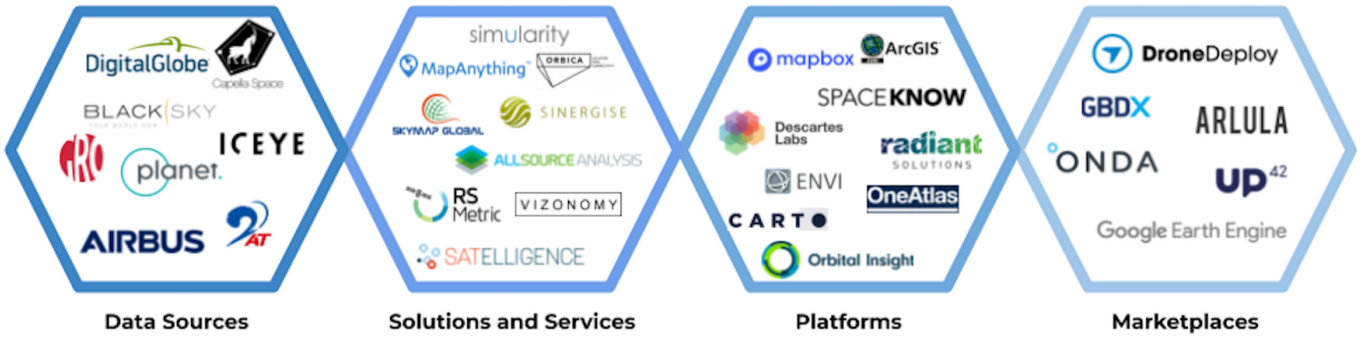
Approaching Geospatial 2.0: Unlocking billions, across verticals, at scale

Josh Gilbert Follow
Jun 25 · 9 min read ★

An analysis of new paradigms in the geospatial technology landscape, which will generate business value at scale, via deep segment-focused capacity.

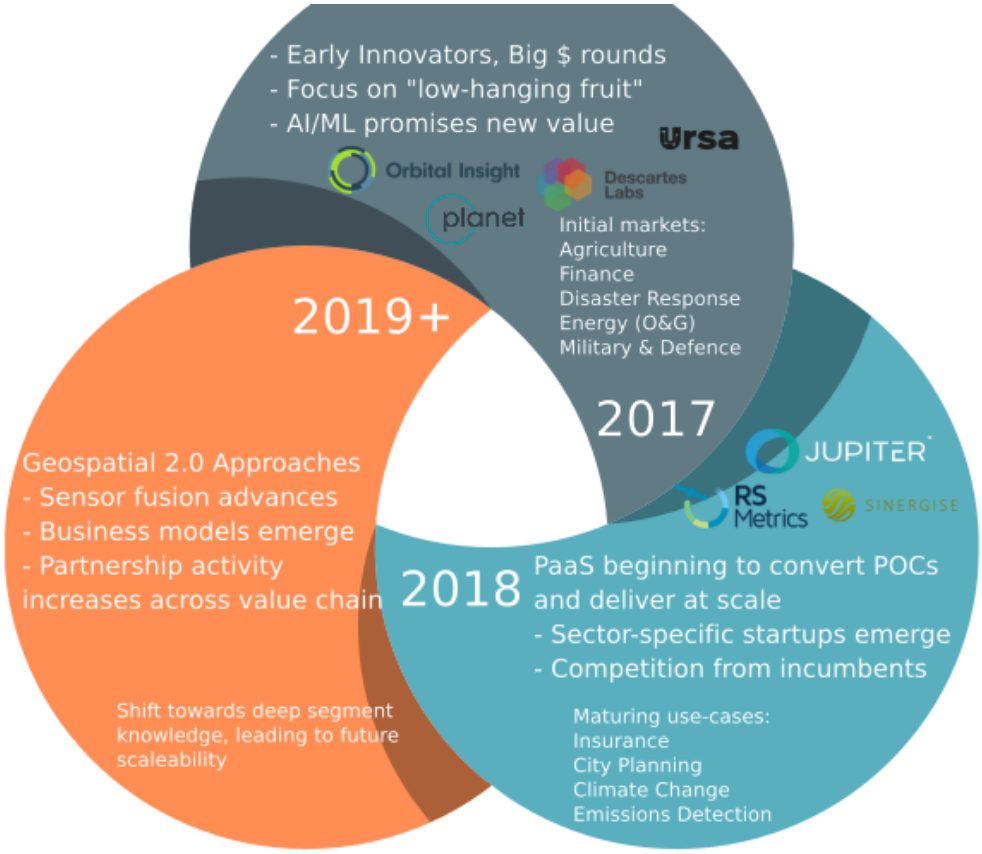
Written with Gopal Erinjippurath



A sample of the Geospatial 2.0 value chain

In this article, we describe the state of geospatial analytics today — an industry on the cusp of unlocking billions of dollars in value via AI-enabled data aggregation. However, this is a promise which is yet to be realized. We posit that with recent advances in sensor fusion capability and emerging business models, we will soon have scalable, tailored geospatial products which can be applied at scale to an array of markets.

An Evolution



A timeline of the recent evolution towards Geospatial 2.0

In recent years, the field of '*geospatial analytics*' has emerged at the intersection of Geospatial Information Systems (GIS), artificial intelligence, and cloud-based computing. We have seen an evolution from '*geospatial 1.0*', as a collection of tools for analysts to 'download, view and analyze' through imagery, geolocation points and other geospatial data streams, towards a scalable collection of cloud native capabilities that promise to deliver action-oriented insights to decision-makers across multiple industries. In this paper, we refer to this landscape evolution as Geospatial 2.0.

Innovators in this Geospatial 2.0 environment have focused on delivering a 'one-size-fits-all' platform-as-a-service (PaaS) for analytics. However, these PaaS offerings are still at an early stage, and the market for these tools is still evolving. As we will describe below, to date, the early PaaS delivery models are yet to provide consistent business value at scale , and the main real-world use cases remain in specific consulting applications. For example, Descartes Labs are working towards a global-scale predictive Data Refinery which provides a digital twin of planet earth, yet the main customer use-cases remain in supplying specific types of business intelligence to agricultural customers (e.g.

agricultural corporate Cargill tracking crop supply chains) and defence (seen in the recent partnership with DARPA).

Technological Enablers & Initial Promise

With the increasing presence of environmental sensing data from Electro-optic(EO), Automated Identification Systems (AIS), Synthetic Aperture Radar (SAR), Greenhouse Gases (GHG) emissions tracking satellites and positional sensing data from GPS and connected devices, there is an explosion in available geospatial data.

High-quality, high-frequency earth observation data for monitoring the globe has historically been expensive and hard to analyze, with most demand coming from government and military analysts. This scenario has been changing over the past five years — smaller, smarter and cheaper satellites are being launched in greater numbers, greatly expanding access to data. Advances in artificial intelligence and computational capabilities have led to software-based, cloud-enabled platform start-ups which process petabytes of imagery data to deliver business insights. Cloud-native processing and spatio-temporal analytics are key technical capabilities that enable this evolution.

The opportunity here is significant. A survey of market forecasts indicates the current size of the geospatial analytics market is somewhere between $35 billion and $40 billion, with forward looking 5-year CAGR of 14–17% — and a market projected to hit $86 billion by 2023. While there has been an initial focus on 'low-hanging fruit' applications, such as precision agriculture, finance and defence, there are huge markets where uptake of geospatial products will drive billions of dollars in value, ranging from insurance, climate change, supply chain management and intelligent city management.

To capture this value, new ventures have raised hundreds of millions of venture capital dollars in an attempt to gain a dominant position in this emerging market. Notable early-movers in the transition towards 'geospatial 2.0' include analytics platforms such as Orbital Insight ($50 million Series B round in 2017) and Descartes Labs ($30 million Series B round in 2017). On the imagery side, early movers include Spire, Planet and ICEYE, with funding between them exceeding $300 million.

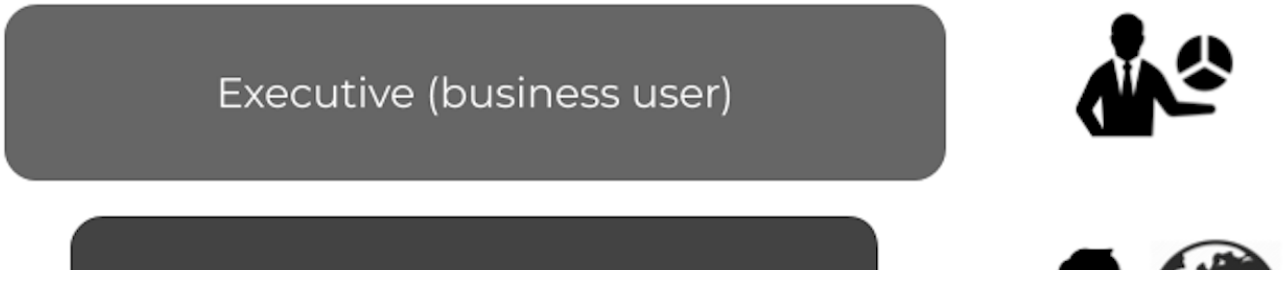
Geospatial 2.0: The Current Landscape

Geospatial 2.0: a sample of the landscape, circa 2019

In the last 18–24 months, we have seen growth in the number of players and further evolution across the geospatial ecosystem, as well as new ways to integrate geospatial tools for multiple types of user. Looking at the value-chain, from geospatial sensors to end-users, we can identify the focal points where data-driven and platform oriented business are currently being built, and where value is most likely to accrue.

User Personas

Much of the value-add of geospatial analytics is in the simplification of previously complex and/or time-consuming processes for geo-aware uses and going from raw sensor data to refined signals serving business insights. In a highly oversimplified view of the usage landscape for geospatial analytics, there are three major user personas in geospatial 2.0, whom we like to prototypically call the Developer, the Analyst and the Executive.



Characterizing geospatial analytics user personas

The Developer

We see the developer persona consuming geo-data inputs and building on them to deliver geo-aware and location-dependent applications and interfaces. The primary medium of delivery is via APIs often compliant with open geo-aware standards. These enterprise-facing APIs act as gateways to the cloud-native geospatial platforms being developed by Geospatial 2.0 entities.

The Analyst

The second persona is that of an analyst, looking at imagery and other sources of data in integration platforms like Earth Engine from Google, ENVI from Harris and ArcGIS from ESRI. At times, analysts also use custom visualization interfaces. Analytics can be served to these platforms through open geospatial standard interfaces too like WebTile Mapping Service (WTMS), Web Map Service (WMS) and Web Feature Service (WFS). This cohort is well versed in SQL and familiar with writing queries and creating reports for the purposes of business intelligence. They bring together different sources of imagery to create static maps or serve up intelligence reports.

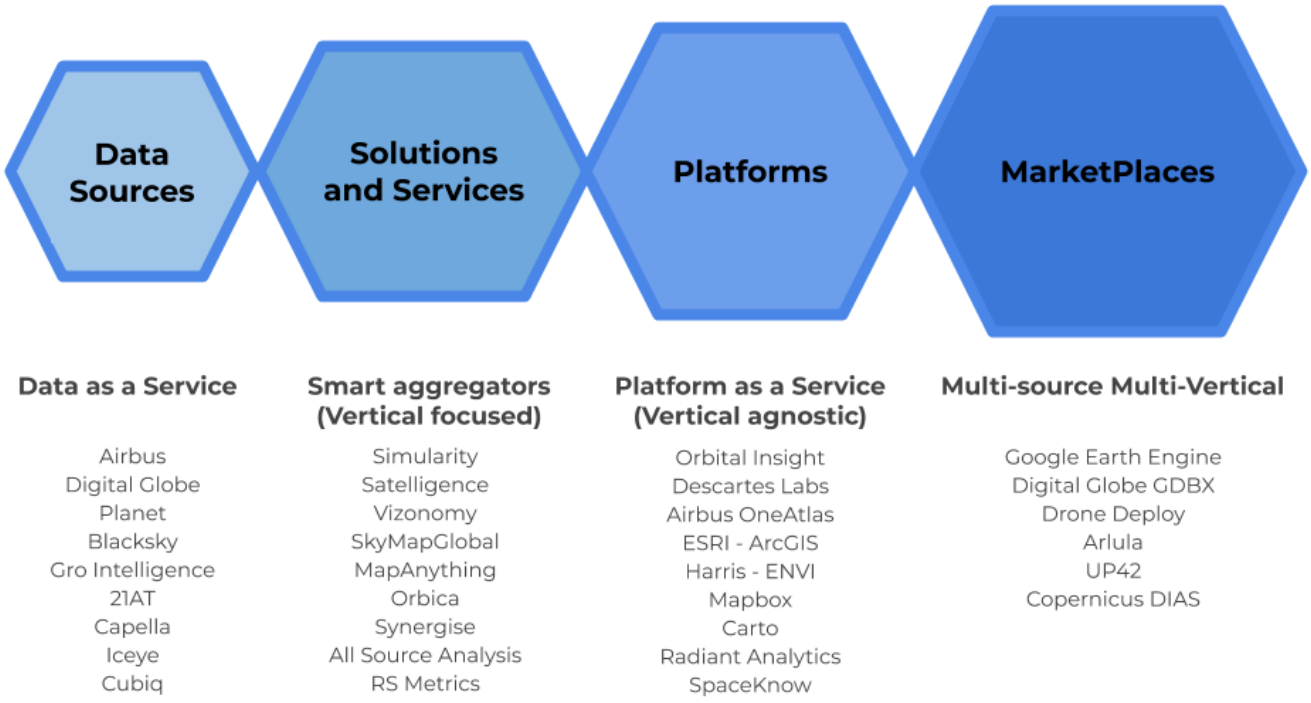
The Executive

The third persona is one of an executive decision maker. Limited in time and making serious cost impacting decisions, these users expect clear, refined signals often communicated through dashboards and time series. These users use business intelligence platforms like Tableau, Microsoft PowerBI or Google BI Engine.

In the Geospatial 2.0 landscape, technological and computational advances allow automated delivery of business insights directly to the executive persona. This new

paradigm is a significant lever for the creation of business value, where previously hours of analyst work would be needed to provide this actionable data.

The Geospatial 2.0 Value Chain



Current Geospatial Landscape and Value Chain, circa 2019 (representative, but not comprehensive)

Data as a Service (DaaS)

These are data providers with source specific interfaces serving raw, semi-processed and processed geospatial data for search and download through simple APIs. These DaaS players mostly represent incumbent market leaders with lineage in hardware such as satellites and different types of onboard sensors. We are also seeing some early multi-source data aggregators for sector specific applications and location-based services.

Smart Aggregators

These are vertical focused aggregators of relevant data, applying geospatial solutions to a specific market use-case. Today, most of these aggregators have vertical specific expertise and vertical focused partnerships to source the right data for the analytics problem to be solved from upstream DaaS providers. We are seeing some very potent smart aggregators bringing together data operations expertise and machine learning

prowess to solve unique challenges in specific verticals like precision agriculture, energy and utilities and mapping.

Platforms

Platforms charge for using hard coded pre-developed features. Platforms are paid (gated) or freemium to enable subscription businesses. Like preconfigured basemaps, specific radiometrics and geometric collections, etc. Platforms serve users in many different verticals. They help partners and customers build solutions. We are seeing traditional desktop tools like ArcGIS and ENVI create bigger platform plays with cloud native processing and next generation cloud based workflows.

Marketplaces

Marketplaces make it super easy for users to engage with their platforms, and aim to reduce the friction to discover new capabilities and experiment with them. Marketplaces bring together datasets, processing chains and expertise to enable creation of third party applications.

They are also the hardest to build because of the “cold start problem”, where there is a large barrier to entry due to the array of licensing partnerships needed to get started, and the need to develop relationships with lighthouse customers who will sign-up, leading others to follow to the platform. Marketplaces will use raw and derived data without any hesitation. Platforms will want raw data and use their own AI/ML/CV platform to serve up refined data downstream to their customers.

We can sift through the large collection of geospatial product and solution companies and identify which of these align with the business value propositions as listed above. We are also listing a few examples of companies serving these specific value propositions. This list is representative but not exhaustive.

The Road ahead: Challenges and Opportunities

Technology push vs. market pull

Despite a huge total addressable market and large war-chests of capital being raised, there is yet to be a breakout success in the cohort of ‘geospatial 2.0’ companies. Initial proof of concept (POC) contracts, which promise near-instant analytics at large scale,

have been signed mainly by commodities or financial services companies, but conversion of POCs into long-term, profitable partnerships has been slower than anticipated.

The one-size-fits-all platform-based model of geospatial analytics tend to have been created by space-sector executives (for example, long-term employees of NASA, national research labs, and incumbent aerospace operators). These early-movers recognized the emerging technological trends, and raised venture-funding to scale rapidly.

However, in the rush for rapid scaling, *geospatial 2.0* products have been developed by tech-savvy developers and executives from government agencies. This has led to a technology-driven approach aimed at horizontal growth across verticals via a supply-side push of technology. This initially tech-centric approach means that deep vertical specific knowledge of demand-side client needs has lagged behind the technical capabilities of geospatial platforms. Early adopters have proven willing to experiment with geospatial 2.0 solutions, but we are yet to see solutions cross the chasm and provide value at scale to the early majority of potential customers.

At the other end of the spectrum, niche application GIS consultancies have tended to be led by geographers/GIS experts, with a focus on analysts utilizing point-and-click tools (e.g. ESRI ArcGIS). Although these organizations are looking to integrate emerging geospatial technology (moving to the cloud, automation using AI), the innovator's dilemma means that there is a path dependency in place which inhibits real innovation.

The Future: Further evolution of geospatial platforms

The simplest form of PaaS is one that enables data for a small collection of data sources serving a specific set of use cases targeting a single vertical. We see early examples of such PaaS solutions in precision Agriculture (FarmShots, CropIn) and disaster analytics (Mayday, CloudtoStreet).

The next order of complexity is using a small collection of data sources to serve insights in multiple verticals. Orbital Insight, Descartes and SpaceKnow are examples with such products. Geospatial 2.0 PaaS would use a large collection of data sources to serve insights in multiple verticals.

The challenge for PaaS providers to date has been that in order to serve a wide collection of use cases, there exists a technical gap for harmonizing data from multiple sensors

together (a sensor fusion problem) and a solutions gap to address different forms in which insights can be consumed (an integration problem). These two issues can be broadly characterized as a technological problem, and a business model problem, respectively.

The solutions gap is the last-mile link, and final piece in the Geospatial 2.0 puzzle. By connecting geospatial PaaS with vertical-specific end-users, we will unlock scalable platform products that provide foundational capabilities across verticals, and solutions engineering that tailor those capabilities to specific vertical specific use cases. Herein lay the big opportunities, and winning strategies in Geospatial 2.0. We expect the rapid iteration and evolution of geospatial solutions to continue throughout 2019 and beyond, with unified platform solutions reaching technological and commercial maturity in the near future.

This is the first in a series of articles in which we explore these Geospatial 2.0 dynamics. In follow up work, we will highlight some of the emergent use-cases and vertical-specific solutions which can unlock the potential of geospatial analytics at scale.

— — —

Content here present the author's own views and are not representative of their professional affiliations.

For more, make sure to follow myself and Gopal on Medium and LinkedIn, and visit sust.global. We would love to hear from you.

Startup Geospatial Artificial Intelligence Technology Trends Tech