ITG Horizon*Plus*™

What is it?

HorizonPlus™ is a suite of program trading strategies that enable you to select an optimized strategy for one of the following four benchmarks:

- Volume Weighted Average Price (VWAP)
- Time Weighted Average Price (TWAP)
- Implementation Shortfall (Decision Price)
- Market Close.

Horizon*Plus* allows you to specify various participation based strategies as well as various static and dynamic price constraints with offsets in basis points and cent per share.

As a integrated part of ITG's Direct Access products (Triton™, QuantEX®), Horizon*Plus* provides you with an easy-to-use front end that allows you to monitor, control and customize your strategy in real time.

How does it work?

Horizon*Plus* makes use of a wide array of liquidity sources including POSIT®, TriAct™, ECNs, DOT, NYSE, Market On Open and Market On Close. Using tested and proven ITG Horizon algorithm, Horizon*Plus* determines new order sizes, corrections, and cancellations for your orders. And Horizon*Plus* uses ITG's proprietary **Limit Order Model** to price those orders.

Limit Order Model

The **Limit Order Model** is a statistical model based on survival analysis. This statistical model determines the probability of execution for a limit order by looking at stock characteristics such as liquidity, market, time of day, current market on the stock, and short term / long term price momentum. The Limit Order Model is tuned and updated every quarter by ITG Research.

Full Transparency

Horizon*Plus* is unlike any other product in the industry, providing you with full transparency for your trades. With Horizon*Plus*, you can view all strategy orders and modify the parameters and distributions of your strategy in real time.

The Strategies

Volume Weighted Average Price (VWAP)

The Horizon*Plus* VWAP strategy allows you to achieve an average execution price for a stock which is in line with the Volume Weighted Average Price of the security.

Horizon*Plus* uses a minute-by-minute historical volume distribution to predict the volume in any time frame. The strategy uses this data and a sophisticated patented algorithm to determine the number of shares to execute, correct and cancel. The strategy also uses Limit Order Model to price the orders. The pricing and size of the orders, corrections, and cancellations depend on various factors such as current market, price momentum, liquidity, volatility of the market and stock, size of the order, and time remaining to finish the order. The VWAP strategy uses most liquidity sources such as DOT, ECNs, POSIT, TriAct, Market on Open and Close.
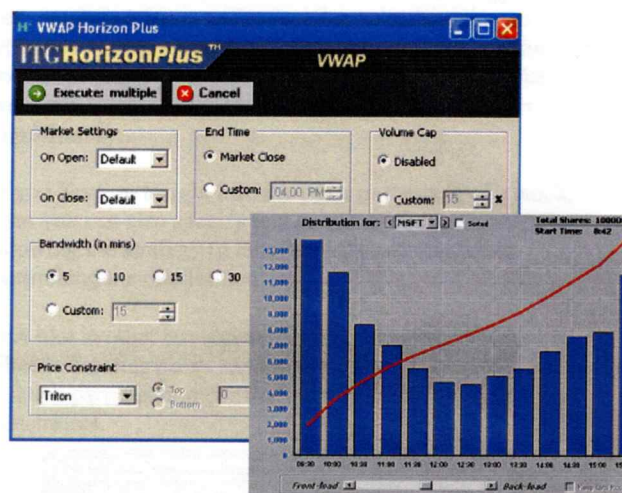
VWAP Quick Screen and Distribution

Time Weighted Average Price (TWAP)

Horizon*Plus* **TWAP** strategy allows you to achieve an average execution price for a stock that is in line with the Time Weighted Average Price of the security. The time weighted average price is the average price of all trades in a certain time horizon; however, it ignores the sizes of each of these trades. Horizon*Plus* uses the same algorithm for the TWAP Strategy as it does for the VWAP Strategy, except that TWAP uses a linear distribution instead of predicting the volume in any particular bin. All parameters available for the VWAP strategy can also be used for the TWAP strategy.
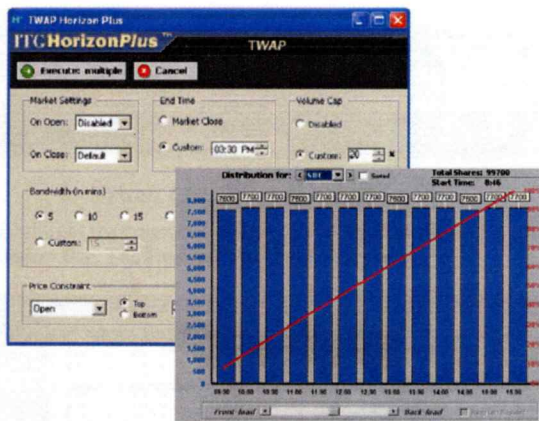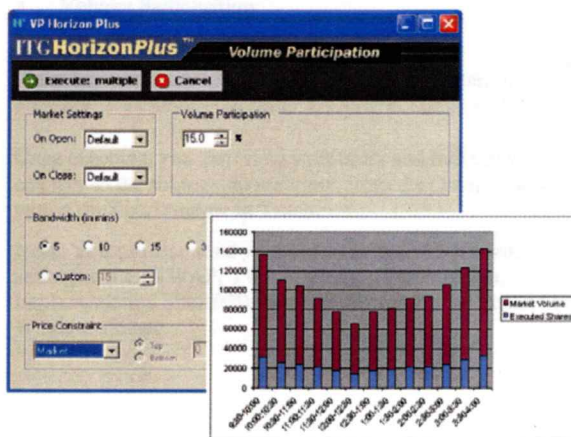

TWAP Quick Screen and Distribution

Volume Participation

The **Volume Participation** strategy executes slices of the order at a constant percent of the actual market volume, regardless of the price. The volume participation strategy also uses Intraday VWAP, between the start time and the expected end time, as its benchmark to optimize the results.

The only difference between the parameters in the VWAP and Volume Participation strategy is that, in the VWAP strategy, the user enters the End Time, while in the Volume Participation strategy, the user enters the Volume Participation Rate. All other parameters are identical

Volume Participation Quick Screen and Distribution
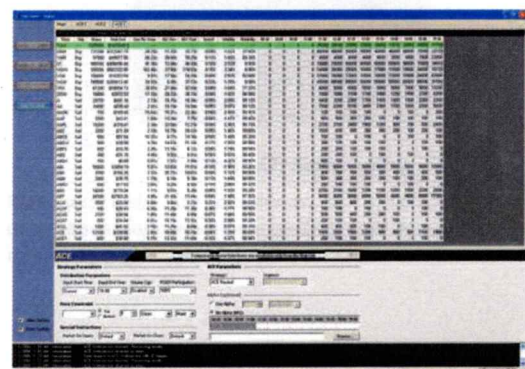
Implementation Shortfall

The **Implementation Shortfall** strategy is optimized to trade against decision price benchmarks. The VWAP strategy spreads the trade according to the volume distribution of the security and thus reduces the market impact, automatically, while having almost no variance to the VWAP benchmark. On the other hand, the Implementation Shortfall strategy needs to reduce the variance from the decision price while trying to minimize the market impact (by spreading out trades, if possible) and trying to increase price improvement (by trading in the bins with lower spread, if possible). The Horizon*Plus* Implementation Shortfall strategy achieves this optimization by using ITG Risk Optimizer (ACE).

The Implementation Shortfall strategy lets you choose to what extent you would like to reduce the variance to the decision price. Then, the strategy determines (using ITG Risk) an optimized strategy by looking at the volatility, intraday spread distribution and intraday liquidity distribution. The strategy also provides you with feedback, in terms of what cost and variance it expects for the chosen strategy.

The Horizon*Plus* Implementation Shortfall strategy further reduces the variance to the decision price by using an efficient trading algorithm, for example by sending the trades to POSIT and TriAct that will have no effect on Market impact but will reduce the variance to the decision price significantly.

If you have an insight into the price movement of a stock, then you can also specify that as one of the parameters, allowing the strategy to take that into account while optimizing the distribution.

Just like in other strategies, Horizon Plus Implementation Shortfall strategy also lets the user specify price constraints, volume participation constraints and POSIT participation constraints.

**Implementation Shortfall Results Screen**

Using HorizonPlus

One of the biggest advantages of HorizonPlus is its front-end. This sophisticated and easy-to-use application allows you to create, view, analyze and modify a strategy.

Note: The examples provided were performed within ITG Triton.
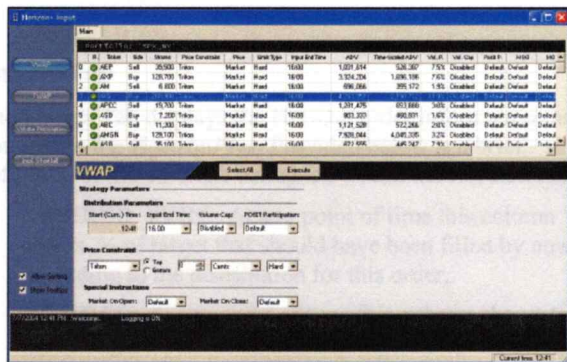
Sending a New Order

1. From within the Triton List Window, enter the Ticker and number of shares into the applicable columns.
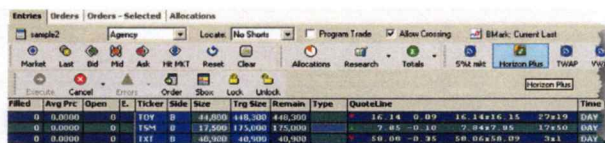
Triton List Window – Entries Tab

2. Highlight the column and then select **Horizon Plus** from the button Bar. The Horizon*Plus* Screen displays.

**HorizonPlus Input Screen**

3. Select the strategy you would like to use for your order. The options include:

    *   TWAP
    *   VWAP
    *   Volume Participation
    *   Implementation Shortfall

4. Make any necessary changes to the Input Parameter, then click **Execute**. This sends your order to Horizon Strategy.

    Once executed, you can view your order and make any changes to the strategy, in real time, from the Orders Tab within the List Window in Triton.

    Note: You can also send your orders to specific HorizonPlus strategies (i.e., VWAP, TWAP, Volume Participation, Implementation Shortfall) using the buttons on the Triton List Window toolbar.

Viewing the Details of your Horizon Order

*   From within Triton List Window, select the Orders tab. The details of the order display within the Orders Tab.
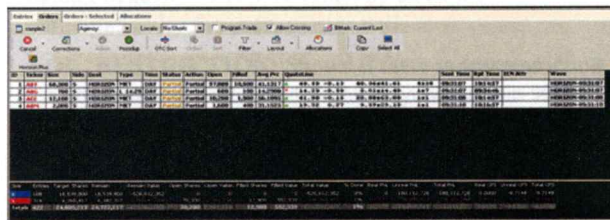

Triton List Window – Orders Tab

Cancelling a Horizon Order

1. From the Triton List Window – Orders Tab, highlight the HorizonPlus order(s) you would like to cancel (i.e., the order with HORIZON in the Dest column).

2. On the Toolbar, click **Cancel**. Your order is cancelled.

Correcting the Order Size of your Horizon Order

1. From the Triton List Window – Orders Tab, highlight the HorizonPlus order(s) you would like to cancel (i.e., the order with HORIZON in the Dest column).

2. Right-click within the spreadsheet, then select **Correction**. The Correct Orders dialog displays.
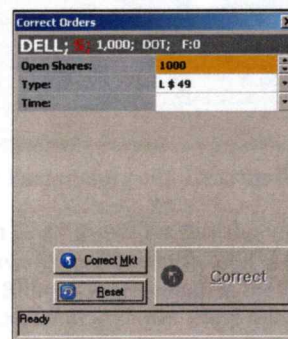

Correct Orders dialog

3. Make your order size corrections, then select **Correct**. Your order is sent for correction including your new order size information.

Viewing Macro Details Of Horizon Orders

Once you've executed your Horizon orders, a new list is created within Triton that contains your Horizon orders. This new list is added to the List Manager within Triton (upper left panel) and will have the following name format: **<portfolioname>_HORIZON**

To open the list, simply double-click the list name. Your Horizon orders will display in the List window, on the right side of the application. The List View tabs display all of the parameters you selected while entering your order, as well as the current status of the order.
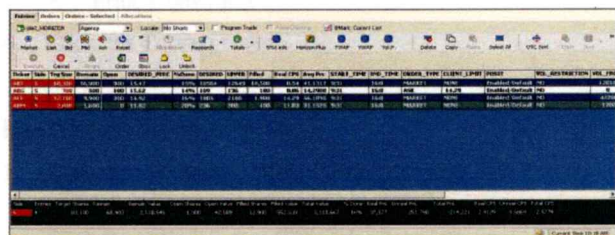
Horizon List

Entries Tab

The Entries Tab displays the Horizon order information that you sent to the Horizon*Plus*. Provided below is a brief definition of the columns contained within the Horizon list.

- **DESIRED_PERC**: At any point of time this column shows % of target that should have been filled by now according to the distribution for this order.

- **DESIRED**: At any point of time this column shows that how many shares should have been filled by now according to the distribution for this order.

- **START_TIME**: Order arrival time

- **END_TIME**: Order end time.

- **ORDER_TYPE**: Order Price constraint, if any. ORDER_TYPE column displays the original price constraint order type for example OPEN+ 2 BASIS POINTS instead of displaying the actual price limit. If no price constraint was set then ORDER_TYPE = MARKET.

- **CLIENT_LIMIT**: CLIENT_LIMIT translates the ORDER_TYPE into an actual price limit and displays the actual price limit in number form in the column. For no price constraint (MARKET) CLIENT_LIMIT will display MARKET. Similarly for Dynamic Price limits such as VWAP and TIME-VWAP CLIENT_LIMIT will display the same information as the ORDER_TYPE column.

- **CLIENT_LIMIT_TYPE**: This column shows whether the price constraint is Hard or Soft.

- **POSIT**: This column will show the POSIT setting for this order. This column will show whether POSIT participation is enabled/disabled. The column will also show whether POSIT participation setting is set to default behavior or is overridden by an explicit participation by the user.

- **VOL_RESTRICTION**: Shows if there is any restriction for not exceeding the filled shares beyond certain % of Market volume.

- **FILL_PERCENT**: Shows the shares filled in % of the market volume traded since the inception of the order.

Orders Tab

To see how your Horizon strategy is executing the orders, select the Orders tab at the top of the screen. This displays all of the orders for that portfolio that were executed through Horizon*Plus*.

Order Parameters and Distribution

On the <PortfolioName>_HORIZON Entries Tab, highlight the name of the order you would like to view, then click the **VWAP** button. A dialog box displays with the current order parameters as well as the distribution.
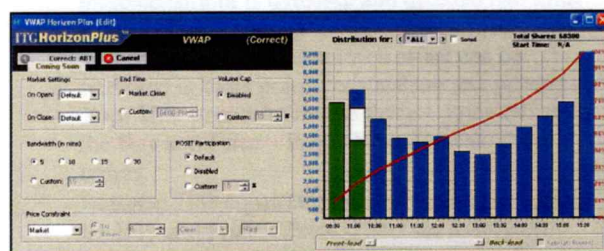
Order Parameters and Distribution Dialog

The Distribution Chart shows the distribution in bin form, as well as cumulative form. Bin distribution is shown using bar a chart in **No of Shares,** represented on the left axis. Cumulative Distribution is shown using line chart in % of Target and is represented on the right axis.

Green part of the bars show the filled shares, while the white part of the bars show the current outstanding shares in the Market (sent by the strategy).

Correcting the strategy parameters:

1. From the <portfolio>_HORIZON entries page, highlight the Horizon order on you would like to correct.

2. Click the **VWAP** button. The Order Parameters and Distribution dialog displays.

3. From this dialog, modify all settings you would like to correct. You can correct the following parameters displayed on the dialog:

   - End Time
   - Volume Cap
   - Posit Participation
   - Price Constraint

4. Click the **Correct** button.

Modifying the distribution:

1. From the <portfolio>_HORIZON entries page, highlight the Horizon order on you would like to correct.

2. Click the **VWAP** button. The Order Parameters and Distribution dialog displays.

3. Under the distribution chart, move the slider to the left to front-load the distribution or to the right to back-load the distribution.

4. Once completed, click on **Correct** button.

Entering an Implementation Shortfall Strategy

1. From the Implementation Shortfall Ace dialog, enter the End Time (Default is 16:00)

2. Chose one of the following strategies:

   - ACE Passive
   - ACE Neutral (Default)
   - ACE Aggressive
   - ACE Custom- Enter a risk aversion between 0-1 (interval .1)

3. Enter Day Alpha. This is an optional field.

4. Click the **Calculate ACE** button. HorizonPlus will optimize these orders for the selected parameters and display the distribution for each name, Expected End Time as well as the expected cost and variance.

5. Review the results of your selection. If you aren't satisfied, change the parameters and hit **Calculate ACE** again.

6. As an option, you can also enter a Price constraint, Volume Constraint and POSIT Participation constraint.

7. Once you are satisfied with the results, click the **Execute** button.

HorizonPlus Strategy Dialog Field Definitions

Provided below are field definitions for some of the fields displayed on the Horizon*Plus* dialog screens.

- **End Time:** The Time you want to finish the order

- **Price Constraint:**
  - Market:
  - **Triton:** The Strategy will inherit the price limit from the Triton Order Type column. If that Order Type Column is blank Triton will treat the order as Market.
  - **Prev. Close:** Previous close price of the stock.
  - **Open:** Open price of the stock.
  - **Aggr:** Current offer price for buy orders and bid price for sell / short orders.
  - **Passive:** Current bid price for buy orders and ask price for sell / short orders.
  - **Mid:** Current Mid point price of the security.
  - **Last:** Last price of the security

- **Special Price constraints:**
  - **VWAP:** This will set the VWAP price of the stock (VWAP from 9:30) as the price constraint. The price-constraint is dynamic and updated real time.
  - **Time VWAP:** This will set VWAP price of the stock from the start time as the price constraint. The price-constraint is dynamic and updated real time.
  - **Price Offset :** This option can be provided to the selected price constraint. Price offset can be provided in basis points, cents/share and percent.
  - **Top:** This constraint means Price + Price Offset for the Buy and Price – Price Offset for Sell/Short orders.
  - **Bottom:** This constraint means Price- Price Offset for Buy and Price + Price Offset for Sell/Short orders.

- **Limit Types:**
  - **Hard:** Hard Price constraint means that strategy will never execute any order slice worse than the price constraint.
  - **Soft:** Soft Price constraint is less conservative and means that strategy will guarantee that the average price of the whole order is better than or equal to the price constraint. Strategy will be able to send some slices at prices worse than price constraint if it has got some orders done at better prices than the price constraint.

- **Volume Cap:** By default it is disabled. User can specify a restriction that strategy should not trade more than certain % of volume traded in the market since the inception of the order.

- **Posit % Target :** By default strategy participates in POSIT but only to an extent that it does not deviate from expected Volume trend. User can override this setting. He can disable the participation or can specify explicitly what % of target should be sent in to POSIT. Strategy will realign the distribution once it gets fills back from POSIT.

- **Market On Open:**
  - **Default:** Enable for Buys, Sells and Sell Shorts. Limit on Open order for Limit Orders.
  - **Enable:** Same behavior as Default
  - **Disable:** Disable MOO participation

- **Market On Close:**
  - **Default:** Enable for Buys and Sells. Disabled for Sell Shorts. Disabled for Limit Orders.
  - **Enable:** Also enable for Sell Shorts Enable for Limit Orders. Will send a Limit on Close order.
  - **Disable:** Disable MOC participation