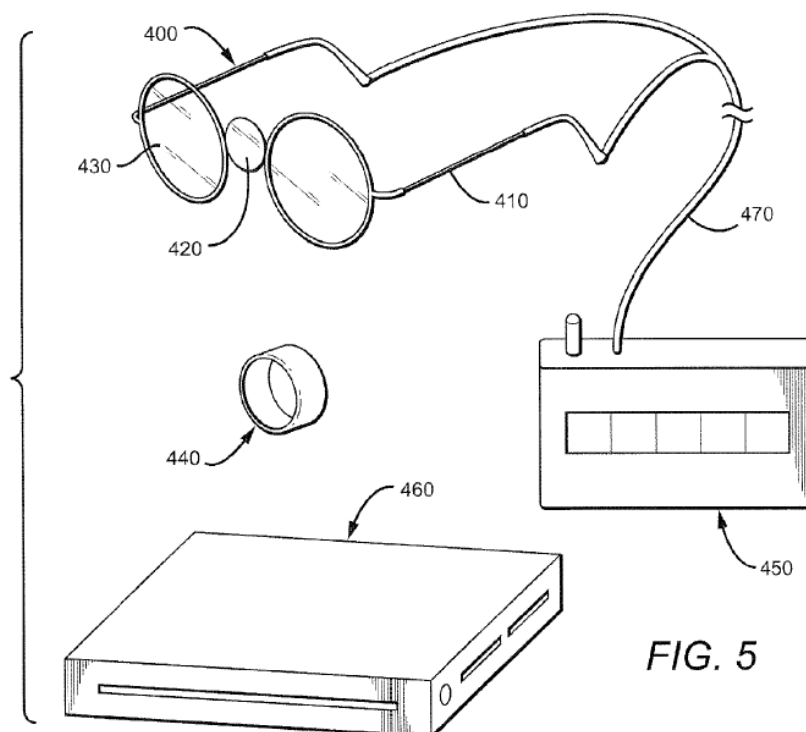
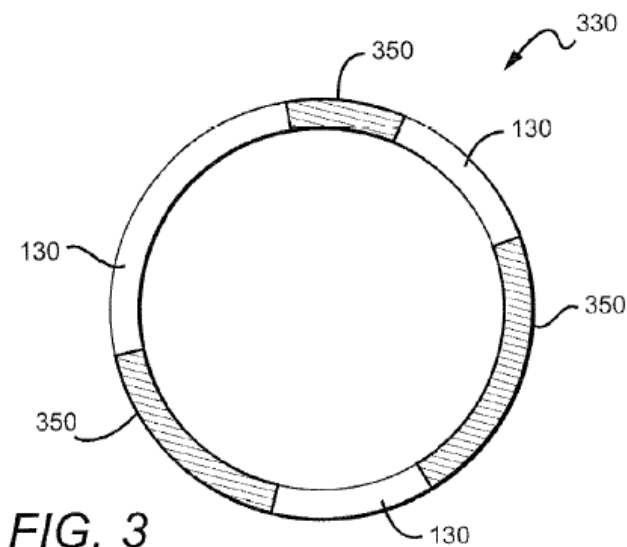


FIG. 5

The recorder is described as “any recording device that records video and/or audio data” and includes a microprocessor 240 (*id.*, 3:11-16) that is “any component” of the recorder “which manipulates data” (*id.*, 5:20-21, 5:39-42).

104. “In preferred embodiments, users can decide when to record or protect a portion of data being recorded by sending a signal.” *Id.*, 4:8-9. Figure 3 shows “image data 130 marked for protection becomes protected data 350 in [memory] loop 330” (*id.*, 4:10-11). “Protected data 350 is characterized as a predefined portion of the recording data,” and it “is contemplated that the portion of the loop that is marked as protected data cannot be overwritten once the recorder loops back to the beginning of the media.” *Id.*, 4:11-15. Optionally, this predefined portion of the recording data

“can be configured for any suitable length,” including extending from some time “before the signal” to some time “after the signal.” *Id.*, 4:37-41.



105. Preferably, “the microprocessor is programmed to allow editing” a given portion of image data “upon receiving image data or protected data” (*id.*, 5:28-30) and “without stopping and replaying the image” (*id.*, 1:45-47). Editing actions can include “book-marking an additional portion of the loop memory” or “releasing a protected portion of the memory from protection.” *Id.*, claim 19.

106. All of these features were widely known and used before the claimed priority date of the '540 patent, including in real-world situations (*e.g.*, video recording systems in police cars). EX1007, 2; EX1024.

B. The '752 Patent

107. The '752 patent discloses “apparatus, systems and methods in which a memory stores multiple data streams, each of which includes pre-start signal and post-start signal data.” EX1004, 2:21-24. Figure 4, below, illustrates one such system in

which camera 42 is coupled to recorder 46 via data and power cord 44. *Id.*, 4:46-52. Also depicted is “ring-shaped” signaling device 45 and an off-line docking station 47. *Id.*

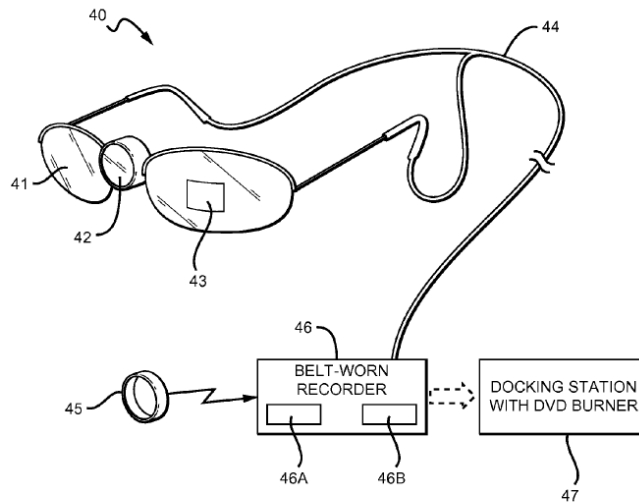


FIG. 4

108. The recorder is described as “any recording device that records video and/or audio data” and includes a processor 46A “that runs software to accomplish the functions described.” *Id.*, 4:65-5:1. Figure 5, which illustrates “recording multiple events without overwriting or offloading the memory, and including potentially lengthy portions of data streams prior to start signal events,” depicts the functions contemplated to be performed by the software running on processor 46A (*id.*, 5:35-38):

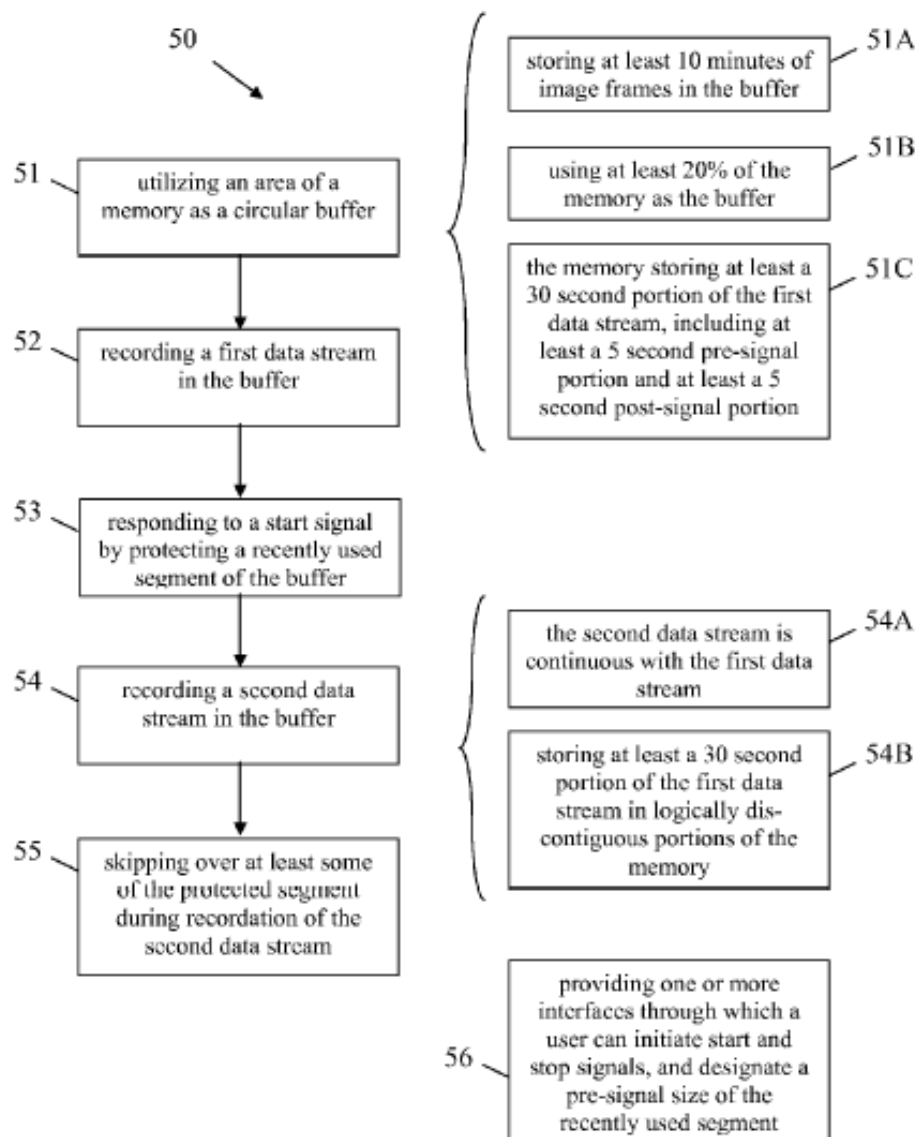


Figure 5

Id., Fig. 5; *see also id.*, 5:35-61.

VI. Claim Construction

109. It is my understanding that in determining whether a patent claim is anticipated or obvious in view of the prior art, the Patent Office must construe the claim by giving the claim its plain and ordinary meaning, consistent with the

specification and prosecution history. For the purposes of this declaration, I have construed each claim term in accordance with its plain and ordinary meaning except where particular constructions are discussed.

A. '540 Patent: Patent Owner's Construction Of Claim 1

110. In this declaration, I apply Patent Owner's construction of claim 1 of the '540 patent, including: (1) the preamble; and (2) the "recorder coupled to the camera" limitation. EX1018, 8:19-36.

111. Regarding the preamble of claim 1, I understand Patent Owner's position is that the preamble is not limiting and "is duplicative of the limitations in the body of the claim":

[P]roviding a recorder coupled to the camera and having a memory and using that memory to record segments of image data, makes clear that the image data is stored in the camera, specifically within memory of a recorder coupled to (i.e., within the single unit of) the camera. Storing of discrete segments of imaged data in a camera is therefore duplicative of providing a recorder coupled to the camera and having a memory and using that memory to record segments of image data as recited in the body of the claim[.]

EX1047, 1-2.

112. As for the "recorder coupled to the camera" limitation of claim 1, I understand Patent Owner's position is that the "commonly understood meaning" of "coupled" is "to come together to form a single unit." *Id.*, 4 (citing

<https://www.merriamwebster.com/thesaurus/coupled>). In claim 1 of the '540 patent, according to Patent Owner, “the word ‘coupled’ is used to designate a camera substructure as a component within an entire recording device,” and “[a]s recited in claim 1, and consistent with the patentee’s use of ‘coupled’ in the specification, the camera and recorder come together to form a single unit.” *Id.* Further, according to Patent Owner, “[a] lay person would easily understand that ‘a recorder coupled to the camera and having a memory’ refers to a camera having sub-components, including a recorder having a memory.” *Id.*, 2.

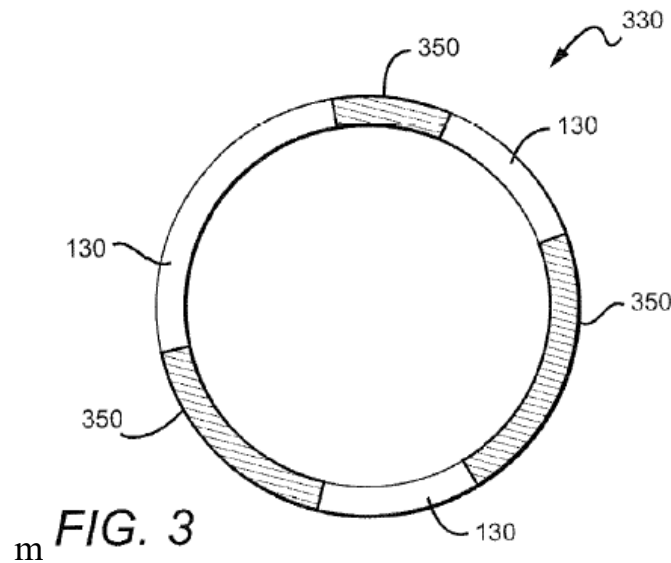
B. '540 Patent: “file”

113. Independent claim 1 of the '540 patent recites “treating the memory loop as a single *file*,” “protecting the multiple portions, within the single *file*, from being overwritten by subsequent recording in the memory loop,” and “allowing the editing of the imaged data in protected multiple portions stored in the memory loop within the single *file* via a recorder control while recording additional segments of the image data in the memory loop within the single *file*.”² EX1018, 8:27-36. For all claims of the '540 patent, it is my opinion that the term “file” should be given its plain and ordinary meaning as of June 2007, which was “an identifiable collection of data.”

114. The '540 patent describes its purported invention as utilizing a file-based approach for the memory loop. The patent states that the entire memory loop can be

² In this declaration, all emphasis is added unless otherwise noted.

treated as a file. EX1018, 2:4-8, 4:3-4. The patent further states that write-protected portions of the memory loop can be “stored as separate files or a common file separate from the loop single file.” *Id.* In Figure 3, the entire memory loop 330 is treated as a file, and the write-protected portions 350 are also treated as files stored in the memory loop:



115. In this example, the memory loop 330 and write-protected portions 350 are “files” inasmuch as they comprise identifiable collections of data, although the patent does not describe any particular file type or structure for these files.

116. In my opinion, the '540 patent uses the term “file” in a manner consistent with its plain and ordinary meaning as of June 2007, i.e., “an identifiable collection of data.” The patent does not suggest that any particular type of file is required and thus provides no basis for departing from this plain and ordinary meaning.

117. The prosecution histories of the related patents in the family likewise do not compel a narrower construction. During prosecution, Applicant reiterated what was recited in the various pending claims but did not otherwise limit the claimed “file” to any particular type of file. *See, e.g.*, EX1011, 77; EX1013, 285-86.

118. General-purpose and technical dictionaries confirm the plain and ordinary meaning of “file” as “an identifiable collection of data.” The American Heritage Dictionary defined “file” as “a collection of related data or program records stored as a unit with a single name” (EX1025, 518), and Merriam-Webster’s Collegiate Dictionary defined it as “a collection of related data records (as for a computer)” (EX1026, 467). A technical dictionary, the Wiley Electrical and Electronics Engineering Dictionary, defined “file” as “a collection of information which is stored as a unit.” EX1027, 283. Likewise, “Operating Systems” (Third Ed. 2004) (attached as Appendix II, included in EX1041) by H.M Deitel, P.J. Deitel, and D.R. Choffnes, a well-known, reputable textbook, states that “[m]ost computer users are familiar with the concept of file as a named collection of data that is manipulated as a unit,” further confirming a POSITA’s understanding of “file” as “an identifiable collection of data.” Appx II at 586.

119. In sum, it is my opinion that the term “file” should be interpreted as meaning “an identifiable collection of data” for all claims of the ’540 patent.

C. '752 Patent: “Hardware that executes an instruction set that...”

120. Claim 1 of the '752 patent recites “hardware that executes an instruction set” that performs certain recited functions. EX1004, 6:20-31. I understand Patent Owner’s position is that the claim language “hardware that executes an instruction set” recited in claim 1 of the '752 patent merely “refers to a processor.” EX1056, 20. I further understand Patent Owner’s position is that there are no MPF limitations in claim 1. *Id.*

121. If the “hardware that executes an instruction set” limitations are MPF limitations, I understand that the Parties in the related litigation have identified the claimed functions and corresponding structure. EX1057, 4-7. I understand that the Parties agree about each of the claimed function (*id.*), and Patent Owner’s position is that the corresponding structure is the same for all four claim limitations, whereas Petitioner identifies different corresponding structure for two of the limitations:

Patent Owner’s Identification Of Corresponding Structure	Petitioner’s Identification Of Corresponding Structure
Elements 3, 4, 5, 6: FIGS 3A-H, 4 and 5 including corresponding descriptions in the specification and equivalents thereof; 2:25-44, 4:64-5:4, 5:35-61, Abstract; Any recording device including a processor that runs software to accomplish the described function	Element 3: hardware and software programmed to perform the circular buffer algorithm disclosed at 2:36-39, 4:67-5:1, Figs. 3A-3H, 3:13-4:45, Fig. 5 (Step 51), 5:35-40 Element 4: hardware and software programmed to perform the circular buffer algorithm disclosed at 2:36-39, 4:67-5:1, 5:12-14, Fig. 3A, 3:13-16, Fig. 5 (Step 52), 5:48

Id.

122. For purposes of this declaration, I have applied the constructions (MPF and non-MPF) argued by Patent Owner, as well as Petitioner's proposed alternative corresponding structure for the two limitations above.

VII. Summary Of The Prior Art

A. Yerazunis

123. Yerazunis, EX1017, entitled "Video Recording Device for a Targetable Weapon," was filed September 9, 1998 and issued January 2, 2007. Accordingly, it is my understanding that Yerazunis is prior art to the '540 and '752 patents.

124. Yerazunis discloses a "compact video image recording device" for different applications. EX1017, Abstract, 1:21-31, 3:5-10, 9:8-16. In one application, it is "mounted to a targetable weapon, such as a gun," for "recording video images before and after the firing of the gun." *Id.*, Abstract, 3:9-10, 4:28-30, 8:8-25, 9:60-10:11, 16:4-8, 16:43-17:38 *see also, generally* U.S. 2002/005895 ("Freeman 1") (EX1028) (continuation of Appl. No. 08/906,493, for which Yerazunis is a continuation-in-part); U.S. 7,088,387 ("Freeman 2"), attached as Appendix EE (included in EX1041), (issued from Appl. No. 08/906,493).

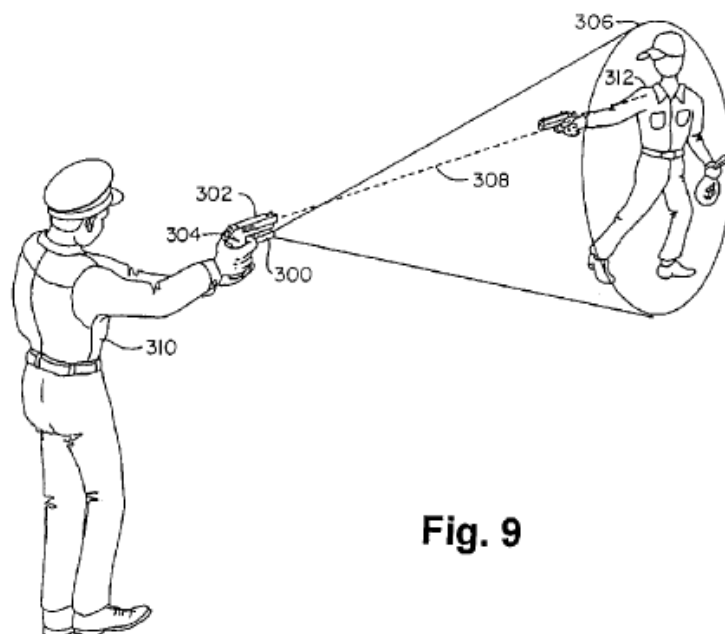


Fig. 9

Id., Fig. 9.

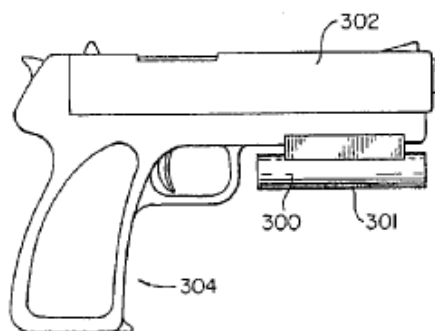


Fig. 10a

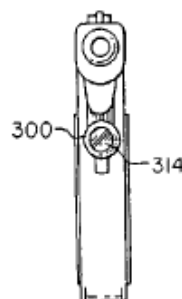


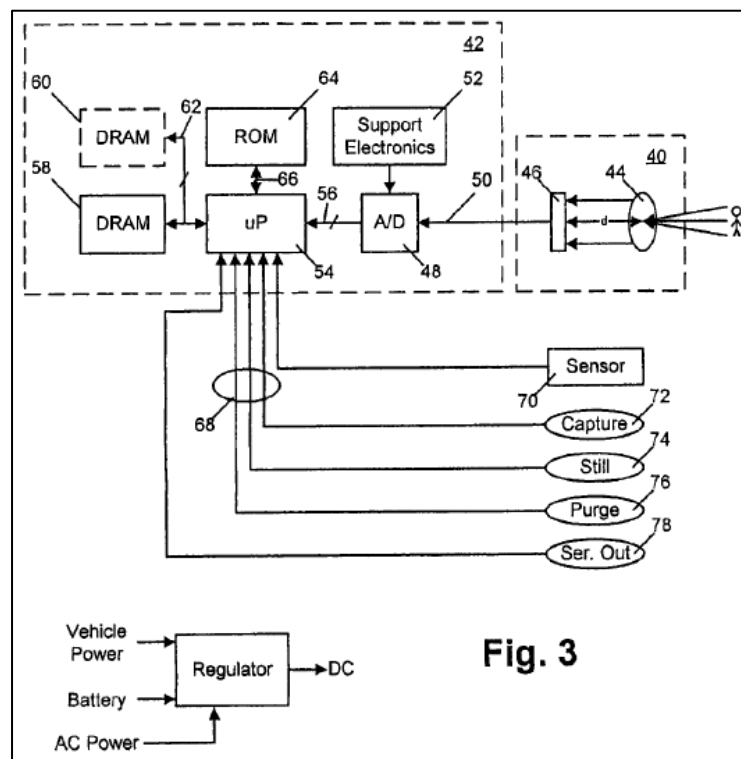
Fig. 10b

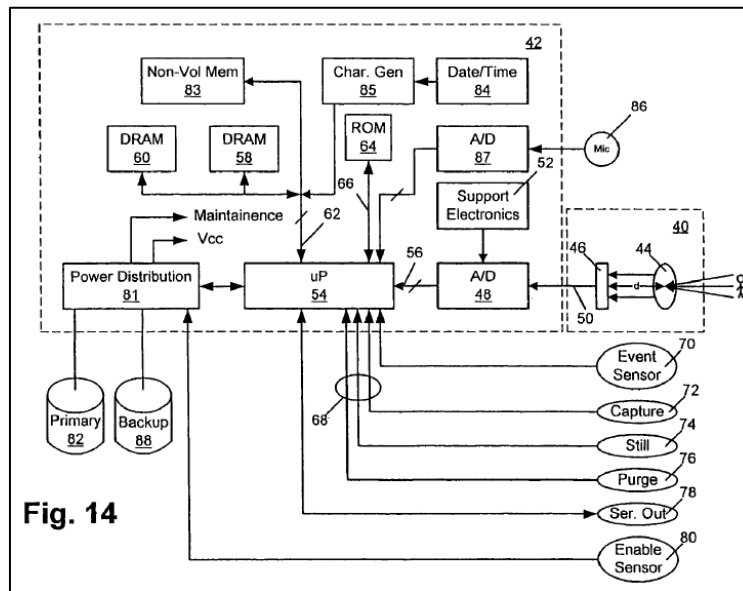
Id., Figs. 10a, 10b.

125. Yerezunis's video recording device "records video frames successively in at least one circular buffer memory organized as a continuous loop overwriting the oldest frame within the respective buffer memory with a more recently received frame." *Id.*, 2:19-23. For a gun-mounted application, Yerezunis discloses that a "gun firing signal may be generated upon discharge of the gun," and "specified frame data

associated with that firing event both before and after the event is preserved and cannot be overwritten as a result of further use of the gun or subsequent firing events.”

126. Figure 3 depicts an “electrical block diagram of the video recording device” (*id.*, 3:55-56), and Figure 14 illustrates “a video recording device in accordance with the present invention for use with a gun” (*id.*, 4:28-30).





Id., Figs. 3, 14; *id.*, 16:4-8 (“[t]he operation of the [Figure 14] recording device is generally in accord with the description provided with respect to FIG. 3”), 17:34-38. These figures and other relevant disclosure of Yerazunis are described in further detail below.

127. Figure 4a depicts a circular memory buffer formed in DRAM (*id.*, 7:9-11), and Figure 4b shows “a semiconductor memory buffer employed in the video recording device of FIG. 3 to implement a circular memory buffer and associated head and tail pointers” (*id.*, 3:60-63).

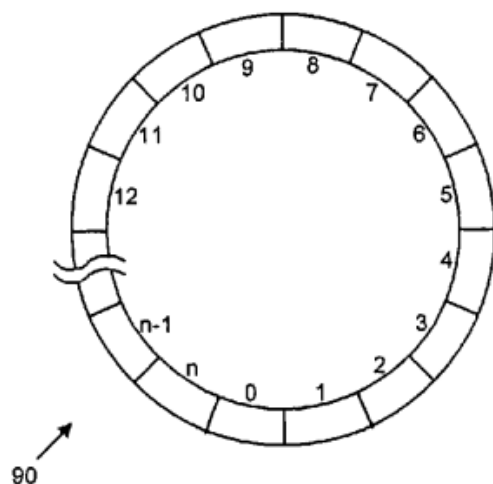


Fig. 4a

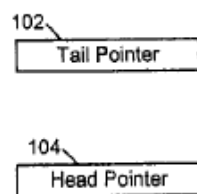
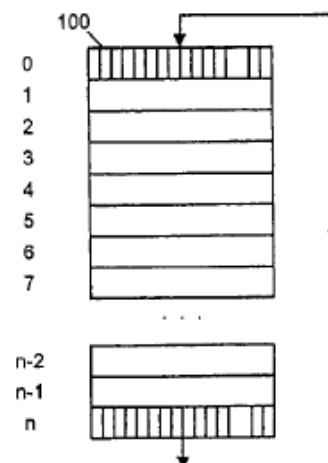


Fig. 4b



Thus, following compression, each compressed video frame is stored in the next successive frame buffer location and any frame data continued in such location is overwritten. For example, referring to FIG. 4 a, if the last frame were stored at location 3 of the circular buffer 90, the subsequent video frame would be stored at location 4 of the circular frame buffer. The video recording device, absent receipt of some trigger event from the sensor 54 or activation of other input by the user, continues to store captured frame data in successive locations of the circular buffer, overwriting previously received frame data stored in respective buffer locations with the most recently received frame data.

Id. at 7:11-22; Freeman 1 at [0037]; Freeman 2 at 6:9-20. “The operation of the circular buffer is described with more particularity below and with respect to FIG. 4b.” *Id.* at 7:23-24; Freeman 1 at [0038]; Freeman 2 at 6:21-22.

Associated with the semiconductor memory buffer 58 (and additional buffer memory 60 if such is employed) are a tail pointer 102 and a head pointer 104. The head pointer points to the address of the frame buffer

location for storage of the next frame data. Such address is offset in the respective frame to address the respective byte for the frame data being stored. For simplicity, the operation of the buffer is explained with respect to the frame addresses recognizing that plural locations are utilized within the buffer to store the data associated with any given frame.

Id. at 7:33-61; Freeman 1 at [0039] – [0040]; Freeman 2 at 6:31-59.

128. In Figures 3 and 14, the recording device includes camera 40 and video electronics 42. *Id.*, 5:40-42; *id.*, 16:4-8. The device further includes local memory (DRAMs 58, 60) coupled to camera 40 via microprocessor 54. *Id.*, 6:24-26; Freeman 1 at [0033]; Freeman 2 at 5:22-24. Microcontroller 54 has “a number of inputs 68 which permit activation of the video recording device and control of the device by a user.” *Id.*, 6:40-42; Freeman 1 at [0034]; Freeman 2 at 5:38-40. Inputs include capture button 72 that causes video data in the local memory’s circular buffer to be write-protected. *Id.*, 6:43-44, 7:11-22, 8:8-61, 9:17-26; Freeman 1 at [0034]; Freeman 2 at 5:41-42.

129. Inputs further include event sensor 70 configured to detect gun firings and other events. *Id.*, 8:8-61, 16:43-17:61. Upon event detection, microprocessor 54 preserves video data for the event by write-protecting it in the circular buffer. *Id.*; *see also id.*, 9:34-42; Freeman 1 at [0047]; Freeman 2 at 8:32-36. In embodiments, the microprocessor “tag[s] protected frame locations containing captured still frames and check[s] to determine whether a frame location is protected prior to writing to the

frame location.” *Id.*, 9:39-42; Freeman 1 at [0047]; Freeman 2 at 8:37-40. In Yerazunis’s gun-camera embodiment (Figures 9-14), “recording of data continues [after a gun-firing event] since a subsequent firing event may occur,” accomplished by storing pointers “defining the area(s) of the circular buffer memory” to be write-protected in a table. *Id.*, 17:45-61. This “allow[s] later retrieval of the video data pertaining to each firing of the gun.” *Id.*; *see also id.*, 17:9-12.

B. Ely

130. Ely, EX1020, entitled “Distributed Video Data Storage in Video Surveillance System,” was filed on April 22, 1996, and issued on November 9, 1999. Accordingly, it is my understanding that Ely is prior art to the ’540 and ’752 patents.

131. Figure 2 of Ely, reproduced below, is “a block diagram of a video surveillance system provided in accordance with the present invention.” *Id.* at 5:21-22.

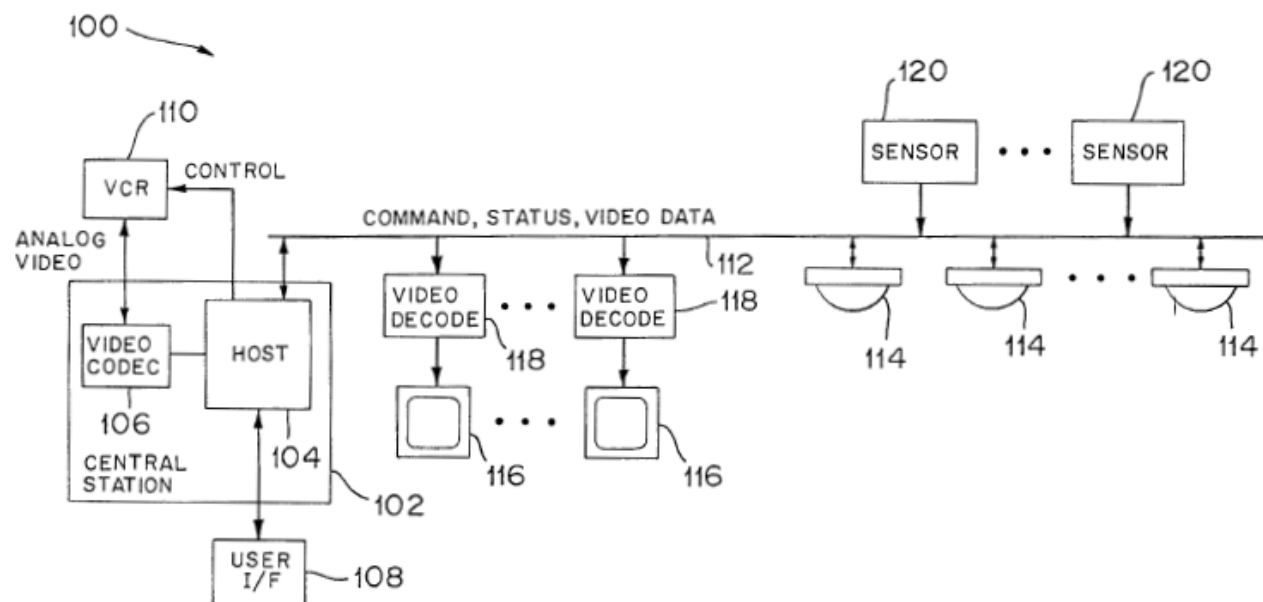


FIG. 2

in the memory 150.” *Id.* at 7:28-34. A POSITA would have understood the “ring buffer” to mean a “circular buffer” of the type disclosed in the Stellar patents.

133. Ely discloses that “over-writing of the oldest data [in the ring buffer] is subject to inhibition in response to alarm commands.” *Id.* at 7:34-36. “On such occasions, the live compressed video data is written into a portion of the memory device 150 which does not hold video data that is to be preserved.” *Id.* at 7:36-39. “When an alarm command is received, a process (indicated by block 160) is carried out in which the control circuit 134 protects from over-writing compressed digital video data previously stored in the memory 150, and corresponding to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command.” *Id.* at 7:48-55. The write protecting carried out in response to an alarm command at step 160 is highlighted below:

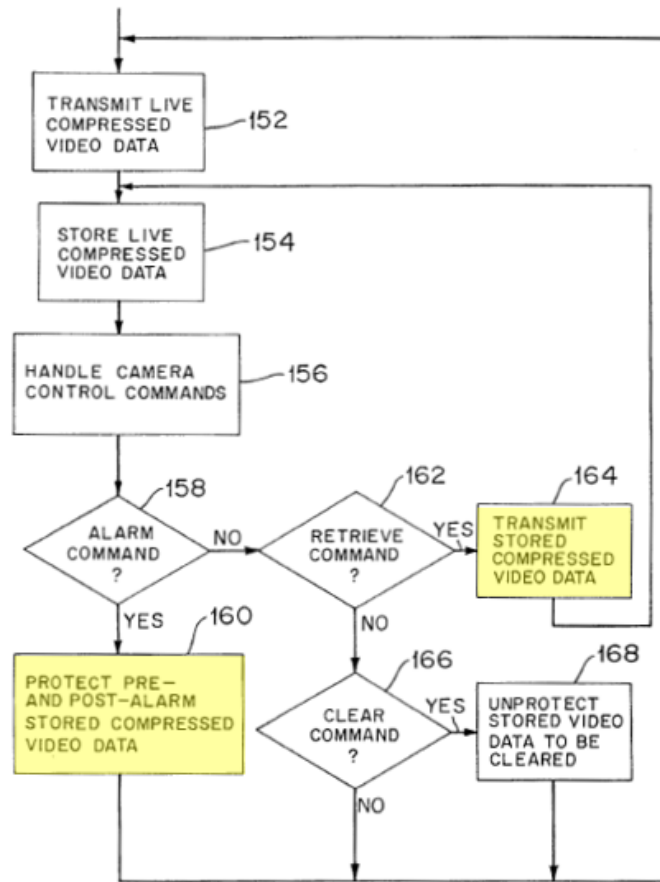


FIG. 4
CAMERA UNIT OPERATION

Id. at Fig. 4 (color added).

134. This figure illustrates “processes carried out by the control circuit 113 under the control of a stored program.” *Id.* at 7:12-16. As seen above, if a “retrieve” command is received, then at step 164 (highlighted above) the control circuit 134 causes video data previously stored in the ring buffer of the memory device 150 to be transmitted to a remote central station. *Id.* at 7:56-8:6. “The stored data to be retrieved may be data that was previously protected from over-writing in response to an alarm command, or may be other data that has previously been stored in the buffer memory

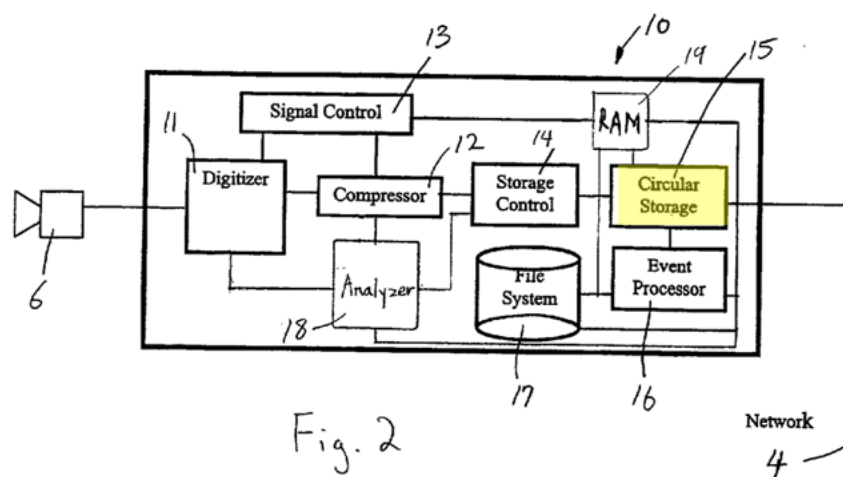
150.” *Id.* at 7:59-63. “As indicated by decision block 166, the control circuit 134 is also conditioned to receive ‘clear’ commands, in response to which the control circuit removes a previously protected block of stored video data from protection, thereby permitting ‘live’ video data to be written over the now-unprotected stored video data.” *Id.* at 8:7-12.

C. Fiore

135. Fiore, EX1009, entitled “Data Recording and Playback System and Method,” was filed April 9, 2002 and published December 19, 2002. Fiore incorporates by reference and claims priority to U.S. Provisional Application No. 60/282,162, filed April 9, 2001 (EX1030). Accordingly, it is my understanding that Fiore is prior art to the ’540 and ’752 patents.

136. Fiore discloses “data recording and playback systems for monitoring processes or occurrences of events which allows the replay and/or analysis of a time sampled signal.” EX1009, [0003]. FIG. 2 shows a schematic illustration of the signal processor 10 in accordance with one embodiment of the present invention.” *Id.* at [0043]. “As can be seen, the signal processor 10 is in communication with monitoring device 6 that provides an input signal data to the signal processor 10 such as a video, audio or other type of signal.” *Id.* “The network 4 may be any type of a network such as a local area network, wireless network, wide area network, or the Internet.” *Id.* at [0039]. “[I]n the networked embodiment of the present invention as shown in FIGS. 1 to 4, the network allows transfer and access of data utilized and stored by the data

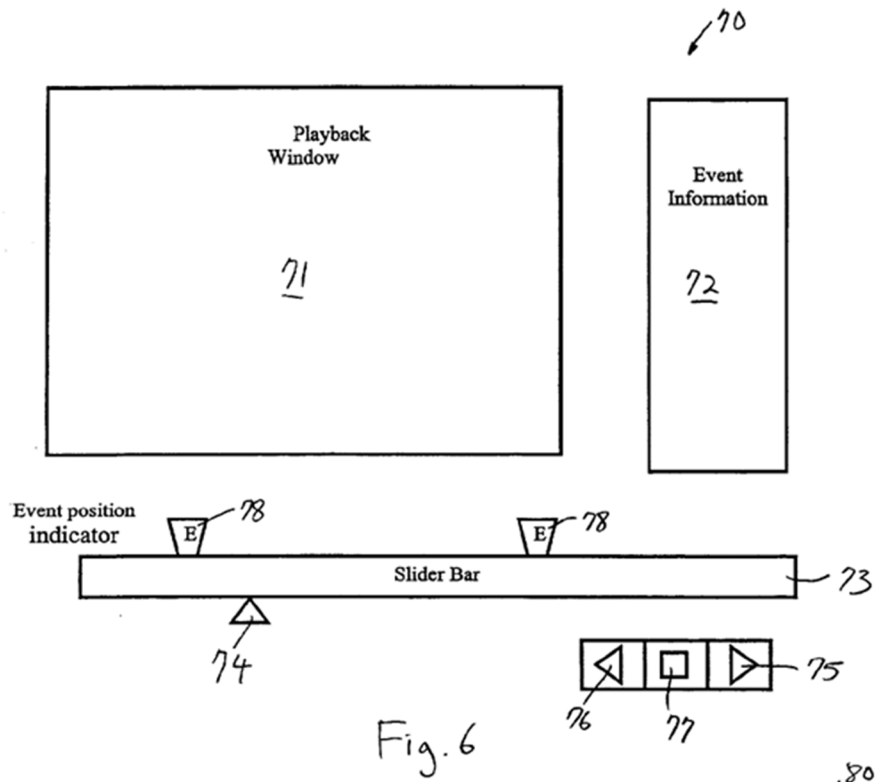
recording and playback system of the present invention.” *Id.* at [0077]. Fiore’s circular storage buffer 15 stores data frames of an input signal from monitoring device 6 (which may be a video camera, *id.*, [0040]):



Id., Fig. 2 (color added); *id.*, [0048]. Circular storage buffer 15 “may be implemented as a reserved area in memory, a disk file, or as a storage in a looped media.” *Id.*, [0065]. “The signal processor 10 also includes an event processor 16 that is adapted to extract data frames starting from a data frame that is a predetermined number of data frames before the external event time provided by the server 20 as described in further detail below, and ending a predetermined number of data frames after the external event time.” *Id.* at [0048]. “The extracted data frames are then stored in file system 17 thereby providing a permanent record of the data frames before, during, and after the event prior to the data frames being overwritten in the circular storage buffer 15 by more recent data frames.” *Id.* “[T]he event processor 16 of the present embodiment is also adapted to mark the input signal data being stored in the circular storage buffer 15

when an event occurs to thereby flag the location of an occurrence of an external event in the circular storage buffer 15, signal to mark the input signal data being provided by the event processor 16.” *Id.* “Further in this regard, the event signals may be initiated manually by the user of the data recording and playback system 10 as well using an input device such as a keyboard, mouse, etc. so that a particular data frame in the circular storage device may be manually marked.” *Id.* at [0049].

137. Circular storage buffer 15 is implemented as a memory-mapped file. *Id.*, [0047], [0068]. In the context of Fiore, a memory-mapped file is a file “having the same address space as the memory device for storing the input signal data” to allow “the input signal data” to be “swapped between the RAM” and “the file system,” “as needed.” *Id.*, Abstract, [0047]. “The client circular storage control 32 receives the playback commands provided by the user playback control 31, and receives the signal data from the circular storage buffer 15 of the signal processor 10 or from previously saved event files stored in the file system 17.” *Id.* at [0053]. “FIG. 6 shows one embodiment of a user playback control screen 70 which may be provided to or by the client computers 30 and 30’ of FIG. 1 that allows a user to control and interface with the data recording and playback system 2.” *Id.* at [0057]. “The playback control screen 70 is provided with a video playback window 71 for graphically displaying the retrieved data frames from the circular buffer 15 or the file system 17 of the signal processor 10.” *Id.* “As can also be seen, the slider bar [Fig. 6] is marked by event position indicators 78” *Id.* at [0059]; Fig. 6.



Id. at Fig. 6. “These event position indicators 78 ... mark the position along the slider bar 73 where an event has occurred and is stored in the circular storage buffer 15 of the signal processor 10.” *Id.* at [0059]. “The corresponding information may also be displayed in the event information window 72, the displayed event information serving as embedded links to playback the respective data frames associated to the event.” *Id.*

138. “The storage control 14 provided in the signal processor 10 receives the digitized and/or compressed input signal data from the monitoring device 6, and stores the input signal data and the analysis data in the circular storage buffer 15 together with a time stamp for each record.” *Id.* at [0047]. “In this regard, the circular storage buffer 15 has two unique positions, the head and tail.” *Id.* “The head represents the position in the circular storage buffer 15 having the most recent signal data, and the

tail position represents the position in the buffer having the oldest signal data that is leaving the circular storage buffer 15, i.e. being overwritten by the most recent signal data.” *Id.* “The circular storage buffer 15 is preferably implemented as a memory mapped file.” *Id.*

139. POSITAs recognized the advantages provided by memory-mapped files, including increased input/output (I/O) performance. *Id.*, [0065]. Figure 9 “shows details of a file format in a table 107 suitable for implementing the circular storage buffer 15” (EX1009, [0064]), noting file size and other details of the file:

File Size	Size of the file in bytes
Maximum Frame Index	Last frame in buffer
Maximum Frame Size	Space allocated for largest frame size
Average Frame Size	Running average of all frames in buffer
Frame Rate	Rate at which the frames are digitized
Head Frame	Position in the file of the head frame
Tail Frame	Position in the file of the tail frame
Format Size	Size of the following format description block
Format 1	Format descriptor of frame data
...	...
Format 128	
Frame 1 Header: Time Stamp	Time of data capture
Frame 1 Header: Page	Virtual memory page boundary
Frame 1 Header: Offset	Offset from frame virtual memory page boundary to data header
Frame 1 Header: Size	Size of the data block
Frame 1: Frame Data	Data block
...	
Frame n Header: Time Stamp	.
Frame n Header: Page	.
Frame n Header: Offset	.
Frame n Header: Size	.
Frame n: Frame Data	.

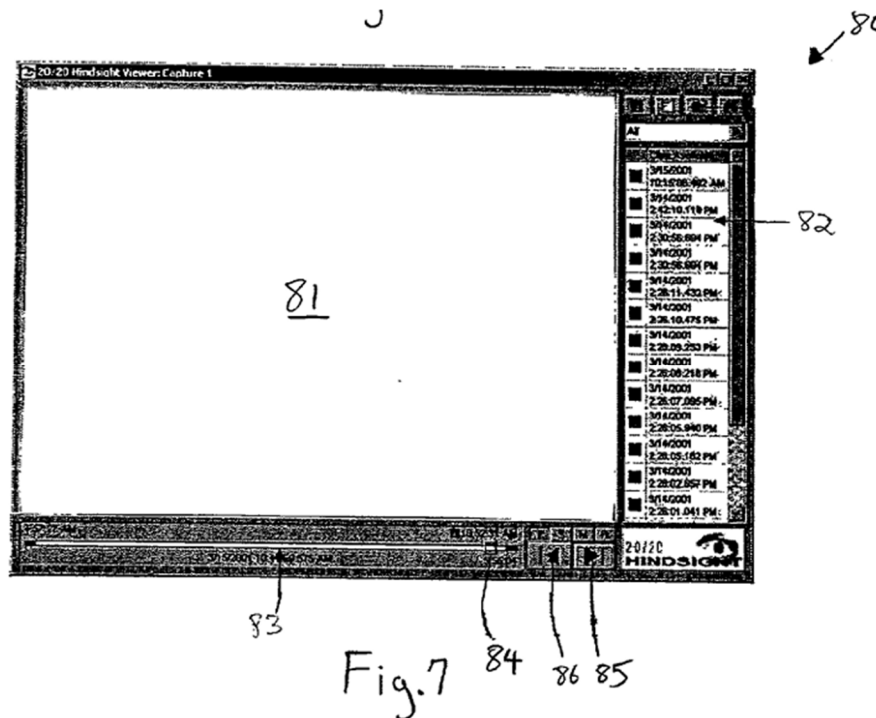
Fig. 9

Id., Fig. 9. “[T]he file format shown in table 107 has been found to be well suited for implementing the circular storage buffer 15 and for storing video data that are made of sequence of frames, each representing an individual image.” *Id.* at [0064]. “In addition, the size of the circular storage buffer is fixed and has a fixed size file header that points to the beginning (head) and end (tail) of the circular storage buffer data.” *Id.* “Initially, it should be noted that the circular storage buffer may be implemented as a reserved area in memory, a disk file, or as a storage in a looped media.” *Id.* at [0065]. “The memory mapped file 110 has a memory mapped architecture that combines the access speed of the RAM memory with large storage capacity of a disk file.” *Id.* “The memory mapped architecture allows the playback from the circular storage buffer to be independent from recording into the buffer so that such recording is uninterrupted by the playback.” *Id.* “In particular, the memory mapped file 110 of the circular storage buffer 15 is mapped in the sense that multiple sections of the file 120 stored on disk drives 102 and/or 103 are mapped to specific ranges of addresses within the RAM 19 of the signal processor 10.” *Id.* at [0066]. “Such a configuration maximizes access and utilization of the circular storage buffer 15 while minimizing disk latency and performance penalties.” *Id.* “Because the circular storage buffer is implemented via a memory mapped file 110 which is preferably a single contiguous disk file, reads and writes to adjacent virtual memory locations are insured to be physically adjacent on the disk drive.” *Id.* at [0071]. “In this manner, the circular storage buffer cannot become fragmented on the disk drive.

140. Fiore teaches indexing data frames associated with events as files within circular storage buffer 15. Fiore's Background section describes conventional approaches that do not differentiate event data as files in the circular buffer. EX1009, [0005]-[0006]. In contrast, Fiore describes indexing identifiable collections of data (*i.e.*, files) for respective events in circular storage buffer 15. *Id.*, [0022]-[0023], [0051], [0059], [0060].

141. Specifically, when an external event occurs (as indicated via an event signal generated by a sensor, *id.*, [0041]), time stamps associated with the event are stored in event database 23, and “the input signal data being stored in the circular storage buffer 15 [is marked] ... to thereby flag the location of an occurrence of an external event in the circular storage buffer.” *Id.*, [0048], [0050], [0051]. An event processor copies data frames associated with the event—including “frames before, during, and after the event”—to file system 17. *Id.*, [0048], [0051]. The use of files in circular storage buffer 15 for indexing event data enables data to be offloaded to file system 17 for permanent preservation. *Id.*, [0022], [0051].

142. Use of files in circular storage buffer 15 also enables event data to be played back directly from circular storage buffer 15 “without interrupting simultaneous recording of new input signal data into the circular storage buffer.” *Id.*, Abstract, [0023], [0057]-[0060], [0065], [0068], [0072], Fig. 6. “FIG. 7 shows an example playback control screen which has been implemented as a computer window screen 80.” *Id.* at [006].



Id. at Fig. 7. “As can be seen, the window screen 80 is provided with a playback window 81 that displays the reconstructed data frames, and an event information window 82 which lists the events that may be viewed the user, the listed events serving as embedded links to playback the respective data frames associated to the event.” *Id.*

143. “One embodiment of the data recording and playback system also includes an event controller that provides an event signal associated to time of an event. An event database is provided for storing event signal data, and an event processor is provided that copies a plurality of data frames stored in the circular storage buffer that have time stamps proximate to the time of the event into additional secondary memory mapped files, each containing a single event, indexed from the event database. An access controller may be provided which is adapted to retrieve the plurality of data frames that have time stamps proximate to the time of the event from

the event database, the event database being provided in at least one hard disk drive of a computer in one embodiment. The access controller may be connected to a network to allow remote access thereof. In such an embodiment, the system may be provided with at least one client device connected to the network, the client device such as a computer being adapted to remotely control the access controller. In this regard, the client device may include a display device for displaying the plurality of data frames copied from the circular storage buffer.” *Id.* at [0022]. Therefore, it was known to treat a circular buffer as a single file and to index write-protected portions of a circular buffer as a second, distinct file in the circular buffer.

D. Lewellen

144. Lewellen, EX1019, entitled “Vehicle Video System and Method” was filed on July 11, 2002, and published on January 15, 2004. Accordingly, it is my understanding that Lewellen is prior art to the ’540 and ’752 patents.

145. Lewellen describes a “vehicle video system” that “records video information on a digital video recorder that uses digital media such as a hard disk drive.” EX1019 at Abstract. Lewellen discloses that “a vehicle video system includes a small camera in the passenger area.” *Id.* at [0010].

The vehicle video system records video information on a digital video recorder that uses digital media such as a hard disk drive, recordable CD (CD-R), rewritable CD (CR-RW), or writable Digital Video Disc (DVD). The vehicle video system includes a local wireless interface, such as a Bluetooth-compatible interface, that automatically connects to a

compatible device in the parking area of the vehicle that is coupled to a database. In this manner, the digital video information collected by the vehicle video system is automatically transferred to the database when the vehicle is parked, removing the need for any human intervention for the logging and cataloging of video tapes. The local wireless interface of the vehicle video system also allows other devices, such as a handheld device or a vehicle video system in a different vehicle, to access the stored digital video information.

Id. “Vehicle video system 300 includes a local wireless interface 390.” *Id.* at [0031]. “Local wireless interface 390 provides a significant advantage over the prior art vehicle video systems.” *Id.* “Devices enabled with Bluetooth wireless technology will be able to: free electronic accessories and peripherals from wired connections” and “exchange files.” *Id.* at [0035]. “Products that incorporate a Bluetooth interface are already on the market.” *Id.* at [0040]. “Nokia Corp. is selling its Bluetooth 6310 phones in Europe, and are expected to be available in the United States sometime in 2002.” *Id.* “Bluetooth wireless technology...provides links between mobile computers, mobile phones, other portable handheld devices, and connectivity to the Internet.” *Id.* at 32.

146. “The digital video information collected by the vehicle video system is automatically transferred” via a wireless interface to a “database when the vehicle is parked, removing the need for any human intervention for the logging and cataloging of video tapes.” *Id.* Figure 3 of Lewellen depicts a vehicle video system 300 having long-distance and local wireless interfaces (380, 390, respectively):

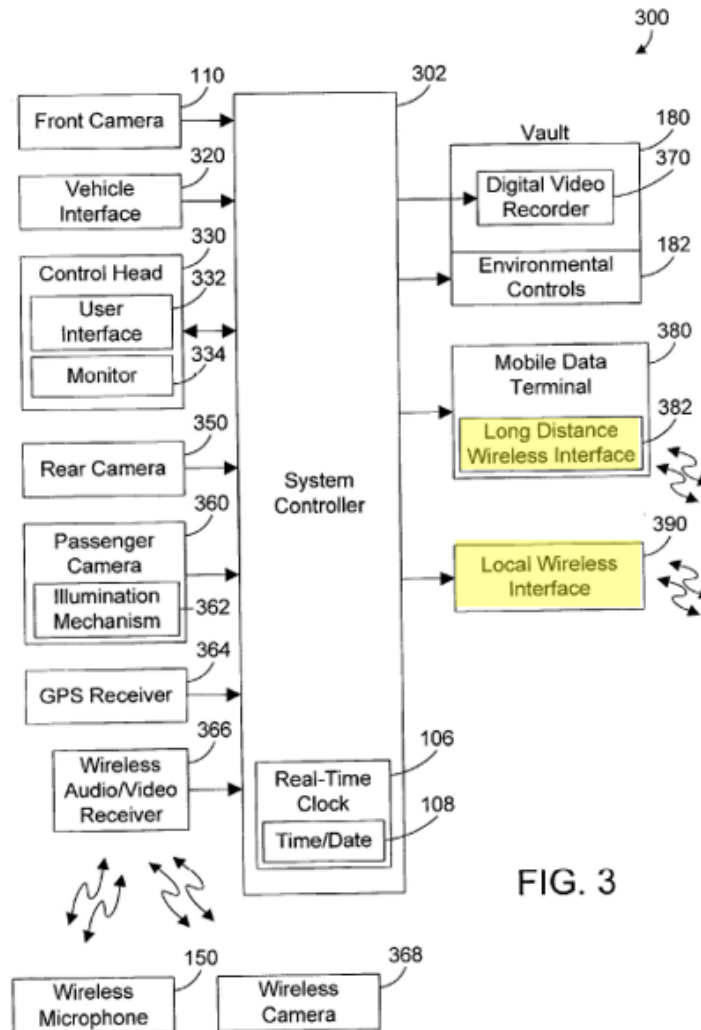


FIG. 3

Id. at Fig. 3 (color added).

147. The long-distance wireless interface 382 enables communication with police headquarters, whereas the local wireless interface 390 enables communication with devices located in the nearer vicinity via short-range wireless communications.

Id. at [0030]-[0031]. “The local wireless interface of the vehicle video system ... allows other devices, such as a handheld device or a vehicle video system in a different vehicle, to access the stored digital video information.” *Id.* at Abstract. The local

wireless interface 390 may be “a Bluetooth-compatible interface, which can communicate with other Bluetooth-compatible devices,” including mobile phones. *Id.* at [0031], [0037], [0041]. Lewellen explains that the “benefit of providing the local wireless interface 390 is that digital information recorded by the digital video recorder 370 may be automatically transmitted and received to and from compatible devices.” *Id.* at [0043]. “As shown in FIG. 5, one example of a compatible device is a parking area data transfer mechanism 510.” *Id.* “A second example of a compatible device is a portable data transfer mechanism 520.” *Id.* “A third example of a compatible device is a vehicle video system 300A in a different vehicle.” *Id.* For example, “[i]n response to the upload command, the vehicle video system transmits digital data to the parking area data transfer mechanism (step 860)” including “recorded digital video data.” *Id.* at [0049]. “[T]he present invention relieves the law enforcement officer from the chore of handling video tapes.” *Id.* at [0045].

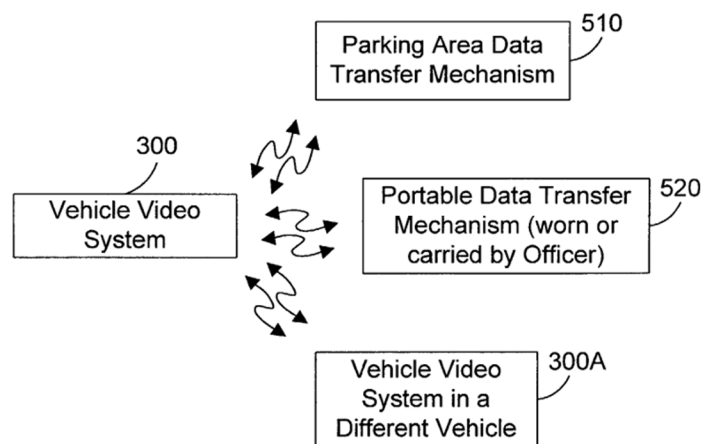


FIG. 5

“Referring back to FIG. 5, a second suitable wireless device that is compatible with the local wireless interface 390 in the vehicle video system 300 is a portable data transfer mechanism 520, which may be worn or carried by a law enforcement officer.” *Id.* at [0046]. “Such a portable data transfer mechanism 520 could act in the same manner as the parking area data transfer mechanism 510, exchanging digital information in both directions as needed.” *Id.* “Note, however, that the portable nature of the portable data transfer mechanism 520 allows for easily exchanging digital information with the vehicle video system 300 in the field, without having to return to the parking garage.” *Id.*

During the chase, let’s assume that the police car is wrecked. If the only data transfer mechanism were in the parking garage, the car would have to be towed to the parking garage to retrieve the digital information recorded by the digital video recorder 370. However, with a portable data transfer mechanism 520 or using a vehicle video system in a different vehicle 300A, the stored digital information in the wrecked police car can be uploaded to a different device, which can then transfer the data to the central database. We see from this simple example that exchange of digital information in the field is a significant advantage of the preferred embodiments.

Id. at [0047].

E. Mann

148. Mann, EX1015, entitled “Wearable Camera System with Viewfinder Means,” was filed on March 25, 1999, and issued on June 4, 2003. Accordingly, it is my understanding that Mann is prior art to the ’540 and ’752 patents.

149. Mann describes a body-worn portable electronic camera system with wearable viewfinder means, particularly as built into eyeglass frames, as illustrated in Figure 1. EX1015 at [0001], [0056].

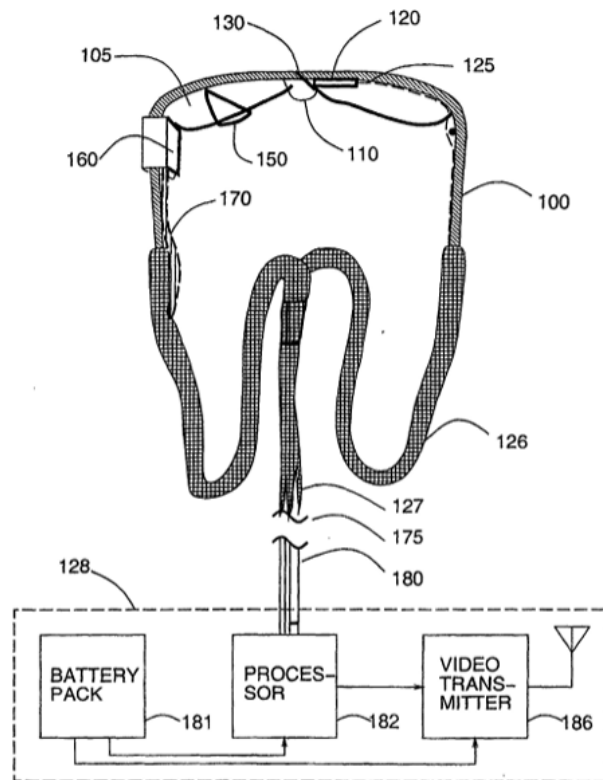


FIG. 1 – FOVEATED EMBODIMENT OF WEARABLE CAMERA SYSTEM

Id. at Fig. 1. This figure depicts eyeglasses with frames 100, lenses 105, cameras 110 and 120, electronic display 160 that acts as a viewfinder screen. *Id.* at [0056]-[0058].

Figure 1 further depicts a belt pack or body-worn pack 128 connected to the eyeglasses via wiring harness 180 and cable harness 127. *Id.*

150. Mann's system includes a "chording keyboard" with letter keys, one of which can be pressed by a user to begin recording via the cameras. *Id.* at [0064]-[0065]. "Recording is typically retroactive, in the sense that the wearable camera system, by default, always records into a 5-minute circular buffer, so that pressing [the letter key] begins recording starting from 5 minutes ago, e.g. starting from 5 minutes before [the letter key] is pressed." *Id.* at [0065].

151. In addition to Mann, wearable cameras including cameras mounted to eyeglasses and using circular buffers to record pre-event data were well-known by June 2007. EX1029.

F. Fiedler

152. Fiedler, EX1037, entitled "Device and Method for Selective Recall and Preservation of Events Prior to Decision to Record the Events," was filed June 20, 2001, published February 27, 2003, and issued October 12, 2004. Accordingly, it is my understanding that Fiedler is prior art to the '540 and '752 patents.

153. Fiedler describes a "device process for event-activated recording," wherein events are recorded in an "acquisition buffer" and "[a]ction by the user or triggering system" preserves "all or part of the record of the most recent events recorded in the acquisition buffer." EX1037, Abstract. The event data "is preserved by reserving a portion of the record of events from being overwritten by other events,

and/or by transferring the selected portions of the record of events to a predetermined permanent location.” *Id.*

154. Fiedler discloses that the “present invention may be applied to sound or video recording” (*id.*, 2:60-61), and that an “area of technology addressed by the present invention is event-activated recording, in which a recording process is initiated on the occurrence of some event that is recognized by some mechanism, algorithm or other automated means,” such as “[i]n a security system, audio and/or video recording activated on detection of movement” (*id.*, 1:43-53). Fiedler further discloses that the “invention may be advantageously embodied in a portable device that clips to a pocket or other article of clothing, as shown in FIG. 11” wherein a “microphone, camera, camera lens, infrared or radio-frequency receiver, or similar device is attached to the clip, exposed to the outside environment.” *Id.*, 13:11-16.

155. Fiedler also describes “pressing Capture once may capture the most recent minute, pressing it twice in rapid succession may capture the most recent two minutes, and so on.” *Id.* at 9:42-45. The “Capture” button “toggles the capture state of the current block” and “[m]ay be pressed at any time to capture the current block.” *Id.*, 9:5-8.

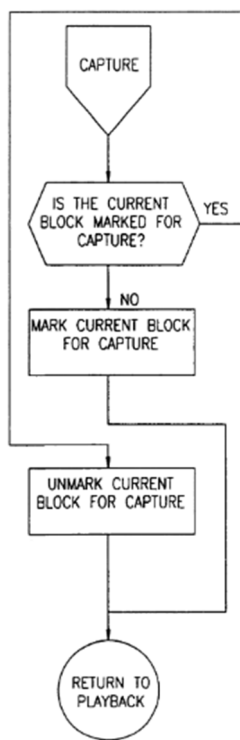
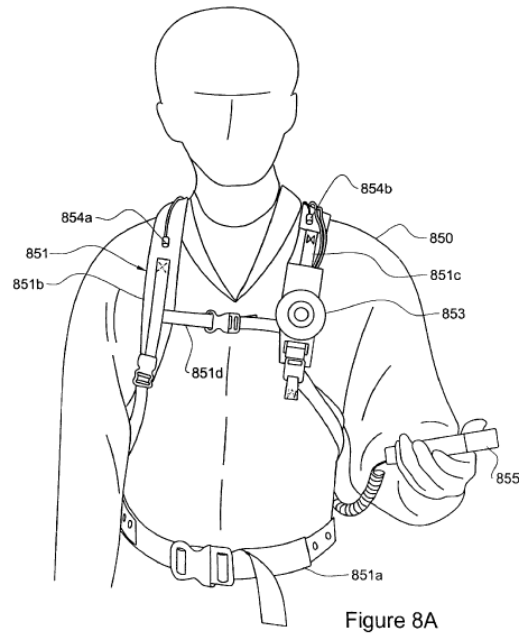


FIG.9

G. Strub

156. Strub, EX1046, entitled “Low Attention Recording Unit For Use By Vigorously Active Recorder,” was filed on April 21, 2000, and issued on May 13, 2003. Accordingly, it is my understanding that Strub is prior art to the ’540 and ’752 patents.

157. Strub discloses a “recording unit” with a video camera that “acquires a continuous stream of visual data” of an event. EX1046, 15:41-48.



Id., Fig. 8A. Strub teaches that “it is desirable that the recording unit components be packaged so that the recording unit has a discreet appearance,” which “is in keeping with the goal of making the recording unit unobtrusive (particularly to persons other than the recorder) so that the recording unit can best be used for its intended purpose, i.e., as a device that enables low attention recording.” *Id.*, 66:24-31. Strub further teaches that “it can be desirable to integrate components of a recording unit according to the invention into clothing to be worn by a recorder” and that components of a recording unit according to the invention “can be sewn into clothing” such as “a special police officer’s uniform.” *Id.*, 66:31-39.

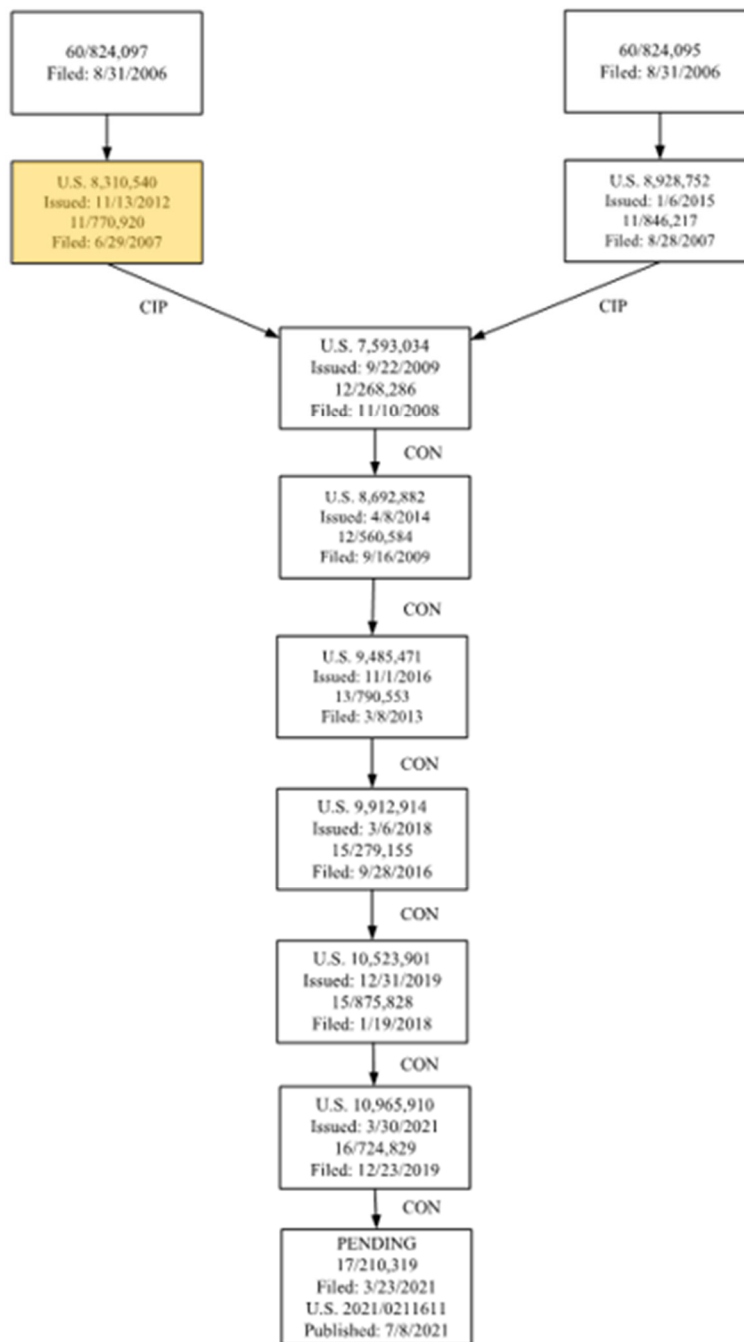
158. Strub’s recording unit preferably includes a video camera that “acquires a continuous stream of visual data” of an event. *Id.*, 15:41-48. “During recording of an event, it can be desirable to mark the recording,” which Strub discloses is “intended to indicate that the content represented by the recording data is of interest and may be

particularly desirable to view during later display of the recording.” *Id.*, 3:44-54. Further, to “facilitate” marking, Strub discloses that “it may be desirable to provide additional apparatus (a ‘marking token’)” that is “physically separated from the rest of a recording unit,” such as “a ring, brooch, bracelet (e.g., a watch-like band) or similar wearable item can be constructed with one or more pushbuttons and adapted to enable communication (perhaps wirelessly) with the remainder of the recording unit.” *Id.*, 54:20-33.

VIII. '540 Patent: Claims 1-19

159. The '540 patent of the Stellar patent family is highlighted below:

Stellar Patent Family



160. The '540 patent claims to U.S. Provisional App. No. 60/824,097, filed August 31, 2006.

A. Summary Of The '540 Patent File History

161. Application No. 11/770,920, which eventually issued as the '540 patent, was filed on June 29, 2007 with 19 claims. EX1011, 1-34. The Office provisionally rejected claims 1, 4, 8, and 10-16 on the basis of non-statutory double patenting over co-pending Application No. 12/268,286, which issued as the '034 patent. *Id.*, 59-66. The Office also rejected claims 1, 3-8, 10, 11, and 13-15 under 35 U.S.C. § 102(b) as anticipated by U.S. 5,523,799 ("Hattori," EX1016), and rejected claims 2, 9, 12, and 16-19 under 35 U.S.C. § 103(a) as unpatentable over Hattori in view of certain other references. EX1011, 59-66.

162. Applicant submitted a terminal disclaimer (*id.*, 84), added new claim 20 (*id.*, 75), and amended the claims to recite, among other things, "providing a recorder coupled to the camera and having a memory" and "allowing the editing of the imaged data in protected multiple portions stored in the loop via a recorder control while recording additional segments of the image data in the loop," arguing these limitations were not disclosed in the cited prior art (*id.*, 73-79).

163. The Office issued a final rejection, rejecting claims 1-8, 10, 11, 13-15, and 20 under 35 U.S.C. § 103(a) as unpatentable over Hattori in view of other prior art. *Id.*, 87-95. In response, Applicant canceled claim 3, amended claim 1 "to clarify that the loop is a memory loop that is treated as a single file, and that the claimed operations take place within the single file," and argued these new limitations were not disclosed in the prior art. *Id.*, 158-165, 169-182 (emphasis in original).

164. The Office then allowed claims 1, 2, and 4-20. *Id.*, 183-192.

B. Ground 1a: Claims 1-7, 9-15, And 19 Of The '540 Patent Would Have Been Obvious Over Yerazunis Alone Or As Combined With Fiore

1. Motivation To Combine

165. A POSITA would have been motivated to combine Yerazunis and Fiore for multiple reasons.

166. As one example, both references describe similar technologies and solve similar problems. Yerazunis describes a “compact video image recording device” that uses a circular buffer to record video frames continuously, and portions of the circular buffer are write protected upon detection of certain events. *See, e.g.*, EX1017 at Abstract, 2:19-23, 3:19-28, 14:45-50, 16:66-17:61. The write-protected portions include frame data that was recorded both before and after the event. *See, e.g.*, at 3:28-33, 14:50-61. Fiore similarly discloses a “data recording and playback system” that uses “a circular storage buffer having a memory mapped file with [the] same address space as the memory device for storing the input signal data.” EX1009 at Abstract. In Fiore, “data frames before, during, and after [an] event” are preserved, similar to what is disclosed in Yerazunis. *Id.* at [0048]. Because Yerazunis and Fiore both disclose data recording systems that store data in a circular buffer and preserve data associated with an event—both before and after an event trigger—a POSITA would have been aware of and motivated to combine the two references.

167. As another example, a POSITA would have been motivated to implement Yerazunis's video recording device with Fiore's file-based approach for the circular storage buffer and event data stored therein. Yerazunis describes that segments are "tagged" for write protection (EX1017 at 9:34-46), and that pointers identifying such segments are indexed and "stored in a table" to permit retrieval of event data (*id.* at 17:50-61). Yerazunis discloses that event data corresponding to a gun firing is stored for later playback, including "video frame information generated before and after the discharge of the weapon by the office" so "an evidentiary record may be generated." *Id.* at 14:45-64. And Yerazunis discloses that the "circular buffer memory may be subdivided evenly to accommodate a predetermined number of firings of the gun and an equal number of frames may be stored within the circular buffer memory for each firing." *Id.* at 17:9-12. Because Yerazunis's tagging and use of pointers identify a collection of data for an event in the buffer, and because a POSITA would have understood that selective retrieval of event data necessitates an ability to locate the event data within the buffer, Yerazunis discloses indexing the write-protected segment as a file in the buffer.

168. To the extent, however, that a POSITA needed further guidance on ways to implement data or file storage techniques in a circular buffer, the POSITA would have been motivated to turn to Fiore. Fiore provides a fulsome description of its file-based approach, which includes (i) implementing the circular storage buffer 15 as a memory-mapped file and (ii) indexing event data for events as respective files within

the memory-mapped file. *See, e.g.*, EX1009 at [0022]-[0023], [0051], [0059], [0060].

Fiore also describes numerous benefits of its file-based approach, including:

[I]t should be noted that the circular storage buffer may be implemented as a reserved area in memory, a disk file, or as a storage in a looped media.... *The memory mapped file 110 has a memory mapped architecture that combines the access speed of the RAM memory with large storage capacity of a disk file.*

Id. at [0065].

The above implementation of the circular storage buffer 15 with a memory mapped file 110 has *the advantage of using the same address pointer access as RAM 19 of the signal processor 10 making the indexing of data in the memory mapped file 110 transparent to the circular storage buffer's 15 access objects....* When the RAM 19 of the signal processor 10 mapped to the memory mapped file 110 has been filled, the file is unmapped and the signal data is cached to the file system 17.

Id. at [0067].

The memory mapped file implementation of the circular storage buffer is *especially advantageous in that it allows the abstraction of the circular storage buffer to a direct pointer virtual address space thereby avoiding issues of switching between Random Access Memory (RAM) and disk files.* This enables multiple processes mapped in virtual memory space to read from, and write to the same memory, thereby concurrently sharing the circular storage buffer. *Thus, the present system allows the playback from the circular storage buffer without interrupting recording into the*

circular storage buffer, and significantly reduces the likelihood of dropped frames.

Id. at [0068]; *see also id.* at [0072] (describing approach as providing “significant performance gains” and allowing “playback from the circular storage buffer without interrupting recording into the circular storage buffer”).

169. In view of these exemplary benefits, and other reasons discussed herein, a POSITA implementing Yerazunis would have been motivated to utilize Fiore’s teachings regarding (i) the circular storage buffer implemented as a memory mapped file and (ii) indexing of event data as files within the circular storage buffer. A POSITA would have had a reasonable expectation of success because Fiore provides a detailed disclosure of its file-based approach, and applying those techniques to Yerazunis would have been routine and well within a POSITA’s skill.

2. Independent Claim 1

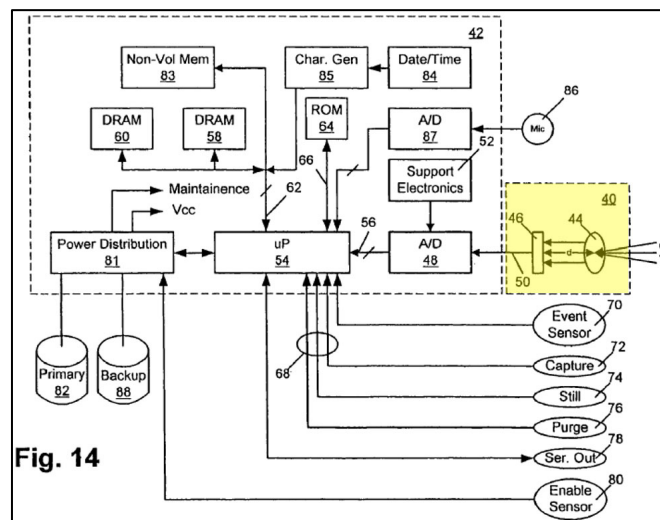
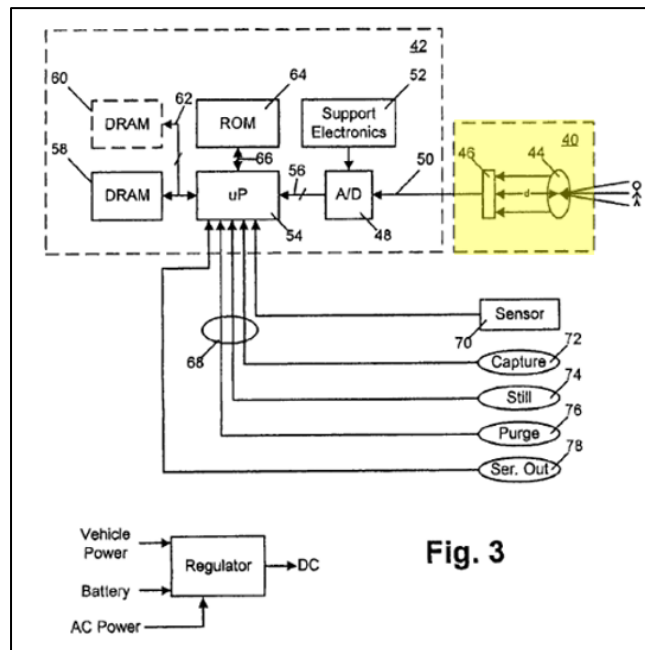
a) Preamble: A method of storing discrete segments of imaged data in a camera, comprising:

170. For purposes of this declaration, I have applied Patent Owner’s construction of claim 1, including that the preamble is not limiting and “is duplicative of the limitations in the body of the claim.” EX1047, 1-2. I address the prior art’s disclosure of the limitations alleged to be duplicative of the preamble below. I note, however, that Yerazunis does disclose a method in which a video recording device 300 that includes a camera and camera lens 314 stores discrete segments of imaged

data, such as images relating to multiple different firings of a gun. EX1017, 14:45-64; 15:9-13.

b) Element 1: using a sensor in the camera to capture image data;

171. Yerazunis discloses this claim element. Yerazunis's video recording device includes a camera 40 with image sensor 46 that captures image data:



EX1017, Figs. 3, 14 (color added); *see also id.*, 2:33-41.

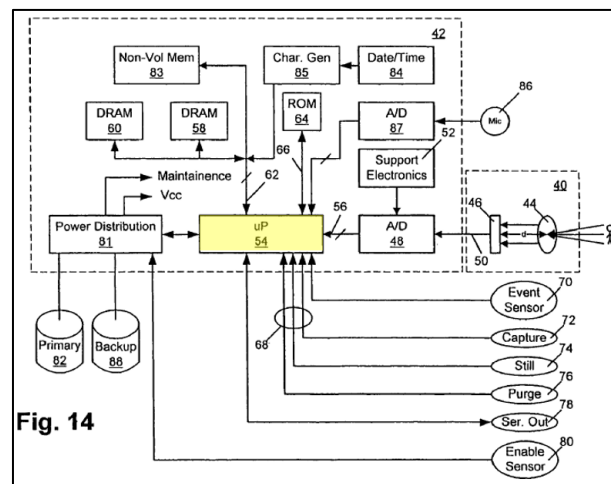
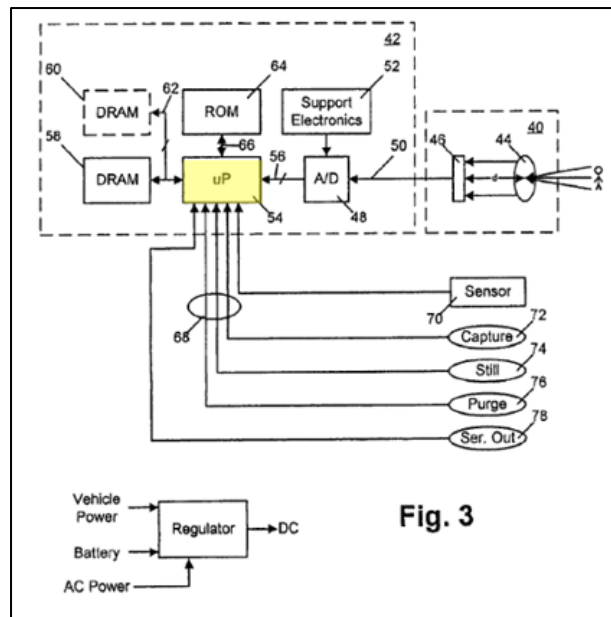
172. The camera 40 is “comprised of a lens 44 which is disposed a predetermined distance *d* from the surface of an image sensor 46.” *Id.*, 5:43-45. “The image sensor 46, ... may comprise a [CCD] array, an artificial retina, or any other suitable image sensor operative to provide an output signal representative of a video image which impinges upon the sensor.” *Id.*, 5:45-49. The output signal is “an analog signal which is coupled to one or more A/D converters” (ADC 48) that “generate a digital representation of the video image.” *Id.*, 2:37-41. Camera 40 thus discloses the claimed “sensor” because it uses its image sensor 46 (*i.e.*, “using a sensor in the camera”) to capture video images impinging on the sensor 46 (*i.e.*, “to capture image data”).

c) Element 2: providing a recorder coupled to the camera and having a memory;

173. For purposes of this declaration, I have applied Patent Owner’s construction of claim 1, including that “a recorder coupled to the camera” means “the camera and recorder come together to form a single unit,” with “a camera substructure as a component within an entire recording device.” EX1047, 1-2, 4.

174. Yerazunis discloses this claim element. Yerazunis’s video recording device includes camera 40 (*i.e.*, “the camera”) and video electronics 42 (*i.e.*, “a recorder coupled to the camera and having a memory”). EX1017, 5:40-43, 16:4-8; *id.*, Figs. 3, 14. Camera 40 captures video, and the aforementioned ADC 48, coupled

to camera 40 via signal path 50, converts the captured video into a digital signal. *Id.*, 5:40-67. The digital signal is provided to inputs of microprocessor 54, and microprocessor 54 “compresses the digitized frame data and stores the compressed frame data in the next sequential location of [a] circular buffer.” *Id.*, 2:45-47, 6:24-26, 6:52-7:6, 10:55-67, 17:50-59; *see also id.*, 11:50-14:44, Figs. 6-8.



Id., Figs. 3, 14 (color added). Yerazunis’s circular buffer is formed in the DRAM 58 (*id.*, 7:7-61, 18:7-12), which is coupled to microprocessor 42 (*id.*, 6:24-26, 6:28-33).

Video electronics 42, which includes microprocessor 54 and DRAM 58, thus discloses the claimed “recorder coupled to the camera and having a memory.” Coupled together as shown in Figures 3 and 14 and described in Yerazunis’s text (*see, e.g., id.*, 5:40-67, 6:14-36), the camera 40 and video electronics 42 form a single unit, and both of them are parts of a video recording device. Figure 2A of Yerazunis shows the video recording device as within a single housing 10, with a recorder coupled to a camera with a lens 12. EX1017, 4:57-5:15. And Figures 9-12 of Yerazunis show a gun camera embodiment with a video recording device 300 including a recorder coupled to a camera with a lens (314 or 324). *Id.*, 14:45-15:56.

175. Yerazunis’s disclosure of the recorder is similar to that of the ’540 patent, which describes a recorder 120 that uses a microprocessor 240 to “receive[] and store[] image data, mark protected data, and process[] the protected data to match what the user has commanded,” and to “operate a RAM, ROM, or other data storage device.” EX1018, 5:20-27; *see also id.*, 3:11-14, 5:28-42, 7:15-27.

d) Element 3: using multiple portions of the memory as a memory loop in which to record segments of the image data in approximately real time;

176. Yerazunis discloses this claim element. Yerazunis’s video recording device “records video frames successively in at least one circular buffer memory organized as a continuous loop overwriting the oldest frame within the respective buffer memory with a more recently received frame,” as illustrated in Figures 4a, 4b (EX1017, 2:19-23, 17:9-20, 17:50-59):

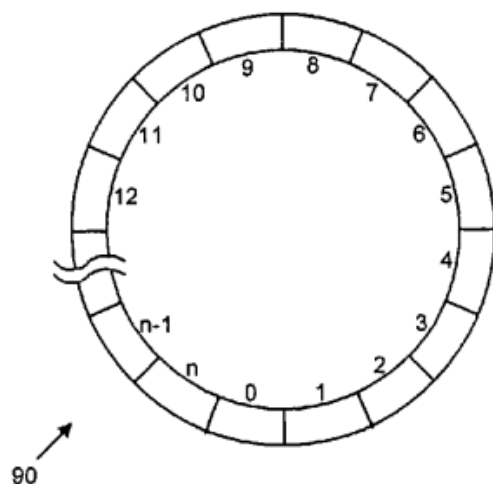


Fig. 4a

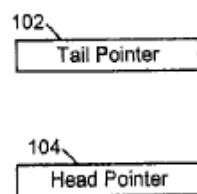


Fig. 4b

Id., Figs. 4a, 4b.

177. In one embodiment, the circular buffer “may be subdivided” to accommodate multiple gun-firing events, with each subdivision (*i.e.*, “portion”) of the memory allocated to a particular event. *Id.*, 16:66-17:38. Each subdivision includes one or more frames, which are discrete segments of image data. A POSITA would have understood Yerazunis’s “circular buffer” (which is “organized as a continuous loop”) to be a “memory loop” of the type described in the ’540 patent.

178. In another embodiment, Yerazunis discloses that upon activation of a still button 74, “the video electronics captures a video frame and stores the frame within the buffer memory 58 [or 60].” EX1017, 9:27-31. A captured frame stored as a result of the activation of the still button 74 can be “stored within a frame location within the circular buffer, however, the frame is protected from overwriting while video capture within the circular buffer continues. Such may be accomplished via tagging

protected frame locations containing captured still frames and checking to determine whether a frame location is protected prior to writing to the frame location.” *Id.*, 9:34-42.

179. Yerazunis’s video recording device records segments of the image data in approximately real time: As explained above, image sensor 46 captures image data, and ADC 48 generates a digital representation of the video image. EX1017, 2:37-41, 5:45-49. Then, microprocessor 54 “compresses the digitized frame data and stores the compressed frame data in the next sequential location of [a] circular buffer,” which is formed in DRAM 58. *Id.*, 2:45-47, 6:24-26, 6:52-7:61, 10:55-11:16, 11:50-14:44, 17:50-59, 18:7-12, and Figs. 5, 6-8. A POSITA would have known that one of the main requirements of video cameras and video recording devices is to record captured data in real-time or approximately real time to eliminate the need for large high-speed temporary buffers or reduce their capacities. In addition, because conventional and well-known techniques for compression and digitization in June 2007 were capable of handling data at real time or near real time speeds, a POSITA would have understood Yerazunis to record “in approximately real time.”

e) Element 4: treating the memory loop as a single file;

180. Yerazunis alone or as combined with Fiore discloses this claim element.

181. Yerazunis discloses tail and head pointers (102 and 104, respectively) that “defin[e] the area(s) of the circular buffer memory.” EX1017, 7:33-61, 17:50-56.

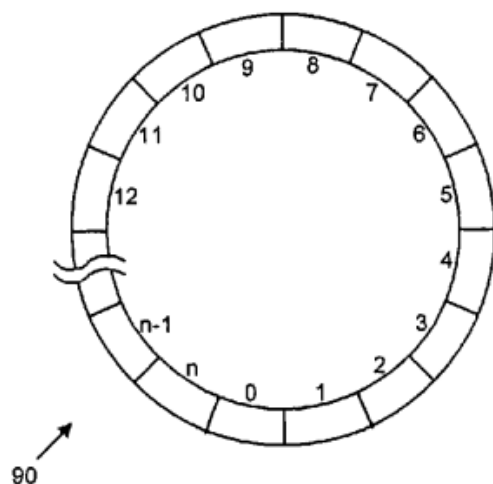


Fig. 4a

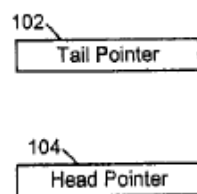
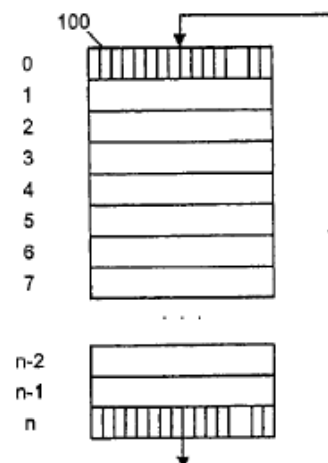


Fig. 4b



Id., Figs. 4a, 4b.

182. While Yerazunis does not expressly refer to “treating the memory loop as a single file,” Yerazunis does disclose that in a gun camera embodiment, “the head pointer 104 and the tail pointer 102 ... defining the area(s) of the circular buffer memory, are stored in a table to allow later retrieval of the video data pertaining to each firing of the gun.” EX1017, 17:50-56. A POSITA would have found it obvious to treat the circular buffer as a single file (*i.e.*, a single identifiable collection of data) based on Yerazunis’s disclosure of storing pointers that “defin[e] the areas(s) of the circular buffer” in memory. Further, a POSITA would have understood that utilizing multiple files can be more time consuming than using a single file, and that using a single file format had been found to be well-suited for implementing a circular storage buffer and for storing video data. And a POSITA would have understood treating the

circular buffer as a single file to be one of a finite number of identified solutions for implementing Yerazunis's circular buffer, evidencing its obviousness.

183. To the extent a POSITA wanted further guidance as to particular methods for implementing Yerazunis's circular buffer and recording image data into the buffer, a POSITA would have been motivated to turn to Fiore. Fiore discloses a circular storage buffer 15 that is treated as a single file: Fiore discloses that the circular storage buffer 15 is implemented as a memory-mapped file (i.e., "a single file"). EX1009, [0022]-[0023], [0051], [0059]-[0060], [0071] (memory-mapped file is preferably "a *single* contiguous disk file"). Fiore also describes advantages of the single file format, including that its single "memory mapped file ... has a memory mapped architecture that combines the access speed of the RAM memory with large storage capacity of a disk file." *Id.*, [0065]. "The memory mapped architecture allows the playback from the circular storage buffer to be independent from recording into the buffer so that such recording is uninterrupted by the playback." *Id.* "Because the circular storage buffer is implemented via a memory mapped file 110 which is preferably a single contiguous disk file, reads and writes to adjacent virtual memory locations are insured to be physically adjacent on the disk drive. In this manner, the circular storage buffer cannot become fragmented on the disk drive." *Id.*, [0071].

184. Fiore also describes indexing collections of frame data for respective events as files within the memory-mapped file. *Id.*, [0022]-[0023], [0051], [0059]-[0060], [0071]-[0072]. Fiore describes the benefits of its file-based approach,

including enabling playback of video data for a specific event from the circular buffer without interrupting simultaneous recording of new video data into the buffer. *Id.*, [0065], [0067]-[0068], [0071]-[0072]. In view of these exemplary benefits, a POSITA would have been motivated to treat Yerazunis's circular buffer as a single file in the manner Fiore discloses.

f) Element 5: protecting the multiple portions, within the single file, from being overwritten by subsequent recording in the memory loop; and

185. Yerazunis alone or as combined with Fiore discloses this claim element.

186. In embodiments, Yerazunis's video recording device includes the microprocessor 54 with "a number of inputs 68 which permit activation of the video recording device and control of the device by a user." EX1017, 6:40-42, Figs. 3, 14. Inputs include still button 74, the activation of which causes a video frame to be "stored within a frame location within the circular buffer," with the "frame [being] protected from overwriting while video capture within the circular buffer continues." *Id.*, 9:27-31, 9:34-42.

187. In Yerazunis's gun-camera embodiment, event sensor 70 is "responsive to the discharge of [a] gun" and thus generates a "gun firing signal" "upon discharge of the gun." EX1017, 3:20-33, 8:8-25, 14:55-61. Upon detection of the gun firing signal from event sensor 70, the microprocessor 54 causes "specified frame data associated with [the] firing event both before and after the event" to be "preserved," such that it "cannot be overwritten as a result of further use of the gun or subsequent

firing events.” *Id.*, 3:25-38, 8:26-30, 15:9-13. With the specified frame data being write protected, “[f]rame data associated with each subsequent firing event[] is stored within an unused portion of the circular buffer memory.” *Id.*, 3:31-33.

188. Yerazunis teaches that when its video recording device is employed with a gun, “it may be desirable to generate a video record which is associated with each firing of the gun.” *Id.*, 16:66-17:4. “The circular buffer memory may be subdivided evenly to accommodate a predetermined number of firings of the gun and an equal number of frames may be stored within the circular buffer memory for each firing.” *Id.*, 17:9-12. “Alternatively, a fraction of the circular buffer memory may be devoted to the storage of data associated with the first firing,” and thereafter “another fraction of the remaining portion of the circular buffer memory may be employed for the storage of frame data pertaining to the second firing of the gun,” and so on. *Id.*, 17:12-38, Figs. 6-8.

189. “To accommodate this objective,” Yerazunis discloses that the write protecting performed by microprocessor 54 may include storing pointers that define areas of the circular buffer that are not to be overwritten “in a table to allow later retrieval of the video data pertaining to each firing of the gun.” *Id.*, 17:45-61. Thus, Yerazunis discloses protecting video data pertaining to multiple events within the single file from being overwritten by subsequent recording in the circular buffer by indexing the video data in a table/index corresponding to the buffer.

190. Further, a POSITA would have recognized the claimed “protecting the multiple portions, within the single file, from being overwritten by subsequent recording in the memory loop” as being one of a finite number of identified solutions for preserving data in Yerazunis, further evidencing its obviousness. A POSITA would have recognized that Yerazunis’s event data must be preserved in some way, and write protecting the event data as multiple portions within a single file (the circular buffer) using indexing was a well-known approach for doing so. Preserving event data using this conventional approach was not innovative but rather a straightforward application of ordinary skill or common sense.

191. To the extent that a POSITA wanted further guidance as to particular methods for indexing or preserving of event data as files in Yerazunis’s buffer, a POSITA would have been motivated to turn to Fiore. Fiore implements its circular storage buffer 15 as a memory-mapped file and describes indexing collections of frame data for respective events as multiple portions within the memory-mapped file. *See, e.g.*, EX1009, [0022]-[0023], [0051], [0059], [0060]. Fiore also describes the benefits of its file-based approach, including that it enables playback of video data for a specific event from the circular buffer without interrupting simultaneous recording of new video data into the buffer. *See, e.g., id.*, [0065], [0067], [0068], [0072]. In view of these exemplary benefits, a POSITA would have been motivated to implement Yerazunis’s microcontroller 54 to “protect[] the multiple portions, within the single

file, from being overwritten by subsequent recording in the memory loop” by indexing the write-protected portions in the buffer in the manner disclosed in Fiore.

- g) Element 6: allowing the editing of the imaged data in protected multiple portions stored in the memory loop within the single file via a recorder control while recording additional segments of the image data in the memory loop within the single file.**

192. Yerazunis alone or as combined with Fiore discloses this claim element.

193. Yerazunis discloses various “editing of the imaged data.” For example, Yerazunis also discloses a purge button 76 that is electronically coupled to microprocessor 54. EX1017, 9:47-48. “Upon activation of the purge button, the contents of the circular buffer and any still images that have been captured are erased. Thus, in the event that a user captures images which, for any reason, such user does not desire to retain, they may be erased.” *Id.*, 9:48-53. Accordingly, write-protected portions are released from protection, which the ’540 patent method claims expressly recite as among potential “editing” steps. EX1018, claim 19 (“wherein the step of allowing the editing of the image data ... includes an action selected from the group consisting of ... releasing a protected portion of the memory from protection”).

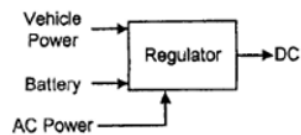
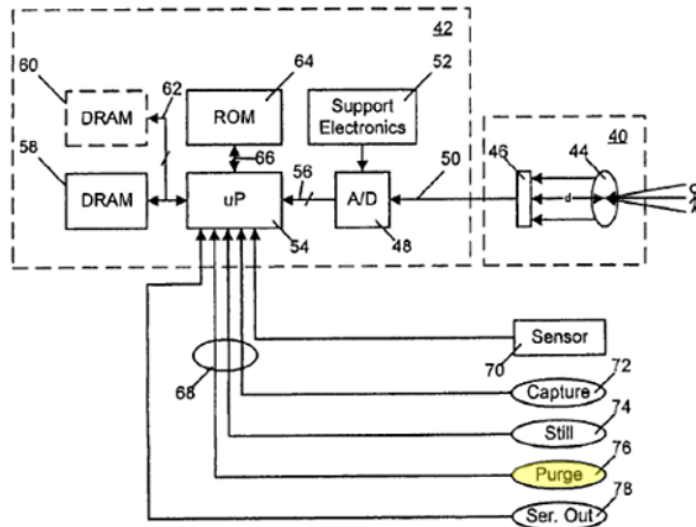


Fig. 3

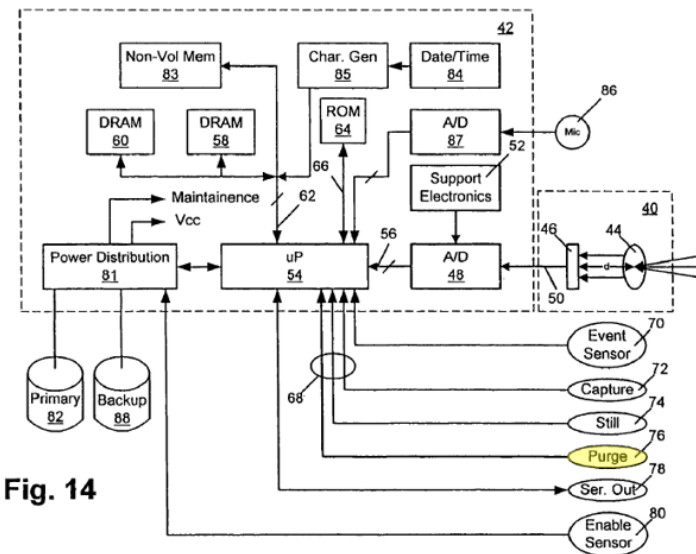


Fig. 14

EX1017, Figs. 3, 14 (color added); *id.*, 19:30-34.

194. Purge button 76 is a “recorder control” because it “permits activation of the video recording device and control of the device by a user.” EX1017, 6:40-44. The releasing from protection occurs while recording additional segments of the

image data: Yerazunis states that recording occurs “continuously” (*id.*, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:56-61), such that the editing (purging) necessarily occurs “while recording additional segments.” A POSITA would have understood the claimed “editing” to be well-known and as covering myriad potential actions. Yerazunis, for example, further discloses that date/time of an event may be “stamped” onto each associated frame. EX1017, 19:1-9.

195. Further, it was known prior to the ’540 patent to allow editing of imaged data in a memory loop. I explain this in Section IV.B.8 above with reference to prior art references including U.S. 5,465,120 (“Schultheiss,” attached as Appendix OO in EX1052), which discloses an “editing process” to “sort, order, crop, and otherwise alter the video” in a memory loop, *see* 1:10-22; U.S. 8,350,907 (“Blanco,” attached as Appendix R in EX1041), which discloses converting a “video clip ... from 30 fps to an arbitrary lower rate” in a memory loop, *see* 5:54-57; PCT Pub. No. WO2004/036926 (“Pearlson,” attached as Appendix X in EX1041), which discloses editing imaged data in a memory loop that includes “formatting video specifically for [a] target device,” *see* 7:26-29; and U.S. 6,624,611 (“Kirmuss,” attached as Appendix PP in EX1052), which discloses superimposing text data on video signals in a memory loop, *see* 13:56-61.

196. And, to the extent a POSITA wanted further guidance as to particular methods for allowing editing while recording additional image data, a POSITA would have been motivated to turn to Fiore. Fiore’s memory mapped file and use of indexing

enable “multiple processes mapped in virtual memory space to read from, and write to the same memory, thereby concurrently sharing the circular storage buffer.” EX1009, [0068]. “The memory mapped file 110 has a memory mapped architecture that combines the access speed of the RAM memory with large storage capacity of a disk file. The memory mapped architecture allows the playback from the circular storage buffer to be independent from recording into the buffer.”; *Id.* at [0065]; *see also id.*, [0023], [0071]-[0072]. A POSITA would have understood that Fiore’s teachings would enable Yerzunis’s editing (purging) to occur while recording (“without interrupting” recording, *id.*), *e.g.*, by enabling processes for editing and recording to “concurrently shar[e] the circular storage buffer.” *Id.*, [0068].

3. Dependent Claims 2-7, 9-15, and 19

197. **Claim 2:** Claim 2 depends from claim 1 and recites “wherein the loop is sufficiently large to store at least five minutes of the image data.” This limitation would have been obvious in view of Yerazunis. In one embodiment, Yerazunis’s memory holds approximately 15 seconds of video data; in another, 30 seconds. EX1017, 8:43-51, 11:31-43. Yerazunis provides motivation for increasing the total recording time, explaining that “[i]t may be desired to increase the memory capacity of the recording device to permit a greater number of frames to be captured or to accommodate the storage of video images received from plural cameras.” *Id.*, 6:33-36. Yerazunis also teaches “[a]dditional semiconductor memory 60 may be coupled

to the microprocessor 54 via a bus 62 in the event that it is desired to increase the semiconductor memory capacity of the video recording device. EX1017, 6:30-33.

198. In addition to increasing memory capacity, Yerazunis also discloses multiple techniques for increasing the total record time that would have been conventional and well-known by June 2007, including using a lower sampling rate (*id.*, 6:12-13), using compression (*id.*, 10:63-67, 11:31-35), and using “any number of storage methods . . . to extend the period of time captured within the semiconductor memory buffer, or to achieve almost any frame capture profile that may be desired,” including those techniques illustrated in Yerazunis’s Figures 6-8. *Id.*, 10:37-49, 11:44-49, 17:34-38. In sum, a POSITA would have been motivated to implement a “sufficiently large” memory loop in the Yerazunis/Fiore system, such as to store at least five minutes of the image data, to permit a greater number of frames to be captured, and a POSITA would have been aware of conventional and well-known techniques for doing so.

199. **Claims 3 and 4:** Claim 3 depends from claim 1 and recites “storing first and second ones of the multiple portions as separate files.” Claim 4 depends from claim 1 and recites “storing first and second ones of the multiple portions in a common file.” Yerazunis alone or as combined with Fiore discloses these limitations.

200. Yerazunis discloses write-protecting multiple events in the circular buffer: Upon detection of the gun firing signal from event sensor 70, the microprocessor 54 causes “specified frame data associated with [the] firing event both

before and after the event” to be “preserved,” such that it “cannot be overwritten as a result of further use of the gun or subsequent firing events” (*id.*, 3:25-38, 8:26-30, 15:9-13); and “[f]rame data associated with each subsequent firing event[] is stored within an unused portion of the circular buffer memory.” *Id.*, 3:31-33; *see also id.*, 16:66-17:4, 17:9-44, Figs. 6-8. “To accommodate this objective,” the write protecting performed by microprocessor 54 may include storing pointers that define areas of the circular buffer that are not to be overwritten “in a table to allow later retrieval of the video data pertaining to each firing of the gun.” *Id.*, 17:45-61. Yerazunis discloses that the circular buffer may be subdivided, with each subdivision (*i.e.*, each identifiable collection of data) accommodating a single event. *Id.* Yerazunis also discloses that “the gun may be refired within the post trigger event time period.” *Id.* at 17:39-44. In such instances, “the recording time may be extended so as to terminate another post event time period after the last such firing.” *Id.* Thus, Yerazunis discloses protecting video data pertaining to multiple events from being overwritten (by subsequent recording) by indexing the video data as one or more files in a table/index corresponding to the buffer.

201. Fiore likewise implements its circular storage buffer 15 as a memory-mapped file and like Yerazunis describes indexing collections of frame data for respective events as multiple portions within the memory-mapped file. *See, e.g.*, EX1009, [0022]-[0023], [0051], [0059], [0060]. “One embodiment of the data recording and playback system also includes an event controller that provides an event

signal associated to time of an event. An event database is provided for storing event signal data, and an event processor is provided that copies a plurality of data frames stored in the circular storage buffer that have time stamps proximate to the time of the event into additional secondary memory mapped files, each containing a single event, indexed from the event database. An access controller may be provided which is adapted to retrieve the plurality of data frames that have time stamps proximate to the time of the event from the event database, the event database being provided in at least one hard disk drive of a computer in one embodiment. The access controller may be connected to a network to allow remote access thereof. In such an embodiment, the System may be provided with at least one client device connected to the network, the client device such as a computer being adapted to remotely control the access controller. In this regard, the client device may include a display device for displaying the plurality of data frames copied from the circular storage buffer.” *Id.* at [0022].

202. In view of Yerazunis and Fiore, it would have been obvious to a POSITA to index the event data either “as separate files” or “in a common file,” as claimed. Both “separate files” and “common files” were conventional and well-known file structures by June 2007, and a POSITA would have been motivated to select either technique to accomplish Yerazunis’s goal of enabling “later retrieval of the video data pertaining to each firing of the gun.” EX1017, 17:45-61. A POSITA would have had a reasonable expectation of success because implementing such file-management

techniques in the Yerazunis/Fiore recording system would have been routine and well within a POSITA's skill.

203. **Claims 5 and 6:** Claim 5 depends from claim 1 and recites “continuing to record the image data immediately after ending at least one of the segments.” Claim 6 depends from claim 1 and recites “continuing to record the image data immediately after protecting at least one of the segments.” Yerazunis discloses these limitations. Yerazunis discloses that recording of image data into the circular buffer occurs continuously. EX1017, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:56-61. Yerazunis thus discloses “continuing to record the image data immediately” (i) “after ending at least one of the segments” (claim 5), and (ii) “after protecting at least one of the segments” (claim 6).

204. Yerazunis also discloses that a captured frame stored as a result of the activation of the still button 74 can be “stored within a frame location within the circular buffer, however, the frame is protected from overwriting *while video capture within the circular buffer continues*,” and this “may be accomplished via tagging protected frame locations containing captured still frames and checking to determine whether a frame location is protected prior to writing to the frame location.” EX1017, 9:34-42.

205. Yerazunis further discloses that when its video recording device is employed with a gun, “it may be desirable to generate a video record which is associated with each firing of the gun.” *Id.*, 16:66-17:4. “To accommodate this

objective, after the conclusion of data storage associated with one firing event, the head pointer 104 and the tail pointer 102 ... defining the area(s) of the circular buffer memory, are stored in a table to allow later retrieval of the video data pertaining to each firing of the gun,” and the pointers “are then reset to allow continued recording into another portion of the circular buffer memory without over writing the previously stored and preserved data.” *Id.*, 17:50-59. Thus, after recording a segment of image data or preserving video data pertaining to an event, “recording of data continues since a subsequent firing event may occur.” *Id.*, 17:45-50.

206. **Claims 7 and 9:** Claim 7 depends from claim 1 and recites “designating a beginning of a first one of the multiple portions in response to a start signal from a user of the camera.” Yerazunis discloses this limitation. Yerazunis discloses an input mechanism through which a user triggers a write-protecting signal, including “a button actuated by a user.” EX1017, 2:58-64; *see also id.*, 9:17-18 and Fig. 3 (describing “capture button 72, which serves as a user activatable trigger event”), Fig. 14 (depicting capture button 72); *see also* Figs. 3, 14 (depicting still button 74). Pushing this button (capture or still) provides a trigger signal to central control processor 54, which causes a portion of the circular buffer to be write protected, which would include designating the beginning of the write-protected portion. *Id.*, 9:19-22.

207. Yerazunis’s video recording device may also be “interfaced directly to the trigger of the gun” such that “the trigger is employed to generate a switching action or signal which is used to indicate a trigger event.” EX1017, 16:59-62. The gun

trigger results in “designating a beginning of a first one of the multiple portions” just as with the capture or still button.

208. Claim 9 depends from claim 7 and recites “designating an end of the first one of the multiple portions in response to a stop signal from the user.” Yerazunis discloses this limitation. Yerazunis’s video recording device responds to a signal from a user to save a recording by write protecting specified frame data in the circular buffer. EX1017, 3:20-38, 8:8-30, 14:55-61, 15:9-13. The signal from the user includes “a stop signal,” as recited in claim 9. Specifically, Yerazunis’s signal from the user tells the video recording device when to (i) start recording, *i.e.*, upon detection of the signal, EX1017, 3:25-38, 8:26-30, 15:9-13, and when to (ii) stop recording by designating an end of a write-protected portion, *i.e.*, when a predetermined number of frames subsequent to the trigger event have been write protected, *id.*, 2:53-64, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:38. Yerazunis thus discloses the limitations added in claim 9.

209. **Claim 10:** Claim 10 depends from claim 7 and recites “wherein the start signal comprises a manually operated switch.” Yerazunis discloses this limitation. As explained for claim 7, Yerazunis teaches a “capture button 72 which serves as a user activatable trigger event” (EX1017, 9:17-18; *see also id.*, 2:58-64), a “still” button (*id.*, 9:27-46), and a gun trigger “directly interfaced to” Yerazunis’s video recording device (*id.*, 16:59-62). The capture button, still button, and gun trigger are “manually operated switch[es]” that trigger the signal to write protect video data.

210. **Claim 11:** Claim 11 depends from claim 7 and recites “wherein the start signal comprises an audio signal.” Yerazunis discloses this. Yerazunis’s “event sensor 70 is operative to generate a trigger signal in response to the discharge of the gun,” and may comprise a microphone “operative to detect the sound associated with the firing of the gun” (*i.e.*, “audio signal”). EX1017, 16:43-55; *see also* 8:17-19.

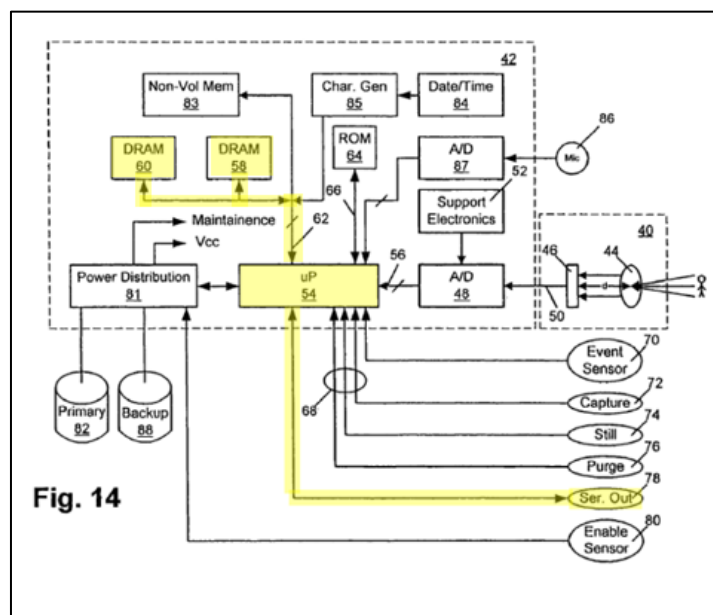
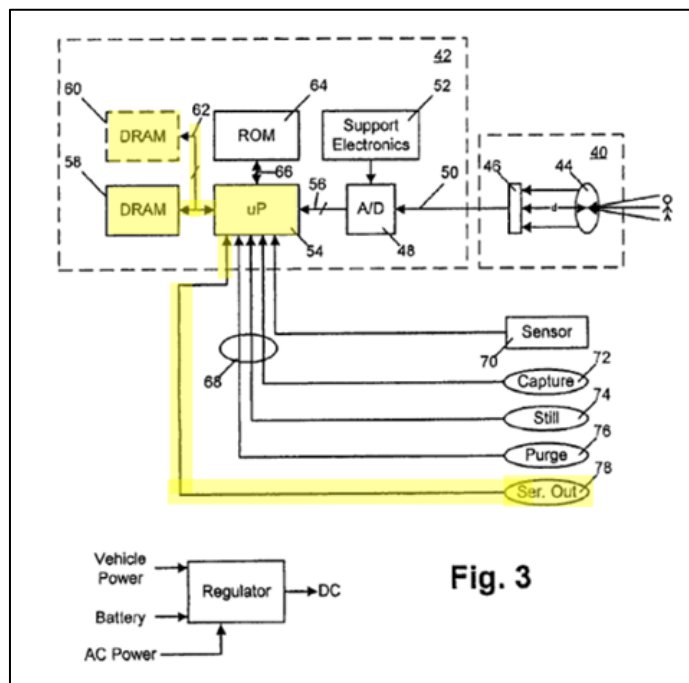
211. **Claim 12:** Claim 12 depends from claim 7 and recites “including in the first one of the multiple portions, a time span of the image data that occurred prior to the start signal.” Yerazunis discloses this limitation. EX1017, 2:53-58, 4:35-56, 8:8-61, 10:37-49, 11:31-43. In one embodiment, upon detecting a gun-firing signal, microprocessor 54 causes “specified frame data associated with [the] firing event both before and after the event” to be “preserved,” such that it “cannot be overwritten as a result of further use of the gun or subsequent firing events.” EX1017, 3:25-38, 8:26-30, 15:9-13. The frame data from *before* the event, which is preserved in response to the gun-firing signal, discloses the claimed “time span of the image data that occurred prior to the start signal.”

212. **Claims 13 and 14:** Claim 13 depends from claim 12 and recites “wherein the time span comprising at least 5 seconds” Claim 14 depends from claim 12 and recites “wherein the time span comprising at least 15 seconds” Yerazunis discloses these limitations. In one embodiment, the write-protected segment is approximately 15 seconds long, half being the pre-recorded subset (*i.e.*, the “time span”). EX1017, 11:31-43. In another embodiment, the write-protected segment is approximately 30

seconds long, half being the pre-recorded subset. *Id.*, 8:43-51. This discloses the limitations of claims 13 and 14: the approximately 7.5-second pre-recorded segment is “at least 5 seconds” and the approximately 15-second pre-recorded segment is “at least 15 seconds.” Yerazunis teaches that “the number of frames that are recorded before and after [a trigger signal] are a matter of design choice.” *Id.*, 8:51-55.

213. Further, as explained for claim 2, a POSITA would have been motivated to increase the total record time, and would have had a reasonable expectation of success in doing so. For at least these same reasons, a POSITA would have been motivated to increase the “time span” of the image data that occurred prior to the start signal, including at least to capture events preceding the trigger signal, *e.g.*, additional actions of a suspect preceding a police officer’s firing of his gun. This would have been routine and well within a POSITA’s skill, as evidenced by, as one example, Ely, which discloses write protecting a “ten minute period” with “five minutes prior to the alarm and five minutes after.” EX1020, 10:60-65; *see also* EX1015 (Mann), [0065].

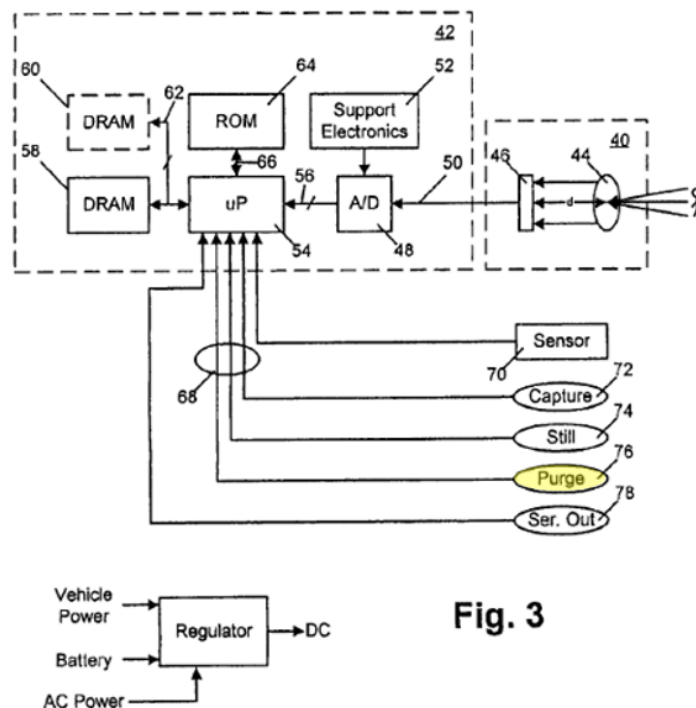
214. **Claim 15:** Claim 15 depends from claim 1 and recites “wirelessly transmitting a first one of the segments to a remote memory, and releasing a corresponding one of the multiple portions of memory from protection.” Yerazunis discloses this limitation. Yerazunis’s microprocessor 54 includes a serial output channel 78 that is “provided to permit recorded frame data to be downloaded to a computer for viewing.” EX1017, 3:1-2, 6:45-51, 18:60-66.

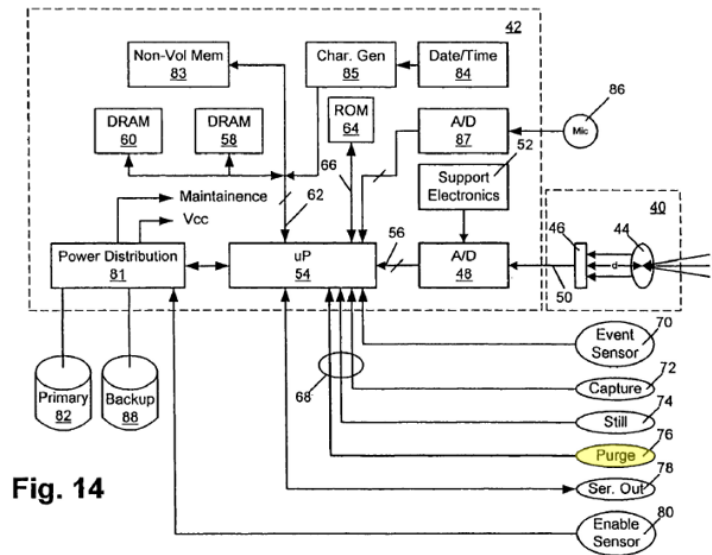


Id., Figs. 3, 14 (color added). Serial output channel 78 “is employed to download captured and stored video images” from the circular buffer of DRAM 58 “to an external Personal Computer (PC)” (*id.*) or to “a radio transmitter to transmit RF signals to a base station.” EX1017, 9:63-10:3. Serial output channel 78 coupled to Yerazunis’s radio

transmitter discloses “wirelessly transmitting a first one of the segments to a remote memory.”

215. As explained for element 6 of claim 1, Yerazunis also discloses “releasing a corresponding one of the multiple portions of memory from protection”: Yerazunis discloses a purge button 76, and that “[u]pon activation of the purge button, the contents of the circular buffer and any still images that have been captured are erased. Thus, in the event that a user captures images which, for any reason, such user does not desire to retain, they may be erased.” *Id.*, 9:48-53. It would have been obvious to a POSITA that one reason the “user does not desire to retain” captured images is that the images have been offloaded.





EX1017, Figs. 3, 14 (color added); *id.*, 19:30-34.

216. **Claim 19:** Claim 19 depends from claim 1 and recites “wherein the step of allowing the editing of the image data while recording additional segments in the loop includes an action selected from the group consisting of book-marking an additional portion of the loop memory, and releasing a protected portion of the memory from protection.” As explained for element 6 of claim 1, Yerazunis alone or as combined with Fiore discloses this limitation via the “purge” button that “releas[es] a portion of the memory from protection.” Additionally, Yerazunis discloses that a “gun firing signal may be generated upon discharge of the gun,” and “specified frame data associated with that firing event both before and after the event is preserved and cannot be overwritten as a result of further use of the gun or subsequent firing events.” Yerazunis 3:19-31. “Frame data associated with each subsequent firing event[] is stored within an unused portion of the circular buffer memory.” *Id.*, 3:31-33. A

POSITA would understand that the ability of Yerzunis to detect, mark, and store write-protected events is an automatic bookmarking functionality.

C. Ground 1b: Claims 16-18 Of The '540 Patent Would Have Been Obvious Over Yerazunis Alone Or As Combined With Fiore, In Further View Of Mann

1. Motivation To Combine

217. POSITA would have been motivated to combine Mann with Yerazunis and Fiore. Yerazunis describes a “compact video image recording device,” which is “mountable to a gun” or mounted within a vehicle. EX1017 at Abstract, 4:35-39. Like Yerazunis, Mann discloses a compact, mountable camera system: Mann describes a body-worn portable electronic camera system with wearable viewfinder means, particularly as built into eyeglass frames. EX1015 at [0001], [0056]. Because all three of Yerazunis, Fiore, and Mann disclose video recording systems—and Yerazunis and Mann in particular disclose compact, mountable systems—a POSITA would have been aware of and motivated to combine these references. Mann also describes why a POSITA would have been motivated to implement the Yerazunis/Fiore system in an eyeglasses-mounted apparatus. Among other reasons, Mann’s wearable viewfinder system advantageously “allows the user to record a portion of his or her eye’s visual field of view.” EX1015 at [0044].

2. Dependent Claims 16-18

218. *Claims 16 and 17:* Claim 16 depends from claim 1 and recites “[a] system comprising electronics that implements the method of claim 1, and a clothing

accessory that supports the sensor.” Claim 17 depends from claim 16, and recites “wherein the clothing accessory comprises a pair of glasses.” Yerazunis alone or as combined with Fiore, in further view of Mann, discloses these limitations. For claim 16, Yerazunis alone or as combined with Fiore discloses a “system comprising electronics that implements the method of claim 1,” as explained above for claim 1. For claim 17, Mann discloses “a clothing accessory that supports the sensor,” which is “a pair of glasses.” Mann describes a body-worn portable camera system with wearable viewfinder means, particularly as built into eyeglass frames 100 with lenses 105 and cameras 110 and 120, as illustrated in Figure 1. EX1015, [0001], [0056]-[0058], Fig. 1.

219. **Claim 18:** Claim 18 depends from claim 17 and recites “providing a viewfinder in a lens of the glasses.” Mann discloses this limitation. As illustrated in Figure 1, the optics of the viewfinder (optical system 150) are concealed in or behind one or both of the glass lenses. *Id.*, [0047], [0058]. “This optical system provides a magnified view of an electronic display,” which “acts as a viewfinder screen.” *Id.*, [0058].

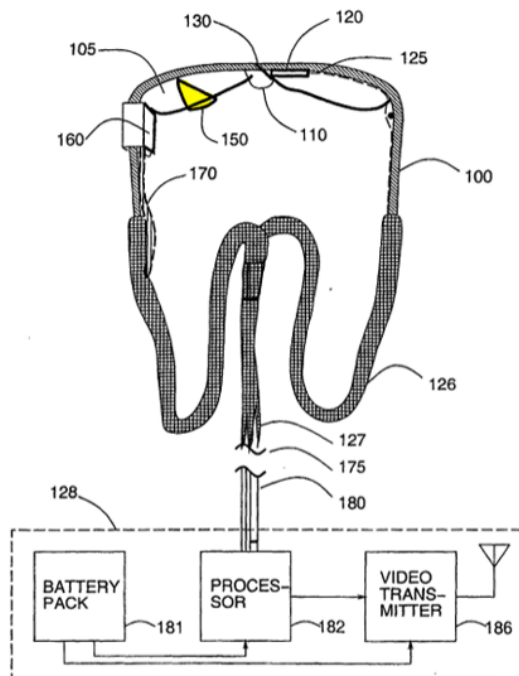


FIG. 1 - FOVEATED EMBODIMENT OF WEARABLE CAMERA SYSTEM

EX1015, Fig. 1 (color added).

D. Ground 1c: Claim 8 Of The '540 Patent Would Have Been Obvious Over Yerazunis Alone Or As Combined With Fiore, In Further View Of Strub

220. Claim 8 depends from claim 7 and recites “using a switch in a clothing accessory to operate an aspect of the method.” To the extent Yerazunis and Fiore do not disclose this limitation, it would have been obvious in view of Strub (EX1046).

221. The combination of the Yerazunis/Fiore video recording device with Strub discloses “using a switch in a clothing accessory to operate an aspect of the method,” as recited in claim 8 of the '540 patent. Strub discloses using a wearable item (a clothing accessory) with pushbuttons (a switch) to control operation of a physically separate recording unit. EX1046, 54:20-33. A POSITA would have been

motivated to implement the Yerazunis/Fiore video recording device with Strub's wearable item with user-pressable pushbuttons to facilitate operation of the video recording device by a user. For example, a police officer surveilling a situation with Yerazunis's video recording device (*e.g.*, mounted on a gun or in a car) could use Strub's wearable item to discretely take video or photographs (*i.e.*, "using a sensor in the camera to capture image data," as recited in method claim 1 of the '540 patent) without handling the video recording device directly. *See also* EX1049 (Blum), EX1050 (Blum provisional).

E. Ground 2a: Claims 1-7, 9-14, And 19 Of The '540 Patent Would Have Been Obvious Over Ely Alone Or As Combined With Fiore

1. Motivation To Combine

222. A POSITA would have been motivated to combine Ely and Fiore for multiple reasons.

223. As one example, both references describe similar technologies and solve similar problems. Ely describes a surveillance system that uses a ring buffer (*i.e.*, a circular buffer) to continuously record a video signal generated by a camera 130, and portions of the ring buffer are write protected in response to an alarm command. Ex. 1020 at 6:51-53, 6:61-65, 7:28-39. The write-protected portions include video data recorded both before and after the alarm command. *Id.* at 7:48-55. Fiore similarly discloses a "data recording and playback system" that uses "a circular storage buffer having a memory mapped file with same address space as the memory

device for storing the input signal data.” EX1009 at Abstract. In Fiore, “data frames before, during, and after [an] event” are preserved, similar to what is disclosed in Yerazunis. *Id.* at [0048]. Because Ely and Fiore both disclose data recording systems that store data in a circular buffer and preserve data associated with an event (or alarm)—both before and after the event—a POSITA would have been aware of and motivated to combine the two references.

224. As another example, a POSITA would have been motivated to implement Ely’s video surveillance system with Fiore’s file-based approach for the circular storage buffer and event data stored therein. Ely discloses that a write-protected portion of the ring buffer can be retrieved and used in various ways (*see, e.g.*, EX1020 at 7:56-8:6, 10:17-23), such that a POSITA would have understood the write-protected portion as being indexed as a file (*i.e.*, an identifiable collection of data) in the ring buffer. To the extent, however, that a POSITA needed further guidance on ways to implement data or file storage techniques in a circular buffer, the POSITA would have been motivated to turn to Fiore. Fiore’s file-based approach includes (i) implementing a circular storage buffer as a memory-mapped file and (ii) indexing event data for events as respective files within the memory-mapped file. *See, e.g.*, EX1009 at [0022]-[0023], [0051], [0059], [0060]. Fiore also describes numerous benefits of its file-based approach. *See, e.g., id.* at [0065], [0067], [0068], [0072].

225. In view of these exemplary benefits, and other reasons discussed in this declaration, a POSITA implementing Ely would have been motivated to utilize Fiore’s

teachings on the circular storage buffer implemented as a memory-mapped file and the indexing of event data as files within the circular storage buffer. A POSITA would have had a reasonable expectation of success because Fiore provides a detailed disclosure of its file-based approach, and applying those techniques to Ely's surveillance system would have been routine and well within a POSITA's skill.

2. Independent Claim 1

a) Preamble

226. For purposes of this declaration, I have applied Patent Owner's construction of claim 1, including that the preamble is not limiting and "is duplicative of the limitations in the body of the claim." EX1047, 1-2. I address the prior art's disclosure of the limitations alleged to be duplicative of the preamble below. I note, however, that Ely does disclose a method in which a "camera unit or units respond to the alarm command by protecting buffered video data which corresponds to a predetermined pre-and post-alarm time period," with multiple "blocks of alarm data" being saved. EX1020, 10:10-15, 10:59-11:8.

b) Element 1

227. Ely discloses this claim element. Ely's camera unit 114 includes a camera 130 with the claimed "sensor ... to capture image data":

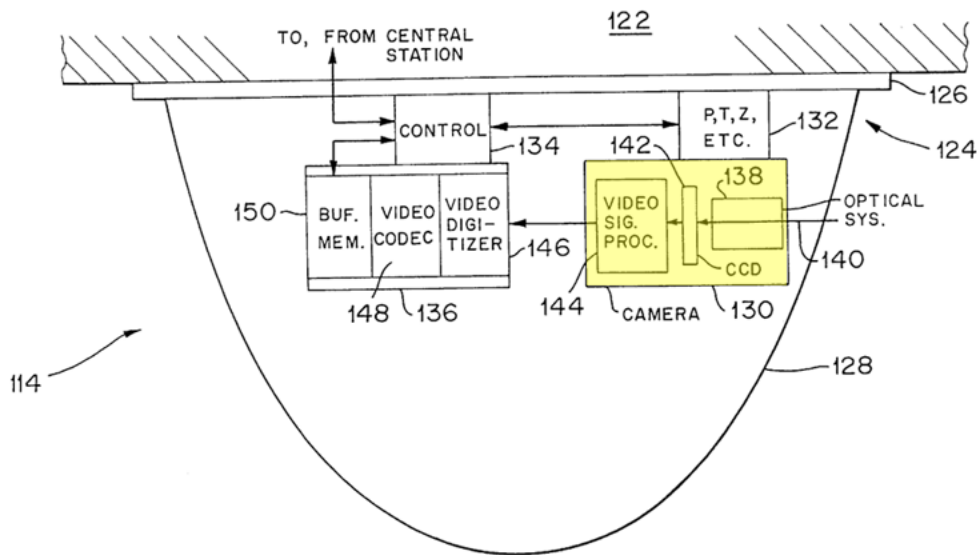


FIG. 3

EX1020, Fig. 3 (color added).

228. In the camera 130, an “image formed by the optical system 138 is converted into an electrical signal at CCD 142 and the resulting signal is subjected to conventional analog signal processing at video signal processing circuit 144.” *Id.*, 6:21-28. The camera 130 thus discloses the claimed “sensor” because it has a CCD 142 that captures video images that impinge on it.

c) Element 2

229. For purposes of this declaration, I have applied Patent Owner’s construction of claim 1, including that the claimed camera and recorder are “coupled” if they “come together to form a single unit,” with “a camera substructure as a component within an entire recording device.” EX1047, 1-2, 4. Ely discloses this claim element. Ely’s camera unit 114 includes a recorder (memory board 136 under

TO, FROM CENTRAL STATION

122

126

124

P, T, Z, ETC. 132

CONTROL 134

150

BUF. MEM. VIDEO CODEC VIDEO DIGI-TIZER 148 136

146

VIDEO SIG. PROC. 142

138

OPTICAL SYS. 140

CCD 130

CAMERA 144

128

114

EX1020, Fig. 3 (color added); *see also* 3:46-55.

-182-

discloses the claimed “recorder coupled to the camera and having a memory.” Coupled together as shown in Figure 3 and described in Ely’s text (*see, e.g., id.*, 6:17-21, 6:48-65), the camera 130 and memory board 136 form a single unit, and both of them are parts of a camera unit 114.

d) Element 3

231. Ely discloses this claim element. Ely’s memory device 150 “functions as a buffer for the video signal generated by the camera 130, and is controlled by the control circuit 134.” EX1020, 6:61-65. “[M]emory 150 serves as a ring buffer, in which currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150.” *Id.*, 7:28-34. A POSITA would have understood the “ring buffer” to mean a “memory loop” of the type disclosed in the ’540 patent.

232. The compressed video data is stored as one or more frames, which are discrete segments of image data, and Ely’s circular buffer may be organized into multiple “blocks” (*i.e.*, “multiple portions”) containing one or more segments of image data corresponding to an event (EX1017, 10:56-11:2). Block 154 of Figure 4 further illustrates this step of “stor[ing] live compressed video data” in the ring buffer:

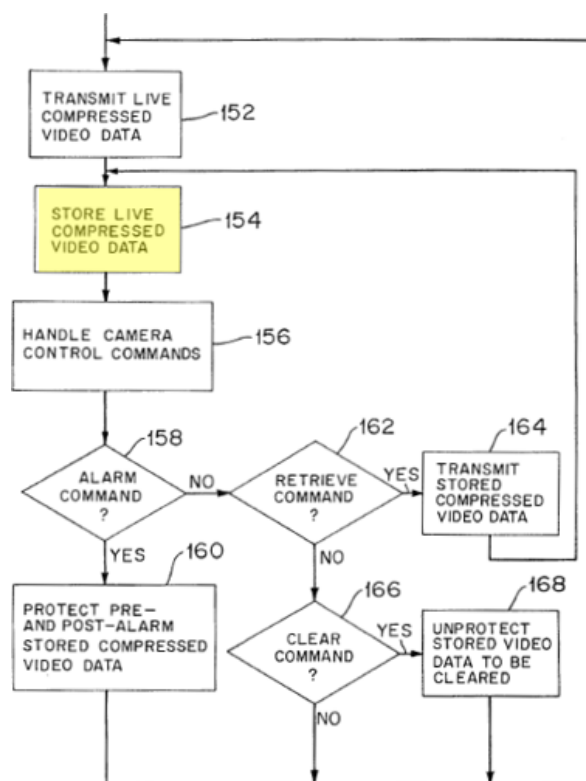


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added). A POSITA would have understood “stor[ing] live compressed video data” to mean recording segments of the image data in approximately real time—*i.e.*, recording video data that is “live” after conversion into an electrical signal at CCD 142, digitization, and/or compression. *Id.*, 6:21-28, 6:48-65. Additionally, a POSITA would know that one of the main requirements of video cameras and video recording devices is to record captured data in real-time or approximately real time to eliminate the need for large high-speed temporary buffers or reduce their capacities. Moreover, because conventional and well-known techniques for compression and digitization in June 2007 were capable of handling data at real time or near real time speeds, a POSITA would have understood Ely to record “in approximately real time.”

e) Element 4

233. Ely alone or as combined with Fiore discloses this claim element.

234. Ely discloses that the camera system responds to an “alarm command by protecting buffered video data which corresponds to a predetermined pre- and post-alarm time period” and the “protected data is then available for subsequent retrieval, display, and permanent recording” EX1020, 10:11-17. In Ely, “[a]fter the compressed video data stored at one of the camera units has been protected pursuant to an alarm command, the data (which will sometimes be referred to as ‘alarm data’) can be selectively retrieved in response to user instruction either for display (block 180) or directly for taperecording (block 182).” *Id.*, 10:17-23.

235. While Ely never expressly refers to treating the ring buffer as a single file, a POSITA would have understood that utilizing multiple files can be more time consuming than using a single file, and that using a single file format had been found to be well-suited for implementing a ring buffer and for storing video data. And a POSITA would have understood treating the ring buffer as a single file to be one of a finite number of identified solutions for implementing Ely’s ring buffer, evidencing its obviousness.

236. To the extent a POSITA wanted further guidance as to particular methods for implementing Ely’s ring buffer and recording image data into the buffer, a POSITA would have been motivated to turn to Fiore. Fiore discloses a circular storage buffer 15 that is treated as a single file: Fiore discloses that the circular storage buffer

15 is implemented as a memory-mapped file (*i.e.*, “a single file”). EX1009, [0022]-[0023], [0051], [0059]-[0060], [0071] (memory-mapped is preferably “a *single* contiguous disk *file*”). Fiore describes advantages of the single file format. *See, e.g., id.*, [0065] (“memory mapped file ... combines the access speed of the RAM memory with large storage capacity of a disk file”), [0071] (“reads and writes to adjacent virtual memory locations are insured to be physically adjacent on the disk drive,” ensuring that “the circular storage buffer cannot become fragmented”).

237. Fiore also describes indexing collections of frame data for respective events as files within the memory-mapped file. Fiore describes the benefits of its file-based approach, including enabling playback of video data for a specific event from the circular buffer without interrupting simultaneous recording of new video data into the buffer. *Id.*, [0065], [0067]-[0068], [0072]. In view of these exemplary benefits, a POSITA would have been motivated to treat Ely’s ring buffer as a single file in the manner Fiore discloses.

f) Element 5

238. Ely alone or as combined with Fiore discloses this claim element.

239. First, Ely discloses that overwriting of data in the ring buffer “is subject to inhibition in response to alarm commands.” EX1020, 7:34-35. “On such occasions, the live compressed video data is written into a portion of the memory device 150 which does not hold video data that is to be preserved.” *Id.*, 7:35-38. “When an alarm command is received,” a process is “carried out in which the control circuit 134

protects from over-writing compressed digital video data previously stored in the memory 150.” EX1020, 7:48-55. The write-protected video data “correspond[s] to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continu[es] for a predetermined time after receipt of the alarm command.” *Id.*; *see also id.*, 10:11-15. Multiple “blocks” of alarm data for respective alarm commands can be protected within the ring buffer. *See id.*, 10:59-11:2.

240. Second, Ely discloses that “[a]fter the compressed video data stored at one of the camera units has been protected pursuant to an alarm command, the data (which will sometimes be referred to as ‘alarm data’) can be selectively retrieved in response to user instruction either for display (block 180) or directly for taperecording (block 182).” *Id.*, 10:17-23. A POSITA would have understood that selectively retrieving alarm data associated with an alarm command necessitates an ability to locate the alarm data within the buffer by indexing the alarm data in a table/index corresponding to the buffer. Thus, Ely discloses protecting alarm data pertaining to multiple alarm commands within the single file from being overwritten by subsequent recording in the buffer by indexing the alarm data in a table/index corresponding to the buffer. *Id.*

241. A POSITA would have found it obvious to protect video data for multiple events within the single file from being overwritten by subsequent recording in the memory loop based on Ely’s disclosure of storing the alarm data for subsequent, selective “retrieval, display, and permanent recording.” Further, a POSITA would

have recognized the claimed “protecting the multiple portions, within the single file” as being one of a finite number of identified solutions for preserving alarm data in Ely, further evidencing its obviousness. A POSITA would have recognized that Ely’s alarm data must be preserved in some way, and write protecting the alarm data as multiple portions within a single file was a well-known approach for doing so. Preserving event data using this conventional approach was not innovative but rather a straightforward application of ordinary skill or common sense.

242. To the extent that a POSITA wanted further guidance as to particular methods for indexing or preserving of alarm data as files in Ely’s buffer, a POSITA would have been motivated to turn to Fiore. Fiore implements its circular storage buffer 15 as a single memory-mapped file and describes indexing collections of frame data for respective events as multiple portions within the memory-mapped file. *See, e.g.,* EX1009, [0022]-[0023], [0051], [0059], [0060]-[0061]. Fiore also describes the benefits of its file-based approach, including that it enables playback of video data for a specific event from the circular buffer without interrupting simultaneous recording of new video data into the buffer. *See, e.g., id.,* [0065], [0067], [0068], [0072]. In view of these exemplary benefits, a POSITA would have been motivated to implement Ely’s control circuit 134 to “protect[] the multiple portions, within the single file, from being overwritten by subsequent recording in the memory loop” by indexing the write-protected portions in the buffer in the manner disclosed in Fiore.

g) Element 6

243. Ely discloses this claim element. Ely's control circuit 134 responds to "clear" commands by removing a block of stored video data from protection, thereby permitting "live" video data to be written over the now-unprotected video data. EX1020, 8:7-12. The clear command may be sent after write-protected alarm data is retrieved and transmitted. *Id.*, 10:24-43, 10:51-55, Fig. 4, Fig. 5B (block 190). Accordingly, write-protected portions are released from protection, which claims of the '540 patent explicitly recite as an "editing" step. *See* EX1018, claim 19. And as explained in Section IV.B.8, it was known to allow editing of imaged data in a memory loop prior to the alleged invention of the '540 patent.

244. Additionally, Ely's clear command is a "recorder control" because it directs control circuit 134—which controls the ring buffer—to remove write protection from alarm data. The releasing from protection occurs while recording additional segments of the image data: As illustrated in Figure 4, after unprotection of alarm data (block 168), the process loops back to block 154, "stor[ing] live compressed video data":

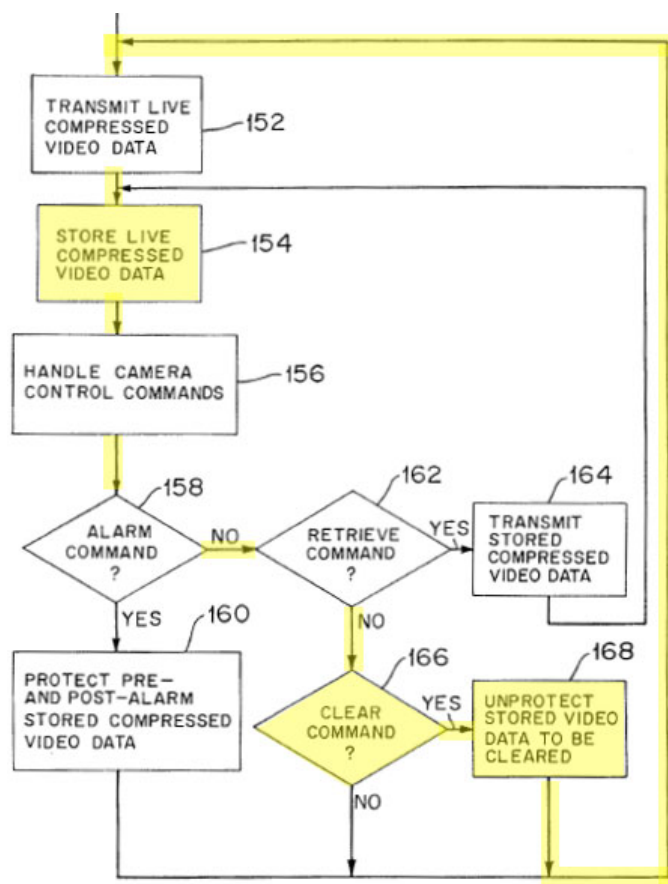


FIG. 4
CAMERA UNIT OPERATION

EX1020, Fig. 4 (color added); *see also id.*, 7:45-48, 8:3-6. Further, because the recording of live video data is “ongoing” (*i.e.*, continuous), the unprotection of alarm data necessarily occurs while recording additional segments of image data. *See id.*, Fig. 4, 7:45-48, 7:56-8:6.

245. To the extent a POSITA wanted further guidance as to particular methods for allowing editing while recording additional image data, a POSITA would have been motivated to turn to Fiore. Fiore’s memory mapped file and use of indexing enable “multiple processes mapped in virtual memory space to read from, and write to the same memory, thereby concurrently sharing the circular storage buffer.” *Id.*,

[0068]. “The memory mapped file 110 has a memory mapped architecture that combines the access speed of the RAM memory with large storage capacity of a disk file. The memory mapped architecture allows the playback from the circular storage buffer to be independent from recording into the buffer.” *Id.* at [0065]; *see also id.*, [0023], [0071]-[0072]. A POSITA would have understood that Fiore’s teachings would enable Ely’s editing (releasing from protection) to occur while recording additional segments, *e.g.*, by enabling processes for editing and recording to “concurrently shar[e] the circular storage buffer.” *Id.*, [0068].

3. Dependent Claims 2-7, 9-14, And 19

246. ***Claim 2:*** Ely discloses the limitations added in dependent claim 2. In one embodiment, the buffer has a storage capacity of “thirty minutes of video signals,” and “each alarm command initiates protection of buffered video signals corresponding to a ten minute period (say five minutes prior to the alarm and five minutes after).” EX1020, 10:60-65.

247. ***Claims 3 and 4:*** Ely discloses the limitations added in dependent claims 3 and 4.

248. Ely discloses that “[a]fter the compressed video data stored at one of the camera units has been protected pursuant to an alarm command, the data (which will sometimes be referred to as ‘alarm data’) can be selectively retrieved in response to user instruction either for display (block 180) or directly for taperecording (block 182).” EX1020, 10:17-23. Ely further discloses write-protecting multiple events (as

multiple “blocks”) in the ring buffer. *Id.*, 10:59-11:2. Thus, Ely discloses protecting alarm data pertaining to multiple events from being overwritten (by subsequent recording) by indexing the alarm data as one or more files in a table/index corresponding to the buffer.

249. Fiore implements its circular storage buffer 15 as a memory-mapped file and describes indexing collections of frame data for respective events as multiple portions within the memory-mapped file. *See, e.g.*, EX1009, [0022]-[0023], [0051], [0059], [0060]. “One embodiment of the data recording and playback system also includes an event controller that provides an event signal associated to time of an event. An event database is provided for storing event signal data, and an event processor is provided that copies a plurality of data frames stored in the circular storage buffer that have time stamps proximate to the time of the event into additional secondary memory mapped files, each containing a single event, indexed from the event database. An access controller may be provided which is adapted to retrieve the plurality of data frames that have time stamps proximate to the time of the event from the event database, the event database being provided in at least one hard disk drive of a computer in one embodiment. The access controller may be connected to a network to allow remote access thereof. In such an embodiment, the System may be provided with at least one client device connected to the network, the client device such as a computer being adapted to remotely control the access controller. In this

regard, the client device may include a display device for displaying the plurality of data frames copied from the circular storage buffer.” *Id.* at [0022].

250. In view of Ely and Fiore, it would have been obvious to a POSITA to index the event data either “as separate files” or “in a common file,” as claimed. Indeed, both “separate files” and “common files” were conventional and well-known file structures by June 2007, and a POSITA would have been motivated to select either technique to accomplish Ely’s goal to enable selective retrieval of alarm data in response to user instruction. EX1020, 10:17-23. A POSITA would have had a reasonable expectation of success because implementing such file-management techniques in the Ely/Fiore recording system would have been routine and well within a POSITA’s skill.

251. **Claims 5 and 6:** Ely discloses the limitations added in dependent claims 5 and 6. Ely discloses that recording of image data into the ring buffer is “ongoing” and thus occurs continuously. EX1020, Fig. 4, 7:45-48, 7:56-8:6. With reference to Figure 4, for example, Ely describes the process of block 154 (“store live compressed video data”) as being “ongoing” (*id.*, 8:3-6) and occurring “concurrently” with other processes (*id.*, 7:45-48):

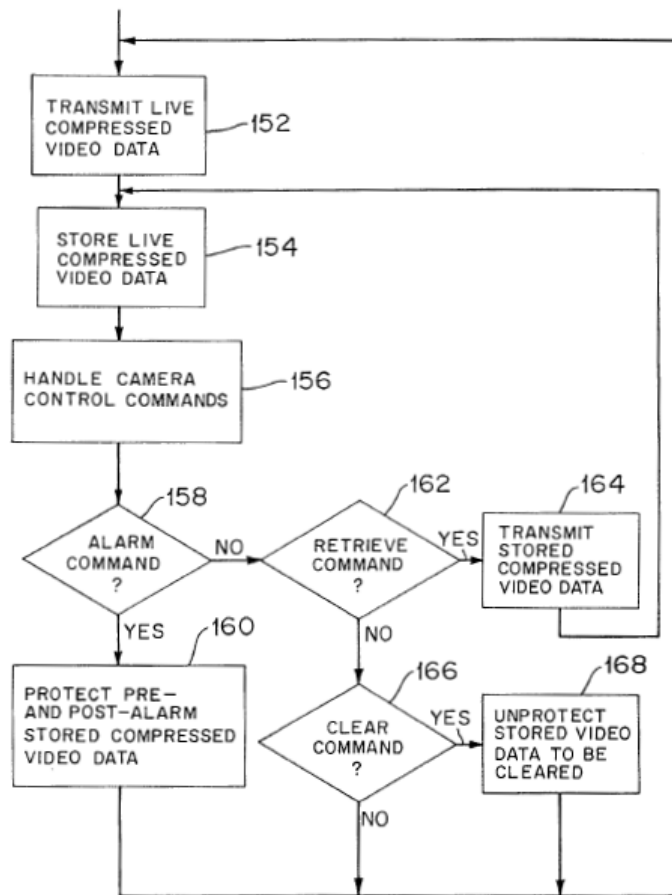


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4.

252. Because recording of image data into the ring buffer occurs continuously, Ely thus discloses “continuing to record the image data immediately” (i) after ending at least one of the segments” (claim 5), and (ii) “after protecting at least one of the segments” (claim 6).

253. Further, Ely discloses write-protecting multiple events (as respective “blocks”) in the ring buffer. *Id.*, 10:59-11:2. A POSITA would have understood that to preserve multiple events in the ring buffer, Ely must “continu[e] to record the image

data immediately after protecting at least one of the segments,” *e.g.*, after protecting a first block of alarm data.

254. **Claims 7 and 9:** Ely discloses the limitations added in dependent claim 7. Ely discloses that “an alarm condition can be generated by a system operator via the user interface.” EX1020, 11:42-47. Ely further describes the user interface as responding to inputs from common computer peripherals (*e.g.*, a mouse, keyboard) and a “TOUCHTRACKER” control module. *Id.*, 5:60-6:3.

255. Ely discloses the limitations added in claim 9. Ely’s system responds to a signal from a user to save a recording by write protecting specified digital video data in the ring buffer. EX1020, 7:48-55, 10:11-15. The signal from the user includes “a stop signal,” as recited in claim 9. Ely’s alarm command tells the video recording device when to (i) “start recording,” *i.e.*, upon receipt of the alarm command, and when to (ii) “stop recording,” *i.e.*, when a predetermined amount of time has passed after receipt of the alarm command. EX1020, 7:48-55, 10:11-23.

256. **Claim 10:** Ely discloses the limitations added in dependent claim 10 for the reasons discussed for claim 7.

257. **Claim 11:** Ely in view of Fiore renders obvious the limitations added in dependent claim 11. Ely discloses various sensors 120 (*e.g.*, motion sensors, heat sensing devices) that generate alarm signals to trigger write protection. EX1020, 5:46-55, 7:48-55, 10:1-23, 11:40-47. To the extent Ely does not disclose “the start signal comprises an audio signal,” Fiore does. Fiore’s signal processor is connected to a

monitoring device, which “may be any type of a device for monitoring such as a video camera, microphone, a sensor, etc., that functions as a signal source for providing an input signal data to the signal processor.” EX1009, [0040]. In “the case of an audio signal the analyzer may trigger an event on the sudden change of amplitude.” *Id.*, [0046].

258. A POSITA would have been motivated to implement the Ely/Fiore system with Fiore’s teachings regarding a microphone or audio sensor for triggering an alarm signal. Ely discloses various sensors 120 for generating alarm signals (EX1020, 5:46-53, 7:48-55), and a POSITA would have been motivated to implement a microphone as an alarm sensor, *e.g.*, to detect breakage of glass or other noisy occurrences. A POSITA would have recognized this audio sensing as complementing Ely’s other sensor types and advantageously enabling a wider variety of events to be detected.

259. **Claim 12:** Ely discloses the limitations added in dependent claim 12. Ely discloses that “[w]hen an alarm command is received, a process (indicated by block 160) is carried out in which the control circuit 134 protects from over-writing compressed digital video data previously stored in the memory 150.” *Id.*, 7:48-55. The alarm data “correspond[s] to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command.” *Id.*

260. **Claims 13 and 14:** Ely discloses the limitations added in dependent claims 13 and 14. In one embodiment, the buffer has a storage capacity of “thirty minutes of video signals,” and “each alarm command initiates protection of buffered video signals corresponding to a ten minute period (say five minutes prior to the alarm and five minutes after).” EX1020, 10:60-65.

261. **Claim 19:** As explained above for element 6 of claim 1, Ely alone or as combined with Fiore discloses the “allowing the editing” limitations added in dependent claim 19 via the “clearing” of write protected alarm data. Additionally, a POSITA would understand that the ability of Ely to detect, mark, and store write-protected events is an automatic bookmarking functionality.

F. Ground 2b: Claim 15 Of The '540 Patent Would Have Been Obvious Over Ely Alone Or As Combined With Fiore, In Further View Of Lewellen

262. Claim 15 depends from claim 1 and recites “wirelessly transmitting a first one of the segments to a remote memory, and releasing a corresponding one of the multiple portions of memory from protection.” Ely’s control circuit 134 responds to “clear” commands by removing a block of stored video data from protection, thereby permitting “live” video data to be written over the now-unprotected video data. EX1020, 8:7-12. The clear command may be sent after write-protected alarm data is retrieved from a local memory (e.g., step 162 in Figure 4) and transmitted to a remote memory (e.g., step 164). *Id.*, Abstract, 9:51-10:3, 10:24-55.

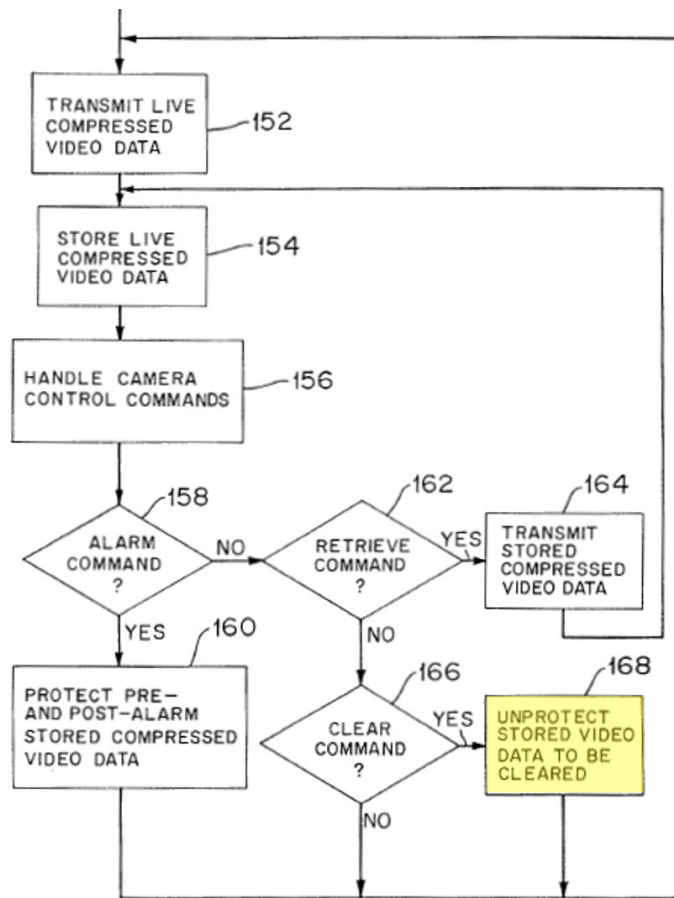


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added); *see also id.*, Fig. 5B (block 190), 7:17-39, 7:56-8:6, 9:31-50, 10:56-11:14. Thus, Ely discloses “transmitting a first one of the segments to a remote memory, and releasing a corresponding one of the multiple portions of memory from protection.”

263. To the extent Ely does not disclose “wirelessly” transmitting the first one of the segments to remote memory, this feature would have been obvious in view of Lewellen (EX1019).

264. A POSITA would have been motivated to combine Lewellen with Ely alone or Ely as combined with Fiore. *Id.* All three disclose video recording systems, such that a POSITA would have been aware of and motivated to combine them. *Id.* Further, a POSITA would have recognized the advantages of modifying the Ely/Fiore system to implement Lewellen's long-distance wireless interface 382 or local wireless interface 390 for transmitting alarm data preserved with the file-based circular buffer approach of the Ely/Fiore system. Ely describes a "data communication network" to transmit "command and status data between the system central station and the video cameras," which "may be provided with sufficient capacity to handle transmission of compressed video data buffered or currently generated at the video camera units, in which case separate video signal transmission cabling can be dispensed with." EX1020, 4:63-5:9. Ely discloses it is an "object of the invention to provide a video surveillance system which requires less cabling than conventional systems." *Id.*, 2:52-54.

265. A POSITA would have recognized the advantages of implementing Ely's video recording system with Lewellen's long-distance wireless interface 382 or local wireless interface 390, *e.g.*, to further reduce the amount of cabling required through wireless rather than wired transmission of signals and data, and to provide a more robust system with redundant transmission options.

266. A POSITA would have had a reasonable expectation of success in implementing the Ely/Fiore system with Lewellen's long-distance wireless interface

382 or local wireless interface 390 and related techniques Lewellen describes. Wireless interfaces (both long-distance and local) were well-known and commercially available, as of June 2007, and adding such an interface in the Ely/Fiore system would have been routine and well within a POSITA's skill.

G. Ground 2c: Claims 16-18 Of The '540 Patent Would Have Been Obvious Over Ely Alone Or As Combined With Fiore, In Further View Of Mann

1. Motivation to Combine

267. Mann discloses the limitations added in dependent claim 10 for at least the reasons discussed above for Ground 1b of the '540 patent. A POSITA would have been motivated to combine Mann with Ely/Fiore. Ely discloses a "video surveillance system" with "an improved capability for storage of video signals." EX1020, 2:34-36. Like Ely, Mann discloses a camera system used for, *e.g.*, surveillance or public safety. EX1015, [0041]-[0042]. Because Ely, Fiore, and Mann all disclose video recording systems, a POSITA would have been aware of and motivated to combine these references.

268. Mann also describes why a POSITA would have been motivated to implement the Ely/Fiore surveillance system (or one or more components of the surveillance system, such as components of camera unit 114) in an eyeglasses-mounted apparatus: For instance, Mann teaches that, "[a]lthough there are a growing number of video surveillance cameras installed in the environment allegedly for 'public safety', there have been recent questions as to the true benefit of such

centralized surveillance infrastructures,” noting that such systems can be abused by their owners, whereas an eyeglasses-based application places the system at the wearer’s control. EX1015, [0041]. Mann’s wearable viewfinder system “allows images to be captured in a natural manner, without giving an unusual appearance to others (such as a potential assailant).” *Id.*, [0042]. Mann’s wearable viewfinder also “allows the user to record a portion of his or her eye’s visual field of view” where, “the device will tend to cause the wearer to want to place the recording zone over tope of whatever is most interesting in [a] scene.” *Id.*, [0044]. A POSITA would have been motivated to implement the Ely/Fiore/Lewellen surveillance system and/or components thereof (*e.g.*, components of camera unit 114) in an eyeglasses-mounted apparatus, to give the wearer more control over what is recorded and how recorded data may be used.

2. Dependent Claims 16-18

269. ***Claims 16 and 17:*** Ely alone or as combined with Fiore, in further view of Mann, discloses the limitations added in dependent claims 16 and 17. As explained above for claim 1, Ely alone or as combined with Fiore discloses a “system comprising electronics that implements the method of claim 1.” And as explained above for Ground 1b, Mann discloses the claimed “clothing accessory that supports the sensor,” which is “a pair of glasses.”

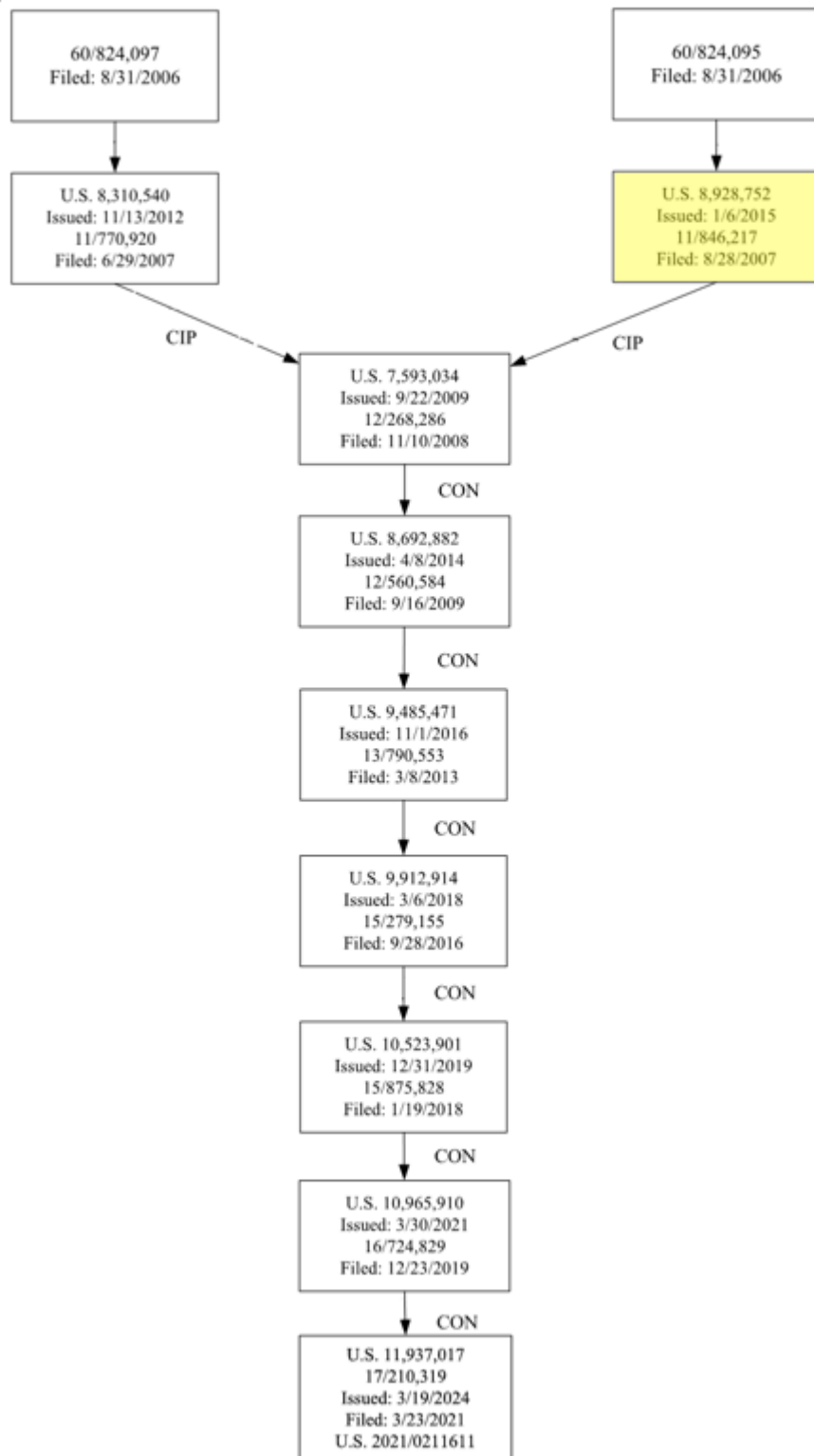
270. ***Claim 18:*** As explained for Ground 1b, Mann discloses the limitations added in dependent claim 18.

H. Ground 2d: Claim 8 Of The '540 Patent Would Have Been Obvious Over Ely Alone Or As Combined With Fiore, In Further View Of Strub

271. To the extent Ely and Fiore do not disclose the limitation added in claim 8 (“using a switch in a clothing accessory to operate an aspect of the method”), this limitation would have been obvious in view of Strub. Strub discloses using a “ring, brooch, bracelet (e.g., a watch-like band) or similar wearable item” (a clothing accessory) with pushbuttons (a switch) to control operation of a physically separate recording unit. EX1046, 54:20-33. A POSITA would have been motivated to implement the Ely/Fiore system with Strub’s wearable item with user-pressable pushbuttons to facilitate operation of the system by a user. For example, a security guard patrolling the floor of a casino or warehouse could advantageously use Strub’s wearable item to take video or photographs (*i.e.*, “using a sensor in the camera to capture image data,” as recited in method claim 1 of the '540 patent) by communicating wirelessly with Ely’s control circuit 134 to control the camera 130.

IX. '752 Patent: Claims 1-18

272. The '752 patent of the Stellar patent family is highlighted below:



A. Summary Of The '752 Patent File History

273. Application No. 11/846,217, which eventually issued as the '752 patent, was filed on August 28, 2007 with 14 claims. EX1012, 1-25. The Office provisionally rejected claims 1, 7, and 9-13 on the basis of non-statutory double patenting over co-pending Application No. 12/268,286, which issued as the '034 patent. *Id.*, 51-54. Applicant overcame these rejections by submitting a terminal disclaimer. *Id.*, 77. The Office also rejected the claims as being unpatentable over U.S. 5,523,799 to Hattori (EX1016) alone or in combination with other prior art. *Id.*, 54-59, 83-89, 122-130. After Applicant made several narrowing amendments (*id.*, 71-76, 91-98, 135-140), the Office allowed the claims. *Id.*, 144-150.

B. Ground 1a: Claims 1-11 And 14 Of the '752 Patent Would Have Been Obvious Over Yerazunis Alone Or As Combined With Fiedler

1. Motivation To Combine

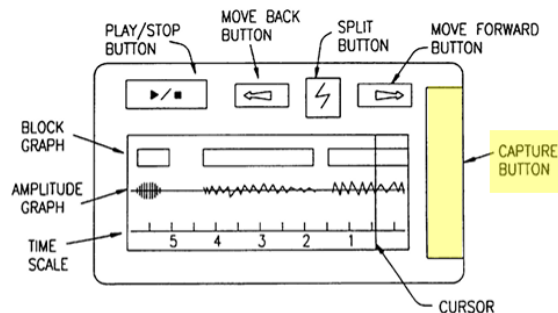
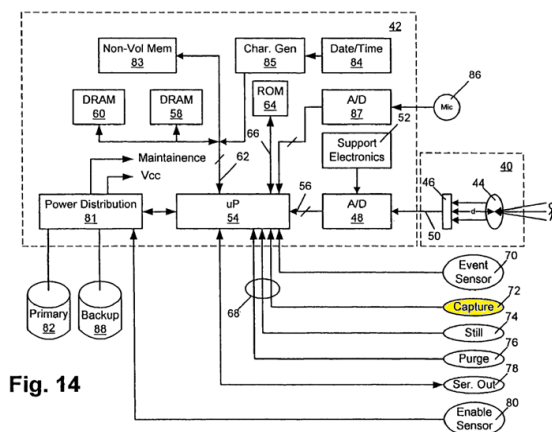
274. A POSITA would have been motivated to combine Yerazunis and Fiedler for several reasons.

275. As one example, because Yerazunis and Fiedler both disclose compact, hand-held data recording systems that store data in a circular buffer and preserve data associated with an event—both before and after an event trigger—a POSITA would have been aware of and motivated to combine the two references.

276. As another example, a POSITA would have been motivated to implement Yerazunis's video recording device with Fiedler's capture functionality to extend the

length of a write-protected segment that occurs prior to an event trigger. Yerazunis discloses (i) the length of the write-protected segment is a matter of design choice, and (ii) the length of the segment can be extended. EX1017, 8:26-61, 16:66-17:44. Further, Yerazunis states an objective of its video recording device in one embodiment is to create an evidentiary record (*id.*, 14:61-64), and teaches in this embodiment that the “events surrounding the initial firing of the gun” are “more likely to bear directly on the question of whether or not the firing by the officer or individual was justified” (*id.*, 17:4-9).

277. A POSITA would have understood that increasing the duration of the protected segment of the buffer prior to the event trigger in Yerazunis using Fiedler’s capture functionality would have advantageously helped to ensure preservation of important video data. Both references disclose a user-pressable “capture” button for preserving data for an event (*e.g.*, EX1017, 6:43-44, 8:8-42, 9:17-26, Figs. 3, 14; EX1037, 9:35-46, Fig. 3), and it would have been obvious to a POSITA to incorporate functionality of Fiedler’s capture button (*e.g.*, increasing the amount of pre-event video preserved in the circular buffer) with Yerazunis’s capture button:



EX1017 (Yerazunis), Fig. 14 (left); EX1037 (Fiedler), Fig. 3 (right) (color added).

278. A POSITA would have understood that Fiedler’s capture functionality would have advantageously enabled capture of additional contextual video data for events occurring before write-protection would otherwise begin, thus preserving, for instance, the events leading up to the firing of a gun that might bear on justification.

279. And a POSITA would have generally known that the length of recording in a circular buffer could be extended in response to a signal, such that implementation of Fiedler’s capture functionality in Yerazunis’s system would have been routine and well within a POSITA’s skill.

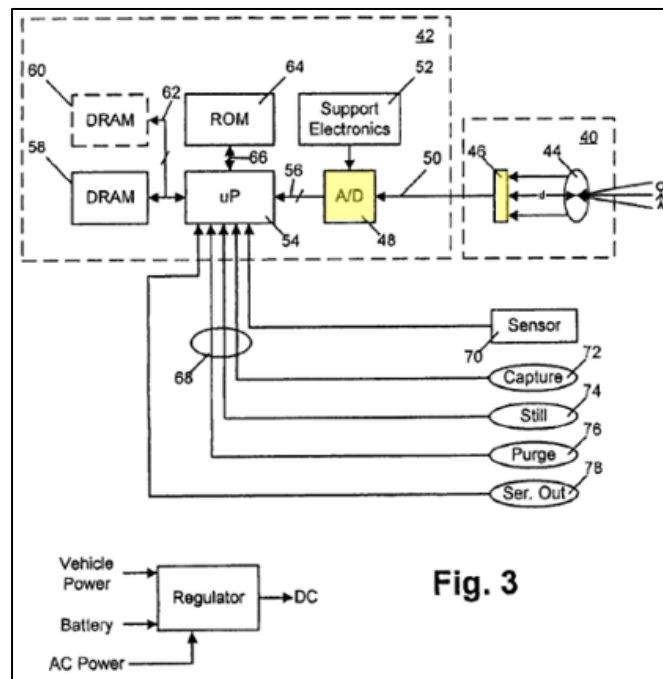
2. Independent Claim 1

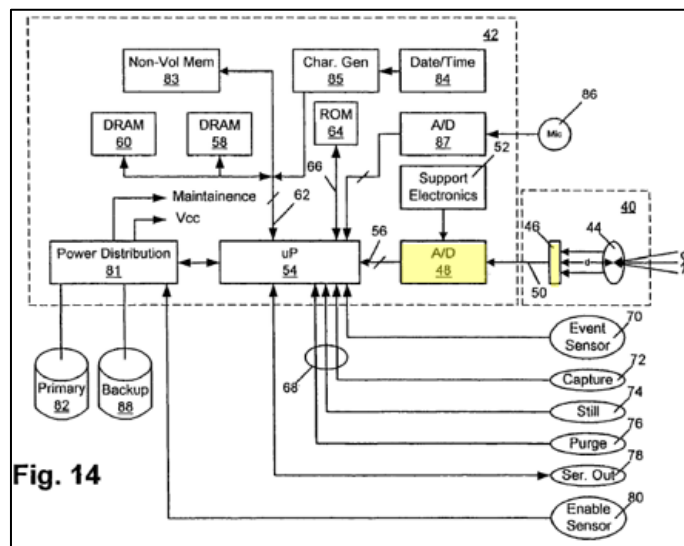
a) Preamble: A surveillance system, comprising:

280. Yerazunis discloses the preamble of claim 1. Yerazunis discloses “a video recording device” that “is contained within a compactly sized housing” and captures video images for, *e.g.*, security purposes. EX1017, 2:12-14; *see also id.*, 1:17-43. Yerazunis therefore discloses a “surveillance system.”

b) Element 1: a camera that converts images into first and second data streams;

281. Yerazunis discloses this claim element. Yerazunis's video recording device includes a camera 40 with sensor 46 that is "operative to provide an output signal representative of a video image which impinges upon the sensor." EX1017, 5:45-49. The output signal is "an analog signal which is coupled to one or more A/D converters" ("ADCs 48") that "generate a digital representation of the video image." *Id.*, 2:37-41.





Id., Figs. 3, 14 (color added).

282. Camera 40 and ADCs 48 collectively disclose the claimed “camera” because camera 40 includes an image sensor 46 that captures video images, and ADCs 48 generate a digital representation of the video image. A POSITA would have understood the digital output of Yerazunis’s ADCs 48 as including data streams because the output is a continuous sequence of data. EX1017, 2:33-52, 5:49-67, 6:52-56, 7:23-32; Appx MM (included in EX1041) at 109. These data streams include the claimed “first and second data streams” as explained below for elements 4 and 5 of claim 1.

c) **Element 2: a memory; and**

283. Yerazunis discloses this claim element. Yerazunis’s video recording device includes video electronics 42 with DRAMs 58, 60 that disclose the claimed “memory.” EX1017, 5:40-43, 6:24-36 and Figs. 3, 14.

d) Element 3: hardware that executes an instruction set that utilizes an area of the memory as a circular buffer,

284. **Patent Owner's Constructions:** Patent Owner's position is that the claimed "hardware that executes an instruction set" merely "refers to a processor." EX1056, 20. Yerazunis discloses a microprocessor 54 (a processor) that receives digital signals from the ADCs 48 and "compresses the digitized frame data and stores the compressed frame data in the next sequential location of [a] circular buffer" formed in DRAM 58. EX1017, 2:45-47, 6:24-26, 6:52-7:61, 10:55-67, 11:50-14:44, 17:50-59, 18:7-12, and Figs. 3, 4a, 4b, 6-8, 14. Yerazunis specifically discloses that its "semiconductor memory [DRAM] 58 is structured as a circular memory buffer as illustrated in FIG. 4a" (*id.*, 7:7-9):

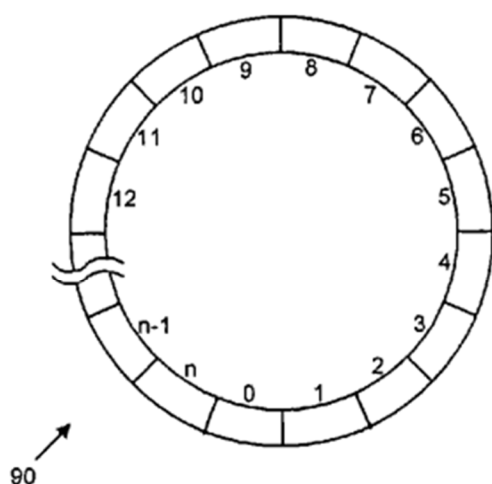


Fig. 4a

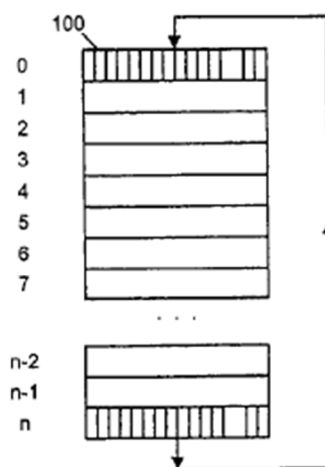
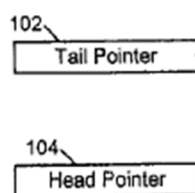


Fig. 4b

Id., Figs. 4a, 4b; see also *id.*, 7:7-61, 18:7-12.

285. Yerazunis thus describes a processor (microprocessor 54) “that utilizes an area of the memory as a circular buffer,” disclosing element 3 under Patent Owner’s non-MPF position.

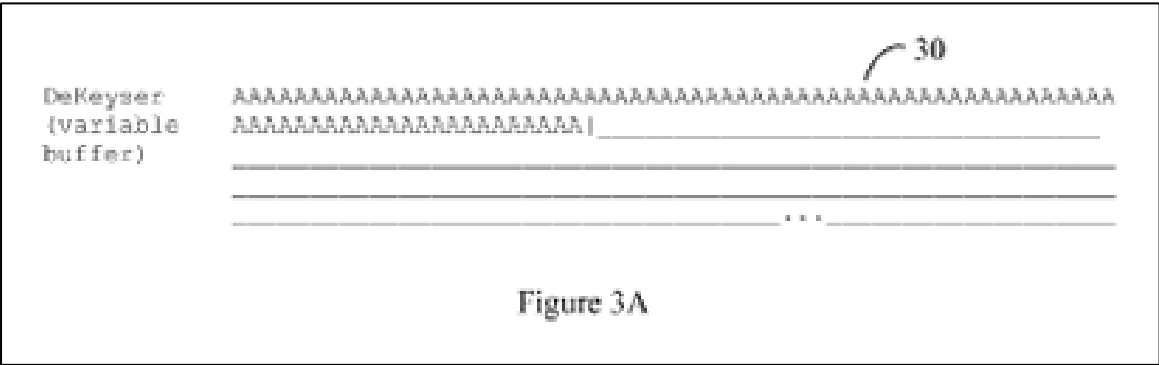
286. Alternatively, Patent Owner contends that the corresponding structure encompasses “[a]ny recording device including a processor that runs software to accomplish the described function” (I refer to this as Patent Owner’s “MPF position”). EX1057, 4-7. Yerazunis discloses element 3 under Patent Owner’s MPF position. As explained above for Patent Owner’s non-MPF position, Yerazunis discloses a video recording device including a processor (microprocessor 54) that runs software to accomplish the claimed function of “utilizes an area of the memory as a circular buffer.” See EX1017, 6:17-23, 6:37-51. Yerazunis thus discloses element 3 under Patent Owner’s MPF position.

287. ***Petitioner’s Corresponding Structure:*** The combination of Yerazunis and Fiedler discloses the corresponding structure identified by Petitioner, *i.e.*, “hardware and software programmed to perform the circular buffer algorithm disclosed at 2:36-39, 4:67-5:1, Figs. 3A-3H, 3:13-4:45, Fig. 5 (Step 51), 5:35-40.”

288. Yerazunis discloses a recorder with a memory that runs software to accomplish functions, consistent with the ’752 patent’s disclosure at 4:67-5:1. Specifically, Yerazunis discloses video electronics 42 (a recorder) having microcontroller 54 that runs software for performing instructions. EX1017, 6:17-23, 6:37-51. The video electronics 42 includes DRAM 58, 60 (memory), and the

microprocessor 54 utilizes an area of the memory as a circular buffer, consistent with the '752 patent's disclosure at Figure 5 (Step 51) and 5:35-40. EX1017, 2:45-47, 6:24-26, 6:52-7:6, 7:7-61, 10:55-67, 11:50-14:44, 17:50-59, 18:7-12, and Figs. 3, 6-8, 14.

289. Yerazunis's microcontroller 54 and software, in view of Fiedler's teachings, perform the "schematics of memory usage" "progressively showing storage of multiple data streams" (EX1004, 3:3-5) described at Figures 3A-3H and 3:13-4:45 of the '752 patent.



'752 Patent	Yerazunis in view of Fiedler
In Figure 3A, memory 30 stores data from data stream "A" up to the current position " " marker. EX1004, 3:13-14.	In Yerazunis's gun-camera embodiment, microprocessor 54 stores a first digital data stream generated by one or more ADCs 48 in a circular buffer formed in DRAM 58, 60 (memory). EX1017, 2:19-23, 2:45-47, 6:24-26, 6:52-7:6, 10:55-67, 11:50-14:44, 17:9-20, 17:50-59, and Figs. 3, 5 (e.g., steps 122, 124, 126, 130), 6-8, 14.

DeKeyser
(variable
buffer)

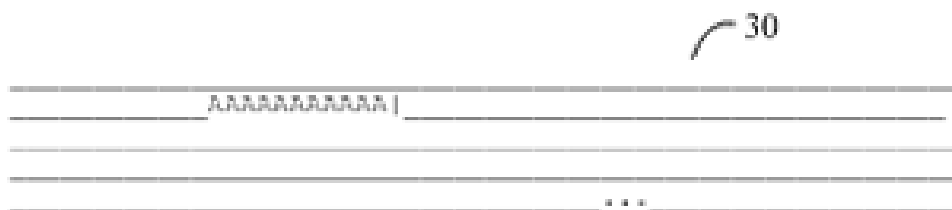
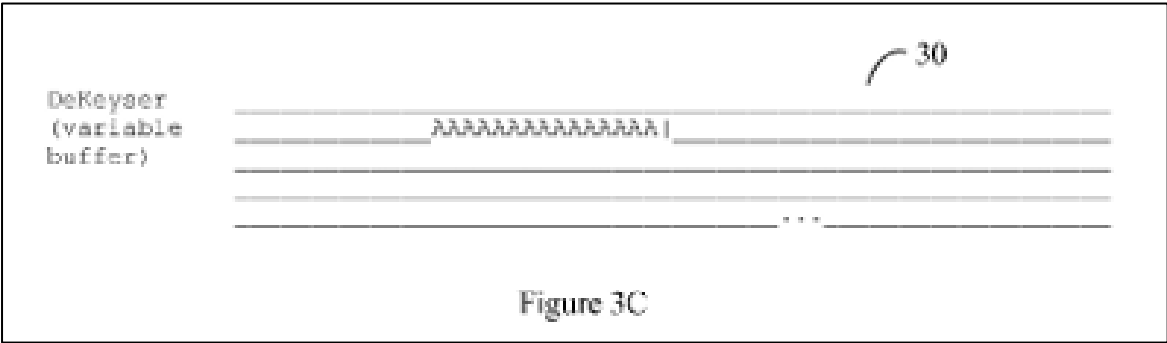


Figure 3B

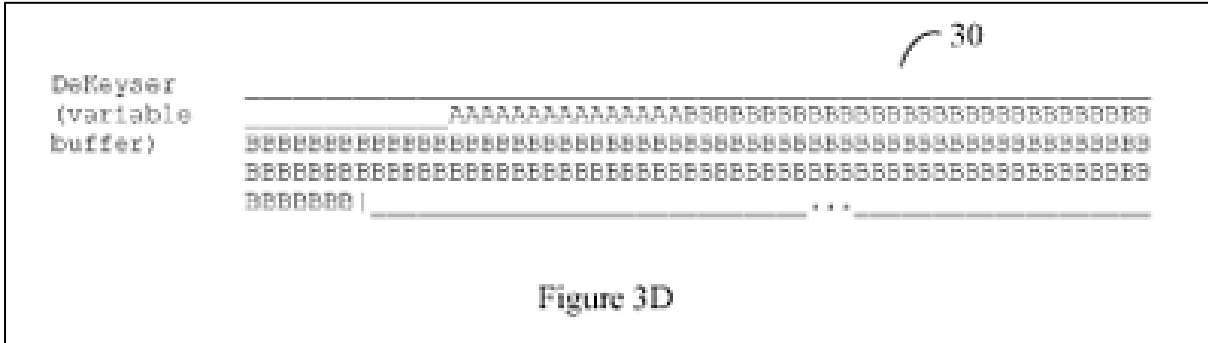
'752 Patent	Yerazunis in view of Fiedler
In Figure 3B, a recent period of data stream “A” has been protected as a function of a “start” signal. EX1004, 3:23-27. In protecting recent data, the system can protect a historical time period preceding the “start” signal. <i>Id.</i>, 3:37-50. Although not depicted in Figure 3B above, the '752 patent further states: “Alternatively, the historical time period being protected could be altered in some manner, such as by software or by a user operating a history button.” <i>Id.</i>, 3:42-47.	In Yerazunis’s gun-camera embodiment, the microprocessor 54 protects a recent period of the first data stream recorded in the circular buffer based on a first trigger signal (a start signal) generated by event sensor 70 or capture button 72. EX1017, 2:1-4, 2:19-33, 3:20-38, 4:45-49, 8:8-30, 9:17-26, 9:34-38, 14:55-61, 15:9-13, 17:45-61. The protected portion of the first data stream in the circular buffer is associated with a first event, <i>e.g.</i>, a first firing of a gun (EX1017, 3:20-38, 8:26-30, 15:9-13, 16:66-17:4, 17:45-61), and includes a period of the first data stream preceding the first trigger signal. <i>Id.</i>, 3:20-38, 14:55-64. Yerazunis also discloses (i) the length of the write-protected segment is a matter of design choice, and (ii) the length of the segment can be extended. EX1017, 8:26-61, 16:66-17:44. Yerazunis thus discloses altering the historical time period being protected. Further, altering the historical time period would have been obvious in

	further view of Fiedler. Fiedler describes “pressing Capture once may capture the most recent minute, pressing it twice in rapid succession may capture the most recent two minutes, and so on.” EX1037, 9:42-45. Further, a POSITA would have generally known that the length of a write-protected segment in a circular buffer could be extended in response to a signal.
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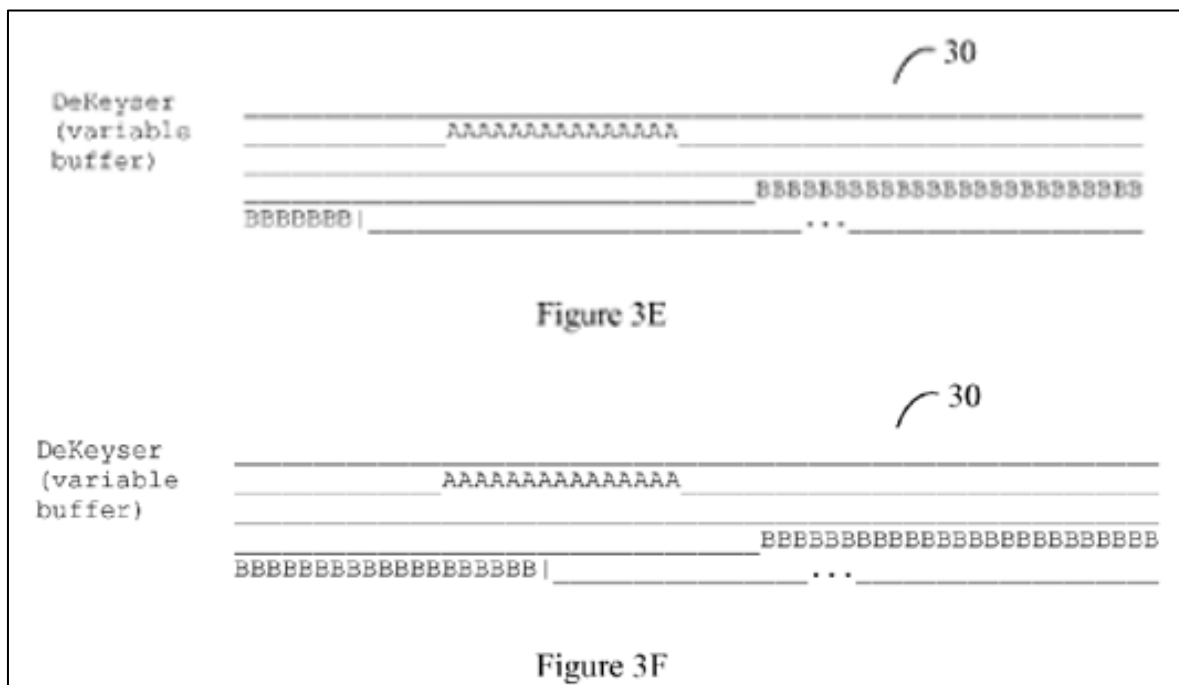
'752 Patent	Yerazunis in view of Fiedler
In Figure 3C, the system has received a “stop” signal sometime after receiving the start signal, thereby lengthening the protected portion of the “A” data stream. EX1004, 3:51-53.	In Yerazunis’s gun-camera embodiment, the video recording device responds to a signal from a user, and the user’s signal includes a stop signal. EX1017, 3:20-38, 8:8-30, 14:55-61, 15:9-13. Specifically, Yerazunis’s signal from the user tells the video recording device when to (i) start recording, <i>i.e.</i>, upon detection of the signal (EX1017, 3:25-38, 8:26-30, 15:9-13), and when to (ii) stop recording by designating an end of a write-protected portion, <i>i.e.</i>, when a predetermined number of frames subsequent to the trigger event have been write protected (<i>id.</i>, 2:53-64, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:38).

	Further, Fiedler discloses a stop signal received after a start signal. EX1037, Fig. 3, 8:45-9:4, 10:35-54. Fiedler’s stop signal toggles the device from a recording mode to a non-recording mode, thereby designating the end of a protected portion. <i>Id.</i> A POSITA would have been motivated to apply Fiedler’s teaching of receiving the stop signal after the start signal to Yerazunis. A POSITA would have recognized that user control to stop write protection following a start signal would have been desirable in some scenarios (<i>e.g.</i>, to prevent unnecessary preservation of unimportant video data), and would have thus been motivated to include a stop signal, consistent with the ’752 patent’s disclosure.
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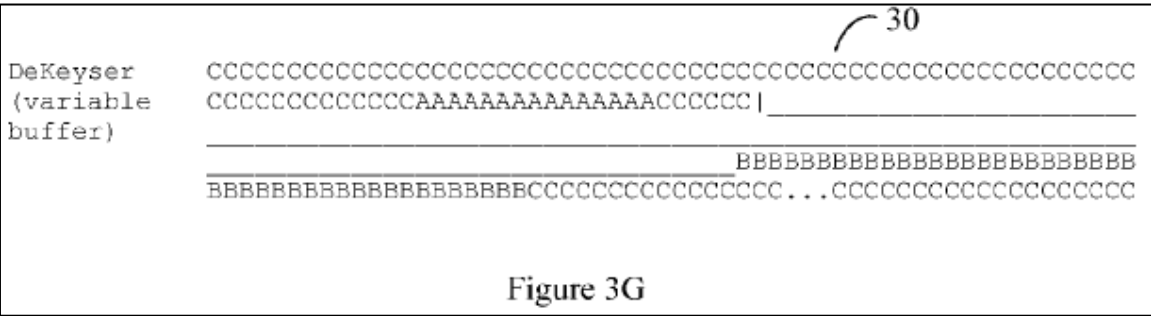
'752 Patent	Yerazunis in view of Fiedler
In Figure 3D, the system has finished protecting the desired portion of the “A” data stream, and has now moved on to storing a “B” data stream. EX1004, 4:16-18. The “B” data stream may be continuous with the “A” data stream, “so that differentiation of ‘A’ and ‘B’ streams is merely an artifact of	In Yerazunis’s gun-camera embodiment, the video recording device under control of microprocessor 54 records into the circular buffer continuously, such that storing of a second data stream in the circular buffer continues after protecting a portion of the first data stream.

how the data is being stored.” <i>Id.</i> , 4:18-21.	EX1017, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:45-61. Further, the second data stream is continuous with the write-protected portion of the first data stream, with the second data stream being recorded in a non-protected portion of Yerazunis’s circular buffer immediately following the write-protected portion of the first data stream. EX1017, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:45-61.
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'752 Patent	Yerazunis in view of Fiedler
Figures 3E, 3F illustrate protection of a portion of the “B” data stream in the same manner as illustrated in Figures 3B, 3C for the “A” data stream, comprising receiving a start signal (Figure 3E) and subsequently receiving a stop signal (Figure 3F). EX1004, 4:35-38.	In Yerazunis’s gun-camera embodiment, the microprocessor 54 is configured to protect a portion of the second data stream in the circular buffer associated with a second event, <i>e.g.</i> , a second firing of the gun, based on a second trigger signal (a start signal) generated by event sensor 70 or capture button 72. EX1017, 4:35-56,

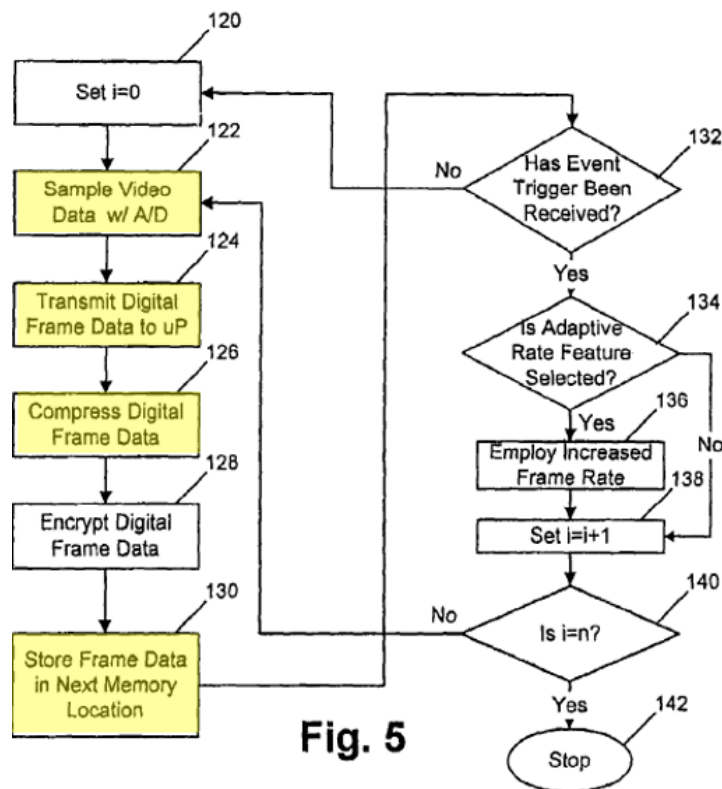
	8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:61. Like the protected portion of the first data stream, the protected portion of the second data stream includes a period of the second data stream preceding the second trigger signal. EX1017, 3:20-38, 14:55-64. And as with the first data stream, Yerazunis's microprocessor 54 stops protection of the second data stream in the circular buffer based on a stop signal. EX1017, 4:35-56, 8:26-61, 11:27-30, 12:14-17, 13:3-17, 16:66-17:38. Further, Fiedler discloses a stop signal received after a start signal, with the stop signal designating the end of a write-protected portion. EX1037, Fig. 3, 8:45-9:4, 10:35-54. A POSITA would have been motivated to apply Fiedler's teaching of receiving the stop signal after the start signal to Yerazunis for the reasons stated above with respect to Figure 3C of the '752 patent.
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'752 Patent	Yerazunis in view of Fiedler
In Figure 3G the system has continued to record data, which is now depicted as data stream "C" because it follows the "B" data stream. EX1004, 4:39-41.	In Yerazunis's gun-camera embodiment, after protecting the portion of the second data stream, the video recording device under control of

e) Element 4: records the first data stream in the buffer;

290. *Patent Owner's Constructions:* Yerazunis discloses a processor (microprocessor 54) that “records the first data stream in the buffer,” as required under Patent Owner’s non-MPF position for element 4. EX1056, 20. Yerazunis’s video recording device under control of microprocessor 54 “records video frames successively in at least one circular buffer memory organized as a continuous loop.” EX1017, 2:19-23, 17:9-20, 17:50-59. Camera 40 captures video, and one or more ADCs 48 convert the captured video into a digital signal. *Id.*, 5:40-67. The digital signal is provided to microprocessor 54, which “compresses the digitized frame data and stores the compressed frame data in the next sequential location of [a] circular buffer.” *Id.*, 2:45-47, 6:24-26, 6:52-7:6, 10:55-67, 11:50-14:44, 17:50-59, and Figs. 3, 6-8, 14. Further, Figure 5 illustrates aspects of Yerazunis’s process for “record[ing] the first data stream in the buffer” at least at steps 122, 124, 126, and 130.



Id., Fig. 5 (color added); *see also id.*, 10:55-11:7. Yerazunis thus discloses element 4 under Patent Owner’s non-MPF position.

291. Yerazunis also discloses element 4 under Patent Owner’s MPF position. As explained for Patent Owner’s non-MPF position, Yerazunis discloses a video recording device including microprocessor 54 that runs software to accomplish the function of element 4.

292. ***Petitioner’s Corresponding Structure:*** The combination of Yerazunis and Fiedler discloses the corresponding structure identified by Petitioner, *i.e.*, “hardware and software programmed to perform the circular buffer algorithm disclosed at 2:36-39, 4:67-5:1, 5:12-14, Fig. 3A, 3:13-16, Fig. 5 (Step 52), 5:48.”

293. As explained above with respect to Petitioner's corresponding structure for element 3 of claim 1, Yerazunis discloses a recorder (video electronics 42) with memory and microcontroller 54 that runs software to accomplish functions, consistent with the '752 patent's disclosure at 4:67-5:1. EX1017, 6:17-23, 6:37-51. The video electronics 42 include DRAM 58, 60 (memory), and the microprocessor 54 records a first data stream in the circular buffer formed in the memory, consistent with the '752 patent's disclosure at Figure 5 (Step 52), 5:35-40, Fig. 3A, and 3:13-16. EX1017, 2:45-47, 6:24-26, 6:52-7:6, 7:7-61, 10:55-67, 11:50-14:44, 17:50-59, 18:7-12 and Figs. 3, 6-8, 14.

294. Additionally, in recording the first data stream to the circular buffer, Yerazunis's microcontroller 54 "utilizes different sections for the buffer at different times, with protected sub-sections being skipped over during storage of subsequent data streams," consistent with the '752 patent's disclosure at 2:36-39. EX1017, 3:28-33, 17:45-61. Further, Yerazunis's recorder (video electronics 42) "record[s] images in digital [or analog] format," consistent with the '752 patent's disclosure at 5:12-14. EX1017, 2:37-47, 5:49-67, 6:14-16, 6:52-57.

- f) **Element 5: responds to a first signal by protecting a recently used segment of the buffer storing at least a portion of the first data stream corresponding to a duration of time prior to the first signal, while at the same time continuously recording the first data stream as the second data stream in an unprotected segment of the buffer, without overwriting the protected segment; and**

295. Yerazunis discloses a processor (microprocessor 54) that “responds to a first signal” in the manner claimed, as required under Patent Owner’s non-MPF position for element 5. EX1056, 20. In embodiments, Yerazunis’s video recording device includes the microprocessor 54 with “a number of inputs 68 which permit activation of the video recording device and control of the device by a user.” EX1017, 6:40-42, Figs. 3, 14. Inputs include still button 74, the activation of which causes a video frame to be “stored within a frame location within the circular buffer,” with the “frame [being] protected from overwriting while video capture within the circular buffer continues.” *Id.*, 9:27-31, 9:34-42.

296. In Yerazunis’s gun-camera embodiment, event sensor 70 generates a “gun firing signal” “upon discharge of the gun.” EX1017, 3:20-33, 8:8-25, 14:55-61. Upon detecting the gun-firing signal, microprocessor 54 causes “specified frame data associated with [the] firing event both before and after the event” to be “preserved,” such that it “cannot be overwritten as a result of further use of the gun or subsequent firing events.” *Id.*, 3:25-38, 8:26-30, 15:9-13. With the specified frame data write-protected, “[f]rame data associated with each subsequent firing event[] is stored within

an unused portion of the circular buffer memory.” *Id.*, 3:31-33. Thus, Yerazunis’s microprocessor 54 “responds to a first signal by protecting a recently used segment of the buffer storing at least a portion of the first data stream corresponding to a duration of time prior to the first signal.”

297. Yerazunis stresses recording occurs “continuously,” such that write-protecting necessarily occurs “while at the same time” as recording. Indeed, Yerazunis expressly discloses that frame data is “protected from overwriting while video capture within the circular buffer continues. *Id.*, 9:34-38; *see also id.*, 2:1-4, 2:19-23, 4:45-49, 17:45-61. Yerazunis also teaches that when its video recording device is employed with a gun, “it may be desirable to generate a video record which is associated with each firing of the gun.” EX1017, 16:66-17:4. “To accommodate this objective, after the conclusion of data storage associated with one firing event, the head pointer 104 and the tail pointer 102 ... defining the area(s) of the circular buffer memory, are stored in a table to allow later retrieval of the video data pertaining to each firing of the gun,” and the pointers “are then reset to allow continued recording into another portion of the circular buffer memory without over writing the previously stored and preserved data.” *Id.*, 17:50-59. Thus, after protecting video data pertaining to an event, “recording of data continues since a subsequent firing event may occur.” *Id.*, 17:45-50.

298. Yerazunis also discloses “recording the first data stream as the second data stream.” For example, in Yerazunis’s gun-camera embodiment, the video

recording device under control of microprocessor 54 records into the circular buffer continuously, such that storing of a second data stream in the circular buffer continues after protecting a portion of the first data stream. EX1017, 2:1-8, 2:19-23, 4:45-49, 7:11-14, 9:34-38, 17:45-61. Further, the second data stream is continuous with the write-protected portion of the first data stream, with the second data stream being recorded in a non-protected portion of Yerazunis's circular buffer immediately following the write-protected portion of the first data stream. *Id.* A POSITA would have understood Yerazunis as disclosing "recording the first data stream as the second data stream." Further, Yerazunis's disclosure of the claimed "recording the first data stream as the second data stream" is consistent with the disclosure of the '752 patent (*e.g.*, with reference to Figure 3D). Yerazunis thus discloses element 5 under Patent Owner's non-MPF position.

299. Yerazunis also discloses element 5 under Patent Owner's MPF position. As explained for Patent Owner's non-MPF position, Yerazunis discloses a video recording device including microprocessor 54 that runs software to accomplish the function of element 4.

g) Element 6: responds to a second signal received after the first signal by increasing the duration of the protected segment of the buffer prior to the first signal.

300. Yerazunis discloses a processor (microprocessor 54) that "responds to a second signal" in the manner claimed, as required under Patent Owner's non-MPF position for element 6. EX1056, 20. Yerazunis states: "Since multiple firings of the

gun are possible, it is conceivable that the gun may be refired within the post trigger event time period that the video recording device is still recording as a consequence of a prior firing.” EX1017, 17:38-42. “In such event, the recording time may be extended” under control of microprocessor 54 “so as to terminate another post event time period after the last such firing.” *Id.*, 17:42-44.

301. Yerazunis also discloses (i) the length of the write-protected segment is a matter of design choice, and (ii) the length of the segment can be extended. EX1017, 8:26-61, 16:66-17:44. It would have been obvious to use the microprocessor 54 to increase the duration of the protected segment of the buffer prior to the first signal in response to a second signal in view of Yerazunis’s disclosure. Moreover, this feature would have been obvious in further view of Fiedler. Fiedler discloses a second signal received after a first signal that causes a duration of a pre-event protected segment to be increased: Fiedler describes “pressing Capture once may capture the most recent minute, pressing it twice in rapid succession may capture the most recent two minutes, and so on.” EX1037, 9:42-45. And a POSITA would have generally known that the length of recording in a circular buffer could be extended in response to a signal.

302. A POSITA would have recognized the advantages of increasing the duration of the protected segment of the buffer prior to the first signal in response to a second signal in the Yerazunis system. Yerazunis states an objective of its video recording device in one embodiment is to create an evidentiary record (EX1017, 14:61-64), and teaches in this embodiment that the “events surrounding the initial

firing of the gun” may be “more likely to bear directly on the question of whether or not the firing by the officer or individual was justified” in firing (*id.*, 17:4-9). A POSITA would have understood the benefits of increasing the duration of the protected segment of the buffer prior to the first signal in the Yerazunis system, including to ensure that important video evidence is preserved (*e.g.*, by capturing important, contextual video data for events occurring before write-protection would otherwise begin). Yerazunis thus discloses element 6 under Patent Owner’s non-MPF position.

303. Yerazunis also discloses element 6 under Patent Owner’s MPF position. As explained for Patent Owner’s non-MPF position, Yerazunis discloses a video recording device including microprocessor 54 that runs software to accomplish the function of element 6.

3. Dependent Claims 2-11, 14

304. **Claim 2:** Claim 2 depends from claim 1 and recites “wherein the buffer stores at least 10 minutes of image frames.” This limitation would have been obvious in view of Yerazunis. In one embodiment, Yerazunis’s memory holds approximately 15 seconds of video data; in another, 30 seconds. EX1017, 8:43-51, 11:31-43. Yerazunis provides motivation for increasing the total recording time, explaining that “[a] greater recording interval may be achieved by ... utilizing a larger memory” (*id.*, 6:11-13), and that “[i]t may be desired to increase the memory capacity of the recording device to permit a greater number of frames to be captured or to

accommodate the storage of video images received from plural cameras.” *Id.*, 6:33-36. Yerazunis also teaches “[a]dditional semiconductor memory 60 may be coupled to the microprocessor 54 via a bus 62 in the event that it is desired to increase the semiconductor memory capacity of the video recording device.” *Id.*, 6:30-33.

305. In addition to increasing memory capacity, Yerazunis also discloses multiple techniques for increasing the total record time that would have been conventional and well-known by June 2007, including using a lower sampling rate (*id.*, 6:12-13), using compression (*id.*, 10:63-67, 11:31-35), and using “any number of storage methods ... to extend the period of time captured within the semiconductor memory buffer, or to achieve almost any frame capture profile that may be desired,” including those techniques illustrated in Yerazunis’s Figures 6-8. *Id.*, 10:37-49, 11:44-49, 17:34-38. A POSITA would have been motivated to implement a sufficiently large circular buffer in the Yerazunis/Fiedler system, such as to store at least 10 minutes of image frames to permit a greater number of frames to be captured, and a POSITA would have been aware of conventional and well-known techniques for doing so. *See* EX1020 (Ely), 10:60-65 (describing embodiment with circular buffer having capacity of “thirty minutes of video signals,” with each alarm command initiating protection of ten-minute period).

306. **Claim 3:** Claim 3 depends from claim 1 and recites “wherein the second data stream is continuous with the first data stream.” In the context of the ’752 patent, this claim language encompasses the second data stream being recorded into the buffer

following protection of the first data stream. *See, e.g.*, EX1004, Fig. 3D, 4:18-21 (after protecting portion of “A” data stream, “B” data stream may be recorded continuous with the “A” data stream “so that differentiation of ‘A’ and ‘B’ streams is merely an artifact of how the data is being stored”).

307. Yerazunis discloses the limitations added in claim 3. In Yerazunis’s gun-camera embodiment, the video recording device under control of microprocessor 54 records into the circular buffer continuously, such that recording of the second data stream in the circular buffer continues immediately after protecting a portion of the first data stream. EX1017, 2:1-8 (describing recordation of video frames “on a continuing basis”), 2:19-23 (describing “successively” recording video frames into buffer organized as a “continuous loop”), 4:45-49 (Yerazunis’s invention “continually record[s] video frames in a circular buffer”), 7:11-14, 9:34-38, 17:45-61 (after trigger event, “recording of data continues since a subsequent firing event may occur”). Further, the second data stream is continuous with the write-protected portion of the first data stream, with the second data stream being recorded in a non-protected portion of Yerazunis’s circular buffer immediately following the write-protected portion of the first data stream. *Id.* “The still button 74 is optionally provided and coupled to the central control processor 54. Upon activation of the still button, the video electronics captures a video frame and stores the frame within the buffer memory 58 or the extended buffer memory 60. In one embodiment, a frame which is stored as a result of the activation of the still button 74 is stored in a protected memory buffer area which

is not employed as a part of the circular buffer 90. *In another embodiment of the video recording device, the captured frame is stored within a frame location within the circular buffer, however, the frame is protected from overwriting while video capture within the circular buffer continues. Such may be accomplished via tagging protected frame locations containing captured still frames and checking to determine whether a frame location is protected prior to writing to the frame location.*” *Id.* at 9:27-41 “*FIGS. 6 through 8 illustrate several frame storage techniques which provide for storage of video information over a greater period of time than is achieved by simply storing each successive frame in a successive buffer location as discussed hereinabove wherein the entire buffer pool is treated as a single circular buffer.*” *Id.* at 11:44-49.

308. **Claims 4 and 5:** Claim 4 depends from claim 1 and recites “wherein the memory stores at least a 30 second portion of the first data stream, including at least a 5 second pre-signal portion and at least a 5 second post-signal portion.” Claim 5 depends from claim 4 and recites “wherein the at least a 30 second portion of the first data stream is stored in logically discontinuous portions of the memory.” Yerazunis discloses these limitations. In one embodiment, the write-protected portion is approximately 30 seconds long, half being the pre-signal portion, thus disclosing the limitations added in claim 4. EX1017, 8:43-51; *see also id.*, 11:31-43 (embodiment with 15-second portion). And since frame data associated with a firing event cannot be overwritten in Yerazunis’s video recording device, the device necessarily records

to physically discontinuous parts of the circular buffer, as the overwriting process skips preserved event data, thus disclosing the limitations added in claim 5. *Id.*, 3:19-33; *see also* Figs 6-8 (illustrating the non-sequential nature of recording).

309. **Claim 6:** Claim 6 depends from claim 1 and recites “wherein at least 20% of the memory is used as the buffer.” Yerazunis discloses this limitation. Yerazunis’s DRAM 58 “is *structured as a circular memory buffer*.” EX1017, 7:7-61, 18:7-12, Figs. 3, 4a, 4b, 14. Accordingly, a POSITA would have understood nearly all of the DRAM 58 (*i.e.*, more than 20% of its storage capacity) to be used as the buffer. Moreover, it would have been an obvious design choice to dedicate at least 20% of Yerazunis’s DRAM 58 to the buffer, *e.g.*, to enable sufficient capacity for recording and preserving video data. Yerazunis discloses flexibility in configuring the circular buffer (*e.g.*, enabling a greater portion of it to be dedicated to “events surrounding [an] initial firing of the gun”), and a POSITA would have recognized such flexibility as enabling the selection of an adequate amount of the DRAM 58 to be used as the circular buffer. EX1017, 16:66-17:38. Additionally, the ’752 patent does not disclose that using at least 20% of the memory as the buffer is critical to the purported invention, nor is there anything inventive or non-obvious about selecting a percentage of the memory to be used as the buffer.

310. **Claims 7 and 8:** Claim 7 depends from claim 1 and recites “a sensor that automatically initiates the first signal.” Claim 8 depends from claim 7 and recites “wherein the sensor operates upon content in the first data stream.” Yerazunis

discloses these limitations. When event sensor 70 detects certain “condition[s],” it automatically provides a trigger output signal that activates capture of video images, causing them to be write-protected. EX1017, 3:25-35, 8:8-30, 15:9-13, 17:45-61. Accordingly, event sensor 70 “automatically initiates the first signal.”

311. “Triggering events may include” a “signal representing a recognized change in a video image or acoustic signal.” *Id.*, 2:58-64. A POSITA would have understood that recognizing a change in a video image would have involved operating upon content in the first data stream.

312. **Claim 9:** Claim 9 depends from claim 1 and recites “an interface through which a human can initiate the signal.” Yerazunis discloses this limitation. The ’752 patent describes an “interface” as an input mechanism for receiving user input. EX1004, Abstract, 2:45-51, 4:6-13. Yerazunis discloses an input mechanism (*i.e.*, “an interface”) through which a human triggers a write-protecting signal, including via “a button actuated by a user.” EX1017, 2:58-64; *see also id.*, 9:17-18 (describing “capture button 72 which serves as a user activatable trigger event”), Fig. 14 (depicting capture button 72). Pushing this button provides a trigger signal to microcontroller 54. *Id.*, 9:19-22.

313. Further, Yerazunis’s “video recording device may be interfaced directly to the trigger of the gun” such that “the trigger is employed to generate a switching action or signal which is used to indicate a trigger event.” *Id.*, 16:59-62. The trigger

is “an interface through which a human can initiate a signal” for reasons similar to the capture button.

314. **Claims 10 and 11:** Claim 10 depends from claim 1 and recites “an interface through which a human can override a default pre-signal size of the recently used segment.” Claim 11 depends from claim 1 and recites “an interface through which a human can override a default post-signal size of the recently used segment.” Yerazunis discloses these limitations. Yerazunis teaches “the number of frames that are recorded before and after [a trigger event] are a matter of design choice.” EX1017, 8:51-55; *see also id.*, 6:11-13, 10:42-47, 11:31-43, 12:37-42. Because a human can set the number of frames recorded before and after a trigger event by “design choice,” Yerazunis necessarily discloses the respective interfaces of claims 10 and 11. These interfaces also would have been obvious in view of Fiedler, which discloses a “Capture” button (*i.e.*, “an interface”) that a human can press to control the amount of video that is captured. EX1037, Abstract, 1:43-54, 2:60-61, 9:5-8, 9:42-45.

315. **Claim 14:** Claim 14 depends from claim 1 and recites “a vehicle mount for the camera.” Yerazunis discloses this limitation. Yerazunis discloses embodiments of its video recording device mounted within a vehicle. EX1017, 4:35-56. It would have been obvious to a POSITA to use the features of Yerazunis’s gun-camera embodiment when the video recording device is mounted in a vehicle. A POSITA would have recognized that the features of the gun-camera embodiment—including the capability to preserve video data for multiple events in the circular

buffer—would have equal application in the vehicle-mounted context, and a POSITA thus would have been motivated to implement them in Yerazunis’s vehicle-mounted video recording device accordingly.

C. Ground 1b: Claims 12, 13, And 15-18 Of The ’752 Patent Would Have Been Obvious Over Yerazunis Alone Or As Combined With Fiedler, In Further View of Strub

316. Claim 12 depends from claim 1 and recites “a wireless receiver upstream of the buffer with respect to the first data stream.” Claim 13 depends from claim 1 and recites “a wearable mount for the camera.” Claim 15 depends from claim 1 and recites “a signaling device in wireless communication with a recorder comprising the memory, and that is configured to wirelessly send the first signal to the recorder.” Claims 16-18 depend from claim 15 and recite “wherein the wireless signaling device comprises a human wearable ring” (claim 16), “wherein the wireless signaling device comprises a key fob” (claim 17), and “wherein the wireless signaling device is local to the camera and the hardware, and local about a user” (claim 18).

317. To the extent Yerazunis and Fiedler do not disclose the limitations added in dependent claims 12, 13, and 15-18, these limitations would have been obvious in view of Strub (EX1046). Additional details are given below.

318. ***Claim 13:*** The combination of the Yerazunis/Fiedler video recording device with Strub discloses “a wearable mount for the camera,” as recited in claim 13 of the ’752 patent. Strub’s recording unit can utilize a wearable video camera, thus disclosing the claimed “wearable mount for the camera.” *See, e.g.,* EX1046, 5:26-31,

6:3-8, 8:1-27, 16:24-41, 43:12-39, 66:31-39, 70:52-58. A POSITA would have been motivated to apply Strub's teaching of a wearable mount for the camera to the Yerazunis/Fiedler video recording device. Because Yerazunis, Fiedler, and Strub all disclose video recording systems—and Yerazunis and Strub disclose compact, mountable systems—a POSITA would have been aware of and motivated to combine these references. Strub also describes why a POSITA would have been motivated to implement the Yerazunis/Fiedler camera with a wearable mount, *e.g.*, “to facilitate freedom of movement” for the user (EX1046, Abstract), and enable hands-free, discreet recording (*id.*, 4:12-39, 66:24-39). Further, Yerazunis discloses embodiments of its video recording device with various mounting options, *e.g.*, mounted to a vehicle (EX1017, 4:35-56) or a gun (*id.*, 14:45-15:20), and a POSITA would have recognized Yerazunis's video recording device as having applicability to other types of mounts, including wearable ones.

319. ***Claims 12 and 15:*** The combination of the Yerazunis/Fiedler video recording device with Strub discloses “a wireless receiver upstream of the buffer with respect to the first data stream” and “a signaling device in wireless communication with a recorder comprising the memory, and that is configured to wirelessly send the first signal to the recorder,” as respectively recited in claims 12 and 15 of the '752 patent. Strub discloses using a wearable item with pushbuttons to wirelessly control operation of a physically separate recording unit. EX1046, 54:20-52. Strub clearly discloses that various components of the recording unit can be connected in wired or

wireless fashions. *Id.* at 64:21-26 (“In general, communication between physically separate components of a recording unit can be implemented using either wired or wireless communication techniques and apparatus. The implementation of wired and wireless communication techniques and apparatus is known to those skilled in the art.”); *see also id.*, 64:27-65:14. A POSITA would have been motivated to implement the Yerazunis/Fiedler video recording device with Strub’s wearable item with user-pressable pushbuttons, and specifically to use Strub’s wearable item to wirelessly send the “first signal” to a wireless receiver of the separate recording unit to initiate preservation of video data.

320. As a POSITA would have recognized, this implementation would have advantageously facilitated operation of Yerazunis’s video recording device by a user. For example, a police officer surveilling a situation with Yerazunis’s video recording device (*e.g.*, mounted on a gun or in a car) could use Strub’s wearable item to wirelessly send the first signal to discreetly take video or photographs without handling the video recording device directly. *See also* EX1049 (Blum), EX1050 (Blum provisional).

321. And a POSITA would have understood such implementations as utilizing “a wireless receiver upstream of the buffer with respect to the first data stream,” as described in Strub and “known to those skilled in the art.” EX1046, 64:21-26; *see also id.*, 6:32-35, 11:29-35, 46:58-47:6, 52:42-47, 69:62-70:3, Fig. 3. The ’752 patent’s specification includes minimal disclosure of the claimed “wireless receiver upstream

of the buffer with respect to the first data stream” of claim 12, describing it with reference to receipt of a stop signal. EX1004, 3:51-65. The disclosure of Yerazunis/Fiedler as combined with Strub—e.g., using a wireless receiver to receive a stop signal from a remote control—is consistent with the ’752 patent’s description of the claimed “wireless receiver.”

322. A POSITA would have had a reasonable expectation of success because wirelessly coupled cameras were well-known, and implementing such cameras in the Yerazunis/Fiedler video recording device would have been routine and well within a POSITA’s skill. *See e.g.*, EX1035, 14:51-59.

323. ***Claims 16 and 17:*** The combination of the Yerazunis/Fiedler video recording device with Strub further discloses the limitations added in claims 16 and 17, *i.e.*, that the claimed wireless signaling device comprises “a human wearable ring” (claim 16) or “a key fob” (claim 17). Strub’s wearable marking token may be, for example, “a *ring*, brooch, bracelet (e.g., a watch-like band) or similar wearable item” that “can be constructed with one or more pushbuttons and adapted to enable communication (perhaps wirelessly) with the remainder of the recording unit.” EX1046, 54:20-52. Strub therefore discloses the claimed “human wearable ring,” and a POSITA would have understood Strub’s wearable token could alternatively be a key fob. Like a ring, a key fob could be worn by a user, and would provide similar advantages. Indeed, wearable, wireless accessories in the form of a key fob for use

with video recording systems were well-known, as evidenced by, *e.g.*, U.S. 7,263,073 to Petite (EX1054, cited by Examiner), U.S. 7,956,735 to Jackson (EX1055).

324. **Claim 18:** Finally, the combination of the Yerazunis/Fiedler video recording device with Strub discloses the limitations added in claim 18, *i.e.*, that the claimed wireless signaling device is “local to the camera and the hardware, and local about a user.” Yerazunis discloses a video recording device which may be mounted to a hand-held gun, and Strub discloses a “marking token” such as “a ring, brooch, bracelet (*e.g.*, a watch-like band) or similar wearable item.” EX1046, 54:20-52. Strub’s wearable token is “local” to Yerazunis’s camera and hardware. All of these components are disposed locally about the user, *e.g.*, with the user holding the gun with camera and hardware mounted thereon in his hand, and Strub’s wearable token located on the user’s clothing.

D. Ground 2a: Claims 1-11 Of The '752 Patent Would Have Been Obvious Over Ely Alone Or As Combined With Fiedler

1. Motivation To Combine

325. A POSITA would have been motivated to combine Ely and Fiedler for several reasons.

326. As one example, because Ely and Fiedler both disclose video recording systems for security, law enforcement, or surveillance operations, that store data in a circular buffer and preserve data associated with an event—both before and after an event trigger. And, Ely and Fiedler specifically disclose recording systems with user

controls for operation and playback. A POSITA therefore would have been aware of and motivated to combine the two references.

327. As another example, a POSITA would have been motivated to implement Ely's surveillance system with Fiedler's capture functionality to extend the length of a write-protected segment that occurs prior to an event trigger. Ely discloses that the respective lengths of video data protected before and after an alarm command are predetermined. EX1020, 7:45-55, 10:11-23, 10:60-65. Ely also discloses a user interface 108 for providing instructions input by users of the system. *Id.*, 5:60-64, 8:16-27, Fig. 2. A POSITA would have understood that increasing the duration of the protected segment of the buffer prior to the event trigger using Fiedler's capture functionality would have advantageously helped to ensure preservation of important video data. For example, Fiedler's capture functionality would have helped ensure important video evidence can be preserved in the Ely system (*e.g.*, by capturing important, contextual video data for events occurring before write-protection would otherwise begin). And a POSITA would have generally known that the length of recording in a circular buffer could be extended in response to a signal, such that implementation of Fiedler's capture functionality in Ely's system would have been routine and well within a POSITA's skill.

2. Independent Claim 1

a) Preamble

328. Ely discloses the preamble of claim 1. Ely discloses a “video surveillance system” including a central control station and “video cameras each mounted inside a dome housing unit.” EX1020, Abstract. Ely therefore discloses a “surveillance apparatus.”

b) Element 1

329. Ely discloses this claim element. Ely’s camera unit 114 includes a camera 130 in which an “image formed by the optical system 138 is converted into an electrical signal at CCD 142 and the resulting signal is subjected to conventional analog signal processing at video signal processing circuit 144.” EX1020, 6:21-28, Fig. 3. Camera 130 is coupled to memory board 136 including video digitizer circuit 146. *Id.*, 6:48-61.

330. Camera 130 and digitizer circuit 146 collectively disclose the claimed “camera” because camera 130 includes CCD 142 that captures video images, and the digitizer circuit 146 generates a digital representation of the video image. A POSITA would have understood the digital output of Ely’s digitizer circuit 146 as including data streams. These data streams include the claimed “first and second data streams,” as explained below for elements 4 and 5 of claim 1.

c) Element 2

331. Ely discloses this claim element. Ely's video surveillance system includes a memory board 136 having a memory device 150 that discloses the claimed "memory." EX1020, 6:17-21, 6:48-53, 6:61-65, Fig. 3. The camera 130 is coupled to the memory board 136, with the memory board 136 being configured "to receive an analog video signal output from the camera 130 and to digitize, compress and store the video signal" in the memory device 150. *Id.*, 6:48-65.

d) Element 3

332. ***Patent Owner's Constructions:*** Ely discloses a processor (control circuit 134) that "utilizes an area of the memory as a circular buffer," as required under Patent Owner's non-MPF position for element 3. EX1056, 20. Ely's camera unit 114 comprises a control circuit 134 "for controlling the storage device to operate as a ring buffer in which digital data representative of a video signal currently formed by the video camera is written over oldest digital data stored in the storage device." EX1020, 4:1-7.

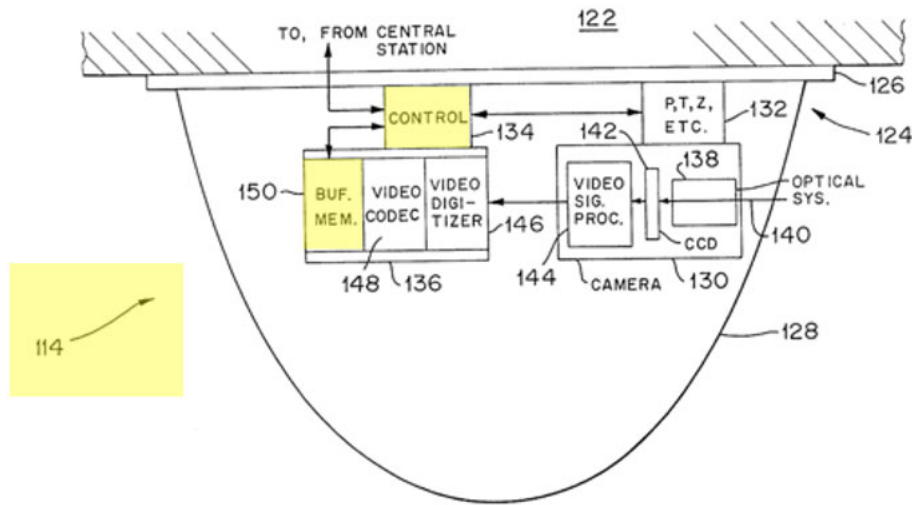


FIG. 3

Id., Fig. 3 (color added).

333. Memory device 150 “functions as a buffer for the video signal generated by the camera 130, and is controlled by the control circuit 134.” *Id.*, 6:48-65. More particularly, “the memory 150 serves as a ring buffer, in which currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150.” *Id.*, 7:28-34. A POSITA would have understood the “ring buffer” to mean a “circular buffer” of the type disclosed in the ’752 patent.

334. Control circuit 134 “may be a conventional microcontroller,” and is “programmed, according to practices of the present invention, to carry out memory control, as well as data storage and retrieval functions” (EX1017, 6:37-47), as Figure 4 illustrates (*id.*, 5:25-26):

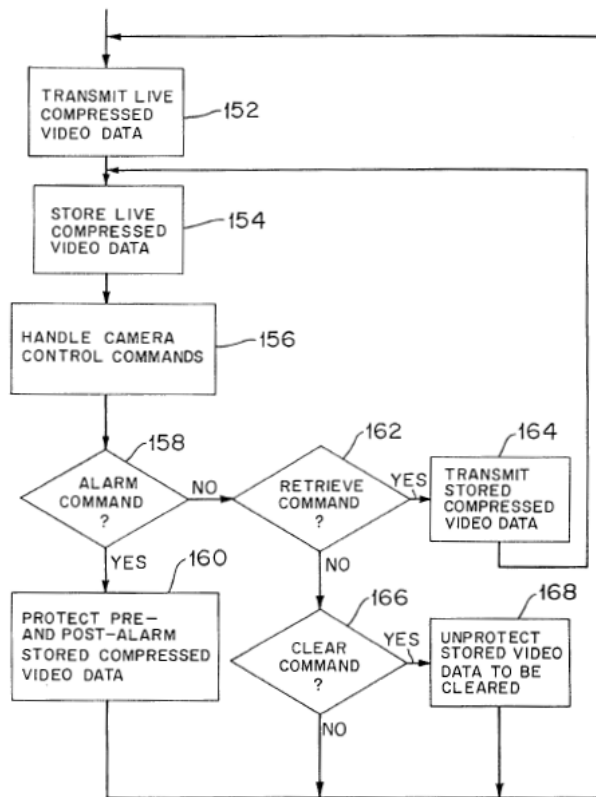


FIG. 4
CAMERA UNIT OPERATION

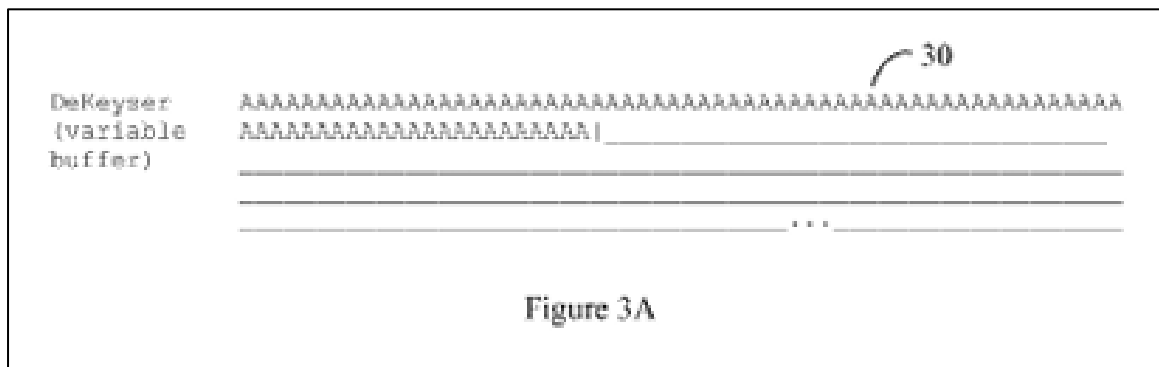
Id., Fig. 4. Ely thus discloses element 3 under Patent Owner’s non-MPF position.

335. Ely also discloses element 3 under Patent Owner’s MPF position. As explained for Patent Owner’s non-MPF position, Ely discloses a camera unit 114 including control circuit 134 that runs software to accomplish the function of element 3.

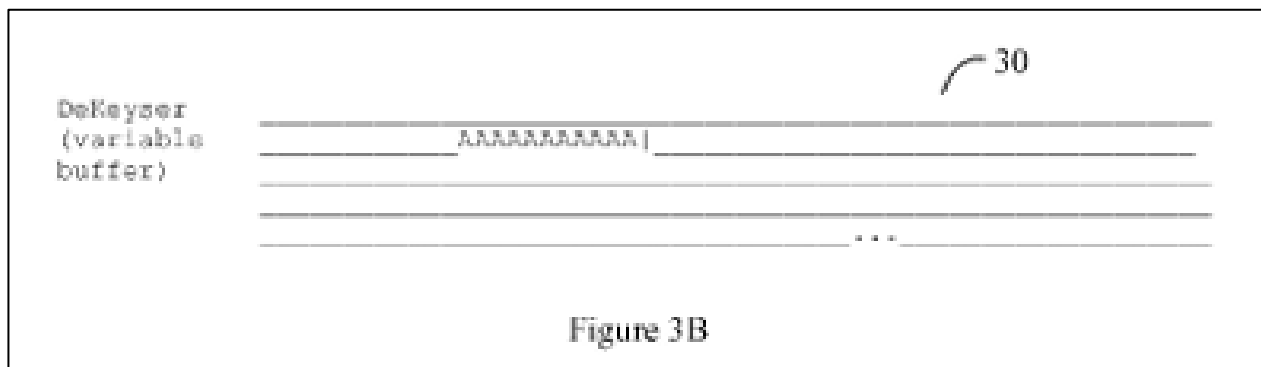
336. ***Petitioner’s Corresponding Structure:*** The combination of Ely and Fiedler discloses the corresponding structure identified by Petitioner, *i.e.*, “hardware and software programmed to perform the circular buffer algorithm disclosed at 2:36-39, 4:67-5:1, Figs. 3A-3H, 3:13-4:45, Fig. 5 (Step 51), 5:35-40.”

337. Ely discloses a recorder with a memory that runs software to accomplish functions, consistent with the '752 patent's disclosure at 4:67-5:1. Specifically, Ely discloses a camera unit 114 having control circuit 134 that runs software for performing instructions. EX1020, 4:1-8, 6:37-47, 7:12-8:12. The camera unit 114 also includes memory device 150, and the control circuit 134 utilizes an area of the memory device 150 as circular buffer, consistent with the '752 patent's disclosure at Figure 5 (Step 51) and 5:35-40. EX1020, 4:1-8, 6:37-47, 7:12-8:12.

338. Ely's control circuit 134 and software, in view of Fiedler's teachings, perform the "schematics of memory usage" (EX1004, 3:3-5) described at Figures 3A-3H and 3:13-4:45 of the '752 patent.



339. Ely discloses that the control circuit 134 stores a first digital data stream generated by video digitizer 146 in a ring buffer formed in memory device 150. EX1020, 7:17-38.

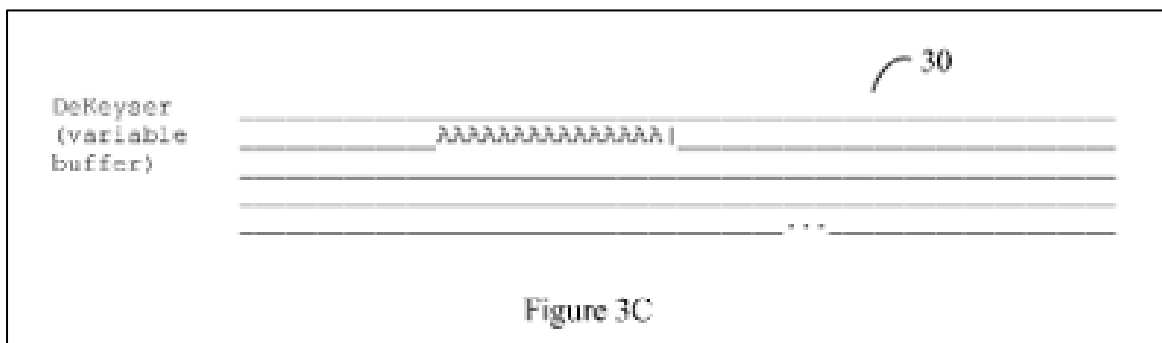


340. Ely’s control circuit 134 protects a recent period of the first data stream recorded in the ring buffer based on a first alarm command (a start signal) generated by sensor 120. EX1020, 4:7-8, 7:48-55, 10:11-23.

341. The protected portion of the first data stream in the ring buffer is associated with a first alarm event (EX1020, 4:7-8, 7:48-55, 10:11-23), and includes a period of the first data stream preceding the first alarm command. *Id.*, 7:48-55, 10:11-23.

342. Ely discloses that the respective lengths of video data protected before and after an alarm command are predetermined. EX1020, 7:45-55, 10:11-23, 10:60-65. Ely also discloses a user interface 108 for providing instructions input by users of the system. *Id.*, 5:60-64, 8:16 27, Fig. 2. Ely thus discloses, or at minimum would have rendered obvious, altering the historical time period being protected. Further, altering the historical time period would have been obvious in further view of Fiedler. Fiedler describes “pressing Capture once may capture the most recent minute, pressing it twice in rapid succession may capture the most recent two minutes, and so on.” EX1037, 9:42-45. Further, a POSITA would have generally known that the

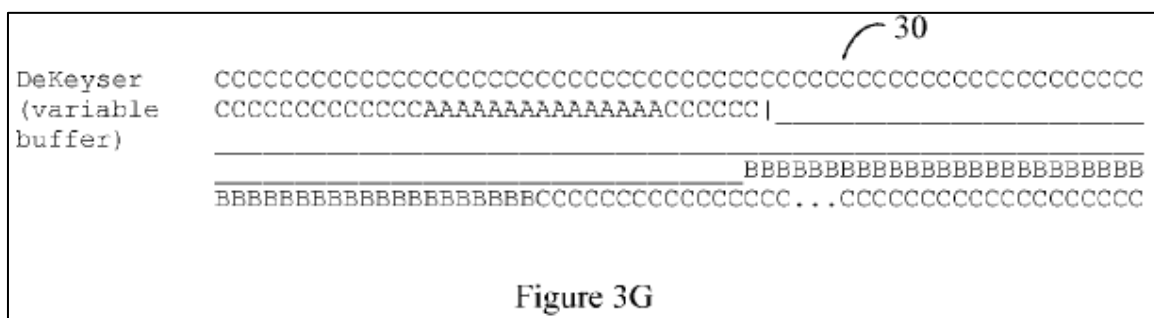
length of a write-protected segment in a circular buffer could be extended in response to a signal.



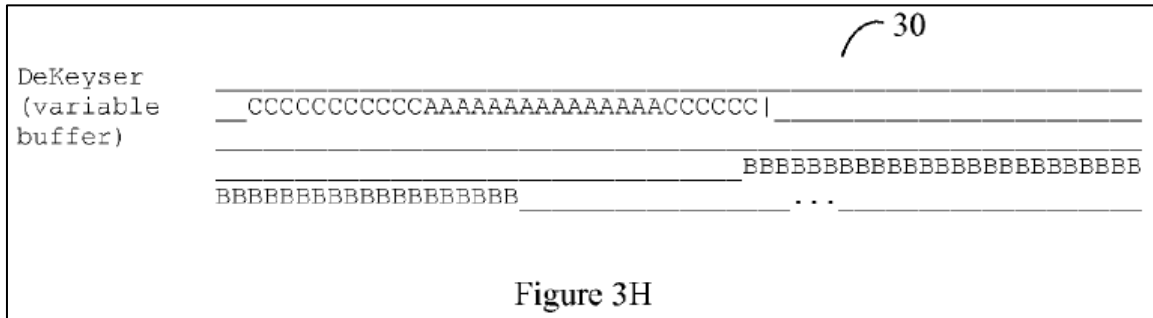
343. Ely’s control circuit 134 stops protection of the first data stream in the ring buffer based on a stop signal. EX1020, 7:48-55, 10:11-23. Specifically, Ely’s system responds to a signal from a user to save a recording, and this signal includes a “stop signal.” EX1020, 7:48-55, 10:11-15. Ely’s alarm command tells the video recording device when to (i) start recording, *i.e.*, upon receipt of the alarm command, and when to (ii) stop recording, *i.e.*, when a predetermined amount of time has passed after receipt of the alarm command. EX1020, 7:48-55, 10:11-23.

344. Further, Fiedler discloses a stop signal received after a start signal. EX1037, Fig. 3, 8:45-9:4, 10:35-54. A POSITA would have been motivated to apply Fiedler’s teaching of receiving the stop signal after the start signal to Ely. A POSITA would have recognized that user control to stop write protection following a start signal would have been desirable in some scenarios (*e.g.*, to prevent unnecessary preservation of unimportant video data).

346. Ely's control circuit 134 is configured to protect a portion of the second data stream in the ring buffer associated with a second alarm event based on a second alarm command (start signal) generated by sensor 120. EX1020, 4:7-8, 7:48-55, 10:11-23, 10:59-11:2.



to the ring buffer as a third data stream. EX1020, Fig. 4, 7:45-48, 7:56-8:6. Recordation of the third data stream would skip over the protected portion of the first data stream in the ring buffer. *Id.*, 7:34-39, 10:11-23.



349. The control circuit 134 of Ely is configured to protect a portion of the third data stream in the ring buffer associated with a third alarm event based on a third alarm command (start signal) generated by sensor 120. EX1020, Fig. 4, 7:45-48, 7:56-8:6, 10:11-23. The protected portion of the third data stream would straddle the protected portion of the first data stream in the ring buffer. *Id.*, 7:34-39, 10:11-23.

e) Element 4

350. ***Patent Owner’s Constructions:*** Ely discloses a processor (control circuit 134) that “records the first data stream in the buffer,” as required under Patent Owner’s non-MPF position for element 4. EX1056, 20. As Figure 4 illustrates, “the memory addressing and writing of data into the memory is controlled by the control circuit 134 so that the memory 150 serves as a ring buffer, in which currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150” (EX1020, 7:17-38):

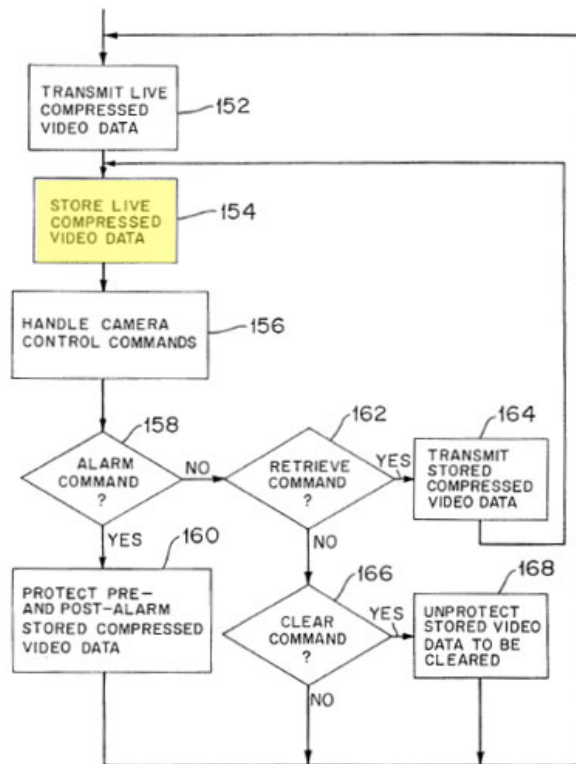


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added). Ely thus discloses element 4 under Patent Owner’s non-MPF position.

351. Ely also discloses element 4 under Patent Owner’s MPF position. As explained for Patent Owner’s non-MPF position, Ely discloses a camera unit 114 including control circuit 134 that runs software to accomplish the function of element 4.

352. ***Petitioner’s Corresponding Structure:*** The combination of Ely and Fiedler discloses the corresponding structure identified by Petitioner, *i.e.*, “hardware and software programmed to perform the circular buffer algorithm disclosed at 2:36-39, 4:67-5:1, 5:12-14, Fig. 3A, 3:13-16, Fig. 5 (Step 52), 5:48.”

353. As explained above for Petitioner's corresponding structure for element 3 of claim 1, Ely discloses a camera unit 114 with control circuit 134 that runs software to accomplish functions, consistent with the '752 patent's disclosure at 4:67-5:1. EX1020, 4:1-8, 6:37-47, 7:12-8:12. The control circuit 134 records a first data stream in the ring buffer formed in the memory device 150, consistent with the '752 patent's disclosure at Figure 5 (Step 52), 5:35-40, Fig. 3A, and 3:13-16.

354. Additionally, in recording the first data stream to the ring buffer, Ely's control circuit 134 "utilizes different sections for the buffer at different times, with protected sub-sections being skipped over during storage of subsequent data streams," consistent with the '752 patent's disclosure at 2:36-39. EX1020, 7:34-38, 10:11-23. Further, Ely's recorder "record[s] images in digital [or analog] format," consistent with the '752 patent's disclosure at 5:12-14. *Id.*, 2:55-3:5, 4:1-8, 6:48-7:11.

f) Element 5

355. Ely discloses a processor (control circuit 134) that "responds to a first signal" in the manner claimed, as required under Patent Owner's non-MPF position for element 5. EX1056, 20. Ely discloses that the camera system responds to an "alarm command by protecting buffered video data which corresponds to a predetermined pre- and post-alarm time period," and the "protected data is then available for subsequent retrieval, display, and permanent recording." EX1020, 10:11-17. In Ely, "[a]fter the compressed video data stored at one of the camera units has been protected pursuant to an alarm command, the data (which will sometimes be

referred to as ‘alarm data’) can be selectively retrieved in response to user instruction either for display (block 180) or directly for taperecording (block 182).” *Id.*, 10:17-23.

356. “When an alarm command is received, a process (indicated by block 160) is carried out in which the control circuit 134 protects from over-writing compressed digital video data previously stored in the memory 150.” *Id.*, 7:48-55. The alarm data “correspond[s] to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command.” *Id.* The protection of alarm data occurs while at the same time continuously recording the data stream into an unprotected segment of the ring buffer: As illustrated in Figure 4, protection of alarm data (at block 160) loops back to the beginning of a process including, at block 154, “stor[ing] live compressed video data”:

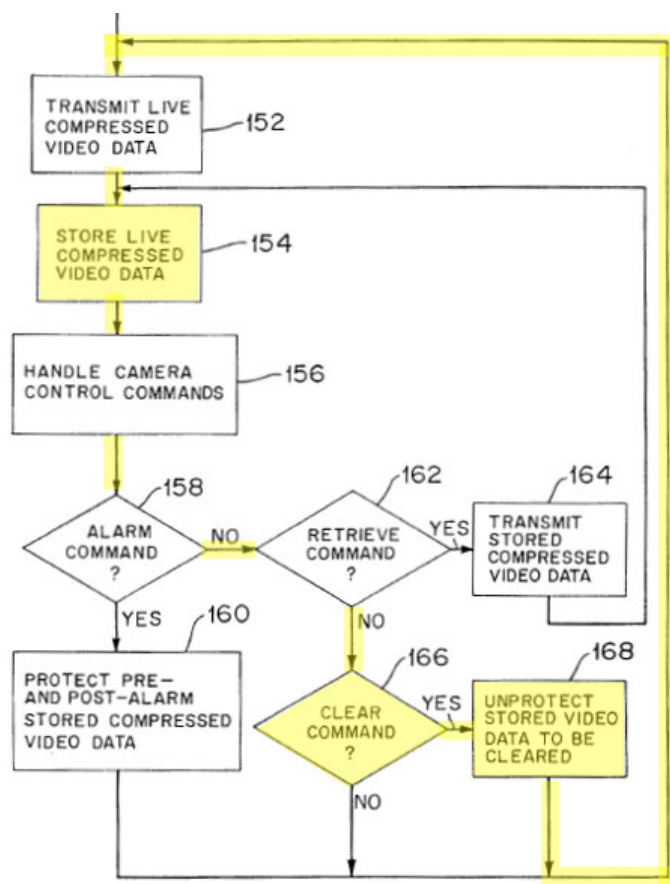


FIG. 4
CAMERA UNIT OPERATION

Id., Fig. 4 (color added); *see also id.*, 7:45-48, 8:3-6.

357. Further, because the recording of live video data is “ongoing” (*i.e.*, continuous), the protection alarm data necessarily occurs while recording additional segments of image data. *See id.*, Fig. 4, 7:45-48, 7:56-8:6. Ely also discloses write-protecting multiple events (as multiple “blocks”) in the ring buffer. *Id.*, 10:59-11:2. A POSITA would have understood that to preserve video for multiple events in the ring buffer, Ely must “continuously record[] the first data stream as the second data stream in an unprotected segment of the buffer, without overwriting the

protected segment,” *e.g.*, the first block of alarm data. Ely thus discloses element 5 under Patent Owner’s non-MPF position.

358. Ely also discloses element 5 under Patent Owner’s MPF position. As explained for Patent Owner’s non-MPF position, Ely discloses a camera unit 114 including control circuit 134 that runs software to accomplish the function of element 5.

g) Element 6

359. Ely discloses a processor (control circuit 134) that “responds to a second signal” in the manner claimed, as required under Patent Owner’s non-MPF position for element 6. EX1056, 20. Ely discloses that the respective lengths of video data protected before and after an alarm command are predetermined. EX1020, 7:45-55, 10:11-23, 10:60-65. Ely also discloses a user interface 108 for providing instructions input by users of the system. *Id.*, 5:60-64, 8:16-27, Fig. 2. It would have been obvious to use the control circuit 134 to increase the duration of the protected segment of the buffer prior to the first signal in response to a second signal in view of Ely’s disclosure.

360. Moreover, such limitations would have been obvious in further view of Fiedler. Fiedler describes “pressing Capture once may capture the most recent minute, pressing it twice in rapid succession may capture the most recent two minutes, and so on.” EX1037, 9:42-45. A POSITA would have generally known that the length of recording in a circular buffer could be extended in response to a signal. A POSITA would have understood the benefits of increasing the duration of the protected

segment of the buffer prior to the first signal in the Ely system to ensure important video evidence can be preserved (*e.g.*, by capturing contextual video data for events occurring before write-protection would otherwise begin). Ely thus discloses element 6 under Patent Owner's non-MPF position.

361. Ely also discloses element 6 under Patent Owner's MPF position. As explained for Patent Owner's non-MPF position, Ely discloses a camera unit 114 including control circuit 134 that runs software to accomplish the function of element 6.

3. Dependent Claims 2-11

362. ***Claim 2:*** Ely discloses the limitations added in dependent claim 2. In one embodiment, the buffer has a storage capacity of "thirty minutes of video signals," and "each alarm command initiates protection of buffered video signals corresponding to a ten minute period (say five minutes prior to the alarm and five minutes after)." EX1020, 10:60-65.

363. ***Claim 3:*** Ely discloses limitations added in dependent claim 3 for the reasons explained for claim 1, element 5.

364. ***Claims 4 and 5:*** Ely discloses the limitations added in dependent claims 4 and 5. In one embodiment, the buffer has a storage capacity of "thirty minutes of video signals," and "each alarm command initiates protection of buffered video signals corresponding to a ten minute period (say five minutes prior to the alarm and five minutes after)," thus disclosing the limitations added in claim 4. EX1020,

10:60-65. And because alarm data cannot be overwritten, Ely's video recording device necessarily records to physically discontinuous parts of the circular buffer, as the overwriting process skips alarm data, thus disclosing the limitations added in claim 5. *Id.*; EX1020, 7:34-39.

365. **Claim 6:** Ely discloses the limitations added in dependent claim 6. Ely's "memory device 150 functions as a buffer for the video signal generated by the camera 130, and is controlled by the control circuit 134." EX1020, 6:48-65. Accordingly, a POSITA would have understood nearly all of the memory device 150 (*i.e.*, more than 20% of it) to be used as the buffer. Moreover, it would have been an obvious design choice to dedicate at least 20% of Ely's memory device 150 to the buffer, *e.g.*, to enable sufficient capacity for recording and preserving video data. *Id.* Ely discloses flexibility in configuring its ring buffer (*e.g.*, enabling a "predetermined proportion" of it to be "utilized for protected storage"), and a POSITA would have recognized such flexibility as enabling the selection of an adequate amount of the memory device 150 to be used as the ring buffer. EX1020, 11:2-8.

366. **Claims 7 and 8:** Ely discloses the limitations added in dependent claims 7 and 8. Sensors 120 "are preferably of conventional types that detect, for example, unauthorized opening of doors, windows and display cases and the like and generate alarm signals indicative of these occurrences," and "may also include conventional motion and/or heat sensing devices." EX1020, 5:50-55.

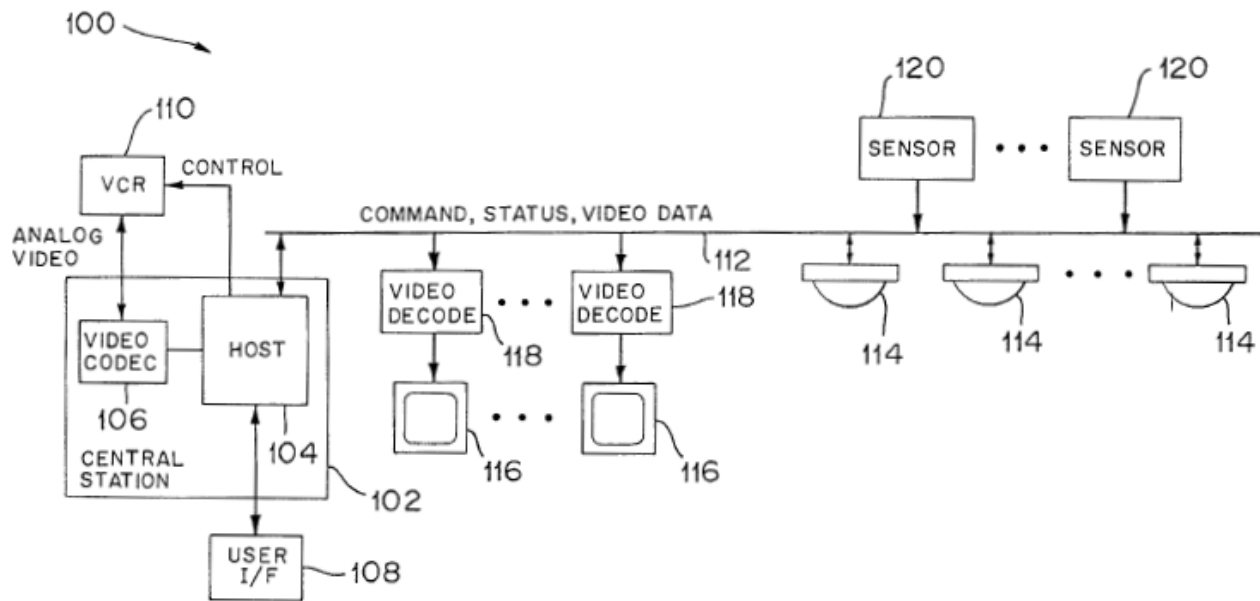


FIG. 2

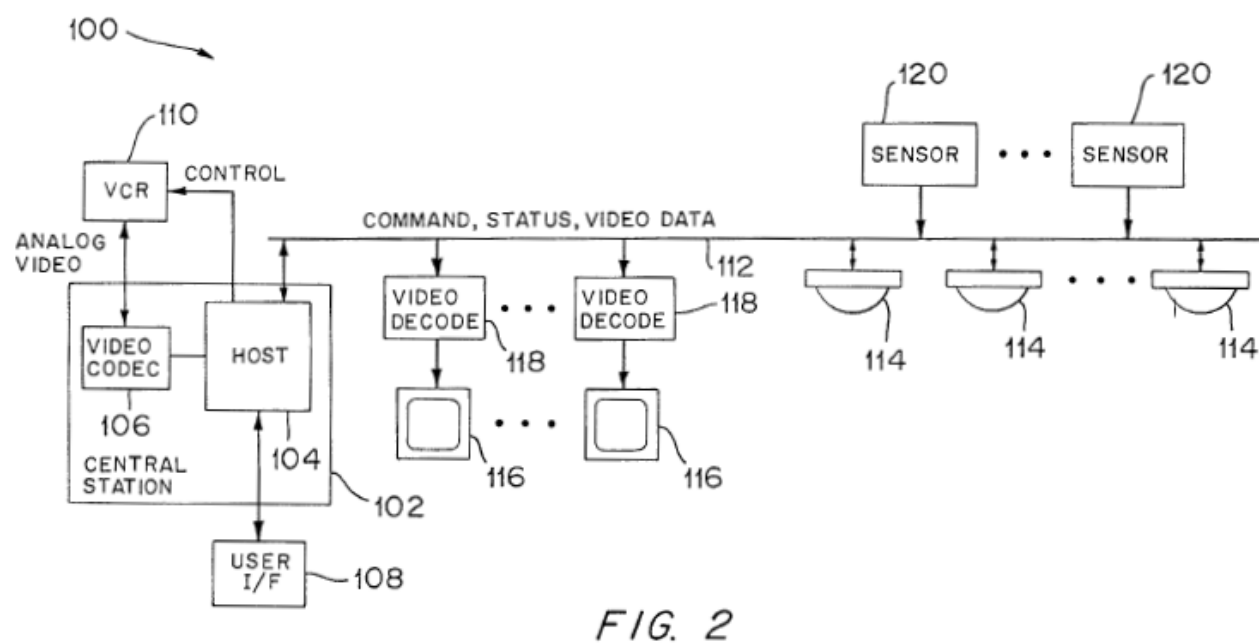
367. Further, “an alarm condition can be detected by machine analysis of the content of live video signals generated by one or more of the camera units.” *Id.*, 11:42-47.

368. **Claim 9:** Ely discloses the limitations added in dependent claim 9. Ely teaches “an alarm condition can be generated by a system operator via the user interface” (EX1020, 11:42-47), and describes the user interface as responding to inputs from common computer peripherals (*e.g.*, a mouse, keyboard) and a “TOUCHTRACKER” control module (*id.*, 5:60-6:3).

369. **Claims 10 and 11:** Ely discloses the limitations added in dependent claims 10 and 11. When an alarm command is received, Ely’s surveillance system protects from overwriting video data previously stored in the memory that “correspond[s] to a time interval beginning at a *predetermined time prior to receipt of the alarm command*, and continuing for a *predetermined time after receipt of the*

alarm command.” EX1020, 7:45-55; *see also id.*, 10:10-23. Ely thus discloses the pre-alarm and post-alarm intervals are predetermined. *See also id.*, 10:60-65. For a human to “predetermine” amounts of time to be protected before and after the alarm command, Ely necessarily discloses the “interface” of claims 10 and 11.

370. Ely further discloses a user interface 108 for users to provide instructions, depicted in Figure 2 (EX1020, 5:60-64, 8:16-27):

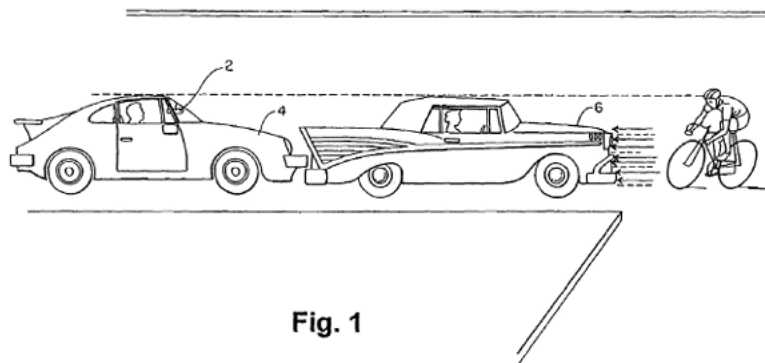


Id., Fig. 2.

371. The interfaces of claims 10 and 11 also would have been obvious in further view of Fiedler, which discloses a “Capture” button (*i.e.*, “an interface”) that a human can press to control the amount of video that is captured. EX1037, Abstract, 1:43-54, 2:60-61, 9:5-8, 9:42-45.

E. Ground 2b: Claim 14 Of The '752 Patent Would Have Been Obvious Over Ely Alone Or As Combined With Fiedler, In Further View Of Yerazunis

372. To the extent Ely and Fiedler do not disclose the limitation added in dependent claim 14, this limitation would have been obvious in view of Yerazunis. Yerazunis discloses embodiments of its video recording device mounted within a vehicle. EX1017, 1:21-26, 4:36-61, Fig. 1. Yerazunis also describes why it is “highly desirable” to mount the recording device in this environment, *e.g.*, “to have an evidentiary record which establishes that the accident was caused by vehicle 6 since it would normally be presumed in such a circumstance that the driver of vehicle 4 was the cause of the accident” (*id.*) in the context of Figure 1:



Id., Fig. 1.

373. A POSITA would have been motivated to mount Ely’s camera unit 114 to a vehicle. While Ely describes the camera unit 114 mounted in a dome 128 (EX1020, Abstract, 6:7-15, Fig. 3), a POSITA would have recognized the camera unit 114 as having advantageous applicability in a vehicle-mounted context, including to enable evidentiary records of vehicle-related incidents, which Yerazunis describes as

“highly desirable.” EX1017, 1:21-26, 4:36-61, Fig. 1. A POSITA would have been motivated to mount Ely’s camera unit 114 in a vehicle with appropriate modifications well within a POSITA’s skill (*e.g.*, coupling the camera unit to other components, like the central station, via a wireless connection).

F. Ground 2c: Claims 12, 13, And 15-18 Of The ’752 Patent Would Have Been Obvious Over Ely Alone Or As Combined With Fiedler, In Further View Of Strub

374. To the extent Ely and Fiedler do not disclose the limitations added in dependent claims 12 and 15-18, these limitations would have been obvious in view of Strub.

375. **Claim 13:** The combination of the Ely/Fiedler video recording device with Strub discloses “a wearable mount for the camera,” as recited in claim 13 of the ’752 patent. Strub’s recording unit can utilize a wearable video camera, thus disclosing the claimed “wearable mount for the camera.” *See, e.g.*, EX1046, 5:26-31, 6:3-8, 8:1-27, 16:24-41, 43:12-39, 66:31-39, 70:52-58. A POSITA would have been motivated to apply Strub’s teaching of a wearable mount for the camera to the Ely/Fiedler system. Because Ely, Fiedler, and Strub all disclose video recording systems, a POSITA would have been aware of and motivated to combine these references. While Ely describes the camera unit 114 mounted in a dome 128 (EX1020, Abstract, 6:7-15, Fig. 3), a POSITA would have recognized the camera unit 114 as having applicability to wearable mounts, including “to facilitate freedom

of movement” for the user, hands-free, discreet recording, and other advantages described in Strub. EX1046, Abstract, 4:12-39, 66:24-39.

376. ***Claims 12 and 15:*** For claims 12 and 15, Strub discloses using a wearable item with pushbuttons to wirelessly control operation of a physically separate recording unit having a wireless receiver. EX1046, 6:32-35, 11:29-35, 46:58-47:6, 54:20-52. Strub clearly discloses that various components of the recording unit can be connected in wired or wireless fashions. *Id.* at 64:21-26 (“In general, communication between physically separate components of a recording unit can be implemented using either wired or wireless communication techniques and apparatus. The implementation of wired and wireless communication techniques and apparatus is known to those skilled in the art.”); *see also id.*, 64:27-65:14, 69:62-70:3, Fig. 3. A POSITA would have been motivated to implement the Ely/Fiedler video recording device with Strub’s wearable item with user-pressable pushbuttons, and specifically to use Strub’s wearable item to wirelessly send the “first signal” to a wireless receiver of the separate recording unit to initiate preservation of video data.

377. As a POSITA would have recognized, this implementation would have advantageously facilitated wireless operation of the Ely/Fiedler system by a user. For example, a security guard patrolling the floor of a casino or warehouse could advantageously use Strub’s wearable item to take video or photographs by communicating wirelessly with Ely’s control circuit 134 to control the camera 130. And a POSITA would have understood such implementations as utilizing “a wireless

receiver upstream of the buffer with respect to the first data stream” as described in Strub (EX1046, 6:32-35, 11:29-35, 46:58-47:6, 52:20-52, 69:62-70:3, Fig. 3), and consistent with the ’752 patent’s support for this limitation at 3:51-65.

378. ***Claims 16 and 17:*** The combination of the Ely/Fiedler system with Strub further discloses the limitations added in claims 16 and 17. Strub’s wearable marking token may be “a ring” or “similar wearable item,” thus disclosing claim 16’s “human wearable ring” and at minimum rendering obvious claim 17’s “key fob.” EX1046, 54:20-52.

379. ***Claim 18:*** The combination of the Ely/Fiedler system with Strub also discloses the limitations added in claim 18. As a wearable item, Strub’s wearable token would be “local about a user,” and would additionally be “local to the camera and the hardware” because the wearable token would be near enough to engage in wireless communication with the Ely/Fiedler system and, in the case of, *e.g.*, security personnel monitoring an office or casino floor, would be worn in the vicinity of the Ely/Fiedler system to send a “first signal” to record events that can be recorded and captured by the Ely/Fiedler system.

APPENDICES

APPENDIX	TITLE
A	<i>Curriculum Vitae</i> of Nabil J. Sarhan
B	U.S. Patent No. 2003/0151663 (Lorenzetti)
C	U.S. Patent No. 7,804,426 (Etcheson)
D	U.S. Patent Pub. No. 2002/0131768 (Gammenthaler 1)
E	U.S. Patent Pub. No. 2004/0201765 (Gammenthaler 2)
F	RESERVED
G	RESERVED
H	RESERVED
I	U.S. Patent No. 6,389,340 (Rayner)
J	U.S. Patent No. 6,421,080 (Lambert)
K	U.S. Patent No. 6,088,635 (Cox)
L	U.S. Patent Pub. No. 2004/0252193 (Higgins)
M	U.S. Patent Pub. No. 2004/0150717 (Page)
N	POLICE VIDEO Up Close and Personal, LAW and ORDER, August 1999
O	Sheriff Baca Introduces In-Car Video System and “Cop-Cam,” County Digest (Country of Los Angeles), March 2000
P	Deja View Camwear Model 100, CARPE’04, October 15, 2004
Q	U.S. Patent Pub. No. 2005/0088521 (Blanco 2)
R	U.S. Patent No. 8,350,907 (Blanco)
S	RESERVED
T	RESERVED
U	U.S. Patent Pub. No. 2005/0078195 (Van Wagner)
V	U.S. Patent No. 6,995,668 (Junqua)
W	U.S. Patent Pub. No. 2001/0005217 (Hamilton)
X	PCT Patent Pub. No. WO2004/036926 (Pearlson)
Y	U.S. Patent No. 6,690,294 (Zierden)
Z	U.S. Patent No. 6,831,556 (Boykin)
AA	Bing-Fei WU et al., “A Practical Home Security System via Mobile Phones,” Proceedings of the 5th WSEAS International Conference on

APPENDIX	TITLE
	Telecommunications and Informatics, Istanbul, Turkey, May 27-29, 2006 (pages 299-304)
BB	S.C. Hui et al., “Remote Video Monitoring Over the WWW,” Multimedia Tools and Applications, 21, 173–195, 2003, Kluwer Academic Publishers, The Netherlands
CC	Video Process Monitoring, Steve Rubin, automation.com, Feb. 3, 2003
DD	U.S. Patent No. 6,578,070 (Weaver)
EE	U.S. Patent No. 7,088,387 (Freeman 2)
FF	U.S. Patent No. 7,747,143 (DeKeyser)
GG	U.S. Patent No. 2007/0071395 A1 (Boone)
HH	U.S. Patent Pub. No. 2007/0132773 A1 (Plante 2)
II	“Operating Systems” (Third Ed. 2004) by H.M Deitel, P.J. Deitel, and D.R. Choffnes (excerpt)
JJ	SecurityMagazine.com – VIDEOSurveillance: Wireless Mesh Networks
KK	DeepSentinel – A Brief History of Surveillance Cameras
LL	Wireless Video Surveillance: A Survey
MM	Cost-Efficient Mining Techniques for Data Streams
NN	Video Compression – Lecture Notes
OO	U.S. Patent No. 5,465,120 (Schultheiss)
PP	U.S. Patent No. 6,624,611 (Kirmuss)