Capital Markets

# Algo Due Diligence Template – Nov 25

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| **GENERAL** | |
| *This general section outlines the core features of the algorithm. Providers may consolidate answers 1–5 into a table or grid if they wish to cover multiple algorithms with the same template.* | |
| Q1 | Algo Provider (also referred to as "you" or "your" below as required): |
| A1 | RBC Capital Markets (RBCCM).[1] |
| Q2 | Algo name(s): |
| A2 | Provide, TWAP, VWAP, IS, Strike, LimitPlus, SmartTake. |
| Q3 | Liquidity type (internal, external, hybrid): |
| A3 | Internal, external, hybrid |
| Q4 | Products covered (spot, NDF): |
| A4 | For further details please see the accompanying documents entitled:<br>▪ RBCCM FX Algorithm Overview<br>▪ RBCCM FX Algorithm Details |
| Q5 | Description of algo(s): |
| A5 | For further details please see the accompanying documents entitled:<br>▪ RBCCM FX Algorithm Overview<br>▪ RBCCM FX Algorithm Details |
| Q6 | Please describe any parameters or controls the user may adjust: |
| A6 | For further details please see the accompanying documents entitled:<br>▪ RBCCM FX Algorithm Overview<br>▪ RBCCM FX Algorithm Details |
| Q7 | Please specify if the product is built internally or externally: |
| A7 | RBCCM algo product is proprietary built and fully developed in house |
| **CONFLICTS OF INTEREST** | |
| *Some conflicts of interest may be expected but it is important to know what they are and what steps have been taken to manage them. This way the Algo User can make an informed decision.* | |
| Q8 | If principal liquidity interacts with the Algo User's order, how does this happen and what steps are taken to ensure the fill is a fair one from the order's point of view? |
| A8 | RBCCM allows clients to express a preference for liquidity at order entry which we will endeavour to respect. |

[1] RBCCM is the global brand name for Royal Bank of Canada and certain of its subsidiaries.

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| | However, RBCCM liquidity may be interjected where: it is necessary to ensure smooth execution and algo completion; to mitigate impact; where more competitive than external liquidity; or, at the explicit direction of the client at order entry.<br><br>Any customer fill from RBCCM is clearly tagged and identifiable via our TCA reports allowing clients to monitor performance. The performance of all RBCCM algos is monitored regularly to ensure that our fills and performance are consistent with our obligations. Clients can fully disable the use of RBCCM liquidity for all scenarios via back-end customizations which can be created on request. |
| Q9 | If another part of your business needs to hedge or trade in the same direction as the Algo User's order, how are fills allocated between the two? |
| A9 | Every algo order (including those of RBCCM) is treated independently. No priority is given to Firm orders, in the event that two orders are submitted at the same time to the same venue they are treated on a first in first out basis. |
| Q10 | Are there any particular commercial interests in trading venues or other relevant service providers that interact with the algorithm provided by you? If so, how are such conflicts addressed? |
| A10 | No |
| Q11 | Please elaborate on your role as regards market risk, counterparty risk, and settlement risk. |
| A11 | When transacting via an algo, clients face RBCCM in a principal capacity (with RBCCM facing external liquidity providers where external liquidity has been utilized). As such, clients will be exposed to counterparty and settlement risk on any transactions executed against RBCCM. Market risk on all algo transactions will be passed to the client by RBCCM.<br><br>RBCCM has a series of systematic controls in place to monitor, test, and manage these risks. |
| Q12 | Is there anything else of which you feel the Algo User should be aware? |
| A12 | RBCCM is a signatory of the FX Global Code Statement of Commitment. As such it is committed to conducting its foreign exchange activities (including Algo trading activities) in line with the principles of the FX Code. For more details please see here. |
| **ALLOCATION POLICY** | |
| *There are many different approaches to allocations. It is important to understand what happens in circumstances where multiple clients wish to trade or, indeed, when one order would be used to fill the order of another client.* | |
| Q13 | If you have more than one client order wishing to trade in the same pair and on the same side, how are fills allocated amongst these orders? |
| A13 | Every algo order (including those of RBCCM) is treated independently. No priority is given to Firm orders, in the event that two orders are submitted at the same time to the same venue they are treated on a first in first out basis. |
| Q14 | If two client orders are eligible for execution netting, how does this process work? |
| A14 | RBCCM does not support the netting of algo orders. |
| **ROUTING POLICY** | |

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| *Routing policy is an important topic. There are several components such as how execution venues are evaluated, curated, and prioritised. Also covered is the question of what fair-value mid the algo uses to make routing decisions and how information leakage is avoided when placing lit orders. Finally, internalisation is defined: some providers have a strict definition such as 'two algo orders netting' whereas others will include midbooks and trades where they have shown a skew through mid externally to incentivise another counterparty to fill them.* | |
| Q15 | How are hedging execution venues evaluated, including both observable (spread, impact) and implicit costs (information leakage)? |
| A15 | There are a variety of factors used to regularly evaluate the execution venues used including, but not limited to: reject rates, response times, and market share. These factors are statistically evaluated using TCA analysis. |
| Q16 | How do you prioritise between different execution venues (both external and internal sources) when routing orders? |
| A16 | By default the RBCCM FX Algos do not give preference to internal versus external liquidity unless this is expressly selected by the client.<br><br>Priority of routing will be based on a variety of factors including, but not limited to: price, available liquidity, historic trading volumes as a percentage of total interbank volumes, and the type of algo being used (for example an aggressive algo strategy will prioritize the factors noted above differently to a passive strategy). |
| Q17 | If multiple clients enter orders in the same pair, will you aggregate these orders before placing orders externally or treat each client order individually and place multiple similar orders, which may compete with one another for fills? |
| A17 | No, RBCCM does not aggregate client orders. |
| Q18 | What – if any – ongoing work do you do in order to curate execution venues, where curation is possible? Approximately how often is this conducted? |
| A18 | Venues are regularly assessed using an external TCA provider. Metrics include, but are not limited to: mark outs over various horizons, signaling risk, speed, and spread. |
| Q19 | Do you have any logic to avoid orders on venues where the order book is visible to all participants (lit execution venues) causing information leakage? If so, please describe it. |
| A19 | No, RBCCM does not have any logic to avoid orders on lit execution venues but clients may request that no lit markets be used upon request. |
| Q20 | Does the mid/fair-value used by the algorithm differ from the one used by your own market making system for pricing and risk management? If yes, please specify. |
| A20 | Yes. Different values are used by the algorithm and RBCCM's market making systems. |
| Q21 | Please define your understanding of 'internalisation' and, using an example, describe how this works in practice, demonstrating if/how your Algo Clients benefit from this process. If you wish to do so you may provide an indication of how much volume is internalised on average. |
| A21 | RBCCM defines 'Internalization' as filling part, or all, of an algo order using RBCCM liquidity. Accessing RBCCM liquidity in addition to external liquidity may or may not enable clients to achieve a better result. |

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| | Internalization rates can vary depending on the algo selected and individual client preferences, i.e a client may configure the utilization of RBCCM liquidity, external liquidity, or both. |
| **SEGREGATION POLICY** | |
| *Segregation policy is all about keeping order information private and reducing the risk of signaling.* | |
| Q22 | Please describe if and how the algo orders are segregated within your institution. |
| A22 | Information barriers exist within RBCCM to restrict visibility of pending and live algo orders from teams other than the responsible e-FX Sales team. These include RBCCM's FX Trading and Voice Sales teams.<br><br>For more information on how RBCCM handles confidential information, please see our RBCCM Client Notice. |
| Q23 | Can sales and trading personnel who provide intraday 'market colour' view algo orders at any stage? If so, what steps have been taken to minimise the risk of information leakage? |
| A23 | As outlined in our RBCCM Client Notice, RBCCM may disseminate aggregated and anonymized information regarding transactions and other client processes for certain purposes, including financial reporting, data contribution, and production of market colour.<br><br>Following the completion of an algo order, FX Sales and Trading have visibility of individual algo executions, but are unable to view parent order information. |
| Q24 | Can discretionary traders who may enter or exit risk for your institution view algo orders at any stage? If so, what steps have been taken to minimise the risk of information leakage? |
| A24 | Information barriers exist within RBCCM to restrict visibility of pending and live algo orders from teams other than the responsible RBC Sales team involved with the monitoring. These areas include RBCCM's FX Trading and Voice Sales teams.<br><br>For more information on how RBCCM handles confidential information, please see our RBCCM Client Notice. |
| Q25 | Can an electronic market making system view algo orders at any stage? If so, what steps have been taken to minimise the risk of information leakage or misuse of information? |
| A25 | No. |
| Q26 | Are algo order flows included in any market positioning tools or analyses that other clients may use? |
| A26 | No. |
| **SAFETY FEATURES** | |
| *Safety features might include fat-finger limits, kill switches or protections that automatically suspend the order when it trades too fast or in certain market conditions.* | |

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| Q27 | Please describe any in-built safety features you have that may cause an order to be suspended or rejected. |
| A27 | RBCCM employs various checks which may cause an order to be suspended or rejected, including, but not limited to:<br><br>▪ Credit checks;<br>▪ Max order quantity;<br>▪ Limit price vs inception market price;<br>▪ Max aggregated order quantity within a time window;<br>▪ Max open orders (quantity or number of orders) in the market; and<br>▪ Child order validation to prevent overfill or limit price violation.<br><br>All limits are configurable with limits subject to internal oversight. |
| Q28 | Please explain what you have done, and will continue to do, to ensure the integrity of the electronic trading system you provide for clients to use (including the system's reliability, security, capacity and contingency measures). |
| A28 | RBCCM algo strategies are subject to various controls prior to deployment. To ensure the stability of the platform RBCCM maintains a formal electronic trading governance structure via which new processes or material changes are reviewed. A number of overlapping pre-quote and pre-trade checks also exist to mitigate relevant risks during execution.<br><br>RBCCM employs 24-hour real-time monitoring, including performance/capacity monitoring. FX kill switches can be deployed, where necessary.<br><br>RBCCM has documented business continuity plans that are tested on a periodic basis and periodic stress testing is performed to ensure RBCCM's system can handle necessary trading volumes. |
| **TCA** | |
| *TCA is an increasingly important part of the service. Where the TCA is not third party it is important to understand internal metrics. For example, if you have 'beaten risk transfer price' by 3bp how is that risk transfer price calculated?* | |
| Q29 | Do you support any TCA or analytics? If so, please specify which providers. |
| A29 | Yes. RBCCM can provide both internal or external TCA analytics. RBCCM's own TCA can provide a full break-down of every child order including timestamp (millisecond), venue, rate, and comparison rate to the primary ECN.<br><br>External TCA is available on request from BestX and TradeFeedr |
| Q30 | If you provide proprietary analytics, please describe how relevant metrics are calculated (mid-price, risk-transfer benchmarks, etc.). |
| A30 | All metrics are calculated by comparison to the respective primary ECN which varies by currency. For example, EUR/USD is EBS and GBP/USD is Reuters. |
| Q31 | If you provide proprietary analytics, is there a difference in data provided to different users? If so, please elaborate. |
| A31 | RBCCM's TCA data is derived from the same source for all clients. Depending on the algo strategy selected it may be possible for clients to tailor analytics as per their own requirements.<br><br>TCA data from BestX or TradeFeedr may be provided independent of RBCCM upon client request. |

| **SWAPS** | |
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| *Algo Users may have a need to roll an algo execution entirely/partially to one or more forward value date/s. If roll forwards are executed with the Algo Provider, it is crucial to understand if the respective swap prices are competitive and whether potentially sensitive order information is exposed. For example, does the swaps trader know which side of the quote the algo execution is on or do they receive a two-sided RFQ? Also, does the swap trader know they are quoting a captive spot fill or does it appear the same as RFQs that are priced in competition with other banks?* | |
| Q32 | What information is provided to the STIRT desk when there is a request for swap pricing from an algo order? |
| A32 | As outlined in the 'Segregation Policy' section information barriers restrict the visibility of information related to live or pending algo orders from areas outside of RBCCM's e-FX Sales Desk. As such, if a client wishes to roll an algo execution to a forward value date(s) with RBCCM they have two options:<br><br>▪ Option 1 - The client can request that the algo execution is rolled without human intervention by the algo.<br>▪ Option 2 - The client may request via the relevant Voice FX Sales team that the algo execution be rolled by RBCCM's FX Forwards desk. |