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October 1, 2012

Elizabeth Murphy
Secretary
U.S. Securities and Exchange Commission
100 F Street, N.E.
Washington, DC 20549-1090

Re: Technology and Trading Roundtable (File No. 4-652)



GETCO

Dear Ms. Murphy:

As an active participant in our global financial markets, GETCO appreciates the opportunity to provide its views on practices that firms can use to reduce the likelihood, and minimize the magnitude, of errors and trading disruptions from the application of trading technology. Our views are based on our experience in developing, testing, deploying, and operating proprietary and third party hardware and software to engage in a wide range of market activities, including to generate, route, modify, and execute orders, and to clear millions of transactions each trading day.

As the SEC notes, the advancements in technology over the last decade have fundamentally transformed our capital markets. Technology now plays a central role in virtually every aspect of risk transfer, or trading life-cycle, and indeed in every aspect of our modern-day market structure.

Nearly all trading activity in the securities markets flows through a wide variety of interconnected automated systems. Broker-dealers, exchanges and other service providers, whose automated systems collectively compose the current market infrastructure, have a responsibility – as well as a strong commercial interest – to minimize, manage and monitor operational and other risks.

GETCO approaches this challenge with two fundamental principles in mind. First, we believe that it is critical that firms create and foster specific organizational approaches and processes in response to the dynamic of

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constant technology change and innovation. The larger market system constantly evolves and firms must adapt their systems in response. Therefore, technological change must be not only accepted, but encouraged at every level of an organization. Discouraging or needlessly impeding changes within a firm's own systems can create risks by deterring developers from improving, adapting, and fixing software. It can also preclude an organization from creating smart, sustainable processes to support the pace of technological modification occurring in today's marketplace. For this reason, GETCO believes that the goal should not be to minimize changes, but instead to allow change to take place in a responsible and controlled environment.

Second, we believe that a firm's systems, protocols, and procedures should be designed with the knowledge that there will be human mistakes and technology breakdowns that lead to trading errors and system failures. With this reality in mind, the following can form the foundation for minimizing the magnitude of failure both internally and for the market as a whole:



- Independently designed systems. To the extent possible, systems should be independent from other systems to limit the potential for an error or failure to cascade to other systems;
- Frequent, small changes. Making smaller, incremental changes to a system to reduce the magnitude of any errors and make it easier to mitigate the impact of such errors if they do occur; and
- Layered, redundant risk measures. Using multiple, overlapping levels of preventive or protective risk controls that each look at a system independently.

The practices we discuss below are not novel and we believe are used by many, if not most, firms in the financial industry. We, nevertheless, believe that regulators have a role in establishing baseline principles for all firms. In this regard, we believe that the SEC's Market Access Rule plays an important role in establishing uniform, system-wide principles for risk control and monitoring requirements. In addition, regulators should consider ways to encourage more widespread use of risk management tools offered by markets, such as independent "drop copies" and "cancel-on-disconnect" features.

I. INTRODUCTION

GETCO is a leading global market maker providing institutional investors with a range of execution services. From offices in Chicago, New York, London, Singapore, Hong Kong, and Palo Alto, the firm transacts business in cash and futures products across four asset classes – equities, fixed income, currencies and commodities on over 50 trading venues around the world.

GETCO's primary trading strategy is market making—posting two sided markets—to help investors efficiently transfer the risk commonly associated with assets such as stocks, bonds, commodities and options contracts. We are a registered market maker on various equity and options exchanges and a Designated Market Maker (DMM) and Supplemental Liquidity Provider (“SLP”) on the New York Stock Exchange (“NYSE”).¹

GETCO also provides brokers-dealers and institutional investors with access to dedicated liquidity through an alternative trading system, GETMatched and an agency execution business, GETAlpha.



II. DISCUSSION

All financial services enterprises have a strong interest in ensuring that their technical infrastructure and trading software work as intended – whether routing a retail order to an exchange, processing a company dividend, or making sure customers receive prompt confirmation of executions. And, they need to be able to achieve these goals in an environment that encourages, and often requires, change and innovation. Changes need to be made, not only for competitive reasons, but also to respond to the behavior of other market participants and to new regulatory requirements. For this reason, it is important that systems and procedures not limit change or establish barriers that discourage it.

As a general matter, a market participant's procedures for development, testing, and deployment of hardware and software changes should take into account the scope of the potential impact of such changes on other market participants. The trading systems of market centers, for example, are inherently interconnected with all of their members' or participants' systems. A broker's systems that connect with its customers are similarly

¹ Registered Equity Market Maker: Nasdaq, NYSE Arca, and BATS; Designated Market Maker and Supplemental Liquidity Provider: NYSE; Registered Option Market Maker: BATS Options, C2, Chicago Board Options Exchange, International Securities Exchanges, Nasdaq Options Market, NYSE Amex Options, and NYSE Arca Options.

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interconnected. Changes to these types of interconnected systems may, in turn, require changes or testing by another participant, and development, testing, and deployment procedures should reflect this potential, including adequate notice and testing opportunities for potentially impacted participants.

Other systems operate more independently. These types of “loosely coupled” systems limit the magnitude of potential failure when errors do occur. For this reason, GETCO is a strong believer that, whenever possible, systems should be built to be independent from other systems so that when problems arise they remain isolated. These “loosely coupled” systems can be changed more rapidly, which in turn allows each change to be smaller and more incremental; further reducing the magnitude of any errors. This type of system design is easier to implement for individual firm’s trading systems that operate proprietary trading businesses, than for other business lines.



The discussion below provides more specifics on the way in which GETCO thinks about managing the risks associated with systems development and changes in its proprietary trading business. GETCO believes that development, testing, deployment, and monitoring should all be part of a continuous cycle within a firm. Each element reinforces the other and helps to create a stable and sustainable change cycle.

A. Code Development and Testing

All firms should have well-defined, internal procedures and controls for the development, testing and deployment of trading software. GETCO has a formal process for testing its software, including a testing lab, testing protocols that developers follow, and change management processes. Development and testing should reinforce each other; continuous building and testing gives developers a strong feedback loop. In the development cycle, there are some common approaches to software testing that GETCO believes are best practices all firms should follow:

- **Unit testing**: These are tests of discrete, generally small, specific and functional, components of the system.
- **Regression testing**: These are tests built specifically to address a bug previously identified and to prevent the reintroduction of that bug.
- **Integration testing**: These are system tests designed to test the interaction of applications with each other or outside parties.

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Good testing protocols increase the likelihood that errors are identified and corrected. There is not a specific testing discipline that is appropriate for all firms. Instead, the specific procedures will vary depending on the size, scope, trading strategies and business lines of that firm.²

Finally, a common element of effective testing and change management at a firm is that there is a culture that encourages making changes that improve the operation and reliability of a firm's systems and that these changes are easily testable. A testing process that creates too many frictions can discourage making changes that improve a system.

B. Deployment

Deployment provides another line of defense in minimizing the scope of failures and correcting any failures before they can become widespread. No amount of systems testing will catch all problems. With this recognition, deployment should be designed to catch any problems undetected through testing in a way that minimizes the magnitude of an error:



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- **Staged deployment:** Deploy new software in phases, starting with implementation on a small scale. If there is success in this initial deployment, further deployments continue on a phased basis.
- **Validation:** At all stages in deployment, validation serves to evaluate whether a change is successful. Validation can be done on an automated or manual basis, or some combination of both. Automation in the validation process allows reviews and checks to be done in a repeatable and consistent way. People also have an important role in the validation process, but should focus on interpreting automated alerts.

In addition, all stakeholders should be empowered to express concerns about the release of a new system or change.

² The Futures Industry Association's ("FIA") Principal Trading Group and European Principal Trading Association developed recommendations for software development and change management to assist trading firms in development their own procedures related to software development. See www.futuresindustry.org/downloads/Software_Change_Management.pdf.

C. Monitoring and Alerts

Once a change is deployed, unexpected errors can be exposed. Latent bugs, scaling issues, and second order effects of changes elsewhere in the environment can reveal themselves as errors in large, complex systems. These errors can arise within a single market participant's systems and within the larger market.

A robust system, therefore, includes several elements:

- Broad monitoring that identifies or highlights unusual or abnormal behaviors – so called “smoke signals;”
- Rich data to allow rapid investigation of potential issues identified by these “smoke signals;” and
- Once it is determined whether a “smoke signal” was an error or a false positive, create a more specific, discrete alert that incorporates this information and, thus, contributes to a more robust alert system.



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The monitoring and alert process within a firm will find issues that necessitate additional development work. This cycle of development, testing, deployment, and monitoring are layers of risk management controls that help insulate a firm from system's errors.

D. Pre- and Post-trade controls

An additional, critical layer of risk control is the pre-trade filters, post-trade controls, and real-time monitoring by firm personnel.

Effective pre-trade risk controls are critical to prevent “fat finger” or other errors from getting to the market, which can cause trading losses for the firm or customer that sent such orders and disrupt fair and orderly trading on markets. The SEC's Market Access Rule eliminated “unfiltered” access to securities markets and required broker-dealer to establish a system of risk management controls and supervisory procedures to manage financial and operational risks associated with sending agency and principal orders to the market.

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Under the Market Access Rule, firms sending orders to markets must establish for their proprietary trading and client orders appropriate pre-set financial risk limits, as well as those controls designed to limit erroneous orders. At a minimum, firms pre-set risk limits should include:

- A maximum amount of exposure based on an aggregate notional value of positions and open order.
- To limit erroneous orders, a maximum notional amount per order.
- Real-time monitoring of the pre-set limits and any orders rejected because of these limits.

Moreover, though not required by the Market Access Rule, firms should consider controls offered by markets that automatically cancel resting orders when a firm's connection to the market is disconnected. Firms should also put in place controls to limit over-messaging.



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In addition to pre-trade risk controls, post-trade monitoring through receipt of "drop copies" from markets where a firm trades can provide an independent reconciliation of a firm's trading activity. "Drop copies" are execution reports sent by exchanges and other markets through separate connections to firm. These "drop copies" provide a real-time check on a firm's trading activity. The information received through "drop copies" can be compared with the trade confirmations a firm receives from the markets on which it trades. GETCO believes that the ability to reconcile trading activity between two independent sources should be an element of all firms risk management and that the SEC should consider requiring broker-dealer participants to use them to monitor their trading positions.

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E. Market Level Controls

Risk management is most effective when it is a multi-layered, overlapping approach. In this regard, exchanges and other markets can provide additional levels of protection. GETCO participated in the industry working group composed of SROs and other market participants that is considering measures that could be put in place by exchanges to limit the impact of technology errors or extreme events.³ We support development of “kill switches” at exchanges that would monitor for abnormal or excessive trading by a member and establish clear and transparent procedures for notification and disconnection from the exchange. GETCO believes this type of initiative would be a useful, additional layer of risk control.



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Other firm-level risk controls need the markets to provide functionality or information in order to be effective. For example, markets must provide “cancel on disconnect” functions in order for firms to be able to use them. Similarly, while most market centers make drop copies available to members and participants, the SEC should consider whether to require all market centers, or at least all market centers of significant size, to make independent “drop copies” available.

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GETCO appreciates the opportunity to provide its views on these important issues. Please feel free to contact me if you have any questions in connection with these issues.

Sincerely,



Elizabeth K. King
Head of Regulatory Affairs

³ Letter to Elizabeth M. Murphy, Secretary, Securities and Exchange Commission from Joseph M. Mecane, EVP, Head of U.S. Equities, NYSE Euronext, Richard G. Ketchum, Chairman and CEO, FINRA, and Eric Noll, Executive Vice President – Transaction Services, Nasdaq OMX, Inc., dated September 28, 2012 (File No. 4-652; SEC Technology and Trading Roundtable).