Quant Algorithms White Paper

Overview of Products & Design Methodology

This document provides an overview of our Active Trader (ES) Package, design specifications, correlation analysis versus the S&P 500, post trading support methodology and product dashboard.

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Introduction to Automated Trading

Unfortunately, for most automated trading system developers, the following cycle will look all too familiar. They will start with a faulty trading strategy, only to convince themselves it is the Holy Grail, then trade live only to see horrible performance.

Next, they will rationalize away the poor returns. They might say, "If only my stop was X instead of Y, the performance would have been amazing!" They will then modify the design or re-optimize, only to find that they continue to experience bad results.

When it comes to automated trading system development, it really is a matter of art and science. As most developers know, a big difference between trading systems that appear favorably based on back-tested results, and those that perform well once live. Coding a solid trading strategy is certainly the first step, but not all automated trading systems are created equally.

In this white paper, we will provide details on our trading system design methodology and provide a deep level analysis of the products we offer to include quality control processes and details on each algorithm. We will also highlight the potential pitfalls prevalent in automated trading system development, as well as how to avoid them.

At Quant Algorithms, we have a solid design methodology that we strictly follow. Furthermore, we have quality control processes in place to ensure we remain on the right track.

Overview of our Automated Trading System Offerings

We offer a single automated system that trades five uncorrelated algorithms (T2 Burst ES, O2 Overnight Gap ES, B2 Breakout ES, S2 Breakdown SHORT ES and P2 Push-Pull TY). The allocation we use for all of our analysis assumes 1 contract is traded per $17,000 in the account. This allocation provides enough buffer for a user to trade 1 contract on each algorithm even if we have a 30% drawdown. For example, if someone has an account with $34,000 they can trade up to 2 contracts on each algorithm. With $51,000, they can trade 3 contracts on each algorithm. With an account of $68,000, they can trade up to 4 contracts on each algorithm.

A Complete Trading System

Our complete trading system consists of five uncorrelated strategies traded concurrently.

While someone could trade only one of the Futures Trading Strategies, it is our strong recommendation that you trade all five for reasons that will be clear as you continue to dive deeper into our automated trading system design methodology.

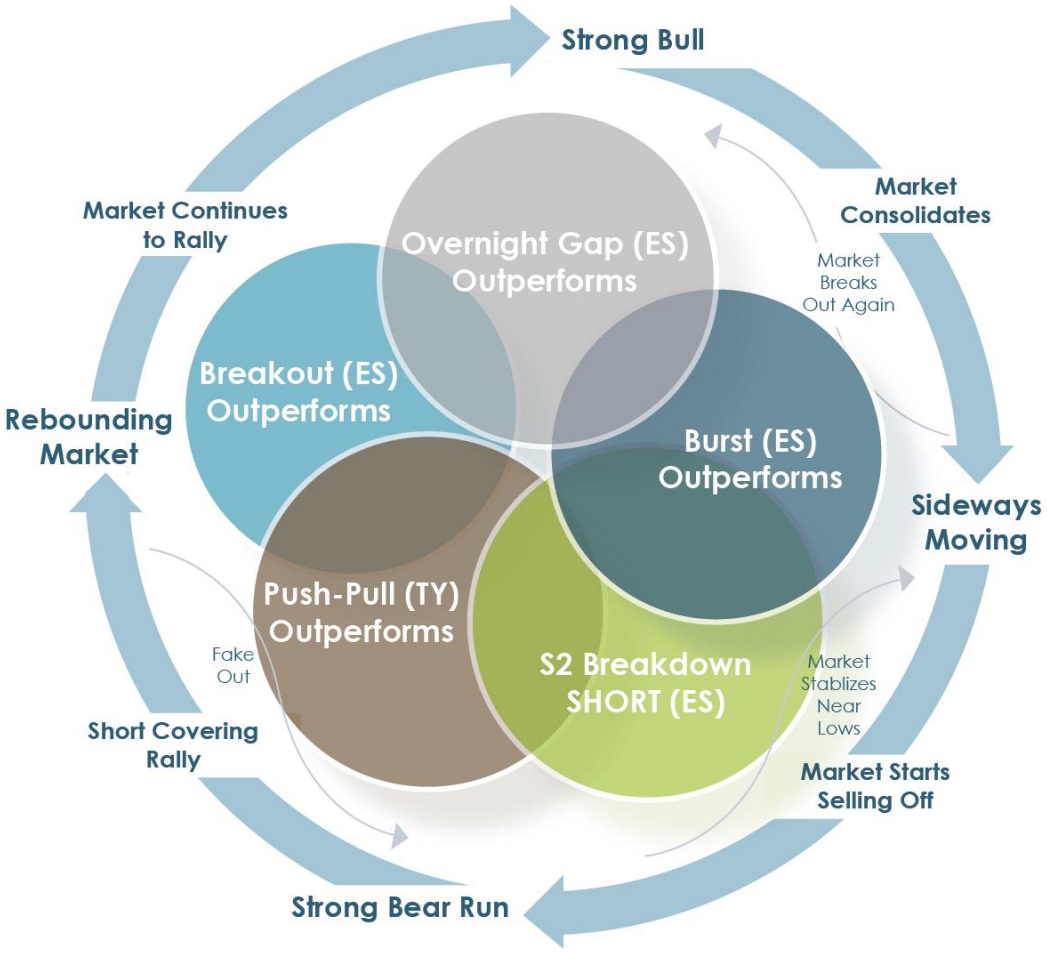
Keep in mind that no one has the Holy Grail of trading. Trading futures involves risk and trading is not for the faint of heart. You will have days where you suffer losses or give back gains. Even with automated trading systems, you will have urges to turn off the algorithms and not let them run. It is our experience that those periods typically produce the best opportunities, and we strongly advise our customers to permit the course of the trades to run. While one algorithm might be in a drawdown, it is possible the others will be breakeven or profitable, helping the combined system to potentially generate positive results. Of course, there are no guarantees in trading; however, we attempt to put every odd in our favor to drive maximum probability of success.

Predicting Market Direction

Regrettably, there is no crystal ball when it comes to trading. While we have percentage profitability expectations for every single trade we make based on the back-testing, ultimately no one knows for sure what the market will do at any given time. It is for this reason we employ five separate trading strategies –

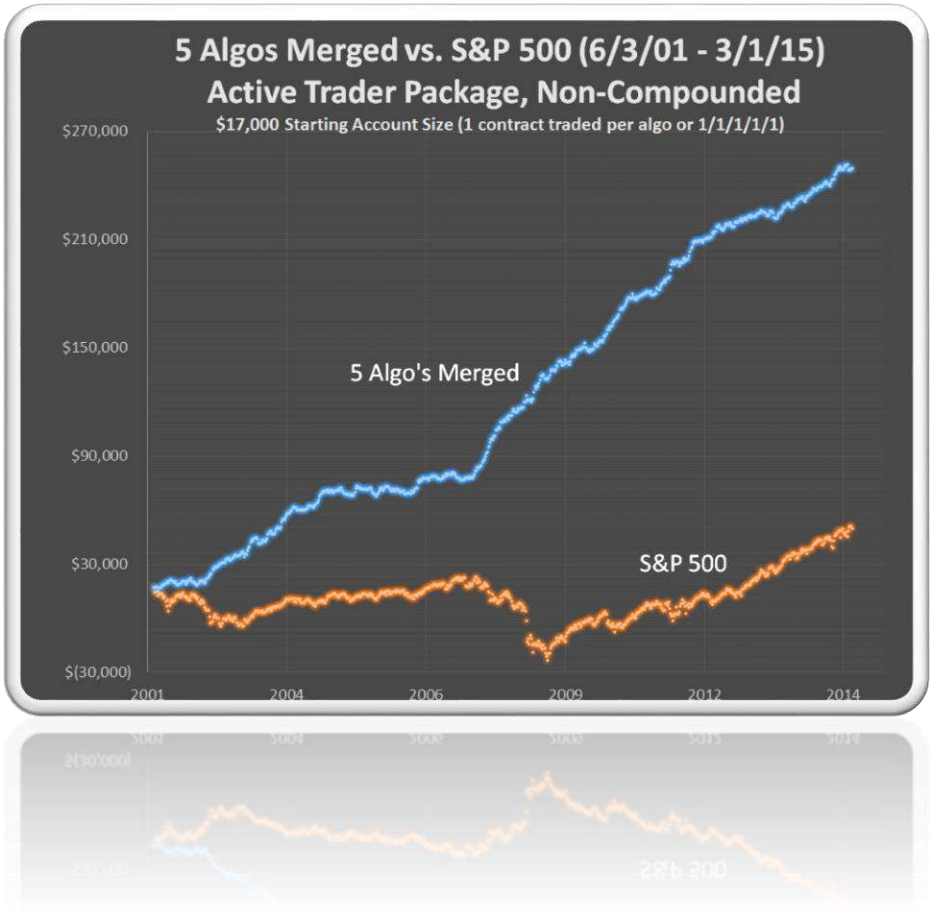
because what we know with certainty is that the market will either move sideways, higher or lower for any given period under analysis. For the purpose of system development, we've added a fourth category called "rebounding" that represents a strong move higher after a substantial down move; also called a short covering rally. We do everything we can to be market direction agnostic by trading five trading strategies concurrently, each with its own strengths, weaknesses and expectations for the 4 different market conditions.

The following diagram captures the four different market conditions along with the expectations of positive performance for each algorithm. Each algorithm has a strongly positive expectation for one of the four conditions along with weaker positive expectations where the overlaps occur. The ideal conditions for the algorithms are when the algorithms performance overlap since that implies multiple algorithms are performing well. In fact, we have had months where all five algorithms are profitable resulting in exceptional returns for those periods.



Performance vs. the S&P 500

The following equity curve shows the performance of the merged algorithms as compared to the S&P 500 (Active Trader Package). As you can see, the combined automated trading strategy performance is spectacular during both bull and bear markets. This chart includes a more aggressive estimate for slippage and commission. As the equity curve shows, there is little correlation between the five merged algorithms and the S&P 500. Our back-tested performance is not tied to the performance of the S&P 500.



Mathematical Proof of Correlation

The correlation coefficient is a percentage that represents how interrelated two data sets are. In trading algorithm development, a designer will typically measure the correlation of their algorithms to the S&P 500 to determine how correlated an algorithm is to the broader market performance. Since the goal of most auto trading systems is to outperform this index, it only makes sense to measure the correlation between the trading strategy developed and the S&P.

Here is a commonly accepted definition of what different values imply:

+.70 or higher Very strong positive relationship
+.40 to +.69 Strong positive relationship
+.30 to +.39 Moderate positive relationship
+.20 to +.29 weak positive relationship
+.01 to +.19 No or negligible relationship
-.01 to -.19 No or negligible relationship

A value of 100% would imply that the two data sets are equal. A value of 0% would imply two fully random data sets. A negative value would imply an inverse relationship.

Active Trader Package (ES) Correlation Coefficient as compared to the S&P 500 = .03%.

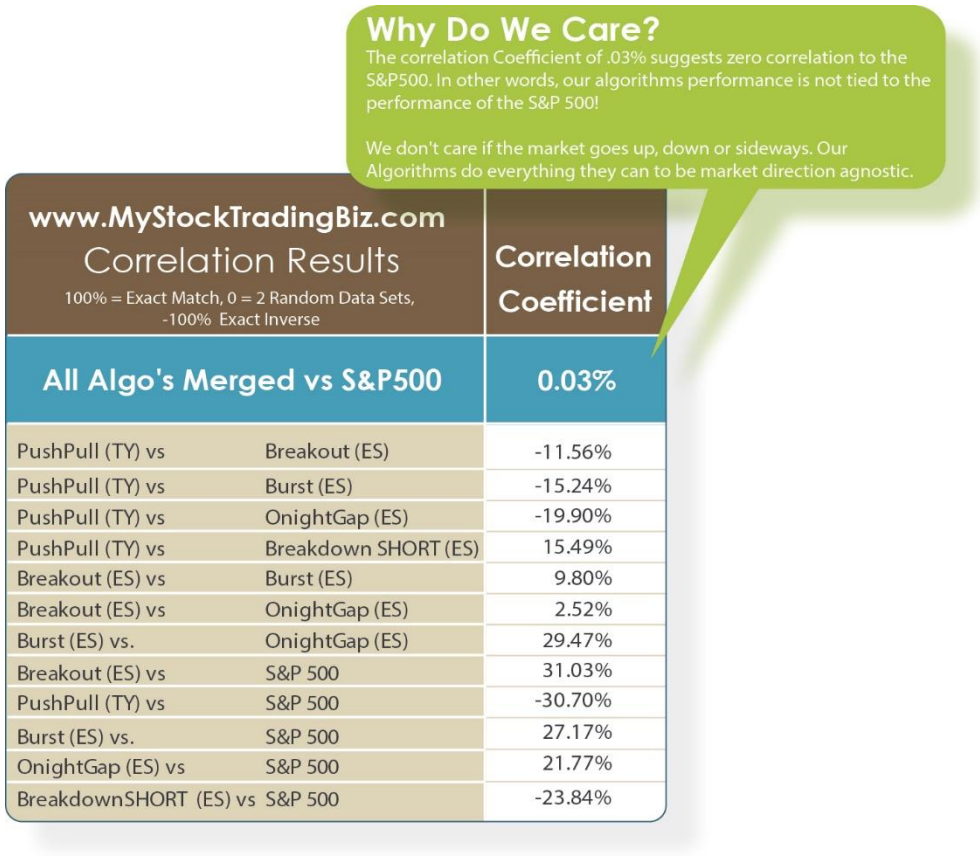
This means the algorithms performance is not driven by the S&P 500 performance. As the merged equity curve shows, and correlation coefficient confirms, our Automated Trading System has no relationship to the performance of the broader S&P 500.

It is our opinion that any correlation below 50% is positive news. If the goal were to outperform the S&P 500, then anything north of 50% would seem to defeat the purpose of implementing an algorithmic trading system since the trader could simply buy and hold the S&P and not waste their time with trading.

Fortunately, as our merged equity curve demonstrates, our expectation is for continued positive returns independent of market conditions.

Correlation of each algorithm to the others

Digging deeper into our correlation to the S&P 500, we can also determine the relationship between the five different trading algorithms to one another (non-merged). We trade five separate futures trading systems for a reason. The idea behind it is that at all times, one trading system is strongly up, one slightly up, one breakeven and one slightly down. This results in a net positive automated trading system based on the back-testing.



www.MyStockTradingBiz.com Correlation Results 100% = Exact Match, 0 = 2 Random Data Sets, -100% Exact Inverse		Correlation Coefficient
All Algo's Merged vs S&P500		**0.03%**
PushPull (TY) vs	Breakout (ES)	-11.56%
PushPull (TY) vs	Burst (ES)	-15.24%
PushPull (TY) vs	OnightGap (ES)	-19.90%
PushPull (TY) vs	Breakdown SHORT (ES)	15.49%
Breakout (ES) vs	Burst (ES)	9.80%
Breakout (ES) vs	OnightGap (ES)	2.52%
Burst (ES) vs.	OnightGap (ES)	29.47%
Breakout (ES) vs	S&P 500	31.03%
PushPull (TY) vs	S&P 500	-30.70%
Burst (ES) vs.	S&P 500	27.17%
OnightGap (ES) vs	S&P 500	21.77%
BreakdownSHORT (ES) vs	S&P 500	-23.84%

Of particular note, you will see that the P1TY (push-pull) vs. the S&P has a moderate inverse relationship (-30.70 %). Furthermore, the S2 Breakdown SHORT ES algo has a -23.84% inverse relationship to the S&P 500 implying that it should continue to help provide a hedge in the event we enter another sustained bear market. This is the primary reason behind the expectation that our algorithms will continue performing well when the market goes lower. The push-pull (TY) and Breakdown SHORT algos provide a great hedge against down moves on the broader market. Furthermore, the B2ES (breakout) has little to no correlation to the other algorithms demonstrating its value to the final trading system we offer. The Burst and Overnight Gap are the most correlated algorithms we have (to each other, as well as to the S&P), and the primary reason why we are profitable during sideways or upward moving markets.

Weekly Returns as Compared to the S&P 500 (6/3/01- 3/1/15)

The following spreadsheet shows the weekly returns of each algorithm from 6/3/2001-3/1/2015, as well as merged returns for the combined Trading System (active trader package). It also shows the weekly S&P 500 returns for a strategy that buys at the open of the week, and exits at the close of that week. This "test" algo is used to run the correlation analysis and to provide a metric to compare our five algorithm suite to. Lastly, the spreadsheet includes the correlation report using Excel's correlation coefficient calculations.

For more info: Five Algorithms Merged, Weekly Performance vs. SP500 (includes correlation report)

Typical Trading Algorithm Development Cycle

The following is a basic overview of how an individual algorithm might be developed.

Step 1: Create an Idea

This process begins with a simple idea, which is subsequently coded and analyzed. It might start as an idea to "sell or fade a gap up at the opening bell" but then changes to see what happens if you "buy an opening gap". After running multiple simulations, the idea abandoned, and replaced with new options in search of something else.

Step 2: Back Test & Optimize the Algorithm

Once a basic trading strategy is coded and looks to be promising, the developer will optimize the algorithm's inputs. This might be a stop, target, or some other technical indicator. During this phase, simulations will run, changing inputs based on the granularity selected. They will also cross-optimize the inputs to find - based on the previous history - what the most optimal inputs (stop, target, technical indicator) would have been. Trading platforms will then produce a report indicating those critical inputs. They will also generate back-tested performance reports indicating everything from maximum drawdown, percent profitability, profit factors and much more.

Once the optimization is complete, the trader in theory has a mechanical trading system that could be auto executed. However, there is much more to developing a winning trading system than just running the above outlined steps.

Quant Algorithms Automated Trading System Design Specifications

As mentioned, there is much more to automated trading system development than just coding an algorithm, back testing and optimizing it. The real work comes in vetting the algorithm that was developed. The goal of any system developer should be to attempt to break the algorithm and try to find reasons why it will not work going live. This process can create very emotional swings for the developer. At first glance, a new trading system might appear to be full-proof, only to find that it is not qualified to trade because it does not adhere to one of many requirements (i.e. too few trades, back tested only 5 years, too small average $ gain per trade, etc.).

A very common question we get from potential clients is, "What separates you from all the other automated trading system developers pitching their algorithms to the market place?" The answer is that we adhere to the following guidelines. Typically, for every 100 trading systems we work on, only one will meet the requirements. This strict set of design rules helps ensure we are providing the best trading strategies we possibly can, as opposed to just selling an algorithm for the sake of selling it.

Quant Algorithms LLC is an innovative algorithmic trading system design firm and you should only expect the best from us. This includes the following design criteria for our complete automated trading system.

One of the biggest flaws a designer can make is to cut corners in an attempt to create a winning system. Everyone wants to code the Holy Grail and will tend to violate key design criteria either consciously or subconsciously. At Quant Algorithms, we take these principles seriously and do not violate them. We understand that the key to successful auto-trading is to remove any emotion from the development process and simply let the chips fall as they may.

Back-Test 10+ Years

When optimizing our algorithms, we back-test starting from June 2001. Many developers will only go back 4 years (or even less), conveniently avoiding the 2008 crash and market periods prior to that. To further try and "break" the algorithms, we modified the burst and push-pull so it could trade on the broader index, as well as tested as far back as 1984. This also showed very good results. During our back-testing phase, the more we tried to crack the algorithms – the more we began to realize how truly special they were.

Uncorrelated Algorithms

We prefer to have 4-5 uncorrelated algorithms for any complete automated trading strategy designed. This can be easily measured using a correlation coefficient. It is our opinion that any value between 0-.50 is sufficient. However, it does depend on the goal of each algorithm. This is measured by comparing the algorithms weekly performance with the S&P 500 to determine how correlated (or uncorrelated in our case) the trading system is to the broader index. A final value of over .50 suggests that the system will simply perform as the S&P 500 does in most cases (a strong positive correlation). In that case, why use an automated trading system? Simply buy and hold the S&P instead and save the headache. Furthermore, it is our expectation that the systems independent trading algorithms are also uncorrelated. Refer to the previous section above for details on all of our correlation reports.

Reasonable Profit Factors (1.2-2.6)

The profit factor (PF) is simply a ratio of total gain to total loss. Broadly accepted is that any PF lower than 1.2 is probably not worth your time since it is barely profitable. Furthermore, it is our experience that any PF above 2.6 is probably not realistic and can only be achieved by violating the other design criteria we mention here (i.e., back testing less than 10 years, scalping or having less than 200 trades in the back tested history). Our profit factors range from 1.20-2.50 depending on the algorithm.

Large Average Gain per Trade

If you average all trades in the complete system, winners and losers, you will come up with an average $ gain per trade. It is very important to have room for error, therefore the higher this number the better. The most common mistake I have seen in new traders is that they will create a scalping algorithm that is in and out multiple times throughout the day. They look good back-tested, but once traded live they fall apart. More times than not, this occurs because their average gain per trade is less than one tick on the index they are trading. While over time, the $12.50 gains per trade will add up and show great equity curves, stable profit factors and seemingly amazing reports with low drawdowns, the reality is that they will probably be at a loss when going live. They provide little room for error given that if there is on average one bad fill per trade, they have essentially eaten into all of their profit or perhaps gone net negative. No retail trader should be in and out multiple times during the day, leave that to the HFT firms that have hundreds of thousands of dollars if not millions invested in getting the most optimal locations for servers and dedicated design teams to monitor their HFT algorithms.

Use Look-Inside (LIB) and Intrabar Order Generation (if applicable)

Another common mistake when developing algorithms is to turn off the look-inside bar back-testing feature.

This is a bit complicated to explain. In essence, if unchecked you will have inaccurate back-testing results that will show winners when in fact the actual trades were losers. This is a bigger problem for algorithms that trade on large candles and/or algorithms that have very tight stops or very tight targets (even worse both). The problem arises when within a single candle; either the stop or target could have been hit. With LIB checked, the back-testing optimizations take longer because Tradestation will analyze every tick within the candle to determine which was hit first, the stop or the target. Tradestation defaults to this being unchecked so that simulations are faster. With LIB unchecked, Tradestation will use its own proprietary algorithm to determine if the stop was hit first or the target was. *Unfortunately*, it seems that their algorithm will more often than not err on the side of assuming a target was hit first. This has caused many system developers to feel that they found the Holy Grail only to find their back testing littered with incorrect data. During our development cycle, we always run with LIB on to ensure that the back-tested results are accurate. With regard to Intrabar order generation (IOG), it really does depend on the intent of the trading system. By design, we do not run with IOG enabled.

Include Adequate Slippage & Commission in Analysis

Slippage and commissions eat into any profits. Since this can vary from trade to trade, a system designer needs to be realistic with this to err on the side of caution. If an algorithm enters at the market and exits at a limit, then you can assume you will have at least one tick of slippage on the buy, and potentially some slippage on the sell (even though it is a limit order to exit). The reason there is also possible slippage on the sell is that at times, the index traded will barely hit the limit price but it will not fill. It will then reverse. The algorithm thinks you exited the trade, even though in the live account it did not fill. If this happens, our algorithms are programmed to exit at the market (typically) 15 seconds later to ensure the live account is in-sync with the algorithm. Commission rates should also factor into the performance. In our case, we add both slippage and commission to all of our reports unless stated otherwise.

Use Three of Fewer Technical Indicators

Another broadly accepted principle in trading system development is the fewer the technical indicators the better. We require three or fewer; in fact, our algorithms have only one in some cases. We do use price action heavily and pattern recognition in our algorithms, which is a different concept. In general, think of an algorithm as a house of cards. The more technical the indicators: the more flimsy the house. Usually, algorithms with a large amount of technical indicators will result in over-optimization when back-testing performed. As results are analyzed, the developer will add new indicators to try to avoid losses building a very flimsy algorithm that will more than likely fall apart once traded live. Our philosophy is that we would rather have a reliable algorithm that works traded live and accept a lower profit factor, than one that looks good on back-testing, but performs horribly going live.

Perform Monte Carlo Simulation

Results should undergo a Monte Carlo Simulation. This randomizes the back-tested trades to ensure there are no hidden patterns that exist only due to unique market conditions. It is just another way to try and "crack" or "break" the trading system and evaluate performance with the same trades executed randomly. This is helpful in determining a worst-case potential drawdown.

Modify Inputs +/- 10%, Ensure Minimal Impact

Once optimization is performed, we modify all inputs randomly by +/- 10% to ensure the algorithm still looks acceptable. This is a way of trying to measure how flimsy the algorithm is. For example, after optimizing an algorithm we might determine that the most optimal target is 10 points. We will then go back and modify the target to be 9 points and 11 points to ensure that the algorithm still looks ok. If it falls apart, then that is a big warning sign that it has been over-optimized.

At Least 200 Trades in Back-Testing History

In general, the bigger the data set the better when analyzing an algorithm. Our complete system has over 3,300 trades as of the time of this writing. If an algorithm has less than 200 trades, it is our opinion that there is not enough data to make a case for that algorithm's performance going forward.

Trade Live Prior to Offering to Public

Any algorithm should be traded live prior to making any strong conclusions about it.

Drawdown Scalable to Meet Various Customer Needs

The drawdown should be scalable to meet an individual's needs. Our algorithms can be scaled by adjusting the number of contracts traded per X amount of dollars in the account. For example, if someone is uncomfortable with a 30% drawdown potential, they could trade 1 contract per $34,000 in the account instead of 1 contract per $17,000 in the account. This would cut the expected maximum drawdown from 30% to 15%, but would also cut the potential gains in half.

Do Not Over Optimize

Once an algorithm is coded, it is optimized to determine the best possible values for each input. These values can be optimized with as much granularity as a developer wants. While we could optimize down to .0001 points or lower for any give input, we choose to use a much higher granularity to help ensure we are not over optimized. We would rather under-promise and over-deliver when it comes to framing expectations.

Independent Third Party Evaluation

Ideally, a third party should evaluate any algorithm or complete trading system prior to a final seal of approval. In our case, another organization did have an independent design firm evaluate our algorithms. The intention is simple: to get one more set of eyes on the product. In our case, we received a report that gave our algorithms very high marks. In fact, the evaluator spent over 1 month trying to break our algorithms, in the end to no avail. His final report was extremely positive and the recommendations he gave was that we forward test the algorithms in order to evaluate how the algorithms would perform with an

optimization set that was then "run forward" to measure forward looking performance. The entity funding execution of the report decided not proceed with this final step since the previous optimizations showed live trades over performed over the previous 6 months. In our opinion, this was better than conducting any forward testing. In essence, the forward testing analysis would have required a fresh optimization (changing the inputs to the algorithms as they are now) and rerun on the same data set that we already had live returns on. In our opinion, this would have been a step backward. While it would provide another angle at examining each algorithm, it was deemed unnecessary given that we already had live returns for the existing optimizations.

Here is a link to the third party evaluation we had performed:

http://www.mystocktradingbiz.com/forms/Algo%20Due%20Diligence%20Report%20%20-%20v1.1.pdf

Scalable System

can handle volume and account can grow with system performance

Any successful system should be able to handle a large account size and be able to scale higher with the success of the system (increasing contract size as the system performs). Very simply, the key to this is to only trade markets with the greatest amounts of liquidity. We trade the Emini S&P 500 Futures (ES) and the 10-Year Note (TY), which are some of the most liquid futures instruments traded. Furthermore, while futures trade 24-hours we ensure the algorithms can handle volume at all hours by limiting our trading to only when the equity markets are open. This helps ensure when a trade is triggered, there will be enough liquidity to ensure our slippage is minimized.

According to the CME Group, the average daily volume (ADV) on the ES is almost 2 Million contracts. At an initial margin rate of $5,000 per contract traded this amounts to approximately $10 Billion worth of trades on the S&P every day. The TY has an ADV of almost 1.5 Million contracts, which is equal to approximately $2.2 Billion worth of shares traded every day. Averaged out over a 24-hour period, this allows for plenty of liquidity to handle our algorithms traded with very large accounts across multiple customers.

Final Sanity Check

The definition of this final step is slightly less structured, and since it is a bit abstract and difficult to quantify, it's not listed as an actual design requirement. Simply put the concept or principles behind the automated trading strategy should make sense and pass a basic sanity check. For example, it is probably not sufficient to just stumble upon a random pattern and justify it as a reliable basis for an algorithmic trading system. While it is possible there are exceptions out there, the best algorithms should be able to have reasons behind their expectation for success.

For the breakout, we are capturing short covering rallies and buying when it is difficult (on a gap up for example). When most day traders are shorting the large gap up, expecting it to fill the gap, we will typically buy the breakout. Furthermore, once it has made a large up move from our entry, most day traders will feel

it has moved to far and get out. The back-testing data suggests that in fact, you should hold until the end of the day, and so that is what we do.

Our breakdown short algo is similar in concept, however instead of buying into strength it will buy into weakness. When most retail traders are buying a gap down, thinking that the market has gone too far and will rally, the best trade is once again the harder trade; namely shorting into the weakness.

The logic behind the burst is that we buy breakouts within range bound or sideways moving markets (but exit quickly in case they are false breakouts). We will also buy the bottom of the range in sideways trading markets and allow for a larger target, exiting once the futures trade back towards the top of the range.

For the Push-Pull, it is similar to the burst except that we hold longer and typically only buy on dips.

The principle behind the overnight gap is equally straightforward in that it buys into strength during upward trending markets, attempting to exit the following morning when the equity markets opens. This tendency to gap up is in our opinion due to the ramp in futures that tends to happen in strong markets during the overnight "light volume" trading session.

At Quant Algorithms, our number one principle when designing algorithms is to think in terms of "Why do most day traders fail?" Our answer: because they make the comfortable trades instead of the gut wrenching, difficult ones. They are reluctant to buy breakouts because they feel it has already moved too far, so they sit around waiting for the pullback to happen. Once it does happen, they tend to get scared, then will not enter out of fear that the market will finally crash. If the pullback intensifies, they will finally feel like the market has moved too far down and cannot go further. That is when they buy, which is typically the exact wrong time. They take the comfortable trade instead of the right trade.

At Quant Algorithms, we determine "What's the hardest trade to make?" - Then, we execute on that trade without our emotions being involved. We simply let the robotic trading system run our trading.

We spend a huge amount of time, energy and resources developing the trading strategy, so we have a confidence level that allows us to trust it once it goes live, and just let the trades play out.

To summarize, for any given trading system, it is our opinion that the core principle should make sense in general terms and be something that can be justified. During this final step in trading system development, you explore every possible path to eliminate any holes or fractures in the algorithm.

Product Offering Dashboard

Quant Algorithms LLC

Product Dashboard

	Active Trader Package (S&P 500)
All 5 Algo's Combined Performance (5/1/2001 - 3/13/2015)	
Yearly Analysis	
Avg % gain/year	104.15%

Monthly Analysis	Assumes $17,000 Account
Avg % gain/month	8.67%
Total Number of Months Back-Tested	166
Losing months	49
Winning months	117
Monthly Win Rate	70.48%
Total Number of Winning Months w/ $3,000 or Bigger Gain	41
Total Number of Losing Months w/ $3,000 or Bigger Loss	4

Quarterly Analysis	Assumes $17,000 Account
Q1 Average % Gain	18.01%
Q2 Average % Gain	25.04%
Q3 Average % Gain	32.43%
Q4 Average % Gain	24.55%
Total Number of Back-Tested Quarters	55
Losing Quarters	8
Winning Quarters	47
Quarterly Win Rate	85.45%
Total Number of Winning Quarters w/ $3,500 or Larger Gain	28
Total Number of Losing Quarters w/ $3,500 or Larger Loss	1
Largest Winning Quarter	$13,530.00
Largest Losing Quarter	($3,551.00)

Back-Testing Information	
Period Analyzed	
Historical Period Analyzed	May 1 2001 - 13 March 2015

Slippage & Commission Used in Analysis	
Commission used in all reports	$6.50 per round trip trade
Slippage used in all reports (ES)	$12.50 per round trip trade
Slippage used in all reports (TY)	$24.00 per round trip trade

Draw - Down	
Worst % Drawdown (closing month-to-closing month, marked to market)	-29.96%

Account Requirements	
Account Details	
Minimum Account Size	$17,000.00
Allocation	1 contract traded on each algorithm (1/1/1/1/1, 5 total) per $17,000
Instrument Traded	ES/TY
Trades Long & Short	Yes
Account Types Allowed	Cash, IRA, Roth IRA
Number of Algorithms Traded	5

Auto-Executed with Best Efforts	
Simple account setup	✓
100% Fully Automated (no discrecionary trades)	✓
Zero Time Required	✓
No need to monitor your positions	✓
Receive Daily Statements	✓
Smart phone app telling you in real time every time a trade is initiated	✓
Supports IRA/Roth IRA	✓

Algos Traded on Each Package	
P1 Push-Pull	
Instrument Traded	10 Yr Note (TY)
Profit Factor (Ratio of Total Gain to Total Loss)	2.35
% Profitable	83.13%
Total Number Trades	326
Out Performs During	Down Markets/Consolidating Markets
Can Hold Overnight?	Yes
Type of Algo	Mean Reversion/Buy on Pull-Back

T2 Burst	
Instrument Traded	Emini S&P 500 (ES)
Profit Factor (Ratio of Total Gain to Total Loss)	1.47
% Profitable	86.92%
Total Number Trades	887
Out Performs During	Sidways & Up Moving Markets
Can Hold Overnight?	Yes
Type of Algo	Mean Reversion

O2 Overnight Gap	
Instrument Traded	Emini S&P 500 (ES)
Profit Factor (Ratio of Total Gain to Total Loss)	1.50
% Profitable	69.67%
Total Number Trades	577
Out Performs During	Sideways & Up Moving Markets
Can Hold Overnight?	Yes
Type of Algo	Trend Following

B2 Breakout	
Instrument Traded	Emini S&P 500 (ES)
Profit Factor (Ratio of Total Gain to Total Loss)	1.21
% Profitable	39.93% *(winners much larger than losers)*
Total Number Trades	899
Out Performs During	Rebounding / Down Markets
Can Hold Overnight?	No (this algo is a day trade)
Type of Algo	Momentum (long)

S2 Breakdown SHORT	
Instrument Traded	Emini S&P 500 (ES)
Profit Factor (Ratio of Total Gain to Total Loss)	1.41
% Profitable	50.83% (winners much larger than losers)
Total Number Trades	240
Out Performs During	Down Markets
Can Hold Overnight?	No (this algo is a day trade)
Type of Algo	Momentum (short)

Pricing	
Payment Options	
Licenses Available	Yes
Fee Structure	Based on Number of Contracts Traded
Licencing Fee	Call or Email for a Quote!

The Five Algorithms

The following section provides a basic overview of each algorithm we trade. More details on each algorithm can be found on our website, which includes links to each algorithm's performance report from Tradestation providing worst-case drawdowns, complete trade list and much more.

TY Push-Pull Bond Algo

Key Features

- Trades the 10 Year Note (TY) on 120 minute increments
- Extremely effective during down moving markets (best year was 2008)
- Does very well during all other market conditions
- Average Win Rate 83.18% on 327 Trades

Entry/Exit Points

- Potentially enters at closure of 120 minute candles (10 AM EST, 12 PM EST, 2 PM EST, 4PM EST or 4:59 PM EST) if certain market conditions are present
- Exits when either stop or target is hit (can hold overnight)

Example Trade

While the market was selling off in the early part of October 2014, the Push-Pull TY bond algo had a few winning trades. This compliments the other algo's very well. While the equity markets are dropping, the Push – Pull algo will typically be hitting it out of the park with winning trades, profiting during down moving markets.

Burst Algo

Key Features

- Trades the E-Mini S&P Futures (ES) on 120 minute increments
- Extremely effective during sideways & upward drifting market conditions
- Outperforms during down moving markets
- Average Win Rate 69.67% on 577 Trades

Entry/Exit Points

- Potentially enters at closure of 120 minute candles (11:30 AM EST, 1:30 PM EST, 3:30 PM EST or 5:14 PM EST) if certain market conditions are present
- Exits when either stop or target is hit (can hold overnight)

Example Trade

This sequence shows a period where the market traded sideways with a slight bias to the upside (11/7/19-11/19/14). The Burst algorithm timed the entries and exits about as perfect as you can get. We had 5 winners and no losers in this 9 day period (the blue dotted line indicates a winning trade).

Overnight Gap Algo

Key Features

- Trades the E-Mini S&P Futures (ES) on 389 minute increments
- Extremely effective during up moving market conditions.
- Outperforms during down moving markets
- Average Win Rate 86.92% on 887 Trades

Entry/Exit Points

- Enters one minute before the market closes (3:59 PM EST) if certain market conditions are present
- Exits when either stop or target is hit (can hold overnight)

Example Trade

This sequence shows 10 trading days (between 11/5/14 and 11/18/14). During this period, we closed out 9 back-to-back winning trades (the blue dotted line indicates a winning trade). Keep in mind, once we load the software, you will be able to see chart like this for every day going back to 2003 (or further if you wish).

Breakout Algo

Key Features

- Trades the E-Mini S&P Futures (ES) on 10 minute increments
- Extremely effective during down moving markets (captures short covering rallies)
- Profitable during most other market conditions as well
- Average Win Rate 40.02% on 902 Trades (Ratio of Average Win: Average Loss = 1.82, meaning when it wins – it's almost twice as large as the loss)
- This is a very low risk day trade (we get in at the morning and out at the close, with a very tight stop). Uses a trailing stop once a certain price level is reached.

Entry/Exit Points

- Enters at 9:50 AM EST if certain market conditions are present
- Exits at the market close, unless stopped out

Example Trade

This sequence shows 8 trading days (between 10/17/14 and 10/28/14). During this period, we closed out 4 winning trades (the blue dotted line indicates a winning trade). This sequence occurred late in October 2014 when the market started rallying after a huge selloff. The breakout trade hit it out of the park!

Breakdown (SHORT) Algo

Key Features

- Trades the E-Mini S&P Futures (ES) on 10 minute increments
- Extremely effective during longer term bear markets
- Great hedge against a sustained bear market. This algorithm had it's best year in 2008. Combined with the other algorithms (back tested), 2008 was our best year merged.

Entry/Exit Points

- Enters short at 9:50 AM EST if certain market conditions are present
- Exits at the market close, unless stopped out

Example Trade

This sequence shows 2 trading days (between 3/10/15 and 3/11/15). During this period, we closed out a single winning trade (the blue dotted line indicates a winning trade). As shown below, shorting into the weakness was the correct trade. On this trade alone, we made 12.25 points of profit on the ES. On a $17,000 account trading one contract, that was a gain of $612.50 or about 3.6%.

Quality Control Processes

At Quant Algorithms, we have implemented the following quality control mechanisms to monitor the performance of the automated trading system and ensure its integrity to the best of our ability.

This includes the following cycle that continually repeats itself.

Ensure Live Returns Match Back-Tested Expectations

As time goes on and more and more trades are placed live, we continue to monitor the performance of the algorithms and constantly compare profit factors, drawdowns and equity curves on each of the four algorithms. We do this to certify that results continue to match back-tested expectations.

Monitor Slippage

Slippage is monitored closely across our live accounts to ensure that our model accurately represents the average slippage seen. We also monitor the liquidity of the S&P to ensure that it can handle our market buy orders and limit sell orders. One way we do this is by tracking the number of contracts trading our algorithm.

Monitor Auto-Execution Service

We closely monitor the live trading accounts that are setup to ensure trades are properly executed.

Ensure Consistent Results for All Customers

Given our automated trading system is auto-executed; this process is completed with great ease. Upon generation of a buy, block orders are placed so that we all get the same fills, and we are all trading the algorithms properly. For those that trade our system on Tradestation, it is possible that your actual fills will be different since they are not block orders.

Once our customers sign up, they have access to our trading room where they can watch all five algorithms trade live. They can also monitor the trades in their own account using the OEC iBroker smart phone app. This app alerts you every time a new trade is placed. As you see trades getting executed in the trading room, you can cross check with the actual trades in your own account.

Make Adjustments if Needed

Should the algorithms ever need tweaks we will provide updates as needed. This is all included as part of our maintenance package.

Comments on Forward Testing

Forward testing is a method used by some auto trading system developers for further evaluation of an algorithm's expected performance once it goes live. This method is also used to constantly update optimizations (targets, stops, etc.) based on changing market conditions. They typically will weigh heavily the most recent market behavior in their optimizations justifying that the patterns seen more recently are probably more likely to continue (as opposed to patterns seen many years prior). This topic is up for debate in our opinion. It is a good way to test an algorithm while in the development phase, however we do not agree with the idea that you should constantly update your optimizations based on more recent market behavior.

It is a somewhat common practice in automated trading system development, however since we have been trading live for well over a year with results fitting within the back-tested expectations we do not feel a need to continually forward test and provide new optimizations. Should performance lag, and there be a need to do this, we will do so as part of our maintenance agreement.

Final Word

Quant Algorithms is a leading provider of hedge fund quality Automated Trading Systems to not only CTA's & Hedge Funds, but also retail traders. Our customers receive our full attention and we devote and pride ourselves with customer service while sticking to our core competency of developing high quality algorithmic trading systems. We have a well-formed team that is dedicated to providing our customers with the best Algorithm Based Trading System we can.

By using our automated trading system, our customers are finally able to remove their emotions from trading allowing the algorithms to excel and capitalize on short-term market inefficiencies to reap profits. While no system is perfect and we cannot guarantee continued success, it is our strong expectation that we will continue to do well moving forward and would love to answer any questions you might have.

Risk Disclosures

U.S. Government Required Disclaimer- Commodity Futures Trading Commission Futures trading has large potential rewards, but also large potential risk. You must be aware of the risks and be willing to accept them in order to invest in the futures markets. Do not trade with money you cannot afford to lose. This is neither a solicitation nor an offer to Buy/Sell futures. No representation is being made that any account will or is likely to achieve profits or losses similar to those discussed on this website or on any reports. The past performance of any trading system or methodology is not necessarily indicative of future results.

CFTC RULE 4.41 - Hypothetical or simulated performance results have certain limitations. Unlike an actual performance record, simulated results do not represent actual trading. Also, since the trades have not been executed, the results may have under-or-over compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account will or is likely to achieve profit or losses similar to those shown.

Statements posted from our actual customers trading the algo's include slippage and commission (Customer A and Customer B). Statements posted are not fully audited or verified and should be considered as customer testimonials (individual results, results vary, etc.). They are real statements from real people trading our algorithms on auto-pilot and as far as we know, do NOT include any discretionary trades. Trade lists posted on this site also include slippage and commission.

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* Up to 10.06% per month is based on back-tested results (see limitations on back testing above) using our ES Active Trader Package. This includes reasonable slippage and commission. Refer to our license agreement for full risk disclosure.

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