UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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ASKELADDEN L.L.C.,

Petitioner,

v.

INTERCURRENCY SOFTWARE LLC,

Patent Owner.

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Case IPR2023-_____

Patent No. 10,062,107 B1

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DECLARATION OF MARC REID

I, Marc Reid, declare as follows:

I. QUALIFICATIONS

1. My name is Marc Reid.

2. I have been asked to provide my opinions in this matter regarding U.S. Patent No. 107 (the "'107 patent") and certain prior art to the '107 patent. I have been asked to give my opinions regarding the teachings and scope of the prior art to the '107 patent and whether those documents disclose the features of the '107 patent.

3. I have over 30 years of experience in information technology consulting and financial management. I have been employed in IT management consulting and public accounting with several of the "Big 4" consulting firms. I have experience in multiple industries including financial services, healthcare, government, telecommunications, managed services, energy and utilities, and manufacturing. I have provided consulting services in information technology planning, design and implementation, ecommerce, systems development and configuration, IT strategy, and IT program and project management. My implementation experience includes financial transaction systems that include trading and investment, payment processing, and currency exchange and trading.

4. As a result of my experience, I have gained a detailed understanding of the technology that is the subject of this declaration. For example, my experience with financial transactions, securities and materials trading systems, and computer network architecture is relevant to the subject matter of the ’107 patent. Through my education, training, and experience in the financial services technology field, I am familiar with software development for trading currencies, order matching, order execution, market data, and related systems. As such, and as further described herein, I am qualified to provide opinions regarding the state of the art at the period of time of the invention, which I understand to be around the year 2007 timeframe, how one of ordinary skill in the art at that time would have interpreted and understood the ’107 patent, and how one of ordinary skill in the art at that time would have interpreted and understood the disclosure of prior art to the ’107 patent.

5. I am a Senior Consultant contracted with eComp Consultants. eComp Consultants provides professional consulting services relating to computer and technical matters in a wide range of industries including embedded internet systems, cellular telephony, and eCommerce and financial transactions. These consulting services are wide ranging, and include working with clients, such as

Amazon.com, Microsoft, GEICO, Verizon, and McGraw-Hill, on specific information technology projects, process improvement, project management, and other technology issues.

6. eComp Consultants has been compensated at an hourly rate of $450.00 for the time required to research and prepare this report. eComp Consultants is also being reimbursed for all related expenses incurred. My compensation is not contingent upon my testimony, or upon any outcomes or court proceedings. I have no interest, either current or anticipated, in the parties to the suit upon which the report, analysis and testimony may be based.

7. I attach to this report at Exhibit 1003, a copy of my Curriculum Vitae describing further details on my education, experience, publications, relevant cases experience and other qualifications to render an expert opinion in this matter.

II. SCOPE OF WORK

8. I understand that a petition is being filed with the United States Patent and Trademark Office for Inter Partes Review (IPR) of U.S. Patent 10,062,107 (the "'107 Patent") attached as EX1001, entitled "Consolidated Trading Platform." I have reviewed the same and agree with its contents.

9. I have been retained by Askeladden to offer an expert opinion on the '107 patent related to my experience and expertise. I have also been retained by

Askeladden to offer an expert opinion on U.S. Patent Nos. 10,776,863 (the "'863 Patent"), and U.S. Patent 11,449,930 (the "'930 Patent"). My firm has worked with Askeladden on IPR's. including the following:

10.

Case IPR Number	Patent Number
Case IPR2018-00745 and IPR2018-00746	Patent No. 9,054,860 B1
Case IPR2017-00083	Patent No. 7,197,297
Case IPR2017-00726	Patent No. 8,285,648
Case IPR2022-00379 and IPR2022-00380	Patent No. 10,535,058 and 8,589,236
Case IPR2020-01406 and IPR2020-01407	Patent No. 7,896,242
Case IPR2020-00005	Patent No. 8,280,776 B2
Case IPR2021-00278	Patent No. 8,788,353 B2
Case IPR2021-00658	Patent No. 8,719,165 B2
Case IPR2022-00319	Patent No. 6,876,979 B2
Case IPR2023-00146 and IPR2023-00147	Patent No. 7,110,792 B2
Case IPR 2023-00421 and IPR2023-00422	Patent No. 7,837,100 B2 and 8,905,301 B2

11. For purposes of this declaration, I have been specifically asked to provide my opinions on claims 1-36 of the '107 patent. In connection with this analysis, I have reviewed the '107 patent and its file history. I have also reviewed and considered various other documents in arriving at my opinions, and I may cite to

them in this declaration. For convenience, information relied upon in arriving at my opinions is listed in Appendix A.

III. LEGAL STANDARDS

12. I have been advised that the U.S. Patent Trial and Appeal Board (PTAB) will interpret the claims of the challenged patent using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b), including construing the claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b) (2020). "In determining the meaning of [a] disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc*., 469 F.3d 1005, 1014 (Fed. Cir. 2006).

13. I have been advised that claim terms are given their plain and ordinary meaning as would be understood by a person of ordinary skill in the art at the time of the invention and in the context of the entire patent disclosure. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (*en banc*). "There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim

term either in the specification or during prosecution." *Thorner v. Sony Comput. Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012).

14. I have been advised that to prevail in a challenge to the patentability, a Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e). I have been advised that in an IPR, the Petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016).

15. I have been advised that a claim is unpatentable for obviousness if, to one of ordinary skill in the pertinent art, "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made." *KSR Int'l Co. v. Teleflex Inc.,* 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103(a) (2006)).

16. I have been advised that the question of obviousness is resolved on the basis of underlying factual determinations, including "the scope and content of the prior art"; "differences between the prior art and the claims at issue"; and "the level of ordinary skill in the pertinent art." *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When conducting an obviousness analysis, the PTAB will consider a prior

art reference "not only for what it expressly teaches, but also for what it fairly suggests." *Bradium Techs. LLC v. Iancu*, 923 F.3d 1032, 1049 (Fed. Cir. 2019) (citation omitted).

17. I have been advised that a patent claim "is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR*, 550 U.S. at 418. An obviousness determination requires finding "both 'that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.'" *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016) (citation omitted); *see KSR*, 550 U.S. at 418 (for an obviousness analysis, "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does"). Also, "in appropriate circumstances, a patent can be obvious in light of a single prior art reference if it would have been obvious to modify that reference to arrive at the patented invention." *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016).

18. I have been advised that "[a]lthough the *KSR* test is flexible, the Board 'must still be careful not to allow hindsight reconstruction of references . . . without any explanation as to how or why the references would be combined to

produce the claimed invention.'" *TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016) (citation omitted). Further, an assertion of obviousness "cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 550 U.S. at 418 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

19. Accordingly, I have applied the foregoing concepts to the best of my ability in rendering my opinions and other testimony in this Declaration.

IV. OVERVIEW OF THE '107 PATENT

20. I will first describe the Background of the '107 patent.

21. The '107 patent describes a "problem" with the prior art relating to cross-border, electronic trading. The '107 patent notes that "investors residing in China can trade the US securities from their accounts at Charles Schwab via the

Internet." EX1001, 1:37-38.[1] The '107 patent is directed to a perceived problem relating to currency conversion:

> [A]ll accounts at Charles Schwab must be in US dollars and all transactions must be conducted in US dollars. FIG. 1 illustrates a process how an investor in China would trade securities listed on a US exchange (e.g., NASDAQ). Because all securities listed on a US exchange are traded in US dollars the investor must first pre-allocate a bulk amount in his/her local currency (e.g., RMB¥) and look for a source to convert the amount into US dollars that are then deposited into a brokerage (e.g., Charles Schwab) by wire or check. Through the brokerage, the investor may place multiple orders to buy stocks being traded on a US exchange. At a later time, when the investor wishes to realize the profit or loss on his US dollar-denominated stock he must sell his stock and then separately find a foreign exchange resource to convert the settlement of selling the stock back to his local currency. At the time of buying or selling the stocks, as well as during the whole period the investor held the stocks, the investor had no certain knowledge of what profit or loss he was going to get because the currency exchange rate must be obtained for a bulk amount at another time, which may fluctuate significantly enough to affect the ultimate profit or loss. 1:39-60.

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[1] References to the '107 patent are made using the notations column:lines, e.g., column 1, lines 25-30 are referenced as "1:25-30."

22. Uncertainty occurs because the prior art purportedly failed to display quotes in a preferred currency and traded using a currency exchange rate at a time different than the time of the transaction. "One of the problems in the current trading system is that the currency conversion is not at a transactional level. There is a great need for an improved system which performs currency conversion on a transactional level so that a trader or investor knows exactly what profit or loss may occur with a transaction." EX1001, 1:61-66. The '107 patent goes on to state that "[i]t is desirable for a trading system to be able to show prices as well as conduct all transactions in a currency preferred by an investor regardless of whatever currency being used in the primary market for the security/asset." EX1001, 1:66-2:3.

23. The skilled person would understand the "problems" the patent is directed to addressing relate primarily to displaying trading data in a trading system in the trader's currency and secondarily, to retail-type electronic trading wherein currency is converted in bulk by a broker, rather than on a per transaction / trade basis when trading in a market using a different currency than the trader.

24. Hence, the patent is directed to adding the age old craft of money changing to a modern electronic trading system.

A. The ’107 Patent Disclosure

25. The Detailed Description of the Specification spans a mere 4 ½ columns and describes 5 figures. Figs. 2A and 2B are high-level block diagrams with no real inventive features.

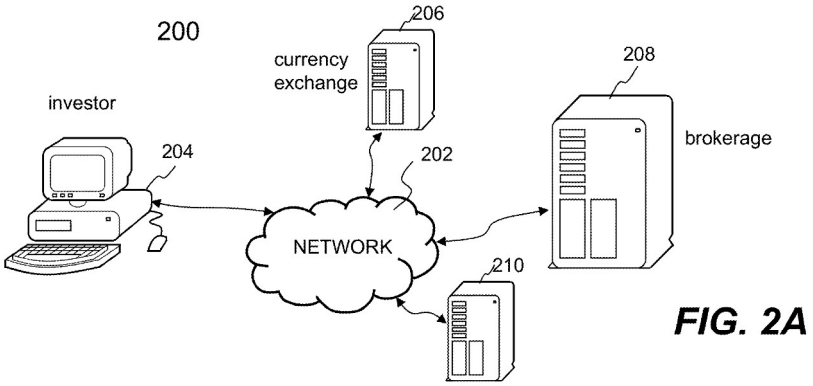


FIG. 2A

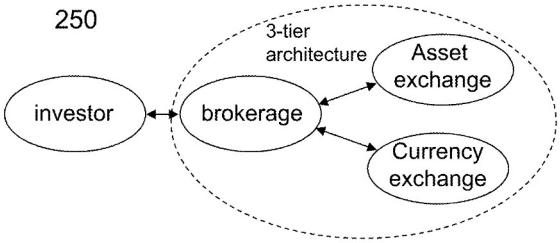


FIG. 2B

26.

27. I believe these figures show nothing more than a known “three-tiered architecture.” Certainly each element – the investor computer, a currency exchange, a brokerage and a market exchange – all existed as shown being arranged by 2007.

28. The patent explains that through a consolidated trading platform, the brokerage 208 presents all prices, market data, P&L estimates, and transaction results or settlements in a preferred currency, in conjunction with the market

exchange 210 and the currency exchange 206. As a result, a trader always knows exactly what he/she may end up in the preferred currency with a transaction of an asset. When the transaction of the asset is actually performed, the consolidated trading platform can also perform a currency conversion (e.g., of trade proceeds) automatically based on specified conditions. EX1001, 2:29-38.

29. There does not seem to be any significance to which components perform each step. Naturally, the market exchange server executes trades and provide trading information (bid, ask, quantity, etc.). Also, the currency exchange handles currency issues. But the server 108 appears to be a broker computer that performs many of the other steps, but there is no particular description of the computer itself, its configuration, communication protocols, or programming. Therefore, the configuration of the computer architecture of the ’107 patent is somewhat of a black box for performing the processes described in the patent, which are discussed next.

30. Figs. 3-5 are basic flow diagrams that show a high-level process for trading according to embodiments of the present invention. Fig. 3 is directed to a basic process for making a trade in a currency that is different than the market’s currency.

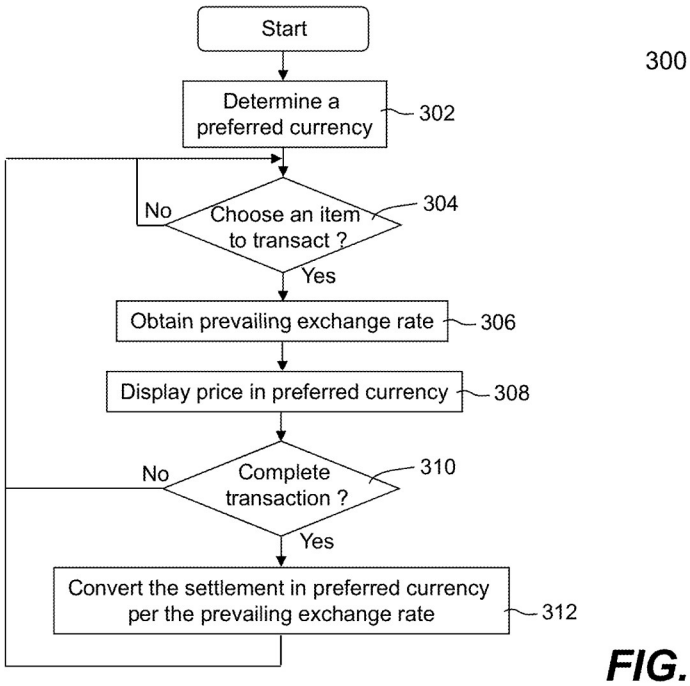


FIG. 3

31.

32. As shown, the process is fairly simple. Once an asset (e.g., stock ID) is selected by the trader – which could be virtually anyone or anything (e.g., algorithmic trading server, order management system) initiating a securities transaction (2:39-44)-- the price of the asset is obtained by performing a currency conversion, and after a transaction is complete, the settlement details, i.e., the record of the transaction, are converted with a currency conversion. "In one embodiment, to complete the transaction in the preferred currency, the currency exchange converts all settlements to the preferred currency per the prevailing exchange rate, as if the item has changed hands in the preferred currency. In other words, as shown in FIG. 2A, the server 208 communicates with the server 210 to complete the currency conversion. Depending on implementation, the server 210

may be part of the brokerage or an independent agent, and the currency conversion may actually happen (actually money exchanged) or credits may be used in the account." EX1001, 6:4-14. In other words, a currency trade could be made after the transaction in order to obtain currency in the preferred currency to deposit into the investor's account, which, as set forth herein, was well known by 2007.

33. It is important to note that the process is described only at a high level, in business method terms. There is no reference to any source code or specific programming necessary to perform the steps.

34. According to another embodiment, a "forward" rate (i.e., a currency conversion rate agreed to for a later date, e.g., a future settlement date) or a "spot" rate (an instant currency conversion rate if immediately executed) can be used for currency conversion. EX1001, 6:15-35. These are the only two actual rates described in the Specification. The patents give the example of a 30-day oil contract transaction, which would use a forward rate for 30 days, while a U.S. equity (e.g., stock) transaction would use the spot next rate (i.e., the currency conversion rate available immediately after the security is traded). EX1001, 6:33-35.

35. The currency conversion is described in the specification as follows:

> Price of Asset in Home Currency = (Price of Asset in USD)/(Rate of EUR/USD) (EX1001, 6:27-28.)

The currency conversion formula is extremely basic, and the Specification discloses no novel manner of calculating the preferred currency nor any particular computer programing or systems required to obtain the currency conversion.

36. Rate refers to the "prevailing exchange rate," which the patent states is obtained from a currency exchange server. The currency exchange server, which is not inventive, is responsible for providing current, real-time exchange rates. While it doesn't provide explicit technical details of a rate calculation process, the Specification states:

> Based on the preferred currency, a prevailing exchange rate is obtained at 306 from a currency exchange. In one embodiment, the prevailing exchange rate is provided by a participating financial agency that is willing to buy the Japanese yen and sell US dollars at the published exchange rate. (EX1001, 5:48-53.)

37. This passage suggests that the prevailing exchange rate can be determined by obtaining exchange rate information from a participating financial agency, which is willing to facilitate currency conversion at the published exchange rate. The patent doesn't go into further detail about how exactly the calculation is performed or how the exchange rates from various sources are aggregated to determine the prevailing exchange rate.

38. Once the prevailing exchange rate is obtained, the consolidated trading platform uses this rate to convert various costs and fees associated with the asset after settlement. These costs can include market costs, transaction fees, and other charges related to trading the asset. EX1001, 5:55-59. The patent states that the settlement details can be displayed to the trader in their preferred currency, thereby providing a clear understanding of the financial implications of the transaction. EX1001, 8:10-13.

39. Notably, there is no display interface disclosed in Specification, no picture or drawing of an interface provided in the figures, nor any particular details of how costs or fees are converted or displayed. Rather, the only manner of conversion and display described is obtaining an exchange rate from a currency exchange server and executing the basic formula listed above, and displaying the result.

40. Fig. 4 adds a limit order feature (406) to the process of Fig. 3.

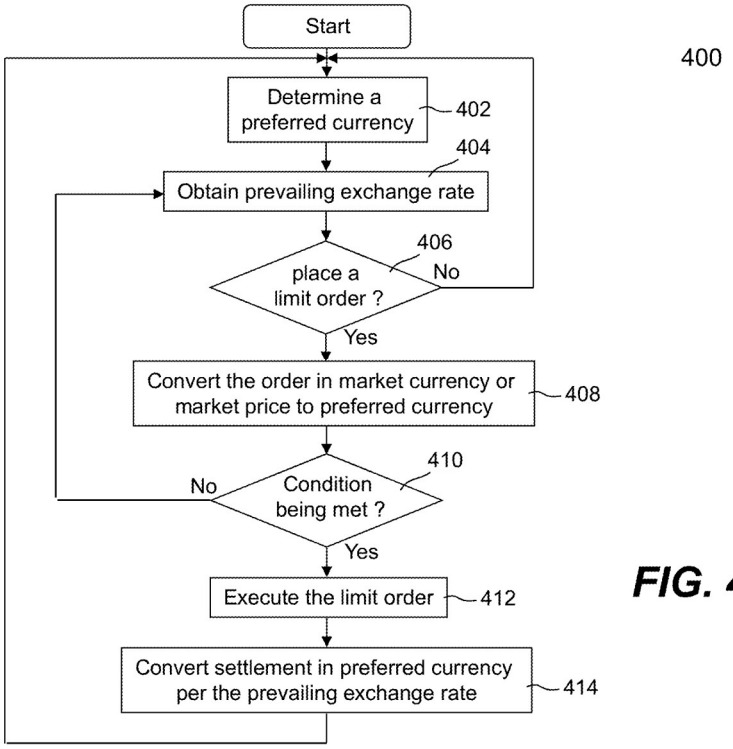


FIG. 4

41.

42. Limit orders were well known by the time of the ’107 patent. The only difference between known limit orders processes and the limit order of the ‘107 patent relates to the step of currency conversion. Namely, in a traditional limit order process, the limit price is set in the market currency. However, in the patent's process, the limit price is converted to the trader's preferred currency using an exchange rate. This allows for a comparison between the limit price in the trader's preferred currency and the converted current market price in the trader's preferred currency. Of course, the limit order actually placed in the market exchange must be priced in the market currency according to exchange rules.

43. Fig. 5 includes in process the common sense feature where both ends of a trade are using the same currency, and therefore, no conversion is necessary to transact.

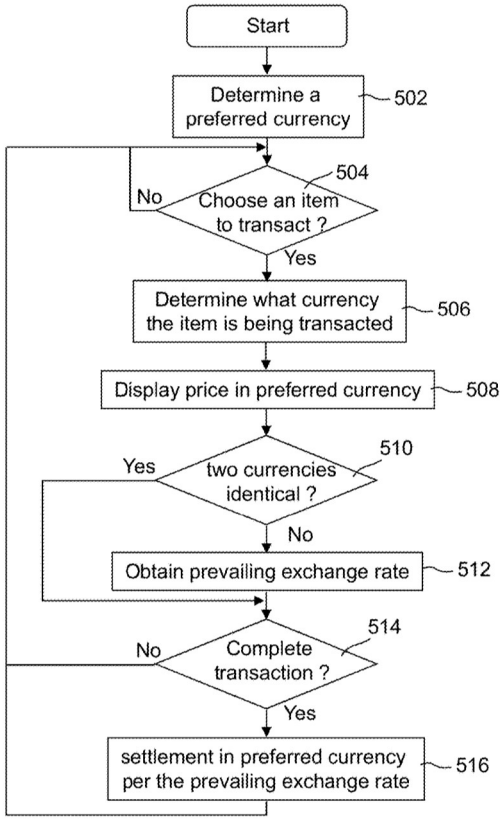


FIG. 5

44.

45. The process purportedly aims to match traders who trade in the same preferred currency for a specific asset, <u>which could be the market currency</u>, thereby eliminating the costs and risks associated with currency conversion. For example, if Trader A wants to sell shares of a stock and Trader B wants to shares

of the same stock, and both are trading in the same currency, the patent states that the system causes the trade to occur without involving currency conversion.

46. The ’107 patent does not provide specific technical details on how the shares are transferred directly between traders in the scenario where both traders are using the same preferred currency. The patent mentions only the concept of currency-neutral trading and the advantages it offers. The patent primarily emphasizes the ability to match traders with the same preferred currency. Of course, this would happen naturally in an exchange.

47. The patent does not provide details on how to affect a currency-neutral trade other than providing the parties settlement instructions:

> For example, two investors sharing Euro as a home currency, both elect to send orders at 40 euro/barrel. When a match occurs (e.g., on an over-the-counter market), one embodiment of the present invention notes that these two investors traded in the same home currency, as they both take Euro as their home currency. Instead of performing currency conversion trades, the system contemplated in accordance with the present invention simply sends appropriate settlement instructions to each so that the oil contracts can be exchanged directly. (EX1001, 7:42-52.)

48. It is my understanding that in the patented system, the broker performs the crossing. Thus, I understand that the patent does not teach that the consolidated trading platform can execute exchange trades (let alone how), but

suggests that a broker might directly cross both sides of a trade of an over-the-counter (OTC) asset when both sides are the broker's clients. By 2007, brokers could directly cross (execute) OTC trades without the need to send each side to the exchange.

B. Claims of the '107 Patent

49. The '107 patent includes 36 claims, 4 of which are independent. Although the claims have some differences, they are minor. For example, there are differences in the order of some of the steps or the way the limitations are worded. The claim sets, however, are substantially the same scope and the analysis of claim 1 is applicable to the analysis of the other independent claims. As described herein, all of the claim limitations are found in the prior art and the skilled person would have found the subject matter to be obvious prior to 2007. Claim 1 recites:

> 1. A method for providing a consolidated trading platform, the method comprising:
>
> providing a trading server coupled to one or more currency exchange servers and one or more market exchange servers;
>
> receiving in the trading server an indicator of a preferred currency from a trader;

causing a client computer associated with the trader to display at least an asset in the preferred currency while the asset is being traded in a market currency, wherein said causing a client computer associated with the trader to display at least an asset in the preferred currency comprises:

determining in the trading server a prevailing exchange rate between the preferred currency and the market currency, wherein the prevailing exchange rate is derived from all exchange rates obtained from the one or more currency exchange servers when the asset is displayed in the preferred currency; and

displaying all costs and fees in the preferred currency to own or sell the asset, wherein the all costs and fees are dynamically changed in accordance with the prevailing exchange rate updated constantly even when a market value of the asset remains unchanged, wherein the trader has certain knowledge of what to pay for the asset, or profit or loss when acting on the asset;

conducting in the trading server a transaction of the asset by transmitting a transaction request from the trading server to a market exchange server when the trader decides to proceed with trading the asset;

receiving a settlement notification in the trading server when the transaction of the asset is performed by the market exchange server in accordance with conditions set by the user, wherein the conditions include a price at which the asset is traded in the preferred currency, the trading server is configured to calculate the prevailing exchange rate from all exchange rates obtained from the one or more currency exchange servers right before the transaction takes place when the asset is not priced in the preferred currency, and executes the transaction with the calculated

prevailing exchange rate obtained at the transaction to prevent uncertainty in currency exchanges in another time; and

performing a currency conversion of some portion or all of the transaction from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate. (EX1001, 8:45-9:27.)

50. Claim 1 can be paraphrased as a method using a trading server that accepts parameters and displays trading information on a graphical user interface (GUI) of a trader's client computer. The server determines market rates (e.g., using a market data feed) and has some basic display features. The server can generate an order, receive settlement (i.e., execution) data, and convert the data to the selected currency. As demonstrated herein, all these features were conventional by 2007.

51. Claim 1 of the '107 patent includes other features relating to "constantly updating" the display and calculating a prevailing currency exchange rate based on multiple inputs. The '107 patent does not explicitly mention the concept of dynamically or automatically updating a display in real time or "constantly." The focus of the Specification is on conducting security transactions in a preferred currency, ensuring currency conversion at a transactional level, displaying costs

and fees, executing limit orders, and enabling currency-neutral trading. The specific details regarding real-time or constant updating of displays are not mentioned in the Specification.

52. The dependent claims do not add anything that appears to be novel. The four claim sets mirror each other respectively, with 2 sets being directed to methods and 2 others being directed to non-transitory computer medium claims. Claims 2-8 are representative of the dependent claims. Claims 2-8 recite the following:

> 2. The method as recited in claim 1, wherein said conducting in the trading server a transaction of the asset comprises:
>
> monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server; and
>
> performing the transaction of the asset only when the conditions have been met involving a retrieved price of the asset and an updated prevailing currency exchange rate from the one or more currency exchange servers at a minimum cost to the user right before the transaction takes place. (EX1001, 9:28-40.)

Claim 2 adds basic features to claim 1 that one would expect to be found in an electronic trading system by 2007, such as monitoring market conditions and currency prices, and performing basic limit order functions, i.e., executing the trade when conditions of the order are met. Claim 20 corresponds to claim 2.

> 3. The method as recited in claim 2, wherein said monitoring the conditions in conjunction with the one or more currency exchange server and the market exchange server further comprises:
>
> receiving periodically an updated price of the asset being traded from the market exchange server;
>
> receiving periodically an updated currency exchange rate from the one or more currency exchange servers when the preferred currency is not identical to the market currency; and
>
> determining whether the conditions have been met together with the updated price of the asset and the updated currency exchange rate. (EX1001, 9:41-53.)

Claim 3 adds features to claim 2 that appear to define how conditions are monitored. Claim 3 requires periodic checking of the market price and currency price (when the preferred currency is different than the market currency). Claim 21 corresponds to claim 3.

> 4. The method as recited in claim 1, wherein,
>
> when the preferred currency is identical to the market currency, the transaction is conducted directly between the trader and another trader selling or buying the asset without currency conversion. (EX1001,9:54-58.)

Claim 4 adds the limitation that no currency conversion is done if the preferred currency is the same as the market currency. Of course, trading systems prior to 2007 already made trades without currency conversion. Claim 22 corresponds to claim 4.

> 5. The method as recited in claim 4, wherein
>
> the transaction is conducted across at least two countries. (EX1001, 9:59-60.)

Claim 5 adds the feature to claim 4, which has no currency conversion, that the trade is across two countries. This covers the trader that is outside of the U.S. trading U.S. securities in U.S. Dollars. Of course, this was already being done prior to 2007. Claim 23 corresponds to claim 5.

> 6. The method as recited in claim 1, wherein said performing a currency conversion of some portion or all of the transaction comprises:
>
> receiving a set of conditions for the transaction to take place; and
>
> monitoring the prevailing exchange rate in conjunction with the one or more currency exchange servers and the market exchange server to ensure that the transaction only happens when the conditions are met with the prevailing exchange rate. (EX1001, 9:61-3:3.)

Claim 6 adds basic features one would expect to be found in an electronic trading system by 2007, such as receiving conditions, which could be limit order parameters, and monitoring market conditions and currency prices, and performing basic limit order functions, i.e., executing the trade when conditions of the order are met. Claim 24 corresponds to claim 6.

> 7. The method as recited in claim 6, wherein said monitoring the conditions comprises:
>
> determining how much of the asset has been transacted on a market exchange server; and
>
> determining when a price of the asset exceeds a predetermined or dynamically determined threshold value. (EX1001, 10:4-9.)

Claim 7 adds basic features to claim 6, and one would expect these features to be found in an electronic trading system by 2007. Claim 7 requires determining how much has been transacted and determining when a price exceeds a threshold value. Systems routinely determined how many shares were left in a limit order and monitored conditions in connection with the open part of the order. Dynamic

thresholds were well known before 2007, such as pegged orders or spreads. Claim 25 corresponds to claim 7.

> 8. The method as recited in claim 1, wherein the transaction includes first and second portions, and said performing a currency conversion of some portion or all of the transaction comprises:
>
> analyzing any purchases or sales which make up the transaction of the asset in the market currency to determine a first portion of the transaction that was bought or sold from another trader with the same preferred currency as the trader was performing the transaction; and
>
> performing the currency conversion only on a second portion of the transaction that was bought or sold from another trader with a different preferred currency. (EX1001, 10:10-23.)

Claim 8 also adds basic features one would expect to be found in an electronic trading system by 2007, such settling a transaction and doing currency conversion on a portion of the transaction. Claim 26 corresponds to claim 8.

53. The remaining claims can be grouped into 3 additional sets directed to different statutory categories of inventions, but the claims are substantially of the same scope as claims 1-8, meaning the salient features of the claims are identical or nearly identical. Claims 9-18 recite method claims while claims 19-36 recite non-transitory computer-readable storage medium claims with an executable software product (i.e., computer program products). The computer-readable storage medium claims are essentially the claimed methods recited as operations

stored on a computer to be executed to perform the same methods. Therefore, my reasoning set forth herein with respect to any particular claim of the ’107 patent may be equally applicable to another corresponding claim in a different one of the claim sets. I analyze each element of each claim individually below in Section VII.

C. Prosecution History of the ’107 Patent

54. I have been advised that the examination process, or prosecution history, of the application that led to the ’107 patent may be relevant to my analysis of the patentability of the claims.

55. I have been advised that the Application that became the ’107 patent was filed on April 18, 2007, and included 36 original claims. Original Claim 1 is representative of the originally filed independent claims:

> 1. A method for providing a consolidated trading platform, the method comprising:
> providing access to a trading server that is coupled to one or more currency exchange servers and one or more market exchange servers;
> receiving a preferred currency of a trader;
> determining whether an asset is being chosen for trading, wherein the asset is being traded in a market currency;

> conducting a transaction of the asset by transmitting a transaction request to a market exchange server when the trader decides to proceed;
> receiving a notification that the transaction of the asset was performed by the market exchange server; and
> performing a currency conversion of some portion or all of the transaction amount from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed through a currency exchange server. (EX1004 at 393.)

56. I have been informed that a restriction requirement was issued on March 22, 2010, asserting that claims 9-18 and 27-36 were different inventions than claims 1-8 and 19-26. EX1004 at 334. The Applicant responded by arguing as following:

> All of the claims in the present application recite the same claimed invention, namely a consolidated trading platform involving a trading server, one or more currency exchange servers, and one or more market exchange servers. FIG. 2A or FIG. 2B shows one embodiment that uses these three types of servers to accomplish a trading being marketed in different currencies, where a trading process is illustrated in FIG. 4. (EX1004 at 335.)

57. I understand the Examiner agreed with the applicant. EX1004 at 315.

58. I have been advised that a first Office Action on the merits issued on May 14, 2010, and all the claims were rejected. Notably, the claims were rejected as

being anticipated or obvious in view of U.S. Patent Publication 2006/10095361 to Rude.[1] EX1004 at 319.

59. I have been advised that in response to the rejection, the applicant filed amended claims on August 14, 2010. Claim 1 was amended as follows:

[1] The claims were rejected under 112 and 101 as well, but for the purposes of this opinion, I have focused on the prior art rejections.

1. (*Currently amended*) A method for providing a consolidated trading platform, the method comprising:

~~providing access to~~ establishing a trading server coupled to one or more currency exchange servers and one or more market exchange servers;

receiving in the trading server an indicator of a preferred currency ~~of~~ from a trader;

determining whether an asset is being chosen for trading, wherein the asset is being traded in a market currency but displayed in the preferred currency regardless the asset is traded in the preferred currency or the market currency;

conducting a transaction of the asset by transmitting a transaction request from the trading server to a market exchange server when the trader decides to proceed;

receiving a notification ~~that~~ when the transaction of the asset ~~was~~ is performed by the market exchange server in accordance with conditions set by the user, wherein the conditions include a price at which the asset is traded, the trading server determines first a prevailing exchange rate among the currency exchange servers in favor of the user and executes the transaction with the prevailing exchange rate to prevent uncertainty in currency exchanges in another time; and

performing a currency conversion of some portion or all of the transaction ~~amount~~ from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed ~~through~~ by ~~a~~ the prevailing exchange rate~~currency exchange server~~.

60.

EX1004 at 295.

61. A final rejection was issued on October 27, 2010. EX1004 at 276. Amendments were made on March 25, 2011 and filed with an RCE. EX1004 at 252. Claim 1 was further amended as follows:

1. (*Currently amended*) A method for providing a consolidated trading platform, the method comprising:

~~establishing~~ providing a trading server coupled to one or more currency exchange servers and one or more market exchange servers;

receiving in the trading server an indicator of a preferred currency from a trader;

determining in the trading server whether an asset is being chosen for trading, wherein the asset is being traded in a market currency but displayed in the preferred currency regardless of whether the asset is traded in the preferred currency or the market currency;

conducting in the trading server a transaction of the asset by transmitting a transaction request from the trading server to a market exchange server when the trader decides to proceed;

receiving a settlement notification in the trading server when the transaction of the asset is performed by the market exchange server in accordance with conditions set by the user, wherein the conditions include a price at which the asset is traded in the preferred currency, the trading server determines ~~first~~ a prevailing exchange rate ~~among~~ from the currency exchange servers in favor of the user just before the transaction takes place when the asset is not priced in the preferred currency, and executes the transaction with the prevailing exchange rate obtained at the transaction to prevent uncertainty in currency exchanges in another time; and

performing a currency conversion of some portion or all of the transaction from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed by the prevailing exchange rate.

62.

EX1004 at 253.

63. Applicant made the following arguments:

It is commonly known that a profit or a loss of trading a foreign stock is subject to the currency exchange rate at the time the trading takes place. As amended, Claim 1 explicitly indicates that when a trader decides to

trade, for example, a foreign stock, a prevailing exchange rate is determined at a transactional level. Paragraph [0005] explicitly describes what the problem is with the prior art system. The definition of "transactional" is commonly defined to be an instance or process of transacting something (see \.\/WW.dictionary.com) Paragraphs [0024] and [0025] describe one embodiment of carrying out a transaction of obtaining a prevailing currency exchange rate at the instance of the transaction. As the currency exchange rate changes every minute, it is very important to lock up a best exchange rate for a foreign stock when trading the stock takes place so as to prevent uncertainty in the currency exchange rates in another time.

In contrast, Rude shows a trading system facilitating trading of securities priced in currencies other than a trader's operating currency. As described in paragraph [0019], Rudy [sic] explicitly specifies that the currency exchange happens AFTER the transaction took place, namely at settlement. Paragraph [0052] and FIG. 4 and FIG. 5 further show Rude teaches explicitly getting the foreign exchange rate from FOREX (a foreign exchange market). It is well known, FOREX provides an average conversion rate, not a prevailing currency exchange rate at the instance of trading a foreign security. As described above, an exchange rate could change every minute. An average conversion rate is not in the best interest to the trader at the time of trading a foreign security.

The Applicant submits Rude does not teach nor suggests getting a prevailing exchange rate from the currency exchange servers in favor of the user just before the transaction takes place when the asset is not priced in

the preferred currency, and executes the transaction with the prevailing exchange rate obtained at the transaction to prevent uncertainty in currency exchanges in another time as recited in Claim 1. In one perspective, Rudy [sic] teaches away from Claim 1 as amended by explicitly teaching that the currency exchange happens AFTER the transaction. Accordingly, the Applicant submits Claim 1 as amended shall be allowable over Rude. (Response at 15-16 (underlining in original).) (EX1004 at 266-67.)

64. In response, the Examiner issued a new Office Action on October 7, 2014. EX1004 at 254. The Office Action included no prior art rejections but failed to provide reasons for the withdrawal of the rejections. Prosecution proceeded for three more years focusing entirely on 101 rejections, including *Alice*-type rejections. The claims were amended 5 times more. On January 22, 2018, the applicant added the following language to the independent claims:

> displaying all costs and fees in the preferred currency to own or sell the asset, wherein the all costs and fees are dynamically changed in accordance with the prevailing exchange rate updated constantly even when a market value of the asset remains unchanged, wherein the trader has certain knowledge of what to pay for the asset, or profit or loss when acting on the asset;

65. EX104 at 47.

66. The Applicant also made the following argument:

> One of the important features or limitations recited in Claim 1 is the specially designed mechanism to derive a prevailing exchange rate from all

> exchange rates obtained from one or more currency exchange servers. The exchange rate is used to display all costs and fees in a local (preferred) currency to own or sell an asset, wherein the <u>all costs and fees are dynamically changed in accordance with the prevailing exchange rate updated constantly even when a market value of the asset remains unchanged</u>. As a result of using the trading system per the instant application, the trader can be assured what to pay for an asset, or profit or loss when acting on the asset. Further, unlike the prior art system that settles a transaction at the end of the day, a prevailing exchange rate is derived again prior to a transaction on an asset takes place. The trader can be assured again of the financial result at the moment without worrying about anything that could happen after the transaction took place. (EX1004 at 60 (underlining added).)

67. I read this argument as highlighting real-time monitoring or current exchange rates. Of course, electronic trading systems prior to 2007 monitored market and currency prices in real-time. Furthermore, the applicant appears to argue that the currency rate must be at the time of the transaction, rather than at the end of the day. This makes sense since the currency price might change after the transaction is made. Therefore, the parties to the transaction must agree to use the real-time price at the time of the transaction (or right before since the transaction will be submitted to a broker). The "spot" market, which existed long

before 2007, allowed parties to agree on a currency price. As described by Luca: "A *spot deal* takes place between two parties who deliver a certain amount of different currencies to each other, based on an agreed exchange rate, within two business days of the deal date." (EX1028 at 91.) This means that the rate is locked in but the exchange takes place later, within two days.

68. The 101 rejection was withdrawn and a Notice of Allowance was issued on June 18, 2018, allowing all claims. As regards the prior art, the following reasons for allowance were given:

> The prior art of record fails to teach a method for providing a consolidated trading platform comprising the steps of determining in a trading server a prevailing exchange rate between a preferred currency and a market currency, wherein the prevailing exchange rate is derived from all exchange rates obtained from a one or more currency exchange servers when the asset is displayed in the preferred currency; displaying all costs and fees in the preferred currency to own or sell the asset, wherein the all costs and fees are dynamically changed in accordance with the prevailing exchange rate updated constantly even when a market value of the asset remains unchanged; receiving a settlement notification in the trading server when the transaction of the asset is performed by the market exchange server in accordance with conditions set by the user, wherein the conditions include a price at which the asset is traded in the preferred currency, the trading server is configured.

69. I read this as the Examiner basically summarizing all the features of the claims without highlighting any particular feature as a point of novelty.

70. I believe the skilled person would understand that the patent was allowed over the prior art because the ’107 patent claims used current exchange rates rather than FOREX average rates.

V. LEVEL OF ORDINARY SKILL AND RELEVANT TIME

71. I have been advised that “a person of ordinary skill” is a hypothetical person who is presumed to have known the relevant art at the relevant time. Factors that may be considered in determining the level of ordinary skill in the art may include: (A) "type of problems encountered in the art;" (B) "prior art solutions to those problems;" (C) "rapidity with which innovations are made;" (D) "sophistication of the technology; and" (E) "educational level of active workers in the field. In a given case, every factor may not be present, and one or more factors may predominate." *In re GPAC*, 57 F.3d 1573, 1579, 35 USPQ2d 1116, 1121 (Fed. Cir. 1995); *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962, 1 USPQ2d 1196, 1201 (Fed. Cir. 1986); *Environmental Designs, Ltd. V. Union Oil Co.*, 713 F.2d 693, 696, 218 USPQ 865, 868 (Fed. Cir. 1983). "[I]n many cases a person of ordinary skill will be able to fit the teachings of multiple

patents together like pieces of a puzzle." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 42 (2007).

72. I have been advised that, for the purposes of my analysis, I should assume that the relevant time is April 2007.

73. By virtue of my education, experience, and training, I am familiar with the ordinary level of skill in the art of the ’107 patent. In my opinion, the person of ordinary skill would include someone who had, through education or practical experience, obtained a working knowledge of electronic trading systems from both the computer science and finance perspectives. This would include someone who had, through education or practical experience, the equivalent of a bachelor’s degree in computer science, information systems, or a related field, and at least two years of work experience developing electronic trading systems. This would also include a person who had, through education or practical experience, the equivalent of a bachelor’s degree in finance, economics, or a related field, and who had obtained knowledge of computer systems equivalent to that described above. I believe that I qualify as a person skilled in the art for the ’107 patent.

74. I note that the disclosure of ’107 patent is at a particularly high level of abstraction with respect to implementation details and therefore, the skilled person need not necessarily have particular coding experience in order to understand and practice the invention of the ’107 patent, nor to understand the

prior art. Rather, the person of ordinary skill would have been familiar with currency trading practices and the aspects of electronic currency trading systems existing in and before 2007, and/or analogous practices and electronic systems used for other asset classes. The skilled person would have readily understood the basic components of a trading system such as the graphic user interface and connectivity with broker and market computers for sending and receiving market data (including currency data) order data and execution or settlement data.

VI. THE STATE OF THE ART

75. I reviewed the patent claims and compared them to the prior art. In doing so, I applied the plain and ordinary meaning of the words of the claims as would be understood by the skilled person, except I also considered the arguments made in the prosecution of the ’107 patent that a FOREX *average* rate is not a “prevailing” rate.

76. In my opinion, and as explained in further detail below, the claims of the ’107 patent, viewed as a whole, do not identify anything new or significantly different from what was already known to individuals of ordinary skill in the field in the early 2000’s, and certainly prior to the filing date of the ’107 patent, April 18, 2007.

77. In the following sections, I provide a brief overview of the state of art in electronic trading of assets and currencies. The overview is based on my knowledge and experience and on the references considered, which are listed in Appendix A, which confirmed my understanding of the asset and currency trading field before April 18, 2007. I may cite to certain documents that published after April 18, 2007, but describe the state of the art prior to April 18, 2007. These documents also confirm my understanding, based on my experience in the field, of the state of the art prior to April 18, 2007.

A. Background of Currency Trading

78. Currency conversion is ancient. Currency trading is itself a longstanding business practice stretching back millennia. Money was coined by the Egyptians over 4500 years ago, and foreign exchange markets can be traced back to the ancient Middle East, where money changers initiated the exchange of coins. EX1028 at 8. One of the most famous channels of foreign exchange occurred on the "Silk Road." EX1027 at 24.

79. The key roles in the foreign exchange market were dealers (*e.g.,* banks), customers who ultimately use the currency for purchases or speculation (I may also refer to them as traders), and intermediaries (*e.g.,* brokers and various computer systems). *See* EX1029 (Rime), 473. Dealers, also known as market makers, quote currency pairs and continually buy and sell currencies to earn the "spread" (*i.e.*, the

difference between the bid and ask prices), thus providing liquidity in this off-exchange market. *See* EX1029 (Rime), 476-77. Dealers effectively set the prices in the market in competition with each other. They advertised their own rates, which fluctuated over time based on a variety of factors.

80. As computer technology developed during the second half of the twentieth century, several types of electronic systems were developed to support or replicate human-performed functions of the currency trading market. Using available technology, dealers set and advertised their quotes (*i.e.*, buy and sell prices for various currency pairs, generally associated with a size), and customers or other dealers either agreed to trade at the quoted price or proposed a different one. Early electronic trading systems provided price quotes on rudimentary market data terminals while improvements in technology eventually transformed these early systems into fully electronic markets with online negotiation and automated trade execution available around the clock. EX1029 (Rime), 479.

81. For example, the Reuters Market Data Service (RMDS) and other data vendors introduced electronic platforms in the 1980's which allowed dealers to continuously update and advertise their price quote information in real-time. EX1029 (Rime), 479. Continuing into the 1990's, electronic trading systems

developed even further, providing more expansive trading capabilities such as providing quote data while simultaneously facilitating the trades themselves. Variations of trading systems were developed for all dealer and trader types. Some systems introduced during this period provided prices set by other trading venues (thus operating as a "crossing network"), while others acted as market makers themselves (determining their own prices and serving as a counter party to trades) and allowed for price discovery between parties (*e.g.*, by receiving limit orders from customers setting their own price). *See* EX1024-1026, EX1029.

82. A variety of standard order types were available to facilitate different types of trade requests. These order types were common in many other types of markets, and their operation in the foreign exchange market was not materially different from their operation in any other market. A broker receiving any of these order types would typically determine whether the order could be filled based on other outstanding orders; if so, the trade was made, and if not, the order would be maintained by the broker until it could be filled or until it expired.

83. A well-known type of trade order is the limit orders, which allows traders to request a purchase or sale at their own price, often referred to as the "limit price."

84. The first instances of electronic trading involved simple electronic order submission and execution systems. The New York Stock Exchange (NYSE)

introduced the "DOT" (Designated Order Turnaround) system in 1969, allowing member firms to electronically submit and execute orders. In the 1970s, the NASDAQ (National Association of Securities Dealers Automated Quotations) became the first electronic stock market, using a computerized system to display and execute trades.

85. With the advent of computers and electronic trading platforms, financial institutions gained the ability to process and display real-time exchange rate information more efficiently. Computer networks enabled traders to access and react to market data in a matter of seconds.

86. The introduction of Bloomberg terminals in the 1980s is well known as revolutionizing financial information dissemination. These terminals provided traders and analysts with real-time data on various financial instruments, including currency exchange rates.

87. In the 1980s and 1990s, alternative trading systems (ATSs) emerged as electronic trading platforms that operated alongside traditional exchanges. They matched buyers and sellers outside the traditional exchange model, sometimes in anonymous dark pools. Examples include Instinet (founded in 1969), which pioneered electronic trading for institutional investors, and Island ECN (founded in

1996). Electronic Communication Networks (ECNs) became popular in the late 1990s and early 2000s. These platforms connected buyers and sellers directly, allowing for more transparent and efficient trading. Examples include Archipelago (ArcaEx) and Island ECN. ECNs played a significant role in the shift toward electronic trading.

88. The widespread adoption of the internet in the late 20th century further accelerated the availability of real-time financial data to a broader audience. Online trading platforms and financial websites began offering up-to-the-minute exchange rate information.

89. Throughout the early 2000s, various trading platforms and systems continued to evolve. Exchanges like NYSE and NASDAQ introduced electronic trading components alongside traditional trading floors. The proliferation of electronic trading extended to various asset classes, including equities, options, and futures.

90. The foreign exchange (FOREX) market also saw a move toward electronic trading. The Continuous Linked Settlement (CLS) system, launched in 2002, aimed to reduce settlement risk in the global FX market. Electronic currency trading platforms like EBS (Electronic Broking Services) and Reuters Dealing emerged as major players.

91. The mid-2000s saw the rise of high-frequency trading, where algorithms executed trades at extremely high speeds. High frequency trading (HFT) firms utilized electronic trading systems to capitalize on tiny price discrepancies, for example, arbitrage trading. This sparked debates about market stability and fairness.

92. Also during the mid-2000s, various electronic trading platforms, order management systems (OMS), and execution management systems (EMS) were already in use by market participants. Prior to 2007, the market was flooded with systems that allowed traders to receive real-time data and execute orders on multiple exchanges simultaneously. EX1030. By 2005, OMS's had automated nearly every aspect of the trading process including trading domestic and international equities, futures, and foreign exchange. *Id*.

93. Thus, at the time of the invention, the market was awash with fully integrated trading systems providing real-time access to all sorts of trading data from myriad sources, including brokers, exchanges, ATS's, ECNs, FOREX, and other trading systems.

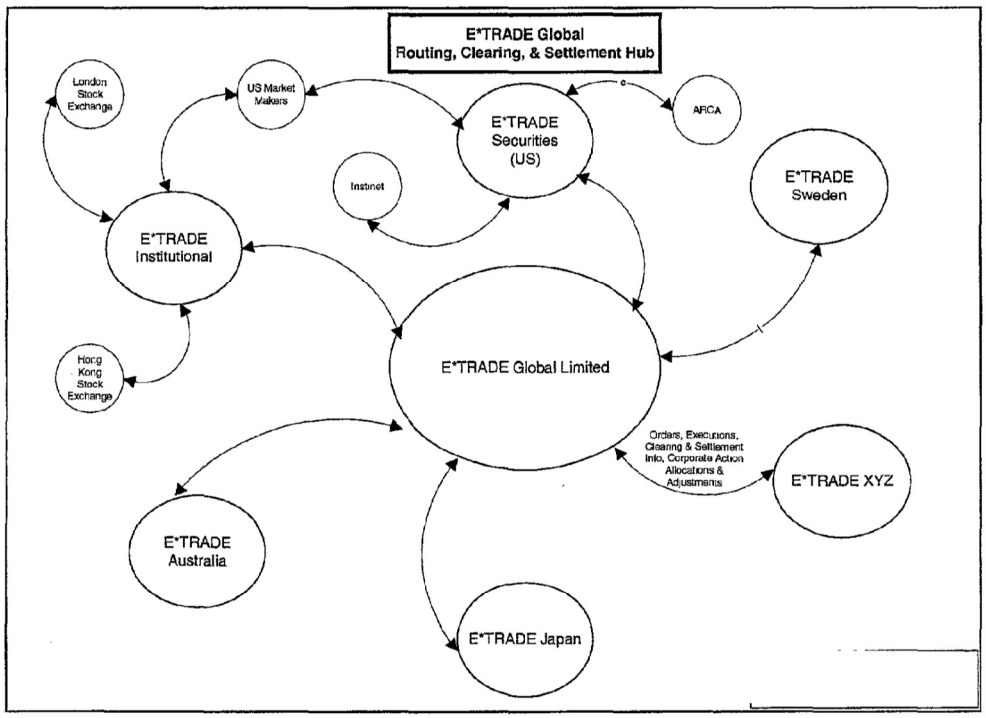
B. Prior Art References

94. In the following sections, I analyze prior art relevant to the claims of the '107 patent. As part of this analysis, I evaluate each piece of prior art both as a

whole, and for its individual teachings, and explain what specific disclosures would have taught those of ordinary skill in the art. My descriptions of the disclosures of the prior art are from the perspective of how one skilled in the art would have read the references and viewed their teachings.

1. U.S. Patent Application Publication 2002/0087454 to Calo et al. ("Calo"), EX1005

95. Calo was filed on January 24, 2001, and is prior art to the '107 patent under 35 U.S.C. § 102(b). Calo was originally filed by E*TRADE Group Inc. and discloses features of the E*TRADE Global network.



96. FIGURE 1

97. Calo was not cited or considered during the prosecution of any of the '107 patent.

98. Calo discloses a method for placing a securities trading order on a securities exchange. Calo ¶ 0030. The method includes a step of determining a net settlement amount for the securities trading order in a local currency (i.e., market currency) of the securities exchange and in response to the determined net settlement amount, automatically placing a foreign exchange trading order to convert the determined net settlement amount from the local currency to an operating currency (e.g., a preferred or domestic currency) of a party for whom the securities trading order was placed. Calo ¶¶ 0030, 0057.

99. Calo discloses a method of performing a cross-border trade of a security or commodity, including (i) accepting an electronic transaction order from a first customer in a first country to purchase a stock for a first amount (e.g., quote price), the stock being available on a first financial exchange; (ii) checking an account balance in a customer account for said first customer to determine if the customer account balance is at least equal to said first amount; (iii) electronically transmitting the transaction order to a global hub being electronically connected to at least a second financial exchange and the first financial exchange; (iv) purchasing the stock

on the first financial exchange; (v) deleting a second amount from the customer account (e.g., execution price). See Calo claim 14. The first financial exchange is in a second country different from said first country. See Calo claim 15. The second amount correlates to the first amount. The customer account is in a first currency (e.g., AUD) and a second currency (e.g., USD) is used to purchase the stock on the first financial exchange. See Calo claim 18. And the global hub converts the first currency to the second currency. See Calo claim 19.

100. Calo discloses, among other things, "a customer in Australia receives from E*TRADE Global a preview price on a real-time basis for a U.S. equity (such as an individual stock or mutual fund share). A customer normally is expected to place orders based on the currency of the target market in which the security trades. A price in the native currency may also be provided, with this price being based on both the real-time quote for price on the U.S. equity, as well as a real-time conversion from the foreign exchange rates. In any case, the estimated prices are computed *automatically* through, by, or with information obtained through E*TRADE Global." Calo ¶ 0030 (emphasis added).

101. Accordingly, the concept of automatically displaying to a trader real-time quotes in a foreign currency of a U.S. equity, with a real-time conversion using real-time foreign exchange rates (i.e., a prevailing rate), was disclosed by Calo. This is exactly the point of the '107 patent.

102. Calo further discloses that "immediately after the equity order is executed and reported to E*TRADE Global, E*TRADE Global transacts a foreign exchange order prior to confirming the trade back to E*TRADE Australia in step 310. At step 308, E*TRADE Global transmits an order to the foreign exchange facility to sell Australian dollars. At step 309, the foreign exchange facility confirms the FX deal to E*TRADE Global. Because of the timing of step 307, it is assumed that the foreign exchange facility can match the value date of the currency transaction to the settlement date of the security transaction. At step 310, the trade is confirmed to E*TRADE Australia with the USD execution price and principal amount as well as the locked-in AUD value of the trade. At step 311, E*TRADE Australia gives confirmation to the customer of the purchase. This confirmation includes E*TRADE Australia's commissions and fees. Calo ¶ 0030 (underlining added).

103. Accordingly, the concept of executing a trade using real-time foreign exchange rates (i.e., a prevailing rate) before the settlement is returned to the trader (i.e., at the time of the transaction), was disclosed by Calo. Calo discloses to perform currency conversion on a transactional level, just like disclosed and claimed in the '107 patent. I should point out that the locked-in rate does not mean that the display

does not change when the rates change, but rather that the rate, which may be continuously changing, becomes locked-in for the purpose of the transaction at the time the trader makes the trade.

104. Calo further discloses that "E*TRADE Global includes the local affiliates which interface to E*TRADE Global via a global affiliate interface, which also interfaces to the E*TRADE Global FX facility and its brokerage services systems. The E*TRADE Global FX facility is responsible for the foreign exchange procedures and therefore receives global foreign exchange rates from E*TRADE Market Data Services (which in turn receives foreign exchange quotes from a provider). The E*TRADE Global FX facility also maintains FX Margin management data, and can receives a contingency foreign exchange contribution via a Web Server connected to the internet. The E*TRADE Global FX facility communicates retail foreign exchange rates to each local affiliate through E*TRADE global affiliate interface." Calo ¶ 0050 (underlining added). Thus, Calo discloses using multiple rates and naturally, would provide the best rate to the customer.

105. Calo also discloses "generating a corresponding foreign exchange order on a real-time basis after an equity order executes by differentiating between payment and settlement currencies on an order record." Calo ¶ 0057.

106. Accordingly, the concept of calculating the prevailing currency exchange rate from a plurality of inputs rates was disclosed by Calo.

107. Calo discloses the same three-tiered network, including the exchange and the broker, as in the '107 patent.

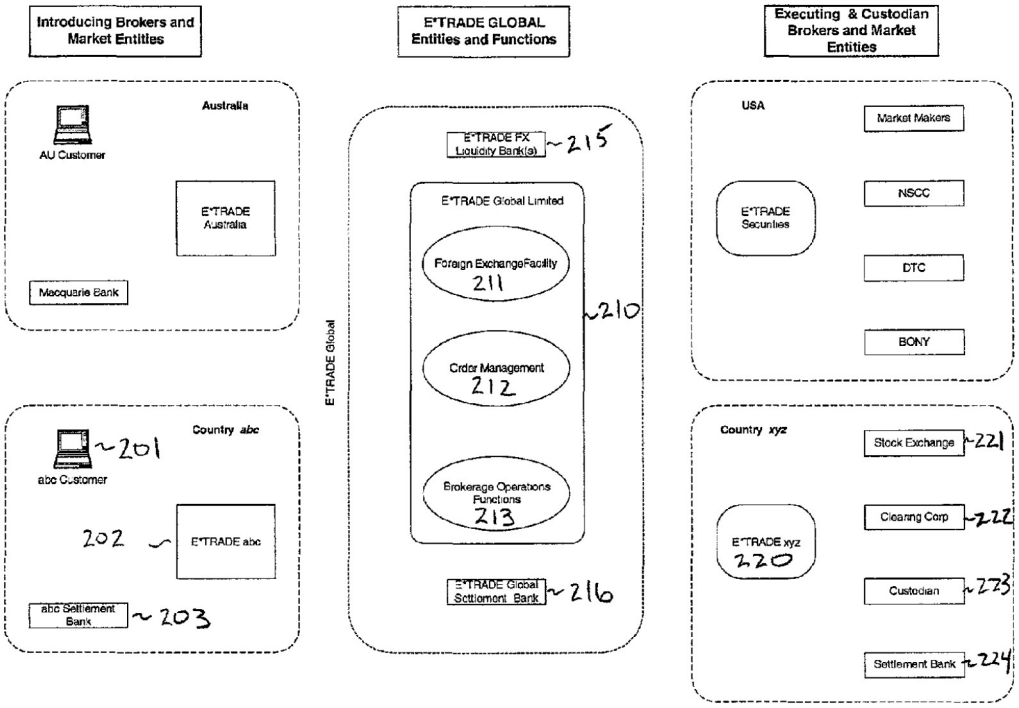


FIGURE 2

108.

109. Calo describes an order management system (OMS) responsible for a many, if not most, well-known trading features. As I discussed above in Section

VI.A, OMSs were ubiquitous by 2007 and enabled all the known processes of electronic trading.

110. The Order Management System, referenced in FIG. 2 as E*TRADE Global Trading, handles the routing and execution reporting of cross-border transactions (securities and currency) to, as needed, the appropriate affiliate and foreign exchange facility. It therefore is responsible for: 1) routing all non-domestic customer securities orders from the introducing broker/dealer to the executing broker/dealer; 2) routing order status (executions and expirations) from the executing broker to the introducing broker/dealer including local currency value of executions; 3) defining which instruments can be traded in the network (for example, only over-the-counter equities might be traded through the system); 4) identifying and defining the destinations for certain types of instruments if it is not one of the affiliate broker/dealers. Currency transactions, for example will be routed to the foreign exchange facility; 5) managing the routing (and re-routing) parameters by instrument including currencies; 6) monitoring order and execution activity, including accompanying foreign exchange transactions; 7) reconciling orders and trades, including foreign exchange; 8) generating a corresponding foreign exchange order on a real-time basis after an equity order executes by differentiating between payment and settlement currencies on an order record; 9) defining and developing the procedures for managing exceptions which occur in the order and execution

process; adjusting open orders for corporate actions, expirations, and exercises; 10) *monitoring open orders against currency fluctuations* and notifying the introducing brokers when this exposure occurs; 11) validating cross-border orders against affiliates' positions and trading limits; 12) routing orders based on parameters per security traded in the Global network; 13) automatically placing any foreign exchange deal after execution of an equity trade; 14) placing speculative foreign exchange transactions for cash management purposes; 15) reconciling trades; 16) managing open orders such as expirations and adjustments for corporate actions; and 17) ordering and filling adjustments. Calo ¶ 0057 (emphasis added).

111. Calo also discloses that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders. With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater. A limit order can potentially be left open for 60 days in the US market, for example, and currency rates can move substantially within that time frame." ¶ 0070 (underlining added). Calo teaches to reduce the risk by "marking-to-the market all open limit orders" on a regular basis. *Id.* "Mark-to-market" is a well-known practice of valuing assets or liabilities based on their current market value or exchange rates.

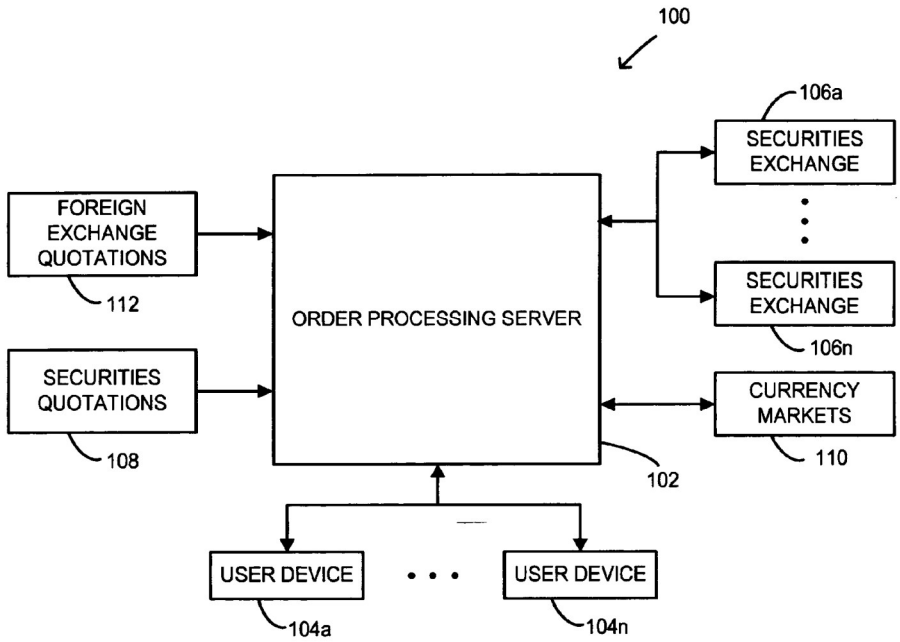
112. Accordingly, Calo discloses all of the trading system features disclosed and claimed in the ’107 patent, including receiving conditions for a trade, monitoring the exchanges, updating a limit order price based upon exchange rates, receiving settlement data, displaying it to the user, and automatically converting the currency. Also, OTC orders can be directly matched in Calo’s trading system. I note, as discussed below in section VII, to the extent any claim limitation is missing from Calo, it is found in other references.

2. U.S. Patent Application Publication 2006/0095361 to Rude (“Rude”), EX1006

113. U.S. Patent Application Publication 2006/0095361 is titled “Methods and apparatus for automatic settlement of foreign securities trades in trader's operating currency.” Rude was published on May 4, 2006, and I understand that it is prior art under 35 U.S.C. §§102(a) and (e).

114. As described above, this was the closest prior art reference citing during prosecution of the ’107 patent was Rude, but in my opinion, the Examiner misunderstood the disclosure of Rude as it relates to using a “prevailing exchange rate.”

115. Rude discloses system and method for handling foreign securities trading transactions. Rude discloses the basic tiered system of the ‘107 patent including a market exchange and a currency exchange.



116.

117. Rude discloses <u>automatically converting price quotations</u> from foreign securities exchanges into the trader's *operating* currency (i.e., "preferred currency") and displays them to the trader accordingly. Rude ¶ 0020. When a trader places an order for a foreign security, the system executes the order in the local currency of the foreign exchange. *Id*. It then determines a net settlement amount based on the execution price and expenses. *Id*. Therefore, it discloses calculating costs and fees for a trade.

118. The net settlement amount is automatically converted to the trader's operating currency through a forward foreign exchange transaction, effectively

mitigating foreign exchange risk. *Id.* The system offers options for traders to customize their preferences regarding currency display and automatic foreign exchange conversion. Rude ¶ 0024. Overall, Rude teaches to provide a seamless and transparent foreign securities trading experience by simplifying currency conversion and managing foreign exchange transactions automatically. Rude ¶ 0060.

119. Accordingly, Rude discloses the basic system of the '107 patent.

120. Rude discloses that a system in which a securities trading order for a foreign security is received. "Each order may include details of the order, including: an identification of the customer, an identification of the security to be purchased or sold, and the size of the order. Other terms may also be provided (e.g., Such as an identification of whether the order is a market or <u>limit order</u> or the like). In the case of a limit order, additional information may be provided, such as the <u>limit price</u>." Rude ¶ 0051 (underlining added). Rude discloses that the order processing server places a trading order for the foreign security in question with the securities exchange on which the security trades. Rude ¶ 0052. "In the event that the order is a limit order, <u>the limit price indicated in the user's operating currency may be translated to the local currency of the Securities exchange in accordance with the foreign exchange rate information received</u>." (underlining added)

121. Rude discloses the foreign exchange transaction may be a forward rate or a spot rate:

> In response to the determination of the net settlement amount, the process 400 advances to 410, where the order processing server 102 automatically, and without further input from the user beyond the original placement of the securities order at 404, places a foreign exchange order with a currency market 110 to convert the net settlement amount to the user's operating currency. For example, where the underlying securities trading order was for the purchase of a security, the automatically placed foreign exchange trading order may be to buy forward the local currency as of the date of settlement (typically three days after execution) for the securities trading order. Alternatively, the foreign exchange trading order may be a purchase of the local currency on the spot market. In some embodiments, the foreign exchange order may be placed by the server 102 immediately after the net settlement amount is determined. Rude ¶ 0054 (underlining added).
>
> As another example, if the underlying securities trading order was for the sale of a security, the automatically placed foreign exchange trading order may be to sell forward the local currency as of the settlement date for the securities trading order, or alternatively the foreign exchange trading order may be a sale of the local currency on the spot market. Rude ¶ 0055 (underlining added).

122. Thus, Rude discloses using rates that were not the average FOREX rate.

123. Accordingly, Rude, like Calo, discloses all of the trading system features disclosed and claimed in the ’107 patent, including receiving conditions for a trade, monitoring the exchanges, updating a limit order price based upon exchange rates, receiving settlement data, displaying it to the user, and automatically converting the currency.

124. It is my understanding that Rude was considered by the Examiner during the prosecution of the ’107 patent, but Calo was not. Therefore, I use Calo below as the primary references. Rude, however, discloses all the principal features of the claims of the ’107 patent in my opinion.

3. U.S. Patent Application Publication 2002/0023053 to Szoc et al. (“Szoc”), EX1007

125. Szoc published on February 21, 2002, and is prior art to the ‘107 patent under 35 U.S.C. § 102(b). Szoc was not considered during the prosecution of any of the ‘107 patent.

126. Szoc discloses a system and method for providing real-time foreign exchange information, cross-border payments, and other financial information and services to clients over the Internet. Real-time foreign exchange rate quotes are provided that may be relied on in timing international transactions. Single or

multiple transactions are automatically converted from a consumer's native currency to any of a plurality of foreign currencies and vice versa, thereby simplifying and facilitating these international transactions. Szoc, Abstract.

127. Szoc discloses the volatile nature of exchange rates impedes what could otherwise be straightforward international transactions. Exchange rate volatility introduces financial risk and uncertainty, which can have large negative consequences to parties involved in a cross-border or international transaction. This risk is absent in transactions in which the currencies of parties to the transaction are the same. In short, the element of risk makes international transactions fundamentally different from other types of transactions. Szoc ¶ 0009.

128. Szoc discloses that real-time foreign exchange rate quotes may be provided that <u>may be relied upon by consumers</u> for a predetermined period of time. In one embodiment, quotes derived from spot rates are provided. Szoc ¶ 0018. In other words, the rates are locked in.

129. Szoc discloses displaying conditions of a transaction along with currency rates to the user. Szoc discloses an interface that includes the scrolling quote bar providing a list of the foreign exchange rates received by the web server from a quote server. Rates are displayed for various currencies with respect to the

selected client's native currency. The scrolling quote bar is customizable at a discretion of the client, whereby the client may change the number of rates displayed, the manner in which they are displayed, the client's native currency, etc. The scrolling quote bar may display real-time, constantly-changing rates. See Szoc, FIGS. 4A and 4B and ¶ 0083 (underlining added). Thus, Szoc discloses the benefits of constantly updating rates in real time, such as reducing risk caused by currency conversion. Szoc displays settlement in the preferred currency. Szoc ¶0084.

130. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶0101.

131. Szoc also discloses that it is desirable to allow a client to choose whether or not to enter into a transaction based on the exchange rate. "[T]he client may choose to execute a transaction following receipt of a favorable exchange rate quote with respect to the transaction. As long as an exchange rate quote has not yet

expired at a time of execution of a transaction, the transaction will receive the benefit of that rate quote." Szoc ¶ 0102 (underlining added).

132. Thus, Szoc teaches that to identify and use a favorable exchange rate, i.e., a prevailing rate, is beneficial, and it would have been obvious to the skilled person to apply the teachings of Szoc to the systems of Calo or Rude.

4. U.S. Patent No. 4,251,867 to Uchida et al. ("Uchida"), EX1008

133. Uchida issued on February 17, 1981, and is prior art to the '107 patent under 35 U.S.C. § 102(b).

134. Uchida is directed to a money exchanger apparatus including an exchange rate input means adapted to enter exchange rates used when exchanging moneys or securities of a single country or plural countries other than a specific country into the currency of the specific country. Uchida discloses a numerical value information input means adapted to enter numerical information such as the amount and kind of moneys or securities to be exchanged, memory means for storing numerical value information, and computing means for calculating the amount and kind of currency of the specific country from the numerical value information indicative of moneys or securities of the country other than the specific country. The information being delivered by the numerical information storing

memory means, and from the exchange rate stored in said memory means. A disbursing means pays out exchange money of the specific country based on the results of computations performed by the computing means. Uchida, Abstract.

135. Uchida shows how well-known many exchange system were prior to 2007.

5. U.S. Patent Application Publication 2002/0010673 to Muller et al. ("Muller"), EX1009

136. Muller published on January 24, 2002, and is prior art to the '107 patent under 35 U.S.C. § 102(b).

137. Muller discloses real time currency exchange price in the market maker context. A computer system automatically calculates a real time bid and ask – a prevailing exchange rate.

138. Muller shows it was well-known to use real time currency exchange prices in a trading system prior to 2007.

6. U.S. Patent Application Publication 2006/0124729 to Martin ("Martin"), EX1010

139. Martin was filed on November 18, 2005, published on June 15, 2006, and was issued as U.S. Patent No. 7,783,539 on August 24, 2010. Martin is prior art to the '107 patent under 35 U.S.C. § 102(e).

140. Martin discloses a derivative system that monitors currency exchange rates and makes calculations for transferring monies in one currency to another party in a different currency, using the most favorable exchange rate.

141. Thus, it was well-known to calculate a prevailing or favorable currency exchange rate based on multiple currency exchange rates.

7. U.S. Patent Application Publication 2006/0294004 to Burge ("Burge"), EX1011

142. Burge was published on December 28, 2006, and is prior art to the '107 patent under 35 U.S.C. § 102(e).

143. Burge discloses a system that enables mobile service providers to transmit user-requested currency exchange rates directly to a user's mobile phone, allowing for accurate and updated daily currency exchange rate calculations. Burge ¶¶ 0002-0006. The user can initiate a currency exchange rate request by selecting the desired exchange currencies using the phone's keypad. Burge ¶ 0012. Burge's system ensures that the currency exchange rates are up-to-date and transparently retrieved from the mobile service provider. Burge ¶¶ 0011, 0017. There is an associated expiration period for the rates, and the software automatically initiates a request to the service provider to update the rates when necessary. Burge ¶ 0017.

144. Thus, Burge discloses a system in which the currency exchange rates on the mobile phone are regularly updated, showing that accessing currency exchange systems with a trader interface was well-known by 2007.

8. U.S. Patent Application Publication 2007/0055590 to Kretzschmar et al. ("Kretzschmar"), EX1012

145. Kretzschmar was filed on September 7, 2005, and published on March 8, 2007, and is prior art to the '107 patent under 35 U.S.C. § 102(e).

146. Kretzschmar discloses a project management system enabled to handle multiple currencies within managed projects. An exchange series includes currency definition parameters such as currency pairing, frequency of rate change, and effective date of exchange rate. Using the exchange series and a strong definition of cost for tasks and resources (i.e. indicating currency type along with value of cost), the project management system allows costs to be entered in local currency. Project level roll-ups are calculated employing time-phased currency conversion based on whether the cost is variable or fixed. For scheduling, speculative conversions are facilitated based on latest actual exchange rate information. Local and project currency costs are provided to a project server for enterprise level roll-ups and multi-project management. Kretzschmar, Abstract.

147. Use of multiple sets (series) of exchange rates between two currencies is supported, enabling customers to choose which type of exchange rate is applicable

between currencies. Retrieval and processing of exchange rates may be performed by project server 302 or locally at projects sites 304 and 306 on a client device. Kretzschmar ¶ 0036. In one embodiment, the project management system may determine the cost associated with a project task in the local currency, select an applicable conversion rate based on the local currency, the project currency, and the predetermined exchange series. Kretzschmar ¶ 0044.

148. Kretzschmar discloses that network topology may be "dynamic," providing the capability to be real-time was well-known, indeed ubiquitous, by 2007.

9. U.S. Patent Application Publication 2006/0015437 to Kulasooriya et al. ("Kulasooriya"), EX1013

149. Kulasooriya was filed on November 16, 2004, was published on January 19, 2006, and issued as U.S. Patent No. 7529706 on May 5, 2009. Kulasooriya is prior art to the '107 patent under 35 U.S.C. § 102(e).

150. Kulasooriya discloses systems and methods for effecting international online financial transactions between individuals or between individuals and entities such as banks, merchants and other companies. In one embodiment, requests for international currency exchanges are processed in batch form. Kulasooriya, abstract.

151. Kulasooriya's architecture is shown below.

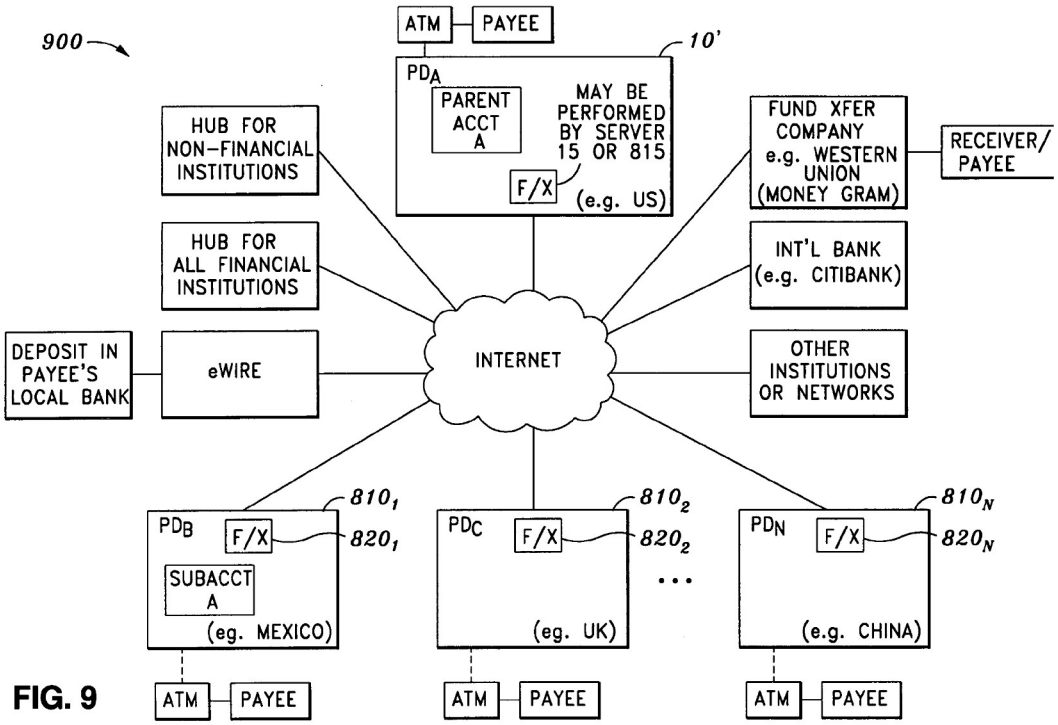


FIG. 9

152.

153. Kulasooriya shows that the infrastructure for performing cross-border transactions existed and was well-known by 2007.

10. U.S. Patent No. 5,897,621 to Brian Paul Boesch ("Boesch"), EX1014

154. Boesch issued on Apr. 27, 1999, and is prior art to the '107 patent under 35 U.S.C. § 102(b). Boesch is assigned to Pay Pal Inc.

155. Boesch discloses a system and method for approving a transaction over a communications network between a merchant and a customer. More specifically, the present invention is directed to a system and method for approving a transaction

between a merchant and a customer, wherein the transaction occurs over an electronic network (such as the Internet) and wherein the customer pays for a product using electronic cash in one currency and the merchant receives electronic cash for the product in a different currency. Boesch, Abstract.

156. Boesch discloses that the frequency that the current exchange rate data is updated can depend upon the level of risk that the approving entity may be willing to accept and the availability of updates from currency brokerage services. It is preferred that when the server is the approving entity, it receives updates to the exchange rate data on-line from one or more currency brokers. Frequency and timing of updates are based on business rules agreed between the operator of the server and the currency broker or brokers. Boesch 8:59-9:4.

157. Thus, Boesch shows it was well-known to obtain multiple rates to determine a prevailing exchange rate for cross-border transactions.

11. U.S. Patent No. 6,829,590 to Greener et al. ("Greener"), EX1015

158. Greener issued on December 7, 2004, and is prior art to the '107 patent under 35 U.S.C. § 102(b). Greener is assigned to Goldman Sachs.

159. Greener shows that it was known to connect a transaction processing server with a currency exchange server.

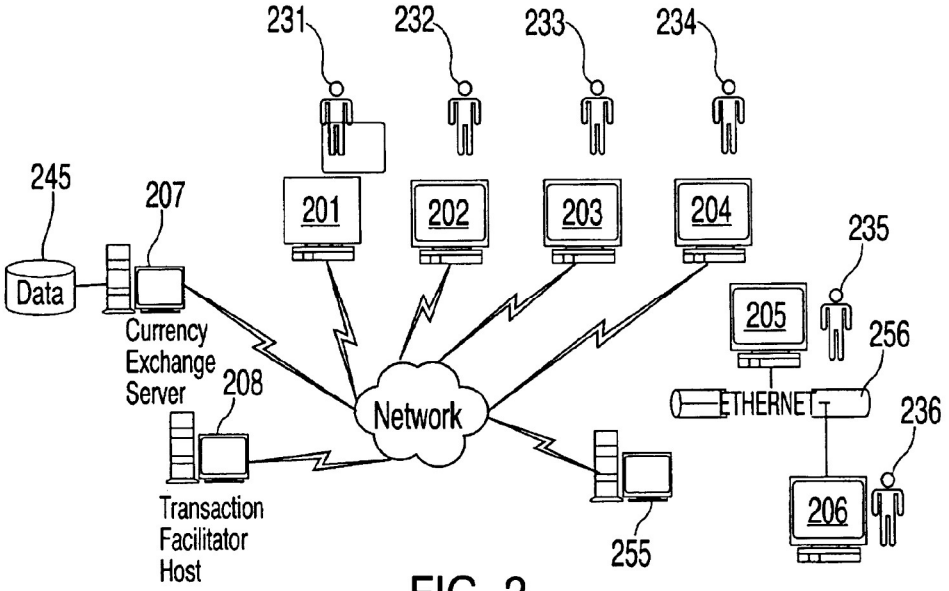


FIG. 2

160.

161. Greener discloses a currency exchange risk management system 113 can present to users of B2B exchanges and portals both bid and ask prices <u>in their local currencies, regardless of what country a supplier 111 or a purchaser 112 on the opposite side of the transaction is located</u>. These prices are programmed to <u>adjust in real-time via a live pricing feed</u>, or be set for a predetermined period of time. Greener 4:11-20 (underlining added).

162. Referring now to FIG. 3, a U.S. based supplier can post an asking price 306, such as, for example USD 1 million for X widgets. A purchaser 112, such as a European buyer 301, a Korean buyer 302, an Australian buyer, a Canadian buyer 304, or a British buyer 305 can view a price posted in a local currency 311, as well as an FX rate 312 and the price converted to another currency, such as U.S. Dollars 313. Greener 11:32-37.

163. A buyer 301-305 can also post an offer to buy in the buyer's 301-305 local currency 311, which can be automatically converted such that the supplier can view the prices only in USD 313, or perhaps USD and the seller's currency 311 313. A supplier may be able to benefit from such automatic viewing, as the supplier can easily determine which purchaser 301-305 is offering a price most favorable in USD terms. Greener 11:38-46.

164. Similarly, a purchaser 112 can see supplier prices 314 converted from a currency of choice of the supplier 314, to a currency of the purchaser's choice, such as USD 315. One embodiment, including multiple sellers 110 allows the purchaser 112 to display multiple offers for sale 314 wherein the offers can originate in a currency chosen by each supplier and be displayed in a currency chosen by the purchaser 315. In this manner, a relative cost of goods can include the price of foreign exchange. A single interface can include multiple prices for ease of comparison. Greener 11:47-56 (underlining added).

165. Although the system of Greener is not a securities trading system, the skilled person would understand that Greener disclosed the concept of displaying prices in a preferred currency to show the related costs of a transaction, including currency exchange costs, to a user.

12. U.S. Patent Application Publication 2005/0021454 to Karpovich et al. ("Karpovich"), EX1016

166. Karpovich was published on January 1, 2005, and therefore is prior art to the '107 patent under 35 U.S.C. § 102(b). Karpovich is assigned to the Royal Bank of Scotland.

167. Karpovich discloses a data processing systems for international commerce for cross border transactions in which a foreign exchange transaction is required to settle payment for goods or services. Karpovich, Abstract. Although the system is capable of operating with rates from a single rate provider, in a preferred embodiment there are a plurality of rate providers, and the algorithm selects a rate provider offering <u>an optimum rate</u> for execution of the net position transaction. Beneficially, the client positions and net position in each relevant currency pair are maintained on a real time basis so that execution may be instructed at any time. Karpovich ¶ 0034 (underlining added).

168. The customers of the clients will also be given exact prices for goods or services, without having to estimate separately exchange rates, or rely upon inefficient retail exchange rates. Karpovich ¶ 0068.

169. Karpovich shows that it was well-known to select an optimum rate for a cross border transaction.

13. U.S. Patent Application Publication 2007/0005481 to Kidea et al. ("Kidea"), EX1017

170. Kidea was filed on Jun 29, 2005, and was published on January 4, 2007. Therefore, Kidea is prior art to the '107 patent under 35 U.S.C. §§ 102(a) and (e).

171. Real time graphical user interface for on-line trading – shows that real-time continuous updates to data in a trading GUI were well known.

172. Kidea discloses systems and methods for displaying on a graphical user interface (GUI) at least one of stock and other equity type information for trade related actions by a user with an electronic exchange. The display is configurable by the user, and graphically displays and updates in substantially real time in a first portion of the GUI historical filled order data; graphically displaying and updating in substantially real time in a second portion of the GUI current unfilled order data (i.e., a portion that is not executed); the trade related actions made on the GUI by the user; updated modifications made on GUI to the trade related actions by the user; and allowing variation by the user of physical dimension of at least one of the first portion and the second portion of said graphical user interface. Kidea, Abstract. Depth price bands graphically display the real-time depth of the market i.e. the

available volume at a particular price. Historical depth of market snapshots, including periodic snapshots, simple average snapshots, weighted average and Max-Min-Open-Close snapshots, can be graphically shown along with real time market data. Kidea, Abstract.

173. Kidea shows that it was well known to divide open orders into portions, such as the executed and unexecuted portions, and to display those portions to the user in real time with constant updates.

14. U.S. Patent Application Publication 2004/0267655 to Davidowitz et al. ("Davidowitz"), EX1018

174. Davidowitz was published on December 30, 2004, and is prior art to the '107 patent under 35 U.S.C. § 102(b). It was originally filed by Bear Stearns but was assigned to JPMorgan Chase.

175. Davidowitz is directed to methods and systems for initiating trading across multiple exchanges by allowing a trader to monitor, trade, and hedge related securities that span across various markets. The patent is related to spread trading across markets. Davidowitz, Abstract.

176. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional <u>risk associated with the exposure to the foreign currency</u>. Davidowitz ¶ 0007. Davidowitz disclosed the need for an

automated system that can continuously monitor the various markets and automatically execute transactions based upon the realization of specific parameters chosen by the investor. ¶ 0008. The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. *Id.*

177. Accordingly, the concept of continuously monitoring exchange rates and updating trading information for a trader based on changing market conditions was disclosed by Davidowitz. It would have been obvious to include in the Calo system, continuously monitor the various markets and automatically execute transactions based upon the realization of specific parameters such as limit price including monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency.

15. U.S. Patent Application Publication 2004/0236664 to Sellberg et al. ("Sellberg"), EX1019

178. Sellberg was published on November 25, 2004, and is prior art to the '107 patent under 35 U.S.C. § 102(b). It was originally filed by OM tech AB but was assigned to NASDAQ. Sellberg was cited during prosecution but not discussed.

179. Sellberg, like the '107 patent, is directed to a computerized trading system. Sellberg addresses the same problems that of the '107 patent. For instance, Sellberg states that "Sometimes a trader may want to sell or buy a … financial instrument in another currency than the one used for that instrument in the [market]…[but] the trader does not have knowledge in advance of the exchange rate…." Sellberg ¶¶ 0003-0004. Sellberg explains that one solution to this problem is to modify the trading system to be capable of receiving orders in a plurality of currencies. Id. ¶ 0005.

180. Sellberg discloses a system that allows a trader to give an order in an instrument in a currency that is different from the currency used for that instrument. Id. ¶ 0007. That is, the trader can provide orders in his or her preferred currency.

181. When an order is received in a preferred currency that is different than the market currency, Sellberg also teaches to use an updated exchange rate (which is updated repeatedly in real-time), <u>preferably the last exchange rate just prior to the submitting the order, for performing the transaction</u>. Id. ¶¶ 0023-0025. Sellberg therefore teaches using exactly the same prevailing rates as the '107 patent. The rates are received repeatedly and automatically from a currency market or market maker. Id. ¶¶ 0024, 0055.

182. Sellberg also teaches monitoring the currency exchange rate to execute limit orders. That is, if the market price of the asset does not change in the market

exchange, but the currency exchange rate does, a trade can still be executed when a favorable currency exchange rate is detected. *Id*. ¶ 0028. Sellberg specifically teaches processing portions of limit orders based on exchange rates received. Sellberg ¶¶ 0035, 0037. Sellberg also describes benefits of adding currency exchange features to a trading system, such as increasing liquidity in the system. Id. ¶ 0012. Thus, the skilled person would have known that adding currency exchange to a trading system would be a desired improvement.

183. Sellberg discloses, in an automated trading system wherein orders in an instrument in a specified currency are received and a trade in the instrument is performed when, for a certain volume of the instrument, a bid price matches an ask price, a method for automatically generating an order in the instrument in the specified currency. The method includes receiving from a current exchange rate between a currency other than the specified currency and the specified currency; receiving from a trader an order in the instrument in the other currency; calculating a price of the order in the specified currency based on the received order and the current exchange rate; and generating the order in the instrument in the specified currency. Sellberg, Abstract.

184. Sellberg discloses that an updated exchange rate between the other currency and the specified currency is received repeatedly and automatically, and the last received updated exchange rate between the other currency and the specified currency at the time of calculating the price is defined as the received current exchange rate. Sellberg, claim 3.

185. Thus, Sellberg is a very similar system to that of Calo and Rude, and the skilled person would have been motivated to add features from Sellberg to Calo and Rude, and would have had on problem doing so, and would have believe it would have been successful. Therefore, as described below in Section VII, to the extent any limitations of the claims are absent in Calo and Rude, Sellberg can fill in the gaps. For example, to the extent that any of the claims require the prevailing rate be the last exchange rate just prior to the submitting the order, Sellberg clearly teaches that and the skilled person would have found it obvious to use that rate in the Calo system.

16. U.S. Patent Application Publication 2008/0147569 to Kahan et al. ("Kahan"). EX1020

186. Kahan was filed on December 4, 2007, but claims priority to U.S. Provisional Application No. 60/872,743, filed Dec. 4, 2006. Therefore, for subject matter in both the publication and the provisional, Kahan is prior art under 35 U.S.C. § 102(e).

187. Kahan discloses a method for producing quotes in a first currency for a financial instrument traded in a second currency. At least one substantially real time series of currency conversion quotes for converting the second currency to the first currency is received. This series of currency conversion quotes is applied to a currency conversion model adapted to estimate future currency conversion quotes. An offered conversion price within a settlement time window is determined using the estimated future currency conversion quotes. The settlement time window begins at the current time and extends through the financial instrument settlement period. A substantially real time series of quotes for the financial instrument, in the second currency, is received. A substantially current time quote for the financial instrument is multiplied by the offered conversion price to determine a hedged quote for the foreign financial instrument in the first currency. Kahan, Abstract.

17. U.S. Patent Application Publication 2001/0049651 to Selleck ("Selleck"), EX1021

188. Selleck was published on December 6, 2001, and is prior art to the '107 patent under 35 U.S.C. § 102(b).

189. It is included in this my report because it provides a survey style discussion of the global electronic trading environment at the time and show that in

the electronic trading industry most trading systems and features were well-known by 2007.

18. U.S. Patent Application Publication 2002/0128958 to Slone ("Slone"), EX1022

190. Slone was published on September 12, 2002, and is prior art to the '107 patent under 35 U.S.C. § 102(b).

191. Slone provides a thorough description of a conventional order management system within a trading platform. The system displays and stores all aspects of an order, including the currency cross rates and the currency that an asset trades in. Slone shows that systems for displaying and processing orders, including cross currency rates, were well known by 2007.

19. U.S. Patent Application Publication 2002/0184134 to Olsen et al. ("Olsen"), EX1023

192. Olsen was published on December 5, 2002, and is prior art to the '107 patent under 35 U.S.C. § 102(b).

193. Olsen discloses an exchange rate is the price at which one national currency can be exchanged for another. The most common currency value notion is the bilateral exchange rate (or simply the foreign exchange (FX) rate) quoted by an FX trader or reported by a quote vendor. This is a nominal exchange rate because it is the number of units of a currency offered in exchange for one unit of another (for

example, 1.5 German marks for 1 U.S. dollar). The spot exchange rate is a particular example of a nominal bilateral exchange rate, where the transaction takes place immediately. Another example is the forward exchange rate, where the price is agreed now but the transaction takes place in the future. An FX price is composed of two quantities: a price at which a bidder offers to buy (termed the bid price) and a price at which a seller offers to buy (the ask price). Olsen ¶ 0003 (underlining added).

20. U.S. Patent Application Publication 2004/0177024 to Bok et al. ("Bok"), EX1024

194. Bok was published on September 9, 2004, and is prior art to the '107 patent under 35 U.S.C. § 102(b).

195. Bok describes features relating to trading orders, including limit orders. Bok discloses well known techniques of monitoring open orders in the market for executions (partial or full), adjusting prices and size, cancelling and submitting new orders. Bok, *Passim*.

21. U.S. Patent No. 7,778,919 to Waelbroeck et al. ("Waelbroeck"), EX1025

196. Waelbroeck has an effective U.S. filing date of December 5, 2002, and is prior art to the '107 patent under 35 U.S.C. § 102(e). Waelbroeck is directed to a system of managing distributed trade data and teaches basic, industry operations that were well known by 2007, including monitoring trade orders in the market place. Waelbroeck, Abstract.

22. U.S. Patent No. 5,077,665 to Silverman et al. ("Silverman"), EX1026

197. Silverman was filed in 1989 by David Silverman, Alfred Scholldorf and Norman Keller of Reuters and issued on December 31, 1991. It is an early patent on electronic matching systems for monitoring and matching orders in the modern electronic trading environment. It discloses, among other things, features that were completely common place by 2007, such as electronically monitoring open orders and notifying traders of partial fills (a portion of an order less than total portion), updating data in order books, and other basic operations. Silverman, Abstract.

23. Peter Rosenstreich, FOREX Revolution, An Insider's Guide to the Real World of Foreign Exchange Trading (Rosenstreich) (2005), EX1027.

198. Rosenstreich is a text book – a printed publication that was published in 2005 and bears the Library of Cong. Cat. No. 2005921697. It is a printed

publication and was publicly available more than a year prior to the ’107 patent filing date. It is therefore prior art to the ‘107 patent under 35 U.S.C. § 102(b).

199. Rosenstreich discloses general background on the FOREX market, the history of exchange trading / currency trading, a description of the state of the art in 2005, and everything one would need to know to trade Forex hands-on in 2005.

24. Cornelius Luca, Trading in the Global Currency Markets(1995)(“Luca”), EX1028.

200. Luca is a text book – a printed publication that was published in 1995 and bears the Library of Cong. Cat. ISBN 0-13-293424-8, HG3851.L83 1995. It is a printed publication and was publicly available more than a year prior to the ’107 patent filing date. It is therefore prior art to the ‘107 patent under 35 U.S.C. § 102(b).

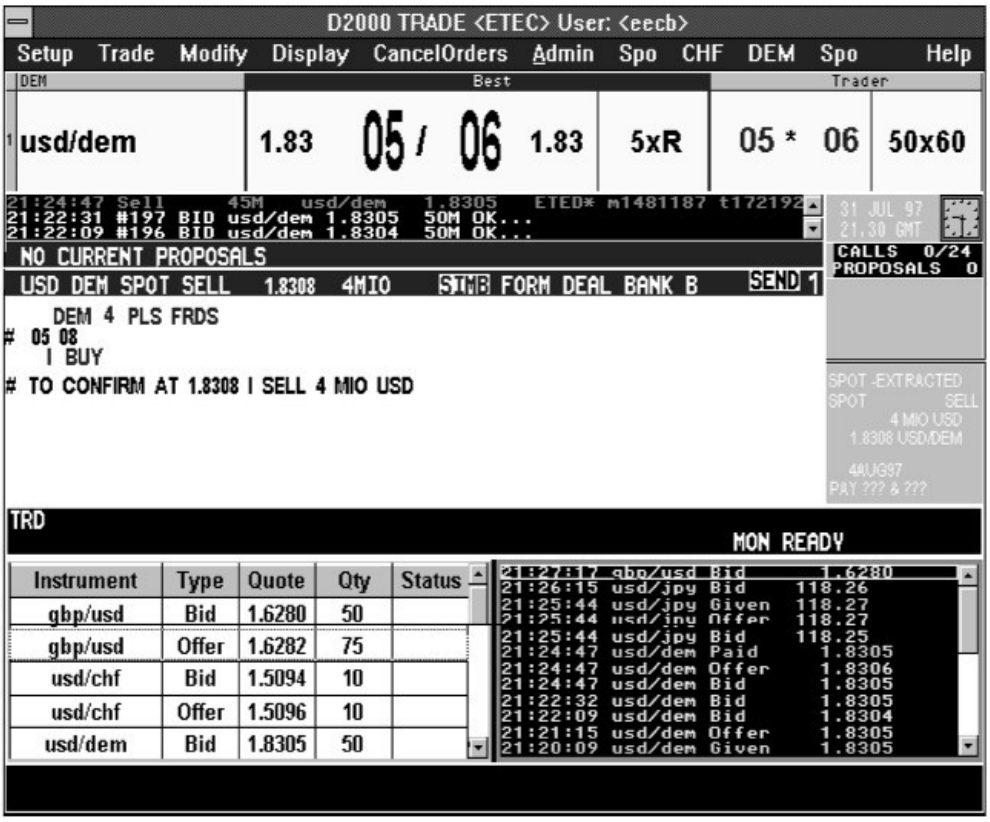
201. Luca is a trader’s guide and explains the mechanics of the foreign exchange market, the players and markets, the risks, and methods of trade execution and settlement. The basic manner of submitting orders for execution and settling them electronically was well known by 1995. Luca notes on page 6: “In addition to the dealing systems, matching systems simultaneously connect all players around the world, electronically duplicating the brokers market.”

25. Rime, Dagfinn, “New Electronic Trading Systems in Foreign

Exchange Markets," New Economy Handbook, pp. 469-504 (2003)("Rime"), EX1026

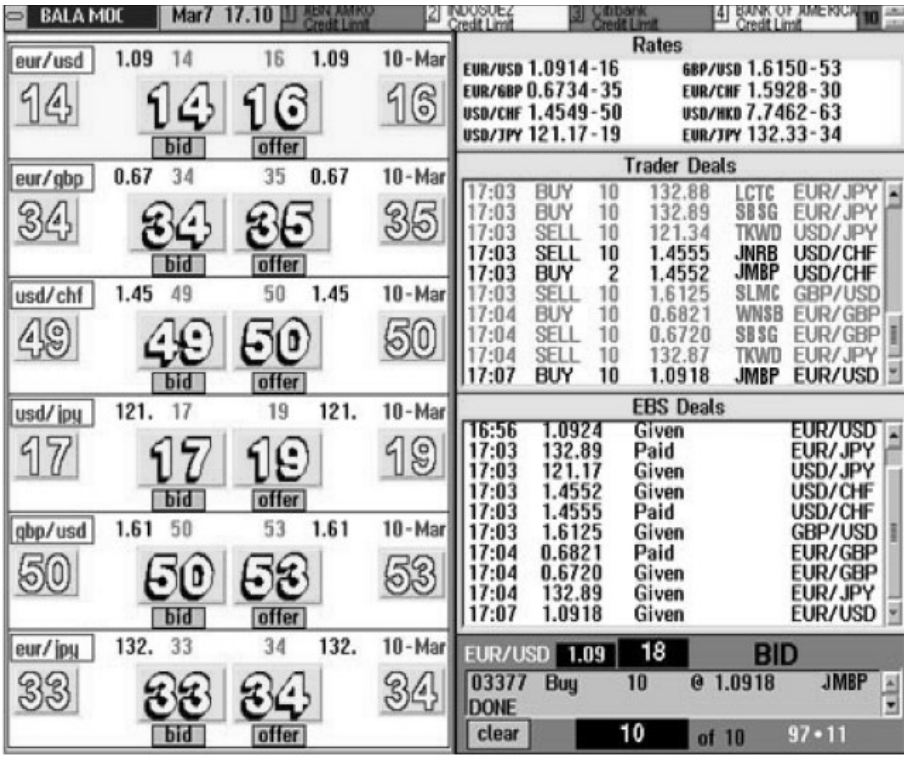
202. Rime was published in 2003 in the New Economy on September 15, 2003 and bears the ISBN-10:0123891728. Rime is therefore a printed publication and was publicly available more than a year prior to prior to the '107 patent filing date. It is therefore prior art to the '107 patent under 35 U.S.C. § 102(b).

203. Rime discloses that obtaining a price in real time is a routine activity of any electronic trading system used to maintain and communicate current and historical asset prices such as exchange rates. Rime, 479-86, 496; Gathering and displaying price data was well-known in the art, in fact and computer components used to facilitate this task were readily available in the market well prior to 2007. Many electronic trading systems involved servers that collected and maintained exchange rates because it was conventional for electronic brokering systems to continually receive updated quotes from multiple partners to determine the best bid and offer prices, which would then be stored in the computer system so they could be communicated to traders. For example, the Dealing 2000-2 screen shot below shows how the system collected and displayed bid and offer prices in the upper portion of the window:

204. 

Rime, 485.

205. The Electronic Broking Services ("EBS") screen shown below similarly collected and displayed bid and offer prices for multiple currency pairs in the left portion of the screen:

206. 

Id.

207. Clearly, before 2007, it was routine to display multiple quotes in a single window, including currency exchange quotes.

VII. <u>DISCUSSION OF CLAIMS</u>

208. In the following sections, I analyze claims 1-36 of the ’107 patent. As part of this analysis, I evaluate each claim as a whole while also explaining why each limitation reflects a process or feature that was routine and conventional to those of ordinary skill in the art in light of the disclosures of the prior art. I will also explain how the skilled person would have found the features of the claims obvious based on the prior art. I will explain why the skilled person would have been motivated

to implement certain teachings of the prior art and/or to combine such teachings from different references. In my analysis, I have applied the legal framework discussed above, and considered the words of the claims, the teaching of the Specification, and the prosecution history of the ’107 patent.

209. As described herein, it is my opinion that each and every element of claims 1-36 of the ’107 patent can be found in prior art, as set forth above in Section VI, which is hereby incorporated into this Section by reference, and as further set forth below, and the skilled person would have had no problem combining the teachings of the prior art to at claims 1-36.

210. It is my opinion that the claims of the ’107 patent merely recite routine currency trading steps that have long been conventional in the field, and that have been well-known and commonly used in electronic trading systems. These steps include price data collection, data validation, and generation of trading recommendations.

211. In my opinion, the claims merely reflect longstanding currency trading practices, as well as functionality that was routine for electronic trading systems. Given the conventional nature of the recited steps, even when viewed as a whole,

and the lack of any implementation details beyond the extremely high-level descriptions of each step, the claims added nothing new to the field.

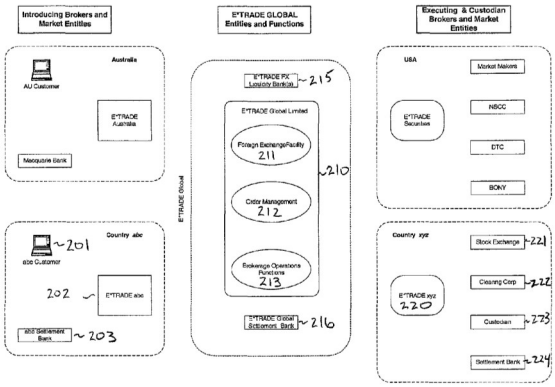
212. As demonstrated above in Section VI, by 2007 electronic trading was so wide spread and common that most, if not all the features of the '107 patent were well-known. Sections VI.B.1-3 and 13-15 above set forth all the elements of the claims. Although numerous other references could be cited for each element below, for simplicity, I give only a few non-limiting examples of where each limitation can be found.

Independent Claim 1 of the '107 Patent

213. In my opinion, each and every element of claim 1 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to arrive at each and every element of claim 1 as arranged. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 1 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

i. *A method for providing a consolidated trading platform, the method comprising:*

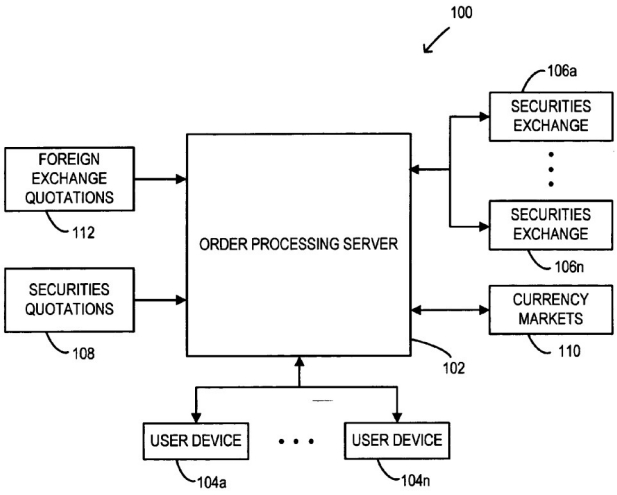
214. The first element *i* is the preamble. By 2007, consolidated trading platforms were well known, and therefore, methods of providing them were well known. Calo and Rude both describe consolidated trading platforms of the same kind as the one disclosed and claims in the '107 patent. For example, Calo discloses a trading platform with a three-tier network in Fig. 2.



215. FIGURE 2

216. Calo discloses, "The E*TRADE Global hub 210 supports a Foreign Exchange Facility 211, an order management system 212 and a brokerage operation system 213 internally. E*TRADE Global 210 also interfaces with a Foreign Exchange (FX) liquidity bank 215, and its own global settlement bank 216." Calo ¶ 0027.

217. Likewise, Rude discloses a consolidated trading platform in Fig. 1.

218. 

219. Rude explains that "trading system 100 includes an order processing server 102 in communication with one or more user device(s) 104, a plurality of securities exchanges 106, and a source or sources 108 of current securities price quotations. Some or all of the sources 108 of price quotations may, but need not, be integrated with the securities exchanges 106. The order processing server 102 is also in communication with one or more currency (foreign exchange) markets 110, and one or more sources 112 of foreign exchange price quotations. Some or all of the sources 112 of foreign exchange price quotations may be integrated with the currency markets 110." Rude ¶ 0021.

ii. *providing a trading server coupled to one or more currency exchange servers and one or more market exchange servers;*

220. Element *ii* is a step of providing computer servers: one or more currency exchange servers and one or more market exchange servers. To fulfil this element, only one of each server needs to be provided.

221. Both Calo and Rude disclose trading servers coupled with at least one currency exchange server and at least one market exchange server.

222. Calo discloses an extensive trading platform including Foreign Exchange servers and trading servers. "Each local affiliate is preferably connected directly to the Global system, with the local affiliate also connected to a local exchange or exchange member, such as INSTINET, ARCA (Archipelago), or the U.S. market makers. In FIG. 1, E*TRADE institutional is an affiliate that caters to the institutional investor and is not affiliated with only a single country or stock exchange. As shown, it connects to the Hong Kong exchange, the London Stock Exchange, and the U.S. market makers, and also connect to other executing brokers and exchanges." Calo ¶ 0025. "The E*TRADE Global hub 210 supports a Foreign Exchange Facility 211, an order management system 212 and a brokerage operation system 213 internally. E*TRADE Global 210 also interfaces with a Foreign Exchange (FX) liquidity bank 215, and its own global settlement bank 216." Calo ¶ 0027.

223. As shown above, in Fig. 1 of Rude, Rude's system is connected to a foreign exchange quotation computer, a currency quotation computer, and a currency market computer. Rude's system is also connected to security exchanges. *Id*.

iii. receiving in the trading server an indicator of a preferred currency from a trader;

224. Element *iii* is a step of receiving in the trading server something that identifies a preferred currency for the trader. Calo discloses that its system may provide price of a security in the "native," or preferred currency. Calo ¶ 0030. Of course, this inherently means that an indication of the preferred currency is received.

225. Calo explains that in some embodiments, "the user interface of the user device 104, in cooperation with the order processing server 102, may present one or more screen displays (not shown) to the user, <u>to permit the user to select in advance for his or her operation of the user device options as to whether foreign securities quotations are to be provided in an operating currency designated by the user</u> or in the local currencies in which the foreign securities trade. Similarly, the system may present the user with advance options as to whether or not the system should automatically place a foreign exchange trading order indicated at 410 in FIG. 4 in response to execution of each foreign securities trading order. In some

embodiments, a screen display (not shown) which allows the user to place the foreign securities trading order may also present to the user an option to override a previously indicated preference for an automatic follow-up foreign exchange trading order to fund the foreign securities trading order." Calo ¶ 0058 (underlining added).

226. Rude also discloses that a trading system may provide quotes in an "operating" currency rather than the currency local to the market where an asset is traded. E.g., Rude ¶ 0019. Rude also discloses that the user, i.e., the trader, may choose to have the system automatically convert "quotes of security prices in local currencies to his/her operating currency…" Rude ¶ 0060. The user device 104 exchanges information with the order processing server 102. See, e.g., Rude ¶ 0029. The order processing server performs the bulk of the processing steps described in Rude (Rude ¶ 0036) including conversion of quotes from a local (market) currency to the operating (preferred) currency. *See*, e.g., Rude ¶¶ 0047-49.

227. A number of other references disclose this as well. For example, Szoc discloses that real-time foreign exchange rate quotes are provided that may be relied on in timing international transactions. Single or multiple transactions are

automatically converted from a consumer's native currency to any of a plurality of foreign currencies and vice versa, thereby simplifying and facilitating these international transactions. Szoc, Abstract. Sellberg discloses that a trading system should be capable of receiving orders in a plurality of currencies. Sellberg. ¶ 0005. Sellberg discloses picking a preferred trading currency. Sellberg. ¶ 0007. Greener discloses that users of its system can select a preferred currency. Greener 11:47-56.

iv. causing a client computer associated with the trader to display at least an asset in the preferred currency while the asset is being traded in a market currency, wherein said causing a client computer associated with the trader to display at least an asset in the preferred currency comprises

228. Element *iv* is a displaying step. The asset being traded is displayed in a preferred currency, which may be the same as the market currency. As described above, both Calo and Rude disclose displaying at least an asset in the preferred currency while the asset is being traded in a market currency.

229. Numerous other prior art references disclose displaying an asset in a preferred currency. See, e.g., Kretzschmar, Greener, Karpovich, Sellberg, and Kahan *supra*.

v. determining in the trading server a prevailing exchange rate between the preferred currency and the market currency, wherein the prevailing exchange rate is derived from all exchange rates obtained from the one

or more currency exchange servers when the asset is displayed in the preferred currency; and

230. Element *v* is a step of determining an exchange rate from one or more received exchange rate(s). In my opinion, the "prevailing" exchange rate is not an FOREX average rate. That is, the "prevailing" rate might not cover an average FOREX exchange rate, which is an average rate from rates over a specified period or at a point in time across exchanges. That is, the Applicant argued that FOREX was providing an average rate rather than a current rate. As described above, the Specification (only) of the '107 patent describes using a "forward" rate or a "spot" rate. Therefore, a real-time exchange quote of a currency rate, or a spot rate, is a prevailing rate. Also, the claim is limited to exchange rates obtained from "one or more currency exchange servers." Therefore, a single spot quote should be sufficient to meet the claimed limitation.

231. Both Calo and Rude disclose determining in the trading server, a prevailing exchange rate between the preferred currency and the market currency, wherein the prevailing exchange rate is derived from all exchange rates obtained from the one or more currency exchange servers when the asset is displayed in the preferred currency.

232. For example, Calo discloses:

Some time prior to step 301, a customer in Australia receives from E*TRADE Global a preview price on a real-time basis for a U.S. equity (such as an individual stock or mutual fund share). A customer normally is expected to place orders based on the currency of the target market in which the security trades. A price in the native currency may also be provided, with this price being based on both the real-time quote for price on the U.S. equity, as well as a real-time conversion from the foreign exchange rates. In any case, the estimated prices are computed automatically through, by, or with information obtained through E*TRADE Global. Calo ¶ 0030. E*TRADE Global includes the local affiliates which interface to E*TRADE Global via a global affiliate interface, which also interfaces to the E*TRADE Global FX facility and its brokerage services systems. The E*TRADE Global FX facility is responsible for the foreign exchange procedures and therefore receives global foreign exchange rates from E*TRADE Market Data Services (which in turn receives foreign exchange quotes from a provider). The E*TRADE Global FX facility also maintains FX Margin management data, and can receives a contingency foreign exchange contribution via a Web Server connected to the internet. The E*TRADE Global FX facility communicates retail foreign exchange rates to each local affiliate through E*TRADE global affiliate interface. Calo ¶ 0050.

233. Rude likewise discloses:

Price quotations from a foreign securities exchange may be automatically converted to a trader's operating currency and may be displayed by a trading system to the trader in the operating currency, rather than in the local

currency in which the quotations are presented on the foreign securities exchange. Rude ¶ 0019. Rude discloses using real-time, prevailing rates:

> Step 402 continues at 506, where the order processing server 102 converts the local currency quotation information for the security in question to quotation information denominated in the user's operating currency. For example, the local currency bid quotation for the security may be converted using the foreign exchange bid rate between the local and operating currencies; and the local currency ask quotation for the security may be converted using the foreign exchange ask rate between the local and operating currencies. Rude ¶ 0049.

234. Sellberg, like the '107 patent, is directed to a computerized trading system. Sellberg addresses the same problems as the '107 patent. Sellberg ¶ 0003-0004. Sellberg provides a system that allows a trader to give an order in an instrument in a currency that is different from the currency used for that instrument. *Id*. 0007. When an order is received in a currency other than the market currency, Sellberg teaches to use an updated exchange rate, <u>preferably the last exchange rate just prior to the submitting the order,</u> for performing the transaction. *Id.* ¶¶0023-0025 (underlining added). Sellberg therefore teaches using exactly the same prevailing exchange rate as the '107 patent. Szoc also discloses the volatile nature of exchange rates impedes what could otherwise be straightforward international transactions. Exchange rate

volatility introduces financial risk and uncertainty. This risk is absent in transactions in which the currencies of parties to the transaction are the same. Szoc ¶ 0009. Therefore, Szoc provides an interface that includes the scrolling quote bar providing a list of the foreign exchange rates received by the web server from a quote server. Rates are displayed for various currencies with respect to the selected client's native currency. The scrolling quote bar is customizable at a discretion of the client, whereby the client may change the number of rates displayed, the manner in which they are displayed, the client's native currency, etc. The scrolling quote bar may display real-time, constantly-changing rates. *See* Szoc FIGS. 4A and 4B and Szoc ¶ 0083 (underlining added). Adding the features of Szoc to the Calo_Rude combination likely would have been obvious.

235. It was well known in the art that there was a benefit to using multiple currency exchange rates and/or a favorable rate. *See, e.g.,* Szoc, Muller, Martin, Burge, Kretzschmar, and Karpovich *supra*.

vi. displaying all costs and fees in the preferred currency to own or sell the asset, wherein the all costs and fees are dynamically changed in accordance with the prevailing exchange rate updated constantly even when a market value of the asset remains unchanged, wherein the trader has certain knowledge of what to pay for the asset, or profit or loss when acting on the asset;

236. Step vi is another displaying step. Here, the trading system must display costs and fees in the preferred currency. There is no explanation of what "all costs and fees" include, and therefore, I interpret this to mean that the trading system should disclose an orders costs and/or fees in the preferred currency. It should be noted that the terms "dynamically changed" and "updated constantly," were added to the claims late in prosecution and do not have verbatim support in the Specification. In fact, the '107 Patent Specification fails to disclose constant or even continuous updating the display.[1] The Specification does disclose periodic, not constant checking. Nevertheless, Calo discloses that all costs and fees are displayed prior to a trade in the preferred currency and are updated in real time:

> The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent

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[1] Fig. 4, directed to a limit order, shows a recursive step if certain conditions of a trade are not met, the prevailing currency exchange rate is checked again.

based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for a cross-border trade to the US and an additional "reserve" over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency market. Calo ¶ 0030.

Prior to step 700, the E*TRADE Australia system will provide to the Australian customer a preview of the order with estimated proceeds based on the principal amount calculated in USD based on the current US bid price, the AUD equivalent based on the current bid price for USD based on the USD principal amount, less the estimated commissions and fees for a cross-border trade to the U.S. If the customer decides to sell his equities, E*TRADE Australia will vet the order for an existing position in the customer's account and will reserve that position. Calo ¶ 0038.

237. As noted above, Sellberg teaches to use the prevailing exchange rate just prior to executing a trade. Therefore, it would have been obvious to use this rate in the system of Calo.

238. Szoc also discloses the volatile nature of exchange rates impedes what could otherwise be straightforward international transactions. Exchange rate volatility introduces financial risk and uncertainty. This risk is absent in transactions in which the currencies of parties to the transaction are the same. Szoc ¶ 0009. Therefore, Szoc provides an interface that includes the scrolling quote bar providing a list of the foreign exchange rates received by the web server from a quote server. Rates are displayed for various currencies with respect to the selected client's native currency. The scrolling quote bar is customizable at a discretion of

the client, whereby the client may change the number of rates displayed, the manner in which they are displayed, the client's native currency, etc. The scrolling quote bar may display real-time, constantly-changing rates. *See* Szoc FIGS. 4A and 4B and Szoc ¶ 0083 (underlining added).

239. This risk is also identified in Calo: "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater." Calo ¶ 0070. Thus, it also would have been obvious in view of Szoc to update the display of Calo with real-time, constantly-changing rates.

240. The importance of real-time updates of trading data was well known by 2007 that other references teach, including foreign exchange rates. See, e.g., Burge, Boesch, Davidowitz, and Sellberg.

vi. conducting in the trading server a transaction of the asset by transmitting a transaction request from the trading server to a market exchange server when the trader decides to proceed with trading the asset;

241. This element is fulfilled by the trader selecting to proceed with the trade, which both Calo and Rude disclose. For instance, Calo discloses:

Prior to step 800, the E*TRADE Australia system will provide to the Australian customer a preview of the order with estimated proceeds based on the principal amount calculated in USD based on the current US bid price, the AUD equivalent based on the current bid price for USD based on the USD principal amount, less the estimated commissions and fees for a cross-border trade to the U.S. If the customer decides to sell his equities, E*TRADE Australia will vet the order for an existing position in the customer's account and will reserve that position. The trade and foreign exchange deals are executed and confirmed at step 800 at time T+0. Calo ¶ 0040 (underlining added).

242. Likewise, Rude discloses:

Step 402 continues at 508, where the user device 104 displays on the display 306 the operating currency security price quotation information generated at 506. An example of such operating currency security price quotation information is shown, as noted above, in FIG. 7.

Referring again to FIG. 4, the process 400 advances to 404 where a securities trading order for a foreign security is received. In some embodiments, the order may be submitted as user input directly from a user device 102 to order processing server 102. Rude ¶ 0050-51 (underlining added).

vii. receiving a settlement notification in the trading server when the transaction of the asset is performed by the market exchange server in accordance with conditions set by the user, wherein the conditions

include a price at which the asset is traded in the preferred currency, the trading server is configured to calculate the prevailing exchange rate from all exchange rates obtained from the one or more currency exchange servers right before the transaction takes place when the asset is not priced in the preferred currency, and executes the transaction with the calculated prevailing exchange rate obtained at the transaction to prevent uncertainty in currency exchanges in another time; and

243. This element is fulfilled when the transaction (e.g., buy or sell of a security) is made with prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency" because the settlement notification this condition when a trade is so executed. Calo discloses this element. For instance, Calo discloses:

> The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, <u>the Australian dollar (AUD) equivalent based on the current ask price</u> for USD based on the USD principal amount, the estimated commissions and fees for a

> cross-border trade to the US and an additional "reserve" over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency market…. At step 310, the trade is confirmed to E*TRADE Australia with the USD execution price and principal amount as well as the locked-in AUD value of the trade. Calo ¶ 0030 (underlining added).

244. Calo discloses that handling settlement information is a basic feature of its system. Calo ¶ 0057.

245. Rude does not explicitly state that the price of the trade is based on the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency," but addresses the precise problem "to prevent uncertainty in currency exchanges in another time." Rude provides an example of Fig. 7 whereby a trade is made for a stock on the London stock exchange but the stock it displayed in both Pounds and Dollars. By executing a trade at the real-time exchange rate, the resulting clearance has the condition met where the settlement price is the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency." Rude states:

> The result of these transactions (disregarding any other positions the user may have) is that as of the settlement day (assumed to be three days after the day the securities trading order was placed and executed), the user will be long Vodaphone common (100 shares, denominated in GBP), flat GBP, and short USD $21,267.18. Consequently, the transaction

> from the user's point of view is equivalent to buying 100 shares of Vodaphone at the ask price of $212.67 indicated in the quote information of FIG. 7, and the transaction takes place from the user's point of view in essentially the same manner as a purchase of a domestic security. Thanks to the automatic foreign exchange transaction generated by the trading system in accordance with the invention, the user has effectively settled the foreign securities transaction in USD, the user's operating currency, and has been substantially shielded from currency risk. Rude ¶ 0062 (underlining added).

246. Rude discloses the foreign exchange transaction may be a forward rate or a spot rate:

> In response to the determination of the net settlement amount, the process 400 advances to 410, where the order processing server 102 automatically, and without further input from the user beyond the original placement of the securities order at 404, places a foreign exchange order with a currency market 110 to convert the net settlement amount to the user's operating currency. For example, where the underlying securities trading order was for the purchase of a security, the automatically placed foreign exchange trading order may be to buy forward the local currency as of the date of settlement (typically three days after execution) for the securities trading order.

> Alternatively, the foreign exchange trading order may be a purchase of the local currency on the spot market. In some embodiments, the foreign exchange order may be placed by the server 102 immediately after the net settlement amount is determined. Rude ¶ 0054.
>
> As another example, if the underlying securities trading order was for the sale of a security, the automatically placed foreign exchange trading order may be to sell forward the local currency as of the settlement date for the securities trading order, or alternatively the foreign exchange trading order may be a sale of the local currency on the spot market. Rude ¶ 0055.

247. Szoc also discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also <u>transactions that will execute only when and if a specific foreign exchange rate is available</u>. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101 (underlining added).

248. Sellberg also teaches monitoring the currency exchange rate to execute limit orders. That is, if the market price of the asset does not change in the market exchange, but the currency exchange rate does, a trade can still be executed when a favorable currency exchange rate is detected. Id. ¶ 0028. Sellberg specifically

teaches processing portions of limit orders based on exchange rates received. Sellberg ¶¶ 0035, 0037.

ix. performing a currency conversion of some portion or all of the transaction from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate.

249. This element may be fulfilled by storing the settlement data in the preferred currency per the prevailing rate. *See*, e.g., Fig. 5, step 516 of the '107 patent. Both Calo and Rude disclose this step.

250. Calo discloses that purchased shares "bought by the Australian customer is reflected by a series of book entries" in its system. Calo ¶ 0035. The book entries are stored in the E*TRADE Australia in the customer's account. Calo ¶ 0042.

251. Calo also discloses "generating a corresponding foreign exchange order on a real-time basis after an equity order executes by differentiating between payment and settlement currencies on an order record." Calo ¶ 0057.

252. Rude discloses that settlement data is also in the preferred currency using the prevailing exchange rates. Rude discloses automatically converting price quotations from foreign securities exchanges into the trader's *operating* currency and displays them accordingly. Rude ¶ 0020. When a trader places an order for a foreign security, the system executes the order in the local currency of the foreign exchange. *Id*. It then determines a net settlement amount based on the execution price and expenses. *Id*. Therefore, it discloses calculating costs and fees for a trade.

253. The net settlement amount is automatically converted to the trader's operating currency through a forward foreign exchange transaction, effectively mitigating foreign exchange risk. *Id.* The system offers options for traders to customize their preferences regarding currency display and automatic foreign exchange conversion. Rude ¶ 0024. Overall, Rude teaches to provide a seamless and transparent foreign securities trading experience by simplifying currency conversion and managing foreign exchange transactions automatically. Rude ¶ 0060.

254. Also, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate.

255. Calo discloses that when an Australian customer sells a U.S. equity, "after the equity order is executed, E*TRADE Global transacts a foreign exchange deal prior to confirming the sale of the equity back to E*TRADE Australia. Step 611 includes sending an order to the Global FX facility to sell U.S. dollars for Australian dollars. At step 612, the foreign exchange bank confirms the foreign exchange deal with the Australian dollar counter amount to E*TRADE Global. At step 613, the trade is confirmed to E*TRADE Australia with the USD execution price and principal amount as well as the locked-in AUD value of the trade." Calo ¶ 0036 (underlining added).

256. Likewise, Rude discloses as similar process:

> In response to the determination of the net settlement amount, the process 400 advances to 410, where the order processing server 102 automatically, and without further input from the user beyond the original placement of the securities order at 404, places a foreign exchange order with a currency market 110 to convert the net settlement amount to the user's operating currency. For example, where the underlying securities trading order was for the purchase of a security, the automatically placed foreign exchange trading order may be to *buy forward* the local currency as of the date of settlement (typically three

> days after execution) for the securities trading order. Alternatively, the foreign exchange trading order may be a purchase of the local currency on the *spot market*. In some embodiments, the foreign exchange order may be placed by the server 102 immediately after the net settlement amount is determined. Rude ¶ 0054 (underlining added).

257. As noted above, the '107 patent discloses settling a trade using a forward purchase (in the case of a contract) or a spot purchase (in the case of an equity). Rude discloses that prevailing rates may include current (spot) and forward rates. Rude ¶ 0020.

258. As described above, Sellberg discloses when an order is received in a preferred currency that is different than the market currency, Sellberg teaches to use an updated exchange rate (which is updated repeatedly in real-time), preferably the last exchange rate just prior to the submitting the order, for performing the transaction. Id. ¶¶ 0023-0025.

259. It would have been well within the skill of the person of ordinary skill in the art to combine the teachings of Calo and Rude, with Sellberg or Szoc, which would have resulted in each and every feature of claim 1, performed in the same arrangement as recited in claim 1.

260. Clearly, by 2007, a POSITA would have appreciated that Calo and Rude were in the same field of endeavor and analogous art. Both are directed to the same type of technology. The state of programming technology at the time

supported developing systems that would easily accomplish the features of claim 1 using the teachings of Calo and Rude, and Sellberg or Szoc. In fact, all the teaching of the prior art cited this Declaration would have been easily combinable by the skilled person by 2007.

261. This was also evidenced by the existence of electronic trading systems for currencies and equities prior to 2007. There was a clear motivation to combine the references and a POSITA would have had a reasonable expectation of success when making this combination. For example, the skilled person would have been motivated to improve the features of the display and trading technology to make the system more useful and desirable to use.

B. Claim 2 of the '107 Patent

262. In my opinion, each and every element of claim 2 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to arrive at each and every element of claim 2 as arranged. Below I set forth non-limiting examples of where each element may be found in selected prior art references. I note, however, that the subject matter of claim 2 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ

from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

2. The method as recited in claim 1, wherein said conducting in the trading server a transaction of the asset comprises:

263. Claim 2 depends from claim 1 and, as described above, all the elements of claim 1 are present in Calo and Rude in view of Sellberg or Szoc.

i. monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server; and

264. Calo discloses continuously monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server. Calo ¶ 0057. In fact, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type. As an E*TRADE Group Inc. patent describing its trading systems, Calo discloses the features necessary to support monitoring the conditions for trading. Calo further discloses "Another means to reduce risk from limit orders is marking-to-the market all open

limit orders on a regular basis, such as at the end of the day." which describes monitoring market conditions in limit orders. Calo ¶ 0070.

265. Rude discloses:

> The order processing server 102 also operates to receive from the price quotation sources 108, 112 data concerning market conditions. Such data may include, for example, information concerning the current status of order books at the securities exchanges 106. Thus the data supplied by the source(s) 108 may include current price quotations for securities to be traded via the trading system 100. The quotations may be provided in the local currencies of the various securities exchanges, which may operate in local currencies such as pounds sterling or euros, which may be different from operating currencies such as U.S. dollars for at least some of the users of the user devices 104. In addition, the market data may include current and/or forward exchange rates for various pairs of currencies. (Some of the securities exchanges 106 may operate in the same currency as the user's operating currency. For example, some securities exchanges, such as the New York Stock Exchange, may have U.S. dollars as their local currency. By the same token, some users may operate in currencies other than U.S. dollars.) Rude ¶ 0023.

ii. performing the transaction of the asset only when the conditions have been met involving a retrieved price of the asset and an updated prevailing currency exchange rate from the one or more currency exchange servers at a minimum cost to the user right before the transaction takes place.

266. Calo disclose performing the transaction only when conditions have been met relating to updated prevailing currency exchange rate from the one or more currency exchange servers at a minimum cost to the user right before the transaction takes place. Namely, this claim involves the embodiment of Fig. 4 of the '107 patent, which is the placement of a limit order. Calo states that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders…. Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis…" Calo ¶ 0070. This means adjusting the price of the limit order based on *an updated prevailing currency exchange rate.*

267. Rude also discloses transacting only when a trader's conditions are met.

268. Referring to FIG. 4, the process 400 advances to 404 where a securities trading order for a foreign security is received. In some embodiments,

the order may be submitted as user input directly from a user device 102 to order processing server 102. Orders may be submitted in batch files (e.g., with multiple trade requests) or individually. Each order may include details of the order, including: an identification of the customer, an identification of the security to be purchased or sold, and the size of the order. Other terms may also be provided (e.g., such as an identification of whether the order is a market or limit order or the like). In the case of a limit order, additional information may be provided, such as the limit price. Rude ¶ 0051

269. The process 400 then advances to 406, where the order processing server 102 places a trading order for the foreign security in question with the securities exchange on which the security trades. The order is placed in accordance with the order received from the user device at 404. In the event that the order is a limit order, the limit price indicated at 404 in the user's operating currency may be translated to the local currency of the securities exchange in accordance with the foreign exchange rate information received at 504 (FIG. 5). Rude ¶ 0051

270. Szoc also discloses a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available.

These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101. Sellberg likewise discloses this feature. Sellberg ¶¶0023-0025, 0028.

C. Claim 3 of the '107 Patent

271. In my opinion, each and every element of claim 3 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 3 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *3. The method as recited in claim 2, wherein said monitoring the conditions in conjunction with the one or more currency exchange server and the market exchange server further comprises:*

272. As described above, all the elements of claim 2 are present in Calo and Rude in view of Sellberg or Szoc.

i. receiving periodically an updated price of the asset being traded from the market exchange server;

273. Calo discloses continuously monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server. Calo ¶ 0057. See, also, Rude ¶ 0023; and Sellberg ¶¶0023-0025, 0028, and Szoc ¶ 0101.

274. As described above, numerous references teach the importance of an updated price of the asset being traded from the market exchange server.

ii. receiving periodically an updated currency exchange rate from the one or more currency exchange servers when the preferred currency is not identical to the market currency; and

275. Calo discloses continuously monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server. Calo ¶ 0057. See, also, Rude ¶ 0023; and Sellberg ¶¶0023-0025, 0028, and Szoc ¶ 0101.

276. As described above, numerous references teach the importance of updated currency exchange rates relating to the trade of the asset.

iii. determining whether the conditions have been met together with the updated price of the asset and the updated currency exchange rate.

277. Calo discloses performing the transaction only when conditions have been met relating to the updated prevailing currency exchange rate from the one or more currency exchange servers at a minimum cost to the user right before the transaction takes place. Namely, this claim involves the embodiment of Fig. 4 of the '107 patent, which is the placement of a limit order. Calo states that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders…. Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis…" Calo ¶ 0070. This means adjusting the price of the limit order based on an updated prevailing currency exchange rate. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type. Rude discloses that settlement data is also in the preferred currency using the prevailing exchange

rates. Rude ¶¶ 0020, 0024, 0060. See, also, Rude ¶ 0023; and Sellberg ¶¶0023-0025, 0028, and Szoc 101.

C. Claim 4 of the '107 Patent

278. In my opinion, each and every element of claim 4 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 4. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 4 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

4. The method as recited in claim 1, wherein,

279. As shown above, the features of claim 1 are disclose by Calo and Rude in view of Sellberg or Szoc.

i. when the preferred currency is identical to the market currency, the transaction is conducted directly between

the trader and another trader selling or buying the asset without currency conversion.

280. This element relates to a currency neutral trade, which is a standard trade when the preferred currency is identical to the market currency. In other words, in the system of Calo, if an Australian customer trades an Australian equity, there is no conversion. The same applies to the Rude system. Moreover, it was well-known that a broker may directly match both sides of an OTC trade.

E. Claim 5 of the '107 Patent

281. In my opinion, each and every element of claim 5 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 5. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 5 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

282.

5. The method as recited in claim 4, wherein

283. As shown above, the features of claim 4 are disclose by Calo and Rude in view of Sellberg or Szoc.

i. the transaction is conducted across at least two countries.

284. This is a currency neutral trade but cross border. Since claim 5 depends from claim 4, the preferred currency is the same as the market currency. Therefore, making a U.S. equities trade from China in U.S. Dollars would fulfill this limitation. The background of the '107 patent discloses this, as does Calo and Rude, and numerous other references.

F. Claim 6 of the '107 Patent

285. In my opinion, each and every element of claim 6 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 6. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 6 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it

would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

6. The method as recited in claim 1, wherein said performing a currency conversion of some portion or all of the transaction comprises:

286. As shown above, the features of claim 1 are disclose by Calo and Rude in view of Sellberg or Szoc.

i. receiving a set of conditions for the transaction to take place; and

287. Both Calo and Rude disclose receiving a limit order. See, e.g., Calo ¶ 0070; Rude ¶ 0051. See also Sellberg ¶¶0025-0028 and Szoc ¶101.

ii. monitoring the prevailing exchange rate in conjunction with the one or more currency exchange servers and the market exchange server to ensure that the transaction only happens when the conditions are met with the prevailing exchange rate.

288. Calo discloses to update the limit price of a limit order by marking it to market, thereby ensuring monitoring the prevailing exchange rate to ensure that the limit order only happens when the conditions are met with the prevailing exchange

rate. "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater….Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis..." Calo ¶ 0070. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type.

G. Claim 7 of the '107 Patent

289. In my opinion, each and every element of claim 7 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 7. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 7 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

7. The method as recited in claim 6, wherein said monitoring the conditions comprises

290. As shown above, the features of claim 6 are disclose by Calo and Rude in view of Sellberg or Szoc.

i. determining how much of the asset has been transacted on a market exchange server; and

291. By definition, an open limit order can be partially filled. Calo discloses that its system monitors limit orders, which would include how much of the asset has been transacted on a market exchange server. See, e.g., Calo ¶¶ 0057, 0070.

292. It was well known in the art to monitor open orders to determine how much of the asset has been transacted. *See, e.g.,* Selleck ¶ 0142 ("system warning trading if order getting close to being filled." Bok monitoring open orders. Bok *passim*. Waelbroeck et al. ("When shares [of an open order] are successfully executed, remove them from "Working" and add them to "Filled." If shares are canceled (as in a partial fill, a rejected execution, or a user cancel), remove them from "Working."")

ii. determining when a price of the asset exceeds a predetermined or dynamically determined threshold value.

293. This was standard functionality at least by 2007. A limit order submitted by a trading system by definition involves making this determination. Calo discloses that its consolidated trading platform includes monitoring open orders including limit orders. See above.

H. Claim 8 of the ’107 Patent

294. In my opinion, each and every element of claim 8 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 8. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 8 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *8. The method as recited in claim 1, wherein the transaction includes first and second portions, and said performing a currency conversion of some portion or all of the transaction comprises:*

295. As shown above, the features of claim 1 are disclose by Calo and Rude in view of Sellberg or Szoc.

i. analyzing any purchases or sales which make up the transaction of the asset in the market currency to determine a first portion of the transaction that was bought or sold from another trader with the same preferred currency as the trader was performing the transaction; and

296. The concept of "portion" was introduced during prosecution and has no verbatim support in the common Specification. Nevertheless, market orders and limit orders can be partially filled. When that occurs, execution information is sent from the exchange to the broker. Calo naturally, would perform the currency conversion only on a second portion of the transaction that was bought or sold from another trader with a different preferred currency. For example, each partial fill would be treated as an execution. As already described above, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate. Of course, if the trade was made in the same currency as the preferred currency, no conversion would be done.

297. Kidea substantially discloses a real-time user interface with current unfilled order data. That is, Kidea teaches to track the portions of an order that are traded. Kidea, Abstract. Kideo discloses graphically displaying and updating in substantially real-time, in a first portion of the GUI, historical filled order data; in a second portion of the GUI, current unfilled order data; and displaying trade related actions made by the user and modifications thereto. Kidea therefore teaches breaking orders into portions and displaying both filled portions and unfilled portions, and discloses updating the data for unfilled order data.

298. Sloan also discloses that an order management server tracks all data relating to an order, which includes partial fills, or portions.

299. Bok also describes features relating to trading orders, including limit orders. Bok discloses well known techniques of monitoring open orders in the market for executions (partial or full), adjusting prices and size, cancelling and submitting new orders.

300. Sloan and Bok show that these features were generally well-known to the skilled person by 2007.

ii. performing the currency conversion only on a second portion of the transaction that was bought or sold from another trader with a different preferred currency.

301. The concept of "portion" was introduced during prosecution and has no verbatim support in the common Specification. Nevertheless, market orders and limit orders can be partially filled. When that occurs, execution information is sent from the exchange to the broker. Calo naturally, would perform the currency conversion only on a second portion of the transaction that was bought or sold from another trader with a different preferred currency. For example, each partial fill would be treated as an execution. As already described above, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate. Of course, if the trade was made in the same currency as the preferred currency, no conversion would be done.

302. Kidea discloses a substantially real-time user interface with current unfilled order data. That is, Kidea teaches to track the portions of an order that are traded. Kidea, Abstract. Therefore, it would have been obvious to update the display in the Calo-Rude system to determine a first portion of the transaction that was bought or sold from another trader with the same preferred currency as the

trader was performing the transaction and to update the currency conversion only on a second portion of the transaction that was bought or sold from another trader with a different preferred currency.

303. Bok describes features relating to trading orders, including limit orders. Bok discloses well known techniques of monitoring open orders in the market for executions (partial or full), adjusting prices and size, cancelling and submitting new orders.

i. Independent Claim 9 of the '107 Patent

304. In my opinion, each and every element of claim 9 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 9. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 9 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

9. A method for providing a consolidated trading platform, the method comprising:

305. Calo and Rude both describe a consolidated trading platforms of the same kind as the one disclosed and claims in the '107 patent. For example, Calo discloses a trading platform with a three-tier network in Fig. 2.

306. "The E*TRADE Global hub 210 supports a Foreign Exchange Facility 211, an order management system 212 and a brokerage operation system 213 internally. E*TRADE Global 210 also interfaces with a Foreign Exchange (FX) liquidity bank 215, and its own global settlement bank 216." Calo ¶ 0027.

307. Likewise, Rude discloses a consolidated trading platform in Fig. 1.

308. As depicted, trading system 100 includes an order processing server 102 in communication with one or more user device(s) 104, a plurality of securities exchanges 106, and a source or sources 108 of current securities price quotations. Some or all of the sources 108 of price quotations may, but need not, be integrated with the securities exchanges 106. The order processing server 102 is also in communication with one or more currency (foreign exchange) markets 110, and one or more sources 112 of foreign exchange price quotations. Some or all of the sources 112 of foreign exchange price quotations may be integrated with the currency markets 110. (Rude ¶ 0021.)

i. accessing a trading server coupled over the Internet to at least two currency exchange servers and at least one market exchange server;

309. Calo discloses an extensive trading platform including Foreign Exchange servers and trading servers. "Each local affiliate is preferably connected directly to the Global system, with the local affiliate also connected to a local exchange or exchange member, such as INSTINET, ARCA (Archipelago), or the U.S. market makers. In FIG. 1, E*TRADE institutional is an affiliate that caters to the institutional investor and is not affiliated with only a single country or stock exchange. As shown, it connects to the Hong Kong exchange, the London Stock Exchange, and the U.S. market makers, and also connect to other executing brokers and exchanges." Calo ¶ 0025. "The E*TRADE Global hub 210 supports a Foreign Exchange Facility 211, an order management system 212 and a brokerage operation system 213 internally. E*TRADE Global 210 also interfaces with a Foreign Exchange (FX) liquidity bank 215, and its own global settlement bank 216." Calo ¶ 0027.

310. As shown above, in Fig. 1 of Rude, Rude's system is connected to a foreign exchange quotation computer, a currency quotation computer, and a currency market computer. Rude's system is also connected to security exchanges. Id.

ii. receiving an indication of a preferred currency from a trader;

311. Calo discloses that its system may provide price of a security in the "native," or preferred currency. Calo ¶ 0030. Calo does not explicitly disclose that an indicator of the preferred currency is received from a trader although it is implied by the architecture disclosed by Calo.

312. Rude also discloses that a trading system may provide quotes in an "operating" currency rather than the currency local to the market where an asset is traded. E.g., Rude ¶ 0019. Rude also discloses that the user, i.e., the trader, may choose to have the system automatically convert "quotes of security prices tin local currencies to his/her operating currency…" Rude ¶ 0060. The user device 104 exchanges information with the order processing server 102. See, e.g., Rude ¶ 0029. The order processing server performs the bulk of the processing steps described in Rude (Rude ¶ 0036) including conversion of quotes from a local (market) currency to the operating (preferred) currency. See, e.g., Rude ¶¶ 0047-49.

313. In some embodiments, the user interface of the user device 104, in cooperation with the order processing server 102, may present one or more screen displays (not shown) to the user, to permit the user to select in advance for his or her operation of the user device options as to whether foreign securities quotations are to be provided in an operating currency designated by the user or in the local currencies in which the foreign securities trade. Similarly, the system may present the user with advance options as to whether or not the system should automatically place a foreign exchange trading order indicated at 410 in FIG. 4 in response to execution of each foreign securities trading order. In some embodiments, a screen display (not shown) which allows the user to place the foreign securities trading order may also present to the user an option to override a previously indicated preference for an automatic follow-up foreign exchange trading order to fund the foreign securities trading order. Calo ¶ 0058.

314. Numerous other prior art references disclose displaying an asset in a preferred currency. See, e.g., Kretzschmar, Greener, Karpovich, Sellberg, and Kahan.

iii. *displaying on a client computer associated with the trader at least an asset in the preferred currency while*

the asset is being traded in a market currency, wherein said displaying on a client computer associated with the trader at least an asset in the preferred currency comprises:

315. Both Calo and Rude disclose determining in the trading server, a prevailing exchange rate between the preferred currency and the market currency, wherein the prevailing exchange rate is derived from all exchange rates obtained from the one or more currency exchange servers when the asset is displayed in the preferred currency.

316. For example, Calo discloses:

> Some time prior to step 301, a customer in Australia receives from E*TRADE Global a preview price on a real-time basis for a U.S. equity (such as an individual stock or mutual fund share). A customer normally is expected to place orders based on the currency of the target market in which the security trades. A price in the native currency may also be provided, with this price being based on both the real-time quote for price on the U.S. equity, as well as a real-time conversion from the foreign exchange rates. In any case, the estimated prices are computed automatically through, by, or with information obtained through E*TRADE Global. Calo ¶ 0030.

317. Rude likewise discloses:

> Price quotations from a foreign securities exchange may be automatically converted to a trader's operating currency and may be displayed by a trading system to the trader in the operating currency, rather than in the local currency in which the quotations are presented on the foreign securities exchange. Rude ¶ 0019.

318. Rude discloses using real-time, prevailing rates:

> Step 402 continues at 506, where the order processing server 102 converts the local currency quotation information for the security in question to quotation information denominated in the user's operating currency. For example, the local currency bid quotation for the security may be converted using the foreign exchange bid rate between the local and operating currencies; and the local currency ask quotation for the security may be converted using the foreign exchange ask rate between the local and operating currencies. Rude ¶ 0049.

319. Numerous other prior art references disclose displaying an asset in a preferred currency. See, e.g., Kretzschmar, Greener, Karpovich, Sellberg, and Kahan.

iv. determining in the trading server a prevailing exchange rate between the preferred currency and the market currency, wherein the prevailing exchange rate is

derived from all exchange rates obtained from the at least two currency exchange servers when the asset is displayed in the preferred currency; and

320. Both Calo and Rude disclose determining in the trading server, a prevailing exchange rate between the preferred currency and the market currency, wherein the prevailing exchange rate is derived from all exchange rates obtained from the one or more currency exchange servers when the asset is displayed in the preferred currency.

321. For example, Calo discloses:

> Some time prior to step 301, a customer in Australia receives from E*TRADE Global a preview price on a real-time basis for a U.S. equity (such as an individual stock or mutual fund share). A customer normally is expected to place orders based on the currency of the target market in which the security trades. A price in the native currency may also be provided, with this price being based on both the real-time quote for price on the U.S. equity, as well as a real-time conversion from the foreign exchange rates. In any case, the estimated prices are computed automatically through, by, or with information obtained through E*TRADE Global. Calo ¶ 0030.

322. Rude likewise discloses:

> 323. Price quotations from a foreign securities exchange may be automatically converted to a trader's operating currency and may be

displayed by a trading system to the trader in the operating currency, rather than in the local currency in which the quotations are presented on the foreign securities exchange. Rude ¶ 0019.

324. Rude discloses using real-time, prevailing rates:

> 325. Step 402 continues at 506, where the order processing server 102 converts the local currency quotation information for the security in question to quotation information denominated in the user's operating currency. For example, the local currency bid quotation for the security may be converted using the foreign exchange bid rate between the local and operating currencies; and the local currency ask quotation for the security may be converted using the foreign exchange ask rate between the local and operating currencies. Rude ¶ 0049.

326. Many prior art documents were identified that disclose the benefits of using multiple currency exchange rates and/or a favorable rate. See, e.g., Szoc, Muller, Martin, Burge, Kretzschmar, and Karpovich.

v. displaying all costs and fees in the preferred currency to own or sell the asset, wherein the all costs and fees are dynamically changed in accordance with the prevailing exchange rate constantly updated, a value of the asset being displayed changes as the exchange rate changes,

> *even when a market value of the asset remains unchanged, wherein the trader has certain knowledge of what to pay for the asset, or profit or loss when acting on the asset;*

327. It should be noted that the terms "dynamically changed" and "updated constantly," were added to the claims late in prosecution and do not have verbatim support in the common Specification. In fact, the common Specification fails to disclose constantly or even continuously updating the display. Nevertheless, Calo discloses that all costs and fees are displayed prior to a trade in the preferred currency and are updated in real time:

> The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for a cross-border trade to the US and an additional "reserve" over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency market. Calo ¶ 0030.
>
> Prior to step 700, the E*TRADE Australia system will provide to the Australian customer a preview of the order with

> estimated proceeds based on the principal amount calculated in USD based on the current US bid price, the AUD equivalent based on the current bid price for USD based on the USD principal amount, less the estimated commissions and fees for a cross-border trade to the U.S. If the customer decides to sell his equities, E*TRADE Australia will vet the order for an existing position in the customer's account and will reserve that position. Calo ¶ 0038.

328. Moreover, there are many prior art references that tout the need for real-time, dynamically updated, or constantly updated data in the trading context in order to reduce risk. For example, Szoc discloses the volatile nature of exchange rates impedes what could otherwise be straightforward international transactions. Exchange rate volatility introduces financial risk and uncertainty. This risk is absent in transactions in which the currencies of parties to the transaction are the same. Szoc ¶ 0009. Therefore, Szoc provides an interface that includes the scrolling quote bar providing a list of the foreign exchange rates received by the web server from a quote server. Rates are displayed for various currencies with respect to the selected client's native currency. The scrolling quote bar is customizable at a discretion of the client, whereby the client may change the number of rates displayed, the manner in which they are displayed, the client's

native currency, etc. The scrolling quote bar may display real-time, constantly-changing rates. See Szoc FIGS. 4A and 4B and Szoc ¶ 0083 (underlining added).

329. This risk is also identified in Calo: "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater." Calo ¶ 0070.

330. Sellberg discloses, in an automated trading system wherein orders in an instrument in a specified currency are received and a trade in the instrument is performed when, for a certain volume of the instrument, a bid price matches an ask price, a method for automatically generating an order in the instrument in the specified currency. The method includes receiving from a current exchange rate between a currency other than the specified currency and the specified currency; receiving from a trader an order in the instrument in the other currency; calculating a price of the order in the specified currency based on the received order and the current exchange rate; and generating the order in the instrument in the specified currency. Sellberg, Abstract.

331. Sellberg discloses that an updated exchange rate between the other currency and the specified currency is received repeatedly and automatically, and the last received updated exchange rate between the other currency and the specified currency at the time of calculating the price is defined as the received current exchange rate. Sellberg, claim 3

vi. *receiving an instruction from the trader to trade the asset, wherein the trading server is configured to calculate the prevailing currency exchange rate from all exchange rates obtained from the at least two currency exchange servers right before an transaction pertaining to the asset happens when the preferred currency is not identical to the market currency;*

332. Both Calo and Rude disclose determining in the trading server, a prevailing exchange rate between the preferred currency and the market currency, wherein the prevailing exchange rate is derived from all exchange rates obtained from the one or more currency exchange servers when the asset is displayed in the preferred currency.

333. For example, Calo discloses:

> Some time prior to step 301, a customer in Australia receives from E*TRADE Global a preview price on a real-time basis for a U.S. equity (such as an individual stock or mutual fund share). A customer normally is expected to place orders based on the currency of the target market in which the security trades. A price in the native currency may also be provided, with this price being based on both the real-time quote for price on the U.S.

equity, as well as a real-time conversion from the foreign exchange rates. In any case, the estimated prices are computed automatically through, by, or with information obtained through E*TRADE Global. Calo ¶ 0030.

334. Rude likewise discloses:

> Price quotations from a foreign securities exchange may be automatically converted to a trader's operating currency and may be displayed by a trading system to the trader in the operating currency, rather than in the local currency in which the quotations are presented on the foreign securities exchange. Rude ¶ 0019.

335. Rude discloses using real-time, prevailing rates:

> Step 402 continues at 506, where the order processing server 102 converts the local currency quotation information for the security in question to quotation information denominated in the user's operating currency. For example, the local currency bid quotation for the security may be converted using the foreign exchange bid rate between the local and operating currencies; and the local currency ask quotation for the security may be converted using the foreign exchange ask rate between the local and operating currencies. Rude ¶ 0049.

336. It should be noted that the terms "dynamically changed" and "updated constantly," are found only in the claims and not in the Specification. In fact, the common Specification fails to disclose constantly or even continuous updating the display. Nevertheless, Calo discloses that all costs and fees are displayed prior to a trade in the preferred currency and are updated in real time:

> The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for a cross-border trade to the US and an additional "reserve" over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency market. Calo ¶ 0030.

337. Prior to step 700, the E*TRADE Australia system will provide to the Australian customer a preview of the order with estimated proceeds based on the principal amount calculated in USD based on the current US bid price, the AUD equivalent based on the current bid price for USD based on the USD principal amount, less the estimated commissions and fees for a cross-border trade to the U.S. If the customer decides to sell his equities, E*TRADE Australia will vet the order for an existing position in the customer's account and will reserve that position. Calo ¶ 0038.

338. Moreover, there are many prior art references that tout the need for real-time, dynamically updated, or constantly updated data in the trading context in order to reduce risk. For example, Szoc discloses the volatile nature of exchange

rates impedes what could otherwise be straightforward international transactions. Exchange rate volatility introduces financial risk and uncertainty. This risk is absent in transactions in which the currencies of parties to the transaction are the same. Szoc ¶ 0009. Therefore, Szoc provides an interface that includes the scrolling quote bar providing a list of the foreign exchange rates received by the web server from a quote server. Rates are displayed for various currencies with respect to the selected client's native currency. The scrolling quote bar is customizable at a discretion of the client, whereby the client may change the number of rates displayed, the manner in which they are displayed, the client's native currency, etc. <u>The scrolling quote bar may display real-time, constantly-changing rates.</u> See Szoc FIGS. 4A and 4B and Szoc ¶ 0083 (underlining added).

339. This risk is also identified in Calo: "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater." Calo ¶ 0070. Thus, it also would have been obvious in view of Szoc to update the display of Calo with real-time, constantly-changing rates.

340. By definition, the trader initiates the trade, which then must be sent to the market exchange server for execution. See generally, '107 patent, col. 2:15-44.

341. Sellberg discloses, in an automated trading system wherein orders in an instrument in a specified currency are received and a trade in the instrument is performed when, for a certain volume of the instrument, a bid price matches an ask

price, a method for automatically generating an order in the instrument in the specified currency. The method includes receiving from a current exchange rate between a currency other than the specified currency and the specified currency; receiving from a trader an order in the instrument in the other currency; calculating a price of the order in the specified currency based on the received order and the current exchange rate; and generating the order in the instrument in the specified currency. Sellberg, Abstract.

342. Sellberg discloses that an updated exchange rate between the other currency and the specified currency is received repeatedly and automatically, and the last received updated exchange rate between the other currency and the specified currency at the time of calculating the price is defined as the received current exchange rate. Sellberg, claim 3

> *vii. receiving a price of the asset being traded over the market exchange server, the price shown in the trading server being in the preferred currency in conjunction with the calculated prevailing currency exchange rate; and*

343. Calo discloses this element. For instance, Calo discloses:

> The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for a cross-border trade to the US and an additional "reserve" over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency market…. At step 310, the trade is confirmed to E*TRADE Australia with the USD execution price and principal amount as well as the locked-in AUD value of the trade. Calo ¶ 0030.

344. Rude does not explicitly state that the price of the trade is based on the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency," but addresses the precise problem "to prevent uncertainty in currency exchanges in another time." Rude provides an example of Fig. 7 whereby a trade is made for a stock on the London stock exchange but the stock it displayed in both Pounds and Dollars. By executing a trade at the real-time exchange rate, the resulting clearance has the condition met where the settlement price is the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency." Rude states:

> The result of these transactions (disregarding any other positions the user may have) is that as of the settlement day (assumed

> to be three days after the day the securities trading order was placed and executed), the user will be long Vodaphone common (100 shares, denominated in GBP), flat GBP, and short USD $21,267.18. Consequently, the transaction from the user's point of view is equivalent to buying 100 shares of Vodaphone at the ask price of $212.67 indicated in the quote information of FIG. 7, and the transaction takes place from the user's point of view in essentially the same manner as a purchase of a domestic security. Thanks to the automatic foreign exchange transaction generated by the trading system in accordance with the invention, the user has effectively settled the foreign securities transaction in USD, the user's operating currency, and has been substantially shielded from currency risk. Rude ¶ 0062.

345. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

346. It was well known in the art by 2007 of the benefits of using multiple currency exchange rates and/or a favorable rate. See, e.g., Szoc, Muller, Martin, Burge, Kretzschmar, and Karpovich.

viii. showing a settlement of the transaction in the preferred currency after the transaction of the asset is executed with the calculated prevailing exchange rate to prevent uncertainty in currency exchanges.

347. This element is fulfilled when the transaction (e.g., buy or sell of a security) is made with prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency" because the settlement notification this condition when a trade is so executed. Calo discloses this element. For instance, Calo discloses:

348. The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for a cross-border trade to the US and an additional "reserve" over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency

market…. At step 310, the trade is confirmed to E*TRADE Australia with the USD execution price and principal amount as well as the locked-in AUD value of the trade. Calo ¶ 0030.

349. Rude does not explicitly state that the price of the trade is based on the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency," but addresses the precise problem "to prevent uncertainty in currency exchanges in another time." Rude provides an example of Fig. 7 whereby a trade is made for a stock on the London stock exchange but the stock it displayed in both Pounds and Dollars. By executing a trade at the real-time exchange rate, the resulting clearance has the condition met where the settlement price is the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency." Rude states:

> The result of these transactions (disregarding any other positions the user may have) is that as of the settlement day (assumed to be three days after the day the securities trading order was placed and executed), the user will be long Vodaphone common (100 shares, denominated in GBP), flat GBP, and short USD $21,267.18. Consequently, the transaction from the user's point of view is equivalent to buying 100 shares of Vodaphone at the ask price of $212.67 indicated in the quote information of FIG. 7, and the transaction takes place from the user's point of view in essentially the same manner as a

> purchase of a domestic security. Thanks to the automatic foreign exchange transaction generated by the trading system in accordance with the invention, the user has effectively settled the foreign securities transaction in USD, the user's operating currency, and has been substantially shielded from currency risk. Rude ¶ 0062.

350. Calo discloses that purchased shares "bought by the Australian customer is reflected by a series of book entries" in its system. Calo ¶ 0035. The book entries are stored in the E*TRADE Australia in the customer's account. Calo ¶ 0042.

351. Calo also discloses "generating a corresponding foreign exchange order on a real-time basis after an equity order executes by differentiating between payment and settlement currencies on an order record." Calo ¶ 0057.

352. Rude discloses that settlement data is also in the preferred currency using the prevailing exchange rates. Rude discloses automatically converting price quotations from foreign securities exchanges into the trader's operating currency and displays them accordingly. See Rude ¶ 0020. When a trader places an order for a foreign security, the system executes the order in the local currency of the foreign exchange. *Id*. It then determines a net settlement amount based on the execution price and expenses. *Id*. Therefore, it discloses calculating costs and fees for a trade.

353. The net settlement amount is automatically converted to the trader's operating currency through a forward foreign exchange transaction, effectively

mitigating foreign exchange risk. *Id*. The system offers options for traders to customize their preferences regarding currency display and automatic foreign exchange conversion. Rude ¶ 0024. Overall, Rude teaches to provide a seamless and transparent foreign securities trading experience by simplifying currency conversion and managing foreign exchange transactions automatically. Rude ¶ 0060.

354. Also, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate.

355. Calo discloses that when an Australian customer sells a U.S. equity, "after the equity order is executed, E*TRADE Global transacts a foreign exchange deal prior to confirming the sale of the equity back to E*TRADE Australia. Step 611 includes sending an order to the Global FX facility to sell U.S. dollars for Australian dollars. At step 612, the foreign exchange bank confirms the foreign exchange deal with the Australian dollar counter amount to E*TRADE Global. At step 613, the trade is confirmed to E*TRADE Australia with the USD execution

price and principal amount as well as the locked-in AUD value of the trade." Calo ¶ 0036.

356. Likewise, Rude discloses as similar process:

> In response to the determination of the net settlement amount, the process 400 advances to 410, where the order processing server 102 automatically, and without further input from the user beyond the original placement of the securities order at 404, places a foreign exchange order with a currency market 110 to convert the net settlement amount to the user's operating currency. For example, where the underlying securities trading order was for the purchase of a security, the automatically placed foreign exchange trading order may be to buy forward the local currency as of the date of settlement (typically three days after execution) for the securities trading order. Alternatively, the foreign exchange trading order may be a purchase of the local currency on the spot market. In some embodiments, the foreign exchange order may be placed by the server 102 immediately after the net settlement amount is determined. Rude ¶ 0054.
>
> As noted above, the '107 patent discloses settling a trade using a forward purchase (in the case of a contract) or a spot purchase (in the case of an equity). Rude discloses that prevailing rates may include current (spot) and forward rates. Rude ¶ 0020.

J. Claim 10 of the '107 Patent

357. In my opinion, each and every element of claim 10 was already disclosed by the prior art and the skilled person would have had no problem combining the

teaching of the prior art to derive each and every element of claim 10. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 10 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

10. The method as recited in claim 9, wherein the transaction of the asset executed with the calculated prevailing exchange rate comprises:

358. As described above, all the limitations of claim 9 were disclosed by Calo and Rude in view of Sellberg or Szoc.

i. conducting the transaction of the asset between the trading server and the market exchange server when the trader decided to proceed with trading the asset; and

359. By definition, the trader initiates a trade, which then must be sent to the market exchange server for execution. See generally, EX1001 2:15-44. Further, both Calo and Rude provide the trade the opportunity to initiate the trade or not. See Sections VI.B.1-2 above.

ii. performing a currency exchange of the settlement in the market currency to the preferred currency by the calculated prevailing currency exchange rate when the preferred currency is not identical to the market currency so that the transaction is no longer subject to currency fluctuation at a later time.

360. Calo discloses:

> The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for a cross-border trade to the US and an additional "reserve" over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency market…. At step 310, the trade is confirmed to E*TRADE Australia with the USD execution price and principal amount as well as the locked-in AUD value of the trade. Calo ¶ 0030.

361. Rude does not explicitly state that the price of the trade is based on the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency," but addresses the precise problem "to prevent uncertainty in currency exchanges in another time." Rude provides an example of Fig. 7 whereby a trade is made for a stock on the London stock exchange but the

stock it displayed in both Pounds and Dollars. By executing a trade at the real-time exchange rate, the resulting clearance has the condition met where the settlement price is the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency."

362. Rude states:

> The result of these transactions (disregarding any other positions the user may have) is that as of the settlement day (assumed to be three days after the day the securities trading order was placed and executed), the user will be long Vodaphone common (100 shares, denominated in GBP), flat GBP, and short USD $21,267.18. Consequently, the transaction from the user's point of view is equivalent to buying 100 shares of Vodaphone at the ask price of $212.67 indicated in the quote information of FIG. 7, and the transaction takes place from the user's point of view in essentially the same manner as a purchase of a domestic security. Thanks to the automatic foreign exchange transaction generated by the trading system in accordance with the invention, the user has effectively settled the foreign securities transaction in USD, the user's operating currency, and has been substantially shielded from currency risk. Rude ¶ 0062.

363. Many prior art documents were identified that disclose the benefits of using multiple currency exchange rates and/or a favorable rate. See, e.g., Szoc, Muller, Martin, Burge, Kretzschmar, and Karpovich.

K. Claim 11 of the ’107 patent

364. In my opinion, each and every element of claim 11 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 11. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 11 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

11. The method as recited in claim 10,

365. See my analysis of claim 10 above; all the limitations of claim 10 were disclosed and taught by Calo and Rude in view of Sellberg or Szoc.

i. wherein the currency exchange is conducted in the currency exchange server per the calculated prevailing currency exchange rate.

366. See my analysis of claim 10 above.

L. Claim 12 of the ’107 patent

367. In my opinion, each and every element of claim 12 was already disclosed by the prior art and the skilled person would have had no problem combining the

teaching of the prior art to derive each and every element of claim 12. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 12 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

12. The method as recited in claim 9, further comprising

368. See my analysis of claims 9 and 10 above.

i. providing a currency conversion at a transactional level so that a trader knows exactly what ends up with the transaction of the asset.

369. See my analysis of claims 9 and 10.

M. Claim 13 of the '107 patent

370. In my opinion, each and every element of claim 13 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 13. Below I set forth non-limiting examples where each element may be found in selected prior art

references. I note, however, that the subject matter of claim 13 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

13. The method as recited in claim 9, wherein said determining in the trading server whether an asset is being chosen for trading comprises:

371. See my analysis of claim 9.

i. receiving a set of conditions for the transaction of the asset; an

372. Both Calo and Rude disclose receiving a limit order. See, e.g., Calo ¶ 0070; Rude ¶ 0051.

ii. monitoring the conditions in conjunction with the currency exchange server and the market exchange server.

373. Calo discloses to update the limit price of a limit order by marking it to market, thereby ensuring monitoring the prevailing exchange rate to ensure that the limit order only happens when the conditions are met with the prevailing exchange rate. "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater….Another means to reduce risk from limit orders is

marking-to-the market all open limit orders on a regular basis..." Calo ¶ 0070. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type.

374. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101. As discussed above, Sellberg also teaches this element. See Sellberg ¶¶0023-0025, 0028

375. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional risk associated with the exposure to the foreign currency. Davidowitz ¶ 0007. Davidowitz disclosed the need for an

automated system that can continuously monitor the various markets and automatically execute transactions <u>based upon the realization of specific parameters chosen by the investor</u>. ¶ 0008 (underlining added). The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

N. Claim 14 of the ’107 patent

376. In my opinion, each and every element of claim 14 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 14. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 14 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *14. The method as recited in claim 13, wherein said monitoring the conditions in conjunction with the currency exchange server and the market exchange server further comprises:*

377. See my analysis of claim 13

i. retrieving periodically a price of the asset being traded from the market exchange server;

378. Calo discloses monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server and receives market data at least periodically, which would include an updated market value of the asset being traded from the market exchange server. Calo ¶ 0057.

379. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional risk associated with the exposure to the foreign currency. Davidowitz ¶ 0007. Davidowitz disclosed the need for an automated system that can continuously monitor the various markets and automatically execute transactions based upon the realization of specific parameters chosen by the investor. ¶ 0008. The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

ii. prevailing periodically the currency exchange rate from the currency exchange server when the preferred currency is not identical to the market currency; and

380. Calo discloses monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server and receives an updated prevailing currency exchange rate at least periodically. Calo ¶ 0057.

381. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional risk associated with the exposure to the foreign currency. Davidowitz ¶ 0007. Davidowitz disclosed the need for an automated system that can <u>continuously monitor the various markets</u> and automatically execute transactions based upon the realization of specific parameters chosen by the investor. ¶ 0008 (underlining added). The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

iii. determining whether the conditions have been met together with the retrieved price of the asset and the retrieved currency exchange rate.

382. Calo discloses performing the transaction only when conditions have been met relating to updated prevailing currency exchange rate from the one or more currency exchange servers at a minimum cost to the user right before the transaction takes place. Namely, this claim involves the embodiment of Fig. 4 of the '107 patent, which is the placement of a limit order. Calo states that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders…. Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis…" Calo ¶ 0070. This means adjusting the price of the limit order based on an updated prevailing currency exchange rate. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type.

383. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same

manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101. Sellberg also teaches this feature. Sellberg ¶0028. Adding the features of Szoc or Sellberg would have been obvious.

O. Claim 15 of the '107 patent

384. In my opinion, each and every element of claim 15 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 15. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 15 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

15. The method as recited in claim 14, wherein

385. See claim 14 above.

i. the transaction of the asset only happens when the conditions have been met together with the retrieved price of the asset and the retrieved currency exchange rate.

386. Calo discloses to update the limit price of a limit order by marking it to market, thereby ensuring monitoring the prevailing exchange rate to ensure that the limit order only happens when the conditions are met with the prevailing exchange rate. "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater….Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis..." Calo ¶ 0070.

387. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101. See also Sellberg ¶0028.

P. Claim 16 of the ’107 patent

388. In my opinion, each and every element of claim 16 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 16. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 16 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

16. The method as recited in claim 9, wherein,

389. See my analysis of claim 9.

i. when the preferred currency is identical to the market currency, the transaction is conducted directly between the trader and another trader selling or buying the asset without involving the currency exchange server.

390. Calo describes performing a currency neutral trade.

391. The Order Management System, referred to in FIG. 2 as E*TRADE Global Trading, handles the routing and execution reporting of cross-border transactions (securities and currency) to, as needed, the appropriate affiliate and foreign

exchange facility. It therefore is responsible for: 1) routing all non-domestic customer securities orders from the introducing broker/dealer to the executing broker/dealer; 2) routing order status (executions and expirations) from the executing broker to the introducing broker/dealer including local currency value of executions; 3) defining which instruments can be traded in the network (for example, only over-the-counter equities might be traded through the system); 4) identifying and defining the destinations for certain types of instruments if it is not one of the affiliate broker/dealers. Currency transactions, for example will be routed to the foreign exchange facility; 5) managing the routing (and re-routing) parameters by instrument including currencies; 6) monitoring order and execution activity, including accompanying foreign exchange transactions; 7) reconciling orders and trades, including foreign exchange; 8) generating a corresponding foreign exchange order on a real-time basis after an equity order executes by differentiating between payment and settlement currencies on an order record; 9) defining and developing the procedures for managing exceptions which occur in the order and execution process; adjusting open orders for corporate actions, expirations, and exercises; 10) monitoring open orders against currency fluctuations and notifying the introducing brokers when this exposure occurs; 11)

validating cross-border orders against affiliates' positions and trading limits; 12) routing orders based on parameters per security traded in the Global network; 13) automatically placing any foreign exchange deal after execution of an equity trade; 14) placing speculative foreign exchange transactions for cash management purposes; 15) reconciling trades; 16) managing open orders such as expirations and adjustments for corporate actions; and 17) ordering and filling adjustments. Calo ¶ 0057 (emphasis added).)

392. Calo also discloses that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders. With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater. A limit order can potentially be left open for 60 days in the US market, for example, and currency rates can move substantially within that time frame." ¶ 0070. Calo teaches to reduce the risk by "marking-to-the market all open limit orders" on a regular basis. Id. "Mark-to-market" is a well-known practice of valuing assets or liabilities based on their current market value or exchange rates.

Q. Claim 17 of the '107 patent

393. In my opinion, each and every element of claim 17 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 17. Below I set

forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 17 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

17. The method as recited in claim 9, further comprising:

394. See my analysis of claim 9.

i. analyzing orders and purchases/sales to determine whether or not the trader and another trader selling or buying the asset are matched without currency conversion, when the preferred currency of the trader is identical to a currency of the another trader while the market currency of the two traders is different.

395. Calo also discloses that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders. With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater. A limit order can potentially be

left open for 60 days in the US market, for example, and currency rates can move substantially within that time frame." ¶ 0070. Calo teaches to reduce the risk by "marking-to-the market all open limit orders" on a regular basis. Id. "Mark-to-market" is a well-known practice of valuing assets or liabilities based on their current market value or exchange rates.

396. If the stocks are OTC, this can be done, otherwise you need a matching system.

R. Claim 18 of the '107 patent

397. In my opinion, each and every element of claim 18 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 18. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 18 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

18. The method as recited in claim 16, wherein the transaction is conducted across at least two countries.

398. See my analysis of claim 16, this is a currency neutral trade but cross border. As described above, Calo, Rude, Sellberg and Szoc all teach cross-border trading.

S. Independent Claim 19 of the '107 Patent

399. In my opinion, each and every element of claim 19 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 19. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 19 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter. As described above, claims 19-36 substantially mirror claims 1-18, and therefore, my analysis of claims 1-18, Sections VII.A-R, are incorporated in the following paragraphs analyzing claims 19-36.

19. A non-transitory computer-readable storage medium with an executable software product providing a consolidated trading

platform, a trading server configured to execute the software product to perform operations comprising:

400. The first part of this sentence describes common media of the time, namely DVDs or other storage devices. Instructions (e.g., source codes, operating systems, etc.) for providing a consolidated trading platform would have been implemented in non-transitory computer-readable storage medium before 2007.

401. Calo and Rude both describe a consolidated trading platforms of the same kind as the one disclosed and claims in the '107 patent. For example, Calo discloses a trading platform with a three-tier network in Fig. 2.

402. "The E*TRADE Global hub 210 supports a Foreign Exchange Facility 211, an order management system 212 and a brokerage operation system 213 internally. E*TRADE Global 210 also interfaces with a Foreign Exchange (FX) liquidity bank 215, and its own global settlement bank 216." Calo ¶ 0027.

403. Likewise, Rude discloses a consolidated trading platform in Fig. 1.

404. As depicted, trading system 100 includes an order processing server 102 in communication with one or more user device(s) 104, a plurality of securities exchanges 106, and a source or sources 108 of current securities price quotations. Some or all of the sources 108 of price quotations may, but need not, be integrated with the securities exchanges 106. The order processing server 102 is also in communication with one or more currency (foreign exchange) markets 110, and

one or more sources 112 of foreign exchange price quotations. Some or all of the sources 112 of foreign exchange price quotations may be integrated with the currency markets 110. (Rude ¶ 0021.)

i. coupling the trading server to at least one currency exchange server and one market exchange server;

405. Calo discloses a trading platform with a three-tier network in Fig. 2 coupling a trading server to one or more currency exchange servers and one or more market exchange servers. Calo ¶ 0027.

406. Likewise, Rude discloses a consolidated trading platform in Fig. 1 coupling a trading server to one or more currency exchange servers and one or more market exchange servers. Rude ¶ 0021.

ii. receiving an indicator of a preferred currency from a trader;

407. Calo discloses that its system may provide the price of a security in the "native," or preferred currency. Calo ¶ 0030. Calo does not explicitly disclose that an indicator of the preferred currency is received from a trader although it is implied by the architecture disclosed by Calo.

408. Rude also discloses that a trading system may provide quotes in an "operating" currency rather than the currency local to the market where an asset is traded. E.g., Rude ¶ 0019. Rude also discloses that the user, i.e., the trader, may choose to have the system automatically convert "quotes of security prices tin local currencies to his/her operating currency…" Rude ¶ 0060. The user device 104 exchanges information with the order processing server 102. See, e.g., Rude ¶ 0029. The order processing server performs the bulk of the processing steps described in Rude (Rude ¶ 0036) including conversion of quotes from a local (market) currency to the operating (preferred) currency. See, e.g., Rude ¶¶ 0047-49.

409. Numerous other prior art references disclose displaying an asset in a preferred currency. See, e.g., Kretzschmar, Greener, Karpovich, Sellberg, and Kahan.

iii. determining whether an asset is being chosen for trading, wherein the asset is being traded in a market currency but displayed in the preferred currency in accordance with a prevailing exchange rate derived from all exchange rates obtained from the currency exchange server, a value of the asset being displayed changes as the exchange rate changes, even when a value of the asset on the market exchange server

remains unchanged, wherein the trader has certain knowledge of what to pay for the asset, or profit or loss when acting on the asset;

410. Both Calo and Rude disclose determining in the trading server, a prevailing exchange rate between the preferred currency and the market currency, wherein the prevailing exchange rate is derived from all exchange rates obtained from the one or more currency exchange servers when the asset is displayed in the preferred currency.

411. For example, Calo discloses:

> Some time prior to step 301, a customer in Australia receives from E*TRADE Global a preview price on a real-time basis for a U.S. equity (such as an individual stock or mutual fund share). A customer normally is expected to place orders based on the currency of the target market in which the security trades. A price in the native currency may also be provided, with this price being based on both the real-time quote for price on the U.S. equity, as well as a real-time conversion from the foreign exchange rates. In any case, the estimated prices are computed automatically through, by, or with information obtained through E*TRADE Global. Calo ¶ 0030.

412. Rude likewise discloses:

413. Price quotations from a foreign securities exchange may be automatically converted to a trader's operating currency and may be displayed by a trading system to the trader in the operating currency, rather than in the local currency in which the quotations are presented on the foreign securities exchange. Rude ¶ 0019.

414. Rude discloses using real-time, prevailing rates:

415. Step 402 continues at 506, where the order processing server 102 converts the local currency quotation information for the security in question to quotation information denominated in the user's operating currency. For example, the local currency bid quotation for the security may be converted using the foreign exchange bid rate between the local and operating currencies; and the local currency ask quotation for the security may be converted using the foreign exchange ask rate between the local and operating currencies. Rude ¶ 0049.

416. The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for

a cross-border trade to the US and an additional “reserve” over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency market. Calo ¶ 0030.

417. Prior to step 700, the E*TRADE Australia system will provide to the Australian customer a preview of the order with estimated proceeds based on the principal amount calculated in USD based on the current US bid price, the AUD equivalent based on the current bid price for USD based on the USD principal amount, less the estimated commissions and fees for a cross-border trade to the U.S. If the customer decides to sell his equities, E*TRADE Australia will vet the order for an existing position in the customer's account and will reserve that position. Calo ¶ 0038.

418. Szoc discloses the volatile nature of exchange rates impedes what could otherwise be straightforward international transactions. Exchange rate volatility introduces financial risk and uncertainty. This risk is absent in transactions in which the currencies of parties to the transaction are the same. Szoc ¶ 0009. Therefore, Szoc provides an interface that includes the scrolling quote bar providing a list of the foreign exchange rates received by the web server from a quote server. Rates are displayed for various currencies with respect to the selected

client's native currency. The scrolling quote bar is customizable at a discretion of the client, whereby the client may change the number of rates displayed, the manner in which they are displayed, the client's native currency, etc. The scrolling quote bar may display real-time, constantly-changing rates. See Szoc FIGS. 4A and 4B and Szoc ¶ 0083 (underlining added).

419. This risk is also identified in Calo: "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater." Calo ¶ 0070. Thus, it also would have been obvious in view of Szoc to update the display of Calo with real-time, constantly-changing rates.

420. Sellberg discloses that when an order is received in a currency other than the market currency, Sellberg teaches to use an updated exchange rate, preferably the last exchange rate just prior to the submitting the order, for performing the transaction. Sellberg ¶¶0023-0025. Many prior art documents were identified that disclose the benefits of using multiple currency exchange rates and/or a favorable rate. See, e.g., Szoc, Muller, Martin, Burge, Kretzschmar, and Karpovich.

iv. conducting a transaction of the asset by transmitting a transaction request from the trading server to the market exchange server when the trader decides to proceed with trading the asset;

421. By definition, the trader initiates and trade, which then must be sent to the market exchange server for execution. See generally, '107 patent, col. 2:15-44. Further, both Calo and Rude provide the trade the opportunity to initiate the trade or not.

> *v. receiving a settlement notification that the transaction of the asset is performed by the market exchange server in accordance with conditions set by the user, wherein the conditions include a price at which the asset is traded in the preferred currency, the trading server determines first a prevailing exchange rate from the currency exchange server in favor of the user when the asset is not priced in the preferred currency and then executes the transaction with the prevailing exchange rate to prevent uncertainty in currency exchanges; and*

422. This element is fulfilled when the transaction (e.g., buy or sell of a security) is made with prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency" because the settlement

notification this condition when a trade is so executed. Calo discloses this element. For instance, Calo discloses:

423. The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for a cross-border trade to the US and an additional "reserve" over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency market…. At step 310, the trade is confirmed to E*TRADE Australia with the USD execution price and principal amount as well as the locked-in AUD value of the trade.

Calo ¶ 0030.

424. Rude does not explicitly state that the price of the trade is based on the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency," but addresses the precise problem "to prevent uncertainty in currency exchanges in another time." Rude provides an example of Fig. 7 whereby a trade is made for a stock on the London stock exchange but the stock it displayed in both Pounds and Dollars. By executing a trade at the real-

time exchange rate, the resulting clearance has the condition met where the settlement price is the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency." Rude states:

425. The result of these transactions (disregarding any other positions the user may have) is that as of the settlement day (assumed to be three days after the day the securities trading order was placed and executed), the user will be long Vodaphone common (100 shares, denominated in GBP), flat GBP, and short USD $21,267.18. Consequently, the transaction from the user's point of view is equivalent to buying 100 shares of Vodaphone at the ask price of $212.67 indicated in the quote information of FIG. 7, and the transaction takes place from the user's point of view in essentially the same manner as a purchase of a domestic security. Thanks to the automatic foreign exchange transaction generated by the trading system in accordance with the invention, the user has effectively settled the foreign securities transaction in USD, the user's operating currency, and has been substantially shielded from currency risk. Rude ¶ 0062.

426. Many prior art documents were identified that disclose the benefits of using multiple currency exchange rates and/or a favorable rate. See, e.g., Szoc, Muller, Martin, Burge, Kretzschmar, and Karpovich.

vi. performing a currency conversion of some portion or all of the transaction from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the prevailing exchange rate.

427. This element may be fulfilled by storing the settlement data in the preferred currency per the prevailing rate. See, e.g., Fig. 5, step 516 of the '107 patent. Both Calo and Rude disclose this step.

428. For instance, Calo discloses that purchased shares "bought by the Australian customer is reflected by a series of book entries" in its system. Calo 0035. The book entries are stored in the E*TRADE Australia in the customer's account. Calo at 0042.

429. Calo also discloses "generating a corresponding foreign exchange order on a real-time basis after an equity order executes by differentiating between payment and settlement currencies on an order record." ¶ 0057.

430. Rude discloses that settlement data is also in the preferred currency using the prevailing exchange rates. Rude discloses automatically converting price quotations from foreign securities exchanges into the trader's operating currency and displays them accordingly. *See* Rude ¶ 0020. When a trader places an order for a foreign security, the system executes the order in the local currency of the

foreign exchange. *Id*. It then determines a net settlement amount based on the execution price and expenses. *Id*. Therefore, it discloses calculating costs and fees for a trade.

431. The net settlement amount is automatically converted to the trader's operating currency through a forward foreign exchange transaction, effectively mitigating foreign exchange risk. *Id*. The system offers options for traders to customize their preferences regarding currency display and automatic foreign exchange conversion Rude ¶ 0024. Overall, Rude teaches to provide a seamless and transparent foreign securities trading experience by simplifying currency conversion and managing foreign exchange transactions automatically. Rude ¶ 0060.

432. Also, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate.

433. Calo discloses that when an Australian customer sells a U.S. equity, "after the equity order is executed, E*TRADE Global transacts a foreign exchange deal prior to confirming the sale of the equity back to E*TRADE Australia. Step 611

includes sending an order to the Global FX facility to sell U.S. dollars for Australian dollars. At step 612, the foreign exchange bank confirms the foreign exchange deal with the Australian dollar counter amount to E*TRADE Global. At step 613, the trade is confirmed to E*TRADE Australia with the USD execution price and principal amount as well as the locked-in AUD value of the trade." Calo ¶ 0036.

434. Likewise, Rude discloses a similar process:

> In response to the determination of the net settlement amount, the process 400 advances to 410, where the order processing server 102 automatically, and without further input from the user beyond the original placement of the securities order at 404, places a foreign exchange order with a currency market 110 to convert the net settlement amount to the user's operating currency. For example, where the underlying securities trading order was for the purchase of a security, the automatically placed foreign exchange trading order may be to buy forward the local currency as of the date of settlement (typically three days after execution) for the securities trading order. Alternatively, the foreign exchange trading order may be a purchase of the local currency on the spot market. In some embodiments, the foreign exchange order may be placed by the server 102 immediately after the net settlement amount is determined. Rude ¶ 0054.

435. As noted above, the '107 patent discloses settling a trade using a forward purchase (in the case of a contract) or a spot purchase (in the case of an equity).

Rude discloses that prevailing rates may include current (spot) and forward rates. Rude ¶ 0020.

436. Kidea discloses systems and methods for displaying on a graphical user interface at least one of stock and other equity type information for trade related actions by a user with an electronic exchange, the displaying being configurable by the user, comprising graphically displaying and updating in substantially real time historical filled order data, unfilled order data; trade related actions made by the user; modifications made by the user. Depth price bands graphically display the real-time depth of the market i.e. the available volume at a particular price. Historical depth of market snapshots, including periodic snapshots, simple average snapshots, weighted average and Max-Min-Open-Close snapshots, can be graphically shown along with real time market data. (Kidea, Abstract.)

437. Numerous other prior art references disclose displaying an asset in a preferred currency. See, e.g., Kretzschmar, Greener, Karpovich, Sellberg, and Kahan.

T. Claim 20 of the '107 patent

438. In my opinion, each and every element of claim 20 was already disclosed by the prior art and the skilled person would have had no problem combining the

teaching of the prior art to derive each and every element of claim 20. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 20 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

20. The non-transitory computer-readable storage medium as recited in claim 19, wherein said conducting a transaction of the asset comprises:

439. See my analysis of claim 19 above.

i. receiving a set of conditions for the transaction to take place; and

440. Both Calo and Rude disclose receiving a limit order. See, e.g., Calo ¶ 0070; Rude ¶ 0051.

ii. monitoring a prevailing exchange rate with the currency exchange server and the market exchange server to ensure that the transaction only happens when the conditions are met with the prevailing exchange rate.

441. Calo discloses to update the limit price of a limit order by marking it to market, thereby ensuring monitoring the prevailing exchange rate to ensure that the limit order only happens when the conditions are met with the prevailing exchange rate. "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater….Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis..." Calo ¶ 0070. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type.

442. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

443. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional risk associated with the exposure to the foreign currency. Davidowitz ¶ 0007. Davidowitz disclosed the need for an automated system that can continuously monitor the various markets and automatically execute transactions <u>based upon the realization of specific parameters chosen by the investor.</u> ¶ 0008 (underlining added). The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

U. Claim 21 of the '107 patent

444. In my opinion, each and every element of claim 21 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 21. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 21 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

21. The non-transitory computer-readable storage medium as recited in claim 20, wherein said monitoring a prevailing exchange rate with the currency exchange server and the market exchange server further comprises:

445. See my analysis of claim 20 above.

i. receiving periodically an updated price of the asset being traded from the market exchange server;

446. Calo discloses monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server and receives market data at least periodically, which would include an updated market value of the asset being traded from the market exchange server. Calo ¶ 0057.

447. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the

transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

448. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional risk associated with the exposure to the foreign currency. Davidowitz ¶ 0007. Davidowitz disclosed the need for an automated system that can <u>continuously monitor the various markets</u> and automatically execute transactions based upon the realization of specific parameters chosen by the investor. ¶ 0008 (underlining added). The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

ii. receiving periodically an updated currency exchange rate from the currency exchange servers when the preferred currency is not identical to the market currency; and

449. Calo discloses monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server and receives an updated prevailing currency exchange rate at least periodically. Calo ¶ 0057.

450. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also

transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

451. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional risk associated with the exposure to the foreign currency. Davidowitz ¶ 0007. Davidowitz disclosed the need for an automated system that can <u>continuously monitor the various markets</u> and automatically execute transactions based upon the realization of specific parameters chosen by the investor. ¶ 0008 (underlining added). The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

iii. determining whether the conditions have been met together with the updated price of the asset and the updated currency exchange rate.

452. Calo discloses performing the transaction only when conditions have been met relating to updated prevailing currency exchange rate from the one or more currency exchange servers at a minimum cost to the user right before the transaction takes place. Namely, this claim involves the embodiment of Fig. 4 of the '107 patent, which is the placement of a limit order. Calo states that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders…. Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis…" Calo ¶ 0070. This means adjusting the price of the limit order based on an updated prevailing currency exchange rate. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type.

453. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is

available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

V. Claim 22 of the '107 patent

454. In my opinion, each and every element of claim 22 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 22. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 22 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *22. The non-transitory computer-readable storage medium as recited in claim 19, wherein, when the preferred currency is identical to the market currency, the transaction is conducted*

directly between the trader and another trader selling or buying the asset without currency conversion.

455. See claim 19 above. This element relates to a currency neutral trade, which is a standard trade when the preferred currency is identical to the market currency. In other words, in the system of Calo, if an Australian customer trades an Australian equity, there is no conversion. The same goes for the Rude system.

456. Calo describes an order management system responsible for a number of trading features.

457. The Order Management System, referred to in FIG. 2 as E*TRADE Global Trading, handles the routing and execution reporting of cross-border transactions (securities and currency) to, as needed, the appropriate affiliate and foreign exchange facility. It therefore is responsible for: 1) routing all non-domestic customer securities orders from the introducing broker/dealer to the executing broker/dealer; 2) routing order status (executions and expirations) from the executing broker to the introducing broker/dealer including local currency value of executions; 3) defining which instruments can be traded in the network (for example, only over-the-counter equities might be traded through the system); 4) identifying and defining the destinations for certain types of instruments if it is not one of the affiliate broker/dealers. Currency transactions, for example will be routed to the foreign exchange facility; 5) managing the routing (and re-routing)

parameters by instrument including currencies; 6) monitoring order and execution activity, including accompanying foreign exchange transactions; 7) reconciling orders and trades, including foreign exchange; 8) generating a corresponding foreign exchange order on a real-time basis after an equity order executes by differentiating between payment and settlement currencies on an order record; 9) defining and developing the procedures for managing exceptions which occur in the order and execution process; adjusting open orders for corporate actions, expirations, and exercises; 10) monitoring open orders against currency fluctuations and notifying the introducing brokers when this exposure occurs; 11) validating cross-border orders against affiliates' positions and trading limits; 12) routing orders based on parameters per security traded in the Global network; 13) automatically placing any foreign exchange deal after execution of an equity trade; 14) placing speculative foreign exchange transactions for cash management purposes; 15) reconciling trades; 16) managing open orders such as expirations and adjustments for corporate actions; and 17) ordering and filling adjustments. (Calo ¶ 0057 (emphasis added).)

458. Calo also discloses that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that

accompanies market orders. With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater. A limit order can potentially be left open for 60 days in the US market, for example, and currency rates can move substantially within that time frame." ¶ 0070. Calo teaches to reduce the risk by "marking-to-the market all open limit orders" on a regular basis. Id. "Mark-to-market" is a well-known practice of valuing assets or liabilities based on their current market value or exchange rates.

W. Claim 23 of the '107 patent

459. In my opinion, each and every element of claim 23 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 23. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 23 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *23. The non-transitory computer-readable storage medium as recited in claim 22, wherein the transaction is conducted across at least two countries.*

460. This is a currency neutral trade but cross border. Since claim 23 depends from claim 22, the preferred currency is the same as the market currency.

X. Claim 24 of the '107 patent

461. In my opinion, each and every element of claim 24 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 24. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 24 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *24. The non-transitory computer-readable storage medium as recited in claim 19, wherein said performing a currency conversion of some portion or all of the transaction amount from the market currency to the preferred currency comprises:*

462. This element may be fulfilled by storing the settlement data in the preferred currency per the prevailing rate. See, e.g., Fig. 5, step 516 of the '107 patent. Both Calo and Rude disclose this step.

463. For instance, Calo discloses that purchased shares "bought by the Australian customer is reflected by a series of book entries" in its system. Calo 0035. The book entries are stored in the E*TRADE Australia in the customer's account. Calo ¶ 0042.

464. Calo also discloses "generating a corresponding foreign exchange order on a real-time basis after an equity order executes by differentiating between payment and settlement currencies on an order record." ¶ 0057.

465. Rude discloses that settlement data is also in the preferred currency using the prevailing exchange rates. Rude discloses automatically converting price quotations from foreign securities exchanges into the trader's operating currency and displays them accordingly. Rude ¶ 0020. When a trader places an order for a foreign security, the system executes the order in the local currency of the foreign exchange. Id. It then determines a net settlement amount based on the execution price and expenses. Id. Therefore, it discloses calculating costs and fees for a trade.

466. The net settlement amount is automatically converted to the trader's operating currency through a forward foreign exchange transaction, effectively

mitigating foreign exchange risk. Id. The system offers options for traders to customize their preferences regarding currency display and automatic foreign exchange conversion Rude ¶ 0024. Overall, Rude teaches to provide a seamless and transparent foreign securities trading experience by simplifying currency conversion and managing foreign exchange transactions automatically. Rude ¶ 0060.

467. Also, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate.

468. Calo discloses that when an Australian customer sells a U.S. equity, "after the equity order is executed, E*TRADE Global transacts a foreign exchange deal prior to confirming the sale of the equity back to E*TRADE Australia. Step 611 includes sending an order to the Global FX facility to sell U.S. dollars for Australian dollars. At step 612, the foreign exchange bank confirms the foreign exchange deal with the Australian dollar counter amount to E*TRADE Global. At step 613, the trade is confirmed to E*TRADE Australia with the USD execution

price and principal amount as well as the locked-in AUD value of the trade." Calo ¶ 0036.

469. Likewise, Rude discloses as similar process:

> In response to the determination of the net settlement amount, the process 400 advances to 410, where the order processing server 102 automatically, and without further input from the user beyond the original placement of the securities order at 404, places a foreign exchange order with a currency market 110 to convert the net settlement amount to the user's operating currency. For example, where the underlying securities trading order was for the purchase of a security, the automatically placed foreign exchange trading order may be to buy forward the local currency as of the date of settlement (typically three days after execution) for the securities trading order. Alternatively, the foreign exchange trading order may be a purchase of the local currency on the spot market. In some embodiments, the foreign exchange order may be placed by the server 102 immediately after the net settlement amount is determined. Rude ¶ 0054.

470. As noted above, the '107 patent discloses settling a trade using a forward purchase (in the case of a contract) or a spot purchase (in the case of an equity). Rude discloses that prevailing rates may include current (spot) and forward rates. Rude ¶ 0020.

471. Kidea discloses systems and methods for displaying on a graphical user interface at least one of stock and other equity type information for trade related actions by a user with an electronic exchange, the displaying being configurable by

the user, comprising graphically displaying and updating in substantially real time historical filled order data, unfilled order data; trade related actions made by the user; modifications made by the user. Depth price bands graphically display the real-time depth of the market i.e. the available volume at a particular price. Historical depth of market snapshots, including periodic snapshots, simple average snapshots, weighted average and Max-Min-Open-Close snapshots, can be graphically shown along with real time market data. (Kidea, Abstract.)

i. receiving a set of conditions for the transaction to take place;

472. Both Calo and Rude disclose receiving a limit order. See, e.g., Calo ¶ 0070; Rude ¶ 0051.

ii. monitoring the conditions for currency conversion in conjunction with the currency exchange server and the market exchange server, and

473. Calo discloses to update the limit price of a limit order by marking it to market, thereby ensuring monitoring the prevailing exchange rate to ensure that the limit order only happens when the conditions are met with the prevailing exchange rate. "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater….Another means to reduce risk from limit orders is

marking-to-the market all open limit orders on a regular basis..." Calo ¶ 0070. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type.

474. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101. See also Sellberg ¶0028.

475. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional <u>risk associated with the exposure to the foreign currency.</u> Davidowitz ¶ 0007 (underlining added). Davidowitz disclosed the need for an automated system that can <u>continuously</u> monitor the various markets and automatically execute transactions based upon the realization of specific parameters chosen by the investor. ¶ 0008 (underlining added). The

system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

iii. performing the currency conversion only when the conditions for currency conversion have been met.

476. The concept of "portion" was introduced during prosecution and has no verbatim support in the common Specification. Nevertheless, market orders and limit orders can be partially filled. When that occurs, execution information is sent from the exchange to the broker. Calo naturally, would perform the currency conversion only on a second portion of the transaction that was bought or sold from another trader with a different preferred currency. For example, each partial fill would be treated as an execution. As already described above, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate. Of course, if the trade was made in the same currency as the preferred currency, no conversion would be done.

477. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

Y. Claim 25 of the '107 patent

478. In my opinion, each and every element of claim 25 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 25. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 25 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

25. The non-transitory computer-readable storage medium as recited in claim 24, wherein said monitoring the conditions for currency conversion comprises

479. See my analysis of claim 24

i. determining how much of the asset has been transacted on the market exchange server; and

480. By definition, an open limit order can be partially filled. Calo discloses that its system monitors limit orders, which would include how much of the asset has been transacted on a market exchange server. See, e.g., Calo ¶ 0070.

481. It was well known in the art to monitor open orders to determine how much of the asset has been transacted. See, e.g., Selleck ¶ 0142 ("system warning trading if order getting close to being filled.") Bok monitoring open orders. Bok passim. Waelbroeck et al. ("When shares [of an open order] are successfully executed, remove them from "Working" and add them to "Filled." If shares are canceled (as in a partial fill, a rejected execution, or a user cancel), remove them from "Working."")

ii. determining when a price of the asset exceeds a predetermined or dynamically determined threshold value.

482. Limit orders by definition involve making this determination. Calo discloses that its consolidated trading platform includes monitoring open orders including limit orders. See above.

Z. Claim 26 of the '107 patent

483. In my opinion, each and every element of claim 26 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 26. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 26 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

26. The non-transitory computer-readable storage medium as recited in claim 19, wherein the transaction includes first and second portions, and said performing a currency conversion of some portion or all of the transaction comprises:

484. See my analysis of claim 19.

i. analyzing any purchases or sales making up the transaction of the asset in the market currency to determine when the first portion of the transaction was bought or sold from another trader with the same preferred currency as the trader was performing said transaction; and

485. The concept of "portion" was introduced during prosecution and has no verbatim support in the common Specification. Nevertheless, market orders and limit orders can be partially filled. When that occurs, execution information is sent from the exchange to the broker. Calo naturally, would perform the currency conversion only on a second portion of the transaction that was bought or sold from another trader with a different preferred currency. For example, each partial fill would be treated as an execution. As already described above, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate. Of course, if the trade was made in the same currency as the preferred currency, no conversion would be done.

486. Kidea discloses systems and methods for displaying on a graphical user interface at least one of stock and other equity type information for trade related actions by a user with an electronic exchange, the displaying being configurable by the user, comprising graphically displaying and updating in substantially real time historical filled order data, unfilled order data; trade related actions made by the user; modifications made by the user. Depth price bands graphically display the real-time depth of the market i.e. the available volume at a particular price. Historical depth of market snapshots, including periodic snapshots, simple average snapshots, weighted average and Max-Min-Open-Close snapshots, can be graphically shown along with real time market data. (Kidea, Abstract.)

ii. performing a currency conversion only on the second portion of the transaction where the second portion was bought or sold from another trader with a different preferred currency.

487. The concept of "portion" was introduced during prosecution and has no verbatim support in the common Specification. Nevertheless, market orders and limit orders can be partially filled. When that occurs, execution information is sent from the exchange to the broker. Calo naturally, would perform the currency conversion only on a second portion of the transaction that was bought or sold from another trader with a different preferred currency. For example, each partial

fill would be treated as an execution. As already described above, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate. Of course, if the trade was made in the same currency as the preferred currency, no conversion would be done.

488. Kidea discloses systems and methods for displaying on a graphical user interface at least one of stock and other equity type information for trade related actions by a user with an electronic exchange, the displaying being configurable by the user, comprising graphically displaying and updating in substantially real time historical filled order data, unfilled order data; trade related actions made by the user; modifications made by the user. Depth price bands graphically display the real-time depth of the market i.e. the available volume at a particular price. Historical depth of market snapshots, including periodic snapshots, simple average snapshots, weighted average and Max-Min-Open-Close snapshots, can be graphically shown along with real time market data. (Kidea, Abstract.)

AA. Independent Claim 27 of the ’107 patent

489. In my opinion, each and every element of claim 27 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 27. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 27 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *27. A non-transitory computer-readable storage medium with an executable software product providing a consolidated trading platform, a trading server configured to execute the software product to perform operations comprising:*

490. Calo and Rude both describe a consolidated trading platforms of the same kind as the one disclosed and claims in the ’107 patent. For example, Calo discloses a trading platform with a three-tier network in Fig. 2.

491. “The E*TRADE Global hub 210 supports a Foreign Exchange Facility 211, an order management system 212 and a brokerage operation system 213 internally.

E*TRADE Global 210 also interfaces with a Foreign Exchange (FX) liquidity bank 215, and its own global settlement bank 216." Calo ¶ 0027.

492. Likewise, Rude discloses a consolidated trading platform in Fig. 1.

493. As depicted, trading system 100 includes an order processing server 102 in communication with one or more user device(s) 104, a plurality of securities exchanges 106, and a source or sources 108 of current securities price quotations. Some or all of the sources 108 of price quotations may, but need not, be integrated with the securities exchanges 106. The order processing server 102 is also in communication with one or more currency (foreign exchange) markets 110, and one or more sources 112 of foreign exchange price quotations. Some or all of the sources 112 of foreign exchange price quotations may be integrated with the currency markets 110. (Rude ¶ 0021.)

i. coupling the trading server to one or more currency exchange servers and a market exchange server;

494. Calo discloses a trading platform with a three-tier network in Fig. 2 coupling a trading server to one or more currency exchange servers and one or more market exchange servers. Calo ¶ 0027.

495. Likewise, Rude discloses a consolidated trading platform in Fig. 1 coupling a trading server to one or more currency exchange servers and one or more market exchange servers. Rude ¶ 0021.

ii. receiving an indicator of a preferred currency by a trader;

496. Calo discloses that its system may provide price of a security in the "native," or preferred currency. Calo ¶ 0030. Calo does not explicitly disclose that an indicator of the preferred currency is received from a trader although it is implied by the architecture disclosed by Calo.

497. Rude also discloses that a trading system may provide quotes in an "operating" currency rather than the currency local to the market where an asset is traded. E.g., Rude ¶ 0019. Rude also discloses that the user, i.e., the trader, may choose to have the system automatically convert "quotes of security prices tin local currencies to his/her operating currency…" Rude ¶ 0060. The user device 104 exchanges information with the order processing server 102. See, e.g., Rude ¶ 0029. The order processing server performs the bulk of the processing steps described in Rude (Rude ¶ 0036) including conversion of quotes from a local (market) currency to the operating (preferred) currency. See, e.g., Rude ¶¶ 0047-49.

498. In some embodiments, the user interface of the user device 104, in cooperation with the order processing server 102, may present one or more screen displays (not shown) to the user, to permit the user to select in advance for his or her operation of the user device options as to whether foreign securities quotations are to be provided in an operating currency designated by the user or in the local currencies in which the foreign securities trade. Similarly, the system may present the user with advance options as to whether or not the system should automatically place a foreign exchange trading order indicated at 410 in FIG. 4 in response to execution of each foreign securities trading order. In some embodiments, a screen display (not shown) which allows the user to place the foreign securities trading order may also present to the user an option to override a previously indicated preference for an automatic follow-up foreign exchange trading order to fund the foreign securities trading order. Calo ¶ 0058.

iii. determining whether an asset is being chosen for trading;

499. Initial input is received from a user to direct the securities trading system to place on a securities exchange a securities trading order for purchase or sale of a security. Calo ¶ 0005

iv. determining a market currency of the asset being traded;

500. A net settlement amount is determined for the securities trading order in a local currency of the securities exchange. Calo ¶ 0005

v. receiving a currency exchange rate from the market exchange server when the preferred currency is not identical to the market currency;

501. Calo discloses that its system may provide price of a security in the "native," or preferred currency. Calo ¶ 0030.

502. In some embodiments, the user interface of the user device 104, in cooperation with the order processing server 102, may present one or more screen displays (not shown) to the user, to permit the user to select in advance for his or her operation of the user device options as to whether foreign securities quotations are to be provided in an operating currency designated by the user or in the local currencies in which the foreign securities trade. Similarly, the system may present the user with advance options as to whether or not the system should automatically place a foreign exchange trading order indicated at 410 in FIG. 4 in response to execution of each foreign securities trading order. In some embodiments, a screen display (not shown) which allows the user to place the foreign securities trading order may also present to the user an option to override a previously indicated

preference for an automatic follow-up foreign exchange trading order to fund the foreign securities trading order. Calo ¶ 0058

503. Rude also discloses that a trading system may provide quotes in an "operating" currency rather than the currency local to the market where an asset is traded. E.g., Rude ¶ 0019. Rude also discloses that the user, i.e., the trader, may choose to have the system automatically convert "quotes of security prices in local currencies to his/her operating currency…" Rude ¶ 0060. The user device 104 exchanges information with the order processing server 102. See, e.g., Rude ¶ 0029. The order processing server performs the bulk of the processing steps described in Rude (Rude ¶ 0036) including conversion of quotes from a local (market) currency to the operating (preferred) currency. See, e.g., Rude ¶¶ 0047-49.

504. Sellberg discloses, in an automated trading system wherein orders in an instrument in a specified currency are received and a trade in the instrument is performed when, for a certain volume of the instrument, a bid price matches an ask price, a method for automatically generating an order in the instrument in the specified currency. The method includes receiving from a current exchange rate between a currency other than the specified currency and the specified currency;

receiving from a trader an order in the instrument in the other currency; calculating a price of the order in the specified currency based on the received order and the current exchange rate; and generating the order in the instrument in the specified currency. See Abstract.

v. receiving a price of the asset being traded from the market exchange server, the price shown in the trading server being in the preferred currency converted with the currency exchange rate;

505. Calo discloses, among other things, "a customer in Australia receives from E*TRADE Global a preview price on a real-time basis for a U.S. equity (such as an individual stock or mutual fund share). A customer normally is expected to place orders based on the currency of the target market in which the security trades. A price in the native currency may also be provided, with this price being based on both the real-time quote for price on the U.S. equity, as well as a real-time conversion from the foreign exchange rates. In any case, the estimated prices are computed automatically through, by, or with information obtained through E*TRADE Global." ¶ 0030.

506. Rude discloses automatically converting price quotations from foreign securities exchanges into the trader's operating currency and displays them accordingly. Rude ¶ 0020. When a trader places an order for a foreign security, the

system executes the order in the local currency of the foreign exchange. Id. It then determines a net settlement amount based on the execution price and expenses. Id. 507. Szoc discloses an interface that includes the scrolling quote bar providing a list of the foreign exchange rates received by the web server from a quote server. Rates are displayed for various currencies with respect to the selected client's native currency. The scrolling quote bar is customizable at a discretion of the client, whereby the client may change the number of rates displayed, the manner in which they are displayed, the client's native currency, etc. <u>The scrolling quote bar may display real-time, constantly-changing rates.</u> See FIGS. 4A and 4B and ¶ 0083 (underlining added).

> *vii. displaying all costs and fees in the preferred currency to own or sell the asset, wherein the all costs and fees are dynamically changed in accordance with the currency exchange rate constantly updated, a value of the asset being displayed changes as the currency exchange rate changes, even when a market value of the asset remains unchanged, wherein the trader has certain knowledge of what to pay for the asset, or profit or loss when acting on the asset;*

508. Calo discloses that all costs and fees are displayed prior to a trade in the preferred currency and are updated in real time:

509. The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for a cross-border trade to the US and an additional "reserve" over the previous amounts to allow for fluctuations in both the US equity and USD/AUD currency market. Calo ¶ 0030.

510. Prior to step 700, the E*TRADE Australia system will provide to the Australian customer a preview of the order with estimated proceeds based on the principal amount calculated in USD based on the current US bid price, the AUD equivalent based on the current bid price for USD based on the USD principal amount, less the estimated commissions and fees for a cross-border trade to the U.S. If the customer decides to sell his equities, E*TRADE Australia will vet the order for an existing position in the customer's account and will reserve that position. Calo ¶ 0038.

511. Rude discloses automatically converting price quotations from foreign securities exchanges into the trader's operating currency and displays them accordingly. Rude ¶ 0020. When a trader places an order for a foreign security, the system executes the order in the local currency of the foreign exchange. Id. It then determines a net settlement amount based on the execution price and expenses. Id. Therefore, it discloses calculating costs and fees for a trade.

512. The net settlement amount is automatically converted to the trader's operating currency through a forward foreign exchange transaction, effectively mitigating foreign exchange risk. Id. The system offers options for traders to customize their preferences regarding currency display and automatic foreign exchange conversion Rude ¶ 0024. Overall, Rude teaches to provide a seamless and transparent foreign securities trading experience by simplifying currency conversion and managing foreign exchange transactions automatically. Rude ¶ 0060.

513. Szoc discloses an interface that includes the scrolling quote bar providing a list of the foreign exchange rates received by the web server from a quote server. Rates are displayed for various currencies with respect to the selected client's native currency. The scrolling quote bar is customizable at a discretion of the

client, whereby the client may change the number of rates displayed, the manner in which they are displayed, the client's native currency, etc. The scrolling quote bar may display real-time, constantly-changing rates. See Szoc, FIGS. 4A and 4B and ¶ 0083 (underlining added).

514. Numerous other prior art references disclose displaying an asset in a preferred currency. See, e.g., Kretzschmar, Greener, Karpovich, Sellberg, and Kahan.

viii. executing the transaction of the asset with a prevailing exchange rate obtained at an instance of the transaction to prevent uncertainty in currency exchanges late, wherein the prevailing exchange rate is obtained from all exchange rates obtained from the one or more currency exchange servers right before the transaction takes place; and

515. Calo discloses performing the transaction only when conditions have been met relating to updated prevailing currency exchange rate from the one or more currency exchange servers at a minimum cost to the user right before the transaction takes place. Namely, this claim involves the embodiment of Fig. 4 of the ’107 patent, which is the placement of a limit order. Calo states that “[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders….

Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis…" Calo ¶ 0070. This means adjusting the price of the limit order based on an updated prevailing currency exchange rate.

516. Rude does not explicitly state that the price of the trade is based on the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency," but addresses the precise problem "to prevent uncertainty in currency exchanges in another time." Rude provides an example of Fig. 7 whereby a trade is made for a stock on the London stock exchange but the stock it displayed in both Pounds and Dollars. By executing a trade at the real-time exchange rate, the resulting clearance has the condition met where the settlement price is the prevailing exchange rate "right before the transaction takes place when the asset is not priced in the preferred currency." Rude states:

517. The result of these transactions (disregarding any other positions the user may have) is that as of the settlement day (assumed to be three days after the day the securities trading order was placed and executed), the user will be long Vodaphone common (100 shares, denominated in GBP), flat GBP, and short USD $21,267.18. Consequently, the transaction from the user's point of view is equivalent to buying 100 shares of Vodaphone at the ask price of $212.67

indicated in the quote information of FIG. 7, and the transaction takes place from the user's point of view in essentially the same manner as a purchase of a domestic security. Thanks to the automatic foreign exchange transaction generated by the trading system in accordance with the invention, the user has effectively settled the foreign securities transaction in USD, the user's operating currency, and has been substantially shielded from currency risk. Rude ¶ 0062.

518. Many prior art documents were identified that disclose the benefits of using multiple currency exchange rates and/or a favorable rate. See, e.g., Szoc, Muller, Martin, Burge, Kretzschmar, and Karpovich.

ix. showing a settlement of the transaction of the asset in the preferred currency.

519. Calo discloses that all costs and fees are displayed prior to a trade in the preferred currency and are updated in real time:

520. The customer places the order with a cost estimate based on the real-time quotes for the security. At step 302, E*TRADE Australia provides a preview of the order and vets against the buying power of the customer to reserve the sum of the principal amount calculated in U.S. dollars (USD) based on the current U.S. ask price, the Australian dollar (AUD) equivalent based on the current ask price for USD based on the USD principal amount, the estimated commissions and fees for a cross-border trade to the US and an additional “reserve” over the previous

amounts to allow for fluctuations in both the US equity and USD/AUD currency market. Calo ¶ 0030.

521. Prior to step 700, the E*TRADE Australia system will provide to the Australian customer a preview of the order with estimated proceeds based on the principal amount calculated in USD based on the current US bid price, the AUD equivalent based on the current bid price for USD based on the USD principal amount, less the estimated commissions and fees for a cross-border trade to the U.S. If the customer decides to sell his equities, E*TRADE Australia will vet the order for an existing position in the customer's account and will reserve that position. Calo ¶ 0038.

522. Moreover, there are many prior art references that tout the need for real-time, dynamically updated, or constantly updated data in the trading context in order to reduce risk. For example, Szoc discloses the volatile nature of exchange rates impedes what could otherwise be straightforward international transactions. Exchange rate volatility introduces financial risk and uncertainty. This risk is absent in transactions in which the currencies of parties to the transaction are the same. Szoc ¶ 0009. Therefore, Szoc provides an interface that includes the scrolling quote bar providing a list of the foreign exchange rates received by the

web server from a quote server. Rates are displayed for various currencies with respect to the selected client's native currency. The scrolling quote bar is customizable at a discretion of the client, whereby the client may change the number of rates displayed, the manner in which they are displayed, the client's native currency, etc. The scrolling quote bar may display real-time, constantly-changing rates. See Szoc FIGS. 4A and 4B and Szoc ¶ 0083 (underlining added).

523. This risk is also identified in Calo: "With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater." Calo ¶ 0070. Thus, it also would have been obvious in view of Szoc to update the display of Calo with real-time, constantly-changing rates.

524. Sellberg discloses, in an automated trading system wherein orders in an instrument in a specified currency are received and a trade in the instrument is performed when, for a certain volume of the instrument, a bid price matches an ask price, a method for automatically generating an order in the instrument in the specified currency. The method includes receiving from a current exchange rate between a currency other than the specified currency and the specified currency; receiving from a trader an order in the instrument in the other currency; calculating a price of the order in the specified currency based on the received order and the current exchange rate; and generating the order in the instrument in the specified currency. Sellberg, Abstract. Sellberg discloses that an updated exchange rate

between the other currency and the specified currency is received repeatedly and automatically, and the last received updated exchange rate between the other currency and the specified currency at the time of calculating the price is defined as the received current exchange rate. Sellberg, claim 3

525. Numerous other prior art references disclose displaying an asset in a preferred currency. See, e.g., Kretzschmar, Greener, Karpovich, and Kahan.

BB. Claim 28 of the '107 patent

526. In my opinion, each and every element of claim 28 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 28. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 28 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

28. The non-transitory computer-readable storage medium as recited in claim 27, wherein said executing the

transaction of the asset with the prevailing currency exchange rate comprises:

527. See my analysis of claim 27 above.

i. conducting the transaction of the asset when the trader decided to proceed with trading the asset; and

528. This element is fulfilled by the trader selecting to proceed with the trade, which both Calo and Rude disclose. For instance, Calo discloses:

529. Prior to step 800, the E*TRADE Australia system will provide to the Australian customer a preview of the order with estimated proceeds based on the principal amount calculated in USD based on the current US bid price, the AUD equivalent based on the current bid price for USD based on the USD principal amount, less the estimated commissions and fees for a cross-border trade to the U.S. If the customer decides to sell his equities, E*TRADE Australia will vet the order for an existing position in the customer's account and will reserve that position. The trade and foreign exchange deals are executed and confirmed at step 800 at time T+0. Calo ¶ 0040.

530. Likewise, Rude discloses:

Step 402 continues at 508, where the user device 104 displays on the display 306 the operating currency security price quotation information generated at 506. An example of such operating currency

security price quotation information is shown, as noted above, in FIG. 7.

Referring again to FIG. 4, the process 400 advances to 404 where a securities trading order for a foreign security is received. In some embodiments, the order may be submitted as user input directly from a user device 102 to order processing server 102.

Rude ¶ 0050-51.

ii. performing a currency exchange of the settlement in the market currency to the preferred currency with the prevailing currency exchange rate when the preferred currency is not identical to the market currency so that the transaction is no longer subject to currency fluctuation at a later time.

531. Both Calo and Rude disclose this step.

532. For instance, Calo discloses that purchased shares "bought by the Australian customer is reflected by a series of book entries" in its system. Calo 0035. The book entries are stored in the E*TRADE Australia in the customer's account. Calo ¶ 0042.

533. Calo also discloses "generating a corresponding foreign exchange order on a real-time basis after an equity order executes by differentiating between payment and settlement currencies on an order record." Calo ¶ 0057.

534. Rude discloses that settlement data is also in the preferred currency using the prevailing exchange rates. Rude discloses automatically converting price quotations from foreign securities exchanges into the trader's operating currency and displays them accordingly. Rude ¶ 0020. When a trader places an order for a foreign security, the system executes the order in the local currency of the foreign exchange. Id. It then determines a net settlement amount based on the execution price and expenses. Id. Therefore, it discloses calculating costs and fees for a trade.

535. The net settlement amount is automatically converted to the trader's operating currency through a forward foreign exchange transaction, effectively mitigating foreign exchange risk. Id. The system offers options for traders to customize their preferences regarding currency display and automatic foreign exchange conversion Rude ¶ 0024. Overall, Rude teaches to provide a seamless and transparent foreign securities trading experience by simplifying currency conversion and managing foreign exchange transactions automatically. Rude ¶ 0060.

536. Also, both Calo and Rude disclose making a currency trade at the time of execution of the transaction to convert from the market currency to the preferred currency when the preferred currency is not identical to the market currency, the conversion being performed with the calculated prevailing exchange rate.

537. Calo discloses that when an Australian customer sells a U.S. equity, "after the equity order is executed, E*TRADE Global transacts a foreign exchange deal prior to confirming the sale of the equity back to E*TRADE Australia. Step 611 includes sending an order to the Global FX facility to sell U.S. dollars for Australian dollars. At step 612, the foreign exchange bank confirms the foreign exchange deal with the Australian dollar counter amount to E*TRADE Global. At step 613, the trade is confirmed to E*TRADE Australia with the USD execution price and principal amount as well as the locked-in AUD value of the trade." Calo ¶ 0036.

538. Likewise, Rude discloses as similar process:

> 539. In response to the determination of the net settlement amount, the process 400 advances to 410, where the order processing server 102 automatically, and without further input from the user beyond the original placement of the securities order at 404, places a foreign exchange order with a currency market 110 to convert the net settlement amount to the user's

> operating currency. For example, where the underlying securities trading order was for the purchase of a security, the automatically placed foreign exchange trading order may be to buy forward the local currency as of the date of settlement (typically three days after execution) for the securities trading order. Alternatively, the foreign exchange trading order may be a purchase of the local currency on the spot market. In some embodiments, the foreign exchange order may be placed by the server 102 immediately after the net settlement amount is determined. Rude ¶ 0054.

540. As noted above, the '107 patent disclose settling a trade using a forward purchase (in the case of a contract) or a spot purchase (in the case of an equity). Rude discloses that prevailing rates may include current (spot) and forward rates. Rude ¶ 0020.

CC. Claim 29 of the '107 patent

541. In my opinion, each and every element of claim 29 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 29. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 29 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

29. The non-transitory computer-readable storage medium as recited in claim 28, wherein the currency exchange is conducted in the currency exchange server per the prevailing currency exchange rate.

542. Calo and Rude perform a currency exchange of the settlement in the market currency to the preferred currency at the locked in rate so that the transaction is no longer subject to currency fluctuation at a later time. Calo ¶0030. See also, Rude ¶0062. See also my analysis of element11(i) above.

DD. Claim 30 of the '107 patent

543. In my opinion, each and every element of claim 30 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 30. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 30 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

30. The non-transitory computer-readable storage medium as recited in claim 27, further comprising providing a currency conversion at a transactional level so that a trader knows exactly what ends up with the transaction of the asset.

544. Calo, Rude, Sellberg and Szoc all provide currency conversion on the transactional level. See my analysis of claims 9 and 10.

EE. Claim 31 of the '107 patent

545. In my opinion, each and every element of claim 31 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 31. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 31 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

31. The non-transitory computer-readable storage medium as recited in claim 27, wherein said determining whether an asset is being chosen for trading comprises:

546. See my analysis of claim 27 above.

i. receiving a set of conditions for the transaction of the asset; and

547. Both Calo and Rude disclose receiving a limit order. See, e.g., Calo ¶ 0070; Rude ¶ 0051.

548. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

ii. monitoring the conditions in conjunction with the currency exchange server and the market exchange server.

549. Calo discloses to update the limit price of a limit order by marking it to market, thereby ensuring monitoring the prevailing exchange rate to ensure that the limit order only happens when the conditions are met with the prevailing exchange rate. "With cross-border trades, however, the currency exchange risks remain and

may, in fact, be greater….Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis..." Calo ¶ 0070. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type.

550. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

551. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional <u>risk associated with the exposure to the foreign currency.</u> Davidowitz ¶ 0007 (underlining added). Davidowitz disclosed the need for an automated system that can <u>continuously</u> monitor the various markets and automatically execute transactions based upon the realization of

specific parameters chosen by the investor. ¶ 0008 (underlining added). The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

FF. Claim 32 of the ’107 patent

552. In my opinion, each and every element of claim 32 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 32. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 32 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *32. The non-transitory computer-readable storage medium as recited in claim 31, wherein said monitoring the conditions in conjunction with the currency exchange server and the market exchange server further comprises:*

553. See my analysis of claim 31.

i. retrieving periodically the price of the asset being traded from the market exchange server;

554. Calo discloses monitoring the conditions in conjunction with the one or more currency exchange servers and the market exchange server and receives market data at least periodically, which would include an updated market value of the asset being traded from the market exchange server. Calo ¶ 0057.

555. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

556. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional <u>risk associated with the exposure to the foreign currency.</u> Davidowitz ¶ 0007 (underlining added). Davidowitz disclosed the need for an automated system that can <u>continuously</u> monitor the various

markets and automatically execute transactions based upon the realization of specific parameters chosen by the investor. ¶ 0008 (underlining added). The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

ii. prevailing periodically the currency exchange rate from the market exchange server when the preferred currency is not identical to the market currency; and

557. Calo discloses monitors the conditions in conjunction with the one or more currency exchange servers and the market exchange server and receives an updated prevailing currency exchange rate at least periodically. Calo ¶ 0057.

558. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the

transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

559. Davidowitz teaches that when buying and selling securities in a foreign currency, the entity buying and selling the securities is exposed not only to typical market risks, but also to the additional risk associated with the exposure to the foreign currency. Davidowitz ¶ 0007 (underlining added). Davidowitz disclosed the need for an automated system that can continuously monitor the various markets and automatically execute transactions based upon the realization of specific parameters chosen by the investor. ¶ 0008 (underlining added). The system should monitor the relationships between securities in various foreign currencies and revalue such securities into a single currency in order to facilitate an investor's trading strategy. Id.

iii. determining whether the conditions have been met together with the retrieved price of the asset and the retrieved currency exchange rate.

560. Calo disclose performing the transaction only when conditions have been met relating to updated prevailing currency exchange rate from the one or more currency exchange servers at a minimum cost to the user right before the transaction takes place. Namely, this claim involves the embodiment of Fig. 4 of the ’107 patent, which is the placement of a limit order. Calo states that “[l]imit

orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders…. Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis…" Calo ¶ 0070. This means adjusting the price of the limit order based on an updated prevailing currency exchange rate. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type.

561. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101. See also Sellberg 0028.

GG. Claim 33 of the ’107 patent

562. In my opinion, each and every element of claim 33 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 33. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 33 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *33. The non-transitory computer-readable storage medium as recited in claim 32, wherein the transaction of the asset only happens when the conditions have been met together with the retrieved price of the asset and the retrieved currency exchange rate.*

563. Calo disclose performing the transaction only when conditions have been met relating to updated prevailing currency exchange rate from the one or more currency exchange servers at a minimum cost to the user right before the transaction takes place. Namely, this claim involves the embodiment of Fig. 4 of the ’107 patent, which is the placement of a limit order. Calo states that “[l]imit

orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders…. Another means to reduce risk from limit orders is marking-to-the market all open limit orders on a regular basis…" Calo ¶ 0070. This means adjusting the price of the limit order based on an updated prevailing currency exchange rate. As I mention above, order conditions (such as asset identifiers, prices, buy/sell limit prices, "good till" restrictions, etc…) are routine and necessary components of various trade types (e.g., market or limit orders). A trader cannot trade electronically without the conditions required by the trade type.

564. Szoc discloses an embodiment where a client is able to enter not only present transactions and transactions set to execute at a specific time, but also transactions that will execute only when and if a specific foreign exchange rate is available. These limit transactions, or standing orders, are entered in the same manner as the present and future orders discussed, with the exception that a client must also enter a desired exchange rate. If the desired rate is achieved, the transaction will execute. Otherwise, the transaction may be set to expire after any passage of any chosen period of time. Szoc ¶ 0101.

HH. Claim 34 of the ’107 patent

565. In my opinion, each and every element of claim 34 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 34. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 34 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *34. The non-transitory computer-readable storage medium as recited in claim 27, wherein, when the preferred currency is identical to the market currency, the transaction is conducted directly between the trader and another trader selling or buying the asset.*

566. This element relates to a currency neutral trade, which is a standard trade when the preferred currency is identical to the market currency. In other words, in the system of Calo, if an Australian customer trades an Australian equity, there is no conversion. The same goes for the Rude system.

567. Calo describes an order management system responsible for a number of trading features.

568. The Order Management System, referred to in FIG. 2 as E*TRADE Global Trading, handles the routing and execution reporting of cross-border transactions (securities and currency) to, as needed, the appropriate affiliate and foreign exchange facility. It therefore is responsible for: 1) routing all non-domestic customer securities orders from the introducing broker/dealer to the executing broker/dealer; 2) routing order status (executions and expirations) from the executing broker to the introducing broker/dealer including local currency value of executions; 3) defining which instruments can be traded in the network (for example, only over-the-counter equities might be traded through the system); 4) identifying and defining the destinations for certain types of instruments if it is not one of the affiliate broker/dealers. Currency transactions, for example will be routed to the foreign exchange facility; 5) managing the routing (and re-routing) parameters by instrument including currencies; 6) monitoring order and execution activity, including accompanying foreign exchange transactions; 7) reconciling orders and trades, including foreign exchange; 8) generating a corresponding foreign exchange order on a real-time basis after an equity order executes by

differentiating between payment and settlement currencies on an order record; 9) defining and developing the procedures for managing exceptions which occur in the order and execution process; adjusting open orders for corporate actions, expirations, and exercises; 10) monitoring open orders against currency fluctuations and notifying the introducing brokers when this exposure occurs; 11) validating cross-border orders against affiliates' positions and trading limits; 12) routing orders based on parameters per security traded in the Global network; 13) automatically placing any foreign exchange deal after execution of an equity trade; 14) placing speculative foreign exchange transactions for cash management purposes; 15) reconciling trades; 16) managing open orders such as expirations and adjustments for corporate actions; and 17) ordering and filling adjustments. (Calo ¶ 0057 (emphasis added).)

569. Calo also discloses that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders. With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater. A limit order can potentially be left open for 60 days in the US market, for example, and currency rates can move substantially within that time frame." ¶ 0070 (underlining added). Calo teaches to reduce the risk by "marking-to-the market all open limit orders" on a regular basis.

Id. "Mark-to-market" is a well-known practice of valuing assets or liabilities based on their current market value or exchange rates.

II. Claim 35 of the ’107 patent

570. In my opinion, each and every element of claim 35 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 35. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 35 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *35. The non-transitory computer-readable storage medium as recited in claim 27, further comprising: analyzing orders and purchases/sales to determine whether or not the trader and another trader selling or buying the asset are matched without currency conversion, when the preferred currency of the trader is identical to a currency of the another*

trader while the market currency is different from the preferred currency.

571. Calo describes an order management system responsible for a number of trading features.

572. The Order Management System, referred to in FIG. 2 as E*TRADE Global Trading, handles the routing and execution reporting of cross-border transactions (securities and currency) to, as needed, the appropriate affiliate and foreign exchange facility. It therefore is responsible for: 1) routing all non-domestic customer securities orders from the introducing broker/dealer to the executing broker/dealer; 2) routing order status (executions and expirations) from the executing broker to the introducing broker/dealer including local currency value of executions; 3) defining which instruments can be traded in the network (for example, only over-the-counter equities might be traded through the system); 4) identifying and defining the destinations for certain types of instruments if it is not one of the affiliate broker/dealers. Currency transactions, for example will be routed to the foreign exchange facility; 5) managing the routing (and re-routing) parameters by instrument including currencies; 6) monitoring order and execution activity, including accompanying foreign exchange transactions; 7) reconciling orders and trades, including foreign exchange; 8) generating a corresponding foreign exchange order on a real-time basis after an equity order executes by

differentiating between payment and settlement currencies on an order record; 9) defining and developing the procedures for managing exceptions which occur in the order and execution process; adjusting open orders for corporate actions, expirations, and exercises; 10) monitoring open orders against currency fluctuations and notifying the introducing brokers when this exposure occurs; 11) validating cross-border orders against affiliates' positions and trading limits; 12) routing orders based on parameters per security traded in the Global network; 13) automatically placing any foreign exchange deal after execution of an equity trade; 14) placing speculative foreign exchange transactions for cash management purposes; 15) reconciling trades; 16) managing open orders such as expirations and adjustments for corporate actions; and 17) ordering and filling adjustments. (Calo ¶ 0057 (emphasis added).)

573. Calo also discloses that "[l]imit orders on an equity guarantees that an equity will be bought or sold only at a specific price. This removes the price risk that accompanies market orders. With cross-border trades, however, the currency exchange risks remain and may, in fact, be greater. A limit order can potentially be left open for 60 days in the US market, for example, and currency rates can move substantially within that time frame." ¶ 0070 (underlining added). Calo teaches to

reduce the risk by “marking-to-the market all open limit orders” on a regular basis. Id. "Mark-to-market" is a well-known practice of valuing assets or liabilities based on their current market value or exchange rates.

574. If the stocks are OTC, this can be done, otherwise you need a matching system.

JJ. Claim 36 of the ’107 patent

575. In my opinion, each and every element of claim 36 was already disclosed by the prior art and the skilled person would have had no problem combining the teaching of the prior art to derive each and every element of claim 36. Below I set forth non-limiting examples where each element may be found in selected prior art references. I note, however, that the subject matter of claim 36 was generally well-known as shown by the disclosures of many other references described above in Section VI. Therefore, to the extent an element may differ from the prior art, it would have been generally known to the skilled person by 2007 given the extent and depth of the prior art on this subject matter.

> *36. The non-transitory computer-readable storage medium as recited in claim 35, wherein the transaction is conducted across at least two countries.*

576. This is a currency neutral trade but cross border. Since claim 36 depends from claim 35, the preferred currency is the same as the market currency. Calo and Rude both disclose cross-border trades.

VIII. SUMMARY OF ANALYSIS

577. In summary, each feature of claims 1-36 are found in the prior art. In particular, Calo discloses most, if not all of the features of the invention and whatever features Calo omits, are taught by other prior art references. In addition, many of the features also would have been obvious to the skilled person in the art because they were conventional and well-known features.

578. It is my opinion that all of the features of Claims 1-7, 9-13, 16-18, 19-25, 27-31, and 34-36 were disclosed by Calo in view of Rude and in further view of Sellberg. See Section VI.B.1-2 and 15, and Section VII, above. These references are in the same field of endeavor and the skilled person would have no problem combining their teachings without undue experimentation. Motivation for making such combinations can be found in the prior art references themselves, but also, the skilled person would have been aware of the advantages and benefits of making such combinations. For instance, combining the features would provide a system that is easier and more desirable to use and easier to identify risks.

579. It is my opinion that all of the features of Claims 1-7, 9-13, 16-18, 19-25, 27-31, and 34-36 were disclosed by the combination of Calo in view of Rude and in further view of Szoc. See Section VI.B.1-3, and Section VII, above. These references are in the same field of endeavor and the skilled person would have no problem combining their teachings without undue experimentation. Motivation for making such combinations can be found in the prior art references themselves, but also, the skilled person would have been aware of the advantages and benefits of making such combinations.

580. It is my opinion that all of the features of Claims 14, 15, 32, and 33 were disclosed by the combination of Calo, Rude, and Sellberg or Szoc, in further view of Davidowitz. See Section VI.B.1-3, 14 and 15, and Section VII, above. These references are in the same field of endeavor and the skilled person would have no problem combining their teachings without undue experimentation. Motivation for making such combinations can be found in the prior art references themselves, but also, the skilled person would have been aware of the advantages and benefits of making such combinations.

581. It is my opinion that all of the features of Claims 8 and 26 were disclosed by the combination of Calo and Rude, in further view of Kidea. See Section VI.B.1-2 and 13, and Section VII, above. These references are in the same field of endeavor and the skilled person would have no problem combining their teachings without

undue experimentation. Motivation for making such combinations can be found in the prior art references themselves, but also, the skilled person would have been aware of the advantages and benefits of making such combinations.

582. It is my opinion that all of the features of Claims 27-36 were disclosed by the combination of Calo, Rude, and Szoc in further view of Sellberg. See Section VI.B.1-3 and 15, and Section VII, above. These references are in the same field of endeavor and the skilled person would have no problem combining their teachings without undue experimentation. Motivation for making such combinations can be found in the prior art references themselves, but also, the skilled person would have been aware of the advantages and benefits of making such combinations.

583. Thus, every single claim element and all of the features were disclosed and taught by the prior art references. The skilled person would have had no problem combining the teachings and would have had expectations of success without any requirement of hindsight. In fact, the ’107 patent is at a high level of abstraction and describes no technical issues (kinds of programming, communication protocol, etc.) that would prevent or discourage such combinations of features as described in my declaration.

584. All of the references discussed above are combinable – that is, the references are in the same field of endeavor and the skilled person would have no problem combining their teachings without undue experimentation. Motivation for making such combinations can be found in the prior art references themselves, but also, the skilled person would have been aware of the advantages and benefits of making such combinations. For instance, combining the features taught in the references would provide a system that is easier to use with richer functionality. Such combinations would also more permit more effective trading risk identification and management, as well as, creating more liquidity and providing other advantages to both the trader and the broker

585. Although more than one reference may be identified above disclosing each element, I do not intend to suggest that each reference identified is necessary to complete the disclosure of that respective element. I am merely giving examples of where the disclosure can be found and, in most cases, they can be found in multiple references. In fact, many of the claim features were so well-known that they could be found in myriad references.

IX. CONCLUDING STATEMENTS

586. 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.

587. I reserve the right to updated this document of correct any inaccuracies.

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

Dated: January 2, 2024

/Marc Reid/

Marc Reid

X. APPENDIX – LIST OF MATERIALS CONSIDERED

Exhibit No.	Document Description
1001	The ’107 Patent – U.S. Patent No. 10,062,107
1002	[Intentionally Left Blank]
1003	C.V. of Marc Reid
1004	The File History of the ’107 Patent
1005	U.S. Patent Application Publication 2002/0087454 to Calo et al. (“Calo”)
1006	U.S. Patent Application Publication 2006/0095361 to Rude (“Rude”)
1007	U.S. Patent Application Publication 2002/0023053 to Szoc et al. (“Szoc”)
1008	U.S. Patent No. 4,251,867 to Uchida et al. (“Uchida”)

1009	U.S. Patent Application Publication 2002/0010673 to Muller et al. ("Muller")
1010	U.S. Patent Application Publication 2006/0124729 to Martin ("Martin")
1011	U.S. Patent Application Publication 2006/0294004 to Burge ("Burge")
1012	U.S. Patent Application Publication 2007/0055590 to Kretzschmar et al. ("Kretzschmar")
1013	U.S. Patent Application Publication 2006/0015437 to Kulasooriya et al. ("Kulasooriya")
1014	U.S. Patent No. 5,897,621 to Brian Paul Boesch ("Boesch")
1015	U.S. Patent No. 6,829,590 to Greener et al. ("Greener")
1016	U.S. Patent Application Publication 2005/0021454 to Karpovich et al. ("Karpovich")

1017	U.S. Patent Application Publication 2007/0005481 to Kidea et al. ("Kidea")
1018	U.S. Patent Application Publication 2004/0267655 to Davidowitz et al. ("Davidowitz")
1019	U.S. Patent Application Publication 2004/0236664 to Sellberg et al. ("Sellberg")
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