Massimo Piazza

Aerospace & Systems Eng. | Computer Vision / AI

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Date of Birth: July 14, 1997
Citizenship: Italy
Berlin (Germany)

Working Experience

System Budgets Engineer

Rivada Space Networks rivadaspace.com

Nov 2023 – Ongoing | Berlin, DE

- Systems Engineer responsible for system-wide technical budgets of a 600-satellite LEO constellation, coordinating closely with performance engineers and contractors; the network of laser-meshed satellites is designed to provide Carrier Ethernet services via regenerative Ka-band phased-array payloads
- Requirements/interface management and cross-segment design integration, across Space/Ground/User segments + V&V support
- Precursor mission support, including ConOps and planning of incremental capability demonstrations
- MBSE modeling support (Capella-based), including development of automated workflows and SW interfaces aimed at improving traceability and removing the human-in-the-loop
- Toolchain integration between E2E simulation, reqs. management, V&V, and MBSE environments

Lead Spacecraft Navigation Engineer

Infinite Orbits infiniteorbits.io

Apr 2022 – Nov 2023 | Toulouse, FR

- Leading development & integration of onboard software of a proximity navigation camera / star tracker
- Systems engineering: AIV/AIT support, reqs. management, agile PM, documentation, procurement, contract reviews
- Deep learning-based pose estimation (CNNs) & Kalman filtering
- Synthetic image generation (Blender/UE5 + flight dynamics sim.)
- Development of software for star tracker online calibration and performance characterization
- Integration & testing of GEO flight dynamics software
- Project coordinator for a R&D contract awarded by CNES
- 7-DoF robotic testbed integration, calibration, operations
- Business development support for proposal writing & tracking of US federal grant/contract opportunities
- Other: product management, recruiting, building optical testbeds

Computer Vision Engineer

Infinite Orbits

Jan 2021 – Mar 2022 | Toulouse, FR

- Development of an image processing pipeline (Matlab/Simulink) for angles-only navigation, enabling detection and tracking of resident space objects
- Auto-coding & HIL testing of image processing and estimation algorithms (Xilinx target hardware + FreeRTOS)
- Development of orbit determination software (Orekit-based)
- Other: link budgets, high-fidelity SRP & power generation modeling
- Early employee (#6)

Education

MSc in Space Engineering

Politecnico di Milano

Sep 2018 – Dec 2020

Thesis: "Deep learning-based monocular relative pose estimation of uncooperative spacecraft"
(English taught)

BSc in Aerospace Engineering

Politecnico di Milano

Oct 2015 – Sep 2018

Final project: "Falcon 9 2nd stage redesign using LOX/LH_2 bipropellant"

Publications

Journal papers

- M. Piazza *et al.*, "Monocular relative pose estimation pipeline for uncooperative resident space objects," *AIAA (JAIS)*, pp. 1–20, 2022.

Conference proceedings

- D. Kaidanovic, M. Piazza, *et al.*, "Deep learning based relative navigation about uncooperative space objects," in *73rd International Astronautical Congress*, 2022.
- F. Ventre, ..., M. Piazza, *et al.*, "Phase-A design of a Mars south pole exploration mission: MARS PENGUIN," in *73rd International Astronautical Congress*, 2022.
- M. Piazza *et al.*, "Deep learning-based monocular relative pose estimation of uncooperative spacecraft," in *8th European Conference on Space Debris, ESA/ESOC*, 2021.

Peer-review activity

- Peer-reviewer for scientific journals, including: *Advances in Space Research (Elsevier)* and *Journal of Aerospace Information Systems (AIAA)*

Early Working Experience

Co-founder & CTO

WatchApp, Inc.

Jan 2015 – Aug 2019 Lewes, DE, USA

- Wrote the entire source-code of the mobile apps released by the startup (Canvas Keyboard, Everboard)
- Development of handwriting recognition algorithms and integration of several REST APIs

Project Experience

Telemetry & Telecommand Engineer

MARs South Pole ExploratioN and Geysers in-sitU INvestigation (MARS-PENGUIN)

Mar 2020 – Jul 2020 Milan, IT

- Phase-A design of a rover mission to the south pole of Mars, aimed at collecting soil samples and performing in-situ investigation of geyser phenomena
- TMTC design and link budget analysis involving: cruise, EDL and Martian surface operations

Head of Aerodynamics and Flight Dynamics

Skyward Experimental Rocketry skywarder.eu

Oct 2017 – Jul 2018 (Head) Milan, IT

Oct 2016 – Sep 2017 (Dept. member)

- Carried out flight dynamics simulations and CFD analyses, aimed at designing a jet-powered UAV (project Cyrano)
- Interviewed ∼50 people and selected new team members

Skills & Background

Advanced

Astrodynamics | Propulsion Systems | AOCS | Telecommunications | Systems Engineering | Structural Dynamics | Machine Learning | Computer Vision | Orbit Determination | Attitude Determination

Matlab | Simulink | LaTeX | Git | Unix | Python | PyTorch | C | Objective-C | Auto-coding | Orekit | Valispace | Xcode | CEA | Adobe Illustrator/Photoshop/Premiere Pro | MS Office | Jira/Confluence

Intermediate

GNC | Flight Dynamics | Aerodynamics | Remote Sensing | Signal Processing | Optics | LLMs

OpenCV | Blender | SolidWorks | Solid Edge | Autodesk Inventor | Vitis (Xilinx) | Capella MBSE | HTML/CSS

Patents

WO 2023094347 (issued Nov 24, 2023)
Vision-based Autonomous Navigation System and Method for a Satellite

Accomplishments

- Pose Estimation Challenge, ESA (2020)
- "Best Freshmen of the A.Y. 2015/16" – Politecnico di Milano (Mar 2017)
- Apple's 20 Under 20 (Jun 2015)
- Smau App Awards – Rome (2014)
- Smau App Awards – Milan (2013)

Certifications

- "Deep Learning Specialization (5 courses)" by deeplearning.ai on Coursera
- "Machine Learning" by Stanford University on Coursera
- "Generative AI with LLMs" by AWS on Coursera
- "Private Equity & Venture Capital" by Bocconi University on Coursera
- "Agile Project Management" by Google on Coursera
- "Finance for Managers" by IESE Business School on Coursera
- GRE:(2017) 309/340 (Q:159 - V:150)

Languages

English: full professional proficiency

Italian: mother tongue

French: limited working proficiency

German: elementary proficiency

Other Interests

Music education

- Studied at Conservatory "A. Scarlatti"
  Classical Guitar (8 years)
  Musical Composition (4 years)
- Winner of multiple national and international classical music competitions

Various

Entrepreneurship | Venture Capital | Financial markets | Geopolitics | Artificial Intelligence | NewSpace