



lies in the field of the engineering, design, and development of trading interfaces, such as those used in electronic trade execution systems and proprietary trading systems.

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

8. As CTO in 1997, I designed and developed an internet quote system that was used by the Chicago Mercantile Exchange. In 1998, I designed and developed for a Chicago-based Futures Commission Merchant, named LFG, the first web browser based trade order entry system for the U.S. commodity markets known as “Futuresonline”. From late 1999 until 2002, I was the CTO for Stafford Trading, a proprietary trading company in Chicago, Illinois, USA, which was one of the largest market makers on the U.S. equity option exchanges. In this capacity, I managed a staff of roughly one hundred individuals and an annual technology budget in excess of fifteen million dollars. This staff included approximately 40 software developers, 40 network and server engineers, and 20 support staff. During this time, I also designed a new desktop order entry system to replace a legacy system for the traders at Stafford Trading. In March of 2002, this firm was acquired by Toronto Dominion Bank (the “Bank”), a large Canadian bank, and post acquisition, I served until August 2003 as a Managing Director and CTO of the new entity at the Bank. I subsequently returned to trading and continued to further develop trading systems that I had begun using several years earlier. In 2006, I started my own trading group at the Bank, while still serving as a Managing Director, and actively traded a long-

short portfolio of U.S. Equities and U.S. equity index futures.

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

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

## **II. INFORMATION CONSIDERED**

11. In forming my opinions, I have read the patents-in-suit in the present case. I have reviewed the file histories along with the references cited during the prosecution of the patents. I have read briefs from the parties including the briefs relating to summary judgment of non-infringement. I am also familiar with the operation of the accused products, use of such products, and CQG's role in inducing and contributing to such use based on evidence in this case, including for example, CQG's answers to TT's interrogatories, CQG user manuals, help files, handover documents, operable samples of CQG's DOMTrader, deposition transcripts from Messrs. Braman, Katin, Shterk, and Stavros, Mr. Goodwillie's declaration, various documents produced by CQG (including but not limited to transaction data, pivot tables, customer experience logs, internal CQG emails, and other CQG documents discussing the Accused Products and TT and its patents), and the parties' contentions regarding infringement/non-infringement. I am also familiar with the opinions of non-infringement that CQG has produced in this case, and am prepared to offer my opinion as to why these opinions are incorrect.

12. Further, I participated in the *TT v. eSpeed* litigation, providing expert reports and both deposition and trial testimony, and am familiar with such information. I am familiar with CQG's Markman briefing and the testimony and reports of its expert, Richard Ferraro. I have reviewed the court's claim construction memorandum and order from *TT v. eSpeed*, and the Federal Circuit opinion that affirmed the Court's claim construction, as well as CQG's recent request for additional terms to be construed and their corresponding constructions. I have reviewed various documents and opinions from the *eSpeed* case, including the motion in limine ruling on single action dated September 12, 2007, the jury verdict, and I am familiar with my prior reports and testimony from *eSpeed*. I am familiar with the various fees in the electronic trading industry. I have reviewed information from the *TT v. eSpeed* litigation that sets forth the various fees in the electronic trading industry. PTX 470; MH0000479-80. Because of my prior involvement in *eSpeed*, I have an understanding of both the testimony and the evidence proffered during that trial. I also am familiar with the operation of the eSpeed graphical user interfaces ("GUIs") that were at issue in that litigation. I also am aware of the use of MD Trader by others in the trading industry. For example, I have reviewed numerous declarations from various industry personnel including traders that demonstrate the pioneering nature of the TT patents in suit<sup>1</sup>. In addition to the above, I have personally traded on electronic exchanges using TT products, including MD Trader. I have also talked to others regarding the use of the TT product, including MD Trader. I have also spoken with other experts in the field about how MD Trader is used. In addition, I have read the report of Dr. Mark Holder from the *TT v. eSpeed* case.

13. Additionally, I have read the summary judgment briefing and declarations from

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<sup>1</sup> TTX00020829, TTX00061397-398, TTX00061407-412, TTX00061420-421, TTX00061434-435, TTX00061454-455, TTX00061527-554, TTX00061557-576, TTX00061581-582, TTX00061588-589, TTX03219340-341, TTX03222252-254, TTX03254900.

the *RCG v. TT* case on the issue of infringement, as well as Judge Dow's opinion on infringement. I am also familiar with my expert report from the *RCG* case. I have also reviewed the summary judgment briefing and declarations from the *TT v. GL* case on the issue of infringement. I have reviewed Judge Holderman's opinion from the *GL Trade v. TT* case.

### **III. BACKGROUND OF THE INDUSTRY**

14. The electronic trading industry is made up of various participants. These participants include the exchanges, Futures Commissions Merchants ("FCMs"), technology providers, such as Independent Software Vendors ("ISVs") whose primary business is to provide front end order entry software, trading firms and individual traders. I may describe the roles of these various participants. All of the participants identified above provide complimentary services and work together to facilitate the execution of trades. The norm in the industry is for traders to pay on a per transaction basis to execute a trade. TT is an example of an ISV. Examples of more well diversified vendors include CQG and Bloomberg. Examples of an FCM include RCG and Goldman Sachs. Examples of an exchange include the CME and Eurex.

15. Since at least the early 1990s, the industry participants identified above have been investing in creating and providing front end order entry software. The technology providers include ISVs and more well diversified vendors that provide various technology, including front end order entry software. Many FCMs (such as RCG and Goldman Sachs), and exchanges (such as DTB/Eurex in the 1990s, the CME in the 1990s through the early 2000s and the Intercontinental Exchange ("ICE") today) have provided their own front end order entry software. Furthermore, many trading firms and individual traders have invested in their own technology creating their own front end order entry software. All of the participants identified above compete against each other with respect to front end order entry software.

16. I may testify regarding the nature of the competition between the various

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