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.

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

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

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.

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

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.
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”

“Article highlights many recent challenges to hedge funds.”

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

Featured on ABC News with Diane Sawyer: Holiday shopping parking tips
Retail Products: What We Measure

Indoor Malls

Power Centers & Outlet malls

Strip Centers

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-Trailers Trucks
- Employee Cars
- Dump Trucks/Tippers

Images:
- China Copper Smelter
- Aluminum Storage
Predictive Signal Methodology
Based on Periods of Significant Change

Prior YOY Traffic
Avg. of Prior Two Quarters

Current Quarter YOY Traffic Growth
Month 1
Month 2
Month 3

Cumulative Quarterly Traffic Growth (Blue Line)
Monthly Traffic Growth (Blue Bars)
Negative Std Dev Hurdle (Red Line)
Positive Std Dev Hurdle (Green Line)
Easy-to-Use Vertical Applications, Alerts, Signals, and Data Feeds
Examples of Alpha Generation with Predictive Signals

Retail Examples
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.
June 19, 2018:

SBUX reports preannounced disappointing comps and guidance
From June 19-June 21, SBUX Stock Price Drops from $57 to $48.

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.
Kroger (KR):
Traffic Signals upgraded to a Positive Signal based on February traffic growth, and reiterated the Positive Signal throughout the quarter.
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:
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.

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

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

<table>
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<th></th>
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<tbody>
<tr>
<td>441</td>
<td>Retail &amp; food services, total</td>
<td>0.5</td>
<td>6.6</td>
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<tr>
<td></td>
<td>Total (excl. motor vehicle &amp; parts)</td>
<td>0.4</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>Total (excl. gasoline stations)</td>
<td>0.4</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Total (excl. motor vehicle &amp; parts &amp; gasoline stations)</td>
<td>0.3</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>Retail</td>
<td>0.3</td>
<td>6.4</td>
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<tr>
<td>4411, 4412</td>
<td>Motor vehicle &amp; parts dealers</td>
<td>0.9</td>
<td>4.6</td>
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<tr>
<td></td>
<td>Auto &amp; other motor veh. dealers</td>
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<td>4.8</td>
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<tr>
<td>442</td>
<td>Furniture &amp; home furn. stores</td>
<td>0.6</td>
<td>4.8</td>
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<tr>
<td>443</td>
<td>Electronics &amp; appliance stores</td>
<td>-0.4</td>
<td>2.1</td>
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<tr>
<td>444</td>
<td>Building material &amp; garden eq. &amp; supplies dealers</td>
<td>0.8</td>
<td>6.2</td>
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<tr>
<td>445</td>
<td>Food &amp; beverage stores</td>
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<tr>
<td>4451</td>
<td>Grocery stores</td>
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<td>4.0</td>
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<tr>
<td>446</td>
<td>Health &amp; personal care stores</td>
<td>2.2</td>
<td>6.7</td>
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<tr>
<td>447</td>
<td>Gasoline stations</td>
<td>1.0</td>
<td>21.6</td>
</tr>
<tr>
<td>448</td>
<td>Clothing &amp; clothing accessories stores</td>
<td>-2.5</td>
<td>4.0</td>
</tr>
</tbody>
</table>
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)
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

Price drops as inventories grow

Price increase as inventories drop

Price increase as inventories drop

RS Metrics Y/Y inventory measurements

Copper price chart with RS Metrics signal overlay
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 2018.

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)
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
For more information
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