

Generating Alpha and Insights from Satellite Imagery

Data Sources (Proprietary and from Partners)



High Resolution Imaging Satellites

The number of high resolution imaging satellites are increasing from ~10 today to hundreds over the next 5 years.



Drones

Drones are becoming increasingly legal and available; they are used today for selected products.



Airplanes (Aerial)

We will be increasing usage of airplanes in 2018, flying consistently over factories, commodities, and retail entities in the US and Europe.



Other Geospatial and Alternative Data Sources

Use of credit cards, mobile devices, social media, web traffic, tax, and more.



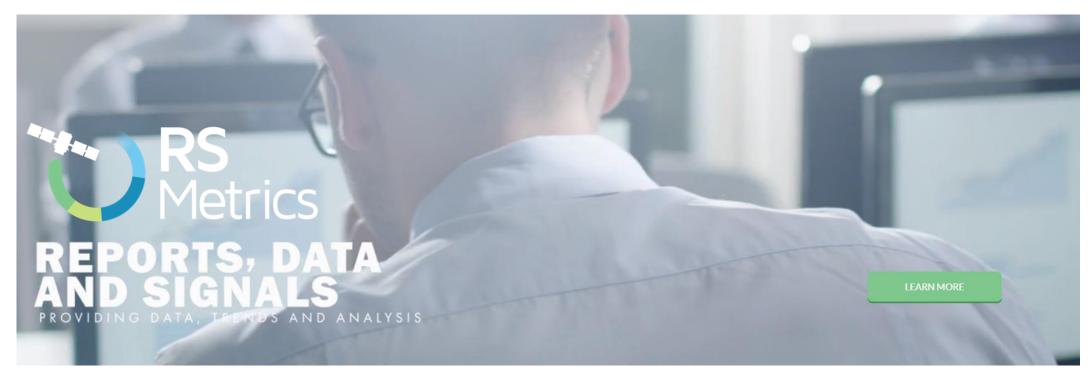
High Resolution Imaging Satellites

- Scalable Big Data Insights
 - Airplanes, Drones, etc good for specific types of project work
- Deep Archive
 - Test hypotheses historically
 - Recreate history to set a base line for analysis
- Global Imaging
 - Very hard for aerial and drone in certain parts of the world
- Compliance
 - Investor legal/compliance department understand that there are no privacy or MNPI issues
 - Speed of sale
 - Easier on boarding as data vendor
- Growth in constellations, quality and revisits allow:
 - Our current product to get better
 - New product development

Raw Data from Imagery Only Gets You to the 10 Yard Line. Most Customers Just Want the Answer

RS Metrics Product Choice, Reports Imagery Accurate Automatic Predictive Financial Image Integration Data Collection and Apps Acquisition Data at Signals and Image with Products Manage (Satellite, Scale Methodology, Proven Alpha Processing in Platform -ment (Indexes, (requires Drone, Sampling, (Counting, Context Generation Partners ETFs) Aerial) SSAA AI/ML Weighting, with End Measuring) (B2B and platform) Balancing User B2C) Needs

Platform Products



Retail

TrafficSignals generates highly accurate chain-wide retail traffic growth data that provides investors and operators with deep fundamental insights, and signals that are predictive of quarterly revenue beats/misses, analyst changes, and stock price/Alpha.

Real Estate

CRE Trends tracks, compares, and benchmarks real-time retail traffic trends for 100,000+ Commercial Real Estate properties, such as malls, shopping centers and stand-alone stores, and groups of properties (Regions, MSAs, A/B/C malls, REITs, retail chains, CMBX)

Metals

MetalSignals measures growth in global stockpiles of copper, aluminum, and zinc (finished metals and concentrates) at hundreds of global smelters and storage sites, and generates signals that are highly predictive of exchange price and inventory. **Press**



RS Metrics is consistently featured by a variety of global publications.



RS Metrics Is Also Featured in Consumer-Focused Press, Making Us Known to Retail Investors and SMBs

Selected Examples:



"Target's stance on bathroom debate drives business to Walmart"

BILLIONS

03/13/17 — Showtime's hit series "Billions" references AR Metrics (RS Metrics) as a company analyzing satellite imagery for investment research.



The Washington Post

"Article highlights many recent challenges to hedge funds."



Featured on ABC News with Diane Sawyer: Holiday shopping parking tips

Retail Products: What We Measure



Indoor Malls



Strip Centers



Power Centers & Outlet malls



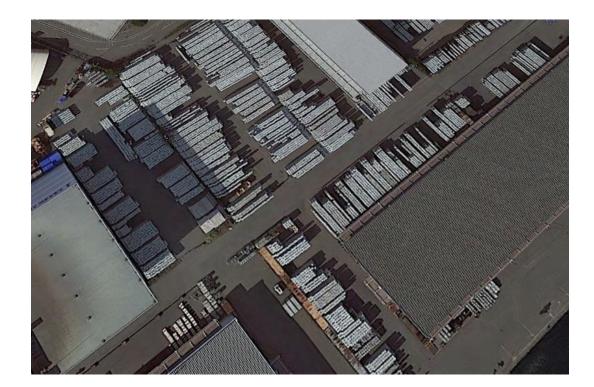
Stand Alone Retail Locations



Metals Products: What We Measure

Metal Stockpile Area (m²): Finished products (ingots, cathodes, etc) Concentrates Stockpile Area (m²) Copper Anodes Area (m²) Semi-Trailer Trucks Employee Cars Dump Trucks/Tippers



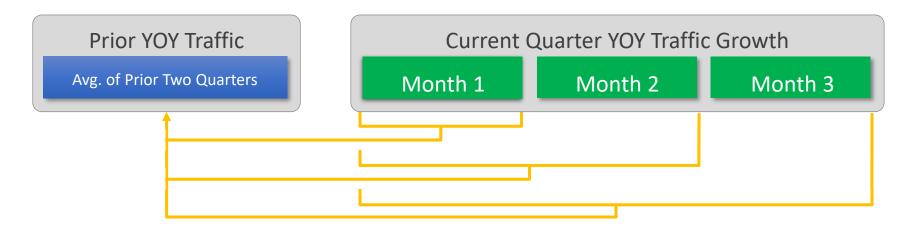


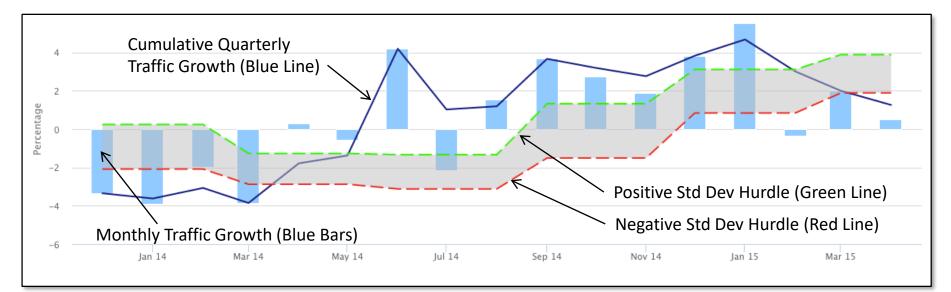
China Copper Smelter

Aluminum Storage

Predictive Signal Methodology Based on Periods of Significant Change



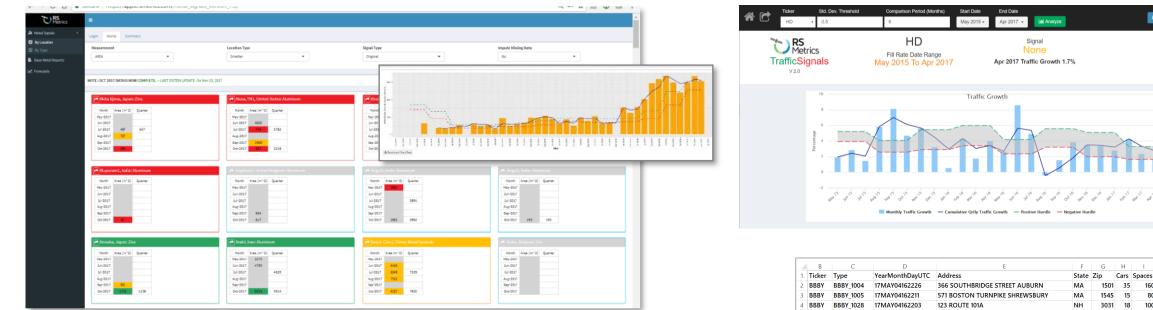




Easy-to-Use Vertical Applications, Alerts, Signals, and Data Feeds



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	В	С	D	E	F	G	н	1	J
1	Ticker	Туре	YearMonthDayUTC	Address	State	Zip	Cars	Spaces	Notes
2	BBBY	BBBY_1004	17MAY04162226	366 SOUTHBRIDGE STREET AUBURN	MA	1501	35	160	5/4/201
3	BBBY	BBBY_1005	17MAY04162211	571 BOSTON TURNPIKE SHREWSBURY	MA	1545	15	80	5/4/201
4	BBBY	BBBY_1028	17MAY04162203	123 ROUTE 101A	NH	3031	18	100	5/4/201
5	BBBY	BBBY_1110	17MAY04162313	1490 UNION TURNPIKE NEW HYDE PARK	NY	11040	28	40	5/4/201
6	BBBY	BBBY_1115	17MAY04162311	365 Rockaway Turnpike Unit 40	NY	11559	36	140	5/4/201
7	BBBY	BBBY_1116	17MAY04162311	3640 LONG BEACH ROAD OCEANSIDE	NY	11572	53	180	5/4/201
8	BBBY	BBBY_1516	17MAY03170155	3301 North U.S. 31	MI	49684	23	80	5/3/201
9	BBBY	BBBY_1577	16MAY05165459	704 South Route 59	IL .	60540	37	120	5/5/201
10	BBBY	BBBY_1720	17MAY04180836	1327 George Dieter Drive	ТΧ	79936	20	200	5/4/201
11	BBBY	BBBY_1736	16MAY03180121	1605 Fall River Drive	со	80538	29	140	5/3/201
12	BBBY	BBBY_1767	16MAY05183454	1919 East Camelback Road Suite 128	AZ	85016	90	100	5/5/201
13	BBBY	BBBY_1786	16MAY04181950	5225 South Calle Santa Cruz	AZ	85706	11	160	5/4/201
14	BBBY	BBBY_1794	17MAY05181622	8850 Holly Avenue Northeast	NM	87122	24	100	5/5/201
15	BBBY	BBBY_1881	17MAY03192239	2246 South Shore Center	CA	94501	27	120	5/3/201
16	BBBY	BBBY_1887	17MAY03192238	15555 East 14th Street	CA	94578	34	120	5/3/201
17	BBBY	BBBY_1890	17MAY02192026	2601 Larkspur Landing Circle	CA	94939	188	200	5/2/201
18	BBBY	BBBY_1890	17MAY04193818	2601 Larkspur Landing Circle	CA	94939	172	200	5/4/201
19	BBBY	BBBY_1912	17MAY05190828	1140 Hilltop Drive	CA	96003	17	80	5/5/201
20	BBBY	BBBY_1919	17MAY04193614	6180 Ulali Drive	OR	97303	17	120	5/4/201
21	BBBY	BBBY_2958	17MAY04162209	17 Highland Commons East	MA	1749	10	100	5/4/201
22	BBBY	BBBY_3010	17MAY05181620	3575 NM 528 Boulevard Building C Suite 100	NM	87144	18	100	5/5/201
23	BBY	BBY_2059	17MAY04162311	660 SUNRISE HWY BALDWIN	NY	11510	33	120	5/4/201
24	BBY	BBY_2060	17MAY04162311	345 Rockaway Tpke	NY	11559	44	60	5/4/201
25	BBY	BBY_2061	17MAY04162311	6 WEST CIRCLE DR VALLEY STREAM	NY	11581	48	240	5/4/201
26	BBY	BBY_2518	17MAY03170155	2577 North US-31 South	MI	49684	35	260	5/3/201
27	BBY	BBY_2629	16MAY05165459	4400 E New York St	IL .	60504	31	220	5/5/201
28	BBY	BBY_2872	17MAY02190508	8363 W Franklin Rd	ID	83709	92	140	5/2/201
29	BBY	BBY 2872	17MAY03184223	8363 W Franklin Rd	ID	83709	76	140	5/3/201

Examples of Alpha Generation with Predictive Signals

Retail Examples



RETAIL EXAMPLES

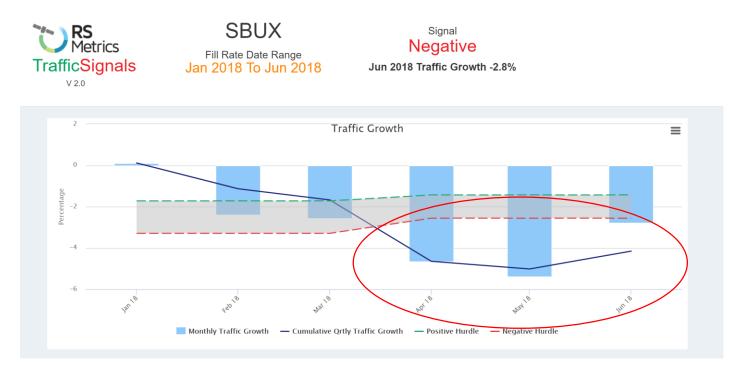
Starbucks (SBUX):



Due to Significant Y/Y Traffic Declines in April 2018, TrafficSignals Generated a Downgrade from a Positive to a Negative Signal.

Negative Signals were Generated for May and June 2018 as well due to Continued Traffic Deterioration.

SBUX		~
Month	YOY	Quarter
Jan-2018	0.1%	
Feb-2018	-2.4%	
Mar-2018	-2.5%	-1.7%
Apr-2018	-4.6%	
May-2018	-5.4%	
Jun-2018	-2.8%	-4.2%







June 19, 2018:

SBUX reports preannounced disappointing comps and guidance

Starbucks Stock Has A Growth Problem

SBUX stock is making new 52-week lows following a guidance cut.

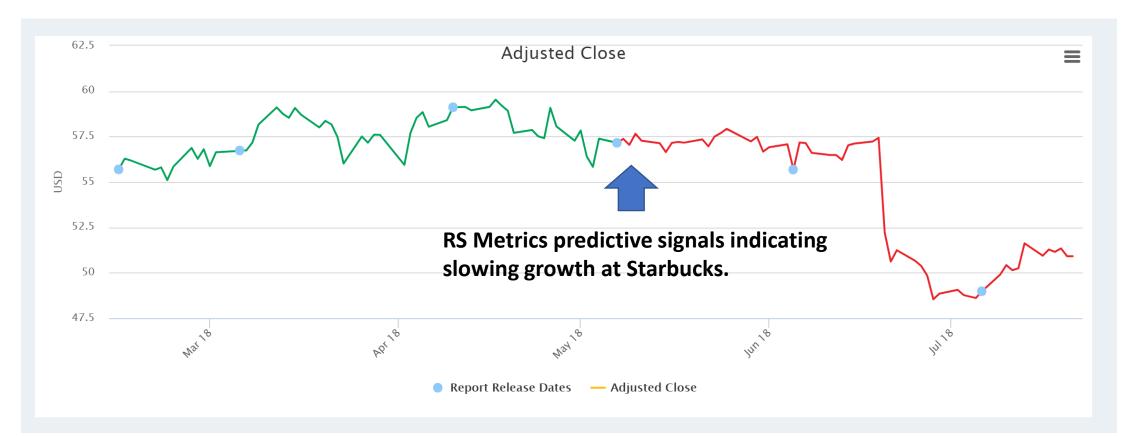


By Wayne Duggan, Contributor | June 21, 2018, at 7:18 a.m.



Starbucks reduced its fiscal third-quarter same-store sales growth guidance to 1 percent. Mark Lennihan/AP





Negative Signals were generated months before the news was priced into the stock, allowing customers to Sell Positions or Short the Stock ahead of the announcement.

RETAIL EXAMPLES

Kroger (KR):

RS

Metrics

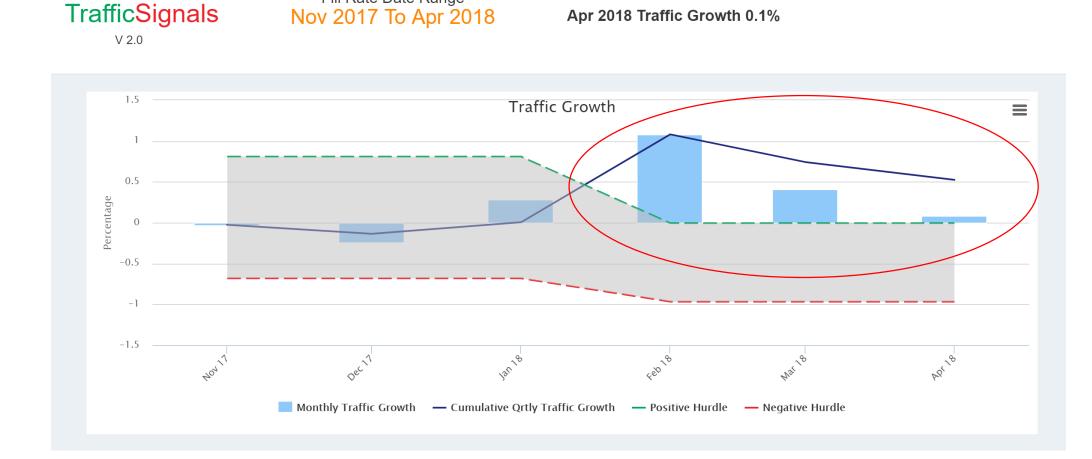
TrafficSignals upgraded to a Positive Signal based on February traffic growth, and reiterated the Positive Signal throughout the quarter.

> Signal Positive

Apr 2018 Traffic Growth 0.1%

KR

Fill Rate Date Range

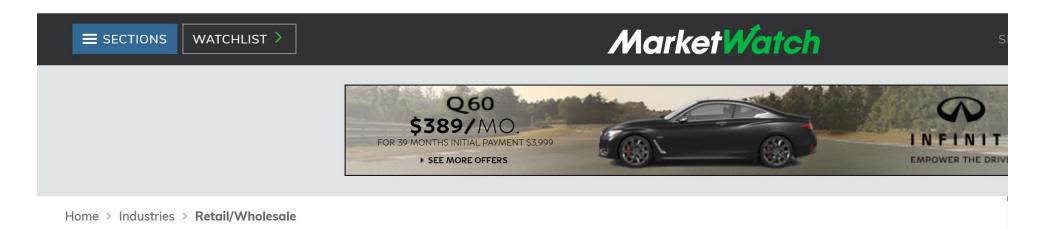




June 21, 2018:

KR reports better than expected revenues, comps and guidance.





Kroger shares soar 8.7% after earnings beat expectations and tweaks guidance

Published: June 21, 2018 7:51 a.m. ET

From June 20-June 22, KR Stock Price Climbs over 11%.



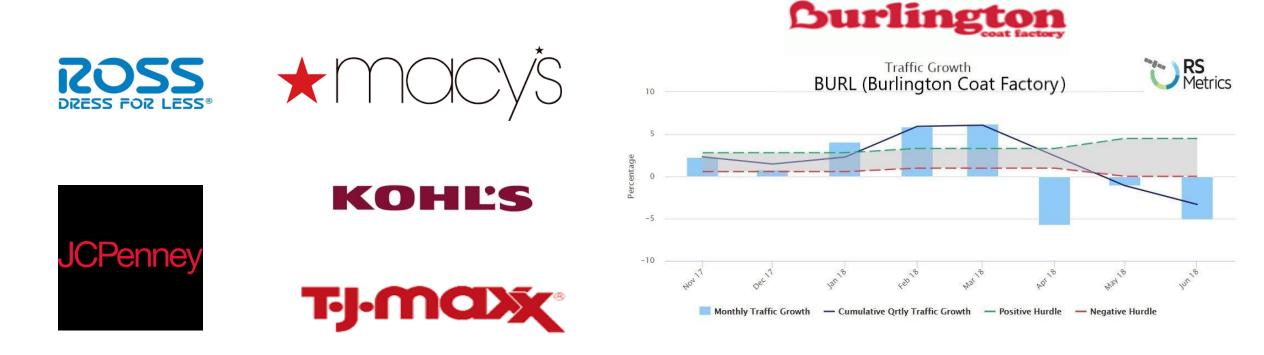


Positive Signals were generated months before the news was priced into the stock.



Overall Retail Sector:

Due to Traffic Trends in June, TrafficSignals generated Negative Signals on almost all of the Apparel Retailers in our coverage universe:



Overall Retail Sector:

June Census Retail Sales Report revealed that although the overall retail sector was healthy for the month, **Apparel Retailers** had their biggest drop since February 2017.



U.S. Department of Commerce Economics and Statistics Administration U.S. CENSUS BUREAU **CENSUS BUREAU**

Table 2. Estimated Change in Monthly Sales for Retail and I

(Estimates are shown as percents and are based on data from the Adv Monthly Retail Trade Survey, and administrative records.)

NAICS	Kind of Business	Jun. 2018 Advance from			
code		May 2018 (p)	Jun. 2017 (r)		
	Retail & food services,				
	total	0.5	6.6		
	Total (excl. motor vehicle & parts)	0.4	7.1		
	Total (excl. gasoline stations) Total (excl. motor vehicle & parts &	0.4	5.4		
	gasoline stations)	0.3	5.6		
	Retail	0.3	6.4		
441	Motor vehicle & parts dealers	0.9	4.6		
4411, 4412	Auto & other motor veh. dealers	1.0	4.8		
442	Furniture & home furn. stores	0.6	4.8		
443	Electronics & appliance stores	-0.4	2.1		
444	Building material & garden eq. &				
	supplies dealers	0.8	6.2		
445	Food & beverage stores	-0.3	3.9		
4451	Grocery stores	-0.2	4.0		
446	Health & personal care stores	2.2	6.7		
447	Gasoline stations	1.0	21.6		
448	Clothing & clothing accessories				
	stores	-2.5	4.0		

Signals as a Trading Strategy

Used as a trading strategy by professional investors, these predictive signals often generate returns that outperform stock, sector and even ETF returns over the same period:

Example of Retail Portfolio Long Weighted Equity Returns (Solactive)

SOLACTIVE German Index Engineering Solactive RS Metrics TrafficSignals

DRAFT - pretending to have data available on the 15th

Selection Criteria

Starting Universe: RS Metrics Universe
Rebalancing Frequency: Monthly
Index Currency: USD
Index Type: Gross Total Return
Minimum 6-month ADV: USD 5 mn
Lower weight bound per stock: 0.2 times equal weight
Upper weight bound per stock: 5 times equal weight





Ratio against SPDR S&P Retail ETF



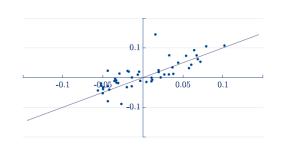
	Solactive RSMet- rics TrafficSignals	SPDR S&P Retail ETF	RSMetrics Uni- verse equal weighted
Mean	12.77%	3.26%	7.12%
Standard Deviation	18.50%	17.78%	17.05%
Downside Deviation	12.51%	12.79%	11.90%
Max Drawdown	-28.22%	-24.17%	-24.13%
Sharpe Ratio	0.69	0.18	0.42
Sortino Ratio	1.02	0.25	0.60

Annualised Performance Figures

Year on Year Returns



Scatterplot of Solactive RSMetrics TrafficSignals (Y) against SPDR S&P Retail ETF (X), monthly data



Historic Turnover

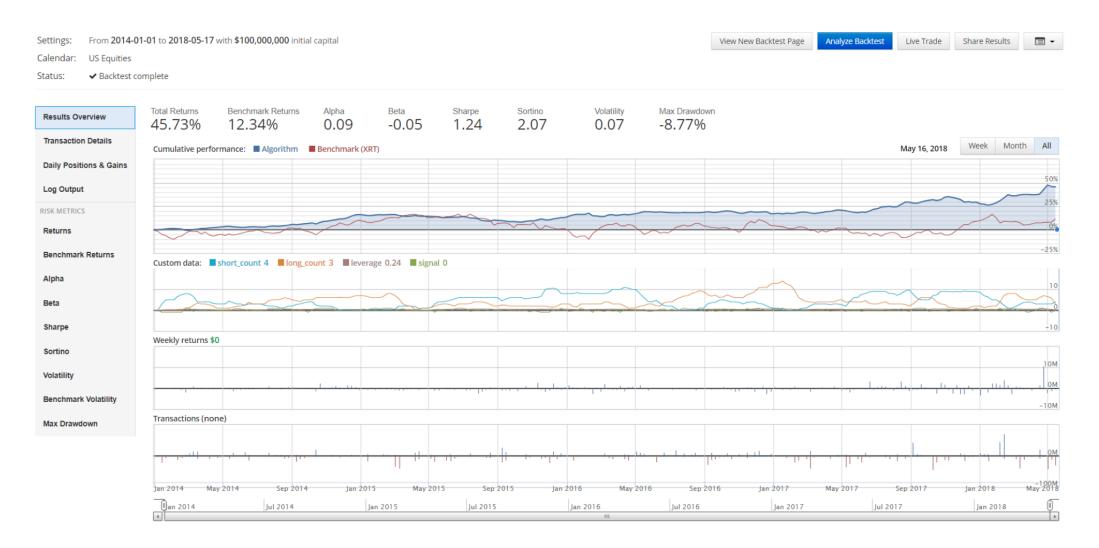




Signals as a Trading Strategy



Retail Portfolio Long/Short Equity Returns (Quantopian):



Examples of Alpha Generation with Predictive Signals

Metals Examples



Copper Price Relationship with RS Metrics Y/Y Global Copper Smelter Inventory Measurements July 2014 – April 2018

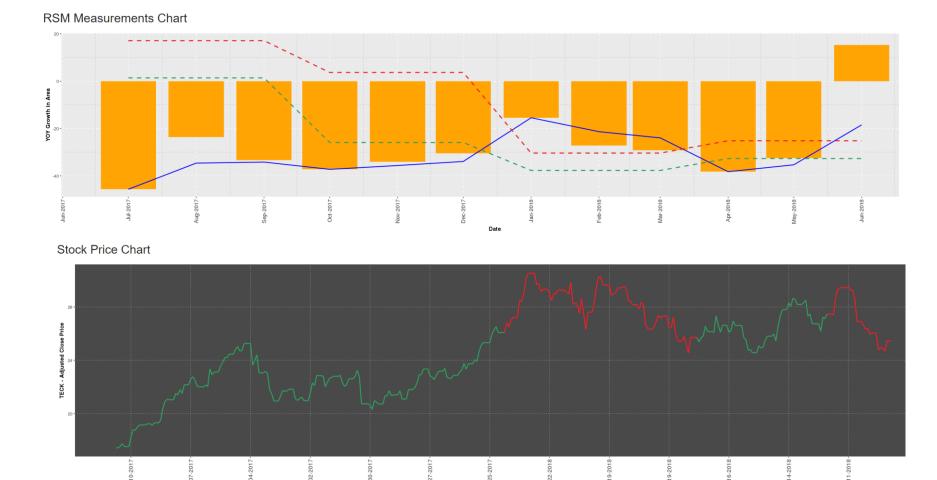


RS Metrics **Teck Resources (TECK):**



TECK is the world's 3rd largest Zinc producer. MetalSignals generated it's first downgrade on Zinc In January 2018. TECK's stock is trading around its lowest levels in 2108.

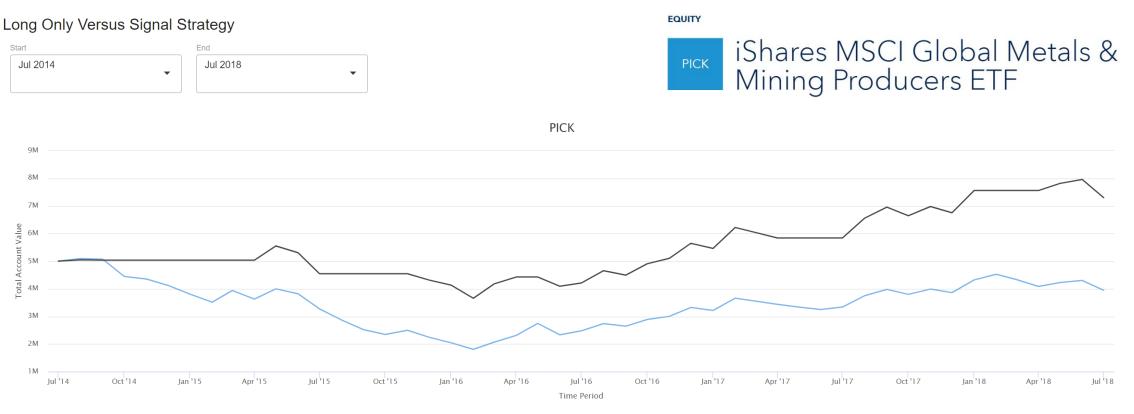
Monthly Inventory Measurements (July 2017 – July 2018)



TECK Price Chart with MetalSignal Overlay (July 2017 – July 2018) Signals as a Trading Strategy

Used as a trading strategy by professional investors, these predictive signals often generate returns that outperform stock, sector and even ETF returns over the same period:

Metals Long Weighted Equity Returns (Example: PICK Index)



iShares' by BLACKROCK'

Find a Fund

Investment Ideas

— Long Only — Long Only With Signal Weights



Education

Insights



Summary:

- We are early in understanding how geospatial big data can help our investor clients make better investment decisions.
 - Alternative data is a fast growing market
- The tsunami of new satellites, sensors and revisits are tremendously exciting for enhance current products and building others in which imagery was too scarce to generate an insight.
- The more predictive and actionable our insights and signals are, the more valuable they are in the marketplace.
- Please contact us with any questions

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