

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
Petitioner,

v.

HEADWATER RESEARCH LLC,
Patent Owner.

IPR2023-01336
Patent 9,137,701

**DECLARATION OF DR. ZYGMUNT J. HAAS IN SUPPORT OF PATENT
OWNER'S RESPONSE TO THE PETITION**

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I, Zygmunt J. Haas, hereby declare as follows:

I. Introduction

1. I am over the age of eighteen (18) years and otherwise competent to make this declaration.

2. I have been retained as an expert witness on behalf of Patent Owner for the above-captioned *inter partes* review (“IPR”). I understand that the petition for *inter partes* review involves U.S. Patent No. 9,137,701 (“the ’701 Patent”).

3. I make this declaration based on my personal knowledge, educational background and training, consideration of the materials that I discuss herein, and my expert opinions.

4. I am being compensated at a rate of \$550 per hour for my time in this matter, in addition to reimbursement for expenses. My compensation does not depend on the outcome of this proceeding, and I have no financial interest in its outcome.

5. In preparing this Declaration, I have reviewed and considered the ’701 Patent, the ’701 Patent’s prosecution history, the Petition, the declaration submitted by Dr. McDaniel in this proceeding, the deposition transcript of Dr. McDaniel in this proceeding, and each document cited in this declaration.

II. Background and Qualifications

6. My qualifications for forming the opinions given in this declaration are briefly summarized here and are addressed more fully in my curriculum vitae, which I understand is submitted as Exhibit 2010.

7. I am a Professor and Distinguished Chair in Computer Science at the Computer Science department of the University of Texas at Dallas. I also hold the title of Professor Emeritus at the School of Electrical and Computer Engineering at Cornell University. Over the years, I provided technical consulting services on intellectual property matters, which have included writing expert reports and providing deposition and trial testimony in the areas of my expertise, including wireless communication technologies.

8. I received my Doctor of Philosophy (Ph.D.) degree in the field of Electrical Engineering from Stanford University in 1988. As part of my Ph.D. program, I authored the thesis titled “Packet Switching in Fiber–Optic Networks.” I received my Masters of Science (M.Sc.) degree in Electrical Engineering, *summa cum laude*, from Tel-Aviv University in 1985 and my Bachelor of Science (B.Sc.) degree in Electrical Engineering *summa cum laude*, from Technion.

9. After receiving my Ph.D. degree from Stanford University, I worked in industry as a member of the technical staff at AT&T Bell Laboratories from 1988 to 1995, initially in the Network Research Department in Holmdel, New

Jersey. There, I performed research in the fields of wireless communications, mobility management, fast protocols, optical networks, and optical switching. During my tenure at AT&T, I also worked for the AT&T Wireless Center of Excellence, in Whippany, NJ. There, I studied various aspects of wireless and mobile networks.

10. After my work at AT&T Bell Laboratories, I joined the faculty of Electrical & Computer Engineering at Cornell University in 1995, and over time I was promoted to Tenured Full Professor. While at Cornell, I headed my research group – the Wireless Networks Lab – which has had extensive contributions in the area of wireless communication systems and networks. In 2013, I retired from Cornell University with the title of Emeritus Professor, and subsequently I joined the Computer Science Department at the University of Texas at Dallas with the title of Professor and Distinguished Chair in Computer Science. Both, at Cornell University as well as at the University of Texas at Dallas, I have taught numerous courses related to computer network (at the undergraduate and graduate levels) and wireless communications. As part of my academic career, I have also served on numerous and various committees for the benefit of the scientific community.

11. In 2007, I was elevated to an IEEE Fellow, and in 2022, I was elevated to an ACM Fellow, both well-known distinctions. For example, the total number of IEEE Fellows which are selected in any given year does not

exceed 0.1% of the total number of voting members of IEEE. Alike, with respect to the ACM Fellow grade, ACM states that “ACM's most prestigious member grade recognizes the top 1% of ACM members for their outstanding accomplishments in computing and information technology and/or outstanding service to ACM and the larger computing community.” See <https://awards.acm.org/fellows>.

12. In 2016, I received the IEEE ComSoc AHSN Recognition Award for “outstanding contributions to securing ad hoc and sensor networks”. In 2012, I have received the IEEE ComSoc WTC¹ Recognition Award, which recognizes individuals for outstanding technical contributions in the field for their service to the scientific and engineering communities. As another example, I received the “Best Paper Award” for the paper “Optimal Resource Allocation for UWB Wireless Ad Hoc Networks” from the IEEE International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC) conference in 2005. Finally, in 2003, I received the “Highly Commended Paper Award” for co-authoring “Performance Evaluation of the Modified IEEE 802.11 MAC for Multi-Channel Multi-Hop Ad Hoc Network,” directed at advanced information networking and applications. Furthermore, many of my papers have been extensively cited by other authors, as indicated by various citation indices. For example, my paper on

¹ Wireless Communications Technical Committee

“Securing Ad Hoc Networks,” co-authored with a Ph.D. student at the time, has been cited over 4000 times by other publications according to the *Google Scholar* index. I have also been invited to many international conferences to make keynote speeches.

13. I am a named author on many book chapters, including “A Decision-Theoretical Approach to Resource Allocation in Wireless Multimedia Networks,” in *Resource Allocation in Next Generation Wireless Networks*, Volume 5, W. Li and Y. Pan, Editors, Nova Science Publishers, 2006, chapter 1, pp.1-23; “Providing Ad-Hoc Connectivity with the Reconfigurable Wireless Networks,” in *Ad-Hoc Networks*, edited by Charlie Perkins, Addison Wesley, 1998; and “Mobile-TCP: An Asymmetric Transport Protocol Design for Mobile Systems,” in *Mobile Multimedia Communications*, edited by D. J. Goodman and D. Raychadhuri, Plenum Publishing, 1997.

14. I am an inventor or co-inventor on over twenty issued patents, which are primarily in the fields of high-speed networking, wireless networks, and optical switching.

15. I have served on the editorial boards of a number of professional journals including Wireless Communications and Mobile Computing, Wireless Networks Journal, and the Journal of High Speed Networks. I have served as guest

editor for the IEEE Journal on Selected Areas in Communications on several occasions.

III. Legal Principles

16. I am not an attorney, and I do not opine on matters of law. In preparation of this Declaration, I have been informed by counsel about certain aspects of the law that are relevant to my analysis and opinions, as set forth below.

A. Claim Construction

17. I have been informed by counsel that the first step in performing a validity analysis of patent claims is to interpret the meaning and scope of the claims by construing the terms and phrases found in those claims. I have been informed by counsel that the appropriate construction of a claim term is its ordinary and accustomed meaning as would have been understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent and the prosecution history.

18. I have been informed by counsel that standard for claim construction in an *inter partes* review is the same standard as is applied in district court proceedings.

19. I have been informed by counsel that a determination of the meaning and scope of the claims is a matter of law. I have been informed by counsel that to

determine the meaning of the claims, one should consider the intrinsic evidence, which includes the patent's claims, written description, and prosecution history.

B. Burden of Proof

20. I have been informed by counsel that in an *inter partes* review, the petitioner has the burden of proving unpatentability by a preponderance of the evidence.

C. Anticipation

21. I have been instructed by counsel and understand that a reference is anticipated if a single prior art reference discloses each and every claim element, either explicitly or inherently, as arranged in the same way as in the claim. I have been informed by counsel that where even one claim element is not disclosed in a reference, a contention of anticipation fails.

22. I further have been informed by counsel that when a reference fails to explicitly disclose a claim element, that reference inherently discloses that element only if the reference must *necessarily* include the undisclosed claim element.

D. Obviousness

23. I have been instructed by counsel and understand that a combination of prior art references may render a claim obvious if, at the time of the invention, a person of ordinary skill in the art would have selected and combined those prior-art

elements in the normal course of research and development to yield the claimed invention.

24. I have been informed by counsel that in an obviousness analysis, one should consider the *Graham* factors, including: the scope and content of the prior art; the differences between the claimed inventions and the prior art; and the level of ordinary skill in the art. I further been informed by counsel that the obviousness analysis is to be performed on a claim-by-claim basis. I have been informed by counsel that a person of ordinary skill in the art is a person of ordinary creativity, not an automaton.

25. I have been instructed by counsel and understand that obviousness requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim under examination. I have been informed by counsel that obviousness requires the additional showing that a person of ordinary skill at the time of the invention would have been motivated to combine those references in a manner that would include all limitations of the challenged claim, and, in making that combination, a person of ordinary skill in the art would have had a reasonable expectation of success (i.e., would have reasonably expected to arrive at the proposed modification without undue experimentation).

26. I also have been informed by counsel that an obviousness analysis must be conducted with awareness of the distortion caused by hindsight bias and with caution of arguments reliant upon *ex post* reasoning. For instance, I understand that when considering obviousness, I should put myself in the position of a person of ordinary skill in the field at the time of the invention, rather than considering new information that is known today, but was not known at the priority date of the challenged patent.

27. I have been informed and understand from counsel that the Supreme Court has recognized that inventions are nearly always “combinations of what, in some sense, is already known.” As a safeguard against hindsight bias, I thus understand that an obviousness determination should take into account whether any proposed modification to the prior art is more than the predictable use of prior art elements according to their established functions. I have been informed by counsel that if the proposed modification *is* more than the predictable use of prior art elements according to their established functions, that is an indication that the proposed modification is inventive, not obvious.

IV. Person of Ordinary Skill in the Art

28. Dr. McDaniel alleges that a person of ordinary skill in the art, as of the priority date of the '701 Patent, “would have had (1) at least a bachelor’s degree in computer science, electrical engineering, or related field, and (2) three to

five years of experience with networking, power consumption of networked computing devices, and/or wireless digital communications systems. Additional graduate education could substitute for professional experience, and *vice versa*.” Ex. 1003 (McDaniel Decl.) ¶ 18. It is my opinion that a POSITA at the time of the invention of the ’701 Patent would have had (1) at least a bachelor’s degree in computer science, electrical engineering, or related field, (2) at least three years of additional experience (which could include graduate experience) with networking, power consumption of networked computing devices, and/or wireless digital communication systems.

29. I have at least the qualifications of such a person of ordinary skill in the art, and had such qualifications prior to January 28, 2009 (the date that Dr. McDaniel applies as the priority date of the ’701 Patent—*see* Ex. 1003 ¶17).

V. Background of the ’701 Patent

30. At a high level, the ’701 Patent is directed at using a differential traffic control policy to selectively block access by an application to a WWAN modem while data is being communicated via the modem, based on a determination that that application is running in a background state, and using the differential traffic control policy to selectively allow access by the application to the modem based on a determination that the application is running in a foreground state.

31. The only independent claim (Claim 1) of the '701 Patent recites in full:

[1pre] A wireless end-user device, comprising:

[1a] a wireless wide area network (WWAN) modem to communicate data for Internet service activities between the device and at least one WWAN, when configured for and connected to the WWAN;

[1b] a wireless local area network (WLAN) modem to communicate data for Internet service activities between the device and at least one WLAN, when configured for and connected to the WLAN;

[1c] one or more processors configured to

[1d] determine, for a first end-user application capable of running in a background state and capable of running as a foreground application, whether the application is running in a background state or as a foreground application, and

[1e] control, via an application program interface (API), application access for Internet service activities provided through the WWAN modem and the WLAN modem, to, **based on a first differential traffic control policy, selectively block and allow access by the first end user application to the WWAN modem at a time when data for Internet service activities is communicated through a WWAN modem connection** to the at least one WWAN,

[1f], [1g] wherein the access is selectively blocked based on a determination that the first end-user application is running in a background state, and wherein the access is selectively allowed based on a determination that the first end-user application is running as a foreground application.

Ex. 1001 at claim 1.²

32. As explained by the '701 Patent, this solution allows the system to prevent particular applications from accessing the modem (and thus prevent them from consuming any network resources) while running in the background:

Advantageously, the differential network access control engine can restrict network access of a particular service usage activity when a condition is satisfied, such as when the service usage activity is a background activity.

...

In an illustrative example, the device 2700 blocks chatter for an application running in the background that is attempting to report device or user behavior. The application traffic prioritization engine 2710 determines that the chatter has zero priority, **such that the network service consuming application 2702 is prevented from consuming any resources.** The user can be sent a notification by the

² All emphases in cited materials herein are added in this document, unless otherwise noted.

application traffic override engine 2718 that **their control policy prohibits the application from consuming network resources**, but that the user can opt to deviate from the control policy if they are willing to pay for the consumed resources. If the user is willing to pay for the resources, traffic can be sent at a certain rate from the application traffic cache 2716 through the network interface 2720, or perhaps sent without using the application traffic cache 2716.

Ex. 1001 at 102:12-37. Accordingly, the invention of the '701 Patent allows the system to not merely decrease the priority of network traffic sent by an application running in the background, but to prevent all access of that application to the modem.

33. Preventing applications running in the background from consuming **any** network resources is especially important in the context of WWAN modems, because, as a POSITA would have known and as the '701 Patent recognizes, “network resources” over WWAN connections typically incur a cost that the user may be charged for. *See generally* Ex. 2007 at 1 (February 10, 2010 article describing “two data plans” offered near the priority date of the '701 Patent: “\$10 for up to 25 megabytes or \$20 for up to 75 megabytes”); Ex. 1001 at 62:39-42 (“In some embodiments, DAS [Device Assisted Services] for protecting network capacity techniques include allowing a user to select how they want their traffic usage and **service plan costs** to be managed.”). As such, the '701 Patent allows a

network traffic control policy to prevent particular applications that are running in a background state from consuming *any* of these valuable network resources unless, for example, “the user is willing to pay for the resources.” Ex. 1001 at 102:23-37.

VI. Claim Construction

34. I am informed by counsel that the Board construes the claim terms and that claim construction is an exercise of interpreting disputed terms, to the extent needed to resolve any controversy between the parties; unless there are particular disputes that need resolution to resolve a controversy between parties, terms are to be given their plain meaning in view of the specification. As explained below, it is my opinion that the theories raised by Dr. McDaniel fail because the proposed modifications to the prior art would not have been obvious to a POSITA, and thus I do not provide any explicit constructions of any claim terms because such an analysis is not necessary to evaluate Petitioner’s and Dr. McDaniel’s failure to show the invalidity of any challenged claim.

VII. Dr. McDaniel’s proposed combination of Rao with Oestvall does not disclose or render obvious claim 1.

35. In my opinion, Dr. McDaniel’s proposed combination does not render obvious Claim 1 (and thus does not render obvious any challenged claim). Below, I first address why Rao alone does not disclose or render obvious Claim 1, and next

I explain why no proposed combination of Rao with Oestvall renders obvious

Claim 1.

- A. Rao does not disclose “selectively block[ing]... access by the first end user application to the WWAN modem... wherein the access is selectively blocked based on a determination that the first end-user application is running in a background state.”**

36. Claim limitations 1[e] and 1[f] recite “selectively block[ing] and allow[ing] access by the first end-user application to the WWAN modem at a time when data for Internet service activities is communicate through a WWAN modem connection..., wherein the access is selectively blocked based on a determination that the first end-user application is running in a background state.”

37. The plain claim language of “block[ing]... access by the first end user application to the WWAN modem” requires blocking an application’s access to the WWAN modem. This understanding, in which the first end user application must be blocked from accessing the WWAN modem, is consistent with the specification of the ’701 Patent, which teaches “block[ing]” access as distinct from less drastic remedies that apply to individual network packets, such as delaying traffic by putting that traffic into lower-priority queues. *See, e.g.*, Ex. 1001, 13:20-25, 55:58-62, 92:9-19. For example, the ’701 Patent describes “allow/block” as a separate operation from “queue[ing]” or “defer[ring]” (*id.* 92:9-19) and clarifies that “blocking” access applies to an entire network connection rather than individual

network packets, for example, *after* a connection is opened. *Id.* (“[B]efore a connection is allowed to be opened (e.g., before a socket is opened), transmission, or a flow/stream is initiated, it is blocked.”); *see also id.*, 102:23-46 (teaching that an advantage of “***block[ing]***” the application is that “the network service consuming application is ***prevented from consuming any [network] resources***” so that costly network resources are not used when the user does not want them to be).

38. Dr. McDaniel’s theory as to how an “application’s access to the network interface 118... is blocked” is based on “network packets generated by an application [being] dropped or discarded before reaching Rao’s network interface 118.” Ex. 1003 ¶ 102. However, Rao limits its discussion to discarding individual network packets in scenarios where (1) a network disruption or congestion occurs; or (2) network disruption/congestion is ***not*** occurring, and a packet is classified as “unwanted.” As I explain in further detail below, neither of these scenarios satisfies the claim requirements, and Dr. McDaniel does not provide any motivation to implement a combination based on Rao in a manner that would meet the claim requirements.

1. Rao’s discarding of certain packets during network disruption or congestion does not meet the claim requirements.

39. Turning to the first of these scenarios, Rao teaches that certain packets can be discarded during a network disruption. *See* Ex. 1005 (“Rao”) ¶[0207]. But discarding packets during a network disruption does not constitute controlling application access “at a time when data for Internet service activities is communicated through a WWAN modem” as required by claim limitation [1e], because Rao teaches that in cases of network disruption, the lower network layers responsible for communicating data across the network connection are disestablished such that no data is communicated via the modem. *See* Rao at ¶[0053] (teaching that the “first portion of the network stack comprises one or more layers of the network stack below the layer of the first protocol,” and that “a disruption in the network connection caus[es] the first portion of the network stack to be disestablished”); *id.* at FIG. 6B (teaching that “discarding communications” at step 670 only occurs between (1) a detected disruption at step 660 and (2) re-establishing the first portion of the network stack at step 675 and communicating network packets at step 680).

40. Another instance where Rao teaches discarding packets is where certain network packets may not be communicated due to “network[] factors, such as congestion, even though the network packets may have a higher priority than

other network packets in a queue.” Ex. 1005 ¶¶[0195]. Dr. McDaniel does not rely on this teaching of Rao in his discussion of the “selectively block[ing] access” limitation. *See* Ex. 1003 ¶¶98-103. This makes sense, because he alleges that an application running in the background results in *low* queue priority in Rao, yet this portion of Rao teaches discarding “*higher priority*” packets, and thus those packets would *not* be discarded based on recognizing that the issuing application was running in the background as would be required for this discarding of packets to (even arguably) satisfy the claim language. In other words, a POSITA would view this teaching of Rao relating to packet discarding as being agnostic to background status.

2. Rao’s discarding of certain “unwanted” patents is not based on whether the application is running in the background.

41. Turning to the scenario where the network is *not* disrupted or congested, Rao provides only the following disclosure:

The filter 322 may use a filter table for filtering packets. The filtering table is used to determine what action to take against packets, such as packets intercepted by the packet capture mechanism 365. *The filter 322 can inspect the contents of the packets, such as routing information, to determine the action to take based on the filtering table.* In some embodiments, the *filter 322 may drop or accept the network packets depending on their content.* In other embodiments, the filter 322 may route the network packets to the agent 326 based on

the packets content and/or the filtering table. *The filter table may also be used to ensure that **unwanted packets are discarded**.* The filter 322 may be used to ***deny access to particular protocols** or to prevent unauthorized access from remote computers by **discarding packets to specified destination addresses**.*

Ex. 1005 ¶[0102]. Thus, Rao’s disclosure of discarding “unwanted” packets teaches three categories of information on which a decision is made that a packet could be discarded—the “content” of the packet, the packet’s “protocols,” and the packet’s “destination address[.]” *Id.* None of these are based in any part on whether an application is running in the background (as Claim 1 would require).

42. First, Rao teaches that packets may be discarded “depending on their content” (e.g., “routing information”). *Id.* But there is no teaching in Rao or allegation by Dr. McDaniel that the “content” of a packet would indicate whether the packet was issued by an application running in the background. Indeed, an application may transmit a packet having a particular content (e.g., routing information) while running in the foreground, and the application could transmit a packet having *identical* content (e.g., routing information) while running in the background. Because the foreground or background status of an application in Rao does not affect the content of packets issued by that application, discarding packets in this scenario could not constitute selectively blocking application access to the

modem “based on a determination that [the] application is running in a background state.”

43. Rao also teaches that packets may be deemed “unwanted” and thus be discarded if they are using “particular protocols” and packets directed to “specified destination addresses.” *Id.* But again, neither what protocol is used for communication, nor the destination address of a given packet depends on whether the application that issued the packet was running in the background or foreground. For instance, applications can use the same protocols and destination addresses when running in either the foreground or the background. Accordingly, discarding packets based on a specified protocol or destination address does not constitute selectively blocking application access to the modem “based on a determination that [the] application is running in a background state.”

44. More generally, there is no allegation or disclosure that packets would be considered “unwanted packets” based on a determination that the issuing application was running in the background. While Rao *is* alleged to teach that packets generated by background applications may be given lower priority than packets generated by foreground applications (*see* Ex. 1005 ¶¶[0046], [0189]), this is in the context of assigning foreground packets a higher queuing priority than background packets. Rao never suggests **discarding** packets of an application based on a determination that the application is running in the background. Indeed,

Rao is explicit that “one ordinarily skilled in the art will recognize and appreciate that the remote access client of the present invention *will communicate the network packets from the queues* in a manner according to or consistent with the determined priorities” (Ex. 1005 ¶[0194]), and Rao never suggests that its system is configured to *discard* low-priority packets when there is no network disruption.

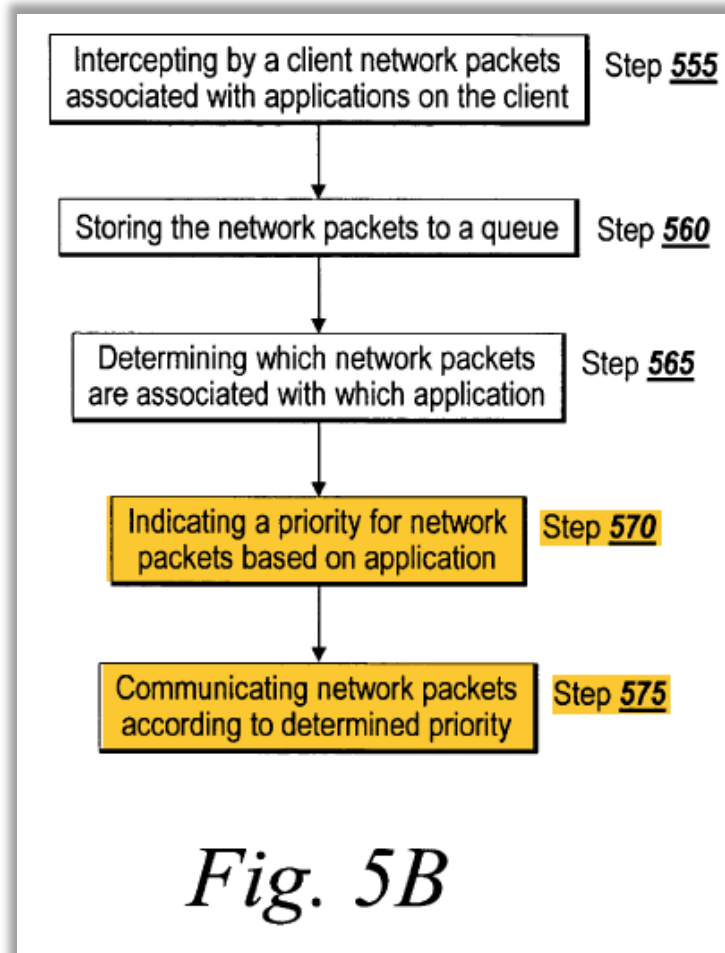
3. Dr. McDaniel’s assertion that Rao’s filter “can be used to” discard low-priority packets is contrary to Rao’s queueing system.

45. Dr. McDaniel alleges that Rao’s filter “can be used to ‘discard[] packets’ having the lowest priority (e.g., ‘unwanted packets’) such that the packets are not transmitted to the network.” Ex. 1003 ¶101. But notably, although Rao is alleged to teach that an application’s background status may reduce its priority (such that packets from that packets from background applications may be sent, for example, after packets from foreground applications), Rao does *not* teach that an application’s background status would result in what Dr. McDaniel refers to as “deprioritizing those... packets *entirely*” “such that the packets are [*never*] transmitted to the network.” See Ex. 1003 ¶101.

46. Indeed, Rao discusses filtering out “unwanted packets,” which will be discarded entirely, as a mechanism that is *separate* from assigning packets a priority for eventual communication. Compare Ex. 1005 ¶[0102] (discussing packets being “unwanted” by virtue of the “protocols” they use or their

“destination addresses”) *with id.* ¶[0184] (“[T]he ***outbound network packets*** generated by an application 338a-338n on the client 105 ***are prioritized*** by the client 105 ***prior to transmission*** based on the type and/or priority of the application 338a-338n.”) *and id.* ¶[0194] (“[T]he network packets are organized into priority queues 540a-540[n] so that the network packets of the highest priority queue 540a-540n are communicated first, and then the next highest priority queue 540a-540n second, and so on.... Regardless of the queue 540a-540n organization and management, one ordinarily skilled in the art will recognize and appreciate that the remote access client of the present invention ***will communicate the network packets*** from the queues....”).

47. For instance, as shown in Rao’s FIG. 5B (reproduced below), after packets are assigned a priority “based on application” in step 570, those network packets are then communicated over the network in step 575:



Ex. 1005, FIG. 5B (annotated). Rao’s claims also make clear that even when a packet may have lower priority than other packets, that lower-priority packet is nevertheless eventually communicated through the network. *See* Rao at Claim 4 (only preventing a lower-priority packet from being communicated “*ahead of*” higher priority packets); *id.* Claim 5 (discussing “holding” a deprioritized network packet, and then “releasing” that hold “upon communication” of certain higher priority packets). This is further confirmed by Rao’s teaching assignment of priority involves at least *some* (non-zero) level of priority, contrary to the teachings of the ’701 Patent which

disclose that a “priority level 0” can be assigned to “block[]” modem access as opposed to non-zero priority levels which “provide” modem access. *See* Rao, ¶[0180] (referring to “levels of priority, such as high, medium, low, or numerically such as priority 1 . . . 10”) (ellipses in original); ’701 Patent at 75:66-76:7 (disclosing that “a priority level 0 can provide a blocked network access, while priority levels between 1 through 9 can provide relatively increasing prioritized network access”).

48. In summary, although Dr. McDaniel cites to Rao’s discussion of analyzing packets and discarding them as “unwanted packets” based on their destination addresses or the protocol used to create the packet (*see* Ex. 1003 ¶101, citing Rao ¶[0102]), this does not teach or suggest determining that a packet is an “unwanted packet” based on whether the application that sent the packet is running in the foreground or the background.

4. Dr. McDaniel’s assertions about how Rao could be modified are insufficient and fail to support obviousness.

49. I also note that Dr. McDaniel provides no plausible motivation to discard packets merely because they were assigned a lower priority than other packets (as opposed to being deemed “unwanted packets”).³

³ As I previously explained, Rao treats assignment of a lower priority to a packet as distinct from determining that the packet is an “unwanted packet[.]” *See* Ex. 1005, ¶[0102] (making clear that “unwanted packets” are discarded); *id.* at ¶¶[0184],

50. First, Dr. McDaniel alleges that a POSITA would recognize that Rao’s “filter 322 *can be* used to ‘discard[] packets’ having the lowest priority... such that the packets are not transmitted to the network.” Ex. 1003 ¶101. But whether a POSITA *could* use Rao’s filters to discard low-priority packets does not mean that a POSITA *would have been* motivated to do so. In my view, this potential modification to Rao is contrary to Rao’s teachings, as I discussed above.

51. Dr. McDaniel also alleges that “a POSITA would have found it obvious to... use [Rao’s] policies 520 to discard low priority packets where the network is not disrupted but there exists a similar desire to, nevertheless, reduce communications over the network (e.g., due to reductions in bandwidth of the network, or a surge in higher priority packets to be sent over the network),” which according to Dr. McDaniel “would have achieved the benefit of ensuring that communication resources are selectively freed up for higher priority

[0194], FIG. 5B, & Claim 5 (showing that lower priority packets are eventually communicated and thus not discarded). While packets may be assigned higher or lower priority for a variety of reasons, Rao only teaches that packets would be discarded absent network disruption if those packets had certain content (e.g., a routing information), were directed to specified destination addresses, or used particular protocols, none of which is dependent on the requesting application’s background status. *See id.* ¶[0102].

packets/communications.” Ex. 1003 ¶101. But this alleged benefit is already present in Rao’s system of prioritizing higher-priority communications over lower-priority communications (without *discarding* the lower-priority packets) which would ensure that communication resources are used first (“freed up”) for higher priority packets, because, as Dr. McDaniel acknowledges, Rao teaches placing packets into various queues and communicating packets “according to the[ir] determined priority.” Ex. 1003 ¶90 (quoting Ex. 1005 ¶¶[0184]-[0190]). For example, Rao makes clear that the function and goal of its system is to ensure that higher-priority packets will be transmitted before lower-level packets are eventually communicated. *See, e.g.*, Ex. 1005, Claims 4, 5; Ex. 1003 ¶72 (“Rao describes applying policies to prioritize transmission of certain higher-priority network packets over other lower-priority network packets.”).

52. Dr. McDaniel does not explain why a POSITA would have viewed modifying Rao to *discard* of low-priority packets as a beneficial modification in ensuring that high-priority communications receive adequate resources, particularly because Rao (as unmodified) teaches *queuing* and *prioritizing* packets, which *already* ensures adequate resources for high-priority packets. Indeed, Rao’s unmodified approach not only achieves the same benefit alleged by Dr. McDaniel to discarding low-priority packets, but also has the added advantage of allowing the lower-priority packets to not be discarded but to rather be transmitted at a later

time. *See generally* Ex. 1003 ¶101 (providing no explanation as to why a POSITA would have viewed the proposed modification to Rao as beneficial over what is ***already*** disclosed by Rao). It is thus my opinion that Dr. McDaniel has set forth no motivation to modify Rao as he suggests: to ***discard*** lower-priority packets based on determining that those packets correspond to a background application (as opposed to merely assigning those packets a lower priority as Rao teaches).

53. I note that unlike Dr. McDaniel's declaration, which does not allege any benefit not already present in Rao in support of the proposed modification to Rao's system to discard packets from low-priority traffic, the **'701 Patent** makes clear that particular applications are prevented from communicating over the network while running in the background to avoid unnecessary data costs to the user (*see* Ex. 1001 Patent at 102:23-37), a concept not discussed in any of Rao, Oestvall, or Dr. McDaniel's opinions regarding Claim 1. Thus, the inventor of the '701 Patent recognized a benefit to the claimed invention that a POSITA would not have understood (and which Dr. McDaniel does not allege a POSITA would have understood) from either Rao or Oestvall.

5. **Discarding individual packets under certain conditions does not constitute blocking “access by the first end user application to the WWAN modem,” as limitation [1e] requires.**

54. Finally, even *assuming* that a POSITA would have been motivated to discard certain low-priority packets under certain conditions where network disruption did not exist (e.g., “a surge in higher priority packets to be sent over the network”), Dr. McDaniel’s theory would still fail. This is because Dr. McDaniel does not explain how discarding individual low-priority packets would constitute blocking “access by the first end user application to the WWAN modem” as Claim 1 requires. Even if particular packets may be discarded, nothing in Rao suggests that an *application* will be blocked from accessing the WWAN modem (rather than just having a certain portion of its packets being discarded on a case-by-case basis, while still maintaining access to the modem).

55. On this point, Dr. McDaniel merely asserts, without explanation, that if “network packets generated by an application [are] dropped or discarded before reaching Rao’s network interface 118,” then “the application’s access to the network interface 118... is blocked.” Ex. 1003 ¶102. But that is not correct; to the contrary, Rao teaches that individual packets are discarded while the application *maintains* access to the modem, and without taking the drastic step of *blocking*

access by the application to the WWAN modem, as is required by the claim language.

56. For instance, Rao teaches that its system allows “lossy protocol network packets [to] get to the recipient on time rather than getting to the recipient reliably” (Ex. 1005, ¶[0077]); *see also id.* ¶[0153]), which indicates that even if lossy protocol packets are discarded in certain instances (i.e., the packets do not arrive “reliably”), ***the application issuing those packets still is able to maintain access to the modem*** (such that the lossy packets are able to arrive “on time”). In other words, Rao teaches that for lossy protocol packets (such as packets for certain real-time voice protocols), certain of those packets may ultimately be discarded resulting in some degradation of sound quality. The fact that these packets are not transmitted “reliably” (i.e., some of those packets are discarded) is acceptable, but would ***not*** be acceptable is for the application’s access to the modem to be blocked, such that none of the packets would arrive “on time.” In sum, the application’s access to the modem is not “selectively block[ed]” (Ex. 1001 at Claim 1) merely by virtue of packets being discarded, because Rao teaches that even if certain packets are discarded, the application maintains access to the modem such that it will continue to transmit packets so that not-discarded packets can arrive “on time.”

57. Accordingly, I disagree with Dr. McDaniel's assertion that if "network packets generated by an application [are] dropped or discarded before reaching Rao's network interface 118," then "the application's access to the network interface 118... is blocked." *See* Ex. 1003 ¶102. To the contrary, applications in Rao can maintain access to the network interface despite packets being discarded.

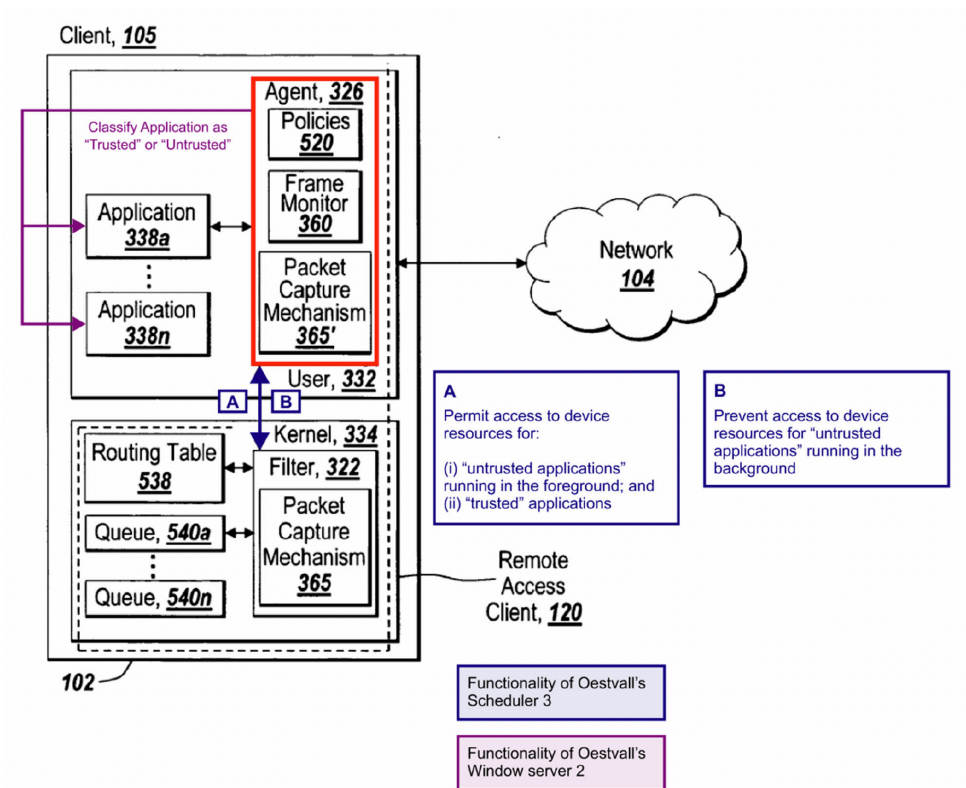
58. Indeed, discarding traffic on a packet-by-packet basis (without actually blocking the corresponding application's access to the modem, as the '701 Patent claims and teaches) would not have had the benefits disclosed by the '701 Patent where a policy "prohibits the application from consuming network resources" that would incur a cost to the user, such that a particular background application would only be able to access the modem "if [a user is] willing to pay for the consumed [network] resources." *See* Ex. 1001 at 102:23-37.

B. Dr. McDaniel does not propose any combination of Rao with Oestvall that cures Rao's deficiencies described above.

59. Dr. McDaniel proposes a combination of Rao with Oestvall that he describes as follows:

For example, in the Rao-Oestvall device (shown below), a POSITA would have improved the agent 326 (red) to incorporate functionality associated with Oestvall's window server 2 (purple) and functionality associated with scheduler 3 (blue). SAMSUNG-1006,

[0023]. Such a configuration would have enabled an improved agent to classify applications 338a-n (for which packet transmissions are prioritized) as an “trusted” or “untrusted” application. *Id.* **The configuration would have also enabled the improved agent to prevent an untrusted application from running or being given access to a service that consumes resources.** *Id.* Below is a visual diagram of the Rao-Oestvall combination discussed above.



SAMSUNG-1005, Figure 5A (illustrating the Rao-Oestvall combination)

Ex. 1003 ¶74. As seen in Dr. McDaniel’s annotated diagram above, the combined system would “[p]revent access to device resources for ‘untrusted applications’ running in the background.”

60. Accordingly, the proposed combination of references, as described by Dr. McDaniel's declaration, would operate to "prevent an untrusted application from running," which would ensure that the untrusted application cannot access to any device resources. *See* Ex. 1003 ¶74. However, this proposed combination fails to meet the claim requirements for several reasons.

61. **First**, the proposed combination does not "selectively block[]" WWAN access "based on a determination that the first end-user application is running in a background state," because in the proposed combination, untrusted applications are *prevented* from running in a background state (and thus there is never any determination that they *are* running in a background state). For instance, Oestvall teaches that the application would be "actively prevented from running" at the same time that the "untrusted application is placed into the background." Ex. 1006 ¶[0021].

62. **Second**, for similar reasons, the untrusted applications in the combined system would not be "capable of running in a background state" as limitation 1[d] requires. *See* Ex. 1001 at claim 1 ("determine, for a first end-user application capable of running in a background state and capable of running as a foreground application, whether the application is running in a background state or as a foreground application"). Because the combined system always prevents the

untrusted applications from running in the background, the untrusted applications are not capable of running in a background state in the combined system.

63. **Third**, to the extent that Oestvall’s prevention of a background untrusted application from running constitutes the “selective[] block[ing]” of WWAN access, Dr. McDaniel does not show (or even allege) that this would be done through an API as required by limitation [1e]. Indeed, *none* of the APIs referenced by Dr. McDaniel are APIs that are even alleged to prevent an application from running.

64. For instance, Dr. McDaniel notes that in Rao, “the priority of network packets” may be communicated via an API (Ex. 1003 ¶91), but communicating priority of network packets would not (and is not alleged to) prevent an application from running or otherwise block an application’s access to a modem. Dr. McDaniel also states that “Dive-Reclus... teaches using APIs in accessing a network.” Ex. 1003 ¶93 (citing Ex. 1026 at 16:23-17:28, 20:1-12). But again, the use of an API to access a network is starkly different than the use of an API to prevent applications from running, as would be required to meet the claim limitation under Dr. McDaniel’s combination.

65. In paragraph 94 of Dr. McDaniel’s declaration, he mentions “several types of APIs in regulating applications,” but again, *none* of those APIs are used for preventing applications from running. For instance, he again references “Dive-

Reclus, which teaches permissions regulating network access by a third-party application that uses an API call, and a POSITA would have found obvious that a permission decision (grant, deny) is communicated to the third-party application through a corresponding API.” Ex. 1003 ¶94 (citing Ex. 1026 at 16:23-17:28, 20:1-12). This however does not relate to using an API to prevent an application from running—indeed, an API call from an application assumes that the application *is* running, contrary to Dr. McDaniel’s proposed combination. There is simply no evidence (or allegation) that in the combined system, an API would be used to control background untrusted applications and prevent them from accessing the WWAN modem.

66. Dr. McDaniel also refers to the “Java sockets API” (Ex. 1003 ¶95), but again, does not explain how the Java sockets API would have been used to control application access to the WWAN in the way Dr. McDaniel’s combination would entail. Indeed, his reference to the Java sockets API appears to assume that the application *would have been running*, because according to Dr. McDaniel it would have been obvious “that the application would have received an indication, via the Java sockets API, of the network access condition.” Ex. 1003 ¶95. Of course, for an application to receive an indication, it would need to be running, contrary to Dr. McDaniel’s proposed combination and Oestvall’s teachings. Furthermore, “receiv[ing] an indication” appears to be irrelevant to the claim

language of claim 1 of the '701 Patent, which requires “**control**, via an [API],... to... selectively block... access.” Ex. 1001 at claim 1. And Dr. McDaniel does not explain how providing an indication to an application would constitute the claimed “control.”

67. Dr. McDaniel further refers to “use of APIs to provide indications to applications.” Ex. 1003 ¶96. But again, he does not explain how providing indications to applications constitutes the claimed control, nor does he provide any explanation of how these APIs would operate in the context of his proposed combination of Rao with Oestvall in which untrusted applications are prevented from running in the background. Indeed, the APIs referenced in paragraph 96 of Dr. McDaniel’s declaration appear to assume that the application continues to run, because that would be required to use the “APIs to provide communications to applications.” Ex. 1003 ¶96.

68. Furthermore, although Dr. McDaniel’s proposed combination (consistent with Oestvall’s disclosure) set forth in his declaration entails preventing an application from running, I understand that Dr. McDaniel at his deposition stated that he believed that in the combined Rao-Oestvall device, the system would “drop[] a network packet based on the foreground/background state of the application” (Ex. 2011 at 65:1-6), which would imply that background untrusted applications would continue to run, consume resources, and generate network

packets only for those packets to be dropped. Although I do not understand that to be Dr. McDaniel's opinion as set forth in his declaration, I below provide some explanation as to why I do not believe a POSITA would have pursued such an approach.

69. First, allowing untrusted applications to run in the background is directly contrary to Oestvall's teachings. Oestvall makes clear that background untrusted applications "***need to be actively prevented from running***," Ex. 1006 ¶[0014], and I do not believe that a POSITA implementing a combination with Oestvall would have wanted to allow untrusted applications to run, contrary to the teachings of Oestvall. *See, e.g.*, Ex. 1006 at Abstract (discussing "a control signal... that in effect prevents the untrusted application from running, e.g., being given any services or consuming any resources"); *id.* at ¶[0021] ("With the present invention, when an untrusted application is running on the battery operated device and another application should be in the foreground, the untrusted application is placed into the background ***and is also actively prevented from running***.").

70. Second, allowing untrusted background applications to run and generate network packets, only for those packets to be discarded, would be wasteful and would undermine the benefits of the Oestvall's approach. In particular, Oestvall teaches that by preventing background untrusted applications from running "denies [the application] system resources and hence preserves

power, as well as unnecessary CPU activity associated with the untrusted application in the background.” Ex. 1006 ¶[0021]. A POSITA reading Oestvall would have understood that the benefit of preventing background untrusted applications from running is not simply limited to network traffic, but also relates to CPU activity. *See, e.g.*, Ex. 1006 ¶¶[0019]-[0020] (“The third party applications [which may be untrusted] are often games or similar types of applications and, when these execute, the *CPU is often running at full speed* to update graphics, sounds etc. When the user or the system needs to display another application or dialog, there is a risk that the third party application will still run in the background and thus drain the battery.”). Accordingly, Oestvall makes clear that the allowing untrusted applications to run in the background would be wasteful from a CPU perspective.

71. Additionally, Dr. McDaniel presents no motivation whatsoever as to why a POSITA might ignore the teachings of Oestvall that untrusted applications need to be prevented from running in the background.

72. Furthermore, Oestvall is clear that preventing background untrusted applications is a mandatory aspect of its invention. *See* Ex. 1006 ¶[0014] (noting that “untrusted applications... need to be actively prevented from running” in the background). This is also consistent with the *claims* of Oestvall, in which the only

independent claims 1, 12, and 14 recite “preventing an untrusted application that is in the background from running.”

73. Oestvall’s discussion of “prevent[ing] background untrusted applications from ‘polling’ for data over a wireless network” (Ex. 1006 ¶[0024]) is simply the result of preventing background untrusted applications from running, so long as those applications could have been polling if they had been running. Of course, an application cannot be polling if it is not running. Thus, to the extent Oestvall’s teachings of preventing an application from running are applied to an application that would attempt to poll over a network, then the “use of [Oestvall’s] invention is to prevent background untrusted applications from ‘polling’ for data over a wireless network.” Ex. 1006 ¶[0024]. Again, this is confirmed by the claim structure. Oestvall’s claim 4 recites: “The method of claim 1 comprising the further step of preventing an untrusted background application form ‘polling’ for data over a wireless network.” But claim 4 depends from claim 1 and recites “preventing an untrusted application that is in the background from running.” Thus, Oestvall clearly teaches that claim 4 (which prevents an untrusted background application from polling) depends from claim 1 (which prevents the background untrusted application from running), such that the prevention of the application from polling would just be an additional feature within the same system that prevents the application from running. In other words, preventing an application from polling

is just a more specific use case of preventing an application from running (e.g., preventing the application from polling is a natural result of preventing the application from running in scenarios where that application would have otherwise attempted to poll for data over the network).⁴

74. I thus do not understand Oestvall to disclose that preventing background untrusted applications from running is an optional part of Oestvall's invention; instead, a POSITA would have understood that Oestvall makes clear that all implementations of its invention would prevent background untrusted applications from running, as shown by Oestvall's claim structure as well as Oestvall's teaching that background untrusted applications "need to be actively prevented from running." Ex. 1006 ¶[0014] and claims 1, 4, 12, and 14.

75. For the reasons above, it is my opinion that Dr. McDaniel has not proposed a combination of Rao with Oestvall that would render obvious the challenged claims of the '701 Patent.

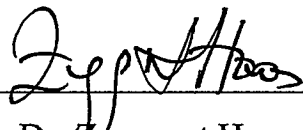
⁴ Conversely, preventing an application from running that has no ability to poll for data would not meet Oestvall's claim 4, because preventing that application from running would do nothing to prevent that application from polling (because it wouldn't have attempted to poll regardless of any steps taken by Oestvall's claimed method).

VIII. CONCLUSION

76. In signing this declaration, I understand that the declaration will be filed as evidence in contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross examination will take place within the United States. If cross examination is required of me, I will appear for cross examination within the United States during the time allotted for cross examination.

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

July 5, 2024



Dr. Zygmunt Haas