Manuel Lombardi

EDUCATION AND TRAINING

November 2023 - Today: **PhD student in "Industrial and Management Engineering"** at Sapienza University of Rome (Rome, Italy) **-** Department of Mechanical and Aerospace Engineering
The PhD program is **funded by PNRR**, **in collaboration with EUROCONTROL** as an industrial partner**.**
Management and operations in aviation play a key role in the research project.

January 2025 - Today: **Visiting PhD student** at Lund University (Lund, Sweden) - Lund University School of Aviation
The main activity of this abroad research period involves the application of FRAM methodology to UAS pilot training context. This methodology is supported by data from simulations (e.g., tlog files, interacion logs).

Master degree: Aeronautical Engineering, 2023 (110/110)
Thesis title: *An algorithm for managing Call Sign Similarity (CSS) to improve air traffic safety*: an algorithm was developed using Microsoft Power BI, which allows to obtain the number of CSS per day, per ACC and in every hour of the day; finally a discussion was carried out, in which an approach to introduce new Call Sign proposals to mitigate the problem was analyzed.
Thesis Supervisor: Prof. R. Patriarca
Università degli Studi di Roma "La Sapienza" - Rome

Bachelor degree: Aerospace Engineering, 2020 (109/110)
Thesis title: Winglets: caratteristiche e funzionalità.
Thesis Supervisor: Prof. G. Graziani
Università degli Studi di Roma "La Sapienza" - Rome

POSTGRADUATE EDUCATION COURSES

1. 27-31 January 2025: **Engage 2 Winter School**, University of Belgrade - Faculty of Transport and Traffic Engineering
2. 18-20 November 2024: **RAM&PHM 4.0 - Advanced methods for reliability, availability, maintainability, prognostic and health management of industrial equipment,** Politecnico di Milano
3. February 2024 - July 2024: **Advanced Training Course in Project Program Portfolio Management,** Sapienza University of Rome & Project Management Institute Italy

TEACHING ACTIVITIES

January 2024 - Today: **Tutor and teaching assistant** for **2nd Level Master's Degree Programme** in **Aviation Industry Management and Operations (AvIMO)** at Sapienza University of Rome (Rome, Italy) - Department of Mechanical and Aerospace Engineering.

Being the classroom tutor supporting a Second Level Master's degree requires me to manage the Master's email in order to interact with partners and participants. This is crucial for several activities, such as organizing lectures and defining teaching schedules. In addition, all the most relevant information must be constantly updated on the official institutional website, which is also managed by me.

PROFESSIONAL EXPERIENCE

1. October 2024 - December 2024: **Support to the mapping activity and preparation of the data catalog related to the characteristic data processed by Eurocontrol tools** - Sapienza, University of Rome: thorough data catalog analysis was performed, in collaboration with Eurocontrol experts. Power BI dashboards were leverages to present final results.
2. **J**une 2023 - November 2023: **Internship Trainee** at **EUROCONTROL Headquarter** (Brussels, Belgium) - Network Management Directorate / Safety Unit: during this time I interacted with many aviation experts, and was involved in several projects, which allowed me to enhance my data analysis skills (e.g., Python, Matlab, Power BI were used). Moreover, monthly participation to data analyst groups allowed me to explore different perspectives of this domain.

IT SKILLS

M, Mathematica, Matlab, Microsoft Office, Python, Power BI

MAIN PROJECTS

1. November 2024 – Ongoing: **Demostration of FRAM applicability in ADR operating environment** – *Department of Mechanical and Aerospace Engineering at Sapienza University of Rome in collaboration with Aeroporti di Roma (AdR)*: the project is about the application of the FRAM methodology to certain maintenance activities to identify the differences between Work-As-Imagined and Work-As-Done. The thorough analysis of the data obtained during the project is crucial to obtain meaningful results.
2. November 2023 - Ongoing: **RESilience management to Industrial Systems Threats (RESIST)** - *Department of Mechanical and Aerospace Engineering at Sapienza University of Rome in collaboration with University of Bologna and Universty Politecnica delle Marche*. Research project funded under the Research Projects of National Interest (PRIN) 2022 programme: this project proposes a Human-Hardware In The Loop STAMP-based simulation to model cyber-physical complex systems. Specifically, analysis of cyber-physical data in experimental high-risk plants are performed.

RESEARCH AWARDS and RECOGNITIONS

1. **Winner of the European Safety and Reliability Association (ESRA) scholarship** for the continuing education course on "RAM&PHM 4.0: Advanced methods for reliability, availability, maintainability, prognostic and health management of industrial equipment", 18-20 November 2024, Milan (Italy)
2. **SESAR Young Scientist Award** (2nd place). SESAR is a collaborative project to completely overhaul European airspace and European Air Traffic management (ATM). SESAR Joint Undertaking manages the selection process and awarded the best three ATM researchers of 2024. *Category: Student*.
3. **Selected paper** during 13th International Association for the Advancements of Space Safety (IAASS) Conference, 8-10 October 2024, Prague (Czech Republic).
4. **Winner of the 2024 International Association for the Advancements of Space Safety (IAASS) scholarship**. The scholarship was provided for best papers submitted to the 13th IAASS Conference "Building a safe, secure, and sustainable space", 8-10 October 2024, Prague (Czech Republic).
5. **Selected paper** during 11th European STAMP Workshop and Conference "Advancing Safety in a Complex World", 2-4 October 2024, Alexandroupolis (Greece).

PUBLICATIONS

Reviewer - Journals

Since 2025: Vox Sanguinis

Since 2025: The Aeronautical Journal

Since 2024: Journal of Aerospace Technology and Management

Since 2024: The Lancet Regional Health - Southeast Asia

International journals

1. **Lombardi, M.**, Sladek, D., Simone, F., Patriarca, R.. *No more flying blind: leveraging weather forecasting for clear-cut risk-based decisions*. Transportation Research Interdisciplinary Perspectives, vol. 30, p. 101349. DOI: 10.1016/j.trip.2025.101349.
2. **Lombardi, M.**, Patriarca, R., 2024. *Tuning into whispered frequencies: Harnessing Large Language Models (LLMs) to detect Weak Signals in complex socio-technical systems*. Under review
3. **Lombardi, M.**, Pallante, G., Patriarca, R., 2024. *A novel set of indicators to assess the impact of Call Sign Similarity (CSS) to airspace complexity*. Under review
4. **Lombardi, M.**, Guskova, N., Stefana, E., Di Gravio, G., Patriarca, R., 2024. *A system-theoretic approach to assess territory readiness for Advanced Air Mobility operations*. Under review
5. **Lombardi, M.**, De Matteis, G., Di Antonio, G., Lumaca, L., Patriarca, R., 2024. *Risk assessment for a suborbital flight operation*. Under review

International conferences

1. L**ombardi, M.**, Patriarca, R., 2024. *Evaluating ground impact severity in suborbital vehicle explosion scenarios*. 3rd International Workshop on Reliability Engineering and System Safety (RECI 2024), 6-8 November 2024, online
2. **Lombardi, M.**, De Matteis, G., Di Antonio, G., Lumaca, L., Patriarca, R., 2024. *Risk assessment for a suborbital flight operation*. 13th IAASS Conference "Building a Safe, Secure and Sustainable Space", 8-10 October 2024, Prague (Czech Republic)
3. Stefana, E., **Lombardi, M.**, Patriarca, R., 2024. *A systemic safety analysis to manage eVTOL vehicles at vertiports in different life cycle stages*. 11th European STAMP Workshop and Conference "Advancing Safety in a Complex World", 2-4 October 2024, Alexandroupolis (Greece)
4. Simone, F., Nakhal, A., A., **Lombardi, M.**, Di Gravio G., Patriarca R., 2024. *Human-Hardware In The Loop (HHIL) STAMP-based simulations to model cyber-physical complexity in experimental high-risk plants*. 11th European STAMP Workshop and Conference "Advancing Safety in a Complex World", 2-4 October 2024, Alexandroupolis (Greece)
5. Nakhal, A., A., J., Simone, F., **Lombardi, M.**, Costantino, F., Di Gravio, G., Tronci, M., Bortolini, M., Mazzuto, G., Patriarca, R., 2024. *Dealing with I5.0 complexity: cyber-socio-technical systems modelling and analysis*. Proceedings of XXIX Summer School "Francesco Turco" Impianti Industriali Meccanici "Sustainability and resilience in industrial systems across the era of digitalization", 11-13 September 2024, Otranto (Italy)
6. **Lombardi, M.**, Di Gravio, G., Licu, T., Patriarca, R., 2024. *An expert system to manage Call Sign Similarity (CSS) for safer air traffic operations*. 24th NTCA International Conference (New Trends in Civil Aviation), 25-26 April 2024, Prague (Czech Republic)

Book chapters

1. Patriarca, R., **Lombardi, M.**, Veterini, A., 2025. *Beyond the hype: Nuances of using Natural Language Processing to uncover pilot adaptations in aviation.* Under review (Human System Interactions (HSI) book)
2. **Lombardi, M.**, Patriarca, R., 2025. *Evaluating ground impact severity in suborbital vehicle explosion scenarios.* Under review (Reliability Engineering and Computational Intelligence (RECI) in aviation book)

Other presentations at conferences

1. **Lombardi, M.** (2024). *An expert system to manage Call Sign Similarity (CSS) for safer air traffic operations - Updates*, EUROCONTROL, Safety Team, EUROCONTROL Headquarters, Brussels (Belgium), 27/06/2024
2. **Lombardi, M.** (2023). *An expert system to manage Call Sign Similarity (CSS) for safer air traffic operations*, EUROCONTROL, Safety Team, EUROCONTROL Headquarters, Brussels (Belgium), 22/07/2023