



IMPERATIVE EXECUTION

December 15, 2022

Mr. Brendan K. Loonam
Senior Director - Business Services, Transparency Services Department
FINRA
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Dear Mr. Loonam:

This letter is in response to your request for information regarding the IntelligentCross ATS ("IntelligentCross") and specifically the display capabilities of the IntelligentCross ASPEN ("ASPEN") Fee/Fee matching model that would be providing quotes to the FINRA Alternative Displayed Facility ("ADF"). Please find below information regarding IntelligentCross' operations, as well as the matching process in general.¹

I. Overview

The IntelligentCross ATS is widely used by most major US broker-dealers and electronic trading firms. During the first three quarters of 2022, IntelligentCross was consistently in the top five of ATSs for total shares traded of NMS Tier 1 stocks in the FINRA ATS weekly statistics, trading over \$4.4 billion notional per day single counted.

The IntelligentCross ATS operates two different matching models: (1) a Midpoint book that only accepts non-displayed midpoint orders and (2) ASPEN, a full limit order book with optional displayed capability.² While the two matching models operate under the same "market participant identifier" (or "MPID") – INCR – the two books are distinct and do not interact with one another.

The ASPEN book has three distinct books distinguished by different fee structures – ASPEN Fee/Fee, ASPEN Maker/Taker and ASPEN Taker/Maker. All three books act independent of each other; orders resting in one book do not rest on or interact with orders resting in another book. The ASPEN Fee/Fee book would be the only order book displaying orders on the ADF, *i.e.*, the only orders from the INCR MPID on the ADF will be from the ASPEN Fee/Fee book.

¹ IntelligentCross is a SEC-registered US equities Alternative Trading System ("ATS"). IntelligentCross has an effective Form ATS-N under Rule 304 of Regulation ATS, which requires ATSs that trade NMS stocks to publicly file with the SEC an initial Form ATS-N (and amendments thereto) containing disclosures about the manner of operations of the ATS and the ATS-related activities of the broker-dealer operator and its affiliates, among other things. Imperative Execution is a financial technology company that is the parent company of IntelligentCross. For further information on Imperative Execution and IntelligentCross, please see <https://www.imperativex.com/intelligentcross>.

² Orders sent to the ASPEN book may be marked by subscribers as either displayed or non-displayed.

Mr. Brendan K. Loonam

December 15, 2022

Page 2 of 8

In addition to the independence of the Midpoint book and all three ASPEN books from one another, the Midpoint book only accepts midpoint peg orders, which are not accepted in any of the ASPEN books. Any orders entered into IntelligentCross through any other order type (*e.g.*, market order, limit order, primary peg order (with or without a limit price), and marketable peg order (with or without a limit price)) will default to the ASPEN Fee/Fee book. Only limit orders and primary peg orders (with or without a limit price) are eligible to be displayed on the ASPEN Fee/Fee book, and therefore on the ADF. A subscriber who wishes to trade in the ASPEN Maker/Taker or Taker/Maker books must affirmatively identify those books when entering their order.³

The ASPEN Fee/Fee book has been operating since 2019 and currently publishes displayed prices in over 6,900 securities. ASPEN Fee/Fee improves the NBBO over 6.4 million times per day for orders of round-lot size or larger on arrival (for third quarter 2022). These prices are not available to most investors because the orders displayed on the IntelligentCross ATS are not disseminated over the SIP and therefore are currently not a part of the NBBO.

As described more fully below, ASPEN Fee/Fee does not tier or discriminate among subscribers, is readily accessible, has a fee schedule that is transparent, formulaic and applies to all subscribers evenly, and its eligible displayed orders are published via a free market data feed (“IQX”).⁴ ASPEN Fee/Fee also is one of the fastest trading venues, acknowledging orders within 13 microseconds on average and trades near-continuously, scheduling matches for each security within 150-900 microseconds.

II. Benefits of ASPEN Fee/Fee Displayed Liquidity as a Protected Quote

IntelligentCross aims to bring additional well-priced displayed liquidity to the public quote through the ADF. Over the course of our four years of operation and matching over \$1.5 trillion (single counted) of orders from over 50 broker-dealer subscribers, we have seen the benefits that IntelligentCross as a whole brings to the markets through our matching process engineered to maximize price discovery and to provide an opportunity for investors to improve performance and achieve best execution. Currently, the displayed liquidity on the ASPEN Fee/Fee book provides brokers an opportunity to improve performance and achieve best execution for their customers. As an example, during the third quarter of 2022, a trade was reported on the SIP at the time ASPEN Fee/Fee has a better displayed quote of round-lot size or larger, over 1.1 million times per day, and 211 million shares per day were printed to the SIP at prices worse than those displayed by ASPEN Fee/Fee at that time. Similarly, over 1.7 billion shares in the ASPEN Fee/Fee book of round-lot size or larger were priced better than the NBBO on arrival per day, and investors paid (on average) \$35 million per day more for securities at other market centers than the prices available at that time on ASPEN Fee/Fee.

³ All three ASPEN books also operate with different MIC codes: ASPEN Fee/Fee - ASPN; ASPEN Maker/Taker - ASMT; and ASPEN Taker/Maker - ASPI.

⁴ Displayed orders from all three ASPEN books are available in the IQX market data feed. Each of the ASPEN books have individualized data feeds; as such, subscribers to the IQX feed can choose to consume data from whichever books they choose through separate feed identifiers.

Mr. Brendan K. Loonam
 December 15, 2022
 Page 3 of 8

Adding the ASPEN Fee/Fee book's displayed liquidity to the public quote as a protected quotation via the ADF will make these quotes available to all market participants and enable them to access better prices, bringing more quality liquidity and price discovery to the broader markets. Bringing the ASPEN Fee/Fee quote to the public quote also is consistent with the objectives of creating a more competitive marketplace for investors and offering market participants additional choices of venues when trading. Among other things, the ASPEN Fee/Fee matching mechanism applies uniformly to all subscribers (and non-subscribers accessing the ASPEN Fee/Fee book through a subscriber) and it utilizes a matching process that provides fair and efficient access to its quotations.

III. ASPEN Fee/Fee Matching Process

The superior displayed prices on the ASPEN Fee/Fee book are possible due to the utilization of a unique matching process that provides subscribers (and their clients) an opportunity to improve their trading performance and achieve best execution.⁵

Determination of Matching Schedule

The ASPEN Fee/Fee book uses a matching mechanism which is near-continuous and that matches orders at scheduled times ("match events"). Matching schedules are calculated using an overnight optimization process that uses historical performance measurements from prior days' matches across all three ASPEN books. Each day starts with a prepared matching schedule for each security that does not change throughout the day.

Each security has an individualized matching schedule, computed daily to maximize price stability after trades. Match schedules are defined by "minimum/maximum time bands" for each security, and these bands can have a minimum time of 150 microseconds and a maximum time of 900 microseconds (*i.e.*, the maximum time for scheduling a match event is capped at 900 microseconds). For example, on a particular day, the match event band for XYZ stock may have a minimum time of 450 microseconds and a maximum time of 600 microseconds. The actual match event time is randomized within the match event band throughout the course of the trading day.

Execution of Orders and Match Events

Subscribers can interact with the ASPEN Fee/Fee book using conventional order types. As discussed above, ASPEN Fee/Fee accepts limit orders with optional display instruction, immediate or cancel orders ("IOC") and pegged orders (which are treated as regular orders with an automated repricing to the NBBO). ASPEN Fee/Fee also will accept incoming Intermarket Sweep Orders ("ISOs") once it displays orders on the ADF.⁶

⁵ The matching process in ASPEN is the same across all three ASPEN books.

⁶ The ASPEN Maker/Taker and Taker/Maker books will not accept ISOs, as they will not be displaying orders on the ADF.

Mr. Brendan K. Loonam

December 15, 2022

Page 4 of 8

Any order for a security that arrives prior to a match event for that security (and that has not been cancelled, has become unmarketable, or has been repriced prior to the match event) will be eligible to participate in the next match event. Match events are scheduled continuously while the book is in a “matchable state” (*i.e.*, there is an order on each side eligible to match); if there are no orders for a stock in the book, no match event will be scheduled. An incoming order that will make the book potentially matchable will trigger a scheduling of a match event if one has not already been scheduled.

When a new order arrives in the ASPEN Fee/Fee book, it will participate in the next scheduled match event time by interacting with existing orders in the order book. At each match event time ASPEN Fee/Fee retrieves the NBBO and then processes all the orders that have arrived and have not been cancelled in price-time priority, and at each price level, displayed orders will have priority over non-displayed orders.⁷ Any matches are immediately reported to subscribers and the SIP via a FINRA Trade Reporting Facility (“TRF”) and disseminated on the IQX market data feed.

The matching process is completely symmetric, *i.e.*, the match times within IntelligentCross are not chosen to favor a particular side of the trade. No subscribers (or non-subscribers accessing IntelligentCross through a subscriber) are given any type of priority through the matching process, and the matching process is blind to the identity of the subscriber (or a non-subscriber accessing IntelligentCross through a subscriber). Both sides of the trade (buyers and sellers) are on equal footing for the next scheduled match, while maintaining full control of their orders - both sides can cancel or update their orders at any time prior to the match.

Open orders may be amended to the extent the amendment is received before a match event involving that order occurs. Order amendments are processed in the order in which they are received by the ATS.⁸ An open order also may be canceled to the extent the cancellation order is received before a match event involving that order occurs. The ASPEN Fee/Fee book will automatically update its quotations, and all quotation updates, including those due to new or cancelled orders, are immediate. In addition, the ASPEN Fee/Fee book will provide any quotes or quote updates to the ADF no later than what is disseminated via the IQX market data feed. All quotations displayed on ASPEN Fee/Fee also are handled on an automated basis and that there is no human discretion in determining any action taken with respect to an order after the order is received.⁹

⁷ IntelligentCross uses a combination of SIP and proprietary direct feeds from national securities exchanges to determine the NBBO and protected quotes (*e.g.*, for trade through purposes), and to price executions.

⁸ The match priority of an order will be preserved when amending the quantity of an order to a value less than the existing quantity of the order; however, the match priority of an order will be lost when amending the quantity of an order to a value greater than the existing quantity or when amending any other value in addition to the quantity of the order.

⁹ For a list of illustrative use cases of the IntelligentCross matching process, please see the IntelligentCross Form ATS-N.

Mr. Brendan K. Loonam
 December 15, 2022
 Page 5 of 8

Non-Match Events

Situations may occur where an incoming order may not execute against a resting order at match event time, such as when:

- an existing resting order cancels prior to the next match event
- an incoming order is canceled prior to the next match event
- the NBBO moves between the time an order is received and the next match event takes place, making either the incoming order or the resting order non-marketable
- the NBBO changed before the next match event and pegged orders were repriced to the new NBBO, making the incoming order or the resting pegged order non-marketable

For example, assume the NBBO in XYZ Stock is \$10.00 x \$10.01 at 9:30:00.000000 and ASPEN Fee/Fee is displaying a limit order to buy at \$10.00. At 9:30:00.000010, ASPEN Fee/Fee receives a sell order to sell at \$10.00. At 9:30:00.000020, the displayed limit order is cancelled. At 9:30:00.000040, the next scheduled match event in XYZ Stock, no match event occurs as there are no two matchable orders. The same result would occur in this example if a market participant sent a sell order that would have interacted with the buy limit order but then cancels their sell order at any time prior to the next scheduled match event.

Similarly, assume the NBBO in XYZ Stock is \$10.00 x \$10.01 at 9:30:00.000000 and ASPEN Fee/Fee is displaying a limit order to buy at \$10.00. At 9:30:00.000010, ASPEN Fee/Fee receives a sell order to sell at \$10.00. At 9:30:00.000040, the time of the next scheduled match event in XYZ Stock, the NBBO has changed and is now 10.01 x 10.02. A match will not occur as it cannot match outside of the NBBO (*i.e.*, the resting buy order is now non-marketable). Note that if the sell order were an ISO, an execution would occur at \$10.00 at the scheduled match event time.

Finally, assume the NBBO in XYZ Stock is \$10.00 x \$10.01 at 9:30:00.000000 and ASPEN Fee/Fee is displaying a primary peg buy order with a limit of \$10.00. At 9:30:00.000010, ASPEN Fee/Fee receives a sell order to sell at \$10.00. At 9:30:00.000040, the time of the next scheduled match event in XYZ Stock, the NBBO is now 9.99 x 10.01. A match will not occur as the pegged order follows the NBBO and gets repriced to 9.99. If the NBBO had moved to \$10.01 x \$10.02, ASPEN Fee/Fee's primary peg would not reprice as it is limited to \$10.00, and a match would not occur.

These non-match events occur in a minority of cases. Year-to-date (through the end of November 2022), 4.2 percent of potential matches on ASPEN Fee/Fee did not complete because a displayed order was canceled, and 4.7 percent of potential matches did not complete because the NBBO changed and at least one of the sides became non-marketable.¹⁰ In such cases, subscribers exercised their right to change their orders or, in the case of pegged orders, instructed IntelligentCross to change their orders in reaction to NBBO changes.

¹⁰ Based on statistics of 193,598 daily match events in IntelligentCross that involved a displayed order, from January 2022 through November 2022.

Mr. Brendan K. Loonam
 December 15, 2022
 Page 6 of 8

IV. Connectivity Information

IntelligentCross subscribers access the ATS via a Financial Information Exchange ("FIX") connection. Such access is available to subscribers through an internet protocol address via communications that are compliant with the FIX API provided by IntelligentCross; the ATS currently supports FIX 4.2. IntelligentCross does not accept orders via any other forms of communication (*e.g.*, telephone, email, instant message).

IntelligentCross' primary matching engines are located in the Equinix NY4 data center in Secaucus, New Jersey. Subscribers wanting to connect directly to IntelligentCross' User Acceptance Testing ("UAT") and Production servers will need to have NY4 cross-connects with the servers of IntelligentCross' co-location and network provider, Pico Quantitative Trading ("Pico") or connect through other network service providers that have a presence in NY4. IntelligentCross is not involved in the installation of cross-connects; a subscriber wishing to cross-connect must deal directly with the network service provider in NY4. Standard NY4 cross connects are single mode, 1 GBps, however, IntelligentCross will support multi-mode, 10Gbps upon subscriber request. IntelligentCross also allows subscribers the ability to determine its level of connectivity. IntelligentCross has a clearing agreement with Instinet, LLC to provide for clearance and settlement of transactions executed on the ATS.

V. Fair Access Information

IntelligentCross operates as an open, fair access market, *i.e.*, it does not tier or discriminate among subscribers. Any registered US broker-dealer can be a member of IntelligentCross, and IntelligentCross only permits registered broker-dealers to be subscribers. All firms also must be in good standing of an SRO to be eligible to become a subscriber. Subscribers also must satisfy certain other eligibility requirements.¹¹

IntelligentCross processes all applications and completes its review and approval/denial process within thirty calendar days of receipt of each completed subscriber application. Each approval or denial must be authorized by the Chief Compliance Officer and communicated to the Head of Trading Operations. Trading Operations will then promptly notify the applicant of the decision.

IntelligentCross creates and maintains records of all decisions granting access, denying access, and the reasons for so doing. IntelligentCross considers a subscriber's regulatory history in examining a subscriber's application. A subscriber can be excluded from IntelligentCross if the subscriber no longer satisfies the eligibility requirements for acceptance as a subscriber. When the ASPEN Fee/Fee book displays orders through the ADF, non-subscribers would access

¹¹ For example, a subscriber must pass Office of Foreign Asset Control ("OFAC") checks and pass disciplinary/regulatory reviews. A subscriber also must satisfy such technical or systems requirements as may be prescribed by IntelligentCross, including but not limited to: connectivity certification, the ability to send orders and cancellations, and to receive trades, cancellations, rejects and trade breaks from the ATS; must have clearing and settlement systems and/or arrangements in place to support participation on the ATS; attest to having in place arrangements to ensure all staff and systems involved in the conduct of business with IntelligentCross are suitable, adequately registered, as applicable, properly trained and supervised; execute the Subscriber Agreement; and execute all other applicable agreements required to facilitate clearance, settlement, trade reporting, error correction and cancellation of trades effected on or through the ATS.

Mr. Brendan K. Loonam
December 15, 2022
Page 7 of 8

IntelligentCross through a subscriber, and IntelligentCross would therefore respond to orders by non-subscribers as promptly as it responds to orders by subscribers.

As part of its display of orders through the ADF, IntelligentCross also will maintain policies and procedures designed to maintain a linkage with the ADF and transmit to the ADF for display the best priced orders entered by its subscribers.

Overall, IntelligentCross provides access to orders that is functionally equivalent to the access that is generally available for quotes displayed by a SRO trading facility or, for orders displayed in an SRO display-only facility, a level and cost of access that is substantially similar to the level and cost of access to quotations displayed by SRO trading facilities in that stock.¹²

VI. Capacity and System Integrity Information

The operation of IntelligentCross is continuously monitored by IntelligentCross' trading operations team to ensure the smooth and correct functioning of the system as well as adherence to IntelligentCross' operating procedures and applicable securities rules and regulations. Authorized personnel can monitor order entry port status, order acknowledgement latency, market data quality, and potential trade-throughs, in addition to detailed metrics on order entry rates, open and executed exposures, and executed volumes.

In addition to real-time monitoring, any anomalies in the activities in IntelligentCross will be reviewed using end-of-day reports. In the event of a problem, such as a systems error at a subscriber or market data issues, trading operations may, among other actions, halt the activity of a subscriber or set of subscribers and/or stock or set of stocks to contain the impact of a problem while pursuing a resolution.

IntelligentCross also has policies and procedures related to periodic system capacity reviews and tests to ensure future capacity, as well as policies and procedures to identify potential weaknesses and reduce the risks of system failures and threats to system integrity. Significantly, for purposes of displaying orders through the ADF, IntelligentCross' policies and procedures require continuous monitoring of its connections with SRO display-only facilities and, in the event that IntelligentCross loses connection with the ADF, IntelligentCross has contingency plans in place, including removing (*i.e.*, zeroing out) all quotes previously published by the system to the ADF and notifying its subscribers of such interruption.

¹² As discussed above, the IntelligentCross ATS operates two different matching models – a Midpoint book and ASPEN. IntelligentCross recognizes that should trading on ASPEN Fee/Fee reach the applicable thresholds under certain Regulation ATS rules (*e.g.*, the “Fair Access Rule” under Rule 301(b)(5) or the order display and execution access requirements under Rule 301(b)(3)), that any requirements would be applicable across all IntelligentCross order books. In addition, as IntelligentCross' volume increases, we acknowledge that other regulatory obligations associated with reaching certain volume thresholds may become applicable in the future (*e.g.*, obligations under Regulation Systems Compliance and Integrity).

Mr. Brendan K. Loonam
December 15, 2022
Page 8 of 8

VII. Fee Information

The IntelligentCross fee schedule is transparent, formulaic and applies to all subscribers evenly. The fee structure applicable to the ADF through the ASPEN Fee/Fee book charges both sides the same fee for transactions. The base rate charged in ASPEN Fee/Fee is \$0.0008 per share for each side of a transaction. Subscribers can pay lower fees through (1) a “Total Composite Volume Incentive” based on the total market volume in all NMS Stocks reported to the consolidated tape and (2) an “Active Order Incentive” which is based on a per symbol basis and the percent that is marketable.¹³ The fee schedule for subscribers is published in the IntelligentCross Form ATS-N. Pricing is subject to change with advanced notice to subscribers.

As discussed above, IntelligentCross only accepts orders from broker-dealer subscribers, and non-subscribers can access IntelligentCross through a subscriber; therefore IntelligentCross’ fee arrangements are with subscribers. IntelligentCross itself does not charge for market data through its market data feed, IQX. IntelligentCross also does not currently charge connectivity fees, and IntelligentCross offers to pay for certain of subscribers’ cross-connect fees at NY4. IntelligentCross also currently covers payment for one primary connection and one back-up connection to access its venue, and any direct subscriber is eligible for this payment. Network providers may charge a fee to receive the IQX data feed that recipients are responsible for paying and IntelligentCross’ network provider and other similar network providers may charge fees relating to connectivity. IntelligentCross believes the level and cost of access to its quotations complies with Rule 610 of Regulation NMS and will be substantially equivalent to the cost of access to quotations displayed by SRO trading facilities in that stock and the costs to connect to any other trading center, such as an exchange.¹⁴

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Please do not hesitate to contact the undersigned at ari.burstein@imperativex.com should you have any additional questions regarding this matter.

Sincerely,



Ari Burstein
General Counsel
Imperative Execution

¹³ The ASPEN Fee/Fee and Midpoint order books follow the same fee schedule, and shares traded will aggregate for volume pricing tiers. The ASPEN Maker/Taker and Taker/Maker order books are charged independently.

¹⁴ In the event that IntelligentCross makes a material change to the policies and procedures governing access to IntelligentCross, including a change to its fees, it will submit the changes to the SEC, as required, under Form ATS-N and also will provide the changes made to FINRA. We recognize that FINRA will post an amended description of such policies, procedures and fees governing access on its website.