

# MAGDRIVE

## Magnetic-Superconductor Cryogenic Non-contact Harmonic Drive

### TOWARDS MORE RELIABLE SATELLITE COMPONENTS

Maintenance of critical satellite components such as cryogenic mechanisms in space is a major challenge. MAGDRIVE will develop a harmonic drive, which needs virtually no maintenance.

Onboard spacecraft, the use of reliable cryogenic mechanisms in space is continuously increasing. Such high sensitivity instruments like infrared interferometers work at temperatures close to absolute zero, performing a wide range of remote sensing applications, such as environmental monitoring. However, the combination of very low temperature and the unavailability of maintenance is a hard requirement for these mechanisms.

The MAGDRIVE project will therefore design, build and test a magnetic-superconductor cryogenic non-contact harmonic drive. This kind of mechanism is expected to

prevent wearing and fatigue and to need virtually no maintenance and no lubrication.

In order to achieve this objective magnetic and superconducting materials are to be used. Forces among these elements will be the basis for the device.

Indeed, MAGDRIVE will explore new ways to harvest the potential of natural forces in space, profiting from the harsh space environment instead of being crushed by it.

The project is set to increase the reliability of instruments used on future satellites, and open up new perspectives for high quality instruments for health, industry and environmental applications.



**JOSÉ-LUIS PÉREZ-DÍAZ**  
IS PROJECT COORDINATOR



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**MAGDRIVE will design, build and test a magnetic-superconductor cryogenic non contact harmonic drive.**

### QUESTIONS & ANSWERS

#### What do you want to achieve with this project?

We want to build and test a new kind of non-contact drive suitable for cryogenic and space environment based on magnetic forces. It is intended not to need lubrication or maintenance.

#### Why is this project important for Europe?

These kinds of mechanisms are needed for highly sensitive instruments like infrared interferometers and other devices. They will improve the performances and reliability and will overpass the working life of the existing drives.

#### How does your work benefit European citizens?

Firstly, it will help to increase the overall reliability of the instruments in satellites and subsequently to reduce the overall cost of them. Secondly, it will open new perspectives for high quality instruments for health, industry and environmental applications.

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## LIST OF PARTNERS

- Universidad Carlos III de Madrid, Spain
- Università degli studi di Cassino, Italy
- CNR-SPIN, Italy.
- CAN Superconductors SRO, Czech Republic
- BPE e. K., Germany
- LIDAX INGENIERÍA S.L, Spain
- SIM -F.C.Universidade de Lisboa, Portugal

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## PROJECT INFORMATION

Magnetic-Superconductor Cryogenic Non-contact Harmonic Drive (MAGDRIVE)  
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