



FICC MARKETS  
STANDARDS BOARD

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# Algorithmic Trading In FICC Markets Statement of Good Practice for FICC Market Participants

TRANSPARENCY DRAFT

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# I Introduction

## 1. The FICC Markets Standards Board

The FICC Markets Standards Board (“FMSB”) was established in 2015 in response to the Fair and Effective Markets Review in the UK with a mandate to issue Standards designed to improve conduct and raise standards in the wholesale Fixed Income, Commodity and Currency (“FICC”) markets. The FMSB will work to build up a body of Standards and Statements of Good Practice (“SGPs” and each an “SGP”) over time, prioritising those areas where its members consider there is a lack of clarity in the standards of behaviour expected of market participants, or a lack of understanding of the issues relevant to a product or transaction type, or evidence of poor conduct.

## 2. Applicability of FMSB Statements of Good Practice

FMSB SGPs are issued by the FMSB from time to time. SGPs do not form part of the FMSB Standards and they are not subject to FMSB’s adherence framework. Rather they reflect FMSB’s view of what constitutes good or best practice in the areas covered by the SGP in question. FMSB members are expected, and other firms are invited, to consider their own practices in light of the SGP and make any changes to such practices that they deem to be appropriate. Failing to do so will not, however, create any presumption or implication that a firm has failed to meet its regulatory or other obligations.

Full details of FMSB member firms are available at <http://www.fmsb.com>. SGPs will be shared with non-member firms and their associations, who are encouraged to consider them. Information on SGPs will be made available to users of the wholesale FICC markets (e.g. corporates and end investors) so that they may be made aware of their existence and FMSB expectation of market conduct.

The FMSB will, as part of its normal course of business, periodically review the applicability of its published SGPs to ensure they are relevant and up to date for market conditions.

## 3. Relationship with law and regulation

FMSB Standards and SGPs do not impose legal or regulatory obligations on FMSB members, nor do they take the place of regulation. In the event of any inconsistency, applicable law, rules and regulation will prevail. In developing Standards and SGPs, certain relevant regulators will in many cases have commented on their drafting, alongside member firms and other bodies, such that the Standards and SGPs once finalised and published are intended to represent an authoritative statement of global good practices and processes.

National laws on employee monitoring vary significantly and some of the monitoring requirements expressed in this guidance may conflict with local laws. As such, this guidance is intended to be considered to the extent it is possible to follow it in compliance with applicable laws. Laws governing data retention periods for documentation in general and suspicious transactions in particular vary between jurisdictions and readers are reminded to check applicable periods in the areas in which they operate.

#### 4. Relationship with other Codes

Other codes already exist in relation to certain FICC markets, such as the FX Global Code, whilst others are in the process of being produced. There will be some overlap between the work of the FMSB and such other bodies and the FMSB will seek to ensure it adopts a consistent approach in cases of overlap wherever possible, and will seek to avoid issuing a Standard or SGP where the subject matter is already covered adequately by existing regulation or a Code issued by another body. It may, however, draw the attention of member firms to an existing code and request that members act in a manner consistent with it, once appropriate steps have been taken to confirm its applicability.

## II Algorithms and Algorithmic Trading

### 1. Background

The use of computer algorithms which are capable of automatically determining individual parameters of orders (referred to in this Statement of Good Practice as “Algorithms”) to facilitate trading in FICC markets has significantly increased in recent years. Such activity has the potential to adversely impact market and firm stability and to harm clients and accordingly it is increasingly the subject of regulatory scrutiny and intervention. This Document sets out a number of Good Practice Statements in relation to the use of Algorithms by FMSB member firms in their FICC business activities. It is expected FMSB member firms will observe these Good Practice Statements globally.

In certain jurisdictions, significant new regulations have already been introduced which cover similar ground to this document, sometimes in more detail and prescription - most notably MiFID II<sup>1</sup> applicable to regulated investment firms in Europe for their relevant “MiFID business”. However, there are certain types of FICC related activity which are ordinarily not subject to MiFID (such as trading of spot FX and physical commodities not on a MiFID regulated venue). This document is therefore intended to apply high level Good Practice Statements relevant to the use of Algorithms in all FICC businesses, wherever carried on.

Given the wide variety of participants in the FICC markets potentially impacted by this document, the Good Practice Statements are expressed at a high level. FMSB member firms are expected to consider the Good Practice Statements and seek to apply them in a manner that is appropriate in light of the nature of activity and size and complexity of their firm and having regard to the purpose of FMSB documents, namely to promote the integrity and effective functioning of FICC markets.

### 2. How Algorithms are used in FICC markets

Algorithms are used in a wide variety of ways in the FICC markets and new uses and applications will no doubt continue to emerge. Examples include:

- Dealers and Brokers who deal in FICC instruments as principal may use Algorithms to assist in the execution of trades for themselves in those instruments, determining at what price and on which markets bids and offers should be submitted electronically to other market participants and execution venues;
- Dealers and Brokers may use Algorithms for the purposes of executing orders with or for their clients, acting either as principal or agent;
- Clients may use Algorithms for the purpose of sending orders to their Dealer or Broker, which Algorithms may be proprietary to the Client or have been provided to them by their Dealer or Broker;
- Venues (such as Exchanges and Multilateral Trading Facilities) will likely use Algorithms in their systems involved in matching orders from different participants and determining the prioritisation of how different orders are matched.

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<sup>1</sup> “MiFID II” means Directive 2014/65/EU and its related Directives, Regulations and Regulatory Technical Standards

In this Statement of Good Practice, “Market Participant” means Dealers, Brokers, Clients and Operators of Venues that allow or enable Algorithmic Trading Activity, in each case active in wholesale FICC markets;

“Dealer” means a firm which provides liquidity to Clients and makes markets in FICC instruments and generally acts as principal;

“Broker” means a firm which assists Clients in accessing liquidity in FICC instruments and may act as principal or agent;

“Client” means a firm which is an end user of, or an investor in, FICC instruments, with or for whom Dealers and Brokers deal;

“Venues” means an Exchange, Multilateral Trading Facility (“MTF”), Organised Trading Facility (“OTF”), or analogous concept outside of Europe, active in FICC Markets, and an Operator of a Venue means an investment or other firm authorised and responsible for the operation of the Venue.

### 3. Scope and application

This Statement of Good Practice applies to wholesale Market Participants (as defined above) that engage in Algorithmic Trading in FICC markets.

For the purpose of this Statement of Good Practice, “Algorithmic Trading” means trading in instruments where a computer algorithm, with limited or no human intervention, automatically determines individual parameters of orders such as:

- whether to initiate the order; or
- the timing, price or quantity of the order; or
- how to manage the order after its submission.

Algorithmic Trading does not include any system that is only used for:

- the purpose of routing orders to one or more Venues (where the router does not have the ability to modify the parameters of the order); or
- the processing of orders involving no determination of any trading parameters; or
- the confirmation of orders or post trade processing of executed transactions.

Where the Algorithm selects an instrument in which to invest but there is human involvement in the execution of the order, or the algorithm provides automated quoting but there is human involvement in the execution of trades based on such quoting, that trading activity will not be deemed Algorithmic Trading (as the human intervention in those instances will be more than limited).

For the purpose of this Statement of Good Practice, a Venue will be regarded as allowing or enabling Algorithmic Trading where order submission and order matching is facilitated by electronic means and any arrangements or systems of a Venue that allow or enable Algorithmic Trading shall be considered an Algorithmic Trading System of such Venue.

## III Good Practice Statements and Commentary

### 1. Overarching Governance Structure

**Statement of Good Practice 1:** Market Participants should have an appropriate governance framework to provide for clear responsibility for, and oversight of, their Algorithmic Trading or the Algorithmic Trading System of a Venue that they operate.

Market Participants should put in place adequate and effective structures and mechanisms to provide for appropriate oversight, supervision and control in relation to the Market Participant's Algorithmic Trading or of an Algorithmic Trading System of any Venue that they operate. This Good Practice Statement applies regardless of whether the Market Participant develops, outsources or procures software or hardware used in the relevant Algorithmic Trading Activity or Algorithmic Trading System. The requirement for governance can be discharged by the use a committee structure or other approach as the firm deems appropriate, provided such structure ensures adequate supervision by Senior Management and:

- effective management of all relevant risks associated with such Algorithmic Trading or Algorithmic Trading System, including financial risks (including market, credit & counterparty and liquidity) and non-financial risks (including operational, conduct, reputational, legal, and regulatory) as appropriate to the Algorithmic Trading or Algorithmic Trading System in question. The management of risks should include a combination of pre-trade controls, real-time monitoring and post-trade reporting and an appropriate supervisory model as is appropriate to manage the risks in question whilst ensuring adherence to firms' stated strategic objectives.
- roles of the business, independent control functions and audit in the governance structure should be sufficiently defined to ensure effective allocation of responsibilities for managing risk and independent oversight across the three lines of defence. Specifically, an independent risk management function should exist and be actively involved in the management of controls relevant to Algorithmic Trading and Algorithmic Trading Systems as described in Statement of Good Practice 4 below.

Additionally, the governance structure should require a periodic (not less than annual) revalidation of the firm's activities and governance applied to Algorithmic Trading or Algorithmic Trading Systems of Venues operated by it, as applicable, as a result of this Statement of Good Practice and, if applicable, relevant regulatory requirements, to ensure the governance structure remains appropriate.

## 2. Minimum Standards

**Statement of Good Practice 2:** Market Participants should define and require adherence to minimum standards relevant to Algorithmic Trading and Algorithmic Trading Systems in relation to the matters set out below.

Market Participants should adopt policies and procedures setting out the minimum standards applicable to them conducting Algorithmic Trading, or to the Algorithmic Trading System of a Venue which they operate, dealing with at least the following areas:

- risk and execution controls;
- kill switches;
- testing practices;
- monitoring;
- continuity of business;
- change processes; and
- documentation requirements.

It is recognised that the importance of, and the level of risk (to the firm and to market integrity) associated with, Algorithmic Trading and Algorithmic Trading Systems for different Market Participants will vary significantly. Accordingly, Market Participants should in defining such minimum standards have regard to relevant risk factors in determining such standards and the level of detail required in their description.

Further detail relating to the minimum standards relevant to risk and execution controls is set out in Statement of Good Practice 4 below.

Differing regulatory requirements in different jurisdictions may mean that a Market Participant applies different standards in different jurisdictions applicable to its Algorithmic Trading, or the Algorithmic Trading Systems of Venues operated by it. However, it is intended that the minimum standards adopted pursuant to this Statement of Good Practice are consistently applied globally (and thus may be less strict than those required pursuant to some regulatory regimes in certain jurisdictions).

Market Participants should provide confidential channels for personnel or external parties to raise concerns about potentially improper practices and behaviours relevant to the requirements of this Statement of Good Practice, together with a mechanism to investigate and respond to such concerns as appropriate.

### 3. Inventories and Definitions

**Statement of Good Practice 3:** Market Participants should maintain a complete list (or lists) and description of the Algorithms which they use in the course of Algorithmic Trading or which are used as part of the Algorithmic Trading System of a Venue operated by them, and related definitions.

The list(s) required by this Statement of Good Practice (referred to as “an inventory”) could include in respect of each Algorithm details of: the name of the Algorithm owner; supervisor(s) of the Algorithm operation; names of developers; system(s) housing the Algorithm; the legal entities operating the Algorithm, the region in which it is to be used, a description of the purpose of the Algorithm and applicable key parameters for the Algorithm.

Where relevant, an inventory of risk/execution controls applicable to a flow/business activity utilising an Algorithm or in the course of operating a Venue which utilises an Algorithmic Trading System should also be maintained. Further, where relevant, firms should also maintain inventories of external execution Venues which may be used in the course of conducting Algorithmic Trading.

Where the description of an Algorithm uses a technical or defined term, market participants should maintain a list of those terms, with a description of their meaning using non-technical language, to ensure a common understanding. These definitions should be relevant to the activity undertaken by the Algorithm; be based on regulatory and market analysis and be reviewed on a regular basis to ensure they remain appropriate and up to date.



#### 4. Risk Management / Controls

**Statement of Good Practice 4:** Market Participants carrying on Algorithmic Trading, or operating a Venue which utilises an Algorithmic Trading System, shall have pre- and post-trade controls in operation which are appropriate to the activity. Firms shall have regard to the nature of the activity and the size and complexity of their firm when determining appropriateness.

Market Participants should ensure pre and post-trade risk and execution controls appropriate to the nature of their activity and the size and complexity of their firm, are put in place to control their Algorithmic Trading and Algorithmic Trading Systems. In particular to prevent inadvertent market activity including unauthorized access, system failures, and errors. Firms should have processes in place to enable the systems associated with its Algorithmic Trading and Algorithmic Trading Systems to be resilient, operate with sufficient capacity to ensure orderly trading under stressed conditions, avoid market manipulation, and have effective business continuity arrangements.

The appropriateness of a pre or post-trade risk and execution control and how it is implemented (for example, in terms of limit size) can vary across different types of instruments and activity type. Consideration should be given to pre or post-trade risk limits that are appropriate for the firms' capital base and risk appetite, trading style, experience, and risk tolerance. These risk limits can include a variety of hard limits, such as position size and order size, burst/throttles, maximum notional/quantity limits, near-time reconciliation and "reasonability checks" on incoming market data as well as on generated values.

Further, firms engaged in Algorithmic Trading should have a formal risk management function, independent from algorithmic traders to determine appropriate levels for pre-trade risk controls as well as to monitor the financial exposure and non-financial risks associated with such Algorithmic Trading. In the event that limits are breached, the risk management function should have procedures for responding to such a breach in limits. Firms should consider formalising a specific risk appetite to Algorithmic Trading where deemed appropriate in the context of the firm's wider trading activities and whether a hierarchy of limits (for example, algorithm, flow/system, legal entity, firm) is appropriate.

## 5. Policies and Procedures

**Statement of Good Practice 5:** Market Participants should ensure they have appropriate written policies and procedures to support and ensure compliance with the requirements of this Statement of Good Practice and such documentation should be kept up to date.

Market Participants should ensure appropriate policies and procedures commensurate with the risks of the Algorithmic Trading that they undertake, or of the Algorithmic Trading Systems of the Venues which they operate, are in place and kept up to date on a regular basis. Documentation requirements may differ depending upon the nature of the activity and size and complexity of the firm.

Market Participants that make available Algorithms for use by others, or execute orders on behalf of their Clients through the use of Algorithms, or operators of Venues whose participants make use of the Venue's Algorithmic Trading System, should also produce documentation for their Clients or participants which provide an adequate description of the way in which the Algorithm works, and where relevant how it should be used.

In all cases documentation should have a clear owner and a process should be put in place to ensure documentation is validated as complete by the owner on a regular basis.

Types of documentation Market Participants should consider producing, that are internal to the firm, in support of this Statement of Good Practice are as follows:

- description of the Algorithm - goals, principles and methods involved in execution;
- "how to use" instructions;
- key parameters, inputs and outputs - what parameters can be set by a human, what inputs the code requires and what outputs broadly it generates;
- the names of the owner of the Algorithm and of the relevant code developer;
- the supervisory model and name of supervisors who monitor performance of the Algorithms;
- approaches to testing; and
- flow diagrams and detail of pre/post trade risk /execution controls (for example, execution control location in flow).

Market Participants undertaking Algorithmic Trading with or for Clients should provide adequate disclosure to those Clients to enable each Client to evaluate the performance of the service provided by the Market Participant. Such disclosure could include:

- a clear description of the algorithmic execution strategy, such as the logic used, intended behaviour and outcomes;
- whether the algorithm provider can execute as principal;

- fees applicable to the provision of the services;
- general information regarding how routing preferences may be determined, if applicable;
- information on the liquidity sources to which access may be provided, if applicable;
- detail on order types, scenarios where discretion or programmed judgment is used and if or how it is used to fill the user order;
- all order types and other relevant functionality which impacts quality of execution or other user outcomes; and
- any relevant conflicts of interests involved in operating an algorithm and how these conflicts are mitigated.

Firms operating a Venue utilising an Algorithmic Trading System should have appropriate documentation describing the responsibilities of participants of the Venue engaged in Algorithmic Trading. These should cover (but are not limited to):

- requirements in relation to on-boarding, enabling or restricting access;
- an error trade policy;
- rules concerning monitoring and configuring any risk limits maintained by the Venue; and
- rules and responsibilities in the processes surrounding connectivity.

## 6. Software Development and Change Process

**Statement of Good Practice 6:** Market Participants engaged in Algorithmic Trading and Market Participants operating a Venue which utilises an Algorithmic Trading System should have appropriate software development and change management processes in place applicable to their development and deployment of new, or changes to existing, Algorithms used in Algorithmic Trading or their Algorithmic Trading System.

Market Participants engaged in Algorithmic Trading or operating Venues utilising Algorithmic Trading Systems should put in place an appropriate initial development and change approval process to ensure risks associated with the implementation of the initial development or of the change request are appropriately reviewed by relevant stakeholders including oversight from 2<sup>nd</sup> line functions. The approval process required should be appropriate to the complexity, risks and nature of the proposed development or change in question.

To determine an appropriate approval process, Market Participants should apply standards commensurate to their business activity. For example a 'materiality' trigger may be agreed and applied to change requests. These standards should be clearly articulated in the firm's policies and procedures and be appropriately disseminated to relevant stakeholders.

As appropriate for the Algorithmic Trading or Algorithmic Trading System in question, Market Participants should consider software development methodology which generates a maintainable source code repository which can manage access, persistence and changes and produces software that is implemented to specified requirements. Additionally, any development environment should be segregated from the production trading environment.

As part of a development and change process, Market Participants should require a process for testing software components before they are released into a production environment. Market Participants should consider whether automation of such testing is appropriate. Testing requirements should be proportionate to the change being made and consider the potential impact of the change to internal systems as well as the external market Clients and participants. Input from 2<sup>nd</sup> line functions should be included in the agreement of a firm's testing approach for algorithms.

Market Participants should consider the following testing types when defining appropriate testing for a particular change type:

- unit testing;
- functional testing (for example, integration and regression testing);
- non-functional testing (for example performance, stability usability, stress);
- end user acceptance testing and venue conformance testing.

Testing should consider all relevant risks including financial and non-financial risks. Non-financial risks should capture relevant conduct risks in relation to fair and effective functioning of markets and fair client outcomes. Market Participants should consider whether regular testing outside of the change process is also appropriate for their activities.

Market Participants should establish a change management process which appropriately controls and manages the propagation and deployment of new and changing software and infrastructure into a production environment. Any process should create an evidential audit trail of the change request and development lifecycle and appropriate approval by a designated responsible party within the firm, and include agreement of 2<sup>nd</sup> line's role and responsibilities in change process. Such change management process may vary depending on the materiality or complexity of the relevant change.

Depending upon the context and the materiality of the new /change request, the approval process might consider:

- conceptual description of the Algorithm (i.e. an internal documentation);
- if relevant, the external documentation and Client documentation;
- intended application (usage, e.g. what asset classes, clients, trading venues, etc.)
- owner's certification that the development and testing has been carried out in line with the firm's requirements;
- results of tests carried out - this should be appropriately documented and supplied with supporting evidence and sign-offs as appropriate;
- identification of potential risks, limitations and conflicts of interests and how they will be monitored or mitigated;
- who will be authorised to use the Algorithm, in what environment and what will be the supervision model for the Algorithm;
- financial and non-financial risks involved in operating the Algorithm.

Depending upon the context and the materiality of the new proposed initial development or change request in question, any approval process should involve sign-offs from the relevant 2<sup>nd</sup> line functions.

## 7. Ongoing Oversight within Governance Structure

**Statement of Good Practice 7:** Market Participants should establish processes to ensure appropriate ongoing oversight and monitoring of Algorithmic Trading and the operation of a Venue utilising an Algorithmic Trading System as part of any governance structure.

Market Participants should consider the nature of their activity type(s) and size and complexity of their firm when defining requirements and the need for a more holistic oversight across a range of activities incorporating 2<sup>nd</sup> line challenge. Market Participants should promote and maintain a robust control and compliance environment to effectively identify manage and report on the risks associated with their Algorithmic Trading activities and the Algorithmic Trading System utilised by Venues which they operate.

Topics which may be appropriate for consideration are: pre / post trade execution control limits; performance measures of algorithms, "business as usual" monitoring, events and incident monitoring, business continuity management and Client outcomes.

## 8. Record Keeping

**Statement of Good Practice 8:** Market Participants should implement processes and recordkeeping to monitor their Algorithmic Trading and the operation of The Algorithmic Trading System utilised by Venues which they operate.

Market Participants should keep a timely, consistent, and accurate record of their Algorithmic Trading to facilitate appropriate levels of transparency and auditability.

## 9. Training and Education

**Statement of Good Practice 9:** Market Participants should ensure relevant personnel are appropriately trained in relation to the subject matter of this Statement of Good Practice.

Market Participants engaged in Algorithmic Trading Activity should ensure relevant personnel are appropriately trained and educated in relation to the requirements of this Statement of Good Practice. Such training should be tailored to the activity and role of the trainee so that a trainee involved in Algorithmic Trading, or in the operation of an Algorithmic Trading System:

- understands the relevant Algorithms with which they are involved and the relevant processes, procedures and applicable governance framework; and
- has technical training on applicable tools associated with the relevant Algorithms.