Allegato B

MARCO EUGENI
Curriculum Vitae

Place: Rome
Date: 10 June 2024

Part I – General Information

Full Name	Marco Eugeni
Date of Birth	-
Place of Birth	-
Citizenship	-
Permanent Address	-
Mobile Phone Number	-
E-mail	-
Spoken Languages	Italian, English, French

Part II – Education

Type	Year	Institution	Notes (Degree, Experience…)
University graduation	2007	Università di Roma "La Sapienza", Facoltà di Ingegneria Civile e Industriale	Bachelor of Science in Aerospace Engineering\Laurea Triennale in Ingegneria Aerospaziale, *cum Laude*, defending the thesis: "Studio della deformazione Finita. Applicazioni alla flessione di travi elastiche ed elastoplastiche'', Advisor: Prof. Ugo Andreaus.
University graduation	2010	Università di Roma "La Sapienza", Facoltà di Ingegneria Civile e Industriale	Master of Science in Space Engineering\Laurea Magistrale in Ingegneria Spaziale, *cum Laude*, defending the thesis "Thesis: "Studio della Biforcazione Locale dell'Equilibrio Mediante Proper Orthogonal Decomposition. Applicazioni a Sistemi Aeroelastici", Advisor: Prof. Franco Mastroddi.

Visiting Scientist	2012	Duke University, Durham, North Carolina, USA	Development of analytical and semi-analytical Normal Form methods for the study of nonlinear structural and aeroelastic systems experiencing a bifurcation of equilibrium working with the research group of prof. E. H. Dowell, one of the major experts in structural dynamics and aeroelasticity.
PhD	2014	Università di Roma "La Sapienza", Facoltà di Ingegneria Civile e Industriale, Department of Mechanical and Aerospace Engineering	Doctor of Philosophy in "Tecnologia Aeronautica e Spaziale" defending the thesis "Perturbation Methods and Proper Orthogonal Decomposition Analysis for Nonlinear Aeroelastic Systems", Advisor: Prof. Franco Mastroddi

Part III – Appointments

IIIA – Academic Appointments in the frame of SC 09/A1- Ingegneria Aeronautica, Aerospaziale e Navale), SSD ING-IND/04 (nuovi GSD 09/IIND-01 – Ingegneria Aerospaziale e Navale, SSD IIND-01/D – Costruzioni e Strutture Aerospaziali).

Start	End	Institution	Position
2014	2016	Università di Roma "La Sapienza", Centro Ricerche Aerospaziali (CRAS)	Assegnista di Ricerca for the study entitled: "Development of Out-put Only Techniques for the dynamical identification of Launcher vehicles structures", held in the frame of SSD ING-IND/04
2016	2018	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Assegnista di Ricerca for the study entitled: "Aerospace on demand laboratory, additive manufacturing methodologies for aerospace components", held in the frame of SSD ING-IND/04
2019	2021	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Assegnista di Ricerca for the study entitled "Development of Smart Structures in composite materials by means of additive manufacturing processes", held in the frame of SSD ING-IND/04.

2021	2031	Ministero dell'Università e della Ricerca	Abilitazione Scientifica Nazionale Abilitazione scientifica nazionale alle funzioni di professore di seconda fascia di cui all'articolo 16 della legge 30 dicembre 2010, n. 240 per il Settore concorsuale 09/A1 conseguita in data 3/02/2022, Domanda 35562. Abilitazione valida fino al 3/02/2031.
2022	To date	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Ricercatore a Tempo Determinato di Tipologia A for the study en: "Smart Manufacturing, Assembly, Integration and Testing di Strutture Aerospaziali", held in the frame of SSD ING-IND/04.

IIIB – Other Appointments in the frame of SC 09/A1- Ingegneria Aeronautica, Aerospaziale e Navale), SSD ING-IND/04 (nuovi GSD 09/IIND-01 – Ingegneria Aerospaziale e Navale, SSD IIND-01/D – Costruzioni e Strutture Aerospaziali).

Start	End	Institution	Position
2010	2011	Dipartimento di Vibrazioni e Rumore, Istituto Italiano di Studi ed Esperienze di Architettura Navale (INM, ex INSEAN-CNR)	Borsa di Ricerca for the study "Proper Orthogonal Decomposition con applicazioni alla riduzione della complessità di modelli di interesse aeroelastico e idroelastico". The research followed the one started during my master thesis my Master Thesis in the frame of a collaboration between the Department of Mechanical and Aerospace Engineering of the University "La Sapienza" of Rome. The theme of this study falls in those SSD ING-IND/04.
2013	2013	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Borsa di Ricerca of one month for the study "Sviluppo di metodi analitici e stocastici con applicazione a sistemi non lineari aeroelastici che stanno sperimentando cambiamenti nelle loro proprietà di stabilità" held within the SSD ING-IND/04.

2018	2019	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Incarico di lavoro Autonomo/Consulenza professionale of five months for the study: "Sviluppo di un modello matematico di sensore-struttura per il monitoraggio di deformazioni all'interno di una piastra in composito" held within the SSD ING-IND/04.
2021	2021	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Incarico di lavoro autonomo/Consulenza professionale of three months for the study: "Consulenza professionale finalizzata allo sviluppo di strutture SMART mediante approcci di Advanced Manufacturing e possibili applicazioni nel campo dello Smart Manufacturing" held within the SSD ING-IND/04.

Part IV – Teaching experience

IIIA – Teaching experience in the frame of the Bachelor degree in Aerospace Engineering/Laurea Triennale in Ingegneria Aerospaziale (L9) and Master degree in Space and Astronautical Engineering/Laurea Magistrale in Ingegneria Astronautica e Spaziale (LM20)

Period	Institution	Lecture/Course
2012 – 2016	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Teaching support to Prof. Franco Mastroddi for the courses "Dinamica delle Strutture Aerospaziali", "Aeroelasticità" held at Università di Roma "La Sapienza" – Facolta' di Ingegneria Civile e Industriale, in the frame of the Master of Science\Laurea Magistrale in Space and Aeronautical Engineering.
2016-2017	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Tutor for the course "Costruzioni Aerospaziali" held at Sapienza University of Rome - Facolta' di Ingegneria Civile e Industriale, in the frame of the Bachelor Degree\Laurea Triennale in Aerospace Engineering, Prof. Paolo Gasbarri.

2017-2018	Università di Roma “La Sapienza”, Dipartimento di Ingegneria Meccanica e Aerospaziale	Tutor for the course "Space Structures” held at Sapienza University of Rome - Facolta' di Ingegneria Civile e Industriale, in the frame of the Master degree\Laurea Magistrale in Space and Astronautical Engineering, Prof. Giuliano Coppotelli
2016-2022	Università di Roma “La Sapienza”, Dipartimento di Ingegneria Meccanica e Aerospaziale	Teaching support for the course "Costruzioni Spaziali”, held at Sapienza University of Rome - Facolta' di Ingegneria Civile e Industriale, in the frame of the Master of Science\Corso di Laurea Magistrale in Space Engineering, Prof. Paolo Gaudenzi.
2020-2023	Università di Roma “La Sapienza”, Dipartimento di Ingegneria Meccanica e Aerospaziale	“Cultore della Materia” for the course “Costruzioni Spaziali”, SSD ING-IND/04.
2020-2021	Università di Roma “La Sapienza”, Dipartimento di Ingegneria Meccanica e Aerospaziale	Incarico di Insegnamento/Professore a Contratto for the Course Course “Laboratorio di Calcolo di Strutture” (3CFU), Faculty of Civil and Industrial Engineering of Sapienza University of Rome.
2024 – to date	Università di Roma “La Sapienza”, Dipartimento di Ingegneria Meccanica e Aerospaziale	Course “Space Structures” (thought in English) for the Master degree/Laurea Magistrale in Space and Astronautical Engineering (3 CFU as RTDA), University “La Sapienza” of Rome, SSD ING-IND/04.
2024 – to date	Università di Roma “La Sapienza”, Dipartimento di Ingegneria Meccanica e Aerospaziale	Course “Smart Manufacturing and Advanced Space Technologies” (thought in English) for the Master degree\Laurea Magistrale in Space and Astronautical Engineering, University “La Sapienza” of Rome (3CFU as RTDA), SSD ING-IND/04.
2024 – to date	Università di Roma “La Sapienza”, Dipartimento di Ingegneria Meccanica e Aerospaziale	Course “Conceptual Space Mission Design” (thought in English) of the Master degree/Laurea Magistrale in Space and Astronautical Engineering, University “La Sapienza” of Rome. My role is to support the students for what concern the structural aspect of the space system project they develop during the course.

IIIB – Other Teaching experiences on theme related to in the frame of SC09/A1, SSD ING-IND/04

2019	XX Communauté des Villes Ariane (CVA) School organized by Sapienza University of Rome and AVIO s.p.a.	Lecture on the theme "Selective Laser Melting of a 1U CubeSat Structure Design for Additive Manufacturing and Assembly".
2019 - 2023	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Tutor and support to organization activities of the Master in Satelliti e Piattaforme Orbitanti of the University of Roma "La Sapienza".
2021	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale, Agenzia Spaziale Italiana	During the project ASI-DIMA "New Materials and Processes for Small Satellites for Internet Delivery production via Additive Manufacturing" I have been lecturer for a 25hurs training course for officers of different Kenyan Institution (as the Kenya Space Agency) on themes concerning Industry 4.0, Smart Manufacturing for aerospace systems, System and Concurrent Engineering, Additive Manufacturing for Space Systems. Title of the course: "System, Concurrent Engineering and Smart Manufacturing approaches for space systems design"
2021 - 2023	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Lecturer for the Master in Space Systems and Services of Università di Roma "La Sapienza". Title of the module (5h): Cyber physical systems and advanced composites

IIIC – Activity as co-advisor of PhD Thesis in the frame of SC09/A1, SSD ING-IND/04

2016-2029	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Co-Advisor of the PhD thesis "Piezoelectric Energy Harvesting by Aeroelastic Means", Dr. Hassan Elahi. Advisor: Prof. Paolo Gaudenzi
2016-2019	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale	Co-Advisor of the PhD thesis "On the simulation of part-consolidated components for Additive Manufacturing-based Supply Chain", Dr. Valerio Cardini. Advisor: Prof. Paolo Gaudenzi

2021-2024	Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale, Telespazio s.p.a.	Co-Advisor of the on-going PhD project "User-focused trade-space analysis for space architectures optimization: An integrated approach for the preliminary design of sustainable missions", Ing. Federica Conti. Advisor: Prof. Michele Pasquali. This PhD has an industrial nature with Telespazio s.p.a. as a partner.

Part V – Society memberberships, Awards and Honors

Year	Title
2010	Membro del Club Alpino Italiano, Istruttore Regionale di Arrampicata Libera, Scuola di Alpinismo e Arrampicata libera Paolo Consiglio, Sez. di Roma.
2011	Selected for VII Pegasus International Students Conference, April 27-29, 2011, Torino (Italy)

Part VI - Funding Information [grants as PI-principal investigator or I-investigator] and scientific collaborations in the frame of SC 09/A1, SSD ING-IND/04 (GSD 09/IIND-01, SSD IIND-01/D)

VIA – Grants as Principal Investigator/Responsabile Scientifico

Year	Title	Program	Grant value
2019	Design and manufacturing of distributed networks of energy harvesters within SMART composites and tissues for aerospace applications	Progetti di Avvio alla Ricerca dell'Università di Roma "La Sapienza" per l'anno 2019	
2020	Modelling and advanced manufacturing of structural components with embedded networks of sensors and energy harvesters for space applications"	Progetti di Avvio alla Ricerca dell'Università di Roma "La Sapienza" per l'anno 2020	
2022	Studio ed applicazione di tecnologie AR/VR per la rappresentazione di modelli di missione con meccanismi di Visual Navigation di assetti in orbita terrestre e lunare.	Telespazio s.p.a., Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale.	

2022	Accordo Collaborazione Scientifica per Dottorato D.M. 1061/2021 - PON "Ricerca e Innovazione" 2014-2020 - Dottorato di Ricerca in Ingegneria Aeronautica e Spaziale - 37° ciclo	Telespazio s.p.a., Università di Roma "La Sapienza", Dipartimento di Ingegneria Meccanica e Aerospaziale. Project title: "User-focused trade-space analysis for space architectures optimization: An integrated approach for the preliminary design of sustainable missions".	
2022	Call for views on the EO PNRR system and/or element architecture, Part A/Space Segment (Upstream)	Funded by European Space Agency and lead by Istituto Superiore per la Protezione e Ricerca Ambientale. Entities involved: ISPRA, Università di Roma "La Sapienza" Dipartimento di Ingegneria Meccanica e Aerospaziale, Consiglio Nazionale delle Ricerche (CNR), Istituto di Studi Superiori Pavia (IUSS), Protezione Civile Nazionale. PI of the Dipartimento di Ingegneria Meccanica e Aerospaziale WP.	
2023	Virtual and Augmented Reality tools for Satellite Industry. Applications to satellite structure Assembly Integration and Testing procedures	Progetti di Ricerca Piccoli dell'Università di Roma "La Sapienza" per l'anno 2023	
2023	Space Advanced Project for Excellence in Research and Enterprise– SAPERE	Progetto di Ricerca Industriale a sostegno della competitività del Cluster Tecnologico Nazionale Aerospazio, finanziato dal MIUR. From 2023 I substituded Prof. Gaudenzi in the PI-role for this project.	

VIA – Grants as I-investigator/Partecipante

Year	Title	Program	Grant value
2013	Development of Out-put Only Techniques for the dynamical identification of Launcher vehicles structures	Project funded by ADS/Astrium. PI prof. Paolo Gaudenzi.	
2016	Macchina per 3D additive manufacturing con polveri metalliche	Grandi Attrezzature scientifiche presso l'Università di Roma "La Sapienza" per l'anno 2015 - Prot. C26J15ENS7. PI prof. Paolo Gaudenzi.	
2016	New Materials and Processes for Small Internet-Delivery Satellites Production via Additive Manufacturing (AM-ID-SS)	Accordo Quadro n. 20l5-1-Q.0 del 27 novembre 2015 fra l'ASI e Sapienza Università di Roma. PI prof. Paolo Gaudenzi.	
2016	Definizione e sviluppo di una procedura di monitoraggio strutturale basata sull'uso di onde elastiche per l'identificazione di delaminazioni in laminati compositi	Horizon 2020 - CleanSky2 Airgreen2 (AG2): CUP E62I15001240006, autorizzato e finanziato dal MIUR D.D. 10/7/2012 n° 404/Ric. Coordinamento e Sviluppo Ricerca - CIG 6761713615. PI prof. Paolo Gaudenzi.	
2018	Development of composites by means of additive manufacturing processes	Progetti di Ricerca Grandi dell'Università di Roma "La Sapienza" per l'anno 2019. PI prof. Paolo Gaudenzi.	
2020	Technical support activities for Vega-C, Vega-E and P-120c Work Order 3 – WP9: AVUM Multi-purpose Structure Concept Design	Financed by European Space Agency, the project concerned the preliminary design of the upper stage of VEGA-E. PI prof. Paolo Gaudenzi.	

2020	Smart Manufacturing for Future Constellations	Project financed by European Space Agency concerning the introduction of Industry 4.0 and Smart Manufacturing logics within satellite industry. Entities involved: European Space Agency (ESTEC), Dipartimento di Ingegneria Meccanica e Aerospaziale and Dipartimento di Ingegneria Informatica Automatica e Gestionale of Sapienza University of Rome, RUAG Space (now Beyond Gravity), Thales Alenia Space Italy.	
2020	ECO4CO - Earth Cognite System for Covid-19	Project financed by European Space Agency concerning the development of Space Assets-based responsive systems to Covid-19 pandemic emergency. Main entities involved: European Space Agency, Telespazio, e-Geos and the interdepartmental research center STICH, Sapienza-Dipartimento di Malattie Infettive e Salutie Pubblica, Dipartimento di Lettere e Culture Moderne.	
2022	Digitalization of Linköping production line - technology study	Project financed by Beyond Gravity (ex RUAG Space) for a support to the development of a Smart Facility in Linköping, Seweden. Entities involved: Sapienza-Dipartimento di Ingegneria Meccanica e Aerospaziale, Sapienza-Dipartimento di Ingegneria Informatica Automatica e Gestionale of Sapienza University of Rome, Beyond Gravity (ex RUAG Space). PI Prof. Michele Pasquali.	

2022	HTE Components - ALM Technology modelling	WP of the PROJECT: HIGH THRUST ENGINE - Initial trade-off activities and technological choices for VEGA, AVIO s.p.a. WP PI prof. Albero Boschetto.	
2023	Enhancing aerospace Assembly-Integration-Testing (AIT) processes resorting to Augmented Reality (AR)- and Virtual Reality (VR)-based Cyber-Physical Systems (CPS).	Progetti Medi anno 2021, Università di Roma "La Sapienza". PI Prof. Michele Pasquali.	

VIA – Scientific collaboration as Principal Investigator (PI) or Investigator (I)

Year	Title	Program
2018	Joined Scientific collaboration between Mechanical and Aerospace Engineering Department of Sapienza and "Centro Sperimentale Volo" of Italian Airforce	The project aimed at the development of Additive Manufacturing techniques for the improvement of logistics supply chain of Italian Airforce. The project culminated with a functional flight on the MB339 vehicle of a stand-by compass realized in the Sapienza Additive Manufacturing Lab. **Role: Investigator (I).**
2024	Joined Scientific collaboration with Northeastern University, Boston, Massachusetts, USA.	Application of the methods and tool developed in the frame of the PhD thesis "User-focused trade-space analysis for space architectures optimization: An integrated approach for the preliminary design of sustainable missions" within the monitoring and the utilization of hospital and clinic parking lots, as well as critical areas which can be observed via satellite imagery, especially during pandemic alert periods" (Ing. Federica Conti PhD thesis see section III of this CV). The phases of the project are under planification, and the start is supposed to be October 2024. **Role: Principal Investigator (PI).**

Part VII - Experience in Technology Transfer and Innovation with the participation to spin-off or start-up

Start	End	Company	Position
2024	To date	Smart Structures Solutions s.r.l. spin-off company of Sapienza University of Rome	From January 2024 CEO of Smart Structures Solutions a spin-off company of University of Rome "La Sapienza". The company is specialized in the development of product and algorithm for the monitoring of critical infrastructures by using smart structures and space services. In the last years the Company is using its expertise developing projects in the frame of Smart manufacturing and Digitalization with particular focus to Space Industry
2017	2023	Smart Structures Solutions s.r.l. spin-off company of Sapienza University of Rome	Development of monitoring systems for large and critical civil infrastructures by using satellite assets. As structural dynamics expert I have been involved in a large number of experimental campaigns on infrastructures of important industrial players as ENEL, TERNA (electric power transmission) and WIND, TRE, TIM (communications). I coordinate also the development of technical offers and proposal for fund raising (European Community, European Space Agency)

VIIB - Experience in Technology Transfer and Innovation – Program manager experience related to the theme of SSD ING-IND/04

2023	To date	Smart Structures Solutions s.r.l. spin-off company of Sapienza University of Rome	Program manager of the project "Virtual Testing – Smart Factory 4.0". In this project, where the contractor is Thales Alenia Space Italy, Smart Structures Solutions s.r.l. is developing approaches and algorithms for Virtual Testing in both acoustic and structural domains for satellite platform. The projects is in the framework of the activities for the realization of the new Smart Factory of Thales Alenia Space Italy to be built near Rome.

Part VIII – Other Professional Experiences related to expertise within SC 09/A1, SSD ING-IND/04 (GSD 09/IIND-01, SSD IIND-01/D)

Period	Title
2019 - 2021	Technical Consultant Assistant (Assistente Commissario Tecnico di Parte – CTP for the Main Technical Consultant Prof. Paolo Gaudenzi (CTP) in the analyses for the determination of the causes of an aircraft accident happened in the Leonardo da Vinci Fiumicino Airport in 2013. The service has been performed for Alitalia s.p.a. within the trial executed by the Civitavecchia Justice Court.

Part IX – Research Activities

Keywords	**Brief Description**
Aerospace Structures MAIT Cyber-physical systems Smart Manufacturing Additive Manufacturing Model-Based System Engineering	**Smart Manufacturing, Advanced Manufacturing, and Innovative Design logics for Aerospace Systems MAIT Improvement** "Industry 4.0" and "Smart Manufacturing" encompass a crucial set of technologies that address the current industrial scenario's needs and is particularly related on the construction of structural components of aerospace systems. The evolution of connectivity and computational capabilities bridges the physical and virtual worlds, while new operational advanced technologies, such as Additive Manufacturing (AM), push the boundaries of design. Within this research stream, concepts, and ideas from Industry 4.0, Smart, and Advanced Manufacturing have been applied to the design of aerospace structures and their Manufacturing, Assembly, Integration, and Testing (MAIT) processes. The results, developed through significant collaboration with important institutional and industrial partners, can be categorized into two main areas, herein described, both characterized by a high level of multidisciplinary as the presence of expert of different field within the authors' line of the related publications demonstrates. In this set of complex research activities, my main role was to coordinate the various participating experts, setting up the research, and acting both as a collector and a linking element between the requirements and peculiarities of aerospace systems, with particular reference to the structural subsystem, and the various experts from different disciplines involved. I also oversaw the development of the different methodologies used, the analysis of the state of the art, and the various structural analyses involved **[1-4].** **Design for Additive Manufacturing of space structures in the framework of aerospace systems** This research investigates the evolution of the design process induced by AM for aerospace systems with particular attention to the structural elements/components of small satellites **[1-2]**. It focuses on identifying optimal design strategies to propose innovative structural configurations that minimize system complexity through parts reduction and subsystem integration into a novel assembly configuration **[2]**. The study optimizes the design of structural parts and their supports to reduce print-induced residual

stresses and distortions. Some results in this field were developed under the project "New Materials and Processes for Small-Satellites for Internet-Delivery Production via Additive Manufacturing," financed by the Italian Space Agency and led by the Department of Mechanical and Aerospace Engineering at Sapienza University of Rome [5].
Key applications of AM in aerospace structures include improving the logistics of production lines **[1]**. AM's digital foundation allows for the modification of current logistics, enabling remote manufacturing, obsolescence and structural integrity management, and easy customization of components within serial production. AM facilitates easy design integration, the creation of virtually any shape, and complex feature integration, significantly simplifying the assembly of structural sub-system. A fruitful collaboration between the Department of Mechanical and Aerospace Engineering and the Italian Military Air Force's Official Test Center (Centro Sperimentale Volo) explored applying AM in a logistical framework **[3]**. The study culminated in a functional flight test where the structural box of a standby compass prototype made using Selective Laser Melting AM technology was tested on the MB-339 vehicle **[3].** This project was part of a PhD thesis, which I co-advised, on simulating part-consolidated components for an AM-based supply chain by Dr. Valerio Cardini **[2].** From 2022 I am member of the Sapienza team that is working with experts of AVIO s.p.a. to develop approaches of modeling AM processes in the frame of launcher industry. The reaching of the previous results has been possible thanks to the multidisciplinary synergy between my research group with a background in aerospace structures and experts in the field of Mechanical Technologies and Additive Manufacturing from the research group of Prof. Alberto Boschetto (see related publication below) and the inputs from the industrial and institutional aerospace environment that addressed the considered applications.

Smart Manufacturing for the Improvement of MAIT Processes for the Small-Satellite Industry and Model Based approaches for the preliminary design of constellations:

The trend towards developing very large constellations of hundreds or thousands of small satellites marks a significant shift in the satellite industry, necessitating increased monitoring and optimization of manufacturing processes and the overall MAIT cycle **[4].** This study started by developing a cyber-physical system for the Beyond Gravity production line, embedding artificial intelligence to predict potential misalignments in production parameters concerning the sandwich panels of the structure of the satellites of the One Web constellation [**4**-5]. The ITT ESA project "Smart Manufacturing for Future Constellations" funded this activity, involving a multidisciplinary team from both academia (Departments of Mechanical and Aerospace Engineering and Computer, Control, and Management Engineering) and industry (Beyond Gravity and Thales Alenia Space Italy) [6-7]. The results of this study for satellite industry have been extended to the launcher industry and scaled up to a smart factory level in the project “Digitalization of Linköping production line - technology study” funded by Beyond Gravity and still under development. This project is relevant to the structural element acting at the top of a large launcher as a dispenser of large

constellations satellites. This structural component has a cylindrical shape and is manufactured in composite materials and accommodates a large number of inserts and connections. The structure is manufactured as an elemental modulus that can be assembled as a single or multiple element dispenser. The last developments of this research stream consider the use of Augmented Reality and Virtual Reality technologies for the improvement of AIT processes of space industry with particular focus on the structural sub-systems and their testing (developed in the new AR/VR laboratory of the Dept. of Mechanical and Aerospace Engineering of Sapienza University of Rome), the development of Virtual Vibration Testing logics for satellite industry [7-9] and are also related to the better described research activity in the last part of this CV "Model-Based Approaches for the Preliminary Design of LEO Constellations of Small Satellites and optimization of space-based services". Key element for the reaching of the described results has been the multidisciplinary environment of the research groups involved lead by expert from Information Technologies (Prof. Massimo Mecella), Industrial Implant (Prof. Francesco Costantino), Mechanical Technologies (Prof. Alberto Boschetto), Aerospace Structures (Prof. Paolo Gaudenzi) and the inputs from important players of space industry that addressed the explored applications.

Relevant related publications <u>attached</u> to the present application:

[1]. Gaudenzi, P., Atek, S., Cardini, V., Eugeni, M., Graterol Nisi, G., Lampani, L., Pasquali, M., Pollice, L. Revisiting the configuration of small satellites structures in the framework of 3D Additive Manufacturing (2018) *Acta Astronautica*, vol. 146, pp. 249-258.

[2]. Boschetto, A., Bottini, L., Eugeni, M., Cardini, V., Nisi, G.G., Veniali, F., Gaudenzi, P. Selective Laser Melting of a 1U CubeSat structure. Design for Additive Manufacturing and assembly (2019) *Acta Astronautica*, vol. 159, pp. 377-384.

[3]. Boschetto, A., Bottini, L., Cardini, V., Eugeni, M., Gaudenzi, P., Veniali, F. Aircraft part substitution via additive manufacturing: design, simulation, fabrication and testing (2021) *Rapid Prototyping Journal*, vol. 27 (5), pp. 995-1009.

[4]. Eugeni, M., Quercia, T., Bernabei, M., Boschetto, A., Costantino, F., Lampani, L., Spaccamela, A.M., Lombardo, A., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M.M., Morabito, G., Simoni, A., Brandão, A., Gaudenzi, P. An industry 4.0 approach to large scale production of satellite constellations. The case study of composite sandwich panel manufacturing (2022) Acta *Astronautica*, 192, pp. 276-290.

Relevant related Publications not included among the selected to be attached at the present application (see also Annex1):

[5]. Eugeni, M., Biondi, F., P. Gaudenzi, Jahjah, M. "Multi-criteria decision-making process in order to select and redesign a satellite component in line with Additive Manufacturing logics", *72nd International Astronautical Congress*, IAC 2021, 25-29 October 2021.

[6]. Bernabei, M., Eugeni, M., Gaudenzi, P., Costantino, F. Assessment of

Smart Transformation in the Manufacturing Process of Aerospace Components Through a Data-Driven Approach (2023) *Global Journal of Flexible Systems Management*, 24 (1), pp. 67-86.

[7]. Gaudenzi P., Eugeni M., Conti F., L. Lampani, Pasquali M. From the experience of Smart Structures to Smart Manufacturing: a general approach for the realization of a Space Smart Factory (2024), 33rd International *Conference on Adaptive Structures and Technologies*, ICAST 2024, 20-22 May 2024, Atlanta, Georgia, USA.

[8]. Eugeni M., Boschetto A., Costantino F., Culla A., Fregolent A., Lampani L., Lorenzetti C., Mastroddi F., Mecella M., Milana S., Morabito G., Pasquali M., Saltari F., Stancu A., Gaudenzi P. A General Approach for the Application of Smart Manufacturing Concepts to Space Industry (2024), *Worldwide Advanced Manufacturing Symposium for Space, Air and Land Transportation*, 19-23 February, Orlando, Florida, USA.

Upcoming conferences presentation:

[9]. Pesce J., Marinacci M., Borgia M., Pasquali M., Eugeni M., Mecella M., Piergentili F., Gaudenzi P. Cyber-physical system implementation for the AR-assisted AIT of aerospace components (2024) *34th Congress of the International Council of the Aeronautical Sciences*, September 9-13, 2024, Florence, Italy

Keywords

Aeroelasticity
Fluid-Structure Interaction
Energy Harvesting
Smart Structures
Piezoelectricity
Sensor Networks
IoT

Brief Description

Aeroelastic Energy Harvesting and Smart Structures

In recent decades, piezoelectric materials have emerged as crucial components for energy harvesting, thanks to their ability to absorb energy from the structural vibrations and convert it into electrical energy **[1].** This capability allows them to power electronic devices directly or indirectly. As the power requirements of electronic circuits have diminished to nano or microwatts, there has been significant progress in developing piezoelectric transducers that address power generation challenges and facilitate self-powered systems **[2,4].**

This area of study is particularly significant given the growing appeal of distributed sensor networks, wireless communication, and potentially self-powered applications in the industrial sector, driven by paradigms like Industry 4.0 and Smart Manufacturing. Our research has focused on harvesting energy from operational conditions, particularly through mechanisms based on structural vibrations induced by Fluid-Structure Interaction phenomena [**3**,5]. We have achieved substantial theoretical and experimental results in the field of flutter-based energy harvesters, especially those involving highly flexible structures, such as flag flutter. My contribution to this field strongly relies on previous activities in the field of aeroelasticity started during my PhD thesis with Prof. Franco Mastroddi and subsequently developed in the other research areas better illustrated in the the following of this CV.

This research stream has benefited from a collaborative, multidisciplinary environment. The involved research groups include the Smart Structures group led by Prof. Gaudenzi and Prof. Luca Lampani, the aeroelasticity group headed by Prof. Franco Mastroddi, and the experimental aerodynamics group led by Prof. Giampaolo Romano. This professional accomplishment has been made possible by my multidisciplinary background, which began with structural dynamics and aeroelasticity and has evolved to include Smart Structures and Sensor Networks in recent years. Notable outputs from this research include significant publications, a comprehensive book on aeroelastic energy harvesting, and the PhD thesis that I co-advised, "Piezoelectric Energy Harvesting by Aeroelastic Means" by Dr. Hassan Elahi. My main role was to conceive and setting up the research, coordinate the various participating experts, conceiving. I developed the the methodologies and analytical approaches used (both numerical and experimental) **[3]** and organized and addressed the study and the analysis of the state of the art **[1,2]**. Notable results of this stream of activity has been the publication of the research book [4].

Relevant related publications <u>attached</u> to the present application:

[1]. Elahi, H., Eugeni, M., Gaudenzi, P. A review on mechanisms for piezoelectric-based energy harvesters (2018) *Energies*, vol. 11 (7), art. no. 1850.

[2]. Elahi, H., Munir, K., Eugeni, M., Atek, S., Gaudenzi, P. Energy harvesting towards self-powered IoT devices (2020) *Energies*, vol. 13 (21), art. no. 5528.

[3]. Eugeni, M., Elahi, H., Fune, F., Lampani, L., Mastroddi, F., Romano, G.P., Gaudenzi, P. Numerical and experimental investigation of piezoelectric energy harvester based on flag-flutter (2020) *Aerospace Science and Technology*, vol. 97, art. no. 105634.

Relevant related Publications not included among the selected to be attached at the present application (see also Annex1):

[4]. Elahi, H., Eugeni, M., Gaudenzi, P. Piezoelectric Aeroelastic Energy Harvesting (2021), Elsevier, November 22, 2021, eBook ISBN: 9780128241776, Paperback ISBN: 9780128239681

[5]. Elahi, H., Eugeni, M., Gaudenzi, P. Design and performance evaluation of a piezoelectric aeroelastic energy harvester based on the limit cycle oscillation phenomenon (2019) Acta Astronautica, vol. 157, pp. 233-240.

Keywords
Viscoelasticity
Continuum Mechanics
Structural Dynamics
Aeroelastic System Control
Rational Thermodynamics,
Launch Systems
Propellant grain behavior

Brief Description

Modelling of viscoelastic continua and applications to aeroelastic control

The numerical modeling of highly damped viscoelastic materials is paramount importance for aerospace applications, such as the dynamic analysis of solid rocket motors—which exhibit high damping ratios due to the presence of solid propellant—and the design of passive damping devices to minimize vibrations in aeronautical and space systems **[1].**

Time-domain viscous damping models, which produce damping forces proportional to velocities, are directly applicable in transient simulations. However, they yield a frequency-linear dissipative behavior that lacks experimental validation. Conversely, frequency-domain hysteretic damping models, which produce damping forces proportional to displacements, offer a frequency-constant dissipation that more accurately describes the behavior of certain materials. Despite this, using hysteretic models in transient analyses can result in unphysical, non-Hermitian, and non-causal system responses **[1,2].** The research has investigated and contextualized these issues, starting from highly general first principles **[2,3**-5]. This research stream is characterized by a solid mathematical physics approach, aimed at bridging theoretical findings with practical industrial applications striving to enhance the capabilities of commonly used commercial software by applying our results to improve the accuracy and reliability of numerical modeling for viscoelastic materials in aerospace contexts. My role in this research activity was to develop the physical-mathematical approach by linking the fundamental principles underlying viscoelastic constitutive relationships with the numerical approaches used in industrial applications **[3,2]**. This allowed the formalization of practical guidelines for the correct modeling of viscoelastic damping **[1,2,3**,4,5].

Relevant related publications <u>attached</u> to the present application:

[1]. Eugeni, M., Saltari, F., Mastroddi, F. Structural damping models for passive aeroelastic control (2021) *Aerospace Science and Technology*, vol. 118, art. no. 107011.

[2]. Mastroddi, F., Martarelli, F., Eugeni, M., Riso, C. Time- and frequency-domain linear viscoelastic modeling of highly damped aerospace structures (2019) *Mechanical Systems and Signal Processing*, vol. 122, pp. 42-55.

[3]. Mastroddi, F., Eugeni, M., Erba, F. On the modal diagonalization of viscoelastic mechanical systems (2017) *Mechanical Systems and Signal Processing*, vol. 96, pp. 159-175.

Relevant related Publications <u>not included</u> among the selected to be attached at the present application (see also Annex1):

[4]. Eugeni, M., Saltari, F., Mastroddi, F., Riso, C. Structural damping models for passive aeroelastic control (2019) International Forum on Aeroelasticity and Structural Dynamics 2019, IFASD 2019, Savannah, Georgia, USA, 9-13 June 2019.

[5]. Eugeni, M., Saltari, F., Mastroddi, F. "Damping models in aircraft

flutter analyses (2019) First International Nonlinear Dynamics Conference (NODYCON), 17-20 February 2019, Roma (Italy).

Keywords

Complex Systems
Chaos
Bifurcation of Equilibria
Reduced Order Modelling
Dissipative systems dynamics
Identification of Time-Varying Dynamical Systems Systems
Launch Systems Identification

Brief Description

Nonlinear dynamics and Identification of structural and aeroelastic systems

This research stream focuses on analytical and semi-analytical approaches to studying the nonlinear dynamics of dissipative systems, with a particular emphasis on applications in structural dynamics and aeroelasticity **[1,2]**. The core objective of my research has been to identify the fundamental terms that govern the complex dynamics arising when a system experiences changes in its stability properties **[1].** A key area of focus has been understanding the role of damping in the spread of chaos and its relation to system dimensions **[1,2**,3].

One of the most important theoretical results in this research stream has been demonstrating the equivalence of Proper Orthogonal Modes and Eigenfunction modes near a Hopf bifurcation the demonstration of which is in [4] that cannot be attached to the present application because the time constraints for the selectable publications. Additionally, I have established a neighborhood of validity for small-divisor based normal form solutions near a Hopf bifurcation and formally determined a mathematical criterion for the activation of slave modes **[1]**. These findings provide crucial insights for the reduced-order modeling of complex dynamical systems **[1,2,**4]. Some of the most important results of this research stream have been developed during my research visit at Duke University and the following collaboration with Prof. E. Dowell, William Holland Hall Distinguished Professor, a major expert in nonlinear structural dynamics and aeroelasticity **[2**,3]. Another important aspect of this research has been the identification of dynamical systems, particularly those with time-varying properties such as launch transportation systems where I identified a theoretical criterion for the analysis of the sensor outputs during the flight of the launcher [6,8]. This work has been significantly advanced through a collaborative project with the Centro Ricerche Aerospaziali Sapienza, Università di Roma "La Sapienza" and AIRBUS-Astrium [5-7] (see the Grants Information Section of this CV).

Relevant related publications <u>attached</u> to the present application:

[1]. Eugeni, M., Dessi, D., Mastroddi, F. A Normal Form analysis in a finite neighborhood of a Hopf bifurcation: on the Center Manifold dimension (2018) *Nonlinear Dynamics*, vol. 91 (3), pp. 1461-1472.

[2]. Eugeni, M., Mastroddi, F., Dowell, E.H. Normal form analysis of a forced aeroelastic plate (2017) *Journal of Sound and Vibration*, vol. 390, pp. 141-163.

Relevant related Publications <u>not included</u> among the selected to be attached at the present application (see also Annex1):

[4]. Eugeni, M., Dowell, E.H., Mastroddi, F. Post-buckling longterm

dynamics of a forced nonlinear beam: A perturbation approach (2014) *Journal of Sound and Vibration*, vol. 333 (9), pp. 2617-2631.
[5]. Mastroddi, F., Dessi, D., Eugeni, M. POD analysis for free response of linear and nonlinear marginally stable aeroelastic dynamical systems (2012) *Journal of Fluids and Structures*, vol. 33, pp. 85-108.
[6]. Eugeni, M., Coppotelli, G., Mastroddi, F., Gaudenzi, P., Muller, S., Troclet, B. OMA analysis of a launcher under operational conditions with time-varying properties (2018) *CEAS Space Journal*, vol. 10 (3), pp. 381-406.
[7]. Conti, E., Saltari, F., Eugeni, M., Camerini, V., Coppotelli, G. Modal parameter estimate of time-varying system using operational modal analysis based on Hilbert transform (2017) *17th International Forum on Aeroelasticity and Structural Dynamics*, IFASD 2017, Como, Italy, 25-28 June.
[8]. Eugeni, M., Saltari, F., Coppotelli, G., Dessi, D. A Method for the estimate of modal parameters of time-dependent aerospace structural systems using operational data (2017) *7th International Operational Modal Analysis Conference*, IOMAC 2017, Ingolstad, Germany, 10-12 May.

Keywords

Model-Based System Engineering
Concurrent Engineering
Small Satellites
Space-based Services

Brief Description

Model-Based Approaches for the Preliminary Design of LEO Constellations of Small Satellites and optimization of space-based services

Traditional approaches to satellite infrastructure design are closely linked to initial conditions and financial efforts, using optimization methods to design specific performances for each individual spacecraft by focusing on individual design each time [1,2]. This means that there is a lack of a holistic approach to constellation design that considers the entire mission, from the analysis of user needs to technical and economic constraints up to the optimal final architectures. The need to develop design tools capable of responding to these requirements is significant in the current industrial scenario, where large constellations of small satellites in Low Earth Orbit (LEO) are increasingly important for Earth observation and Telecommunications [1]. This research stream, which is strictly linked to the framework of the new design methodologies considered in the first research described in this CV, focuses on developing integrated design techniques and tools that structurally link user requirements and services with the technical requirements of the constellation [1,2].

The first subject of study within this research activity was the IRIDE constellation. The IRIDE program will be able to guarantee a satellite constellation for Earth observation that will meet the needs of the users of the Italian Copernicus User Forum. The study aimed to formulate an approach to carefully consider customer demand within the design process, to meet diverse needs and achieve a preliminary design of the SAR and Optical sub-constellations of IRIDE, avoiding the previously mentioned gaps of traditional approaches [1]. This research stream is based on previous research that strictly stressed the importance of the link between the space system architecture and the corresponding service provided. Among those are worth of recall two activities, both characterized by a high level of multidisciplinary and industrial

focus: the first one developed in the framework of the ESA project ECO4CO - Earth Cognite System for Covid-19 [3-5] and the second one concerning the feasibility study of in-orbit services considering the feasibility of an orbital refueling systems for the utilization of propellants produced in an extraterrestrial environment [6]. My role in this research activity was to set it up in terms of methods and objectives, as well as to control them. I also managed the various interactions with the different institutional and industrial entities involved, and I am currently continuing to manage the ongoing activities and the emerging collaboration with Northeastern University in Boston. Below the main bibliographical references can be found and for a larger list the reader can refer to Annex 1 of the present application. Finally, it is worth to note that the Model-based approaches for design of space systems and their sub-system, as the structural one, complete the seamless data cycle along the whole life cycle of the spacecraft that is central to the new logics of Smart Manufacturing better described in the first research activity listed in this CV.

Relevant related publications (see also Annex1):

[1]. Conti F., Eugeni M., Iaquinandi F.M., Pasquali M., Bove M., Marzioli P., Schiavon E., Xuan A.N., Tornato A., Geraldini S., Cotugno F., Giardino C., Manunta M., Lanari R., Piergentili F., Taramelli A., Gaudenzi P. A model-based approach for the preliminary design of small satellites constellations based on user needs analysis. The Iride optical sub-constellation case study (2023), *Proceedings of the International Astronautical Congress*, IAC 2023, 2-6 October 2023.

[2]. Conti, F., Marini, L., Eugeni, M., Pasquali, M., Gaudenzi, P. Innovative methodology for the preliminary design approach for Low Earth Orbit constellations (2022), *Proceedings of the International Astronautical Congress*, IAC 2022, 18-22 September 2022.

[3]. Atek, S., Pesaresi, C., Eugeni, M., De Vito, C., Cardinale, V., Mecella, M., Rescio, A., Petronzio, L., Vincenzi, A., Pistillo, P., Bianchini, F., Giusto, G., Pasquali, G., Gaudenzi, P. A Geospatial Artificial Intelligence and satellite-based earth observation cognitive system in response to COVID-19 (2022) *Acta Astronautica*, 197, pp. 323-335.

[4]. Atek S., Bianchini F., De Vito C., Cardinale V., Novelli S., Pesaresi C., Eugeni M., Mecella M., Rescio A., Petronzio L., Vincenzi A., Pistillo P., Giusto G., Pasquali G., Alvaro D., Villari P., Mancini M., Gaudenzi P. A predictive decision support system for coronavirus disease 2019 response management and medical logistic planning (2023) *Digital Health*, vol. 9.

[5]. Pesaresi, C., Atek, S., De Vito, C., Cardinale, V., Bianchini, F., Novelli, S., Eugeni, M., Mecella, M., Rescio, A., Petronzio, L., Vincenzi, A., Pistillo, P., Giusto, G., Pasquali, G., Alvaro, D., Gaudenzi, P., Mancini, M., Villari, P. The ECO4CO project among retrospective data, improving of algorithms, predictive hypothesis and future perspectives to tackle health emergencies (2022) *J-Reading*, 1, pp. 27-48.

[6]. Sommariva, A., Gaudenzi, P., Pianorsi, M., Pasquali, M., Vittori, E., Eugeni, M., Italiano, M., Telli, C., Di Nicola, M., Gori, L., Chizzolini, B. Preliminary analyses on technical and economic viability of moon-mined propellant for on-orbit refueling (2023) *Acta Astronautica*, 204,

pp. 425-433.

Part X– Activity as reviewer, member of Editorial Board and Scientific Committees Memberships

Year/Period	Activity
2023-to date	Associate Editor for Solid and Structural Mechanics, Frontiers in Mechanical Engineering
2020-to date	Member of the "Topical Advisory Panel in Materials Science and Engineering" for Applied Sciences
2021	Member of the Scientific Comitee of the "GIS Day 2021 - Piattaforme multivariate e sistemi integrati di analisi geospaziale. Nodi e prospettive di raccordo multidisciplinare", Chair Prof. Cristiano Pesaresi
2013-to date	Activity as Reviewer: • Nonlinear Dynamics • Journal of Sound and Vibration • 3D Printing and Additive Manufacturing • Rapid Prototyping Journal • Mechanical Systems and Signal Processing • Journal of Fluids and Structures • Aerotecnica Missili e Spazio • Applied Sciences
2021-to date	Book Proposal reviewer: • Energy Harvesting – Enabling IoT Transformations, CRC Press, Taylor and Francis Group • Composite Overwrapped Pressure Vessels, Elsevier

Part XI– Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	36	SCOPUS	2014	2024
Books [scientific]	1	SCOPUS	2014	2024
Book Chapter [scientific]	1	SCOPUS	2014	2024

Type	**Value**	**Database**
Total number of Publications	64	SCOPUS
Total number of Citations	993	SCOPUS
Average Citations per Product	15,516	SCOPUS
Hirsh (H) index	17	SCOPUS
Total Impact Factor*	87,127	Clarivate Web of Science
Average Impact Factor*	2,811	Clarivate Web of Science
Normalized H index**	1,7	SCOPUS

(*) Calculated on the paper indexed in Scopus and having an Impact Factor relatively at the year of publication in “Clarivate Web of Science”.
(**) H index divided by the academic seniority calculated as the ratio between the H-index and the years from the PhD.

Part XII– Selected Publications

#	Authors, title, reference data	IF*	Citations*
1	Eugeni, M., Quercia, T., Bernabei, M., Boschetto, A., Costantino, F., Lampani, L., Spaccamela, A.M., Lombardo, A., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M.M., Morabito, G., Simoni, A., Brandão, A., Gaudenzi, P. An industry 4.0 approach to large scale production of satellite constellations. The case study of composite sandwich panel manufacturing (2022) *Acta Astronautica*, 192, pp. 276-290. DOI: 10.1016/j.actaastro.2021.12.039	3,500	11
2	Eugeni, M., Saltari, F., Mastroddi, F. Structural damping models for passive aeroelastic control (2021) *Aerospace Science and Technology*, vol. 118, art. no. 107011. DOI: 10.1016/j.ast.2021.107011	5,457	8
3	Boschetto, A., Bottini, L., Cardini, V., Eugeni, M., Gaudenzi, P., Veniali, F. Aircraft part substitution via additive manufacturing: design, simulation, fabrication and testing (2021) *Rapid Prototyping Journal*, vol. 27 (5), pp. 995-1009. DOI: 10.1108/RPJ-06-2020-0140	4,043	7
4	Eugeni, M., Elahi, H., Fune, F., Lampani, L., Mastroddi, F., Romano, G.P., Gaudenzi, P. Numerical and experimental investigation of piezoelectric energy harvester based on flag-flutter (2020) *Aerospace Science and Technology*, vol. 97, art. no. 105634. DOI: 10.1016/j.ast.2019.105634	5,107	70
5	Elahi, H., Munir, K., Eugeni, M., Atek, S., Gaudenzi, P. Energy harvesting towards self-powered IoT devices (2020) *Energies*, vol. 13 (21), art. no. 5528. DOI: 10.3390/en13215528	3,004	143
6	Mastroddi, F., Martarelli, F., Eugeni, M., Riso, C. Time- and frequency-domain linear viscoelastic modeling of highly damped aerospace structures (2019) *Mechanical Systems and Signal Processing*, vol. 122, pp. 42-55. DOI: 10.1016/j.ymssp.2018.12.023	6,471	21
7	Boschetto, A., Bottini, L., Eugeni, M., Cardini, V., Nisi, G.G., Veniali, F., Gaudenzi, P. Selective Laser Melting of a 1U CubeSat structure. Design for Additive Manufacturing and assembly (2019) Acta Astronautica, vol.159, pp.377-384. DOI: 10.1016/j.actaastro.2019.03.041	2,833	33
8	Gaudenzi, P., Atek, S., Cardini, V., Eugeni, M., Graterol Nisi, G., Lampani, L., Pasquali, M., Pollice, L. Revisiting the configuration of small satellites structures in the framework of 3D Additive Manufacturing (2018) *Acta Astronautica*, vol. 146, pp. 249-258. DOI: 10.1016/j.actaastro.2018.01.036	2,482	20
9	Eugeni, M., Dessi, D., Mastroddi, F. A Normal Form analysis in a finite neighborhood of a Hopf bifurcation: on the Center Manifold dimension (2018) *Nonlinear Dynamics*, vol. 91 (3), pp. 1461-1472. DOI: 10.1007/s11071-017-3958-3	4,604	5
10	Elahi, H., Eugeni, M., Gaudenzi, P. A review on mechanisms for piezoelectric-based energy harvesters (2018) *Energies*, vol. 11 (7), art. no. 1850. DOI: 10.3390/en11071850	2,707	182
11	Mastroddi, F., Eugeni, M., Erba, F. On the modal diagonalization of viscoelastic mechanical systems (2017) *Mechanical Systems and Signal Processing* (2017), 96, pp. 159-175. DOI: 10.1016/j.ymssp.2017.04.009	4,370	9
12	Eugeni, M., Mastroddi, F., Dowell, E.H. Normal form analysis of a forced aeroelastic plate (2017) *Journal of Sound and Vibration*, vol. 390, pp. 141-163. DOI: 10.1016/j.jsv.2016.12.001	2,618	13

(*) "Clarivate Web of Science"

Luogo e data: Roma, 10 giugno 2024

ANNEX 1
List of publications

Books

[1]. Elahi, H., Eugeni, M., Gaudenzi, P. (2021) *Piezoelectric Aeroelastic Energy Harvesting*, Elsevier, November 22, 2021, eBook ISBN: 9780128241776, Paperback ISBN: 9780128239681

Journal papers

[1]. Sommariva, A., Gaudenzi, P., Pianorsi, M., Pasquali, M., Vittori, E., Eugeni, M., Italiano, M., Telli, C., Di Nicola, M., Gori, L., Chizzolini, B. Preliminary analyses on technical and economic viability of moon-mined propellant for on-orbit refueling (2023) *Acta Astronautica*, 204, pp. 425-433.

[2]. Bernabei, M., Eugeni, M., Gaudenzi, P., Costantino, F. Assessment of Smart Transformation in the Manufacturing Process of Aerospace Components Through a Data-Driven Approach (2023) *Global Journal of Flexible Systems Management*, 24 (1), pp. 67-86.

[3]. Atek S., Bianchini F., De Vito C., Cardinale V., Novelli S., Pesaresi C., Eugeni M., Mecella M., Rescio A., Petronzio L., Vincenzi A., Pistillo P., Giusto G., Pasquali G., Alvaro D., Villari P., Mancini M., Gaudenzi P. A predictive decision support system for coronavirus disease 2019 response management and medical logistic planning (2023) *Digital Health*, vol. 9.

[4]. Atek, S., Pesaresi, C., Eugeni, M., De Vito, C., Cardinale, V., Mecella, M., Rescio, A., Petronzio, L., Vincenzi, A., Pistillo, P., Bianchini, F., Giusto, G., Pasquali, G., Gaudenzi, P. A Geospatial Artificial Intelligence and satellite-based earth observation cognitive system in response to COVID-19 (2022) *Acta Astronautica*, 197, pp. 323-335.

[5]. Sheeraz, M.A., Malik, M.S., Rahman, K., Elahi, H., Khurram, M., Eugeni, M., Gaudenzi, P. Multimodal piezoelectric wind energy harvester for aerospace applications (2022) *International Journal of Energy Research*, 46 (10), pp. 13698-13710.

[6]. Pesaresi, C., Atek, S., De Vito, C., Cardinale, V., Bianchini, F., Novelli, S., Eugeni, M., Mecella, M., Rescio, A., Petronzio, L., Vincenzi, A., Pistillo, P., Giusto, G., Pasquali, G., Alvaro, D., Gaudenzi, P., Mancini, M., Villari, P. The ECO4CO project among retrospective data, improving of algorithms, predictive hypothesis and future perspectives to tackle health emergencies (2022) *J-Reading*, 1, pp. 27-48.

[7]. Eugeni, M., Quercia, T., Bernabei, M., Boschetto, A., Costantino, F., Lampani, L., Spaccamela, A.M., Lombardo, A., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M.M., Morabito, G., Simoni, A., Brandão, A., Gaudenzi, P. An industry 4.0 approach to large scale production of satellite constellations. The case study of composite sandwich panel manufacturing (2022) *Acta Astronautica*, 192, pp. 276-290.

[8]. Khorasani, M., Elahi, H., Eugeni, M., Lampani, L., Civalek, O. Vibration of FG Porous Three-Layered Beams Equipped by Agglomerated Nanocomposite Patches Resting on Vlasov's Foundation (2022) *Transport in Porous Media*, 142 (1-2), pp. 157-186.

[9]. Eugeni, M., Saltari, F., Mastroddi, F. Structural damping models for passive aeroelastic control (2021) *Aerospace Science and Technology*, vol. 118, art. no. 107011.

[10]. Waqas, M., He, D., Elahi, H., Riaz, S., Eugeni, M., Gaudenzi, P. Study of the surface and dimensional quality of the alsi10mg thin-wall components manufactured by selective laser melting (2021) *Journal of Composites Science*, vol. 5 (5), art. no. 126.

[11]. Sheeraz, M.A., Malik, M.S., Rehman, K., Elahi, H., Butt, Z., Ahmad, I., Eugeni, M., Gaudenzi, P. Numerical assessment and parametric optimization of a piezoelectric wind energy harvester for IoT-based applications (2021) *Energies*, vol. 14 (9).

[12]. Khorasani, M., Elahi, H., Eugeni, M., Lampani, L., Civalek, O. Vibration of FG Porous Three-Layered Beams Equipped by Agglomerated Nanocomposite Patches Resting on Vlasov's Foundation (2021) *Transport in Porous Media*, ISSN: 01693913, Article in press.

[13]. Boschetto, A., Bottini, L., Cardini, V., Eugeni, M., Gaudenzi, P., Veniali, F. Aircraft part substitution via additive manufacturing: design, simulation, fabrication and testing (2021) *Rapid Prototyping Journal*, vol. 27 (5), pp. 995-1009.

[14]. Elahi, H., Rizwan Mughal, M., Eugeni, M., Qayyum, F., Israr, A., Ali, A., Munir, K., Praks, J., Gaudenzi, P. Characterization and Implementation of a Piezoelectric Energy Harvester Configuration: Analytical, Numerical and Experimental Approach (2021) *Integrated Ferroelectrics*, vol. 212 (1), pp. 39-60.

[15]. Elahi, H., Munir, K., Eugeni, M., Gaudenzi, P. Reliability Risk Analysis for the Aeroelastic Piezoelectric Energy Harvesters (2020) *Integrated Ferroelectrics*, vol. 212(1), pp. 156-169.

[16]. Elahi, H., Munir, K., Eugeni, M., Atek, S., Gaudenzi, P. Energy harvesting towards self-powered IoT devices (2020) *Energies*, vol. 13 (21), art. no. 5528.

[17]. Elahi, H., Eugeni, M., Lampani, L., Gaudenzi, P. Modeling and Design of a Piezoelectric Nonlinear Aeroelastic Energy Harvester (2020) *Integrated Ferroelectrics*, vol. 211 (1), pp. 132-151.

[18]. Elahi, H., Munir, K., Eugeni, M., Abrar, M., Khan, A., Arshad, A., Gaudenzi, P. A Review on Applications of Piezoelectric Materials in Aerospace Industry (2020) *Integrated Ferroelectrics*, vol. 211 (1), pp. 25-44.

[19]. Elahi, H., Eugeni, M., Fune, F., Lampani, L., Mastroddi, F., Romano, G.P., Gaudenzi, P. Performance evaluation of a piezoelectric energy harvester based on flag-flutter (2020) *Micromachines*, vol. 11 (10), art. no. 933

[20]. Eugeni, M., Elahi, H., Fune, F., Lampani, L., Mastroddi, F., Romano, G.P., Gaudenzi, P. Numerical and experimental investigation of piezoelectric energy harvester based on flag-flutter (2020) *Aerospace Science and Technology*, vol. 97, art. no. 105634.

[21]. Ali, A., Pasha, R.A., Elahi, H., Sheeraz, M.A., Bibi, S., Hassan, Z.U., Eugeni, M., Gaudenzi, P. Investigation of Deformation in Bimorph Piezoelectric Actuator: Analytical, Numerical and Experimental Approach (2019) *Integrated Ferroelectrics*, vol. 201 (1), pp. 94-109.

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