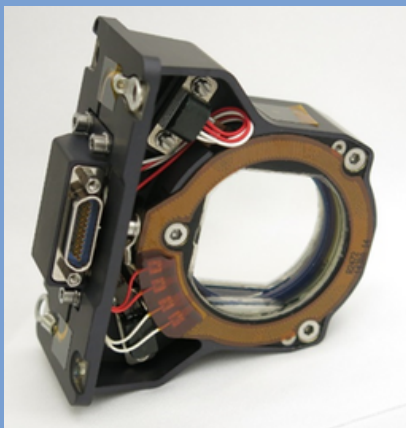




**The device
modulates and
analyzes the light
polarization for
imaging systems**

Applications

- **Earth observation**
- **Remote sensing**
- **Optical communications**
- **Quantum communications**



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Spanish Version



POLARIZATION MODULATOR BASED ON LIQUID CRYSTALS

The Space Optics Department at INTA has developed the polarization modulators based on liquid crystals for the PHI and METIS telescopes onboard Solar Orbiter mission, in operation currently. These devices allow the analysis of the light polarization of an scene with significant lower mass, volume, power and cost than the traditional systems. These features make them suitable for their use in small satellites allowing performances for Earth Observation and Communications systems only achieved before for large satellites.

Description

The polarization modulation has numerous applications. Among others is should be highlighted the remote sensing and optical communications applications. Some of them are characterization of aerosol particles in the atmosphere, health monitoring of soil and vegetation, target detection and measurement of Earth and Sun magnetic fields. Also the polarization control for Quantum Key Distribution (QKD) in quantum communication systems is other of the interesting applications.

The traditional polarization modulation systems consist of rotatory mechanism with a polarizing optical element as a polarizer o retarder plate. That produces that the systems are heavy, bulky, power consuming and with a high cost in order to guarantee the mechanism reability onboard space platform.

The polarization modulators based on liquid crystals use the mature and widely used tecnology for displays with new designs and processes in order to be robust in the harss space envieronment. Thanks to that, the mechanisms or any mobile parts are avoided and the actuation is done by the application of low voltages.

Competitive advantages

- It avoids the use of mechanism
- Mass, volume, power and cost reduction
- New performances for small satellites
- Higher performances for complex instruments and systems

Situation

The device is TRL9, Telecnological Readiness Level, “Actual system proven in operational enviroment”.

Recently, the constitution of the spoinoff EYE4SKY has been approved with INTA participation as partner for the technology commercialization.