

The Secret Weapon of Wall Street: Maps as Market Data

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Geospatial information – from satellite and drone images to aggregated location data – has become a powerful form of alternative data for investors. By translating “real-world” movements (cars in parking lots, ships at port, satellite-observed tank levels, farm vegetation indices, etc.) into actionable metrics, traders gain a near-real-time view of economic activity. This report explores how geospatial data augments traditional market analysis, with examples spanning retail foot traffic, oil and commodity inventories, port shipping activity, and crop forecasts. It reviews the advantages this data provides, highlights leading providers and tools (e.g. Bloomberg’s mapping platforms, Orbital Insight, TellusLabs), and discusses challenges and future trends.

Executive Summary

- **New Alternative Data Source:** Traders and hedge funds are increasingly using geospatial data as an “alternative” input to boost returns . This includes satellite and drone imagery, mobile-location feeds, and mapping data integrated into trading platforms.
- **Key Use Cases:** Notable applications include retail analytics (counting cars in parking lots or tracking mobile phone foot-traffic to predict store sales) ; **energy commodities** (measuring oil inventory via satellite imagery of storage tanks) ; **shipping/port tracking** (assessing global trade flows by monitoring port container levels or ship movements) ; and **agriculture** (forecasting crop yields by analyzing satellite NDVI vegetation indices). A summary of these use cases is provided in the table below.
- **Advantages Over Traditional Data:** Geospatial sources can be more timely and granular than official reports or company filings. For example, satellites can estimate oil stocks days before delayed government inventories are released, or indicate store traffic as earnings report season approaches . Such data can provide traders with an informational edge by revealing trends before traditional data is updated.
- **Industry Players & Tools:** Major platforms now incorporate geodata. Bloomberg terminals (via its MAP and MAP GO applications) support spatial analytics and integrate datasets from partners like Orbital Insight . Specialist analytics firms (Orbital Insight, Kayrros, Spire, TellusLabs, Descartes Labs, Placer.ai, etc.) curate satellite or sensor data into ready-to-use intelligence for traders. For instance, Orbital Insight’s parking-lot datasets are now available on Bloomberg’s terminal , and CME Group’s DataMine offers Orbital Insight and TellusLabs feeds on oil and crops .
- **Challenges:** Geospatial data can be costly and complex. High-resolution imagery and processing require technical expertise and significant investment . Coverage may be limited (e.g. cloud cover can obscure satellites, and only visible outdoor activity is captured) . Furthermore, the lack of long historical archives for some data makes back-testing strategies difficult . These factors tend to favor well-funded institutions, raising questions about market fairness .
- **Outlook:** The use of geospatial data in trading is expected to grow. Advances like rapidly updating satellite constellations, drones, Internet-of-Things sensors, and AI-driven analytics are enabling more real-time insights . Over time, geospatial feeds may be streamed directly into trading algorithms alongside market data, making automated geospatial analysis a mainstream part of financial workflows.

Role of Geospatial Data in Modern Trading

Geospatial data provides investors with a “bird’s eye” perspective on economic activity. Whereas traditional analysis relies on published financial statements, government statistics and news reports, geospatial feeds turn physical world movements into quantitative signals . For example, changes in retail store parking-lot occupancy (captured via satellite or mobile-location data) can indicate shifts in sales, long before quarterly revenue is reported . Similarly, monitoring the movement of oil in storage tanks or the flow of cargo through ports provides earlier visibility into supply and demand dynamics than lagging official data.

The financial industry is rapidly adopting these techniques. According to industry reports, use of location-based analytics in investing is growing sharply – one analysis notes geospatial analytics is on track to be a **\$1 billion market** within a few years . Even Bloomberg is deepening its geospatial focus: its terminal integrates weather and map data, and Bloomberg’s Commodity and Energy teams use spatial tools daily (for example, tracking oil tanker routes and refining capacity via maps) . In short, geospatial data adds a new dimension to market analysis, letting analysts “see” activity that was previously opaque or delayed.

Figure: Global geospatial data enables investors to analyze real-world activities (e.g. shipping routes, crop health, store traffic) across the planet in near real time.

Key Use Cases

The following table summarizes major geospatial analytics use cases in trading:

Use Case	Data Indicators	Example Tools/Providers
Retail Foot Traffic	Store parking-lot car counts; aggregated phone-location pings (Foursquare data, etc.) to gauge customer visits.	Orbital Insight (retail traffic index), Placer.ai footfall analytics, Bloomberg MAP GO.
Oil & Energy Stocks	Satellite images of oil storage tanks (roof shadows, floating roofs) to estimate inventory ; refinery operations via phone-location data.	Orbital Insight (World Oil Storage Index on Bloomberg) , Kayrros Oil Inventory, EnergyPathfinder.
Maritime/ Port Activity	Satellite or drone images of port container yards; Automatic Identification System (AIS) data tracking ship locations and cargo throughput.	Spire and BlackSky (satellite AIS vessel tracking), Planet Labs, Orbital Insight (container counts).
Agriculture & Crops	Vegetation indices (NDVI) and field imagery from satellites for crop growth and yield; weather patterns (soil moisture, rainfall).	TellusLabs (global crop health analytics), Descartes Labs agriforecasts, Planet imagery.
Other Examples	Extreme weather (hurricanes, wildfires) for risk; private jet tracking (JetDB) for corporate activity; retail credit-card spend linked with store visits.	Bloomberg’s weather alerts, Eagle Alpha (jet tracker), Second Measure.

Each use case has demonstrated concrete trading impact. For example, researchers found that a strategy buying (or shorting) retailers based on abnormal increases (or decreases) in parking-lot traffic in

the week before earnings would yield roughly **4–5% extra return** over benchmarks . In commodity markets, Orbital Insight’s daily oil-storage estimates give traders a more immediate read on global supply – Orbital’s “World Oil Storage Index” is now carried on Bloomberg terminals . Likewise, a recent study showed that satellite-based counts of containers in ports can predict national stock-index returns (an average 16.4% annualized excess return was possible in backtests) . In agriculture, early-season NDVI-based yield forecasts have been used to adjust positions in grain futures.

Retail Foot-Traffic Analysis

Traders use geolocation data to estimate consumer spending by measuring foot traffic. For instance, by counting cars in store parking lots via satellite images (or tracking anonymized smartphone pings near retail outlets), investors can infer a retailer’s quarterly performance ahead of official sales releases . Data providers like RS Metrics pioneered this approach, and today Orbital Insight offers a US **Retail Traffic** product covering dozens of public retailers. In 2018 Bloomberg began integrating Orbital’s parking-lot car counts (for 80 major U.S. chains) into its terminal . The chart below (from Orbital Insight via Bloomberg) shows daily year-over-year parking-lot counts for a restaurant chain, illustrating how a drop in traffic hinted at weaker sales. Such analysis is also offered by mobile-footfall analytics firms (e.g. Placer.ai, SafeGraph) that aggregate anonymized GPS data.

Figure: Geospatial analytics can predict retailer earnings. For example, studies show counting cars in parking lots using satellite imagery provides 4–5% trading alpha around earnings . Orbital Insight’s data (like the chart above) is used on Bloomberg terminals to forecast retail performance .

Oil & Commodities Monitoring

Oil and other commodity traders have long relied on maps and flow data, and satellite intelligence adds new granularity. Orbital Insight and competitors use high-resolution imagery to measure oil storage levels: most storage tanks have floating roofs whose shadows move with liquid level. By analyzing these shadows across thousands of tanks worldwide (25,000 floating-roof tanks monitored daily) , Orbital Insight estimates global oil inventories. This provides “unprecedented visibility” into supply changes ahead of official reports . The resulting indices (updated daily) are valuable for assessing crude stockpiles in regions like the U.S., China and the Middle East . Kayrros, another provider, uses satellite and drone imagery to deliver near-real-time crude inventory data to traders . Beyond oil, similar methods track volumes of coal piles, LNG tank storage, and refinery throughput. In power commodities, satellites can even count cars at coal terminals or gauge refinery activity (e.g. via nighttime lights or worker movements) to predict plant outages and supply bottlenecks.

Maritime and Port Activity

Global trade can be inferred by watching the world’s ports and shipping lanes. Satellite images analyzed with machine learning can estimate container volumes stacked in major ports, which correlate with economic output . Similarly, companies like Spire and BlackSky collect AIS signals and radar images to map vessel movements in near real time. For example, spikes in cargo ship traffic into key ports can foreshadow import surges, while a buildup of tankers offshore can signal surging oil demand. These datasets allow investors to gauge trade flow shifts before customs data or trade statistics are released. As an illustration, one study showed satellite-based container counts predicted stock index returns in 27 of 33 countries in tests . Firms like Bloomberg also use vessel-tracking data: Bloomberg’s terminal includes ship location feeds used by commodity traders to monitor fleets of oil tankers and dry bulk carriers (oil flow and coal shipments) .

Agricultural and Crop Forecasting

Satellite remote sensing offers an early window into crop health and yields. Providers like TellusLabs (now part of Indigo Ag) and Descartes Labs process satellite multispectral imagery to compute NDVI and proprietary crop-health indices. These metrics track planting dates, growing conditions, and harvest progress for major crops (corn, soybeans, wheat, etc.). For example, TellusLabs' "Kernel" platform uses machine learning on satellite data to predict global crop yields in near real-time. The insights (e.g. forecasted yields by region) can give traders an edge in agricultural futures and commodity equities. In 2018, CME Group added TellusLabs' crop and Orbital Insight's oil data to its DataMine service for traders, signaling institutional interest in geo-ag-data. (See **Table 1** for a summary of these use cases.)

Advantages Over Traditional Data

Geospatial data offers several edge points versus conventional sources

- **Timeliness and Granularity** – Unlike official statistics (often monthly or quarterly with delays), geospatial signals can be updated daily or even hourly. Satellite constellations (e.g. Planet, Maxar, ESA) can scan global data daily. Weather and traffic sensor networks publish real-time feeds. Thus, traders see developments as they happen. For example, using satellite imagery to estimate oil stockpiles provides information days or weeks sooner than government inventories. Similarly, foot-traffic or credit-card data can reveal consumer trends before retailer's earnings calls.
- **Independent Verification** – Geospatial inputs are generally third-party data sources not controlled by the companies being monitored or by government agencies. This "eye in the sky" can verify (or contradict) official narratives. In opaque markets (emerging economies with unreliable statistics), satellite insights bring much-needed transparency. As one report noted, Orbital Insight's oil storage index "provide[s] a comprehensive and transparent look at global inventory levels".
- **New Perspectives** – Some patterns simply cannot be captured by price history or fundamentals. Mapping supply chains (e.g. tracking typhoons en route to factory regions, or analyzing land use changes) enables unique signals. Geospatial analysis can uncover anomalies (e.g. a sudden drop in retail parking before earnings) that traditional models would miss. This breadth of coverage – from infrastructure (roads, ports) to population movements – yields creative alpha opportunities.
- **Automation and Scale** – Modern image-recognition and AI allow automatic scanning of vast imagery archives. Systems can now detect, count, and correlate thousands of features (cars, containers, storage tanks, solar panels, etc.) much faster than manual analysis. This scalability makes geodata feeds tractable for algorithmic trading. In practice, asset managers are integrating geospatial and other alternative data into quant models to systematically exploit small predictive signals.

Key Players and Tools

Major financial and data firms have built or integrated geospatial analytics platforms:

- **Bloomberg Terminal (MAP & MAP GO)** – Bloomberg's professional terminal includes a suite of geospatial tools. Terminal users can overlay data on interactive maps and subscribe to locationbased datasets. For example, Bloomberg added Orbital Insight's parking-lot car-count retail dataset for its 325,000 users in 2018. Bloomberg's geospatial group also curates hundreds of geo-datasets (weather alerts, climate risk maps, supply-chain disruptions) and provides automated GeoNews alerts based on spatial events.

- **Orbital Insight (GA)** – A leading geanalytics firm that uses AI to analyze imagery and phone location data. Orbital Insight’s products include: the **World Oil Storage Index** (satellite-derived tank inventories) ; **Retail Activity Index** (parking-lot traffic for top retailers) ; and **Site Intelligence** (car counts at factories, refineries, stores). It also collects anonymized smartphone location pings to track economic activities (like factory staffing or store visits) . Orbital serves hedge funds, banks and commodity firms as an alternate data vendor.
- **TellusLabs (now Indigo Ag)** – Focused on agriculture intelligence. TellusLabs built a satellite based analytics platform (using NDVI and proprietary models) to forecast crop yields and monitor farmland conditions . Its client base included commodity traders and insurers. In late 2018, agritech firm Indigo acquired TellusLabs to integrate this data into a larger agriculture platform. TellusLabs’ tools exemplify how geospatial data can drive farm-level and global crop forecasts.
- **Kayrros (FR/UK)** – Provides “Crude Oil Intelligence” using satellite, drone, and AIS data. Kayrros’ **Crude Oil Inventories** product tracks worldwide onshore and offshore oil stockpiles (including Cushing tanks and tanker fleets) with high frequency . Kayrros claims first weekly updates on U.S. tank farm levels and real-time monitoring of oil at sea. Such data helps oil traders anticipate price changes.
- **Spire/BlackSky (Satellite AIS)** – Spire Global and BlackSky (backed by SpaceX) offer space-based maritime tracking. They aggregate AIS signals and satellite imagery to monitor hundreds of thousands of vessels globally . This lets traders see port congestion or cargo rerouting in real time, informing commodity and transportation stocks.
- **Other Data Providers** – A growing roster of alt-data vendors incorporate geospatial elements. Placer.ai, Foursquare and Uber (Nowcast) supply foot-traffic analytics. Descartes Labs and HawkEye 360 apply satellite/RF analysis for agri and environmental forecasting. Second Measure and Earnest Research fuse credit-card spending with geodata. Even social media (“geotagged” posts) and weather feeds are used alongside satellite imagery. Finally, exchanges like CME Group (DataMine) and Nasdaq (Analytics Hub) now offer geospatial datasets (Orbital, Tellus, etc.) alongside conventional market data .

Challenges and Limitations

Despite its promise, geospatial data in trading has hurdles:

- **Cost and Accessibility** – High-quality satellite imagery and processing infrastructure are expensive. Annual subscription fees can run into tens or hundreds of thousands of dollars, putting such data mainly in the hands of large funds . The technical barriers are also steep: specialized machine learning and image-processing expertise are required to clean and analyze the data. A lack of in-house talent to handle these “big and complex” datasets is a common complaint .
- **Coverage and Quality** – Satellites can only image what’s visible outdoors. Cloud cover or darkness can obscure key signals (though radar-equipped satellites help some). Indoor activity, encrypted data, and dark networks remain invisible. Moreover, geospatial signals are often noisy and affected by confounding factors (e.g. a retailer’s parking lot may fill up on weekends regardless of earnings). Smaller sample sizes (a few dozen parking lots vs. millions of consumers) can also skew results. As analysts note, these issues limit the universality of geodata and require careful validation.
- **Historical Data and Backtesting** – Many alternative geospatial datasets have limited historical depth. For example, high-resolution satellite imagery archives may only go back a few years. This makes it harder to fully backtest strategies across market cycles. As one industry analyst observed, “young datasets” and lack of longitudinal coverage pose challenges for model validation.

- **Regulatory and Ethical Concerns** – While not yet heavily regulated, privacy and fairness issues are emerging. Tracking consumer location data (even anonymized) raises questions about surveillance. The use of exclusive data can also exacerbate information asymmetries between large investors and individual traders. These issues suggest future scrutiny by regulators and the need for transparency in how geo-data is sourced and used.

Future Outlook

Geospatial analysis in finance is still evolving, with rapid advances on the horizon:

- **Real-Time Integration** – The next step is streaming geospatial feeds into trading systems. Constellations of small “CubeSats” now image the Earth multiple times per day, and satellite AIS networks refresh ship locations in near real time. Soon, data like daily crop indices, oil tank levels, and port activity could be automatically ingested into algos, much like tick data. For example, Bloomberg’s Bobby Shackelton notes that real-time weather and disaster feeds are now subscribeable, enabling traders to automate storm-impact analysis .
- **AI and Automation** – Machine learning will continue to enhance geospatial analytics. AI models are increasingly capable of automatically detecting and interpreting patterns (e.g. identifying new retail store footprints or counting equipment in mines) . As AI-driven geointelligence matures, vendors can provide higher-level signals (e.g. “crop yield down 5% vs. last year”) rather than raw imagery. This will make geospatial insights more accessible to traders with fewer technical resources.
- **Broader Adoption** – Geospatial data is moving from niche to mainstream. As one industry report notes, the mere fact that firms like CME and Bloomberg are packaging geo-data indicates rising demand . As the value becomes clear (and costs potentially fall with more data providers), more hedge funds and asset managers will incorporate location intelligence. Financial curricula are also starting to teach geospatial techniques, foreshadowing a new generation of geo-savvy quants and analysts.
- **Expanded Applications** – Beyond the use cases already noted, geodata’s role will grow. For example, combining real-time traffic data (e.g. TomTom/Google) with satellite scans could refine retail forecasts. Integrating social-media geotags and credit-card data could further improve consumer insights. Climate risk monitoring (wildfires, droughts) will also feed into asset valuations. In all, the marriage of mapping technologies and finance is set to deepen.

In summary – geospatial data is transforming trading by adding a new edge beyond traditional analytics. As investment firms seek faster, more granular signals, maps and location-intelligence tools are becoming part of the standard toolkit. While challenges remain, the trend – bolstered by technology advances and growing market demand – points to a future where satellites and sensors regularly guide investment decisions in real time.

Sources: Authoritative articles and reports on geospatial analytics and alternative data were used to compile this report , along with industry interviews (e.g. Bloomberg’s geospatial team) and case studies. Each fact above is cited to the relevant source.

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