

# NOVI ENABLES AI-POWERED SPACE EDGE COMPUTING WITH AMD VERSAL™ ADAPTIVE SoCs

## CASE STUDY



### EXECUTIVE SUMMARY

As demand grows for real-time intelligence, organizations need computing platforms that can process AI workloads directly onboard satellites, eliminating the need to transmit massive volumes of raw sensor data back to Earth. NOVI is addressing this challenge by developing high-performance onboard computers (OBCs) and AI-enabled satellite platforms powered by AMD technology.

By integrating AMD Versal™ AI Edge adaptive SoCs into its radiation-tolerant and radiation-hardened space computing platforms, NOVI enables satellites to generate actionable intelligence directly onboard the spacecraft at the sensors themselves, dramatically reducing bandwidth requirements, latency, and operational costs. This supports Earth-monitoring applications in the agriculture, maritime, energy, and environmental industries, as well as in-space applications such as object identification, inspection, rendezvous, and docking. Computing at the space edge can also help enable intelligence across multiple assets and domains.

"Users don't want more data. They want insights," said Michael Bartholomeusz, CEO at NOVI.

### ABOUT THE COMPANY

Founded in 2017, NOVI develops advanced space computing platforms designed to bring artificial intelligence and machine learning directly to the space edge. The company operates across three complementary business areas:

- AI-enabled OBCs for commercial and defense satellite platforms
- End-to-end satellite mission solutions integrating sensors, onboard computing, launch, and mission operations
- The GENIE platform, a system of multi-sensor smart satellites with edge AI compute capability in orbit that enables users to upload a broad array of algorithms and trained AI models - and receive processed, actionable insights and intelligence rather than raw data.

### INDUSTRY

Aerospace

### CHALLENGES

NOVI needed radiation-resilient onboard AI within strict SWaP limits, flexible mission support, traditional spacecraft capabilities, and edge processing to reduce data-transmission costs and latency.

### SOLUTION

NOVI built a modular onboard computing platform with AMD Versal AI Edge adaptive SoCs, enabling reliable space-based AI inference, autonomous operations, mission flexibility, and efficient delivery of actionable intelligence.

### RESULTS

Deploying AMD Versal adaptive SoCs enabled NOVI to process satellite data in orbit, reducing bandwidth, costs, and decision times while delivering automated, actionable intelligence across agriculture, energy, maritime, environmental, and security applications.

### AMD TECHNOLOGY AT A GLANCE

AMD Versal™ AI Edge adaptive SoCs

NOVI's onboard computers support space systems ranging from CubeSats to larger satellite platforms and exploration vehicles, with products optimized for Low Earth Orbit (LEO), Geostationary Orbit (GEO), and lunar missions. The company serves customers spanning commercial space, government agencies, geospatial analytics providers, maritime, energy, and scientific research.

"The common thread through all of these is our onboard computers, where we are unequivocally committed to the AMD Versal platform," Bartholomeusz said.

## CHALLENGE

Delivering AI inference in space presents unique engineering challenges that differ significantly from terrestrial computing. NOVI required a computing platform capable of executing machine learning inference directly onboard satellites while operating reliably in radiation-intensive environments. The system also needed to meet stringent size, weight, and power (SWaP) requirements without compromising performance. Flexibility was equally important, as the onboard computers had to support multiple mission profiles, a broad range of I/O optionality, and both commercial and government applications. In addition to AI acceleration, the platform needed to perform traditional spacecraft functions such as telemetry, command-and-data handling, and sensor interfacing, all while enabling autonomous decision-making and minimizing the need to transmit large volumes of raw data back to Earth or other domains or assets.

As satellite constellations continue to generate exponentially larger datasets, transmitting raw imagery and other datasets becomes increasingly expensive and introduces unnecessary latency. By processing data at the edge (in orbit rather than on the ground), NOVI sought to fundamentally change how satellite intelligence is generated and delivered.

"By pushing compute to the space edge, we dramatically reduce the cost and latency associated with transmitting massive raw datasets, while enabling actionable intelligence to be delivered where and when it is needed," said NOVI CRO and co-founder Scott Steffan.

## SOLUTION

After evaluating available technologies, NOVI selected AMD Versal™ AI Edge adaptive SoCs for its optimal combination of AI acceleration, FPGA adaptability, radiation tolerance, resistance to single-event latch-up, and SWaP optimization. These capabilities enabled NOVI to build a single platform capable of supporting diverse spacecraft workloads while maintaining the reliability required for space operations.

The adaptive architecture allows NOVI's onboard computers to perform AI inference while simultaneously supporting telemetry, command-and-data handling, sensor interfaces,

and mission-specific customization. Rather than transmitting entire datasets, satellites powered by AMD Versal adaptive SoCs analyze imagery in orbit, extract the most valuable information, discard unnecessary data, and send only actionable intelligence to users. This approach dramatically reduces cost while enabling near real-time decision making across a wide variety of commercial, government, and scientific applications.

"The Versal product line offered the best combination of performance, adaptability, and space-readiness in the industry," Bartholomeusz said.

NOVI's implementation focused on building a modular onboard computing platform capable of supporting multiple classes of spacecraft and mission profiles.

The company first integrated AMD technology into its onboard computer architecture before expanding its software capabilities to include AI inference and autonomous mission functions. As customer requirements evolved, NOVI leveraged the flexibility of the Versal adaptive architecture to support increasingly sophisticated workloads across commercial and government missions.

Development was supported primarily through AMD distributor Avnet, whose field application engineers provided responsive technical assistance throughout integration. NOVI also highlighted the value of AMD technical documentation during the design process.

"Working with AMD has been seamless," Bartholomeusz said. "Its field application engineers have consistently provided the technical expertise and responsiveness needed to keep our development moving forward."

## RESULT

Although many customer programs remain confidential, NOVI described significant operational and commercial advantages that have resulted from its AMD enabled onboard computing platform. By moving AI inference from the ground to the satellite itself, the company has fundamentally changed the economics of space-based intelligence. Instead of downloading massive volumes of raw imagery for processing, customers receive concise, actionable insights generated directly in orbit. This reduces bandwidth requirements and operating costs, shortens decision cycles, and enables entirely new classes of applications.

NOVI technology can be used for a variety of applications, including satellite autonomy, maritime intelligence, agricultural monitoring, pipeline surveillance, environmental monitoring, oil and gas operations, space domain awareness, and a wide variety of other geospatial intelligence use cases. In agriculture, for example, satellites can identify areas suffering from inadequate irrigation or pest infestations and

trigger automated responses with significantly reduced human intervention. Similar capabilities allow operators to monitor pipelines, shipping activity, and environmental changes with far greater efficiency than traditional approaches.

Bartholomeusz said the economic impact of onboard AI inference can be significant. “Rather than purchasing raw satellite imagery and performing analytics on the ground, organizations can execute inference directly in space and receive only the resulting intelligence. Depending on the use case and application, this approach can reduce costs by multiples, and potentially by up to two orders of magnitude.”

Jonathan Looney, director of AI programs and partnerships at The Modern Data Company, works with NOVI customers to help them realize the economic benefits of orbital compute. “We work with oil and gas companies to enable pipeline protection and monitor right of way passages. We also help customers with object detection and movement,” Looney said.

The Modern Data Company helps enterprises turn complex data into AI-ready knowledge through a reasoning layer that improves data quality, maps relationships and enables AI-driven decisions. Looney said the industry is shifting toward AI and local model deployment for improved efficiency, privacy, and cost control.

“What’s unique about NOVI is that it is the first to treat data as a utility, because it is able to compute at the edge. With NOVI, we’re helping companies make the jump from the information age to actual knowledge.”

Combined with NOVI’s orbital compute technology, enabled by AMD, Looney said the platform can process and analyze satellite data at the edge, delivering faster, automated insights without transmitting massive datasets to the ground. For pipeline monitoring, Looney says “NOVI costs five figures a month versus six figures a month for traditional alternatives.”

## CONCLUSION

As AI continues moving toward the edge, space-based intelligence platforms will play an increasingly important role in enabling autonomous operations, reducing infrastructure costs, and accelerating real-time decision making.

AMD and NOVI continue to collaborate on advancing AI-enabled onboard computing, expanding the capabilities of adaptive computing for commercial and government space applications. Together, they are helping redefine how intelligence is generated, processed, and delivered from space.

### ABOUT NOVI

NOVI provides the compute foundation for intelligent space systems. Through flight-proven On-Board Computers (OBCs), Mission-as-a-Service capabilities, and GENIEedge™ multi-sensor smart satellites; NOVI enables advanced computing, AI, and actionable intelligence at the space edge for applications ranging from Geo-Intelligence and Missile Defense to Space Autonomy, Lunar Operations, and Satellite Servicing. Read more about NOVI by visiting the company’s website at: <https://www.novispace.ai/>

### ABOUT AMD

For more than 50 years AMD has driven innovation in high-performance computing, graphics, and visualization technologies. Billions of people, leading Fortune 500 businesses, and cutting-edge scientific research institutions around the world rely on AMD technology daily to improve how they live, work and play. AMD employees are focused on building leadership high-performance and adaptive products that push the boundaries of what is possible. For more information about how AMD is enabling today and inspiring tomorrow, visit the [AMD website](#) (NASDAQ: AMD), LinkedIn, and X pages.

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