Maxar - A Leading Space Technology And Intelligence Company

A Talk with Madhav Ragam, VP of International Sales, Public Sector Earth Intelligence, Maxar

Maxar partners with innovative businesses and more than 50 governments to monitor global change, deliver broadband communications and advance space operations with capabilities in Space Infrastructure and Earth Intelligence. With more than 60 years of experience, Maxar design and manufacture satellites and spacecraft components for communications, Earth observation, exploration and on-orbit servicing and assembly. Maxar capabilities in Earth Intelligence help customers map, detect and predict change across the globe.

We had a great opportunity to have a questionnaire with Madhav Ragam, VP of International Sales, Public Sector Earth Intelligence at Maxar. He has shared interesting insights on developments in the Earth Observation industry and its impact on national development. He also talked about products and services, key trends in the industry and how would Maxar contribute to national mission mode projects.

The questionnaire follows as...

GIS Resources - How has Earth observation, from 1860s aerial photography to 1960s satellites, contributed to science, economy, society, and national development for over 150 years?

Madhav Ragam - Earth observation has always played a critical role in society. For example, after the Second World War, satellite imagery was one of the tools that helped keep the Cold War "cold," providing global transparency that enabled nations to act based on facts, not fear.

Before the 1990s, however, Earth observation was primarily a government endeavor. The establishment of the commercial remote sensing industry helped push the sector to new heights. In 1993, one of Maxar's predecessor companies received the United States' first-ever formal remote sensing license. As the commercial remote sensing industry has grown and globalized, it has had an enormous impact on life as we know it.

For example, highly accurate satellite imagery basemaps enable precision mapping solutions that help billions of people and businesses navigate the real world. Remote sensing data plays a critical role in safeguarding national security and supports disaster response by providing near real-time insights that enable situational awareness and that help users make the best decision possible. Geospatial data is critical to helping monitor global change, from climate change to wildlife populations to urban

Madhav Ragam

VP of International Sales
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footprints. Some of the most important aspects of modern life are enabled by the Earth observation industry, and Maxar is proud to lead from the front.

GIS Resources - How are disruptive technologies reshaping the Earth Observation landscape, and how is Maxar adapting to the rapid technological changes?

Madhav Ragam - There are three big trends that are shaping the future of the geospatial industry—the evolution of multisource intelligence, the adoption of artificial intelligence and machine learning (AI/ML) technologies, and the emergence of 3D digital twins. Maxar is at the forefront of all these trends, pushing the boundaries of what's possible in geospatial intelligence.

Multisource intelligence is focused on the integration of multiple remote sensing data sources, including optical, radio frequency (RF) and synthetic aperture radar (SAR). RF and SAR data has been available for years, but as processing techniques have evolved, they have become increasingly important data sources that complement high-resolution optical imagery. RF data provides critical insight into the location and frequency of communications activity. SAR imagery can be taken at night and through clouds, providing users with 24/7, all-weather monitoring capabilities when paired with optical imagery. Customers increasingly expect geospatial intelligence companies to provide access to multiple data sources—something that Maxar has been providing for a long time.

AI/ML technologies are helping customers gain insights from geospatial data at greater speed and scale, moving from sensing to sense-making. Applied ML algorithms help automate object detection, scene characterization and more—providing critical insights in seconds instead of hours or days. Maxar has been deploying ML algorithms for many years. We're also at the next frontier for AI/ML in space, developing a hosted payload that will enable our satellites to perform on-board processing, including automatic target recognition (ATR) and other functions. On-board processing is exciting and necessary because it will reduce the latency from capture to delivery and decision on the ground and reduce the amount of data that needs to be downlinked.

The third big trend is the shift from 2D geospatial data to 3D data. Maxar is developing a scalable digital twin of the Earth to help customers explore and experience our world in 3D. Leveraging the industry's highest resolution 2D geospatial foundation and our unique 3D production capabilities, we're able to build virtual real-world environments with incredible detail and accuracy. The potential use cases for 3D geospatial products are virtually endless, but some existing use cases include military simulation and operational planning, enabling GPS-denied and autonomous navigation for vehicles, and enabling game developers to build immersive environments quickly.

GIS Resources - In what ways would Maxar contribute to national mission mode projects, specifically in city management, infrastructure development, mobility, supply chain, energy sectors, mining, and precision applications?

Madhav Ragam - For the past 30 years, Maxar has supported a wide range of government and commercial missions that have helped enable sustainable development and provided socioeconomic opportunities.

Precision mapping is critical in helping decisionmakers make decisions about everything from land use planning to infrastructure development to supply chain optimization. Maxar has the most extensive, high resolution satellite imagery archive in the industry—we recently announced the completion of the first global, satellite imagery basemap at 30 cm high-definition (HD) resolution. Our data is the foundation for Esri's "Living Atlas of the World", the foremost collection of geographic information, and has been used to help mapmaking company TomTom quickly and accurately update its map layers to help its customers improve navigation.

Our data is also critical to sustainable economic development. In Africa, for example, our satellite imagery is used to enable human population and agriculture census mapping from space, offering a far cheaper alternative to manual efforts and critical in enabling effective policy development as populations grow. Some of our geospatial products, such as Maxar's Crow's Nest solution, help monitor illegal trafficking or fishing activity around the world, as well as monitoring offshore assets such as oil platforms to ensure compliance with local regulations. We also help countries protect their natural resources, supporting wildlife population mapping, monitoring for illegal mining or logging and more.

Finally, our solutions play a critical role in enabling security, which is fundamental to societal development. This includes not only monitoring borders and areas of conflict, but also helping provide insights of the impact of natural disasters to aid in disaster response and recovery. Most recently, our Open Data Program supported recovery and aid efforts in Turkey and Syria after the

February earthquake in that region.

GIS Resources - What key factors and trends are fueling the growth and driving the expansion of the thriving space economy, which is projected to generate over $1.1 trillion in revenue by 2040?

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Madhav Ragam - The growth of space-based data and technology innovation have allowed for faster, more cost-effective satellite production and deployment.

Space-based data is more available and accessible than ever before. In addition to companies like Maxar, which have been providing space-based data for decades, there are countless startups launching satellites designed for specific use cases. Customers have realized that this data, which is far more scalable and cost-effective than most terrestrial or aerial data sources, can help solve a range of complex problems. One highly relevant example is methane emissions. Maxar recently developed a methane detection algorithm, which can help organizations identify and locate the source of methane emissions from assets such as oil and gas infrastructure within a 10-meter radius. This solution can save organizations countless hours and cost when compared to more traditional methods.

A second major factor is the shift toward smaller spacecraft, primarily for low Earth orbit (LEO) constellations. Smaller spacecraft are faster and more cost-effective to build, allowing companies to launch assets onto orbit more quickly. Maxar—which also builds spacecraft for government and commercial customers—has a flexible family of spacecraft platforms that includes the Maxar 300 series designed for high-rate production, rapid constellation deployment and mission-level reliability.

GIS Resources - Given the evolving global security scenario and the intensifying space race, how do you envision the role of Maxar, considering its technology and solutions? Furthermore, what kind of future do you foresee for Maxar in this dynamic landscape?

Madhav Ragam - Maxar has a critical role to play in the future of geospatial intelligence. The commercial remote sensing industry is now a critical partner to governments

in their national security missions, and that collaboration will only grow and deepen in the years to come. Maxar can provide vast amounts of unclassified data at scale. Moreover, we can provide that data—as well as data from other providers—in a streamlined manner that shortens sensor-to-decision timelines and makes it easy to extract the insights they need. Moreover, Maxar is enabling international allied collaboration. Some U.S. partners have access to Maxar data through U.S. government platforms, while others work with us directly. It's clear that commercial geospatial intelligence is vital for maintaining global security, and Maxar is well positioned to support our partners long into the future.

GIS Resources - With the rapid increase in space utilization, the issue of space sustainability has become a pressing concern. How do you comment or share your thoughts on the topic, considering the growing number of satellites, space debris, and other activities in orbit, and the importance of maintaining a sustainable space environment?

Madhav Ragam - All nations and people benefit from the responsible use of space. It is critical that all space operators use the space environment responsibly by following best practices for space traffic management and advocating for sound policies. Maxar aims to be a leader in responsible space operations, including by promoting flight safety and helping mitigate the risks of space debris.

As a responsible operator, we build and develop satellites that can maneuver in space to avoid colliding with space debris and other satellites. We are also developing new technology to support on-orbit servicing, including as a partner in NASA's OSAM-1 mission, which will deploy the first spacecraft to demonstrate on-orbit servicing and manufacturing. From an industry and policy perspective, we regularly collaborate with members of the space community to promote sustainable operations.

We also offer specific technology capabilities on our Earth observation satellites that can help with space domain awareness. Our satellites, including our next-generation WorldView Legion satellites, have a non-Earth imaging (NEI) capability. We can take images of space objects in low Earth orbit (LEO) at resolutions of less than six inches and we can support tracking of objects across a much wider volume of space. This capability can help operators better protect and maintain their assets in space. For example, when our WorldView-2 imaging satellite was hit by a non-tracked piece of debris in 2016, we used this capability to determine that the damage was minimal. It's an exciting capability that nicely complements other tracking solutions that support space sustainability.

GIS Resources - In the last, what are the biggest opportunities for the industry and the biggest challenges facing the industry today?

Madhav Ragam - In terms of value creation opportunities, multisource intelligence is giving users far more insight into what's happening on the ground, and AI/ML technologies are increasing the speed and scale of drawing insights from that data. The emergence of 3D terrain data is a gamechanger for many use cases. There is also an opportunity to bring these solutions to more customers across the globe. While commercial remote sensing data has been broadly used by customers in certain markets for a long time, there's opportunity to make these solutions more accessible and affordable for customers in markets across Asia, Latin America and Africa. Maxar is seeing good momentum in these geographies, thanks in part to the scalable, cost-effective solutions that we provide, and we're excited to see how that helps drive positive outcomes across the world.

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