

# Access To a Conical Rocket Nozzle

## SUMMARY

**Spika designed and manufactured a work platform that could precisely contour to a conical rocket nozzle at any height, and in an upright or inverted position.**

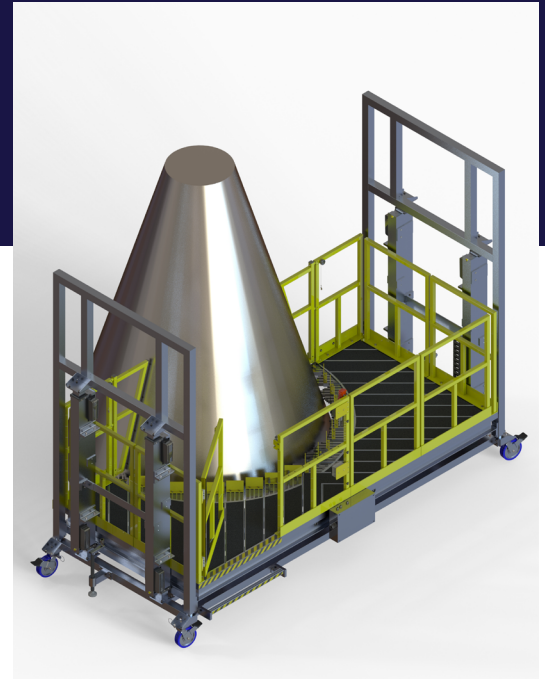
Spika's client is a leading developer and manufacturer of advanced propulsion and energetics systems. They needed to access one half of a rocket nozzle during welding tasks throughout the manufacturing process. A safety professional walking around the floor saw that a welding task required at heights was not ergonomically safe or comfortable, with the pallets currently in use for upper-level access posing a high risk of pallet slippage, resulting in a fall risk to the technicians, as well as damage to the hardware.

Additionally, with many tasks required at heights, significant time was being lost going up and down for equipment and tools. At the time, everything they had in inventory to satisfy this access need was fixed at a single height. The large hardware requiring access really needed one tool that could provide multiple heights and be accommodating to the space constraints. This led them to seek out something more stable, versatile, and easy to move.

The customer stated, "Safety should not be compromised, and it should not be overbuilt. But factors of safety, especially in flight hardware, are

very high," which led to the development of an extensive list of requirements:

- Access was required at infinitely varying heights.
- The conical shape would be worked on in both upright and inverted orientations.
- The surface was not completely uniform, and the location of interferences varied depending on the orientation of the cone.
- The work surface height needed to adjust from ground level to a maximum working height of 8.5'.
- The circular opening had to be adjustable from atop the platform as the working height was changed.
- The sliders had to close off gaps caused by the circular contact surface as well as the objects on the work surface.
- The system had to remain mobile and lightweight but would need to be stable while





positioned around the sensitive work surface.

The client chose to work with Spika because they provided OSHA-compliant products and worked with many of the customer's other suppliers, indicating a proven record in the industry. Upon Googling Spika, a lightbulb went off when they saw Spika's expertise in fitting work platforms to contoured surfaces, and it became a "no brainer" to call Spika up. Spika was able to utilize designs and lessons learned from years of designing to complex access challenges and worked directly with the client throughout the design process, providing CAD files, drawings, and supplementary data to support reviews and integration into their systems.

Spika came up with a slider deck design arranged in a unique pattern to allow the work surface to better match the circular interface of the cone. Typical deck extension sliders were too low resolution to fully close off unwanted gaps. This led to the creation of slider fingers, higher resolution end effectors housed



within a typical slider. This allowed much better matching to the circular work surface, closed off the larger gaps, and allowed for better avoidance of smaller obstructions on the cone's surface.

Due to the cone being worked on in both the upright and inverted orientations, horizontally telescopic handrail was designed to pivot and match the shape of the cone, closing off all potential gaps.

The large height range was accomplished using Spika's standard 2-stage electrically actuated leg sets with controls atop the platform. The leg sets, base-bracing, and floor locks provided system stability that significantly decreased the chances of work surface damage.

Upon delivery of the product, the customer shared,

**"I've enjoyed working with you and all your team members over the last few years. You should be very proud of your product line(s) and your industry accomplishments. We were very fortunate when our team located your company during a random internet search."**