Fabio Valerio Buono mo

Date of birth: 07/03/1996

Nationality: Italian

CONTACT

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ABOUT ME

Ph.D. student in Aeronautics and Space Engineering at "La Sapienza"
University of Rome.

WORK EXPERIENCE

01/07/2023 – 31/10/2023 Rome, Italy

Junior Research Fellow Department of Mechanical and
Aerospace Engineering , "La Sapienza" University of Rome

Winner of the Junior Reaserch Fellowship entitled:

[ITA] " Analisi combinata di dati altimetrici e ottici per la
determinazione orbitale della sonda Europa Clipper"
[ENG] "Combined Analysis of Altimetric and Optical Data for Orbital
Determination of the Europa Clipper Probe"

EDUCATION AND TRAINING

2023 – CURRENT Rome, Italy

Ph.D. in Aeronautics and Space Engineering University
of Rome "La Sapienza"

Website https://www.uniroma1.it/it/pagina-strutturale/home │
Field of study Robotics Space Systems │ **Level in EQF** EQF level 8

2020 – 2023

MSc in Space and Astronautical Engineering University
of Rome "La Sapienza"

After the BA in Aerospace Engineering I have enrolled in MSc Space
and Astronautical Engineering choosing Mission curriculum. Currently I
have already followed and certified the following courses:

1. Gasdynamics
2. SpaceFlight Mechanics
3. Control Systems
4. Space Structures
5. Space Missions and Systems
6. Interplanetary Trajectories
7. Fluidodynamics Astrophysics and Geophysics
8. Advanced Spacecraft Dynamics
9. Electronics
10. Electronics of Space Systems
11. Space Guidance and Navigation
12. Space Propulsion
13. Robotics Space Systems

Highly interested in Orbit Determination and Attitude Determination , I
am currently focusing in Computer Vision , Probabilistic Robotics and
Visual Simultaneous Localization and Mapping (SLAM).

ABSTRACT:

In robotics, Simultaneous Localization And Mapping (SLAM) is a
fundamental problem dealing with the estimation of the robot's pose
while building a map of the operational environment it explores. In
many terrestrial and space applications, a priori knowledge of the
environment is not available, especially in hazardous regions on Earth
or planetary surfaces. To implement the capability of a vehicle to build
an accurate map of the environment while being able to localize itself
within it, a fully autonomous navigation system is essential.
Autonomous navigation systems are crucial in planetary exploration,
where interplanetary distances prevent real-time communications. For
example, a command signal from Earth to Mars takes about 5-20
minutes to reach the rover. Therefore, exploration would be extremely
difficult if the rover's path had to be controlled by commands from
Earth only.

The first formulations of SLAM were mainly based on a laser telemeter approach and implemented with Extended Kalman Filter (EKF). In the early 2000s, attention shifted to an approach based on measurements retrieved from cameras. In the literature, this type of approach is known as Visual-SLAM (VSLAM), where only data from cameras are used for pose estimation and map generation. [...]

The thesis aims to design, implement, and test a navigation system that deals with the 2D Online VSLAM problem using the Extended Kalman Filter Algorithm and a maximum likelihood data association assuming unknown correspondences, which implies no prior information on the environment. Additionally, the objective is to develop a system able to perform localization and mapping in real-time. The infrastructure used to simulate the rover's systems is based on the open-source Robotic Operating System 2 (ROS2). Thorough numerical simulations have been carried out using the open-source software GAZEBO, where a synthetic operational environment has been modeled to assess the attainable accuracies of the VSLAM system compared to a dead reckoning system.

Website https://www.uniroma1.it/it/pagina-strutturale/home | **Field of study** Robotics Space Systems |
Final grade 107/110 | **Level in EQF** EQF level 7 | **National classification** Laurea Magistrale |
Type of credits ECTS | **Number of credits** 120 | **Thesis** Visual SLAM for Planetary Rovers

2015 – 2020

BSc in Aerospace Engineering University of Rome "La Sapienza"

During in the BA in addition of compulsory courses I focused on specific topics regarding space mission, space environment,aerospace construction technology and structural calculation laboratory.

Certificated Exams for Aerospace Engineering :

- Aerodynamics
- Space Environment
- Space Systems
- Numerical Methods
- Aerospace Structures
- Aeronautic and Space Propulsion
- Atmospheric and Spaceflight Mechanics
- Aerospace Materials Technology
- Telecomunication Systems

I acquired skills:

Structural analysis using Nastran and Patran Software
Matlab for simulations, integration of differential equations system, non linear and linear equations.

Thesis Work:

Working on BA Thesis I analyzed the effect of the atmospheric drag on a cubesat in Venusian orbit and verify if such satellite standard is a good choice for mission high risk high reward. The analysis required a big effort to integrate numerically the Gauss Equations using MATLAB. The analysis of Venus atmosphere was performed by using Venus Gram 2005, a Fortran based software developed by MSFC (Marshall Space Flight Center, Nasa) from which I extracted the atmospheric data to implement a simplier model included in the code for the integration.

Website https://www.uniroma1.it/it/pagina-strutturale/home | **Field of study** Aerospace Engineering |
Final grade 104/110 | **Level in EQF** EQF level 6 | **National classification** Laurea Triennale | **Type of credits** ECTS |
Number of credits 180 | **Thesis** The effect of atmospheric drag on a cubesat in a venusian orbit

09/2013 – 05/2014 Coorparoo (Brisbane), Australia

Exchange Student in Australia Coorparoo Secondary College

Address Stanley St E & Cavendish Road, QLD 4151, Coorparoo (Brisbane), Australia | **Website** https://coorparoosecondarycollege.eq.edu.au/

09/2009 – 07/2015 Ciampino (RM), Italy

Scientific High School Diploma Liceo Scientifico Statale " Vito Volterra"

Address Via dell'Acqua Acetosa 8A, 00043, Ciampino (RM), Italy | **Website** http://www.liceovolterra.edu.it/ |
Final grade 98/100 | **Level in EQF** EQF level 4 | **National classification** Diploma Liceale

LANGUAGE SKILLS

MOTHER TONGUE(S): Italian

Other language(s):

English

Listening C1	**Spoken production** B2
Reading C1	**Spoken interaction** B2
Writing B2	

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

AnacondaPython │Programming(Matlab, Python) │Robotics Toolbox MATLAB │Robotics toolbox python │Robotic Operative System (ROS) │Linux: Intermediate user │Microsoft/Microsoft Office │MATLAB, Simulink, │JPL MONTE orbit determination code │C++

ADDITIONAL INFORMATION

Networks and memberships

2018 – 2019 University of Rome "La Sapienza"

Sapienza Rocket Team

Conferences and seminars

08/12/2019 – 12/12/2019 San Francisco, California (USA)

AGU Fall Meeting 2019

Link https://www.agu.org/fall-meeting-2019

Projects

2017 – 2018

Airbus Sloshing Rocket Workshop 2018 - 2019 I partecipated with the Rocket Team at the Airbus Sloashing Rocket Workshop. The project proposed to the examinators consisted in a water rocket that once ended the propulsion was capable of gliding in order to travel the maximum distance possible. Inside the rocket there was a tank with inside liquid water and the aim of the project, beside reaching the maximum distance possibile, was to limit the sloshing phenomenon.

Management and leadership skills

Student Representative at Academic Council of Aerospace Engineering (CAD) (Second Mandate) I have been elected Student Representative at Academic Council of Aerospace Engineering for the biennial 2021-2023.
Member of Working Group MSAR (Master Degree in Space and Astronautical Engineering)
Member of Working Group Quality Assurance Management Commission
Member of Council of Aerospace Engineering

Student Representative at Academic Council of Aerospace Engineering (CAD) I have been elected Student Representative at Academic Council of Aerospace Engineering for the biennial 2019-2021, I am member of the BAER's Work Group and I am spokesman for the first year MSAR (Master Degree in Space and Astronautical Engineering).

Link http://www.ingaero.uniroma1.it/index.php?option=com_content&view=article&id=843&Itemid=1310&lang=it

Student Representative at Liceo Scientifico "Vito Volterra" During the school year 2014-2015 I was elected Student Representative for the School Board and Student Representative for the Class Board.

Hobbies and interests

Sports and Interests I have been practising sport since I was a child including swimming, skiing and fencing at competitive level from 2002 to 2018.
I am deeply interested in reading ranging from academic publications of all kinds to books on literature and philosophy.
I love travelling and learning about other cultures.

Additional Informations

Personal Data Treatment

Roma 05/12/2023