

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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GOOGLE LLC,

Petitioner

v.

NEONODE SMARTPHONE LLC,

Patent Owner

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Case IPR2021-01041

U.S. Patent No. 8,095,879

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**DECLARATION OF CRAIG ROSENBERG, PH.D.**

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1. I, Craig Rosenberg, Ph.D., declare as follows:

## I. INTRODUCTION

2. I have been retained by Neonode Smartphone LLC (“Respondent”) as an independent expert consultant in this *inter partes* review (“IPR”) proceeding before the United States Patent and Trademark Office (“PTO”).

3. I have been asked by Respondent’s counsel (“Counsel”) to consider whether certain references render Claims 1-6 and 12-17 of U.S. Patent No. 8,095,879, (“the ‘879 Patent”) (EX1001) unpatentable for the reasons set forth in the Petition for Inter Partes Review of United States Patent No. 8,095,879, Case No. IPR2021-1041 (“the Petition”), and the accompanying Declaration of Jacob O. Wobbrock, Ph.D., and supporting exhibits. My opinions and the bases for my opinions are set forth below.

4. I am being compensated at my ordinary and customary consulting rate for my work, which is \$450 per hour. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no financial interest in this proceeding.

## II. QUALIFICATIONS

5. All of my opinions stated in this declaration are based on my own personal knowledge and professional judgment. In forming my opinions I have

relied on my knowledge and experience in in human factors, user interface design, user interaction design, human-computer interaction, and software engineering.

6. I am over 18 years of age and, if I am called upon to do so, I would be competent to do testify as to the matters set forth herein. My qualifications to testify about the '879 patent and the relevant technology are set forth in my curriculum vitae ("CV"), which I have included as EX2002. In addition, a brief summary of my qualifications is included below.

7. I hold a Bachelor of Science in Industrial Engineering, a Master of Science in Human Factors, and a Ph.D. in Human Factors from the University of Washington School of Engineering. For 30 years, I have worked in the areas of human factors, user interface design, software development, software architecture, systems engineering, and modeling and simulation across a wide variety of application areas, including aerospace, communications, entertainment, and healthcare.

8. I graduated from the University of Washington in 1988 with a B.S. in Industrial Engineering. After graduation, I continued my studies at the University of Washington. In 1990, I obtained an M.S. in Human Factors. In 1994, I graduated with a Ph.D. in Human Factors. In the course of my doctoral studies, I worked as an Associate Assistant Human Factors Professor at the University of Washington Industrial Engineering Department. My duties included teaching,

writing research proposals, designing and conducting funded human factors experiments for the National Science Foundation, as well as hiring and supervising students. While studying at the University of Washington, I also worked as a human factors researcher and designed and performed advanced human factors experiments relating to virtual environments and interface design, stereoscopic displays, and advanced visualization research, which was funded by the National Science Foundation. My duties included user interface design, systems design, software development, graphics programming, experimental design, as well as hardware and software interfacing.

9. I have published twenty-one research papers in professional journals and proceedings in the areas of user interface design, computer graphics, and the design of spatial, stereographic, and auditory displays. I also authored a book chapter on augmented reality displays in the book “Virtual Environments and Advanced Interface Design” (Oxford University Press, 1995). In addition, I created one of the first virtual spatial musical instruments called the MIDIBIRD that utilized the MIDI protocol, two six-dimensional spatial trackers, a music synthesizer, and a computer graphics workstation to create an advanced and novel musical instrument.

10. For the past 21 years, I have served as a consultant for Global Technica, Sunny Day Software, Stanley Associates, Techrizon, CDI Corporation,

and the Barr Group. In this capacity, I have provided advanced engineering services for many companies.

11. I consulted for the Boeing Company for over 16 years as a senior human factors engineer, user interface designer, and software architect for a wide range of advanced commercial and military programs. Many of the projects that I have been involved with include advanced software development, user interface design, agent-based software, and modeling and simulations in the areas of missile defense, homeland security, battle command management, computer aided design, networking and communications, air traffic control, location-based services, and Unmanned Aerial Vehicle (“UAV”) command and control. Additionally, I was the lead system architect developing advanced air traffic controller workstations and air traffic control analysis applications, toolsets, and trade study simulations for Boeing Air Traffic Management.

12. I was also the architect of the Boeing Human Agent Model. The Boeing Human Agent Model is an advanced model for the simulation of human sensory, cognitive, and motor performance as applied to the roles of air traffic controllers, pilots, and UAV operators. In another project, I was the lead human factors engineer and user interface designer for Boeing’s main vector and raster computer aided drafting and editing system that produces the maintenance manuals, shop floor illustrations, and service bulletins for aircraft produced by the

Boeing Commercial Aircraft Company. Additional responsibilities in my time as a consultant include system engineering, requirements analysis, functional specification, use case development, user stories, application prototyping, modeling and simulation, object-oriented software architecture, graphical user interface analysis and design, as well as UML, C++, C#, and Java software development.

13. In 1995 and 1996, I was hired as the lead human factors engineer and user interface designer for the first two-way pager produced by AT&T. Prior to this technology, people could receive pages but had no way to respond utilizing their pager. This new technology allowed users to use a small handheld device to receive and send canned or custom text messages, access and update an address book, and access and update a personal calendar. This high-profile project involved designing the entire feature set, user interface/user interaction design and specification, as well as all graphical design and graphical design standards.

14. From 1999–2001, I was the lead human factors engineer and user interface designer for a company called Eyematic Interfaces that was responsible for all user interface design and development activities associated with real-time mobile handheld 3D facial tracking, animation, avatar creation and editing software for a product for Mattel. My work involved user interface design, human factors analysis, requirements gathering and analysis, and functional specifications.

15. I was the lead user interface designer for a company called ObjectSpeed that developed a portable handheld telephone for use in homes and businesses that had many of the same capabilities that we take for granted in mobile cellular phones. This portable multifunction device supported voice, email, chat, video conferencing, internet radio, streaming media, Microsoft Outlook integration, photo taking and sharing, etc. The ObjectSpeed device was specifically designed and developed as a portable handheld device.

16. I was the lead user interface designer for a company called Ahaza that was building IPv6 routers. I designed the user interfaces for the configuration and control of these advanced network hardware devices. My responsibilities included requirements analysis, functional specification, user interface design, user experience design, and human factors analysis.

17. I am the founder, inventor, user interface designer, and software architect of WhereWuz. WhereWuz is a company that produces advanced mobile software running on GPS-enabled smartphones and handheld devices. WhereWuz allows users to record exactly where they have been and query this data in unique ways for subsequent retrieval based on time or location. WhereWuz was specifically designed and developed to run on small handheld devices.

18. I am the co-founder of a medical technology company called Healium. Healium developed advanced wearable and handheld user interface

technology to allow physicians to more effectively interact with electronic medical records.

19. I am the co-founder of a medical technology company called StratoScientific. StratoScientific is developing an innovative case for a smartphone that turns a standard handheld smartphone into a full featured digital stethoscope that incorporates visualization and machine learning that can be utilized for telemedicine and automated diagnosis.

20. I designed and developed a large software project for Disney World called xVR that allowed the operational employees of Disney World to utilize a handheld device to view the current and historical status of all of the guests of Disney World within multiple attractions as well as within one of their restaurants. The application could run in a real-time/live mode where it would display data collected from sensors that showed the location and status of all guests within the attraction; the application could also be run in a fast-time/simulated mode. The application was developed on a laptop computer and was specifically designed to run on a variety of devices, including laptops, PCs, smartphones, and tablets.

21. I have received several awards for my engineering work relating to interface design, computer graphics, and the design of spatial, stereographic, and auditory displays, including a \$10,000 scholarship from the I/ITSEC for advancing the field of interactive computer graphics for flight simulation and a Link

Foundation award for furthering the field of flight simulation and virtual interface design. I have also created graphics for several popular book covers as well as animations for a movie produced by MIRAMAR.

## TESTIFYING EXPERIENCE

- *Foursquare Labs v. Silver State Intellectual Technologies*, IPR2014-00159
- *Silver State Intellectual Technologies v. Garmin*, District of Nevada, 2:11-cv-01578-PMP-PAL
- *Select Retrieval v. Overstock*, District of Delaware, 1:11-cv-00812-RGA
- *Location Labs v. LocatioNet*, IPR2014-00199
- *Intellectual Ventures v. Google*, IPR2014-00787
- *FTC v. Amazon*, 2:14-cv-01038-JCC (Eastern District of Texas)
- *Valmont v. Lindsay*, IPR2015-01039
- *Ford Class Action*, 13-cv-3072-EMC (N.D. California.)
- *BeUbiq v. Curtis Consulting Group*, 1-14-cv-270691 (S.D.N.Y.)
- *Edulog v. DML*, DV-06-1072 (Montana Fourth Judicial Court, Missoula)
- *GEMSA v. Alibaba*, 6:16-cv-00098 (M.D. Florida)
- *Level One Technologies v. Penske Truck Leasing*, 4:14-cv-1305-RWS (E.D. Missouri)
- *Title Source v. HouseCanary*, 016-CI-06300 (Texas Dist. (state court), Bexar Co.)
- *Sony v. Arris, Pace*, 337-TA-1049 (International Trade Commission case)

- *Tatsoft v. InduSoft, D-1-GN-14-001853* (Texas state court case)
- *Courthouse News Service v. Yamasaki, 8:17-cv-00126 AG (KESx)* (C.D. Cal.)
- *Princeton Digital Image Corp. v. Konami, 12-1461-LPS-CJB* (D. Del)
- *FCA US LLC Monostable Electronic Gearshift Litigation, 16-md-02744* (E.D. Michigan)
- *Barbaro Technologies, LLC. v. Niantic, Inc., 3:18-cv-02955-RS* (N.D. California)
- *Blackberry Limited. v. Facebook, Inc., 2:18-cv-01844* (C.D. California)
- *Blackberry Limited. v. Snap, Inc., 2:18-cv-02693* (C.D. California)
- *Saracen LLC v. Marginal Unit, Inc., 4:18-cv-3714* (S.D. Texas)
- *Fidelity Information Services, LLC v. Groove Digital, Inc., IPR2019-00050*
- *U.S. Oil & Refining Co., v. City of Tacoma, 18-2-07232-3* (Superior Court of Washington)
- *X One v. Uber, 5:16-CV-06050-LHK* (N.D. California, San Jose Div.)
- *Kipu Systems, LLC v. ZenCharts, LLC, 1:17-cv-24733-KMW-EGT* (S.D. Florida)
- *Maxell, LTD., v. Apple Inc., 5:19-cv-0036-RWS* (E.D. Texas)
- *Aatrix Software, Inc. v. Green Shades Software, Inc., 3:15-cv-00164-J-lOMCR* (M.D. Florida)
- *Universal Electronics Inc. v. Roku, Inc., 337-TA-1200* (I.T.C)

- *Opal Labs, Inc., v. Sprinklr, Inc., 3:18-cv-01192-HZ (Dist. of Oregon, Portland Div.)*
- *ExactLogix, Inc. d/b/a AccuLynx.com, v. JobProgress, LLC., 3:18-cv-50213 (Northern Dist. of Illinois, Western Div.)*

### III. INFORMATION CONSIDERED

22. In preparing this declaration, I have considered the Petition, the Wobbrock Declaration, the exhibits filed with the Petition, and other materials discussed in this declaration, including, for example, the '879 Patent, the references cited by the '879 Patent, the prosecution file of the '879 Patent, various background articles and materials referenced in this declaration, and any other materials identified in this declaration. In addition, my opinions are further based on my education, training, experience, and knowledge in the relevant field.

### IV. RELEVANT LEGAL STANDARDS

23. I am not an attorney and offer no legal opinions. For the purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my analysis, as summarized below.

#### A. Claim Interpretation

24. I have been informed and understand that in an IPR proceeding, claims are to be interpreted according to the *Phillips* claim construction methodology, which, generally speaking, requires that claims be given their ordinary and customary meaning to a person of ordinary skill in the art at the time

of the invention, by considering the claims, the specification and the prosecution history, as well as evidence extrinsic to the patent. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). I have been informed and understand that claim construction is a matter of law and that the final claim constructions for this proceeding will be determined by the Patent Trial and Appeal Board (“PTAB”).

**B. Perspective of one of Ordinary Skill in the Art**

25. I have been informed and understand that a patent is to be understood from the perspective of a hypothetical “person of ordinary skill in the art” (“POSA”). Such an individual is considered to possess normal skills and knowledge in a particular technical field (as opposed to being a genius). I understand that in considering what the claims of a patent require, what was known prior to that patent, what a prior art reference discloses, and whether an invention is obvious or not, one must use the perspective of such a POSA.

**C. Anticipation**

26. I have been informed and understand that a patent claim is anticipated under 35 U.S.C. § 102, and is therefore invalid, if all of the elements of the claim are disclosed by a single prior art reference.

27. I understand that a claim is anticipated if each and every element as set forth in the claim is found, either expressly or inherently, in a single prior art reference. For example, I understand that a claim limitation is inherently disclosed

if it is not explicitly present in the written description of the prior art, but would necessarily be embodied or met by an apparatus or method as taught by the prior art. Moreover, I understand that anticipation does not require that the prior art use the same terminology recited within the patent claims.

**D. Obviousness**

28. I have been informed and understand that a patent claim is obvious under 35 U.S.C. § 103, and therefore invalid, if the claimed subject matter, as a whole, would have been obvious to a POSA as of the priority date of the patent based on one or more prior art references and/or the knowledge of a POSA.

29. I understand that an obviousness analysis must consider (1) the scope and content of the prior art, (2) the differences between the claims and the prior art, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations, if any, of non-obviousness (such as unexpected results, commercial success, long felt but unmet need, failure of others, copying by others, and skepticism of experts).

30. I understand that a prior art reference may be combined with other references to disclose each element of the invention under 35 U.S.C. § 103. I understand that a reference may also be combined with the knowledge of a POSA, and that this knowledge may be used to combine multiple references. I further understand that a POSA is presumed to know the relevant prior art. I understand

that the obviousness analysis may take into account the inferences and creative steps that a POSA would employ.

31. In determining whether a prior art reference would have been combined with other prior art or other information known to a POSA, I understand that the following principles may be considered:

- a. whether the references to be combined involve non-analogous art;
- b. whether the references to be combined are in different fields of endeavor than the alleged invention in the Patent;
- c. whether the references to be combined are reasonably pertinent to the problems to which the inventions of the Patent are directed;
- d. whether the combination is of familiar elements according to known methods that yields predictable results;
- e. whether a combination involves the substitution of one known element for another that yields predictable results;
- f. whether the combination involves the use of a known technique to improve similar items or methods in the same way that yields predictable results;
- g. whether the combination involves the application of a known technique to a prior art reference that is ready for improvement, to yield predictable results;

- h. whether the combination is “obvious to try”;
- i. whether the combination involves the known work in one field of endeavor prompting variations of it for use in either the same field or a different one based on design incentives or other market forces, where the variations are predictable to a POSA;
- j. whether there is some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill in the art to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention;
- k. whether the combination requires modifications that render the prior art unsatisfactory for its intended use;
- l. whether the combination requires modifications that change the principle of operation of the reference;
- m. whether the combination is reasonably expected to be a success; and
- n. whether the combination possesses the requisite degree of predictability at the time the invention was made.

32. I understand that in determining whether a combination of prior art references renders a claim obvious, it is helpful to consider whether there is some teaching, suggestion, or motivation to combine the references and a reasonable

expectation of success in doing so. I understand, however, that a teaching, suggestion, or motivation to combine is not required.

**E. Summary of my Opinions**

33. I have been asked to consider whether the claims of the ‘879 Patent identified in the Petition are unpatentable for the reasons asserted in the Petition and in Dr. Wobbrock’s declaration. As explained below in detail in this declaration, it is my opinion that none of the claims of the ‘879 Patent identified in the Petition and in Dr. Wobbrock’s declaration are unpatentable for the reasons asserted therein.

**V. THE ‘993 PATENT**

**A. Priority Date.**

34. I assume that the priority date for the invention claimed in the ‘879 Patent is December 10, 2002. Accordingly, when I reference the knowledge of a POSA, or how a POSA would understand various disclosures, I do so as of December 10, 2002. If the priority date of the ‘879 Patent were to be determined to be an earlier date in 2002, or in 2000 or 2001, my opinions expressed herein would not change.

**B. Level of Skill Ordinary in the Art.**

35. Dr. Wobbrock contends that “a person of ordinary skill in the art of the ‘879 patent as of its filing date, would have at least a bachelor’s degree in

Computer Science, Human-Computer Interaction, Symbolic Systems, or related engineering disciplines, and at least two years of experience designing and programming graphical user interfaces. In my opinion, relevant work experience can substitute for formal education and advanced degree studies could substitute for work experience.” For the purpose of this declaration, I will apply the same definition of the level of skill of a POSA.

36. Based on my experience, education, and training, I met the definition of a POSA in December 2002, the time of filing of the application that issued as the '879 Patent, and I meet this definition today. I also had greater knowledge and experience than a POSA. I worked with POSAs in 2002, and I am able to render opinions from the perspective of a POSA based on my knowledge and experience. My opinions concerning the '879 Patent claims and the prior art are from the perspective of a POSA, as set forth above.

## VI. CLAIM CONSTRUCTION

37. I interpret the claims of the '993 Patent according to the *Phillips* claim construction methodology referenced above. *Phillips*, 415 F.3d 1303. I have reviewed the specification and file history of the '879 Patent from the point of view of a POSA, which informs my understanding of the scope of the claims.

## VII. EXPLANATION OF PATENTABILITY

38. In this declaration, I principally address the assertions and opinions expressed by Dr. Wobbrock in his declaration, EX1003 submitted by Petitioner in support of the Petition. In doing so, it should be understood that I also address the arguments and statements made by Petitioner in the Petition that are based on or associated with the relevant portions of Dr. Wobbrock's declaration.

### A. Ground 1

1. **A POSA Would Not have been Motivated to Incorporate Robertson's Interface into Maddalozzo or Some Undefined Mobile Handheld Computer Unit (Limitation 1[Preamble])**

**[1Preamble] "A non-transitory computer readable medium storing a computer program with computer program code, which, when read by a mobile handheld computer unit, allows the computer to present a user interface for the mobile handheld computer unit, the user interface comprising:"**

#### **A Laptop is Not a Mobile Handheld Computer Unit**

39. Dr. Robertson refers several times to, e.g., "handheld computing devices, like laptop computers and PDAs." This is an inaccurate characterization of laptop computers, because a typical laptop computer in 2002 (as today) is not a handheld computer unit.

40. As a POSA would understand, one characteristic of a mobile handheld device is that it is typically designed to be held in in one hand while being operated

by the same or the other hand. A POSA would understand that the term is used in exactly this way in the '879 Patent. This is reflected in the description of the invention in the specification, which states that “[t]he user interface is also adapted to be operated by one hand, where the object can be a finger, such as the thumb, of a user of the computer unit, EX1001, 3:3-6, and that “the present invention relates to a user interface for a hand held mobile unit that preferably can be manageable with one hand.” EX1001, 6:4-6. This is also consistent with every illustration of the mobile handheld computer unit. EX1001, Figs. 8, 11-13. It is also consistent with the description of the invention as “adapted to run several applications simultaneously and to present an active application on top of any other application on the display area,” EX1001, 2:2-5, 3:59-61; this indicates that the invention eschews a tiled or cascaded window interface as is common with laptops and desktop systems, and that the user interface of the invention is intended to function on a display much smaller than that of a typical laptop computer. A POSA would understand, in 2002 as today, that a typical laptop computer is not designed to be held in and operated by one hand, and is therefore not a handheld computer unit.

41. Dr. Wobbrock refers to a portion of the Description of Background Art, which he characterizes as stating that “[m]obile handheld computers are known in various embodiments,’ including ‘the personal digital assistant (PDA)’ and ‘the laptop computer, which is getting smaller and smaller, even competing in

size with the PDA's.” EX1003, ¶93 & n.2. Dr. Wobbrock cites to this language in support of a statement he makes concerning “mobile computing devices,” but later in the same sentence he appears to switch his focus to “such handheld computer devices,” appearing to lump laptop computers into this category.

42. I agree with Dr. Wobbrock here that a laptop computer is a type of mobile computer in that it can be easily taken with the user as they travel, but I do not agree with his assertion that a laptop is a mobile handheld computer for the reasons set forth above. I also do not believe that a POSA would have read the language to which Dr. Wobbrock cites in the same manner in which he appears to be reading it. The full sentence reads:

A third kind of handheld computer is the laptop computer, which is getting smaller and smaller, even competing in size with the PDAs.

A POSA would understand this sentence to be referring to laptop computers of a size similar to that of a PDA, enabling one-handed operation. This would be consistent with the common understanding of what a handheld computer unit is, i.e., a computing unit that you can operate with one hand. A POSA would not read this to mean that laptop computers generally are definitionally a type of “handheld computer,” particularly in light of the repeated statements in the patent that the invention is adapted for a device that may be operated with one hand.

**Robertson Does Not Disclose or Suggest an Interface for a Mobile Handheld**

**Device**

43. Petitioner states that Robertson, EX1005, “discloses or suggests [1Preamble].” Pet., p. 12. Dr. Wobbrock states that “Robertson discloses or suggests a non-transitory computer readable medium storing a computer program with computer program code, which, when read by a mobile handheld computer unit, allows the computer to present a user interface for the mobile handheld computer unit.” Neither of these statements is correct.

44. First, Robertson does not disclose an interface on a mobile handheld computer unit. Robertson’s interface is implemented on a typical desktop system of 1991. This would be very clear to a POSA, for multiple reasons. The title of the article is “Buttons as First Class Objects on an X Desktop.” EX1005, at 11. The first sentence of the Abstract is: “A high-level user interface toolkit, called XButtons, has been developed to support on-screen buttons as first class objects on an X window system desktop.” EX1005, at 11. In the Introduction, Robertson explains that “the user must perceive the buttons to be at the same level as windows, icons, and menus on the desktop,” and that “[a] high-level user interface toolkit, called XButtons, implements this class of tailorable buttons as first class objects on an X desktop.” EX1005, at 11. Section 1.1 of the Introduction is entitled “Basic Goals: Buttons as First Class Desktop Objects,” and the “buttons”

are repeatedly referred to as “first class desktop objects” or “first class objects on an X desktop.” EX1005, at 11-12. The author names his buttons “Desktop Buttons.” EX1005, at 12 (*italics in original*). The “XButtons exist on the desktop, can be modified there, are persistent, and can be mailed from one user's desktop to another.” EX1005, at 15. The Summary states: “In this paper, we have defined the notion of Desktop Buttons (DButtons), or first class button objects on a desktop.” EX1005, at 19. The words “mobile,” “portable,” “PDA,” and “handheld” do not appear anywhere in Robertson; the word “desktop” appears approximately 40 times. For at least these reasons, a POSA would understand that Robertson discloses a desktop computing environment and does not disclose an interface for a mobile handheld device.

45. Second, Dr. Wobbrock states that “Robertson discloses a computer unit for presenting its user interface for “pen-based gestural input[s],” but does not specify the type of computer unit.” EX1003, ¶87. On that premise he states that “Robertson’s user interface with “pen-based gestural input[s]” suggests to one skilled in the art that the device could be a mobile handheld computing unit.”

46. Dr. Wobbrock’s premise and conclusion are both incorrect. As shown above and in EX1005, Robertson clearly and repeatedly describes his system as a desktop system, and Robertson does not suggest that a different computer system is used for pen-based inputs than for mouse-based or keyboard-based inputs. While

Robertson does mention that “XButtons support mouse-based or pen-based gestural input in addition to simple ‘pressing,’” EX1005, at 15, this simply indicates that pen-based input may also be used in Robertson’s desktop system. A POSA would understand this, in part because pen-based input (including light pens) was known for desktop systems in 2002.

**Dr. Wobbrock’s Failure to Describe His “Mobile Handheld Computer Unit”  
Undermines His Opinions**

47. Next, Dr. Wobbrock states that a POSA “would have found it obvious to implement Robertson’s user interface in a mobile handheld computer unit, such as the computer unit disclosed in Maddalozzo.” EX1003, ¶89. He refers to some purported POSA motivation to implement Robertson’s “teachings” or the like in “mobile handheld computer devices” or the like in multiple paragraphs of his declaration. *See* EX1003, ¶¶90-90, 93, 95-96.

48. To the extent that Dr. Wobbrock offers an opinion regarding motivation to incorporate Robertson’s interface or “teachings” into some undefined “mobile handheld computer unit,” his opinion lacks credibility because he provides no information about this hypothesized device. Dr. Wobbrock does not explain or describe the structure or workings of his modified “mobile handheld computer unit,” other than by reference to its “mobile handheld” nature. This leaves numerous material aspects of this hypothetical device undefined. For instance,

what functions are activatable from the display? How is the display arranged, and where are the activatable “representations” located? What types of “representations” are presented on the display – are they icons? Sliders? Do the “representations” contain text fields like Robertson’s “Phone” button? How large is the display, and are the representations on the display densely packed or spaced apart? These are material issues for motivation, but Dr. Wobbrock does not provide any guidance whatsoever. Without the clarity that such an effort would bring, there is no basis on which Dr. Wobbrock may credibly opine that a POSA would have been motivated to create his hypothetical device.

**Dr. Wobbrock’s “More Capable Buttons” Rationale and the Undesirability of Robertson’s X Window Interface for a Handheld Device**

49. Dr. Wobbrock next states that a POSA “would have been motivated to use Robertson’s XButtons (or other gesture-activated buttons) in Maddalozzo’s mobile handheld computer units<sup>1</sup> to enhance the user experience through more

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<sup>1</sup> It is not entirely clear that Maddalozzo discloses a mobile handheld computer unit, as it refers to the computer system of Fig. 2 as being “implemented as a notebook-based computer.” EX1006, 4:13-15. I address the issue of whether laptop computers constitute handheld computing units in more depth below.

capable buttons supporting gesture activations.” EX1003, ¶89. I disagree, for several reasons.

50. Dr. Wobbrock’s stated basis for asserting that Robertson’s “XButtons” would have enhanced the user experience of a user of Maddalozzo’s device is that the buttons would have been “more capable.” Frustratingly, however, Dr. Wobbrock fails to explain what he means by “a more capable button” and fails to proffer any explanation as to how Robertson’s “buttons” are more capable than the icons of Maddalozzo. In what way is Robertson’s “button” more “capable,” and what is Dr. Wobbrock comparing it against? What are the criteria that Dr. Wobbrock applies to arrive at this conclusion? A soft button on a user interface is generally “capable” of being activated, but Dr. Wobbrock identifies no deficiency in his hypothesized “mobile handheld device” and the touch-activated icons of Maddalozzo were suffering from no deficiency in this regard, so it is difficult to see how Robertson’s buttons were “more capable” in this respect.

51. If Dr. Wobbrock means that buttons that could be activated in multiple ways were more “capable,” that must be proven for each particular proposed implementation, since it depends on such questions as the functions for

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Nevertheless, for purposes of my analysis I will assume that a POSA would understand Maddalozzo to disclose such a device.

which the icons are coded and the density of icons on the display, among other things. It is meaningless to make such a statement in a vacuum.

52. Putting aside the lack of any measurable criteria for Dr. Wobbrock's "more capable" statement, a POSA would not have viewed Robertson's XButtons as providing "more capable buttons" or enhancing the user experience of Maddalozzo's device or any other plausible mobile handheld computer unit. To the contrary, a POSA would have understood that Robertson's X Window interface would provide no benefit, and would result in significant detriments, in a mobile handheld device, due to the constraints of the X Window system itself.

53. First, a POSA would have understood that Robertson's X Window interface would provide no benefit, and would result in significant detriments, in a mobile handheld device. Robertson disclosed a user interface toolkit that had been developed to support "on-screen buttons" that are "first class objects on an X window system desktop." EX1005, at 11. Robertson's focus was on the buttons, and the ability to "connect user interactions with procedures specified as arbitrary Unix Shell scripts." *Id.* Robertson taught that the buttons were "first class desktop objects," which was an essential characteristic of the buttons because it enabled them to "encapsulate appearance and behavior that is user tailorable." *Id.* And Robertson taught that it was the use of the X Window system that enabled the buttons to be presented as first class objects: In disparaging buttons "whose

appearance and behavior is [sic] determined by the application programmer,” and “are not user tailorable and cannot be moved or mailed,” Robertson stated:

XButtons breaks free of this dependence on an embedding application by providing buttons as first class objects on the X desktop.

EX1005, at 14. So, the use of an X Window system was not just one of several possible windowing systems to use with Robertson’s buttons; it was central to Robertson’s teaching of how to implement XButtons on a desktop.

54. A POSA would have understood that Robertson taught the use of X Window to implement its XButtons, and that the use of the X Window system was integral to presenting the buttons as first class desktop objects. However, a POSA would also have considered the X Window system to be an inappropriate system for use on a mobile handheld device. In fact, I have never heard of a handheld device being configured to run X Window.

55. There are several reasons why a POSA would not have been motivated to attempt to implement X Window on a handheld device in 2002. A short explanation of what the X Window system is, and what it was designed to do, will aid in understanding why.

56. The X Window system (also referred to as just “X” or “X11”) is a network-transparent windowing system that enables multiple applications to run simultaneously in multiple windows on a display. EX1027, at 33. Network

transparency means that application programs can run on machines located at diverse locations in a network, such that the contents of two or more windows on a single terminal running X Window may display content generated by multiple different applications running on multiple different computers located in multiple different locations.

57. X Window provides facilities for generating graphics in a hierarchy of rectangular windows, which may run to several hundred windows and subwindows displayed on a single terminal:

Every window can be thought of as a "virtual screen" and can contain subwindows within it, to an arbitrary depth. Windows can overlap each other like stacks of papers on a desk and can be moved, resized, and restacked dynamically. Windows are inexpensive resources; applications using several hundred subwindows are common. For example, windows are often used to implement individual user interface components such as scroll bars, menus, buttons, and so forth.

EX1027, at 33, 52.

58. In an X environment, the terms "client" and "server" are used differently from how they are commonly understood in the computer science community. In an X environment, the applications running on a user terminal or remote device in a network are the "clients." These clients use the network

services of the X Window system. A program running on the computer with the display hardware (the user terminal) provides these services and so is called the X server. The X server acts as an intermediary between applications and the display of the user terminal, presenting output from the client applications to the user via the display and forwarding input from the user to the appropriate client for processing. EX1027, at 33, 51. An exemplary X environment might appear as follows:

---

4 XLIB

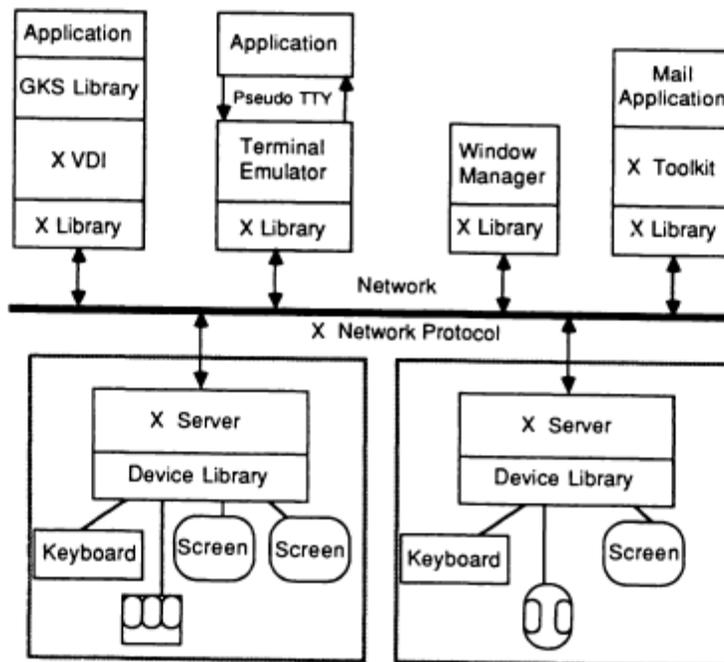


Figure 1. X window system block diagram

EX1027, at 36 [Fig. 1].

59. In an X environment, the clients and servers use a communication protocol known as X protocol to exchange information. The X protocol is just one component of the overall X environment architecture; it is not the complete architecture itself. EX1027, at 39. The X protocol does not define an external user interface (i.e., the interface that exists outside of an application window), but rather provides mechanisms enabling a single client, called a “window manager,” to provide the policies and configuration for the external interface independent of all the other clients. EX1027, at 35-36. It is the window manager that defines policies for the window layout (e.g., tiling of windows), borders and other window decorations, uniform icons, uniform means of moving and resizing window, etc. *Id.*

60. With the above explanation in mind, it should be apparent why a POSA would not have been motivated to attempt to implement Robertson’s X Window interface on the Maddalozzo device, or any other handheld device, in 2002. What Dr. Wobbrock is suggesting is implementing an X server on a handheld device. However, X Window was designed for an entirely different system architecture, and was intended to address entirely different issues, than a POSA would have confronted in considering the design of a user interface for a mobile handheld device circa 2002. It would have made no sense to attempt to implement X Window on a mobile handheld computer unit as of 2002, because the

primary purpose of X Window – to enable a user to have multiple resizable simultaneous windows and subwindows running on a display in a networked environment using device-independent applications – would be entirely wasted on a handheld device, which in 2002 typically presented a single window to the user due to the small displays of handheld devices, and ran applications that were resident on the device. Display space constraints simply did not allow for a usable system that presented multiple resizable simultaneous windows. No POSA would have considered it even potentially advantageous to attempt to implement X Window on a handheld computer; it would have been seen as a waste of effort, primarily due to the relatively small display sizes associated with handheld devices.

61. In addition, the limited functionality of a mobile handheld device circa 2002 in relation to a desktop or terminal system – being focused more on communications and scheduling than heavy computation or file storage or sharing – would have further suggested no benefit from the use of X Window, which was seen in part as a means of enabling the user to manage multiple windows on a terminal, each of which could be executing computationally intensive routines on a remote computer. X Window was not designed for, provided no enhancement for, and solved no problems inherent to the display of a mobile handheld computer unit.

62. A POSA would view an X Window installation on a handheld device as detrimental for another reason. In the X environment, each window running on an X server (i.e., the user terminal) is typically a “dumb terminal,” in which the application executing in the window and the X server running on the user terminal send requests to and receive responses and content from one another. In a network in which the windowed applications are remote from the user terminal (which is often the case in an X environment), there can be significant bandwidth overhead associated with X. While this may not have a material impact on terminal functionality or latency in a network using ethernet or other wired connections, the bandwidth constraints on mobile handheld devices circa 2002 would have rendered them an inappropriate platform for an X Window installation due to the need for frequent communication between the device and the remote computer hosting the “client” application.

63. If Dr. Wobbrock is suggesting that a POSA would have been motivated to implement X Window on a handheld device to run applications that could otherwise run natively (as most or all such applications were configured to do on handheld devices circa 2002), I disagree. First, it would be redundant to do so – why rearchitect and recode an application for an X environment when it could run natively? – and there would be no benefit to doing so. Second, adding one or more additional layers to the software architecture in order to configure the

application to support X Window would have the obvious potential to introduce performance inefficiencies, for no offsetting gain in functionality or performance.

64. Dr. Wobbrock asserts that “[i]t was known to those skilled in the art that handheld computers could run X protocol and/or Unix using touch screens,” citing to Musatov, EX1010. EX1003, ¶89. However, this statement does not address the significant factors identified above that would have driven a POSA away from Dr. Wobbrock’s proposed combination, because X protocol is not X Window.

65. Musatov does not suggest that a POSA would have thought it advantageous to use X Window. Musatov discloses a handheld interactive map device with a touchscreen that uses X protocol for communication between the map device and a remote machine. EX1010, ¶¶0001, 0005, 0017. As noted above, X protocol is a communication standard that is used to support communications between a user terminal running X Window and a remote computer serving content to the terminal, but it is not exclusive to X Window – it may be used to support communications between computers that are running a variety of user interface systems. X Window – a windowing system – is not X protocol – a communications standard. A POSA would understand this, and would understand that Musatov’s references to X protocol do not suggest the use of X Window.

66. Moreover, a POSA would understand that Musatov depicts a device that is not running X Window, for several reasons. First, Musatov explains that modified versions of X protocol were implemented for other windowing systems, including Microsoft Windows and Apple, EX1010, ¶0005, thereby informing a POSA that X protocol may be used to support standard (non-X) windowing systems on other desktop computers. Second, Musatov explains that the software for the map device “includes a standard ‘X-server’ application, which is configured to use the touch screen panel as a pointing device; there is no additional ‘window manager’ or ‘desk top’ application.” EX1010, ¶0039. This means that the “window manager” code for implementing X Window is not included on Musatov’s device. Third, the illustrations of Musatov’s user interface depict a device that runs only a single application with a single interface window. EX1010, Figs. 3, 6. This confirms the absence of a window manager on the Musatov device, and reflects the lack of any motivation to use X Window, a system designed to enable a user to configure multiple separate windows for multiple applications on a single terminal.

67. A POSA reading Musatov would likely conclude that even where X protocol is used to support communication functionality between a handheld device and a remote computer, Musatov implicitly teaches that X Window should not be used, because Musatov itself does not teach using X Window with X

protocol. Musatov does not disclose, or even suggest, a handheld device running X Window.

68. For at least these reasons, A POSA would have concluded that installing Robertson's XButtons on Maddalozzo or any other plausible mobile handheld computer unit would have detrimentally impacted the operation of the device for no countervailing benefit, and would have seen no motivation to modify Maddalozzo in such a fashion.

**Dr. Wobbrock's Additional "Motivations" are Conclusory and Based on False Premises**

69. Dr. Wobbrock's remaining proposed motivations to incorporate Robertson's X Window interface or flicking gesture into Maddalozzo specifically or some unspecified "mobile handheld computer unit" appear to be either conclusory or nonsensical. For instance, Dr. Wobbrock states that "Robertson and Maddalozzo are both directed to touch-based user interfaces" and include graphical buttons on a touchscreen, and infers from this that a POSA "would have understood from this disclosure that Robertson's teachings can apply to many types of gesture-based devices." EX1003, ¶90. However, this is a non sequitur; one might as well say that because an automobile and a submarine both include touchscreen displays, that an operating system for one is suitable for the other. As shown above, Robertson's teachings are focused on buttons implemented in an X

environment, and this would have constrained a POSA's view as to how broadly Robertson's teachings could be applied.

70. Dr. Wobbrock next states that a POSA "would have been motivated to implement Robertson's user interface in Maddalozzo's mobile handheld computer unit, such as a laptop or PDA type device, having non-transitory computer-readable media to provide a simple, configurable multi-function user interface accessible in these types of portable devices." EX1003, ¶91. Dr. Wobbrock's statement that a laptop is a type of handheld computer unit is incorrect, for reasons set forth above. More fundamentally, implementing Robertson's X Window interface on Maddalozzo's device would not have resulted in a "simple" user interface; to the contrary, as explained above, it would have resulted in an inoperable or seriously degraded device providing an interface less efficient and less user-friendly than the touch-activatable display of Maddalozzo. Dr. Wobbrock provides no reasons for why a POSA would have considered it advantageous to modify the well-adapted display of Maddalozzo in this fashion, and a POSA would not have considered it advantageous to do so.

71. Dr. Wobbrock also states that a POSA "would have been motivated to implement Robertson's teachings in mobile handheld computer devices because portability was desired by consumers and the gesture-based interface was more convenient for such small form-factor devices, which often lacked external input

devices such as mice and keyboards.” EX1003, ¶91. And he makes essentially the same point using slightly different verbiage (“a fully integrated handheld device”) directed at the Maddalozzo device, at paragraph 92 of his declaration. However, the fact that handheld devices were typically “integrated” and often lacked external input peripherals such as a mouse or keyboard does not in itself suggest that a “gesture-based interface” would have been more convenient for those devices than a touch-based interface such as that of Maddalozzo. Both touch/tap-based and gesture-based interfaces could be implemented without the need for such peripherals. In addition, Dr. Wobbrock completely overlooks the problems that would have been created and deficiencies that would have resulted from attempting to implement Robertson’s X Window buttons on a handheld device. Again, Dr. Wobbrock provides no reason why a POSA would have changed the well-adapted interface of Maddalozzo from a touch-based to a gesture-based system.

72. Dr. Wobbrock refers to “XButtons (or similar functionality in other operating systems), . . . .” *Id.* I will assume that Dr. Wobbrock here means to refer to the gesture-based functionality of Robertson’s XButtons, although given the vagueness of this reference it is not entirely clear whether this is what Dr. Wobbrock is referring to. In any event, his reference to “other operating systems” is entirely opaque and makes it impossible to assess the credibility of this statement. In addition, Dr. Wobbrock appears to believe that Robertson’s X

Window system was an operating system, which it was not, so it is impossible to determine whether he intends to refer to windowing systems rather than operating systems, or perhaps a combination of both. There is no basis to conclude that a POSA would have considered any such vaguely-referenced “other operating system” as suitable for use on a handheld device.

73. Next, Dr. Wobbrock states that a POSA would have been motivated to “implement Robertson’s gesture-based operations on mobile computing devices, such as mobile laptop computers or PDA-style computer devices, to implement gesture-based action buttons (including making them configurable to users) using ‘pen-based gestural input[s]’ that were common for such handheld computer devices and are more convenient for user to operate on smaller screens.” EX1003, ¶93. However, Dr. Wobbrock again provides no explanation as to why it would have been more convenient to a user to use Robertson’s X Window interface or flicking gesture on some unspecified mobile handheld device. In order to determine whether it would be more convenient to use a particular gesture – such as Robertson’s flicking gesture – on a display one first must define the environment in which the gesture is being used, as outlined in paragraph 50 above, and the alternatives against which the flicking gesture is being compared.

74. In addition, Dr. Wobbrock’s “small screen” rationale actually cuts against the argument that a POSA would have been motivated to use Robertson’s

flicking gesture on a handheld device. In 2002, mobile handheld devices such as mobile phones or PDAs largely presented users with a display densely packed with user interface elements, in order to maximize the functionality presented to the user given their relatively small screen sizes. Touch or tap-based interaction was strongly preferred for such interfaces because the activation technique could be entirely performed within the confines of the icon, thereby minimizing the required space between icons. A POSA would have seen Robertson's "flicking" selection technique as less efficient and more likely to lead to user error by inadvertent activation of non-targeted icons and other user interface elements when applied to the typical small touchscreens of mobile handheld devices in 2002.

75. Next, Dr. Wobbrock states that a POSA would have been motivated to implement "Robertson's teachings" on Maddalozzo's device to "take advantage of the "Unix Shell" command language and the breadth of function operations it provides, thereby providing flexibility and numerous implementations to design gesture-based buttons that are more useful and convenient for users." This seems to be just a conclusion without a basis or reasons. First, it is unclear how the addition of a Unix shell command language would give any more flexibility in the design of the user interface. Second, a POSA would have seen no reason to use the Unix Shell command language in the Maddalozzo device or any other plausible mobile handheld device, which had limited functionality and scope of use,

regardless of whether such an implementation would have provided more flexibility in interface design.

76. Next, Dr. Wobbrock states that a POSA “would also have been motivated to implement Robertson’s teachings on other mobile devices (non-X-based, non-Unix), such as PDAs, which were well-known to utilize gesture-based inputs, such as described in Robertson, to provide more convenient execution of commands and functions using the limited screen space of the PDA.” EX1003, ¶93. This appears to be a variation on Dr. Wobbrock’s “small screen” rationale, which does not support his position for the reasons set forth in paragraphs 71 and 73-74 above. In addition, Dr. Wobbrock does not provide necessary explanation regarding his proposed combination: Which “teachings” of Robertson does he think a POSA would have been motivated to implement on “other mobile devices?” To what “mobile devices” does he refer, and must they be handheld devices as required by the claim? To what “gesture-based inputs” is he referring? Why would a POSA have concluded that Robertson’s “teachings” would have been at all convenient, let alone more convenient, on any such non-X-based mobile device? These are all material questions that would need to be answered in order to arrive at Dr. Wobbrock’s conclusion, but it does not appear that he has considered them.

77. Dr. Wobbrock also states that a POSA “would have been motivated to implement Robertson’s gesture-based function activations in Maddalozzo’s mobile handheld computer units because such devices often have smaller screens and using the pen-based gestures described in Robertson simplifies the process of executing commands to activate functions using the user’s pen (stylus) or finger, without the need for external hardware, such as a mouse or keyboard.” EX1003, ¶94. However, neither the use of Robertson’s X Window system (which, as shown above, would be detrimental) nor of Robertson’s flicking gestures have anything to do with such purported advantages, which are equally if not more fully deliverable by an interface allowing for touch activation, as was natively provided by Maddalozzo. In addition, as discussed above, the fact that handheld devices had small screens would have counseled a POSA to avoid activation techniques such as Robertson’s flicking gesture.

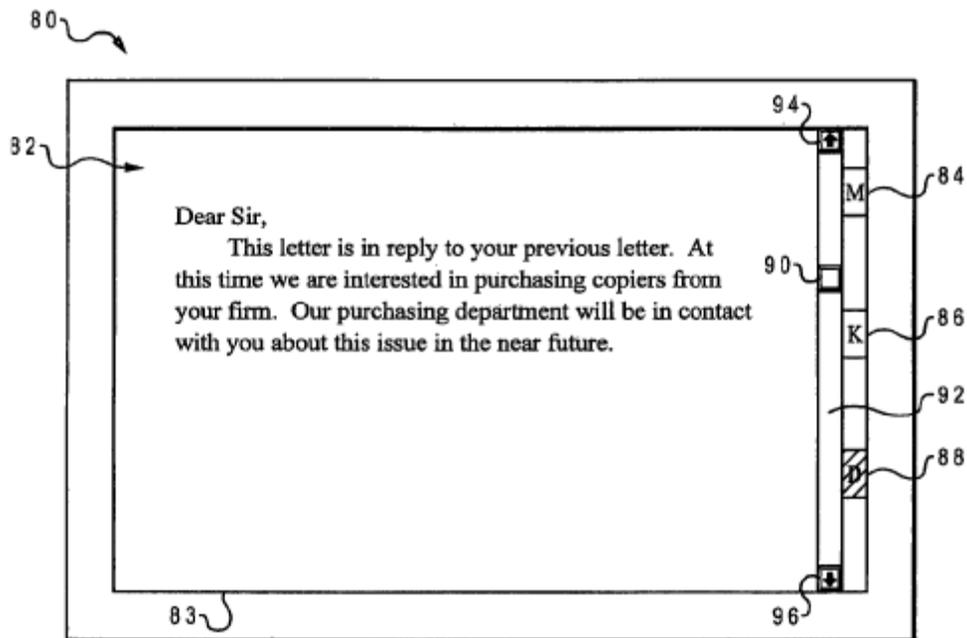
78. In a section of his declaration referencing “[e]xpectation of success,” Dr. Wobbrock states that a POSA “would have known how to implement Robertson’s touch-based gestures on mobile handheld computer devices, such as laptops and PDAs, because Robertson teaches principles for designing touch-based and gesture-based user interfaces applicable to various systems, . . . .” EX1003, ¶96. Putting aside Dr. Wobbrock’s mis-categorization of laptops as a type of handheld computer, it is misleading to state that a POSA would have “expected to

succeed in implementing Robertson's principles across other handheld device operating systems, including Palm OS, Windows Pocket PC, Symbian, etc., . . . ."

*Id.* If by "implementing Robertson's principles" Dr. Wobbrock means implementing Robertson's X Window interface, it is open to question whether it would have even been feasible in 2002 to implement an X server on a handheld device running one of Dr. Wobbrock's cited operating systems, let alone desirable (as discussed above); certainly, Dr. Wobbrock provides no reason to believe that it would have been either feasible or desirable.

79. As noted above, Dr. Wobbrock ties several of his purported motivations specifically to the Maddalozzo device as an exemplary "mobile handheld computer unit." EX1003, ¶¶89, 92-94. However, his purported motivations are refuted by the structure and operation of the Maddalozzo device. In fact, a POSA would have seen no motivation to incorporate Robertson's X Window interface or flicking gesture into Maddalozzo's display.

80. The Maddalozzo display presents three icons (items 84, 86 and 88 of Fig. 5, EX1006, Fig. 5) in a vertical orientation along the right edge of the display, spaced from the working portion of the display by a slider bar with down and up arrows and a movable slider:



*Fig. 4*

EX1006, 6:3-12, Figs. 4-7. The three icons along the right edge are “M” (for “mouse mode”), “K” (for “keyboard mode”) and “D” (for “display mode”).

EX1006, 6:13-18. These icons are touch-activatable (i.e., by “pressing”).

EX1006, 6:9-12.

81. A POSA would have seen no reason to modify these icons for activation by Robertson’s “flicking” gesture. These icons are dedicated to one function – that of activating the associated mouse, keyboard or display mode.

EX1006, 6:13-18. Touch activation was therefore preferable to activation by

Robertson’s “flicking” gesture, because it was both simpler (with a

commensurately lower chance of user error) and faster than Robertson’s flicking

gesture would have been. In addition, modifying Maddalozzo as Petitioner suggests would create the possibility of accidental activation of the slider bar or the virtual keyboard as the pen transited the surface of the display away from the touched icon. In addition, Maddalozzo discloses no reason why a POSA would have thought it advantageous to associate more functions with these icons; certainly, no additional functions are disclosed, and neither Petitioners nor Wobbrock attempt to explain why Maddalozzo's device would benefit from such additional functions.

82. There is no reason to believe that a POSA would have considered Robertson's gesture-based XButtons to be superior to Maddalozzo's touch-based icons for the purposes required by the Maddalozzo device; certainly, Dr. Wobbrock provides none. Maddalozzo's M, K and D icons did not require flick-activation in order to provide users complete functional efficacy, nor did Maddalozzo's sliders require any such functionality. Touch functionality was fully sufficient for the Maddalozzo device. More fundamentally, again as shown above, a POSA would not have considered it advantageous to incorporate Robertson's X Window system into a handheld device due to, for example, the fact that a handheld device is not suited to present a user with multiple resizable simultaneous windows, as well as the likelihood of slower operation and increased probability of accidental activation of unintended user interface widgets.

83. Dr. Wobbrock next states that a POSA “would have been motivated to implement Robertson’s gesture-based function activation techniques to keep the form factor small, while still allowing for convenient user interfaces.” EX1003, ¶92. He asserts that “Robertson’s teachings” would result in a “small” form factor “because multiple functions, commands, or actions could be associated with the individual keys or buttons of a portable device by making them XButtons (or similar functionality in other operating systems), thereby placing more functionality in a confined space.” *Id.* These statements suffer from at least two deficiencies.

84. First, Dr. Wobbrock simply assumes that a POSA would have considered it better to place “more functionality in a confined space,” but that cannot be assumed; it is a heavily context-dependent conclusion, and comes with trade-offs. A POSA would understand that having multiple function activation techniques for a particular button or icon imposes a cost in terms of increasing the potential for user confusion as well as execution time. Users are generally familiar with the standard and common way to interact with graphical user interface elements such as buttons and icons. Adding additional interaction techniques would result in non-standard interfaces that could increase the memory and attentional resources required of the user. Because the standard and well-known ways in which users interact with graphical user interface elements would remain,

a POSA would find no additional benefits to programming additional activation techniques and would instead only incur negatives associated with these additional interaction activation techniques in the form of increased memory load and increased cognitive workload for the user combined with an increased probability of accidental activation of other graphical user interface elements that are proximal to the graphical user interface element that is trying to be activated.

85. In 2002, it was commonly believed in the computer science community that it was more efficient and user-friendly to present handheld device users with only one or two activation techniques (typically, touch and/or tap) rather than a larger number of such techniques, because users would find it difficult to remember them all. Even today, there are typically only one or two activation techniques for a user interface widget on a handheld device. Even in modern iPhones and Galaxy phones gestures are typically only used to activate a few functions (such as for transitioning from a lock screen to a home screen). These instances of gesture-based activation are typically present not when a display is densely-packed – i.e., where Dr. Wobbrock’s “more functionality in a confined space” rationale would be most strongly present – but rather when the display is largely empty of other icons or widgets. If there was a benefit to incorporating a multiplicity of activation techniques for each widget in an interface, such functionality would have been widely implemented, which it has not been. Adding

a suite of gesture-based activation techniques to a handheld device as proposed by Dr. Wobbrock would likely have been rejected by a POSA on that basis alone as being inappropriate for a typical touch-based interface.

86. Second, as explained above, a small form factor and small screen would have tended to drive a POSA away from Robertson's flicking gesture, which would have been more likely to lead to user error by inadvertent activation of non-targeted icons.

**2. Robertson's Phone Button is Not a Representation of Either the *xbedit* or *dialphone* Functions (Limitation 1[a])**

**[1a] "a touch sensitive area in which a representation of a function is provided,"**

87. Dr. Wobbrock states that Robertson discloses limitation [1a].

EX1003, ¶97. I disagree.

88. Dr. Wobbrock points to Robertson's Phone button as "a representation corresponding to a function, such as dialing a phone number or invoking a button editor, . . . ." EX1003, ¶100. I note that the language "a representation corresponding to a function" does not appear in claim 1, so Dr. Wobbrock's opinion here does not map cleanly onto the claim. However, it is clear that Robertson's Phone button is not a representation of a function, for the reasons set forth below.

89. A POSA in 2002, as today, would have understood a “representation of a function,” in the user interface context, to refer to an icon or other image that represented a function. Icons were well known in the field of user interface design in 2002 and would have been immediately recognized as a type of representation of a function. In fact, icons – typically understood to be small images displayed on the screen to represent objects that could be manipulated by the user – would have been understood by a POSA in 2002 as practically synonymous with a “representation” in the user interface context. A definition and illustration of an “icon” from the 1997 edition of the Microsoft Press Computer Dictionary is typical:

**icon** \iˈkɒn\ *n.* A small image displayed on the screen to represent an object that can be manipulated by the user. By serving as visual mnemonics and allowing the user to control certain computer actions without having to remember commands or type them at the keyboard, icons are a significant factor in the user-friendliness of graphical user interfaces. See the illustration. *See also* graphical user interface.

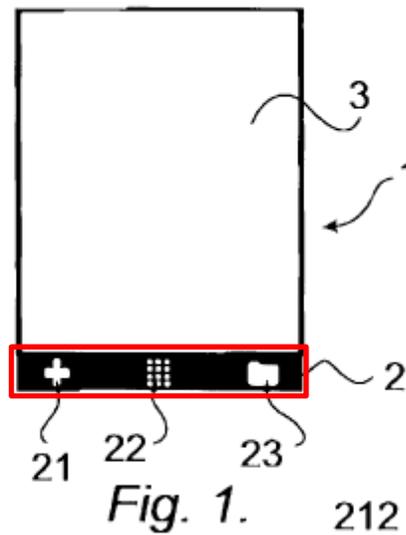


Recycle Bin

***Icon.***

EX2003.

90. The specification of the '879 Patent provides examples of representations of functions, i.e., the first (“general application dependent function”), second (“keyboard function”) and third (“task and file manager”) predefined functions, identified in Figure 1 as items 21-23, respectively:



EX1001, Fig. 1; col. 2:5-10, 4:1-6, 5:65 to 6:3. These are clearly icons.

91. Consistent with the above, a POSA would have understood that a “representation” represents something, in this case a function. The representation need not necessarily be an image or pictorial depiction of a function, but it must serve to represent the function in some understandable way.

92. A POSA would not have considered Robertson’s Phone button to be a representation of the *xbedit* function. Robertson provides no reason to conclude that the Phone button represents the *xbedit* function; to the contrary, Robertson appears to teach that the button editor menu may be opened with respect to any button by performing the “Insert” gesture on the button. EX1005, at 16.

Accordingly, the Phone button does not represent the *xbedit* function, any more than the Word icon in a Windows desktop tray “represents” the function of pinning the icon to a taskbar. Accepting Petitioner’s argument, one would have to

conclude that every button on the display represents the button editor function as well as every other button action command (e.g., *xbcopy*, *xbdelete*, *xbhelp*, *xbmail*, and *xbmenu*). That would render the concept of a “representation” of a function meaningless.

93. A POSA would also not have considered Robertson’s Phone button to be a representation of the *dialphone* function, for a different reason. One attribute of a representation of a function in a graphical user interface is that selection of the representation (e.g., an icon) is typically sufficient in itself to activate the associated function. This is reflected in the representations in the specification of the ‘879 Patent, all of which are activated upon selection without the need for user input of text or other data. This attribute is lacking in Robertson’s Phone button, because it is not activatable upon selection – a user must in every case enter a name into the text entry field of the button prior to performing the gesture in order to enable activation. EX1005, at 15 (“The “Phone” button will let you type the name of someone, then pop up a window with their phone number (by clicking) or dial the number (with the flick right gesture).”). In addition, even following input of a name, activation is contingent on factors other than simple selection of the button – for example, if a user inputs a name that has no associated number stored on the system, the button cannot be activated. Robertson’s Phone button therefore

does not satisfy the conditions to constitute a representation of the *dialphone* function.

**B. Ground 4**

**1. A POSA Would Not have been Motivated to Modify  
Tarpenning’s Book and Library Menu Icons for Activation  
by Touch and Glide (Limitation 1[c])**

94. Dr. Wobbrock states that a POSA “would have found it obvious to implement [a] multi-step touch-then-glide operation to activate the menu functions of book menu key 84 and library menu key 86 rather than a ‘touch’ activation.” EX1003, ¶214. I disagree; in fact, a POSA would have had absolutely no motivation to do so.

95. Tarpenning discloses an early version of an e-reader that includes four keys, each of which is recessed within a housing. EX1009, Fig. 7. Each of these keys has an associated function, and the functions associated with all of these keys are activated by touch. One of these keys is a “hotkey” to which various functions may be assigned. While the assigned function is activated by touch, a user may assign a particular function to the key by touching the display at the location of the key, which opens a window displaying a list of assignable functions, dragging the stylus to a listed function and lifting off of the display.

96. First, Dr. Wobbrock states that the Tarpenning reference “renders obvious that the function of displaying book menu 85 is activated by a multi-step

operation.” EX1003, ¶213. This is incorrect; Tarpenning could not be more clear that book menu 85 is activated by touching the book menu key 84: “When the user presses the book menu key 84 or the library menu key 86, the device 30 displays a book menu 85 (FIG. 6) or a library menu (not shown), respectively.” EX1009, 6:41-43. Dr. Wobbrock admits this. EX1003, ¶214. So, the function of displaying book menu 85 is not activated by a multi-step operation.

97. Dr. Wobbrock then proceeds to make what appears to be his principal argument, that Tarpenning discloses “activating functions for the soft keys, such as soft key 82,” by a touch and glide gesture, and that a POSA “would have found it obvious to implement this multi-step touch-then-glide operation to activate the menu functions of book menu key 84 and library menu key 86 rather than a ‘touch’ activation.” EX1003, ¶214. I disagree with Dr. Wobbrock; in fact, a POSA would not have found it obvious to implement a touch and glide operation to activate Tarpenning’s book menu and library menu keys and would have had no motivation to do so.

98. As an initial matter, Dr. Wobbrock’s characterization of Tarpenning’s disclosure concerning the “soft keys” is inaccurate. Tarpenning does not disclose activating functions for the keys by a touch and glide gesture. To the contrary, Tarpenning discloses activating functions for all four of the keys (Tarpenning

does not use the phrase “soft keys” to refer to these icons) by “pressing” or “touching” them. EX1009, 6:20-23, 35-37, 41-43.

99. There is only one operation performed in connection with any of these keys that involves a multi-step operation, and that is assigning a function to “hotkey” 82 by a touch and drag technique. Dr. Wobbrock states that a POSA “would have found it obvious to replace Tarpenning’s touch operation to activate the menu display functions of book menu key 84 and library menu 86 with the disclosed multi-step touch-then-glide activation gesture, . . . .” EX1003, ¶217. However, Dr. Wobbrock’s reasons for why a POSA would have found this an obvious modification make no sense in light of the structure of the Tarpenning device.

100. Dr. Wobbrock proposes two motivations to modify Tarpenning’s book and library menu keys to activate based on touch and drag instead of touch. First, he asserts that a POSA would have been motivated to modify Tarpenning in this manner “to prevent users from accidentally opening the menu when they inadvertently touch the screen with their finger or heel of their hand, which would lead to frustration.” EX1003, ¶¶217, 219, 221. However, a POSA would not have seen this as a reason to modify Tarpenning in this way because the touch-sensitive display of Tarpenning’s device is recessed within a hard housing, EX1009, 6:4-6 (“The touch screen 74 extends to or slightly beyond the inward-

facing edge 78 of the device's bezel.”), Figs. 2, 6-7 (emphasis added), and the keys were further recessed within semicircular cutouts within the hard casing, EX1009, Figs. 2, 6-7, making accidental activation of these keys extremely unlikely. There was simply no practical reason for a POSA to be concerned with accidental activation of the book and menu library keys (or any of the keys), given Tarpenning’s structural design.

101. For the same reason, Dr. Wobbrock’s modified version of Tarpenning’s Figure 2, illustrating a user’s thumb resting on the casing in the vicinity of one of the buttons, does not show that holding the Tarpenning device “lends itself to accidental activation of menu keys 84 and/or 86 (depending on orientation) if such keys were able to be activated by a ‘touch’ action alone.” EX1003, ¶219. Even if a user rested her thumbs on the casing (as shown) directly adjacent the keys, there would be no practical danger of accidental activation, because the display is recessed within the hard casing and the keys are further recessed within hemispherical cutouts in the casing.

102. In addition, Dr. Wobbrock’s proposed modification would create a new interface problem that does not exist with Tarpenning’s touch activated keys. Dr. Wobbrock suggests that with his modification “the menu function would not activate on merely detecting a touch on the icon, but rather, would open when the glide operation into the screen is detected (such as onto the area of the arrow in

Figure 6), at which point the menu function would activate.” EX1003, ¶219.

However, activation pursuant to this process flow would create the likelihood that the user’s pen would inadvertently activate an item in the book menu or library menu during the step of activating the menu function itself, since during the activation the user’s pen will be dragging across the display in the vicinity of the menu. A POSA would understand that this counsels against modifying Tarpenning in the manner proposed by Dr. Wobbrock.

103. Dr. Wobbrock also asserts that a POSA would have been motivated to implement his proposed modification “to more accurately open sub-menus by gliding up to the desired sub-menu location to open it without lifting the stylus or finger off the screen, which results in faster, more efficient operations for a user.” EX1003, ¶222. But the premise to this purported motivation is false; in fact, touch activation of a submenu function would be faster and more accurate than touch and drag activation. This is so because touch activation of a sub-menu item merely requires that the user touch a sub-menu location on the display, whereas touch and drag activation of Tarpenning’s book and library menu keys would require that the user (i) touch the key for that menu to open the sub-menu, then in the same gesture (ii) glide on the display to the location of the desired sub-menu item and then lift off at the desired location. It is well known in the human factors

community that touch activation of an icon is typically the fastest means of activating an associated function, and it would be here as well.

104. In fact, as shown above, Dr. Wobbrock's proposed modification would likely have the opposite result, i.e., it would render the sub-menu selection process less accurate and less efficient due to increased accidental activations of menu items while the user's pen is completing the touch and drag activation process.

105. Dr. Wobbrock also states that a POSA would have "expected to succeed" in substituting a touch and drag operation for a touch operation on Tarpenning's device. EX1003, ¶224. However, as shown above, a POSA would have had no motivation to make this modification in the first place, so it really does not matter whether a POSA would "expect to succeed" in implementing such a modification.

### **C. Grounds 1-6**

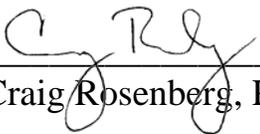
106. Dr. Wobbrock also asserts that claims 2-7, 9, 12-13, and 15-17 are rendered obvious under his Robertson-Maddalozzo combination (Ground 1) or Tarpenning (Ground 4), or under some combination of Grounds 1 and 4 with other cited art. Because these additional claims all depend from claim 1, I understand that they incorporate all of the limitations of claim 1. Because a POSA would not have found claim 1 to be obvious in light of any of Dr. Wobbrock's cited

references or arguments, I understand that none of these additional claims would be obvious either.

### VIII. CONCLUSION

107. 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: October 17, 2021

  
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Craig Rosenberg, Ph.D.