

## **Small Satellites Impact Global Compliance, Standards, Licensing and Data Access Technology - Build a Business Plan to Address these Impacts**

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### **ABSTRACT**

The number of commercially funded earth observation satellites will have surpassed the number of those government funded, requiring Government Agencies to address their use of commercial imagery. As more players enter this New Space additional geospatial data governance and standards become increasingly important, especially as government engages the commercial geospatial industry. Changes in governance, licensing standards and compliance are occurring from the United Nations and NATO to nation states. As more small satellite owner/operators enter the NEW SPACE commercial geospatial industry they will be faced with global compliance, standards, licensing, and data access challenges and opportunities. Advances in Machine Learning algorithms and models will underscore the importance of business models that accommodate different data access licensing and practice than OLD SPACE. A business road map checklist will be presented to assist the small satellite owner/operator in leveraging industry partners in order to allow their data to be utilized at scale, through secure commercial clouds enabling Machine Learning, and new product development in order to build product competitive advantages through algorithms and models. This map will address the impacts of global geospatial data governance challenges.

### **INTRODUCTION**

Growth in commercial earth observation small satellites – satellites measuring less than 180 kg in mass, is requiring Government Agencies to address their utilization of commercial satellite imagery data. As the number of commercially funded earth observation satellites surpasses their government funded counterparts, these agencies will have to manage their use of rapidly evolving commercial capabilities against geospatial governance standards globally that facilitate and define requirements for fulfilling international imaging and government to government partnerships. As the commercial geospatial industry in general, and small satellite industry in particular advance in terms of capabilities and engagement, satellite owner/operators should be prepared with business plans that address global geospatial governance challenges relating to compliance, standards, licensing, and data access technology.

### **COMMERCIAL GEOSPATIAL INDUSTRY**

The commercial geospatial industry is advancing to allow commercial and government clients to gather high resolution imagery data that first various temporal intervals. Persistent surveillance capabilities are changing how remotely sensed data are consumed and underscoring the importance of data accessibility as advances are made, especially in Machine Learning algorithms and models.

#### ***Industry Evolution***

The history of the commercial geospatial industry has been largely dominated by OLD SPACE methods and technology, Science and engineering focused heavy players dominate old space, relying on the government for funding. In general, there are a few strong global players that must adhere to military specification standards across all industry segments. New entrants into the commercial geospatial industry are largely New Space companies, utilizing non-traditional methods and

lower-cost technology to gain business from a selection of customers. Because they are often boot-strapped or venture capital funded, new space companies don't rely exclusively on the government as a client; however, intellectual property is often supported by government or university-funded research.

NEW SPACE developments like small satellites, secure cloud computing, and machine learning algorithms and models can converge in an information-as-a-service model where data is "gold." The persistent coverage of small satellites especially imagery data streamed from satellites to be integrated into models and algorithms that produce customer specific solutions.

### ***Data Accessibility***

Global access to data is changing and the architecture of accessing data is changing. NEW SPACE Geospatial Technology Creators require access to clean data and data licensing that enables utilization of high performance cloud computing, machine learning models and algorithms. Data is the new "gold" for this geospatial market segment and the small satellite owner/operator will face governance and policy-like challenges that must be overcome in order to increase the accessibility of satellite imagery to commercial and government clients globally.

### **GLOBAL GEOSPATIAL GOVERNANCE**

The number of small satellites globally is impacting the ways in which government programs globally have been operated for the past several decades. Changes in governance, licensing standards and compliance are occurring from the United Nations and NATO to nation states. Many US and international government agencies work under political mandates as the providers of a variety of types of geospatial intelligence (GEOINT) products, these agencies will have to manage their use of rapidly evolving commercial capabilities against geospatial governance standards globally that facilitate and define requirements for fulfilling international imaging and government to government partnerships.

Current global geospatial governance emphasizes the provision and sharing of satellite imagery data. As commercial capabilities and engagement evolve, especially in terms of artificial intelligence and machine learning, standards will foreseeably lag and agencies will be faced with new governance challenges. Licensing will be a particular challenge for those purchasing commercial imagery data. Varied or flexible licensing options will need to be adopted in order to facilitate and manage sharing of imagery data, distribution of derived products, and downstream utilization of imagery data or imagery derived data by other users.

In NEW SPACE, multisource and multimodal interoperability standards are extremely important in order to take advantage of persistent surveillance capabilities and utilizing complementary capabilities of multiple systems algorithms and models. Interoperable systems must also meet standard quality/accuracy definitions, which must be developed. These quality/accuracy definitions should pertain to calibration and validation of imagery data, minimization and elimination of false positive, satisfactory confidence intervals, etc. as required for specific customers and applications. This will require some degree of transparency in sources and accuracy/quality of sources, especially in the information-as-a-service business model.

Effective geospatial governance will further be enhanced by tradecraft specific standards. As new entrants enter NEW SPACE, diversity of sensor type and collection capabilities will increase. Broad governance can't effectively establish guidelines and standards to govern niche tradecraft.

### ***Impact on Small Satellite Industry***

Programmatic changes in governance, licensing standards, and compliance impact how commercially available small satellite imagery will be utilized commercially and by government clients. Regulation was the largest challenge from OLD SPACE. Satellite imagery producers in this space required the capacity for government contracting as well as the legal capacity to adhere to government regulations. High regulation and high costs of entry created high barriers to market entry for OLD SPACE imagery producers.

While less regulated than OLD SPACE quasi-government commercial satellite imagery producers, regulation will remain a difficult issue to address in NEW SPACE, and the small satellite industry will have to overcome barriers that limit accessibility to satellite imagery data. These challenges could extend the cycle time of innovation to a decade due to regulations and changes in governance.

The persistent surveillance capabilities of small satellite constellations can advance the accuracy and development of analysis, applications, algorithms, and models, but it must be interoperable with the systems of diverse commercial and government customers. The small satellite owner/operator will be faced with decisions regarding the format of imagery data, content of metadata, transparency of data accuracy/quality, variety of licensing options, and flexibility of licensing options among other challenges. As advances are made in Machine Learning algorithms and models,

distribution of imagery data and derived products will be of particular importance in licensing agreements.

### **DEVELOPING A BUSINESS MODEL**

As changes in governance, licensing standards and compliance occur, the small satellite owner/operator must develop business plans suited to how and by whom their data is being used. We will focus on data as the new "gold" and what can be done in the small satellite business plan to solve these other policy-like challenges to assist the small satellite owner/operator a way to build balance between security and capability, pace, agility, governance - agile digital workflow to enable local approval combined with visibility for oversight. Certain not for profit organizations, which will be listed and introduced in this presentation, can assist the small satellite owner/operator with independent and international assistance on better governance and how it can impact business. In order to do so, the small satellite owner/operator should understand who uses their data and in what part of the spectrum. Understanding your market and presenting how you will get your small satellite products to market can expedite the acquisition of appropriate licenses. Additionally, a business road map will be presented to assist the small satellite owner/operator in:

- Leveraging industry partners in order to allow their data to be utilized at scale through secure commercial clouds enabling Machine Learning and;
- New product development in order to build product competitive advantages through algorithms and models

This presentation will include an overview of the fastest growing markets for small satellite data adoption and what potential those markets are looking for in terms of product.

### **CONCLUSION**

Global access to data and the architecture of accessing data are changing. Major market domains and governments are wrestling with how to reconcile global compliance, standards, licensing, and data access with new and emerging technology and capabilities. Through this, the small satellite owner/operator must stay aware of the changes and develop a successful business plan to build upon the opportunity presented by these changes. This presentation will endeavor to provide insight and operational tactics to assist the small satellite owner/operator the ability to build a successful enterprise.

### **References**

1. Johnson, S.P., "Commercial Geospatial Industry Primer," March 2018.
2. Rohrer, M.E. "Governance Structure Changes Needed in Order to Utilize Commercial Geospatial Data Sources in the Geospatial Intelligence Community." George Washington University. April 2018.