europass Curriculum Vitae

PERSONAL INFORMATION

Marco Eugeni

MAIN RESEARCH AREAS

- Smart Manufacturing, Additive Manufacturing and Industry 4.0 logics for aerospace systems MAIT improvement
- Aeroelastic Energy Harvesting and Smart Structures
- Modelling of Viscoelastic continua and application to aeroelastic control
- Nonlinear dynamics and Identification of structural and aeroelastic systems

EDUCATION AND TRAINING

5 February 2014

Doctor of Philosophy in Tecnologia Aeronautica e Spaziale

Thesis: “Perturbation Methods and Proper Orthogonal Decomposition Analysis for Nonlinear Aeroelastic Systems”
Dipartimento di Ingegneria Meccanica e Aerospaziale, Sapienza Università di Roma
SSD ING-IND/04

January 2012 – June 2012

Visiting Scientist

Development of analytical and semi-analytical Normal Formt methods for the study of nonlinear structural and aeroelastic systems experiencing a bifurcation of equilibrium
Research group of Prof. Earl H. Dowell
Duke University, Durham, North Carolina, USA

22 April 2010

Master of Science in Space Engineering

Thesis: “Studio della Biforcazione Locale dell’Equilibrio Mediante Proper Orthogonal Decomposition- Applicazioni a Sistemi Aeroelastici”
Facoltà di Ingegneria Aeronautica e Spaziale, Sapienza Università di Roma
Final grade: 110/110 cum laude

21 September 2007

Bachelor of Science in Aerospace Engineering

Thesis: “Studio della deformazione Finita. Applicazioni alla flessione di travi elastiche ed elastoplastiche”
Facoltà di Ingegneria, Sapienza Università di Roma
Final grade: 110/110 cum laude

ACCADEMIC RESEARCH APPOINTMENTS

May 2019 – April 2021

Assegnista di Ricerca/Research Fellow

Activity title: “Development of Smart Structures in composite materials by means of additive manufacturing processes”
Dipartimento di Ingegneria Meccanica e Aerospaziale, Sapienza Università di Roma
SSD ING-IND/04

Dec. 2016 – Nov. 2018

Assegnista di Ricerca/Research Fellow

Activity title: “Aerospace on demand laboratory, additive manufacturing methodologies for aerospace components”
Dipartimento di Ingegneria Meccanica e Aerospaziale, Sapienza Università di Roma
SSD ING-IND/04

July 2014 – June 2016

Assegnista di Ricerca/Research Fellow

Activity title: "Development of Out-put Only Techniques for the dynamical identification of Launcher vehicles structures"

Centro Ricerche Aerospaziali (CRAS), Sapienza Università di Roma

SSD ING-IND/04

29 September 2021 — **Under Evaluation for "Abilitazione Professore di Seconda Fascia", SC 09/A1, Domanda 35562, ASN 2021-2023**

OTHER RESEARCH APPOINTMENTS

June 2021 – August 2021 — **Incarico di lavoro autonomo – Consulenza Professionale/Professional advice**

Activity tille: "Consulenza professionale finalizzata allo sviluppo di strutture SMART mediante approcci di Advanced Manufacturing e possibili applicazioni nel campo dello Smart Manufacturing"

Dipartimento di Ingegneria Meccanica e Aerospaziale, Sapienza Università di Roma

SSD ING-IND/04

Dec. 2018 – April 2019 — **Incarico di lavoro autonomo – Consulenza Professionale /Professional advice**

Activity title: "Sviluppo di un modello matematico di sensore-struttura per il monitoraggio di deformazioni all'interno di una piastra in composito"

Dipartimento di Ingegneria Meccanica e Aerospaziale, Sapienza Università di Roma

SSD ING-IND/04

Feb. 2013 – March 2013 — **Research Fellowship**

Activity title: "Sviluppo di metodi analitici e stocastici con applicazione a sistemi non lineari aeroelastici che stanno sperimentando cambiamenti nelle loro proprietà di stabilità"

Dipartimento di Ingegneria Meccanica e Aerospaziale, Sapienza Università di Roma

SSD ING-IND/04

June 2010 – May 2011 — **Research Fellowship**

Activity title: "Proper Orthogonal Decomposition con applicazioni alla riduzione della complessità di modelli di interesse aeroelastico e idroelastico"

Dipartimento di Vibrazioni e Rumore, Istituto Italiano di Studi ed Esperienze di Architettura Navale (INM, ex INSEAN-CNR)

Theme within the SSD ING – IND/04

INTERNATIONAL AND NATIONAL RESEARCH PROJECTS

April 2020 – October 2021 — **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, Thales Alenia Space Italy

Role: Technical Manager

October 2020 – July 2021 — **Technical support activities for Vega-C, Vega-E and P-120c Work Order 3 – WP9: AVUM Multi-purpose Structure Concept Design**

Project financed by European Space Agency concerning the preliminary design of the upper stage of VEGA-E.

Entities involved: European Space Agency (ESRIN), Centro Ricerche Aerospaziali Sapienza (CRAS)

Role: Technical Manager

December 2020 – to date

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, Dipartimento di Malattie Infettive e Salutie Pubblica, Dipartimento di Lettere e Culture Moderne di Sapienza University of Roma
Role: Member of Sapienza Technical Team

June 2018 – Oct. 2019

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 (see Saperi&Co project)
Main Entities: Sapienza University, Aeronautica Militare
Role: Member of Sapienza Technical Team

January 2019 – to date

New Materials and Processes for Small Internet-Delivery Satellites Production via Additive Manufacturing

Project financed by Italian Space Agency concerning the improvement of MAIT cycle of small satellites by means of Additive Manufacturing technologies.
Entities Involved: Italian Space Agency (ASI), Dipartimento di Ingegneria Meccanica e Aerospaziale of Sapienza Universty of Rome, ASI Broglio Space Center of Malindi (Kenya), Kenya Space Agency
Role: Techincal Manager

Feb. 2017 – July 2018

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

Project financed by MIUR concerning the development of detection algorithms for damage identification in composite materials. Activity title: "Definizione e sviluppo di una procedura di monitoraggio strutturale basata sull'uso di onde elastiche per l'identificazione di delaminazioni in laminati compositi"
Entities Involved: Federico II Universty of Naples, Department of Ingegneria Meccanica e Aperospaziale of Sapienza University of Rome
Role: Technical Manager and assistance to WP Manager Prof. Paolo Gaudenzi

Dec. 2016 – Nov. 2018

Sapienza Enhances Research Innovation & Coworking (SAPERI & Co)

Project financed by "bando regionale ex L. regionale 13/2008". Main objective of the project has been the development of an easier access of the industrial community to scientific facilities and techniques with the aim of a higher level of technology transfer. Within this project the "Aerospace on demand laboratory, additive manufacturing methodologies for aerospace components" has been developed.
Entities involved: Sapienza University of Rome, Aeronautica Militare, RUAG Space
Role: Research associate. Development of new design for Additive Manufacturing approaches and introduction of Advanced Manufacturing techniques within the Space Industry for the improvement of MAIT cycle.

Feb. 2013 – March 2013

Development of Out-put Only Techniques for the dynamical identification of Launcher vehicles structures

Development of Out-put Only Techniques for identification of time-varyaing systems with particular focus on the

Entities involved: Centro Ricerche Aerospaziali Sapienza, AIRBUS-ASTRIUM
Role: Member of Sapienza team

EXPERIENCE IN TECHNOLOGY TRANSFER AND INNOVATION

2017- to date

Collaboration with 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 found raising (European Community, European Space Agency)

Role: Technical Consultant, Proposal Manager

OTHER PROFESSIONAL EXPERIENCES

May 2019 – to date

Technical Consultant Assistant (Assistente Commissario Tecnico di Parte – CTP)

Role of Technical Consultant Assistant 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.
Role: Evaluation and study of technical report. Analyses and review of methodologies proposed by the Technical Consultant of the Court.

TEACHING EXPERIENCE

27 July – 26 July

System, Concurrent Engineering and Smart Manufacturing approaches for space systems design-Training Course

During the project ASI-DIMA “New Materials and Processes for Small Satellites for Interned Delivery production via Additive Manufacturing” I have been professor 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

21 May 2021

Cyber physical systems and advanced composites – Lectures for Master in Space Systems and Satellites (Master SEPO) of Sapienza University of Rome

I have been one of the professors for the Master SEPO 2021 performing a 5hours lesson on the topic Cyber physical systems and advanced composites

Academic Year 2020-2021

Adjunct Professor for the Course “Laboratorio di Calcolo di Strutture” Faculty of Civil and Industrial Engineering of Sapienza University of Rome

During the Academic Year 2020-2021 I performed 3 CFU (36 hours of frontal lessons) for the course “Laboratorio di Calcolo Strutture”

15 July 2019

“Selective Laser Melting of a 1U CubeSat Structure Design for Additive Manufacturing and Assembly" lesson for the XX Communauté des Villes Ariane (CVA) School organized by Sapienza University of Rome and AVIO s.p.a.

2020 – to date

“Cultore della Materia” for the course “Costruzioni Spaziali”, Prof. Paolo Gaudenzi, SSD ING/IND-04

2016 – to date	**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 in Space Engineering, Prof. Paolo Gaudenzi.**
Accademic Year 2016/2017	**Tutor for the course "Costruzioni Aerospaziali" held at Sapienza University of Rome - Facolta' di Ingegneria Civile e Industriale, in the frame of the Degree in Aerospace Engineering, Prof. Paolo Gasbarri.**
Accademic Year 2017/2018	**Tutor for the course "Costruzioni Aerospaziali" held at Sapienza University of Rome - Facolta' di Ingegneria Civile e Industriale, in the frame of the master of science degree in Space Engineering, Prof. Giuliano Coppotelli**
2012 - 2016	**Teaching support 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 in Space Engineering.**
Accademic Year 2019/2020 – to date	**Tutor and support to organization activities for the Master in Space Systems and Services of Sapienza University of Roma. Director Prof. Paolo Gaudenzi until a.y. 2020/2021, from a.y. 2021/2022 Prof. Luciano less**

GRANTS

2019	**"Design and manufacturing of distributed networks of energy harvesters within SMART composites and tissues for aerospace applications"** Project financed by Sapienza University of Rome in the framework of Progetti Avvio Alla Ricerca
2020	**"Modelling and advanced manufacturing of structural components with embedded networks of sensors and energy harvesters for space applications"** Project financed by Sapienza University of Rome in the framework of Progetti Avvio Alla Ricerca

PROJECTS AS PROPOSAL MANAGER

2020	**"Innovative Design Approaches and Advanced Manufacturing for Small to Nano Satellites for telecommunication and earth observation" (IDeAM)** Financing Entity: Italian Space Agency, Accordo Quadro ASI-Sapienza n. 2015-1-Q.0 Proponent: Sapienza, Dept. of Mechanical and Aerospace Engineering Outcome: the project has been accepted and the final negotiartion procedures are ongoing Amount: 329.967k€ Project Manager: Prof. Paolo Gaudenzi
2020	**"Smart Manufacturing for Future Consetellations" ESA ITT/AO/1-0002/19/NL/R for Technology Development – European Space Agency** Financing Entity: European Space Agency Proponent Consortium: Sapienza (prime), RUAG Space, Thales Alenia Space Italy Outcome: Financed Amount: 349.960 k€ Project Manager: Prof. Paolo Gaudenzi

ACTIVITY AS EDITOR

2020 – 2021 **Guest Editor for the Special Issue "Energy Harvesting in Aerospace Engineering", Energies, MDPI**

2020 – to date **Member of the "Topical Advisory Panel in Materials Science and Engineering" for Applied Sciences**

SCIENTIFIC COMITEE MEMBERSHIP

2021 **Member of the Scinetific Comitee of the "GIS Day 2021 - Piattaforme multivariate e sistemi integrati di analisi geospaziale. Nodi e prospettive di raccordo multidisciplinare", Chair Prof. Cristiano Pesaresi**

ACTIVITY AS REVIEWER

2013 - to date

Main Journal where I act as a reviewer

- Nonlinear Dynamics
- Journal of Sound and Vibration
- 3D Printing and Additive Manufacturing
- Rapid Prototyping Journal
- Mechanical Systems and Signal Processing

Book Proposal review:

- *Energy Harvesting – Enabling IoT Transformations,* **CRC Press, Taylor and Francis Group**

HONOURS AND SOCIETY MEMBERSHIPS

2011 **Selected for VII Pegasus International Students Conference, April 27-29, 2011, Torino (Italy)**

2010 **Member of the Italina Alpin Club, Mountaineering and Free Climbing Instructor of Scuola di Alpinismo e Arrampicata Libera Paolo Consiglio Club Alpino Italiano, Sezione di Roma**

RESEARCH ACHIEVEMENTS (Ref. SCOPUS)

NUMBER OF DOCUMENTS	46
NUMBER OF CITATIONS	416
AVERAGE CITATIONS PER PAPER	9.000
H-INDEX	11
Total Impact Factor*	65.400
Average Impact Factor*	2.973

(*) Calculated on the paper indexed in Scopus and having and Imapct Factor relatively at the year of publication in "InCite-Journal Citation Reports"

PHD THESIS AS CO-ADVISOR

2019 **Piezoelectric Energy Harvesting by Aeroelastic Means, Dr. Hassan Elahi**

2019

On the simulation of part-consolidated components for Additive Manufacturing-based Supply Chain, Dr. Valerio Cardini

MAIN RESEARCH AREAS

1

2016 – to date

Smart Manufacturing, Additive Manufacturing and Industry 4.0 logics for aerospace systems MAIT improvement

Keywords: *Cyber-physical systems, Smart Manufacturing, Additive Manufacturing, System and Concurrent Engineering, Small-Satellites, Artificial Intelligence, MAIT*

Within "Industry 4.0" and "Smart Manufacturing" are an important set of enabling technologies to address the needs of the present industrial scenario where the evolution of connectivity and computational calculus permit to create a bridge between physical and virtual worlds while new operational technologies like Additive Manufacturing permits to explore new design limits. Within this stream of research, the application of concept and ideas from Industry 4.0, Smart and Advanced Manufacturing have been applied to aerospace systems design and Manufacturing Assembly Integration and Testing processes. The obtained results, that have been developed by means of important collaboration and financed program where my role have been of Technical Manager and support to project management, can be collected in three main area:

1. ***Design for Additive Manufacturing within Space Systems with particular focus to Small Satellite production:***

   Investigation of AM-induced evolution of the design process for small satellites, posing particular attention in identifying the optimal design strategies to propose innovative structural configurations able to minimize the system complexity via parts reduction and the integration of subsystems through an innovative assembly configuration. The study encompasses the optimization of the design of parts and of their supports to reduce print-induced residual stresses and distortions. Some of the results obtained in this field have been developed in the framework of the project "New Materials and Processes for Small-Satellites for Internet-Delivery Production via Additive Manufacturing" financed by Italian Space Agency and lead by the Dept. of Mechanical and Aerospace Engineering of Sapienza University of Rome.
   One of the most important applications of AM for aerospace systems are those related to the improvement of all the logistic aspects of the production line. Indeed, because of its strong foundation on the digital world the AM allows a modification of the present logistic organization permitting remote manufacturing, obsolescence management and easy customization of realized components within a serial production. Finally, it is relevant to point out that AM enables easy integration of design change, has the capability to build virtually any shape, and at least as important it allows complex feature integration and part count reduction, greatly simplifying product assembly. In the present research, a fruitful collaboration between the Department of Mechanical and Aerospace Engineering and the Italian Military Air Force - Official Test Center (Centro Sperimentale Volo), the possibility to apply the AM in a logistical framework was investigated. The study concluded with a functional flight test where a prototyping of the stand-by-compass realized in the Selective Laser Melting Additive Manufacturing Technology where tested flying on the MB-339 vehicle.

This project took place in the framework of the PhD thesis, that I followed as co-advisor, *On the simulation of part-consolidated components for Additive Manufacturing-based Supply Chain* of Dr. Valerio Cardini.

2. ***Smart Manufacturing for improvement of MAIT processes for small-satellite industry:***

The present satellite constellations trend involves the development of very large constellations of hundred or even thousands of small satellites. This means a huge change in the satellite industry production which requires an increasing monitoring and optimization of the manufacturing processes and of the overall MAIT cycle by a synergic use of software technology and Artificial Intelligence. Within this study a Cyber-physical system of the RUAG space production line have been developed embedding also artificial intelligence elements able to predict possible misalignment of the production parameters from the optimum ones. The activity within this project have been financed by the ITT ESA "Smart Manufacturing for Future Constellations" involving a multidisciplinary team from both academy (Dept. of Mechanical and Aerospace Engineering and Dept. of Computer, Control and Management Engineering) and industry (RUAG Space and Thales Alenia Space Italy), see International and National Research Projects section of this CV.

Selected publications attached to the present application:

- 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.

- 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.

- 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.

Publications not included among the selected to be attached at the present application (see also Annex1 e Annex2):

- 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.

- Pollice, L., Gschweitl, M., Usinger, R., Boschetto, A., Bottini, L., Eugeni, M., Gaudenzi, P. Design and realization of an additive manufactured multifunctional spacecraft structure through a systems and concurrent engineering approach (2019) Proceedings of the International Astronautical Congress, 71st International Astronautical Congress, IAC 2019, Vol. 2019-October, art. no. IAC-19_C2_5_12_x53312

- Cardini, V., Eugeni, M., Boschetto, A., Bottini, L., Visone, R., Pollice, L., Coppotelli, G., Stefano, R., Zucca, G., Izzo, G., Bernabei, M., Veniali, F., Gaudenzi, P. “An Additive Manufacturing redesign of a military aircraft equipment within a logistic 4.0 framework (2019) Proceedings of the International Astronautical Congress, 70th International Astronautical Congress, IAC 2019, Vol. 2019-October, IAC-19_C2_5_1_x53230

- Eugeni, M., Quercia, T., Boschetto, A., Bernabei, M., Costantino, F., Lampani, L., Lombardo, A., Marchetti Spaccamela, A., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M.M., Morabito, G., Simoni, A., Brandão, A., Gaudenzi, P. “Smart Manufacturing in the space industry. A Cyber-Physical System architecture and its implementation to a MAIT process for mega constellations of satellites", 72nd International Astronautical Congress, IAC 2021, 25-29 October 2021

- Eugeni, M., Quercia, T., Boschetto, A., Bernabei, M., Costantino, F., Lampani, L., Lombardo, A., Marchetti Spaccamela, A., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M.M., Morabito, G., Simoni, A., Brandao, A., Gaudenzi, P. “Smart Manufacturing in the framework of Space Industy. An Industry 4.0 approach to large scale production of satellite constellations", ICAST 2021 virtual conference, ETH of Zurich, 5-8 october 2021.

Publications under review:

- Eugeni, M., Quercia, T., Boschetto, A., Bernabei, M., Costantino, F., Lampani, L., Lombardo, A., Marchetti Spaccamela, A., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M.M., Morabito, G., Simoni, A., Brandão, A., Gaudenzi, P. (2021) An industry 4.0 approach to large scale production of satellite constellations. The case study of composite sandwich panel manufacturing, under review *Acta Astronautica*

2016 – to date

Aeroelastic Energy Harvesting and Smart Structures

Keywords: *Aeroelasticity, Energy Harvesting, Smart Structures, Structural Dynamics, Piezoelectricity, Sensor Networks, IoT, Smart Structures*

From last few decades, piezoelectric materials have played a vital role as a mechanism of energy harvesting, as they have the tendency to absorb energy from the environment and transform it to electrical energy that can be used to drive electronic devices directly or indirectly. The power of electronic circuits has been cut down to nano or micro watts, which leads towards the development of self-designed piezoelectric transducers that can overcome power generation problems and can be self-powered. This topic is of clear importance by reflecting on how the distributed sensor networks, wireless communicating and possibly self-powered, applications are becoming appealing for the industrial word thanks to paradigm as Industry 4.0 and Smart Manufacturing. Within this research stream particular attention to the possibility to gather energy from operative conditions has been placed with particular focus to the harvesting mechanism based on structural vibrations induced by Fluid-Structure Interaction phenomena. Important results, both theoretically and experimental, have been obtained in the field of flutter-based energy harvesters and in particular those involving very flexible structures, i.e., the so-called flag flutter.

In this research stream I have been able to collect different competencies creating a synergic multidisciplinary environment. Indeed, the research group involved were the research group of Smart Structures of Prof. Gaudenzi and Prof. Luca Lampani, the research group of aeroelasticity lead by Prof. Franco Mastroddi and the group of experimental aerodynamics lead by Prof. Giampaolo Romano. This professional achievement has been possible thanks to my multidisciplinary background that started from structural dynamics and aeroelasticity at the beginning of my career and arrived to Smart Structures and Sensor Networks in the last years. Within this stream of research take place important publication, a book on the topic of aeroelastic energy harvesting and the PhD thesis, that I followed as co-advisor, "*Piezoelectric Energy Harvesting by Aeroelastic Means"* of Dr. Hassan Elahi.

Selected publications attached to the present application:

- 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.

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

Publications not included among the selected to be attached at the present application (see also Annex1 e Annex2):

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

- 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.

- 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

- 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.

2017 – to date

Modelling of viscoelastic continua and applications to aeroelastic control

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

The numerical modeling of highly damped viscoelastic materials is critical for aerospace applications such as dynamic analysis of solid rocket motors – showing high damping ratios due to the presence of solid propellant – and design of passive damping devices for minimizing vibrations in aeronautical and space systems. Time-domain viscous damping models – giving damping forces proportional to velocities – are directly applicable in transient simulations, but they give a frequency-linear dissipative behavior which has no experimental evidence. On the other hand, frequency-domain hysteretic damping models – giving damping forces proportional to displacements – result in a frequency-constant dissipation that better describes the behavior of certain materials. However, using such models in transient analyses may give unphysical, non-Hermitian and non-causal system response. The above issues have been studied and contextualized in this research stream starting from highly general first principles. The researches within this stream are characterized by a solid mathematical physics approach without forgetting the important industrial applications but trying to apply the results in the improvement of what is possible to be obtained from most common commercial software.

Selected publication attached to the present application:

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

Publications not included among the selected to be attached at the present application (see also Annex1 e Annex2):

- 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.
- 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).

2010 - to date

Nonlinear dynamics and Identification of structural and aeroelastic systems

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

In this research stream to main area can be determined the focus has been placed in the analytical and semi-analytical approaches for the study on nonlinear dynamics of dissipative systems with particular attention to the application in the field of structural dynamics and aeroelasticity. Core of all my research in the field has been the necessity to determine the primitive terms that really govern the complex dynamics that can arise when a system experience a change in its stability properties. Particular focus has been placed in the understanding the role of damping in the widespread of chaos and how this can be related to systems dimension. One of the most elegant results within this stream has been the demonstration of the equivalence of the Proper Orthogonal Modes and Eigenfunction modes in the neighborhood of a Hopf bifurcation. Moreover, a neighborhood of validity for the usual small-divisor based normal form solutions in the neighborhood of a Hopf bifurcation and the formal determination of a mathematical criteria for the slave-modes activation has been obtained providing important information in the reduced-order modelling of complex dynamical systems. In this research stream also the topic of the identification of dynamical systems has been addressed with particular attention to those characterized by time-varying properties like the launch transportation systems thanks to an important project involving the Centro Ricerche Aerospaziali Sapienza and AIRBUS-Astrium (see the International and National Research Projects section of this CV).

Publication attached and selected to the present application from these studies:

- 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.

- 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.

- 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.

- 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.

Main publications not included among the selected to be attached at the present application (see also Annex1 e Annex2)::

- 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.

- 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.

- 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.

PERSONAL SKILLS

Mother tongue: **Italian**

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	**C1**	**C1**	**C1**	**C1**	**C1**
	Replace with name of language certificate. Enter level if known.				
French	**A2**	**A2**	**A1**	**A1**	**A1**
	Replace with name of language certificate. Enter level if known.				

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user
Common European Framework of Reference for Languages

ANNEXES

- **ANNEX1:** List of publications
- **ANNEX2:** List of indexed publication updated to the date of the present application

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

[2]. 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.

[3]. 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).

[4]. 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.

[5]. 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.

[6]. 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.

[7]. 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.

[8]. 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.

[9]. 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.

[10]. 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.

[11]. 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

[12]. 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.

[13]. 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.

[14]. Memmolo, V., Elahi, H., Eugeni, M., Monaco, E., Ricci, F., Pasquali, M., Gaudenzi, P. Experimental and Numerical Investigation of PZT Response in Composite Structures with Variable Degradation Levels (2019) *Journal of Materials Engineering and Performance*, vol. 28 (6), pp. 3239-3246.

[15]. 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.

[16]. 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*, 122, pp. 42-55.

[17]. 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.

[18]. Elahi, H., Eugeni, M., Gaudenzi, P., Gul, M., Swati, R.F. Piezoelectric thermo electromechanical energy harvester for reconnaissance satellite structure (2019) *Microsystem Technologies*, vol. 25 (2), pp. 665-672.

[19]. Elahi, H., Butt, Z., Eugeni, M., Gaudenzi, P., Israr, A. Erratum to “Effects of variable resistance on smart structures of cubic reconnaissance satellites in various thermal and frequency shocking conditions”, (*Journal of Mechanical Science and Technology*, 2017, vol. 31 (9), pp. 4151-4157, DOI: 10.1007/s12206-017-0811-z), (2019) *Journal of Mechanical Science and Technology*, 33 (2), p. 991.

[20]. 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.

[21]. Elahi, H., Eugeni, M., Gaudenzi, P., Qayyum, F., Swati, R.F., Khan, H.M. Response of piezoelectric materials on thermomechanical shocking and electrical shocking for aerospace applications (2018) *Microsystem Technologies*, vol. 24 (9), pp. 3791-3798.

[22]. 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.

[23]. 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.

[24]. Bici, M., Cardini, V., Eugeni, M., Guachi, R., Bini, F., Campana, F., Marinozzi, F., Gaudenzi, P. Digital Design of Medical Replicas via Desktop Systems: Shape Evaluation of Colon Parts (2018) *Journal of Healthcare Engineering*, vol. 2018, art. no. 3272596.

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

[26]. 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.

[27]. Elahi, H., Butt, Z., Eugeni, M., Gaudenzi, P., Israr, A. Effects of variable resistance on smart structures of cubic reconnaissance satellites in various thermal and frequency shocking conditions (2017) *Journal of Mechanical Science and Technology*, vol. 31 (9), pp. 4151-4157.

[28]. 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.

[29]. 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.

[30]. 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.

Book chapters

[1]. Elahi, H., Eugeni, M., Gaudenzi, P. Electromechanical degradation of piezoelectric patches (2018) *Advanced Structured Materials*, 81, pp. 35-44.

Conference Proceedings

[1]. Eugeni, M., Quercia, T., Boschetto, A., Bernabei, M., Costantino, F., Lampani, L., Lombardo, A., Marchetti Spaccamela, A., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M.M., Morabito, G., Simoni, A., Brandão, A., Gaudenzi, P. “Smart Manufacturing in the space industry. A Cyber-Physical System architecture and its implementation to a MAIT process for mega constellations of satellites", 72nd International Astronautical Congress, IAC 2021, 25-29 October 2021.

[2]. Eugeni, M., Pasquali, M., Sinopoli, S., Biondi, F., Megliola, P., Moretti, E., Gaudenzi, P., Ierardo, N. “Concurrent Engineering Approach in Preliminary Design of a Multi-Purpose Module for a Launch System", 72nd International Astronautical Congress, IAC 2021, 25-29 October 2021.

[3]. 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.

[4]. Sommariva, A., Gaudenzi, P., Pianorsi, M., Vittori, E., Pasquali, M., Eugeni, M., Quercia, T., Italiano, M., Telli, C., Di Nicola, M., Gori, L., Chizzolini, B. “On-orbit refuelling. Technical and economic viability of Moon-mined propellant transportation, storage, and distribution”, 72nd International Astronautical Congress, IAC 2021, 25-29 October 2021.

[5]. Atek, S., Pesaresi, C., Eugeni, M., Gaudenzi, P., De Vito, C., Cardinale, V., Mecella, M., Rescio, A., Petronzio, L., Vincenzi, A., Pistillo, P., Vora, A. “An Earth Observation Cognitive System in Response to Sars-Covid-19 Emergency”, 72nd International Astronautical Congress, IAC 2021, 25-29 October 2021.

[6]. Eugeni, M., Quercia, T., Boschetto, A., Bernabei, M., Costantino, F., Lampani, L., Lombardo, A., Marchetti Spaccamela, A., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M.M., Morabito, G., Simoni, A., Brandao, A., Gaudenzi, P. Smart Manufacturing in the framework of Space Industy. An Industry 4.0 approach to large scale production of satellite constellations (2021) *ICAST 2021 virtual conference*, ETH of Zurich, 5-8 october 2021.

[7]. Gaudenzi, P., Lampani, L., Eugeni, M., Costantino, F., Boschetto, A., Quercia, T., Spaccamela, A.M., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M., Brandão, A. Smart manufacturing in the framework of space industry. An industry 4.0 approach to large scale production of satellite constellations (2020) *Proceedings of the International Astronautical Congress*, IAC 2020, vol. 2020-October

[8]. Eugeni, M., Elahi, H., Fune, F., Lampani, L., Mastroddi, F., Romano, G.P., Gaudenzi, P. Experimental evaluation of piezoelectric energy harvester based on flag-flutter (2020) *Lecture Notes in Mechanical Engineering*, pp. 807-816, proceedings of AIMETA 2019, Roma, 15-19 September 2019.

[9]. 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.

[10]. Pollice, L., Gschweitl, M., Usinger, R., Boschetto, A., Bottini, L., Eugeni, M., Gaudenzi, P. Design and realization of an additive manufactured multifunctional spacecraft structure through a systems and concurrent engineering approach (2019) *Proceedings of the International Astronautical Congress*, 71st International Astronautical Congress, IAC 2019, Vol. 2019-October, art. no. IAC-19_C2_5_12_x53312

[11]. Cardini, V., Eugeni, M., Boschetto, A., Bottini, L., Visone, R., Pollice, L., Coppotelli, G., Stefano, R., Zucca, G., Izzo, G., Bernabei, M., Veniali, F., Gaudenzi, P. An Additive Manufacturing redesign of a military aircraft equipment within a logistic 4.0 framework (2019) *Proceedings of the International Astronautical Congress*, 70th International Astronautical Congress, IAC 2019, Vol. 2019-October, IAC-19_C2_5_1_x53230

[12]. Eugeni, M., Elahi, H., Fune, F., Lampani, L., Mastroddi, F., Romano, G., Gaudenzi, P. Flutter investigation for piezoelectric aeroelastic energy harvester (2019) *Proceedings of the International Astronautical Congress*, 70th International Astronautical Congress, IAC 2019, Vol. 2019-October, art. no. IAC-19_C2_9_8_x53190

[13]. 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).

[14]. Graterol Nisi, G., Eugeni, M., Atek, S., Cardini, V., Pollice, L. Realization of Smart Components with embedded electronics by using fused filament fabrication (2018) *European Conference on Spacecraft Structures*, Materials and Environmental Testing, 28 May - 1 June 2018, ESTEC Noordwijk, The Netherlands.

[15]. Boschetto, A., Eugeni, M., Bottini, L., Cardini, V., Graterol Nisi, G., Pollice, L., Gaudenzi, P. Introduction of Innovative Additive Manufacturing Technologies into the Nanosatellites Design and Realization (2018) *ASI/IAA Italy-Israel workshop on nanosatellites technologies,* 9-20 April 2018, Roma (Italy).

[16]. Pollice, L., Cascioli, G., Federici, L., Iannelli, P., Di Stefano, I., Ciallella, M., Casini, S., De Gasperis, S., Corallo, F., Rasoni, C.A., Filice, V., Eugeni, M., Palermo, G., Gaudenzi, P. “A preliminary design of a mission to Triton: A concurrent engineering approach (2018) *Proceedings of the International Astronautical Congress*, 69th International Astronautical Congress, IAC 2018, vol. 2018-October

[17]. Elahi, H., Eugeni, M., Gaudenzi, P. “Design and performance evaluation of an aeroelastic energy harvester based on the limit cycle oscillation phenomenon (2018) *Proceedings of the International Astronautical Congress*, 69th International Astronautical Congress, IAC 2018, vol. 2018-October

[18]. 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 (2018) *Proceedings of the International Astronautical Congress*, 69th International Astronautical Congress, IAC 2018, vol. 2018-October

[19]. Eugeni, M., Coppotelli, G., Mastroddi, F., Gaudenzi, P., Muller, S., Troclet, B. “OMA study on the structural dynamic properties of a launcher vehicle using flight data”, *58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Grapevine, Texas, USA, 9- 13 January 2017.

[20]. Eugeni, M., Elahi, H., Lampani, L., Gaudenzi, P. Modeling and design of a nonlinear aeroelastic energy harvester (2017) *Proceedings of the International Astronautical Congress*, 69th International Astronautical Congress, IAC 2017, 12, pp. 8000-8009

[21]. 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.

[22]. Nisi, G.G., Eugeni, M., Atek, S., Gaudenzi, P. A fused filament fabrication procedure for smart components with embedded electronics (2017) *8th Conference on Smart Structures and Materials, SMART 2017 and 6th International Conference on Smart Materials and Nanotechnology in Engineering*, SMN 2017, 5-8 June.

[23]. 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.

[24]. Eugeni, M., Mastroddi, F., Dowell, E.H. Nonlinear aeroelastic response of a flat panel. A normal form approaches (2013) *15th International Forum on Aeroelasticity and Structural Dynamics*, IFASD 2013, Bristol, UK, 24-26 June.

[25]. Mastroddi, F., Eugeni, M., Dessi, D. "POD Analysis for Aeroelastic Systems in a neighborhood of a Hopf Bifurcation (2011) *14th International Forum of Aeroelasticity and Structural Dynamics*, IFASD 2011, Paris, France, 26-30 June.

[26]. Eugeni, M., Mastroddi, F., Dessi, D. Proper Orthogonal Decomposition of an Aeroelastic Piecewise-Linear System (2011) VII Pegasus International Students Conference, Torino, Italy, April 27-29, 2011.

ANNEX 2
List of SCOPUS indexed publication updated to the date of the present

application

		IF*	Citations*
1	Eugeni, M., Saltari, F., Mastroddi, F. Structural damping models for passive aeroelastic control (2021) Aerospace *Science and Technology,* vol. 118, art. no. 107011	5.107	0
2	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	//	0
3	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)	3.004	1
4	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,* https://doi.org/10.1007/s11242-021-01658-3	3.019	1
5	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.	3.095	0
6	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 (2020) *Integrated Ferroelectrics*, vol. 212 (1), pp. 39-60.	0.836	1
7	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.	0.836	0
8	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.	3.004	25
9	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.	0.836	1
10	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.	0.836	6
11	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	2.891	10
12	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	5.107	30
13	Gaudenzi, P., Lampani, L., Eugeni, M., Costantino, F., Boschetto, A., Quercia, T., Spaccamela, A.M., Mecella, M., Querzoni, L., Usinger, R., Aliprandi, M., Stancu, A., Ivagnes, M., Brandão, A. Smart manufacturing in the framework of space industry. An industry 4.0 approach to large scale production of satellite constellations (2020) *Proceedings of the International Astronautical Congress*, 71st International Astronautical Congress, IAC 2020, vol. 2020-October	//	0
14	Eugeni, M., Elahi, H., Fune, F., Lampani, L., Mastroddi, F., Romano, G.P., Gaudenzi, P. Experimental evaluation of piezoelectric energy harvester based on flag-flutter (2020) *Lecture Notes in Mechanical Engineering*, pp. 807-816.	//	2

15	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.	0.557	7
16	Memmolo, V., Elahi, H., Eugeni, M., Monaco, E., Ricci, F., Pasquali, M., Gaudenzi, P. Experimental and Numerical Investigation of PZT Response in Composite Structures with Variable Degradation Levels (2019) *Journal of Materials Engineering and Performance*, vol. 28 (6), pp. 3239-3246.	1.652	14
17	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.	2.833	15
18	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.	6.471	10
19	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.	2.833	28
20	Elahi, H., Eugeni, M., Gaudenzi, P., Gul, M., Swati, R.F. Piezoelectric thermo electromechanical energy harvester for reconnaissance satellite structure (2019) *Microsystem Technologies*, vol. 25 (2), pp. 665-672.	1.737	25
21	Erratum to “Effects of variable resistance on smart structures of cubic reconnaissance satellites in various thermal and frequency shocking conditions”, (Journal of Mechanical Science and Technology, 2017, vol. 31 (9), pp. 4151-4157, DOI: 10.1007/s12206-017-0811-z), (2019) Journal of Mechanical Science and Technology, 33 (2), p. 991.	//	0
22	Eugeni, M., Saltari, F., Mastroddi, F., Riso, C. Structural damping models for passive aeroelastic control, *International Forum on Aeroelasticity and Structural Dynamics 2019*, IFASD 2019, Savannah, Georgia, 10-13 June 2019.	//	0
23	Pollice, L., Gschweitl, M., Usinger, R., Boschetto, A., Bottini, L., Eugeni, M., Gaudenzi, P. Design and realization of an additive manufactured multifunctional spacecraft structure through a systems and concurrent engineering approach (2019) *Proceedings of the International Astronautical Congress*, 70th International Astronautical Congress, IAC 2019, Vol. 2019-October, art. no. IAC-19_C2_5_12_x53312	//	0
24	Cardini, V., Eugeni, M., Boschetto, A., Bottini, L., Visone, R., Pollice, L., Coppotelli, G., Stefano, R., Zucca, G., Izzo, G., Bernabei, M., Veniali, F., Gaudenzi, P. An Additive Manufacturing redesign of a military aircraft equipment within a logistic 4.0 framework (2019) *Proceedings of the International Astronautical Congress*, 70th International Astronautical Congress, IAC 2019, Vol. 2019-October, IAC-19_C2_5_1_x53230	//	1
25	Eugeni, M., Elahi, H., Fune, F., Lampani, L., Mastroddi, F., Romano, G., Gaudenzi, P. Flutter investigation for piezoelectric aeroelastic energy harvester (2019) *Proceedings of the International Astronautical Congress*, 70th International Astronautical Congress, IAC 2019, Vol. 2019-October, art. no. IAC-19_C2_9_8_x53190	//	0
26	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.	//	5
27	Elahi, H., Eugeni, M., Gaudenzi, P., Qayyum, F., Swati, R.F., Khan, H.M. Response of piezoelectric materials on thermomechanical shocking and electrical shocking for aerospace applications (2018) *Microsystem Technologies*, 24 (9), pp. 3791-3798.	1.513	30
28	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*	2.482	11

	Astronautica, vol. 146, pp. 249-258.		
29	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.	4.604	2
30	Pollice, L., Cascioli, G., Federici, L., Iannelli, P., Di Stefano, I., Ciallella, M., Casini, S., De Gasperis, S., Corallo, F., Rasoni, C.A., Filice, V., Eugeni, M., Palermo, G., Gaudenzi, P. A preliminary design of a mission to Triton: A concurrent engineering approach (2018) *Proceedings of the International Astronautical Congress*, 69th International Astronautical Congress, IAC 2018, vol. 2018-October	//	0
31	Elahi, H., Eugeni, M., Gaudenzi, P. Design and performance evaluation of an aeroelastic energy harvester based on the limit cycle oscillation phenomenon (2018) *Proceedings of the International Astronautical Congress*, 69th International Astronautical Congress, IAC 2018, vol. 2018-October	//	0
32	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 (2018) *Proceedings of the International Astronautical Congress*, 69th International Astronautical Congress, IAC 2018, vol. 2018-October	//	0
33	Bici, M., Cardini, V., Eugeni, M., Guachi, R., Bini, F., Campana, F., Marinozzi, F., Gaudenzi, P. Digital Design of Medical Replicas via Desktop Systems: Shape Evaluation of Colon Parts (2018) *Journal of Healthcare Engineering*, 2018, art. no. 3272596.	1.295	3
34	Elahi, H., Eugeni, M., Gaudenzi, P. A review on mechanisms for piezoelectric-based energy harvesters (2018) *Energies*, vol. 11 (7), art. no. 1850	2.707	99
35	Elahi, H., Eugeni, M., Gaudenzi, P. Electromechanical degradation of piezoelectric patches (2018) *Advanced Structured Materials*, vol. 81, pp. 35-44	//	19
36	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	4.370	7
37	Elahi, H., Butt, Z., Eugeni, M., Gaudenzi, P., Israr, A. Effects of variable resistance on smart structures of cubic reconnaissance satellites in various thermal and frequency shocking conditions (2017) *Journal of Mechanical Science and Technology*, vol. 31 (9), pp. 4151-4157	1.194	27
38	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.	2.618	11
39	Eugeni, M., Coppotelli, G., Mastroddi, F., Gaudenzi, P., Muller, S., Troclet, B. OMA study on the structural dynamic properties of a launcher vehicle using flight data (2017) *58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference* 2017, Grapevine, Texas, USA	//	1
40	Eugeni, M., Elahi, H., Lampani, L., Gaudenzi, P. Modeling and design of a nonlinear aeroelastic energy harvester (2017) *Proceedings of the International Astronautical Congress*, 69th International Astronautical Congress, IAC 2017, 12, pp. 8000-8009.	//	2
41	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, vol. 2017-June, Como, Italy	//	0
42	Nisi, G.G., Eugeni, M., Atek, S., Gaudenzi, P. A fused filament fabrication procedure for smart components with embedded electronics (2017) *8th Conference on Smart Structures and Materials*, SMART 2017 and *6th International Conference on Smart Materials and Nanotechnology* in	//	0

	Engineering, SMN 2017, vol. 2017-January, pp. 538-549.		
43	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,* pp. 78-81.	//	1
44	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.	1.813	9
45	Eugeni, M., Mastroddi, F., Dowell, E.H. Nonlinear aeroelastic response of a flat panel. A normal form approaches (2013*) International Forum on Aeroelasticity and Structural Dynamics*, IFASD 2013, Bristol, UK, 24-27 June	//	0
46	Mastroddi, F., Dessi, D., Eugeni, M. POD analysis for free response of linear and nonlinear marginally stable aeroelastic dynamical systems. Journal of Fluids and Structures (2012), vol. 33, pp. 85-108.	2.051	12

(*) "InCite-Journal Citation Reports"