Ramón María García Alarcia

Space Systems Engineer. Research Associate at the Technical University of Munich (TUM).
Spanish, based in Munich (Germany) ○ (+34) 620 566 185 ○ ramon@rgalarcia.com ○ www.rgalarcia.com

EDUCATION

Technical University of Munich (TUM) 11/2022 – Present
PhD in Aerospace and Geodesy
Thesis (working title): "Generative design of spacecraft"
Advisor: Prof. Dr. Alessandro Golkar

ISAE-SUPAERO 10/2020 – 10/2022
Master's in Aerospace Engineering, Major in Space Systems
Thesis: "Modeling of an image processing algorithm for vision based navigation"

Universitat Politècnica de Catalunya (UPC) 09/2015 – 09/2022
Bachelor's in Aerospace Systems Engineering, Mention in Air Navigation
Bachelor's in Telecommunication Systems Engineering
Thesis: "Design of launcher guidance and control in the frame of avionics architecture"

PUBLICATIONS

Journal Publications

1. Simone Scrocciolani, Vincenzo Messina, **Ramón María García Alarcia**, Jaspar Sindermann and Alessandro Golkar, "Advancing Satellite Network Performance: Network Analysis for Federated Satellite Systems", *IEEE Access*, 12, 2024.

Conference Publications

2. **Ramón María García Alarcia** and Alessandro Golkar, "Generative AI for the Design of Complex Systems: Roadmap and Space Mission Case Study", *Procedia Computer Science* (*Complex Adaptive Systems 2025)*, 268, 2025.
3. **Ramón María García Alarcia** and Alessandro Golkar, "A computation engine for numerical system requirements generation in LLM-based spacecraft design assistants", *75th International Astronautical Congress*, 2024.
4. Lara Schuberth, Vincenzo Messina, **Ramón María García Alarcia**, Jaspar Sindermann, Kian Bostani Nezhad, Roberto Aldea Velayos, Sofia Lennerstrand, Julie Rollet, Federico Sofio, Alessandro Tinucci Moñibas, Leonhard Kessler and Alessandro Golkar, "Leveraging event-based cameras for enhanced space situational awareness: a nanosatellite mission architecture study", *75th International Astronautical Congress*, 2024.
5. **Ramón María García Alarcia** and Alessandro Golkar, "Optimizing Token Usage on Large Language Model Conversations Using the Design Structure Matrix", *DS 134: Proceedings of the 26th International DSM Conference (DSM 2024),* 2024.
6. **Ramón María García Alarcia**, Pietro Russo, Alfredo Renga and Alessandro Golkar, "Bringing Systems Engineering Models to Large Language Models: An Integration of OPM with an LLM for Design Assistants", *Proceedings of the 12th International Conference on Model-Based Software and Systems Engineering – MBSE-AI Integration*, 2024.
7. **Ramón María García Alarcia** and Alessandro Golkar, "Architecture of a generative design tool for spacecraft and user front-end implementation through a chatbot smart design assistant", *74th International Astronautical Congress*, 2023.
8. Aurélia Bourgeaux and **Ramón María García Alarcia**, "Comparison of spacecraft vision-based navigation methods and proposal of a novel shadow-correction block", *The 17th International Conference on Space Operations – SpaceOps 2023*, 2023.
9. Miquel Sureda Anfres, Daniel García-Almiñana, Gisela Detrell Domingo, Alberto García Rigo, **Ramón María García Alarcia**, Guillem Megías Homar and David González Díez, "Proceedings of 4th edition Symposium on Space Educational Activities: April 27th, 28th, 29th 2022, Barcelona, Spain: inspiring through space", *4th Symposium on Space Educational Activities*, 2022.
10. Pau Batlle Franch, Antoni Josep Eritja Olivella, **Ramón María García Alarcia** and Paolo Dini, "User mobility inference and clustering through LTE PDCCH data analysis", *2021 IEEE 93rd Vehicular Technology Conference (VTC2021-Spring)*, 2021.
11. Guillem Megías Homar, Roger Bahí Buhigas, **Ramón María García Alarcia**, Gerard Pascual López and Adam Teixidó Bonfill, "The CADMUS experiment in the frame of the BEXUS Programme: an educational perspective", *3rd Symposium on Space Educational Activities*, 2019.

WORK EXPERIENCE

University of Arizona, Visiting Scholar (Tucson, AZ, United States of America) 08/2025 – Present
- Conducting research on the fine-tuning of Large Language Models to assist in the writing of Ontological Modeling Language (OML) code, as part of the NASA JPL "OML CoPilot"

Technical University of Munich (TUM), Research Associate (Munich, Germany) 11/2022 – Present
- Conducting research in the application of generative Artificial Intelligence -in particular, Large Language Models- to the process of designing space missions and spacecraft. The focus is on AI integration to automate or support the initial tasks of the design process, speeding it up, making it more efficient, and democratizing access to space
- Leading communications system design for a 6-Unit CubeSat technology demonstration mission with an event camera and computer vision payloads for in-space object detection, classification, and identification
- Teaching theoretical and practical-based courses in a series of topics regarding space engineering and systems engineering, and supervising master's and bachelor's students' theses

Centre national d'études spatiales (CNES), Intern (Toulouse, France) 05/2022 – 10/2022
- Implemented and tested Vision-Based Navigation algorithms for autonomous spacecraft navigation around asteroids, in particular different centroiding and ellipse fitting algorithms to calculate the relative position between the spacecraft and the asteroid, in the frame of the Milani CubeSat mission to Didymos

GTD Sistemas de Información, Intern (Barcelona, Spain) 06/2019 – 07/2020
- Developed an avionics and flight software simulator for launchers using Matlab, with a focus on the Guidance, Navigation and Control algorithms, implementing PID, LQR, and H infinity controllers

TEACHING

Spacecraft Computers, Software and Data, Instructor, Grader — Summer 2025 & 2024
Spacecraft Electronics, Instructor, Grader — Winter 2023
Design and Simulation of Microsatellites, Instructor, Grader — Summer 2023
Spacecraft Design – Fundamentals, Teaching Assistant, Grader — Summer 2025, 2024 & 2023
Space Systems Seminar, Teaching Assistant, Grader — Summer 2024 & 2023
New Space Economy, Teaching Assistant — Winter 2023
Systems Engineering – Advanced, Teaching Assistant, Grader — Summer 2023

PROJECTS

Image Recording Instrument for Sunrise (IRIS), Project Manager 2020 - 2024
- Served as project manager for the IRIS payload in the Max Planck Institute (MPS)-led Sunrise III solar observation mission in 2022 and 2024. Managed meetings with the MPS, internal schedule and documentation
- Led software development for the payload. Developed flight software in C++ for a MSP430 microcontroller with a Finite State Machines paradigm

4th Symposium on Space Educational Activities (SSEA), Vice Chair 2020 - 2022
- Promoted of the organization in Barcelona of the European Space Agency-led 4th SSEA, held in 2022
- Led & oversaw different work areas of the project as Vice Chair, including proposal, program, venue, budget, IT

Cloud chamber for high Altitude Detection of Muons Under Special relativity effects (CADMUS), Electronics & Software Leader 2016 - 2018
- Responsible of Electronics and Software for the CADMUS instrument, which flew to the near space with the ESA's BEXUS Program in 2017. Built a Raspberry Pi-based on-board computer and coded flight software using Python, communications software using sockets and TCP/IP, and ground control software using C#

International Astronomical Youth Camp (IAYC), Summer Research Participant 2016 - 2018
- Performed tradespace exploration of Earth-Moon-Earth free-return spacecraft trajectories, to select Delta-V and travel time-optimal trajectories given initial conditions — 2018, 2017

- Trained and tested Random Forests for the classification of galaxies by shape 2016
- Tested the SimCADO simulator for the MICADO instrument of the Extremely Large Telescope (ELT), simulating images of galaxies, nebulae, and other celestial bodies

Institut de Física d'Altes Energies (IFAE), Summer Research Participant 2016

- Characterized I-V curves of irradiated and non-irradiated pixel detectors for the high-luminosity upgrade of the ATLAS instrument of the Large Hadron Collider (LHC), analyzed radiation effects on pixel detector degradation

SKILLS

Programming: C, C++, Java, C#, Rust, Python, Pytorch, Matlab, PHP, Javascript, CSS, Bash, AWK

Design and Analysis: SolidWorks, Catia, Proteus, KiCad, CCS, Vitis/Vivado, Simulink, Wireshark

Languages: Spanish (Native), English (C2 CEFR Level), French (C1), Italian (B2), German (B1), Catalan (Native)

Other: Type B European Driving License, EASA Private Pilot License (PPL) theoretical exam

HONORS

DefInSpace Toulouse Hackathon, Winning Team	2021
SCAVENGE Data Challenge, Winning Team	2019
START Hack, SRF Prize	2018
CopenHacks, Bloomberg Prize	2017
Barcelona's City Council Youth Research Prize	2015
Extraordinary Baccalaureate Prize	2015
University Access Exam Distinction	2015