

Vertical Access Platform for the GOES-R Satellite

LOCKHEED MARTIN SPACE SYSTEMS COMPANY

SUMMARY

Lockheed Martin Space Systems Company needed a custom work platform for use in their GOES-R satellite manufacturing facility. Rather than design and build it themselves, they contracted the project to Spika. Working closely with the Lockheed team, Spika designed a 14-module work platform system to meet the complex requirements of the project, which included clean room- and ESD-compliance, extended overreach, and translation in three directions.

Lockheed Martin is a U.S.-based leader in space, defense, missiles, and aviation. They participate in all aspects of the defense and space industries and are the producer of the world's most advanced fighter jet, the F-35.

Lockheed Martin Space Systems Company was selected by NASA to design and build the next-generation Geostationary Operational Environmental Satellite R-Series (GOES-R). Data from the satellite will provide accurate real-time weather forecasts and early warning products to the public and private sectors. Lockheed's Denver, Colorado facility was chosen to house the satellite pre-launch.

In order to support the GOES-R manufacturing operations, the facility needed a Vertical Access Platform system. Jimmi Malacara, the Mechanical



Ground Support Equipment Lead, was in charge of sourcing the equipment. "Platforms are very important," said Malacara. "People underestimate their importance. Access is critical."

The requirements for the GOES-R platform system were fairly complex. "I had a stack of requirements that I had to go through for the customer," said Malacara. "The platforms are used to process a satellite that has high contamination requirements in a clean room setting." The system had to adhere to the following:

- Be adjustable from 14' to 16'
- Have removable, adjustable diving boards
- Incorporate sliders that could be extended from the top of the work stand

The facility with the platforms was also sensitive to magnetic fields, so the platforms had to be chromate coated and equipped with electrostatic discharge reels, ensuring connectivity throughout



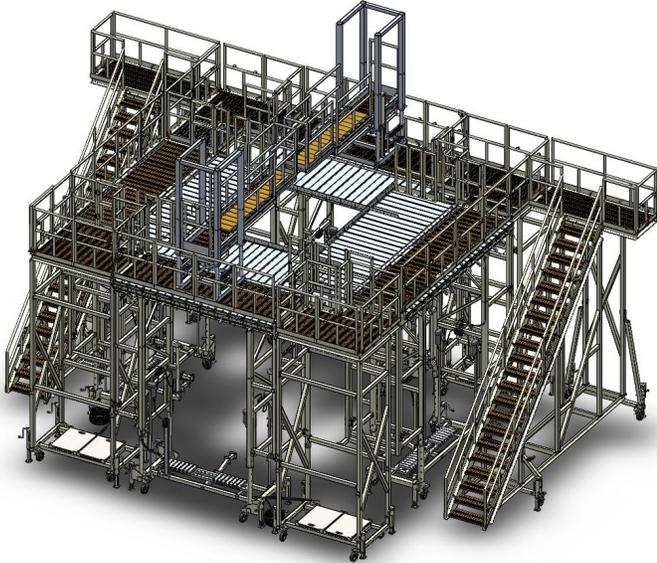
all components.

While Lockheed engineers are fully capable of designing work platforms of this caliber, they determined it would be more efficient, and a better utilization of their resources, to outsource the project to a company experienced in work platform design. In addition, the project required the development and application of several new design concepts, and the business model Lockheed operates under isn't conducive to small-scale prototype work. Malacara decided it was necessary to find an expert in the work platform industry that could partner with Lockheed's design team to develop the complicated platforms required by the GOES-R project.

The decision to outsource wasn't without risk, however. "I was taking a risk trusting this platform set with an outside company, because if it came back with a problem in quality or functionality, I could be in trouble," said Malacara.

Malacara searched the internet for leaders in the work platform industry that had the design capabilities and knowledge necessary to work with his senior engineers. The vendor had to meet the standards and requirements of Lockheed, such as having the capability to perform the necessary analyses to prove the platforms would comply with OSHA standards and regulations, meet the required factors of safety, and complete all proof testing. He only considered vendors who welded to AWS standards and had the capacity, both in facility and production manpower, to deliver on the needs of the GOES-R project.

Upon initial sourcing of the project, Malacara connected with Spika's Director of Sales, whose understanding of the details of the platforms made the initial conversations about Lockheed's requirements uncomplicated. Malacara was especially interested in Spika's design and manufacturing facility, as having both departments under one roof would make changes throughout the design and manufacturing process easy to accommodate.



The collaboration between Lockheed's engineers and Spika's design team resulted in a 14-stand system that adjusted from approximately 14' - 16'. It included two diving boards that ran on linear bearing rails across the decks, adjusted up and down, and extended out and retracted in. The platform sliders were gear-operated, and the whole system was reconfigurable for access in a variety of situations. Finally, the system was fully compliant with clean room requirements.

The platform proved to be even more useful than originally anticipated. "The platform was designed for a specific task, but we found more uses for it than we ever thought," said Malacara. And the Lockheed team was happy with the results. "I've had so many senior managers go up and down those platforms that are just impressed. We've showed them off. They're impressed with your equipment and flexibility."

Malacara's team spent months working closely with Spika's design team to develop a platform system that had cantilevered capabilities, could reconfigure quickly, and would adjust vertically, all while meeting the needs of the satellite technology and clean room requirements.

One particular challenge involved finding a way to easily adjust the sliders around the satellite so the satellite could rotate during manufacturing operations. Spika engineered a specially-designed gear-driven slider system approved for use in a clean room to make adjusting the sliders with precision possible. The new Controlled Precision Slider System utilized a crank shaft on top of the platform that allowed the user to easily and precisely set sliders around the satellite. When the satellite had to be repositioned, users could quickly crank the sliders away from the satellite. The system was also reconfigurable, as two of the height-adjustable stands could be disconnected from the tooling around the satellite and replaced with wing-specific stands.

Spika's ability to quickly create, test, and implement new designs was critical to the success of the project. "Spika can make a complicated custom application that meets the need, and if it doesn't work, they change it the next day and do a prototype of the development. It helps to get you quickly narrowed in to the right solution," said Malacara. "Spika's design team was just like an extension of my design team."

Please thank your team again for all their much appreciated hard work in working with Lockheed Martin and delivering the platform sets that have been and will be used to assemble and test the GOES-R Spacecraft. When it comes to working on the large spacecraft access is everything, and your product has gone above and beyond what we had planned for.

From initial proposal to design to production, I feel like Spika is a big team player making us successful for our customer.

-Jimmi Malacara,
Lockheed Martin Space Systems Company

