esma European Securities and Markets Authority

Consultation paper

Guidelines on systems and controls in a highly automated trading environment for trading platforms, investment firms and competent authorites

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Responding to this paper

ESMA invites comments on all matters in this paper and in particular on the specific questions summarised in Annex 1. Comments are most helpful if they:

- respond to the question stated;
- indicate the specific question to which the comment relates;
- contain a clear rationale; and
- describe any alternatives ESMA should consider.

ESMA will consider all comments received by **3 October 2011**.

All contributions should be submitted online at www.esma.europa.eu under the heading 'Consultations' by the aforementioned deadline.

Publication of responses

All contributions received will be published following the close of the consultation, unless you request otherwise. Please clearly and prominently indicate in your submission any part you do not wish to be publicly disclosed. A standard confidentiality statement in an email message will not be treated as a request for non-disclosure. A confidential response may be requested from us in accordance with ESMA's rules on access to documents. We may consult you if we receive such a request. Any decision we make is reviewable by ESMA's Board of Appeal and the European Ombudsman.

Data protection

Information on data protection can be found at www.esma.europa.eu under the heading 'Disclaimer'.

Who should read this paper

This paper is of interest to operators of regulated markets and multilateral trading facilities, investment firms executing orders on behalf of clients and/or dealing on own account, particularly when their business models include automated trading or they provide direct market access or sponsored access to their clients or eligible counterparties, as well as high frequency traders directly or indirectly accessing European markets. It will also be of interest to other users of European trading platforms including managers of pension funds, collective investment schemes and retail investors. National and European trade associations and consumer bodies representing these groups may also be interested in this paper.

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Acronyms and abbreviations used

AT	Algorithmic trading
CAs	Competent authorities
CCP	Central Counterparty
CEBS	Committee of European Banking Supervisors
CESR	Committee of European Securities Regulators
CfE	Call for Evidence
CFTC	US Commodities Futures Trading Commission
CP	Consultation Paper
CSA	Canadian Securities Administrators
CWG	Consultative Working Group
DEA	Direct Electronic Access
DMA	Direct Market Access
EEA	European Economic Area
EMIR	European Market Infrastructure Regulation
ESMA	European Securities and Markets Authority
ETF	Exchange Traded Fund
EU	European Union
FIA	Futures Industry Association
FIX	Financial Information Exchange
FSA	UK Financial Services Authority
HFT	High Frequency Trading
ID	Identity
IOSCO	International Organization of Securities Commissions
ISV	Independent software vendor

IT	Information Technology
KYC	Know-your-client principle
MAD	Market Abuse Directive
MiFID	Markets in Financial Instruments Directive
MTF	Multilateral Trading Facility
RM	Regulated Market
SA	Sponsored Access
SEC	US Securities and Exchange Commission
SF	Sponsoring firm
SMSC	Secondary Markets Standing Committee
STR	Suspicious Transaction Report
US	United States
VPN	Virtual private network

I. Executive Summary

Reasons for publication

This paper is published to consult on draft ESMA guidelines in accordance with Article 16(2) of the ESMA Regulation.

Contents

Section II explains the background to the draft guidelines in the context of ESMA's work on micro-structural issues.

Section III sets out and explains the draft guidelines on organisational requirements which are relevant in a highly automated trading environment for electronic trading systems, fair and orderly trading and dealing with market abuse (in particular market manipulation). There are separate standards in each of these areas for trading platforms (regulated markets and multilateral trading facilities) and investment firms executing orders on behalf of clients and/or dealing on own account.

Section IV sets out and explains the draft guidelines covering direct market access (DMA) and sponsored access (SA). Again, there are two separate sets of standards relating to trading platforms and investment firms.

Annex I contains a list of the questions in the consultation paper; Annex II the text of relevant legislative provisions of the Markets in Financial Instruments Directive (MiFID) and the Market Abuse Directive (MAD); Annex III a cost-benefit analysis of the draft guidelines; Annex IV a review of academic evidence on the effects of high frequency trading and algorithmic trading on market quality; Annex V a summary of the Call for Evidence (CfE) on micro-structural issues that CESR issued in April 2010; Annex VI a summary of the results of a targeted fact-finding and Annex VII the full text of the draft guidelines.

Next steps

ESMA will consider the responses it receives to this consultation and expects to adopt final guidelines at the end of 2011.

The draft guidelines are separate from the work the European Commission (Commission) is doing to produce proposals to revise MiFID. The guidelines will clarify obligations in relation to a highly automated trading environment for trading platforms and investment firms under the existing legislative framework. They may need to be adapted to the revised version of MiFID once finally adopted and/or transformed into technical standards, where appropriate, at a later stage.

ESMA's draft guidelines on systems and controls of trading platforms and investment firms are only one part of ESMA's work on high frequency trading (HFT) and other micro-structural issues, namely the one that can be conducted without prior legislative changes.

II. Background

1. In April 2010 CESR (ESMA's predecessor) issued a call for evidence on micro-structural issues of the European equity markets (Ref: CESR/10-142).[1] This sought information on HFT, SA, co-location services, fee structures, tick size regimes and indications of interest.

2. In its Technical Advice to the European Commission in the Context of the MiFID Review – Equity Markets (Ref: CESR/10-802) of June 2010[2], CESR summarised the responses to the call for evidence (see Annex IV of this consultation paper (CP) for a fuller summary of the responses) and outlined an action plan on micro-structural issues. This action plan stated that, amongst other things, CESR would:

    - undertake further work to understand better HFT strategies;
    - develop specific guidelines on the application of appropriate systems and controls for investment firms and trading platforms in a highly automated trading environment;
    - develop specific guidelines on sponsored access;
    - develop specific guidelines on co-location services;
    - develop a proposal on how MiFID provisions should apply to fee structures; and
    - develop guidelines on tick sizes.

3. ESMA continued its work on micro-structural issues in November 2010 and has since:

    - reviewed existing academic evidence on the effects of HFT;
    - considered relevant existing standards set by international regulatory bodies, national competent authorities (inside and outside the EEA) and industry bodies;
    - conducted a targeted fact-finding through questionnaires addressed to regulated markets (RMs), multilateral trading facilities (MTFs) and firms conducting HFT, providing DMA and/or SA and/or using co-location/proximity hosting services (see Annex V for a summary of the responses of relevance to this CP);
    - addressed a questionnaire to buy-side firms on the impact of HFT on the quality of markets operated by trading platforms;
    - held a roundtable discussion with trading platforms and investment firms that responded to the fact-finding questionnaires (there were three separate sessions with trading platforms, firms engaged in HFT and investment firms offering DMA/SA services);
    - consulted SMSC's Consultative Working Group (CWG) on relevant policy questions related to all micro-structural issues; and

[1] http://www.esma.europa.eu/index.php?page=consultation_details&id=158
[2] http://www.esma.europa.eu/index.php?page=document_details&from_title=Documents&id=7003, pages 39-43

- identified current gaps and possible legislative improvements in relation to micro-structural issues and highly automated trading in view of the upcoming MiFID and MAD review which would need legislative amendments to be adequately addressed.

4. This CP is published to consult on draft ESMA guidelines on organisational requirements for trading platforms and investment firms in a highly automated trading environment, including in relation to the provision of DMA/SA services, in accordance with Article 16(2) of the ESMA Regulation.

5. This CP does not propose guidelines for co-location, fee structures and tick sizes. The later topics do not relate directly to the challenges for systems and controls of trading platforms and investment firms caused by a highly automated trading environment. There is also a limit to what ESMA could achieve through guidelines in these areas under the existing legislative framework. ESMA has therefore decided at this stage to concentrate on issues related to organisational requirements in a highly automated trading environment, including DMA/SA services. However, this is without prejudice to ESMA's ability to undertake future work in these areas, particularly if and when changes to the legislative framework will have been made.

6. The draft guidelines go further than the action plan for micro-structural issues by covering DMA in addition to SA. ESMA considered that it was sensible to expand the scope of the guidelines in this way because DMA presents similar systems and controls issues to SA.

7. The draft guidelines sit under the existing legal framework provided by MiFID and MAD. These two directives are currently under review and the Commission has committed to making proposals to amend them in the course of 2011. However, ESMA considers that given the importance of the issues raised by automated trading and DMA/SA, regulatory developments outside the EU and the fact that competent authorities across the EEA are already seeking to deal with them within the existing legal framework, it is appropriate to introduce guidelines in the course of 2011. The guidelines, if adopted, will provide greater clarity for trading platforms and investment firms about the expectations of competent authorities and provide for greater consistency of approach by different competent authorities (CAs). At the roundtable sessions that ESMA held in May this was an approach which received broad support from participants.

8. There are points related to the micro-structural issues that ESMA has been considering that cannot be dealt with in the existing legal framework. CESR made some suggestions for how MiFID could be amended in its action plan on micro-structural issues. The Commission included in its consultation on the MiFID review a number of proposals of relevance to micro-structural issues. In the light of the work on micro-structural issues and the Commission's consultation on the MiFID review, ESMA has been working closely with the Commission on those issues. Once MiFID and MAD have been revised and EMIR is finalised, it will be necessary for ESMA to revisit the guidelines, if adopted, to consider whether they need to be adapted in the light of the new legislative framework or transformed into technical standards covering some or all of the issues in this paper.

9. When EMIR and the related technical standards have entered into force, it may be useful, at that stage, to complement the proposed *ESMA guidelines on systems and controls in a highly automated trading environment for trading platforms, investment firms and competent authorities* with further guidelines relating to policies and procedures for investment firms which clear trades for other market

participants through central counterparties (CCPs).[3] Entities clearing trades for others through CCPs need to implement and manage appropriate controls on the clients whose trades they clear. Their risk management procedures and systems should be in step with market behaviours and trading technologies. Where the market behaviour and trading technology of their clients is different to their own activities, the clearing member which clears contracts for its clients through a CCP needs to be able to apply specific control mechanisms to deal appropriately with additional risks to which clearing trades through a CCP for its clients, such as HFT firms accessing markets by DMA/SA, exposes it.[4]

10. ESMA is conscious of the fact that the matters covered in this paper are also of interest to regulatory authorities outside the EEA. ESMA believes it is desirable to achieve a broad consistency of approach to these issues across different jurisdictions given the links between the financial markets of the EEA and the rest of the world. In the draft guidelines ESMA has therefore sought to take account of developments in countries outside the EEA.

Question:

Q1: Do you agree with ESMA that it is appropriate to introduce guidelines already before the review of MiFID covering organisational arrangements for trading platforms and investment firms in relation to highly automated trading, including the provision of DMA/SA?

[3] ESMA notes that guidelines clarifying MiFID obligations could currently only extend to those firms clearing for other market participants through a CCP which are authorised as investment firms. The need for homogenous rules and guidelines across all clearing members clearing for others through a CCP would therefore need to be taken into account when considering possible guidelines by ESMA.

[4] ESMA is aware that the issues arising by clearing for other market participants through a CCP has also been addressed by recent industry initiatives such as FIA's Market Access Risk Management Recommendations, http://www.futuresindustry.org/downloads/Market_Access-6.pdf.

III. Organisational requirements for trading platforms and investment firms in a highly automated trading environment

III.1. Background

11. Trading in financial instruments has come to rely increasingly on the use of electronic trading systems. These have, in the main, replaced open outcry markets with screen-based markets. Screen-based markets are usually accessed electronically by members/participants and users. Order flow from clients is often captured and routed electronically to trading platforms by investment firms. Investment firms and their clients have also made increasing use of trading algorithms whereby orders are generated by computer algorithms responding to market data.

12. An important part of the innovation in this highly automated trading environment has been the rise of what has been labelled HFT. ESMA used the following definition of HFT in its fact-finding questionnaire on micro-structural issues[5]:

> *"Trading activities that employ sophisticated, algorithmic technologies to interpret signals from the market and, in response, implement trading strategies that generally involve the high frequency generation of orders and a low latency transmission of these orders to the market. Related trading strategies mostly consist of either quasi market making or arbitraging within very short time horizons. They usually involve the execution of trades on own account (rather than for a client) and positions usually being closed out at the end of the day."*

13. The establishment of a highly automated trading environment has enabled investors to monitor prices in real time and submit orders electronically, facilitated productivity improvements at investment firms executing client orders and at trading platforms, promoted competition between trading platforms and simplified the process of the settlement of trades. However, several concerns have also been expressed about trading in a highly automated environment. In particular, concern has focused on whether the trading activities that the environment has facilitated, such as HFT, adversely affect the quality of markets for instance through the decrease of trade size and by pushing up indirect trading costs for retail and institutional investors, and the potential for highly automated trading to lead to disorderly trading conditions.

14. The latter concern is not new. For example, there was significant discussion about the behaviour of trading algorithms in the wake of the fall in stock market prices on 19 October 1987. However, developments in the intervening years have not quelled concerns. On 6 May 2010 there was a so-called 'flash crash' in the US. During a 20 minute period starting at 2:40 p.m. over 20,000 trades (many based on retail-customer orders) across more than 300 separate securities, including many ETFs, were executed at prices 60% or more away from their 2:40 p.m. prices.[6] The SEC/CFTC report[7] on the events of 6 May 2010 said that a number of factors had played a part in creating the disorderly condi-

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[5] It should be noted that the purpose of this definition was not to attempt to create a possible legal definition but to assist those who were responding to the fact-finding questionnaire to understand what ESMA was seeking to explore through the questionnaire.

[6] On 10 June 2010, the SEC voted to enact new rules to automatically stop trading of any stock in the S&P 500 whose price changes by more than 10% in any five-minute period.

[7] http://www.sec.gov/news/studies/2010/marketevents-report.pdf

tions that arose. The report highlighted the risks of a highly automated trading environment when it said that:

> "*One key lesson is that under stressed market conditions, the automated execution of a large sell order can trigger extreme price movements, especially if the automated execution algorithm does not take prices into account. Moreover, the interaction between automated execution programs and algorithmic trading strategies can quickly erode liquidity and result in disorderly markets. As the events of May 6 demonstrate, especially in times of significant volatility, high trading volume is not necessarily a reliable indicator of market liquidity*."

15. Whilst the market structure in Europe differs from that in the US, it is clear that many of the concerns that the US authorities raised in the wake of the flash crash about trading in a highly automated environment are also relevant to Europe.

16. In regulating trading platforms and investment firms in relation to secondary markets trading, competent authorities are seeking to:

- protect investors by ensuring that those acting as agent for investors act in the best interests of their clients;

- ensure fair and orderly trading so that one set of investors does not gain an unfair advantage and that there is an efficient process of price formation;

- promote market integrity by seeking to prevent, detect and punish improper behaviour which undermines the integrity of the market;

- strengthen financial stability by ensuring that secondary market trading does not give rise to behaviour that risks a disruption in the financial system with the potential to have serious negative consequences for the internal market and the real economy.

17. Secondary trading in financial instruments on trading platforms carries a number of risks which can threaten these regulatory objectives. These risks include:

- **Operational risk.** Operational risk is the risk that arises from inadequate or failed internal processes, staff and systems, or from external events. In relation to trading it can cover things such as orders being entered erroneously, staff not being adequately trained to operate order entry systems, the reliability of electronic trading systems, the behaviour of trading algorithms and the adequacy of anti-fraud controls. When operational risk crystallises it can lead amongst other things to losses for investors, threats to the financial viability of investment firms and disorderly trading on trading platforms.

- **Credit and market risk.** When investment firms engage in trading on behalf of clients or for themselves they are exposed to the risk that their clients and counterparties will not honour their obligations related to this trading. When trading on their own behalf they are exposed to the risk that they suffer losses on their holdings of financial instruments as markets move against them. Both of these risks need to be controlled to ensure that they do not threaten orderly trading or financial stability.

- **Externalities.** The potential costs of disruption from inadequate management of operational, credit and market risk to other market participants and the wider economy may far exceed the costs to any individual market participants. As a result any individual market participant may not adequately take account of these wider costs when setting its own organisational arrangements and procedures on trading, which in turn may lead to socially sub-optimal investment in such arrangements and procedures.

- **Market abuse.** Orders (and resulting transactions) submitted to a trading platform can be abusive where they seek to give a false impression to others using the trading platform about the price of or supply and demand for a specific financial instrument.

18. These risks are inherent to trading and also exist when trading is done on a person-to-person basis or over the telephone. However, in an automated trading environment, the organisational arrangements required by trading platforms and investment firms should be tailored to the scale, sophistication and speed of the trading activity that is now taking place. Observed behaviour has led to questions about whether the controls around trading in a highly automated trading environment with many market participants engaging in HFT have kept up with the challenges posed to regulatory objectives.

19. Of existing material that ESMA has surveyed the following are of relevance to standards for trading in a highly automated environment (excluding DMA/SA[8]): FSA recognition requirements for Recognised Investment Exchanges[9], FIA Recommendations for Risk Controls for Trading Firms[10], Canadian Securities Administrators' (CSA) draft rules on electronic trading and direct electronic access[11], CEBS guidelines on the management of operational risks in market-related activities[12] and Equity Risk Controls developed by FIX Protocol Ltd[13].

20. There are several key points that emerge from these documents:

- **Governance.** Trading platforms and investment firms should have governance arrangements which ensure that there is effective oversight of IT systems and trading controls in a highly automated trading environment based on a clear understanding of who is responsible for what and issues relating to these are identified swiftly and appropriately dealt with.

- **Access to trading platforms.** Trading platforms should have rules and procedures to ensure only entities with adequate systems and controls and adequately trained staff can trade on a market place.

- **Trade controls.** To ensure markets operate in a fair and orderly way trading platforms and market participants should have effective controls which seek to reduce the possibility of orders reaching the marketplace that are unauthorised, in breach of risk management thresholds, erroneous or disruptive. Post-trade controls are also needed to ensure that potential instances of market abuse can be flagged up and to monitor that pre-trade controls are working as intended.

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[8] DMA and SA are dealt with in a separate section, see Section IV below.
[9] http://fsahandbook.info/FSA/html/handbook/REC/2
[10] http://www.futuresindustry.org/downloads/Trading_Best_Pratices.pdf
[11] http://www.bcsc.bc.ca/policy.aspx?id=12364&cat=BC%20Notices
[12] http://www.eba.europa.eu/documents/Publications/Standards---Guidelines/2010/Management-of-op-risk/CEBS-2010-216-%28Guidelines-on-the-management-of-op-.aspx
[13] http://www.fixglobal.com/system/files/FPLEquityRiskControls_final.pdf

- **Resilience and business continuity.** Electronic trading systems should be designed to be resilient, tested to ensure that they remain resilient and backed up by adequate business continuity arrangements.

- **Periodic review.** All arrangements designed to ensure compliance, manage risk and promote fair and orderly trading should be subject to periodic review and evaluation.

21. The draft guidelines on organisational requirements for trading platforms and investment firms in a highly automated trading environment seek to control the risks that arise from trading. They cover three areas (with separate standards relating to trading platforms and investment firms in each area): electronic trading systems, fair and orderly trading and market abuse (in particular market manipulation). For both trading platforms and investment firms the systems and controls employed will need to be effective and proportionate to the nature, scale and complexity of their business.

22. The standards for investment firms apply to investment firms when they are executing orders on behalf of clients or dealing on own account. They do not apply to investment firms when they are operating an MTF since investment firms when operating an MTF are covered by the guidelines applying to trading platforms.

III.2. Draft guidelines on electronic trading systems for trading platforms and investment firms

a) *Trading platforms*

Guideline 1: Organisational requirements for regulated markets' and multilateral trading facilities' electronic trading systems

(Articles 39(b) and (c) of MiFID for regulated markets and Article 14(1) of MiFID for multilateral trading facilities)

General guideline

1. A regulated market's or multilateral trading facility's electronic trading system (or systems) should enable it to comply with its obligations under MiFID and other relevant Union and national law taking into account technological advancements and trends in the use of technology by its members/participants or users and, in particular, should enable it to ensure continuity and regularity in the performance of the market (or markets) operated by it.

Detailed guidelines

2. In following the general guideline regulated markets and multilateral trading facilities should at least:

   - develop, procure (including outsourcing) and monitor their electronic trading systems through a governance process that embeds compliance and risk management principles and involves a clear process for accountability, communication of information and sign-off for initial deployment, subsequent updates and resolution of problems identified through monitoring;

- have electronic trading systems with sufficient capacity to accommodate reasonably foreseeable volumes of messaging and that are scalable to allow for capacity to be easily and rapidly increased in order to respond to rising message flow and emergency conditions that might threaten their proper operation, in particular through controls on message flows through a 'normal activity/maximum IT capacity' ratio;

- have effective business continuity arrangements in relation to their electronic trading systems covering such matters as:
  - governance for the development and deployment of the arrangements;
  - consideration of an adequate range of possible scenarios related to the operation of their electronic trading systems which require specific continuity arrangements;
  - the backing up of business (including compliance) critical data that flows through their electronic trading systems;
  - the procedures for moving to and operating the electronic trading system from a back-up site;
  - staff training on the operation of the arrangements and individuals' roles within them; and
  - an ongoing programme for the testing, evaluation and review of the arrangements including procedures for modification of the arrangements in light of the results of that programme.

- prior to deploying an electronic trading system, and prior to deploying updates to an electronic trading system, make use of clearly delineated development and testing methodologies to seek to ensure that, amongst other things, the operation of the electronic trading system is compatible with the regulated market's and multilateral trading facility's obligations under MiFID and other relevant Union or national law, that compliance and risk management controls embedded in the systems work as intended (including generating error reports automatically) and that the electronic trading system can continue to work effectively in stressed market conditions;

- monitor in real time their electronic trading systems, deal adequately with problems identified as soon as reasonably possible in order of priority and be able when necessary to adjust or shut down the electronic trading system in an orderly manner;

- periodically review and evaluate the governance, accountability and sign-off framework, the electronic trading systems and their business continuity arrangements so as to ensure their continued appropriateness and act on the basis of these reviews and evaluations to remedy deficiencies;

- have procedures and arrangements for physical and electronic security designed to protect electronic trading systems from misuse or unauthorised access and to ensure the integrity of the data that is part of or passes through the systems; and

- have procedures and arrangements to ensure they employ sufficient number of staff with the necessary skills and expertise to manage their electronic trading systems, including staff with appropriate knowledge of relevant systems, the monitoring and testing of such systems and the sort of trading that will be undertaken by members/participants of the regulated market or users of the multilateral trading facility.

3. Regulated markets and multilateral trading facilities should keep records in relation to their electronic trading systems covering at least the matters referred to in paragraph 2.

4. Regulated markets and multilateral trading facilities should inform competent authorities about significant incidents that may affect the sound management of the technical operations of the system.

Explanatory notes

23. The MiFID obligations that apply to RMs that are of relevance to the performance of their electronic trading systems are set out in Article 39, in particular in points (b) and (c) of that article. These focus on risk management, sound management of technical operations and effective contingency arrangements.

24. The obligations for MTFs are set out in Article 14(1) of MiFID which refers to the organisational requirements in Article 13 of MiFID of which paragraphs (2), (4), (5) and (6) are of most relevance. Article 13 of MiFID also provides the legal basis for several of the articles in the MiFID Implementing Directive of which Articles 5 to 9 are the most relevant. These include obligations on continuity and regularity in the performance of investment services and activities, risk assessment and management, employing personnel with the right skills and expertise, internal audit, monitoring systems and senior management responsibility.

25. In complying with their overarching obligations in respect to their electronic trading systems there are several key issues that trading platforms should have regard to:

- **Governance**. The governance process is central to compliance with regulatory obligations. Trading platforms should have clear and formalised procedures for the development, procurement (including outsourcing) and monitoring of electronic trading systems. This is to ensure that all of the relevant considerations (including commercial, technical, risk and compliance) that ought to be brought to bear in making the key decisions are given due consideration.

- **Resilience.** Systems should be robust, well adapted to the business that takes place through them (including the flow of message traffic) and backed up by effective business continuity arrangements. In terms of setting appropriate capacity limits for volumes of messaging trading platforms said in their responses to ESMA's fact-finding questionnaire that in testing their systems they take order flow from the busiest trading days and then monitor the performance of the system when order traffic is increased to a multiple of up to 20 times that level of order flow. In the event that the volume of messaging threatens to reach capacity limits trading platforms should have processes to ensure that capacity limits are not breached by controlling the volume of messages that individual members/participants or users can send. Trading platforms should also develop and keep under review business continuity plans so that in the event of systems failures caused by a range of different types of scenarios they have back-up plans to seek to ensure the timely resumption of trading.

- **Testing**. In order to be sure that the electronic trading system can do the job it is designed for, there should be a testing phase prior to a system being deployed and prior to updates being deployed. It is particularly important to ensure that the tests seek to ensure that the compliance and risk management controls embedded in the system work as intended and that stress testing is undertaken to learn about the system's resilience.

- **Staff.** All those involved with the electronic trading system should have the necessary skills and expertise, kept up-to-date as necessary, to discharge their respective responsibilities. Across a

trading platform as a whole this requires a mix of individuals with expertise in areas such as programming, systems, risk, compliance and trading. The trading platform should define the mix of skills and procedures to ensure that recruitment and training delivers staff with those skills. In addition to technical skills, staff will also need to have adequate soft skills to effectively represent their function within the trading platform, offering appropriate challenge as necessary within the governance framework.

- **Review.** The procedures and arrangements, including the electronic trading systems themselves, put in place to meet the overarching obligation need to be subject to periodic review or evaluation. Such evaluation or review should have some degree of independence which can be achieved, for example, by the involvement of internal audit or third parties.

- **Records.** There is a general obligation to keep adequate and orderly records. In relation to electronic trading systems they will need to include, for example, information about key decisions, system properties, testing methodologies, test results and periodic reviews.

- **Co-operation with competent authorities.** Different trading platforms will have different reporting obligations to their competent authorities. It is, however, crucial that competent authorities are aware of any significant risks to the sound operation of trading platforms' electronic trading systems that arise and the crystallisation of any such risks.

Questions

Q2: Do you think that the draft guidelines adequately capture all the relevant points relating to the operation of trading platforms' electronic trading systems?

Q3: Are there areas where it would be helpful to have more detail on the organisational requirements applying to trading platforms' electronic trading systems?

Q4: Do you have additional comments on the draft guidelines on organisational requirements for trading platforms' electronic trading systems?

b) *Investment firms*

Guideline 2: Organisational requirements for investment firms' electronic trading systems (including trading algorithms)

(Articles 13(2), (4), (5) and (6) of MiFID and Articles 5, 6, 7, 8 and 9 of the MiFID Implementing Directive)

General guideline

1. Investment firms' electronic trading systems, including trading algorithms, should enable the firm to comply with its obligations under MiFID and other relevant Union and national laws as well as the rules of the regulated markets and multilateral trading facilities to which it sends orders in order to

ensure continuity and regularity in the performance of its investment services and activities in a highly automated trading environment.

Detailed guidelines

2. In following the general guideline, investment firms should at least:

- develop, procure (including outsourcing) and monitor their electronic trading systems, including trading algorithms, through a governance process that embeds compliance and risk management principles and involves a clear process for accountability, communication of information and sign-off for initial deployment, subsequent updates and resolution of problems identified through monitoring;

- have electronic trading systems with sufficient capacity to accommodate reasonably foreseeable volumes of messaging and that are scalable to allow for capacity to be easily and rapidly increased in response to rising message flow, in particular through ongoing monitoring and controls on message flows through a 'normal activity/maximum IT capacity' ratio;

- have effective business continuity arrangements in relation to their electronic trading systems covering such matters as:
  - governance for the development and deployment of the arrangements;
  - consideration of an adequate range of possible scenarios related to the operation of their electronic trading systems which require specific continuity arrangements;
  - the backing up of business (including compliance) critical data that flows through their electronic trading systems;
  - the procedures for moving to and operating the electronic trading system from a back-up site;
  - staff training on the operation of the arrangements and individuals' roles within them; and
  - an ongoing programme for the testing, evaluation and review of the arrangements including procedures for modification of the arrangements in light of the results of that programme.

- prior to deploying an electronic trading system, or a trading algorithm, and prior to deploying updates, make use of clearly delineated development and testing methodologies to seek to ensure that, amongst other things, the operation of the electronic trading system or trading algorithm is compatible with the investment firm's obligations under MiFID and other relevant Union and national laws as well as the rules of the trading platforms they use, that the compliance and risk management controls embedded in the system or algorithm work as intended (including generating error reports automatically) and that the electronic trading system or algorithm can continue to work effectively in stressed market conditions;

- adapt trading algorithm tests (including tests outside live trading environments) to the strategy the firm will use the algorithm for (including the markets to which it will send orders and their structure) and ensure they are commensurate with the risks that this strategy may pose to the investment firm as well as to the fair and orderly functioning of the markets operated by the trading platforms the firm uses;

- roll out the deployment of trading algorithms in a live environment in a controlled fashion;

- monitor in real time their electronic trading systems, including trading algorithms, deal adequately with problems identified as soon as reasonably possible in order of priority and be able

when necessary to adjust or immediately shut down their electronic trading system or trading algorithm in an orderly manner;

- periodically review and evaluate the governance, accountability and sign-off framework for electronic trading systems and trading algorithms, the trading systems and algorithms themselves and their business continuity arrangements so as to ensure their continued appropriateness and act on the basis of these reviews and evaluations to remedy deficiencies;

- have procedures and arrangements for physical and electronic security designed to protect electronic trading systems and trading algorithms from misuse or unauthorised access and to ensure the integrity of the data that is part of or passes through the systems and algorithms; and

- have procedures and arrangements for ensuring that they employ sufficient staff with the necessary skills and expertise to manage their electronic trading systems and trading algorithms, including staff who have appropriate knowledge of relevant IT systems and algorithms, the monitoring and testing of such systems and algorithms, and knowledge of the sort of trading strategies that the firm deploys through its trading systems and algorithms.

3. Investment firms should keep adequate records of their electronic trading systems (and trading algorithms) including at least the matters covered in paragraph 2.

4. Investment firms should keep competent authorities informed of major incidents that may affect the sound management of the technical operations of their electronic trading systems and algorithms.

Explanatory notes

26. The obligations in MiFID relevant to investment firms' operation of electronic trading systems are in Article 13 whose paragraphs 2, 4, 5 and 6 are of most relevance. Article 13 of MiFID also provides the legal basis for several of the articles in the MiFID Implementing Directive of which Articles 5 to 9 are the most relevant. These include obligations on continuity and regularity in the performance of investment services and activities, risk assessment and management, employing personnel with the right skills and expertise, internal audit, monitoring systems and senior management responsibility.

27. Within the scope of electronic trading systems used by investment firms, ESMA includes electronic systems to send orders to trading platforms (whether or not orders from clients are submitted electronically to the investment firm) and electronic systems which automatically generate orders i.e. trading algorithms. Smart order routers may be part of a firm's systems for sending orders to trading platforms. For the purposes of this work, ESMA covers smart order routers only from the perspective of the risks involved in order entry.

28. Most of the points that were discussed above in relation to trading platforms are also of relevance to the electronic trading systems of investment firms. The main additional points worth making mainly relate to trading algorithms:

    - **Governance.** Investment firms should consider whether specific governance arrangements are needed for their trading systems. For trading algorithms investment firms will also need to make

sure that they have a good understanding of the properties of the algorithm, particularly in light of the trading strategies the algorithm is intended to be used for and that the algorithm cannot be used for other trading strategies than it is intended to be used and signed off for. Real-time monitoring of the behaviour of the algorithm is also needed to ensure that it is performing as expected.

- **Testing.** The purpose of testing is to ensure that an algorithm works as intended from the technical, regulatory and commercial point of view. In the responses to our questionnaire the following sorts of test were mentioned by investment firms using trading algorithms:
  - performance simulations/back testing;
  - off-line testing within an exchange testing environment;
  - review of output of strategy (in terms of profit and loss) and market impact (what one firm referred to as 'post-trade analytics');
  - small-scale live testing (including reconciliation with simulation testing).

  This last point emphasises the importance of the need for investment firms to be cautious when putting an algorithm (and any update to an algorithm) into production. There is the possibility that in a live environment the algorithm might not perform in quite the same way as in testing. Therefore it is sensible that it is initially used in a restricted way with, for example, limits being placed on the number of financial instruments being traded, the value and number of orders, and the number of markets to which orders are sent. It should also be the case that algorithms are adapted to the markets (and the structure of those markets) in which they are intended to be used and are only deployed in those markets unless further testing is undertaken to understand how they will operate in other markets.

- **Monitoring.** The monitoring systems at investment firms should have alerts that assist staff in identifying when an algorithm is not behaving as expected in as close to real-time as possible. When alerts are made there needs to be a process in place to take remedial action including, as necessary, an orderly withdrawal from the market (e.g. not letting an algorithm exit all positions simultaneously).

- **Records.** Amongst the records that investment firms keep on trading algorithms it is particularly important that an adequate record is kept that explains the trading strategy or strategies each algorithm is deployed to execute.

Questions

Q5: Do you think that the draft guidelines adequately capture all the relevant points related to the operation of trading algorithms?

Q6: Are there areas where it would be helpful to have more detail in the guidelines applying to the organisational requirements for investment firms' electronic trading systems?

Q7: Do you have additional comments on the draft guidelines relating to organisational requirements for investment firms' electronic trading systems?

III.3. Draft guidelines on organisational requirements for trading platforms and investment firms to promote fair and orderly markets in a highly automated trading environment

a) *Trading platforms*

Guideline 3: Organisational requirements for regulated markets and multilateral trading facilities to promote fair and orderly trading in a highly automated trading environment

(*Article 39(b), (c) and (d) and Article 42 of MiFID for regulated markets and Articles 14(1) and (4) of MiFID for multilateral trading facilities)*

General guideline

1. Regulated markets' and multilateral trading facilities' rules and procedures for fair and orderly trading should be appropriate to an increasingly automated trading environment and the nature and scale of trading on their markets, including the types of members and participants and their trading strategies.

Detailed guidelines

2. In following the general guideline, the rules and procedures of regulated markets and multilateral trading facilities should at least include:

   - the ability to prevent in whole or in part the access of a member or participant to the trading facility and to cancel, amend or correct a transaction;

   - arrangements to prevent the excessive flooding of the order book at any one moment in time, notably through limits per participant on order entry capacity;

   - arrangements to prevent capacity limits from being breached through a mechanism for slowing down order flow from members/participants and users which restricts the number of messages of any individual member/participant or user within a set timeframe in the event that there is a danger of capacity limits being reached;

   - arrangements to constrain trading or halt trading in individual or multiple financial instruments when necessary, on both an automatic and discretionary basis, to maintain an orderly market. This may include automatic rejection of orders which are outside of certain set volume and price thresholds;

   - standardised testing to ensure that the systems that members and participants are using to access the venue have a minimum level of functionality that is compatible with fair and orderly trading on the venue;

   - minimum requirements for members' and participants' pre- and post-trade controls (including controls to ensure that there is no unauthorised access to trading systems) to ensure that there is orderly trading on the venue, in particular requirements for filtering order price and quantity (this requirement is without prejudice to the primary responsibility of members/participants or users to implement their own pre- and post-trade controls);

- standards covering the knowledge of persons within members/participants and users that will be using order entry systems;

- where applicable, clear organisational requirements for members or participants who are not credit institutions or investment firms, including requirements on the monitoring of trading against the rules of the venue and the management of risk; and

- the ability to obtain information from a member/participant or user to facilitate monitoring of their compliance with the rules and procedures of the regulated market or multilateral trading facility relating to organisational requirements and trading controls.

3. Regulated markets and multilateral trading facilities should keep adequate records of the matters covered by paragraph 2.

Explanatory notes

29. For RMs Article 39(d) of MiFID imposes an obligation to have rules and procedures to provide for fair and orderly markets. But the obligations relating to managing risk and sound management of technical systems in Article 39(b) and (c) of MiFID are also relevant here, as is Article 42 relating to access to the RM. For MTFs, the same fair and orderly trading requirement is set out in Article 14(1) of MiFID which also refers to the organisational requirements in Article 13 of MiFID, whilst Article 14(4) of MiFID deals with access requirements (and in turn refers to Article 42).

30. The draft guidelines relate to fair and orderly trading. The concept of fair and orderly trading has a wide application, covering many aspects of the operation of markets including, for example, the information made available to investors about the trading in a financial instrument, including trading interest and completed transactions. However, in the context of this work on the challenges of trading in a highly automated environment, ESMA is focusing on the aspect of fair and orderly trading that relates to the controls that trading platforms impose on their members/participants and users.

31. The draft guidelines cover several issues::

- **Controls.** Fundamentally it is for the members/participants and users of trading platforms to ensure that they do not make errors in order entry. But trading platforms need to set out what controls members should have and then also have their own arrangements to intervene in trading or to halt trading in individual or multiple financial instruments when necessary, on both an automatic and discretionary basis, to maintain an orderly market. This may include controls which reject orders which appear to be erroneous. To back this up trading platforms must be able to prevent the access of individual members/participants or users. It is also necessary to have controls to ensure that there is the capability to 'throttle' orders (i.e. to limit the number of orders that each member/participant or user can send within a set timeframe) if there is the possibility of capacity limits on messaging being reached.

- **IT compatibility**. Before allowing a member/participant or user to start trading, trading platforms should require that the member/participant or user is subject to a series of conformance tests. These are designed to ensure that the members/participants' or users' IT systems are com-

patible with the trading platforms' electronic trading systems and will not pose a threat to fair and orderly trading from a technical point of view.

- **Circuit breakers.** Trading platforms need to have automatic mechanisms to constrain trading or to halt trading in a specific financial instrument or more widely in response to significant variations in price to prevent trading becoming disorderly. Responses to our questionnaire indicated that volatility limits are widely used by trading platforms (except where trading platforms are dependent on price formation processes on other trading platforms). Two types of control are usually applied: dynamic, usually with reference to the price of the last transaction (or the average price over the previous few minutes); and static, usually linked to the price of the previous auction. Once a control is breached then trading is usually halted and, in some cases, restarts after an auction. In addition, operators of trading platforms also need to intervene to halt trading even if the automatic mechanisms have not been triggered if they have concerns that trading either is or may become disorderly.

  Each trading platform is responsible for its own circuit breakers. Under the existing MiFID framework, competent authorities do not have the ability to require the co-ordination between different trading platforms trading the same financial instrument regarding how automatic circuit breakers will work.

- **Market access.** For members/participants and users that are credit institutions or investment firms trading platforms have assurance that they have adequate organisational arrangements to trade safely. This is because they are obliged to have such arrangements under MiFID. The same is not the case for members/participants or users that are not credit institutions or investment firms. For these firms there might be some comfort if they are regulated in another jurisdiction but not if they are completely unregulated. Trading platforms should make clear to such entities before allowing them to use their facilities what high level organisational requirements they should adopt, based on those in MiFID.

  ESMA expects trading platforms to undertake adequate due diligence before accepting a new member/participant or user. In addition, trading platforms should have the capacity to request information from a member/participant or user, in writing or through interview, to check those controls and arrangements in response to concerns about their adequacy, or as part of cross-cutting work looking at members/participants or users' compliance with their obligations under the rules of the trading platform.

- **Trader access.** Trading platforms should set requirements governing the knowledge of employees of members/participants or users who enter orders into their systems.

- **Records**. Trading platforms should keep adequate records of their policies and procedures to ensure fair and orderly markets, including of any issues that emerge in relation to those policies and procedures.

Questions

Q8: Do the draft guidelines on organisational requirements for trading platforms to promote fair and orderly trading offer a sufficiently comprehensive list of the necessary controls on order entry?

Q9: Are there any areas of the draft guidelines on organisational requirements for trading platforms to promote fair and orderly trading where you believe it would be helpful to have more detail?

Q10: Do you have additional comments on the draft guidelines on organisational requirements for trading platforms to promote fair and orderly trading?

b) *Investment firms*

Guideline 4: Organisational requirements for investment firms to promote fair and orderly trading in a highly automated trading environment

(*Articles 13(2), (4), (5) and (6) of MiFID and Articles 5, 6, 7 and 9 of the MiFID Implementing Directive)*

General guideline

1. Investment firms should have adequate policies and procedures to ensure that their highly automated trading activities on regulated markets and multilateral trading facilities comply with their regulatory requirements under MiFID and other relevant Union and national laws and, in particular, manage the risks relating to those trading activities.

Detailed guidelines

2. In following the general guideline, investment firms' electronic trading systems should automatically block or cancel orders:

   - that do not meet set price or size parameters (differentiated as necessary for different financial instruments), either on an order-by-order basis or over a specified period of time, or because orders appear to be duplicative;

   - if the client does not have adequate funds or holdings of, or access to, the relevant financial instrument to complete the transaction;

   - if they are for a financial instrument that a trader does not have permission to trade;

   - where they would be inconsistent with a firm's obligations under MiFID, such as the client order handling rules, or other relevant Union or national legislation, or under the rules of the RM or MTF to which the order is to be sent (including rules relating to fair and orderly trading); and

   - where they risk compromising the firm's own risk management and/or capital adequacy thresholds, applied as necessary and appropriate to exposures to individual clients or financial instruments or groups of clients or financial instruments, exposures of individual traders, trading desks or the investment firm as a whole.

3. Investment firms should have procedures and arrangements for dealing with orders which have been automatically blocked by the firm's pre-trade controls but which the investment firm wishes to submit. These procedures and arrangements should make compliance and risk management staff, as neces-

sary, aware of when controls are being overridden and require their approval for the overriding of these controls.

4. Investment firms should ensure that employees involved in order entry have adequate training on order entry procedures, including complying with requirements imposed by RMs and MTFs, before they are allowed to use order entry systems.

5. Investment firms should ensure that compliance staff has a feed of the firm's orders in as close to real time as possible and have systems for monitoring those orders.

6. Investment firms should ensure that they have control of messaging traffic to individual trading platforms to avoid overcrowding the systems of the trading platform.

7. Investment firms should manage the operational risks in electronic trading through appropriate and proportionate governance arrangements, internal controls and internal reporting systems.

8. Investment firms should keep adequate records of the matters covered by paragraphs 2 to 7. For investment firms' records to be adequate, they should be sufficiently detailed so as to allow competent authorities to appropriately supervise and monitor investment firms' trading activities, and assess the conformity of these activities with MiFID, MAD and any other relevant European and national legislation.

Explanatory notes

32. For investment firms, Article 13(2), (4), (5) and (6) of MiFID sets out requirements governing adequate policies and procedures for compliance with regulatory obligations and effective procedures for risk management. These are expanded in Articles 5, 6, 7 and 9 of the MiFID Implementing Directive.

33. The draft guidelines for organisational requirements for investment firms to promote fair and orderly trading cover the following issues:

- **Erroneous order entry.** Investment firms' order management systems should prevent orders from being sent to trading platforms that are outside of pre-determined parameters covering price, volume and repetition which attempt to stop orders which are entered in error. Staff entering orders should also have sufficient skill and knowledge through for example on-the-job training with experienced traders or classroom based training to reduce significantly the risks of erroneous order entry.

- **Risk management.** Investment firms' order management systems should prevent orders from being sent to trading platforms where the orders breach credit limits set for the accounts of clients, where the client does not have sufficient funds or holdings of the relevant financial instrument to settle the trade it has entered into, where the orders breach risk limits for the trading of individual traders, trading desks or the firm as a whole.

- **Overriding pre-trade controls.** There might be circumstances in which it is appropriate for pre-trade controls to be overridden in relation to a specific trade or specific set of trades. This

should only happen with the full knowledge and active approval of relevant staff responsible for compliance and risk management**.**

- **Operational risk.** Some aspects of operational risk are covered by the first two points but there are other aspects as well, such as arrangements designed to prevent fraud by employees. The CEBS[14] guidance on operational risk in a trading environment, published in response to several recent instances of fraud linked to trading activities and other problems, provides an all encompassing approach covering governance arrangements, internal controls and internal reporting systems to which investment firms should adhere.

34. In the responses to our fact-finding questionnaire the most common pre-trade controls that HFT firms mentioned were: price, quantity, value and position. Some firms also have checks on the number of orders sent and the rate of messaging traffic against a defined maximum value and profit-and-loss controls or loss limits in place. Most checking took place at the level of individual orders, although some firms also operated a second layer of controls on aggregated orders.

35. Investment firms' controls will be partly duplicative of those of the trading platforms. This helps to reinforce the protections for fair and orderly trading but also allows the investment firm to set its controls more tightly than those of the trading platform in the light of its own risk appetite. However, the controls of investment firms also need to be more extensive to deal with the risks they are exposed to in executing orders on behalf of clients and dealing on own account.

Questions

Q11: Do the draft guidelines on organisational requirements for investment firms to promote fair and orderly trading offer a sufficiently comprehensive list of the necessary controls on order entry?

Q12: Are there any areas of the draft guidelines on organisational requirements for investment firms to promote fair and orderly trading where you believe it would be helpful to have more detail?

Q13: Do you have additional comments on the draft guidelines on organisational requirements for investment firms to promote fair and orderly trading?

[14] The Committee of European Banking Supervisors (CEBS) was the predecessor of the European Banking Authority (EBA).

III.4. Draft guidelines on organisational requirements for trading platforms and investment firms to prevent market manipulation in a highly automated trading environment

a) *Trading platforms*

Guideline 5: Organisational requirements for regulated markets and MTFs to prevent market abuse (in particular market manipulation) in a highly automated trading environment

(Article 39(d) and Article 43 of MiFID for regulated markets and Article 14(1) and Article 26 of MiFID for MTFs and Article 6(6) of MAD for RMs and MTFs)

General guideline

1. Regulated markets and multilateral trading facilities should have effective arrangements and procedures which enable them to identify conduct by their members/participants and users that may involve market abuse (in particular market manipulation) in a highly automated trading environment.

Detailed guidelines

2. In following the general guideline, the arrangements and procedures of regulated markets and multilateral trading facilities which seek to prevent and identify conduct by their members/participants and users that may involve market abuse and in particular market manipulation in a highly automated trading environment should at least include:

   - having adequate systems (including automated alert systems on transactions and orders) with sufficient capacity to accommodate high frequency generation of orders and transactions and low latency transmission, in order to monitor, using a sufficient level of time granularity, orders entered and transactions undertaken by members/participants and users and any behaviour which may involve market abuse (in particular market manipulation) and with the ability to trace backwards transactions undertaken by members/participants and users as well as orders entered/cancelled which may involve market manipulation;

   - having in place clear procedures for ensuring that conduct that may involve market abuse and in particular market manipulation is reported to the relevant competent authority (or authorities) without delay in accordance with the requirements under Articles 26(2) and 43(2) of MiFID and Article 6(9) of MAD;

   - having sufficient staff with the understanding and skill to monitor trading activity in a highly automated trading environment and identify behaviour giving rise to suspicions of market abuse; and

   - conducting periodic reviews and internal audits of procedures and arrangements to prevent and identify instances of conduct that may involve market abuse.

2. Regulated markets and multilateral trading facilities should keep adequate records of the matters covered by paragraph 2.

Explanatory notes

36. Under Article 43(1) of MiFID RMs have to monitor transactions undertaken on their systems to identify, inter alia, conduct that may involve market abuse. RMs and MTFs also have to report instances of conduct that may involve market abuse to their competent authority and the competent authority for the investigation of market abuse under Article 43(2). Article 39(d) of MiFID imposes more general requirements on risk management and compliance of RMs. Additionally, under Article 6(6) of MAD Member States have to ensure that market operators put in place structural measures aimed at detecting market abuse.

37. The obligations of Article 43(1) and (2) of MiFID for RMs are mirrored in Article 26(1) and (2) for MTFs. In addition, MTFs have general requirements around risk management and compliance in Article 14(1) of MiFID.

38. In the context of this work on the challenges posed by trading in a highly automated environment ESMA is focusing on possible instances of market abuse related to orders which give false or misleading signals as to the supply of, or demand for, or price of, financial instruments. The sorts of behaviour this might include cover the practices depicted as possible signals of market manipulation in Article 4 of MAD Implementing Directive[15], the types of practice which would constitute market manipulation described in the first set of CESR Level 3 guidance and information on the common operation of MAD[16] and the activities or forms of potential market abuse that might arise, or might become more widespread, due to the high speed trading strategies. As a way of illustration these might include:

    - **ping orders** – entry of small quantity orders aiming at triggering a reaction by other participants, bringing additional information about their positions and expectations;

    - **quote stuffing** – entry of small variations of the position in the order book so as to create uncertainty for other participants, slow down their process and hide their own strategy;

    - **momentum ignition** - entry of aggressive orders so as to start or exacerbate a trend hoping for other trend followers to bring the trend further and offer an opportunity to unwind the position; and

    - **layering and spoofing** – submitting multiple orders at different prices on one side of the order book slightly away from the touch, submitting an order to the other side of the order book (which reflects the true intention to trade) and, following the execution of the latter, rapidly removing the multiple initial orders from the book.

39. When thousands of order messages a second are flowing to individual trading platforms it increases the challenge of spotting potentially abusive behaviour. Efforts to compress data to make it more manageable through aggregation are likely to hide much more than they reveal and the number of false positives produced by systems designed to provide alerts will rise.

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[15] Commission Directive 2003/124/EC of 22 December 2003 implementing Directive 2003/6/EC of the European Parliament and of the Council as regards the definition and public disclosure of inside information and the definition of market manipulation, OJ L 339, 24.12.2003, p. 70.

[16] http://www.esma.europa.eu/popup2.php?id=3282

40. The exact relationship between trading platforms and competent authorities in relation to dealing with market abuse varies across jurisdictions. MAD generally prohibits members/participants and users of RMs and MTFs from using the systems to commit market abuse. RMs/MTFs could emphasise this legal obligation and the responsibilities of a member/participant or a user of a trading platform by contractually prohibiting such behaviour. However, ESMA would expect that trading platforms' rules and procedures to prevent, identify and report instances of possible market abuse at least include:

- **Monitoring.** Put in place proportionate arrangements, given the nature size and scale of the business done through the trading platform, to monitor orders and transactions with the aim of flagging possible instances of conduct that might involve market manipulation for follow-up investigation. These systems will need to be the subject of frequent review to ensure that they can cope with the volume of information they need to sift through so that they can be adapted in the light of experience and intelligence to make them as effective as possible in generating useful information about possible instances of market abuse and in particular market manipulation.

- **Staff.** Systems in themselves are insufficient to catch possible instances of market abuse. This requires staff with appropriate knowledge so that they can follow up information provided by automatic alerts. They will need to know both about the details of MAD and other relevant Union and national legislation but also about trading and trading strategies.

- **Competent authorities.** Operators of RMs and MTFs have to report instances of possible market abuse to their competent authority and also, without delay, to the authority competent for the investigation and prosecution of market abuse. This obligation needs to be backed up by clear arrangements at a trading platform for ensuring that such reporting happens without delay. Trading platforms should work on the basis that competent authorities should be notified without delay if it is immediately obvious that the issue is one for them to consider. If initial enquiries are undertaken a report should be made as soon as possible if those enquiries fail to find a satisfactory explanation for the observed behaviour.

- **Records.** Good recordkeeping is essential in relation to conduct which might constitute market abuse. In particular it is important for trading platforms to have effective audit trails regarding how each alert is dealt with. As recommended by CESR in its Third set of guidance and information on MAD[17], RMs and MTFs should keep records of cases of potentially suspicious transactions that have been examined but which have not been reported to the competent authorities.

Q14: Are there any areas of the draft guidelines on organisational requirements for trading platforms to promote fair and orderly trading where you believe it would be helpful to have more detail?

Q15: Do you have additional comments on the draft guidelines on organisational requirements for trading platforms to promote fair and orderly trading?

[17] http://www.esma.europa.eu/popup2.php?id=5727.

b) ***Investment firms***

Guideline 6: Organisational requirements for investment firms to prevent market abuse (in particular market manipulation) in a highly automated trading environment

(*Articles 13(2) and (6) of MiFID and Articles 5, 6 and 9 of the MiFID Implementing Directive, Article 6(9) of MAD and Articles 7 to 10 of the MAD Implementing Directive 2004/72/EC)*

General guideline

1. Investment firms should have policies and procedures in place to minimise the risk that their highly automated trading activity gives rise to market abuse (in particular market manipulation). The policies and procedures should take into account the highly automated trading environment and the nature, scale and complexity of the firm's trading activity in this respect and the nature and range of investment services and activities that the firm undertakes.

Detailed guidelines

2. In following the general guideline the policies and procedures of investment firms engaging in highly automated trading activities should at least include:

   - procedures to seek to ensure that staff exercising the compliance function has sufficient understanding, skill and authority to challenge staff responsible for trading when the trading activity gives rise to suspicions of market abuse (in particular market manipulation);

   - initial and regular refresher training on what constitutes market abuse (in particular market manipulation) for all individuals involved in executing orders on behalf of clients and dealing on own account ;

   - monitoring the activities of individuals/algorithms trading on behalf of the firm and the trading activities of clients, taking account of orders submitted, modified and cancelled as well as transactions executed, and adequate systems in place (including automated alert systems), using a sufficient level of time granularity, to flag any behaviour likely to give rise to suspicions of market abuse (in particular market manipulation);

   - adequate arrangements to identify transactions and orders that require a Suspicious Transaction Report (STR) to competent authorities in relation to market abuse (in particular market manipulation) and to make those reports without delay;

   - periodic reviews and internal audits of procedures and arrangements to prevent and identify instances of conduct that may involve market abuse; and

   - frequently reviewed arrangements governing the access of staff to trading systems.

3. Investment firms should keep adequate records of the arrangements and procedures to identify conduct that may involve market abuse covering the matters set out in paragraph 2.

Explanatory notes

41. Investment firms are required under Article 13(2) of MiFID to have adequate policies and procedures for compliance with their obligations under the directive which includes ensuring that the activities they carry out as an investment firm do not breach the prohibition on market manipulation in Article 1(2) of MAD. These obligations are expanded on in the articles on general organisational requirements and compliance in the MiFID Implementing Directive. Under Article 6(9) of MAD investment firms have to report suspicious transactions to competent authorities without delay. Articles 7 to 10 of the MAD Implementing Directive[18] provide more details on fulfilling the obligation. Moreover, in CESR's first[19] and third[20] set of Level 3 guidance on the implementation of the MAD, CESR has already provided guidelines on STR, which specify, in particular, that suspicious orders are recommended, when not already legally required on a national basis, to be reported to the competent authorities. The guidance also provides a standard STR report form.

42. The comments in the previous section on trading platforms' organisational arrangements relating to monitoring, staff and records are also relevant to the similar obligations for investment firms. Additional points of relevance to investment firms include:

    - **Suspicious transaction reports.** Investment firms should make STRs to competent authorities where they are aware of transactions that give rise to suspicions of market abuse. They need to have procedures which ensure that the relevant staff know what might constitute a suspicious transaction and what to do when they become aware of such a transaction so that the firm is able to discharge its responsibility under MAD. Given the nature of highly automated trading, suspicious transaction reports should also be extended to orders entered, modified or cancelled, even if they did not produce any transaction.

43. In this CP, the focus is on the possible instances of market abuse related to market manipulation which appears prima facie to be more impacted by the challenges posed by a highly automated environment. However, it should be highlighted that highly automated trading should also be considered a relevant feature for the purpose of monitoring insider trading (which is to be performed by trading platforms and investment firms under MiFID and MAD). Indeed, a highly automated environment necessarily has an impact on many parameters that are used to calibrate alerts. Moreover, the kind of orders used by insiders may be a proxy to unusual haste in trading. As a result, for the purposes of monitoring insider trading, due consideration should be given to designing and considering the adequacy of tools, procedures and alerts as well as staff training.

Questions

Q16: Are there any areas of the draft guidelines on organisational requirements to deal with market manipulation for investment firms where you believe it would be helpful to have more detail?

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[18] Commission Directive 2004/72/EC of 29 April 2004 implementing Directive 2003/6/EC of the European Parliament and the Council as regards market practices, the definition of inside information in relation to derivatives on commodities, the drawing up of list of insiders, the notification of managers' transactions and the notification of suspicious transactions, OJ L 162, 30.4.2004, 70 .

[19] Sections IV and V of the May 2005 guidance (Ref : CESR/04-505b).

[20] Section 2 of the May 2009 guidance (Ref: CESR/09-219).

Q17: Do you have additional comments on the draft guidelines relating to organisational requirements to deal with market manipulation for investment firms?

IV. Organisational requirements for direct market access and sponsored access

IV.1. Background

44. ESMA defines DMA and SA as follows:

- **Direct Market Access (DMA):** *An arrangement through which an investment firm that is a member/participant or user of a trading platform permits specified clients (including eligible counterparties)*[21] *to transmit orders electronically to the investment firm's internal electronic trading systems for automatic onward transmission under the investment firm's trading ID to a specified trading platform.*

- **Sponsored access (SA)**: *An arrangement through which an investment firm that is a member/participant or user of a trading platform permits specified clients (including eligible counterparties) to transmit orders electronically and directly to a specified trading platform under the investment firm's trading ID without the orders being routed through the investment firm's internal electronic trading systems.*

45. The increasing sophistication of trading technologies has meant firms can access markets and place orders with greater independence, speed and reduced cost. DMA and SA offer market participants that are not members/participants or users of RMs and MTFs a more direct or independent route to market than conventional trading through an intermediary and in doing so provides latency advantages as well as other key advantages such as trading anonymity. DMA/SA essentially involves one firm, the intermediary, which is a market member, allowing another firm, which is not a market member, to use its trading ID at a trading platform to place its trades directly or indirectly in the market place.

46. When firms allow their trading IDs to be used by other firms, though this may improve revenues, it can pose potential risks not only to the intermediary firm, but to other firms throughout the trading chain. In the absence of proper controls, a firm using another firm's trading name may lack incentives to behave in a way that would limit reputational risk to the firm whose name it is using or to ensure its actions do not jeopardise the ability of a firm to clear trades or for a venue to function in an orderly manner. In other words, this arrangement can promote moral hazard and negative externalities unless incentives are aligned through adequate risk control measures.

47. The primary risks arising from DMA/SA arrangements are:

- **Trading risk to investment firm**. Where clients' conduct may breach a trading platform's operating rules and the DMA and SA provider firm is responsible for compliance with those rules.

– **Credit risk to investment firms**. The DMA and SA provider firm is normally financially responsible for the trades of a client. This means that they are vulnerable to DMA and SA clients erroneously entering large orders or entering orders that would breach pre-agreed position limits as these would raise the risk of default throughout the trading chain.

[21] In line with Recital 40 of MiFID, the term client is to be understood to include eligible counterparties.

- **Reputational risk**. This arises because a firm uses the name of an intermediary firm to conduct its trading and may potentially compromise the good name of the intermediary. The same reputational damage would also apply to trading platforms that may suffer detriment because a DMA and SA client has caused a halt to trading on the market.

- **Market-wide disruption**. Depending on the size of the trades placed by a DMA and SA client, the size of the relevant market and the size/importance of the firms involved in the trades, a combination of trading and/or credit risk could lead to wider market disruption since trading platforms may consequently have to take drastic action to restore orderly trading by constraining or halting trading. This is obviously inefficient and costly for the market and its participants.

- **Market abuse risks**. There is a risk that firms trading directly on the market through DMA or SA hide behind market members to conceal market abuse.

48. ESMA considered several documents that provide standards relating to DMA and SA: IOSCO's Principles for Direct Electronic Access to Markets[22], SEC Rule 15c3-5[23], Canadian Securities Administrators' (CSA) draft rules on electronic trading and direct electronic access[24], FSA Market Watch 30[25] and Recommendations by CFTC's Pre-Trade Functionality Subcommittee on Pre-Trade Practices for Trading Firms, Clearing Firms and Exchanges involved in Direct Market Access[26]. The paper from IOSCO provides a set of principles for DEA within which more specific guidelines for trading platforms and investment firms can sit. Its eight principles cover: minimum customer standards, legally binding agreements, an intermediary's responsibility for trades, customer identification, pre- and post-trade information, adequate systems and controls and adequacy of systems. The SEC rules, CSA draft rules, FSA guidance and the recommendations of the CFTC's Committee are in effect detailed applications of IOSCO's principles.

IV.2. Guidelines on direct market access and sponsored access

a) *Trading platforms*

Guideline 7: Organisational requirements for RMs and MTFs whose members/participants and users provide direct market access/sponsored access

(Articles 39(b) and 43(1) of MiFID for regulated markets and Articles 14(1) and 26(1) of MiFID for multilateral trading facilities)

General guideline

1. Regulated markets and multilateral trading facilities should have rules and procedures which seek to ensure that, where they allow members/participants or users to provide direct market ac-

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[22] http://www.iosco.org/library/pubdocs/pdf/IOSCOPD332.pdf
[23] http://www.sec.gov/rules/final/2010/34-63241fr.pdf
[24] http://www.bcsc.bc.ca/policy.aspx?id=12364&cat=BC%20Notices
[25] http://www.fsa.gov.uk/pubs/newsletters/mw_newsletter30.pdf
[26] http://www.cftc.gov/ucm/groups/public/@swaps/documents/dfsubmission/tacpresentation030111_ptfs2.pdf

cess/sponsored access, the provision of direct market access/sponsored access is compatible with fair and orderly trading and arrangements aimed at preventing and detecting market manipulation.

Detailed guidelines

2. In following the general guideline, regulated markets and multilateral trading facilities should set out whether or not it is permissible for their members/participants or users to offer direct market access and/or sponsored access. Where they allow members or participants to offer direct market access and/or sponsored access their rules and procedures should at least:

   - make clear that the member/participant or user is responsible for all orders entered under its trading codes;

   - require the member/ participant or user to have adequate systems and controls to ensure that the provision of direct market access/sponsored access does not adversely affect compliance with the rules of the regulated market or multilateral trading facility, lead to disorderly trading or facilitate conduct that may involve market abuse;

   - require the member/ participant or user to conduct due diligence on any client to which it provides direct market access/sponsored access;

   - allow the regulated market or multilateral trading facility to refuse a request from a member/participant or user to allow a client to be provided with sponsored access where the regulated market or multilateral trading facility is not satisfied that this would be consistent with its rules and procedures for fair and orderly trading;

   - allow the regulated market or multilateral trading facility to suspend or withdraw the sponsored access after it has been granted where the regulated market or multilateral trading facility is not satisfied that continued access would be consistent with its rules and procedures for fair and orderly trading; and

   - have the ability to stop orders from a person trading through sponsored access separately from the orders of the member or participant sponsoring that person's access.

3. Regulated markets and multilateral trading facilities should keep adequate records of the matters covered in paragraph 2.

Explanatory notes

49. Obligations for RMs that are of relevant for SA/DMA are included in Articles 39(b) and 43(1) of MiFID, whilst for MTFs the relevant provisions are Articles 14(1) and 26(1). These require RMs and MTFs to have adequate arrangements in place to identify and manage the risks to their operations which would include the trading and market abuse risks posed to them by DEA arrangements, and to monitor compliance with their rules.

50. For trading platforms, the primary advantage of allowing members/participants or users to offer DMA/SA arrangements to their clients, is the opportunity to add order volume to their market.

51. However, where trading platforms open up their markets through DMA/SA to third party firms, it is important that they retain control of and closely monitor their systems to minimise any potential disruption caused by these third parties. Under these access arrangements, trading platforms are vulnerable to either the potential misconduct or market abuse of DMA/SA clients or to their inadequate/erroneous systems. Both could disrupt trading conditions and force a venue to deploy more drastic measures to normalise trading. Potentially, these risks could be magnified under SA arrangements where the orders do not pass through the sponsoring firm's order management systems before reaching the trading platform.

52. To avoid or minimise the risk that a trading platform would have to resort to measures to suspend trading, it is necessary that a set of effective controls is defined and required of members/participants or users offering DMA/SA to ensure that the market is not misused/disrupted by any DMA/SA client. Therefore, trading platforms which allow members/participants or users to provide access to their markets using either DMA or SA (or both), should have in place an appropriate set of rules/sanctions which reduces the risks/disruption to the particular trading platform and the wider market. We think the following should be viewed as an appropriate guide as to what minimum standards CAs would expect from trading platforms in order to ensure the safe and orderly functioning of markets under DMA/SA arrangements.

53. The draft guidelines on organisational requirements for trading platforms on DMA/SA cover several areas:

- **Responsibility.** ESMA believes that DMA/SA arrangements between the trading platform and DMA/SA provider should stress that the DMA/SA provider firm remains responsible for all trades using their market participant ID code. This is in keeping with the approaches of other regulatory bodies (including the SEC) and indeed IOSCO principle 3 which stipulates that *"An intermediary retains ultimate responsibility for all orders under its authority and for compliance of such orders with all regulatory requirements and market rules"*.

  The CSA in its explanation of its draft rules on electronic trading and direct electronic access (mentioned in paragraph 48 above) highlights the importance of clarifying which entity in DEA arrangements has responsibility for trades:

  "*Marketplace participants have indicated that there exists uncertainty in some instances regarding ultimate responsibility in relation to trades occurring pursuant to DEA. As electronic trading gets faster, there is a greater risk of issues occurring that result in liability. For example, systems failures or the execution of erroneous trades may cause losses or situations where parties are manipulating the market using DEA. There is a need to have clarity as to who will be held responsible for ensuring that these risks are appropriately and effectively controlled and monitored.*

  In line with the IOSCO principle 3 the CSA makes clear that they regard the DEA provider firm as the party liable for all trades under its market participant ID: *The approach we have taken supports the principle that marketplace participants, including participant dealers, are responsible for all orders entered onto a marketplace using their marketplace participant identifier. If a participant dealer chooses to provide its number to a client, it is the participant dealer's responsibility to ensure that the risks associated with providing that number are adequately managed."*

- **Obligations of members/participants and users.** ESMA believes that trading platforms should require that DMA/SA provider firms have adequate systems to minimise the risks of their clients disrupting orderly trading or participating in market abuse activities before permission to provide DMA/SA services is given. While some trading platforms have told us that it is impractical for them to carry out extensive checks on every member firm's internal control measures, ESMA believes that it should be in the commercial and reputational interests of trading platforms to be able to carry out where necessary a review of members/participants or users' internal risk control systems.

- **Rights of access.** Trading platforms should retain the right to decide who is able to access their market. In the case of those prospective SA clients that are seeking to connect directly to the trading platform without passing their orders through the sponsoring firm's order management systems, a trading platform should - in accordance with its rules and procedures - refuse permission to the sponsoring firm if it sees fit to do so in accordance with its rules and procedures and similarly, revoke permission later if the trading platform has legitimate concerns about the behaviour/risks of the SA client.

- **Control over SA.** For proper order management in response to SA arrangements, trading platforms should be able to distinguish between the orders sent from SA users from other orders sent by the sponsoring firm so that if a trading platform has to 'bust' or cancel an order, it can do so quickly and with minimal market impact. Trading platforms should therefore be capable of assigning unique customer IDs to clients that are accessing their market through SA.

  In the case of DMA the orders from these clients will be indistinguishable for trading platforms from other orders which come through the investment firm's order management system. If there are any problems with orders from DMA clients, trading platforms can therefore only stop the trading of the investment firm which is offering the DMA service and it will be up to that investment firm to sort out the problem, potentially by terminating the DMA arrangement.

Questions

Q18: Do the draft guidelines on organisational requirements for trading platforms whose members/participants or users offer DMA/SA deal adequately with the differences between DMA and SA?

Q19: Are there any areas of the draft guidelines on organisational requirements for trading platforms whose members/participants or users offer DMA/SA where you believe it would be helpful to have more detail?

Q20: Do you have additional comments on the draft guidelines relating to organisational requirements for trading platforms whose members/participants or users provide DMA/SA?

b) Investment firms

Guideline 8: Organisational requirements for investment firms that provide direct market access and/or sponsored access

(*Articles 13(2), (5) and (7) of MiFID and Articles 5, 6 and 7 of the MiFID Implementing Directive*)

General guideline

1. Investment firms offering direct market access/sponsored access to clients ('direct market access/sponsored access clients') are responsible for the trading of those clients and should establish adequate policies and procedures to ensure the trading of those clients complies with the rules and procedures of the relevant regulated markets and multilateral trading facilities to which the orders of such clients are submitted and enables the investment firm to meet its obligations under MiFID and other relevant Union and national law.

Detailed guidelines

2. In following the general guideline above, the policies and procedures covering the activities of direct market access/sponsored access clients should at least include:

   - criteria, differentiated as necessary between direct market access and sponsored access, which a client has to meet in order to be suitable for direct market access/sponsored access covering such issues as the training and competency of individuals entering orders, access controls over order entry, allocation of responsibility for dealing with actions and errors and financial standing of the direct market access/sponsored access client;

   - assessment, periodically reviewed if the person is accepted as a direct market access/sponsored access client of prospective clients against the criteria for direct market access/sponsored access clients and clear procedures for signing off on the acceptance of direct market access/sponsored access clients;

   - an assessment, periodically reviewed, of the trading activities of direct market access/sponsored access clients to assess the potential market wide impact of the orders that are likely to be sent to the relevant regulated markets and multilateral trading facilities;

   - appropriate credit thresholds for each client, reviewed on a regular basis, for which an investment firm provides direct market access/sponsored access, which will include an overall credit threshold and potentially credit thresholds in relation to specific financial instruments based on appropriate due diligence as to the direct market access/sponsored access client's financial condition, trading patterns and order entry history;

   - pre-trade controls on the orders of direct market access/sponsored access clients of the sort covered in paragraph 2 of Guideline 4 on organisational requirements for investment firms to promote fair and orderly trading in a highly automated trading environment;

   - clarity that the investment firm should solely be entitled to modify the parameters of the pre-trade controls (the direct market access/sponsored access client should not be able to do so);

- a real-time feed of orders entered and trading done by a direct market access/sponsored access client which separately identifies those orders and trades from the orders and trades of other clients and proprietary trades of the firm to enable the investment firm to check that direct market access/sponsored access clients' trading is compatible with the rules of relevant regulated markets and multilateral trading facilities and to help identify conduct that may involve market abuse, in particular, market manipulation;

- the ability to immediately halt trading by individual direct market access/sponsored access clients; and

- documentation of the rights and obligations of both parties in relation to the direct market access/sponsored access service.

3. Investment firms should keep adequate records of the matters covered in paragraph 2.

4. Investment firms offering direct market access/sponsored access can use pre- and post-trade controls which are proprietary controls of the investment firm, controls bought in from a vendor, controls provided by an outsourcer or controls offered by the venue itself (they should not be the controls of the direct market access/sponsored access client). However, in each of these circumstances the investment firm remains responsible for the effectiveness of the controls and has to be solely responsible for setting the key parameters.

Explanatory notes

54. Articles 13(2), (5) and (7) of MiFID and Articles 5, 6 and 7 of the MiFID Implementing Directive set down the relevant provisions for investment firms to have adequate arrangements in place to identify and manage the risks to their operations which would include trading and market abuse risks posed to them by DMA/SA arrangements. Aside from obliging investment firms to take due care to ensure that they have procedures and systems in place to detect risk of failure by the firm to meet its general MiFID obligations and to identify and manage risk to their operations, among other things, these provisions also demand that personnel have the necessary level of expertise/knowledge to undertake their roles.

55. The DMA/SA provider firm should in ESMA's view be mindful of its responsibility for all trades executed under its market participant ID. This responsibility should govern the approach the DMA/SA provider firm takes to assessing potential DMA/SA clients and the monitoring of their trading activity.

56. For a robust framework to mitigate the risks set out in the introduction to this section of the paper, controls need to operate on a pre-trade and post-trade basis. And of course, oversight of these risk controls needs to be monitored on an ongoing basis.

57. There are several key areas covered by the guidelines on organisational requirements for investment firms offering DMA/SA services:

- **Taking on DMA/SA clients.** Preliminary assessments of prospective DMA/SA clients are needed to determine if clients are suitable candidates for DMA/SA services. Firstly, therefore, DMA/SA provider firms should define what criteria these DMA/SA clients should be considered

against. Secondly, they should assess every prospective DMA/SA client against these criteria. ESMA is aware that many firms have 'on-boarding procedures' to ensure DMA/SA client suitability and competence and also rely on know-your-client (KYC) processes to carry out these preliminary assessments of their DMA/SA clients. ESMA thinks the criteria should at least cover:

- the training and competency of the individuals entering orders;
- access controls over order entry;
- allocation of responsibility for dealing with actions and errors;
- the financial standing of the DMA/SA client; and
- historical trading pattern/behaviour of the DMA/SA client, when available.

As part of this preliminary assessment of prospective clients, firms should also consider the potential impact of the DMA/SA client's trading strategy, taking account of the client's historical patterns of trading, on the relevant trading platforms and the wider market. They should also take account of the prospective DMA/SA client's disciplinary history with competent authorities and trading platforms.

- **Rights and responsibilities.** Under MiFID there is only a requirement for an investment firm and a client to have a written basic agreement with a retail client (for services other than investment advice). As DMA/SA clients are likely to be professional clients or eligible counterparties this requirement will not usually apply to DMA/SA services. However, it makes sense that where DMA/SA services are provided there should be clarity over the responsibilities of the respective parties and that they should record what they understand to be their respective rights and responsibilities.

- **Pre-trade controls.** Guideline 4 sets out organisational arrangements for investment firms for fair and orderly trading. Those controls need to be applied to the trading of DMA/SA clients.

  Based on this initial assessment of a DMA/SA client, the DMA/SA provider firm should set appropriate credit thresholds. The speed at which orders are entered into the market by their DMA/SA clients increases the risk that without controls, trades may exceed credit or financial limits. This may occur because DMA/SA clients cannot keep track of the orders being entered or because erroneous trades are entered and executed because no controls or a lack of proper controls exist to stop them.

  While the majority of investment firms said they operated automated controls on a pre-trade basis, a few firms highlighted the use of either adjusting the credit limit itself (which may or may not be appropriate according to whether the DMA/SA provider firm can see the DMA/SA clients' overall position across multiple markets - this may not always be the case) or over reliance on post-trade drop copies.

  In ESMA's view the DMA/SA provider firm should operate appropriate automated pre-trade controls which stop automatically any order from a DMA/SA client which would either compromise the DMA/SA provider firm's risk appetite or the credit thresholds. Whereas in the case of DMA this can be done at the firm level once the order passes through their systems, for SA this would need to be done at the trading platform level. It is important therefore that DMA/SA firms, wherever they source their pre-trade controls, be it a third party vendor, their own proprietary controls, or controls offered by the venue, have the ability to cancel a trade which is in-built and automatic should the trade pose a risk.

It is clear from feedback to our questionnaire that many investment firms providing DMA/SA services appear to have in place some form of control infrastructure to manage trading and credit risks that may arise from, among other things, their DMA/SA arrangements. However, it would appear that the rigour and risk control standards vary widely between firms and ESMA thinks it is important to set out what DMA/SA provider firms should consider as minimum measures to manage their risks effectively.

- **Monitoring.** On a post-trade level, DMA/SA provider firms should at least be monitoring trades in real time using real-time copied feeds of their DMA/SA clients' activities and using client IDs to monitor and review their DMA/SA clients' trading activity. DMA/SA firms should also have the post-trade measure to terminate a DMA/SA client's access to the order book.

- **Outsourcing.** The controls over the trading of DMA clients will usually be those of the firm as the order flow goes through the firm's systems. The same is not necessarily true for SA clients as the order flow does not go through the firm's systems. The controls over the trading of SA clients can be the firm's own controls or controls purchased from a vendor (including a trading platform). However, the responsibility for the effectiveness of the controls, including for the thresholds embedded in the controls, always remains with the investment firm offering SA and not with the SA client. The SA clients should not be able to change the controls on their own authority.

Questions

Q21: Do the draft guidelines on organisational requirements for investment firms providing DMA/SA deal adequately with the differences between DMA and SA?

Q22: Are there any areas of the draft guidelines on organisational requirements for investment firms providing DMA/SA where you believe it would be helpful to have more detail?

Q23: Do you believe that there is sufficient consistency between the draft guidelines on organisational requirements for investment firms providing DMA/SA and the SEC's Rule 15c3-5 to provide an effective framework for tackling relevant risks in cross-border activity and without imposing excessive costs on groups active in both the EEA and the US?

Q24: Do you have additional comments on the draft guidelines on organisational requirements for investment firms providing DMA/SA?

General question regarding the draft guidelines in Annex VII to this CP:

Q25: Does the explanatory text provided in addition to the guidelines (see Annex VII to this CP) help market participants to better understand the purpose and meaning of the guidelines? Should it therefore be retained in the final set of guidelines?

Annex I

Summary of questions

Q1: **Do you agree with ESMA that it is appropriate to introduce guidelines already before the review of MiFID covering organisational arrangements for trading platforms and investment firms in relation to highly automated trading, including the provision of DMA/SA?**

Q2: **Do you think that the draft guidelines adequately capture all the relevant points relating to the operation of trading platforms' electronic trading systems?**

Q3: **Are there areas where it would be helpful to have more detail on the organisational requirements applying to trading platforms' electronic trading systems?**

Q4: **Do you have additional comments on the draft guidelines on organisational requirements for trading platforms' electronic trading systems?**

Q5: **Do you think that the draft guidelines adequately capture all the relevant points related to the operation of trading algorithms?**

Q6: **Are there areas where it would be helpful to have more detail in the guidelines applying to the organisational requirements for investment firms' electronic trading systems?**

Q7: **Do you have additional comments on the draft guidelines relating to organisational requirements for investment firms' electronic trading systems?**

Q8: **Do the draft guidelines on organisational requirements for trading platforms to promote fair and orderly trading offer a sufficiently comprehensive list of the necessary controls on order entry?**

Q9: **Are there any areas of the draft guidelines on organisational requirements for trading platforms to promote fair and orderly trading where you believe it would be helpful to have more detail?**

Q10: **Do you have additional comments on the draft guidelines on organisational requirements for trading platforms to promote fair and orderly trading?**

Q11: **Do the draft guidelines on organisational requirements for investment firms to promote fair and orderly trading offer a sufficiently comprehensive list of the necessary controls on order entry?**

Q12: **Are there any areas of the draft guidelines on organisational requirements for investment firms to promote fair and orderly trading where you believe it would be helpful to have more detail?**

Q13: **Do you have additional comments on the draft guidelines on organisational requirements for investment firms to promote fair and orderly trading?**

Q14. Are there any areas of the draft guidelines for trading platforms on organisational requirements for regulated markets and MTFs to prevent market manipulation where it would be useful to have extra detail?

Q15. Do you have additional comments on the draft guidelines on organisational requirements for RMs and MTFs to prevent market manipulation?

Q16: Are there any areas of the draft guidelines on organisational requirements to deal with market manipulation for investment firms where you believe it would be helpful to have more detail?

Q17: Do you have additional comments on the draft guidelines relating to organisational requirements to deal with market manipulation for investment firms?

Q18: Do the draft guidelines on organisational requirements for trading platforms whose members/participants or users offer DMA/SA deal adequately with the differences between DMA and SA?

Q19: Are there any areas of the draft guidelines on organisational requirements for trading platforms whose members/participants or users offer DMA/SA where you believe it would be helpful to have more detail?

Q20: Do you have additional comments on the draft guidelines relating to organisational requirements for trading platforms whose members/participants or users provide DMA/SA?

Q21: Do the draft guidelines on organisational requirements for investment firms providing DMA/SA deal adequately with the differences between DMA and SA?

Q22: Are there any areas of the draft guidelines on organisational requirements for investment firms providing DMA/SA where you believe it would be helpful to have more detail?

Q23: Do you believe that there is sufficient consistency between the draft guidelines on organisational requirements for investment firms providing DMA/SA and the SEC's Rule 15c3-5 to provide an effective framework for tackling relevant risks in cross-border activity and without imposing excessive costs on groups active in both the EEA and the US?

Q24: Do you have additional comments on the draft guidelines on organisational requirements for investment firms providing DMA/SA?

Q25: Does the explanatory text provided in addition to the guidelines (see Annex VII to this CP) help market participants to better understand the purpose and meaning of the guidelines? Should it therefore be retained in the final set of guidelines?

Annex II

Text of relevant legislative provisions in MiFID and MAD

Regulated Markets

Article 39(b), (c) and (d) of MiFID

Member States shall require the regulated market:

(b) to be adequately equipped to manage the risks to which it is exposed, to implement appropriate arrangements and systems to identify all significant risks to its operation, and to put in place effective measures to mitigate those risks;

(c) to have arrangements for the sound management of the technical operations of the system, including the establishment of effective contingency arrangements to cope with risks of systems disruptions;

(d) to have transparent and non discretionary rules and procedures that provide for fair and orderly trading and establish objective criteria for the efficient execution of orders;

Article 42(1) to (3) of MiFID

1. Member States shall require the regulated market to establish and maintain transparent and non-discriminatory rules, based on objective criteria, governing access to or membership of the regulated market.

2. Those rules shall specify any obligations for the members or participants arising from:

(a) the constitution and administration of the regulated market;

(b) rules relating to transactions on the market;

(c) professional standards imposed on the staff of the investment firms or credit institutions that are operating on the market;

(d) the conditions established, for members or participants other than investment firms and credit institutions, under paragraph 3;

(e) the rules and procedures for the clearing and settlement of transactions concluded on the regulated market.

3. Regulated markets may admit as members or participants investment firms, credit institutions author Annex V 2000/12/EC and other persons who:

(a) are fit and proper;

(b) have a sufficient level of trading ability and competence;

(c) have, where applicable, adequate organisational arrangements;

(d) have sufficient resources for the role they are to perform, taking into account the different financial arrangements that the regulated market may have established in order to guarantee the adequate settlement of transactions.

Article 43 of MiFID:

1. *Member States shall require that regulated markets establish and maintain effective arrangements and procedures for the regular monitoring of the compliance by their members or participants with their rules. Regulated markets shall monitor the transactions undertaken by their members or participants under their systems in order to identify breaches of those rules, disorderly trading conditions or conduct that may involve market abuse.*

2. *Member States shall require the operators of the regulated markets to report significant breaches of their rules or disorderly trading conditions or conduct that may involve market abuse to the competent authority of the regulated Annex V regulated market to supply the relevant information without delay to the authority competent for the investigation and prosecution of market abuse on the regulated market and to provide full assistance to the latter in investigating and prosecuting market abuse occurring on or through the systems of the regulated market.*

Article 6(6) of MAD

6. *Member States shall ensure that market operators adopt structural provisions aimed at preventing and detecting market manipulation practices.*

MTFs

Article 14(1) and (4) of MiFID

1. *Member States shall require that investment firms or market operators operating an MTF, in addition to meeting the requirements laid down in Article 13, establish transparent and non discretionary rules and procedures for fair and orderly trading and establish objective criteria for the efficient execution of orders.*

4. *Member States shall require that investment firms or market operators operating an MTF establish and maintain transparent rules, based on objective criteria, governing access to its facility. These rules shall comply with the conditions established in Article 42(3).*

Article 26 of MiFID

1. *Member States shall require that investment firms and market operators operating an MTF establish and maintain effective arrangements and procedures, relevant to the MTF, for the regular monitoring of the compliance by its users with its rules. Investment firms and market operators operating an MTF shall monitor the transactions undertaken by their users under their systems in order to identify breaches of those rules, disorderly trading conditions or conduct that may involve market abuse.*

2. *Member States shall require investment firms and market operators operating an MTF to report significant breaches of its rules or disorderly trading conditions or conduct that may involve market abuse to the competent authority. Member States shall also require investment firms and market operators operating an MTF to supply the relevant information without delay to the authority competent for the investigation and prosecution of market abuse and to provide full assistance to the latter in investigating and prosecuting market abuse occurring on or through its systems.*

Investment firms

Article 13(2), (4), (5), and (6) of MiFID

2. An investment firm shall establish adequate policies and procedures sufficient to ensure compliance of the firm including its managers, employees and tied agents with its obligations under the provisions of this Directive as well as appropriate rules governing personal transactions by such persons.

4. An investment firm shall take reasonable steps to ensure continuity and regularity in the performance of investment services and activities. To this end the investment firm shall employ appropriate and proportionate systems, resources and procedures.

5. An investment firm shall ensure, when relying on a third party for the performance of operational functions which are critical for the provision of continuous and satisfactory service to clients and the performance of investment activities on a continuous and satisfactory basis, that it takes reasonable steps to avoid undue additional operational risk. Outsourcing of important operational functions may not be undertaken in such a way as to impair materially the quality of its internal control and the ability of the supervisor to monitor the firm's compliance with all obligations.

An investment firm shall have sound administrative and accounting procedures, internal control mechanisms, effective procedures for risk assessment, and effective control and safeguard arrangements for information processing systems.

6. An investment firm shall arrange for records to be kept of all services and transactions undertaken by it which shall be sufficient to enable the competent authority to monitor compliance with the requirements under this Directive, and in particular to ascertain that the investment firm has complied with all obligations with respect to clients or potential clients.

Article 5(1) to (3) and (5) of the MiFID Implementing Directive

1. Member States shall require investment firms to comply with the following requirements:

(a) to establish, implement and maintain decision-making procedures and an organisational structure which clearly and in documented manner specifies reporting lines and allocates functions and responsibilities;

(b) to ensure that their relevant persons are aware of the procedures which must be followed for the proper discharge of their responsibilities;

(c) to establish, implement and maintain adequate internal control mechanisms designed to secure compliance with decisions and procedures at all levels of the investment firm;

(d) to employ personnel with the skills, knowledge and expertise necessary for the discharge of the responsibilities allocated to them;

(e) to establish, implement and maintain effective internal reporting and communication of information at all relevant levels of the investment firm;

(f) to maintain adequate and orderly records of their business and internal organisation;

(g) to ensure that the performance of multiple functions by their relevant persons does not and is not likely to prevent those persons from discharging any particular function soundly, honestly, and professionally.

Member States shall ensure that, for those purposes, investment firms take into account the nature, scale and complexity of the business of the firm, and the nature and range of investment services and activities undertaken in the course of that business.

2. *Member States shall require investment firms to establish, implement and maintain systems and procedures that are adequate to safeguard the security, integrity and confidentiality of information, taking into account the nature of the information in question.*

3. *Member States shall require investment firms to establish, implement and maintain an adequate business continuity policy aimed at ensuring, in the case of an interruption to their systems and procedures, the preservation of essential data and functions, and the maintenance of investment services and activities, or, where that is not possible, the timely recovery of such data and functions and the timely resumption of their investment services and activities.*

5. *Member States shall require investment firms to monitor and, on a regular basis, to evaluate the adequacy and effectiveness of their systems, internal control mechanisms and arrangements established in accordance with paragraphs 1 to 4, and to take appropriate measures to address any deficiencies.*

Article 6 of the MiFID Implementing Directive

1. *Member States shall ensure that investment firms establish, implement and maintain adequate policies and procedures designed to detect any risk of failure by the firm to comply with its obligations under Directive 2004/39/EC, as well as the associated risks, and put in place adequate measures and procedures designed to minimise such risk and to enable the competent authorities to exercise their powers effectively under that Directive.*

   Member States shall ensure that, for those purposes, investment firms take into account the nature, scale and complexity of the business of the firm, and the nature and range of investment services and activities undertaken in the course of that business.

2. *Member States shall require investment firms to establish and maintain a permanent and effective compliance function which operates independently and which has the following responsibilities:*

   (a) to monitor and, on a regular basis, to assess the adequacy and effectiveness of the measures and procedures put in place in accordance with the first subparagraph of paragraph 1, and the actions taken to address any deficiencies in the firm's compliance with its obligations;

   (b) to advise and assist the relevant persons responsible for carrying out investment services and activities to comply with the firm's obligations under Directive 2004/39/EC.

3. *In order to enable the compliance function to discharge its responsibilities properly and independently, Member States shall require investment firms to ensure that the following conditions are satisfied:*

   (a) the compliance function must have the necessary authority, resources, expertise and access to all relevant information;

   (b) a compliance officer must be appointed and must be responsible for the compliance function and for any reporting as to compliance required by Article 9(2);

   (c) the relevant persons involved in the compliance function must not be involved in the performance of services or activities they monitor;

   (d) the method of determining the remuneration of the relevant persons involved in the compliance function must not compromise their objectivity and must not be likely to do so. However, an in-

vestment firm shall not be required to comply with point (c) or point (d) if it is able to demonstrate that in view of the nature, scale and complexity of its business, and the nature and range of investment services and activities, the requirement under that point is not proportionate and that its compliance function continues to be effective.

Article 7 of the MiFID Implementing Directive

1. Member States shall require investment firms to take the following actions:

(a) to establish, implement and maintain adequate risk management policies and procedures which identify the risks relating to the firm's activities, processes and systems, and where appropriate, set the level of risk tolerated by the firm;

(b) to adopt effective arrangements, processes and mechanisms to manage the risks relating to the firm's activities, processes and systems, in light of that level of risk tolerance;

(c) to monitor the following:

(i) the adequacy and effectiveness of the investment firm's risk management policies and procedures;

(ii) the level of compliance by the investment firm and its relevant persons with the arrangements, processes and mechanisms adopted in accordance with point (b);

(iii) the adequacy and effectiveness of measures taken to address any deficiencies in those policies, procedures, arrangements, processes and mechanisms, including failures by the relevant persons to comply with such arrangements, processes and mechanisms or follow such policies and procedures.

2. Member States shall require investment firms, where appropriate and proportionate in view of the nature, scale and complexity of their business and the nature and range of the investment services and activities undertaken in the course of that business, to establish and maintain a risk management function that operates independently and carries out the following tasks:

(a) implementation of the policy and procedures referred to in paragraph 1;

(b) provision of reports and advice to senior management in accordance with Article 9(2).

Where an investment firm is not required under the first subparagraph to establish and maintain a risk management function that functions independently, it must nevertheless be able to demonstrate that the policies and procedures which it is has adopted in accordance with paragraph 1 satisfy the requirements of that paragraph and are consistently effective.

Article 8 of the MiFID Implementing Directive

Member States shall require investment firms, where appropriate and proportionate in view of the nature, scale and complexity of their business and the nature and range of investment services and activities undertaken in the course of that business, to establish and maintain an internal audit function which is separate and independent from the other functions and activities of the investment firm and which has the following responsibilities:

(a) to establish, implement and maintain an audit plan to examine and evaluate the adequacy and effectiveness of the investment firm's systems, internal control mechanisms and arrangements;

(b) to issue recommendations based on the result of work carried out in accordance with point (a);

(c) to verify compliance with those recommendations;

(d) to report in relation to internal audit matters in accordance with Article 9(2).

Article 9 of the MiFID Implementing Directive

1. *Member States shall require investment firms, when allocating functions internally, to ensure that senior management, and, where appropriate, the supervisory function, are responsible for ensuring that the firm complies with its obligations under Directive 2004/39/EC.*

   In particular, senior management and, where appropriate, the supervisory function shall be required to assess and periodically to review the effectiveness of the policies, arrangements and procedures put in place to comply with the obligations under Directive 2004/39/EC and to take appropriate measures to address any deficiencies.

2. *Member States shall require investment firms to ensure that their senior management receive on a frequent basis, and at least annually, written reports on the matters covered by Articles 6, 7 and 8 indicating in particular whether the appropriate remedial measures have been taken in the event of any deficiencies.*

3. *Member States shall require investment firms to ensure that the supervisory function, if any, receives on a regular basis written reports on the same matters.*

4. *For the purposes of this Article, 'supervisory function' means the function within an investment firm responsible for the supervision of its senior management.*

Article 6(9) of MAD

9. *Member States shall require that any person professionally arranging transactions in financial instruments who reasonably suspects that a transaction might constitute insider dealing or market manipulation shall notify the competent authority without delay.*

Annex III

Cost-benefit analysis of the draft guidelines on systems and controls in a highly automated environment for trading platforms, investment firms and competent authorities

I. Executive Summary

The cost-benefit analysis impact assessment of the draft guidelines on systems and controls in a highly automated trading environment for trading platforms, investment firms and competent authorities indicates the following aggregated cost impacts across the concerned stakeholders based on the weighting set out in detail below.

	The overall cost of the ESMA guidelines					
Stake-holders	**Competent authorities**	**Trading platforms**	**Investment firms**	**Aggregation of costs**	**Non-regulated trading firms**	**Overall impact**
One-off	√	√	√√	√√	√	**Low/Medium**
Ongoing	√	√	√√	√√	√	**Low/Medium**

Impact of the benefit of the guidelines		
Stakeholders	**Benefits for all market participants**	**Overall impact**
One-off	√√	**Medium**
Ongoing	√√	**Medium**

In conclusion the guidelines appear to deliver higher benefits than costs.

Summary of the impact assessment		
	Costs	**Benefits**
One-off	**Low/Medium**	**Medium**
Ongoing	**Low/Medium**	**Medium**

I. Background

1. According to Article 16 of the ESMA regulation, "*The Authority shall, where appropriate, conduct open public consultations regarding the guidelines and recommendations and analyse the related potential costs and benefits. Such consultations and analyses shall be proportionate in relation to the scope, nature and impact of the guidelines or recommendations*".

2. Over the last few years, the European marketplace has experienced significant changes in the market microstructure with the advent of algorithmic trading (AT) and, as part of it, of HFT[27], fuelled by technological innovation and market fragmentation. The increasing role played by automated trading can be illustrated by evidence of the importance of HFT in the European equity market. According to answers received to the questionnaires ESMA sent to trading platforms, HFT firms accounted for between 40% and 70% of the total equity index trading volumes in Q4 2010 on individual trading platforms. In the futures market, HFT firms accounted for between 10% and 60% of total equity index futures trading volumes on individual trading platforms over the same period and HFT firms accounted for up to 95% of all orders sent and 97% of all orders cancelled for one trading platform.[28]

3. Estimates of the level of HFT trading depend on the definition of HFT being used, but the figures from the responses to the ESMA questionnaire are similar to figures from other sources. According to the answers to a call for evidence of CESR[29], two equity trading platforms representing a significant market share in Europe indicated that HFT trading on their platforms accounted for 13% and 40% of the total volume traded; banking trade associations estimated that between 50% and 80% of trading on European equity trading platforms came from HFT firms; whereas HFT firms themselves estimated they accounted for 25% to 45% of trading on European equity trading platforms. According to a Tabb group study[30], HFT accounted for 35% of the total turnover in the UK in 2010, and 77% for continuous markets. The HFT market share is expected to grow to 45% in 2012 according to Aite Group.[31] In the U.S., estimates suggested that HFT accounted for 40% to 67% of trading volume at end 2009.[32]

4. The ESMA fact-finding exercise more generally confirms the perception that the role of AT and HFT with regard to both the liquidity provision and the price formation processes that occur on European securities trading platforms is material and significant.

5. At the same time, new forms of market access have emerged such as DMA, whereby an investment firm (IF) allows a client to use its ID to electronically transmit orders for executions to a trading platform through the investment firm's infrastructure and SA, whereby the client uses the investment firm's member ID without using the intermediary's infrastructure. According to answers received to

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[27] A provisional definition of HFT is given by "Trading activities that employ sophisticated, algorithmic technologies to interpret signals from the market and, in response, implement trading strategies that generally involve the high fre-quency generation of orders and a low latency transmission of these orders to the market. Related trading strategies mostly consist of either quasi market making or arbitraging within very short time horizons. They usually involve the execution of trades on own account (rather than for a client) and positions usually being closed out at the end of the day."

[28] The shorter duration of HFT orders leads to emphasize their number. An average of the number of orders weighted by their duration might thus appear more relevant. Calculating such an indicator would however raise significant computational difficulties.

[29] See "Consultation responses to Call for Evidence on Micro-structural Issues of the European Equity Markets http://www.esma.europa.eu/index.php?page=responses&id=158.

[30] "Breaking down the UK equity market. Executable liquidity, dark trading, high frequency and swaps", January 2011.

[31] See Aite Group "The European Equity Electronic Trading Landscape: How Deep is Your Pool", March 2010.

[32] The estimate of TABB Group (Sep. 2009) is 61%; that of Rosenblatt Securities (30/09/09)"approx. 66%"; Celent (Dec. 2009) is more conservative (42%).

the ESMA questionnaire from trading platforms, the percentage of market members providing DMA ranges from 25% to 100%. For trading platforms that allow SA, the figure ranges from 3 to 5%.

6. An overall assessment of the balance of costs and benefits of recent changes in market structure gives rise to a number of conceptual and empirical difficulties that have been partly addressed by on-going academic analysis but largely remain to be explored. Appendix IV provides a survey of academic studies on the impact of AT and HFT on market quality.

7. Overall, according to the academic literature, the effects of algorithmic trading are mixed. On the one hand, AT and HFT have some positive effects: i) improve instantaneous measures of liquidity by reducing bid-ask spreads and often post the markets' best quotes, and ii) improve price discovery. On the other hand, AT and HFT can decrease other types of liquidity (increase in realised spreads, reduction in traded volumes and market depth), especially under stress conditions. According to the CFTC-SEC's report on the 6 May 2010 'flash crash', "*the interaction between automated execution programs and algorithmic trading strategies can quickly erode liquidity and result in disorderly markets*". Indeed Kirilenko et al. (2010)[33] show that during the 'flash crash', HFT had a negative impact on liquidity: HFT became directional (selling pressure in a downward spiralling market) as HFT firms had to unwind their positions and balance their net positions. As a result HFT firms competed for liquidity ('hot potato effect'), amplifying the price impact of the initial selling pressure, as they sold when price decreased and bought while it increased, resulting in higher volatility.

8. The survey of the academic studies mentioned above has been taken into account in preparing the cost-benefit analysis below. However, ESMA believes that a further review of the relevant literature would be necessary if more stringent regulatory measures were envisaged in the context of the revision of MiFID and MAD.

II. Cost-benefit analysis

9. The development of algorithmic trading strategies, including HFT, has brought considerable change in the order processing chain at trading venues. While market infrastructures have been developed to accommodate a wider range of trading needs, the processing of orders has become much more technology intensive and much more complex and new risks have emerged as a result. Developments observed in the European marketplace linked to algorithmic trading and new forms of access to trading platforms by persons who are not members of those platforms triggers various types of market failures which require adapting applicable regulatory frameworks.

II.1. Market failure analysis

10. The massive increase in message traffic sent to trading platforms may disrupt electronic trading systems if institutions operating those systems do not have adequate systems and controls to deal with capacity constraints. This generates collective costs (**negative externalities**) that are borne not only by firms using algorithms, but rather by all market participants, increasing uncertainty and reducing financial stability.

11. The increasing complexity of algorithms reduces the capacity of firms using them - as well as that of other market participants – to assess the impact of their implementation in the market. This creates

[33] Kirilenko, A., A. Kyle, M. Samadi and T. Tuzun (2010): "The flash crash: the impact of high frequency trading on an electronic market", working paper CFTC and University of Maryland.

uncertainties for various types of market participants (such as trading venues and buy-side), and is particularly likely to have an impact in times of stressed market conditions; firms without appropriate development and testing processes may also implement trading algorithms without assessing their likely impact on the market. Whereas, this effect is in principle partly mitigated by the incentive of firms that send orders to the market to bear the financial and reputational consequences of inappropriate implementation of their algorithms, imperfect information could result in firms lacking incentives to sufficiently assess the likely impacts of their algorithms on the market, as well as the potential negative externality.

12. Another **information asymmetry** can arise from the volume and complexity of algorithmic trading. It is becoming harder for competent authorities to promote market integrity, including detecting market abuse, due to the costs and time needed to process the massive amount of information sent by algorithms to the market and to the increased complexity of algorithmic trading behaviour. New types of manipulation strategies can also be implemented using algorithms (such as spoofing, layering and quote stuffing). According to answers received to the ESMA questionnaires, some investment firms had observed instances of unusual market activities such as last order modification or spoofing/layering and discussions with people in charge of market surveillance have indicated that market abuse is indeed harder to spot. One individual involved in market surveillance told ESMA that efforts to compress data to make it more manageable through aggregation are likely to hide much more than they reveal and the number of false positives thrown out by systems designed to alert on abusive behaviour to rise.

13. Direct access to a trading platform, where the person or institution receiving access trades in the name of a member/participant or user of the trading platform, can create **both negative externalities and information asymmetries**. Particularly in the case of SA, firms accessing trading platforms directly may lack incentives to have an adequate risk management framework as the SA provider is legally responsible for the trading of their clients. Firms using SA may implement riskier strategies than they would otherwise do under alternative market access, given that they do not have to use their intermediary's infrastructure (moral hazard). SA may attract riskier firms for the same reason, resulting in adverse selection. This would increase reputational and credit risk for the investments firms providing SA. From discussions with market participants, it appears that some investment firms do not provide SA for these particular reasons. At the same time, fierce competition for clients between investment firms may result in a 'race to the bottom', whereby firms providing SA may have little incentive to require their clients to strengthen risk management and not be willing to bear the costs of monitoring them by themselves.

14. Market-driven solutions may be insufficient to address such market failures:

- Market participants – including HFT firms, investment firms and trading venues – do not always have incentives to internalise the costs of their actions on all market participants. While this may be mitigated partly by high (reputational) costs of market disruptions and dysfunctions, risks may also be increased by the consolidation of market infrastructures (potentially any given problem disrupts more trading activity than would otherwise be the case) or of market participants (problems in order entry might be multiplied across a wider number of orders);
- Given the fierce competition for order flow including the provision of DEA and, in particular, SA market-based solutions may be insufficient for managing the risk these activities pose. Such competition between trading venues and/or investment firms for attracting clients may thus lead to a 'race to the bottom' and reduce risk management standards.

II.2 Regulatory objectives at risks

15. The development of algorithmic trading and direct access to the market is perceived to create risks to the following regulatory objectives:

    Investor protection: Investors may individually take risks that they are not aware of when trading in a market relying on algorithmic trading. More generally, risks to market stability and integrity may have direct consequences for them if they crystallise.

    Fair and orderly trading: Insufficient systems and controls for managing the risks related to algorithmic trading, investment firms' direct electronic access, and trading venues infrastructures may imply that trading techniques used could have a detrimental impact on the market (such as slowing trading but also leading to "erroneous" trades).

    Market integrity: Insufficient detection of fraud and abusive behaviour may reduce the participation of investors in the markets by diminishing their confidence that they will be fairly treated when using markets. A lower level of trading activity could reduce liquidity and raise transactions costs on secondary markets, increasing the costs of raising capital through markets in financial instruments.

    Financial stability: Disruptions in the functioning of secondary market have consequences on the provision of liquidity and on the formation of public prices. This could cause problems for individual institutions and more generally add to moments of stress in financial markets with repercussions for the functioning of financial intermediaries as a whole.

II.3 Why is intervention necessary?

16. Trading platforms, investment firms providing access to the market, and investment firms using algorithmic trading lack incentives to bear the full cost of managing the risks and negative impacts of their trading strategies and the necessary organisational arrangements for their activities linked to trading. There are limits to the market's capacity to mitigate such detrimental effects. Related shortcomings are considered to be market failures that justify some form of regulatory intervention.

17. Moreover, under the existing legal framework provided by MiFID (such as Articles 39(b), (c) and Article 42(1) to (3) for RMs, Articles 14(1) and 26 for MTFs and Articles 13 and 5 to 9 of the MiFID Implementing Directive for investment firms) and MAD (Article 6(6) for RMs and Article 6(9) for investment firms), no specific clarification has been given at the EU level to address the concerns related to the recent developments of electronic trading including algorithmic trading and DMA and SA in the European marketplace.

II.4 Regulatory policy response

18. Dealing with risks induced by algorithmic trading leads to consideration of two options:

    1) do nothing; or

    2) provide regulatory guidance, aimed at:

        a) ensuring that trading venues and investment firms have the technical and human capabilities, as well as the appropriate procedures, to manage the risks incurred by algorithmic trading; and

b) ensuring that processes are in place for monitoring market activity.

19. It should be noted that MiFID provisions currently do not allow for imposing prescriptive rules. ESMA can only adopt guidelines as provided for in Article 16 of the ESMA Regulation. In drafting the guidelines in this paper ESMA has sought to provide greater clarity on the obligations in current legislation whilst staying within the confines of what is permitted under Article 16. The adoption of more prescriptive rules on a national level might lead to regulatory arbitrage. In addition, the adoption of guidelines, preferably to binding rules, should be expected to mitigate concerns about proportionality and unintended effects of regulation. However, because guidelines are not binding, the do not bring the legal certainty of legislation and rules and cannot deal with issues – such as the fact that some HFT firms are exempt from MiFID – which would require a change in the legislative framework.

20. Beyond the scope of the present guidelines binding rules might be envisaged at a later stage, should amendments to the MiFID requirements provide the vires to do so. More specifically, ESMA could be granted powers to issue Binding Technical Standards (BTS) with regard to the issues under consideration. Such legislative changes might in particular lead to:

a) the power to turn guidelines into BTS;

b) requirements involving improved information collection and consolidation for market surveillance purposes;

c) regulation of some specific aspects of the market structure such as, for example, co-location, tick size or fee schedules, which may have direct impacts on low latency trading and related risk management frameworks; and

d) implement technical features to reduce the amount of information sent to trading venues and slow down trading.

21. In response to CESR's call for evidence (Annex V) and ESMA's fact-finding questionnaires concerns were expressed by market participants about the consistency of the application of the current rules. ESMA therefore believes that it is appropriate to move on from the current position by adopting guidelines. They will help clarify competent authorities' expectations for trading platforms and investment firms in a highly automated trading environment and provide a common platform for the more consistent application of the rules by competent authorities.

II.5 Methodology

22. In order to assess the costs and benefits linked to the guidelines, ESMA has identified the costs and benefits they have in terms of their potential impact on the following stakeholders:

- market participants (all stakeholders in general: investors, issuers, etc.);
- competent authorities;
- trading platforms;
- investment firms; and
- non-regulated trading firms.

23. The costs and benefits that have been considered in this analysis are set out below:

Costs

a) for competent authorities:

- supervisory costs

b) for trading platforms:

- compliance costs
- operational costs

c) for investment firms:

- compliance costs
- operational costs

c) for non-regulated trading firms:

- indirect compliance and operational costs

Benefits

- investor protection improvement
- fairer and more orderly trading
- greater market integrity
- lower risk of financial instability.

Key impact of the overall costs and benefits of the draft ESMA guidelines		
High	Medium	Low
√√√	√√	√

24. The final impact assessment is made by calculating the impact of the overall costs and benefits. This requires the calculation of a single figure for the costs for different stakeholders: i) competent authorities, ii) trading platforms, and iii) investment firms.

a) Costs

i) Impact on competent authorities

Supervisory costs

25. Set-up costs. Competent authorities in the EU will have to review existing guidance to trading platforms and investment firms to ensure that it is consistent with these guidelines and replace it where it is not. This is likely to have a small cost as it appears that whilst some competent authorities have pub-

licly commented on some of the issues covered by these guidelines, there is little explicit guidance of other national authorities on the issue. The costs of reviewing existing guidance against the new guidelines and making any necessary amendments should therefore be small across the EU as a whole.

26. Ongoing costs. Competent authorities will also need to ensure that in their supervision of trading platforms and investment firms they take account of these guidelines and review their implementation over time. This should not add significantly to the existing costs of supervision. Competent authorities are already engaging with trading platforms and investment firms on the issues covered by the guidelines. Ensuring that the guidelines are being observed should not require significant new supervisory effort, although in the short term competent authorities might need to devote more time and effort to engaging with trading platforms and investment firms on their compliance with the guidelines.

Overall assessment

27. The overall supervisory costs of the guidelines should therefore be low, although slightly higher in the short term than in the medium to long term.

Costs for competent authorities	
One-off	Ongoing
√	√

ii) Impact on trading platforms

28. According to ESMA's MiFID database there are 142 regulated markets in the EEA and 92 MTFs. There is a smaller number of operators of regulated markets and MTFs because many operators operate more than one market. The regulated markets and MTFs trade a wide range of the different types of financial instruments covered by MiFID.

Compliance costs

29. Trading platforms will need to review their existing policies and procedures against the guidelines. Based on the responses to the ESMA fact-finding questionnaire t it is probable that there is already a relatively high degree of compliance with the standards set out in the guidelines. Therefore, once trading platforms have completed an assessment of their compliance against the guidelines, and although some policies and procedures may need to be updated, it is unlikely that trading platforms will have to completely rewrite their policies and procedures. Once their policy and procedures have been updated as necessary, there should not be a substantial additional increase in compliance costs in the medium to long term because there should not be a significant set of additional issues for compliance functions to have to concern themselves with.

Operational costs

30. Some trading platforms will probably need to adapt their electronic trading systems and associated controls in order to comply with the guidelines. The costs of such changes would include the costs of IT staff and other personnel who would be required to be involved in the development plus the costs of software and hardware. Additional ongoing costs for the maintenance of the enhanced trading systems and controls are expected to result from it. The guidelines are however believed to be based on current

best practice of a number of operators, given their answers to the ESMA questionnaires, and should thus involve only limited incremental costs. A possible cost of the guidelines could be caused by a change in the business models of some trading platforms, as they may require more staff, resulting in higher operational costs. This could reduce competition between trading platforms as it would raise the barriers to entry to new competitors.

Overall assessment

31. Modest compliance costs are expected for trading platforms in complying with the guidelines. More significant costs are expected for any trading platforms that need to adjust their trading systems and associated controls.

Costs for trading platforms	
One-off	Ongoing
√	√

iii) Impact on investment firms

32. Based on data from national competent authorities there are 5,000 investment firms in the EU and 4,500 credit institutions. A smaller number of entities will be affected by these guidelines as not all of the firms mentioned above will be members/participants or users of regulated markets and MTFs. A broad indication of the numbers affected (it obviously does not cover entities who are members/participants and users of trading platforms who deal on own account and do not execute orders on behalf of clients) is probably given by the number of entities who have permission to execute orders on behalf of clients. This includes approximately 2,500 investment firms and 3,100 credit institutions.

33. The responses to QVI of ESMA's fact-finding questionnaire to trading platforms (summarised in Annex VI) provides some information on the extent to which members/participants of regulated markets and MTFs offer SA. It is not possible to provide any significant data on the prevalence of DMA.

Compliance costs

34. Investment firms will need to review their existing policies and procedures against these guidelines and make changes as necessary and then take these guidelines into account as part of their ongoing monitoring and review of their organisational arrangements. Based on the responses to the ESMA fact-finding questionnaires it would appear that these guidelines represent what is currently best practice amongst investment firms in the areas they cover. However, this means that not all investment firms will have organisational arrangements which meet all aspects of the guidelines and they will need to revise them as necessary. Once the revisions have been made then they should be taken into account in a firm's existing processes for monitoring and reviewing its organisational arrangements.

35. An upper limit for the costs is found in a comparable exercise of the SEC in the United States and points to limited additional costs of compliance for investments firms.[34] Indeed, one would expect

[34] See the cost-benefit analysis of the SEC related to the adoption of its Rule 15c3-5 on risk management controls for brokers or dealers with market access, which dealt with issues raised by ESMA's proposed guidelines 4 and 8 and, to an extent, 9.

some investment firms to need to upgrade existing trading controls in Europe but not for investment firms to build control systems from scratch, as this would represent a serious compliance failure under present rules. Where firms upgrade their existing systems this is likely, as in the US, to be associated with increased ongoing costs as well.

Operational costs

36. Investment firms will potentially have to upgrade their electronic trading systems and related controls under the guidelines. Such upgrades will require time from IT and other staff and potentially new software and hardware costs followed on by additional ongoing costs of maintenance. Here again, and for the same reasons as previously mentioned, the similar exercise of the SEC provides an upper bound to the operational cost estimate.[35]

Overall assessment

37. Guidelines themselves should not cause significant new compliance costs given that investment firms will already have had to assess the rules under which the guidelines sit when the rules were implemented. However, there might be significant operational costs for some firms where existing trading systems and controls do not meet the best practice set out in the guidelines.

Costs for investment firms	
One-off	Ongoing
√√	√√

The SEC estimated that for broker-dealers covered by rule 15c3-5, one-off compliance costs would approximately amount to $32,200 per broker-dealer or a total of $44.3mn across all the 1,375 broker dealers. The costs include 15 hours work each by a compliance lawyer and a compliance manager and 5 hours work by a CEO. Almost two-thirds of the total costs reflect the work of the CEO whose time it was estimated would cost $4,005 an hour. The SEC estimates the annual increment to compliance costs to be approximately $34,800 per broker dealer for a total of $47.9 million across all 1,375 broker dealers. Again, two-thirds of estimated costs relate to the cost of 5 hours work by a CEO. Such cost estimates per firm are likely, to overestimate the costs of complying with comparable standards in European guidelines for several reasons, including that: The SEC's assessment relates to the introduction of a binding rule, not of guidelines; SEC rules require CEOs to sign off on risk controls. In the EU senior management are collectively responsible for compliance under Article 9 of the MiFID Level 2 Directive; SEC rules embed a new specific annual review and CEO certification of the review. There is already such a requirement in the EU namely to review, monitor and report, at least annually, to senior management under Article 9 of the MiFID Level 2 Directive.

[35] The SEC estimates that, for broker-dealers covered by rule 15c3-5, one-off operational compliance costs would reach $70.1Mn and ongoing annual costs $65Mn. The one-off cost figure is based on the assumption that 5% of the 1,375 firms covered build control systems from scratch. For them the SEC estimates that they would spend approximately $167,904 per firm on technology staff (for a total of 720 hours of work) and $102,500 per firm on hardware and software. The SEC estimates that the other 95% of firms would spend some $27,984 per firm on technology personnel (120 hours of work) and approximately $11,517 on hardware and software costs. Ongoing costs assume each firm to pay $47,300 annually on maintaining an in-house risk management system. This includes $26,800 for technology personnel (115 hours of work) and $20,500 on hardware and software. The main reason for believing that costs in the EU would, for comparable standards, be lower than in the US relate to the previously mentioned difference between rules and guidelines.

iv) Impact on non-regulated trading firms

38. ESMA has no information on the number of non-regulated firms who might be affected by the guidance.

Compliance costs

39. Non-regulated trading firms are outside the scope of the guidelines. However, firms using SA and DMA may incur some indirect costs given that investment firms providing direct market access would require them to have appropriate systems and controls. Based on the responses to ESMA's fact-finding questionnaires it would appear that these guidelines represent what is currently best practice amongst non-regulated trading firms in the areas they cover. However, for some firms that do not have adequate systems and controls, the cost may be significant.

Operational costs

40. Non-regulated trading firms will potentially have to upgrade their electronic trading systems and related controls under the guidelines. Such upgrades will require time from IT and other staff and potentially new software and hardware costs followed on by additional ongoing costs of maintenance.

Overall assessment

41. Guidelines themselves should not cause significant new compliance costs for non-regulated trading firms given that some of them will already have had to assess the rules under which the guidelines sit when the rules were implemented. Moreover, only non-regulated trading firms using DEA would incur the costs linked to the guidelines. However, there might be significant operational costs for some firms where their existing trading systems and controls do not meet the best practice set out in the guidelines.

Costs for non-regulated trading firms	
One-off	Ongoing
√	√

b) Benefits

42. As noted previously the rules under which the guidelines sit are designed to promote investor protection, fair and orderly trading, market integrity and financial stability. In relation to these regulatory objectives the main benefit of the guidelines themselves, as opposed to the benefit of the rules under which they sit, should be to bring about a greater consistency of compliance across the EU by setting out clearly what competent authorities expect of trading platforms and investment firms in the areas covered by the guidelines. This should add a marginal benefit in relation to each of the objectives.

    Investor protection: Implementation of the guidelines should ensure that investors are more consistently protected against investment firms making errors when entering their orders. More generally, more robust and resilient trading systems should mean that investors are able to trade when they want to do so.

Fair and orderly markets: If the risks of erroneous order entry is controlled then there should be less 'noise' in financial markets making it easier for investors to interpret trading information and to make more effective investment decisions. This would result in greater confidence and less uncertainty in trading.

Market integrity: More consistent organisational arrangements by trading platforms and investment firms should help to diminish the risk that there will be an attempt to manipulate markets for financial instruments through trading on trading platforms. If the risk of market manipulation is reduced this should help to give investors greater confidence and potentially aid liquidity and price formation thereby delivering markets involving lower costs for investors and issuers of capital.

Financial stability: Better control of operational, credit and market risk by investment firms through controls on their systems and trading activity could mitigate the risks they pose to the system. The same objective would be achieved if the same controls were implemented by regulated trading firms and non-regulated trading firms. In addition, for firms providing DMA and SA, the proposed guidelines would lead to the potential benefit of a reduction in credit risk and reputational risk arising from their clients' risk taking and trading behaviour.

43. As stressed in paragraph 23 above, the benefits will be dependent on the responses of trading platforms, investment firms and competent authorities. The benefits will only arise if trading platforms and investment firms (who are subject to these guidelines) implement them and they are integrated in the supervisory practice of competent authorities.

Overall assessment

44. The guidelines should strengthen the significant benefits which flow from the rules under which they sit by ensuring greater uniformity in the supervision against the rules and greater uniformity in the way in which trading platforms and investment firms approach compliance with the rules.

Benefits for market participants	
One-off	**Ongoing**
√√	√√

Annex IV

Review of academic evidence on the effects of algorithmic and high frequency trading on market quality

1. Over the last decade, research in microstructure has shown extensively the benefits of technology for the markets. Academic research, by stressing the capacity of technology to consolidate order flows across multiple trading venues, widely underpinned regulatory reform that fragmented the markets in the U.S. and Europe, for the purpose of increasing competition among trading venues[36]. Furthermore, it is argued that technology enables to automate tasks that were previously performed less efficiently by humans (monitoring of the markets, consolidation and processing of information, etc.)[37].

2. Over the last few years, several papers have assessed empirically the impact of HFT and algorithmic trading (AT) on market quality. The following focuses on this empirical research, the authors of which use a variety of definitions and proxies to measure HFT and AT activity in financial markets as there are no single, widely accepted definition of AT or HFT.

3. Studies of AT use proxies of AT activity such as the number of electronic message per unit of trading volume (Hendershott, Jones and Menkveld (2011)) or flags of AT by trading venues (Hendershott and Riordan (2009) for the German equity market and Chaboud et al. (2009) for the FX market).

4. A few empirical papers rely also on proxies of HFT based on the mean reversion of net trading positions (Kirilenko et al. (2010)) or on a specific identification of the firms generating the order flow – either by an exchange (Nasdaq in the case of Brogaard (2010)) or in direct connection with the HFT firm itself (Menkveld (2011)).

5. The impact of HFT and AT can be assessed using two main criteria: liquidity formation and price formation. Liquidity itself has three main dimensions: instantaneous trading costs, immediacy (depth), and price impact and resilience (the time dimension of liquidity). Price formation includes the implications for financial stability of HFT/AT.

Effective trading costs appear to be decreasing

6. In the literature the effects of AT and HFT on trading costs are generally assessed by measuring bid-ask spreads. As trading has become more automated there has been a decrease in quoted spreads both in the U.S. and Europe (although macroeconomic uncertainties in recent years have, at times, pushed spreads wider). Effective measures of bid-ask spreads – measures taking into account the bid-ask spreads that prevail when trades effectively occur – should be considered here, as low latency trading algorithms have the specific ability to amend quotes very frequently and quickly, and quoted spread information might thus relate to liquidity on offer but not to liquidity effectively consumed by market participants. Evidence on this point shows that AT improves (reduces) effective spreads both in the U.S. and in Europe.

[36] See in particular, Harris (2003) and Foucault and Menkveld (2008).
[37] See, for example, Hasbrouck and Saar (2011) or Biais, Weill (2009).

7. Hendershott, Jones and Menkveld (2011) study the impact of AT on the NYSE over the 2002-2003 period. In July 2003, the NYSE started using autoquote for a few stocks which enabled AT to trade on these stocks. The authors show that autoquote led to an increase in AT. By comparing liquidity measures for 'autoquote' stocks and other stocks, the authors found that available liquidity (quoted and effective spreads) in 'autoquote' stocks has been higher than for other stocks. In Europe, Jovanovic and Menkveld (2011) compare transaction costs in the Dutch and Belgian equity markets, after Chi-X enabled AT to trade Dutch stocks (but not Belgian ones). Controlling for changes in the Belgian market (which was not impacted by a similar development of AT, including HFT), they show that AT led to a 13% reduction in effective bid-ask spreads in the Dutch market.

8. Using Deutsche Börse data on DAX stocks during the first 13 days of January 2008, Hendershott and Riordan (2009) find that AT provides the liquidity for 50% of traded volumes (50% of volumes have an AT limit order on the side of the trade that provides liquidity), but that AT liquidity demand represents 52% of traded volumes (52% of traded volumes have an AT order on the liquidity consuming side of the trade[38]). The authors thus find that AT consumes more liquidity than it provides. However, they make several observations to put this finding in context. First, AT is more likely to initiate marketable orders when spreads are low – i.e. to consume liquidity when it is cheap – and to provide liquidity when it is expensive, thus smoothing out liquidity provision over time. Moreover, AT/HFT firms provide the best quotes more often than others. In the U.S., Brogaard (2010) shows that 26 Nasdaq HFT firms provide the best quotes 65% of the time.

Other dimensions of liquidity are less well assessed

9. Whereas lower trading costs are likely to increase trading volumes, if information asymmetries between market participants increase as a result of AT/HFT, they may lead to a decrease in the participation of some types of investors in the markets (adverse selection), resulting in a negative effect on trading volumes. On the whole, there is little empirical evidence on the impact of AT/HFT on overall trading volumes, as it remains difficult to disentangle the specific impact of AT/HFT development. Controlling for factors that might bias the comparison, Jovanovic and Menkveld (2011) found a 13% decrease in traded volumes in the Dutch market following the entry of an HFT player. As a result, and against the background of previously mentioned benefits of HFT for effective spreads, they consider the impact of HFT on liquidity to be ambiguous, without being able to assess the net welfare effect.

10. The impact of AT/HFT on quoted market depth is documented as being negative. While Gresse (2010) documents a general decrease in quoted depth for a sample of French and U.K. blue chip stocks, Jovanovic and Menkveld (2010) ascribe such a drop in quoted depth to HFT on the Dutch market. Similarly, in the U.S., on the NYSE, Hendershott, Jones and Menkveld (2011) show that growth in AT led to a drop in quoted depth (as well as to a rise in realised spreads). It is, however, important here to enter a caveat relating to the impact of AT/HFT on effective depth, as there are reasons to doubt of the meaningfulness of quoted spreads in the current context: quoted depth measures generally relate to best quotes, but the decrease in tick sizes has spread out liquidity across several tick sizes; averages based on periodic measures (say every second) of depth do not take into account the more frequent update of such liquidity provision.

11. The price impact of trades relates negatively to liquidity available for immediate trading. Hence, this liquidity measure matters particularly for traders such as institutional investors, who need to trade in

[38] Liquidity consuming orders can be either marketable orders or limit orders that match previously posted limit orders, and are thus immediately executed.

large sizes but whose execution costs may evolve adversely when large order executions are fragmented and spread over time. The underlying issue is essentially informational (adverse selection) and reflects the extent to which trading costs move adversely when a large trading interest is detected by the market. Indicators of the price impact of U.S. institutional investors' trades have been estimated by Anand et al. (2011).[39] The authors find a significant drop in the implementation shortfall over the last decade until 2007. They however observe a significant rise since the crisis, the reversal of which is found to be only limited in the period under review (until 2009Q3).

Price formation: Short-term benefits are noted, but longer-term benefits are less obvious

12. As long as it does not result from adverse selection, the price impact of trades can be interpreted in terms of capacity of the market to incorporate relevant information into securities prices. Assessing the quality of the price formation process remains however challenging, as the market equilibrium, fundamental, price (the 'true' value of the security) is essentially unobservable. Empirical estimates thus need to rely on assumptions for approximating this price and/or on its properties.[40] In practice most microstructure studies rely on information share methodology developed by Hasbrouck (1991) and Hasbrouck (1995) to assess price formation in the short-term (on horizons of a few minutes).

13. Against this background, the impact of AT and HFT on price formation appears ambiguous: it is positive in the short run (intra-day) but might be negative in the longer run (quarterly horizon) on equity markets. Hendershott and Riordan (2009) and Brogaard (2010) find AT and HFT participants contribute more to price discovery than non-AT/HFT participants. Their impacts on prices last longer (suggesting that AT/ HFT trades provide more private information), and they contribute more to changes in the efficient price. In FX markets, Chaboud et al. (2009) finds that human trades contribute more to price discovery than AT. In the longer run, however, Zhang (2010), using quarterly data, finds that HFT does not improve price discovery as it causes prices to overreact to news that contain fundamental information on prices.

Volatility and financial stability: AT/HFT market dynamics remain largely to be analysed and seem to depend largely on the specific market conditions

14. Most of the studies under review do not establish a significant relationship between volatility and AT/HFT in normal times. Jovanovic and Menkveld (2010) found that volatility is not higher in the Dutch (HFT) market than in the Belgian market, while Brogaard (2010) argues that HFT is not linked to volatility and that HFT continues to supply liquidity when volatility is high (although it provides 10% less liquidity than the average when volatility is low). This is also a finding of Chaboud et al. (2009) in the FX market, where volatility is found to be unrelated to the share of AT in overall activity, or potentially even to decrease with a rise in the share of AT. Using quarterly data, Zhang (2010), however, finds a positive relationship between HFT and volatility.

15. During periods of stress, HFT seems to increase volatility in securities market. Kirilenko and al. (2010) find that during the flash crash, competition for liquidity among HFT firms led to a 'hot potato' effect that increased volatility in the futures market. Easley, Lopez de Prado and O'Hara (2011), furthermore stress that liquidity imbalances may structurally result from the development of HFT and of the in-

[39] The indicator considered is the implementation shortfall, namely the difference between prices prevailing at the time of investment decisions and final execution prices. The decision price is approximated by the trading session opening price.

[40] The information share methodology assumes the efficient price to follow a random walk, and breaks the variance of the efficient price down into trade-correlated and trade-uncorrelated trades. The information share of a market (here HFT) is thus computed as the portion of total price discovery that correlates with trades on this market, see Hasbrouck (1995).

duced rise in the concentration of trading and correlation of trading strategies, and may thus come with risks to financial stability[41].

Limited research on AT/HFT's externalities, particularly on market integrity and more generally on social welfare

16. Theoretical papers have shown that the change in equity market structure might have adverse effects in terms of social welfare. Pointing to the adverse selection effects on specific types of investors (along the lines of the above-mentioned study of institutional investors by Anand and al. (2011)), Biais, Foucault, Moinas (2011), for example[42], contend that the benefit of technology for the market must be balanced against the potential detrimental impacts of asymmetries of information it creates for informed traders who are not processing price information as quickly as AT firms. They also point to a potentially sub-optimal equilibrium, in which collective 'over-investment' in market infrastructures would occur. This point remains however largely to be assessed empirically.

17. Lastly, the development of AT/HFT creates a potential for new forms of potential market abuse to arise, or some forms of market abuse to become more widespread[43]. Some academic papers have raised potential concerns about a blurring of the divide between abusive and authorised behaviour[44]. AT/HFT also increases the number of messages and the complexity of AT/HFT market information and thus the difficulty and cost for market surveillance to detect such abusive behaviour. It is necessary to take such costs into account when assessing the overall balance of positive and negative welfare effects of AT and HFT on market quality.

[41] The authors however design early warning indicators of such imbalances, thus pointing to a market solution to the problem.

[42] Along this line of thinking, Jarrow and Protter (2011) show, in a theoretical model, that "*HFT can create a mispricing that they unknowingly exploit to the disadvantage of ordinary investors (…) In fact their trades can create increased volatility and mispricings (deviations from fundamental value) that they exploit to their advantage*", whereby "*The price trend is generated by their collective but independent actions, coordinated via the observation of common signals*".

[43] New types of abuses are identified by HFT respondents to the survey of ESMA, such as pinging or quote-stuffing. New ways to implement existing types of market abuses are identified by market surveillance, including the automation of order book layering strategies. Such strategies aim at providing the (wrong) image of an order book imbalance by accumulating orders on one side of the book and then suddenly cancel their orders and trade on the opposite direction. Angel, Harris and Spatt (2010) express, for their part, concern about front running in correlated securities, typically futures (or ETFs) and underlying stocks.

[44] According to Hasbrouck and Saar (2011): "*strategies seem to blur the traditional divide between supplying and demanding liquidity, as "component orders" of the strategy are placed and cancelled to affect the probability of achieving an execution*". O'Hara (2010) raises more explicit concerns about market integrity "*Artificial quotes are different in that they are typically computer generated and have such short duration that execution is not a possibility. While arguably such quotes could be part of some complex (arcane?) trading strategy, a more disquieting explanation is that they are used in a new form of manipulation that works off of algorithmic trading and crossing. If a quote is never intended to be traded at, is it really a quote?*".

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Annex V

Feedback on CESR's call for evidence

1. CESR undertook a call for evidence on micro-structural issues of the European equity markets (Ref: CESR/10-142) in April 2010.[45] A generic summary of the responses received as far as they are relevant for the topics covered by this CP is set out below.

Questions on High Frequency Trading

Q I: Please describe trading strategies used by high frequency traders and provide examples of how they are implemented.

2. Most respondents said that HFT is not a strategy in itself but a methodology to implement existing (algorithmic) strategies in a 'compressed timescale'.

3. Respondents describe HFT as follows:

- 'High velocity order entry' - high frequency methodology required to implement strategies relies on low latency infrastructure, computational power coupled with co-location of servers and highly competent staff.

- A means of automated execution of strategies based on mathematical algorithms. For example, users of HFT exploit low latency technology and co-location arrangements to generate first-mover profits.

- HFT strategies attempt to be market-neutral or closed out by the end of the day and most respondents concurred with this view, although one respondent questioned the validity of this assumption.

- Others considered that HFT can be defined by the originator of the trade; that there is no client order nor official market maker role, no overnight positions and the trade activity is related to arbitrage strategies. There was general agreement that HFT implies the implementation of *proprietary* strategies with a very short time horizon although others mentioned the use of HF methods to execute client orders at high speed across multiple venues.

4. Commonly two types of broad strategy were mentioned: (i) statistical arbitrage and (ii) electronic market making. Neither strategy involves taking a positional view.

Statistical arbitrage

5. A number of respondents defined 'statistical arbitrage' as seeking to take advantage of perceived temporary pricing anomalies created through market pricing and infra-structure inefficiencies. Statistical arbitrage can take place across different markets and asset classes.

[45] http://www.esma.europa.eu/index.php?page=document_details&id=6535&from_id=61

Electronic market making/ liquidity provision

6. Electronic market making is a mean reversion strategy which one market participant defined as posting "two-sided orders onto electronic order books, providing liquidity and making a public price". It has also been stressed that the 'holding period' for market makers has typically always been short as market makers provide a revenue generating service including compensation for risk taken, rather than any interest in long term beneficial ownership. One trading venue further narrows this to an "attempt to capture spread and earn rebates whilst managing positional risk in real time". One respondent also described it as a "rebate capture strategy to exploit beneficial fee structures, such as 'maker-taker' structures; meaning that there is no 'genuine' trading interest".

7. Some respondents said market making could be classified as arbitrage across time or temporal arbitrage.

Other notable comments

8. A sub-set of arbitrage, inter-market hedging and correlation strategies were specifically mentioned by several respondents. One respondent stated that "for investment banks, HFT is mostly used to arbitrate baskets against futures and in the context of a correlation book." These strategies direct flow into multiple-listed equities, fungible products like American Depositary Receipts (ADRs) and highly correlated products like futures and ETFs.

9. Another respondent commented that it views HFT as a group of abusive strategies that adversely affect them. These include front running, execution timing, adverse selection (liquidity only provided when adverse price move is expected,) pennying and manipulation (placing of orders with no intention to trade but to move prices or bait algorithms).

Q II: Please provide evidence on the amount of European trading executed by HF traders. If possible, please distinguish between HFT on transparent organised trading platforms and on dark pools of liquidity.

10. Most respondents did not answer or felt that they could not comment either because of the lack of a clear definition of HFT or because they could not source the necessary data. Some directed these enquiries to the trading platforms.

11. The responding platforms estimated the share of HFT on their respective lit markets to be between 13% and 40%.

12. Some banks believe that HFT could be as high as 50-80%.

13. One HFT firm estimated European electronic trading volumes to be at 45% and another at 40%+ but both feel that this represents all algorithmic trading, not just HFT. Another HFT firm estimates HFT at 20-30% and the average trade size at €6000. They see little volume in dark pools but increasing HFT demand along with futures, options and FX.

Q III: What are the key drivers of HFT and (if any) limitations to the growth of HFT?

Drivers

- Technological progress: greater processing power at lower cost with lower latency.

- Trading model/strategy development and network architecture, including the management of order exposure times on exchanges.
- Availability of specialist programming/IT staff.
- Profit opportunities: from arbitrage across new venues and asset classes.
- Reduced frictional costs: reduced fees – from venues and through interoperability.
- Greater automation and adoption of algorithms by retail users.
- Increased volumes and volatility due to macro events.
- Tick sizes: standardised minimums across venues for each security.

Limitations

- Tick sizes: to force order book queuing.
- Macros events: Economic and political instability had decreased volumes and volatility. Increased HFT competition: Reaching a finite point of liquidity - i.e. too many HFT players without increased 'natural' business. Profits will be cannibalised and reduced as they compete with each other.
- Costs of trading, clearing and settlement: HFT firms work on very low margins and the costs of fragmented clearing and settlement in Europe are a major impediment to growth.
- Costs: at the point where attaining/maintaining relative latency becomes economically unviable – this is a natural limit to latency.
- Regulatory restraint/taxes: measures to maintain market integrity and/or prevent manipulation may impinge on innovation and HFT growth. Short selling/stock loan restrictions and an increased leverage requirement are examples of this
- Fragmentation: to the extent that costs increase as trades sizes decrease and there is a need to connect to more venues and manage order flow between them.

Q IV: In your view, what is the impact of high frequency trading on the market, particularly in relation to:

- **market structure (e.g. tick sizes);**
- **liquidity, turnover, bid-offer spreads, market depth;**
- **volatility and price formation;**
- **efficiency and orderliness of the market?**

Market structure

14. Generally, respondents said that market structure developments, advances in technology and venue competition introduced by MiFID has reduced transaction costs and provided an opportunity for HFT firms. Transparency in equity markets has also assisted with the growth of HFT. A number of respondents considered that HFT firms have had a positive impact by aligning the prices on different execution venues. Other respondents noted that HFT firms had contributed to the fall in average trade sizes.

Tick sizes

15. A number of respondents noted that HFTs benefit from smaller tick sizes. However, there were mixed views on whether the reduction in tick sizes could be directly attributed to HFT activity. One respondent considered that the reduction in fees and ticks is excessive, creating volume and complexity without any real contribution to the markets.

Liquidity, market depth, bid/offer spread

16. The majority of respondents said that HFT firms provide liquidity and contribute to the tightening of bid/offer spreads. Some said that liquidity and market depth were positively influenced by more competition and turnover. A number of respondents pointed to the volatility in 2008 and noted that liquidity did not disappear from equity markets during this time. There were mixed views on whether HFT strategies meaningfully contributed to market depth.

17. One respondent noted the US temporary ban on short selling in September 2008 which prevented HFTs from providing liquidity in certain securities. This respondent suggested that spreads in 950 stocks (with the short-sale ban) were 50% higher than spreads in stocks with no additional short sale restrictions.

Volatility and price formation

18. A number of respondents noted the difficulty in measuring the impact on volatility given the recent financial crisis. Some respondents said that HFT act to reduce volatility. They note that price volatility is generally caused when a huge imbalance of supply or demand exists, causing instability in the order book. HFT strategies that provide liquidity to reduce such imbalances help stabilise the market and control price volatility allowing markets to operate in an orderly fashion. Some respondents noted that HFT firms benefit from volatile markets and may contribute to increases in volatility. Some respondents considered that HFT does not add to liquidity or price formation.

Efficiency and orderliness of the market

19. Respondents noted that HFT firms contribute to market efficiency by providing competition to traditional market makers and by arbitraging pricing variations between different markets/instruments. HFT firms can also assist with the orderliness of the market by smoothing volatility (as noted above). Other respondents noted that technology needs to be implemented in a controlled manner to avoid unforeseen consequences to the efficiency and orderliness of the market.

Q V: What are the key benefits from HFT? Do these benefits exist for all HFT trading strategies?

20. A number of respondents considered that HFT provided the benefits outlined in question 4 above, including:

    - increased liquidity, market depth and tightening of bid/offer spreads;
    - reduced volatility and contribution to the price formation process; and
    - enhanced efficiently, lower transaction costs and orderliness of the market.

21. Some respondents said that HFT drives innovation and competition amongst trading venues which benefits all trading participants through improved technology, services and lower trading costs. They believe HFT strategies have contributed to market transparency, by partly replacing the traditional market maker model which is based on non pre-trade transparent OTC transactions.

22. Other respondents suggested that not all HFT strategies provide a benefit (e.g. predatory or gaming strategies). Some considered there was no evidence that the acceleration of pricing frequency has a positive economic effect from a market structural perspective. They suggested that HFT firms extract unwarranted prices from end investors. Others suggested that HFT may increase market volatility through smaller order sizes and the potential for sudden withdrawal from the market.

23. A number of respondents requested further empirical research to quantify costs/benefits.

Q VI: Do you consider that HFT poses a risk to markets (e.g. from an operational or systemic perspective)? In your view, are these risks adequately mitigated?

24. There were mixed views on whether HFTs posed new risks to markets. A summary of risks identified by some respondents are as follows:

- Systemic risks through increased bandwidth usage, order entry/deletion and rogue algorithms – although not specific to HFT, these can be mitigated by appropriate systems and controls (including testing) to manage automated order flow.

- Market abuse – may become more difficult in a fragmented and highly automated environment. Market surveillance must keep pace with technology developments and new trading strategies.

- Appropriate access, supervision and control by market operators – trading platforms need to ensure they can monitor trading activity and act quickly to maintain integrity and orderliness (including capacity/volatility 'circuit breakers') e.g. by switching off a member. Some respondents considered that infrastructure providers have kept pace with innovation.

- Liquidity obligations – the potential withdrawal of large amounts of liquidity can exacerbate volatility.

- Potential de-correlation from market fundamentals and from 'real economy' where strategies focus on short term trading profits

- Financial risks:

    - Electronic market making – low risk given that positions are held for a short period of time and they are flat over night.

    - Statistical arbitrage – potential risk where positions are held for longer periods of time (risks are greater in less liquid securities).

- Financial risks are partially mitigated by clearing and settlement arrangements, but appropriate risk controls are also necessary for firms engaging in proprietary trading. Some respondents said that the small margins associated with HFT strategies means that financial risks are well monitored.

Q VII: How do you see HFT developing in Europe?

25. Some respondents do not foresee growth. Arbitrage opportunities afforded by post-MiFID fragmentation will disappear as platforms consolidate and regulation will stop the growth of dark venues. One respondent said that profits will narrow due to competition between HFT firms as long as this is not offset by rebates etc. One bank shared this view but added that technological innovation will continue as HFT firms compete with each other rather than other user groups.

26. Some respondents said that HFT will continue to grow due to lower fees and post-trade costs brought about through interoperability, and because US-based HFT firms will move into Europe.

27. One HFT firms commented that markets are becoming more liquid and centrally cleared. HFT will continue to challenge the monopoly of issuers making markets for their own products, and will also continue to put pressure on platform competition by continuing to take investments in trading systems. Where such stakes are volume-based, HFT firms have a greater incentive to direct their liquidity provision to certain markets.

28. Some respondents took the view that regulatory harmonisation will increase the efficiency of European markets, lowering costs and fostering HFT growth. One respondent added that European and US market structures will become more similar.

29. One MTF thought that further automation and adoption of strategies will occur, leading to increased use by more participants across a wider range of securities. Similarly another MTF believes that HFT will increase as market players become more technologically mature.

30. One respondent believed that HFT is dependent on fragmentation and trading costs, and that retail and institutional users will adopt algorithms to ensure MiFID compliance, encouraging HFT.

31. One investment firm asserted that the success of the MTF's will attract more HFT. Another one said that HFT will broaden its asset class range leading to increased transaction volumes. A trading platform agreed that this could happen.

32. One market participant believes that HFT will continue to grow but at a declining rate. One trading venue thought that it will reach a natural limit. Others believe that HFT will increase due to reduced technological cost and regulatory innovation (to resemble the US). One investment firm believes that HFT firms will become market makers, whilst one HFT firm stated that moving OTC to exchange traded products will foster HFT growth.

Q VIII: Do you consider that additional regulation may be desirable in relation to HF trading/ traders? If so, what kind of regulation would be suitable to address which risks?

33. The majority of respondents felt that no additional HFT-specific regulation was required, especially because of the difficulty to define 'HFT'. Some added the caveat that additional regulation could be detrimental if it was not well thought out and implemented after careful analysis and consideration of empirical evidence.

34. One respondent commented that HFT was a product of the fragmentation created by MiFID.

35. One trading platform stated that regulators should focus on trading behaviour and its outcome whilst the trading venues need to ensure that their systems keep pace with new trading techniques and strategies. Trading platforms should be resilient and reliable with sufficient capacity and monitoring in place.

36. Several respondents expressed a desire for additional surveillance of market abuse. One respondent specifically stated that HFT firms should be appropriately capitalised. Another said that MIFID-exempt firms should have more stringent capital requirements and additional reporting obligations. Some respondents stated that HFT firms should not be exempt from MiFID. One HFT firm requested that HFT firms should have minimum capitalisation requirements and market maker obligations.

37. One investment firm proposed that the expansion of HFT should be limited by frictional costs such as increased tick sizes, minimum duration of orders, banning of co-location and pre-trade risk checks to increase the latency of orders. Another firm said that "*It is necessary to restrict HFT activity via tick size, transaction frequency, reporting transparency/requirements and fee schedules because of the very real risk of simultaneous concourse of algorithms in the case of a market reversal of market*". Conversely, a banking association said that these measures must be ruled out since they would harm the market.

38. On the regulation of market structure some respondents mentioned a need for fair access to co-location facilities and another respondents even looks forward to a well defined framework for direct market access in the EU.

39. The most specific regulatory proposals were put forward by a trading platform. These included the following:

- monitoring current industry initiatives around tick-size harmonisation;
- harmonising time-stamps;
- implementing standardised circuit breakers, prohibiting wash-trades and defining standard trade cancellation mechanisms;
- ensuring fair access to the market and market data;
- limiting potential for conflicts of interest; and
- identifying and monitoring of HFT flow by regulators.

Questions on sponsored access

Q IX: What are the benefits of SA arrangements for trading platforms, sponsoring firms, their clients and the wider market?

40. The following benefits were seen by the various stakeholder groups:

Trading platforms**:** increased volume, increased fees, increased liquidity, which in turns attracts additional participation.

Sponsoring firms: Incremental flow, more commission received and more discounts at trading and clearing level. Sponsoring firms (SFs) can advertise a larger market share. SA extends the range of commercial services offered so that sponsoring firms do not give up business to other firms.

SA clients: Reduced latency, control of its execution, discounted trading fees due to aggregation with the sponsoring firm's trading volume, having all benefits of being a direct member of a trading venue without bearing the respective regulatory costs and overhead expenses.

Wider range of market participants: Increased liquidity through HFT and other latency sensitive strategies.

41. Generally respondents felt that naked sponsored access should be banned. Specific remarks included:

- SA is the only efficient way to access some European markets (e.g. Spain, eastern Europe countries) where a physical presence is still required. Such limitations should be removed
- There should be no regulatory arbitrage opportunities between SA and direct membership.
- SA should not be allowed without adequate pre-trade management controls (which would transfer sponsored access effectively into a DMA business). The key point would not be where the controls and filters are located, but whether or not they exist.

Q X: What risks does SA pose for the orderly functioning of organised trading platforms? How could these risks be mitigated?

42. Risk of erroneous trades, market integrity concerns. Lightly controlled access to markets might cause systemic risks to the orderly functioning of the market.

43. Risks can be mitigated with robust systems and adequate pr-trade risk management filters and post trade controls at the level of the trading venue and/or at the SF level. There was consensus on the need for pre-trade risk controls, and some discussion about who should be responsible for doing what:

(i) Broad-based filters (such as 'fat finger' controls) implemented by exchanges at exchange level and operation controls, legal controls and effective monitoring;

(ii) client-specific filters to be implemented at broker level or to be provided by exchanges and customised by individual brokers

44. Strong support was expressed for harmonised regulatory requirements in terms of level of controls to be implemented at trading platforms when authorising SA at to be provided by investment firms to avoid race to the bottom due to commercial pressure. Ultimately, the sponsoring firm should retain responsibility for the trades of its SA clients.

Q XI: What risks does SA pose for sponsoring firms? How should these risks be mitigated?

45. The risks associated with the SA offering are potentially considerable as the SF retains responsibility for their SA clients' trades: trading related risks, credit and operational risk, financial and reputational risks.

46. These risks can to be mitigated by the due diligence process, pre-trade risk management and filters, post trade controls by the SF.

Q XII: Is there a need for additional regulatory requirements for sponsored access, for example:

a. limitations on who can be a sponsoring firm;

b. restrictions on clients that can use sponsored access;

c. additional market monitoring requirements;

d. pre-trade filters and controls on submitted orders.

Responses to Q XII a):

47. SF firms should be a registered broker dealer and SA arrangements should not be its sole activity. There should be an adequate balance between the level of activity the SF is supporting and its capital adequacy. Support for harmonised risk management to be met by an SF.

Responses to Q XII b):

48. Responsibility of the SF to determine who can be an SA client (some responses suggest that SA should be limited to smaller firms , other firms having to go through the direct membership route, one response suggests limitation to EU registered funds,). The SF must satisfy itself that the SA client has necessary risk management systems and procedure in place.

Responses to Q XII c):

49. Support for regulation requiring specific pre-trade checks for all SA offering by venues. Some responses suggest that SA customers should have a unique identifier to enable adequate market monitoring.

Responses to QXII d):

50. Strong support for consistent regulatory requirement for pre-trade risk management and controls at venue and SF level (e.g.; size and price of orders, size and/or value of open positions, consistency with normal trading patterns of the SA clients, value of incurred trading losses, both open and closed).

Q XIII: Are there other market wide implications resulting from the development of SA?

51. Mixed views were expressed regarding the wider implications of SA. If no standardised systems and controls are required and applied on a pre-trade level, SA could be detrimental to all. A more positive approach concludes that SA, where appropriate controls are in place, is a legitimate market tool that brings benefits to the market. One response stressed that SA should not be used to avoid regulatory obligation such as non EEA firms trying to enter Europe without local regulatory oversight. At the other end of the spectrum, one response explained that members may ultimately opt out of trading from certain platforms that allow SA.

52. In a nutshell: There is real awareness of the risks attached to SA. There is support for specific regulatory requirements to avoid a 'race to the bottom'. But there are some concerns about an unlevel playing field/regulatory arbitrage between SA arrangements and the costs attached to direct membership.

Annex VI

Summary of the results of a targeted fact-finding on micro-structural issues

1. ESMA undertook a targeted fact-finding. Three questionnaires were addressed to RM/MTFs, HFT firms and investment firms providing DMA/SA services and/or using co-location/proximity hosting services.

2. This Annex provides a generic summary of the answers provided to those questions which are relevant to the various topics of the proposed *ESMA guidelines on systems and controls in a highly automated trading environment for trading platforms, investment firms and competent authorities*.

Questions addressed to RMs/MTFs

Information on risk control standards and precautionary volatility measures

Q I: A description of the measures and procedures your RM/MTF has in place to handle high volumes of order entry, messaging and trading to mitigate the risk of e.g. insufficient capacity within the trading system.

3. Out of 23 respondents, 13 stated that they have pre-determined limits on the total number of messages in a day and/or the number of messages per second that a participant can send. The message flows and response times are then monitored. If a participant reaches any of the limits, traffic is suspended or, more commonly, throttled.

4. Another topic commented on is having sufficient capacity headroom in the trading systems. Generally, server capacity can be increased on relatively short notice. Other approaches involve simulating predicted future order traffic in early stages or, as for three RMs/MTFs, using added or scalable server capacity in times of high traffic.

5. If throttling measures or capacity headroom is insufficient or not in place there are alternative solutions. At three RMs/MTFs orders are queued when necessary. Two RMs/MTFs currently lack high messaging measures since order traffic constitutes a fraction of the system capacity.

Q II: The percentage of order entry capacity you use under normal market conditions.

6. 11 out of 17 RMs/MTFs answered that the normal capacity usage lies somewhere between 5 and 10 %. There are a couple of outliers: two RMs/MTFs at 25-50 % and 40 %t respectively, which could be of concern. The capacity usage at two of the respondents on the other hand is close to zero.

Q III: A description of the kind of stress test scenarios you apply to test the capacity of your platform, particularly in peak and emergency situations.

7. The overall approach is similar between the respondents and usually consists of simulating or generating order traffic. Alternatively, the order flow is replayed from the busiest trading days to receive a realistic mix of order input. Depending on the RM/MTF, the traffic is then increased between 1.5 to 20 times historic peak levels. System performance and latency is monitored while traffic is increased and

sustained up until some sort of system failure occurs or where appropriate trading conditions can no longer be maintained. The bottleneck or source of failure is then identified and noted for future system upgrades.

8. In general, the tests are conducted both regularly and at system upgrades. Minor variations exist between RMs/MTFs. Some scenarios are run in test systems and others in production. Another difference is that some tests are performed in the business or client environment as opposed to internal capacity testing. The biggest difference is that very few respondents have commented on emergency situations, i.e. what happens in case of a system failure. While all RMs/MTFs have described their performance tests, only two have reported failover and recovery tests. The reason may be that it is obvious that back-up servers and capacity are in place in the system infrastructure. Otherwise this could possibly be a source of concern.

Q IV: Details of any circuit breakers, volatility limits and procedures for trading halts/intra-day auctions or other precautionary volatility measures including the triggering point, measures taken thereafter and the basis of a resumption of trading, and how the measures taken are communicated i) to trading participants, ii) to other trading platforms trading the same share, and iii) the public.

9. Besides two RMs/MTFs that are dependent on price formation at primary markets, most RMs/MTFs have volatility limits. There are two basic types of volatility limits. The first is a dynamic volatility guard that is triggered if the next trade price deviates too much in percentage terms from the last paid price. It is only applicable during continuous trading. The second is a static volatility guard that is triggered if the next trade price deviates too much in percent from a reference price, which is usually the price from the last auction. The vast majority of the RMs/MTFs apply both, but it is possible to use only a dynamic or only a static volatility guard.

10. The price limits are referred to as collars, thresholds, price bands etc and their distance from the reference price is normally dependent on the type of financial instrument and their volatility and liquidity. It is set on order book level and may be adjusted during the day to volatile market conditions or other circumstances such as earnings reports. The distance between the price limits and the reference price may be as low as 3 % for blue-chip stocks and as high as several hundred percent for penny-stocks or derivatives.

11. When price limits are breached one of three things happen. The most common is that trading is halted and an intra-day auction is started. The auction usually lasts for a predetermined time-period, ranging from 1 to 10 minutes between the RMs/MTFs, but there are exceptions. One alternative is that trading resumes when the equilibrium price has been between the threshold levels for at least 1 minute. Another approach suggested by a RM/MTF is that trading is resumed after the relevant trading party has been contacted and asked for confirmation or deletion. When the call auction is over, the matching price determines the new reference price of the static volatility guard.

12. Almost as common as intra-day auctions are trading safe-guards. This involves rejecting orders that would lead to price limit breaches. One RM/MTF emphasised that this is the best way to provide an orderly market as there is no disruption to continuous trading. Another RM/MTF supported this view and further pointed out that a consistent pan-European approach is preferable, not only to promote reliability and predictability, but also to avoid trading halts as a source of regulatory arbitrage. The fact that all MTFs do not halt trading when there is an intra-day auction at the primary market may give support to this view.

13. The third thing that might happen when a price limit is breached is that a trade is executed, which triggers a trading halt but no auction follows. This is however only applicable at one RM/MTF trading derivatives which is subject to higher volatility and where auctions are uncommon. Executions are manually examined and evaluated and traders affected by deletions are informed.

14. Information about trading halts and measures taken are generally communicated to trading participants through the trading platform or consolidated market data feeds. The same information is usually communicated to other trading platforms and the public through information vendors and company websites. Other trading platforms may subscribe to market data feeds, but are not treated specially in other regards. Finally, submitting orders that result in a trading halt or order rejection will result in a message in the trading application. Investors will obviously not see automatic matching during intra-day auctions either.

Q V:

a) Information on any platform-level control arrangements you offer – if any – that may be used by members (e.g. order entry controls that they can tailor for their particular use), whether these are provided by your platform or a third party provider.

15. Of the 22 responding RMs/MTFs, 10 do not provide such services, while 5 offer at least some 'fat-finger' order entry controls or messaging limitations and the rest provide the full range of pre-trade controls to be used by members. They can be set on client or firm level. Both in-house solutions and third party provisions exist, but in-house solutions are slightly more common. Examples most often mentioned were:

- Most RMs/MTFs offer order entry controls on price and order size. Some quantity restrictions are set per order and others per trading day.
- Cancellation of orders in case of disconnection from the market.
- The possibility to throttle the number of messages or transactions per client and also number of messages per instrument.
- Cancellation and prevention of client orders for other reasons, e.g. in emergency situations.
- Market maker protection, i.e. the possibility for derivatives market makers to perform quote validations in the underlying before a trade.
- Self-match prevention.
- Other software vendor tools that can be tailored by market participants themselves.

b) Information on rules – if any - requiring members to place controls on their order flow, and how you enforce these rules.

16. As a rule, the member is responsible for any order placed on the trading platform and all orders should comply with the member rules of the trading platform. This includes orders from clients using automated order routing, DMA or SA. The member rules generally stipulate that pre-trade controls of price and quantity are in place. Activity that is aimed at reducing the functionality or performance of the trading system or the systems of other participants is also prohibited.

17. There is some variation among the respondents. The biggest difference is that some RMs/MTFs explicitly comment on the security functions and systems tests that must be in place to avoid erroneous

orders. Others state e.g. a maximum number of messages per client per second, or prohibit market abuse. In one jurisdiction, the regulatory framework concerning handling of orders is provided by the supervisory authority instead of the exchange.

18. Failure to comply with the member rules result in disciplinary procedures. Such penalties come in the form of fines, order cancellation, restrictions on placing orders and trading suspension.

Questions on SA and DMA

19. For the purposes of the fact-finding, ESMA defined DMA and SA as follows:

Direct Market Access (DMA) should be understood as:

Arrangement where an intermediary, who is a market member, permits its customers to use its member ID (mnemonic) to electronically transmit orders for execution directly to the market using the intermediary's infrastructure (i.e. system architecture, which may include technical systems and/or connecting systems).

Sponsored Access (SA) should be understood as:

Arrangement where an intermediary, who is a market-member, may permit its customers to use its member ID (mnemonic) to electronically transmit orders for execution directly to the market without using the intermediary's infrastructure.

Q VI: Please provide information on whether DMA and/or SA are allowed by your trading platform and, if so, the percentage of members providing DMA and/or SA clients.

20. Among the 21 respondents to the specific question, 5 declared that neither DMA nor SA arrangements are allowed on their trading platforms.

21. One RM/MTF declared that only DMA is offered to its members but no percentage was provided. In 6 cases RMs/MTFs[46] said they allowed members/participants and users to provide DMA and/or SA services, but stated that statistics regarding the number of member firms providing DMA services are not available. In fact:

- one RM/MTF stated that member firms are liable for all the order flow sent by DMA, that it does therefore not require a notification of the number of DMAs activated by member firms and that SA is not allowed;
- one RM/MTF asserted that participants are not required to flag DMA order flow, whereas 5% provide SA;
- one RM/MTF declared that approximately 4% of the members offer SA and that members are not required to disclose whether they are offering DMA access to their clients, but it is expected that the majority of brokers provide this service to some of their clients;
- one RM/MTF (which operates an exchange and an MTF) asserted that the exchange is not able to separately identify DMA flows and that MTF's members do not have to declare which of the cus-

[46] Since the questionnaire was addressed to the trading RMs/MTFs, one response can cover several RMs/MTFs operated by a single market operator.

tomers benefit from such access; it highlights that SA services will be offered by the end of 2011 and that when SA services will be introduced on the platform, rules will be different from those applied to DMA services, in the sense that members offering to sponsor non member firms need to inform the MTF who sponsored firms are;

- one RM/MTF asserted that DMA and SA are allowed and that several members operate DMA platforms but that the orders sent through them are not marked and cannot be identified consecutively; none of the members have provided SA to third parties.

22. Other respondents declared that DMA and/or SA arrangements are allowed and reported the percentages of members providing these arrangements to their clients, where these services are provided:

Respondent	**DMA**	**SA**
RM/MTF 1	between 69% and 83%	none
RM/MTF 2	70%	3%
RM/MTF 3	53.23%	none
RM/MTF 4	25%	
RM/MTF 5	Only DMA is allowed. However, in fact, no members provide the service at this stage.	
RM/MTF 6	60%	none
RM/MTF 7	43.6%[47]	none
RM/MTF 8	100%	none
RM/MTF 9	60%	none

Q VII: Please provide information on rules requiring members to place controls on the order flow of DMA and/or SA clients, if any, and how these rules are enforced.

23. One RM/MTF declared that any rules regarding DMA access are defined directly between the market member and their customers.

24. Three respondents asserted that there are no rules requiring members to place controls on the order flow of their DMA clients. In a similar way:

- one RM/MTF asserted that all its members/participants or users must adhere to the rules set by the RM/MTF about all the order flows including DMA;
- one RM/MTF declared that rules are applicable for its members/participants or users of one of its markets where DMA is allowed; with regards to the other RM/MTF this respondent operates, if a member/participant or user is allowed to use order routing systems in accordance with internal regulation, such trading participants shall be responsible for ensuring that the order routing facility is used properly, for the designated purpose and in accordance with the provisions of exchange law;
- one RM/MTF specified that the exchange of the group does not have additional rules for DMA and, with regards to the MTF of the group, the orders sent by the DMA client go through the sys-

[47] The percentage refers to just one of the RMs/MTFs operated by trading venue 15.

tems and controls of the member firm and these orders are being treated as direct orders from the member firm.[48]

25. Among the other respondents, most underlined that members of the venue are responsible for the order flow of their DMA and/or SA clients, but, in any case, additional controls and procedures are required. In particular:

- two RMs/MTFs explained the process that the participants to the venue have to follow, also in terms of application forms and documentation, in order to provide SA arrangements to their clients:
    - the first RM/MTF, in order to provide SA, participants have to sign an addendum and complete a process (drafted to ensure that only suitable participants are able to offer SA to their clients); among other things, rules relate to SA include that: i) the rights of any sponsored participant to access or to use the venue can be suspended, terminated or restricted at any time; ii) the RM/MTF may also require the sponsoring participant to have in place systems and controls or to provide information from or relating to any sponsored participant;
    - the second RM/MTF, it may consider an application from a member who wishes to provide SA for one or more of his clients and may refuse such application or may impose conditions on any approval granted in respect of such application.
- Seven other respondents specified that the rules have to include special provisions with regard to handling of orders by participants and can include filters of activity; more details on pre-trade controls were provided by some respondents:
    - one of them declared that the group prescribes that orders submitted by the systems used for DMA and/or SA shall be subject to appropriate pre-trade validations, in order to ensure that the client would not exceed any of the payment and/or delivery risk limits: for DMA, the rules require that members provide detailed technical documentation about the implementation of such controls in the system and that such documentation is evaluated before granting the member the right to offer DMA to its clients; for SA, members could use the exchange provided that a service of pre-trade risk management service is implemented;
    - another one declared that for orders sent through DMA it is required to i) control the systems that permit the entry of orders, that must make it possible to ensure the recognition of the DMA clients and the controls of their orders; ii) control the overall trading activity carried out by the DMA clients; iii) monitor the frequency of DMA orders that have overridden controls and system alerts in terms of price, size and number; moreover, firms are required to equip themselves with controls and monitoring systems in order to i) prevent the entry of orders that exceed the maximum variation threshold, and ii) instruct DMA clients on best practice over order entry management;
    - a third one specified that members' internal controls shall include, inter alia, pre and post trade risk management controls which are appropriate to the nature, scale and complexity of the member's business and the member must be also able to demonstrate that the following monitoring requirements have been incorporated in their systems: position limits, user definitions, product definitions, maximum order size per user and either automatic

[48] One venue also specified that, when SA is provided by the platforms of the group, different rules for SA services can be introduced.

order rejection when a limit is exceeded or the order being held subject to manual override by an appropriately authorised risk manager.

Q VIII: Please provide information on the platform-level control arrangements you have in place – if any – that must be used by members providing SA services to clients (e.g. order entry controls that they can tailor for their particular use), whether these are provided by your platform or a third part provider.

26. Many respondents (10 RMs/MTFs) did not provide any response to the specific question. This is because some of them (5 RMs/MTFs), they do not use SA or DMA arrangements and other trading venues (4 RMs/MTFs) do not offer SA services. One RM/MTF did not provide any answer.

27. Among the respondents, three RMs/MTFs asserted that they have no arrangements that customisation services are not available and no mandatory pre-trade validations are in place.

28. Some other respondents (4 RMs/MTFs) declared that, even though SA services are provided by the members of the venue, all controls are proprietary and provided by the venue itself. In particular:

- one RM/MTF) declared that order entry and validation controls (about maximum order size per order, maximum notional value per order, maximum number of orders per second, etc.) are included at the venue's level. Moreover, the sponsor member may specify a daily cumulative total or cancel all of its client's open orders and/or block new orders; the venue may override any control or impose more stringent controls if necessary to maintain the orderliness of the market;
- one RM/MTF declared that every change in the conditions has to be homologated again;
- one RM/MTF declared that the number of mandatory platform-level controls over the provision of SA services are enforced in its venue; among others i) risk controls are imposed at the point of entry; ii) the sponsor member must provide a per order consideration threshold for each of their clients; in addition, optional controls are set i) if a sponsor needs to limit trading in individual stocks, then this information can be supplied to the venue and orders in these stocks would be rejected back to the clients; ii) a sponsor can elect to set (at the stock level) daily and per order volume thresholds for each of their clients; iii) a sponsor can optionally set a maximum number of orders that a client session is permitted to enter per trading day; iv) a sponsor can elect for the venue absolute consideration limits at a session level;
- one RM/MTF declared that the platform-level control arrangements that are in place in the exchange of the group are those applied to the member firms and, with regards to the MTF of the group, order controls are set at the platform level.

29. However, 3 other RMs/MTFs underlined that members have full responsibility:

- One RM/MTF declared that providing SA services to clients is the full responsibility of the members who offer such a service.
- One RM/MTF declared that the member is liable to put controls on the DMA systems.
- One RM/MTF declared that the member is liable to put controls on the DMA system and that DMA systems are provided to the members by third party providers.

30. Finally, one RM/MTF declared that pre and post trade validations will be implemented during 2011 and will be related to turnover, volumes and prices.

Questions addressed to HFT firms

Q I: Do you develop your own trading algorithms and/or trading software? If not, what kind of development services have you outsourced to a third party? How do you evaluate whether the skills and competences of such a third party provider are adequate for your needs?

31. Eleven respondents indicated that they fully develop their own trading algorithms and trading software, with one respondent explicitly stating that in spite of the high associated cost, it is a 'key enabler' for their business strategy. One respondent uses trading software developed by the parent company. One respondent does not use any trading algorithms or software. Respondents that partially outsource their trading algorithms and software, outsource various parts. For example:

- One firm has developed its own high frequency trading strategies, and has undertaken limited outsourcing of functions associated with the employment of the strategies (e.g. data verification) but not with their development.
- One firm uses third party software to access the trading venues. The algorithms it uses are also developed by a third party but can be parameterised internally.
- One firm uses a standard independent software vendor (ISV), but develops its own strategies in a scripting tool.
- One firm partially develops its own software but also outsourced software, mainly concerns ISV.

Q II: Please describe how you test and monitor the performance of the live trading algorithms that you employ. How, and based on what grounds, do you decide to close down a certain trading algorithm?

32. The answers can be evenly split into three groups: a) firms that state that they primarily take profitability into account when evaluating the performance of an algorithm, b) firms that put strong emphasis on the consistency and the messaging behaviour of the algorithm, and c) firms that claim to do both.

33. Some firms have elaborate procedures and simulators at their disposal that they use to measure the performance of their algorithms, while others appear to rely on much more straightforward and less granular indicators. This seems closely related with the sophistication of the firm in general. The same is true for *who* monitors the performance (traders only, or traders in combination with compliance and/or risk management), as well as for the timeliness of any reports that are generated about algorithm performance (real time vs. t+1 etc).

34. Five firms noted that an important indicator for the correct functioning of an algorithm is that there needs to be a statistically close and consistent match between the simulated behaviour of an algorithm in a test environment and its behaviour in live trading. When these two begin to diverge, this is a sign that something is wrong and that adjusting (or shutting down) is needed.

35. One firm explicitly states that an algorithm should not be considered fully deployed until this consistency has been proven during a considerable period of time. Another firm states that an algorithm that would trade differently from what would be expected would be shut down immediately. This firm claims that this has never happened in practice, due to its rigorous back testing and monitoring tools.

In this context, another firm stated that it prefers recalibrating an algorithm to shutting it down when its performance deteriorates.

36. Interesting remarks:

- Traders are subject to hard risk limits that cannot be breached and their decisions are supervised in the same way as floor traders historically were subject to risk limits and supervision. This ensures that the traders comply with trading rules and do not trade in a manner that exposes a firm or the market to excessive or systemic risk.
- In conjunction with the monitoring activities performed by the traders, compliance and operations personnel use a range of tools to monitor the functionality and performance of models and systems. These include:
    - compliance dashboard;
    - daily compliance reports;
    - intraday electronic notifications.
- The firm will shut an algorithm if, based on intraday or T+1 compliance reports, operations or compliance staff note a high level of messaging or potential instances of wash trading. In addition, the algorithm will be automatically shut off if a trader reaches a risk limit.
- Algorithms are programmed to ensure an orderly withdrawal from a market, e.g. an algorithm will not exit all positions simultaneously.
- Running strategies are reviewed through regular meetings between the strategy developer and management and the overall set of strategies being traded are regularly reviewed by a regional risk manager.

Q III: What kinds of market data do you use as input for your high frequency algorithms? Please explain and categorise per trading strategy you employ.

37. Fifteen respondents make use of market data directly coming from exchanges, reflecting trades and quotes. Two of these respondents do not only use data from the RMs/MTFs on which the firm is active, but also data from other RMs/MTFs. Four respondents state that they use commercial data feeds for some or all of their trading strategies. One respondent makes partial use of such feeds for some instruments for which they do not have direct market data available, while another considers that for less latency sensitive strategies data from commercial providers can be used. One respondent makes use of electronic news feeds for some of its strategies, while another explicitly stresses that it does not use any input from news.

Q IV: Please describe control mechanisms (around share, size, price, etc.) that you employ to avoid misuse and errors.

38. Types of checks/controls conducted: the most common are order price, order quantity, order value and position limits. Some implement checks on number of orders sent and rate of messaging traffic against defined maximum value. A few have profit & loss controls or loss limits in place. Some also indicated they conduct controls on whether trading is permitted on the concerned instrument.

39. Majority of checks and controls are implemented on individual orders. A few add a second layer of control on aggregated orders (outstanding order and/or on a daily basis). Most of the control/checks

operate on an automated basis within the algorithms and some respondents also have checks implemented at the level of the order gateways or use order validation tools prior to routing orders to venue.

Q V: Please describe how you monitor your positions and prevent breaching pre-agreed credit limits.

40. Most respondents implement monitoring of position limits and some indicated they also have in place monitoring of credit exposures limits. Limits are pre-set, sometimes hard coded, and an internal pre-approval process is usually in place for requesting their modification.

41. Most respondents implement checks at algo/strategy/model level. So it is assumed that these controls are operated real time although only some clearly stated the monitoring is actually real time.

42. Some operate pre-trade controls on orders to prevent breach: use of order validation tools automatically rejecting orders that results in crossing a set limit or allowing only reducing position orders to be sent when a set limit is hit.

43. The post-trade controls in place aim at generating alerts on limits breached or on aggregate or overall risk/position exposures so as mitigation could take place if needed (e.g. closing down a position).

Q VI: Do you use sponsored access arrangements to access European trading platforms? If so, (i) How many European trading platforms do you access through SA? If so, (ii) How many European trading platforms do you access through DMA?

44. Among all the respondents to the questionnaire (19 HFT firms), 8 asserted that they are direct members of the markets on which they trade and do not use SA arrangements.

45. All the other HFT firms, declared that they do not access any European trading platform through SA and access a certain number of European trading platforms through DMA. Some of them underlined that currently one RM/MTF in Europe does not allow non-local firms to become members; therefore, due to local market infrastructure, DMA is used to access this trading platform.

46. One HFT firm declared that, in order to trade in the aforementioned markets, they use SA, whereas DMA arrangements are in place but are not currently used.

Questions addressed to investment firms providing SA/DMA

Information on trading through DMA/SA services

Q I: Do you offer DMA and/or SA services to your clients? If so, is it available to all your clients? What criteria do you use to assess whether to offer this service to a client?

47. All 24 respondents answered this question.

48. Just over half of the respondents offer only DMA and this is mostly to professional clients or eligible counterparties who meet strict financial and technical requirements.

49. Just under a third of respondents offered both DMA and SA. Not all these firms provided detail on the criteria clients had to meet in order to access these services. Those that did stipulated that SA services were only available to clients with high operating standards - typically these firms stressed the importance of financial soundness, technical expertise and adequate resources to support the infrastructure and who passed on-boarding process.

50. One firm said clients were required to pass all exchange conformance tests, quality assurance and upgrade procedures, must be able to detect problems and have procedures on how to deal with them, have additional internal risk systems, including pre-trade risk management – and, if applicable, cross-exchange risk management, before DMA and SA were offered.

51. Another firm attributed their lack of SA clients to their strict access criteria.

52. A couple of respondents put greater emphasis on the volume and revenue of business SA would generate as being fundamental to their decision to offer SA.

Q II: Please provide a brief summary of the DMA and/or SA service you offer to clients.

53. All 24 respondents answered this question.

DMA

54. The number of RMs/MTFs accessed through DMA varies between firms. While several firms responded that they offer DMA across all major European markets (both lit and dark) - with one firm specifying that it provided access to over 40 equity and futures markets – other firms indicated they provided access to a more limited number of RMs/MTFs.

55. DMA access is typically delivered either through a direct FIX connection to the firm's platform which clients can access through various routing networks, a virtual private network (VPN)/leased lines or over vendor platforms.

56. One firm makes the distinction between 'pure DMA' where the firm simply routes client orders to relevant markets and 'direct strategy access' where its clients execute large orders using algorithms through the firm's systems.

57. A handful of firms highlighted that they can execute orders directly to markets where they are members or indirectly through a network of 'partner' brokers.

SA

58. Most firms indicated that they are mainly providing SA to MTF's, namely Chi-X, BATS, NASDAQ OMX (though one firm also cited Reuters Tradebook) but are looking to expand their SA offering to other RMs/MTFs.

59. The pre-trade risk controls are typically those that operate at venue level though one respondent did say that these controls were also developed and maintained by the sponsored client.

Q III: What number and percentage of all your clients use the DMA and/or SA service? If DMA or SA is not offered to all clients, what number and percentage of those it is offered to use it?

60. All 24 respondents answered this question. The overall proportion of clients using DMA and/or SA ranged from 0.027- 100%. Typically, around a quarter of clients use DMA though some firms said all their institutional clients were DMA users. One firm had only around 10% of its client base using its DMA services. The number of the overall client base using SA, was comparatively small - typically only around 1% of clients. However, one firm has SA users representing 10% of its client base.

Q IV: What volume of business did your DMA and/or SA clients undertake during Q4 2010 (number of trades and total value of trading) and what proportion of your total client flow did this represent?

61. All 24 respondents answered this question. Answers varied greatly by firm: for some firms, DMA and SA together accounted for as much as 100% of client order flow, for others DMA/SA accounted for less than 1%. Volume varied from around 9 million trades to less than 100 in the period specified. Value of DMA/SA trading varied sharply too from US$ 115 billion to around US$ 36 million in the period specified.

Q V: If DMA and SA are offered, please explain the latency differences and briefly describe the reasons for these differences.

62. 11 respondents (46%) did not offer any explanation of the latency differences as they do not offer SA services. Two respondents did not answer this question.

63. Generally, the responses confirmed that SA offers significant latency advantages compared to DMA sometimes cutting the time by half. Firm data on latency differences between SA and DMA varied. Firms cited improvements ranging from 60% to in some cases 100% compared to DMA.

64. Firms generally attributed this latency difference to the less complex circuit associated with SA. One firm explained that DMA adds time because DMA flow goes through the firms internal infrastructure which includes order management processes, pre trade risk checks, protocol conversion (where relevant) and a variety of hardware layers. With SA, the pre-trade risk and checks are built into the platform engine. Therefore, a client that accesses a platform through SA will not go through the firm's layers of technology and therefore achieve comparable latencies to those achieved through direct membership.

65. Another firm said that latency varies with a number of factors such as type of networks used, localisation of the hosting services versus the exchange, number of market players providing systems to execute the order flow and internal latency of the matching engine.

Information on the control systems

Q VI: What SA-specific due diligence do you carry out on clients using SA, both before admitting them to use the service and whilst they use it?

66. 13 (54%) respondents answered this question. 11 respondents did not offer any explanation as they do not offer SA services.

67. Due diligence on potential SA clients appears to be done typically as part of firms' on-boarding process or Know-Your-Customer (KYC) process. It is not clear from the responses that all firms have a distinct due diligence process for SA clients as some firms implied that they carried out a general on-boarding process to assess all clients.

68. One firm responded that it required its clients to sign agreements testifying to their 'systematic competency'. Another firm said that its KYC process included checks that the client is capable of building and maintaining suitable systems, strategies and communication links to the relevant exchanges. This same firm then said that it carried out checks to establish that the client had a strong trading record with no irregular history.

69. A couple of firms provided further detail around their due diligence processes:

- One firm said that its on-boarding process would require SA clients to provide among other things a certificate of registration, certificate of incorporation, list of directors, recent audited financial statements and ownership of structure. Once the initial on-boarding process is complete, a series of risk control tools (operated by the firm's trading desk) then monitor client trading flow in terms of per order value and daily trading limit checks and each client's trading limits are monitored to ensure credit limits are not breached. The firm uses various systems to monitor and control agreed limits and trading is suspended if these limits are breached (in terms of both pending orders and executions). The firm noted that no breach of a limit is allowed and all new orders will be rejected on reaching 100% of trading limit. The firm's trading desk takes a pro-active approach to contacting clients to make them aware of the approaching limit. The issue is then discussed with the affected client in order to determine whether trading limits should be increased and if so, whether it should be increased for that day only or generally.

- Another firm described how it carefully assesses whether there are adequate limit checking controls available at each venue for the SA offering and that these can be set on a per order and per client basis. In addition, the firm ensures they have confidence in the overall market monitoring controls of the particular RM/MTF.

- This same firm examines the client's trading history and assesses its overall trading sophistication. The firm ensures client trading and monitoring takes place not only at the individual order level but also at a portfolio level.

Q VII: What control systems do you have in place for your SA service? Please generally describe.

70. 8 respondents answered this question. 5 respondents failed to submit a response. 11 respondents did not offer any explanation as they do not offer SA services.

71. Most firms indicated that they rely on the controls operating at the exchange level. One firm said that it played a bigger role in designing those controls to suit a client's profile, while other firms appeared to take a more passive role and implement the generic controls designed and managed by the exchange.

72. A more proactive approach by one firm involved working closely with the trading venues to agree mandatory pre-trade risk controls including: mass order cancel, single order cancel, modify/remove

restrictions from the restricted list, modify daily consideration limits, modify maximum order cap limits, stop trading.

73. The firm then outlines the risk management layer provided by the venue through which a client connects. The firm provides the information that this layer uses in order to undertake pre-trade risk controls which include restricted list validations, daily limit validation, total daily limit, per order limit, price tolerance check (in accordance with the applicable rules of each trading venue), and maximum order cap limits.

74. Another firm described how client orders are subjected to the pre-trade risk controls supplied by the venue which are then tested by the firm. The pre-trade limits are applied using the venue's technology and the firm has access to define and adjust these as necessary.

75. There is no firm infrastructure used in the SA implementation and any pre-trade intervention is carried out by the venue using the parameters supplied by the broker. In addition the firm receives a 'drop copy' (separate copy of messages) from the venue to provide full visibility of open and executed orders. This drop copy feeds back into the firm's systems to provide visibility of individual orders and portfolio level cumulative exposure to the supervising persons within the firm.

76. Details of the venue controls and specific risk limits include:

    - Max notional per order per market, maximum number of shares per order, maximum number of orders per second per port, maximum number of orders per symbol per second per port, restricted stock list, maximum daily notional (executed and exposed) per port.

    - One other firm pointed to its brokers and back-office specialists who apparently, on a daily basis, scrutinise and control securities and funds limits in the trading platform and compare them with records/balances in the internal systems in order to prevent breaches of trading limits.

In particular:

QVII a: Do you have the ability to monitor your clients' trade position real-time?

77. 13 (54%) of respondents answered this question. 11 respondents did not offer any explanation as they do not offer SA services.

78. Of those firms who offer SA, the majority said that they monitor their clients' real-time trade position though few firms go into any great detail. Some firms indicated that their real-time monitoring was done mostly on the basis of receiving or relying on drop-copies from the execution venue. One firm said they monitored trading by re-performing the trades from the drop-copy feed in real-time. Another firm said its internal controls alert the firm and the client that pre-set thresholds are being approached – including cumulative value (which are the limits based on the un-netted sum of all executed trades) net cumulative value (which is the netted value of all executed trades), cumulative number of orders (total number of orders traded) cumulative quantity (total number of shares/contracts executed). Another firm said it monitors in real-time an individual client's overall exposure such that at any point in time the firm is aware of the total net client positions and therefore the exposure the firm has to the underlying client.

79. Only a couple of respondents said that they did not monitor clients' real-time position – one said that while they had the ability to they do not do it.

Q VII b: Do you have sight of a client's pending (i.e. orders placed but not yet executed) order flow?

80. 13 (54%) of respondents answered this question. 11 respondents did not offer any explanation as they do not offer SA services.

81. The majority of firms offering SA confirmed that they can see their client's pending order flow.

82. However, one firm said that they relied on the venue to give them sight of open orders in the drop copy feeds. Another firm commented that they will not see all pending order flow as some orders are given on a IOC (immediate or cancel) basis and so do not reach a 'pending status'.

83. A firm indicated that it did not monitor its client's pending order flows and reasoned that since SA allowed a client to trade on a venue through many different sponsoring firms, the venue was best placed to monitor order flow. Again, a firm responded that while it had the capability to monitor pending order flow, it chooses not to do so.

Q VII c: Do your systems prevent a client order reaching a market if that order would put the client in breach of your credit limit with them?

84. 13 (54%) of respondents answered this question. 11 respondents did not offer any explanation as they do not offer SA services.

85. The majority of firms said that those client orders that would breach a firm's credit limit would be rejected automatically. One firm said that they apply credit limits set from the exchanges pre-trade risk management tool which prevents orders reaching a market if credit limits are breached – although this firm notes that limits vary between RMs/MTFs and consequently the firm stresses the importance of being able to monitor the overall risk of the client across RMs/MTFs. They do this by receiving drop–copies from all RMs/MTFs.

86. In addition, one firm commented that it is alerted in real-time if a client reaches certain thresholds and so it is very unlikely a client reaches a point where they may breach a limit before the firm has contacted them to discuss the situation. Another firm adds that its credit risk department sets each client's credit thresholds and credit trigger limits.

87. One firm whose systems do not prevent orders reaching markets in spite of the credit risk to the firm explained that the orders do not go through the firm's systems and therefore they are unable to prevent orders reaching markets. However they added that they carry out extensive analyses of the venue 'risk layer' to ensure client limits are at the appropriate level. The risk layers will prevent the orders from reaching the market should the limit be breached. Another firm said that though they have the capability to prevent client orders reaching the market to prevent credit limit breaches, they currently do not do so.

Q VII d: How would you manage a potential breach of a credit limit? Do you have the ability to turn off the pipe or connection to the market if needed?

88. 13 (54%) of respondents answered this question. 11 respondents did not offer any explanation as they do not offer SA services.

89. All respondents confirmed that they have the ability to turn off or kill the trading connection to the exchange although this does not always appear to be automatic or immediate in all cases. For instance one firm said that in addition to terminating the trading connection, they have the option to accept only new orders that would normalise a client's position (e.g. accept only buy or sell orders). Other firms described how their controls would alert them to when clients are approaching their credit limits after which the firm's trading desk would contact the client to remind them of their trading limits. The firm would then agree with the client whether the client's credit limits should be increased either for that day or going forward.

90. A firm added that it assesses a client's position across all RMs/MTFs and can monitor their positions by security, by asset, by market or across the entire portfolio. They have the capability to either halt trading altogether, or only allow orders which decrease the position causing the breach.

91. Another firm explained how it sets certain intraday thresholds around clients' trading activity. If a threshold is breached they are able to react in a timely manner before the client reaches any 'hard limit'. At any time the firms stated that the client connection can be terminated, the trading session blocked and all open orders cancelled on the market, either automatically or manually.

Q VII e: How often do you review and monitor your control procedures?

92. 13 (54%) of respondents answered this question. 11 respondents did not offer any explanation as they do not offer SA services.

93. This varies markedly between firms. Some firms commented they monitored either on a constant, daily or weekly basis – one firm said that they monitored constantly to ensure the controls are working correctly and to upgrade and enhance them as required. The same firm stressed that constant checks were vital to ensure that they can instantly identify any malfunction or unauthorised amendment to any systems/procedures and to keep pace with current industry practices and requirements.

94. Other firms carry out their checks on a less frequent basis which varied from monthly, quarterly, semi-annually or an annual basis.

Q VIII: Have you been asked by sponsored access clients to 'switch-off' pre-trade controls in order to minimise latency? Please explain.

95. 13 (54%) of respondents answered this question. 11 respondents did not offer any explanation as they do not offer SA services.

Annex VII

Draft guidelines on systems and controls in a highly automated trading environment for trading platforms, investment firms and competent authorities

I. Scope

1. These guidelines apply to *competent authorities,* regulated markets, multilateral trading facilities and investment firms.

2. They apply in relation to:

   - the operation of an electronic trading system by a regulated market or a multilateral trading facility;

   - the use of an electronic trading system, including a *trading algorithm*, by an investment firm for dealing on own account or for the execution of orders on behalf of clients; and

   - the provision of *direct market access* or *sponsored access* by an investment firm as part of the service of the execution of orders on behalf of clients.

3. References in the guidelines to investment firms relate to investment firms when executing orders on behalf of clients and/or dealing on own account in a highly automated trading environment. An investment firm when operating a multilateral trading facility is covered by the guidelines relating to regulated markets and multilateral trading facilities.

4. These guidelines apply from [*three months after they have been issued*.]

II. Definitions

5. For the purposes of these guidelines, terms shown in italics have the meaning defined in the table below or, if not shown in the table, have the meaning defined in Article 4 of the *Markets in Financial Instruments Directive (MiFID)*.

Competent authorities	Competent authorities designated under Article 48 of MiFID
Direct Market Access (DMA)	An arrangement through which an investment firm that is a member/participant or user of a trading platform permits specified clients (including eligible counterparties) to transmit orders electronically to the investment firm's internal electronic trading systems for automatic onward transmission under the investment firm's trading ID to a specified trading platform.
ESMA	European Securities and Markets Authority
ESMA Regulation	Regulation (EU) No 1095/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Au-

	thority (European Securities and Markets Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/77/EC, OJ L 331, 15.12.2010, p.84.
Financial market participants	A person as defined in Article 4(1) of the ESMA Regulation
Market Abuse Directive (MAD)	Directive 2003/6/EC of the European Parliament and of the Council of 28 January 2003 on insider dealing and market manipulation (market abuse), OJ L 96, 12.4.2003, p.16.
Markets in Financial Instruments Directive (MiFID)	Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on markets in financial instruments amending Council Directives 85/611/EEC and 93/6/EEC and Directive 2000/12/EC of the European Parliament and of the Council and repealing Council Directive 93/22/EEC, OJ L 145, 30.4.2004, p.1.
MiFID Implementing Directive	Commission Directive 2006/73/EC of 10 August 2006 implementing Directive 2004/39/EC of the European Parliament and the Council as regards organisational requirements and operating conditions for investment firms and defined terms for the purposes of that Directive, OJ L 241, 2.9.2006, p.26.
Sponsored Access (SA)	An arrangement through which an investment firm that is a member/participant or user of a trading platform permits specified clients (including eligible counterparties) to transmit orders electronically and directly to a specified trading platform under the investment firm's trading ID without the orders being routed through the investment firm's internal electronic trading systems.
Trading algorithm	Computer software operating on the basis of key parameters set by an investment firm or a client of an investment firm that generates orders to be submitted to trading platforms automatically in response to market information.
Trading platform	A regulated market (RM) or multilateral trading facility (MTF).

III. Purpose

6. The purpose of these guidelines is to ensure common, uniform and consistent application of MiFID and MAD as they apply to the systems and controls required of:

   - trading platforms and investment firms in a highly automated trading environment; and
   - trading platforms and investment firms in relation to the provision of DMA or SA.
   -

IV. Compliance and reporting obligations

Status of the guidelines

7. This document contains guidelines issued under Article 16 of the ESMA Regulation. In accordance with Article 16(3) of the ESMA Regulation competent authorities and financial market participants must make every effort to comply with the guidelines and recommendations.

8. Guidelines set out ESMA's view of how Union law should be applied in a particular area, or of appropriate supervisory practices within the European System of Financial Supervision. ESMA therefore expects all relevant competent authorities and financial market participants to comply with guidelines unless otherwise stated. Competent authorities to whom guidelines apply should comply by incorporating them into their supervisory practices, including where particular guidelines within the document are directed primarily at financial market participants.

Reporting requirements

9. Competent authorities to which these guidelines apply must notify ESMA whether they comply or intend to comply with these guidelines, with reasons for non-compliance, by [*two months after the final guidelines have been issued*]. Notifications should be sent to [*email address*].

V. Draft guidelines for systems and controls of trading platforms and investment firms in a highly automated trading environment

Guideline 1

10. The MiFID obligations that apply to RMs that are of relevance to the performance of their electronic trading systems are set out in Article 39, in particular in points (b) and (c) of that article. These focus on risk management, sound management of technical operations and effective contingency arrangements.

11. The obligations for MTFs are set out in Article 14(1) of MiFID which references the organisational requirements in Article 13 of MiFID of which paragraphs (2), (4), (5) and (6) are of most relevance. Article 13 of MiFID also provides the legal basis for several of the articles in the MiFID Implementing Directive of which Articles 5 to 9 are the most relevant. These include obligations on continuity and regularity in the performance of investment services and activities, risk assessment and management, employing personnel with the right skills and expertise, internal audit, monitoring systems and senior management responsibility.

12. The draft guidelines on organisational requirements for trading platforms and investment firms in a highly automated trading environment seek to control the risks that arise from trading. They cover three areas (with separate standards relating to trading platforms and investment firms in each area): electronic trading systems, fair and orderly trading and market abuse (in particular market manipulation). For both trading platforms and investment firms the systems and controls employed will need to be effective and proportionate to the nature, scale and complexity of their business.

13. The standards for investment firms apply to investment firms when they are executing orders on behalf of clients or dealing on own account. They do not apply to investment firms when they are operating an MTF since investment firms when operating an MTF are covered by the guidelines applying to trading platforms.

Guideline 1: Organisational requirements for regulated markets' and multilateral trading facilities' electronic trading systems

(*Articles 39(b) and (c) of MiFID for regulated markets and Article 14(1) of MiFID for multilateral trading facilities)*

General guideline

1. A regulated market's or multilateral trading facility's electronic trading system (or systems) should enable it to comply with its obligations under MiFID and other relevant Union and national law taking into account technological advancements and trends in the use of technology by its members/participants or users and, in particular, should enable it to ensure continuity and regularity in the performance of the market (or markets) operated by it.

Detailed guidelines

2. In following the general guideline regulated markets and multilateral trading facilities should at least:

   - develop, procure (including outsourcing) and monitor their electronic trading systems through a governance process that embeds compliance and risk management principles and involves a clear process for accountability, communication of information and sign-off for initial deployment, subsequent updates and resolution of problems identified through monitoring;

   - have electronic trading systems with sufficient capacity to accommodate reasonably foreseeable volumes of messaging and that are scalable to allow for capacity to be easily and rapidly increased in order to respond to rising message flow and emergency conditions that might threaten their proper operation, in particular through controls on message flows through a 'normal activity/maximum IT capacity' ratio;

   - have effective business continuity arrangements in relation to their electronic trading systems covering such matters as:
     - governance for the development and deployment of the arrangements;
     - consideration of an adequate range of possible scenarios related to the operation of their electronic trading systems which require specific continuity arrangements;
     - the backing up of business (including compliance) critical data that flows through their electronic trading systems;
     - the procedures for moving to and operating the electronic trading system from a back-up site;
     - staff training on the operation of the arrangements and individuals' roles within them; and
     - an ongoing programme for the testing, evaluation and review of the arrangements including procedures for modification of the arrangements in light of the results of that programme.

   - prior to deploying an electronic trading system, and prior to deploying updates to an electronic trading system, make use of clearly delineated development and testing methodologies to seek to ensure that, amongst other things, the operation of the electronic trading system is compatible with the regulated market's and multilateral trading facility's obligations under MiFID and other relevant Union or national law, that compliance and risk management controls embedded in the systems work as intended (including generating error reports automatically) and that the electronic trading system can continue to work effectively in stressed market conditions;

- monitor in real time their electronic trading systems, deal adequately with problems identified as soon as reasonably possible in order of priority and be able when necessary to adjust or shut down the electronic trading system in an orderly manner;

- periodically review and evaluate the governance, accountability and sign-off framework, the electronic trading systems and their business continuity arrangements so as to ensure their continued appropriateness and act on the basis of these reviews and evaluations to remedy deficiencies;

- have procedures and arrangements for physical and electronic security designed to protect electronic trading systems from misuse or unauthorised access and to ensure the integrity of the data that is part of or passes through the systems; and

- have procedures and arrangements to ensure they employ sufficient number of staff with the necessary skills and expertise to manage their electronic trading systems, including staff with appropriate knowledge of relevant systems, the monitoring and testing of such systems and the sort of trading that will be undertaken by members/participants of the regulated market or users of the multilateral trading facility.

3. Regulated markets and multilateral trading facilities should keep records in relation to their electronic trading systems covering at least the matters referred to in paragraph 2.

4. Regulated markets and multilateral trading facilities should inform competent authorities about significant incidents that may affect the sound management of the technical operations of the system.

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14. In complying with their overarching obligations in respect of their electronic trading systems there are several key issues that trading platforms should have regard to:

- **Governance**. The governance process is central to compliance with regulatory obligations. Trading platforms should have clear and formalised procedures for the development, procurement (including outsourcing) and monitoring of electronic trading systems. This is to ensure that all of the relevant considerations (including commercial, technical, risk and compliance) that ought to be brought to bear in making the key decisions are given due consideration.

- **Resilience.** Systems should be robust, well adapted to the business that takes place through them (including the flow of message traffic) and backed up by effective business continuity arrangements. In the event that the volume of messaging threatens to reach capacity limits trading platforms should have processes to ensure that capacity limits are not breached by controlling the volume of messages that individual members/participants or users can send. Trading platforms should also develop and keep under review business continuity plans so that in the event of systems failures caused by a range of different types of scenario they have back-up plans to seek to ensure the timely resumption of trading.

- **Testing**. In order to be sure that the electronic trading system can do the job it is designed for there should be a testing phase prior to a system being deployed and prior to updates being deployed. It is particularly important to ensure that the tests seek to ensure that the compliance and

risk management controls embedded in the system work as intended and that stress testing is undertaken to learn about the system's resilience.

- **Staff.** All those with an involvement with the electronic trading system should have the necessary skills and expertise, kept up to date as necessary, to discharge their respective responsibilities. Across a trading platform as a whole this requires a mix of individuals with expertise in areas such as programming, systems, risk, compliance and trading. The trading platform should define the mix of skills and procedures to ensure that recruitment and training delivers staff with those skills. In addition to technical skills staff will also need to have adequate soft skills to effectively represent their function within the trading platform, offering appropriate challenge as necessary within the governance framework.

- **Review.** The procedures and arrangements, including the electronic trading systems themselves, put in place to meet the overarching obligation need to be subject to periodic review or evaluation. Such evaluation or review should have some degree of independence which can be achieved, for example, by the involvement of internal audit or third parties.

- **Records.** There is a general obligation to keep adequate and orderly records. In relation to electronic trading systems they will need to include, for example, information about key decisions, system properties, testing methodologies, test results and periodic reviews.

- **Co-operation with competent authorities.** Different trading platforms will have different reporting obligations to their competent authorities. It is, however, crucial that competent authorities are aware of any significant risks to the sound operation of trading platforms' electronic trading systems that arise and the crystallisation of any such risks.

Guideline 2

15. The obligations in MiFID relevant to investment firms' operation of electronic trading systems are in Article 13 whose paragraphs 2, 4, 5 and 6 are of most relevance. Article 13 of MiFID also provides the legal basis for several of the articles in the MiFID Implementing Directive of which Articles 5 to 9 are the most relevant. These include obligations on continuity and regularity in the performance of investment services and activities, risk assessment and management, employing personnel with the right skills and expertise, internal audit, monitoring systems and senior management responsibility.

Guideline 2: Organisational requirements for investment firms' electronic trading systems (including trading algorithms)

(Articles 13(2), (4), (5) and (6) of MiFID and Articles 5, 6, 7, 8 and 9 of the MiFID Implementing Directive)

General guideline

1. Investment firms' electronic trading systems, including trading algorithms, should enable the firm to comply with its obligations under MiFID and other relevant Union and national laws as well as the rules of the regulated markets and multilateral trading facilities to which it sends orders in order to

ensure continuity and regularity in the performance of its investment services and activities in a highly automated trading environment.

Detailed guidelines

2. In following the general guideline, investment firms should at least:

- develop, procure (including outsourcing) and monitor their electronic trading systems, including trading algorithms, through a governance process that embeds compliance and risk management principles and involves a clear process for accountability, communication of information and sign-off for initial deployment, subsequent updates and resolution of problems identified through monitoring;

- have electronic trading systems with sufficient capacity to accommodate reasonably foreseeable volumes of messaging and that are scalable to allow for capacity to be easily and rapidly increased in response to rising message flow, in particular through ongoing monitoring and controls on message flows through a 'normal activity/maximum IT capacity' ratio;

- have effective business continuity arrangements in relation to their electronic trading systems covering such matters as:
  - governance for the development and deployment of the arrangements;
  - consideration of an adequate range of possible scenarios related to the operation of their electronic trading systems which require specific continuity arrangements;
  - the backing up of business (including compliance) critical data that flows through their electronic trading systems;
  - the procedures for moving to and operating the electronic trading system from a back-up site;
  - staff training on the operation of the arrangements and individuals' roles within them; and
  - an ongoing programme for the testing, evaluation and review of the arrangements including procedures for modification of the arrangements in light of the results of that programme.

- prior to deploying an electronic trading system, or a trading algorithm, and prior to deploying updates, make use of clearly delineated development and testing methodologies to seek to ensure that, amongst other things, the operation of the electronic trading system or trading algorithm is compatible with the investment firm's obligations under MiFID and other relevant Union and national laws as well as the rules of the trading platforms they use, that the compliance and risk management controls embedded in the system or algorithm work as intended (including generating error reports automatically) and that the electronic trading system or algorithm can continue to work effectively in stressed market conditions;

- adapt trading algorithm tests (including tests outside live trading environments) to the strategy the firm will use the algorithm for (including the markets to which it will send orders and their structure) and ensure they are commensurate with the risks that this strategy may pose to the investment firm as well as to the fair and orderly functioning of the markets operated by the trading platforms the firm uses;

- roll out the deployment of trading algorithms in a live environment in a controlled fashion;

- monitor in real time their electronic trading systems, including trading algorithms, deal adequately with problems identified as soon as reasonably possible in order of priority and be able

when necessary to adjust or immediately shut down their electronic trading system or trading algorithm in an orderly manner;

- periodically review and evaluate the governance, accountability and sign-off framework for electronic trading systems and trading algorithms, the trading systems and algorithms themselves and their business continuity arrangements so as to ensure their continued appropriateness and act on the basis of these reviews and evaluations to remedy deficiencies;

- have procedures and arrangements for physical and electronic security designed to protect electronic trading systems and trading algorithms from misuse or unauthorised access and to ensure the integrity of the data that is part of or passes through the systems and algorithms; and

- have procedures and arrangements for ensuring that they employ sufficient staff with the necessary skills and expertise to manage their electronic trading systems and trading algorithms, including staff who have appropriate knowledge of relevant IT systems and algorithms, the monitoring and testing of such systems and algorithms, and knowledge of the sort of trading strategies that the firm deploys through its trading systems and algorithms.

3. Investment firms should keep adequate records of their electronic trading systems (and trading algorithms) including at least the matters covered in paragraph 2.

4. Investment firms should keep competent authorities informed of major incidents that may affect the sound management of the technical operations of their electronic trading systems and algorithms.

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16. Within the scope of electronic trading systems used by investment firms, ESMA includes electronic systems to send orders to trading platforms (whether or not orders from clients are submitted electronically to the investment firm) and electronic systems which automatically generate orders i.e. trading algorithms. Smart order routers may be part of a firm's systems for sending orders to trading platforms. For the purposes of this work, ESMA covers smart order routers only from the perspective of the risks involved in order entry.

17. Most of the points that were discussed in relation to trading platforms are also of relevance to the electronic trading systems of investment firms. The main additional points worth making relate to trading algorithms:

- **Governance.** Investment firms should consider whether specific governance arrangements are needed for their systems. For trading algorithms investment firms will also need to make sure that they have a good understanding of the properties of the algorithm, particularly in light of the trading strategies the algorithm is intended to be used for and that the algorithm cannot be used for other trading strategies than it is intended to be used and signed off for. Real-time monitoring of the behaviour of the algorithm is also needed to ensure that it is performing as expected.

- **Testing.** The purpose of testing is to ensure that an algorithm works as intended from the technical, regulatory and commercial point of view. In the responses to our questionnaire the following sorts of test were mentioned by investment firms using trading algorithms:
  - performance simulations/back testing;
  - off-line testing within an exchange testing environment;

- review of output of strategy (in terms of profit and loss) and market impact (what one firm referred to as 'post-trade analytics');
- small-scale live testing (including reconciliation with simulation testing).

This last point emphasises the importance of the need for investment firms to be cautious when putting an algorithm (and update to an algorithm) into production. There is the possibility that in a live environment the algorithm might not perform in quite the same way as in testing. Therefore it is sensible that it is initially used in a restricted way with, for example, limits being placed on the number of financial instruments being traded, the value and number of orders, and the number of markets to which orders are sent. It should also be the case that algorithms are adapted to the markets (and the structure of those markets) in which they are intended to be used and are only deployed in those markets unless further testing is undertaken to understand how they will operate in other markets.

- **Monitoring.** The monitoring systems at investment firms should have alerts that assist staff in identifying when an algorithm is not behaving as expected in as close to real-time as possible. When alerts are made there needs to be a process in place to take remedial action including, as necessary, an orderly withdrawal from the market (e.g. not letting an algorithm exit all positions simultaneously).

- **Records.** Amongst the records that investment firms keep on trading algorithms it is particularly important that an adequate record is kept that explains the trading strategy or strategies each algorithm is deployed to execute.

Guideline 3

18. For RMs Article 39(d) of MiFID imposes an obligation to have rules and procedures to provide for fair and orderly markets. But the obligations relating to managing risk and sound management of technical systems in Article 39(b) and (c) of MiFID are also relevant here, as is Article 42 relating to access to the RM. For MTFs, the same fair and orderly trading requirement is set in Article 14(1) of MiFID which also refers to the organisational requirements in Article 13 of MiFID, whilst Article 14(4) of MiFID deals with access requirements (and in turn refers to Article 42).

Guideline 3: Organisational requirements for regulated markets and multilateral trading facilities to promote fair and orderly trading in a highly automated trading environment

(Article 39(b), (c) and (d) and Article 42 of MiFID for regulated markets and Articles 14(1) and (4) of MiFID for multilateral trading facilities)

General guideline

1. Regulated markets' and multilateral trading facilities' rules and procedures for fair and orderly trading should be appropriate to an increasingly automated trading environment and the nature and scale of trading on their markets, including the types of members and participants and their trading strategies.

Detailed guidelines

2. In following the general guideline, the rules and procedures of regulated markets and multilateral trading facilities should at least include:

   - the ability to prevent in whole or in part the access of a member or participant to the trading facility and to cancel, amend or correct a transaction;

   - arrangements to prevent the excessive flooding of the order book at any one moment in time, notably through limits per participant on order entry capacity;

   - arrangements to prevent capacity limits from being breached through a mechanism for slowing down order flow from members/participants and users which restricts the number of messages of any individual member/participant or user within a set timeframe in the event that there is a danger of capacity limits being reached;

   - arrangements to constrain trading or to halt trading in individual or multiple financial instruments when necessary, on both an automatic and discretionary basis, to maintain an orderly market. This may include automatic rejection of orders which are outside of certain set volume and price thresholds;

   - standardised testing to ensure that the systems that members and participants are using to access the venue have a minimum level of functionality that is compatible with fair and orderly trading on the venue;

   - minimum requirements for members' and participants' pre- and post-trade controls (including controls to ensure that there is no unauthorised access to trading systems) to ensure that there is orderly trading on the venue, in particular requirements for filtering order price and quantity (this requirement is without prejudice to the primary responsibility of members/participants or users to implement their own pre- and post-trade controls);

   - standards covering the knowledge of persons within members/participants and users that will be using order entry systems;

   - where applicable, clear organisational requirements for members or participants who are not credit institutions or investment firms, including requirements on the monitoring of trading against the rules of the venue and the management of risk; and

   - the ability to obtain information from a member/participant or user to facilitate monitoring of their compliance with the rules and procedures of the regulated market or multilateral trading facility relating to organisational requirements and trading controls.

3. Regulated markets and multilateral trading facilities should keep adequate records of the matters covered by paragraph 2.

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19. The draft guidelines relate to fair and orderly trading. The concept of fair and orderly trading has a wide application, covering many aspects of the operation of markets including, for example, the in-

formation made available to investors about the trading in a financial instrument, including trading interest and completed transactions. However, in the context of this work on the challenges of trading in a highly automated environment ESMA is focusing on the aspect of fair and orderly trading that relates to the controls that trading platforms impose on their members/participants and users.

20. The draft guidelines cover several issues::

- **Controls.** Fundamentally it is for the members/participants and users of trading platforms to ensure that they do not make errors in order entry. But trading platforms need to set out what controls members should have and then also have their own arrangements to intervene in trading or to halt trading in individual or multiple financial instruments when necessary, on both an automatic and discretionary basis, to maintain an orderly market. This may include controls which reject orders which appear to be erroneous. To back this up trading platforms must be able to prevent the continued access of individual members/participants or users. It is also necessary to have controls to ensure that there is the capability to 'throttle' orders (i.e. to limit the number of orders that each member/participant or user can send within a set timeframe) if there is the possibility of capacity limits on messaging being reached.

- **IT compatibility**. Before allowing a member/participant or user to start trading, trading platforms should require that the member/participant or user is subject to a series of conformance tests. These are designed to ensure that the members/participants' or users' IT systems are compatible with the trading platforms' electronic trading systems and will not pose a threat to fair and orderly trading from a technical point of view.

- **Circuit breakers.** Trading platforms need to have automatic mechanisms to constrain trading or halt trading in a specific financial instrument or more widely in response to significant variations in price to prevent trading becoming disorderly. Responses to our questionnaire indicated that volatility limits are widely used by trading platforms (except where trading platforms are dependent on price formation processes on other trading platforms). Two types of control are usually applied: dynamic, usually with reference to the price of the last transaction (or the average price over the previous few minutes); and static, usually linked to the price of the previous auction. Once a control is breached then trading is usually halted and, in some cases, restarts after an auction. In addition, operators of trading platforms also need to intervene to halt trading even if the automatic mechanisms have not been triggered if they have concerns that trading either is or may become disorderly.

  Each trading platform is responsible for its own circuit breakers. Under the existing MiFID framework, competent authorities do not have the ability to require the co-ordination between different trading platforms trading the same financial instrument regarding how automatic circuit breakers will work.

- **Market access.** For members/participants and users that are credit institutions or investment firms trading platforms have assurance that they have adequate organisational arrangements to trade safely. This is because they are obliged to have such arrangements under MiFID. The same is not the case for members/participants or users that are not credit institutions or investment firms. For these firms there might be some comfort if they are regulated in another jurisdiction but not if they are completely unregulated. Trading platforms should make clear to such entities before allowing them to use their facilities what high level organisational requirements they should adopt, based on those in MiFID.

Trading platforms should undertake adequate due diligence before accepting a new member/participant or user. In addition, trading platforms should have the capacity to request information from a member/participant or user, in writing or through interview, to check those controls and arrangements in response to concerns about their adequacy, or as part of cross-cutting work looking at members/participants or users' compliance with their obligations under the rules of the trading platform.

- **Trader access.** Trading platforms should set requirements governing the knowledge of employees of members/participants or users who enter orders into their systems.

- **Records**. Trading platforms should keep adequate records of their policies and procedures to ensure fair and orderly markets, including of any issues that emerge in relation to those policies and procedures.

Guideline 4

21. For investment firms, Article 13(2), (4), (5) and (6) of MiFID sets out requirements governing adequate policies and procedures for compliance with regulatory obligations and effective procedures for risk management. These are expanded in Articles 5, 6, 7 and 9 of the MiFID Implementing Directive.

Guideline 4: Organisational requirements for investment firms to promote fair and orderly trading in a highly automated trading environment

(Articles 13(2), (4), (5) and (6) of MiFID and Articles 5, 6, 7 and 9 of the MiFID Implementing Directive)

General guideline

1. Investment firms should have adequate policies and procedures to ensure that their highly automated trading activities on regulated markets and multilateral trading facilities comply with their regulatory requirements under MiFID and other relevant Union and national laws and, in particular, manage the risks relating to those trading activities.

Detailed guidelines

2. In following the general guideline, investment firms' electronic trading systems should automatically block or cancel orders:

   - that do not meet set price or size parameters (differentiated as necessary for different financial instruments), either on an order-by-order basis or over a specified period of time, or because orders appear to be duplicative;

   - if the client does not have adequate funds or holdings of, or access to, the relevant financial instrument to complete the transaction;

   - if they are for a financial instrument that a trader does not have permission to trade;

- where they would be inconsistent with a firm's obligations under MiFID, such as the client order handling rules, or other relevant Union or national legislation, or under the rules of the RM or MTF to which the order is to be sent (including rules relating to fair and orderly trading); and

- where they risk compromising the firm's own risk management and/or capital adequacy thresholds, applied as necessary and appropriate to exposures to individual clients or financial instruments or groups of clients or financial instruments, exposures of individual traders, trading desks or the investment firm as a whole.

3. Investment firms should have procedures and arrangements for dealing with orders which have been automatically blocked by the firm's pre-trade controls but which the investment firm wishes to submit. These procedures and arrangements should make compliance and risk management staff, as necessary, aware of when controls are being overridden and require their approval for the overriding of these controls.

4. Investment firms should ensure that employees involved in order entry have adequate training on order entry procedures, including complying with requirements imposed by RMs and MTFs, before they are allowed to use order entry systems.

5. Investment firms should ensure that compliance staff has a feed of the firm's orders in as close to real time as possible and have systems for monitoring those orders.

6. Investment firms should ensure that they have control of messaging traffic to individual trading platforms to avoid overcrowding the systems of the trading platform.

7. Investment firms should manage the operational risks in electronic trading through appropriate and proportionate governance arrangements, internal controls and internal reporting systems.

8. Investment firms should keep adequate records of the matters covered by paragraphs 2 to 7. For investment firms' records to be adequate, they should be sufficiently detailed so as to allow competent authorities to appropriately supervise and monitor investment firms' trading activities, and assess the conformity of these activities with MiFID, MAD and any other relevant European and national legislation.

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22. The guidelines for organisational requirements for investment firms to promote fair and orderly trading cover the following issues:

- **Erroneous order entry.** Investment firms' order management systems should prevent orders from being sent to trading platforms that are outside of pre-determined parameters covering price, volume and repetition which attempt to stop orders which are entered in error. Staff entering orders should also have sufficient skill and knowledge through for example on-the-job training with experienced traders or classroom based training to reduce significantly the risks of erroneous order entry.

- **Risk management.** Investment firms' order management systems should prevent orders from being sent to trading platforms where the orders breach credit limits set for the accounts of clients, where the client does not have sufficient funds or holdings of the relevant financial instrument to

settle the trade it has entered into, where the orders breach risk limits for the trading of individual traders, trading desks or the firm as a whole.

- **Overriding pre-trade controls.** There might be circumstances in which it is appropriate for pre-trade controls to be overridden in relation to a specific trade or specific set of trades. This should only happen with the full knowledge and active approval of relevant staff responsible for compliance and risk management**.**

- **Operational risk.** Some aspects of operational risk are covered by the first two points but there are other aspects as well, such as arrangements designed to prevent fraud by employees. The CEBS[49] guidance on operational risk in a trading environment, published in response to several recent instances of fraud linked to trading activities and other problems, provides an all encompassing approach covering governance arrangements, internal controls and internal reporting systems that investment firms should adhere to.

23. Investment firms' controls will be partly duplicative of those of the trading platforms. This helps to reinforce the protections for fair and orderly trading but also allows the investment firm to set its controls more tightly than those of the trading platform in the light of its own risk appetite. However, the controls of investment firms also need to be more extensive to deal with the risks they are exposed to in executing orders on behalf of clients and dealing on own account.

Guideline 5

24. Under Article 43(1) of MiFID regulated markets have to monitor transactions undertaken on their systems to identify, inter alia, conduct that may involve market abuse. Regulated markets and multilateral trading facilities also have to report instances of conduct that may involve market abuse to their competent authority and the competent authority for the investigation of market abuse under Article 43(2). Article 39(d) of MiFID imposes more general requirements on risk management and compliance of regulated markets. Additionally, under Article 6(6) of MAD Member States have to ensure that market operators put in place structural measures aimed at detecting market abuse.

25. The obligations of Article 43(1) and (2) of MiFID for regulated markets are mirrored in Article 26(1) and (2) for multilateral trading facilities. In addition, multilateral trading facilities have general requirements around risk management and compliance in Article 14(1) of MiFID.

Guideline 5: Organisational requirements for regulated markets and MTFs to prevent market abuse (in particular market manipulation) in a highly automated trading environment

(Article 39(d) and Article 43 of MiFID for regulated markets and Article 14(1) and Article 26 of MiFID for MTFs and Article 6(6) of MAD for RMs and MTFs)

General guideline

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[49] The Committee of European Banking Supervisors (CEBS) was the predecessor of the European Banking Authority (EBA).

1. Regulated markets and multilateral trading facilities should have effective arrangements and procedures which enable them to identify conduct by their members/participants and users that may involve market abuse (in particular market manipulation) in a highly automated trading environment.

Detailed guidelines

2. In following the general guideline, the arrangements and procedures of regulated markets and multilateral trading facilities which seek to prevent and identify conduct by their members/participants and users that may involve market abuse and in particular market manipulation in a highly automated trading environment should at least include:

   - having adequate systems (including automated alert systems on transactions and orders) with sufficient capacity to accommodate high frequency generation of orders and transactions and low latency transmission, in order to monitor, using a sufficient level of time granularity, orders entered and transactions undertaken by members/participants and users and any behaviour which may involve market abuse (in particular market manipulation) and with the ability to trace backwards transactions undertaken by members/participants and users as well as orders entered/cancelled which may involve market manipulation;

   - having in place clear procedures for ensuring that conduct that may involve market abuse and in particular market manipulation is reported to the relevant competent authority (or authorities) without delay in accordance with the requirements under Articles 26(2) and 43(2) of MiFID and Article 6(9) of MAD;

   - having sufficient staff with the understanding and skill to monitor trading activity in a highly automated trading environment and identify behaviour giving rise to suspicions of market abuse; and

   - conducting periodic reviews and internal audits of procedures and arrangements to prevent and identify instances of conduct that may involve market abuse.

3. Regulated markets and multilateral trading facilities should keep adequate records of the matters covered by paragraph 2.

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26. In the context of challenges posed by trading in a highly automated environment, the focus is on possible instances of market abuse related to orders which give a false or misleading signals as to the supply of or demand for or price of financial instruments. The sorts of behaviour this might include cover the practices depicted as possible signals of market manipulation in Article 4 of MAD Implementing Directive[50], the types of practice which would constitute market manipulation described in the first set of CESR Level 3 guidance and information on the common operation of MAD[51] and the activities or forms of potential market abuse that might arise, or might become more widespread, due to the high speed trading strategies. As a way of illustration these might include:

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[50] Commission Directive 2003/124/EC of 22 December 2003 implementing Directive 2003/6/EC of the European Parliament and of the Council as regards the definition and public disclosure of inside information and the definition of market manipulation, OJ L 339, 24.12.2003, p. 70.

[51] http://www.esma.europa.eu/popup2.php?id=3282.

- **ping orders** – entry of small quantity orders aiming at triggering a reaction by other participants, bringing additional information about their positions and expectations;

- **quote stuffing** – entry of small variations of the position in the order book so as to create uncertainty for other participants, slow down their process and hide their own strategy;

- **momentum ignition** - entry of aggressive orders so as to start or exacerbate a trend hoping for other trend followers to bring the trend further and offer an opportunity to unwind the position; and

- **layering and spoofing** – submitting multiple orders at different prices on one side of the order book slightly away from the touch, submitting an order to the other side of the order book (which reflects the true intention to trade) and following the execution of the latter, rapidly removing the multiple initial orders from the book.

27. When thousands of order messages a second are flowing to individual trading platforms it increases the challenge of spotting potentially abusive behaviour. Efforts to compress data to make it more manageable through aggregation are likely to hide much more than they reveal and the number of false positives produced by systems designed to provide alerts will rise.

28. The exact relationship between trading platforms and competent authorities in relation to dealing with market abuse varies across jurisdictions. MAD generally prohibits members/participants and users of regulated markets and multilateral trading facilities from using the systems to commit market abuse. Regulated markets/multilateral trading facilities could emphasise this legal obligation and the responsibilities of a member/participant or user of a trading platforms by contractually prohibiting such behaviour. It is expected that trading platforms' rules and procedures to prevent, identify and report instances of possible market abuse include:

    - **Monitoring.** Put in place proportionate arrangements, given the nature size and scale of the business done through the trading platform, to monitor orders and transactions with the aim of flagging possible instances of conduct that might involve market manipulation for follow up investigation. These systems will need to be the subject of frequent review to ensure that they can cope with the volume of information they need to sift through so that they can be adapted in the light of experience and intelligence to make them as effective as possible in generating useful information about possible instances of market abuse and in particular market manipulation.

    - **Staff.** Systems in themselves are insufficient to catch possible instances of market abuse. This requires staff with appropriate knowledge so that they can follow up information provided by automatic alerts. They will need to know both about the details of MAD and other relevant Union and national legislation but also about trading and trading strategies.

    - **Competent authorities.** Operators of regulated markets and multilateral trading facilities have to report instances of possible market abuse to their competent authority and also, without delay, to the authority competent for the investigation and prosecution of market abuse. This obligation needs to be backed up by clear arrangements at a trading platform for ensuring that such reporting happens without delay. Trading platforms should work on the basis that competent authorities should be notified without delay if it is immediately obvious that the issue is one for them to con-

sider. If initial enquiries are undertaken a report should be made as soon as possible if those enquiries fail to find a satisfactory explanation for the observed behaviour.

- **Records.** Good recordkeeping is essential in relation to conduct which might constitute market abuse. In particular it is important for trading platforms to have effective audit trails regarding how each alert is dealt with. As recommended by CESR in its Third set of guidance and information on MAD[52], regulated markets and multilateral trading facilities should keep records of cases of potentially suspicious transactions that have been examined but which have not been reported to the competent authorities.

Guideline 6

29. Investment firms are required under Article 13(2) of MiFID to have adequate policies and procedures for compliance with their obligations under the directive which includes ensuring that the activities they carry out as an investment firm do not breach the prohibition on market manipulation in Article 1(2) of MAD. These obligations are expanded upon in articles on general organisational requirements and compliance in the MiFID Implementing Directive. Under Article 6(9) of MAD investment firms have to report suspicious transactions to competent authorities without delay. Articles 7 to 10 of the MAD Implementing Directive[53] provide more details on fulfilling the obligation. Moreover, in CESR's first[54] and third[55] set of Level 3 guidance on the implementation of the MAD, CESR has already provided guidelines on suspicious transactions reports (STR), which specify, in particular, that suspicious orders are recommended, when not already legally required on a national basis, to be reported to the competent authorities. The guidance also provides a standard STR report form.

Guideline 6: Organisational requirements for investment firms to prevent market abuse (in particular market manipulation) in a highly automated trading environment

(Articles 13(2) and (6) of MiFID and Articles 5, 6 and 9 of the MiFID Implementing Directive, Article 6(9) of MAD and Articles 7 to 10 of the MAD Implementing Directive 2004/72/EC)

General guideline

1. Investment firms should have policies and procedures in place to minimise the risk that their highly automated trading activity gives rise to market abuse (in particular market manipulation). The policies and procedures should take into account the highly automated trading environment and the nature, scale and complexity of the firm's trading activity in this respect and the nature and range of investment services and activities that the firm undertakes.

Detailed guidelines

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[52] http://www.esma.europa.eu/popup2.php?id=5727.

[53] Commission Directive 2004/72/EC of 29 April 2004 implementing Directive 2003/6/EC of the European Parliament and the Council as regards market practices, the definition of inside information in relation to derivatives on commodities, the drawing up of list of insiders, the notification of managers' transactions and the notification of suspicious transactions, OJ L 162, 30.4.2004, 70 .

[54] Sections IV and V of the May 2005 guidance (Ref : CESR/04-505b).

[55] Section 2 of the May 2009 guidance (Ref : CESR/09-219).

2. In following the general guideline the policies and procedures of investment firms engaging in highly automated trading activities should at least include:

   - procedures to seek to ensure that staff exercising the compliance function has sufficient understanding, skill and authority to challenge staff responsible for trading when the trading activity gives rise to suspicions of market abuse (in particular market manipulation);

   - initial and regular refresher training on what constitutes market abuse (in particular market manipulation) for all individuals involved in executing orders on behalf of clients and dealing on own account ;

   - monitoring the activities of individuals/algorithms trading on behalf of the firm and the trading activities of clients, taking account of orders submitted, modified and cancelled as well as transactions executed, and adequate systems in place (including automated alert systems), using a sufficient level of time granularity, to flag any behaviour likely to give rise to suspicions of market abuse (in particular market manipulation);

   - adequate arrangements to identify transactions and orders that require a Suspicious Transaction Report (STR) to competent authorities in relation to market abuse (in particular market manipulation) and to make those reports without delay;

   - periodic reviews and internal audits of procedures and arrangements to prevent and identify instances of conduct that may involve market abuse; and

   - frequently reviewed arrangements governing the access of staff to trading systems.

3. Investment firms should keep adequate records of the arrangements and procedures to identify conduct that may involve market abuse covering the matters set out in paragraph 2.

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30. The comments in the previous section on trading platforms organisational arrangements relating to monitoring, staff and records are also relevant to the similar obligations for investment firms. Additional points of relevance to investment firms include:

    - **Suspicious transaction reports.** Investment firms should make suspicious transaction reports to competent authorities where they are aware of transactions that give rise to suspicions of market abuse. They need to have procedures which ensure that the relevant staff know what might constitute a suspicious transaction and what to do when they become aware of such a transaction so that the firm is able to discharge its responsibility under MAD. Given the nature of highly automated trading, suspicious transaction reports should also be extended to orders entered, modified or cancelled, even if they did not produce any transaction.

31. The focus of the guidelines is possible instances of market abuse related to market manipulation which appears prima facie to be more impacted by the challenges posed by a highly automated environment. However, highly automated trading can be a relevant issue for the purpose of monitoring insider trading (which is to be performed by trading platforms and investment firms under MiFID and MAD). Indeed, a highly automated environment necessarily has an impact on many parameters that are used to calibrate alerts. Moreover, the kind of orders used by insiders may be a proxy to unusual haste in trad-

ing. As a result, for the purposes of monitoring insider trading, due consideration should be given to designing and considering the adequacy of tools, procedures and alerts as well as staff training.

Guideline 7

32. Obligations for regulated markets that are of relevant for direct market access/sponsored access are included in Articles 39(b) and 43(1) of MiFID, whilst for multilateral trading facilities the relevant provisions are Articles 14(1) and 26(1). These require regulated markets and multilateral trading facilities to have adequate arrangements in place to identify and manage the risks to their operations which would include the trading and market abuse risks posed to them by direct market access/sponsored access arrangements, and to monitor compliance with their rules.

Guideline 7: Organisational requirements for RMs and MTFs whose members/participants and users provide direct market access/sponsored access

(Articles 39(b) and 43(1) of MiFID for regulated markets and Articles 14(1) and 26(1) of MiFID for multilateral trading facilities)

General guideline

1. Regulated markets and multilateral trading facilities should have rules and procedures which seek to ensure that, where they allow members/participants or users to provide direct market access/sponsored access, the provision of direct market access/sponsored access is compatible with fair and orderly trading and arrangements aimed at preventing and detecting market manipulation.

Detailed guidelines

2. In following the general guideline, regulated markets and multilateral trading facilities should set out whether or not it is permissible for their members/participants or users to offer direct market access and/or sponsored access. Where they allow members or participants to offer direct market access and/or sponsored access their rules and procedures should at least:

   - make clear that the member/participant or user is responsible for all orders entered under its trading codes;

   - require the member/ participant or user to have adequate systems and controls to ensure that the provision of direct market access/sponsored access does not adversely affect compliance with the rules of the regulated market or multilateral trading facility, lead to disorderly trading or facilitate conduct that may involve market abuse;

   - require the member/ participant or user to conduct due diligence on any client to which it provides direct market access/sponsored access;

   - allow the regulated market or multilateral trading facility to refuse a request from a member/participant or user to allow a client to be provided with sponsored access where the regulated market or multilateral trading facility is not satisfied that this would be consistent with its rules and procedures for fair and orderly trading;

- allow the regulated market or multilateral trading facility to suspend or withdraw the sponsored access after it has been granted where the regulated market or multilateral trading facility is not satisfied that continued access would be consistent with its rules and procedures for fair and orderly trading; and

- have the ability to stop orders from a person trading through sponsored access separately from the orders of the member or participant sponsoring that person's access.

3. Regulated markets and multilateral trading facilities should keep adequate records of the matters covered in paragraph 2.

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33. Where trading platforms open up their markets through direct market access/sponsored access to third party firms, it is important that they retain control of and closely monitor their systems to minimise any potential disruption caused by these third parties. Under these access arrangements, trading platforms are vulnerable to either the potential misconduct or market abuse of direct market access/sponsored access clients or to their inadequate/erroneous systems. Both could disrupt trading conditions and force a venue to deploy more drastic measures to normalise trading. Potentially, these risks could be magnified under sponsored access arrangements where the orders do not pass through the sponsoring firm's order management systems before reaching the trading platform.

34. To avoid or minimise the risk that a trading platform would have to resort to measures to suspend trading, it is necessary that a set of effective controls is defined and required of members/participants or users offering direct market access/sponsored access to ensure that the market is not misused/disrupted by any direct market access/sponsored access client. Therefore, trading platforms which allow members/participants or users to provide access to their markets using either direct market access or sponsored access (or both), should have in place an appropriate set of rules/sanctions which reduces the risks/disruption to the particular trading platform and the wider market.

35. The draft guidelines on organisational requirements for trading platforms on direct market access/sponsored access cover several areas which are considered as an appropriate guide as to what minimum standards competent authority would expect from trading platforms in order to ensure the safe and orderly functioning of markets under direct market access/sponsored access arrangements:

- **Responsibility.** Direct market access/sponsored access arrangements between trading platforms and a direct market access/sponsored access provider firm should stress that the direct market access/sponsored access provider firm remains responsible for all trades using their market participant ID code.

- **Obligations of members/participants and users.** Trading platforms should require that direct market access/sponsored access provider firms have adequate systems to minimise the risks of their clients disrupting orderly trading or participating in market abuse activities before permission to provide direct market access/sponsored access services is given. It is in the commercial and reputational interests of trading platforms to be able to carry out, where necessary, a review of members/participants or users' internal risk control systems.

- **Rights of access.** Trading platforms should retain the right to decide who is able to access their market. In the case of those prospective sponsored access clients that are seeking to connect di-

rectly to the trading platform without passing their orders through the sponsoring firm's order management systems, a trading platform should - in accordance with its rules and procedures - refuse permission to the sponsoring firm if it sees fit to do so in accordance with its rules and procedures and similarly, revoke permission later if the trading platform has legitimate concerns about the behaviour/risks of the sponsored access client.

- **Control over sponsored access.** For proper order management in response to sponsored acess arrangements, trading platforms should be able to distinguish between the orders sent from SA users from other orders sent by the sponsoring firm so that if a trading platform has to 'bust' or cancel an order, it can do so quickly and with minimal market impact. Trading platforms should therefore be capable of assigning unique customer IDs to clients that are accessing their market via sponsored access. In the case of direct market access the orders from these clients will be indistinguishable for trading platforms from other orders which come through the investment firm's order management system. If there are any problems with orders from direct market access clients trading platforms can therefore only stop the trading of the investment firm which is offering the direct market access service and it will be up to that investment firm to sort out the problem, potentially by terminating the direct market access arrangement.

Guideline 8

36. Articles 13(2), (5) and (7) of MiFID and Articles 5, 6 and 7 of the MiFID Implementing Directive set down the relevant provisions for investment firms to have adequate arrangements in place to identify and manage the risks to their operations which would include trading and market abuse risks posed to them by direct market access/sponsored access arrangements. Aside from obliging investment firms to take due care to ensure that they have procedures and systems in place to detect risk of failure by the firm to meet its general MiFID obligations and to identify and manage risk to their operations, among other things, these provisions also demand that personnel have the necessary level of expertise/knowledge to undertake their roles.

Guideline 8: Organisational requirements for investment firms that provide direct market access and/or sponsored access

(*Articles 13(2), (5) and (7) of MiFID and Articles 5, 6 and 7 of the MiFID Implementing Directive*)

General guideline

1. Investment firms offering direct market access/sponsored access to clients ('direct market access/sponsored access clients') are responsible for the trading of those clients and should establish adequate policies and procedures to ensure the trading of those clients complies with the rules and procedures of the relevant regulated markets and multilateral trading facilities to which the orders of such clients are submitted and enables the investment firm to meet its obligations under MiFID and other relevant Union and national law.

Detailed guidelines

2. In following the general guideline above, the policies and procedures covering the activities of direct market access/sponsored access clients should at least include:

   - criteria, differentiated as necessary between direct market access and sponsored access, which a client has to meet in order to be suitable for direct market access/sponsored access covering such issues as the training and competency of individuals entering orders, access controls over order entry, allocation of responsibility for dealing with actions and errors and financial standing of the direct market access/sponsored access client;

   - assessment, periodically reviewed if the person is accepted as a direct market access/sponsored access client of prospective clients against the criteria for direct market access/sponsored access clients and clear procedures for signing off on the acceptance of direct market access/sponsored access clients;

   - an assessment, periodically reviewed, of the trading activities of direct market access/sponsored access clients to assess the potential market wide impact of the orders that are likely to be sent to the relevant regulated markets and multilateral trading facilities;

   - appropriate credit thresholds for each client, reviewed on a regular basis, for which an investment firm provides direct market access/sponsored access, which will include an overall credit threshold and potentially credit thresholds in relation to specific financial instruments based on appropriate due diligence as to the direct market access/sponsored access client's financial condition, trading patterns and order entry history;

   - pre-trade controls on the orders of direct market access/sponsored access clients of the sort covered in paragraph 2 of Guideline 4 on organisational requirements for investment firms to promote fair and orderly trading in a highly automated trading environment;

   - clarity that the investment firm should solely be entitled to modify the parameters of the pre-trade controls (the direct market access/sponsored access client should not be able to do so);

   - a real-time feed of orders entered and trading done by a direct market access/sponsored access client which separately identifies those orders and trades from the orders and trades of other clients and proprietary trades of the firm to enable the investment firm to check that direct market access/sponsored access clients' trading is compatible with the rules of relevant regulated markets and multilateral trading facilities and to help identify conduct that may involve market abuse, in particular, market manipulation;

   - the ability to immediately halt trading by individual direct market access/sponsored access clients; and

   - documentation of the rights and obligations of both parties in relation to the direct market access/sponsored access service.

3. Investment firms should keep adequate records of the matters covered in paragraph 2.

4. Investment firms offering direct market access/sponsored access can use pre- and post-trade controls which are proprietary controls of the investment firm, controls bought in from a vendor, controls provided by an outsourcer or controls offered by the venue itself (they should not be the controls of the di-

rect market access/sponsored access client). However, in each of these circumstances the investment firm remains responsible for the effectiveness of the controls and has to be solely responsible for setting the key parameters.

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37. The direct market access/sponsored access provider firm should be mindful of its responsibility for all trades executed under its market participant ID. This responsibility should govern the approach the direct market access/sponsored access provider firm takes to assessing potential clients and the monitoring of their trading activity.

38. For a robust framework to mitigate the risks related to direct market access and sponsored access controls need to operate on a pre-trade and post-trade basis. Oversight of these risk controls needs to be monitored on an on-going basis.

39. There are several key areas covered by the guidelines on organisational requirements for investment firms offering direct market access/sponsored access services:

- **Taking on direct market access/sponsored access clients.** Preliminary assessments of prospective direct market access/sponsored access clients are needed to determine if clients are suitable candidates for direct market access/sponsored access services. Direct market access/sponsored access provider firms should therefore firstly define what criteria these direct market access/sponsored access clients should be considered against and secondly, assess every prospective direct market access/sponsored access client against these criteria. The criteria to carry out these preliminary assessments of their direct market access/sponsored access clients should at least cover:
    - the training and competency of the individuals entering orders;
    - access controls over order entry;
    - allocation of responsibility for dealing with actions and errors;
    - the financial standing of the direct market access/sponsored access clients client; and
    - historical trading pattern/behaviour of the direct market access/sponsored access clients client, when available.

  As part of this preliminary assessment of prospective clients, firms should also consider the potential impact of the direct market access/sponsored access clients client's trading strategy, taking account of the client's historical patterns of trading, on the relevant trading platforms and the wider market. They should also take account of the prospective direct market access/sponsored access clients client's disciplinary history with competent authorities and trading platforms.

- **Rights and responsibilities.** Under MiFID there is only a requirement for an investment firm and a client to have a written basic agreement with a retail client (for services other than investment advice). As most direct market access/sponsored access clients are more likely to be professional clients or eligible counterparties this requirement will not usually apply to direct market access/sponsored access services. However, where direct market access/sponsored access services are provided to professional clients and/or eligible counterparties there should be clarity over the responsibilities of the respective parties. The respective rights and responsibilities should be documented.

- **Pre-trade controls.** Guideline 4 sets out organisational arrangements for investment firms for fair and orderly trading. Those controls need to be applied to the trading of direct market access/sponsored access clients.

  Based on the initial assessment of a direct market access/sponsored access client, the direct market access/sponsored access provider firm should set appropriate credit thresholds. The speed at which orders are entered into the market by their direct market access/sponsored access clients increases the risk that without controls, trades may exceed credit or financial limits. This may occur because direct market access/sponsored access clients cannot keep track of the orders being entered or because erroneous trades are entered and executed because no controls or a lack of proper controls exist to stop them.

  The direct market access/sponsored access provider firm should operate appropriate automated pre-trade controls which stop automatically any order from a direct market access/sponsored access client which would either compromise the direct market access/sponsored access provider firm's risk appetite or the credit thresholds. Whereas in the case of direct market access this can be done at the firm level once the order passes through their systems, for sponsored access this would need to be done at the trading platform level. It is therefore important that direct market access/sponsored access firms, wherever they source their pre-trade controls, be it a third party vendor, their own proprietary controls, or controls offered by the venue, have the ability to cancel a trade which is in-built and automatic should the trade pose a risk.

- **Monitoring.** On a post-trade level, direct market access/sponsored access provider firms should at least be monitoring trades in real time using real-time copied feeds of their direct market access/sponsored access clients' activities and using client IDs to monitor and review their direct market access/sponsored access clients' trading activity. Direct market access/sponsored access firms should also have the post-trade measure to terminate a direct market access/sponsored access client's access to the order book.

- **Outsourcing.** The controls over the trading of direct market access clients will usually be those of the firm as the order flow goes through the firm's systems. The same is not necessarily true for sponsored access clients as the order flow does not go through the firm's systems. The controls over the trading of sponsored access clients can be the firm's own controls or controls purchased from a vendor (including a trading platform). However, the responsibility for the effectiveness of the controls, including for the thresholds embedded in the controls, always remains with the investment firm offering sponsored access and not with the sponsored access client. The sponsored access clients should not be able to change the controls on their own authority.