

# DECIMUS CAPITAL MARKETS, LLC



## Modern HFT

**HFT Market Making Strategies, Regulation NMS  
& Exchange Order-Matching Engine Practices**

**Haim Bodek**

Copyright © 2013 Decimus Capital Markets, LLC  
Highly Confidential - Do Not Redistribute Without Permission





## Module 1: HFT Market Making Strategies

The module reviews the HFT scalping algorithmic trading tradition in detail. Properties are discussed that have remained relatively stable pre and post REG NMS.

- HFT prior to rebate scalping
- The “0+ Scalping Strategy”
- Top-of-queue strategies
- Queue utility
- Self-insurance
- Sweep risk
- Key microstructure conditions
- Flow discrimination & toxic flow identifiers
- Low latency as a barriers to entry
- Why “fast and dumb” strategies continue to work
- Fragmentation of microstructure alpha across venues
- Market structure arbitrage
- Economics of HFT scalping strategies
- Observable phenomena associated with HFT scalping
- HFT scalping and the rapid withdrawal of liquidity
- HFT scalping and false liquidity
- HFT scalping and mini-flash crashes
- HFT scalping and “spam & cancel strategies”
- HFT scalping and baiting techniques

## Module 2: Regulatory Arbitrage

This module provides overview of REG NMS and how this body of regulation was subverted by firms engaging in new forms of “regulatory arbitrage”

- REG-NMS
- Order Protection Rule
- Access Rule
- Sub-Penny Rule
- Market Data Rules and Plans
- Trade-through rules
- Locked markets
- Introduction to REG NMS price sliding
- Impact of the SIP feed
- Constructed NBBO feeds
- Disparity between market centers
- Latency arbitrage
- REG-NMS and Intermarket Sweep Orders
- Limit order protection
- Best execution rules
- Relevant pricefeed features





### Module 3: HFT Order Types

This module provides a detailed explanation of order types that have artificially advantaged HFT scalping strategies.

- Traditional order types
- Hidden orders and REG-NMS
- Non-routable orders
- Introduction to advantaged order types
- Intermarket Sweep Orders (ISOs)
- “Adding Only” orders
- DAY ALO ISOs
- Orders that “hide and light”
- “Hide and light” – exchange comparison
- REG NMS price sliding revisited
- Common advantaged API features
- Midpoint order types
- Important order modifiers
- Additional special order type variants
- Relation to price feed features

### Module 4: Order Matching Engine Practices

This module provides a review of key features of exchange order matching engines leveraged by HFTs.

- Exchange API channels
- Spamming and canceling
- Rejects and unsolicited cancels
- Reposting strategies
- Price time priority
- Precedence of order types
- Self-trade prevention
- The dark side of REG NMS price-sliding
- Various forms of price-sliding
- Hidden vs. “lit” states revisited
- “Display” and “working” prices
- Conditions for “lighting”
- Rebooking and display times
- Price-time priority corruption
- Maker-taker allocation
- Exchange nuances handling locked markets
- Assessing price-sliding utility
- Comparison between electronic exchanges
- Impact on price feed features



## Module 5: Predatory HFT

This module provides a review of exchange order matching practices that are heavily exploited by predatory HFT strategies

- Classes of predatory HFT
- Latency arbitrage revisited
- Collocation preferencing
- Quote layering, stuffing, spoofing?
- Order matching engine abuse
- How HFTs exploit order precedence
- How HFTs exploit price sliding
- How HFTs exploit maker/taker fee allocation
- How HFTs exploit locked markets
- How HFTs exploit trade-through protections
- Exchange-specific practices
- Price feed artifacts utilized by HFTs
- Additional predatory practices

## Module 6: Electronic Liquidity Strategy

This module covers a number of defensive and offensive measures firms can take to effectively extract liquidity from HFTs.

- Recognizing matching engine abuse
- Measuring slippage attributable to HFT
- Adverse fill detection
- Correlating exchange latencies
- Usage of liquidity codes
- Usage of confirms, cancels and naks
- Usage of price-sliding feedback
- Defending against latency arbitrage
- Defending against market structure arbitrage
- Measures to avoid being used for self-insurance
- Measures to exploit adverse impact of sweeps
- Measures to defend against queue jumping
- Selective usage of self-insurance methods
- Managing intermarket contamination
- Options for sponsored access risk checks
- Rationalizing HFT concepts with traditional buy side algorithmic trading strategies
- Migrating to signal-based execution strategies

## Decimus Capital Markets, LLC



---

Haim Bodek  
Managing Principal  
203-286-4470  
[haim@haimbodek.com](mailto:haim@haimbodek.com)

---

Decimus Capital Markets, LLC | 11 Sea Beach Drive | Stamford, CT 06902 | 203.286.4470 | [www.haimbodek.com](http://www.haimbodek.com)

### IMPORTANT INFORMATION

This presentation has been prepared by Decimus Capital Markets, LLC ("DCM") exclusively for the benefit and internal use of the DCM client to whom it is delivered (such client hereinafter, "you" or the "Company") in order to assist the Company in evaluating, on a preliminary basis, the feasibility of a possible transaction or transactions, including but not limited to the provisioning of DCM's services and products to you. The information in this presentation includes certain statements, opinions, and analyses that are based on information that is proprietary to us. It has been produced solely for your use and should not be reproduced or disclosed, in whole or in part, to any other person without our prior written consent. This document remains our property, and at our request this copy and any copies that you have made must be returned to us and/or destroyed. This presentation is for discussion purposes only and is incomplete without reference to, and should be utilized solely in conjunction with, the oral briefing provided by DCM.

The information in this presentation reflects our views as well as prevailing conditions as of the date of this presentation. The information in the presentation is subject to change without notice and DCM assumes no duty to update the information. HBC's opinions, interpretations, and estimates (with regard technological, financial, regulatory and other areas of domain expertise, and including but not limited to information based upon or provided by third parties ) constitute DCM's judgment and should be regarded as indicative, preliminary and for illustrative purposes only. In preparing this presentation, we have relied upon and assumed, without independent verification, the accuracy and completeness of certain information available from public sources or which was provided to us by third parties . In addition, our analyses are not and do not purport to be appraisals or forward looking statements with regard to any of the assets, securities, or businesses of the Company or of any other entity. DCM makes no representations as to the value., which may be paid or received in connection with any particular transaction, nor the legal, tax and/or accounting effects of consummating such a transaction.

Nothing in this presentation should be construed as regulatory, valuation, legal, tax, accounting or investment advice and it does not constitute a recommendation, solicitation, offer or commitment to purchase, sell or underwrite any securities to you, from you, or on your behalf, or to extend any credit or provide any insurance to you or to enter into any transaction. Unless otherwise agreed in writing, we are not acting as your financial adviser or fiduciary. Before you enter into any transaction you should ensure that you fully understand the potential risks and rewards of that transaction and you should consult with such advisers, as you deem necessary to assist you in making these determinations including but not limited to your accountants, investment advisors, legal and/or tax experts.

Copyright © 2012 Decimus Capital Markets, LLC  
Highly Confidential - Do Not Redistribute Without Permission

