



Satellite flying since Oct. 2023

NASA's Psyche mission, led by Arizona State University, aims to explore the metal-rich asteroid Psyche located between Mars and Jupiter. One of the mission's key innovations is the Deep Space Optical Communications (DSOC) system, which uses lasers. This technology offers faster, more efficient communication with spacecraft, marking a shift from traditional radio waves. Recently, the DSOC successfully transmitted data over 140 million miles (225 million km), a significant leap in space communication.

A critical component of this system is Cedrat Technologies' state-of-the-art piezoelectric **Point Ahead Mechanism (PAM30)**. This high-precision device, featuring a silicon carbide (SiC) mirror, ensures that the laser beam remains accurately aligned, anticipating the satellite's movements to keep it perfectly centered despite the vast distances between Earth and the spacecraft. The piezoelectric actuation allows for precise steering of the laser beam, enhancing communication reliability. Thanks to its compact design, precision, and energy efficiency, the mechanism is ideally suited for the demands of deep space missions. Cedrat Technologies' contribution to the DSOC system highlights its expertise in delivering advanced space-grade piezoelectric solutions, pushing the boundaries of space exploration.

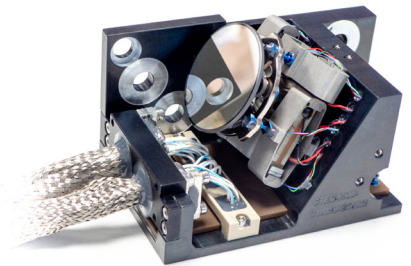


Fig. 1: Point Ahead Mechanism PAM30

> **PAM30'S ENVIRONMENTAL CONDITIONS**

- Operating temperature: -40/+65 °C
- Vacuum compatible
- Random vibration: up to 42 Grms
- Lifetime: > 7 years

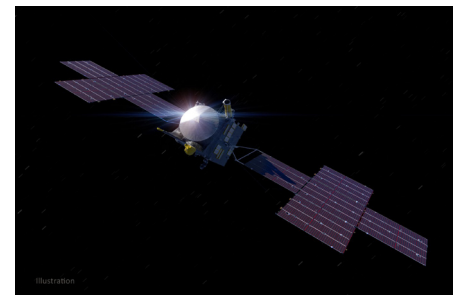


Fig. 2: Artistic view of the PSYCHE's spacecraft
Courtesy of NASA/JPL-Caltech/ASU

> **PAM30 PERFORMANCES**

PARAMETER	UNIT	PAM30
Max. angular stroke	mrad	8
Total mass	g	<500
Mirror diameter	mm	∅ 32
Loaded resonance frequency	Hz	>1200
Reflective Wavefront Error PV	nm	4

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