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## Free-space optical communications for CubeSats

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#### Abstract

The TeideSat project was born as an initiative of students from the University of La Laguna with the desire to know more about satellites and space, which led to constitute a team whose objective is the design, construction, placement in orbit and operation of a nanosatellite based on the CubeSat ESA standard.

It is the first satellite of the University of La Laguna and one of the first entirely from Canarias. The purpose of this project is the establishment of a free-space optical link between a ground station and a CubeSat. Serving as a precursor to make a more powerful data transmission technique a more common choice for low-cost satellites while documenting all the associated problems the team may have.

The TeideSat project consists of four fundamental pillars:

- **Scientific Objective:** To establish an optical data downlink between the nanosatellite and the surface of Earth.
- **Technological Objective:** To design and build a perfectly functional nanosatellite that complies with ESA quality standards.
- **Academic Objective:** To learn about areas of knowledge related to space outside the academic discipline of each member, with the aim of becoming a much more complete and versatile professional.
- **Dissemination Objective:** The TeideSat team believes in the importance of scientific-technical dissemination among people of all ages, but with special emphasis in the young. It devotes part of its time to this end trying to increase their interest in this topic

The TeideSat team is composed by a huge number of members from a really wide range of areas. How to manage and organize a big group of people within these types of projects, how to search for good member candidates and how to find good ways of obtaining funding are some of the issues TeideSat has come through parallel to the technical challenges of operating the CubeSat and transmitting information using an optical link (including error correcting codes for data transmission) while we are still building and designing our satellite.

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