# EXHIBIT B

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA, SAN JOSE DIVISION

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| APPLE INC., a California corporation,<br><br>Plaintiff,<br><br>vs.<br><br>SAMSUNG ELECTRONICS CO., LTD., a Korean business entity; SAMSUNG ELECTRONICS AMERICA, INC., a New York corporation; SAMSUNG TELECOMMUNICATIONS AMERICA, LLC, a Delaware limited liability company,<br><br>Defendants. | CASE NO. 11-cv-01846-LHK |

**EXPERT REPORT OF STEPHEN GRAY**
**REGARDING INVALIDITY OF U.S. PATENT NOS. 7,844,915 AND 7,864,163**

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| Exhibit A | U.S. Patent No. 7,849,915 |
| Exhibit B | John Vardalas, *From DATAR To The FP-6000 Computer: Technological Change In A Canadian Industrial Context*, IEEE Annals of the History of Computing, Vol. 16, No. 2, 1994. |
| Exhibit C | Johnson, E.A. (1965), "Touch Display - A novel input/output device for computers," *Electronics Letters* 1 (8). |
| Exhibit D | Johnson, E.A. (1967). "Touch Displays: A Programmed Man-Machine Interface," *Ergonomics* 10 (2). |
| Exhibit E | U.S. Patent App. 2007/0252821 ("Hollemans") |
| Exhibit F | Dean Harris Rubine, "The Automatic Recognition of Gestures," CMU–CS–91–202 (December, 1991). |
| Exhibits G1-G2 | Japanese Patent Publication No. 2000-163031A ("Yasuhiro") and Translation |
| Exhibit H | U.S. Pat. No. 7,138,983 |
| Exhibit I | Animation: From Cartoons to the User Interface, Bay-Wei Chang and David Ungar, UIST (1993) |
| Exhibit J | Henry, T.R., Hudson, S.E. and Newell, G.L., Integrating gesture and snapping into a user interface toolkit, Proc, UIST (1990), New York: ACM Press. |
| Exhibit K | U.S. Patent No. 6,677,965 |
| Exhibit L | Alan Esenther, Cliff Forlines, Kathy Ryall, Sam Shipman. *DiamondTouch SDK: Support for Multi-User, Multi-Touch Applications* (ACM CSCW 2002), reprinted as MERL Technical Report No. TR2002-48 ("TR2002-48"). |
| Exhibit M | Tse, et al., "Enabling Interaction with Single User Applications through Speech and Gestures on a Multi-User Tabletop," AVI '06 (May 23-26, 2006), Venezia, Italy, first published in December 2005 as MERL Technical Report No. TR2005-130 ("TR2005-130"). |
| Exhibit N | [redacted] |
| Exhibit O | Clifton Forlines and Chia Shen, *DTLens: Multi-user Tabletop Spatial Data Exploration* (UIST Oct. 23-27 2005) ("DTLens Paper") |
| Exhibit P | Chris Forlines, C., Esenther, A., Shen, C., Wigdor, D., and Ryall, K. *Multi-user, Multi-display Interaction with a Single-user, Single-display Geospatial Application*. UIST '06 (ACM Oct. 15-18 2006) printed in original at pp. 273-276, reprinted as Mitsubishi Electronic Research Laboratories ("MERL") Technical Report No. TR2006-083 in October 2006 ("*MERL-TR2006-083*") |
| Exhibit Q | P.H. Dietz and Leigh, D. *DiamondTouch: a multi-user touch* |

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| | *technology*. Proc ACM UIST, (ACM 2001) printed in original at pp. 219-226, reprinted as MERL Technical Report No. TR2003-125. ("*MERL-TR2003-125*") |
| Exhibit R | Mark S. Hancock, Frederic D. Vernier, Daniel Wigdor, Sheelagh Carpendale, Chia Shen. Rotation and Translation Mechanisms for Tabletop Interaction, printed as MERL Technical Report No. TR2005-118 ("*MERL-TR2005-118*") |
| Exhibit S | Alan Esenther and Kent Wittenburg, *Multi-User Multi-Touch Games on DiamondTouch with the DTFlash Toolkit* (MERL 2005), printed as MERL Technical Report No. TR2005-105 ("*MERL-TR2005-105*") |
| Exhibit T | Oscar de Bruijn, et al., *An Interactive Coffee Table for Opportunistic Browsing*, *available at* *MERLDrive*/pdh/papers/chi2003/OB_CoffeeTable.pdf, ("*MERL-CoffeeTable paper*") |
| Exhibit U | [redacted] |
| Exhibit V | Jun Rekimoto, *SmartSkin: An Infrastructure for Freehand Manipulation on Interactive Surfaces*, Conference on Human factors in computing systems, April 2002 ("*SmartSkin*"). |
| Exhibit W | Jefferson Y. Han. 2006. *Multi-touch interaction wall*. In ACM SIGGRAPH 2006 Emerging technologies (SIGGRAPH '06). ACM, New York, NY, USA, Article 25. |
| Exhibit X | Jefferson Y. Han. 2005. *Low-cost multi-touch sensing through frustrated total internal reflection*. In Proceedings of the 18th annual ACM symposium on User interface software and technology (UIST '05). ACM, New York, NY, USA, 115-118. |
| Exhibit Y | [redacted] |
| Exhibit Z1 | [redacted] |
| Exhibit Z2 | [redacted] |
| Exhibit AA | U.S. Patent No. 7,864,163 |
| Exhibit BB | U.S. Patent Application No. 2002/0030699 ("Van Ee") |
| Exhibit CC | U.S. Patent Application No. 2004/0107403 ("Tetzchner") |
| Exhibit DD | U.S. Patent No. 7,327,349 ("Robbins") |
| Exhibit EE | U.S. Patent Application No. 2005/0195221 ("Berger") |
| Exhibit FF | APLNDC-X0000002313 |
| Exhibit GG | APLNDC 0001200374 |
| Exhibit HH | APLNDC 00016628 |
| Exhibit II | Bederson, et al.: Applens and LaunchTile: Two Designs for One-Handed Thumb Use on Small Devices (Exhibit II) |
| Exhibit JJ | U.S. Patent No. 6,211,856 ("Choi") |
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| Exhibit LL | U.S. Provisional Application (60/718,187) ("Flynt") |
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| Exhibit NN | U.S. Patent No. 7,138,983 ("Wakai") |
| Exhibit OO | [redacted] |
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## I. INTRODUCTION

1. I have been retained by Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Samsung Telecommunications America, LLC (collectively "Samsung") as an independent expert in this action. I expect to testify concerning the subjects outlined in this report.

2. As part of this engagement I have been asked to provide analysis and expert opinions on the following topics: (a) the disclosure of U.S. Patent Nos. 7,844,915 (hereafter, the '915 Patent) and 7,864,163 (hereafter the '163 Patent); and (b) the validity of the Asserted Claims. I understand that the claims asserted by Apple include claims 1-21 of the '915 Patent and claims 2, 4-13, 17, 18, 27-42 and 47-52 of the '163 Patent.

3. I am being compensated for my work on this case at my standard consulting rate of $370 per hour. I am also being reimbursed for expenses that I incur. My compensation is not contingent upon the results of my study or the substance of my testimony.

4. I expect to be called to provide expert testimony regarding opinions formed resulting from my analysis of the issues considered in this report. If asked to do so, I may also provide testimony describing application programming interfaces, scrolling and scroll indicators, gesturing, rubber banding, and multi-touch technology using one or more input points as well as drag user inputs. I may also discuss the use of software, drivers and/or application programming interfaces capable of providing scrolling, zooming, panning, and other manipulation of content on touch sensitive hardware devices.

5. Additionally, I may discuss my own work, teachings, and knowledge of the state of the art in the relevant time period. I may rely on handbooks, textbooks, technical literature, and the like to demonstrate the state of the art in the relevant period and the evolution of relevant technologies.

6. This Report is a description of the testimony I expect to offer in the case named above. However, I respectfully reserve my right to alter or supplement my analysis in response to any criticisms or alternative opinions offered by Apple.

7. In reaching the conclusions described herein, I have considered the documents and materials identified in Appendix 1 that is attached to this report. My opinions are also based upon my education, training, research, knowledge, and personal and professional experience.

8. It is my understanding that discovery is still ongoing. I reserve the right to modify or supplement my opinions, as well as the basis for my opinions, in light of any documents, testimony, or other evidence that may emerge during the course of this matter, including depositions that have yet to be taken.

9. It is also my understanding that Apple may submit an expert report responding to this report. I reserve the right to rebut any positions taken in that report.

10. Throughout this report, I refer to specific pages of patents and other technical documents. The citations are intended to be exemplary and are not intended to convey that the citations are the only source of evidence to support the propositions for which they are cited.

## I. BASIS FOR OPINIONS

### A. Qualifications

11. I am an independent consultant. All of my opinions stated in this report are based on my own personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in graphical user interfaces and operating systems; software development practices; programming, including C and graphical programming; and on the documents and information referenced in this Report. If I am called upon to do so, I would be competent to testify as to the matters set forth herein. I have attached as Exhibit 2 a copy of my current curriculum vitae (CV), which details my education and experience. The following thus

provides only a brief overview of some of my experience that is relevant to the matters set forth in this report.

12. Since the mid-1970s, I have designed, developed, and deployed computing systems and products that operate in server, desktop, and graphical environments. As such, I have acquired expertise and am an expert in the areas of server computing architecture and design, graphical user interfaces, operating systems, local area and wide area networks, and various programming languages used in the development of those systems and products. I have been employed by or retained as a consultant, including acting as a litigation consultant, for numerous companies such as Burroughs, Filenet, Fujitsu, Marriott Corporation, MCI, Northern Telecom, Olivetti, TRW, and Xerox, as well as other companies.

13. I have several relevant professional experiences that further demonstrate my expertise in the field of graphical user interfaces. In late-2001 to mid-2002, as Chief Technology Officer for Networld Exchange Inc., I was responsible for the design, development and deployment of a suite of products that delivered eCommerce functions. These functions were provided over the Internet and included product catalog information display, purchase and/or purchase order creation, order delivery to fulfillment systems and order status reporting. The products that I had responsibility for provided an electronic shopping graphical user interface for business-to-business and business-to-consumer transactions. The graphical user interface was designed to support both vendors of products as well as customers. Each of these user interfaces were an optimization based on the specific user class.

14. In the mid 1990s I was a consultant for Xerox. One of my assignments there was to develop a graphical interface for network attached office products. For example, one of the graphical user interfaces I designed provided end user visibility into printer queues supporting

distributed network printers. Another graphical user interface I designed provided network operations distributed job management control.

15. Finally, I have been retained by attorneys for plaintiffs and defendants in several matters where the concepts and practice of graphical user interface technology was a central issue. The matters include contract disputes: GTE v. Videotron; Eyefinity, Inc. v. Entigo; HealthFirst v. HealthTrio; Waltrip Associates v. Kevin Kimperlin & Spencer Trask Ventures, as well as patent infringement: WebSide Story v. NetRatings; ICR v. Harpo; Leader v. Facebook; Fotomedia v. Yahoo!; Cisco v. Telcordia; Ampex v. Kodak, et al and ICI v. Red Hat and Novell.

16. As my curriculum vitae shows, much of my career has been spent as a software development professional. As a software development professional, I have had numerous occasions to review bodies of source code. I have analyzed source code written in several variants of C, SQL, COBOL, RPG, variants of Basic, Java, Perl, several Assembler languages, and others. For example, as an individual contributor at Xerox during the mid-1980s to 1990, I evaluated the quality of source code from third party software providers for possible inclusion in the Xerox product line. Also, as another example, I evaluated the source code of several application software packages for completeness and maintainability for possible inclusion into the NTN product line in 2000-2001. During my early career, I spent time maintaining source code written by others. In each of these assignments, I analyzed the source code to identify the data structures, logical flow, algorithms and other aspects.

17. In addition, on several occasions, I have served as an expert witness where source code analysis was required to render an opinion. These matters include Autobytel v. Dealix; NetRatings v. Coremetrics, et al.; Ampex v. Kodak, et al.; AB Cellular v. City of Los Angeles; Oracle v. Mangosoft; Harrah's Casino v. Station's Casino; Autobytel v. Dealix; MediaTek v. Sanyo; MathWorks v. Comsol; and other matters still pending.

18. During my career as a software development professional, I have several relevant professional experiences that demonstrate my expertise in the field of operating system technologies. I have performed operating system programming assignments, I have publicly lectured regarding various operating systems, and I have provided litigation support where operating system technology was central to the matter.

19. I have performed system programming assignments with the following operating systems: Burroughs MCP, IBM MVS, various versions of UNIX, Microsoft Windows, and DEC VAX/VMS.

20. I have developed and presented numerous public and in-house courses in operating system technology including IBM MVS, UNIX, Linux, IBM OS/2, Microsoft Windows, and related networking technologies.

21. In addition, on several occasions, I have served as an expert witness where operating system technology was an issue in the matter. These matters include SuperSpeed v. IBM; FedEx v. U.S.; MathWorks v. Comsol; Ametron-American Electronic Supply v. Entin, et al; BMC Software v. Peregrine Systems, Inc.; and ADV Freeman v. Boole & Babbage.

22. I have authored no publications in the last ten years.

23. I have testified as an expert at trial or by deposition within the preceding four years, as set forth in Appendix 2.

**B. Preparation for this Report**

24. In forming my opinions, I have considered, in addition to my own knowledge and experience, (a) the documents and things listed in Exhibit 1 as well as (b) any other references referred to or cited in this Report.

25. All of the opinions stated in this report are based on my own personal knowledge and professional judgment; if called as a witness during the trial in this matter I am prepared to testify competently about them.

26. I reserve the right to update, supplement, or amend this report in view of additional information obtained through discovery or other information that may become available between now and trial that may affect the opinions set forth in this report. I provide the details of my analysis, and the conclusions that form the basis for any testimony that I may give, below. Any testimony I give may include appropriate visual aids, some or all of the data or other documents and information cited herein or identified in Appendix 1, and additional data or other information identified in discovery, to support or summarize my opinions.

**C. Materials Considered**

27. This report is based on my review of U.S. Patent Nos. 7,844,915 and 7,864,163 and their respective file histories, and parts of the record and documents produced in this case to date.

28. Additionally, I have considered the references set forth in Appendix 1.

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

29. I believe that a person of ordinary skill in the art relating to the '915 Patent would have at least a Bachelor's Degree in computer science (or equivalent industry experience) and at least two years of experience in the area of computer programming and/or operating systems.

30. I meet these criteria and consider myself a person with at least ordinary skill in the art pertaining to the '915 Patent. I would have been such a person at the time of invention of the '915 Patent.

31. I have also considered Apple's position on the background of a person of ordinary skill in the art pertaining the '915 Patent. My opinions regarding invalidity of the '915 Patent

apply equally under Apple's position regarding a person of ordinary skill in the art pertaining the '915 Patent.

32. I believe that a person of ordinary skill in the art relating to the '163 Patent would have at least a Bachelor's degree in Computer Science, or the equivalent work experience and one to two or more years of software design and implementation experience, including experience with graphical user interface design and touch-sensing technologies.

33. I meet these criteria and consider myself a person with at least ordinary skill in the art pertaining to the '163 Patent. I would have been such a person at the time of invention of the '163 Patent.

34. I have also considered Apple's position on the background of a person of ordinary skill in the art pertaining the '163 Patent. My opinions regarding invalidity of the '163 Patent apply equally under Apple's position regarding a person of ordinary skill in the art pertaining the '163 Patent.

## II. LEGAL UNDERSTANDINGS

35. In this section I describe my understanding of certain legal standards. I have been informed of these legal standards by Samsung's attorneys. I am not an attorney and I am relying only on instructions from Samsung's attorneys for these legal standards.

### A. A Person of Ordinary Skill in the Art

36. I am informed by counsel that a person having ordinary skill in the art is a hypothetical person who is used to analyzing the prior art without the benefit of hindsight. A person of ordinary skill in the art is presumed to be one who thinks along the lines of conventional wisdom in the art and is not one who undertakes to innovate, whether by extraordinary insights or by patient and often expensive systematic research.

37. I am further informed by counsel that the hypothetical person of ordinary skill is presumed to have knowledge of all references that are sufficiently related to one another and to the pertinent art, and to have knowledge of all arts reasonably pertinent to the particular problem that the claimed invention addresses.

**B. Legal Standard for Patentability**

38. I am informed by counsel that in order to receive a patent an inventor must invent or discover a new and useful process, machine, manufacture, or composition of matter.

39. I am further informed by counsel that patent protection may be granted for any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof.

**C. Legal Standard for Prior Art**

40. I am informed by counsel that a patent or other publication must first qualify as prior art before it can be used to invalidate a patent claim.

41. I am further informed by counsel that "prior art" includes public information, public knowledge, and public acts that occur before an application for a patent was filed. Prior art includes patents, journals, Internet publications, systems and products.

42. I am further informed by counsel that a U.S. or foreign patent qualifies as prior art to an asserted patent if the date of issuance of the patent is prior to the invention of the asserted patent. I further understand that a printed publication, such as an article published in a magazine or trade publication, qualifies as prior art to an asserted patent if the date of publication is prior to the invention of the asserted patent.

43. I am further informed by counsel that a U.S. or foreign patent qualifies as prior art to an asserted patent if the date of issuance of the patent is more than one year before the filing date of the asserted patent. I further understand that a printed publication, such as an article

published in a magazine or trade publication, constitutes prior art to an asserted patent if the publication occurs more than one year before the filing date of the asserted patent.

44. I am further informed by counsel that Section 102 of the Patent Act provides that "[a] person shall be entitled to a patent unless . . . (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or . . . (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or . . . (g) . . . (2) before such person's invention thereof, the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it."

45. I have also been informed by counsel that the evidence must be "clear and convincing" for a claim to be found invalid.

**D. Legal Standard for Anticipation**

46. I am informed by counsel that "prior art" includes public information, public knowledge, and public acts that occur before an application for a patent was filed. Prior art includes patents, journals, Internet publications, systems and products.

47. I am further informed by counsel that a prior art reference "anticipates" an asserted claim, and thus renders the claim invalid, if all elements of the claim are disclosed in that prior art reference, either explicitly or inherently (i.e., necessarily present or implied).

48. I have written this Report with the understanding that anticipation must be shown by clear and convincing evidence.

**E. Legal Standard for Obviousness**

49. I am informed by counsel on the law regarding obviousness, and understand that even if a patent is not anticipated, it is still invalid if the differences between the claimed subject

matter and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the pertinent art.

50. I am further informed by counsel that an obviousness determination includes the consideration of various factors such as (1) the scope and content of the prior art, (2) the differences between the prior art and the Asserted Claims, (3) the level of ordinary skill in the pertinent art, and (4) the existence of secondary considerations such as commercial success, long-felt but unresolved needs, failure of others, etc.

51. I am further informed by counsel that secondary indicia of non-obviousness may include (1) a long felt but unmet need in the prior art that was satisfied by the invention of the patent; (2) commercial success or lack of commercial success of processes covered by the patent; (3) unexpected results achieved by the invention; (4) praise of the invention by others skilled in the art; (5) taking of licenses under the patent by others; and (6) deliberate copying of the invention. I also understand that there must be a relationship between any such secondary indicia and the invention. I further understand that contemporaneous and independent invention by others is a secondary consideration supporting an obviousness determination.

52. I am further informed by counsel that an obviousness evaluation can be based on a combination of multiple prior art references. I understand that a proper obviousness analysis generally requires a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements of multiple prior art references in the way the claimed new invention does. I understand that the prior art references themselves may provide a suggestion, motivation, or reason to combine, but other times the nexus linking two or more prior art references is simple common sense. I further understand that obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may be supplied by the direction of the marketplace.

53. I am further informed by counsel that if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

54. I am further informed by counsel that practical and common sense considerations should guide a proper obviousness analysis, because familiar items may have obvious uses beyond their primary purposes. I further understand that a person of ordinary skill in the art looking to overcome a problem will often be able to fit the teachings of multiple publications together like pieces of a puzzle. I understand that obviousness analysis therefore takes into account the inferences and creative steps that a person of ordinary skill in the art would employ under the circumstances.

55. I am further informed by counsel that a particular combination may be proven obvious merely by showing that it was obvious to try the combination. For example, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp because the result is likely the product not of innovation but of ordinary skill and common sense.

56. The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability.

57. I am further informed by counsel that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not just the patentee.

Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

58. I am further informed by counsel that a claim can be obvious in light of a single reference, without the need to combine references, if the elements of the claim that are not found explicitly or inherently in the reference can be supplied by the common sense of one of skill in the art.

59. I am further informed by counsel that even if a claimed invention involves more than substitution of one known element for another or the application of a known technique to a piece of prior art ready for improvement, the invention may still be obvious. I also understand that in such circumstances courts may need to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art to determine if the claimed invention is obvious.

60. In sum, my understanding is that prior art teachings are properly combined where a person of ordinary skill in the art having the understanding and knowledge reflected in the prior art and motivated by the general problem facing the inventor, would have been led to make the combination of elements recited in the claims. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the elements of multiple prior art references in the claimed manner.

61. I have been informed and understand that the obviousness analysis requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

62. I am informed by counsel that obviousness must be proven by clear and convincing evidence and I have written this Report with the understanding that obviousness must be shown by clear and convincing evidence.

**F. Indefiniteness**

63. I am informed by counsel that a patent specification must conclude with one or more claims particularly pointing out and distinctly claiming the subject matter that the applicant regards as his invention. Claims are indefinite if they do not reasonably apprise those skilled in the relevant art of the applicant's intended scope of the invention when read in light of the specification.

64. I am further informed by counsel a claim is indefinite if it contains words or phrases whose meanings are unclear when read in light of the specification. Lack of proper antecedent basis results in a "zone of uncertainty" as to construction, and renders the claim insolubly ambiguous.

65. I am further informed by counsel that a claim is considered indefinite if it does not reasonably apprise those skilled in the art of its scope. I am informed that a claim reciting both an apparatus and a method of using that apparatus renders a claim indefinite. I understand that where it is unclear whether infringement occurs when one creates a system that allows the user to perform a function, or whether infringement occurs when the user actually uses the system to perform a function, the claim does not apprise a person of ordinary skill in the art of its scope, and it is invalid as indefinite.

66. I am further informed by counsel that when a claim uses a means-plus-function term as authorized by 35 U.S.C. § 112 ¶ 6, the scope of the claim limitation must be defined by structure disclosed in the patent specification. In the absence of structure disclosed in the

specification to perform the functions, a means-plus-function claim limitation lacks specificity and the claim as a whole is indefinite.

67. I am further informed by counsel that indefiniteness must be proven by clear and convincing evidence.

68. I have written this Report with the understanding that indefiniteness must be shown by clear and convincing evidence.

**G. Written Description and Enablement**

69. I am further informed by counsel that a patent must contain a written description of the claimed invention. The written description must clearly convey to those skilled in the art that, as of the filing date sought, the applicant was in possession of the invention claimed.

70. I am further informed by counsel that a claimed invention must be enabled. A claimed invention is not enabled and, therefore, unpatentable if the specification does not teach those of ordinary skill in the art how to make and use the invention as it is claimed, without undue experimentation. Undue experimentation is based on the level of skill in the art as of the effective filing date of the patent.

71. I am informed by counsel invalidity for lack of adequate written description or enablement must be shown by clear and convincing evidence.

72. I have written this report with understanding that invalidity for lack of written description or enablement must be shown by clear and convincing evidence.

**H. Conception and Reduction to Practice**

73. I am informed by counsel that many of the different categories of prior art refer to the date at which the inventor made the invention. This is called the "date of invention."

74. I am further informed by counsel that there are two parts to the making of an invention: "conception" and "reduction to practice."

75. I have been advised that when the inventor first has the idea of the invention, this is referred to as "conception" of the invention. Conception is the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice. A conception of an invention is complete when the inventor has formed the idea of how to make and use every aspect of the claimed invention, and all that is required is that it be made without the need for any further inventive effort.

76. I am further informed by counsel that the actual making of the invention is referred to as "reduction to practice." An invention is said to be "reduced to practice" when it is made and shown to work for its intended purpose. I understand that the filing of a patent application serves as conception and constructive reduction to practice of the subject matter described in the application.

**I. Priority Date**

77. I am informed by counsel that the "critical date" for a patent is one year prior to its filing date. It is my understanding that the critical date is significant because patents, systems, or documents that are public prior to the critical date, if they disclose each and every limitation of the claims, will invalidate a patent regardless of when the inventors invented the claim.

78. I further understand that the "priority date" of a patent is the date on which it is filed. I further understand that the priority date is significant because patents, systems, or documents that are public less than one year prior to the priority date may invalidate the claims. My understanding is that, for such prior art references, a patentee may attempt to show that the claimed invention was conceived prior to the publication date of the prior art reference.

79. Although the priority date of an issued patent is ordinarily the date of filing of the application, I understand that an issued patent may claim the priority date of an earlier filed application if the application provides written description support for the claimed invention.

80. I am further informed by counsel that a patent may be valid over prior art that was published or was publically available before the priority date but after the critical date. To do so, it is my understanding that the patentee must prove that the named inventors conceived of the claimed invention before the prior art, and were diligent in reducing the claimed inventions to practice. It is my understanding that conception is the formation in the mind of the inventor, of a definite and permanent idea of the complete and operative invention, as it is hereafter to be applied in practice. A conception of an invention is complete when the inventor has formed the idea of how to make and use every aspect of the claimed invention, and all that is required is that it be made without the need for any further inventive effort. It is my understanding that the actual making of the invention is referred to as "reduction to practice." An invention is said to be "reduced to practice" when it is made and shown to work for its intended purpose. I understand that the filing of a patent application serves as conception and constructive reduction to practice of the subject matter described in the application. Based on my understanding of the relevant legal principles, it is my opinion that Apple has not demonstrated a conception of the claimed invention or diligence in reducing the claimed invention to practice prior to the priority date.

**J. Claim Construction**

81. I understand that a patent may include two types of claims, independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim or another dependent claim. I understand that a dependent claim includes all the limitations that it recites in addition to all of the limitations recited in the claim from which it depends.

82. I am informed by counsel that claim construction is a matter of law for the Court to decide. Claim terms should be given their ordinary and customary meaning within the context

of the patent in which the terms are used, i.e., the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention in light of what the patent teaches.

83. I understand that to determine how a person of ordinary skill would understand a claim term, one should look to those sources available that show what a person of skill in the art would have understood disputed claim language to mean. Such sources include the words of the claims themselves, the remainder of the patent's specification, the prosecution history of the patent (all considered "intrinsic" evidence), and "extrinsic" evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.

84. I am further informed by counsel that, in construing a claim term, one looks primarily to the intrinsic patent evidence, including the words of the claims themselves, the remainder of the patent specification, and the prosecution history.

85. I am further informed by counsel that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient.

86. I am further informed by counsel that words or terms should be given their ordinary and accepted meaning unless it appears that the inventors were using them to mean something else. In making this determination, however, of paramount importance are the claims, the patent specification, and the prosecution history. Additionally, the specification and prosecution history must be consulted to confirm whether the patentee has acted as its own lexicographer (i.e., provided its own special meaning to any disputed terms), or intentionally disclaimed, disavowed, or surrendered any claim scope.

87. I am further informed by counsel that the claims of a patent define the scope of the rights conferred by the patent. The claims particularly point out and distinctly claim the subject matter which the patentee regards as his invention. Because the patentee is required to

define precisely what he claims his invention to be, it is improper to construe claims in a manner different from the plain import of the terms used consistent with the specification. Accordingly, a claim construction analysis must begin and remain centered on the claim language itself. Additionally, the context in which a term is used in the asserted claim can be highly instructive. Likewise, other claims of the patent in question, both asserted and unasserted, can inform the meaning of a claim term. For example, because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims. Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.

88. I am further informed by counsel that the claims of a patent define the purported invention. I understand that the purpose of claim construction is to understand how one skilled in the art would have understood the claim terms at the time of the purported invention.

89. I am further informed by counsel that a person of ordinary skill in the art is deemed to read a claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification. For this reason, the words of the claim must be interpreted in view of the entire specification. The specification is the primary basis for construing the claims and provides a safeguard such that correct constructions closely align with the specification. Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim as set forth in the patent itself.

90. I am further informed by counsel that it is improper to place too much emphasis on the ordinary meaning of the claim term without adequate grounding of that term within the context of the specification of the asserted patent. Hence, claim terms should not be broadly construed to encompass subject matter that, although technically within the broadest reading of the

term, is not supported when the claims are read in light of the invention described in the specification. Put another way, claim terms are given their broadest reasonable interpretation that is consistent with the specification and the prosecution history. Art incorporated by reference or otherwise cited during the prosecution history is also highly relevant in ascertaining the breadth of claim terms.

91. I am further informed by counsel the role of the specification is to describe and enable the invention. In turn, the claims cannot be of broader scope than the invention that is set forth in the specification. Care must be taken lest word-by-word definition, removed from the context of the patent, leads to an overall result that departs significantly from the patented invention.

92. I am further informed by counsel that claim terms must be construed in a manner consistent with the context of the intrinsic record. In addition to consulting the specification, one should also consider the patent's prosecution history, if available. The prosecution file history provides evidence of how both the Patent Office and the inventors understood the terms of the patent, particularly in light of what was known in the prior art. Further, where the specification describes a claim term broadly, arguments and amendments made during prosecution may require a more narrow interpretation.

93. I am further informed by counsel that while intrinsic evidence is of primary importance, extrinsic evidence, e.g., all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises, can also be considered. For example, technical dictionaries may help one better understand the underlying technology and the way in which one of skill in the art might use the claim terms. Extrinsic evidence should not be considered, however, divorced from the context of the intrinsic evidence. Evidence beyond the patent specification, prosecution history, and other claims in the patent should not be relied upon

unless the claim language is ambiguous in light of these intrinsic sources. Furthermore, while extrinsic evidence can shed useful light on the relevant art, it is less significant than the intrinsic record in determining the legally operative meaning of claim language.

94. I am further informed by counsel that in general, a term or phrase found in the introductory words of the claim, the preamble of the claim, should be construed as a limitation if it recites essential structure or steps, or is necessary to give life, meaning, and vitality to the claim. Conversely, a preamble term or phrase is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention. In making this distinction, one should review the entire patent to gain an understanding of what the inventors claim they actually invented and intended to encompass by the claims.

95. I am informed by counsel that language in the preamble limits claim scope (i) if dependence on a preamble phrase for antecedent basis indicates a reliance on both the preamble and claim body to define the claimed invention; (ii) if reference to the preamble is necessary to understand limitations or terms in the claim body; or (iii) if the preamble recites additional structure or steps that the specification identifies as important.

## III. THE 915 PATENT

### A. Background of the Relevant Technology

#### 1. Interfaces and Event Handling

96. Graphical User Interfaces (GUIs) are a type of user interface that allows users to interact with electronic devices with graphic and image elements rather than with text based interactions only. Most computer users will instantly recognize the differences between a graphical user interface (e.g. Microsoft Windows 95) and a command based interface (e.g. MS-DOS).



**GUI "Desktop" of MS Windows 95 (left) vs. Non-GUI MS-DOS Command Prompt (right)**

*images available at*

http://upload.wikimedia.org/wikipedia/en/9/91/Windows_95_Desktop_screenshot.png and

http://www.operating-system.org/betriebssystem/gfx/logo/msdos_screenshot.jpg.

97. As shown above, a GUI typically includes the use of graphic icons with which a user may interact through the use of a pointing device (e.g., a mouse) to control a computer. Whereas GUIs represent information and actions available to a user through graphical icons and visual indicators, text-based interfaces such as MS-DOS only utilized typed commands to control a computer.

98. An application programming interface (API) is a programming specification that is used by software components to communicate with each other. An API is commonly used to provide service routines or data manipulation. An API is specified in terms of a programming language that can be interpretative or compiled when an application is built. The software that provides the functionality exposed by an API is said to be an implementation of the API. The details regarding how the function is performed by the software implementing the API is hidden from the software component that uses or calls the API.

99. As GUI applications execute, they typically display visual elements on the screen

and then wait for user interaction. Under subsequent user interaction with the system (e.g. mouse clicks, key presses, touch screen presses), the application executes code to respond to that event, and then goes back into wait mode. This method of continually waiting, acting to handle events, and returning to wait is called event-driven programming and is a design methodology that traces its origins to early GUIs. Applications employing event-driven programming typically spend a majority of the time waiting and act only to handle events. The underlying software component that the GUI accesses through an API typically receives these events and passes them on to portions of the application called "event handlers."

100. In his overview of event driven programming, Stephen Ferg discloses "event objects – objects for holding events" that are "essentially packets into which we can stuff as much information about an event as we might wish" and are therefore "wonderful tools for doing event-driven programming." Ferg, "Event-Driven Programming: Introduction, Tutorial, History" (Feb. 8, 2006), *available at* http://eventdrivenpgm.sourceforge.net/event_driven_programming.pdf. Ferg further explains that event objects were a standard mechanism for representing user input as event data structures. Event driven programming focuses on event loops that retrieve user input in the form of event objects and dispatch it to event handlers for appropriate processing.

101. One of the basic characteristics of object oriented programming is the invocation of methods to perform various computing functions. *See* "What Is an Object?" The Java Tutorials (Oracle), Learning the Java Language, Object-Oriented Programming Concepts, *available at* http://docs.oracle.com/javase/tutorial/java/concepts/object.html (last visited March 21, 2012). That is, when a certain operation is performed, a corresponding call to a method is issued or executed.

**2. Multi-Touch Displays and Devices**

102. System designers have searched for ways to improve user interaction with

computer systems since the very first GUIs were developed. Among the first pointing devices developed was the trackball, which was developed by Tom Cranston, Fred Longstaff and Kenyon Taylor working on the Royal Canadian Navy's DATAR project in 1952. John Vardalas, *From DATAR To The FP-6000 Computer: Technological Change In A Canadian Industrial Context*, IEEE Annals of the History of Computing, Vol. 16, No. 2, 1994. Independently, Douglas Engelbart at the Stanford Research Institute developed the first mouse prototype in 1963, with the assistance of his colleague Bill English. Benj Edwards, *The computer mouse turns 40*, Macworld.com, *available at* http://www.macworld.com/article/1137400/mouse40.html.

103. Another pointer-based system was developed by Ivan Sutherland for the Sketchpad in 1963. It used a light-pen to guide the creation and manipulation of objects in engineering drawings. Sutherland, Ivan Edward, preface by Alan Blackwell and Kerry Roddenphone (September 2003), "Sketchpad: A Man-Machine Graphical Communication System," Technical Report No. 574, University of Cambridge, UCAM-CL-TR-574, *available at* http://www.cl.cam.ac.uk/techreports/UCAM-CL-TR-574.pdf. Capacitive touch-screens were developed in the early 1960s to similarly enhance user interaction with computer systems -- for example, touch-screen systems for air traffic control were described in papers by E.A. Johnson. *See* Johnson, E.A. (1965), "Touch Display - A novel input/output device for computers," *Electronics Letters* 1 (8): 219–220; Johnson, E.A. (1967). "Touch Displays: A Programmed Man-Machine Interface," *Ergonomics* 10 (2): 271–277. These represent a few examples of devices for user interaction with computer systems -- new ways to interact directly with displays are continually being invented.

104. Generally speaking, many of the known technologies for sensing direct touch of screens relate to resistive, optical and acoustic technologies. For many years, these various kinds of touch sensitive displays were commonly used with GUIs using standard event driven

programming models. Indeed, U.S. Patent App. 2007/0252821 ("Hollemans"), which was cited by the Examiner during the prosecution of the '915 Patent, discloses this history:

> Touch screens have had enormous growth in many areas of modern life. Touch screens are now common in places such as kiosks at airports, automatic teller machines (ATMs), vending machines, computers of all kinds. The elimination of the need for a pointing device and/or a light pen in many applications has been widely successful.

Hollemans at [0002].

105. Hollemans also confirms that in one known touch-screen configuration, a display surface:

> can be coated with any known film used for touch display, and can be used on any type of display, including . . . computers, PDAs, wireless communication devices, standard wireless telephones, video cell phones, etc.

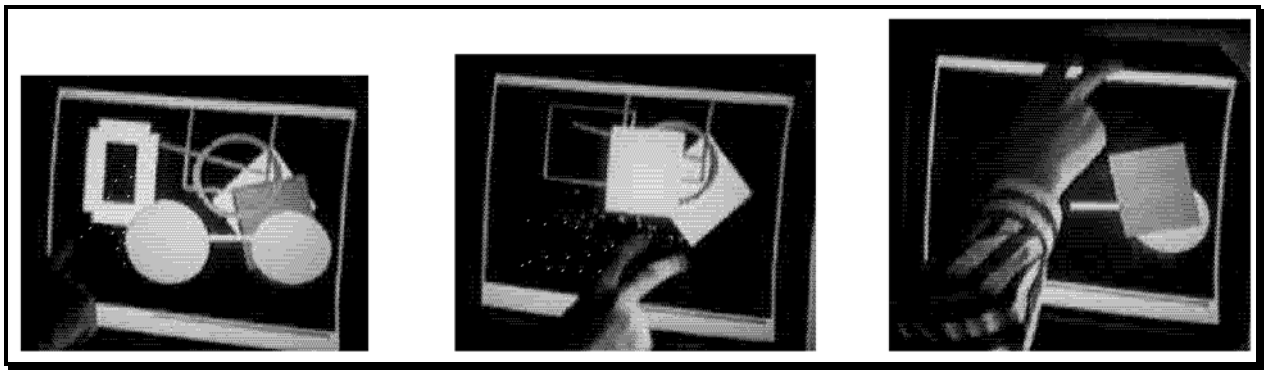
Hollemans at [0038].

**3. Gestural Input**

106. Touch-sensitive screens enable a user to interact directly with what is displayed on a screen, rather than indirectly with a pointer such as a mouse. Touch sensitive screens also eliminate the need for a device such as a stylus held in the hand. Touch sensitive screens enable *gestures*, e.g., multi-touch zooming, which may be more natural to a user than clicking buttons in a GUI. One of the goals in developing a multi-touch system includes mapping gestures to operations that are intuitive and easy for users to adopt. For example, rather than clicking on buttons which represent various control or navigation functions, a user can move his or her fingers in natural motions that correspond closely to the desired control or navigation operation (e.g. "pinch to zoom").

107. Early gestures on touch screens included using multiple fingers to move or change objects on a screen. For example, in December 1991, Dean Rubine's thesis, entitled "The Automatic Recognition of Gestures"("Rubine"), disclosed a number of gesture-based computer interaction techniques, including "two-phase multiple-finger interaction," which allowed multiple

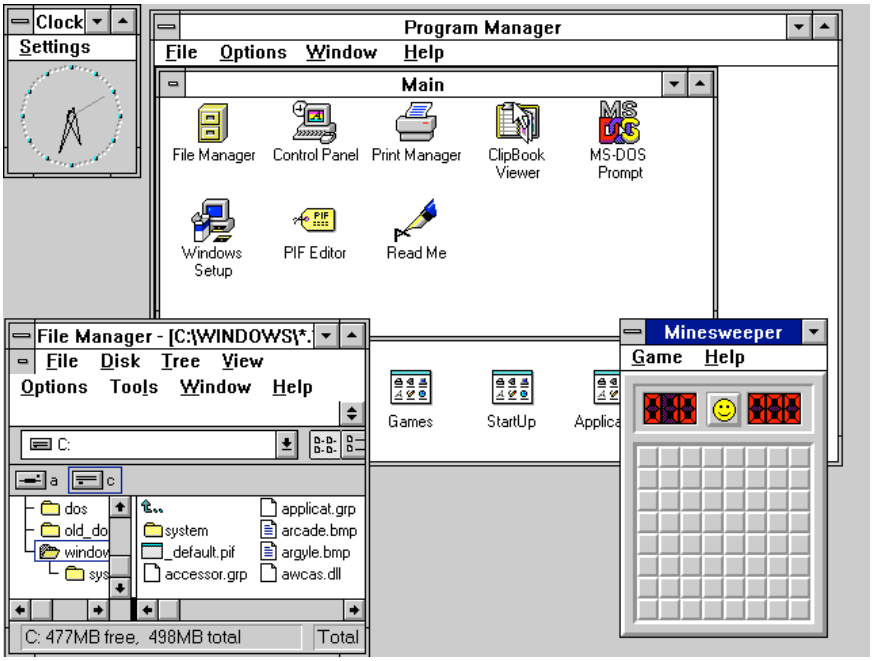
fingers to manipulate information on the touch screen. Dean Harris Rubine, "The Automatic Recognition of Gestures," CMU–CS–91–202 (December, 1991). These techniques allowed users to create and manipulate lines, rectangles, ellipses, and text using single-touch and multi-touch gestures.



**Early Multi-Touch** (Rubine at 182.)

108. Common methods of navigating content in a graphical user interface include scrolling or panning information – which moves information on the screen without changing its size as well as "scaling" or "zooming" content on the display – that changes the magnification of content to make it appear larger or smaller.

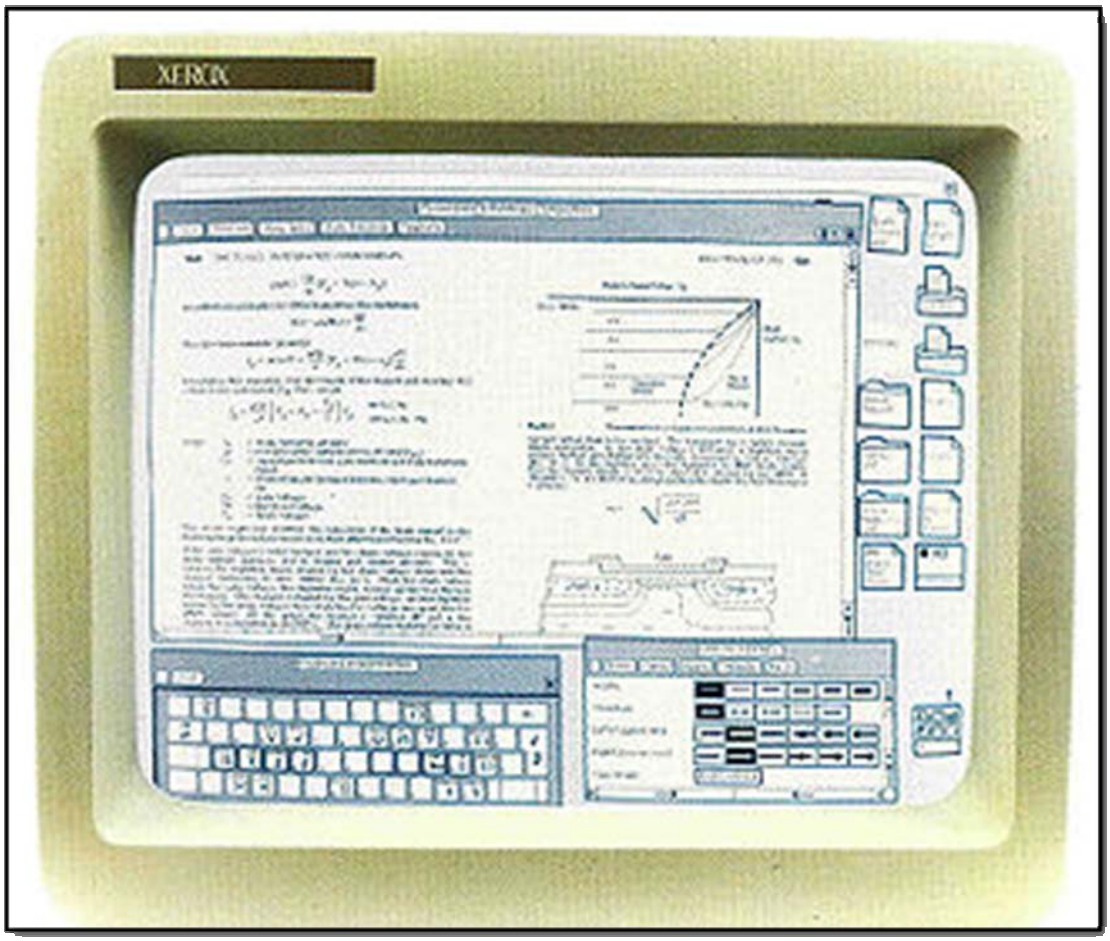
109. Scrolling (also called "panning") is implemented on most modern computing systems which utilize a graphic user interface such as Microsoft Windows. In many instances, the ability to scroll in a display window is graphically represented by a scroll bar on the side or bottom of the window.




**Windows 3.11 (released 12/31/93) workspace, showing scroll bars at the bottom left.**

*available at* http://upload.wikimedia.org/wikipedia/en/7/73/Windows_3.11_workspace.png

110. Scrolling operations using a scroll indicator (such as a scroll bar) trace their origins to Xerox's PARC Labs. By the mid-1970's, Xerox had developed a development environment and user interface called Smalltalk, and introduced many modern GUI concepts. Alan Kay, The Early History of Smalltalk, ACM SIGPLAN Notices, Vol. 28, No. 3 (March 1993) at *available at* http://www.smalltalk.org/downloads/papers/SmalltalkHistoryHOPL.pdf. Smalltalk coalesced in 1974, and was continuously updated and enhanced. *Id.* Scroll indicators were included in the SmallTalk development environment indicate to a user where they were currently located in a scrollable region that exceeded the size of a window: *Id.* at 34.




**Xerox's 8010 released in 1981, featuring Star, a GUI with scroll bars**

*available at* http://upload.wikimedia.org/wikipedia/en/f/f2/Xerox_8010_compound_document.jpg.

111. The ability to scroll through text or other content is necessary in any computer system where there is more content than can be displayed on a screen. Xerox's systems also utilized a mouse, which was used in conjunction with the scroll bar to scroll through documents.

112. Scroll bars can be used to control the speed, direction, and distance of a scroll operation. Scrolling is so fundamental that it appeared in one form or another in essentially every graphical user interface system that followed the Xerox Smalltalk, including Macintosh and Windows. Numerous interaction mechanisms were used to enable users to control scrolling including not only scrollbars, but also keyboard control, direct manipulation with single or multiple finger touching on trackpads and touch screens, and specialized hardware devices such as

scroll wheels that are integrated into mice. Even prior to GUI operating systems, text editors and word processors in early computer systems allowed users to utilize "page up", "page down" and arrow keys on a keyboard to scroll through content on a screen. Indeed, some early text editors and word processors showed an indicator when more content was available and the user was able to reveal more content by using certain key(s) on the keyboard.

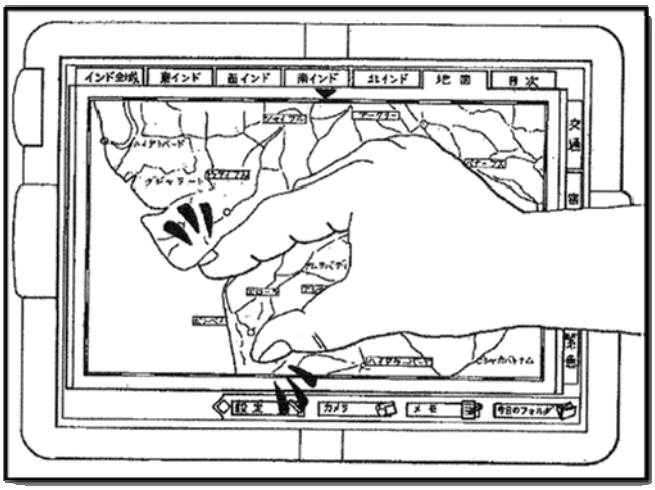
113. Zooming (or "scaling") allows users to change the scale of a viewed area in order to see more detail (or less). The idea of a zooming user interface or zoomable user interface (ZUI) goes back to the early 1990s with the "Pad" system, which supported black & white simple zooming in and out. K. Perlin and D. Fox, "Pad: A Multiscale Approach to the Computer Interface," Courant Institute of Mathematical Sciences, NYU (1993) *available at* http://mrl.nyu.edu/~perlin/pad-siggraph.pdf. The idea of zoomable interfaces was well known before 2007, as major software companies offered software with zooming features, including Adobe Acrobat Reader, Microsoft Office including Word and Excel, Apple's Preview, and Google Maps.

114. Others also developed and disclosed touch-based zoomable user interfaces before 2007, including Rubine (1991) and, in 2000, Yasuhiro in Japanese Patent Publication No. 2000-163031A (SAMNDCA00359127-359156; SAMNDCA00359049-359126). Numerous interfaces for controlling the zooming were developed including use of one button on a mouse, multiple buttons on a mouse, keyboards, single touches on touch screens, and multiple touches on touch screens – including "pinch" to zoom out, and "unpinch" to zoom in. Additionally, Hollemans discloses that a "two finger touch can be used to make a selection of items that are displayed within this square in order to select, zoom, copy, move, delete, etc., or select a dial to rotate the contents of the grid." (Hollemans at [0007].)

115. Multi-finger pinching to zoom was performed at least by Rubine in 1991,

Yasuhiro in 2000 and Wakai in 2001 as disclosed in U.S. Patent No. 7,138,983 (*see* Section III.D.5). Zooming through a pinch interface on a multi-touch screen is similar to natural interactions in the physical world and, therefore, likely a predictable design choice. People naturally move their fingers apart to stretch elastic materials, and move their fingers back together to shrink or compress them (e.g. stretching a rubber band on one's fingers). As a result, it is not surprising that the "pinch" gesture was similarly utilized to implement scaling operations in multiple prior art systems.

116. Yasuhiro described an e-book which used multi-touch gestures, such as two-finger zooming:



**Yasuhiro E-book Zooming Gesture Example** (Fig. 5; SAMNDCA00359142)

117. As discussed in more detail below, numerous references disclosed both one-finger scrolling and two-finger zooming.

**4. Rubberbanding**

118. The '915 Patent identifies a "rubberbanding" operation; however, the description in the Specification of the '915 Patent is unclear. For example, the Specification of the '915 Patent merely describes that the rubberband operation "has a rubberband effect on a scrolled region by a predetermined maximum displacement when the scrolled region exceeds a display edge based on a

scroll." For purposes of this report, I will construe "rubberbanding" and "rubberband effect" as moving content on a display in a manner that appears elastic. This elastic effect may also be described as "snapping" content back to a certain position on the display.

119. However, the notion of "snapping" elements in a GUI to align with a certain borders or boundaries was a well established concept. Snapping refers to alignment. Animation is the rapid display of a sequence of images to create an illusion of movement, and is implemented by drawing visual elements repeatedly, in succession and in slightly different positions and may be applied to snapping functionality in GUIs. Physics-based animation can replicate real-world properties such as elasticity. momentum, inertia, gravity, etc. These types of computer based animations based on physics were described as early as 1993. *See* e.g. Animation: From Cartoons to the User Interface, Bay-Wei Chang and David Ungar, UIST (1993).

120. The idea of alignment predates graphical user interfaces. Alignment is required in printing and graphic design where visually related information is laid out on a page so that related items are visually presented along a common edge. For example, items in a list might be vertically organized and aligned on their left edge. Alignment was naturally applied to layouts in the earliest graphical user interfaces.

121. Snapping allows objects to be moved, or "snapped", into alignment with respect to borders, screen limits, etc. *See* Henry, T.R., Hudson, S.E. and Newell, G.L., Integrating gesture and snapping into a user interface toolkit, Proc, UIST (1990), New York: ACM Press, 112-122. Snapping became a common fixture in user interfaces over the past two decades, appearing in graphic editors and CAD design programs such as Autodesk AutoCAD and Adobe Illustrator.

122. Putting these elements together to create snap-back animation in connection with "rubberbanding" as claimed in '915 Patent was straightforward. Further, the concept of applying the behavior or a rubber band to various GUI actions was hardly new. For example, U.S. Patent

No. 6,677,965 ("Ullmann") contemplated mimicking a rubber band's elastic motion specifically in scrolling as early as 2000.

**B. Background of the Patent**

**1. The '915 Patent Generally**

123. The '915 Patent, entitled "Application Programming Interfaces for Scrolling Operations," issued on Nov. 30, 2010 from an application filed Jan. 7, 2007. The named inventors of the '915 Patent are Andrew Platzer and Scott Herz. The Patent is assigned to Apple Inc.

124. I understand that in 2011, Apple filed this suit against Samsung, a competitor of Apple. I understand that claims 1-21 of the '915 Patent are at issue in this case.

125. The '915 Patent relates to the field of application programming interfaces that provide user interface operations, such as scrolling. The '915 Patent specifically concerns the problem of distinguishing among different touch-based user inputs, and responding by carrying out an appropriate operation in a computer system. As discussed in Section III.A.2, and as demonstrated in Appendices 3-6, as of the date of invention this was not a new problem, and a number of solutions to this problem already existed in the art.

126. The '915 Patent generally describes a programming implementation for recognizing touch-based user input that signals either a "scrolling" operation or a non-scrolling "gesture" operation that includes scaling, and possibly other operations, e.g., rotation.

127. As described in Figure 1 of the '915 Patent, an event object is created in response to receiving user input on a touch-sensitive display. This event object purportedly "invokes" one of two operations: (1) a "scroll operation" that scrolls a window if the touch input consists of one input point, or (2) a "gesture operation" that scales a view if the touch input consists of two or more input points.

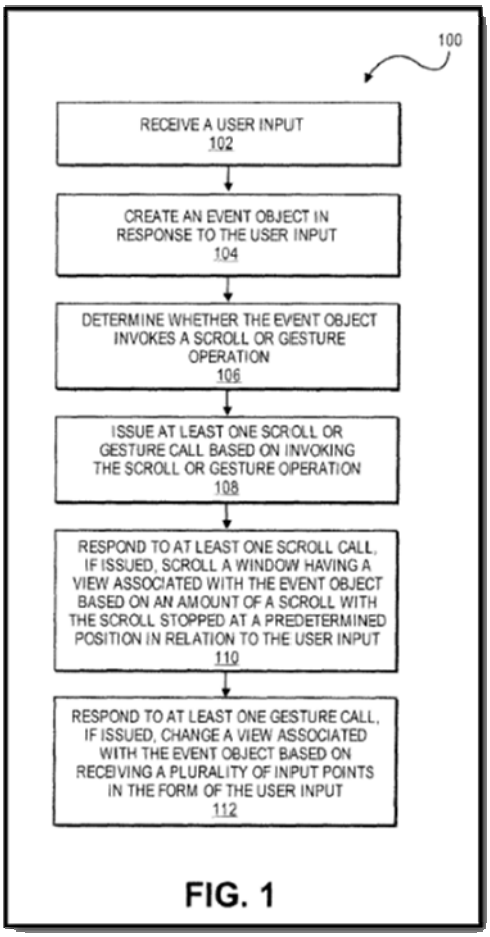


FIG. 1

128. Claims 1, 8, and 15 are independent claims. The remaining asserted claims are dependent claims. These claims are reproduced in their entirety below. (The bracketed letter designations do not appear in the original claims and are added only for clarity.)

> 1. A machine implemented method for scrolling on a touch-sensitive display of a device comprising:
>
> [a] receiving a user input, the user input is one or more input points applied to the touch-sensitive display that is integrated with the device;
>
> [b] creating an event object in response to the user input;
>
> [c]determining whether the event object invokes a scroll or gesture operation by distinguishing between a single input point applied to the touch-sensitive display that is interpreted as the scroll operation and two or more input points applied to the touch-sensitive display that are interpreted as the gesture operation;
>
> [d] issuing at least one scroll or gesture call based on invoking the scroll or gesture operation;

[e] responding to at least one scroll call, if issued, by scrolling a window having a view associated with the event object based on an amount of a scroll with the scroll stopped at a predetermined position in relation to the user input; and

[f] responding to at least one gesture call, if issued, by scaling the view associated with the event object based on receiving the two or more input points in the form of the user input.

2. The method as in claim 1, further comprising: rubberbanding a scrolling region displayed within the window by a predetermined maximum displacement when the scrolling region exceeds a window edge based on the scroll.

3. The method as in claim 1, further comprising: attaching scroll indicators to a content edge of the window.

4. The method as in claim 1, further comprising: attaching scroll indicators to the window edge.

5. The method as in claim 1, wherein determining whether the event object invokes a scroll or gesture operation is based on receiving a drag user input for a certain time period.

6. The method as in claim 1, further comprising: responding to at least one gesture call, if issued, by rotating a view associated with the event object based on receiving a plurality of input points in the form of user input.

7. The method as in claim 1, wherein the device is one of: a data processing device, a portable device, a portable data processing device, a multi touch device, a multi touch portable device, a wireless device, and a cell phone.

8. A machine readable storage medium storing executable program instructions which when executed cause a data processing system to perform a method comprising:

[a] receiving a user input, the user input is one or more input points applied to a touch-sensitive display that is integrated with the data processing system;

[b] creating an event object in response to the user input;

[c] determining whether the event object invokes a scroll or gesture operation by distinguishing between a single input point applied to the touch-sensitive display that is interpreted as the scroll operation and two or more input points applied to the touch-sensitive display that are interpreted as the gesture operation;

[d] issuing at least one scroll or gesture call based on invoking the scroll or gesture operation;

[e] responding to at least one scroll call, if issued, by scrolling a window having a view associated with the event object; and

[f] responding to at least one gesture call, if issued, by scaling the view associated with the event object based on receiving the two or more input points in the form of the user input.

9. The medium as in claim 8, further comprising: rubberbanding a scrolling region displayed within the window by a predetermined maximum displacement when the scrolled region exceeds a window edge based on the scroll.

10. The medium as in claim 8, further comprising: attaching scroll indicators to a content edge of the view.

11. The medium as in claim 8, further comprising: attaching scroll indicators to a window edge of the view.

12. The medium as in claim 8, wherein determining whether the event object invokes a scroll or gesture operation is based on receiving a drag user input for a certain time period.

13. The medium as in claim 8, furthering comprising: responding to at least one gesture call, if issued, by rotating a view associated with the event object based on receiving a plurality of input points in the form of user input.

14. The medium as in claim 8, wherein the data processing system is one of: a data processing device, a portable device, a portable data processing device, a multi touch device, a multi touch portable device, a wireless device, and a cell phone.

15. An apparatus, comprising:

[a] means for receiving, through a hardware device, a user input on a touch-sensitive display of the apparatus, the user input is one or more input points applied to the touch-sensitive display that is integrated with the apparatus;

[b] means for creating an event object in response to the user input;

[c] means for determining whether the event object invokes a scroll or gesture operation by distinguishing between a single input point applied to the touch-sensitive display that is interpreted as the scroll operation and two or more input points applied to the touch-sensitive display that are interpreted as the gesture operation;

[d] means for issuing at least one scroll or gesture call based on invoking the scroll or gesture operation;

[e] means for responding to at least one scroll call, if issued, by scrolling a window having a view associated with the event object; and

[f] means for responding to at least one gesture call, if issued, by scaling the view associated with the event object based on receiving the two or more input points in the form of the user input.

> 16. The apparatus as in claim 15, further comprising: means for rubberbanding a scrolling region displayed within the window by a predetermined maximum displacement when the scrolling region exceeds a window edge based on the scroll.
>
> 17. The apparatus as in claim 15, further comprising: means for attaching scroll indicators to a content edge of the window.
>
> 18. The apparatus as in claim 15, further comprising: means for attaching scroll indicators to the window edge.
>
> 19. The apparatus as in claim 15, wherein determining whether the event object invokes a scroll or gesture operation is based on receiving a drag user input for a certain time period.
>
> 20. The apparatus as in claim 15, further comprising: means for responding to at least one gesture call, if issued, by rotating a view associated with the event object based on receiving a plurality of input points in the form of user input.
>
> 21. The apparatus as in claim 15, wherein the apparatus is one of: a data processing device, a portable device, a portable data processing device, a multi touch device, a multi touch portable device, a wireless device, and a cell phone.

129. For ease of explanation, I describe elements of the asserted claims below. This discussion is not meant to be exhaustive, and my full element-by-element analysis is provided in subsequent sections of this report and in Appendices 3-6.

**(a) Touch-sensitive display (Claims 1[a], 8[a], 15[a])**

130. All of the asserted claims require receiving user input "on a touch-sensitive display," and further specify that "the user input is one or more input points applied to the [or "a"] touch-sensitive display." As discussed in Section III.B.1.a, multi-touch display technology was well known by persons of ordinary skill in the art in 2007.

**(b) Events and event objects (Claims 1[b], 8[b], 15[b])**

131. When an input event occurs in a computing system, data relating to the event is captured that represents that event. This data is later used by the system to respond to or otherwise handle the event. As described in Section III.B.1.b, this was well known in 2007, and was in standard practice in every user interface I am aware of.

**(c) Gesture recognition (Claims 1[c], 8[c], 15[c])**

132. Touch input is analyzed to determine the user's apparent intention by recognizing the input as a known type of gesture. In multi-touch systems, this step commonly includes, among other things, using the number of input points to determine the appropriate operation to perform. The '915 Patent describes a known method for determining the appropriate operation to perform; that is, determining whether to perform a scroll or a scaling operation based on the number of input points. As described in Section III.B.1.c, this method was well understood by persons of skill in the art in 2007.

**(d) Scrolling and scaling operations (1[d]-[f], 8[d]-[f], 15[d]-[f])**

133. The '915 Patent claims describe using software to manipulate displayed content in a user interface, including "scrolling" content – *i.e.*, moving it on the display – and "scaling" content – *i.e.*, increasing or decreasing the level of magnification. As discussed in Section III.B.1(d), these operations were common and well understood by persons of skill in the art in 2007.

**2. Priority Date for the '915 Patent**

134. As discussed in Section II.1, my understanding is that the *critical date* for a patent is one year prior to its filing date.

135. The '915 Patent was filed in the United States on January 7, 2007, and claims no earlier priority; thus, it is my understanding that the critical date for the '915 Patent is January 7, 2006, one year before the filing date.

136. As discussed in Section II.1, my understanding is that the *priority date* is significant because patents, systems, or documents that are public less than one year prior to the priority date may invalidate the claims. My understanding is that a patentee may attempt to show that the claimed invention was conceived prior to the publication date of potentially invalidating

prior art references.

137. Based on my understanding of the legal principles provided in Section III, it is my opinion that Apple has not demonstrated that the named inventors conceived of the claimed invention prior to the priority date of January 7, 2007.

138. [redacted]

**C. Claim Construction for the '915 Patent**

139. In conducting my analysis of the '915 Patent claims, I have applied the legal understandings set out in Section II of this report.

**1. "scrolling a window having a view"**

140. I understand that the parties disagree on the proper construction of the claim term "scrolling a window having a view" as recited in claims 1 and 8. I understand that Samsung set forth its claim construction of this term in its responsive claim construction brief on December 22, 2011. I agree with Samsung's position that the construction of the term should be "Sliding a

window in a direction corresponding to the direction of the user input over a view that is stationary relative to the window." I incorporate and adopt Samsung's opinions regarding the '915 Patent in its claim construction brief, and the bases for those opinions, into this report.

141. I also understand that Apple's position is that no construction is necessary. I understand that the Court has not yet set forth its construction, so I will use Samsung's construction for purposes of this report since Apple has not put forth any construction of this term. I reserve the right to supplement this report when the Court's decision on claim construction is issued.

**2. Means-plus-function terms**

142. I understand that the parties dispute the meaning and validity of nine means-plus-function terms in claims 15-18, 20. *See* Exh. A of Samsung's Patent Local Rule 4-2 Disclosures . I understand that these terms have been addressed in Samsung's Patent Local Rule 4-2 Disclosures. I incorporate and adopt Samsung's positions regarding the '915 Patent as set forth in Exh. A of Samsung's Patent Local Rule 4-2 Disclosures and Samsung's claim construction briefs, and the bases for those opinions, into this report.

**D. Overview of the Prior Art**

143. It is my opinion that claims 1-21 of the '915 Patent (the "Asserted Claims") are anticipated or rendered obvious in light of the prior art specifically discussed below. I understand that the Asserted Claims include the claims relied upon by Apple for its infringement allegations.

144. As I discussed above, multi-touch gestures were well-known in the field in the 1990s and 2000s. By 2007, there were numerous examples of multi-touch systems that recognized single-finger input as a scrolling operation and multi-finger input as a scaling operation. Below I describe several such systems, as well as patents and printed publications related to the techniques described in the '915 Patent claims.

**1. DiamondTouch System**

145. The Diamond Touch system is comprised of the following components:

The DiamondTouch SDK

Mandelbrot ("Mandelbrot Application");

DiamondTouch running GSI ("GSI Application");

DiamondTouch running DTLens ("DTLens Application");

DiamondTouch running DTMouse ("DTMouse Application"); and

DiamondTouch running DTFlash ("DTFlash Application").

146. In 2001, Mitsubishi Electronics Research Laboratories (MERL) developed a capacitive multi-touch table, called the DiamondTouch. The DiamondTouch table is a multi-touch, interactive PC interface product that has the capability of allowing multiple people to interact simultaneously with applications executing on the PC while identifying which person is touching where. Sandhana, L., "Interactive display system knows users by touch", New Scientist, 25 May 2006. The technology was originally developed by Paul Dietz and Darren Leigh at MERL, and presented at the ACM Symposium on User Interface Software and Technology (UIST) in 2001. Dietz, P.; Leigh, D. (2001). "DiamondTouch: A Multi-User Touch Technology". Proceedings of the 14th annual ACM symposium on User interface software and technology. f. UIST: Orlando, FL. pp. 219–226, available at http://www.merl.com/papers/docs/TR2003-125.pdf.

147. DiamondTouch technology enables development of user interfaces using touch screens and supporting multiple concurrent users in computer assisted collaborative environments:

> DiamondTouch is a multi-user touch technology for tabletop front-projected displays. It enables several different people to use the same touch-surface simultaneously without interfering with each other, or being affected by foreign objects. It also allows the computer to identify which person is touching where.
>
> [Dietz, p. 219.]

148. According to its inventors, the DiamondTouch technology meets all of the following requirements for a multi-user touch technology for table top user interfaces:

> 1. Multipoint: Detects multiple, simultaneous touches.
> 2. Identifying: Detects which user is touching each point.
> 3. Debris Tolerant: Objects left on the surface do not interfere with normal operation.
> 4. Durable: Able to withstand normal use without frequent repair or re-calibration.
> 5. Unencumbering: No additional devices should be required for use - e.g. no special stylus, body transmitters, etc.
> 6. Inexpensive to manufacture.
> [Dietz, p. 220.]

149. Each active user of the DiamondTouch System is associated with a specific signal frequency which enables the system to discriminate between multiple users:

> DiamondTouch works by transmitting a different electrical signal to each part of the table surface that we wish to uniquely identify. When a user touches the table, signals are capacitively coupled from directly beneath the touch point, through the user, and into a receiver unit associated with that user. The receiver can then determine which parts of the table surface the user is touching.
> […]
> When a user touches the table, a capacitively coupled circuit is completed. The circuit runs from the transmitter, through the touch point on the table surface, through the user to the user's receiver and back to the transmitter.
> [Dietz, p. 220]

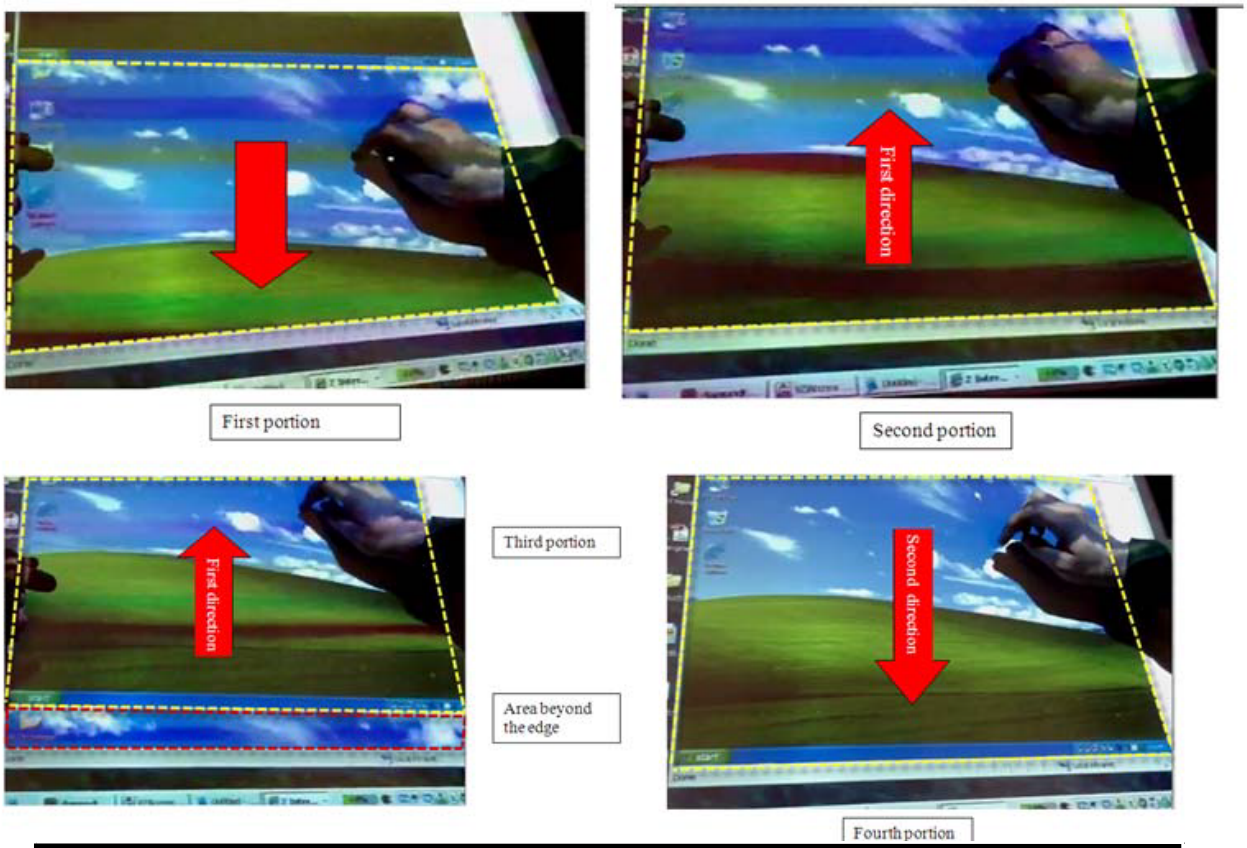
150. The DiamondTouch table led to developments in tabletop computing, shared display groupware, and touch-based interaction. "UbiTable: Impromptu Face-to-Face Collaboration on Horizontal Interactive Surfaces," *Fifth International Conference on Ubiquitous Computing*, UbiComp: Seattle, WA, available at www.merl.com/papers/docs/TR2003-49.pdf. In 2003, MERL started a university loan program in which DiamondTouch tables were provided to universities for research purposes, and tabletop computing research built around DiamondTouch began at research groups including Stanford University, Carnegie Mellon University, Georgia

Institute of Technology, and University of Tokyo, leading to research papers presented at academic conferences including UIST, ACM Conference on Human Factors in Computing Systems (CHI), ACM Conference on Computer Supported Cooperative Work (CSCW), and International Conference on Human-Computer Interaction (HCII). Research in the field led to the formation the annual academic conference beginning in 2006 called Tabletop (initially, the IEEE International Workshop on Horizontal Interactive Human-Computer Systems or TableTop 2006, and most recently the ACM International Conference on Interactive Tabletops and Surfaces or Tabletop 2010).

151. DiamondTouch first appeared publicly at a reception at the 2004 Technology Entertainment Design (TED) conference and soon after that at the first NextFest sponsored by Wired Magazine. Sanders, T., "Touch-screen gamers ex-static at NextFest", V3.co.uk (May 17, 2004), available at http://www.v3.co.uk/v3-uk/news/1968199/touch-screen-gamers-static-nextfest. In 2006, MERL began selling the DiamondTouch table product commercially. *See* MERL – DiamondTouch Website at http://www.merl.com/areas/DiamondTouch/

152. MERL employees developed many applications for the DiamondTouch system, in a number of different programming languages, and publicly demonstrated those applications running on DiamondTouch hardware in a variety of settings: trade shows, academic conferences, and meetings with educational institutions, potential business partners (*e.g.*, Apple and Google), and public officials (*e.g.*, the New York Police Department's Real Time Crime Center). Wigdor, D., Shen, C., Forlines, C., Balakrishnan, R., Table-centric interactive spaces for real-time collaboration: solutions, evaluation, and application scenarios (July 2006), available at http://www.dgp.toronto.edu/~ravin/papers/collabtech2006_tabletopinteraction.pdf; *see generally* [redacted]

153. A number of these applications recognized two-finger input as a scaling operation, and single-finger input as a scrolling operation. These applications include "Mandelbrot" (a.k.a. "FractalZoom"), an application for viewing a Mandelbrot fractal; GSI, an interface to Google Earth that recognized multi-touch input and speech commands; DTMouse, a mouse-emulation program that supported a variety of single-finger and multi-finger inputs; and DTFlash, which supports the execution of Adobe Flash programs such as the Tablecloth webpage on the DiamondTouch platform. These applications are discussed in greater detail in Appendix 3 to this report.




[redacted]

154. The DiamondTouch applications discussed above employ code written in a variety of programming languages. [redacted]

[redacted] Java and C# were well-known object-oriented programming languages by the mid-2000s, and a number of how-to books and development toolkits existed to facilitate software development in these languages.

155. As explained in Appendix 3, certain DiamondTouch applications utilized these well-known features to receive user input events.

156. I understand that the DiamondTouch system was publicly available running each of the applications listed above by at least January 7, 2007, and was publicly available running at least the Mandelbrot, GSI, DTMouse, and DTFlash/Tablecloth applications by at least by January 6, 2006, before the critical date of the '915 Patent, and is therefore prior art to the '915 Patent. I also understand that the DiamondTouch System was not abandoned, suppressed, or concealed at any time.

**(a) DiamondTouch SDK Publication ("DiamondTouch")**

157. The DiamondTouch SDK publication ("DiamondTouch") is a primary reference I rely upon to describe the DiamondTouch System's capabilities of running additional software and applications.

158. The DiamondTouch Software Development Kit (SDK) provides support for the development of Microsoft Windows and Linux applications that utilize DiamondTouch's capabilities to implement computer-supported collaboration and rich input modalities (such as gestures). Alan Esenther, Cliff Forlines, Kathy Ryall, Sam Shipman. *DiamondTouch SDK: Support for Multi-User, Multi-Touch Applications* (ACM CSCW 2002), reprinted as MERL Technical Report No. TR2002-48 ("TR2002-48"). In addition to implementing key features of the DiamondTouch technology, the SDK provides a platform for further exploration of its possibilities and applications, and is the vehicle whereby collaborators (internal and external) are supported.

The SDK provides libraries to support DT application development. The DiamondTouch hardware periodically produces frames of data indicating the proximity of the user's finger(s) to each antenna. The SDK reads these data frames from the device and provide access to the raw data as well as various abstractions and interpretations of that data, such as the location of the touch point and the bounding box of the area touched. A weighted interpolation algorithm increases the effective resolution to subpixel resolution. Adaptive touch thresholding and other techniques improve robustness in the face of RF interference. The SDK provides support for application development in a variety of languages (C/C++, Java, ActiveX Control) and includes a number of diagnostic (e.g., merldt) and utility applications (e.g., mouse emulation, projector calibration, thresholding, etc).

159. The named authors of DiamondTouch SDK Publication are Alan Esenther, Cliff Forlines, Kathy Ryall, and Sam Shipman.

160. DiamondTouch SDK was published in 2002 in as one of the Association of Computing Machinery's Computer Supported Co-operative Work special interest group publications. DiamondTouch was also reprinted as a MERL Technical Report No. TR2002-48. Based on my understanding, this reference qualifies as prior art.

**(b) DiamondTouch running Mandelbrot ("Mandelbrot Application")**

161. The Mandelbrot application was developed to utilize features of DiamondTouch. For purposes of this report, I will refer to the DiamondTouch System running Mandelbrot as the "Mandelbrot Application."

162. The following prior art references define the Mandelbrot Application:

- Mandlebrot System source code and executable [redacted]

- Alan Esenther, Cliff Forlines, Kathy Ryall, Sam Shipman. DiamondTouch SDK: Support for Multi-User, Multi-Touch Applications (ACM CSCW 2002), reprinted as MERL Technical Report No. TR2002-48 ("TR2002-48") published in 2002.

163. A video demonstration of the Mandelbrot Application is available at http://www.youtube.com/watch?v=JKWe9U5PHmQ.

164. The Mandelbrot Application displays a fractal image that is the result of a calculation performed by a computer using equations named after Benoit Mandelbrot. The aforementioned video demonstrates a DiamondTouch table top displaying the Mandelbrot Application as well as projecting it on a wall. A user performs two touch magnification of zoom of the image on the display of the DiamondTouch table top as well as scrolling of the image. As the user zooms the image on the DiamondTouch table top, an image on the wall remains of the whole image and displays a viewport on the wall that shows the area of the image being shown after zooming on the DiamondTouch table top. A further gesture on the table top allows for scrolling of the zoomed image which moves the view port on the wall to reflect the current location of the image being displayed on the DiamondTouch table top.

165. The Mandelbrot Application source code confirms the operation demonstrated in the video. The modules are described in the attached chart (Appendix 3).

**(c) DiamondTouch running the Gesture-Speech Interface to Google Earth (GSI) ("GSI Application")**

[redacted]

166. The Gesture-Speech Interface to Google Earth (GSI) application was developed to utilize features of DiamondTouch. For purposes of this report, I will refer to the DiamondTouch System running GSI as the "GSI Application."

167. The following prior art references define the GSI Application:

- Tse, et al., "Enabling Interaction with Single User Applications through Speech and Gestures on a Multi-User Tabletop," AVI '06 (May 23-26, 2006), Venezia, Italy, first published in December 2005 as MERL Technical Report No. TR2005-130 ("TR2005-130").
- Alan Esenther, Cliff Forlines, Kathy Ryall, Sam Shipman. DiamondTouch SDK: Support for Multi-User, Multi-Touch Applications (ACM CSCW 2002), reprinted as MERL Technical Report No. TR2002-48 ("TR2002-48") and first published in 2002.

168. Video demonstration of Gesture-Speech Interface to Google Earth http://video.google.com/videoplay?docid=6420668728353654549 (Tse Video).

169. The GSI Application is demonstrated by two examples of the gesture-speech interface in the Gesture-Speech Interface to Google Earth video. In the first example a user operates the GSI Application to perform panning (scrolling), magnification (gestures) and control tasks by a combination of voice and touch screen actions on a Google Map. For example, the user scrolls a map from one hemisphere to another and magnifies a specific geographical region. In another example, the user directs players in a video game with a similar combination of speech and touch screen controls.

170. In his deposition, [redacted]

171. The Tse article provides details of the system including a description of the architecture. Among other things, the GSI Application architecture described in the article includes:

- a 42" MERL Diamond Touch surface
- a speech recognition unit including software using the Microsoft Speech Application Programmers' Interface
- a Diamond Touch gesture recognition engine to convert the raw touch information produced by the DiamondTouch SDK into a number of rotation and table-size independent features such as touch screen zooming and scrolling.

**(d) DiamondTouch running DTLens ("DTLens Application")**

172. DTLens is an application developed to utilize features of DiamondTouch. For purposes of this report, I will refer to the DiamondTouch System running DTLens as the "DTLens Application."

173. The following prior art references define the DTLens Application:

- Clifton Forlines and Chia Shen, *DTLens: Multi-user Tabletop Spatial Data Exploration* (UIST Oct. 23-27 2005) ("DTLens Paper")
- [redacted]
- Alan Esenther, Cliff Forlines, Kathy Ryall, Sam Shipman. DiamondTouch SDK: Support for Multi-User, Multi-Touch Applications (ACM CSCW 2002), reprinted as MERL Technical Report No. TR2002-48 ("TR2002-48")

174. A demonstration of DTLens is available at http://video.google.com/videoplay?docid=-3886513468838294l4#docid=3206119989161784297.

[redacted]

175. The DTLens Application is a DiamondTouch based technique for exploring spatial data such as a map or astronomical photograph by providing multiple viewports or lenses operated simultaneously by multiple users.

176. The DT Lens video demonstration shows a user on a DiamondTouch table identifying a portion of a displayed map image for magnification. This is accomplished by the user placing two fingers on the DiamondTouch table which define the corners of a box that represents the lens. While maintaining contact with the table the user moves their fingers in opposite directions to magnify the map image data in the original lens. Releasing the fingers returns the magnified portion back to its original size. There are other features of the DT Lens System including the ability to make the magnified region remain on the DiamondTouch table for annotations. The Forelines paper describes some of the details regarding the DT Lens System.

177. The DTLens source code and executables confirm the operation of the DT Lens System.

**(e) DiamondTouch running DTMouse ("DTMouse Application")**

178. DTMouse is an application developed to utilize features of DiamondTouch. For purposes of this report, I will refer to the DiamondTouch System running DTMouse as the "DTMouse Application."

179. The following prior art references define the DTMouse Application:

- [redacted]
- DTMouse documentation, including but not limited to documentation produced at [redacted]

[redacted]

[redacted]

- Alan Esenther, Cliff Forlines, Kathy Ryall, Sam Shipman. DiamondTouch SDK: Support for Multi-User, Multi-Touch Applications (ACM CSCW 2002), reprinted as MERL Technical Report No. TR2002-48 ("TR2002-48") and first published in 2002.

180. A video demonstration of the DTMouse Application is available at http://www.youtube.com/watch?v=t35HXAjNW6s, [redacted]

181. The DTMouse Application is an application using the DiamondTouch platform implementing, among other things, a touchscreen user interface. The DTMouse video shows multiple users performing various user interface "mouse" operations on the DiamondTouch table top such as annotation, zooming using two touch points and scrolling using a single touch point.

182. The DTMouse Application source code and executables confirm the operation of the DTMouse Application.

**(f) DiamondTouch running DTFlash ("DTFlash Application") and the Tablecloth DTFlash webpage**

183. DTFlash is an application developed to utilize features of DiamondTouch. For purposes of this report, I will refer to the DiamondTouch System running DTFlash as the "DTFlash Application."

184. The following prior art references define the DTFlash Application:

- [redacted]

[redacted]

- Alan Esenther, Cliff Forlines, Kathy Ryall, Sam Shipman. DiamondTouch SDK: Support for Multi-User, Multi-Touch Applications (ACM CSCW 2002), reprinted as MERL Technical Report No. TR2002-48 ("TR2002-48") and first published in 2002.

185. The DTFlash Application is an application using the DiamondTouch platform implementing, among other things, a touchscreen user interface. The DTFlash supports the execution of Adobe Flash programs on the DiamondTouch platform.

186. The DTFlash Application was frequently demonstrated in the lobby at MERL in Massachusetts in 2004.

187. One example of an Adobe Flash program that utilizes DTFlash was the "Tablecloth DTFlash webpage" application, [redacted] The Tablecloth DTFlash webpage demonstrates a rubberbanding effect. Tablecloth DTFlash is a single picture Flash based webpage comprising a scrolling region. When the user scrolls up or down past the edge of the window boundary and then releases the scroll, the image bounces back to its original position. The bounce back effect (or "rubberbanding") simulates a physics based elastic effect.

**2. Portable Information Device and Information Storage Medium. Japanese Patent Publication No. 2000-163031 to Yasuhiro, et al. ( "Yasuhiro")**

188. Japanese Patent Publication No. 2000-163031A ("Yasuhiro") was published in 2000. The first named inventor is Nomura Yasuhiro. Yasuhiro discloses a portable information device (i.e. E-book) that allows for touch gestures, such as scrolling and zooming, to navigate the information displayed on the E-book (e.g., maps and books).

[redacted]

189. Yasuhiro discloses a system for information distribution with a touch screen user interface that provides for various control operations:

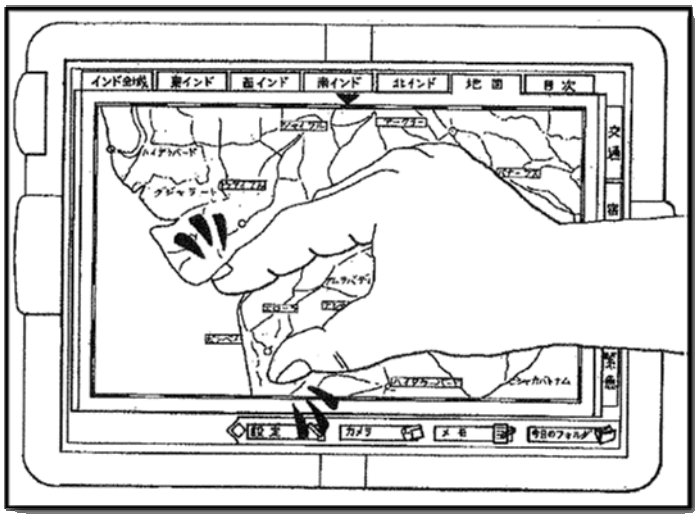
> There are provided an E-book or a portable information device that can be realized in a human interface convenient to use the features such as rotation, zooming-in, zooming-out and scrolling of map images, and an information storage medium used for the same.
>
> An E-book with a display capable of displaying map images. An execution instruction and the amount of manipulation regarding at least one of rotation, zooming-in, zooming-out and scrolling manipulations for map images may be simultaneously input by action histories of fingers in contact with the display.
>
> [Yasuhiro, p. 1, ll. 2-11]

190. Yasuhiro also discloses a portable information device with a touch screen interface that allows for user interface operations using the touch screen:

> A zooming-in instruction and the amount of zooming-in for map images may be input by an action of widening the gap between two fingers. A zooming-out instruction and the amount of zooming-out for map images may be input by an action of narrowing the gap between two fingers. A rotation instruction and the amount of rotation for map images may be input by an action of rotating one finger around an axis of another finger.
>
> [Yasuhiro p. 1, ll. 12-16]

191. Yasuhiro discloses techniques using a touch screen for zooming, rotating and scrolling as well as other user interface operations.

> A finger action detector 10 detects histories of finger actions taken on a display on which a map image is displayed, in order to allow a user to input rotation, zooming-in, zooming-out, and scrolling manipulations for the map image. The finger action detector 10 is made by mounting a transparent touch panel on a display 60. Detected data acquired in the finger action detector 10 is input to a processor 20.
>
> [Yasuhiro p. 14, ll. 16-22]



**Yasuhiro E-book Zooming Gesture Example** (Fig. 5; SAMNDCA00359142)

192. I understand that Yasuhiro was published at least by June 2000, and is therefore prior art to the '915 Patent.

**3. Sony SmartSkin**

193. Jun Rekimoto's paper, entitled "SmartSkin: An Infrastructure for Freehand Manipulation on Interactive Surfaces" and published in April 2002 ("Sony SmartSkin") describes Sony's SmartSkin introduced in 2002. Sony SmartSkin is an integrated system including interactive "capacitive sensing" on tabletop surface or tablet. The user operates the Sony SmartSkin using hand and multi-touch finger gestures. Sony SmartSkin was used with a number of system applications, including web browsers, map viewers, graphic editors, and games.

194. SmartSkin discloses using multi-touch capacitive sensing to track the position of the user's hand and fingers. The sensing architecture was compatible with surfaces such as table tops or walls and tracked the position of the user's fingers and hands. Various interaction techniques were described in the SmartSkin paper, including mouse emulation and shape based manipulation.

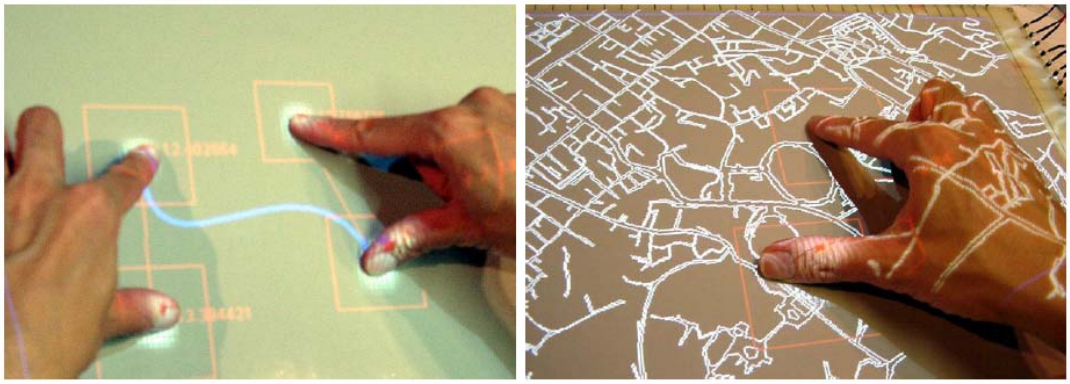


**Figure 12: Examples of uses of multiple-finger interfaces: left: curve editing. right: a map browsing system. The user can use one finger for panning, or two or more fingers for simultaneous panning and scaling.**

(*SmartSkin* at 117)

195. Sony SmartSkin also describes mouse emulation to recognizing a user's hand and finger gestures to emulate mouse operations. (See Figures 5, 6 and 7.) Numerous examples of finger and hand gestures are also disclosed in Sony SmartSkin.

196. I understand that Sony SmartSkin was publicly available at least by April 2002, before the critical date of the '915 Patent, and is therefore prior art to the '915 Patent.

**4. Jefferson Han's Multi-Touch System**

197. In 2005, Jefferson Han introduced a multi-touch system that demonstrated a wide variety of gesture-based control on content on a touch sensitive display ("Han's Multitouch System"). Jefferson Y. Han, *Low-cost multi-touch sensing through frustrated total internal reflection*, In Proceedings of the 18th annual ACM symposium on User interface software and technology (UIST '05), ACM, New York, NY, 115-118. Han's Multitouch System encompassed numerous touch-based applications, including Map, Recurl, and Photoboard. These applications allowed touch-based manipulation of images displayed on the screen, including one-finger scrolling and two-finger zooming.

198. A video demonstration of Han's Multitouch System is available at http://www.ted.com/talks/jeff_han_demos_his_breakthrough_touchscreen.html and demonstrates the Photoboard application among others.

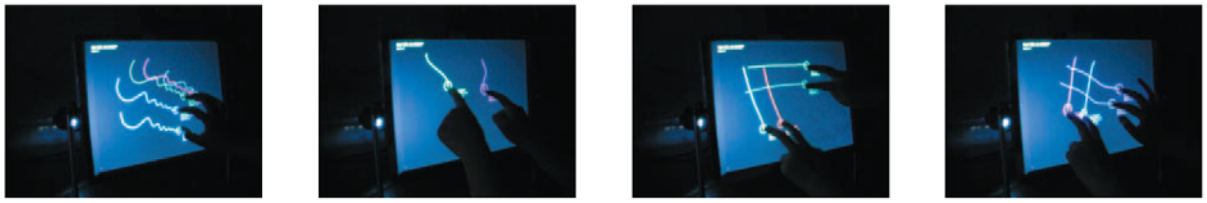


Figure 1: Simple examples of multi-touch interaction using our FTIR technique

199. I understand that Han's Multitouch System was invented and publicly demonstrated at least by 2005, and is therefore prior art to the '915 Patent.

**5. LaunchTile/XNav**

200. I understand that Benjamin Bederson and his colleagues created a graphical user interface for mobile devices in 2004 known as LaunchTile. This user interface is described in an indexed publication entitled AppLens and LaunchTile: Two Designs for One-Handed Thumb Use on Small Devices (hereafter "LaunchTile Publication"), which was published no later than April 7, 2005 and was prepared by Dr. Bederson for the ACM Conference on Human Factors in Computing Systems (known as the CHI Conference). I also understand that during the CHI Conference in April 2005 (and later at a May 2005 symposium at the Human-Computer Interaction Lab at the University of Maryland) Dr. Bederson and his team discussed their work on LaunchTile and gave live demonstrations. *See* Bederson Declaration (August 20, 2011) and Bederson Deposition Transcript (September 17, 2011).

201. I further understand that Dr. Bederson and his colleagues created a variant of the LaunchTile software called XNav, which was adapted for use with Windows XP. I understand that a device running XNav (as well as a device running LaunchTile) was demonstrated in a video presentation that Dr. Bederson made available on his web page around April 2005. I also understand that Dr. Bederson provided source code for the XNav application to Microsoft in

August 2005, and that this source code was made available to Microsoft without any restriction on its ability to reproduce, use, or disseminate that code. *See* Bederson Declaration (August 20, 2011) and Bederson Deposition Transcript (September 17, 2011).

202. In forming my opinion, I have personally used a Compaq iPaq h1900 series model 1950 PocketPC device running LaunchTile, and I have personally used XNav running on Sony VGN-U750P touch-screen device. I have reviewed the declaration of Bejamin Bederson in support of Samsung's Opposition to Apple's Motion for Preliminary Injunction in this case, and have reviewed the XNav source code attached as an exhibit thereto.

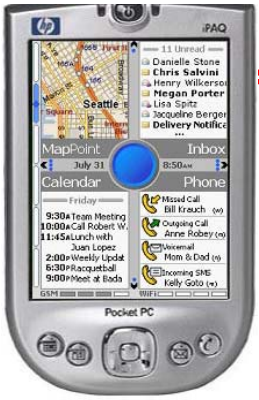
203. In the LaunchTile Publication, Bederson describes the use of gestures on a touch screen user interface for navigation within an information or content space. The space is constrained by the form factor of the smart phone:

> For device interaction when using a touch-sensitive screen, both designs utilize a gestural system for navigation within the application's zoomspace. While our designs do not directly address one-handed text entry, they are compatible with a variety of existing single-handed text input techniques, including single- and multi-tap alphanumeric keypad input, as well as miniature thumb keyboards and unistroke input systems executed with a thumb (e.g.,Graffiti [6], Quikwriting [17]).

*See* LaunchTile Publication at p.202

204. LaunchTile consisted of an "interactive zoomspace" consisting of 36 application tiles, divided into nine zones of four tiles each. The LaunchTile Publication referred to this "zoomspace" as the "World." The zoomspace included a blue button ("Blue") in the center of each 4-tile zone that could be selected by the user to enlarge and translate the four tiles that were adjacent to the selection button. When enlarged, the four tiles and the selection button are referred to as the *zone view*:


World View




Zone View

205. In response to a user tap on a "zone" the device provides a "zone view," which "divides the screen area into 4 equally sized application tiles." The user can then tap any of the 4 "notification tiles" to launch the corresponding application:

206. Also, from the "zone view," LaunchTile permits the user to pan to neighboring 4-tile clusters by "dragging" the thumb either vertically or horizontally on the "rails" separating each application tile. As the user initiates the pan process, the "zoomspace moves with the thumb during dragging."

207. Finally, LaunchTile and XNav provide a rubber band effect when the user attempts to pan past the edge of the zone or application view within a limit.

208. Given these facts, I understand LaunchTile and XNav were in public use before the critical date of the '915 Patent and thus are prior art to the '915 Patent.

**E. Analysis of the Validity of the '915 Patent**

209. Here I assess the validity of the asserted claims of the '915 Patent. For terms and claim limitations where no construction has been provided, I analyze those elements using the plain and ordinary meaning of the terms as would have been understood by a person of ordinary skill in the art as of November 2010.

210. In the following sections, I provide a narrative of my opinions. I have also attached for each reference detailed charts identifying the anticipating disclosure for each prior art reference.

211. I reserve the right to demonstrate at trial any of the systems described herein, including all associated applications.

**1. Anticipation**

**(a) DiamondTouch System (Appendix 3)**

212. Appendix 3 describes the DiamondTouch System and particular software applications for that system. A single DiamondTouch System could and did include multiple software applications, and the disclosures in Appendix 3 are each indicative of the functionality of the DiamondTouch System. I may rely on disclosures in Appendix 3 , alone or in combination, to show that the '915 Patent is invalid over the DiamondTouch System

213. In my opinion, the DiamondTouch System with the Mandelbrot Application ([redacted]), GSI, DTLens Applicatoin, DTMouse Application and/or DTFlash/Tablecloth Application embodied each and every limitation of claims 1-21 of the '915 Patent, and therefore anticipates these claims.

214. Appendix 3 provides an element-by-element invalidity analysis of the DiamondTouch System, and are incorporated by reference into this report.

**(b) Sony SmartSkin (Appendix 4)**

215. In my opinion, the Sony SmartSkin system embodied each and every limitation of claims 1, 6, 7, 8, 13, 14, 15, 20 and 21 of the '915 Patent, and therefore anticipates these claims.

216. Appendix 4 provides an element-by-element analysis of the Sony SmartSkin system and is incorporated by reference into this report.

**(c) Yasuhiro (Appendix 5)**

217. In my opinion, the Yasuhiro discloses each and every limitation of claims 1, 6, 7, 8, 13, 14, 15, 20 and 21 of the '915 Patent, and therefore anticipates these claims.

218. Appendix 5 provides an element-by-element invalidity analysis of Yasuhiro and is incorporated by reference into this report.

**(d) Han's Multitouch System (Appendix 6)**

219. In my opinion, Han's Multitouch System discloses each and every limitation of claims 1, 6, 7, 8, 13, 14, 15, 20 and 21 of the '915 Patent, and therefore anticipates these claims.

220. Appendix 6 provides an element-by-element invalidity analysis of Han's Multitouch System and is incorporated by reference into this report.

**2. Obviousness**

221. Appendices 4-6 for the Sony SmartSkin, Yasuhiro, and Han references attached to this report contain an element-by-element claim chart comparing each of the asserted claims of the '915 Patent to prior art that renders the asserted claims invalid, including invalid as obvious. I incorporate that analysis into the body of this report. In this section I provide a narrative overview of my opinions regarding obviousness.

222. Each of the prior art references relied upon in Appendices 4-6, either alone or in combination with other prior art, renders the asserted claims of the '915 Patent invalid as obvious. In particular, each of these prior art references may be combined with other prior art references listed as relevant to the '915 Patent, or with information known to persons skilled in the art at the

time of the alleged invention. Specific combinations of prior art are provided below and in Appendices 4-6 by way of example only.

**(a) The '915 Patent is a Combination of Prior Art Elements**

223. Each of the elements in the '915 Patent was present in the prior art. Specifically, as discussed above, touch-sensitive displays, events and event objects representing those events, gesture recognition of touch input where touch input is analyzed to determine the user's apparent intention, and scrolling and scaling operations were all well known in the art as of January 2007. Likewise, elements of the asserted dependent claims - rubberbanding, scroll indicators, rotation, and the use of receiving a drag input for a period of time to distinguish between a scroll and scale gesture – were also present in the prior art.

**(i) Rubberbanding was well known**

224. The technique of "rubberbanding" content was well known to persons of ordinary skill in the art. A variety of prior art systems disclosed rubberbanding, including the LaunchTile/XNav, and the DTFlash application (specifically the "Tablecloth" application in DTFlash) as described in Section III.D.5 and Appendix 3 (DiamondTouch System Chart).

225. The '915 Patent inventors do not claim to have invented any new "rubberbanding" concept. [redacted]

226. Rubberbanding functionality is a graphic user interface technique which may be employed in a variety of systems. Since the technique had been used to improve at least one device (e.g. using LaunchTile/XNav on a Compaq iPaq h1900 and DTFlash on the DiamondTouch System), a person of ordinary skill in the art would recognize that it would improve similar devices in the same way. Moreover, as one of the goals of implementing multi-touch functionality is to improve the user experience by bring a more natural interaction with a given system, it would be obvious to implement rubberbanding functionality in a graphic user interface to mimic a physical feature of the natural world (e.g. elasticity). Using the rubberbanding technique in a graphic user interface utilized in a multi-touch system would also yield predictable use of a prior art element according to its established function.

227. Therefore, to the extent that Sony SmartSkin system, Yasuhiro, and Han do not describe rubberbanding, it would have been obvious to one of ordinary skill in the art to combine these references with the rubberbanding prior art references described above for purposes of

implementing software using "rubberbanding" in connection with scrolling content.

228. It is my opinion that it would be obvious to combine the multi-touch capabilities of the Sony SmartSkin system, Han or Yasuhiro with either LaunchTile/XNav or DTFlash application. The combination of these references would render claims 2, 9 and 16 of the '915 Patent as obvious.

229. I note that the PTO stated that it did not find any non-obvious advancement in the art in claims 2, 9, or 16 of the '915 Patent regarding rubberbanding. (*See* Office Action, December 21, 2009.)

**(ii) Scrolling indicators were well known**

230. Scrolling indicators, and their attachment to scrollable regions of the user interface, were not new in 2007. The '915 Patent in fact admits that scroll indicators were the "***typical***" scrolling mechanism in 2007: "In a ***typical*** graphical user interface, ***scrolling is done with the help of a scrollbar*** or using the keyboard shortcuts, often the arrow keys" ('915 Patent col. 1:41-43) (emphases added).

231. As described in Section III.A.3, Microsoft Windows 3.11 and Xerox's SmallTalk system both utilized scrollbars.

232. Scrollbar functionality is a graphic user interface technique which may be employed in a variety of systems. Since the technique had been used to improve at least one device (e.g. using any number of applications running on Windows XP on the DiamondTouch System), a person of ordinary skill in the art would recognize that it would improve similar devices in the same way. Using scrollbar functionality in a graphic user interface utilized in a multi-touch system would also yield predictable use of a prior art element according to its established function.

233. Therefore, to the extent that Sony SmartSkin system, Yasuhiro and Han do not

describe scrollbars, it would have been obvious to one of ordinary skill in the art to combine these references with Microsoft Windows' scroll bars for purposes of implementing software with scrolling indicators.

234. It is my opinion that it would be obvious to combine the multi-touch capabilities of the Sony SmartSkin system, Han or Yasuhiro with either LaunchTile/XNav or DTFlash application. The combination of these references would render claims 3, 4, 10, 11, 17, and 18 of the '915 Patent as obvious.

235. I note that the PTO stated that it did not find any non-obvious advancement in the art in claims 3, 4, 10, 11, 17, or 18 of the '915 Patent regarding attaching scroll indicators. (*See* Office Action, December 21, 2009.)

**(iii) Detecting gestures based on a certain period of time was well known**

236. Claim 5 recites a gesture detection method that "is based on receiving a drag user input for a certain time period."

237. The DiamondTouch system discloses determining whether the event object invokes a scroll or gesture operation is based on receiving a drag user input for a certain time period. [redacted]

238. Since the drag input detection technique had been used to improve at least one device (e.g. the DiamondTouch System), a person of ordinary skill in the art would recognize that

it would improve similar multi touch capable devices in the same way. Moreover, as one of the goals of implementing multi-touch functionality is to improve the user experience by bring a more natural interaction with a given system, it would be obvious to implement a method of determining whether the event object invokes a scroll or gesture operation is based on receiving a drag user input for a certain time period. Using the drag user input method of detecting a scroll or gesture technique in a multi-touch system would also yield predictable use of a prior art element according to its established function.

239. Therefore, to the extent that Sony SmartSkin system, Yasuhiro, and Han do not describe a method of determining whether the event object invokes a scroll or gesture operation is based on receiving a drag user input for a certain time period, it would have been obvious to one of ordinary skill in the art to combine these references with the DiamondTouch system.

240. It is my opinion that it would be obvious to combine the multi-touch capabilities of the Sony SmartSkin system, Han or Yasuhiro with DiamondTouch. The combination of these references would render claims 5,12, and 19 of the '915 Patent as obvious.

**(b) One Skilled In The Art Would Have Found It Obvious To Combine The Known Elements In The '915 Claims**

241. I understand from counsel that where there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated successful solution to that problem, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was "obvious to try" can demonstrate that the combination was obvious.

242. In my opinion, a person of ordinary skill would have been motivated to pursue the claimed combination of elements based on trends in industry and research.

243. Trends in the user interface field in the mid-2000s provided a strong motivation to combine the different elements present in the asserted claims.

244. As the '915 Patent and the prior art references illustrate, the trend toward using multi-touch user interface technologies made the combination of these systems with other well-known elements of user interfaces (including, for example, rubberbanding while scrolling, attaching scroll bars) obvious as the field evolved. Additionally, the use of a drag input for a period of time to distinguish between a scroll and scale gesture was obvious to any multi-touch system able to distinguish between a single touch for scroll and multiple touches for scale (e.g. pinch to zoom).

245. In my opinion, at the time of filing, there was a design need or market pressure to simplify the computer user experience in the area of user interfaces, particularly for users to use natural movement to control a variety of applications using well-known features (e.g. rubberbanding while scrolling, attaching scroll bars) using multi-touch user interfaces such as those used by Sony SmartSkin, Yasuhiro, or Han. There was a finite number of identified, predictable solutions, including the alleged solution presented by the '915 Patent, and a person of ordinary skill would have had good reason to pursue the known options within his or her technical grasp. Therefore, the combination of these elements is not the result of innovation but of ordinary skill and common sense.

246. As shown in the Charts attached to this report, prior art devices and publications not only foreshadow the combination of elements described in the '915 Patent, but in fact actually practiced them. Persons of ordinary skill were motivated to, and in fact did, combine the prior art elements recited in the '915 Patent claims to achieve the same results described in the '915 Patent specification.

247. Furthermore, to the extent that Apple argues that a particular combination of

limitations was not found in the prior art, it is my opinion that any missing limitation would have been nothing more than a design choice well within a person of ordinary skill's grasp. The patent does not identify any shortcomings in the prior art, and the asserted claims do not overcome any drawbacks in the prior art. Instead, to the extent that there are differences between the prior art and the asserted claims, these differences are a result of the asserted claims merely choosing from among several interchangeable elements that happen to be different from one or more interchangeable elements found in the prior art.

**(c) Secondary Considerations Do Not Alter the Conclusion of Obviousness**

248. I have been informed that certain secondary considerations may be examined to determine whether a certain invention would have been obvious to one of ordinary skill in the art.

249. As I indicate above, I understand that secondary considerations may be addressed when relevant. In this case, it is my opinion that there are no secondary considerations that overcome the obviousness determination.

250. I am further informed, however, that it is Apple's burden to make a showing of secondary considerations. At this point, I understand that Apple has not yet showed any secondary considerations. Thus, I have not included any opinions on secondary considerations of nonobviousness in this report. If Apple should attempt to show secondary considerations of non-obviousness, I hereby reserve my right to address those claims in a supplemental report or at trial.

**3. Lack of Written Description and Enablement**

251. In my opinion, the '915 Patent is invalid as demonstrated at least by the references discussed in Section III.E.1 and III.E.2. As discussed there, the prior art references alone and in combination enable a person of ordinary skill in the art to make the invention without undue experimentation.

252. The '915 Patent specification does not contain a written description of any new solutions to the well-known background techniques that would be used to combine known prior art elements, such as touch-screen input, gesture recognition, event handling, or scrolling and scaling operations. To the extent Apple contends that combining these prior art elements presented some unique challenge that would require more than the background knowledge of one of skill in the art, in my opinion the '915 Patent specification does not address or solve any such challenges. Moreover, the specification does not teach those of ordinary skill in the art how to make and use the combination of claim elements without undue experimentation, to the extent Apple contends that one of skill would not immediately appreciate how to make this combination of claimed elements using their background knowledge. In my opinion the '915 Patent relies on a person of skill's background knowledge to guide and enable the claimed combination of prior art elements.

253. The Asserted Claims also include several generic software elements, including creating and invoking event objects and issuing and responding to "calls." As discussed above in Appendices 3-6 and Sections III.D, these elements were well known in the art long before the patent. If Apple alleges that it would be challenging to create event objects generally, or for touch events as opposed to other events specifically, then this element is not enabled by the '915 Patent, which merely restates that objects should be created and used, including objects representing various touch characteristics – not how those objects should be created or used. Also, if Apple alleges that a person of ordinary skill in the art, relying on only his or her background knowledge, would be unable make use of event objects (including incorporating these into systems that did not yet utilize them) without undue experimentation, then the use of event objects is not enabled by the '915 Patent.

254. Associating an event object with a view would have also been known to one of

ordinary skill in the art. Associating views with non-touch event objects (*e.g.*, mouse or stylus input) was well known in the prior art. Every graphical user interface I am aware of sends pointer events, such as mouse, stylus, or touch events, to the top-most view that is located at the point of the pointer input. A person of ordinary skill in the art would find no difficulty in associating a view with a touch event object. If Apple alleges that it would be more challenging to associate views with event objects, generally or in the touch event context specifically, then this element is not enabled by the '915 Patent. Also, if Apple alleges that a person of ordinary skill in the art, relying on only his or her background knowledge, would be unable make this element without undue experimentation, then this element is not enabled by the '915 Patent.

255. The Asserted Claims require determining whether the event object invokes a scroll or gesture operation by distinguishing between a single input point and two or more input points applied to a touch sensitive screen. The '915 Patent requires that a person of ordinary skill in the art would be able to perform this determination in order to practice the claimed invention. If Apple alleges that a person of ordinary skill in the art, relying on only his or her background knowledge, would be unable make this element without undue experimentation, then this element is not enabled by the '915 Patent.

256. The Asserted Claims also require scrolling and scaling without disclosing any structure or algorithms for performing these functions, using specific finger inputs to trigger those operations. The '915 Patent requires that a person of ordinary skill in the art would be able to perform scrolling and scaling, and map these operations to one-finger inputs and multi-finger inputs respectively, in order to practice the claimed invention. If Apple alleges that a person of ordinary skill in the art, relying on only his or her background knowledge, would be unable make these elements without undue experimentation, then these elements are not enabled by the '915 Patent.

257. The Asserted Claims also require rubberbanding a scroll region by simply providing a description of the visual effect of rubberbanding.

> Rubberbanding a scrolled region according to the method 300 occurs by a predetermined maximum displacement value when the scrolled region exceeds a display edge of a display of a device based on the scroll. If a user scrolls content of the display making a region past the edge of the content visible in the display, then the displacement value limits the maximum amount for the region outside the content. At the end of the scroll, the content slides back making the region outside of the content no longer visible on the display.

(7:59-67.) If Apple alleges that a description of visual effect of rubberbanding in the prior art is not enough to enable a person of ordinary skill in the art to make this element, then this element is not enabled by the '915 Patent.

258. The Asserted Claims also require the use of scroll indicators without a specific definition of this element, presuming that one of ordinary skill in the art already has knowledge of scroll indicators. If Apple alleges that the existing knowledge of one of ordinary skill in the art is not sufficient to enable one of ordinary skill in the art to attach scroll indicators to various positions on the display, then these elements are not enabled by the '915 Patent.

259. The Asserted Claims also require determining whether the event object invokes a scroll or gesture operation based on receiving a drag user input for a certain time period. If Apple alleges that the existing knowledge of one of ordinary skill in the art is not sufficient to enable one of ordinary skill in the art to make this claim element, then this element is not enabled by the '915 Patent.

260. Thus, to the extent more than background knowledge is required, the '915 Patent does not enable the full scope of claims 1, 8, and 15 and their dependent claims. One of ordinary skill in the art would not be able to, without undue experimentation, make and use the apparatus as described in claims 8-12 and 15-19 or the method as described in claims 1-5 if background knowledge alone was not sufficient to make and use this combination of prior art elements. Specifically, the '915 Patent lacks any detailed technical guidance that would (absent background

knowledge) be sufficient to create and use event objects, or distinguish between one finger and more than one finger on a touch sensor, for implementing scrolling, scaling or rubberbanding operations.

**4. Indefiniteness**

261. In my opinion, all of the asserted Claims of the '915 Patent are indefinite. Each of the independent claims recites:

> distinguishing between a single input point applied to the touch-sensitive display that is interpreted as the scroll operation and two or more input points applied to the touch-sensitive display that are interpreted as the gesture operation.

262. The Specification defines gesturing as "a type of user input with two or more input points." Col. 1:44-45. However, the definition of scrolling is not limited to one input point: "Scrolling is the act of sliding a directional (e.g., horizontal or vertical) presentation of content, such as text, drawings, or images, across a screen or display window." ['915 Col. 1, ll. 39-41]

263. The Specification also describes that a gesture operation can result in a scroll operation:

> If the list of emails fills more than the allotted screen area, the user may scroll through the emails using vertically upward and/or vertically downward swipe gestures on the touch screen. In the example of FIG. 6A, a portion of a list of emails is displayed in the screen area, including a top displayed email 3530 from Bruce Walker and a bottom displayed email 3532 from Kim Brook. A user performs a vertically downward swipe gesture 3514 to scroll toward the top of the list. The vertically downward gesture 3514 need not be exactly vertical; a substantially vertical gesture is sufficient. In some embodiments, a gesture within a predetermined angle of being perfectly vertical results in vertical scrolling."
>
> ['915 Col. 9, ll. 10-21]

264. None of the claims describe that a gesture operation results a scroll operation. Rather, as described above, all of the independent claims include a limitation directed towards distinguishing scroll operations from gesture operations.

265. Since the Specification makes it clear that in at least one embodiment a gesture

operation results in a scroll operation, and nowhere limits the scroll operation to a single input point, the claims are indefinite. In other words, the meaning of the claims language is unclear in light of the Specification. Specifically, a person of ordinary skill in the art would understand that according to the Specification a gesture operation could, in at least one embodiment, initiate a scroll operation. The same person of ordinary skill could not reconcile this understanding with the language of the claims, which call for distinguishing between gesture operations and scroll operations. The Specification describes that a scroll operation is a type of gesture operation.

266. All of the asserted Claims of the '915 Patent are also indefinite for another reason. Each of the independent claims recites "the event object invokes a . . . operation." In my 35 years of systems experience, I have never observed a system where an event object invoked a method. Therefore, in my opinion, a person of ordinary skill would not understand that an event object invokes a method in Claims 1, 8 and 15, rendering these claims (and all dependent claims) invalid as indefinite. [redacted]

[redacted]

267. In my opinion, dependent Claims 3, 10, and 17 are also indefinite. These claims recite "attaching scroll indicators to a content edge of the window." While the Specification describes attaching "a scroll indicator to a . . . ***window edge***" or "attaching scroll indicators a ***content edge*** of a **display**" (Col. 11, ll. 16-20 and 63-64) (emphasis added), the Specification distinguishes a "content edge" from a "window edge" on two separate occasions (Col. 6, ll. 64-67; Col. 6 l. 67 – Col. 7 l. 3). In other words, while the Specification describes attaching scroll indicators to a "window edge" or a "content edge", the meaning of "content edge of the window" is unclear in light of the Specification. I also note that Claims 4, 11, and 18 are directed to "attaching scroll indicators to the window edge." It is unclear to me what the terms mean. Thus, in my opinion, a person of ordinary skill in the art would not understand the difference between a "content edge of the window" and "a window edge"—and the Specification does not anywhere define "content edge of the window." Therefore, the same person of ordinary skill could not reconcile the differentiation of the terms "content edge" and "window edge" with the phrase "content edge of the window" in Claims 3, 10, and 17, rendering these claims invalid as indefinite.

268. Additionally, claims 15-18 and 20 are indefinite for failing to disclose the corresponding structure for several means-plus-function limitations.

269. It is my opinion that one of ordinary skill in the art would not understand this proposed construction to disclose a structure. Apple has not identified the particular structure or algorithm used to perform the claimed functions, and I believe one of ordinary skill in the art would not understand the necessary structure or algorithm from reading the Patent specification. It is my opinion that claims 15-18 and 20 are therefore invalid for indefiniteness.

## IV. THE '163 PATENT

### A. Background of the Relevant Technology

270. The '163 Patent relates to methods for enlarging and translating a structured electronic document on a portable electronic device with a touch-screen display. These methods are directed to navigating a large information space on a device with limited display.

#### 1. Portable Electronic Devices

271. At the time the subject-matter of the '163 Patent was allegedly invented, portable electronic devices were commonly used and were well-known to those skilled in the art. The IT Law Wiki defines a "wireless portable electronic device" as: a device that is capable of storing, processing, or transmitting information. These devices include:

- personal digital assistants (PDA)
- smartphones
- two-way pagers
- handheld radios
- cellular telephones
- personal communications services (PCS) devices
- multifunctional wireless devices
- portable audio/video recording devices with wireless capability
- scanning devices
- messaging devices.

*See* http://itlaw.wikia.com/wiki/Wireless_portable_electronic_device.

272. At the time the '163 Patent was invented, there was a definite motivation among those skilled in the art to reduce the size and weight of portable electronic devices. Reducing the size of such devices enhanced their portability and was an attractive feature for users. Such reduced size, however, necessarily came at the cost of reduced display size. The tradeoff between size of the device and available display area was therefore well-known. As described by Van Ee in March 2002 (US 2002/0030699):

> Studies further indicate that the functionalities of PDAs and mobile phones have started to converge, and that a mobile information society is developing. There will be an emerging of dedicated devices. PDAs are now work-related. In the near future PDAs will be personalized computers that stay with the user all the

> time. PDAs will get more power and smaller size and accommodate more, and more versatile functionalities.
>
> Bandwidth and display size are believed to be the factors that limit the usability and practicality of the handheld device, be it a mobile phone, a palmtop or a hybrid. In particular, the GUI and the services accessible to such handhelds are critical factors for the consumers' acceptability of such services.

Van Ee US 2002/0030699 A1 at [0005-0006].

**2. Touch Screen Displays**

273. As discussed in Section III.A.2 multi-touch display technology was well known by persons of ordinary skill in the art in 2006. The term "touch screen display" was commonly used to refer to displays incorporating the well-known technologies for sensing the direct touch of a user through resistive, optical and acoustic technologies.

**3. Structured Electronic Documents**

274. At the time of the '163 Patent, persons skilled in the art would have been familiar with structured electronic documents and their various applications. As understood by those in the art, a "structured electronic document" refers to any type of two dimensional information space containing embedded coding that provides some meaning or "structure" to the document. The coding is embedded within the content of the document and specifies how elements or objects are to be arranged within the information space and relative to one another. Thus, the comingling of data providing *structure* and data providing *content* in the code of the document is a distinguishing feature of a structured electronic document.

275. Two common markup languages known to persons skilled in the art at the time of filing the '163 Patent were Hypertext Markup Language ("HTML") and Extensible Markup Language ("XML"). HTML was and is the most common form of markup languages for the web pages that comprise the World Wide Web. An HTML document consists of "tags" that are embedded in, and surround, the content that is to be displayed. These tags provide the author's intent as to how the elements are to be displayed and arranged on the HTML document presented to a user through a standard web browser. The browser interprets these HTML tags and renders the document on the two dimensional display surface accordingly.

276. HTML was and is a useful means for providing structure to electronic documents for several reasons:

> To publish information for global distribution, one needs a universally understood language, a kind of publishing mother tongue that all computers may potentially understand. The publishing language used by the World Wide Web is HTML.

HTML Specification § 2.2, http://www.w3.org/TR/html4/intro/intro.html#h-2.2.

HTML gives authors the means to:

- Publish online documents with headings, text, tables, lists, photos, etc.
- Retrieve online information via hypertext links, at the click of a button.
- Design forms for conducting transactions with remote services, for use in searching for information, making reservations, ordering products, etc.
- Include spread-sheets, video clips, sound clips, and other applications directly in their documents.

*Id.*

277. XML was and is primarily used for interoperability between computing entities in a distributed computing environment. It is a markup language that is designed to be readily readable by both humans and machines. Like HTML, XML is based on the use of tags that provide the structure to the XML documents. However, unlike HTML, the meanings of the tags are defined by the developers that are creating the XML documents. A schema, a Document Type Definition or DTD for example, defines the format of the XML tags. The original design goals of XML were:

- XML shall be straightforwardly usable over the Internet.
- XML shall support a wide variety of applications.
- XML shall be compatible with SGML.
- It shall be easy to write programs which process XML documents.
- The number of optional features in XML is to be kept to the absolute minimum, ideally zero.
- XML documents should be human-legible and reasonably clear.
- The XML design should be prepared quickly.
- The design of XML shall be formal and concise.
- XML documents shall be easy to create.
- Terseness in XML markup is of minimal importance.

XML Specification Revision 5 §1.1. http://www.w3.org/TR/REC-xml/#sec-intro.

278. A "style sheet" can provide additional information as to how documents are presented on two dimensional surfaces such as a computer screen or printer. By attaching a style sheet to a structured document, e.g. an HTML document, an author can separate the presentation of the document from the content and structure of the document. The presentation of the document is derived from data in the style sheet while the content and structure of the document is derived from the data in the HTML.[6]

279. A single HTML document may have multiple style sheets. A *cascading style sheet* is one that adheres to a priority scheme to determine which style rules apply. For example, if a HTML document has two style sheets and conflicting presentation data is contained in them, the cascading style sheet technique allows for the conflict to be resolved. This method of resolving conflicts is referred to as a *cascade* technique, i.e., priorities or weights are calculated and assigned to rules, so that the results are predictable.

280. Style sheets and cascading style sheets would have been well known to persons of skill in the art at the time of the filing of the '163 Patent.

**4. Well-Known Limitations Of Portable Electronic Devices With Touch-Screen Displays At The Time Of The '163 Patent**

281. A well-known limitation of portable electronic devices at the time the '163 Patent was developed was the limited display space available to display information, e.g., structured documents, as compared to desktop computers which had much larger screens. For example, Van Ee (US 2002/0030699), describes devices "with a relatively small screen real estate." According to Van Ee "display size" was among the factors that "limit the usability and practicability of the handheld device, be it a mobile phone, a palmtop or a hybrid." Van Ee at [0006].

282. Additionally, Tetzchner (US 2004/0107403) addresses the inherent limitations of limited-display devices in its disclosure of a method "to provide adequate presentation of Web

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[6] It should be noted that HTML can provide the structure and content, as well as the presentation data. Style sheets came about to provide a mechanism for more flexible presentation options.

pages on small display screens." The method disclosed by Tetzchner included a method of "adapting an HTML document to the width of the display" in order to eliminate the need for "horizontal scrolling." Tetzchner at [0005, 0006].

283. The '163 Patent itself acknowledges that the small display area available on portable electronic devices was among the limitations that were well know to those of skill in the art:

> As portable electronic devices become more compact, and the number of functions performed by a given device increase, it has become a significant challenge to design a user interface that allows users to easily interact with a multifunction device. This challenge is particular[ly] significant for handheld portable devices, which have much smaller screens than desktop or laptop computers.

'163 Patent at 1:52-56.

284. In addition to recognizing the inherent limitations of small-screen devices, several prior art references also recognized specific approaches to overcome these limitations – approaches that are now claimed as novel by the '163 Patent. For instance, Robbins (US 7,327,349) describes "dividing [an] information space into manageable segments." Robbins at 6: 4-5. Similarly, Berger (2005/0195221) describes a segmentation approach wherein "a fundamental functional component involves the partitioning of a web page(s) into segments or 'focus regions.'" Berger at [0082].

285. With respect to enlarging the view of a particular segment or focus region, Tetzchner (US 2004/0107403) states "[f]rom a number of prior art Web browsers it is known to use zooming in order to view pages . . . . [i]n this way, a small portion of the page may be enlarged to fill the display so that details of the page are shown." Tetzchner at [0005]. Van Ee (2002/0030699) describes an "auto-zoom" feature that is "relevant to the rendering of any kind of graphical information on a display too small for the total information content." Van Ee at [0008].

286. Therefore, segmentation and zooming techniques for rendering web-based content on small screen devices was common in the field well before the filing of the '163 Patent.

**B. Background Of The '163 Patent**

**1. The '163 Patent Generally**

287. The '163 Patent, entitled "Portable Electronic Device, Method And Graphical User Interface For Displaying Structured Electronic Documents," issued on January 4, 2011 from an application filed on September 4, 2007, and purports to claim priority to a provisional application filed as early as September 6, 2006. The named inventors of the '163 Patent are Bas Ording, Scott Forstall, Greg Christie, Stephen O. Lemay, Imran Chaudhri, Richard Williamson, Chris Blumenberg, and Marcel Van Os. The patent is assigned to Apple Inc. A review of the file history shows that Apple filed a request for a certificate of correction on January 14, 2011 to remove Bas Ording as an inventor and add Andre M.J. Boule as an inventor.

288. The '163 Patent relates to the field of graphical user interfaces that facilities navigation through an information space. The '163 Patent claims a method of segmenting an information space into regions, or "boxes" of content, and permitting a user to "enlarge" (*i.e.*, zoom or scale) and "translate" (*i.e.*, scroll or pan) the information space in order to provide an enlarged or enhanced view of a particular region.

289. Claim 2 (which is reproduced below as modified by a March 15, 2011 Certificate of Correction) is the primary independent claim of the '163 Patent. Claim 2 is a "computer-implemented method" claim, and generally tracks the language of independent claims 49, 50, 51, and 52. Claims 49 and 51 claim a "graphical user interface" and a "non-transitory computer readable storage medium," respectively. Claims 50 and 52 are in means-plus-function form and also generally recite the same limitations as independent claim 2. All remaining asserted claims are dependent to claim 2.

> 2. A computer-implemented method, comprising:
>
> **[a]** at a portable electronic device with a touch screen display; displaying at least a portion of a structured electronic document on the touch screen display, wherein the structured electronic document comprises a plurality of boxes of content;
>
> **[b]** detecting a first gesture at a location on the displayed portion of the structured electronic document; determining a first box in the plurality of boxes at the location of the first gesture; enlarging and translating the structured electronic document so that the first box is substantially centered on the touch screen display;
>
> **[c]** while the first box is enlarged detecting a second gesture on a second box other than the first box; and in response to detecting the second gesture, translated

> [sic] the structured electronic document so that the second box is substantially centered on the touch screen display.

290. Also of note, dependent claims 4 and 5 relate to specific types of structured electronic documents, namely "webpages," and HTML or XML documents. Dependent claims 10-13, 30-38, and 41-42 relate to specific types of gestures. Claims 17 and 18 relate to the degree of "enlarging" specified in claim 2. And, claims 27, 28, and 29 purport to disclose a "third gesture" that "reduces in size" the structured electronic document from its "enlarged" state.

291. The '163 Patent also appears to disclose various other features relating to the display of structured electronic documents, including a method of "scaling the document width to fit within the display width independent of the document length," (claim 6); "rotating the displayed portion of the structured electronic document" in response to "a change in orientation of the device" (claims 7 and 47); and "translating the displayed portion of the structured electronic document" in response to a "swipe gesture" (claims 39-42).

292. The foregoing description of the asserted claims is not meant to be exhaustive. My full element-by-element analysis of the claims and the prior is provided in subsequent sections of this report and in Appendices 7-10.

**2. Priority Date for the '163 Patent**

[redacted]

[redacted]

### 3. File History Of The '163 Patent

298. All of the asserted claims of the '163 Patent involve "translating" the structured electronic document.

299. From my review of the prosecution history, I note that independent claim 2 of the '163 Patent was originally written as follows:

> 2. A computer-implemented method, comprising: at a portable electronic device with a touch screen display,
>
> displaying at least a portion of a structured electronic document on the touch screen display, wherein the structured electronic document comprises a plurality of boxes of content;
>
> detecting a first gesture at a location on the displayed portion of the structured electronic document;
>
> determining a first box in the plurality of boxes at the location of the first gesture;

and

enlarging and substantially centering the first box on the touch screen display.

300. In a June 11, 2010 action Office Action Summary, the patent examiner found this claim unpatentable over Gillespie et al. (WO 02/093542) and Funkakami (WO 2005/106684) and initially rejected claims 1-26; 34-39; and 50-53.

301. On July 26, 2010, Apple's representatives conducted an in-person interview with the Examiner. They discussed these references amongst others. An Interview Summary issued on July 30, 2010 indicated that agreement with respect to the claims was reached.

302. In a September 13, 2010 response, the applicant amended independent claim 2 as follows (amendments shown in bold and underline, deletions are shown crossed out):

> 2. A computer-implemented method, comprising: at a portable electronic device with a touch screen display,
>
> displaying at least a portion of a structured electronic document on the touch screen display, wherein the structured electronic document comprises a plurality of boxes of content;
>
> detecting a first gesture at a location on the displayed portion of the structured electronic document;
>
> determining a first box in the plurality of boxes at the location of the first gesture; and
>
> enlarging and **translating the structured electronic document so that** ~~substantially centering~~ the first box **is substantially centered** on the touch screen display.

303. The specification of the '163 Patent does not explicitly describe what "translating" the structured electronic document involves. However, in describing the functions of independent claim 2, the specification states that "in response to a single tap gesture on block 3914-2, block 3914-2 may be enlarged with a zooming animation and two-dimensionally scrolled to the center of the display . . . ." '163 Patent at 17:32-35.

304. The specification therefore appears to equate translating and scrolling. The specification also makes clear that "animated" operations for navigating a structured electronic document are a key element to the features claimed in the '163 Patent. I can conclude, from this amendment that "translating" a box to the center must mean something different from just

"substantially centering" the box. I therefore interpret "translating" the structured electronic document to involve an animated "scrolling" or "panning" operation.

305. On January 20, 2011, the Examiner issued a notice of allowability. The Notice of Allowability indicated that the Examiner conducted a telephone interview with Apple's representative on October 12, 2010, who authorized this amendment.

306. The amendment was as follows (Examiner's amendment is in bold, underline and italics):

> 2. A computer-implemented method, comprising: at a portable electronic device with a touch screen display,
>
> displaying at least a portion of a structured electronic document on the touch screen display, wherein the structured electronic document comprises a plurality of boxes of content;
>
> detecting a first gesture at a location on the displayed portion of the structured electronic document;
>
> determining a first box in the plurality of boxes at the location of the first gesture; and
>
> enlarging and **translating the structured electronic document so that** ~~substantially centering~~ the first box **is substantially centered** on the touch screen display**;**
> ***while the first box is enlarged, detecting a second gesture on a second box other than the first box; and***
> ***in response to detecting the second gesture, translating the structured electronic document so that the second box is substantially centered on the touch screen display***.

307. Claims 50-52 were similarly amended. The Examiner also indicated that the claims were allowable because the prior art did not teach "while the first box is enlarged, translating the webpage/ structure [sic] document such that the second box is substantially centered."

**C. Claim Construction of the '163 Patent**

308. I understand that certain terms from the asserted claims of the '163 Patents will likely require the Court's construction. I have reviewed Apple's and Samsung's proposed constructions for these terms. Generally, I disagree with Apple's proposed constructions.

309. For terms and claim limitations where no construction has been provided, I analyze those elements using the plain and ordinary meaning of the terms as would have been understood by a person of ordinary skill in the art as of September 2006.

310. Having reviewed each asserted patent, its file history, and based on my understanding of the state of the art as it existed at the time each patent was filed, it is my opinion that one of ordinary skill in the art would understand the disputed terms as set forth below.

**1. "Substantially Centered" (Claims 2, 4-13, 17-18, 27-42, 47-52)**

311. As discussed in my invalidity summary below, Section IV.E.4.(a), it is my opinion that the term "substantially centered" fails to apprise persons ordinarily skilled in the art as to the degree or the type of centering that is required. The term is therefore indefinite.

312. In the event the Court determines the term is not indefinite, it is my opinion that "substantially" centered requires the edges of the object to be equidistant from at least two parallel sides of the touch screen display. In other words, I interpret "substantially centered" to mean that the object must be centered in at least one direction of the touch screen (*i.e.*, either horizontally or vertically).

**2. Means-plus-function Claim (Claim 50, 52)**

313. As discussed below in my invalidity summary below, Section IV.E.4.(c), it is my opinion that the '163 Patent specification discloses insufficient structure to support means-plus-function claims 50 and 52.

314. In the event the Court determines the term is not indefinite, my invalidity opinion assumes that the corresponding structure identified by Apple in its P.L.R. 4-2 disclosure applies for each of the means-plus-function claim limitations. Therefore, I interpret claims 50 and 52 as being limited to the functions described therein, being performed by "one or more special or general purpose processors programmed with special-purpose software to execute an algorithm."

**D. Overview of the Prior Art**

315. Specifically, based on my analysis, I conclude, as described below, that the asserted claims of the '163 Patent are anticipated and/or rendered obvious by at least the following references either standing alone or in combination:

- Bederson, et al.: AppLens and LaunchTile: Two Designs for One-Handed Thumb Use on Small Devices ("Launch Tile Publication");
- LaunchTile running a HP Compaq iPaq 1900 Series Pocket PC ("LaunchTile System")

- XNav running on a Sony VGN-U750P tablet device ("XNav System")
- The Robbins Patent: US 7,327,349 ('349 Patent; "Robbins Patent");
- The Choi Patent: US 6,211,856 ('856 Patent; "Choi");
- The Flynt Patent: U.S. 7,933,632 ('632 Patent; "Flynt");
- The Hinckley Patent: 7,289,102 B2 ('102 Patent; "Hinckley");
- The Wakai Patent: 7,138,983 ('983 Patent; "Wakai");
- The Van Ee Application US 2002/0030699 A1 ('699 Application; "Van Ee");
- The Tetzchner Application: US 2004/0107403 A1 ('403 Application; "Tetzchner");
- The Berger Application: US 2005/0195221 ('221 Application; "Berger");
- The Jefferson Han TED Video: Unveiling the Genius of Multi-Touch Interface Design ("Han Video").

**1. The LaunchTile System, XNav System, and the LaunchTile Publication**

316. I understand that Benjamin Bederson and his colleagues created a graphical user interface for mobile devices in 2004 known as LaunchTile (also, sometimes referred to as LaunchPoint). This user interface is described in an indexed publication entitled AppLens and LaunchTile: Two Designs for One-Handed Thumb Use on Small Devices (hereafter "LaunchTile Publication"), which was published no later than April 7, 2005 and was prepared by Dr. Bederson for the ACM Conference on Human Factors in Computing Systems (known as the CHI Conference). I also understand that during the CHI Conference in April 2005 (and later at a May 2005 symposium at the Human-Computer Interaction Lab at the University of Maryland) Dr. Bederson and his team discussed their work on LaunchTile and gave live demonstrations.

317. I further understand that Dr. Bederson and his colleagues created a variant of the LaunchTile software called XNav, which was adapted for use with different operating systems, including Windows XP. I understand that a device running XNav (as well as a device running LaunchTile) was demonstrated in a video presentation that Dr. Bederson made available on his web page around April 2005. I also understand that Dr. Bederson provided source code for the XNav application to Microsoft in August 2005, and that this source code was made available to Microsoft without any restriction on its ability to reproduce, use, or disseminate that code.

318. In forming my opinion, I have personally used a HP Compaq iPaq h1900 series model 1950 PocketPC device running LaunchTile, and I have personally used XNav running on

Sony VGN-U750P touch-screen device. I have reviewed the declaration of Benjamin Bederson in support of Samsung's Opposition to Apple's Motion for Preliminary Injunction in this case, and have reviewed the XNav source code attached as an exhibit thereto.

319. In the LaunchTile Publication,[7] Bederson describes the use of gestures on a touch screen user interface for navigation within an information or content space.. The space is constrained by the form factor of the smart phone:

> For device interaction when using a touch-sensitive screen, both designs utilize a gestural system for navigation within the application's zoomspace. While our designs do not directly address one-handed text entry, they are compatible with a variety of existing single-handed text input techniques, including single- and multi-tap alphanumeric keypad input, as well as miniature thumb keyboards and unistroke input systems executed with a thumb (e.g.,Graffiti [6], Quikwriting [17]).

LaunchTile Publication at p. 202.

320. LaunchTile consisted of an "interactive zoomspace" consisting of 36 application tiles, divided into nine zones of four tiles each. The LaunchTile Publication referred to this "zoomspace" as the "World." When the entire zoomspace was in view, the LaunchTile Publication referred to the view as "World View."

World View

[7] As described in Appendix 7, it is my opinion that the LaunchTile Publication, the LauchTile product, and the XNav product each constitute separate prior art references that invalidate the claims of the '163 Patent.

321. The zoomspace included a blue button ("Blue") in the center of each 4-tile "Zone" that could be selected by the user to enlarge and translate the four tiles that were adjacent to the selection button. When enlarged, the four tiles and the selection button are referred to as the "Zone View":


Zone View

322. From the Zone View, LaunchTile permits the user to select any one of the 4 application tiles to launch the corresponding application. Additionally, from Zone View, a user can pan to neighboring 4-tile clusters by "dragging" the thumb either vertically or horizontally on the "rails" separating each application tile. As the user initiates the pan process, the "zoomspace moves with the thumb during dragging." LaunchTile at p. 205.

**2. "The Robbins Patent": US 7,327,349 B2 ('349 Patent)**

323. U.S. Patent No. 7,327,349 was filed March 2, 2004. The patent was published September 8, 2005, and it issued February 5, 2008. The first named inventor on the Patent is Daniel C. Robbins. The patent was assigned to Microsoft Corporation.

324. Robbins describes a system and methods to allow a user to more effectively view information within the constraint space offered by the display on a small portable electronic device like a PDA or a cell phone with "a touch screen or some other type of display screen or touch pad that is sensitive to and/or receptive to a pointing device." Robbins at 2:15-18:

> The present invention relates to a system and/or methodology that facilitate navigating and/or browsing large information spaces on relatively small portable devices such as portable phones, PDAs and the like, for example. In particular,

> the system and method allow navigation of multi-resolution graphical content at multiple levels of magnification. As a result, a user can quickly choose between a fixed number of view configurations at a given zoom level. In addition, the present invention provides the user with an ability to quickly glance at an alternative view with respect to the current view. This affords the user with an improved perspective of the current view in relation to the surrounding areas.

Robbins at 1:38-50.

325. Robbins refers to "zoomable user-interfaces." These are user interfaces that address the problem of presentation of data that exceeds the limitations of the small form factor displays that are common on portable electronic devices such as PDAs and smartphones. The intent of the zoomable user-interfaces is to improve the user's ability to navigate the information space:

> The size and layers of detail in common information spaces, such as maps, spreadsheets, and web pages, easily overwhelm the small screen of smartphones. When a user zooms in far enough to see relevant detail, it becomes tedious for the user to navigate across large distances using the d-pad of the smartphone. Additionally, when the user is zoomed in, it is difficult for the user to retain a sense of context and maintain a mental model of the information space. This invention details a combination of techniques which can adapt zoomable user interfaces (ZUIs) for small form factor mobile or portable devices.

Robbins at 5:57-67.

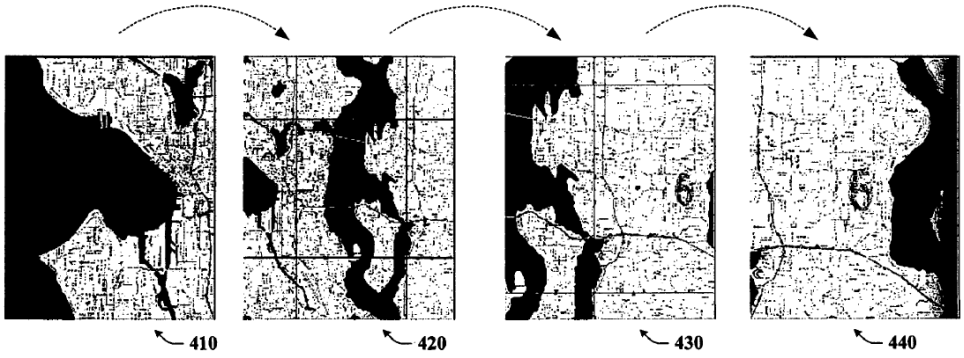
326. Robbins discloses a technique of "segmenting" an information space including a web page using a "segmentation component":

> The content can include, but is not limited to, any type of document, such as pictures, calendars, images, spreadsheets, reports, maps, books, text, web pages, etc. as well as their related programs or applications. The data-set can be received by a segmentation component **210** which can divide the viewable content (e.g., parent view) into any number of segments, sub-sectors or child views.

Robbins at 8:8-15.

327. Robbins further discloses a technique of zooming into specific segments created by the segmentation component and panning to different segments in response to user inputs:

> A user can then choose to zoom in to one of these sub-sectors by pressing on the number key (**330**—pressing the "6" key as indicated by the darker shading on the "6") that corresponds to that sector of the screen. Pressing the same number key again, after the zoom-in action, can toggle the view to zoom back out to the parent view, as depicted in screen view **340**.
>
> When currently zoomed in, pressing a different number key will cause the view to gracefully shift to the appropriate sibling sector at the same zoom level.




VIEW ZOOMS OUT DURING PAN FROM ONE SIBLING VIEW (SECTOR 4) TO ANOTHER (SECTOR 6)

**FIG. 4**

Robbins at 9:46-55 & Fig. 4.

328. Robbins also discloses a technique that permits a user to reduce the displayed portion of the document and thus alter the view of the information through a zooming process:

> If the user is zoomed-in and wants to then zoom back out from the current view, the user can either press the number key that corresponds to the current view or press on a dedicated "zoom out" key (in our implementation, the "*" key). Pressing the zoom out key causes the view to zoom out—which results in the display of the child view boxes for the new current view.

Robbins at 10:32-38.

329. Finally, Robbins discloses an "overlapping" segmentation technique that displays at least a portion of a second segment of content while zoomed-in to a first segment of content. This "overlapping" segmentation technique allows for the selection of the second segment while zoomed into the first segment, resulting in a re-centering of the view on the second segment.

> If the user merely taps another button on the keypad **(820)**, the view is shifted to another predefined locus of interest at a predefined (or the current) zoom level (see e.g., sequence **900** in FIG. **9**).
>
> * * *
>
> Variations on segmentation may include having sub-view-segments that overlap to provide views that share some amount of content.

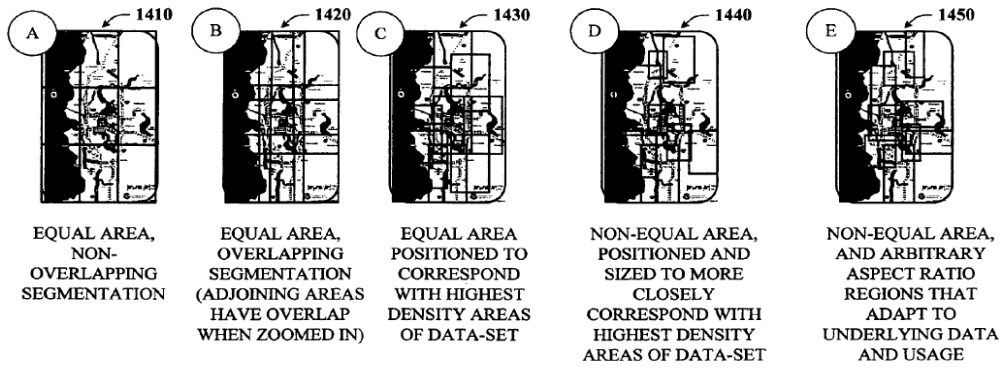


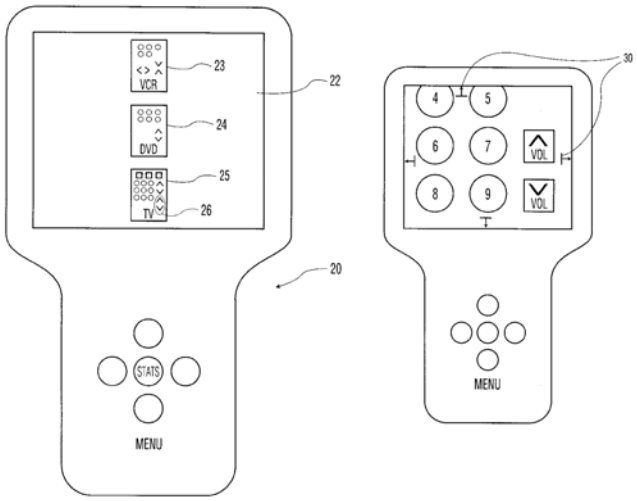

**FIG. 14**

Robbins at 23:22-25; 13:53-55, & Fig. 14.

### 3. "The Choi Patent": U.S. 6,211,856 B1 ('856 Patent)

330. U.S. Patent No. 6,211,856 was filed April 17, 1998. It was issued April 3, 2001. The first named inventor on the Patent is Sung M. Choi.

331. Choi discloses a touch screen display that is capable of zooming in on a subset of "features" contained within a user interface object that represent "functions" of an underlying device such as a television or VCR remote control. Any one subset of features of a given function is accessible through a user's finger touch or stylus. When a subset of features is selected, the subset is enlarged such that it fits within the width of the touch-screen display:



> Accordingly, it is an object of the invention to provide a GUI touch screen display on a hand-held device that provides a maximum number of icons on the display yet the features of the icons are easily accessible by a user.
>
> This object is achieved by providing a zoom feature whereby a relatively small icon is provided on the GUI such that its functions are recognizable but not easily accessible by a user, but upon touch of the icon by a user the icon is made larger or magnified so that its functions can be accurately touched by a user's finger or stylus. Assuming the original icon is a picture of a keyboard, the icon in accordance with the invention is large enough to make the displayed keys "recognizable," but too small to allow individual keys to be conveniently accessed by the user.

Choi at 1:53-66.

332. Choi further describes a technique where the user interface can be scrolled by selection of an edge of a zoomed-in subset of features. Upon a user touch along the "edge" of a zoomed-in subset of features, the view is translated to a second subset of features:

> In a further embodiment of the invention, the user can move across the entire keyboard by touching a particular edge of the magnified area causing magnification of the next area of the keyboard thus achieving a scrolling effect. In this embodiment of the invention, upon selection of a function or key of the icon, the icon will return to its original size, or again the icon could remain magnified until a predetermined time period elapses without a key being selected.

Choi at 3:16-23.

**4. "The Flynt Patent": U.S. 7,933,632 B2 ('632 Patent)**

333. U.S. Patent No. 7,933,632 was filed June 16, 2006. It was published April 12, 2007. It was issued April 26, 2011. The first named inventor on the Patent is David Wayne Flynt. It is assigned to Microsoft Corporation. The Flynt Patent claims priority to provisional application number 60/718,187, which was filed on September 16, 2005.

334. Flynt discloses an improved user interface for mobile devices:

> Briefly described, the provided subject matter concerns an improved user interface for mobile devices such as smartphones, personal digital assistants (PDAs) and the like. An enhanced, customizable user interface can be updated dynamically to provide users with content without requiring user interaction. Users can monitor status and/or data of content accessible through the mobile device by simply observing the user interface.

Flynt at 2:6-13.

335. The user interface disclosed by Flynt consists of structured electronic documents representing content accessible from the mobile device such as applications and web pages. The structured electronic documents are represented on the user interface in the form of "tiles." Selection of a tile provides access to the content:

> Referring now to FIG. 6, an exemplary display **600** including a content tile **602** associated with remote content, shown here in summary view, is illustrated. Content can be retrieved or obtained from a remote source, such as a server. Vendors of services or data can generate and offer tiles to users. For example, a vendor that maintains an online auction website can provide an auction specific tile to a user, such as content tile **602**. The auction tile **602** can track the current status of any auctions in which the user is participating, indicating auction information such as the current bid or time remaining in an auction. The content tile **602** associated with the auction can update dynamically to reflect content obtained from the remote source (e.g., additional bids by the user and expiration of item auctions). Tiles can be dynamically updated based upon updated content without direct action by the user.


Flynt at 8:48-62 & Fig. 6.

336. Flynt further discloses a "navigation component" that "controls movement through the tile space." Flynt at 6:35-37. Therefore, in response to user inputs, the user can translate across the tile space and bring new tiles into an enlarged "focus" or "active" view. *Id.* at 6:42-48.

337. I have reviewed the Flynt provisional application 60/718,187 (filed on September 16, 2005), and it is my opinion that the provisional application provides written description support for the claimed invention. For instance, the provisional specification states that the

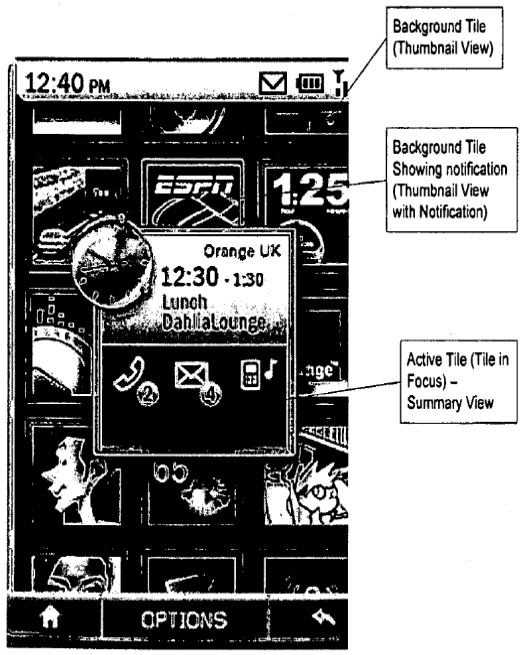
invention covers "[a] set of tools . . . to allow users to navigate through content and tasks stored locally on the portable electronic device as well as access to remote content." Provisional App. 60/718,187 at [0006].

338. Further, the provisional specification states that the system can "include a personalized homespace" which can in turn "include a set of tiles," *id.* at [0077-0078]:

> Tiles are presented as a grid with focus on one tile at time. When a tile is in focus, the tile is expanded such that additional information is presented to the user. Users can select tiles to access tasks, data, online services or applications. The tile gridspace provides users with information at a glance and allows quick access to additional information or services.

*Id.* at [0078].

339. Below is a reproduced image of Figure 39 from the provisional application:




340. Therefore, it is my opinion that the Flynt Patent is considered part of the prior art as of the date of the filing of the provisional application, on September 16, 2005.

**5. "The Wakai Patent": 7,138,983 B2 ('983 Patent)**

341. U.S. Patent No. 7,138,983 was filed January 26, 2001 and published March 28, 2002. It was issued November 21, 2006. The first named inventor on the patent is Masanori Wakai. The assignee of the '983 Patent is Canon Kabushiki Kaisha.

342. Wakai is directed to a system and methods that implement a user interface function for detecting position information of two inputs, e.g., finger touches, on the surface of a touch screen for the purpose, among others, of detecting a users intent to initiate a scaling or magnification operation on content on the display of a mobile device such as a PDA or smartphone:

> The present invention relates to a position information processing apparatus, and more particularly, to a position information processing apparatus that detects position coordinates and paths of the position coordinates input by a finger, a pen, or a pointer, and interprets an instruction, input by a user and represented by the path, to perform an operation.

Wakai at 1:8-14.

343. Specifically, Wakai discloses a technique that detects two paths traced along a touch panel by two fingers of a user. If the position information obtained from the touch screen user interface indicates that the movement along the paths between the original two touch points is increasing, i.e., are moving away from each other, an "expansion operation" is performed:

> FIGS. 22A and 22B show an operational example that is interpreted as an expansion operation. As shown, designated position points A and B at the start time $t_1$ of a travel are respectively shifted to designated position points A′ and B′ at the end time $t_5$ of the travel. This input is interpreted as an expansion operation.

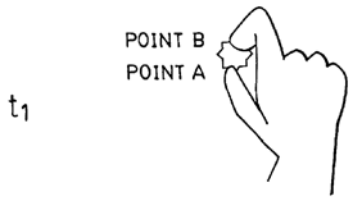



FIG. 22A

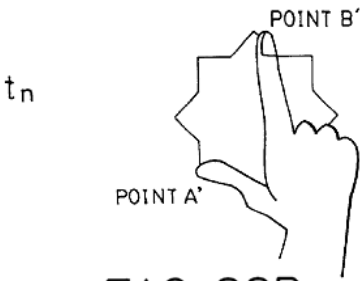



FIG. 22B

Wakai at 12:32-37 & Figs. 22A, 22B.

**6. "The Hinckley Patent": 7,289,102 B2 ('102 Patent)**

344. U.S. Patent No. 7,289,102 was filed June 6, 2001. The Patent was published February 21, 2002. The Patent issued October 30, 2007. The first of the named inventors on the Patent is Kenneth P. Hinckley. The Patent is assigned to Microsoft Corporation.

345. Hinckley discloses a device capable of scaling content such that the content width is equal to the display width independent of length of the content. The Patent discloses the use of a "tilt sensor" within a device such as a PDA or mobile phone that is capable of detecting a change in the angular position of the device such that the "image on the display . . . may be matched to the mobile device orientation":

> In other embodiments of the present invention, the tilt sensor is used to detect the orientation of the mobile device so that the image on the display of the mobile device may be matched to the mobile device orientation.
>
> FIG. 10 provides an example of a mobile device **1100** in an upright orientation. In FIG. 10, the present invention displays an image **1102** of a set of text in a portrait orientation to match the orientation of mobile device **1100**. FIG. 11 shows the same mobile device rotated counterclockwise 90°. Under the present invention, this rotation is sensed by the tilt sensors and in response, a new image **1104** of the set of text is displayed. In particular, image **1104** shows the text in a landscape view to match the new orientation of mobile device **1100**.

Hinckley at 9:20-33.

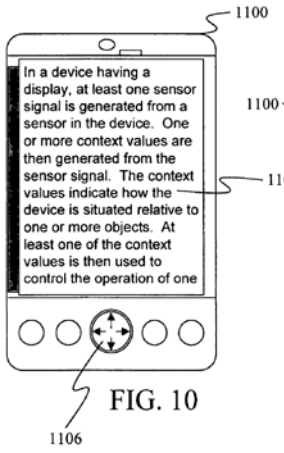



FIG. 10

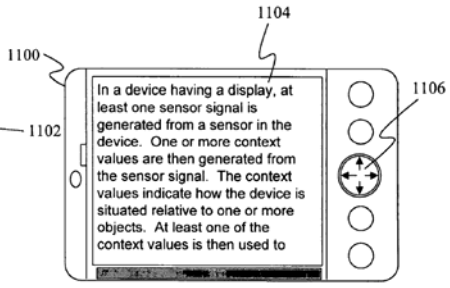



FIG. 11

**7. "The Tetzchner Application": US 2004/0107403 A1 ('403 Application)**

346. The '403 Patent Application was filed September 4, 2003 and it was published June 3, 2004. The named inventor on the Application is Jon Stephensen von Tetzchner. The

Correspondence Address on the Application is to Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P.

347. The Tetzchner Application discusses a zooming method on a document that is an HTML page:

> From a number of prior art Web browsers, it is known to use zooming in order to view pages written in e.g. HTML on a display. In this way, a small portion of the page may be enlarged to fill the display so that details of the page are shown.

*See* Tetzchner at [0005].

348. Tetzchner discloses a device capable of scaling a web page width to the display width independent of the page's length, thus "eliminat[ing] the need for horizontal scrolling." *See* Tetzchner at [0005].

349. Also, Tetzchner utilizes a style sheet to perform the zooming method in conjunction with an HTML document wherein the "style is written on a style sheet," and "[t]he style sheet language is preferably . . . [a] CSS (Cascading Style Sheet[])." Tetzchner at [0022-0024].

**8. "The Van Ee Application" US 2002/0030699 A1 ('699 Application)**

350. U.S. Patent Application 2002/0030699 A1 was filed July 19, 2000. It was published March 14, 2002. The named inventor on the Application is Jan Van Ee. The Application Correspondence Address is to Philips Electronics North America Corporation.

351. The Van Ee Application discloses an "auto-zoom" feature that can be used during the rendering any kind of graphical information on a display too small for the total information content:

> For example, handheld information processing devices with Internet access . . . can be given browsers for retrieving and navigating web pages from the Internet, but they cannot render a page in its entirety without losing information […]

Van Ee at [0008].

352. Van Ee discloses a technique for improved reading of a Web page on a display that is too small to view the entire page, for example a browser on a PDA or smart phone. First

the entire page is displayed on the touch screen. Touching a portion of the web page causes the expansion of the portion page so as to fill the display's area:

> When the user now touches the screen in the associated location or area, this action gets translated . . . into a zooming-in on that part of the page image that is centered around the touch location.

Van Ee at [0008].

**9. "The Berger Application" US 2005/0195221 A1 ('221 Application)**

353. U.S. Patent Application 2005/0195221 A1 was filed on March 4, 2004. It was published September 8, 2005. The named inventors on the Application are Adam Berger, Thomas Kang, Tony Dewitt, and Gregory C. Schohn.

354. The Berger Application discloses a "system, apparatus, and method for facilitating presentation of content on communication device displays." Berger Abstract. A "fundamental functional component" of the Berger Application "involves the partitioning of a web page(s) into segments or 'focus regions.'" Berger at [0082].

355. The Berger Application describes a technique for selecting segments, or focus regions, and rendering the segment in a more reader-friendly format:

> When a segment has been selected, the presented image on the display can be switched from the thumbnail layout which displays multiple (or all) segments of the document image, to a narrow-screen layout where the selected segment may be independently displayed to facilitate viewing of the segment content.

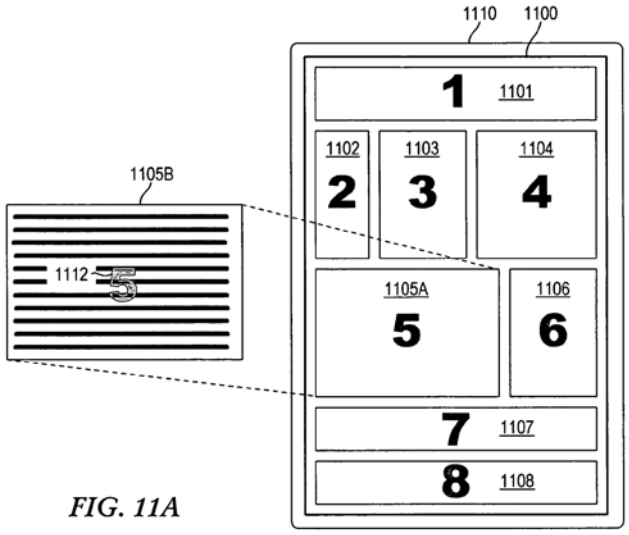



*FIG. 11A*

*See* Berger at [0095] & Fig. 11A.

**10. The Jeffery Han TED Video ("Han Video")**

356. The TED Video entitled Jeffery Han: Unveiling the Genius of Multi-Touch Interface Design is described above, Section III.D.4. As described there, the video illustrates a method of two-finger zooming in mapping and graphics applications.

**E. Analysis of the Validity of the '163 Patent**

357. Here I assess the validity of the asserted claims of the '163 Patent. For terms and claim limitations where no construction has been provided, I analyze those elements using the plain and ordinary meaning of the terms as would have been understood by a person of ordinary skill in the art as of September 2006.

358. It is my opinion that certain of the asserted claims are anticipated by:

- The LaunchTile Publication
- The LaunchTile System
- The XNav System
- The Robbins Patent
- The Flynt Patent
- The Choi Patent

359. It is also my opinion that certain other of the asserted claims are rendered obvious by the abovementioned references alone and in combination with at least the following additional references:

- The Wakai Patent
- The Hinckley Patent
- The Tetzchner Application
- The Van Ee Application
- The Berger Application
- The Han Video

360. In the following sections, I provide a narrative of my opinions. I have also attached for each reference detailed charts identifying the anticipating disclosure for each prior art reference.

**1. Anticipation**

**(a) The LaunchTile Publication (Appendix 7)**

361. Appendix 7 describes the LaunchTile Publication. I may rely on disclosures in Appendix 7 , alone or in combination, to show that the '163 Patent is invalid over the LaunchTile Publication.

362. In my opinion, asserted claims 2, 6-7, 10-13, 17-18, 27-42, and 49-52 are anticipated by the LaunchTile Publication.

363. The LaunchTile Publication was published no later than April 7, 2005 and discloses each and every limitation of the aforementioned claims.

364. Appendix 7 provides an element-by-element analysis of the LaunchTile Publication, is are incorporated by reference into this report.

**(b) The LaunchTile System (Appendix 7)**

365. Appendix 7 describes the LaunchTile System. I may rely on disclosures in Appendix 7, alone or in combination, to show that the '163 Patent is invalid over the LaunchTile System.

366. Asserted claims 2, 6, 10-13, 17-18, 27, 29-42, and 49-52 are anticipated by the LaunchTile System.

367. The LaunchTile System was invented and in public use no later than April 2005 and discloses each and every limitation of the aforementioned claims.

368. Appendix 7 provides an element-by-element analysis of the LaunchTile System, and is incorporated by reference into this report.

**(c) The XNav System (Appendix 7)**

369. Appendix 7 describes the XNav Systen. I may rely on disclosures in Appendix 7, alone or in combination, to show that the '163 Patent is invalid over the XNav System.

370. Asserted claims 2, 6-7, 10-13, 17-18, 27, 29-42, and 49-52 are anticipated by the XNav System.

371. The XNav System was invented and in public use no later than August 2005 and discloses each and every limitation of the aforementioned claims.

372. Appendix 7 provides an element-by-element analysis of the XNav System, and is incorporated by reference into this report.

**(d) The Robbins Patent (Appendix 8)**

373. Appendix 8 describes the Robbins Patent. I may rely on disclosures in Appendix 8, alone or in combination, to show that the '163 Patent is invalid over the Robbins Patent.

374. Asserted claims 2, 4-6, 8, 10-13, 17-18, 27-42, and 49-52 are anticipated by the Robbins Patent.

375. The Robbins Patent was filed on March 2, 2004 and published on September 8, 2005 and discloses each and every limitation of the aforementioned claims.

376. Appendix 8 provides an element-by-element analysis of the Robbins Patent, and is incorporated by reference into this report.

**(e) The Flynt Patent (Appendix 9)**

377. Appendix 9 describes the Flynt Patent. I may rely on disclosures in Appendix 9, alone or in combination, to show that the '163 Patent is invalid over the Flynt Patent.

378. Asserted claims 2, 10-13, 17, 27-38, and 49-52 are anticipated by the Flynt Patent. Appendix 9 provides an element-by-element analysis of the Flynt Patent and is incorporated by reference into this report.

379. The Flynt Patent was filed on June 16, 2006 and published on April 12, 2007, which a priority date of September 16, 2005. The Flynt Patent discloses each and every limitation of the aforementioned claims.

380. Appendix 9 provides an element-by-element analysis of the Flynt Patent, and is incorporated by reference into this report.

**(f) The Choi Patent (Appendix 10)**

381. Appendix 10 describes the Choi Patent. I may rely on disclosures in Appendix 10, alone or in combination, to show that the '163 Patent is invalid over the Choi Patent.

382. Asserted claims 2, 6, 10-13, 17-18, 27-38, and 49-52 are anticipated by the Choi Patent.

383. The Choi Patent was filed on April 17, 1998 and discloses each and every limitation of the aforementioned claims.

384. Appendix 10 provides an element-by-element analysis of the Choi Patent, and is incorporated by reference into this report.

**2. Obviousness**

385. Appendix 7 – Appendix 10 attached to this report contain an element-by-element claim chart comparing each of the asserted claims of the '163 Patent to prior art and prior art combinations that renders the asserted claims invalid for obviousness. To summarize, I believe the following claims of the '163 Patent are obvious in view of the following prior art combinations:

- Asserted claim 4 is rendered obvious in view of the prior art. Alternatively, claim 4 is rendered obvious by a combination of the Van Ee Application, the Tetzhcner Application, the Berger Application, and any one of the LaunchTile Publication, the LaunchTile System, the XNav System, the Flynt Patent, or the Choi Patent.
- Asserted claim 5 is rendered obvious in view of the prior art. Alternatively, claim 5 is rendered obvious by a combination of the Tetzchner Application and any one of the LaunchTile Publication, the LaunchTile System, the XNav System, the Flynt Patent, or the Choi Patent.
- Asserted claim 6 is rendered obvious by a combination of the Hinckley Patent and any one of the LaunchTile Publication, the LaunchTile System, the XNav System, the Flynt Patent, or the Choi Patent.

- Asserted claims 7 and 47 are rendered obvious by a combination of the Hinckley Patent and any one of the LaunchTile Publication, the LaunchTile System, the XNav System, the Robbins Patent, the Flynt Patent, or the Choi Patent.
- Asserted claims 8 and 9 are rendered obvious in view of the prior art. Alternatively, claims 8 and 9 are rendered obvious by a combination of the Tetzchner Application and any one of the LaunchTile Publication, the LaunchTile System, the XNav System, the Robbins Patent, the Flynt Patent, or the Choi Patent.
- Asserted claim 48 is rendered obvious by a combination of the Wakai Patent, the Han Video, and any one of the LaunchTile Publication, the LauchTile System, the XNav System, the Robbins Patent, the Flynt Patent, or the Choi Patent.

**(a) The '163 Patent Is A Combination of Prior Art Elements**

386. Each of the elements in the '163 Patent was present in the prior art. Specifically, as discussed above, zooming and panning techniques for navigating structured electronic documents on touch screen displays of limited area were well known in September 2006. Additionally, the features enumerated in the dependent claims of the '163 Patent, including scaling document width independent of document length; rotating a document in response to a rotation in the device orientation; and performing an expansion operation in response to a "de-pinch" gesture, were well-known in the prior art.

**(i) Segmentation Of A Structured Electronic Document Was Well-Known**

387. Many prior art systems explicitly recognized the advantages to segmenting an information space, such as a structured electronic document, into discrete regions. For example, the Robbins Patent describes "dividing [an] information space into manageable segments." Robbins at 6:4-5.

388. Similarly, Berger describes a segmentation approach wherein "a fundamental functional component involves the partitioning of a web page(s) into segments or 'focus regions.'" Berger at [0082].

**(ii) Zooming And Panning Techniques To Navigate Segments Of A Structured Electronic Document Was Well-Known**

389. The use of zooming and panning techniques to navigate structured electronic documents was well-known in the prior art. For instance, Robbins describes "Zoomable User Interfaces" or "ZUIs," which "attempt to address the issue of navigating among sub-views of large or infinite information spaces." Robbins 6:38-40. Robbins describes how these ZUIs "arrange information in space and scale and allow users to navigate by use of a combination of panning and zooming. *Id.* at 6:41-43.

390. With respect to enlarging the view of a particular segment or focus region, the Tetzchner Application states "[f]rom a number of prior art Web browsers it is known to use zooming in order to view pages . . . . [i]n this way, a small portion of the page may be enlarged to fill the display so that details of the page are shown." Tetzchner at [0005].

391. The Van Ee Application describes an "auto-zoom" feature that is "relevant to the rendering of any kind of graphical information on a display too small for the total information content." Van Ee at [0008].

392. Finally, the LaunchTile Publication states that the LaunchTile System made use of "Scalable User Interface (ScUI) techniques." These techniques were described as "variations of zooming interface techniques to provide multiple views of application date." LaunchTile Publication at p. 201.

393. With respect to scrolling or panning from one enlarged segment of content to another, this feature was similarly well-known in the prior art. Robbins states that after zooming into a particular region, "the user merely taps another button . . . [and] the view is shifted to another predefined locus of interest at a predfined (or the current) zoom level. Robbins at 12:22-25 & Fig. 9. The LaunchTile Publication describes the LaunchTile System as a "zoom+pan" system, *see* LaunchTile Publication at p. 202, and describes methods by which a user can "drag" the interactive zoomspace, *see id.* at p. 205. Finally, Choi describes how a user, "by touching a

particular edge of the magnified area," can cause "magnification of the next area of the [content] thus achieving a scrolling effect." Choi at 3:16-19.

**(iii) Scaling A Structured Electronic Document Width Independent Of Document Length Was Well-Known**

394. In the field of graphical-user interfaces, the term "scaling" was well-known to persons skilled in the art and referred generally to the technical operation of rendering content to an appropriate level of detail during an enlarging or zooming step.

395. Prior to the '163 Patent, the desirability of "scaling" or fitting a structured electronic document such that the width of the document was the same as the width of the touch screen display independent of the document length was well-known. For example, Tetzchner explicitly states that its object was to provide "a method, a device and a computer program which eliminates the need for horizontal scrolling . . . ." Tetzchner at [0010].

**(iv) The Use Of Swipe Gestures To Translate A Structured Electronic Document In Any Direction Was Well-Known**

396. Also common in the prior art at the time of the '163 Patent were techniques for detecting a user "swipe" on a touch screen display, and translating the displayed portion of a structured electronic document in response.

397. For example, the LaunchTile Publication describes how users can "drag" the interactive zoomspace vertically and horizontally. LaunchTile Publication at p. 205.

398. Additionally, when the map program of the LaunchTile System is opened, a user is able to swipe across the map and translate the map to bring different segments of content into view. The swiping feature in the LaunchTile mapping program permits translation in each of the vertical, horizontal, and diagonal directions.

**(v) Rotating The Display Of A Structured Electronic Document In Response To A Change In Device Orientation Was Well-Known**

399. Many prior art systems also recognized the ability of rotating the displayed portion

of a structured electronic document on a touch screen display in response to a change in orientation of the device. The LaunchTile Publication states "[r]ecent research efforts pairing gestures with PDA-sized devices have emphasized gestures based on changes in device position or orientation. LaunchTile Publication at p. 202.

400. Additionally, Hinckley describes in detail the method of using "tilt sensors" to sense "the angle of [the device's] physical attitude with respect to gravity." Hinkley at 4:35-39. According to Hinckley, such tilt sensors can be "used to detect the orientation of the mobile device so that the image on the display of the mobile device may be matched to the mobile device orientation." Hinckley at 9:20-23.

**(vi) The Use Of Multi-Finger De-Pinch Gestures To Perform Expansion Operations Was Well-Known**

401. Finally, the use of multi-finger de-pinch gestures to enlarge portions of a structured electronic document was also common in the prior art. Wakai describes a touch screen display capable of tracing the travel of designated position points corresponding to a user's multi-finger touch and drag. "In an example . . . the two points move away from each other. This example may be used to expand or maximize an object." Wakai at 9:5-8.

402. Similarly, the Jefferson Han video demonstrating the multi-touch system illustrates several different embodiments of multi-touch zooming.

**(vii) To The Extent Any Limitations Of The '163 Patent Involve Elements Not Explicitly Cited In The Prior Art, Such Elements Would Have Required Only Ordinary Skill To Develop**

403. To the extent that Apple argues that any element of any particular combination of limitations was not found in the prior art, it is my opinion that any missing limitation would have been nothing more than a design choice well within the grasp a person of ordinary skill.

404. The '163 Patent does not identify any shortcomings in the prior art, and the asserted claims do not overcome any drawbacks in the prior art. Instead, to the extent that there are

differences between the prior art and the asserted claims, these differences are a result of the asserted claims merely choosing from among several interchangeable elements that happen to be different from one or more interchangeable elements found in the prior art.

**(b) One Skilled In The Art Would Have Found It Obvious To Combine The Known Elements In The '163 Claims**

405. As shown above and in Appendices 7-10 attached to this report, prior art devices and publications not only foreshadow these combinations, but in fact actually practiced them. Additionally, persons of ordinary skill were motivated to, and in fact did, combine the prior art elements recited in the '163 Patent claims to achieve the same results described in the '163 Patent specification.

406. All of the techniques described above were used in the context of graphical user interfaces for multi-touch technology. All of the techniques aimed to solve the same shortcoming in the relevant technological field: the difficulty of displaying large, detailed structured electronic documents on the relatively small displays of portable electronic devices.

407. A person of ordinary skill at the time the '163 Patent was developed would have been motivated to combine these elements to produce a better method of displaying and navigating content on touch-screen displays. In fact, as demonstrated in Appendices 7-10, many of these elements were, in fact combined in different permutations to arrive at many different prior art solutions to the very same problem addressed by the '163 Patent.

408. Together, the combination of these familiar elements yields only expected results. The '163 Patent's method of combining prior art elements to display and navigate structured electronic documents on a touch-screen display improved the prior art in only the most predictable fashion.

**(c) Secondary Considerations Do Not Alter the Conclusion of Obviousness**

409. I have been informed that certain secondary considerations may be examined to determine whether a certain invention would have been obvious to one of ordinary skill in the art.

410. As I indicate above, I understand that secondary considerations may be addressed when relevant. In this case, it is my opinion that there are no secondary considerations that overcome the obviousness determination.

**3. Lack of Written Description and Enablement**

411. I would note that the prior art discloses at least the same level of detail as the '163 Patent specification. Thus, in the event that Apple successfully argues that the combinations proposed in Appendices 7-10 of this report would not enable one of ordinary skill in the art to practice the asserted claims, then these claims would be invalid for a lack of enablement by the '163 Patent specification.

412. The '163 Patent specification does not contain a written description of any new solutions to the well-known background techniques that would be used to combine known prior art elements, such as detecting touch-screen input, enlarging structured electronic documents, or, translating structured electronic documents. No specific algorithms or computer code sequences are disclosed.

413. To the extent Apple contends that combining these prior art elements presented some unique challenge that would require more than the background knowledge of one of skill in the art, in my opinion the '163 Patent specification does not address or solve any such challenges.

414. Moreover, the specification does not teach those of ordinary skill in the art how to make and use the combination of claim elements without undue experimentation. To the extent Apple contends that one of skill would not immediately appreciate how to make this combination of claimed elements using their background knowledge. In my opinion the '163 Patent relies on a person of skill's background knowledge to guide and enable the claimed combination of prior art elements.

**4. Indefiniteness**

415. It is also my opinion that several claim limitations in the '163 Patent do not reasonably apprise persons ordinarily skilled in the art as to the scope of what is being claimed. Such claims are therefore invalid on the whole due to indefiniteness.

**(a) "Substantially" Centered (Claims 2, 4-13, 17-18, 27-42, 47-52)**

416. All of the asserted claims of the '163 Patent involve "substantially center[ing]" a box of content within the structured electronic document. It is not clear to me what type of centering and what degree of centering is required to fall within the scope of the claims.

[redacted]

418. Because it is unclear to me what type and degree of centering is required to fall within the scope of the language "substantially centered," and because even the named inventors on the '163 Patent could not articulate a means for reasonably apprising one of ordinary skill in the art as to what was meant by the claim language, it is my opinion that the "substantially centered" term of claim 2 is indefinite.

**(b) "Substantially" the Same (Claim 18)**

419. It is my opinion that the term "substantially the same" in claim 18 fails to apprise persons ordinarily skilled in the art as to the required width of an enlarged first box as compared to the width of the touch-screen display.

420. The specification of the '163 Patent provides little to no guidance in the construction of the term "substantially the same." In discussing the enlarging operation of claim 18, the specification states "[i]n some embodiments, the width of the block is scaled to fill the touch screen display with a predefined amount of padding along the sides of the display." *See* '163 Patent 17:27-30. No further clarification is provided as to what constitutes a "predefined amount of padding."

421. Just as the term "substantially centered" fails to reasonably apprise a person of ordinary skill as to the scope of claim 2, so too does the term "substantially the same" fail to reasonably apprise a person of ordinary skill as to the scope of claim 18.

**(c) Means-plus-function Claim (Claim 50 and 52)**

422. It is my opinion that the specification of the '163 Patent lacks corresponding structure to adequately identify the scope of claims 50 and 52 with the requisite specificity.

423. I have reviewed Apple's P.L.R 4-2 disclosures in this case, and I am aware that Apple's position on the means-plus-function elements is that they are limited to "one or more special or general purpose processors programmed with special-purpose software to execute an algorithm."

424. It is my opinion that one of ordinary skill in the art would not understand this proposed construction to disclose a structure. Apple has not identified the particular algorithm used to perform the claimed functions, one of ordinary skill in the art could identify the corresponding algorithms from reading the Patent specification. It is my opinion that claims 50 and 52 are therefore invalid for indefiniteness.

## V. CONCLUSION

For the foregoing reasons, it is my opinion that every asserted claim in both the '915 Patent and the '163 Patent are invalid.

Dated: March 22, 2012

By Stephen Gray
Stephen Gray