



TELESPAZIO
a LEONARDO and THALES company

LEONARDO



2022

TELESPAZIO TECHNOLOGY CONTEST



telespazio.com

#T-TEC // I PROGETTI VINCITORI

SAFE - SYSTEM TO AVOID FATAL EVENTS

TEAM: BENEDETTA MARGRETHE CATTANI - GAIA RONCALLI - MIREIA LEON DASI – ENRIQUE FERNANDEZ-MARTIN

From: Delft University of Technology (Paesi Bassi) and Observatoire de Paris (Francia)

More than 30000 man-made objects orbit the Earth, and the probability of their collision with operational satellites continues to increase over time, especially with the advent of megaconstellations composed of thousands of satellites. Managing close encounters in space and avoiding collisions is becoming increasingly urgent.

System to Avoid Fatal Events (SAFE) is an innovative software package that can be easily integrated into any ground station. It evaluates the probability of collision between orbiting objects and suggests optimal maneuvers to minimize fuel consumption and service downtime.

The main innovation is the collision probability estimation algorithm by which SAFE achieves results that are up to 70 percent more accurate and 10 times faster than the state of the art.

SPAICE

TEAM: MATTEO CUCCORESE - NICHOLAS ARGENZIANO - GUILLEM GARROFÉ - CARLOTA PARÉS - RONALD CLARK

From: Imperial College (Regno Unito) - Max Planck Institute (Germania) - ETH Zurich (Svizzera) - Stanford University (USA) - University of Oxford (Regno Unito)

In-Orbit Servicing is of utmost importance in aerospace, as it is crucial for tasks such as docking, refueling, repairing, upgrading, maintaining space assets, and removing orbital debris.

Although several manned in-orbit servicing missions have been carried out, current technology is not yet able to provide a fully autonomous, unmanned solution for proximity tasks due to the scarcity of reliable automated solutions. For this purpose, it is indeed crucial to accurately determine the target's position and trajectory.

SPAICE aims to support ground-based control by exploiting the prospects offered by artificial intelligence. The solution is based on the improvement of photorealism, that is, the transformation of synthetic images of space assets to be acted upon into a realistic-looking version. Through the use of artificial intelligence, SPAICE is able to provide accurate images, which are essential during in-orbit operations for which the docking of a moving object is required.

SUNCUBES

TEAM: ALBERTO CHIOZZI - TOMMASO ARESI – ESTER SOMMARIVA - ALESSANDRO DE LUCA - FEDERICO OGNIBENE – ANNACHIARA IPPOLITO

From: Politecnico di Milano (Italy)

In today's space economy, solar panels and batteries represent a huge part of the cost and weight of satellites. SunCubes aims to create an alternative to the current power supply system so that satellite manufacturers can maximize their return on investment.

The solution is to have a network of standard satellites with the main purpose of producing and storing energy. The energy will be transferred to the recipient satellites through the use of laser technology.

This system will not only be a great advantage in terms of cost savings, but also increase mission flexibility, leading to reduced component and launch costs and at the same time a longer service life.

#T-TEC

2022

TELESPAZIO TECHNOLOGY CONTEST

TELESPAZIO
a LEONARDO and THALES company

LEONARDO



telespazio.com

CONSTELLATION ARCHITECTURE IN LUNAR ORBIT ENERGY WIRELESS TRANSMISSION ON THE MOON

TEAM: FRANCESCO LOPEZ – ANNA MAURO - GIUSEPPE MONTELEONE - DOMENICO EDOARDO SFASCIAMURO – ANDREA VILLA

From: Politecnico di Torino (Italy)

Lunar economy is one of the most promising realities in the space sector. Upcoming human missions to the lunar surface will target stable settlements, to which telecommunication and navigation services will be indispensable. The project aims to establish an in-orbit lunar infrastructure for wireless power transmission to the lunar surface through a constellation of satellites around the Moon.

The constellation will be in icy or near-freezing orbits at low altitude around the Moon and will send power to the lunar surface for lunar bases, exploration and scientific devices. The system is based on a few key technologies: high-power lasers, adaptive optics and photovoltaic receivers.