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Miguel Callejón Cantero

Aerospace Engineer

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Aerospace Engineering MSc from Delft University of Technology (TUDelft), and BSc at Technical University of Madrid (UPM). Very interested in space from both a scientific and technologic point of view, currently working in the Space Situational Awareness (SSA) domain. Robust mathematical abstraction capabilities and deep understanding of metaheuristic, numerical optimisation, and astrodynamic algorithms proven by previous experience. Strong team-working, assertivity, communication, and drive skills proven by international working environment. Looking for upcoming challenges which can broaden my knowledge and working experience.

Skills

Programming	Python (Conda, Pip, Numpy, Pandas, FEnics, Pykep, Pygmo, Pytorch...), Matlab, Fortran 90, C, C++
Presentation tools	Office suite, LaTeX, MarkDown, Marp, GIMP
Other technical tools	Jupyter, Visual Studio Code, Git, Linux, Paraview,
Communication	Spanish (mother tongue), English (C1, 101/120 TOEFL 23/02/2019), French (A2, basic level)

Technical Experience

ALGORITHMS ENGINEER IN THE SPACE SITUATIONAL AWARENESS (SSA) TEAM **Apr. 2023 — Currently**
GMV *Tres Cantos, Comunidad de Madrid, Spain*

- Development of astrodynamics GMV C++ library for building and maintaining a space catalogue of objects.
  - Low-level implementation of features in the library, and extensive validation through testing.
  - High-level analysis of the functionality and limitations of the algorithmic.
  - International working environment with team members working from Germany, France, and Spain .

INTERN IN THE SPACE SITUATIONAL AWARENESS (SSA) TEAM **Jun. 2022 — Apr. 2023**
GMV *Tres Cantos, Comunidad de Madrid, Spain*

- Performing Master's thesis: Assimilation of Swarm C atmospheric density observations into NRLMSISE-00.
  - Literature study on atmospheric density models, and data assimilation approaches.
  - Created a data assimilation approach to improve the accuracy of density models with several space weather conditions, satellite geometries, and altitudes, and implemented it in a GMV C++ library.
  - Preliminary results presented in NEO-SST 2 conference.

INTERN IN THE ADVANCED CONCEPTS TEAM (ACT) **Jul. 2020 — Nov. 2020**
European Space Agency (ESA) *Noordwijk, Zuid Holland, The Netherlands*

- Main task: create and develop optimisation challenges in the web platform optimize.
- Three challenges created: Jupiter Icy Moons Explorer (JUICE) mission design, Traveling Salesman Problem (TSP) based on space debris recovery, and interferometry reconstruction.

Education

Master of Science in Aerospace Engineering **Sep. 2019 — Apr. 2023**
Technical University of Delft (TUDelft) *Delft, Zuid Holland, The Netherlands*

- Specialization: Space Flight, Space Exploration. Key courses: Multi-Disciplinary optimisation; Astrodynamics, optimisation in Astrodynamics, Numerical Astrodynamics, Mission Geometry and Orbit Design, Planetary Sciences, Space Systems Engineering.
- Key projects:
  - Preliminary design of a *scientific mission to explore the centaur Chariklo*.
  - Systems requirements analysis of an *asteroid mining mission*.
  - Design of an *Earth Observation mission* required to analyse sea-level variance for a span of 10 years.
  - *Shape Design optimisation of an Earth re-entry system* to find the shape with the best compromise between three objectives.
- Literature study: Application of Taylor Series Integration to an astrodynamics trajectory to a binary asteroid system such as HERA.
- Master's thesis: Assimilation of Swarm C atmospheric density observations into NRLMSISE-00.

Grado en Ingeniería Aeroespacial **Sep. 2015 — Aug. 2019**
School of Aeronautical and Space Engineering (ETSIAE), Technical University of Madrid (UPM) *Madrid, Madrid, Spain*

- Specialization: Aerospace Science and Technology (7.14)
- Key courses: Optimisation Theory (9.4), Complex Analysis (9.5), Orbital Mechanics, Flight Mechanics, Vibrations.
- Internship in the Department of Applied Mathematics working with open source platforms FEnics, Python, and Paraview. Dissertation (Trabajo Fin de Grado, TFG): Implementation of a compressible Navier-Stokes solver using FEnics.

Activities

Formal Education in Music (Piano) at Valladolid Music Conservatory 09 2004 - 07 2014