

# MECHATRONIC SYSTEMS FOR OPTICAL COMMUNICATION (FSO)



# MECHATRONICS FOR OPTICAL COMMUNICATION

More than 30 years ago Cedrat Technologies (CTEC) developed the first Amplified Piezo Actuator (APA®) compliant with the space environment for CNES (French Space Agency). Over the years CTEC developed more complex space mechanisms for space missions such as the XYZ stage for ROSETTA (1999) for ESA and a Beam Steering Mirror DTT35XS for an interferometer application in PHARAO (2003) for AIRBUS.

With the booming Free-Space Optical Communication (FSO) market our Fast Steering Mirrors (FSM) are developed to :

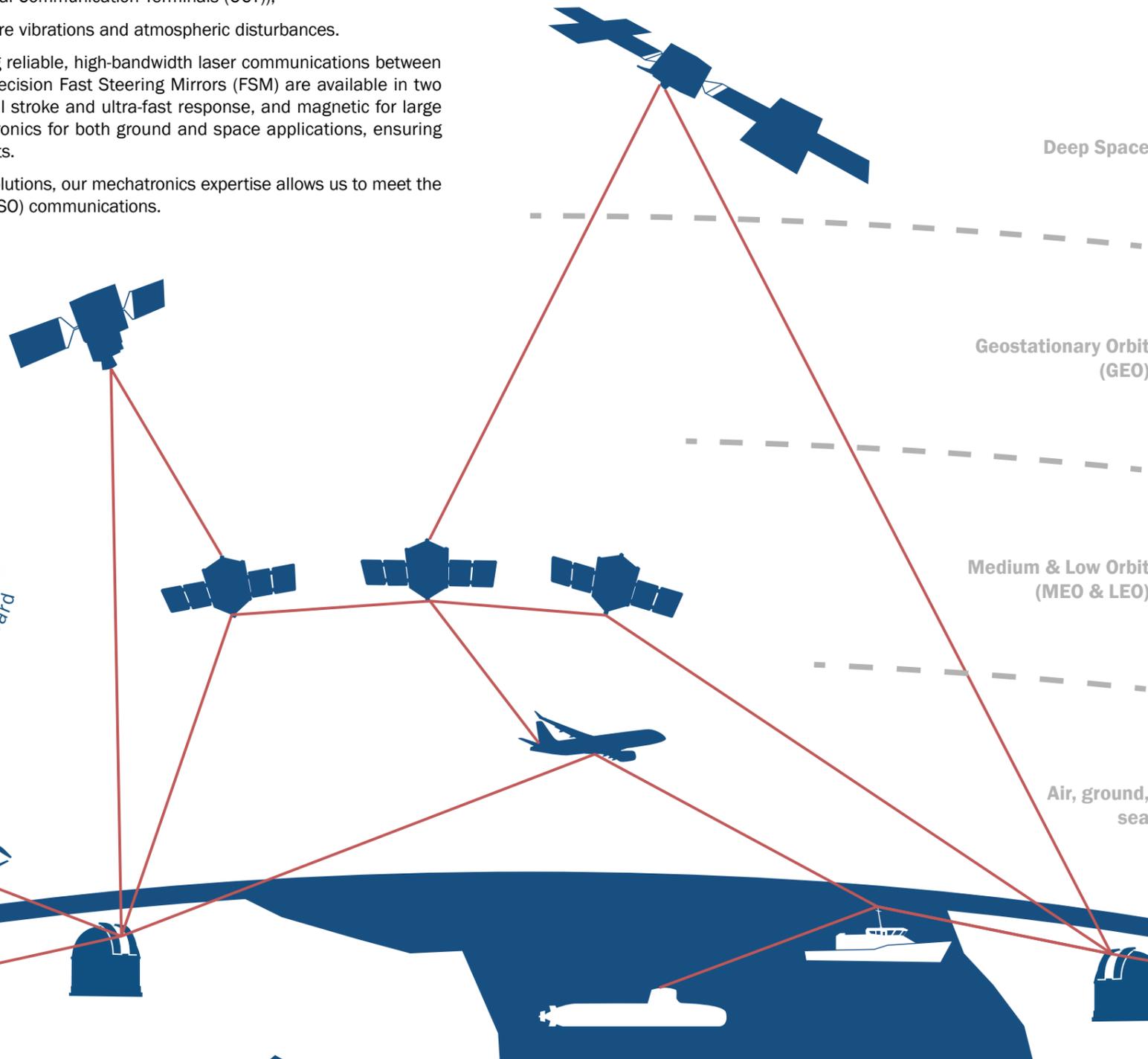
- Ensure that the laser beam remains accurately aligned, anticipating the satellite's movements as on the PSYCHE mission (PAM30 mechanism flying since 2024),
- Compensate satellite vibrations (integrated in Optical Communication Terminals (OCT)),
- Compensate Optical Ground Stations (OGS) structure vibrations and atmospheric disturbances.

These pointing mechanisms are essential for ensuring reliable, high-bandwidth laser communications between satellites or between satellites and OGS. Our high-precision Fast Steering Mirrors (FSM) are available in two versions: piezoelectric for applications requiring small stroke and ultra-fast response, and magnetic for large stroke needs. We also provide adapted control electronics for both ground and space applications, ensuring optimal performance of our systems in all environments.

Whether you need standard products or customized solutions, our mechatronics expertise allows us to meet the requirements of New Space and Free-Space Optical (FSO) communications.



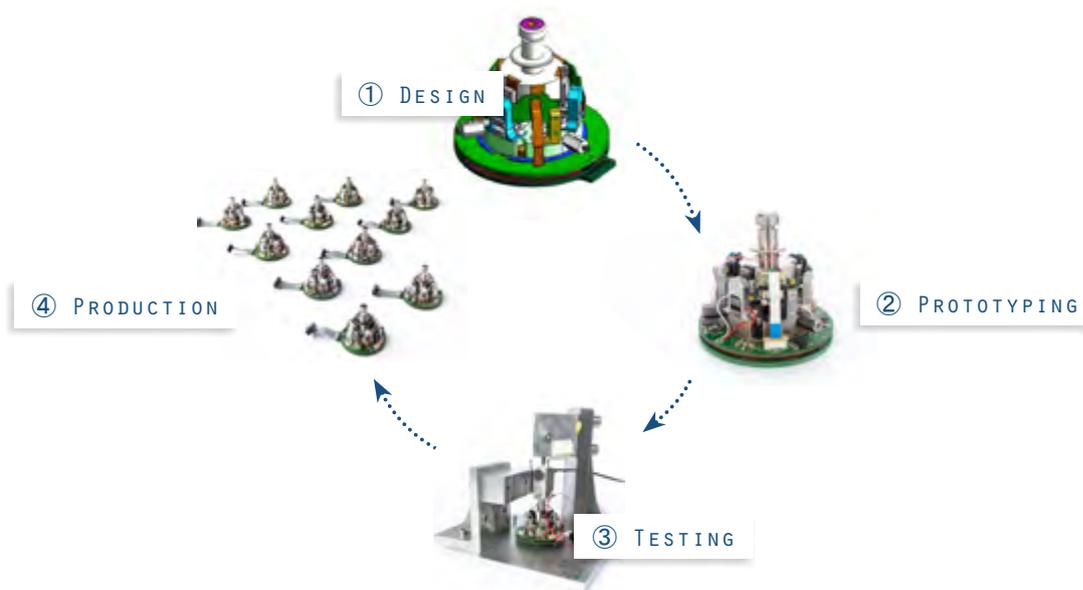
FOR A COMPLETE SOLUTION, CEDRAT TECHNOLOGIES CAN INTEGRATE CUSTOM **MIRRORS**, USING SILICON CARBIDE (SiC), OR OTHER SUBSTRATES AND HIGH-REFLECTIVITY COATINGS FOR HIGH-POWER APPLICATIONS.



CEDRAT TECHNOLOGIES offers off-the-shelf mechatronics products including piezoelectric & magnetic actuators, motors, mechanisms, transducers and sensors with corresponding drivers & controllers. These mechatronics products are used for scientific and industrial applications requiring functions such as: micro & nano positioning, generation of vibrations, micro-scanning, fast & precise motion control, active control of vibrations, and energy harvesting...

Most of the products are available in OEM versions for low cost & high volume industrial applications. CEDRAT TECHNOLOGIES also offers services including, design, R&D under contract and training.

## FROM DESIGN TO BATCHES



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