

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

APPLE INC.

Petitioner

v.

SMITH INTERFACE TECHNOLOGIES, LLC,

Patent Owner

---

IPR2024-01085  
Patent 10,649,580

---

**DECLARATION OF DR. MARK P. MAHON**

## TABLE OF CONTENTS

|                                                                                                                                                                                                                                                                       | Page |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| I. INTRODUCTION .....                                                                                                                                                                                                                                                 | 1    |
| II. BACKGROUND AND QUALIFICATIONS .....                                                                                                                                                                                                                               | 1    |
| III. COMPENSATION.....                                                                                                                                                                                                                                                | 9    |
| IV. LEGAL CONSIDERATIONS.....                                                                                                                                                                                                                                         | 10   |
| V. TASK SUMMARY .....                                                                                                                                                                                                                                                 | 11   |
| VI. OVERVIEW OF THE '580 PATENT.....                                                                                                                                                                                                                                  | 14   |
| A. Independent Claims 1, 22, and 58 .....                                                                                                                                                                                                                             | 15   |
| VII. LEVEL OF ORDINARY SKILL IN THE ART .....                                                                                                                                                                                                                         | 15   |
| VIII. OVERVIEW OF THE PRIOR ART .....                                                                                                                                                                                                                                 | 16   |
| A. Ramos Paper.....                                                                                                                                                                                                                                                   | 16   |
| B. Ramos Video.....                                                                                                                                                                                                                                                   | 18   |
| C. Ording .....                                                                                                                                                                                                                                                       | 20   |
| IX. THE '580 PATENT'S CLAIMS ARE NOT OBVIOUS.....                                                                                                                                                                                                                     | 21   |
| A. Ground 1A: Dr. Cockburn Does Not Show That The Ramos Paper, Ramos Video, And The Ording Device Would Have Rendered Obvious Claims 1, 3, 17, 19, 22, 24, 36, 41, 58, 60, 77, 82, And 83 .....                                                                       | 21   |
| 1. Dr. Cockburn's Combination Of The Ramos Paper, Ramos Video, And The Ording Device Is Not Supported.....                                                                                                                                                            | 21   |
| 2. Limitations[1h], [1i], [1k], [1l], 3, 17, 19, [22d], [22f], [22g], 24, 36, 41, [58c], [58e], [58f], [58g], 60, 77, 82, 83: second virtual display layer that appears to have a lesser depth than the first virtual display layer .....                             | 33   |
| 3. Limitations [1i], [1l], [22d], [22g], [58c], [58g]: at least [a] portion of the second virtual display layer is at least partially translucent .....                                                                                                               | 38   |
| 4. Limitations 1[l], 22[g], 58[f], 82 and 83: perform a zoom operation on the at least portion of the contents of the first virtual display layer without performing [the]/[any] zoom operation on the plurality of markings in the second virtual display layer..... | 47   |
| 5. Limitations [1h], [22d], [58c]: [when/in response to] an aspect of the touch [is/being] detected to surpass a threshold, display[ing], via the touch screen, a plurality of markings in a second virtual display layer .....                                       | 51   |

|                                                                                                                                                                         |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 6. Claims 29, 65: wherein the touch and the another touch are detected to be part of a single continuous gesture with constant contact with the electronic device ..... | 55 |
| 7. Claims 9, 32, 69: the aspect of the touch includes a duration aspect and the threshold includes a duration magnitude threshold .....                                 | 59 |
| B. Ground 1B: Dr. Cockburn Does Not Show that The Ramos Paper, Ramos Video, Ording, and Hayward Combination Would Have Rendered Obvious Claim 48 .....                  | 60 |
| X. CONCLUSION .....                                                                                                                                                     | 64 |

## **I. INTRODUCTION**

1. My name is Mark Mahon. I am over the age of twenty-one (21) years, of sound mind, and capable of making the statements set forth in this Declaration. I am competent to testify about the matters set forth herein. All the facts and statements contained herein are with my personal knowledge, and they are true and correct to the best of my knowledge.

2. I have been asked by Smith Interface Technologies, LLC (“Smith” or “Patent Owner”) to submit this declaration in response to the challenge of the validity of claims 1–4, 6–10, 17, 19, 22–26, 28–30, 32–33, 36, 41, 48, 58–62, 64–65, 67, 69–70, 73, 77, and 82–83 (“Challenged Claims”) of U.S. Patent No. 10,649,580 (the “’580 Patent”) by Petitioner Apple Inc. (“Apple” or “Petitioner”).

## **II. BACKGROUND AND QUALIFICATIONS**

3. Exhibit 2006 is a true and correct copy of my curriculum vitae (“CV”), containing my complete qualifications and professional experience. The following is a brief summary of my relevant qualifications and professional experience.

4. I am a Teaching Professor in the School of Electrical Engineering and Computer Science at Pennsylvania State University, University Park, PA (“Penn State” or “PSU”). I have worked on telecommunications and wireless networks, including Z-Wave, Bluetooth, Zigbee, Wi-Fi, NFC, AMPS, IS-95, CDMA2000, GSM, EDGE, UMTS/WCDMA, LTE, and 5G cellular systems since 1988.

5. I received my B.S. in Electronics Engineering from the University of Scranton in 1987. I received my M.S. in Electrical Engineering and Ph.D. in Acoustics from Penn State in 1991 and 2001, respectively.

6. In 1988, after I received my bachelor's degree, I joined the Central Intelligence Agency (CIA) while pursuing my M.S. degree at Penn State part-time. My first job at the CIA involved designing and testing systems to automatically capture and characterize telecommunication signals and emissions from various wireless and computer networking devices.

7. I returned to Penn State in early 1990 to pursue graduate research full-time and complete my M.S. degree. My graduate research work focused on wideband beamforming and adaptive signal processing. After completing my M.S. degree in EE in 1991, I accepted a full-time faculty research position at the Applied Research Lab at PSU, primarily working on classified programs, and began working on diverse radio frequency and acoustic sensor systems including wireless communications and small wireless networks for acoustic tracking, source localization, and feature extraction.

8. I began pursuing my Ph.D. part-time in 1993 while continuing my faculty research position. In 1997, as part of my faculty research position, I began working on classified programs focused on mathematical analytical modeling of cellular communication networks and the development of hardware and software

systems to test against cellular networks. My role was to develop algorithms and write the code running on a specially developed embedded system. For this work, I received a letter of recognition as the “genius behind the VELA software algorithms” from the Director of National Reconnaissance Office (NRO) Systems Engineering and Technology Office. As part of this same work, I was extensively involved in protocol and signaling analysis as well as researching model-specific performance and unique functional characteristics associated with individual mobile devices. The work involved testing dozens of handsets from many manufacturers in controlled and real-world environments against network simulators and live operational networks for each research project.

9. In 2000 my research extended into utilizing non-orthogonal wavelets for improving detection and localization of cellular handsets from high altitude sensor systems. In 2001, I completed my Ph.D. and my research focused on the utilization of advanced communication signals for wideband characterization and remote sensing of propagation channels.

10. Beginning in 1997 my cellular communications research work focused on CDMA, GSM, EDGE, UMTS, LTE, and 5G cellular systems primarily under grants sponsored principally by the Department of Defense. This classified research work required 3GPP protocol analysis and development of real-time embedded hardware and software systems capable of interacting with cellular networks and

cellular handsets. A large portion of my work was directed at architectures, protocols, software, and signaling.

11. I have been working on classified projects since 1988. Before 1998, because the work was not deemed highly classified, I was able to publish eight journal and conference papers prior to 2000. Between 1999 and 2015, however, I was allowed to publish only one article in an unclassified symposium and published and presented about a dozen articles in classified settings. This is because during this period, the vast majority of my research was highly classified. As a result, nearly all of my research results were summarized in classified reports and not available to the general public. Further, because the U.S. government owns any intellectual property resulting from the sponsored research work, I did not pursue or file patent applications.

12. Beginning in 2003, I was co-principal investigator and technical lead on a 3 year multi-million-dollar research effort for developing the Global Information Grid (GIG). This project was sponsored by the Secretary of Defense's Office with a goal of developing a real-time, multi-intelligence (multi-Int) network for collecting, processing, storing, disseminating, and managing information on demand for decision makers including the warfighter, combatant command centers, policy makers, and support personnel and was the largest network-centric warfare project in development at the time. My research team (Ubiquitous Automated

Information Manager) focused on building and deploying a scalable application to perform real-time, multi-int data fusion to support every user in the system. This software application was deployed in Combat Operation Centers, Joint Interagency Task Force locations, and on various platforms (mobile and small computing environments) used by various warfighters. The fused data sources included various content management systems, supply chain logistic reports, GPS-based reports, news feeds, backend databases, sensor system reports, and various other broad data sources.

13. Beginning in 1994, I worked on various projects that involved the implementation and design of user interfaces to support the use of the research, design, analysis tools and signal processing systems for the end user. User platforms comprised a broad array of footprints including small handheld devices with screens or visual displays and those limited to audio-only inputs, medium sized laptops and small desktop systems, and also large, heavy devices, such as servers and clusters in operational environments (including combat operations centers and 3D immersive environments).

14. Specifically, for the GIG research effort, I led a team of software engineers to deploy our inferencing tool for a disparate range of end users, e.g. dismounted combat soldiers with only a microphone as an interface, soldiers in mules with smart devices (such as tablets and laptops with multiple visual display

interaction capabilities), to field command centers with more computational capability (such as medium sized clients with significant video displays, processing power, and touch/stylus interfaces) to combat operation centers with high-powered processing and complex user-interface capabilities/modalities (such as 3D immersive environments).

15. In 2015, I transferred to the School of Electrical Engineering and Computer Science at Penn State as a teaching faculty member. In that role, I have continued teaching graduate and undergraduate courses, guiding Ph.D. and M.S. students in communication, mobile (including LTE and 5G cellular networks), and neural networks, and pursuing research in these and related areas. Since 2015, I have been an author on nine refereed papers as listed in my curriculum vitae (CV).

16. Because of my decades of research and my continuing work at Penn State, I have intimate knowledge of telecommunication networks, including the technology involved in the patents in this case. I have been highly recognized as an expert in such systems within the research community. I was recognized twice by the National Reconnaissance Office with commendation letters for work dealing with detecting cellular signals in low signal to noise ratio environments. The U.S. government awarded me over \$12M in grants between 2003 and 2015 for projects focused on mobile communication devices and networks, in which I served as a Principal Investigator (PI), Co-PI, and/or technical lead.

17. Additionally, during my research career, I interacted extensively with computer scientists and engineers responsible for the design, development, and testing of telephony and data networking systems and testbeds. As a research faculty member, I oversaw engineers and computer scientists that executed many joint projects with development organizations. These interactions exposed me to a wide range of computer scientists and engineers working on telecommunication network technologies. Since 2011, I have been teaching undergraduate and graduate classes in communication and mobile networking and am familiar with the curricula being taught to electrical engineers and computer scientists. The interactions with a wide range of computer scientists and engineers working on telecommunication network technologies and the familiarity with the classes taught to electrical engineers and computer scientists have allowed me to have a good understanding of the level of skills possessed by a person of ordinary skill in the field of cellular technology.

18. I have extensive experience with mobile networks in general and LTE and 5G specifically. While most of my research efforts between 1998 and 2015 were highly classified, I can state that they included detailed investigation of network architectures, signaling, and functional behavior. A typical research effort would involve studying 3GPP, 3GPP2, IEEE, and other protocol standards to fully comprehend all aspects of L1, L2, and L3 requirements including timing, bit-level construction of the control and user plane messages, and timing characteristics for a

given standard as well as functional behavior of network components and user equipment.

19. From 2006 through 2015 my research focused specifically on LTE. My research continues to this day, although I am no longer operating in a classified environment. During this time, I investigated the performance and functional differences of many varied network and handset devices to see how differing signaling and hardware configurations (including MIMO) and environmental factors influenced the behavior of user equipment in a given network environment. This included how diversity techniques (transmit and receive), synchronization, timing, and signal to interference plus noise ratio (SINR) for a given device would affect specific functional aspects including elements of the receiver structure, decoding and demodulation performance, calculation of parameters used by the device for making decisions and deriving parameters reported to the network.

20. As part of my research work, I built several custom CDMA, GSM, UMTS, and LTE platforms that implemented specific network-side and user equipment-side functionality including custom signal generation and processing structures, particularly the signal processing chains on both the transmit and receive sides. This equipment was developed using network simulation hardware in a laboratory environment and was later tested with corresponding networks in both controlled and fully operational environments. Implementing the transmit and

receive chains for custom built protocol-enabled equipment required me to gain an intimate understanding of the relevant 3GPP protocol specifications and the underlying structures. Since 2015, I have been primarily focused on guiding graduate students in pursuing research in using code domain non-orthogonal multiple access (NOMA) combined with MIMO sparse coding multiple access to minimize latency and maximize user density in grant free Internet of Things (IoT) environments. Additionally, I am guiding my graduate students in pursuing research in optimized distributed processing algorithms, implementation of block chain coding techniques to improve handover security, and edge computing resource allocation in 4G (LTE)/5G (NR) networks.

21. Much of the classified research work I performed also led to similar approaches for other wireless protocols including IEEE 802.11 and 802.15 (e.g., Zigbee, Bluetooth, and UWB), HART, and other short-range standards as well as HF radio and Wi-MAX.

22. Throughout my career, I have accumulated significant expertise in the area of user interface design and the development of software and software tools for implementing and facilitating efficient user interaction, dissemination of complex information, and simple, intuitive user interfaces for screen displays.

### **III. COMPENSATION**

23. In consideration for my services, my work on this matter is being billed

at my customary rate of \$550 an hour, independent of the outcome of this proceeding. I also am being reimbursed for any reasonable expenses I incur in relation to my services. I have no pecuniary interest in the outcome of this proceeding.

#### **IV. LEGAL CONSIDERATIONS**

24. I am not an attorney and have not been asked to offer my opinion on the law. However, as an expert offering an opinion on whether the claims of the '580 Patent are patentable, I have been told that I am obliged to follow existing law. My understanding of the law is based on information provided by counsel.

25. I understand that in an *inter partes* review proceeding, a patent claim is unpatentable if it is shown by a preponderance of the evidence that the claim is anticipated or obvious. I also understand that the anticipation or obviousness determination is viewed from the perspective of a person of ordinary skill in the art ("POSITA").

26. For a claim to be anticipated, I understand that every limitation of the claim must be disclosed by a single prior art reference, as viewed from the perspective of a POSITA.

27. For a claim to be obvious, I understand that every limitation of the claim must be disclosed in a combination of prior art references, as viewed from the perspective of a POSITA. I understand that a POSITA is presumed to know the

relevant prior art.

28. I understand that while there is no rigid rule that a reference or combination of references must contain a “teaching, suggestion, or motivation” to combine references, some motivation to combine or modify prior art references must exist in the references or the knowledge generally available to a POSITA, otherwise the challenged claims would not have been obvious. I also understand that the “teaching, suggestion, or motivation” test can be a useful guide in establishing a rationale for combining elements of the prior art. In addition, I have been informed and I understand that there must be a reasonable expectation of success in combining prior art teachings to arrive at the claimed invention.

29. I understand that the relevant time for considering whether a claim would have been obvious to a POSITA is the time of the effective filing of the ’580 Patent.

## **V. TASK SUMMARY**

30. I have been asked to review the challenged U.S. patent: the ’580 Patent. I have been asked to provide my opinions from the perspective of a POSITA, having knowledge of the relevant art, as of August 5, 2011, and the opinions stated in this declaration are from that perspective. The qualifications and abilities of such a person are described in Section VII below.

31. In preparing this declaration, I have considered this patent in its entirety

and the general knowledge of those familiar with the field of graphical user interfaces, as of August 5, 2011. My opinions are based on my education, training, and experience, as well as the references that form the basis for Petitioner’s challenge to the ’580 Patent, which I have reviewed in their entirety, including the publications listed in the following table:

| <b>Exhibit</b> | <b>Short Title</b> | <b>Description</b>                                                                                                                                                                            |
|----------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1001           | ’580 Patent        | U.S. Patent No. 10,656,755                                                                                                                                                                    |
| 1002           |                    | U.S. Patent No. 10,656,755 File History                                                                                                                                                       |
| 1003           | Cockburn Decl.     | Declaration of Dr. Andrew Cockburn                                                                                                                                                            |
| 1004           | Ramos Paper        | Ramos et al., “Zliding: Fluid Zooming and Sliding for High Precision Parameter Manipulation,” <i>UIST: Proceedings of the ACM Symposium on User Interface Software and Technology</i> , 2005. |
| 1005           | Ramos Video        | Zooming & Zliding (Gonzalo Ramos), December 28, 2007, available at <a href="https://www.youtube.com/watch?v=EcE3XBytN-U">https://www.youtube.com/watch?v=EcE3XBytN-U</a>                      |
| 1006           | Ording             | US 2008/0094356 to Ording et al. (“Ording”)                                                                                                                                                   |
| 1007           |                    | Declaration of Kathryn Talbot                                                                                                                                                                 |
| 1008           |                    | Gonzalo Alberto Ramos, <i>Press-Sensitive Pen Interactions</i> 2008) (Ph.D. thesis, University of Toronto) (“Ramos Thesis”)                                                                   |
| 1009           |                    | Declaration of June Ann Munford                                                                                                                                                               |
| 1010           |                    | Webpage version of the Ramos Video, available at <a href="https://www.youtube.com/watch?v=EcE3XBytN-U">https://www.youtube.com/watch?v=EcE3XBytN-U</a>                                        |
| 1011           |                    | <i>Dictionary of Computing</i> , Sixth Edition (2010)                                                                                                                                         |
| 1012           |                    | <i>Telecom Dictionary</i> , First Edition (2007)                                                                                                                                              |
| 1013           |                    | <i>Wiley Electronical and Electronics Engineering Dictionary</i> , First Edition (2004)                                                                                                       |
| 1014           |                    | <i>A Dictionary of Computing</i> , Sixth Edition (2008)                                                                                                                                       |
| 1015           |                    | <i>The Facts on File Dictionary of Computer Science</i> , Revised Edition (2006)                                                                                                              |
| 1016           | Hayward            | U.S. Patent Pub. No. 2012/0176401 to Hayward et al.                                                                                                                                           |
| 1017           |                    | U.S. Patent No. 7,479,949 to Jobs et al.                                                                                                                                                      |

|      |                        |                                                                                                                                                                                                                                                                                                                                        |
|------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1018 |                        | Bezerianos & Balakrishnan, “The Vacuum: Facilitating the Manipulation of Distant Objects,” PAPERS: Smart Interaction Techniques 2, April 2-7, 2005                                                                                                                                                                                     |
| 1019 |                        | Fitzmaurice et al., “Tracking Menus,” <i>UIST</i> , 20                                                                                                                                                                                                                                                                                 |
| 1020 |                        | U.S. Patent Pub. No. 2012/0319959 to Saponas et al. (“Saponas”)                                                                                                                                                                                                                                                                        |
| 1021 |                        | U.S. Patent No. 2012/0046071 to Brandis et al. (“Brandis”)                                                                                                                                                                                                                                                                             |
| 1022 |                        | Declaration of Gonzalo Ramos                                                                                                                                                                                                                                                                                                           |
| 1023 |                        | U.S. Patent Publication No. 2008/0316183 to Westerman et al. (“Westerman”)                                                                                                                                                                                                                                                             |
| 1024 |                        | U.S. Patent No. 8,164,573 to da Costa (“da Costa”)                                                                                                                                                                                                                                                                                     |
| 1025 |                        | U.S. Patent Publication No. 2012/0046071 to Brandis et al. (“Brandis”)                                                                                                                                                                                                                                                                 |
| 1026 |                        | U.S. Patent Publication No. 2006/0026535 to Hotelling et al. (“Hotelling”)                                                                                                                                                                                                                                                             |
| 1027 |                        | U.S. Patent Publication No. 2006/0132457 to Rimas-Ribikauskas et al. (“Rimas-Ribikauskas”)                                                                                                                                                                                                                                             |
| 1028 |                        | U.S. Patent Publication No. 2008/0024459 to Poupyrev et al (“Poupyrev”)                                                                                                                                                                                                                                                                |
| 1029 |                        | United States District Courts — National Judicial Caseload Profile (Dec. 31, 2023)   United States Courts (uscourts.gov), <a href="https://www.uscourts.gov/sites/default/files/fcms_na_distprofile_1231.2023_0.pdf">https://www.uscourts.gov/sites/default/files/fcms_na_distprofile_1231.2023_0.pdf</a> (last visited June 25, 2024) |
| 1030 |                        | Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (USPTO June 21, 2022) (“Guidance”)                                                                                                                                                                       |
| 1031 |                        | Case Management Order, Smith Interface Technologies, LLC v. Apple Inc., 3-23-cv-01187, S.D. Cal. (June 20, 2024)                                                                                                                                                                                                                       |
| 2007 | Cockburn-1             | April 16, 2025 Transcript of the Deposition of Andrew Cockburn, Ph. D.                                                                                                                                                                                                                                                                 |
| 2008 | Cockburn-2             | April 17, 2025 Transcript of the Deposition of Andrew Cockburn, PhD.                                                                                                                                                                                                                                                                   |
| 2009 | Zoom Definition        | Merriam-Webster’s Dictionary Definition for “zoom”                                                                                                                                                                                                                                                                                     |
| 2010 | Transparent Definition | Merriam-Webster’s Dictionary Definition for “transparent”                                                                                                                                                                                                                                                                              |
| 2011 | ’918 Provisional       | U.S. Provisional Patent Application No. 61/581,918                                                                                                                                                                                                                                                                                     |

## **VI. OVERVIEW OF THE '580 PATENT**

32. The '580 Patent “generally relate[s] to touch screens.” EX1001, 1:36–37. Specifically, the '580 Patent features a camera on a mobile device, zooming functionality, various virtual display layers, implementation of translucency, and a display of a plurality of markings in response to a touch exceeding a threshold. See EX1001, Claims 1, 22, and 58. The '580 Patent explains that “[i]n various embodiments, a 3D layered user interface may make use of multiple virtual display layers,” and “[i]n the context of the present description, a virtual display layer refers to a collection of display elements which have all been assigned the same apparent depth within the 3D layered user interface.” EX1001, 68:6–11; EX2011, [00793].

33. The '580 Patent further states that “virtual display layers may be given the appearance of depth through the use of 3D depth cues.” EX1001, 68:25–27; EX2011, [00795]. Such visual cues “refer[] to an effect, manipulation, transformation, animation, or operation which gives a visual indication of simulated depth. For example, in one embodiment, a 3D depth cue may be a blur operation, such that layers located at successively greater depths may appear blurrier than those closer to the user. In various embodiments, one or more 3D depth cues may be used to give the appearance of depth to one or more virtual display layers.” EX1001, 68:27–35; EX2011 [00795]. Different depth cues may be used for different virtual display layers; depth cues may also “be used in conjunction with a 3D layered user

interface implemented in a layered display device, to enhance the layered appearance.” EX1001, 68:36–40; EX2011 [00795].

**A. Independent Claims 1, 22, and 58**

34. Independent claims 1, 22, and 58 of the ’580 Patent are directed to an electronic device programmed to perform certain functions. *See generally* EX1001. Specifically, claims 1, 22, and 58 include “when” or “in response to” “an aspect of the *touch* being *detected to surpass a threshold*,<sup>1</sup> displaying, via the touch screen, a plurality of markings in *a second virtual display* layer that appears to have a *lesser depth than the first virtual display layer*, where at least a portion of the second virtual display layer is at least partially translucent so that at least a portion of the contents of the first virtual display layer is visible through the at least portion of the second virtual display layer.” *See* Limitations [1h], [22d], [58c]. Additionally, “the at least portion of the second virtual display layer is at least partially translucent so that *a result of the zoom operation* on the at least portion of the contents of the first virtual display layer is visible through the at least portion of the second virtual display layer.” *See* Limitations [1i], [22g], [58g].

**VII. LEVEL OF ORDINARY SKILL IN THE ART**

35. At the time of the invention of the ’580 Patent, a POSITA would have

---

<sup>1</sup> All emphasis added unless noted otherwise.

had at least a bachelor's degree in computer science, computer engineering, electrical engineering, or a related field, and would have had at least two years of relevant work experience in the design and development of graphical user interfaces (GUIs) or equivalents thereof. Less work experience may be compensated by a higher level of education and vice versa.

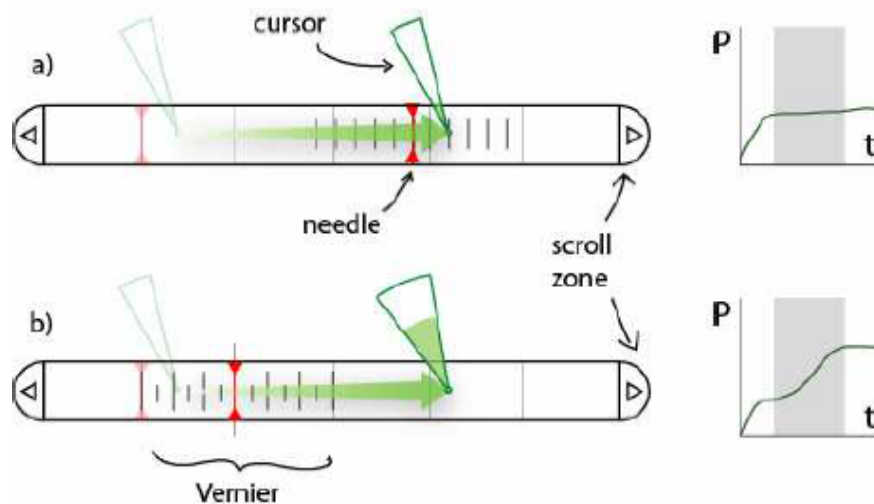
36. I have reviewed the proposed level of ordinary skill in the art by Petitioner's expert, Dr. Cockburn. EX1003, ¶¶26–27. I disagree with Dr. Cockburn's definition of a POSITA to the extent it includes work experience in the design and development of human-computer interfaces, which is a broad field that includes physical interfaces, such as computer accessories, ergonomics, etc., that are not relevant to the graphical user interfaces at issue. Nonetheless, I would have at least been a POSITA as of the priority date under either definition and can opinion on the perspective of a POSITA at that time. *See* § II; EX2006.

## **VIII. OVERVIEW OF THE PRIOR ART**

### **A. Ramos Paper**

37. The Ramos Paper is titled “Zliding: Fluid Zooming and Sliding for High Precision Parameter Manipulation,” and “introduces the notion of Zoom Sliding, or *Zliding*, for fluid integrated manipulation of scale (zooming) via pressure input while parameter manipulation within that scale is achieved via x-y cursor movement (sliding).” EX1004, Abstract. The Ramos Paper “present[s] the Zlider

(Figure 1), a widget that instantiates the Zliding concept.” EX1004, Abstract.



38. As an interactive widget, Zlider offers high precision parameter manipulation and immediate feedback for continuous, rather than discrete, parameter adjustments. EX1004, 1. The Ramos Paper evaluates “three different input techniques for cursor position,” but ultimately elects the “stylus with integrated isometric pressure sensing tip” as the favored choice. EX1004, Abstract. “The scale factor of the Zlider is adjusted by changes in pressure at the stylus’ tip, and the stylus’ x-y position enables sliding of the parameter’s value.” EX1004, 3.

39. The Zlider also features “a clutching mechanism that enables users to completely stabilize pressure and hence lock the zoom level while sliding.”

EX1004, 3. Clutching is activated “by sliding the cursor away from the Zlider’s working rectangle,” and declutching occurs by “[r]entering the working rectangle.”

EX1004, 3. “While clutched, users can still slide outside the working rectangle [] but the widget maintains its scale at the last reported value regardless of pressure variations.” EX1004, 3.

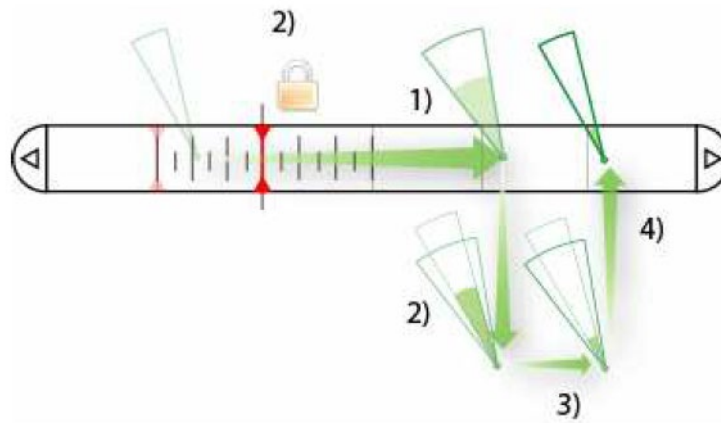
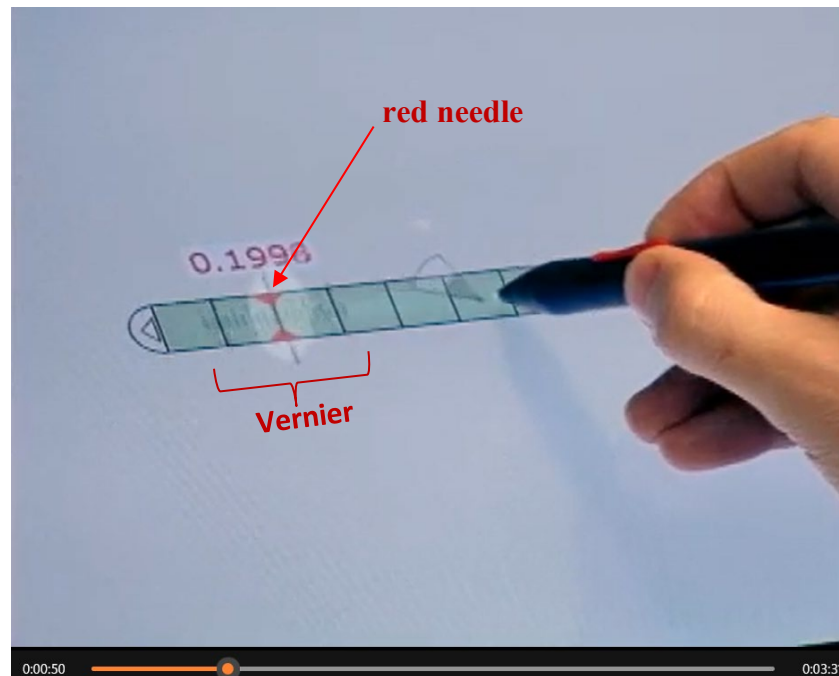


Figure 4: Clutching the zoom level

## B. Ramos Video

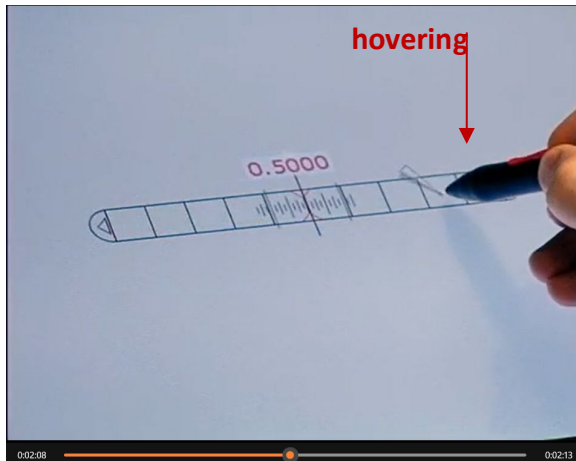
40. The Ramos Video illustrates the use and functionality of the Zlider described in the Ramos Paper. The Zlider “behaves like a regular selector with the difference that users can, while dragging or sliding, explicitly adjust the precision they wish to interact at or zoom by changing the amount of pressure they apply with an input device.” EX1005, 0:14–0:27. The Zlider uses a pressure cursor that “provides users with a real-time visual indicator of the pressure they are applying with the input device. As the user slides across the working area, a red needle indicates the parameter’s magnitude relative to its minimum and maximum values

at the extremes of the widget. The Zlider also displays a Vernier, which adapts its grid spacing depending on the widget's current precision." EX1005, 0:27-0:59.

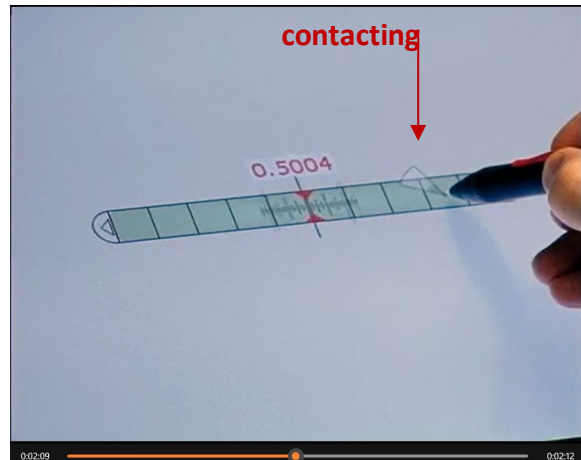


EX1005, 0:50 (Zlider) (annotated)

41. In addition to the clutching mechanism described above in the Ramos Paper, the Ramos Video explains that “[u]sers can also hold the slider’s current scale by using the *hover* region of the input device,” which “allows them to perform micro parameter adjustments without the need to reacquire a precision level as well as to reposition the cursor as needed.” EX1005, 2:00-2:45. “The hover region of the input device also allows users to reach arbitrarily high precision levels. ... by repeatedly alternating between increasing pressure and lifting the stylus while remaining in tracking distance.” *Id.* “By leaving and re-entering the Zlider’s working area while in the hover region, users can also decrease ... precision.” *Id.*



EX1005, 2:08 (annotated) (hovering)



EX1005, 2:09 (annotated) (contacting)

### C. **Ording**

42. Ording is titled “Methods For Determining A Cursor Position From A Finger Contact With A Touch Screen Display,” and relates “to portable devices that adaptively determine a cursor position from a finger contact with a touch screen display and then perform operations according to the cursor position.” EX1006, [0003]. Ording developed its methods to address the difficulty in navigating compact mobile devices forced to support increasing functionality but armed with outdated user interfaces such as physical pushbuttons. EX1006, [0004]–[0007]. Specifically, it addresses challenges in accurately identifying and responding to user input on a compact screen, which is essential for improving usability on multifunctional mobile devices. EX1006, [0004], [0006].

43. The invention includes a method where the device identifies the contact area of a user’s finger on the touch screen and determines a cursor position based

partially on this contact area. EX1006, [0009]. Other factors influencing cursor positioning include distances to nearby user interface elements and specific “activation susceptibility” values for each element, which improve the precision and accuracy of the touch input. EX1006, [0009]. This method allows for dynamic adaptation to different user interactions, improving the user experience by reducing accidental selections and enhancing ease of use. *See* EX1006, [0007]. The patent further covers the application of this cursor positioning method to various device functions, such as “telephoning, video conferencing, e-mailing, instant messaging, blogging, digital photographing, digital videoing, web browsing, digital music playing, and/or digital video playing.” EX1006, [0008].

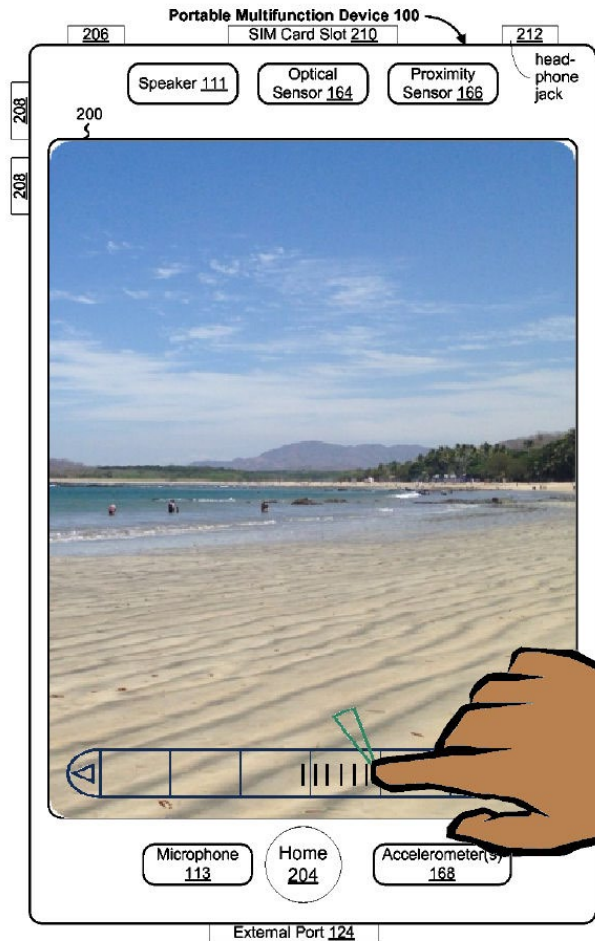
## **IX. THE '580 PATENT'S CLAIMS ARE NOT OBVIOUS**

### **A. Ground 1A: Dr. Cockburn Does Not Show That The Ramos Paper, Ramos Video, And The Ording Device Would Have Rendered Obvious Claims 1, 3, 17, 19, 22, 24, 36, 41, 58, 60, 77, 82, And 83**

#### **1. Dr. Cockburn's Combination Of The Ramos Paper, Ramos Video, And The Ording Device Is Not Supported**

##### ***a) Dr. Cockburn's Statements And Motivations Are Unrelated To Semitransparency***

44. Dr. Cockburn's obviousness theory depends not just on combining the Zlider of the Ramos Paper and Ramos Video with the device of Ording, but on doing so in such a way that most of the Zlider is transparent as shown in ¶53 of Dr. Cockburn's Declaration:



45. Without this particular combination of the references, all grounds are insufficient because, as explained below and recognized in the Institution Decision, the Ramos Paper and Ramos Video do not meet the requirements of Limitations [1h] and [1i] of a second virtual display both (i) at a lesser depth than the first virtual display layer with the contents and (ii) at least a portion of which is at least partially translucent.

46. The obviousness rationale offered by Dr. Cockburn does not support an RROD combination in which the Ramos Zlider is semitransparent or overlies the

image. He offers three purported reasons to combine the Ramos Zlider with Ording, each of which does not support the above-depicted combination.

47. Dr. Cockburn first contends that “a POSITA would have naturally looked to prior art references, such as Ording, that also are directed to touch screen devices with user interfaces for user interaction and that have applications that necessitate precise parameter manipulation, as Ording provides.” EX1003, ¶61. Even if this is accepted for the sake of argument, this does not suggest any benefit to making Ramos’s Zlider semitransparent.

48. Dr. Cockburn next contends that “[t]he combined disclosures of the Ramos Paper, Ramos Video, and Ording would have amply motivated a POSITA to implementation of a widget in a ‘multifunctional device,’ e.g., the device taught in Ording, which includes various software and hardware components and additionally provides semitransparent user input control devices, resulting in the Ramos Paper-Ramos Video-Ording device (‘RROD’).” EX1003, ¶63. Again, even if this is accepted for the sake of argument, the statement does not suggest any benefit to making Ramos’s Zlider semitransparent.

49. First, Dr. Cockburn asserts that “Ording offers foundational hardware (including processor and memory) for implementing a widget, . . . .” EX1003, ¶64. This says nothing about semitransparency, and on its face would therefore not motivate the modification of Ramos Zlider to be semitransparent.

50. Second, Dr. Cockburn asserts that “Ording teaches the use of various applications that could use the Zlider widget in the RROD,” and “any one of these applications would benefit from the Zlider widgets and its ‘precise parameter manipulation when desired.’” EX1003, ¶65.

51. This too says nothing about semitransparency, and on its face would therefore not have motivated the modification of Ramos Zlider to be semitransparent.

***b) Dr. Cockburn’s single purported motivation related to semitransparency***

52. Dr. Cockburn next points out that “Ording further explicitly teaches providing ‘user interfaces that are intuitive and transparent,’ such as a ‘virtual click wheel’ that can be a ‘semitransparent object.’” APPLE-1006, [0028], [0045]; EX1003, ¶66. From that, Dr. Cockburn asserts that “[a] POSITA would have recognized the benefits of transparent or semitransparent UI objects that are minimally intrusive to the user.” EX1003, ¶66. This would not have motivated a POSITA to make the Zlider semitransparent.

53. Dr. Cockburn seemingly attempts to conflate Ording’s use of “transparent” and “semitransparent” as suggesting a overarching desire for optical transparency. But that is misleading. Ording’s discussion of “user interfaces that are intuitive and transparent” is clearly not referring to transparency in an optical sense (*i.e.*, making something appear see-through).

54. Instead, “intuitive and transparent” uses “transparent” in the sense of a user interface that is readily understandable (consistent with its paring with “intuitive”). *See* EX2010, 1 (“readily understood”). Ording’s paragraph [0028] is not concerned with optical transparency, but with increasing user satisfaction with portable devices by offering multifunctional operations on user interfaces based on finger input. EX1006 at [0028]. The passage in Ording from which Dr. Cockburn selectively quotes reads:

The various applications that may be executed on the device may use at least one common physical user-interface device, such as the touch screen. One or more functions of the touch screen as well as corresponding information displayed on the device may be adjusted and/or varied from one application to the next and/or within a respective application. In this way, a common physical architecture (such as the touch screen) of the device may support the variety of applications with user interfaces that are intuitive and transparent.

EX1006, [0028].

55. There is no mention of optical transparency, rather, Ording is addressing user interfaces that are user-friendly and intuitive to navigate and operate. The rest of Dr. Cockburn’s obviousness rationale fares no better.

(1) Ording's semitransparency is specific to Ording's click wheel; semitransparency would hurt Ramos' Zlider

56. The notion that a click wheel could be semitransparent does not suggest that Ramos' precision Zlider should be semitransparent. Ording's discussion does not even broadly refer to all click wheels. Ording instead addresses a click wheel that appears when used over a screen full of icons (*see* Ording's FIG. 4B, inset below), and that disappears when not in use. *See* EX1006, [0045] ("For a virtual click wheel, the click wheel may be either an opaque or semitransparent object that appears and disappears on the touch screen display in response to user interaction with the device.").

57. Given that Ording's virtual click wheel appears temporarily and, by necessity, over an already crowded environment, it makes sense that Ording might make it semitransparent. Otherwise, Ording's click wheel could obscure the very icons it is designed to permit a user to navigate. EX1006, [0045] ("A user may navigate among and interact with one or more graphical objects (henceforth referred to as icons) displayed in the touch screen 112 by rotating the click wheel or by moving a point of contact with the click wheel (e.g., where the amount of movement of the point of contact is measured by its angular displacement with respect to a center point of the click wheel).").

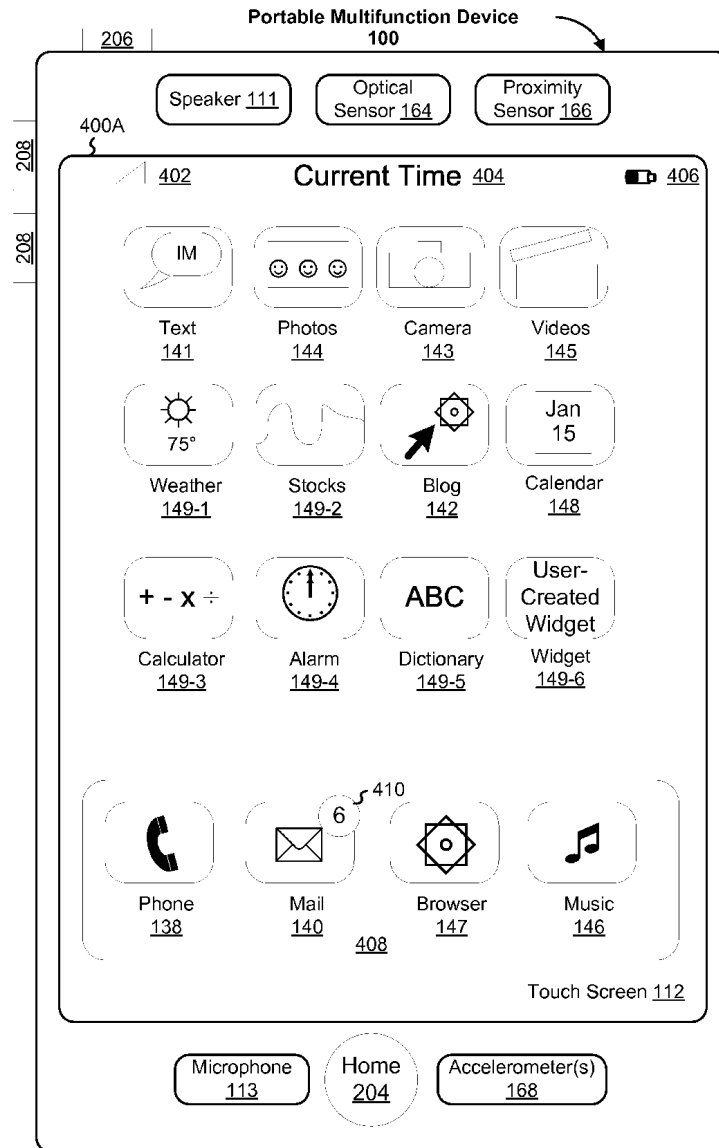


Figure 4A

58. In contrast, a POSITA would have understood that Ramos colors his Zlider's working to contrast with the markings to ensure that the markings are readily visible to a user. If instead those markings were not readily visible, there would be no need for the markings at all. *See also* EX1005, 0:55–1:00 (“the Vernier adapts its grid spacing depending on the widget’s current precision”).

59. A POSITA would thus have viewed this contrast as a necessary

component of the Zlider, without which contrast it would be impossible for a user to gauge the degree of precision—*i.e.*, the purpose—of the Zlider.

(2) Dr. Cockburn's purported motivation is not specific to Ramos Zlider, and would impermissibly render the Zlider unsuitable for its purpose

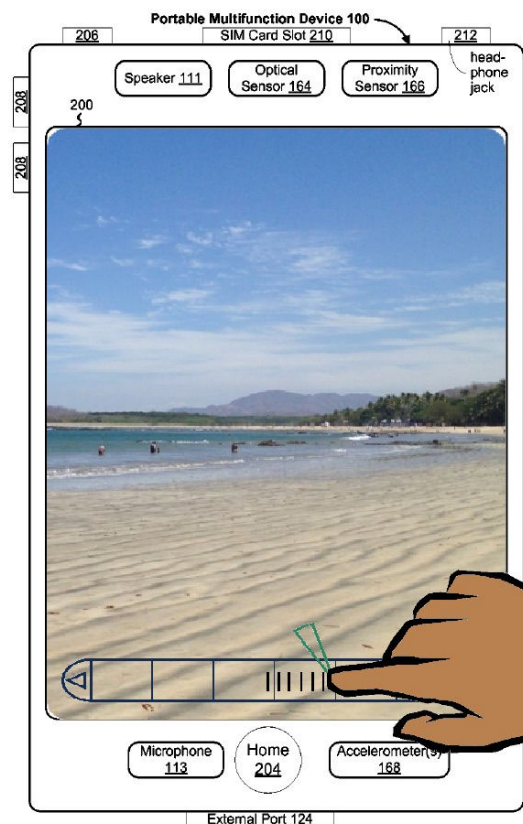
60. Despite these differences between Ording's teachings and Ramos' context, Dr. Cockburn marches ahead with a purported motivational statement, *i.e.*, that "[a] POSITA would have recognized the benefits of transparent or semitransparent UI objects that are minimally intrusive to the user." EX1003, ¶66. This does not explain what the purported benefits are; it instead merely contends that a POSITA would have recognized undescribed benefits.

61. Dr. Cockburn also does not explain why this would have motivated a POSITA to modify Ramos' Zlider. For example, Even if Ramos' Zlider were implemented in Ording's device just as Ramos did in the Ramos Video, it would remain true that semitransparency could be beneficial to Ording's click wheel.

62. Dr. Cockburn's assertions therefore do not present any benefit that would be achieved, and do not present any conflict that would be resolved, by modifying Ramos' Zlider to be semitransparent. The Ramos Paper contemplates, and the Ramos Video shows, the Zlider implemented on a touch screen with an application allowing for image manipulation. However, Dr. Cockburn does not explain why the semitransparent Zlider as he envisions it in the RROD combination

would be less intrusive than the Zlider is in Ramos itself. It would not.

63. Instead, in the RROD combination, the Zlider is noticeably more intrusive than in its original implementation in the Ramos Paper and Ramos Video. Specifically, in the RROD combination (inset below), the Zlider is pushed inward from the edge of the screen such that the Zlider overlaps—and directly interferes with the user’s perception of—the image itself.



64. This overlap is wholly unnecessary. As shown in the Ramos Video (inset below), disposing the Zlider at the edge of the display avoids overlap and maximizes the uninterrupted area in which to display the image.

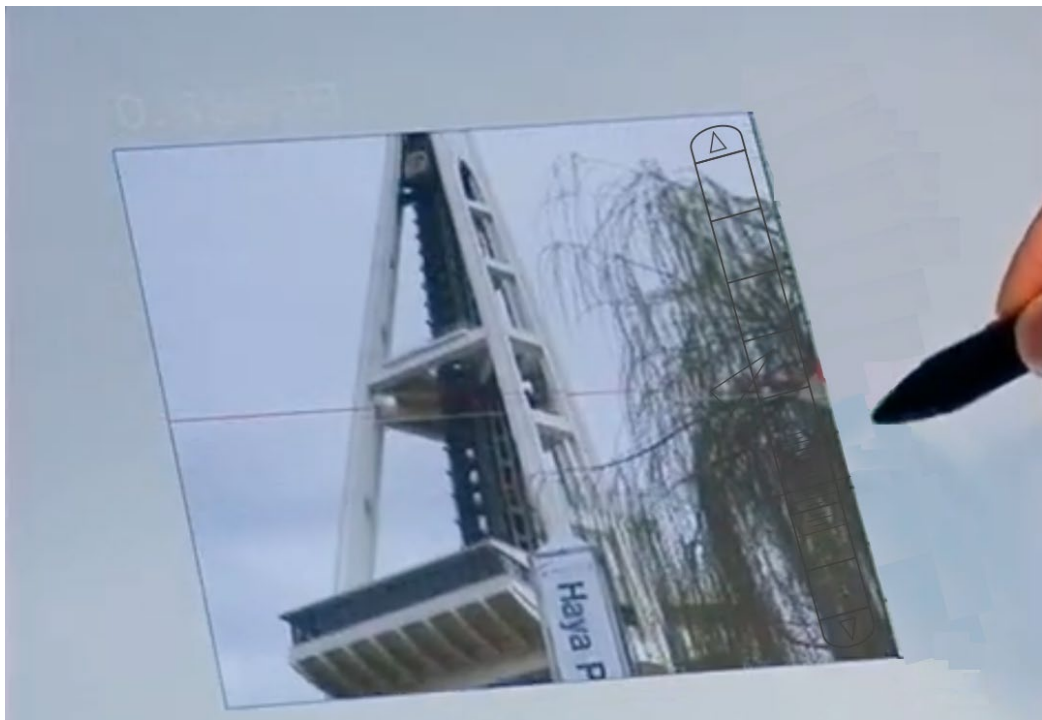


EX1005, 3:16.

65. The RROD combination doesn't just unnecessarily make the Zlider more intrusive; it would also make the Zlider unusable. Specifically, by making the Zlider semitransparent, the contrast between markings and background depends on the image and part thereof that happens to be displayed.

66. Therefore, while the Zlider may be visible on the sand in Dr. Cockburn's illustration of the RROD combination, zooming in such that the mountains are under the Zlider would make it difficult (if not impossible) to see the markings.

67. The below images illustrate the difficulty where the image underlying the Zlider is almost the same color, making it impossible to see the markings or perceive the scale they serve to indicate.



68. A POSITA would have understood, as Ramos' makes clear, that its Vernier is an integral component of its Zlider that provides immediate feedback to users when granularity is adjusted. *See* EX1004, 1, 3. Dr. Cockburn's proposed modification would obscure the Vernier and thereby hamper a user's ability to view this immediate feedback and conduct high precision selection tasks. A POSITA would not have been motivated to make such a modification.

69. Dr. Cockburn does not offer a motivation to modify Ramos' Zlider in Ordering such that the Zlider is semitransparent as shown in Dr. Cockburn's declaration. EX1003, ¶93.

70. None of Dr. Cockburn's proffered motivations would have lead a POSITA to that result. And Dr. Cockburn does not show that, much less explain how, the RROD combination would have made the Zlider less intrusive than it is in the Ramos Video itself.

71. To summarize, a POSITA instead would have not made the combination as asserted because it both would have needlessly interfered with a user's perception of the underlying image—making the Zlider more intrusive than it is in the Ramos Video—but also would have needlessly interfered with the usability and function of the Zlider itself.

**2. Limitations[1h], [1i], [1k], [1l], 3, 17, 19, [22d], [22f], [22g], 24, 36, 41, [58c], [58e], [58f], [58g], 60, 77, 82, 83: second virtual display layer that appears to have a lesser depth than the first virtual display layer**

72. Dr. Cockburn does not show that the RROD combination would render obvious a “second virtual display layer that appears to have a lesser depth than the first virtual display layer.” Each of Limitations [1h], [1i], [1k], [1l], [22d], [22f], [22g], [58c], [58e], [58f], and [58g] and claims 3, 17, 19, 24, 36, 41, 60, 77, 82, and 83 recite “[a]/[the] second virtual display layer,” and Dr. Cockburn’s mapping is insufficient with respect to each of these Limitations. *See generally* EX1001.

73. The challenged claims recite “a first virtual display layer including contents” and “a second virtual display layer that appears to have a lesser depth than the first virtual display layer . . . .” *E.g.*, EX1001, Claim 1.

74. The ’580 Patent explains that “virtual display layers [like the second virtual display layer] may be given the appearance of depth through the use of 3D depth cues. In the context of the present description, a 3D depth cue can be an effect, manipulation, transformation, animation, or operation which gives a visual indication of simulated depth.” EX1001, 68:25–30; EX2011, [00795].

***a) Dr. Cockburn does not show that the Ramos Paper and Ramos Video would suggest a second virtual display layer at a lesser depth***

75. Dr. Cockburn claims that the “first virtual display layer” in the Ramos Paper and Ramos Video is the image “contents,” while the “second virtual display

layer” contains the “‘pressure cursor’ of the Zlider” “along with the other components of the Zlider (*i.e.* the working area and Vernier).” EX1003, ¶¶74, 91; *see also*, EX2007, at 63:9–65:11.

76. Dr. Cockburn alleges that “the Zlider widget (*e.g.*, working area) [is] overlaying the content,” and the “Vernier is displayed over the image, so a POSITA would have understood the Vernier is in a second virtual display layer that appears to have lesser depth than the first virtual display layer in which the image content is located,” EX1003, ¶¶48, 89. Dr. Cockburn is incorrect.

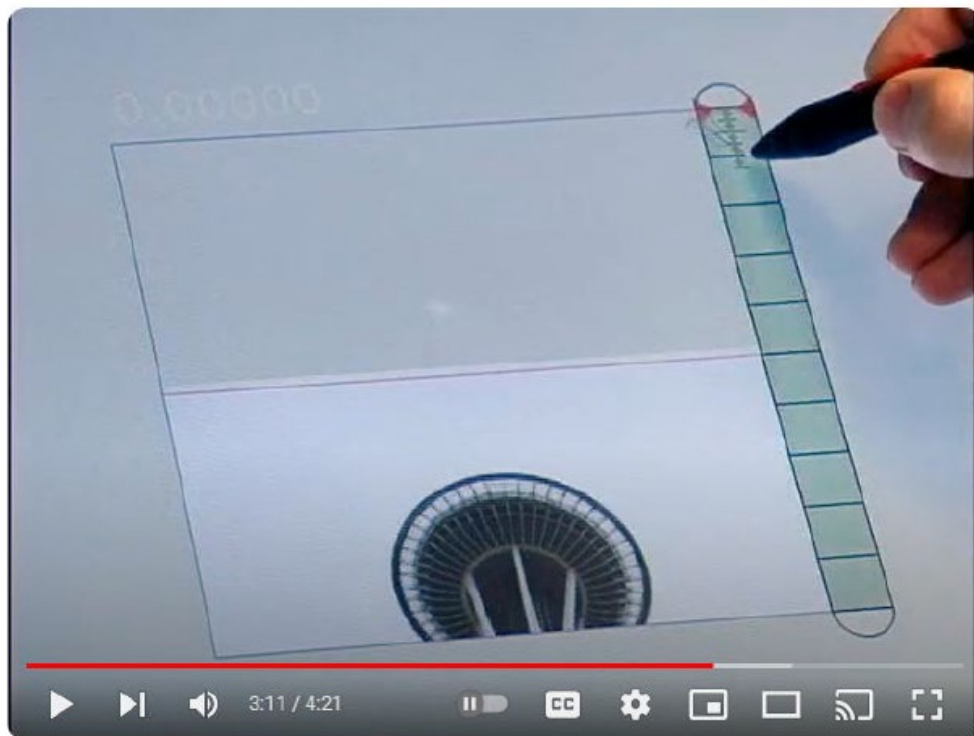
77. None of Dr. Cockburn’s examples disclose “a second virtual display layer that appears to have a lesser depth than the first virtual display layer.” EX1003, ¶89. Nor do Dr. Cockburn’s mappings show a second virtual layer overlaying the image content.



APPLE-1005, 3:22 (annotated)

78. As the Board found at institution, “[a]lthough Petitioner describes the video as showing ‘the Zlider widget (e.g., working area) overlaying the content,’ the two images being referenced in the Petition show the rectangular working area as being adjacent to the contents, not overlaying the contents.” D.I., 15, n.5.

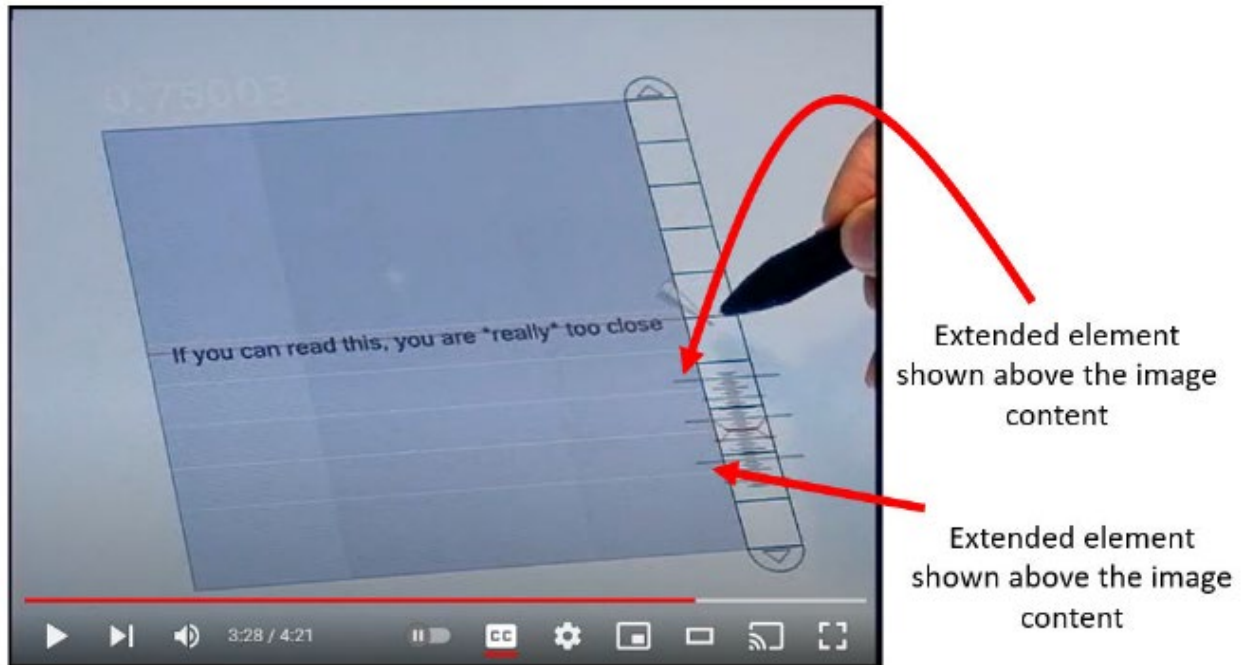
79. Thus, the contents and the working area are in the same virtual display layer, and not in separate display layers. This is confirmed in view of the plain demarcation between the working area and the adjacent image contents, as shown both in the image above and the image below (where the image is shown in lower portion of excerpt below beginning with the light gray color).



APPLE-1005, 3:11 (displaying the touch screen after a touch on the working area is detected (i.e., surpassing the hover threshold), as evidenced by the appearance of the Vernier on the working area)

80. Additionally, Dr. Cockburn incorrectly states that the “Vernier is displayed over the image” contents. EX1003, ¶89. As shown above, it is not.

81. As shown below, the Vernier is displayed over the working area and not the image contents. As the Board noted in its Institution Decision, the Ramos working area is adjacent to the image content, “not overlaying the contents.” D.I., 15, n.5. In his deposition, Dr. Cockburn confirmed his assertion that the Ramos working area, Vernier, and pressure cursor are all in the same layer. EX2007, 65:2-11; EX1003, ¶91. Thus, Dr. Cockburn does not show that the Ramos Paper and Ramos video disclose more than one virtual display layer. EX1003, ¶91.



APPLE-1005, 3:28 (annotated)

82. Dr. Cockburn should not be permitted to, on the one hand claim that the Vernier, pressure cursor, and working layer all share a common virtual layer, and on the other hand claim that one or more of these elements are in a separate virtual layer. But Dr. Cockburn seems to do just that in contending that the RROD combination would have rendered obvious the “second virtual display layer that appears to have a lesser depth than the first virtual display layer” of Limitations [1h], [1i], [1k], [1l], [22d], [22f], [22g], [58c], [58e], [58f], and [58g], and claims 3, 17, 19, 24, 36, 41, 60, 77, 82, and 83.

83. Nevertheless, if everything in the Ramos Paper and Ramos Video are in the same virtual layer, then there is no second virtual display layer. If instead the

pressure cursor is above the markings, and the markings are above content, then the alleged translucency of the pressure cursor cannot satisfy the requirement of Limitation [1i] of at least partial translucency in the second virtual display layer.

**3. Limitations [1i], [1l], [22d], [22g], [58c], [58g]: at least [a] portion of the second virtual display layer is at least partially translucent**

84. I do not agree that “the Zlider widget (*e.g.*, working area) [is] overlaying the content” or that the content area is in the first virtual display layer while the working area is in the second virtual display layer. EX1003, ¶¶48, 91.

85. However, if the Dr. Cockburn’s position is accepted by the Board, and specifically that the image content and the working area are overlapping (*i.e.*, not adjacent) and that the contents constitute the first virtual display layer and the working area constitutes the second virtual display layer, Dr. Cockburn’s invalidity mapping is still incorrect.

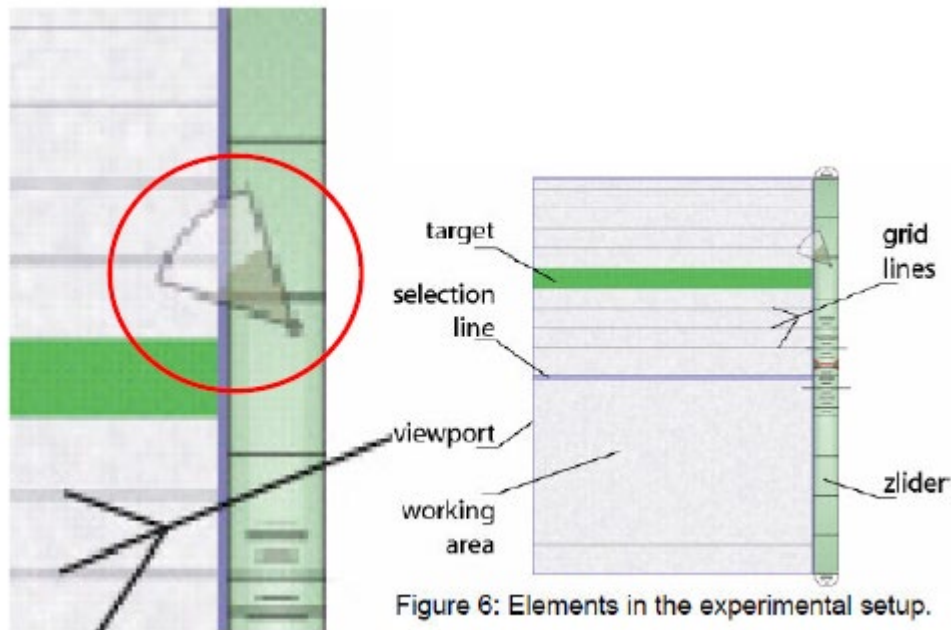
86. Limitations [1i], [1l], [22d], [22g], [58c], and [58g] require that at least a portion of the second virtual display layer is partially translucent. Dr. Cockburn offers two mappings to meet these Limitations, both of which are internally inconsistent and do not meet the recited combination of these claim limitations even under Dr. Cockburn’s positions.

***a) Dr. Cockburn's first mapping relies on a semitransparent element that is not in the second virtual display layer***

87. Dr. Cockburn's first mapping does not show a partially translucent second virtual display layer that appears to have a lesser depth than the first virtual display layer.

88. In addition to the "plurality of markings in a second virtual display layer that appears to have a lesser depth than the first virtual display layer," Limitations [11], [22g], and [58g] also require that "at least [a] portion of the second virtual display layer is at least partially translucent."

89. For the "at least partially translucent" limitation, Dr. Cockburn points to the "semi-translucent" aspect of the pressure cursor in the Ramos Paper as meeting the "partially translucent" element in Limitations [1i], [11], [22d], [22g], [58c], and [58g]. EX1003, ¶90. Specifically, Dr. Cockburn points to Figure 6 (inset below, as excerpted and annotated by Dr. Cockburn) of the Ramos Paper showing the "pressure cursor" as "semi-translucent, as evidenced by the grid lines visible through the cursor." EX1003, ¶90. Dr. Cockburn then cites to Figure 6 (inset below) of the Ramos Paper to support its position that "the 'pressure cursor' of the Zlider is displayed in a second layer." APPLE-1030, ¶91. Dr. Cockburn's positions are untenable.

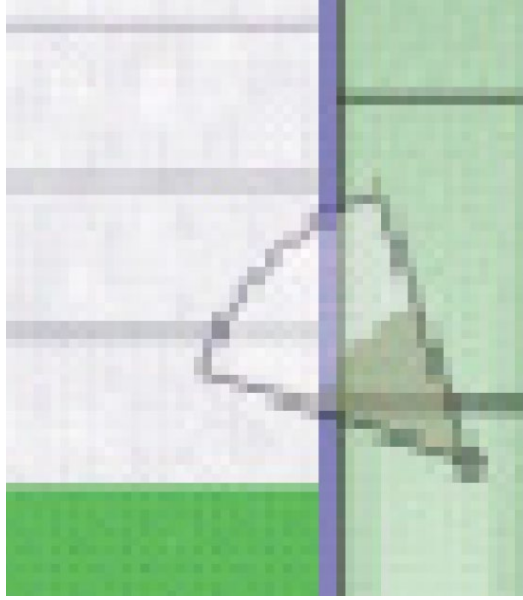


APPLE-1004, 127 (Figure 5-16) (annotated, zoomed in on left)

90. Any translucency of the pressure cursor cannot meet the requirement that “at least a portion of the second virtual display layer is at least partially translucent” for at least two reasons.

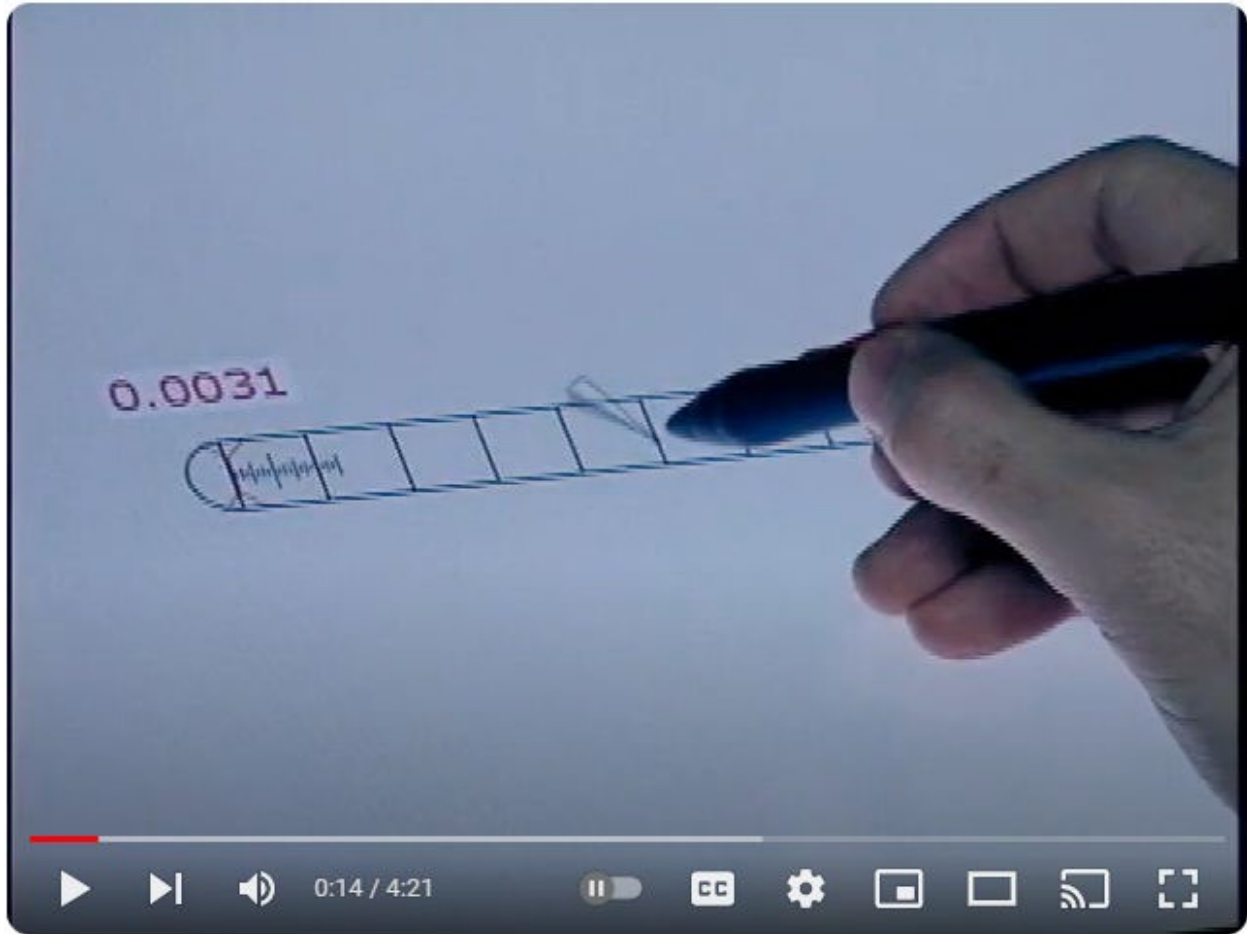
91. First, because the pressure cursor is plainly shown to be above the Zlider and not in the second virtual display layer as described above. *See* EX1004, Fig. 5. The translucency of the pressure cursor is seen over both the content area (which Dr. Cockburn identifies as being in a first virtual display layer) and the Zlider widget (which Dr. Cockburn identifies as being in a second virtual display layer). *See* EX1003, ¶91.

92. Because the pressure cursor is translucent over both inherently supports that the pressure cursor is overlaying both the content and the working area—and thus is in a separate virtual display layer from the contents and the Zlider.

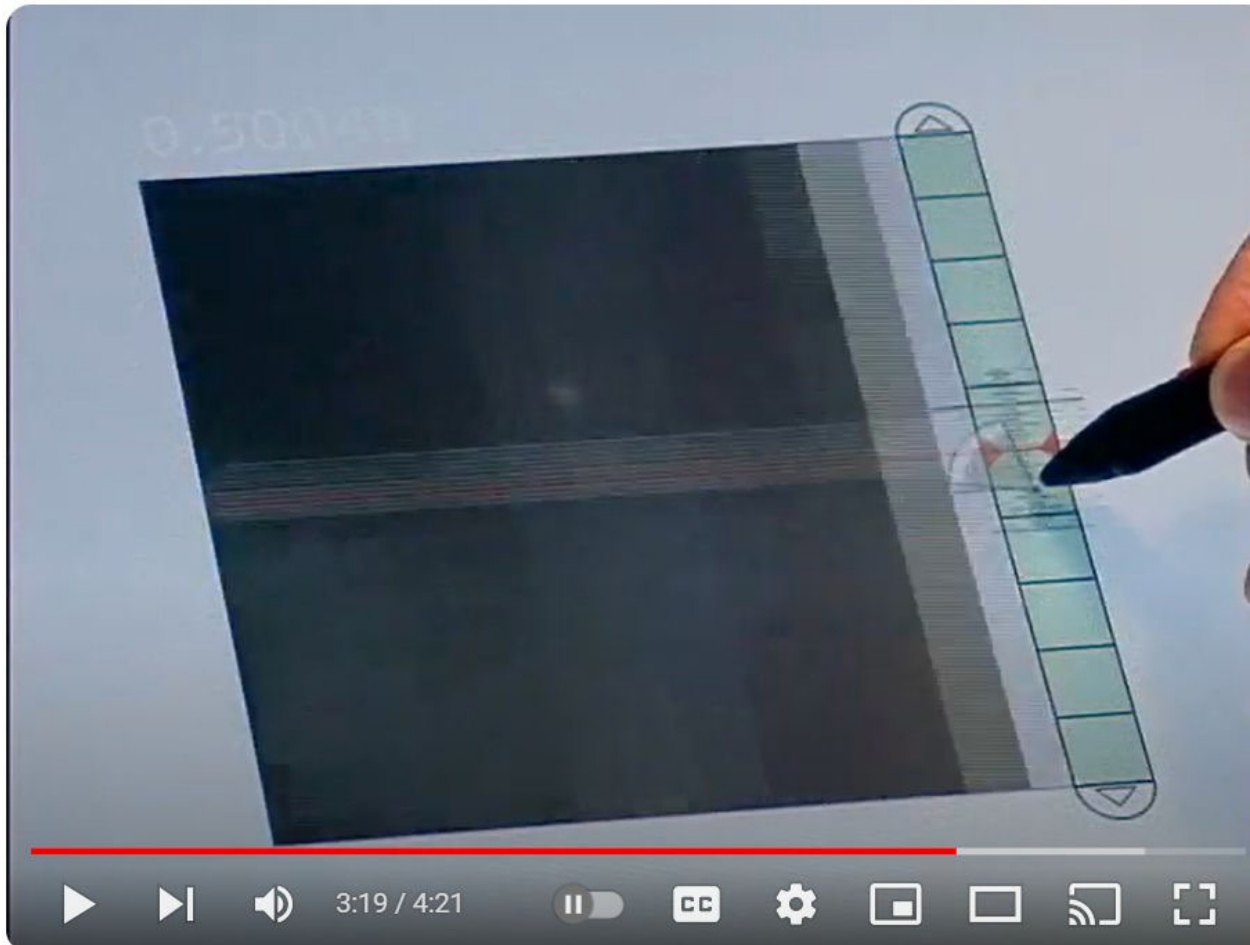


EX1004, Fig. 5 (excerpt).

93. The pressure cursor's translucency over both the content and the working areas can also be seen in the Ramos Video, in which the pressure cursor is translucent over both areas and plainly casts a shadow over both the Zlider and the adjacent content area just before the stylus contacts the screen. EX1005, 0:14; EX1003, ¶51.



94. The same is true once the stylus contacts the screen, as can be seen in another part of the Ramos Video inset below.



EX1005, 3:19; EX1003, ¶52.

95. As shown—and consistent with Figure 6 of the Ramos Paper—the translucency of parts of the pressure cursor changes the appearance of both the markings of the Vernier and the underlying content—plainly indicating that the pressure cursor is in a different virtual display layer. *See also* EX1001, 68:7–11 (“a virtual display layer refers to a collection of display elements which have all been

assigned the same apparent depth within the 3D layered user interface”).<sup>2</sup>

96. Second, if the alleged markings<sup>3</sup> are in the second virtual display layer, then the pressure cursor is not in the second virtual display layer, and Dr. Cockburn’s mapping does not show “at least a portion of the second virtual display layer is at least partially translucent.”

97. The only evidence that the “semi-translucen[cy]” of “the grid lines [being] visible through the cursor” offers is that the pressure cursor overlays the

---

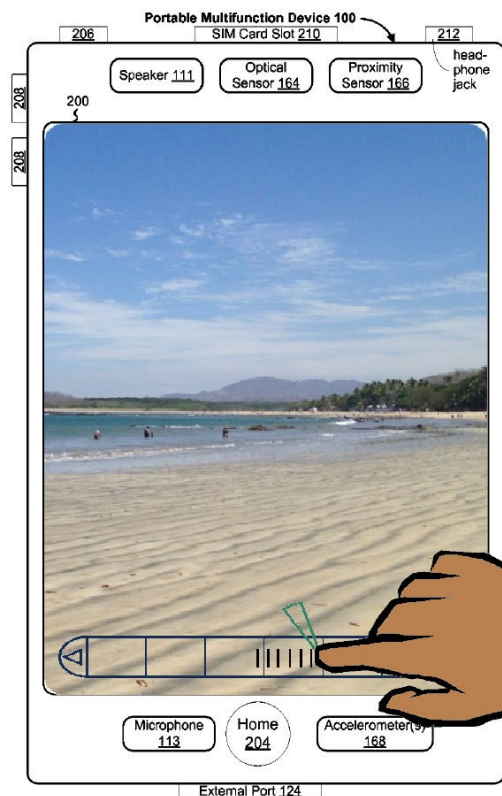
<sup>2</sup> Dr. Cockburn also identifies an aspect of a different, color-picker widget in the Ramos Video as showing alleged translucency above the content. EX1003, ¶¶91, 92. However, Dr. Cockburn does not explain any reason it would have been obvious to include that in Ramos’ Zlider, much less in a way that would position that alleged translucency in a second virtual display layer as required by Limitations [1i], [22d], and [58c].

<sup>3</sup> Dr. Cockburn implies, without directly alleging, that the Ramos Video displays the Vernier’s extended markings in a “semi-transparent manner.” EX1003, ¶57. But the Ramos Video does no such thing; the extended markings are shown as opaque. *See* EX1005, 3:19. Further, Dr. Cockburn’s actual mapping does not point to these extended markings. *See* EX1003, ¶90–92.

markings. Simply put, Limitations [1h]–[1i], [22d], and [58c] each require the markings and the translucency to both be in the same virtual display layer, and Dr. Cockburn’s first mapping simply does not disclose or suggest this.

***b) Dr. Cockburn’s second mapping does not show semitransparency in a second virtual display layer***

98. Dr. Cockburn’s second mapping also does not render obvious translucency in second virtual display layer at a lesser depth than the first layer. Dr. Cockburn contends it was obvious for a POSITA to modify Ramos’ Zlider with the “semitransparent object” in Ording, and shows a modified version of Ording with the “semitransparent” Zlider (inset below). EX1003, ¶93.



EX1003, ¶93.

99. Dr. Cockburn does not show, or assert, that the alleged markings (*i.e.*, Ramos' Vernier) in the RROD combination would be in a second virtual display layer. *See also* EX1003, ¶93.

100. Thus, Dr. Cockburn's second mapping is at least incomplete in that it focuses on a single feature (translucency) of Limitations [1i], [22d], and [58c] to the exclusion of all others.

101. While the Board preliminarily disagreed (D.I., 30–31), Dr. Cockburn's mappings for the rest of the limitations related to markings, layers, and depth (*e.g.*, Limitations [1h], [1i], [1k], and [1l]) do not address this RROD combination, and does not explain how it meets the various requirements other than translucency.

102. As such, Dr. Cockburn's declaration leaves it to the reader to guess at which Ramos element is purportedly in which alleged virtual display layer. *See, e.g.*, D.I., 31 (addressing only that “a portion of a beach is visible” thought the Zlider widget with Vernier markings, not whether the Zlider widget or Vernier markings are in a second virtual display layer at a lesser depth than a first virtual display layer).

103. Moreover, for the reasons explained above, Dr. Cockburn does not adequately support the RROD combination. *See also* EX1003, ¶93.

104. Absent that RROD combination, Dr. Cockburn does not show the claimed translucency of, for example, Limitations [1i] and [1l]. D.I., 29–30. Dr. Cockburn therefore does not show obviousness of translucency in the second virtual

display layer.

105. Dr. Cockburn therefore does not show that the RROD combination would disclose or suggest any of Limitations [1i], [1l], [22d], [22g], [58c], and [58g].

**4. Limitations 1[l], 22[g], 58[f], 82 and 83: perform a zoom operation on the at least portion of the contents of the first virtual display layer without performing [the]/[any] zoom operation on the plurality of markings in the second virtual display layer**

106. Dr. Cockburn does not show that the RROD combination suggests zooming in on at least a portion of the contents “without performing any zoom operation on the plurality of markings.” Limitations [1l], [22g], and [58f] and claims 82 and 83 all recite “perform a zoom operation on the at least portion of the contents of the first virtual display layer without performing [the]/[any] zoom operation on the plurality of markings in the second virtual display layer . . . .” Accordingly, Dr. Cockburn’s invalidity mapping is insufficient.

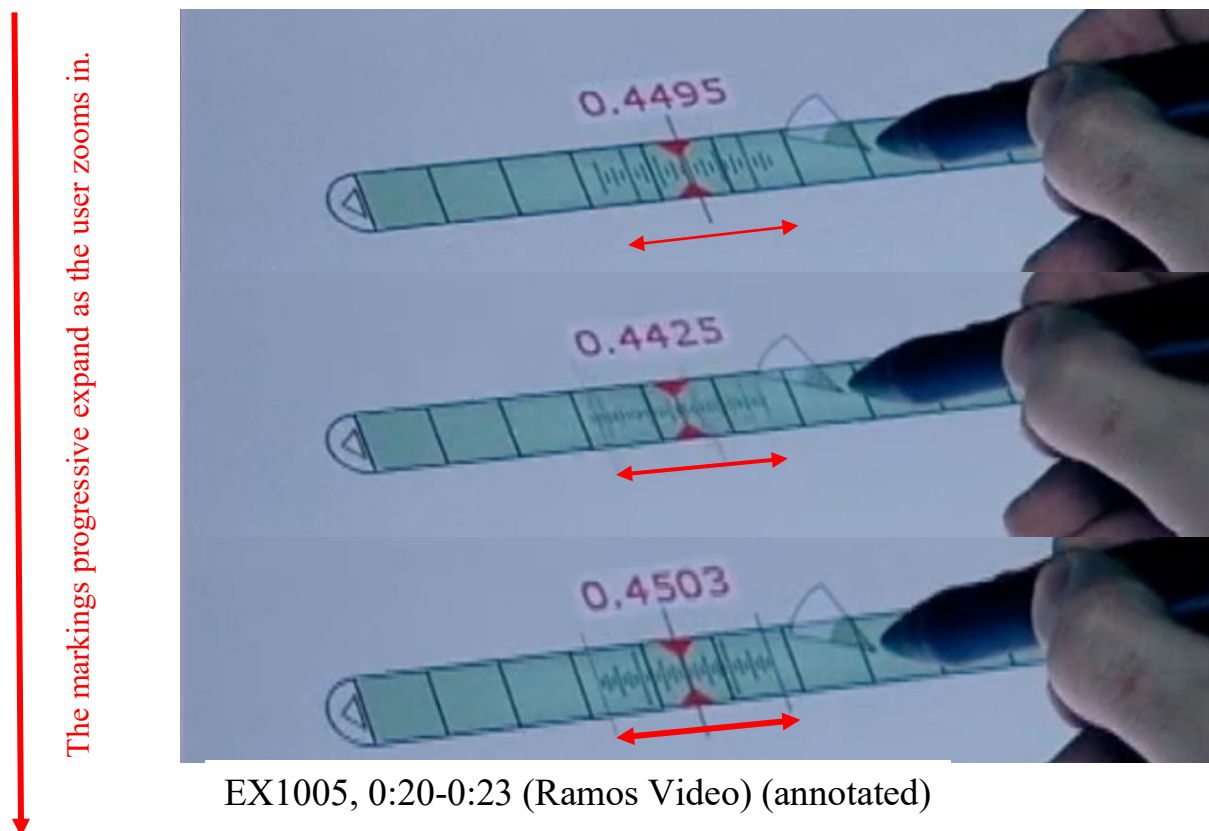
107. Dr. Cockburn states that the “Vernier comprises a plurality of markings.” EX1003, ¶86. Dr. Cockburn then asserts that the zoom operation is not performed on the plurality of markings when a zoom operation is performed on at least some contents in the first virtual display layer for at least two reasons. EX1003, ¶¶101–104.

108. Dr. Cockburn first claims that while the “grid spacing is adapted according to the current precision level” the plurality of markings are not magnified because “they remain the same thickness.” EX1003, ¶103.

109. Dr. Cockburn next asserts that “[w]hile the scale of the Vernier *does* influence the magnification level (a zoom operation) applied to the content,” “the zoom operation applied to the content is not applied to the Vernier.” EX1003, ¶104. Dr. Cockburn claims this because “the pressure applied to the working area determines the Vernier’s scale factors,” which is associated with “‘precision’ and ‘granularity’” and not magnification level. EX1003, ¶104.

110. Dr. Cockburn’s position is incorrect. Dr. Cockburn acknowledges that the plurality of markings change as a function of a zoom operation on the content – “[t]he Ramos Paper explains that ‘the Vernier in our Zlider adapts its grid spacing depending on the widget’s current scale factor.’” EX1003, ¶97. In other words “when a user touches the markings and presses down (changing the pressure applied to the touch screen), the scale factor for zoom changes, causing the one or more markings to move in the second virtual display layer.” EX1003, ¶97. “In this way, the markings in the Vernier displayed in the second virtual display layer are moved as a function of the pressure applied in the touch movement. EX1003, ¶97.

111. But the zoom operation *occurs* on the plurality of markings when the pressure is applied, as seen in the screenshots from the Ramos Video.



EX1005, 0:20–0:23.

112. As shown above, as the user performs a zoom operation on the working area the zoom operation also occurs on the plurality of markings as seen in the video by the plurality of markings expanding—*i.e.*, appearing to get closer to the user—as can be seen when viewing the video.

113. Dr. Cockburn confirms that the plurality of markings change as the zoom operation is performed on the content, but asserts that this is due to “precision” levels changing rather than zooming. Specifically, Dr. Cockburn contends “[t]he Ramos Paper also confirms that ‘the Vernier in our Zlider adapts its grid spacing [plurality of markings] depending on the widget’s current scale factor.’” EX1003,

¶103. But these words lack substantive import.

114. The Ramos Video shows its Zlider zooming in on its marking as a portion of image is enlarged (zoomed), that it “adapts its grid spacing” according to the zoom is just another way of saying that it also zooms in on the grid spacing. The plain meaning of zoom, which applies to the term barring any definition to the contrary, is a means of producing an enlarged image. EX2009 (Webster’s Dictionary).

115. That is precisely what the Ramos Video shows: “The Zlider widget behaves like a regular selector with the difference that users can while dragging or sliding explicitly adjust the precision at which they interact or zoom by changing the amount of pressure they apply with the input device.” EX1005, 0:14–0:27; EX1005, 0:20–23 (Ramos Video) (Annotated), *infra*.

116. This much is apparent in the portion of the Ramos Video from which screen shots are annotated above, in which, as the zoom operation is performed on the image, the spacing between Vernier markings increases (the markings get larger), until another set of intermediate markings appears, and the spacing between the markings continue to increase. EX1005, 0:20–0:23 (Ramos Video) (Annotated), *infra*.

117. Thus, the Ramos Video makes clear that what is occurring with the Vernier and Zlider is a “zoom,” despite Dr. Cockburn’s attempt to recast it as

something else. *See* EX1005, 0:20–0:23 (Ramos Video) (Annotated), *infra*.

118. Dr. Cockburn thus does not show that the RROD combination would suggest any of Limitations [11], [22g], and [58f], or claims 82 and 83. RROD therefore does not render obvious “perform[ing] a zoom operation on the at least portion of the contents of the first virtual display layer without performing [the]/[any] zoom operation on the plurality of markings in the second virtual display layer . . . .”

**5. Limitations [1h], [22d], [58c]: [when/in response to] an aspect of the touch [is/being] detected to surpass a threshold, display[ing], via the touch screen, a plurality of markings in a second virtual display layer**

119. Limitation [1h] recites: “when an aspect of the touch is detected to surpass a threshold, display, via the touch screen, a plurality of markings in a second virtual display layer . . . .” Limitations [22d] and [58c] similarly recite: “in response to an aspect of the touch being detected to surpass a threshold, display, via the touch screen, a plurality of markings in a second virtual display layer . . . .” For claim 1, “the touch” finds its antecedent in Limitation [1g]: “detect, via the touch screen, at least a portion of touch on the least one user interface element.” *See also* Limitations [22c], [58b]. Because “touch” is not the same as “no touch” or “hover,” Dr. Cockburn’s mappings are insufficient.

**a) A “touch” is a touch; hovering is not a “touch”**

120. For Limitation [1g], Dr. Cockburn assumes there is no difference

between a stylus not touching, but hovering within a threshold distance of the touch screen and touching (*i.e.* actually contacting) the screen. Dr. Cockburn is wrong.

121. Dr. Cockburn starts by asserting that the “[t]he Ramos Video further shows several examples of the device detecting *at least a portion of a touch* on the working area (at least one user interface element) displayed on the touch screen, as evidenced by the ‘before’ and ‘after’ of the displays, shown below.” EX1005, ¶79.

122. Dr. Cockburn then shows a number of screenshots from the Ramos Video, without pointing out that the display of the Vernier is responsive to the stylus hovering within a threshold distance of the screen, *not* to the stylus actually touching the screen. Dr. Cockburn next asserts—without explanation—that a “POSITA would have understood that a touch in the Ramos Paper and Ramos Video includes both contact with the touch screen *and meeting a threshold proximity* [without contact] between the stylus and the touch screen.” EX1003, ¶80. But that assertion misses the mark and contradicts the disclosure of the ’580 Patent.

123. The only support Dr. Cockburn cites for the conclusion that merely getting close could be a “touch” is a misquoted passage in the ’580 Patent discussing “touch state,” not “touch” itself.

124. Dr. Cockburn contends that “the ’580 Patent explains that ‘contact pressure level may be represented by a touch state,’ which ‘refers to a predefined subset of the range of measurable contact pressures,’ where the ‘lowest touch state

may require some form of proximity,” and therefore the “RROD teaches and/or renders obvious detecting at least a portion of a touch (e.g., proximity).” EX1001, 17:22–36. But “touch” is not the same as “no touch” or a “hover.”

125. Further, interpreting “touch” to include a hover or lack of touch (*i.e.*, “proximity”) would not make sense in the context of the Challenged Claims (and those that depend therefrom), which recite: “detect[ing], via the touch screen, at least a portion of touch on the least one user interface element.” EX1001, Claim 1. Dr. Cockburn acknowledges that a touch includes a temporal component. *See* EX2007, 23:13–14 (“I would agree that ‘touch’ can have a temporal component.”); 38:3–6 (“From the user’s perspective and from physics perspective, there will be a temporal component of aspects of the touch.”) Dr. Cockburn also acknowledges that a touch includes a physical component. *See* EX2007, 27:10–13. The ’580 Patent even provides that “a *touch* event refers to an event in which an implement of interaction comes *into contact* with an interaction surface.” EX1001, 52:48–50.

***b) Ramos Paper and Ramos Video display their Vernier in response to a hover—not touch***

126. For Limitation [1h], Dr. Cockburn contends that “when an aspect of the touch is detected to surpass a threshold, display[ing], via the touch screen, a plurality of markings in a second virtual display layer” is met by Ramos Paper and Ramos Video’s display of their Vernier. EX1003, ¶85

127. But Dr. Cockburn neglects the fact that the Zlider in the Ramos Paper

and Ramos Video does **not** display its Vernier in response to an aspect of a touch, but instead in response to a proximity threshold as shown below and does not articulate any reason or motivation to change that foundational element of the Ramos Paper and Ramos Video. *See e.g.*, EX1005, 3:09.

128. Dr. Cockburn recognizes that the Ramos Paper and Ramos Video suggest the use of a threshold associated with a hover state to determine when the hover surpasses “a threshold (*i.e.*, the signals associated with the hover threshold described further below) when using the Zlider, the Vernier is displayed on the touchscreen.” EX1003, ¶85 (citing EX1004, FIG. 5) (“POSITA would have understood or found obvious that the tracking state is activated when signals from the stylus exceed a threshold (*i.e.*, the stylus is close enough to the touch surface to be registered as movement near the surface)”); EX1005, 0:14, 3:10–3:11.

129. Thus, Ramos Paper and Ramos Video display their Vernier in response to the stylus coming near the display, **not** in response to the stylus actually touching the display.

130. Further, despite arguing generally that it would have been obvious in view of Ording to add a duration threshold to the Ramos Paper and Ramos Video, Dr. Cockburn never articulates any theory (much less motivation) to modify the Ramos references to display the Vernier in response to touch rather than mere proximity to / hover near the touch screen. *See* EX1003, ¶¶83-86.

131. Therefore, even if the Ramos Paper and/or Ramos Video were modified to include a duration threshold (purportedly to avoid inadvertent activations), the technology shown in the Ramos Paper and Ramos Video would still display the Vernier in response to a hover, not “when [in response to] an aspect of the touch is [being] detected to surpass a threshold.”

**6. Claims 29, 65: wherein the touch and the another touch are detected to be part of a single continuous gesture with constant contact with the electronic device**

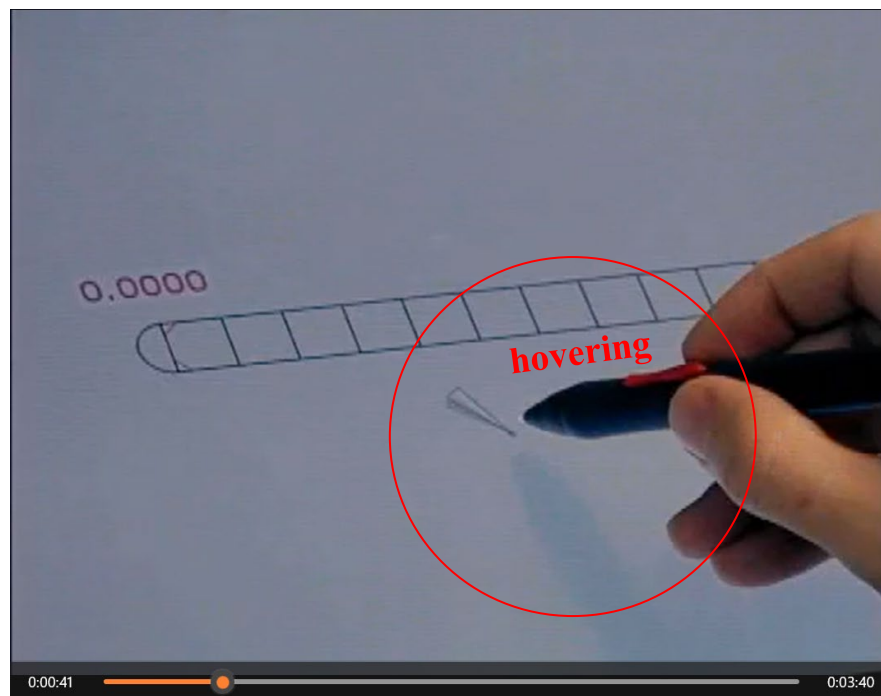
132. Dependent claims 29 and 65 both recite “the touch and the another touch are detected to be part of a single continuous gesture with constant contact with the electronic device.” Dr. Cockburn’s mapping is insufficient because Dr. Cockburn cannot show that the RROD prior art references disclose two independent touches that are detected to be a part of a single continuous gesture in constant contact with the electronic device.

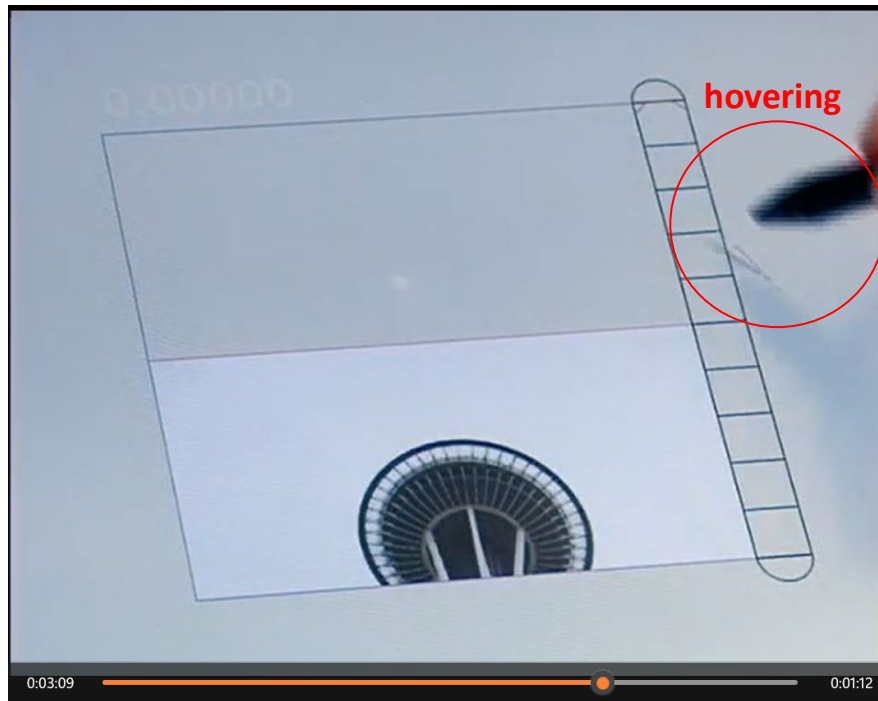
133. Dr. Cockburn maps the single continuous gesture to “a single continuous touch movement,” with the first touch to “the user moving a stylus within proximity of the touch screen (causing display of the Vernier on the working area),” and the second touch to when the stylus “continue[s] moving on the touchscreen along the Zlider and during the continuous touch movement[.]” EX1003, ¶112. But what Dr. Cockburn mapped to does not constitute a single continuous gesture nor two touches.

134. As previously discussed, hovering—“moving a stylus within proximity of the touch screen”—is not a touch as discussed above, so it plainly cannot constitute one of the two touches.

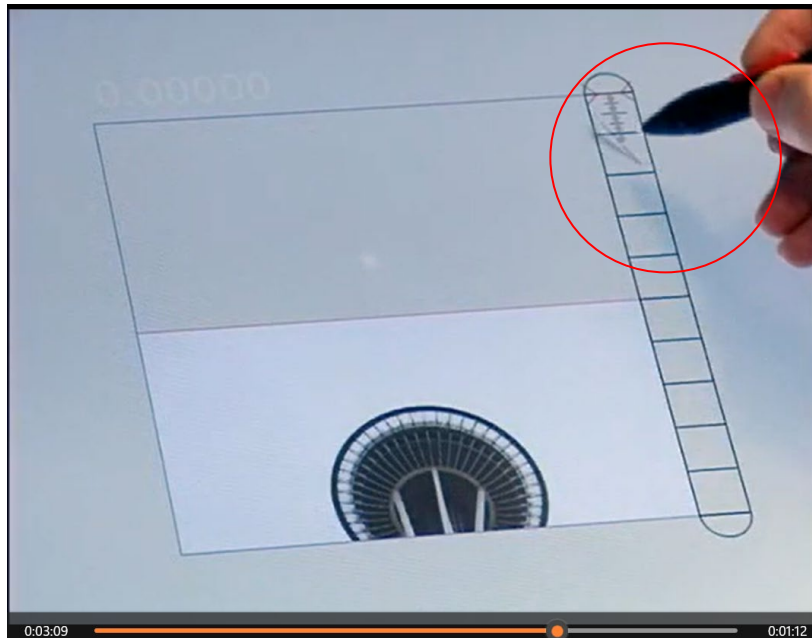
135. And, even if hovering constituted a touch in this context, which it does not, it would still not be a part of a single continuous gesture when the second touch according to Dr. Cockburn is the stylus touching the working area and triggering the Vernier.

136. This is because the stylus is detected when it is hovering near the working area without coming into contact with the touch screen, and this type of gesture alone (*i.e.*, a hand hovering above the touch screen) constitutes a separate and distinct gesture from moving a stylus into contact with the touch screen.

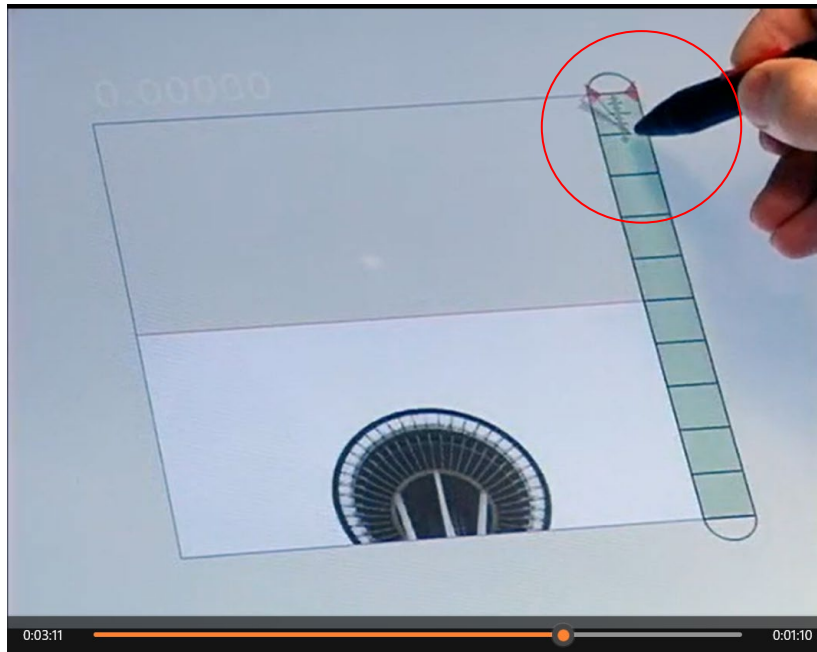




Still hovering, but the grid marks have appeared, meaning stylus is close enough to be detected.



No longer hovering; stylus made contact activating the working area (green background) and turning the needle red.



137. As shown above, when the user brings the stylus to make contact with the working area, thus triggering the Vernier, that movement constitutes a second gesture.

138. Furthermore, when the user moves the stylus on the x-axis of the Zlider to scroll the content that movement of the stylus constitutes a third gesture.

139. Finally, pressing the stylus on the touch screen to increase or decrease the zoom operation constitutes a fourth gesture.

140. Thus, none of these movements (*e.g.*, hovering, vertical gesture, and horizontal gesture) and their associated touches (*e.g.*, an initial tap, swiping or sliding, and pressing) are part of a single continuous gesture.

141. Dr. Cockburn therefore does not show that the RROD prior art combination would disclose or suggest claims 29 and 65. His mapping is insufficient for these reasons.

**7. Claims 9, 32, 69: the aspect of the touch includes a duration aspect and the threshold includes a duration magnitude threshold**

142. Claims 9, 32, and 69 recite “the aspect of the touch includes a duration aspect and the threshold includes a duration magnitude threshold.” Dr. Cockburn, however, does not establish obviousness as to these limitations because a POSITA would not have been motivated to combine the Ramos Paper and the Ramos Video with Ording to meet the limitation “duration magnitude threshold.”

143. Dr. Cockburn asserts that a POSITA would have found it obvious “that a touch has at least a duration and a length that are used to determine whether the touch is intentional and [to] identify the type of gesture.” EX1003, ¶114. Dr. Cockburn explains that “Ording recognizes a ‘time period’ associated with a finger’s contact with a touch screen, and using such information to identify a touch was well known by the Critical Date.”) EX1003, ¶114.

144. But the Zlider in the Ramos Paper and Video is not using duration to determine whether a touch is intentional. EX2008, 17:16–23 (agreeing there is no explicit disclosure or mention of the use of time thresholds to ignore inadvertent contacts in the Ramos Paper that describes the Zlider using duration to determine whether the touch from the user is intentional).

145. Instead, the Zlider uses proximity to sense whether the stylus is approaching the working area (*i.e.*, moving the stylus past a threshold and closer to the working area “activates” the Zlider, thus signaling that the user has an intention to interact with the Zlider). Nor does the Zlider look at any “time period” associated with the touch to identify a touch.

146. Thus, as the Zlider is not concerned with the touch surpassing a time threshold to determine whether the touch is intentional, a POSITA would not look to Ording (or any other reference) that discusses a “time period” associated with a gesture to incorporate functionality not contemplated by the Zlider in the Ramos Paper and the Ramos Video.

147. Dr. Cockburn therefore does not show that the RROD prior art combination would disclose or suggest claims 9, 32, and 69.

**B. Ground 1B: Dr. Cockburn Does Not Show that The Ramos Paper, Ramos Video, Ording, and Hayward Combination Would Have Rendered Obvious Claim 48**

148. A POSITA would not have been motivated to combine the RROD prior art references with Hayward to render Claim 48 obvious.

149. Dr. Cockburn claims that a POSITA would have found it obvious to improve RROD by using its slider to modify parameters, such as the contrast in an image. EX1003, ¶166. Specifically, Dr. Cockburn alleges that “[a] POSITA would have found it obvious to modify the RROD with Hayward’s teachings to include a

separate widget (as taught by Ramos Paper and Ramos Video) for use in adjusting exposure levels (as taught by Hayward) when using a camera applications/camera module, as described in Ording.” EX1003, ¶¶167, 170 Yet, nothing in the RROD prior art references suggest such an application.

150. The Ramos Paper and Ramos Video are not concerned with implementing touch gestures for image filtering, which is the focus of Hayward. Instead, the Ramos Paper and Ramos Video references are concerned with high precision parameter manipulation:

In this paper, we propose and study a mechanism for use with pressure sensitive input devices, called Zoom Sliding, or *Zliding* for short, in which users use the pressure modality to fluidly and explicitly *zoom* or adjust the granularity of the parameter space, while *sliding* or dragging the input device to perform high precision parameter manipulation within that zoomed parameter space.

EX1004, 1 (emphasis added).

151. Ording focuses on cursor positioning methods. EX1006, [0009]. Ording discloses methods to address the difficulty in navigating compact mobile devices forced to support increasing functionality but armed with outdated user interfaces such as physical pushbuttons. EX1006, [0004]–[0007]. Specifically, Ording addresses a method where the device identifies the contact area of a user’s finger on the touch screen and determines a cursor position based partially on this contact area. EX1006, [0009]. The method allows for dynamic adaptation to

different user interactions and reducing accidental selections on a touch screen. *See* EX1006, [0007].

152. On the other hand, Hayward is concerned with mapping touch gestures with image processing techniques (*e.g.*, image filters):

Accordingly, there is a need for techniques to implement a programmatic interface to map particular user interactions, *e.g.*, gestures, to the input parameters of various image processing routines, *e.g.*, image filters, in a way that provides a seamless, dynamic, and intuitive experience for both the user and the client application software developer.

EX1016, [0007].

153. A POSITA would not look to Hayward for high precision parameter manipulation techniques because the Zlider is focused on “fluid integrated manipulation of scale (zooming) via pressure user input while parameter manipulation within that scale is achieved via x-y cursor movement (sliding).”

EX1004, 1.

154. Indeed, Hayward already discloses and illustrates a gesture (*see* EX1003, ¶163) to accomplish what Dr. Cockburn seeks to make more complicated by adding Ramos’ Zlider.

155. Dr. Cockburn does not explain why Hayward’s approach to adjusting contrast was lacking, or why the added complexity was needed or beneficial.

156. Simply put, a POSITA looking to improve high precision parameter techniques would not look to a reference merely linking gestures with image processing techniques, or vice versa.

157. Dr. Cockburn's mapping for Claim 48 is therefore insufficient.

## **X. CONCLUSION**

158. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and 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.

Dated: 4/30/25

Respectfully submitted,

Mark P. Mahon  
Mark P. Mahon, Ph.D.