

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**IBG LLC, INTERACTIVE BROKERS LLC,
TRADESTATION GROUP, INC., and TRADESTATION SECURITIES, INC.,**

Petitioners

v.

TRADING TECHNOLOGIES INTERNATIONAL, INC.,

Patent Owner

**Case CBM2016-00054
U.S. Patent No. 7,693,768 B1**

DECLARATION OF CHRISTOPHER H. THOMAS

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I. INTRODUCTION

I, Christopher H. Thomas, declare as follows:

1. I am over 18 years of age. I have personal knowledge of the facts stated in this declaration and could testify competently to them if asked to do so.

2. I have been retained on behalf of Patent Owner Trading Technologies International, Inc. (“Patent Owner”) to provide expert opinions in connection with Case CBM2016-00054, regarding United States Patent No. 7,693,768 (“the ’768 patent”). I have also been retained on behalf of Patent Owner to provide expert opinions in connection with other CBM proceedings and litigations involving the ’768 patent and other patents owned the Patent Owner.

3. I understand that a Petition was filed on April 12, 2016 seeking covered business method (“CBM”) review of claims 1 through 23 of the ’768 patent, and the petition was subsequently assigned Case No. CBM2016-00054. I understand that in the Petition, Petitioner alleged that the claims are unpatentable under 35 U.S.C. § 101 and also provided various grounds under 35 U.S.C. § 103. I understand that the Petitioner did not allege any grounds of anticipation. The PTO instituted CBM review, by decision dated October 18, 2016, for all claims of the ’768 patent under § 101 and for all claims of the ’768 patent under § 103.

4. I have been asked to provide my opinion relating to an inquiry into the patentability of claims 1 through 23 of the ’768 patent under 35 U.S.C. § 103. I

have also been asked to address the technological nature of the claims, as well as the inquiry into whether the invention solves a technical problem using a technical solution. I have also been asked to address whether the claim elements are routine and conventional.

5. I am being compensated for my time spent on this matter, including independent study, document review, analysis, and writing. My opinions stated herein are based on review and analysis of the materials obtained in connection with my work in this matter, together with my education and experience. The opinions stated herein are my own. My compensation is not contingent upon my opinions stated herein or the outcome of this proceeding.

6. As will be discussed in greater detail below, it is my opinion that the invention of claims 1 through 23 of the '768 patent would not have been obvious to one of ordinary skill in the art at the time of the invention. The bases for my opinions are set forth below. One basis assumes that each of the claim elements can be found in the prior art. In addition, for purposes of this declaration, I want to make clear that I have been asked to *assume* that TSE qualifies as prior art to the '768 patent, even though I understand that there is a significant issue in this proceeding as to whether or not that assumption is valid. As also discussed in greater detail below, it is my opinion that the invention of claims 1 through 23 of the '768 patent was not obvious at the time of the invention in view of TSE,

Belden and Cooper, as alleged by Petitioner. The claims are not obvious because none of TSE, Belden, and Cooper, whether taken alone or in the suggested combination, teach the combination of elements, as claimed in the independent claims of the '768 patent.¹ My opinion is supported by overwhelming real world evidence, which I will discuss below, from both before and after the time of the Patent Owner's introduction of the commercial embodiment of the invention. This evidence supports my opinion regarding the state of mind of one of ordinary skill in the art at the relevant time. This evidence also includes substantial objective indicia (secondary considerations) of non-obviousness. Taking this body of evidence as a whole, including the path from the prevalent GUI tools for electronic trading before the claimed invention, to the initial skepticism of the claimed invention, to widespread acceptance and copying, as well as other factors discussed below, it is my opinion that the claimed invention of the '768 patent was not only *not* obvious to one of ordinary skill in the art at the time of the invention, but also that the claimed invention rises to the rare revolutionary and pioneering status, in the technical field of GUI tools for order entry in electronic trading. I also note that

¹ In addition, certain dependent claims further distinguish from the prior art and provide further independent bases that the invention, including the features of those dependent claims, would not have been obvious to one of ordinary skill in the art. I address some of these dependent claims as well below.

during the original examination of a parent application,² the Examiner assumed that the prior art included a trading GUI tool with all elements of those independent claims other than “single action order entry.” Thus, the “closest art” identified by the Examiner in that proceeding was assumed to include the other claim elements. It is also my opinion, based on my experience as one with skills higher than one of ordinary skill in the art, that the Examiner was correct in concluding that the independent claims would not have been obvious even with the above-identified assumption regarding the identified “closest art” and that the Examiner was correct in allowing the claims.

II. QUALIFICATIONS & BACKGROUND

7. My curriculum vitae is attached to this report as Exhibit 2201. Briefly, my expertise lies in the field of the engineering, design, and development and construction of graphical user interface (“GUI”) tools for electronic trading, such as those used in electronic trade execution systems and proprietary trading systems.

² The parent application resulted in the related U.S. Patent No. 6,772,132 and U.S. Patent No. 6,766, 304. The primary reference here, TSE, was cited and considered during reexamination proceedings involving the ‘132 and ‘304 patents. *See* Exhibit 2202, ‘132 Reexam Certificate and Exhibit 2203, ‘304 Reexam Certificate. The claims of the ‘132 and ‘304 patents are related to the claims in the ‘768 patent because they all claim subject matter found in TT’s MD Trader product, discussed below.

8. I have been actively trading on exchanges worldwide and managing portfolios of futures, commodities, stocks, and stock indexes since 1992. In 1996, I began developing trading decision and execution systems. At that time, my trading became completely reliant on the systems that I had developed. Ultimately, this led to my career in technology as a Chief Technology Officer (CTO) for several large trading companies and Managing Director of a large Canadian bank.

9. As CTO of Emerald Market Systems in 1997, I designed and developed an internet quote system that was used by the Chicago Mercantile Exchange to provide free quotes for certain new markets that the exchange was promoting over the internet. The system had two versions. The first version was a HTML based quote application that provided typical last price, best bid and ask price information. The second version was a JAVA based version of the HTML quote application. Both of these versions were used to facilitate trading in the open outcry trading pits. In 1998, I designed and developed for a Chicago-based Futures Commission Merchant, named LFG, the first web browser based trade order entry system for the U.S. commodity markets known as "FuturesOnline." When FuturesOnline was first released to users, there were no electronic exchanges for futures that were available to regular users who were not members of an exchange in the United States. Because of this, FuturesOnline was initially connected to the TOPS system at the Chicago Mercantile Exchange. This allowed traders connected

via the internet to send orders using FuturesOnline, which would be routed to the relevant trading pit at the exchange using the TOPS system. FuturesOnline also provided quotes to its traders and also allowed them to view their previous transactions, open orders, account balances, etc. Later, when GLOBEX became available to regular customers of FCMs, FuturesOnline was connected to GLOBEX as an electronic exchange destination. I was responsible for designing and programming all of the graphical user interfaces (“GUIs”) and designing and implementing the database that FuturesOnline used for storing trades, orders, account balances, etc. There was another component to FuturesOnline which I developed and that was the broker version. This enabled brokers at LFG to see all of the account balances and open and closed orders for all of their clients, and it enabled the brokers to enter orders, modify existing orders, cancel orders or close out trades for any of their customer’s accounts. This was functionality that they had never had before and it greatly increased the productivity of the brokers and allowed them to have improved risk management over their customers’ trading activities. FuturesOnline was so successful that I created a white-labeled version that enabled other FCMs to use the FuturesOnline technology while it appeared to their customers that it was their own. FuturesOnline was white labeled to three FCMs, in addition to LFG’s use. In developing LFG’s FuturesOnline, I utilized Distributed Network Architecture (“DNA”) technology from Microsoft Corp.

FuturesOnline was later featured on Microsoft's website as a case study for its use of DNA technology. A copy of the case study is attached as Exhibit 2204, (Microsoft DNA Case Study). This technology was developed for electronic trading, not for mimicking or supporting open outcry trading. As will be discussed below, in the transition away from open outcry trading, some technology was developed to mimic open outcry trading, while other technology was developed to carry out electronic trading by sending trade orders to an electronic exchange for automatic anonymous matching. FuturesOnline falls into the latter category.

10. During the period from about 1992 to 2002, I was active in the trading community in a variety of roles relating to trading and/or technology for trading, as described in this declaration. By virtue of this experience, I witnessed, participated in, and am familiar with the industry's transformation from open outcry trading pits, to early trading tools for after-hours trading (such as the Chicago Board of Trade's Project A and the CME/Reuters GLOBEX system) and, eventually, to what we refer to today as electronic trading and its technology based trading tools.

11. From late 1999 until 2002, I was the CTO for Stafford Trading, a proprietary trading company in Chicago, Illinois, USA, which was one of the largest market makers on the U.S. equity option exchanges. In this capacity, I managed a staff of roughly one hundred individuals and an annual technology budget in excess of fifteen million dollars. This staff included approximately 40

software developers, 40 network and server engineers, and 20 support staff. During this time, I also designed a new desktop order entry system to replace a legacy system for the traders at Stafford Trading. This system was connected to electronic exchanges and ECNs for stocks and options on stocks, and was connected to the CME GLOBEX electronic exchange for futures. I designed the GUIs for that system, which included Level II type quotes (this is functionally equivalent to Figure 2 in the TT patents). In April of 2000, while at Stafford Trading I became a founder and CTO of a technology company called Ragnarok Systems Inc., which was majority owned by the principals of Stafford Trading. Ragnarok Systems was a next generation online trading brokerage firm. Ragnarok Systems along with parts of Stafford Trading was acquired by Toronto Dominion Bank in March of 2002. Ragnarok Systems was also featured on Microsoft's website as an example of large commercial usage of Microsoft's technologies in the Financial Services industry. At Toronto Dominion Bank ("the Bank"), a large Canadian bank, after the acquisition, I served until August 2003 as a Managing Director and CTO of the new entity at the Bank that was named TD Options, LLC. I subsequently returned to trading as a Managing Director at TD Options LLC and continued to further develop trading systems that I had begun using several years earlier. In 2006, I started my own trading group at TD Options LLC, while still serving as a Managing Director, and actively traded a long-short portfolio of U.S. Equities and

U.S. equity index futures, using the trading strategies and software tools that I developed. This trading was electronic trading. When I refer to electronic trading, I am referring generally to a system in which traders send electronic orders to an electronic exchange, where the electronic exchange uses technology to implement an automatic matching engine (via hardware and software).

12. I left TD Options LLC in October of 2008 and became a founder of a proprietary trading firm in Chicago, named Pembroke Trading LLC, specializing in algorithmic trading of futures markets. In this capacity, I was responsible for designing and managing the development of the user interfaces and electronic trading platforms and infrastructure for testing and executing trading strategies in live markets.

13. In May of 2011, I started my own proprietary trading firm, Maridunum Capital, L.L.C., which specializes in automated algorithmic trading of Futures Markets. In this capacity, I was responsible for designing all trading software and algorithms for the company. Additionally, I was responsible for programming portions of the software.

14. In May of 2016, I became a founder of a software company named Primal Quant LLC, which will provide trading strategy design and testing tools to online traders without the need for the trader to have programming experience or

knowledge. At Primal Quant I am responsible for all GUI and database designs, as well as managing a team of software engineers.

15. I am not a professional expert witness. My profession is the development of technology for trading and trading. My experience as an expert is limited to the subject matter of the TT patents, and I was hired more than 10 years ago in that role because of my relevant experience in the trading industry, including open outcry, electronic trading, and the development of technology for use in electronic trading. Prior to that, I had never testified as an expert witness in any matter. In sum, before getting involved as an expert, I had widespread exposure and personal knowledge as to the state of the art at the time of the invention, as well as before and after the time of the invention. Through my experience with the litigation, I was exposed to additional items of information. Coupled with my personal experience in the industry, I have therefore gained extensive knowledge of the art.

III. INFORMATION CONSIDERED

16. I am familiar with the '768 patent, the Petition and supporting exhibits and declaration, and the Board's institution decision, and the January 13, 2017 deposition transcript of Mr. Román. I am familiar with the prosecution history of the '768 patent. In addition, I worked on litigations involving related patents such

as U.S. Patent Nos. 6,766,304 and 6,772,132, and 7,676,411, and I am familiar with the file histories of these related patents.

17. As a result of my involvement in prior court proceedings for these related TT patents, I have been exposed to the large amount of alleged prior art that has been presented by the parties in the related litigations over the past ten years. Many, many documents relating to alleged prior art were produced by the defendants, members of the Joint Defense Group, and other third parties. In connection with the court proceedings, there were many dozens of depositions seeking information on the state of the art at the time of the invention, including a number of depositions of third party individuals who executed declarations regarding the uniqueness and benefits to the user and the industry of the commercial embodiment of the claimed invention. In addition, there were party contentions and expert reports relating to the validity of the patents. There were summary judgment filings relating to validity and declarations in support of such filings. Prior to trial in the *eSpeed* and *CQG* cases, the parties served expert reports and contentions. In the *eSpeed* and *CQG* cases, I testified at trial, as did a number of other experts for the parties. Voluminous material relating to the validity of the patents was developed. Because of my own experience in the industry, my review of the file history, and my experience in the district court proceedings, I have a

thorough understanding of the state of the art at the time of the invention, and before and after the time of the invention.

18. In the district court proceedings, I became familiar with the TSE reference that has been presented in this proceeding, as well as other TSE documents and the 2005 deposition of a TSE representative (Mr. Kawashima), who was recently deposed again. I have considered both deposition transcripts. For purposes of clarity, I will use the shorthand “TSE” to refer to the reference relied upon in this proceeding. TSE was first raised in the court proceedings more than ten years ago. In October of 2007, a jury determined that, among other things, TSE did not render the ’132 patent and the ’304 patent unpatentable and that TSE did not qualify as prior art. The district court agreed, and these findings were not appealed. I am also familiar with the prosecution of the ’132, ’304, and ’768 patents at the PTO, including reexamination proceedings, in which the claims of the ’132 and ’304 patents were upheld, including over TSE. The alleged prior art asserted by Petitioners in this proceeding is either less pertinent or, at best for Petitioners, cumulative to the alleged prior art references that were considered by the PTO, either in the original prosecution or in the reexamination proceedings. In addition, as noted in the Other Publications section on the face of the ’768 patent, a number of TSE related documents (including translations) were cited references and therefore were considered during prosecution. Ex. 1001 at pp. 2-7.

19. In addition, I have personal experience with a wide variety of technologies for electronic trading (as referenced above in background) and, over the course of my professional involvement in trading, have seen numerous GUI tools for electronic trading. Throughout my professional trading career, I have made an effort to stay current and, when possible, ahead of the curve, on technologies for trading, including investigating new technology offerings, attending trade shows, and receiving sales pitches from trading technology vendors, as well as developing technology myself. I also have colleagues in the industry, some of whom would be considered one of ordinary skill in the art, and some of whom I would consider to be of significantly higher levels of skill. Because of my roles in the industry, from a time significantly before the invention until well thereafter, I was working and speaking on a regular basis with these colleagues and the traders themselves about technology for trading in general, and GUI tools in particular, and their needs, desires, frustrations and challenges with the technology available at the time. These experiences further inform my opinions from the perspective of one of ordinary skill in the art.

20. In addition to the above, I have personally traded on electronic exchanges using Trading Technologies' ("TT's") products, including MD Trader, which is the commercial embodiment of the inventions described, for example, in the '768 patent. MD Trader has always embodied the claimed inventions described

in the '768 patent since MD Trader was launched in 2000 through to the present. In addition, I have spoken with numerous users of MD Trader and other experts in the field about MD Trader and how it functions.

IV. PERSON OF ORDINARY SKILL IN THE ART

21. The technology at issue in this proceeding is a graphical user interface (“GUI”) tool for trading. In general, the term GUI refers to a human-machine interface that allows users to interact with the machine by utilizing graphical elements, as opposed to, for example, text-based interfaces. Text-based interfaces typically required the user to type commands on a keyboard. With a GUI tool, the user may interact with the graphical elements on a display, such as by using a keyboard, a mouse, a stylus, a finger, or other pointing device. GUI tools are constructed using a combination of software and hardware elements. In addition to desktop and laptop computers, GUI tools are used in a wide variety of handheld devices. GUIs are also sometimes referred to as MMIs (man-machine interfaces) or HCIs (human-computer interfaces). These GUIs are analogous to mechanical devices because, like mechanical devices, they are designed to permit a user to interact with a machine. For example, in older airplanes, the cockpit utilizes physical buttons, levers or switches to control the operation of the airplane. In modern day aircraft, the cockpit utilizes GUIs that enable the pilot to control the operation of the airplane. As another example, old calculators have push buttons

that enable the user to enter values or operations, whereas today's smartphones utilize, for example, a GUI that enables the user to enter the same values or operations.

22. GUI tools like the invention of the '768 patent are typically developed for and used by professionals, particularly at the time of the invention. Thus, in addition to providing desirable functionality, these GUI tools must be highly stable and reliable. In my experience, GUI tools for trading are extensively tested, including testing in all kinds of simulated market conditions, well in advance of any use in a live market. As discussed below, GUI tools are mission critical for professional electronic traders. They are the primary tools of their trade, just like GUIs in a cockpit are the primary tools for pilots flying modern day aircraft.

23. In the course of my industry experience, I have hired people to do GUI tool development for electronic trading. Backgrounds included previous experience in software development, technical degrees in computer science, engineering or other science disciplines, or equivalent work experience, etc.

24. In my opinion, one of ordinary skill in the art for purposes of this proceeding is a person having (1) a bachelor's degree or equivalent experience and (2) two years of experience designing and/or programming graphical user interfaces, including experience designing and/or programming graphical user interfaces for electronic trading based on input from a person with knowledge of

the needs of an electronic trader. I have a greater level of skill, but I can speak about what one of ordinary skill in the art would understand because of my background and experience.

25. I have reviewed Mr. Román's definition of one of ordinary skill (submitted with the Petition) and I disagree with it for at least the reason that it does not provide sufficient weight to the experience designing and/or programming GUIs for electronic trading based on input from a person with knowledge of the needs of an electronic trader. Mr. Román's definition instead focuses primarily on GUI experience, with no access to or knowledge of the needs of an electronic trader, which is plainly deficient. He suggests that merely direct or indirect experience with trading or related systems is adequate. This is incorrect because it ignores the needs of the trader for whom the GUI is designed, and further illustrates why his opinions regarding obviousness are incorrect. In addition, I disagree with his assertion that the person of ordinary skill would need a bachelor's degree or higher in computer science or computer engineering. Based on my experience in the industry for over 20 years, I believe that this requirement is too restrictive, again skewing the view of the person of ordinary skill toward a generalized GUI designer and away from the recited field.

26. My definition of the person of ordinary skill in the art is that of a baseline worker in this industry. Many individuals in the industry, as one would

expect, have a significantly higher level of skill. My level of skill in the art is significantly higher than that of the person of ordinary skill, and my level of skill was attained through my numerous relevant work experiences, including trading experience, self-taught programming proficiencies, as well as experiences in designing, developing and implementing electronic trading systems.

V. CLAIM CONSTRUCTION

27. I was asked to review the following claim terms and provide my understanding of the broadest reasonable interpretation of these terms from the perspective of a person of ordinary skill in the art.

A. “order entry region”

28. Each independent claim of the patent recites an “order entry region” that includes “a plurality of locations for receiving single action commands to send trade orders.” The independent claims further recite that the plurality of locations include a “first fixed location” and a “second fixed location.” The patent also discloses sending an order, for example, by selecting a location in the order entry region through a single action of a user input device to both set a plurality of parameters for the trade order and send the trade order to the electronic exchange. The independent claims recite that the first fixed location “correspond[s] to a first price level along the price axis” and the second fixed location “correspond[s] to a second price level along the axis.” Under the broadest reasonable interpretation,

the claimed order entry region includes a plurality of locations, each location corresponding with a different price level along the price axis (e.g., aligned with a price level), each location being configured to be selected by a single action command to both set a plurality of parameters for a trade order and to send the trade order to an electronic exchange. That both setting parameters and sending the trade order results from selection of a location of the order entry region is the only proper construction in light of the specification; indeed, this is the only example of order entry disclosed in the specification. Ex. 1001, 4:48-53, 7:24-31, 8:64 – 9:2, 9:46 – 10:60. Further, the benefit of order entry speed, discussed *infra* in paragraphs 75, 89, and 107 among others, flows directly from this claim element and this construction.

B. “setting a plurality of parameters for a trade order relating to the commodity and sending the trade order to the electronic exchange in response to a selection of a particular location of the order entry region by a single action of a user input device”

29. Each independent claim of the patent recites the phrase “setting a plurality of parameters for a trade order relating to the commodity and sending the trade order to the electronic exchange in response to a selection of a particular location of the order entry region by a single action of a user input device.” Using the broadest reasonable interpretation of this phrase, this claim element requires that the single action of the user input device set a plurality of parameters for a trade order and also send the trade order to an electronic exchange by selecting a

particular location of the order entry region. Again, that both setting parameters and sending the trade order results from selection of a location of the order entry region is the only proper construction in light of the specification; indeed, this is the only example of order entry disclosed in the specification. Ex. 1001, 4:48-53, 7:24-31, 8:64 – 9:2, 9:46 – 10:60. Further, the benefit of order entry speed, discussed *infra* in paragraphs 75, 89, and 107 among others, flows directly from this claim element and this construction. A trade order is an electronic message that includes the parameters of a desired order.

C. “entered order indicator in association with a price level along the price axis”

30. Claim 6 recites “dynamically displaying an entered order indicator in association with a price level along the price axis, wherein the entered order indicator represents an order pending at the electronic exchange.” The claimed entered order indicators are displayed in association with the corresponding price level on the price axis and indicate something about the user’s own orders working at that price level. The specification discloses an “entered/working” column (E/W) that “displays the current status of the trader’s orders.” Ex.1001, 7:50-52, Figs. 3-4. To one of ordinary skill in the art, “entered” means the order is pending at the electronic exchange and has not yet been filled. One of ordinary skill in the art would readily recognize that the entered order indicator must indicate to the user

that the user has an order at a particular price level along the price axis. *See, id.* at 7:50-58.

D. “single action”

31. The Petitioners’ construction of the term “single action” is sufficient for these proceeding so long as the construction is understood to be limited to “*an action* by a user” or “*one action* by a user.” Ex. 1001, 4:8-18.

E. “centering command”

32. The ‘768 patent explains that the user can execute a “re-centering command” with, for example, a single click of a mouse button by a user, which will “re-center the inside market on the trader’s screen.” Ex.1001, 8:49-54. One of ordinary skill in the art would readily recognize that “centering” the display “upon receipt of a centering instruction” causes the first and second indicators to be immediately displayed substantially at the center of the displayed range of price levels of the price axis as a result of manual centering command. *Id.*

F. “a computer readable medium having program code recorded thereon”

33. Claim 23 recites “[a] computer readable medium having program code recorded thereon” One of ordinary skill in the art, under any reasonable definition, would not read a computer-readable medium with software recorded (*i.e.*, stored) on it to be directed to a transitory, propagated signal, carrier wave or other transmission. This is because the act of recording, or storing, something on

or in a medium is intended to give permanence to the data being recorded, such that it can later be accessed and retrieved. A propagated signal or other transmission, due to its inherent transience, would be unsuitable for that purpose. One of ordinary skill in the art would know this, and would use a broader term, such as “encoded” or “encoding,” if she or he were to describe both storage media (tangible structure) and propagated information (transitory signal) as a set. The transitive verb “encode” means to convert (a message, information, etc.) into code and is known to be applicable to both bodies of information that are transitorily propagated and bodies of information that are tangibly recorded and indefinitely saved for future retrieval and use. See "encode," Merriam-Webster Online Dictionary, 2016. <http://www.merriam-webster.com> (4 Nov. 2016).

VI. BACKGROUND OF THE INDUSTRY

34. To understand the claimed invention, it is important to have an understanding of the nature of the industry in which it was developed and the mission critical nature of tools used for electronic trading. The electronic trading industry is made up of various groups. These groups include the exchanges, Futures Commissions Merchants (“FCMs”) (the equivalent of equity brokers for futures), technology providers, such as Independent Software Vendors (“ISVs”) whose primary business is to provide GUI tools, trading firms, brokers and individual traders. All of the groups identified above provide complimentary

services and work together to facilitate the execution of trades. TT is an example of an ISV. Examples of more well-diversified vendors include CQG and Bloomberg. Examples of an FCM include RCG and Goldman Sachs. Examples of an exchange include the CME, Eurex and the Tokyo Stock Exchange (“TSE”). A broker is generally speaking someone who, typically for a fee, executes buy and sell orders on behalf of another. An FCM is an entity that facilitates the buying and selling of futures contracts and typically holds monetary funds as margin for trading activities. An exchange is a marketplace in which things of value are traded, such as securities, options, futures, etc.

35. TradeStation Group, Inc. is the parent company of TradeStation Technologies, Inc., a trading technology company, and TradeStation Securities, Inc., an online securities and futures brokerage firm (broker and FCM). I may refer to these Petitioners collectively as “TradeStation.” TradeStation Technologies was founded under the name Omega Research in 1982, which initially focused on developing and marketing tools that would allow users without a technical or computer programming background to program and test their own trading strategies. Since that time, TradeStation has been engaged in developing and marketing technology for traders, including, after the advent of electronic exchanges, technology for electronic trading. TradeStation’s technology has included, and today includes, GUI tools for electronic trading. Thus, TradeStation

has been significantly involved in the technology side of the trading industry for over thirty years. TradeStation is a large company that invests millions of dollars annually on technology development. TradeStation's revenue is derived from a combination of a monthly fee for access to their trading platform and/or a fee per trade. IBG LLC and Interactive Brokers LLC, (hereinafter collectively, "IB") are likewise very large technology and trading companies. IB conducts an electronic brokerage business, providing its customers what it claims to be one of the most effective and efficient trading platforms in the industry. IB charges a fee for access to its data feed, as well as fees on a per share traded basis, and recently reported annual net revenue is in excess of one billion dollars.

36. Prior to the advent of electronic trading, the trading of futures occurred in what is known as the open outcry system. Open outcry is the name of a system of financial trading, used for over one hundred years, in which traders shout their bids and offers aloud in an area of a trading floor referred to as a trading pit. In the trading pit, traders utilize shouting and hand signals to transfer information about buy and sell orders to other traders. To avoid confusion, the inside market prices were the focus, and traders could only shout and signal regarding their interest at the best bid/offer or at a price that *improves* the best bid/offer. Orders (bids or offers) at prices *away* from the inside market were not allowed. Traders executed trades by agreeing with another trader in the pit on a price and quantity.

As such, there was no transparency into what interest others might have at prices away from the best bid/offer. Indeed, traders in a trading pit frequently would try to hide their interest in order to obtain the best prices for their orders. In addition, in the trading pit personality and physical presence played a role—there was no anonymity. Traders often wore distinguishing clothing, such as colorful jackets or even platform shoes, to garner attention in the pits in an attempt to gain priority for order execution. For the same reasons, certain locations in the trading pit could be more desirable than others. Furthermore, each pit was limited to contracts for a particular product and thus, in the open outcry system, the trader could only trade the contracts that were available in the pit where he/she stood. Mobility between the pits was limited, by physical distance between the pits, timeliness of the opportunity, and other factors. In its early form, there was no technology in the open outcry trading pits. Nonetheless, open outcry pit trading was viewed as incredibly efficient and it was viewed favorably and supported by large numbers of industry groups.

37. As technology developed, exchanges and trading entities utilized the technology within the open outcry trading paradigm. For example, technology was added by the exchanges to assist in the processing of orders executed in the open outcry pits, which is sometimes referred to as backend processing. Similarly, brokers began to utilize technology to route customer orders to the appropriate

trader in the pit. An example of this type of technology is shown in the patent to Gutterman. *See Ex. 1011*. Even though it utilized technology to facilitate the functioning of the entities involved in the trading pit, the open outcry paradigm was essentially unchanged.

38. Subsequently a different paradigm appeared, which very rapidly changed the way trading was done. Many in the industry, of course, resisted the new paradigm, especially in the United States. The new paradigm was electronic trading. As opposed to the use of computers to facilitate the open outcry system, I understand “electronic trading” to refer to technologies that allow a trader to send an order to an electronic exchange, where the exchange uses technology to implement a matching engine (hardware and software). The electronic exchanges typically publish rules advising users of the manner in which the exchange will prioritize and match orders. Technologies that assist in the functioning of an open outcry trading pit, such as order routing or order management technologies, are *not* electronic trading. Initially, electronic trading was used to extend trading hours, where the electronic markets could be utilized after the open outcry pits had closed. Later, electronic trading was used as a complete replacement for the open outcry trading pits. In the new paradigm, electronic trading involves providing traders with real time data feeds and mission critical GUIs for interacting with the electronic exchange. In this paradigm, traders no longer pick who they trade with.

Instead, traders send orders at any desired price and quantity as electronic messages that get queued and matched by an electronic exchange (computer hardware and software), typically on a first-in-first-out basis. In this system, the traders are anonymous to each other. The electronic exchange publishes this mass amount of data to people all over the world, so the information is known and transparent in contrast to the situation in traditional open outcry trading pits.

39. In the early period of applying technology to trading, there were different approaches and theories driving technology development. Some entities took the approach, which now seems silly in hindsight, of trying to continue the pit paradigm by taking advantage of technology to continue pit trading. The patent to Belden is an example of this approach that attempted to continue the pit paradigm by mimicking the trading pit. *See* Ex. 1012. Under the pit-mimicking approach, the GUI tools were constructed such that the trader could see an electronic representation of the pit and an electronic representation of other traders participating within that pit. In the representation of the pit, the various representations of traders typically also displayed the trader's offers and/or bids at the inside market prices. In order to execute a trade, the trader would click on an icon representing a trader in the pit. There was no matching engine (i.e., no electronic exchange) in these types of pit-mimicking systems. One train of thought in support of this approach was that traders who had previously traded in the

trading pits would like it and adapt more readily because it would be more familiar to them, in the sense that, as in open outcry pit trading, the traders were able to select the other trader with whom they wanted to trade. Also, several United States exchanges and many of their members wanted to retain the open outcry pit trading model.

40. The other approach looked to create a new and different electronic trading paradigm. Specifically, this approach was focused on the development of GUI tools for electronic trading and the development of electronic exchanges. The invention of the patent here falls into this second approach. The invention is not compatible with a pit mimicking approach. Likewise, a pit mimicking approach is not compatible with an electronic exchange. The pit mimicking approach is merely a continuation of the open outcry paradigm, with an incremental utilization of technology. By the time of the invention, those of ordinary skill in the art working in the direction of the electronic trading approach had issues with the pit mimicking approach. For example, the pit mimicking approach was really just a platform for users to execute trades with each other, continuing the open outcry paradigm, whereas the electronic trading paradigm allowed for anonymous and automatic electronic matching. Eventually, electronic trading ushered in the new paradigm, and the attempts to use GUIs to replicate the trading pit experience fell by the wayside as did open outcry trading itself. There was no place for use of

these types of trading tools with the new electronic trading exchanges. Anonymity, electronic matching algorithms, speed and the ability to simultaneously trade multiple contracts came to the fore with electronic trading, and pit trading's personality, physical presence, lack of transparency, and limitations on the ability to trade more than one type of contract were out.

41. One of ordinary skill in the art would understand that an electronic exchange includes a matching engine in which trade orders that are sent to the electronic exchange (in the form of electronic messages) are automatically matched in accordance with rules set by the exchange. Most electronic exchanges match orders based on a first-in-first-out priority, using time stamps to determine priority. The electronic exchange stores an order book database including bid and offer information and sends out updates in a data feed. The trade order messages are sent to the exchange electronically and typically queued for execution using a first-in-first-out matching algorithm. There are no open outcry pits in an electronic exchange. And in contrast to open outcry pits where traders are in close proximity to each other, know the identity of the other traders and actually choose who they trade with, trading on an electronic exchange is generally anonymous. Conventional GUI tools were developed to permit traders to send order messages to an electronic exchange.

42. Since at least the early 1990s, the industry participants identified above have been investing in developing and providing GUI tools for electronic trading (for order entry on electronic exchanges). These tools are developed, for example, by ISVs and more well diversified vendors. For example, since at least the early 1990's, many electronic exchanges (such as DTB/Eurex in the 1990s, the CME in the 1990s through the early 2000s and the Intercontinental Exchange ("ICE") today) have provided their own GUI tools for electronic trading. After exchanges began investing in developing and providing GUI tools for electronic trading, many FCMs and brokers (such as RCG and Goldman Sachs) followed suit. In particular, after application programming interfaces (APIs) became available at electronic exchanges, the FCMs and brokers (as well as ISVs) were able to begin to develop their own GUIs that were connected through these APIs to electronic exchanges. An example of this is FuturesOnline. IB and TradeStation, Petitioners in the current proceedings, have also invested substantially in creating and providing GUI tools for electronic trading. *See, e.g.*, Exhibit 2206, Excerpts from IB 10-K Statement at 419 ("Our proprietary technology is the key to our success."); Exhibit 2207, Excerpts from TS 10-K Statement at 5187 ("We believe that our success depends, in large part, on our ability to offer unique, Internet-based trading technologies."). Furthermore, many trading firms and individual traders have invested in their own technology creating their own GUI tools for

electronic trading. All of the participants identified above compete against each other with respect to GUI tools for electronic trading and invest untold millions of dollars on an annual basis on these technologies.

43. Because of the significant monetary stakes involved, i.e., the very livelihood of the user or the user's clients, the GUI tool for order entry is mission critical. The GUI tool of the '768 patent was designed and developed for the needs of a professional trader. A professional trader is conducting trading as his/her profession. Some professional traders trade on behalf of others (e.g., clients), while others trade on behalf of themselves. Professional traders are highly trained and have very specialized skill sets. There is nothing more critical for this type of user than the ability to see the market information, to quickly react to that information with the ability to accurately enter, modify and cancel orders, and to observe the results of those actions. This type of tool is expensive to develop, and also expensive for the professional traders to use. It is indisputably the primary tool of the trade, very much like a primary flight display ("PFD") in the cockpit of an airplane, which provides the pilot with the critical flight information (attitude, altitude airspeed, etc.) as well as feedback based on pilot input to the flight controls. For this reason, users typically set up the GUI tool in a very precise manner according to their personal tastes, and the location of this GUI tool coincides with their center of focus on their workspace. These professional users

are typically committed to significant monthly costs to be able to use these GUI tools, particularly at the time of the invention. For example, I understand that TT's trading software costs \$1,000 per month per user.

44. The incentives to the industry for success are pure – there is a lot of money at stake. Traders (who can be brokers, speculators and/or hedgers) use technology, such as software and hardware products, to help make quick decisions and seize opportunities on behalf of themselves or clients. This technology can be obtained from any of the various industry groups described above. At the time of the invention and continuing to today, there is a strong interest in technology that provides even the slightest edge or advantage over others in the industry. As a result, there are tens of millions of dollars spent each year on research and development to create technologies that can provide a participant in the industry any edge. *See, e.g.*, Exhibit 2207 at 5188 (“In 2006, 2005, and 2004, technology development expenses were approximately \$5.2 million, \$4.5 million, and \$4.4 million”). Different members of the industry have different motivations for success, but each participant is well-capitalized and highly motivated to provide improved GUI tools for traders. This is true today and was also the case both before and at the time of the invention. For example, success for traders is measured in terms of profitability. Brokers, FCMs and exchanges make money by charging fees for trading activity—so technology that causes traders to trade more

makes them more money, and of course they want participants to be successful, otherwise they would not trade. ISVs and other software vendors charge in different ways, such as monthly site fees or based on transactions – but their success is directly related to the success of the traders.

45. Speed and accuracy are often critical factors for success. Because opportunities may exist for only fleeting moments, the ability to spot them and seize those opportunities can often be the difference between the success and failure of a trader. Thus, even the smallest appreciation or suspicion that some new technology has a chance to provide even a slight advantage is quickly tried by the industry. This was true before the time of the invention, at the time, and continues today. Unlike the case in some other industries, there are no market factors or other reasons why groups in the industry would not try any technology that is perceived as having the slightest possibility of providing an edge. Similarly, the exchanges, brokers and FCMs make more money when more volume is traded, because they typically have transaction fees as a significant part of their revenue models. As such, they are always looking to develop technology that will increase the volume traded by end users. As a result of this aligned interest among industry participants, new technology that provides a competitive edge spreads like wildfire.

46. It is important to appreciate that, in this industry, there is a very fine line between success and failure, and differences in GUI tools, which may appear

minor to a layperson or one who is *not* one of ordinary skill in the art, may actually be extremely significant to one of ordinary skill. What may seem to be a minor tweak, especially with the benefit of hindsight, to a person who is not one of ordinary skill in the art or a person outside of the field of electronic trading, could mean the difference between an incredible success and a complete failure. As a result, one of ordinary skill in this art may perceive a difference as critical, whereas someone outside the field may see the same difference as minor with the benefit of hindsight.

47. As volume through electronic trading increased, electronic trading quickly became a large portion of the business for exchanges. The exchanges, whose revenues are typically tied to trading volume, therefore had great interest in promoting electronic trading. Eurex invested in promoting electronic trading and trading screens in particular. The Chicago Board of Trade (“CBOT”) developed its own screen. The Chicago Mercantile Exchange (“CME”) provided Globex and Globex II, both of which included trading screens. All of these exchanges had an incentive to create an improved trading GUI that caused people to trade more and that improved trader performance, so the exchanges would make more money through increased volume.

48. One of ordinary skill in the art, and certainly an expert in the relevant area, would have an understanding of the background of the trading industry set

forth in the preceding paragraphs. These are commonly understood principles in the industry. I will explain below that, in the context of this industry, where many were investing in development of GUI tools and yet all failed to achieve the technical solution of the claimed invention, the claimed invention was revolutionary. Despite the significant investment in research and development and pure motivation for improvement throughout the industry, Petitioners are unable to allege that anyone, anywhere in the world, actually achieved the invention recited in the claims prior to the inventors of the '768 patent. To my knowledge, the inventors here were the first in the world to combine the elements as recited in the claims. Petitioners nonetheless assert that the invention is obvious. This is illogical, and I strongly disagree. To illustrate how Petitioners' position is incorrect, I will provide details below, in timeline fashion, of the state of the industry leading up to the time of the invention, a description of the invention and its benefits and advantages, and what happened in the industry after the invention.

VII. CONVENTIONAL GRAPHICAL USER INTERFACE TOOLS (“GUI TOOLS”)

49. In the electronic trading industry, both prior to the invention of the '768 patent and for a period thereafter, there was a widely accepted conventional wisdom regarding the design of a graphical user interface tool (“GUI tool”) for order entry on electronic exchanges.

50. For example, it was conventional to provide the ability to enter and send orders to an electronic exchange using order entry tickets. While the precise layout of an order entry ticket could vary, there was a conventional construction of these tickets. In particular, it was conventional to provide a GUI, in the form of a window, with areas in which the trader could fill out parameters for an order, such as the price, quantity, an identification of the item being traded, buy or sell, etc. The tickets would typically also provide an area (e.g., a button), which the user could press or select (e.g., click on) to send the order to the exchange. Often times the order ticket would also provide a confirmation window or button that needs to be selected before the order message is actually sent. This method was known as being very accurate for order entry, but also widely known as being very slow. Indeed, these types of conventional order tickets are still widely used today.

51. With respect to GUI tools that permitted users to enter and send orders by directly interfacing with displayed prices (e.g., through the use of a mouse), the overwhelming majority of GUI tools were constructed to provide designated locations in the GUI in which the best bid price and best ask price are displayed.

52. Figure 2 of the '768 patent (reproduced with annotations below) illustrates an example of one such common GUI tool. *See* Ex. 1001.

FIG. 2

	201	202	203	204	205				
	Contract	Depth	BidQty	BidPrc	AskPrc	AskQty	LastPrc	LastQty	Total
1	CDHO	•	785	7626	7627	21	7627	489	8230
2			626	7625	7629	815			
3			500	7624	7630	600			
4			500	7623	7631	2456			
5			200	7622	7632	800			

53. Figure 2 represents a screenshot of such a GUI tool at a snapshot in time for a particular item (the contract for “CDHO”). Typically, the user would select what item is being traded, and then the client hardware running the GUI tool would connect to a live data feed for data relating to that item. The data feed is provided to client hardware running the GUI tool by an electronic exchange, for example as illustrated in Figure 1 of the ’768 patent.

54. This GUI tool is constructed as follows: it displays a BidPrc column 203 that includes locations (e.g., cells) in which bid prices are displayed and an AskPrc column 204 adjacent to the BidPrc column that includes locations (e.g., cells) in which ask prices are displayed. The best bid price that is currently available in the market (the highest price at which there is an order to buy for the item being traded at the electronic matching engine) is always displayed at the top of column 203, and other prices *at which there are other orders to buy pending* at the electronic exchange are displayed in descending price order in the BidPrc

column 203, each such price being displayed in a separate location (e.g., cell). Similarly, the best ask price that is currently available in the market (the lowest price at which there is an order to sell for the item being traded at the electronic matching engine) is always displayed at the top of column 204, and prices *at which there are other orders to sell pending* at the electronic exchange are displayed in ascending price order in the AskPrc column 204, each such price being displayed in a separate location (e.g., cell). The inside market is understood by those of ordinary skill in the art as meaning the best bid price and best ask price available in the market.

55. As noted above, the BidPrc column 203 and the AskPrc column 204 display prices at which there are currently orders to buy and sell, respectively, resting at the electronic exchange, each price being displayed in a separate location (e.g., cell). The quantities associated with the orders to buy and sell resting at the electronic exchange are also displayed. The GUI tool of Figure 2 is constructed to display a BidQty column 202 that includes locations (e.g., cells) in which bid quantities are displayed. The BidQty column 202 is located adjacent to the BidPrc column 203. The GUI tool also displays an AskQty column 205 that includes locations (e.g., cells) in which ask quantities are displayed, and the AskQty column 205 is located adjacent to the AskPrc column 204. Each location (e.g., cell) in the BidQty column 202 and the AskQty column 205 displays a number indicating the

total quantity at the electronic exchange at the price shown in the adjacent location (e.g., cell) of the corresponding BidPrc column 203 and AskPrc column 204, respectively. All the displayed prices and quantities illustrated in Figure 2 update dynamically as such information is relayed from the electronic exchange.

56. The GUI tool shown in Figure 2 is dynamic with respect to the display of prices because each and every time the inside market changes, based on updates from the electronic exchange, the GUI tool causes the display of price values within the cells of the top row in columns 203 and 204 to change. More particularly, the GUI tool causes the value displayed in the location of the best bid price cell (i.e., the location at the top of the column 203) to change every time an update reflecting a change to the best bid price available in the market is received, and the value in the best ask price cell (i.e., the location at the top of column 204) to change every time an update reflecting a change to the best ask price available in the market is received. The other displayed bid and ask prices, as well as the associated quantities located in columns 202 and 205, similarly change to reflect updates from the market. Therefore, the displayed prices and quantities are constantly changing in response to updates from the electronic exchange. However, the locations (or cells) designated for the inside market remains in the same top row of the display of prices. In other words, though the displayed values for the prices are changing in the cells, the dynamic display maintains the inside

market at the same location in those top two cells. Thus, the dynamic GUI tool of Figure 2 is constructed to fix the location of the inside market for a commodity in a predetermined portion of the display (e.g., in the top cells of columns 203 and 204).

57. In this type of dynamic screen, there is no price axis. In other words, this GUI tool only displays, in columns 203 and 204, those prices for which orders are pending at the electronic exchange. This GUI tool does *not* display price levels that have no orders. For example, in Figure 2 above, price level 7628 is omitted, because there is no order pending at the electronic exchange at that price level.

58. In the conventional Figure 2-style GUI tool, the user could place an order by clicking on a location (e.g., cell) in one of the price or quantity columns. For example, if a user wanted to place an order to sell a specified quantity of the contract CDHO, e.g., 50 contracts, at the price 7626, the user would position the mouse over the location (e.g., cell) having that price and click. I discussed entry of these types of orders in the conventional Figure 2-style GUI tool at the *eSpeed* trial using the following demonstrative slide:

Patent Background - Bids

Join Buyers or Sell Now

Bid Quantities
Bid Prices

BidQty	BidPrc
785	7626
626	7625
500	7624

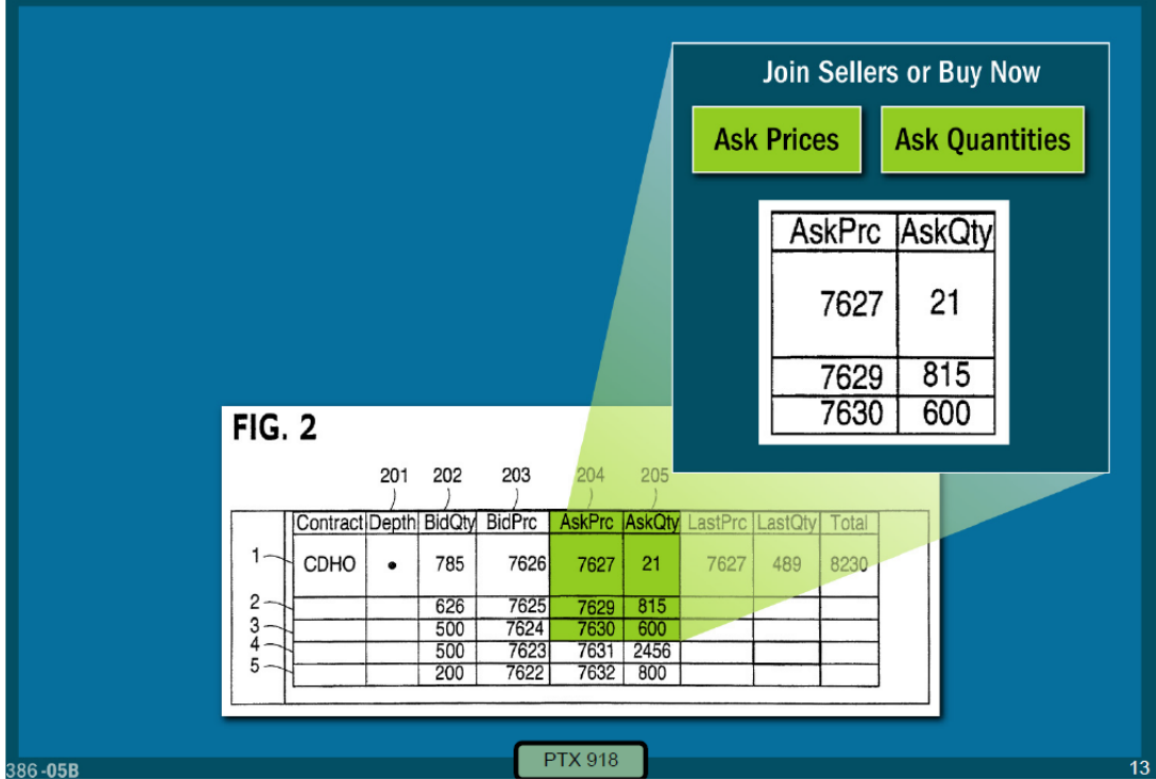
	Contract	Depth	BidQty	BidPrc	AskPrc	AskQty	LastPrc	LastQty	Total
1	CDHO	•	785	7626	7627	21	7627	489	8230
2			626	7625	7629	815			
3			500	7624	7630	600			
4			500	7623	7631	2456			
5			200	7622	7632	800			

201
202
203
204
205

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59. Similarly, if the user wanted to place an order to buy a specified quantity of the contract CDHO, e.g., 20 contracts, at the price of 7627, the user would position the mouse over the location (e.g., cell) having that price and click. I discussed order entry of this type at the *eSpeed* trial using the following demonstrative slide:

Patent Background - Asks



60. As the market for CDHO updates, any of the numbers in the price and quantity columns may be changing.

61. GUI tools like the example shown in Figure 2 were ubiquitous by the time of the invention. Typically, these GUI tools provided the user the ability to select the number of rows to be displayed. For example, if a trader desired only to see the inside market, the trader could limit the GUI tool to display only the top row.

62. Prior to the invention, GUI tools of the sort shown in Figure 2 represented the engrained conventional wisdom and state of the art in the minds of persons of ordinary skill in the art regarding how electronic trading GUIs were best

designed and constructed. While most dynamic GUI tools are similar to what is shown in Figure 2 (where the best bid and ask prices are provided side-by-side), at the time of the invention there were also similar dynamic GUI tools that displayed the locations for the best bid and ask prices such that the prices were displayed vertically (*e.g.*, with the location for the best ask price being displayed above the location for the best bid price). However, such GUI tools, like the dynamic display in Figure 2, displayed the best bid and best ask prices only at designated locations on the screen.

63. While various features may have varied from one dynamic GUI tool to another, there was one constant: the tool displayed (or provided) fixed, designated locations for displaying the best bid price and the best ask price. This made perfect sense because it emphasized focus on the primary target for the traders: the inside market. Displaying the inside market in a fixed location was perceived, by those skilled in the art at the time of the invention, as a significant advantage. First, the inside market (where an item is trading at a given moment) is the most important information for a trader. In addition, the inside market was the focus because, prior to the invention, the most common types of orders were orders made at the inside market (commonly referred to as “market orders” or “market type orders”). The same was true in the open outcry trading pits, where the inside market was the focus because, in the pits, trades were only made at the inside

market (orders could only be represented at the inside market prices or better). Since the location of the inside market is always known, the trader may easily spot the target, regardless of changes in the market. At any given time, the trader could look at the screen and immediately know the current state of the market. The conventional dynamic screens were valued by those skilled in the art at the time of the invention as being the fastest and most accurate way to enter orders at the inside market. It is fast because the inside market is always displayed at a fixed location where the bid and ask are in close proximity to one another, so that the trader can quickly trade by placing the mouse cursor over the best bid price or best ask price and click. It is accurate because the inside market location is fixed for the trader.

64. At the time of the invention (and after), those of ordinary skill in the art applied specific design criteria to GUI tools for order entry in electronic trading. Specifically, one design criterion was to conserve screen real estate. In addition, it was another design criterion to provide GUI tools that enabled users to enter orders with maximum speed and accuracy.

65. Screen “real estate” is a reference to the size of the GUI tool, or the amount or portion of the trader’s screen that the GUI tool occupies. Conserving screen real estate was important because traders had numerous types of information provided on the limited space of the trading screen, including: multiple

markets for products to be traded, various price charts, numerous news feeds, *etc.* It was critical to minimize space so that the market for each product could be displayed, as well as to reduce the amount of mouse movement between products. The conventional dynamic GUI tools satisfied this criterion because the locations for displaying the best bid and ask prices are fixed and extremely close together (e.g., side-by-side in adjacent cells). In addition, in the higher-end dynamic screens, the number of locations for displaying bid and ask prices beyond the inside market may be adjusted to further minimize the amount of screen real estate required for a product. That is, the screen real estate for a product can be reduced to simply four locations for displaying pieces of market data that would be displayed in a single row (or column): a best bid price and quantity, and a best ask price and quantity. With the dynamic GUI tools, the other rows, such as those below the top row of Figure 2, are not necessary to see the current inside market and, therefore, do not need to be displayed. Thus, the dynamic GUI tool allowed mouse movement by the user within a product, as well as between products, to be minimized. For example, if the GUI tool was condensed to a single row displaying a best bid price and quantity, and a best ask price and quantity for one product, then the user could very quickly move the mouse between these four closely grouped locations.

66. There were numerous examples of dynamic GUI tools in the futures space prior to the patents-in-suit, including but not limited to:

SPATS screen;

GLOBEX I trading screens;

LIFFE APT trading screens;

the OSD screen of the LIFFE APT system;

MEFF dynamic screen;

TT's X_TRADER;

Project A trading screens;

eSpeed trading screens;

Patsystems trading screens;

Globex II trading screens;

DTB/Eurex trading screens;

Ecco trading screens;

RTS trading screens; and

EasyScreen trading screen

67. Examples of screenshots of these dynamic GUI tools are collected in Exhibit 2208, (Excerpts from the Expert Report of David Silverman and LIFFE Directory of Software Solutions October 1998). To say that the Figure 2 style dynamic GUI tool was prevalent prior to, and at the time of, the invention is a huge

understatement. These types of GUI tools were being used throughout the industry for order entry in that time frame. Mr. Román acknowledged this. Indeed, these type of dynamic GUI tools remained in very strong use after the invention and are still widely used today.

68. In terms of the GUI tool, I want to be clear that I am referring to tools for professional traders. By the time of the invention, non-professionals, to the extent that such individuals had access to submit orders electronically, would typically use a basic order entry ticket, as described above. Using this method, the user may not even desire or have the need to view live market data. An example of such an order ticket is attached as Exhibit 2209, (Globex 1 Order Ticket). On the other hand, the professional tools described above combined presenting real time market data and order entry in the same tool. As described above, for professional traders, these GUI tools are mission critical tools of the trade.

69. Indeed, in 2001, I designed an order entry interface for Stafford Trading, and later used by TD Bank, which used a dynamic GUI tool similar to that of Figure 2. There also were hundreds of these types of dynamic GUI tools used in other asset classes, including bonds and equities (*e.g.*, NASDAQ level 2 type dynamic trading screens). Still today, this style of dynamic GUI tool is a common type of order entry screen in all asset classes other than futures.

70. Thus, it comes as no surprise that the only professional GUI tools that Mr. Román specifically recalled from approximately 1999 (at best several months after the invention) were dynamic GUI tools similar to that of Figure 2. In particular, Mr. Román testified at a previous deposition that he served as an expert witness in 1999 for Tradescape, which was a proprietary trading group. Exhibit 2165, 5/3/2016 Román Dep. Tr. at 26:11-27:7. Tradescape, like many others in the industry, invested heavily in technology. It employed 10 in-house developers and, as Mr. Román testified at deposition, Tradescape’s GUI was a “Level II interface.” *Id.* at 27:15-22. The “Level II interface” referred to by Mr. Román, also referred to as a NASDAQ Level II interface at the deposition, was a dynamic GUI tool, similar to that of Figure 2, in which the GUI tool displayed the best bid and ask in fixed locations side-by-side. Tradescape’s developers were adding additional features to this conventional GUI tool. The NASDAQ Level II GUI tool was known for its use in equities trading, but the functionality was in all aspects relevant to this proceeding the same as Figure 2. One of ordinary skill in the art would readily understand reference to a “Level II” or “NASDAQ Level II” GUI tool as functionally equivalent to the conventional GUI tool described herein.

71. I have personal knowledge of the state of the electronic trading industry prior to the invention. For professional traders who were concerned with speed, the overwhelming conventional wisdom at the time called for a dynamic

display with the inside market being displayed at a fixed location on the GUI tool. For professional traders that were concerned with accuracy, the conventional wisdom at the time called for an order ticket. In addition, information utilized by the trader, such as fills, working orders, market depth etc., if provided at all, was commonly displayed in separate windows. The conventional dynamic GUI tool described above was not only widely adopted and used, but also accepted by those in the industry as the engrained conventional wisdom. Indeed, TradeStation's President, Mr. Bartleman, [REDACTED]

[REDACTED]

[REDACTED] Ex. 2403; 187:4-8; Ex. 2509.

VIII. THE UTILITY AND ADVANTAGES OF THE PATENTED INVENTION

72. Through my experiences, I have seen a lot of patents in the field of electronic trading, and many relate to incremental improvements to existing technologies. It is my understanding that not all inventions need to be pioneering or revolutionary to be non-obvious. In fact, very few rise to that level, as illustrated by many of the patents in this field. In my opinion, for an invention to be pioneering or revolutionary in nature, the invention must cause the path of development to diverge from the conventional path, opening the door for new developments improving upon the revolutionary idea. Also, the invention should be contrary to conventional wisdom and create a significant improvement that

affects many people. In other words, if an invention changes the course of development in the field, spawning a substantial new arena of innovation, I would consider that invention to be revolutionary.

73. In my opinion the present invention is not only not obvious, but one of those few inventions that rises to the level of revolutionary. The invention changed the industry and spawned a whole new arena of innovation in the design of GUI tools for electronic trading. The invention's construction radically diverged from the conventional GUI tools of the time and provided a technical solution to technical problems in the prior art. The claimed GUI's solution technically improved the prior art GUI tools available at the time by combining dynamically displaying indicators corresponding to price levels along a price axis, and displaying an order entry region having a plurality of fixed locations that correspond to respective price levels, such that when the market changes, the indicators move relative to the price axis, but the fixed graphical locations in the order entry region continue to correspond to the respective price levels. Further, each fixed location is configured such that it can be selected through a single action of a user input device, which causes the software to both set a plurality of parameters and to send a trade order with those parameters to the electronic exchange.

74. In dynamic GUI tools, the display was constructed so that the location of the inside market remains fixed and the values displayed at those locations change with each and every inside market update. Thus, with each and every change in the inside market update, the price levels change positions, which can cause the trader to miss his or her price intended price (due to the intended price level “flipping” or changing positions just prior to the trader clicking on a cell). In contrast to these dynamic GUI tools, the GUI tool of the invention is constructed so that the locations of the order entry region are fixed; that is, these locations continue to correspond to the same respective price levels along the price axis even after a change to the inside market so that the trader will not miss his or her intended price when the inside market changes. Further, unlike dynamic GUI tools, the claimed invention is constructed so that bid and ask indicators are displayed and then moved relative to the price levels along the price axis. Moreover, unlike dynamic GUI tools, the claimed invention shows gaps, i.e., price levels for which there are no quantities currently being offered in the market, because the price levels are arranged along a price axis. The claimed structure, makeup, and functionality of this GUI tool was not routine or conventional. Instead, the overall ordered combination of all of the limitations was unconventional. The claimed invention would, as a matter of first impression, be perceived by those of ordinary skill in the art as unacceptable, particularly given the engrained conventional GUIs.

For example, a display of graphical locations corresponding to price levels along an axis would have been viewed by one of ordinary skill as using too much space on the screen, i.e., too much screen real estate, in terms of the size of the display for each product on the screen. In addition, in terms of the distance that the trader would have to move the pointing device, e.g., a mouse, within a single product and between products when trading multiple products, a display that includes graphical locations corresponding to price levels along an axis would have been viewed as much too slow (requiring too much mouse movement). Another apparent disadvantage of a display that includes price levels along an axis and relative movement of bid/ask indicators is that it would permit the inside market—viewed as the target—to move up and down on the screen and, as a result, a user interested in placing an order at the best bid or ask would have to “chase” the market. Thus, such a screen would be slower and less accurate with respect to market type orders. Furthermore, unlike the conventional GUI where the inside market is displayed in a fixed location, with the present invention, the user is not able to look at only a small portion of the GUI to, at all times, see the inside market – the area of focus in the conventional GUI. Instead, the focus grows much larger due to movements of the inside market and because the price axis shows gaps.

75. Nonetheless, the invention provided significant benefits to users even though it had significant drawbacks that would initially turn off potential users.

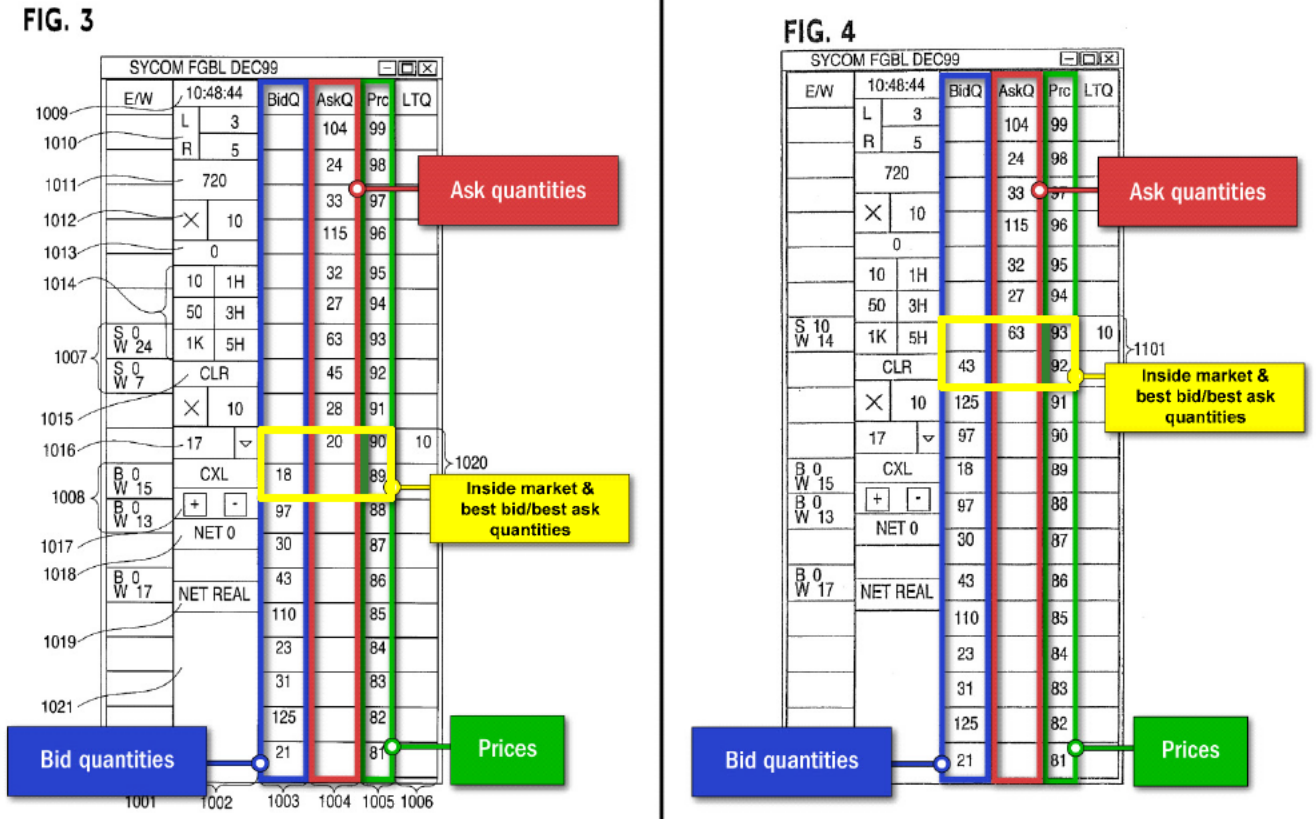
The claimed combination provided benefits over the prior art GUIs in terms of improved speed without the need to sacrifice accuracy when trading at specific prices and improved usability in terms of providing a better visualization of the market. It turns out that these benefits dramatically improved profitability of traders and also dramatically increased the trading volume of traders using tools embodying the claimed combination.

76. It should be appreciated that the claims of the '768 patent recite a price axis (with fixed order entry locations) and the relative movement of dynamic bid and ask indicators relative to the price axis, whereas, e.g., the '132 patent recites a static display of prices and a dynamic display of a plurality of bids and asks and the '304 patent recites a static price axis and a dynamic display of a plurality of bids and asks. Although using different language, each of these patents describes and claims the functionality of every version since inception of TT's MD Trader, and all of these versions of MD Trader are commercial embodiments of each of these patents. *See* Exhibit 2233 ('768 Claim Chart). I have reviewed all of these versions and understand MD Trader has always met the claim features. In Exhibit 2233, I explain how all versions of TT's MD Trader meet each and every element of several exemplary claims of the '768 patent, as well as how Petitioners' products meet each and every element of these same claims. In addition, as one of ordinary skill in the art would readily understand, any GUI with a static price axis,

or a static display of prices, would also necessarily include a price axis and fixed order entry locations with relative movement. Furthermore, the price axis and fixed order entry locations with relative movement provides the benefits and advantages, as discussed in this declaration, that are also provided by a static display of prices and a static price axis.

77. I have seen evidence that confirms the non-obvious nature of the invention and shows how it revolutionized GUI tools in the industry. For example, in 2004, Mr. Durkin, who was then Director of Merrill Lynch Futures, wrote to the inventor, Mr. Brumfield, regarding his initial reaction to seeing an embodiment of the invention. Remarkably, even though he was given the opportunity to see the invention in person, Mr. Durkin initially could not comprehend what he was seeing. He stated “[a]t first, I couldn’t even understand what I was looking at.” Exhibit 2210, Email from Durkin to Brumfield, May 28, 2004. It was only after seeing the inventor enter a few orders that Mr. Durkin “figured out the layout.” *Id.* After Mr. Durkin realized how the inventive GUI tool operated, he “was immediately struck by the novel way the market prices were displayed and how easy it was to enter orders.” *Id.* If someone like Mr. Durkin could not even understand the inventive GUI tool when he initially saw it, this shows that it is simply not possible for anyone to reasonably conclude that the invention would have been obvious to one of ordinary skill in the art.

78. The display of price levels along a price axis (with fixed order entry locations) is described in the specification of the '768 patent, for example with reference to Figures 3 and 4, reproduced below with annotations:



79. Figures 3 and 4 show an embodiment of a GUI tool according to the invention. The GUI tool displays the name of the product, in this example “FGBL DEC99,” at the top of the window. Figure 3 shows the market for the product at one time and Figure 4 shows the market for the same product at a later time. This GUI tool is constructed as follows: it displays a price axis (“Prc”) that includes locations (e.g., cells) in which each of a range of price levels is displayed. It

provides graphical locations (e.g., cells), where each graphical location corresponds to a different price level along the price axis, and the GUI tool also may display the bid/ask indicators at graphical locations corresponding to their respective price levels. The GUI tool obtains the underlying market information for the bid/ask indicators from a data feed that is provided by an electronic exchange. As shown in Figure 3, the best (i.e. highest) bid indicator is located at the price level of 89 and the best (i.e. lowest) ask indicator is located at the price level of 90. The indicators in this embodiment are numerical and show quantity at the corresponding price level. At the best bid (price level 89), the indicator shows a quantity of 18, and at the best ask (price level 90), the indicator shows a quantity of 20. By displaying additional bid/ask indicators at price levels other than 89 and 90, as shown in the embodiment of Figure 3, the GUI tool displays additional market depth for the product at the time.

80. At the time shown in Figure 4, the GUI tool clearly illustrates how the market information for the product has changed upon receipt of new market information. Relative movement of the first and second indicators, results from the invention's juxtaposition of a display of price levels and a dynamic display of bid and ask indicators. Specifically, the locations of a number of bid/ask indicators moved relative to the display of prices because the inside market and portions of the market depth have changed. In particular, the location of the indicator for the

best (i.e. highest) bid has moved relative to the display of prices to a different graphical location, now corresponding to the price level of 92 (an increase of three price levels), and the location of the indicator for the best (i.e., lowest) ask has moved relative to the display of prices by a like amount, now corresponding to the price level of 93. The GUI tool has also updated, for example, the indicators at the best bid and ask to show quantities of 43 and 63, respectively.

81. A comparison of the GUI tool in Figures 3 and 4 shows that locations in the order entry region that correspond to respective price levels of the price axis are fixed. In other words, while the bid/ask indicators in the GUI tool moved in response to new market information from the electronic exchange, the locations of the order entry region corresponding to the price levels of the price axis did not change positions; that is, those locations continued to correspond to the same respective price levels of the price axis even after this change in the inside market. For instance, the location in the AskQ column 1004 corresponding to price “90” in Fig. 3 continues to correspond to price “90” even after the inside market prices changed in Fig. 4. Each value of the price levels along the price axis remained in the same location/cell, and the indicators for the inside market moved locations/cells relative to the price axis. Thus, in contrast to the dynamic screens (e.g., Figure 2 style), the GUI tool of Figures 3 and 4 provides an order entry region with fixed locations corresponding to the price levels along an axis, and

these locations continue to correspond to the same price levels even after a change of the inside market price, and further, that provides indicators that move relative to the price levels along the axis. This movement, which provides users with an intuitive feel for the behavior of the market for the product, is not present in the conventional dynamic screens.

82. I captured a video clip showing the operation of a dynamic screen available at the time of the invention in a side-by-side comparison with a screen in accordance with the invention. The captured video clip may be viewed at <http://107.134.85.251>. In the video, both the dynamic screen and the screen operating in accordance with the invention are operating with data for the same market. As shown in the dynamic screen (lower portion of the video), the location of the inside market is fixed; i.e., the top row of cells, where the best bid price and best ask price are always located in the cells immediately below the column headings BidPrc and AskPrc, respectively. As market updates are displayed, one can readily see that the numbers representing the best bid price and the best ask price are constantly changing. Turning to the top screen of the claimed invention, because the locations in the order entry regions continue to correspond to the price levels along the price axis after there was a change of at least one inside market price, this screen increased the likelihood of the user getting her intended price and improved conventional GUI tools, like the dynamic screen, in which it was much

more likely for a user to miss her intended price due to the structure of the prior GUI tool.

83. The claimed invention displays an order entry region comprising a plurality of locations for receiving single action commands, where such single action commands both set parameters for a trade order and send the trade order to the electronic exchange. Each location corresponds to a respective price level along the price axis and continues to correspond to the respective price level even after a change to an inside market price. Using the claimed invention, a trade order can be sent by selecting a particular location by a single action (e.g., a single click or a double click of a mouse button) of the user input device in the particular location. The single action sets a plurality of parameters (e.g., price, quantity, order type) for the trade order and sends the trade order to the electronic exchange. For shorthand, I sometimes refer to the elements of the locations corresponding to price levels along the price axis that can be selected by a single action of a user input device to both set a price and send a trade or message, as “single action order entry.”

84. By combining a dynamic display of bid/ask indicators corresponding to price levels along a price axis, with single action order entry that occurs by selecting a fixed location corresponding to a price level along that price axis to both set parameters and send the trade order, the inventors went against the

prevailing and overwhelming conventional wisdom at the time. For example, instead of having the inside market in a fixed location with the prices changing in that fixed location, the inventors provided a GUI tool that is constructed to allow the inside market to move locations relative to the price levels along the display of prices but fix locations of an order entry region. The fixed locations of the order entry region do not change in response to a change in an inside market price so that the trader will likely not miss his or her intended price when the order is sent if that intended price was a particular price (as opposed to the inside market). Thus, the combination of the invention has the advantage of improving the accuracy of orders in which the user intends to submit an order at a particular price without the need to sacrifice speed. In addition, the invention also promotes quick and efficient trading by providing a display that fluctuates logically up or down as the market prices change. Ex. 1001 at 3:5-10. Thus, the trader receives a visual indication of the market movements and the direction and speed of that movement. One of ordinary skill in the art would readily appreciate that, in this case, the claims are directed to the GUI tool itself, and are not directed to any GUI that simply generically allows access to an underlying invention. Nor are the claims directed to a method of data processing.

85. In conceiving the main idea behind the claimed invention, Mr. Brumfield (the primary inventor) was primarily concerned with addressing a

problem he experienced with conventional dynamic screens whereby he would miss his intended price as a result of the price changing from under his cursor before an order is sent. *See, e.g.*, Exhibit 2211, Brumfield Trial Tr., at 682:1-684:3. I have attached an animation demonstrating the problem of a trader missing his/her intended price. Exhibit 2212. As shown in the animation, the prices and quantities in the conventional dynamic GUI tool are constantly changing within the displayed cells. In the animation, the trader wishes to place an order to buy the contract at the price of 111175. However, as the trader moves the cursor to the location corresponding to the best ask price of 111175 and attempts to select that price with the mouse, the price changes to 111180 just prior to the trader clicking the mouse, such that when the mouse is clicked to set and send the order, it is sent at the wrong price, 111180. This example results in a loss of \$1562.50. This is also illustrated in the demonstrative below:

Problem With Conventional Screens

Placing a Buy Order for 100 ZN DEC04 contracts at 111175

Contract	Depth	BidQty	BidPrc	AskPrc	AskQty	LastPrc	LastQty	Total
		80	111170	111175	167			
		1120	111165	111180	167			
		578	111160	111185	265			
		349	111155	111190	52			
		58	111150	111195	144			

111175

Time 1

Contract	Depth	BidQty	BidPrc	AskPrc	AskQty	LastPrc	LastQty	Total
		478	111175	111180	67			
		466	111170	111185	245			
		85	111165	111190	743			
		337	111160	111195	1044			
		164	111155	111200	73			

111180

Time 2

\$1562.50 Loss



PTX 5520

2

86. As shown above, at time 1, the trader is moving the cursor toward the intended price of 111175. At time 2, the price has changed to 111180 just as the trader is clicking the mouse in the desired cell, resulting in the loss of \$1562.50. This problem, recognized by Mr. Brumfield, is caused by the functioning of the conventional dynamic GUI. It is caused by the technology. Such a problem of accuracy of data entry is a classic technical problem. That the problem may affect a business issue—the inaccuracy leads to an incorrect order—does not change the technical nature of the problem. Mr. Brumfield was uniquely positioned to be confronted with this problem because he was trading huge volume (approximately

20% of the volume of German Bund Futures) and was more focused on particular prices than market prices as many other traders were. For Mr. Brumfield, a small error could be disastrous.

87. Mr. Brumfield conceived of a solution that combined a dynamic display of bid/ask indicators corresponding to price levels along a price axis with an order entry region having fixed locations corresponding to price levels along a price axis, where the fixed locations do not change positions at a time when the inside market changes (*i.e.*, the fixed locations continue to correspond to the same price levels after a change to an inside market price), and which in response to a selection of a particular location of the order entry region both setting parameters for a trade order and sending the trade order to the electronic exchange. Exhibit 2213, (Brumfield Sketch) depicts a sketch of Mr. Brumfield's idea that he prepared in 1998. Even with this combination of features in mind, however, he did not know for certain whether the resulting GUI tool would in fact prove advantageous in comparison to the conventional screens. Shortly thereafter, Mr. Brumfield hired TT under a consulting contract to build a prototype. It took a number of months to get a prototype that was sufficiently working and bug free for Mr. Brumfield to truly test the prototype—to take for a live spin with live bullets using his normal approaches to trading. Only by doing that could he ultimately tell if the new GUI tool would be advantageous.

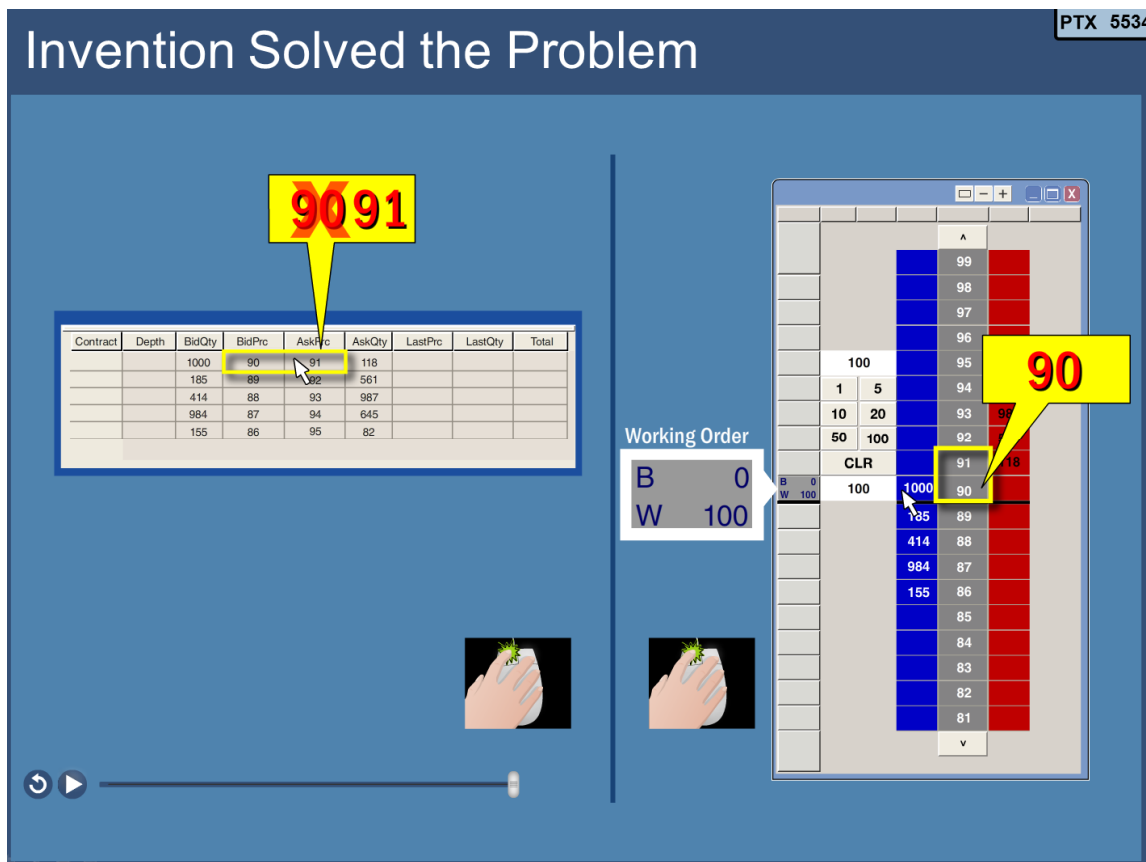
88. Once he was really able to use the prototype for trading in his usual manner, he saw that the invention was a big deal. First, the invention addressed the accuracy problem—it solved the missing price problem illustrated above with respect to conventional Fig 2 style screens. Second, the prototype had the unexpected benefit of providing a more intuitive visualization of the market that allowed him to have a better feel for and quicker reaction to the market. The overall combination had a dramatic impact on his trading—causing his profitability (already huge) to skyrocket.

89. The claimed invention set forth in the '768 patent provided the unexpected benefit providing faster order entry at specified prices because the user has more confidence in obtaining the desired price, even if the inside market is changing. Having a price change at the moment a trader enters a trade order is akin to having the rug pulled out from under you. Thus, knowing that the prices will not change at the moment the trader enters the order engenders confidence and reduces trader hesitation, thus ultimately leading to faster order entry. Also, the relative movement of the indicators along the price axis allowed the trader to intuitively sense market movements, thereby enhancing the user's ability to identify and quickly act upon opportunities. *Compare* GUI tools shown in the video clip at <http://107.134.85.251>. The speed increase was unexpected because one of ordinary skill in the art would have expected the invention to be slower

because the inside market is not at a fixed location. The increased confidence of obtaining the desired price caused trading volume to grow—a significant benefit to the industry (not only in terms of more revenue to FCMs and exchanges, but the market obtained the benefit of greater liquidity).

90. The invention solved the conventional GUI tool's problem of missing the intended price. I have attached an animation illustrating the invention's solution to the problem of a trader missing his/her price. Exhibit 2214. As shown in the animation, a conventional GUI tool is shown on the left and an embodiment of the invention is shown on the right. In the animation, both GUI tools are receiving the same market updates. In the conventional GUI tool, the inside market is fixed to the location highlighted by the yellow box. In the embodiment of the invention, on the other hand, the inside market, also highlighted by a yellow box, moves relative to the display of prices. As shown, the trader wishes to enter an order to buy at the price of 90. In the conventional GUI tool, as the trader moves the mouse into the appropriate location on the GUI tool, the price changes to 91 just prior to the trader clicking on the cell, resulting in the trader entering an order at the wrong price, 91. Again, this problem is specifically caused by the GUI tool and is a problem of inefficient data entry. In the embodiment of the invention, on the other hand, the trader moves the mouse to the 90 price level and clicks to send the buy order at 90 thereby obtaining the intended price, even though the inside

market changed. This change is a result of the specific construction and features of the improved GUI tool. A screen capture from the animation is shown below:



91. In MD Trader, the inside market moves up and down relative to the price levels as the market updates are received thereby providing the unexpected benefit of improved market visualization. As a result of the above described benefits, the GUI tool of the invention provided tremendous benefits to the trader, including most importantly, financial benefits. This new GUI tool was literally a money-making machine. For example, Exhibit 2215, (Brumfield Trading Results) is a graph showing Mr. Brumfield’s cumulative trading results during the time that he was testing the prototype software embodying the invention. Mr. Brumfield

credits the invention for the significant success illustrated by the graph, even though the prototype still had some significant bugs. Exhibit 2211, Brumfield Trial Tr.at 712:13-713:11; *see also*, Exhibit 2216, Declaration of D. Martin, discussed below in paragraph 109 (discussing an extended period of uninterrupted success). Mr. Brumfield's trading strategy during this time frame did not change. What changed was the GUI tool technology he was using.

92. The invention arose out of a series of very unusual and unique circumstances. Mr Brumfield was widely known for his tremendous success in the open outcry trading pits, where he was one of the largest traders at the Chicago Board of Trade. Yet in the midst of that success, he quit the trading pits "cold turkey" in the late 1990s, because he had the vision to see open outcry trading as a dinosaur, in the last stages of life. Exhibit 2211 at 672:3-673:8. Mr. Brumfield recognized that electronic trading would render the open outcry pits, which were thriving at the time, obsolete. As we know today, Mr. Brumfield proved to be right. After leaving the open outcry pits in Chicago, Mr. Brumfield turned his attention to electronic trading.

93. Around the time of the invention, Mr. Brumfield, the primary inventor, was one of the largest electronic traders in world. He was using conventional GUI tools, as described above including the market grid and order entry tickets. For a period of time, he *alone* accounted for 20% of daily volume of

a particular futures contract (a German bond) that was traded on an electronic exchange. *Id.* at 674:22-675:20. Because of his trading proficiency, Mr. Brumfield had the resources and, more importantly the willingness, to hire developers to build trading tools for him, even when it was very unclear whether the tools would provide benefits over his existing tools. For example, prior to the invention, I understand that Mr. Brumfield hired TT to develop another idea that he had for an improvement. *Id.* at 690:8-19. After spending the time and money to develop the prototype, Mr. Brumfield discarded that idea, because it proved not to be useful. *Id.* at 691:3-19.

94. Later, he conceived of the present invention and again engaged TT to develop the prototype. It took over six months just to get the prototype up and running, at least to a degree sufficient for him to test the prototype and see if it made a difference. Mr. Brumfield testified that the prototype was still buggy and crashing. *Id.* at 711:2-16. In my view, Mr. Brumfield's actions were very unusual and extremely risky—Mr. Brumfield was willing to give the prototype a full try, i.e, trading 20% of the volume in a contract, even while it was still in development. This is analogous to Howard Hughes taking the Spruce Goose up in the air without knowing that it was airworthy. Mr. Brumfield put aside the conventional order entry GUI tools with which he was having great financial success, to try something that was radically different. In my experience, it was unheard of for a successful

trader to switch tools under these circumstances. When Mr. Brumfield switched to the new GUI tool, the results were shocking in terms of the positive impact that it had on his already successful trading. Based on the evidence that I have seen, the invention was a money-making machine for Mr. Brumfield. He came to appreciate the significant value of the invention, and its potential to change the industry. I have reviewed a number of articles about Mr. Brumfield and have had discussions with Mr. Brumfield about his open outcry pit trading and his transition into electronic trading. Exhibit 2217, (Brumfield Articles). I conclude from all of this that Mr. Brumfield has a very “outside the box” personality, and his creative thinking has been shown to have been visionary. I believe that invention would not have come into being without Mr. Brumfield’s approach, which was outside the limits of conventional thinking. I have reviewed sworn declarations from industry leaders who came to this same conclusion. *See, e.g.*, Exhibit 2218, Declaration of Zellinger; Exhibit 2219, Declaration of Cahnman. Only Mr. Brumfield’s visionary and persistent attitude could have led to this invention—it ultimately showed its benefits despite significant apparent drawbacks that would have caused it to be a non-starter to any person of ordinary skill in the art at the time.

95. As illustrated by Mr. Brumfield’s experience, even if one of ordinary skill in the art had knowledge of *all* elements of the invention separately, he or she would not have recognized the advantages of combining those elements, as in the

invention, over the conventional screen. The conventional wisdom regarding the primary goals of designing order entry GUI tools for electronic trading—conserving screen real estate and providing for fast and accurate order entry—strongly taught against using the claimed invention. Those of ordinary skill in the art would immediately recognize the apparent drawbacks and disadvantages of the claimed combination (e.g., excessive use of screen real estate, chasing the market), which one of ordinary skill in the art at the time of the invention would find unacceptable, a complete non-starter. It is only with hindsight using the patent’s disclosure of benefits and advantages, or experience with the invention, like Mr. Brumfield’s use of the prototype in live markets, that would lead one of ordinary skill in the art to even consider such a drastic deviation from the engrained conventional screen.

96. Mr. Brumfield believed in the significant benefits of the invention and felt that it could help TT, which was at the time struggling. Although already an investor in TT, Mr. Brumfield decided to assign the invention to TT and increase his investment, provided that TT agreed to develop the prototype into a commercial product and, importantly, pursue protection of the invention with patents. He felt that the invention could turn the company around, but the invention had to be protected by patents because it was a GUI that could be seen and easily

copied once people realized its impact. Once again, Mr. Brumfield's vision proved accurate.

97. Following Mr. Brumfield's realization of the benefits, he and TT worked to convert the prototype software into a commercial product, which was introduced in the late summer of 2000 under the trade name MD Trader.³ MD Trader is the commercial embodiment of the invention claimed in the patent today, and every version of MD Trader that has ever been released has embodied the claims of the '768 patent since MD Trader was launched in the summer of 2000. Attached as Exhibit 2233 is a claim chart illustrating how each element of the claimed invention is present in MD Trader in all versions since its launch. Attached at Exhibits 1, 2, and 3, are manuals from versions of X_Trader (of which MD_Trader was a window) released in 2014, 2004, and 2000, respectively. Even though MD Trader was launched *about two years after* Mr. Brumfield first conceived of the invention, MD Trader was the first product available in the industry that combined a dynamic display of bid/ask indicators that correspond to price levels along a price axis and that move relative to the price axis, an order entry region with fixed locations that correspond to price levels along the price axis, where the fixed locations continue to correspond to the same price levels

³ In parallel with this development effort, TT also undertook steps to secure patent protection, filing the priority application to the '768 patent in March of 2000.

along the price axis when at least one inside market price changes, and single action order entry that occurs by selecting a particular location corresponding to a price level to both set a plurality of parameters and send the order, as set forth in the claims. This significant period of time, from late summer of 1998 to late summer of 2000, during which the industry was constantly investing in and developing improved GUI tools, but failed to achieve the claimed invention, in itself suggests that the invention was not obvious.

98. I have reviewed the Declarations of Mr. Geannopoulos and Mr. McDonnell, which provide details about TT's recovery and success after the launch of the commercial embodiment of the invention. *See* Exhibits 2171 (Geannopoulos Dec.) and Exhibit 2173 (McDonnell Dec.). I am also familiar with the effect that the commercial embodiment had on TT through my participation in the litigations, where there was testimony at the *eSpeed* trial and the *CQG* trial about TT's success and the direct connection between the commercial embodiment and TT's success. I have also reviewed the Exhibits to those declarations, which confirm TT's growth in sales. All of this evidence provides compelling real world evidence that Mr. Brumfield's belief in the potential of the invention was justified. Within just a few years following the introduction of the commercial embodiment of the invention TT's sales (in terms of both revenue and total product) ramped up

dramatically, increasing almost 10-fold. Exhibit 2171 at ¶ 43; Exhibit 2173 at ¶ 21-23. This is an unusual success story in a very difficult ISV industry.

99. Once the GUI tool of the invention was introduced to the public in 2000, as TT's MD Trader, and overcame initial widespread skepticism, it became a fixture in futures trading. Indeed, many technology developers in the industry copied TT's GUI tool as described elsewhere in this Declaration. *See, e.g., infra* at paragraphs 110-111, 126-28, 133, 136. In addition to becoming a fixture in futures trading, TT's GUI tool is still growing in other asset classes, including equities, options and even event betting exchanges, more than 15 years after its initial launch. Many patented inventions have a much shorter useful life, as the technology rapidly advances. The continued strength of this invention in the industry, after so many years of investment and development in GUI tools for electronic trading, speaks to the pioneering nature of this invention. Mr. Brumfield could have kept the invention to himself, as I believe most would have under the circumstances. But, Mr. Brumfield had a very different mindset than others. At the time, he was an investor in TT, which was struggling. He thought that commercializing the invention would help TT's business and save the jobs of TT employees. Mr. Brumfield also thought that commercializing the invention would benefit the industry, helping traders be more successful and helping exchanges grow volume. So, with the understanding that TT would protect the invention with

patents (which was essential, because the commercial product could not be maintained as a trade secret), Mr. Brumfield agreed to assign the invention to TT. He then convinced TT, against internal resistance, to turn the invention into a commercial product and bring it to market. TT undertook efforts to convert the prototype into a commercial product to appease its essential investor, Mr. Brumfield. At the time, there was skepticism at TT about the commercial viability of the invention. Indeed, no one at TT thought the invention would be a significant addition to TT's product offering. There was so much skepticism, even at TT, that Mr. Brumfield insisted that TT create a new position dedicated to educating TT employees and its customers about the benefits of the invention in an attempt to overcome this skepticism. Exhibit 2211 at 715:19-716:18. Ultimately, as described further below, Mr. Brumfield's belief in the invention was proven correct—once it gained some traction in the marketplace, it was a huge success and it turned TT around. Within a few years of TT introducing the commercial embodiment of the invention, TT's sales and revenues increased dramatically. Exhibit 2173 at ¶ 21-23.

100. From my own experience, I am familiar with TT's position in the ISV market, both before and after the introduction of the commercial embodiment of the invention. Before, TT was a niche player in the GUI tool space. After the introduction of the commercial embodiment of the invention, and as a result thereof, TT became a major force in the GUI tool space. I have personal

knowledge of the industry's reaction to the launch of MD Trader. Initially, because the new GUI tool was contrary to the conventional wisdom at the time, MD Trader was met with a heavy dose of skepticism. However, once the benefits of the invention became apparent, MD Trader became the GUI tool of choice among professional futures traders, and later expanded into other asset classes. In addition, as discussed further below, I believe that MD Trader drove volume increases at the electronic exchanges.

101. Mr. Brumfield's discovery of this invention was unique under the circumstances. In this industry, there were many savvy, motivated and well-funded companies and individuals trying to innovate at all times to gain a competitive edge. And yet, none of these savvy companies and individuals put the elements together to arrive at the claimed invention. Notably, Petitioners, Interactive Brokers and TradeStation were among these many savvy industry participants that were working to create GUI tools, and they failed to make the claimed combination until years after the commercial embodiment was in the marketplace and available for all to see. Rather, it took Mr. Brumfield's creativity and TT's experience to make this invention. Under these real-world circumstances, it is simply not credible to say that the invention would have been obvious to one of ordinary skill in the art. It is only with improper hindsight, armed with knowledge


from the patent itself, that one can could arrive at the invention by picking and choosing elements from the conventional technology.

102. I understand that there was a massive worldwide hunt for prior art to the invention, in connection with the district court proceedings, where multiple defendants subpoenaed over 30 companies looking for prior art, and doubtless sought informal discovery from many more. The subpoenaed companies included some of the largest organizations in the financial arena, including Goldman Sachs, Citigroup, Reuters, and Credit Suisse etc. Yet, despite this massive hunt, the defendants and members of the joint defense group never found prior art that combines the elements of the invention as claimed. Indeed, the most relevant prior art was of record and properly considered in the original prosecution. Discovery confirmed that conventional thinking at the time of the invention was to provide the conventional dynamic Fig. 2 style GUIs.

103. Further confirmation that the invention was neither routine nor conventional followed from events after TT's launch of MD Trader. At the outset, MD Trader was not an immediate success and was met with a significant amount of initial skepticism. TT sales personnel met resistance from traders, who were hesitant to switch to the new technology. Exhibit 2170, Burns Decl., at ¶ 22; Exhibit 2171, at ¶ 39-41. Indeed, the initial skepticism was so significant that TT took the unusual step of creating a new role within TT and hiring an employee,

Mike Burns, to help TT overcome the skepticism—both from users and from employees within TT. Exhibit 2170, at ¶ 22; Exhibit 2171, at ¶ 39-41. Many of the Declarations (referenced further below) from traders and prominent leaders in the futures industry also demonstrate the presence of initial skepticism. In addition, Mr. Feltes and Mr. McElveen both confirmed the initial skepticism. For example, Mr. Feltes testified in the *eSpeed* case as follows:

Initial Skepticism



David Feltes
CEO, Marquette
Partners

Q. So tell me about that. What was the initial reaction to MD Trader at Marquette?

A. Traders were **initially skeptical** because profitable traders are hesitant towards change, because change can alter confidence. And if you are successfully making money, they're skeptical that they would be able to make more money elsewhere – with additional functionality.

PTX 1384 79

Exhibit 2220, *eSpeed* Trial Tr. (Feltes) at 3035:17-25.

104. Similarly, Mr. McElveen stated that he was “aware that many traders who were used to using older style screens that existed prior to the release of MD

Trader were initially skeptical of the MD Trader screen and reluctant to use it.”

Exhibit 2221, McElveen Decl., at ¶ 6.

105. After a period of initial skepticism, the invention broke through to become the prominent trading tool in the futures trading space. *E.g.*, Exhibit 2222, *eSpeed* Trial Tr. (Geannopoulos) at 346:8-13; Exhibit 2221, at ¶ 7. This was confirmed by Mr. Feltes, CEO of Marquette Partners, a proprietary trading firm, who testified that, after initial skepticism, MD Trader became very successful and introduced “a new paradigm.” Specifically, Mr. Feltes testified as follows:

TT Has Been Praised by the Industry

David Feltes
CEO, Marquette Partners

But gradually, over the course of the next six months to a year, more and more traders moved. Because it took one trader experimenting, finding very good success and then, once success is proven, other traders will move over. So there was a fairly quick take-up on the new MD Trader – **after initial skepticism.**

[MD Trader] seemed to be a new paradigm ... it seemed different than previous systems that we had seen.

PTX 1385 80

2220, at 3036:7-14; 3030:15-17.

106. The invention received widespread praise. For example, over 30 prominent traders and leaders in the futures industry signed declarations under the penalty of perjury attesting to the importance of the patented invention to electronic trading, declaring, for example:

“Mr. Brumfield had a unique vision and [MD Trader] was ingenious” (Glickman, Decl., ¶ 6)

“significantly reduces the mental calculations required by the preexisting systems” (*Id.* at ¶ 5)

“much faster than any order entry system I had used before” (Thomas Burns Decl., ¶ 7)

“created a paradigm change in the way that active traders traded” (Feldes Decl., ¶ 5)

“fast and accurate order entry and management” (Johnson Decl., ¶ 7)

“more intuitive and easy to use than other systems” (Ryan Decl., ¶ 4)

“changed the way electronic trading was done” (Anthony Decl., ¶ 6)

“made it much easier to see how the market was moving” (Oryhon Decl., ¶ 4)

“allowed traders to . . . react quicker” (*Id.* at ¶ 5)

“radically different than the types of trading tools that were available at that time” (Monieson Decl., ¶ 7)

“far superior” (Clark Decl., ¶¶ 4-5)

“allowed a trader to recognize opportunities much quicker” (Cahnman Decl., ¶ 8)

“a world of difference” (Thomas Burns Decl., ¶ 5)

“[traders] saw the great advantages of using MD Trader and now could not switch back” (Moore Decl., 4)

“far superior for the active trader because it was fast” (Zellinger Decl., ¶ 5)

“a very significant departure from the . . . [systems available]” (Grisafi Decl., ¶ 6)

“allow for a trader to be more aggressive and more confident” (Anthony Decl., ¶ 6)

“a revolutionary product providing great benefits to electronic traders” (Oryhon Decl., ¶ 6)

“revolutionary . . . not just an incremental improvement.” (Kidd Decl., ¶ 8)

The differences between MD Trader and previous systems resulted “in MD Trader being an invaluable tool to traders.” (Grisafi Decl., ¶ 5)

“a stroke of genius and I had not seen anything like it before” (Martin Decl., ¶ 8)

“different . . . from anything I had ever seen before” (Leone Decl., ¶ 3)

“a major improvement . . . so significant that I cannot put a price on its value” (Parker Decl., ¶ 4)

“displayed the ebbs and flows of a market in a way that I could easily see” (Thomas Burns Decl., ¶ 6)

Prior to TT’s launch of MD Trader “no one suggested anything remotely like MD Trader” (Feltes Decl., ¶ 8)

“whoever came up with . . . MD Trader was truly ‘thinking outside of the box’” (Oryhon Decl., ¶ 6)

“MD Trader provided a significant change to the order entry screens that were prevalent at the time of its release. Prior to the release of MD Trader, traders did not even perceive a problem with the old tools they were using. Only after seeing the benefits of MD Trader did people like myself realize the shortcomings of the preexisting systems.” (Schuman Decl., ¶ 12)

MD Trader was a “superior tool to the other systems available at the time.” (Zellinger Decl., ¶ 4)

“MD Trader was the first application designed to be used as a true trading tool by the trader to enhance trading.” (Zellinger Decl., ¶ 5)

“MD Trader proved to be a significant advance in performance.” (Marlovics Decl., ¶ 8)

MD Trader was “great.” (Gancer Decl., ¶ 4)

MD Trader is “invaluable.” (Jahno Decl., ¶ 5)

“substantially increases the speed in which traders can react to opportunities and enter orders.” (Mendelson Decl., ¶ 6)

“revolutionary.” (Moricz Decl., ¶ 4)

“radically different . . . far superior.” (Monieson Decl., ¶ 7)

“a world of difference for the trader.” (Melgarejo Decl., ¶ 4)

“provided dramatic benefits to traders.” (Ryan Decl., ¶ 5)

Exhibit 2223, (Collection of Trader Declarations); *see also* Ex. 2534, ¶¶ 2-7.

107. Another example is provided by the author of the book, “Steidlmayer on Markets,” which states “from a pure speed perspective, TT’s X_TRADER[®] front end with the MD_Trader[™] display provides what you are looking for, the

fastest access to the market.” Exhibit 2226, at 206 (excerpts). The author goes on to state, “[w]ith speed being our basis of comparison, TT has the others beat hands-down. The process is faster and more reliable.” *Id.* at 207.

108. In addition, by keeping the price levels still and having the inside market move relative to the price axis, the invention unexpectedly better represented the market and changes in the market than prior art style screens. *E.g.*, Exhibit 2221, at 705-706. This required less mental processing demands on the trader, and also more precisely identified the current market. *E.g.*, Exhibit 2223, Anthony, Decl., ¶ 5, Cahnman Decl., ¶¶ 8-9, Glickman, Decl., ¶ 5; Grisafi, Decl., ¶¶ 4-5, McElveen, Dec., ¶¶ 4-5, Feltes, Decl., ¶¶ 4-5, Northway, Decl., ¶ 4, Zellinger, Decl., ¶ 5. Thus, order entry at desired prices was improved. *E.g.*, Exhibit 2221, at 703-706; Exhibit 2223, Anthony, Decl., ¶ 5, Glickman, Decl., ¶¶ 4-5, Grisafi, Decl., ¶¶ 4-5, Clark Decl., ¶ 5; Cahnman Decl., ¶ 8, Feltes, Dec., ¶¶ 4-5, McElveen, Dec., ¶¶ 4-5, Northway, Decl., ¶ 4; *see also* Ex. 2534, ¶¶ 2-7. The combination of this unexpected benefit with the fast/accurate order entry made this invention very valuable to many traders. For example, allowing the market to move up and down on the screen provided the ability of the trader to enter orders more quickly and accurately at desired prices relative to the market.

109. It turned out that, by combining the features in the manner of the patent, the invention was extremely valuable. For example, one of the inventors,

Harris Brumfield, changed from using the conventional prior art style interface to the invention claimed in the patents-in-suit and as a result quickly experienced an exponential increase in his gains. Exhibit 2211, at 707-713; Exhibit 2215. One early adopter, David Martin, changed from using a prior art style Globex terminal to the invention claimed in the patents-in-suit and soon thereafter had approximately 90 consecutively profitable trading days using the invention. Exhibit 2216, ¶ 8; Ex. Exhibit 2224, Martin Dep. Tr., at 118-120. According to Mr. Martin, the invention “was far superior to preexisting systems” and his success was “directly attributable” to TT’s patented invention. Exhibit 2216at ¶ 8. Yet another user of the invention, Charles McElveen III, founder and owner of Kingstree Trading, L.L.C., licensed and used the invention soon after it launched and quickly saw the “significant advance over the trading screens existing at the time.” Exhibit 2221 at ¶ 4. Using the invention, Mr. McElveen commented that the invention “allows for traders to react much more quickly to fast-changing market conditions than the preexisting systems.” *Id.* at ¶ 5. Mr. McElveen also testified that the patented invention was so important that his company may not have even been able to survive without it. Exhibit 2225, McElveen Dep., Tr., at 107-109. Mr. McElveen stated, “the competitive advantage that we gained by trading with the MD Trader screen has been a determining factor in our success.” Exhibit 2221 at ¶ 5. Many electronic futures traders recognized the benefits of the invention and started using

it. Exhibit 2221 at ¶ 6. The patented invention has also received accolades and been widely copied. *E.g.*, Exhibit 2226, Steidlmayer on Markets, pp. 205-207.

110. I also understand that there is evidence that the invention of the patent provided a significant added benefit to exchanges and FCMs. Specifically, the evidence shows that the invention caused traders to increase the volume of their trades. For example, the former Managing Director and Chief Information Officer of the CME, Scott Johnston, testified that a major contributor to the CME's dramatic volume growth from 2000 to 2002 was MD Trader (TT's commercial embodiment of the invention). Exhibit 2227, Johnston Decl., at ¶ 3; Exhibit 2228, Johnston Dep. Tr. at 69-71. Mr. Johnston testified that he had observed that the electronic trading volume at the CME coming from Kingstree Trading (headed by Mr. McElveen and referenced in the preceding paragraph of this Declaration) "had exploded" after the fall of 2000. Exhibit 2227 at ¶ 4. Mr. Johnston and other CME employees visited Kingstree and observed firsthand that "Kingstree's traders were all frenetically trading on a front-end that looked different from what I had seen before. That front-end was TT's MD Trader." *Id.* Mr. Johnston had previously witnessed traders using the CME-provided Globex front-end (which was developed by GL Trade and utilized a conventional screen for order entry), and noted that traders using MD Trader entered orders at a quicker rate than with Globex. *Id.* Around the time that MD Trader became "the order entry of choice for

most high-end active professional futures traders,” the CME asked GL Trade to put a tool similar to MD Trader into its front-end because the exchange “viewed the MD Trader type front-end as causing traders to trade more volume.” *Id.* at ¶ 5. In addition to Messrs. McElveen and Johnston, others in the industry also provided declarations stating that the commercial embodiment of the invention caused increased trading volume. *See, e.g.*, Exhibit 2229, Grisafi Decl., at ¶ 5; Exhibit 2218, Zellinger Decl., at ¶ 10.

111. I have also reviewed articles giving accolades to TT for its invention. Exhibit 2226 at 205-07; Exhibit 2230, (Front-End Article) at 7. I have also reviewed the deposition and *eSpeed* trial testimony of Mr. Feltes, the head of Marquette Trading, who testified that TT’s invention represented “a new paradigm or a change that we hadn’t requested.” Exhibit 2220, at 3030:15-17. The reasons for the accolades were because of the new and innovative combination of a static price axis with relative movement and single action order entry, and how this combination provided for faster and more accurate order entry. Many also praised features from the dependent claims, such as displaying an entered order indicator in association with a price level along the price axis, the ability to delete such an order by selecting the entered order indicator, and the ability to manually center the price axis after the inside market indicators moved away from the center of the displayed field of prices.

112. After the initial skepticism was overcome, there was widespread commercial success of the invention. For example, Mr. Geannopulos, at the time TT's Executive Vice President of Business Development, testified that the invention was a huge commercial success such that TT had gone from a little known, unprofitable company to having a substantial presence within the space with sales increased around 700%, after the introduction of the invention. Exhibit 2171 at ¶ 43; Exhibit 2231, (TT Global Revenue); *see also* Exhibit 2173 at ¶ 21-22. Mr. Geannopulos also testified that MD Trader is “the reason why people come and talk to us and—and why we’re on the map...” *Id.* at ¶ 44. He also stated that MD Trader was responsible for such explosive growth, and the GUI tool customers identified with TT. *Id.*; *see also* Exhibit 2232, Lapan Dep. Tr. at 145:18-21. As pointed out below, the invention has also been a selling point for other companies who directly or indirectly copied the invention. Commercial success is further evidenced by the amount of revenue that TT has received from TT products that embody the invention. Exhibit 2173 at ¶ 21-22. It is also evident from the revenue TT has received as a result of worldwide licensing of the patents and settlements/damages from the district court proceedings. Exhibit 2172, Knobloch Decl., at ¶ 11.

113. The commercial success of Petitioner TradeStation's commercial product, Matrix, also supports the commercial success of the claimed invention

because this product embodies each and every claim element. Ex. 2233. Exhibit 2406 is an [REDACTED]

[REDACTED]

[REDACTED] Ex. 2404, 667:7-668:8. Exhibit 2406

[REDACTED]

[REDACTED]

[REDACTED] Mr. Bartleman testified that [REDACTED]

[REDACTED]. Ex. 2404, 668:15-669:11 ([REDACTED])

[REDACTED]

[REDACTED]

[REDACTED]; *see also id.*, 674:7-675:12 (explaining that in [REDACTED])

[REDACTED]

[REDACTED] *see also* Ex. 2514 (showing [REDACTED])

[REDACTED] Ex. 2515 (same); Ex. 2516 (same); Ex. 2517 (same); Ex. 2518

(same). [REDACTED]

[REDACTED]. Exhibit 2143 [REDACTED]

[REDACTED]) also [REDACTED]

[REDACTED]

[REDACTED]

114. I am also aware of widespread copying of the invention throughout the industry and that many of those copies were commercially successful for others. For example, I am aware of copying by companies such as Patsystems, Refco, Ninja, FastFill, NYFIX, Orc, RealTime Systems Group, and Strategy Runner. Images of the products that copied the invention were presented during the *eSpeed* trial using the following demonstrative exhibits:

**MD Trader Was Widely Copied
By Other Software Vendors**

**Patsystems
Trading Screen
- PTX762**

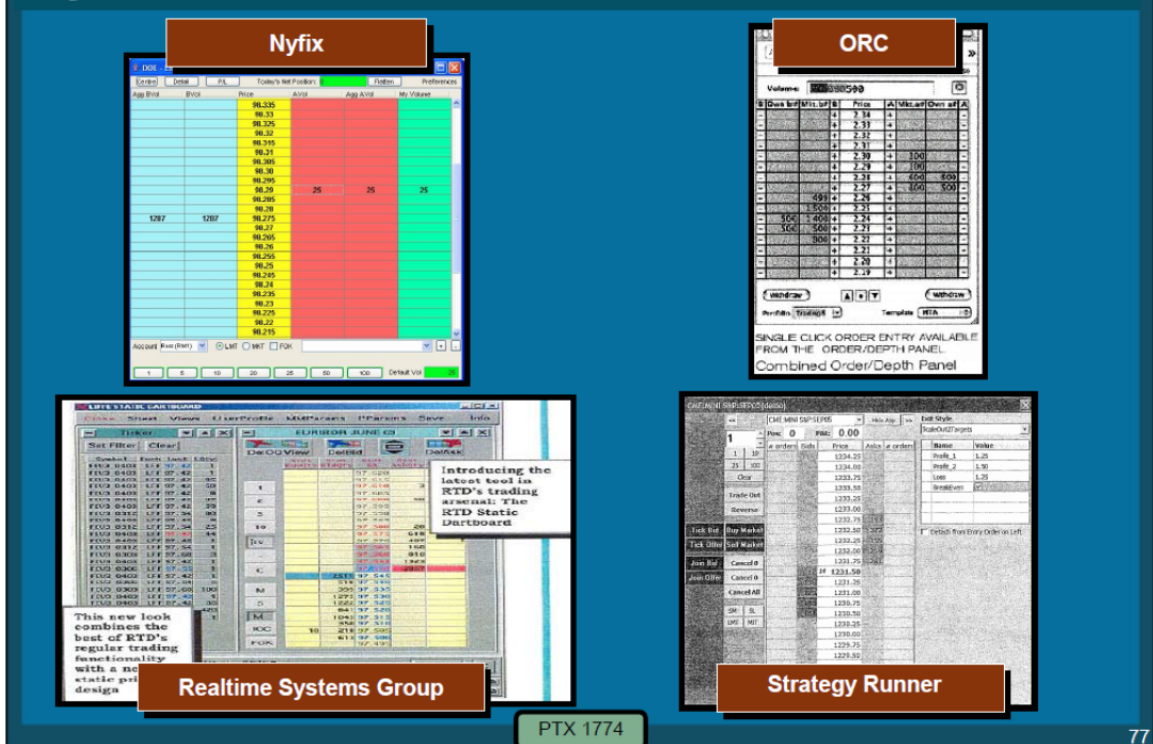
**RefcoPro
Ladder Ticket
- PTX773**

**Ninja
- PTX385**

**Fastfill
- PTX387**

PTX 1773

MD Trader Was Widely Copied By Other Software Vendors



115. As noted below in paragraph 151, each of these companies is subject to a consent judgment, acknowledging infringement and validity. Each of these products was introduced in the years following TT's launch of MD Trader. Just like MD Trader, TT's commercial embodiment of the invention, each of these products is constructed to include all elements of the invention. For example, as claimed in the '768 patent, these products were constructed to include a dynamic display of bid and ask indicators that move relative to a prices axis. In addition, each is constructed to include single action order entry that occurs by selecting a fixed location corresponding to a price level along the price axis to both set parameters and send the order. Other dependent claim elements that are found in

these products include a centering command to center the inside market, display of a user's entered orders aligned with price levels along the price axis (as shown above), and deleting the user's entered order in response to a single action of the user input device with the cursor of the user input device positioned over the entered order indicator.

116. There are a number of additional striking similarities between TT's MD Trader and the trading screens of these competitors which were launched after MD Trader. These similarities encompass all of the features claimed in the patents-in-suit that are also embodied in MD Trader. I am able to point to these similarities in each of the screens illustrated above, which can act as examples of all of the competitor screens that copied TT's MD Trader.

117. For example, MD Trader displays an inside market with a highest bid price and lowest ask price. Likewise, each of the eight exemplary products illustrated above displays an inside market with a highest bid price and a lowest ask price. In MD Trader, the inside market is displayed along a vertical display of price levels along a price axis. The same vertical display of price levels along a price axis was implemented into each of the eight exemplary products.

118. MD Trader also displays market depth through a plurality of bid and ask indicators. Likewise, each of the eight exemplary products illustrated above displays market depth through a plurality of bid and ask indicators. For both MD

Trader and the eight exemplary products, the bid and ask indicators are displayed in alignment with the price levels along the vertical display of price levels.

119. In MD Trader, the vertical display of price levels along the price axis does not move at times when the inside market changes. Instead, when the inside market changes, the bid and ask indicators displayed in MD Trader move up and down relative to the price axis. This functionality was directly copied by others in the industry, including the eight exemplary products.

120. MD Trader also offers the ability for a user to enter an order with a single click of a mouse in an order entry region having fixed locations that correspond to price levels along the price axis. This “single action order entry” is similarly available in each of the eight exemplary trading screens.

121. MD Trader then displays an entered order indicator that is in association with the price at which the user entered its order. These entered order indicators are similarly displayed in the eight exemplary products. These products also offer the ability for a user to delete its trade by single clicking on the entered order indicator, just as MD Trader does. Other features such as the use of default quantity, the display of volume history per price level, and the color of the columns were directly copied.

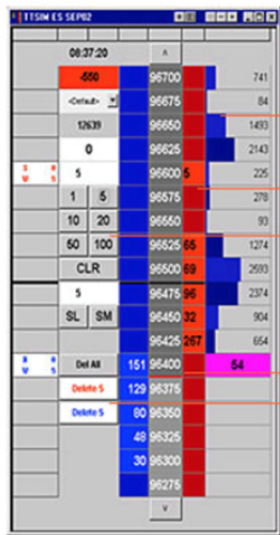
122. Again, Petitioners’ products, the Matrix (TradeStation) and BookTrader (IBG) windows, also embody the ‘768 patent, as I set forth in Exhibit

2233. *See also*, Ex. 2403, Bartleman Tr. at 285:16-286:10 ([REDACTED] [REDACTED]); Ex. 2154, Galik, Tr. at 276:5-277:7 ([REDACTED] [REDACTED]). Indeed, both the Matrix window offered by TradeStation and the BookTrader window offered by Interactive Brokers are susceptible to the same striking similarities, as further described below. Thus, evidence that TradeStation copied MD Trader in developing Matrix, and the subsequent praise and commercial success of Matrix, is directly relevant to objective indicia of nonobviousness.

123. With just a cursory glance, it is evident that TradeStation also copied TT's MD Trader when developing its Matrix window.

124. An image of TT's website from April 16, 2003 is depicted below. This image alone shows that TT advertised the features of MD Trader, which included, at a minimum, volume by price along a vertical display of prices that included visible market gaps. MD Trader also displayed the daily high/low and offered the ability to enter and delete orders via a single click of a mouse. Visually, MD Trader also displayed a plurality of bids in the blue column and a plurality of asks in the red column.

Market Depth Trader Window



- volume by price
- market gaps visible
- single-click trading
- daily high / low
- single-click deleting

MD_TRADER's vertical display allows for unprecedented market feel, an intuitive sense of where the market is headed. The vertical grid format dynamically displays the market depth for a given instrument, enabling the trader to enter orders by clicking once in the buy or sell column.

© 1997-2003, Trading Technologies International, Inc.
[Legal Information](#)



Exhibit 2234 (X_Trader Product Tour). Shortly thereafter, in May of 2003,

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] TT's website touted:

MD_TRADER's vertical display allows for unprecedented market feel, an intuitive sense of where the market is headed. The vertical grid format dynamically displays the market depth for a given instrument, enabling the trader to enter orders by clicking once in the buy or sell column.

Ex. 2405, at 1. [REDACTED]

[REDACTED]

[REDACTED]

Ex. 2144, at TS0107057. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Ex. 2404, 604:7-13. *See also* Ex. 2403, 221:24-222:12 ([REDACTED]

[REDACTED]

[REDACTED]).

125. An image of TradeStation's website from June 6, 2004 is depicted below. Similar to TT's MD Trader, the Matrix window included volume by price along a vertical display of prices that included visible market gaps. Matrix also displayed the daily high/low and offered the ability to enter and delete orders via a single click of a mouse. Visually, Matrix also displayed a plurality of bids in the blue column and a plurality of asks in the red column.

TradeStation's MATRIX Window—Next Generation Manual Order Entry



TradeStation's new MATRIX window combines the benefits of the market depth window, a highly-advanced order entry tool, and an order tracking system, all in one window.

The MATRIX window supports the full functionality of TradeStation's order execution capabilities. With just a single click on any row in the Bid or Ask column, you're able to immediately place an order. Your order then appears in the Order column. To cancel an order, simply click on that order in the Order column. To cancel/replace an order, simply drag and drop it to a different price. Once your order is filled, you're able to view your open position profit/loss in the P&L column and place an order to close the position at the desired level with just a click of your mouse.

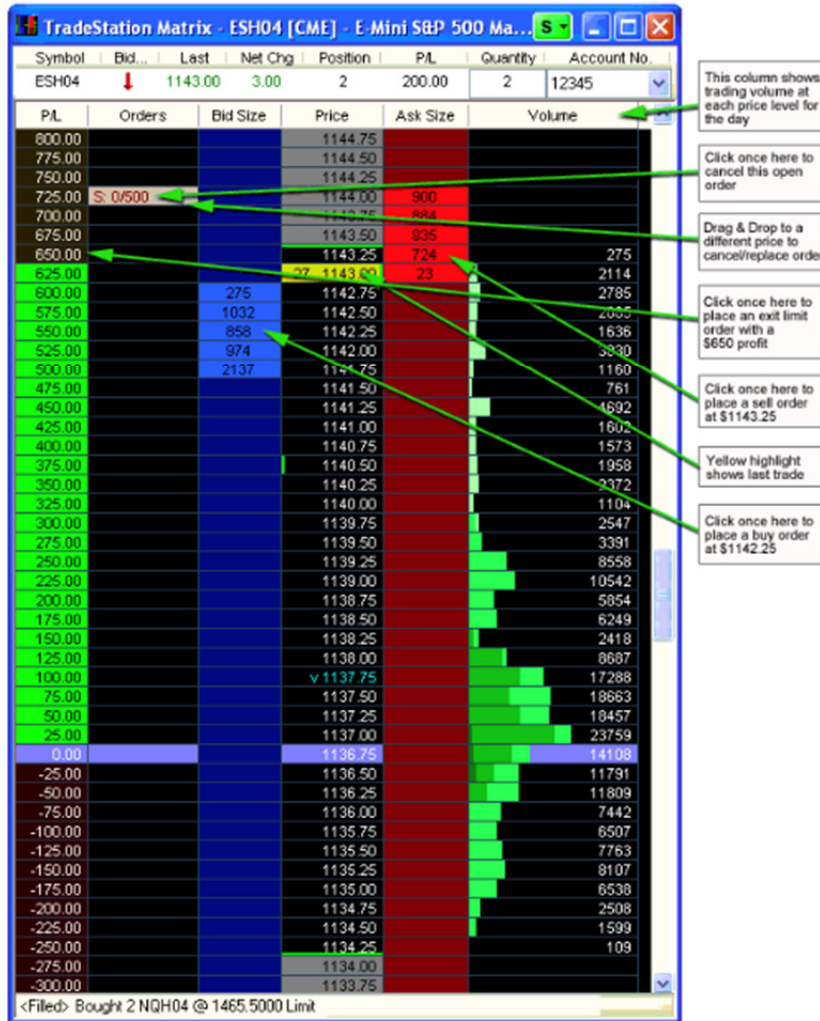
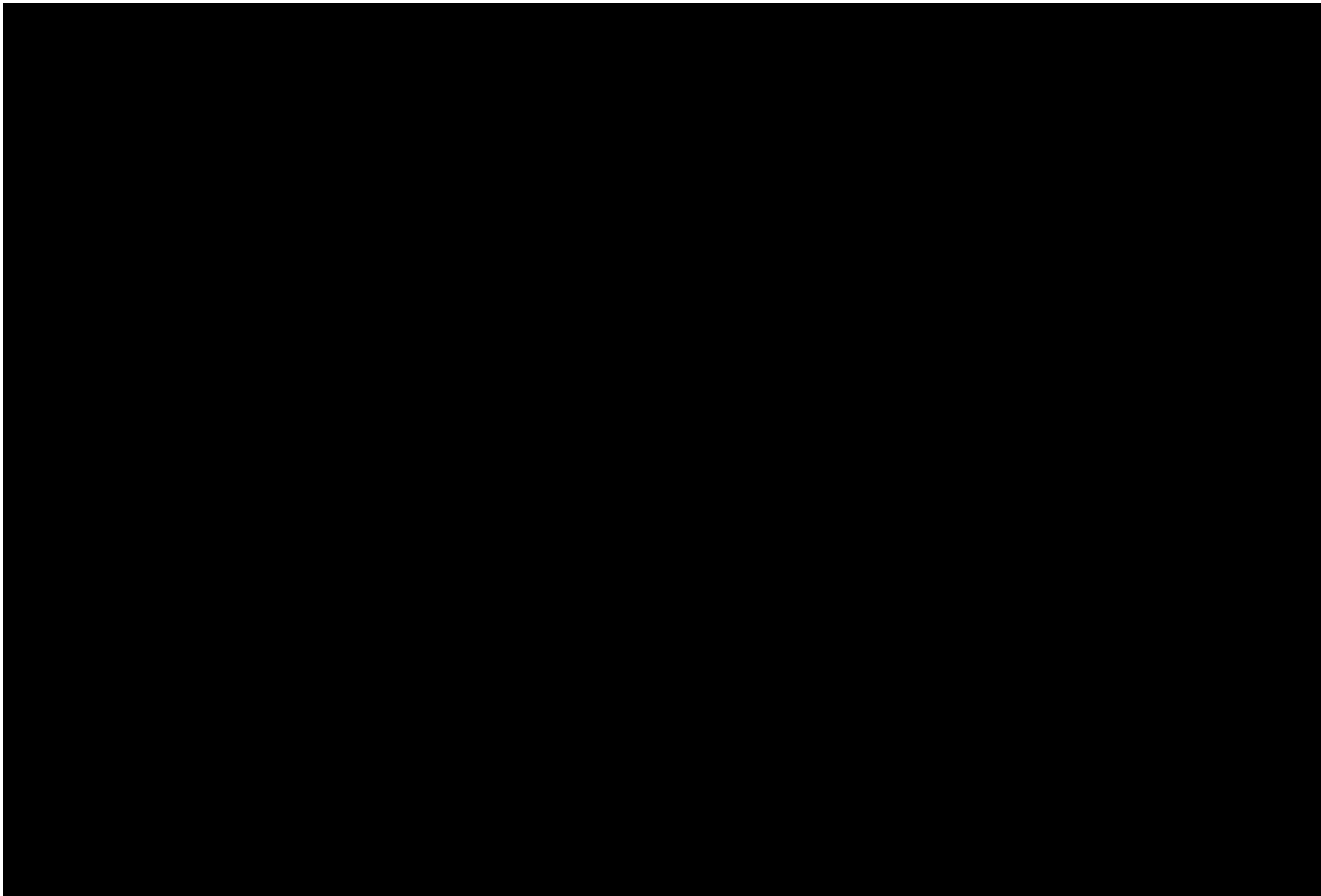


Exhibit 2235 (Advanced Futures Orders). TradeStation

Id. at TS01707057; see also Ex. 2524

[REDACTED] Ex. 2530 (same).



[REDACTED]

[REDACTED]

[REDACTED]

126. As yet another example, TT proclaimed that MD Trader “dynamically displays the market depth.” *See supra* at ¶ 121, Figure 1. Likewise, in its announcement of the release of TradeStation in 2003, TradeStation stated that the new Matrix window “dynamically displays the market depth.” Coincidentally, this language is also used in the patents-in-suit.

New Matrix Window Offers State-of-the-Art Order Entry for Equities and Futures

TradeStation's new Matrix window dynamically displays the market depth of a stock or futures contract. Traders can place orders by single-clicking on the appropriate bid or ask level in the display. The Matrix window also provides a graphical representation of the trader's open positions and open orders, and enables the trader to drag-and-drop an open order to automatically cancel and replace it at a different price. The company believes its Matrix window will offer a new level of flexibility for manual order placement for both equities and futures.

Exhibit 2237, (TradeStation Launch Article).


127. Notwithstanding the admission of TradeStation's President, these additional similarities provide concrete evidence that TradeStation copied TT's MD Trader when developing and marketing its Matrix window. TradeStation also has continuously marketed its Matrix window as being "innovative," "new," "state-of-the-art," and an "innovative order entry management tool."

PLANTATION, Fla., Nov. 24 /PRNewswire-FirstCall/ -- TradeStation Group, Inc. (Nasdaq: TRAD) today announced the launch of TradeStation 7.2, the third update to the company's next-generation TradeStation trading platform made this year. The new features in TradeStation 7.2 include enhancements that have been widely requested by the company's clients. Most notably, TradeStation 7.2 now offers unique forex analytics and execution capabilities, state-of-the-art order entry through its new Matrix window, and direct exchange market data connectivity for Nasdaq, NYSE, AMEX and OPRA.

Id.

About the Matrix Window

The Matrix window provides users with an exciting new view of the market including an innovative graphical display of market depth and trade activity for a given instrument along with lightning fast order execution with its one-click trading capability. This combination allows for unprecedented market feel and efficiency for the frequent trader.

▶ To create a Matrix window, click the **Matrix**  icon in the **TradingApps** window. A new Matrix window is displayed.

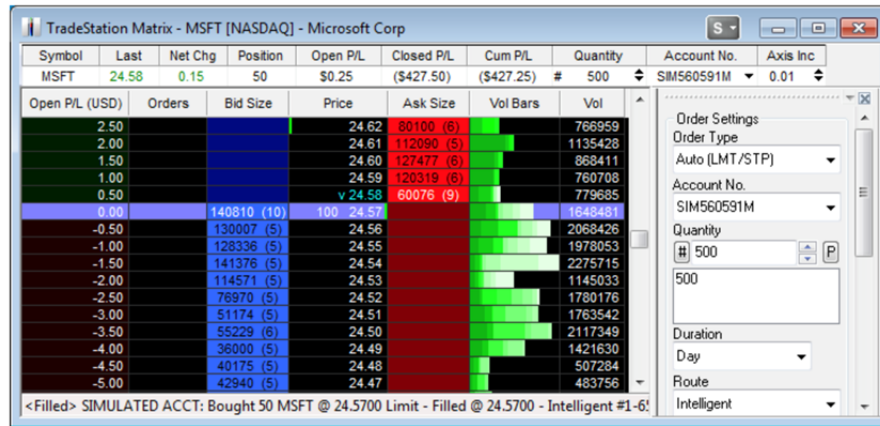


Exhibit 2236, (About the Matrix Window).



Open an account today
and **SAVE** up to \$200
in **COMMISSIONS***

[GET STARTED](#)

**Can you place entry and exit orders at the same time
with just one click?**

With **TradeStation MATRIX**, you can.



The more you trade, the more you need TradeStation's innovative order management tool, MATRIX. [Watch the free demo](#) and discover how MATRIX works with the entire TradeStation platform to make you the best trader you can be.

- Track all positions and place orders while looking at indicators in real-time, all in one window.
- See a symbol's ask, ask size, bid, bid size, and volume at each price level for the day.
- Place, cancel or reverse simple, complex, even bracketed orders with a single click.
- View open positions profit/loss at a glance.

Exhibit 2238, (TradeStation Securities MATRIX); *see also* Ex. 2520 (showing customer requests to implement claimed features and/or copying of the claimed features); Ex. 2521 (same); Ex. 2522 (same).

128. In addition to these examples, I am aware of others in the industry that copied MD Trader. For example, Mr. McElveen, who was the founder and owner of Kingstree Trading, acknowledged that “many competitors of TT have come out with similar screens to MD Trader utilizing the static price concept, the improved order entry and the re-centering features.” Exhibit 2221 at ¶ 7. In fact, Mr. McElveen stated that he was “not aware of any competitors of Kingstree...that are not using an MD Trader type screen.” *Id.* As another example, Mr. Durkin from Merrill Lynch stated:

Since that time [when I first saw an embodiment of the invention in the Spring of 2000] there have been many imitations presented to me as “just as good as TT”, (I think YESTRADER was the first one to show me a knock-off MD-Trader). GL, Pats, Easy Screen and Cantor [eSpeed] all demonstrated their versions of a “vertical” or “ladder” market display. They all seem to be unable to put all of the pieces together, probably a result of programmers being told to “copy TT” without understanding the functionality that it delivers to the trader. Re-centering is the most obvious example of a feature often omitted from the various knock-off attempts. More recently my Bloomberg rep came by to show me their most recent attempt at a futures order entry screen. As he was demonstrating it to me he conceded that it was not that good yet, but he assured me that Bloomberg had “200 developers working to make a screen just like TT”.

Exhibit 2210. Still more examples are provided in the declarations of independent traders and leaders in the industry, collected at Exhibit 2223, which state that competitors copied MD Trader. *See, e.g.*, Exhibit 2219 at ¶ 10. Clearly, there was widespread copying of the invention throughout the industry.

129. In the *eSpeed* district court proceedings, witnesses testified about widespread copying. *See, e.g.*, Exhibit 2225 at 88-89, 98-99; Exhibit 2221 at ¶ 7; Exhibit 2239, Marlovics Declaration, ¶ 10. Indeed, many of the above-referenced declarants attest to copying. I have also reviewed the deposition testimony of Messrs. Deux, Lapan and Geannopoulos, and the declarations of Messrs. Burns (Exhibit 2170), McDonnell (Exhibit 2173), and Geannopoulos (Exhibit 2171) which indicate that the invention was widely copied throughout the industry. Also, Charles McElveen, founder of Kingstree, testified [REDACTED] [REDACTED] Exhibit 2225 at 88-89, 98-99. Other documents evidence eSpeed's copying as well. *See* Exhibit 2240 (PTX 38); Exhibit 2241 (PTX 78); Exhibit 2242 (PTX 123); Exhibit 2243 (PTX 279); Exhibit 2244 (PTX 281); Exhibit 2245 (PTX 286); Exhibit 2246 (PTX 294).

130. Mr. Deux, referenced in the preceding paragraph, also [REDACTED] [REDACTED] [REDACTED] Exhibit 2247, Deux Dep. Tr. at 210:8-212:25. Mr. Deux is the founder and CEO of NinjaTrader Group LLC, which offers technology for electronic trading and is a competitor to TT. [REDACTED] [REDACTED] [REDACTED]. *Id.* at [REDACTED]

29:7-32:22. In my opinion, [REDACTED]

[REDACTED].

131. As another specific example of copying, I have seen GL Trade documents showing copying. In one document, dated the year following TT's launch of MD Trader, GL stated that it developed its Quicktrade product in order to compete with the "innovative competition, *providing an alternative way of trading.*" (emphasis added)

March 2001

GL QUICKTRADE

CORPORATE DEFINITION:

An order input system that couples a popular vertical display of prices, with a fast and direct trade execution.

GL QUICKTRADE is available on GL WIN workstation: version 4.90 (U1)

Why has GL QUICKTRADE been developed?

GL TRADE developed a new window to compete with the innovative competition, providing an alternative way of trading.

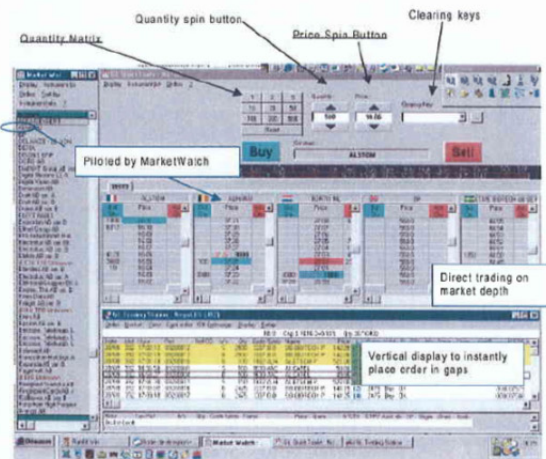
GL QUICKTRADE combines Market-Depth and MarketWatch windows, displaying prices vertically and offering fast and efficient access to the market, thus allowing traders to take advantage of all market conditions.

The vertical display of prices offers an alternative visual layout and is an approach

that suits traders that frequently refer to the MarketDepth window. It also allows traders to instantly see gaps in prices and to place orders rapidly.

GL QUICKTRADE is multi-market and multi-instrument.

GL QUICKTRADE itself pilots the GL Trading station, thus benefiting from the inherent advantages.



Internal Use Only

SUCCESS STORIES

- ◆ **London:** JPM have given positive feedback, in particular using the window to replace Trading Technologies screens. Deutsche Bank London has requested to be pilot.
- ◆ **Tokyo:** JPM has also been giving equally positive feedback.
- ◆ **Chicago:** Fuji, Last Atlantis and Kingtree are all local type arcades and have chosen GL WIN over PATS and Trading Technologies solely because of GL QUICKTRADE.

SALES TARGET

- ◆ Brokers watching multi markets (Equities, Bonds, Derivatives),
- ◆ Futures Traders (and Locals) needing fast execution and efficient price display.

PRICING

Included in standard GL WIN

COMPETITION

- ◆ **Trading Technologies:** similar trading pad plus "cancel and modification" functionality.
- ◆ **RTS:** Looks like an Excel spreadsheet; displays more than 6 instruments per windows.
- ◆ **Patsystems: "DOME"** (Depth of Market Executor). Displays only one instrument per windows. Cancel functionality.

IPN GL QUICKTRADE-0002

PLAINTIFF'S
TRIAL EXHIBIT
2064

TT0109460

Exhibit 2248, (GL Quicktrade).

132. The Internal Product News document, which is dated March of 2001, identifies TT as the “innovative competition” and suggests that Quicktrade was

being developed to “replace Trading Technologies [sic] screens.” *Id.* GL’s Quicktrade product was constructed to provide a dynamic display of bid and ask indicators that move relative to a price axis. In addition, the product included single action order entry that occurs by selecting a location corresponding to a price level along the price axis to both set parameters and send the order. In 2002, to further replicate TT’s MD Trader, GL added a display of a user’s entered orders aligned with price levels on the price axis, and canceling the user’s trade order in response to a single action of the user input device with the cursor of the user input device positioned over the entered order indicator. Exhibit 2249, (GL Product Information). GL later entered into a settlement agreement with TT and took a license under TT’s patents.

133. Prior to GL’s launch of Quicktrade, Elliot Lapan, who supervised traders at Transmarket Group LLC and was a principal at Transmarket until 2006, suggested to GL that it look at TT’s MD Trader (which he referred to as “Market Depth Trader”). Exhibit 2232 at 144:24-145:7. Mr. Lapan testified that he “actually told them they should go out and get a TT license and play with the product [MD Trader] and look at it.” *Id.* at 145:3-5. He further testified that, “I specifically recommended that they have something that resembled TT’s vertical price display. This was something that my traders were very excited by.” *Id.* at 145:18-21. Mr. Lapan told GL, “[i]f they really want to go in the right direction,

here is the way to go.” *Id.* at 151:15-16. Thus, Mr. Lapan suggested that GL copy TT’s MD Trader and even that his traders were very excited by MD Trader. Subsequently, GL launched Quicktrade and, as referenced in the preceding paragraph, entered into a settlement agreement with TT and took a license. In addition, Transmarket Group LLC developed a copy of MD Trader and, as referenced in Paragraph 148 below, became subject to a Consent Judgment as a result.

134. Another illustrative example from the district court proceedings is the case of eSpeed. In the early 2000s, eSpeed offered a cash market and provided traders on that market with a conventional dynamic screen for electronic trading. After the launch of TT’s MD Trader, eSpeed decided to enter the electronic futures trading space and attempted to copy the invention based on customer demand. eSpeed had access to TT’s commercial embodiment of the invention (MD Trader). Nonetheless, in the process of attempting to copy the invention, eSpeed at first got it wrong. Exhibit 2250, PTX 438. Tellingly, *years after* the invention, in its attempts to copy, eSpeed initially followed the engrained conventional wisdom, which still existed years after the release of the commercial embodiment of the invention, and provided a dynamic GUI tool in which the inside market was continuously displayed in the center of a vertically-oriented column of prices. *Id.* eSpeed employees (with skill levels above one of ordinary skill in the art) had

access to TT's invention, attempted to copy the invention, and yet still failed to appreciate the invention and got it wrong. *Id.* Thus, the claimed combination was not obvious to the eSpeed developers (again of a higher skill level than that of one of ordinary skill in the art), even with the benefit of hindsight. This real-world evidence confirms that it would have been impossible for the invention to have been considered obvious at the time of the invention.

135. Later, after eSpeed realized its error, it implemented a GUI tool with a dynamic display of bid and ask indicators that move relative to a prices axis. *See* Ex. 2034, *eSpeed* jury verdict; *see also Trading Technologies Int'l, Inc. v. eSpeed, Inc.*, 595 F.3d 1340, 1348 (Fed. Cir. 2010) (noting "eSpeed concedes that Futures View satisfies all claim limitations"). As shown below, the eSpeed products (which eSpeed called "Futures View" and Ecco "T-Ware Ladder View") were a knockoff of TT's commercial embodiment of the claimed invention. eSpeed documents showed that they copied the claimed invention. *See infra* at ¶ 136. Also, witnesses who worked at the time at eSpeed testified to copying. *See, e.g.*, Exhibit 2251, *eSpeed* Trial Tr. (Lewis) at 440; Exhibit 2252, PDX 215.

eSpeed's Copying

The screenshot displays three windows from the eSpeed trading platform:

- MD Trader:** A window from Trading Technologies showing a market depth table with columns for price, quantity, and order type. It lists various price levels from 123350 down to 122900.
- Futures View:** A window from eSpeed showing a futures market depth table for 'ZF Dec 07 ch090'. It displays bid and ask prices and quantities, with a current price of 99050.
- Price Ladder:** A window from EccoWare showing a price ladder for 'AMEX QQQ Future Dec 03 [HOUSE]'. It displays bid and ask prices and quantities, with a current price of 39.95.

At the bottom center of the interface, there is a green button labeled 'PTX 1355'.

136. As demonstrated at the eSpeed trial, these products infringed the asserted patents; an example claim chart for claim 1 of US Patent No. 6,766,304 (“the ’304 patent”) and eSpeed’s Futures View tool, which was presented at the trial and demonstrates infringement, is shown below:

eSpeed Infringes on Each Element of Claim 1



'304 Patent

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an **inside market with a highest bid price and a lowest ask price** on a graphical user interface, the method comprising:



361-01

PTX 1318

87

eSpeed Infringes on Each Element of Claim 1



'304 Patent

dynamically displaying a **first indicator** in one of a plurality of locations in a **bid display region**,



361-02

PTX 1319

88

eSpeed Infringes on Each Element of Claim 1



'304 Patent

each location in the bid display region corresponding to a price level along a **common static price axis**,



99050	-	-
99045	-	-
99040	-	-
99035	-	-
99030	-	-
99025	30	-
99020	10	-
99015	-	-
99010	10	-
99005	60	-
99000	462	-
98315	10	10
98310	10	12
98305	-	-
98300	2	-
98295	-	-
98290	-	-
98285	-	-
98280	-	-
98275	-	-

Common Static Price Axis

361 -03

PTX 1320

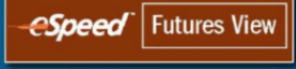
89

eSpeed Infringes on Each Element of Claim 1



'304 Patent

the **first indicator** representing quantity associated with at least one order to buy the commodity at the **highest bid price** currently available in the market;



99050	-	-
99045	-	-
99040	-	-
99035	-	-
99030	-	-
99025	30	-
99020	10	-
99015	-	-
99010	10	-
99005	60	-
99000	462	-
98315	10	10
98310	10	12
98305	-	-
98300	2	-
98295	-	-
98290	-	-
98285	-	-
98280	-	-
98275	-	-

First Indicator

Highest Bid Price

361 -04

PTX 1321

90

eSpeed Infringes on Each Element of Claim 1



'304 Patent

dynamically displaying a **second indicator** in one of a plurality of locations in an **ask display region**,



			99050	
			99045	
			99040	
			99035	
			99030	
			99025	30
			99020	10
			99015	10
10			99010	10
60			99005	60
	462		99000	
10	10		98315	
10	12		98310	
			98305	
	2		98300	
			98295	
			98290	
			98285	
			98280	
			98275	

Second Indicator

Ask Display Region

361-05

PTX 1322

91

eSpeed Infringes on Each Element of Claim 1



'304 Patent

each location in the ask display region **corresponding to a price level** along the common static price axis,



			99050	
			99045	
			99040	
			99035	
			99030	
			99025	30
			99020	10
			99015	10
10			99010	10
60			99005	60
	462		99000	
10	10		98315	
10	12		98310	
			98305	
	2		98300	
			98295	
			98290	
			98285	
			98280	
			98275	

Location Corresponding to a Price

361-06

PTX 1323

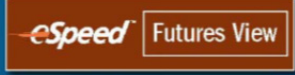
92

eSpeed Infringes on Each Element of Claim 1



'304 Patent

the **second indicator** representing quantity associated with at least one order to sell the commodity at the **lowest ask price** currently available in the market;



361-07

PTX 1324

93

eSpeed Infringes on Each Element of Claim 1



'304 Patent

displaying the bid and ask display regions in relation to fixed price levels positioned along the common static price axis such that **when the inside market changes, the price levels along the common static price axis do not move** and at least one of the first and second indicators moves in the bid or ask display regions relative to the common static price axis;



361-08

PTX 1325

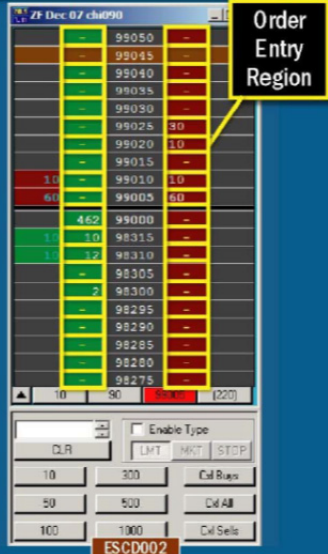
94

eSpeed Infringes on Each Element of Claim 1



'304 Patent

displaying an **order entry region** comprising a **plurality of locations** for receiving commands to send trade orders, each location corresponding to a price level along the common static price axis; and



Order Entry Region

361-09

PTX 1326

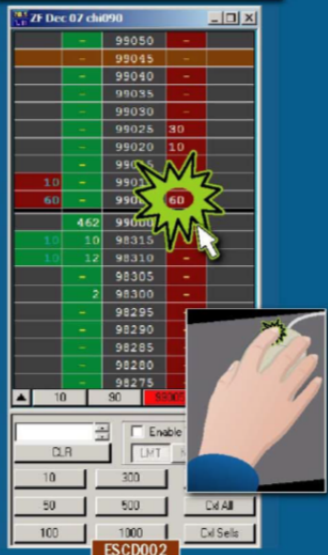
95

eSpeed Infringes on Each Element of Claim 1



'304 Patent

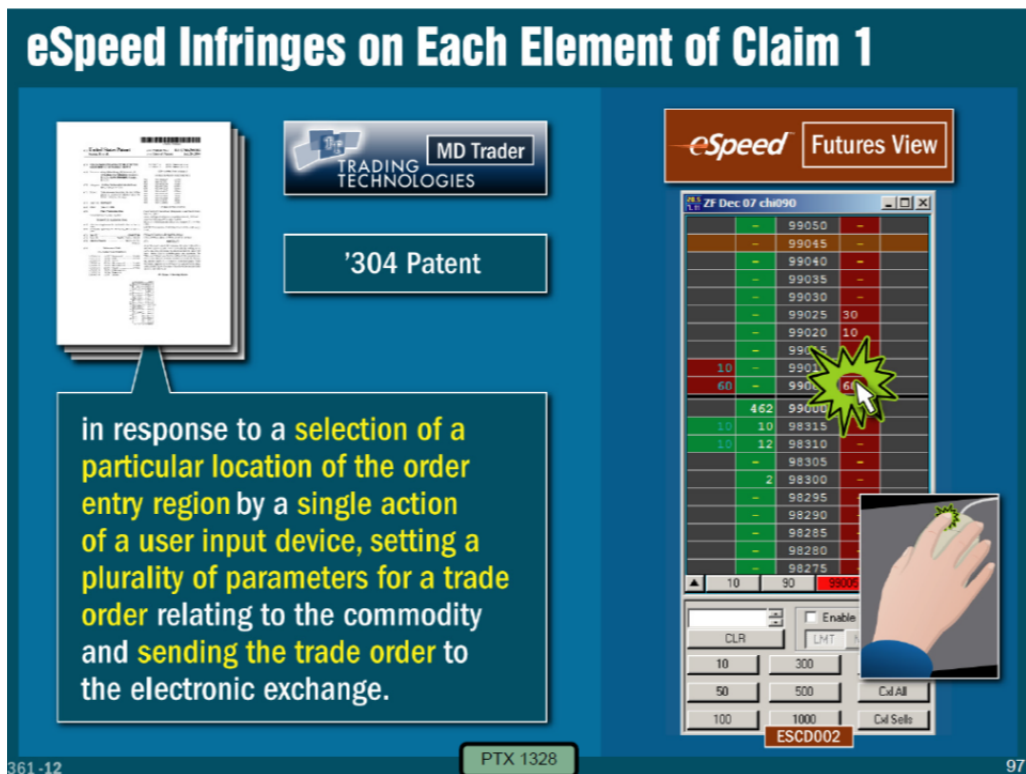
in response to a **selection of a particular location of the order entry region** by a **single action of a user input device**,



361-11

PTX 1327

96



137. The '304 patent shares a common specification with the '768 patent. Each of these products is constructed to include a display of an order entry region comprising a plurality of fixed graphical locations, where the fixed locations correspond to price levels along a price axis and continue to correspond to these same price levels after a change to an inside market price, along with single action order entry that occurs in response to selection of one of the fixed graphical locations of the order entry region, which both sets parameters and sends the trade order.

138. eSpeed's documents make clear that its products were designed to copy the salient features of TT's invention. For example, internal eSpeed documents suggest that eSpeed "copy TT," (Exhibit 2253, PTX 1366; Exhibit

2254, PTX 80; Exhibit 2255, PTX1367; Exhibit 2256, PTX 81), and “duplicate TT,” make a product that is “visual [sic] and electronically similar to TT,” (Exhibit 2257, PTX 1356; Exhibit 2258, PTX 110), “make our futures screen look like TT...color codes the bid and offer columns separately (might as well use TT’s blue/red scheme) and have as close a look and feel as possible to TT.” Exhibit 2259, PTX 1360; Exhibit 2260, PTX 448. As another example, an internal eSpeed document makes clear that eSpeed was copying the functionality of TT’s price axis. The document, authored by eSpeed’s Bill Gill, states, “the reason I populated all price levels up and down from the best at the default increment, is that’s how Trading Technologies appears to do it, if you look at their website.” Exhibit 2261 (PTX 1357); Exhibit 2262 (PTX 79). As a further example, eSpeed copied the “relative movement” feature in which “a dynamic display of bid and ask indicators ... move relative to a price axis.” See Exhibit 2263 (PTX 1358); Exhibit 2250 (PTX 438); Exhibit 2255 (PTX 1367); Exhibit 2256 (PTX 81). This in turn led to eSpeed copying the re-centering feature. Exhibit 2255 (PTX 1367); Exhibit 2256 (PTX 81 (stating “move line dividing buy/sell, rather than move prices; add button to realign to center”)); Exhibit 2264 (PTX 1359); Exhibit 2260 (PTX 448 (“Re-center the bid/offer stacks with single click of mouse button [Steger, Lon] TT and other futures app’s [sic] do this”)). As yet another example, the documents show that eSpeed copied the working order feature and the feature of canceling the

working order through a single action of a user input device. Exhibit 2265 (PTX 1361); Exhibit 2266 (PTX 1362); Exhibit 2267 (PTX 1363); Exhibit 2268 (PTX 1364); Exhibit 2269 (PTX 1365); Exhibit 2270 (PTX 36); Exhibit 2271 (PTX 440); Exhibit 2272, (PTX 441).

139. A motive for copying TT is that traders came to demand the features of the invention. For example, Amanda Lewis, a former eSpeed employee, testified that when she would visit clients, “they would ask for whatever TT had.” *See, e.g.*, Exhibit 2251 at 440; Exhibit 2252. This sentiment was confirmed by Mr. Cowan, founder of Ecco (later acquired by eSpeed) and Mr. Feltes. *See* Exhibit 2273 (PTX 1371); Exhibit 2274 (PTX 1369); Exhibit 2275, 1/24/07 Feltes Dep. Tr., at 54:8-56:16; Exhibit 2276 (PTX 1370). TradeStation’s customers demanded the features too, as Mr. Bartleman admitted. Ex. 2403 at 234:7-14; Ex. 2404 at 445:8-22, 686:7-10; *see also* Ex. 2510 (customers demanding claimed features); Ex. 2511 (same); Ex. 2512 (same); Ex. 2525 (same); Ex. 2526 (same); Ex. 2527 (same); Ex. 2529 (same). So too did IB customers. *E.g.*, Ex. 2508 (IB customer demanding single action features).

140. Another example is CQG. CQG is a diversified vendor of analytics and GUI tools for trading. As is common in the industry, CQG solicits feedback from traders/users about desirable functionality. *See* Exhibit 2277 (PTX 600). This CQG document shows that CQG was asking its users, i.e. traders, “what they

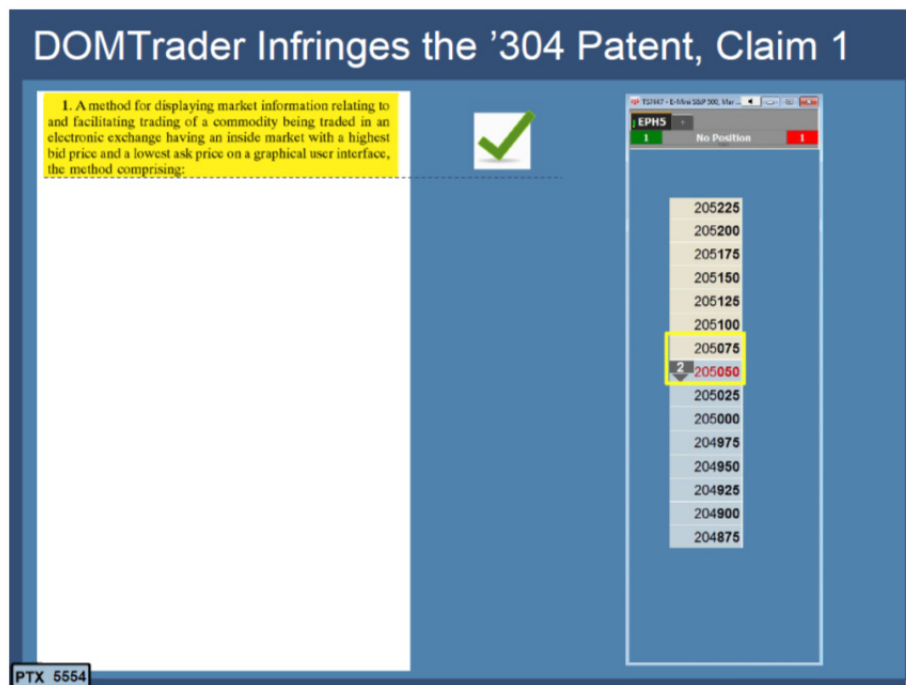
like/dislike about TT and what their requirements are to use CQG.” *Id.* In response, “traders said they absolutely need... [a] fixed ladder like TT.” *Id.* I understand that TT’s MD Trader screen is sometimes informally referred to in the industry as “TT.” CQG was comparatively late into the market, with its knockoff (called the CQG DOMTrader) of TT’s MD Trader being introduced around 2004. A side-by-side comparison of TT’s MD Trader and CQG’s DOMTrader is shown below:



141. DOMTrader is constructed to provide a dynamic display of bid and ask indicators that move relative to a price axis. In addition, it is constructed to include single action order entry that occurs by selecting a location corresponding

to a price level along the price axis to both set parameters and send the order. Other dependent claim elements that are found in DOMTrader include a re-centering command to center the inside market, display of a user's entered orders aligned with price levels on the price axis (as shown above), and deleting the user's trade order in response to a single action of the user input device with a pointer of the user input device positioned over the entered order indicator.

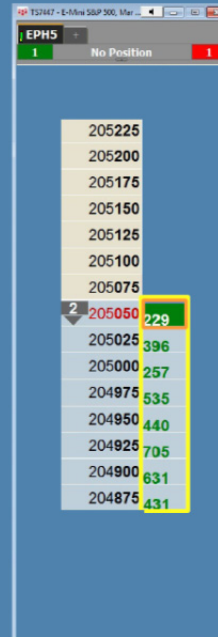
142. As demonstrated at the CQG trial, the DOMTrader tool infringed the asserted patents; an example claim chart for claim 1 of US Patent No. 6,766,304 (“the ’304 patent”) and another layout of the DOMTrader tool, which was presented at the trial and demonstrates infringement on an element-by-element basis, is shown below:



DOMTrader Infringes the '304 Patent, Claim 1

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;



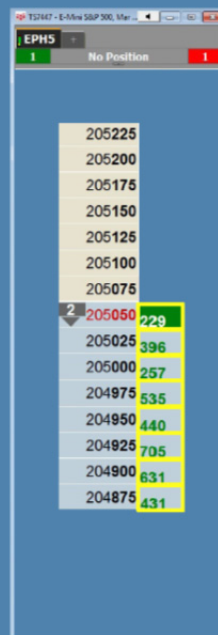
PTX 5555

86

DOMTrader Infringes the '304 Patent, Claim 1

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;



PTX 5556

87

DOMTrader Infringes the '304 Patent, Claim 1

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;

dynamically displaying a second indicator in one of a plurality of locations in an ask display region, each location in the ask display region corresponding to a price level along the common static price axis, the second indicator representing quantity associated with at least one order to sell the commodity at the lowest ask price currently available in the market;



EPHS	
1	No Position
205225	324
205200	505
205175	485
205150	524
205125	331
205100	354
205075	87
2 205050	229
205025	396
205000	257
204975	535
204950	440
204925	705
204900	631
204875	431

PTX 5557

88

DOMTrader Infringes the '304 Patent, Claim 1

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;

dynamically displaying a second indicator in one of a plurality of locations in an ask display region, each location in the ask display region corresponding to a price level along the common static price axis, the second indicator representing quantity associated with at least one order to sell the commodity at the lowest ask price currently available in the market;



EPHS	
1	No Position
205225	324
205200	505
205175	485
205150	524
205125	331
205100	354
205075	87
2 205050	229
205025	396
205000	257
204975	535
204950	440
204925	705
204900	631
204875	431

PTX 5558

89

DOMTrader Infringes the '304 Patent, Claim 1

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;

dynamically displaying a second indicator in one of a plurality of locations in an ask display region, each location in the ask display region corresponding to a price level along the common static price axis, the second indicator representing quantity associated with at least one order to sell the commodity at the lowest ask price currently available in the market;

displaying the bid and ask display regions in relation to fixed price levels positioned along the common static price axis such that when the inside market changes, the price levels along the common static price axis do not move and at least one of the first and second indicators moves in the bid or ask display regions relative to the common static price axis;



EPH5	
1	No Position
205225	324
205200	505
205175	485
205150	524
205125	331
205100	354
205075	87
205050	229
205025	396
205000	257
204975	535
204950	440
204925	705
204900	631
204875	431

PTX 5559

90

DOMTrader Infringes the '304 Patent, Claim 1

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;

dynamically displaying a second indicator in one of a plurality of locations in an ask display region, each location in the ask display region corresponding to a price level along the common static price axis, the second indicator representing quantity associated with at least one order to sell the commodity at the lowest ask price currently available in the market;

displaying the bid and ask display regions in relation to fixed price levels positioned along the common static price axis such that when the inside market changes, the price levels along the common static price axis do not move and at least one of the first and second indicators moves in the bid or ask display regions relative to the common static price axis;



EPH5	
1	No Position
205225	324
205200	505
205175	485
205150	524
205125	331
205100	354
205075	87
205050	229
205025	396
205000	257
204975	535
204950	440
204925	705
204900	631
204875	431



PTX 5560

91

DOMTrader Infringes the '304 Patent, Claim 1

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;

dynamically displaying a second indicator in one of a plurality of locations in an ask display region, each location in the ask display region corresponding to a price level along the common static price axis, the second indicator representing quantity associated with at least one order to sell the commodity at the lowest ask price currently available in the market;

displaying the bid and ask display regions in relation to fixed price levels positioned along the common static price axis such that when the inside market changes, the price levels along the common static price axis do not move and at least one of the first and second indicators moves in the bid or ask display regions relative to the common static price axis;

displaying an order entry region comprising a plurality of locations for receiving commands to send trade orders, each location corresponding to a price level along the common static price axis; and



Order Type	Price	Quantity	Order Type
	205225	324	
Buy	205200	505	Sell
	205175	485	
	205150	524	
Buy	205125	331	Sell
	205100	354	
	205075	87	
Buy	205050	229	Sell
	205025	396	
	205000	257	
Buy	204975	535	Sell
	204950	440	
	204925	705	
Buy	204900	631	Sell
	204875	431	

PTX 5561

92

DOMTrader Infringes the '304 Patent, Claim 1

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;

dynamically displaying a second indicator in one of a plurality of locations in an ask display region, each location in the ask display region corresponding to a price level along the common static price axis, the second indicator representing quantity associated with at least one order to sell the commodity at the lowest ask price currently available in the market;

displaying the bid and ask display regions in relation to fixed price levels positioned along the common static price axis such that when the inside market changes, the price levels along the common static price axis do not move and at least one of the first and second indicators moves in the bid or ask display regions relative to the common static price axis;

displaying an order entry region comprising a plurality of locations for receiving commands to send trade orders, each location corresponding to a price level along the common static price axis; and

in response to a selection of a particular location of the order entry region by a single action of a user input device, setting a plurality of parameters for a trade order relating to the commodity and sending the trade order to the electronic exchange.



Order Type	Price	Quantity	Order Type
	205225	324	
Buy	205200	505	Sell
	205175	485	
	205150	524	
Buy	205125	331	Sell
	205100	354	
	205075	87	
Buy	205050	229	Sell
	205025	396	
	205000	257	
Buy	204975	535	Sell
	204950	440	
	204925	705	
Buy	204900	631	Sell
	204875	431	

PTX 5562

93

DOMTrader Infringes – Browse Prices Mode

1. A method for displaying market information relating to and facilitating trading of a commodity being traded in an electronic exchange having an inside market with a highest bid price and a lowest ask price on a graphical user interface, the method comprising:

- dynamically displaying a first indicator in one of a plurality of locations in a bid display region, each location in the bid display region corresponding to a price level along a common static price axis, the first indicator representing quantity associated with at least one order to buy the commodity at the highest bid price currently available in the market;
- dynamically displaying a second indicator in one of a plurality of locations in an ask display region, each location in the ask display region corresponding to a price level along the common static price axis, the second indicator representing quantity associated with at least one order to sell the commodity at the lowest ask price currently available in the market;
- displaying the bid and ask display regions in relation to fixed price levels positioned along the common static price axis such that when the inside market changes, the price levels along the common static price axis do not move and at least one of the first and second indicators moves in the bid or ask display regions relative to the common static price axis;
- displaying an order entry region comprising a plurality of locations for receiving commands to send trade orders, each location corresponding to a price level along the common static price axis; and
- in response to a selection of a particular location of the order entry region by a single action of a user input device, setting a plurality of parameters for a trade order relating to the commodity and sending the trade order to the electronic exchange.

Order Type	Price	Quantity
Buy	205275	
	205250	
	205225	324
Buy	205200	505
	205175	485
	205150	524
Buy	205125	331
	205100	354
	205075	87
Buy	205050	229
	205025	396
	205000	257
Buy	204975	535
	204950	440
	204925	705
Buy	204900	631
	204875	431
	204850	
Buy	204825	

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143. In the court proceedings, CQG’s DOMTrader tool was found to infringe TT’s ’132 and ’304 patents. Exhibit 2278, CQG Verdict. Moreover, at trial, despite awareness of all of the alleged prior art that was collected in the worldwide hunt, including TSE and the other art in this proceeding, CQG did not even challenge the asserted patents on anticipation or obviousness grounds. *See id.* CQG vigorously pursued numerous other defenses at trial.

144. I am also aware that there were court proceedings involving Rosenthal Collins Group (“RCG”). These proceedings further demonstrate the non-obvious nature of the invention. In the RCG case, the court entered a default judgment against the defendant because there was an attempt to *modify* the functionality on

an alleged prior art system. RCG, an FCM (a futures commission merchant) that employs developers to create its own technology, traces its history in trading back nearly 100 years, was very experienced in electronic trading tools and, around the time of the court proceedings, certainly employed numerous individuals who were well beyond the level of skill of those having ordinary skill in the art. RCG's top officials have served as chairmen of Chicago's major futures exchanges: Les Rosenthal at the Chicago Board of Trade, Bob Collins at the MidAmerica Commodity Exchange, and RCG Chairman/CEO Scott Gordon at the Chicago Mercantile Exchange. *See* rosenthalcollinsgroup.com/about-us/who-we-are/. In my view, RCG's depth of knowledge and experience in the field rises to the level of an expert, and not merely one of ordinary skill. In addition to employing its own developers, RCG also purchases technology from vendors. RCG, as a member of the joint defense group, had full knowledge of all the prior art being asserted in these proceedings, and its counsel even attended the TSE deposition. Rather than relying in any way on the TSE reference in the litigation, the centerpiece of RCG's validity argument was the underlying material to U.S. Patent No. 6,408,282 ("the Buist patent"). Ex. 1022.

145. As an initial matter, the Buist patent, which was brought to the Examiner's attention by TT, was not only considered during the original prosecution (which included the PTO's "second set of eyes" review) of the parent

application to the '768 patent, but also was discussed in the notice of allowance of that application as one of the closest items of prior art. I have been advised that the Examiner treated the Buist patent as prior art. *Trading Techs. Int'l, Inc. v. eSpeed, Inc.*, 370 F. Supp. 2d 691, 694 (N.D. Ill. 2005). In addition, the examiner treated the reference as showing, among other things, static.⁴ With that assumption, the only element(s) lacking from the Buist patent are the "single action order entry" elements: fixed graphical locations in an order entry region for receiving single action commands to set parameters and directly send the trade order. As described in the Buist patent, there is a separate conventional order entry ticket and the user needs to take multiple steps to send an order.

146. The Buist patent was considered, as noted above, in the original examination of the parent application and again by the court in litigation, including by the district court judge in a preliminary injunction hearing in the *eSpeed* case. It is my understanding that, in a preliminary injunction setting the patent owner needs

⁴ "Static" is not a claim term that is used in the '768 patent, which instead recites a dynamic display of bid and ask indicators that move relative to a price axis. Nonetheless, a reference that discloses a "static" price axis with dynamic bid/ask indicators would also, by definition, disclose a price axis with relative movement. Therefore, the conclusion that the combination of "static" and single action would not be obvious, would likewise apply to the combination of relative movement along a price axis and single action. In other words, the Examiner was taking a broad view of the term static, so that its scope would encompass relative movement for purposes of evaluating alleged prior art. Exhibit 2298 (Compilation of Interview Summaries).

to show a likelihood of success. In *eSpeed*, the judge found that TT showed a strong likelihood of success in view of this art and other art, which was more relevant than what is being asserted here. In fact, the likelihood of success was so strong that the Court presumed irreparable harm.⁵ *TT v. eSpeed*, 370 F. Supp. 2d at 704.

147. RCG, as experts in the field, and not merely those of ordinary skill, realized that the claimed invention was not obvious in light of the Buist patent or the other art being asserted. In other words, RCG did not believe that the Buist patent, along with all of the other alleged prior art that was located during the worldwide search for prior art, was sufficient to render the TT patents obvious. So, they hired Mr. Buist as a consultant. Mr. Buist found zip drives in his barn with the code for the implementation of the system shown in the Buist patent. Although the code on the zip drives was initially inoperable, Mr. Buist was able to get the screen back up and running. The screen had a static price axis and the ability to enter orders much quicker (although still not by a single action) than disclosed in the Buist patent. Based on Mr. Buist's work, RCG moved for summary judgment of invalidity. After a significant investment in time and money, including engaging code experts to analyze the evidence, TT uncovered that Mr. Buist, working with

⁵ The Court ultimately denied TT's request for a preliminary injunction, although not because of the alleged prior art.

RCG counsel, modified the zip drives he found to add in code for faster order entry functionality than shown in the patent. Later, TT also uncovered that Mr. Buist and/or RCG's counsel actually *modified* the dates in the metadata to hide that these changes were made. TT only discovered this by a stroke of luck. The summary judgment motion did not identify any of these changes. Ultimately, the district court entered a default judgment in TT's favor. *Rosenthal Collins Grp., LLC v. Trading Techs. Int'l, Inc.*, No. 05-cv-4088, 2011 WL 722467 (N.D. Ill. Feb. 23, 2011).

148. RCG's actions show two things: (1) experts in the field recognized that the mountain of alleged prior art (including TSE) was not sufficient to render the invention obvious and (2) experts in the field recognized that, in this field, unless there is a single reference with all of the elements of the claims, there can be no viable obviousness argument.

149. I have also reviewed the progression of competitor's GUI tools prior to the date of the invention of the '768 patent, as set forth in the LIFFE ISV directories. Exhibit 2279 (LIFFE Directory October 1998); Exhibit 2280 (LIFFE Directory February 1999); Exhibit 2281 (LIFFE Directory June 1999); Exhibit 2282 (LIFFE Directory May 2001). LIFFE is a London-based exchange, which was in the process in 1999 of switching certain contracts from floor-based open outcry trading pits, to electronic trading. LIFFE provided an API, which was an

interface that allowed qualified ISVs to provide GUI tools to LIFFE traders for electronic trading. The series of directories provided by LIFFE makes clear that the invention in TT's patent was neither routine nor conventional in the industry. For example, in the LIFFE directories prior to the launch of TT's commercial embodiment of the invention, MD Trader, trading interfaces are shown that only have the inside market fixed on the screen. *See* Exhibit 2279; Exhibit 2280; Exhibit 2281. Shortly after TT's roll-out of MD Trader, the May 2001 LIFFE directory shows the unique MD Trader GUI tool. Exhibit 2282 at 33. Around that time, copies of MD Trader began to appear in the market.

150. I am aware of the industry's widespread use of the invention from numerous consent judgments entered by the Judges in the district court proceedings. Specifically, the district court has entered consent judgments in favor of TT and against the following entities:

1. Goldenberg Hehmeyer & Co.
2. Kingtree Trading, LLC
3. Ninja Trader, LLC
4. Man Group, PLC
5. Patsystems PLC
6. NYFIX, Inc.
7. Peregrine Financial Group, Inc.
8. RTS Realtime Systems AG
9. Rolfe & Nolan Systems Inc.
10. Strategy Runner. LTD
11. FFastFill PLC
12. TransMarket Group LLC
13. Orc Software AB
14. Refco

15. Cunningham Trading Systems, LLC, Cunningham Commodities, LLC
16. TradeHelm, Inc.
17. Rosenthal Collins Group, LLC (2005)
18. Rosenthal Collins Group, LLC (2010)
19. Stellar Trading Systems, Ltd., Stellar Trading Systems, Inc.
20. BGC Capital Markets, LP, eSpeed Markets, LP and Eccoware Ltd.

(Collectively attached at Exhibit 2283).

151. I understand that virtually all of the defendants listed above admitted in papers filed with the court that the TT patents were valid and infringed and have agreed to either a worldwide workaround to avoid infringement or to take a license. *See* Exhibit 2172 at ¶¶4-9, 14. I understand that TT has entered into settlements and/or license agreements, which include the '768 patent, with the following entities:

1. Goldenberg Hehmeyer & Co.
2. Kingtree Trading, LLC
3. NinjaTrader, LLC
4. Man Group, PLC
5. Patsystems PLC
6. NYFIX, Inc.
7. Peregrine Financial Group, Inc.
8. TradeMaven Group, LLC
9. RTS Realtime Systems AG
10. Rolfe & Nolan Systems Inc
11. Strategy Runner, Ltd.
12. FfastFill Pic
13. TransMarket Group LLC
14. Orc Software AB
15. Advantage Futures LLC
16. REFCO Group LLC
17. Marex Trading Services Ltd.

18. Cunningham Commodities
19. Tradehelm, Inc.
20. RCG
21. Stellar
22. BGC
23. OEC
24. GL Trade &Sungard
25. TD
26. FUTUREPATH
27. CQG
28. TradeExchange Network Ltd
29. Direct Trading Institutional, L.P.
30. tradeMONSTER

Aside from demonstrating widespread unauthorized use of the invention, as well as subsequent authorized uses, the consent judgments and settlements/license agreements indicate that the invention is valuable to the industry. In addition, it is my opinion that the consent judgments and settlements/license agreements demonstrate a widespread industry acquiescence to the patented invention.

152. I have also read articles that evidence copying of the invention, such as, “What Is Behind Your Front-End?” Exhibit 2230, and “We Can Do That Too.” *Id.* at sidebar p. 7. In this sidebar, the author points out that, while TT’s GUI tool was initially considered “unique,” “now many front-ends offer similar features.” *Id.* This article further confirms my opinion that at the time of the invention, it was unique, and not routine or conventional. Another example is the book, “Steidlmayer on Markets,” which states that the invention had a “superior form—and we know it is superior because all the competitors are attempting to copy it”.

MD_Trader™ display of the Mini Nasdaq. On the left-most side of the display are the components needed to enter trade size, account number, and other relevant information. In the next column to the right, all your working orders are denoted. Farther to the right is the price array for the underlying instrument with the book (existing bids below and offers above). The last column lists the price and quantity for the last trade. This superior format—and we know it is superior because all the competitors are attempting to copy it—has a consolidation feature that allows for more or fewer prices to be displayed in the MD_Trader™ display. This feature comes in handy during periods of extreme volatility (e.g., release of economic numbers, news events). Combining all these features elevates your confidence level in responding and clicking the price you want to be trading. Another feature of the MD_Trader™ is center clicking, which positions the currently traded price to the center of the MD_Trader™ display window. Therefore, from a pure speed perspective, TT's X_TRADER® front end with the MD_Trader™ display provides what you are looking for, the fastest access to the market.

Two satisfied customers have had this to say about the product: D.J. Martin, independent trader with an MBA from New York University (NYU), whose dream was to move to Chicago and strike it rich as a trader. He moved to Chicago during the summer of 1997. Over the next 4 years, D.J. came close to losing his nest egg more times than he cares to remember; however, he always managed to fight back and make enough to live on. He realized there was something missing in his trading, so he made the change to TT during the summer of 2001. Since switching to TT, he has not had a losing week, has had 6 straight winning months, and has strung together 94 winning days in a row. "Since I started using TT, my income has increased by almost \$600,000 a year. My trading approach has remained the same; therefore, I must conclude my recent success is directly related to using MD_Trader™ and other innovative tools and cutting edge technology offered at TT." This from Chuck McElveen, owner/operator Kingstree Trading, a

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large Chicago-based proprietary trading firm that accounts for the largest percentage of daily mini volume traded at the Chicago Mercantile Exchange (CME). "Since opening our doors, TT has been our company-wide solution for trading software. Without question, we could not have achieved the same success or traded as much volume without MD_Trader™. No other application allows you to fully capture the flow of the market and to capitalize on that flow with speed and precision. Our relationship with TT goes back to the company's inception, so it's difficult to assign a dollar amount or percentage by which they have contributed to the bottom line. I can say, however, that having my traders use TT front-end has positively impacted profitability at Kingstree Trading." With speed being our basis of comparison, TT has the others beat hands-down. The process is faster and more reliable.

The next layer of comparison is looking at what front-end providers have done to differentiate themselves from a value-added perspective. This is where TT has really distinguished themselves. They have created automated order execution and management tools. At this point in time, the application that really sets TT apart from the rest of the competition is the Autospreader. The Autospreader allows for the entry of two-legged spreads with a high degree of reliability. The key word here is reliability, it is one thing to offer the functionality, yet another to deliver. There is no worse feeling than entering a spread order, getting hit on one leg, and subsequently watching the market move sharply against you. The Autospreader allows the trader to set up a spread and enter spread orders in an MD_Trader™ display. After an order is entered, the tool automatically enters orders into the outright legs and manages those orders. The Autospreader automatically sends offset orders into the other leg once an order in one leg has been filled.

Figure 13-13 is a screen capture of the Autospreader with the corresponding underlying futures contracts. The Autospreader is the leftmost MD_Trader™ display, and the futures contracts are the right two MD_Trader™ displays. In setting up the spread ma-

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Exhibit 2226.

153. My opinion that those of ordinary skill in the art would not have found the invention obvious is proven by actual events that occurred. One of the companies mentioned above, Patsystems, was both subject to a consent judgment and entered into a settlement agreement with TT. Patsystems, a long-time competitor of TT and TT's primary archrival in the early to mid 2000s, provided real world evidence that a skilled person did not combine and would not have combined the features as in the invention. Around the time TT's MD Trader was launched, Patsystems (a public UK company) had been a leader in the electronic trading industry for years and employed numerous individuals who I would

consider to be above the level of ordinary skill in the field. As early as 1998, Patsystems reportedly had an interface with a static display of prices and another separate interface with single click order entry. Exhibit 2284, (Patsystems) and Exhibit 2285, (Patsystems Canned Demo). However, Patsystems indisputably failed to combine the two features. While they reportedly had the components of the invention separately, Patsystems' own witness, Nicholas Garrow (head of products), candidly testified that it was "not obvious" to combine static with single action. Exhibit 2286, Garrow Dep. Tr. at 125:16-126:9 (stating "I don't believe that the patents in dispute in this case [the '132 and '304 patents] were an obvious—how can I phrase this—an obvious continuation, if you like, from—from what Pats had."). In fact, Patsystems never combined the features as in the invention until after TT launched the commercial embodiment of the invention in the late summer of 2000.

154. This is further confirmed by the testimony of Mr. McCausland, who developed a dynamic front-end trading interface for an early electronic exchange, Intex. The Intex interface was always centered on the last traded price, but the screen included brief unpredictable moments when the price levels would not change positions. Exhibit 2287, McCausland Dep. Tr. at 61:13-17. Mr. McCausland further testified that this was a shortcoming of the programming implementation, but that, because the display was only used "occasionally" and the

traders worked off a different, conventional page (showing the best bid and offer), they had other priorities ahead of fixing the shortcoming. McCausland at 173:20-175:9. In Intex, order entry was a multi-step process using a keyboard to fill in a conventional order entry ticket. *Id.* at 78-81. When asked in 2005 whether there was a way in the Intex interface to keep the display of prices static, Mr. McCausland testified, “it is illogical that you would want to do that.” *Id.* at 61:5-17. Mr. McCausland was likely someone who was significantly beyond the level of skill of one of ordinary skill, and to him one of the primary aspects of the invention seemed “illogical.” Mr. McCausland’s reaction reflects the same conclusions as would be shared by those of ordinary skill in the art. For the same reason, under Mr. McCausland’s view and the view of one of ordinary skill in the art, to the extent that TSE even qualifies as prior art, one of ordinary skill would have elected to use the TSE compressed Board mode, in which, like Intex, the market information is always centered. Specifically, Mr. McCausland testified in 2005 that it was desirable to only show a price where there was actually an order, because a trader “wants to know where the orders are. He doesn’t want to look at a page full of empty prices.” *Id.* at 154:10-14. In addition, one of ordinary skill in the art viewing the uncompressed mode of TSE, in which the market information is alleged to center when the best bid/ask moves a preset distance away from the

center, would consider such functionality to be illogical and would reject its use in the manner proposed by the combination (*i.e.*, TSE with Belden).

155. In the district court proceedings, there was additional evidence of industry participants trying to develop improved GUI tools around the time of the invention and failing to do so. For example, David Feltes, at the time head of Marquette Trading (an international proprietary trading firm), testified that around the time of the invention, he polled approximately 40 staff to see if they had any ideas for an improved trading tool that would justify Marquette investing in developing its own software as opposed to purchasing software from vendors. Exhibit 2223 at, ¶ 8; Exhibit 2220 at 33-34. None of the staff suggested any idea remotely like the invention. *Id.* As another example, Mike Burns testified that he worked with an experienced software developer to try to come up with an inventive trading interface to solve the same problem ultimately solved by the invention, and that he failed. Exhibit 2288, Burns Dep. Tr. at 294-95. Similarly, Mr. Lapan testified at his deposition about requesting improvements to GL's GUI tools, and offering to work with GL on improved tools. Exhibit 2232 at 220-224.

156. Despite years of discovery into alleged prior art, including formal and informal searches coordinated by numerous defendants and industry participants, everything unearthed is at best cumulative to references considered by the Examiner in the original prosecution. During the original prosecution, TT

withdrew a parent application from allowance in order to have additional prior art considered. Exhibit 2289, (11/12/2002 Petition to Withdraw). The additional prior art included Wit Capital (which became the Buist patent) and Friesen. *Id.* The Examiner assumed that this cited art included not only a price axis, but also a static price axis, with dynamic bid and ask indicators that move relative to the price axis. *See* Exhibit 2290 (Notice of Allowance). The Examiner also recognized that other elements, including single action order entry, could be found separately in other prior art references. I am familiar with the art cited by the Examiner in the original prosecution, and I am familiar with the references cited by Petitioners in this CBM proceeding, and the art cited by the Examiner is more relevant to the claims than the references cited by Petitioners. Nonetheless, the Examiner correctly concluded that the claimed combination was not obvious, even in the face of the more relevant art. *See id.* At the time, the art unit to which TT's application was assigned had implemented a "second set of eyes" quality review, under which all allowed applications were reviewed, prior to issuance, by a second qualified Examiner who again considered patentability. *TT v. eSpeed*, 370 F. Supp. at 694 ("[t]he patents were reviewed . . . once through the usual procedures and once through a special quality review procedure."); *see also* Exhibit 2291 (PTX0624). After the quality review, the original Examiner's conclusion of non-obviousness was confirmed and the patents issued. As a result of the worldwide hunt for prior art initiated during

the *eSpeed* case, an anonymous request for reexamination of the ‘132 and ‘304 patents was filed. *See, e.g.*, Ex. 2047. The request relied on TSE. The reexamination branch confirmed the non-obviousness of the claimed invention, ultimately issuing reexamination certificates confirming the patentability of the claims without amendment. A second reexamination request on the same patents was filed by some of the defendants. Ex. 2049. The second request was based on references that had already been considered, either during initial prosecution or in the first reexamination. The PTO denied the second request for reexamination. Ex. 2042. The repeated review of the patentability of the invention, in view of this extraordinary scope of the search for prior art, in both the district court and the PTO, further demonstrates not only the non-obvious nature of the invention, but also that it was revolutionary.

157. All of these entities knew of single click order entry, knew of dynamically displaying quantity on screens, and knew of price axes—almost every trader used a chart. These elements were known separately, and were widely known to many, many people all investing heavily and looking for any edge. Many of those with knowledge of these elements were people far above the level of skill possessed by the person of ordinary skill. The fact that none of these people put together the claimed combination, which proved to be a money-making machine

and was even resisted at first, speaks for itself. It was clearly not obvious to try the claimed combination.

IX. THE CLAIMED INVENTION IS NOT OBVIOUS

158. Against this backdrop, it is my opinion that the claimed invention is very clearly *not* obvious. Beyond the fact that the cited references fail to even suggest the claimed combination, we have the benefit of a mountain of real world evidence that confirms the non-obviousness of the invention. The industry was well-funded, motivated to gain any edge, and focused on improving GUI tools. Industry participants developed GUI tools utilizing the talents of employees whose skill sets often significantly exceeded the level of ordinary skill in the art. Yet, no one else made the combination until long after Mr. Brumfield had made the invention, TT had launched its MD Trader product, convinced some open-minded yet influential traders/companies to try it, and then started to achieve some traction in displacing the entrenched conventional screens. The evidence also shows the following factors supporting non-obviousness are present in this instance:

1) commercial success; 2) initial skepticism followed by acceptance; 3) widespread copying; 4) failure of others; 5) praise and accolades; 6) licensing and settlements; 7) failure to recognize the problems with the conventional GUI; and 8) unexpected results. In light of the characteristics of the industry, the conventional GUIs and accepted design criteria, and all of the evidence referenced above, it is clear that in

the absence of an anticipatory reference, the present invention cannot be deemed obvious.

159. Even in view of the drawbacks of the prior art dynamic screens, which I note are apparent only now with the benefit of hindsight (e.g., the drawbacks of the prior art dynamic screens are first pointed out, to my knowledge, in the specification of the patent under review), in my opinion the design considerations and the advantages of the prior art dynamic screens at the time of the invention taught heavily away from even considering a dynamic display of bid and ask indicators that move relative to a price axis (e.g., Figs. 3 and 4 of the '768) in combination with single action order entry, as included in the claims. In particular, the invention included a number of drawbacks that would have rendered it a non-starter to one of ordinary skill in the art at the time of the invention. This is because of at least the following reasons:

- i.) A dynamic display of bid and ask indicators that move relative to a price axis would have been viewed by one of ordinary skill as using too much space on the screen, i.e., too much screen real estate, in terms of the size of the field of the dynamic display of bid and ask indicators that move relative to a price axis for each product on the screen;

- ii.) In terms of the distance that the trader would have to move the pointing device, e.g., a mouse, within a single product and between products when trading multiple products, a dynamic display of bid and ask indicators that move relative to a price axis would have been viewed as much too slow; and
- iii.) A dynamic display of bid and ask indicators that move relative to a price axis would permit the inside market-viewed as the target—to move on the screen and, as a result, a user interested in placing an order at the best bid or ask would have to “chase” the market and thus such a screen would be slower and less accurate with respect to market type orders.

160. Therefore, at the time of the invention, a dynamic display of bid and ask indicators that move relative to a price axis (with fixed order entry locations) was unsatisfactory to one of ordinary skill in the art because it would be perceived as failing on all important design criteria—conserving screen real estate and providing for fast and accurate order entry. In regard to each of these design criteria, the invention ran counter to the conventional thinking at the time. The invention is perceived to waste screen real estate, particularly in comparison to the conventional GUI tools at the time of the invention. In addition, the invention, while increasing accuracy with respect to orders intended for a specific price in

comparison with the dynamic screens where prices routinely flip, is not as accurate as prior art screens that have an order entry ticket. With an order entry ticket, like the TSE, the trader typically fills in the required parameters and then clicks a “send” button. The invention is not as accurate as an order entry ticket system because in the invention, a market type order would require the user to chase the moving inside market and, for all order types, the order can be sent at the wrong price if the trader happens to click at the wrong price level. Thus, it is noteworthy that the invention of the ’768 patent with a dynamic display of bid and ask indicators that move relative to a price axis can be seen to have disadvantages. The disadvantages caused traders, initially, to not want to use the invention, and thus, also caused those of ordinary skill in the art at that time to reject and not even consider using a dynamic display of bid and ask indicators that move relative to a price axis in conjunction with an order entry GUI tool. Nevertheless, the ability to obtain the intended price (not as fast as market type orders in dynamic screens having a fixed inside market) with a single action order entry (not as accurate as an order ticket window) resulted in an improved and unobvious GUI tool. The claimed combination is not routine and conventional. Instead, the claims are directed to novel combination of elements that provide significant benefits as described above.

161. For my analysis, I am relying on Petitioners' translation of TSE.⁶ As an initial matter, I note that TSE is deficient in the clarity of its description of screen functionality. Specifically, I was asked to review the function and operation of the displays of market information and windows for order entry in TSE, including the non-compressed board mode, based on the description in Petitioners' translation of TSE. One of ordinary skill in the art would only take from TSE as much as such a person could adequately comprehend. Thus, as an initial matter, the statements made in the Petition cannot be completely verified from the TSE document. For example, TSE describes that the non-compressed board mode includes a "floating display" region, but fails to describe with any level of clarity how this "floating display" works. The "floating display" region plainly implicates the manner in which the prices are displayed. Nor does TSE explain why the non-compressed board mode includes this "floating display" region, or even the purpose for including both a compressed board mode⁷ and a non-compressed board mode. The limited testimony of Mr. Kawashima is not helpful on this point either.

162. As for the TSE, even assuming that the TSE reference qualifies as prior art (which I understand is disputed) and that TSE operated as purported by

⁶ I further understand that there may be an issue about the accuracy of Petitioners' translation. Nonetheless, for purposes of this declaration only, I have been asked to *assume* that the translation is accurate.

⁷ Petitioners do not suggest that the compressed board mode included a price axis, and I agree that it does not. *See infra* note 8.

Petitioners (also disputed), Petitioners best case scenario, for the sake of argument, would be that TSE shows a price axis with relative movement (uncompressed Board mode),⁸ but not the claimed single action order entry (or the recited order entry region). In fact, in my opinion, because of its regular automatic recentering, the TSE relates to a system that is more akin to a dynamic screen. One of ordinary skill in the art would have rejected TSE as a starting point, given the important design criteria applied by those of ordinary skill in the art at the time of the invention—conserving screen real estate and providing for fast and accurate order entry. TSE (uncompressed Board mode) is a compromise without benefits. It takes up significant screen real estate, without benefits to speed and accuracy. Indeed, it is significantly less accurate because the regular automatic recentering may cause an even greater magnitude error in the price that it conveys to the order entry ticket. This would appear to actually increase the time that it would take to enter an order using TSE's already slow order entry ticket.

163. In any event, it is undisputed that TSE does not disclose single action order entry. Even as of late 2005, TSE had not combined a price axis with relative movement and single action order entry, as called for in the claims. Thus, even if one were to assume for the sake of argument that TSE includes all elements other

⁸ There is no price axis in the compressed Board mode, because prices are omitted if there is no order at that price.

than a single action to “set[] a plurality of parameters for a trade order and . . . and send[] the trade order to the electronic exchange,” and given the strong interest in the industry for technology that provides even the slightest edge or advantage over others, it is telling that no one in the industry, including Petitioners and the TSE, ever combined a price axis with relative movement and single action for *years* after Mr. Brumfield conceived of this invention. It is also clear, from TSE’s use of regular, if not frequent, automatic recentering, that TSE had no appreciation whatsoever of the potential benefits of a price axis with relative movement, as described herein. Nor would one of skill in the art perceive the benefits of a price axis with relative movement, as described herein, from a review of TSE. As such, the person of ordinary skill in the art would certainly not have been motivated to use TSE as a starting point, and if he/she in fact did so, would not have found the invention remotely obvious (even with the additional disclosures of Belden and Cooper). In particular, a person of ordinary skill in the art would have been strongly led away from implementing single action order entry into TSE by the TSE’s frequent automatic recentering, which would have led to completely unacceptable levels of accuracy for the TSE user. TSE did not appreciate the benefits of the invention stemming from relative movement, as evidenced by their regular automatic re-centering in the uncompressed mode (when best bid or offer moves more than one or three prices away from center).

164. In my opinion, for all the reasons given above, it would not have been obvious to one of ordinary skill in the art at the time of the invention to combine a price axis with relative movement and single action order entry, as claimed. While the invention was widely copied, and is prevalent in futures trading today (and making inroads in other asset classes), it was a radical departure from conventional thinking at the time. It still is a radical departure from conventional thinking even today in many asset classes.

165. In any event, even if one were to combine TSE, Belden and Cooper, and even if TSE constitutes prior art, in my opinion the claimed invention cannot be considered obvious because the references, whether taken alone or in combination, fail to disclose many elements of the claims, including the “order entry region” element and the “setting” element. The “order entry region” element requires a plurality of locations (corresponding to price levels along a price axis) for receiving single action commands “to send trade orders” to the electronic exchange. Ex. 1001, 11:65-67. In TSE, trade orders cannot be sent (to an electronic exchange) from a location that corresponds to a price level along a price axis. Nor does Belden suggest such an order entry region because, at a minimum, it is completely lacking any showing of a price axis. Thus, even if combined as suggested, Petitioner’s combination fails to suggest the invention, as claimed. Moreover, the “setting” element requires that the single action of the user input

device in the order entry region both set a plurality of parameters for a trade order and send the trade order to an electronic exchange. Neither TSE nor Belden teach or suggest this element because neither of them have an order entry region as claimed. Petitioners rely on Belden for teaching a single action, but again, Belden does not show a single action to both set parameters and send an order from an area that corresponds to a price level along a price axis. As such, TSE and Belden both fail to teach or suggest a single action command in an order entry region to both set a plurality of parameters and send the trade order.

166. In addition to the above, these references are missing other claims elements. In particular, these references fail to disclose the combination of updating the display of the first and second indicators such that the indicators are moved relative to the price axis and an order entry region with fixed graphical locations for receiving single action commands to send trade orders, where the fixed graphical locations correspond to price levels along a price axis, and continue to so correspond to these price levels after an update to an inside market price. In other words, the references fail to disclose a fixed order entry region with relative movement. I understand that Mr. Román opined that TSE teaches these claim elements “at least in Scroll Screen mode.” Ex. 1017 at ¶¶ 115, 119. I also understand that during Mr. Román’s January 13, 2017 deposition, he clarified that he was relying only on TSE’s scroll mode for an alleged teaching of these

elements, and that he had no opinion on whether any other mode in TSE (e.g., non-scroll mode) discloses these elements. Ex. 2531 (Román Tr.) at 78:10 – 79:12, 80:22 – 81:11. In my opinion, TSE’s scroll mode fails to disclose these elements for two independent reasons.

167. First, TSE does not disclose that the bid/ask quantity indicators are updated *on the display* in scroll mode. For an alleged disclosure of this, Mr. Román relies on pages 91 and 115 of TSE, stating that ““the price display positions do not change automatically,”” “but the automatic update of market information still occurs.” Ex. 1017 at ¶ 119. However, as Mr. Abilock explains in his declaration, the Japanese version of TSE **does not** make clear whether this updating occurs in memory only or on screen. Ex. 2178, ¶¶ 20, 23-25. Given this ambiguity, one of ordinary skill in the art would not have understood TSE to disclose a scroll mode in which the bid/ask indicators are updated on the screen such that they move relative to a price axis. Rather, one of ordinary skill in the art would have understood that in scroll mode, the board information is updated in memory, such that when the screen is transitioned back into non-scroll mode, the most up-to-date board information can be displayed on the screen.

168. Second, TSE does not disclose that the user can bring up the new order input window while in scroll mode. Thus, the purported locations in TSE’s scroll mode on which Mr. Román relies for a teaching of the claimed order entry

region (which is incorrect for the additional reasons given above) cannot possibly constitute the claimed order entry region because they cannot even receive commands to open the new order input window, let alone receive commands to actually send trade orders. Indeed, the only mode that TSE discloses in which the user is able to bring up the new order input window from which orders can be sent is the non-scroll mode. *E.g.*, Ex. 1017 (TSE) at 137-139. Each example of the new order input window is shown in connection with the non-scroll mode. *Id.* It is evident that the Board Screen is shown in non-scroll mode because the word “OVER” is shown at the top of each screen. *Id.* That TSE does not permit the user to access the new order input window in the scroll mode is confirmed based on my experience trading and designing graphical user interfaces for trading. Indeed, a trader would only want to begin the order entry process from a screen at which he or she could ascertain the market conditions. That is, if the screen did not convey market conditions, a trader would not want to begin the order entry process from that screen because they would be trading blind. TSE’s scroll mode does not accurately convey market conditions. As TSE discloses, in scroll mode the price display positions do not change automatically, and thus the screen does not update to keep the board display central price (e.g., the last traded price) in the center of the board as it would in non-scroll mode. Additionally, because in scroll mode the bid/ask indicators are not updated on the screen, the scroll mode does not

accurately convey the current inside market price, or the current quantities pending at the displayed price levels. As such, it would not have made sense that TSE would have been designed so that a trader could begin the order entry process from the scroll mode.

169. Moreover, it is my opinion that there would be no motivation for one of ordinary skill in the art to combine the teaching of TSE and Belden in the first instance. In particular, there would have been no motivation to one of ordinary skill in the art to modify TSE to incorporate Belden's alleged teaching of single action. In fact, TSE actually teaches away from such a combination. In TSE, when the new order input window opens in response to a user command, the user must enter a quantity in the order entry window. This procedure – where the user has to provide additional information prior to sending the order using the separate order entry window – is intended to slow the order entry process to increase accuracy, which is a desired feature in a system like TSE that is akin to an order ticket. In particular, the TSE user must use a keyboard to enter a quantity for the order, (Ex. 1017 at TSE0000000783-785), then move the mouse (or perhaps use the keyboard to move a cursor) to the “send” or “submit” area of the order entry window to actually send the order. *Id.* In my opinion, therefore, combining a single action to “set[] a plurality of parameters” and “send[]” a trade order with the TSE system would negate the desired accuracy of the TSE's deliberate, slow order entry

process, rendering the separate order entry window superfluous and TSE inoperable for its intended purpose. Thus, the TSE order entry process, which utilizes a separate order entry window and requires that the user fill out at least a portion of the order entry window using a keyboard, teaches against using anything like a single action to “set[] a plurality of parameters” and “send[]” a trade order. Indeed, single action order entry is incompatible with the TSE process of requiring the user to enter information in a separate order entry window. In addition, in TSE, the system refreshes at a slow 3-second rate (*i.e.*, updates are displayed after 3 seconds). In my opinion, this is a very slowly-responding refresh rate. As a result, in my opinion, single action order entry would not be needed or desired in such a slow system, and one of ordinary skill in the art would have understood that the accuracy of the order entry process in TSE is more important than speed in a system that refreshes at such a slow rate. For this additional reason, it would not have been obvious to combine or implement single action with TSE.

170. Moreover, one skilled in the art would not have looked to Belden in the first instance because Belden it is a pit-mimicking reference that has nothing to do with sending an order to an electronic exchange, as the difference is described above.

171. I disagree with Mr. Román’s assertion that Belden provides “explicit motivation” for the combination of TSE and Belden. I understand that Mr. Román

relies on a teaching in Belden relating to “speed” for providing the motivation to one of ordinary skill in the art to modify TSE to incorporate Belden’s alleged teaching of single action. Ex. 1017 at ¶ 89. Specifically, Mr. Román cites to a passage in Belden, explaining that “a trader ‘benefits from the speed with which he can take or liquidate positions.’” *Id.* (citing Ex. 1012 (Belden) at 0004). However, a full review of the context in which this statement was made, (as well as the remainder of Belden), reveals that the “speed” to which Belden was referring was the speed that *floor traders* could take or liquidate positions. More specifically, in the same paragraph on page 0004 of Belden, Belden recites that “[f]loor traders are generally classified in two ways (1) as speculators, or “locals” . . . or (2) as floor brokers . . . A ‘local’ can take long-term positions . . . He may trade in one or more pits. He benefits from the speed with which he can take or liquidate positions” In view of this, it is clear that the “speed” Belden refers to here is the speed that *floor traders* can take or liquidate positions by virtue of being in physical proximity to the other traders. This is confirmed in other passages in Belden, which describe how groups of traders are positioned within the pit “so that a broker with an order can locate the particular market as quickly as possible.” (Belden at page 0005). Clearly, this speed has nothing to do with speeding up graphical user interfaces for electronic trading. Indeed, Belden’s recitation that the speed with which *floor traders* can take or liquidate positions would not have provided any

motivation to one of ordinary skill in the art to alter the TSE's graphical user interface to increase the speed of order entry – let alone provide motivation to alter TSE's graphical user interface in the specific way recited by the claims (i.e., to eliminate TSE new order input window). Mr. Román confirmed as much in his January 13, 2017 deposition when he testified that Belden's reference to "speed" was limited to pit trading and that he actually was not relying on this portion of Belden as motivation for modifying a GUI. Ex. 2531 (Román Tr.) at 31:3 – 32:22. This confirms my opinion that one of ordinary skill in the art would not have been motivated to alter TSE to reduce the time needed to place an order – let alone alter TSE to eliminate the new order input window in the specific manner required by the claims. And even if Belden's teachings could somehow be deemed relevant to the design of a GUI for order entry, and in particular the speed at which order entry is carried out in a trading GUI, one of ordinary skill in the art would still not arrive at the claimed invention. That is, there is no teaching that would lead one of ordinary skill in the art to eliminate the new order input window altogether and send orders from the board screen. At best, Belden would only teach speeding up the order entry process in the new order input window (which requires multiple actions, e.g., filling out the quantity, moving the cursor, and depressing the send button), which still would not result in the claimed invention. Clearly, Mr. Román

arrived at the claimed invention using pure hindsight and the '768 patent as a roadmap, which I have been advised is not proper.

172. Mr. Román also relies on Belden teaching that it is “applicable to all markets” (Belden page 0008) for providing the alleged motivation to one of ordinary skill in the art to modify TSE to incorporate Belden’s alleged teaching of single action. In my opinion, this falls woefully short of providing any motivation to combine. That Belden is applicable to all markets has no bearing on GUI design whatsoever, and certainly does not provide any motivation to one of ordinary skill in the art to alter the TSE’s graphical user interface to increase the speed of order entry, let alone alter TSE in the specific way to arrive at the claimed invention.

173. It is my understanding that if the independent claim is not rendered obvious, the each of the dependent claims is likewise not obvious.

174. In my opinion, claim 6 is not rendered obvious by the combination of references TSE and Belden. In particular, even if one were to combine TSE and Belden, and even if TSE constitutes prior art, in my opinion the claimed invention cannot be considered obvious because the references, whether taken alone or in combination, fail to disclose dynamically displaying an entered order indicator in association with a price level along the price axis, where the entered order indicator represents the user’s trade order working at that price level. In TSE, bids and asks are displayed, however there is no display to represent the user’s trade

order. Specifically, in TSE the bids and asks at each level of the display represent *all of the orders* pending, and the trader cannot know whether their order is represented in that total amount, or if it has been filled. In addition, as mentioned above, there is a 3-second delay between updates of the information displayed on TSE. Because of this delay, a user's entered order may be sent to the exchange and filled before the next update is ever sent to the display. As such, the user may never see any change in the total of all of the orders pending, much less an indication of the user's own order at a particular price level. Because TSE only shows the total of all orders pending at the time of the update, there is no way for a user to know whether their orders are represented in the total or if they have been filled in whole or in part.

175. In my opinion, claim 7 is not rendered obvious by the combination of references TSE and Belden. In particular, even if one were to combine TSE and Belden, and even if TSE constitutes prior art, in my opinion the claimed invention cannot be considered obvious because the references, whether taken alone or in combination, fail to disclose sending a message to the electronic exchange to delete the user's trade order in response to a single action of the user input device with the pointer of the user input device positioned over the entered order indicator. First, none of the references shows the entered order indicator, as discussed above with respect to claim 6, much less deleting the user's trade order with a single

action of the user input device positioned over the entered order indicator. The references are silent in this regard.

176. In my opinion, claim 11 is not rendered obvious by the combination of references TSE and Belden. In particular, even if one were to combine TSE and Belden, and even if TSE constitutes prior art, in my opinion the claimed invention cannot be considered obvious because the references, whether taken alone or in combination, fail to disclose centering the display of the first and second indicators upon receipt of a centering instruction. In TSE, there is a purported scroll mode, but no mention of centering in that mode. Petitioners rely only on the “Home” (“H”) button of TSE’s scroll mode, but one of ordinary skill would have readily understood the ‘H’ button to merely switch modes from the scroll mode to non-scroll mode. One of ordinary skill would have understood that switching modes in this manner would not have constituted the claimed “centering” because switching modes in TSE operates to display an entirely new set of prices rather than centering the existing set of prices.⁹ Moreover, in TSE, the user can manually switch between modes, however that action does not constitute a centering command. In TSE’s purported “compressed” mode, there is no centering because

⁹ An additional reason why this claim element is not met by selecting the ‘H’ button in scroll mode is that the claim requires centering the first and second indicators, which are displayed corresponding to a price level along a price axis. Petitioners do not suggest that the compressed board mode included a price axis, and I agree that it does not. *See supra* notes 7-8.

the window is always centered. Ex. 1017 at TSE0000000761. Finally, in TSE's uncompressed mode, assuming that the mode operates as suggested by Petitioners, the claim is still not met because there is no way for the user to center the inside market. There is no suggestion, when in the TSE Board mode, to provide any manner of manual centering.

X. THE CLAIMED INVENTION IS TECHNICAL

177. In my opinion, the claimed invention is a very specialized GUI tool. As noted above, at the time of the invention there were a number of conventional ways to trade electronically, including the ubiquitous Figure 2 style GUI tool and order entry tickets. The patent in this proceeding does not prevent others from using these conventional GUI tools because the claims thereof do not read on these countless other number of GUI tools. Set forth below are screenshots of some of these other GUI tools presented during the *CQG* district court proceedings, which are not read on by the claims:

No Pre-emption



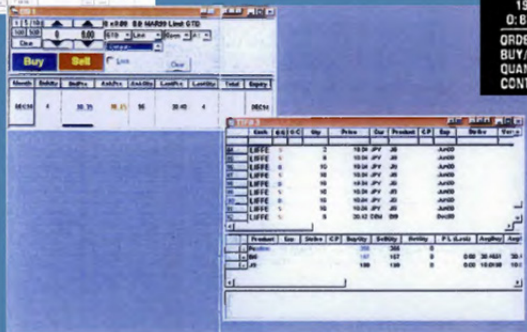
Ecco,
May 2001

Intex,
1980s

INTEX/04-JAN-83/9:17

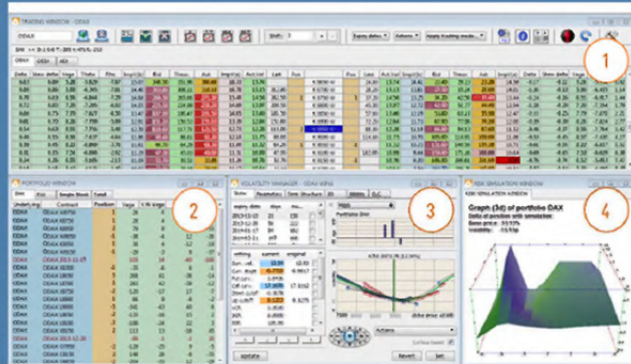
MAR 83	PRICE	LAST: 87.30
BID SIZE		OFFER SIZE
88.05		192
88.04		146
88.03		273
88.02		221
88.01		117
88.00		118
87.31		175
87.30		175
LAST	87.30	**LAST**
170	87.29	
173	87.28	
190	87.27	
142	87.26	
176	87.25	
193	87.24	
O: 87.25	Hi: 88.03	LO: 87.23 V: 990
ORDER TYPE	: LIMIT	
BUY/SELL	: BUY	
QUANTITY	: 25	
CONTRACT ID (MMYY):	MAR 83	

TT,
1999



PTX 6037

No Pre-emption



1. Market overview and single-click order entry.
2. Post-trade risk and P&L information to support trading.
3. Advanced volatility management capabilities.
4. Perform scenario analysis using pre-defined or custom risk reports.

Orc Trader Screen

PTX 6038

No Pre-emption



Reuters FX

Bloomberg Tradebook



PTX 6039

No Pre-emption

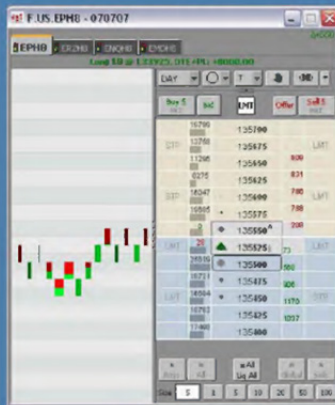
DOMTrader Price Scale

DOMTrader Price Scale:

- Responsive Price Scale
- Dynamic Price Scale

For a dynamic price scale, select the **Dynamic Price Scale** button. The current price stays centered on DOMTrader window.

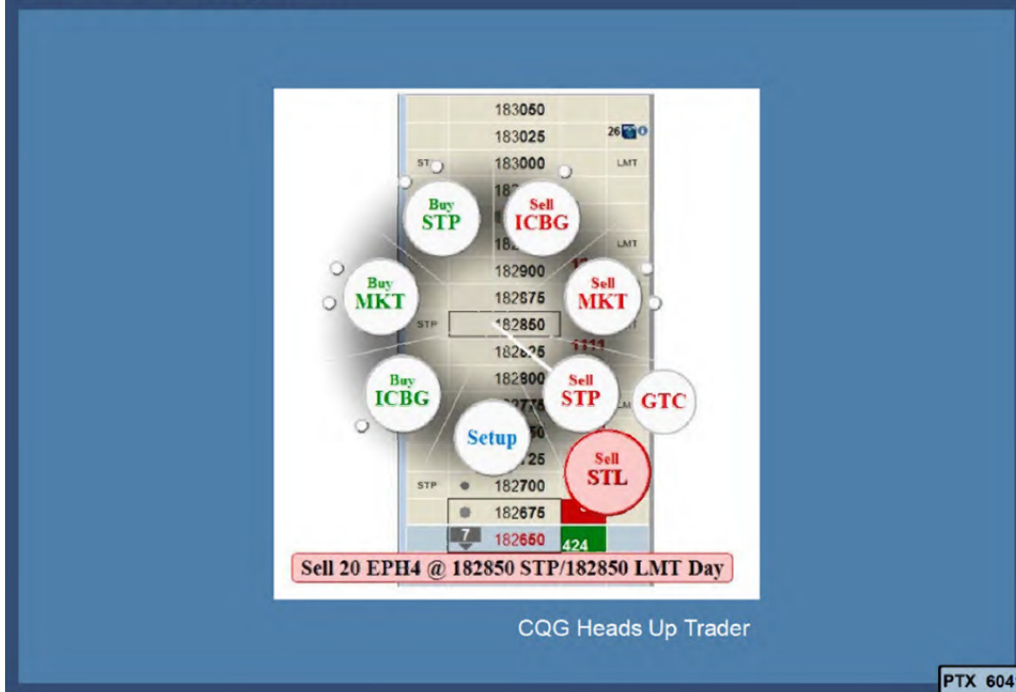
CQG Trader User Guide



CQG Dynamic Screen

PTX 6040

No Pre-emption



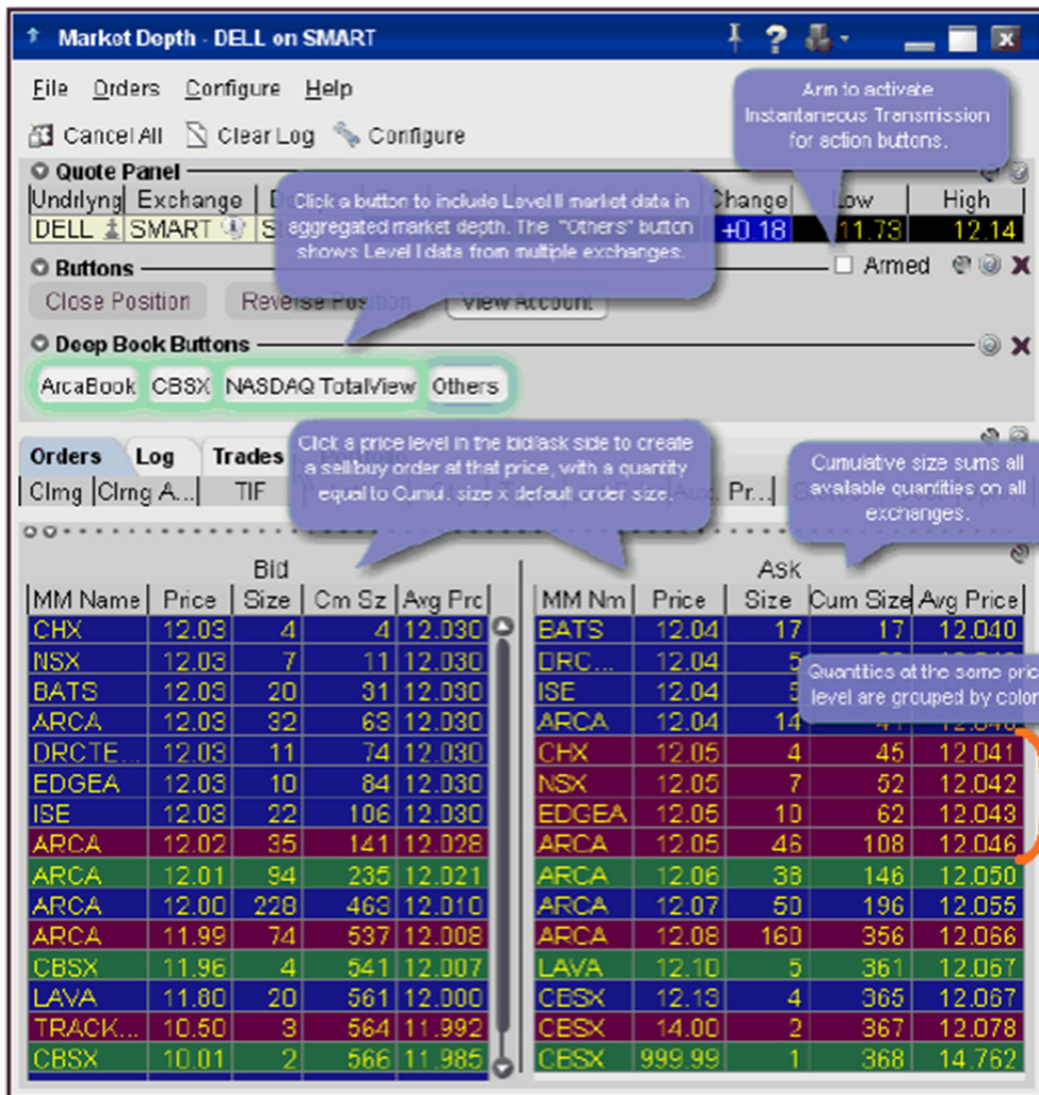
Further, Petitioners themselves perform, what they refer to as the purported abstract idea, in multiple non-covered ways, such as using confirmation windows in the accused products (removing “single action”), or using different GUI tools. Below is one such different GUI tool, TradeStation’s Market Depth Window¹⁰:

¹⁰ Available at http://help.tradestation.com/09_00/tradestationhelp/md/about_the_market_depth_window.htm; see also Ex. 2502 (showing different screens); Ex. 2503 (same); Ex. 2506 (same).



Below is another such different GUI tool, Interactive Broker's Market Depth Trader¹¹:

¹¹ Available at https://www.interactivebrokers.com/en/software/tws/usersguidebook/specializedorderentry/aggregated_market_depth_window.htm.



178. Nor is the patent directed to any particular type of trading strategy.

Indeed, in the *CQG* case involving patents of which the '768 patent is a continuation, for example, *CQG*'s expert admitted that the invention does not stop someone from practicing any particular trading strategy and does not preclude all ways of trading electronically. Exhibit 2292, Van Dusen Dep. Tr., at 107:3-109:24.

179. The claimed invention has no "pen-and-paper" analogue. Indeed, the invention cannot be performed using pen and paper, on a chalkboard, or by any

other “by-hand” method. As I explained above, the invention of the ‘768 patent requires an order entry region comprising a plurality of locations for receiving single action commands, where such single action commands both set parameters for a trade order and send the trade order to the electronic exchange. In the invention of the ‘768 patent, each location corresponds to a respective price level along the price axis and continues to correspond to the respective price level even after a change to an inside market price, which is updated via a dynamic display of bid/ask indicators that move relative to the price axis. Using the claimed invention, a trade order can be sent by selecting a particular one of the fixed locations by a single action (e.g., a single click or a double click of a mouse button) of the user input device in the particular fixed location. The single action sets a plurality of parameters (e.g., price, quantity, order type) for the trade order and sends the trade order to the electronic exchange.

180. I am aware of something referred to as a “specialist book.” The claimed invention is not merely an automation of the specialist book. For starters, a specialist book was not a trading system but rather a list of the orders received by the specialist from brokers and other exchange members to be entered into the market and filled by the specialist. The orders in the specialist book were not published to any other traders in the pit and are not even considered “working/entered” orders for that reason. Petitioners’ argument that a trader could

point at the order they want in the book is unsupported and at odds with reality. So too are Petitioners arguments that TT's claims could be performed mentally, with pen-and-paper. Indeed, all of these arguments ignore the bulk of TT's claims, omitting elements such as dynamically displaying bids/offer indicators, updating the display of indicators to show relative movement of bids and offer indicators versus a price axis, and placing an order with a single action to set a plurality of parameters for the trade order and send it to the exchange. To reiterate, the specialist book would not have dynamically displayed orders actually pending in the market, nor would it have shown bid/ask indicators moving relative to a price axis – let alone shown a price axis at all. Nor was the specialist book an order entry tool; the specialist book did not have any order entry region – let alone an order entry region comprising fixed locations for receiving single action commands, which both set parameters for a trade order and sent that trade order to an electronic exchange.

181. The invention is a technological improvement over prior art GUI tools. Based on my own experience, GUI tools are technical in nature, and indeed the entire electronic trading industry considers GUI tools as being technology. The invention is a far cry from business methods, or methods that implement trading strategies. Instead, the GUI tools act as the platform for the user/trader to interact with the electronic exchange. In the litigations involving TT's patents, numerous

experts for different defendants all agreed that the patents are directed to GUIs and that GUIs are in a technical field. For example, Mr. Silverman, an expert for eSpeed, testified that the patents¹² are directed to “a field of technology” in which “skilled software engineers” develop “real time processing” and “graphical user interfaces.” Exhibit 2293, 8/24/07 Silverman Dep. Tr., at 131:17-132:2. In another example, Mr. Mellor, a technical expert for CQG, testified that the “underlying technology [in this case] is the graphical user interface.” Exhibit 2294, 1/16/15 Mellor Dep. Tr., at 45:8-46:2. Other experts in the field testified in a similar manner. Exhibit 2292 at 110:3-111:4; Exhibit 2295, 8/9/07 Ferraro Tr., at 329:10-11; 336:13-15; 443:2-4; Exhibit 2293 at 131:17-132:2; Exhibit 2296, 8/17/07 Dezmelyk Tr., at 8:15-18. TradeStation’s President, Mr Bartleman, even testified that [REDACTED]

[REDACTED]. Ex. 2403, 90:21-92:2; *see also* Ex. 2404, 668:22-669:11; 91:22-25; 580:11-24; 559:6-12¹³; *see also* Ex. 2501 ([REDACTED]) [REDACTED] Ex. 2504 (same); Ex. 2507 (same). In fact, I am not aware of a single expert in any of the cases taking the

¹² In the *eSpeed* case, Mr. Silverman reviewed the ’132 and ’304 patents, which resulted from the same priority document as, are the parent applications to, and share a common detailed description with, the ’768 patent.

¹³ [REDACTED] *Id.*, 566:23-567:9; Tr. at 649:21-650:20).

position that the invention is not technological, until that argument was advanced by Mr. Román in these CBM proceedings. As noted above, the invention provides a technical solution to a number of technical problems in the prior art. In the *eSpeed* case, defendants’ expert, Mr. Dezmelyk, acknowledged that the goal of the invention addressed the technical problems of efficiency and accuracy. Ex. 2296 at 8:15-18. As an additional example, the Federal Circuit stated, “[t]he claimed invention facilitates more accurate and efficient orders in this trading environment.”¹⁴ *Trading Technologies Int’l, Inc. v. eSpeed, Inc.*, 595 F.3d 1340, 1345 (Fed. Cir. 2010). Likewise, Mr. Van Dusen, CQG’s expert, noted how the invention was an improvement in the field, when answering questions at deposition:

Q: Is it fair to say –and I believe you testified about this earlier—that MD Trader was an improvement over prior systems?

A: That’s my understanding, that’s accurate.

...

Q: Why is it that MD Trader was an improvement over prior systems?

...

A: Yeah. It seems to me that the reason was, is it facilitated more precision in execution. Because the prices weren’t moving, that axis was static, it allowed traders better precision in terms of their execution.

¹⁴ Again, the Federal Circuit was specifically addressing the claimed subject matter of the ‘132 and ‘304 patents, but the statement also applies to the ‘768 patent, which shares a common detailed description with the ‘132 and ‘304.

Exhibit 2292 at 174:9-174:14; 175:7-175:8; 175:12-15.

182. I am aware that the field of human-computer interaction (also sometimes referred to as the man-machine interface), which includes GUI tool design, is a technical field. For example, many highly regarded educational institutions award technical degrees in the field of human-computer interaction. There are also technical texts on GUI tool design.

183. In connection with my work in the *CQG* case, I am familiar with NASA's treatment of GUI tools as specialized technology. For example, the Human-Computer Interaction Group of the Ames Research Center at NASA applies human-computer interaction methods to the development of GUI tools, focusing on the functionality as well as the interface. Exhibit 2297, (NASA HCI Group).

184. In analyzing the GUI tool of the invention, Mr. Román makes the critical error of looking at the interface as merely an arrangement of GUI elements, without analyzing the underlying functionality. The invention specifically claims functionality of the structural elements and make-up of the interface. For example, the claims recite, among other things, a combination of a dynamic display of bid/ask indicators that correspond to price levels along a price axis and that move relative to the price axis, an order entry region with fixed locations that correspond to price levels along the price axis, where the fixed locations continue to

correspond to the same price levels along the price axis when at least one inside market price changes, and single action order entry that occurs by selecting a particular location (in the order entry region) corresponding to a price level to both set a plurality of parameters (*e.g.*, price, quantity, type, etc.) for a trade order and to send that trade to the electronic exchange. These claim elements are directed to solving a technical problem. Although suggesting that the invention was directed to merely arranging GUI elements for aesthetic purposes, Mr. Román nonetheless had to admit that the invention solves the accuracy problem, a technical problem addressed above in this declaration. Exhibit 2166, 05/05/2016 Román Dep. Tr. at 66-69, 177:6-182:3. Mr. Román’s argument fails because it is analogous to arguing that a physical tool is merely an arrangement of materials, like metal, in a specific configuration. This is a nonsensical argument that divorces functionality and structure of basic tools.

185. Mr. Román argues that a GUI tool needs to be revolutionary to be considered technology. In other words, for GUI tools that are not revolutionary, Mr. Román believes that none of them qualify as technology. This is incorrect for a number of reasons. For starters, as noted above, the invention *is* revolutionary. In addition, even GUI tools that are not revolutionary are still technology—as recognized at the Ames Research Center. There is no basis for injecting the concept of how important the technology is (*i.e.* must be revolutionary) into

categorizing whether something constitutes technology. The fallacy of Mr. Román's argument is illustrated by his limitation of this "revolutionary" requirement to the analysis of GUI tools; Mr. Román acknowledged that other elements of the trading system, including software like the API, gateways and other components of the electronic trading system are technology, regardless of whether they are revolutionary. There is no principled reason to single out the GUI tools for different treatment in the trading system and it is incorrect to do so. GUI tools like the invention are clearly technology.

186. One of ordinary skill in the art would understand that the claimed GUI tool is mission critical. This is contrary to Mr. Román's views on this subject. According to Mr. Román, the layout of GUI tools is driven by aesthetics only, and that the difference between conventional order entry GUI tools and the inventive GUI tool is merely the rearrangement of known graphic display elements on a screen. This is not correct. Professional traders are not concerned about aesthetics, just like a pilot is not concerned about aesthetics in GUI tools in the cockpit, because these tools are mission critical. Electronic traders care about having the best tools available to improve their speed, accuracy, and efficiency, just like pilots want the best tools available in the cockpit so that the plane can be flown safely and efficiently. As with GUI tools in the cockpit, GUI tools for electronic trading are not like consumer products in which aesthetics are important. They are tools

through which users can see, touch, feel and interact with the market. Changes to the mission critical order entry software are not made for aesthetic reasons, and traders will especially resist changes to a tool with which they are having success. Changes to mission critical GUI tools for electronic trading and cockpits are significant--they are not like tweaks to a consumer product. The differences between conventional GUI tools and the inventive GUI tool are not aesthetic, but rather are structural and functional differences that provide numerous benefits as described below. Mr. Román is also wrong when he states that the inventive GUI tool is merely rearranging known graphic display elements. Instead, the inventive GUI tool includes providing the structure, makeup, and functionality of the claimed elements in a novel and nonobvious manner to create a GUI tool that revolutionized the industry.

187. Just like an improved cockpit display, the inventive GUI tool solves technical problems in a technical manner. For example, the inventive GUI tool solves the problem with the construction of prior art GUI tools that would cause a trader to miss his or her intended price. One technical problem with the conventional GUI tools is that they display data that are constantly changing as the market updates are received from the electronic exchange. At the same time, the trader is trying to interact with the GUI tool based on the displayed data. There are competing interests in keeping the GUI tool display up to date with the latest

market information, while at the same time allowing a user to interact with the GUI tool in a fast and accurate manner. The inventive GUI tool solves this problem by displaying an order entry region having fixed graphical locations corresponding to price levels along a price axis, where the fixed locations continue to correspond to the same price levels even after a change to an inside market price (*i.e.*, the fixed graphical locations of the order entry region do not change position in response to a change in the inside market). This is a technical solution to a technical problem, not a business method. Remarkably, Mr. Román says that this is not technology, nor is it a technical problem. But at a deposition, he admitted that the inventive GUI tool did in fact solve the problem with the construction of prior art GUI tools that would cause a trader to miss his or her intended price. Exhibit 2166, Román Tr. at 180:13-182:3.

188. Another technical problem with the conventional GUI tools is that, because they display numbers that are constantly changing as the market updates are received from the electronic exchange, the conventional GUI tool does not provide a measure of how much or how fast the market information is changing. The structure, makeup, and functionality of the inventive GUI tool solves this problem by, again, providing a display in which market indicators move up and down relative to the price axis. This results in improved visualization of market movements because the display shows the amount and direction of the change, as

well as how fast the market is changing. In other words, the interaction of the price axis and the dynamic indicator elements of the inventive tool better represented the market and changes in the market than prior art style GUI tools. The problem with the construction of prior art style GUI tools in terms of lacking market visualization is a technical problem, and not a business method. This is a classic technical problem of usability.

189. Yet another technical problem relates to the efficiency of displaying information. In conventional GUI tools, the trader had to access and utilize a separate screen for market information and order entry (e.g., the conventional market grid in Figure 2 of the patent), a separate screen for working orders, and a separate screen for setting a default quantity. The inventive GUI tool provides for a condensed display that combined these separate screens into a single trading tool which improved the speed, accuracy and efficiency over conventional GUI tools.

[REDACTED]

[REDACTED]

[REDACTED] Ex. 2404, 472:22-473:2 ([REDACTED])

[REDACTED]”).

190. Finally, in my experience, the design and development of GUI tools in this industry is clearly technical in nature as evidenced by the fact that GUI tools are designed and developed by technology groups within the various industry

groups. As a former chief technology officer at a number of places in the industry, my technology group was responsible for GUI tool design and development. The employees in these technology groups typically have a technical background, such as computer science, programming skills and/or engineering. To say that the field of GUI tools for electronic trading is not technology, as Mr. Román asserts, is simply not credible. Indeed, TradeStation's and IB's own public filings reveal that both companies invest significant expenditures and manpower towards developing GUI technology for electronic trading. *See supra*, at ¶¶ 42, 44.

XI. CONCLUDING STATEMENTS

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

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

Executed on January 19, 2017

A handwritten signature in black ink, consisting of a large, stylized 'M' followed by a series of loops and a wavy line at the end.
