

## CV MARCELLO ONOFRI

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### Academic Appointments

- From 1999 Full Professor in Aerospace Propulsion at University of Rome “La Sapienza” (UniRoma1).  
Present teaching: “*Space Propulsion*”.
- From 2008 President and Director (2008-17) of “CRAS – Centro Ricerca Aerospaziale Sapienza”, the largest European University Interdepartmental Center for aerospace research.
- From 2002 Promoter with Carlo Buongiorno and Director of the Master for graduate students in “*Space Transportation Systems*”, now at its 15<sup>th</sup> Edition. The Master STS was created to provide system engineers useful for the development of the VEGA project, and has been continuously supported by ESA, CNES, ASI, Airbus, Ariespace and most of the Italian space industries. Large number of the engineers working successfully in the development of VEGA have been educated and trained by this Program.
- Member of several Scientific and Didactic Organization Boards at University of Rome La Sapienza
- Coordinator of the Propulsion Branch of the Dept. Mechanics and Aerospace Engineering, UniRoma1 (1990/2004 and from 2013)

### Other Appointments

- Since 2016 President of CTNA (National Aerospace Technological Cluster) Institutional Organization of the Ministry for Education & Research, to create Aerospace Industrial and Scientific Chains.
- Since 2016 Member of the **General Assembly** and of the **Board of Directors** (2016-17) of the **Von Karman Institute (VKI)**, Bruxelles
- Since 2014 Representative of the **Distretto Tecnologico Aerospaziale (DTA) of the Lazio Region** in the MIUR- Aerospace Cluster
- Since 2014 **Collaborator** at the board of the Italian Ministry Council for Space Matter
- 2007-2008 Member of the **Board of Directors** of the ASI, Agenzia Spaziale Italiana.
- 2007-2008 / 2012-2013 Member of the **Board of Directors** of the ELV SpA.
- 2006-07 **Consultant** to the Minister for University and Research for Space Matter
- Membre Correspondant de AAE (“Académie de l’Air et de l’Espace” de France)
- Associate Fellow of AIAA (“American Institute of Aeronautics and Astronautics”)
- Founding Member of EUCASS (“European Conference for Aero-Space Sciences »)
- Founding Member of CEAS (“Council of European Aerospace Societies”)
- Member of AIDAA (“Associazione Italiana di Aeronautica e Astronautica”)

### Synthesis of the Scientific and Technical Activity

**Principal Investigator and/or National Coordinator** for a number of Research Projects, funded by European and Italian Space Agency (ESA / ASI), Education and Research Ministry” (MIUR), National Research Council (CNR). on:

- Theoretical Analysis of Gas Dynamic Phenomena in Propulsion Systems,
- Numerical Methods in Nonequilibrium Chemically Reacting Flows and Unsteady Propulsion Flows,
- Thrust Chambers in Liquid Propulsion Rockets, and Gasdynamic Analysis and Design of Advanced Nozzles,
- Modeling of Hypersonic Flows for Reentry Vehicle applications

**Promoter of Studies on the definition of new concepts, architecture and design of Space Launchers**, including the VEGA Evolution, the LYRA program, the options based on LOx-Methane new rocket engines.

**Promoter of Studies for new Reentry Vehicles**, including technology demonstrators: IXV / Space Rider

**Promoter of Scientific Co-operations at European level** (ESA, EC/FP7, Onera, DLR, Université de Rouen), **with USA** (NASA/JPL, NASA/Glenn, Purdue University, Polytech Inst of New York) and **with CHINA** (CASC-Aerospace Corporation, CARDC–Aerodynamic R&D Center))

**Promoter of Bilateral Cooperations** and International MOU for common educational curricula in Space Engineering (ISAE-Toulouse, CNAM-Paris, VKI-Brussels, TU-Delft, Univ of Purdue, Univ of Clarkson) and ASTRI Programme

**Co-chair of the RTO** (former NATO-Agard) **subgroup on “Plug Nozzles”** within the RTO-AVT.

**Consultant for National and International Industries and/or Principal Investigator for Scientific Projects.**

### Publications and Editorial activity

- More than 120 scientific papers published on Books, Journals and Conference Proceedings.
- Impact Index in Scopus Database on 2017: H-index 16, with Citations: 762 e Citing documents:431 (Main Journals: *Journal of Propulsion and Power*, *AIAA Journal*, *Shock Waves*, *Computers and Fluids*)
- Member of the Editorial Boards of several Space Journals and Reviewer for International Journals.

## Scientific and Technical Activity

Prof. Onofri got his engineering degree at the Faculty of Civil Engineering of Sapienza University of Rome on 1974. He has been working in the field of Space Propulsion and theoretical Gasdynamics since the late 70's, when he became first assistant of Prof. Carlo Buongiorno.

In his first studies he achieved two awards for the best papers published on the Italian Journal "Ingegneria Ferroviaria" for studies addressing the theoretical simulation and numerical calculations of the transient flow behavior in channel networks, with application and very successful validations to railways tunnels.

After two years of collaboration with Prof. Moretti at Polytechnic Institute of New York, working on the evolution of Shock-fitting techniques, he developed for the first time in Italy a numerical tool for the solution of the Navier Stokes equations for compressible flows. Then he started studying the numerical simulation of high enthalpy flows in chemical nonequilibrium conditions. In this activity he successfully participated to the working group on thermo-chemical flow predictions for the design of the reentry vehicle of the ESA Hermes Project. In particular in this framework he developed an original numerical scheme to compute efficiently the flow behavior around the vehicle shape.

Afterwards, he gathered a small team of young scientists working in the theoretical gasdynamic aspects of space propulsion engines, and started applying the above tools to the flow prediction in the Vulcain nozzle, where there were noticed dangerous side loads during highly overexpanded operating conditions, and during the start-up transient phase.

In the framework of these studies he participated with his space propulsion team to the working group on the Flow Separation Control Devices, in which for the first time he showed the generation of a large recirculating bubble in the nozzle divergent section during the engine start-up. He proposed an explanation of the physical mechanism of such flow behavior, showing how it plays a prominent role in the generation of the nozzle side loads. These studies found a large interest in the scientific community and also some doubt was risen, until the predictions and explanations of the Sapienza team were definitely confirmed by the measurements of a large experimental campaign.

As an heritage of these studies relevant to nozzle flows, he led his space propulsion team to start studying different possible advanced nozzle configurations, considering in particular Plug nozzles, Extendible nozzle, and Dual Bell nozzles. A large number of detailed analyses were provided for these nozzle configurations that still represent a valid reference for their practical design.

In the framework of this activity he chaired an International RTO Group (former NATO-Agard) working on Plug Nozzles.

More recently he started studying the numerical modeling of the flow-surface interaction in high enthalpy flow, providing theoretical simulations of the multi-physic mechanisms occurring at the interface based on original modeling of the phenomena, and useful for practical purpose. From this activity a number of papers were published addressing the heat-transfer simulation and his management for thrust chamber and nozzle design.

Recent modeling of the flow behavior in cooling channel in near critical flow conditions, with particular emphasis of the use of supercritical methane cooling, and on the ablation simulation modeling for combustion chambers and nozzles of solid rocket motors have met the interest of the scientific community.

During his scientific activity Prof. Onofri promoted the creation of the Italian larger group of researchers working in space propulsion. In particular he coordinated this group for 15 years, before passing to promote the creation of the largest Interdepartmental University Center in Europe working in aerospace: the CRAS (Center for Aerospace Research of the Sapienza University). In fact, CRAS was instituted in June 2008, and gathers 100 Full Professors from 10 Departments of "La Sapienza", plus a number of PhD and post-PhD researcher assistants, working in all the different disciplines related to the Aerospace field. Prof Onofri was nominated Director of this organization.

He was also very active in the promotion of many new didactical curricula in aerospace at the Sapienza University, for which he served in a number of boards of coordination and direction of the internal activities. In particular Prof. Onofri:

- promoted with Carlo Buongiorno, and is presently Director, of the **Master** of second level (for graduate students) in "**Space Transportation Systems**" (STS), established in 2002, and motivated to provide support to the education and training of young system engineers working to the VEGA program. The Master STS is indeed an education program fully focused on the training of graduate students in the field of the Launchers, Launch Bases, and Re-entry Vehicles. In this sense it is quite unique in Europe, and it has achieved high international reputation. It is sponsored by all the major Italian space industries working in the field, has

achieved the support of ESA, ASI and CNES, and by EADS and Ariespace, which in the last eight years has invited the students to visit the Kourou Base and attend to a launch of Ariane 5. High level teachers give mini courses in the Master STS, starting from the ESA DG, Jean Jacques Dordain, and Antonio Fabrizi when he was the ESA Director of Launchers. A large number of the engineers working on the VEGA program have received their background by the Master STS.

- was one of the main promoters of the activation of the **Faculty of Aeronautics and Space Engineering** of La Sapienza, fully dedicated to the aerospace training, including all the levels of education programs, from the basic to the Laurea Magistralis, to the second level Masters and PhD. The faculty was later suppressed because of the budget restrictions imposed by the MIUR to all the University activity, when it showed about 1500 students and 60 professors.
- was one of the promoters and is presently Member of the Scientific-Didactic Board of the **PhD Program in "Aerospace Technologies"**.
- has been the main promoter of the **"Guidonia Project"**, aiming to create in the area of the airport of Guidonia (RM) an International Center fully dedicated to accommodate structures related to the high education programs in the field of Aerospace Engineering and to the fundamental and industrial research of the sector.
- In 2002 e 2004 he was one of the promoters for the **Laurea Honoris Causa** as Doctor in "Aerospace Engineering" at the Scuola di Ingegneria Aerospaziale to John CASANI, Director and Chief Engineer of NASA JPL (2002) and to AI DIAZ, NASA Deputy and Director General of the Scientific Section (2005).

Thanks to his role in the promotion of many space activities he was appointed of the role of Adviser to the Minister of University and Research for Space Matter in 2006-08 and nominated member of the Board of Directors of the Italian Space Agency in 2007-08.

In this role he gave contributions to the definition of the European policy for the Space Launchers, to the development of the Vega project, and to the preparation of his possible evolution. In this view he pursued also national projects, like the starting of the LYRA Program and the development of an Italian industrial capability in the LOx Methane propulsion systems.

Moreover, he started promoting many national and European space projects in the field of launchers, launch base evolutions, and re-entry vehicles. In particular, he:

- promoted the re-organization of the Italian industries working for the Space Bases of Kourou and Malindi,
- worked for the development of the LOx-Methane space propulsion, including the HYPROB Program,
- cooperated in promoting the projects for the development of new technologies for the reentry vehicles, providing support to the Expert and CSTS Projects of ESA, and working for the establishment of the ESA Project of the IXV demonstrator,
- promoted also many other smaller projects for the development of the related technologies.
- In the same period he was also appointed as member of the Board of Director of ELV, the Italian industry acting as Italian leader of the System Activity for Launchers Design, and in particular as System Responsible for the Vega launcher.
- He has been appointed again as member of the Board of Director of ELV on 2012 - 2013.

In the very recent time he has promoted with Jean-Jacques Dordain the **ASTRI Programme**, an innovative organization of training devoted to the best young engineers in European universities. The Programme is based on a major change in the paradigm of education: not any stage or fellowship position in industrial activity, but rather the creation of international Teams of graduated students from different countries, who answer to Call proposed by Industries to solve specific high tech problems or create autonomously innovative solutions for new components.

The ASTRI Programme was agreed and a MOU signed on 21 June 2017 at the Le Bourget Air Show by seven CEO of the major European industries (Airbus, ArianeGroup, Avio, Leonardo-Telespazio, OHB, Ruag, Thales) and eight Universities (CNAM-Paris, EPFL-Lausanne, KTH Stockholm, Polytech Madrid, Sapienza-Rome, Univ Leicestershire, Univ Montpellier, VKI-Bruxelles).

## Activity in International Space Programs

- **Invited or Keynote Lecturer** in International Conferences. Last, the International Symposium on Shock Waves-ISSW30, Tel Aviv, July 2015.
- Promoter and Co-chairman of the Lecture Series per lo Special Year dedicated to "**Combustion Theory**" at Centro IAC -CNR (1990).
- Promoter, in cooperation with ESA-ESTEC, and Co-chairman of the Workshop on "**Advanced Nozzles**", La Sapienza, October 1997.
- Co-chair of the RTO (ex AGARD) group on "Plug Nozzles" in the AVT WG10 (1998-99).
- Invited Lecturer: "**Flow Separation Phenomena in Overexpanded Nozzles**", 4<sup>th</sup> Space Propulsion 2004 Conference, Chia Laguna, June 2004
- Organizer and Chairman of the **17th ISIS**, International Shock Interaction Symposium, Roma, 2006.
- Promoter of **Bilateral Cooperations and International Agreements** for common educational curricula in Aerospace Engineering with European and USA Universities (European Univ.: ISAE-Toulouse, Rouen, Ecole des Arts and Metiers-Paris, TU Delft / USA Univ. :Purdue University, Clarkson University)
- Promoter of Studies and **Scientific Co-operations** al European level (ESA, EC/FP7, CNES, Onera, DLR-Lampoldhausen, Univ de Rouen) and with Universities and Research Centers in USA (NASA/JPL, NASA/Glenn, Purdue University, University of Clarkson, Polytechnic Institute of New York).
- **Principal Investigator** and/or National Coordinator of several research projects funded by Italian Space Agency (ASI), "Ministero Università e Ricerca Scientifica e Tecnologica" (MURST), National Research Council (CNR).
- **Consultant and/or Principal Scientific Investigator** for National and International Industries for Scientific Projects and Applied Researches concerning *Theoretical Analysis and CFD Applications in Gas Dynamic and Space Propulsion Problems*.
- Member of Evaluator and Reviewer Boards to assess the quality of industrial space projects:
  - Chairman of "**LYRA Launch Vehicle Configuration Review**" , ASI (2005).
  - Member of the ESA Steering Board in "**VEGA System Critical Design Review**" (2006-07).
  - Chairman of ASI Review Board for the Program "**LYRA Launcher System**" (2010).
  - Chairman of ASI Board for "**Critical Design Review of the LYRA Program**" (2011).
  - Member of the CIRA Board for the "**Review of the HYPROB program**" (2011)
  - Member for ASI in "**Material Review Board**" to investigate the failure in the test of the MIRA motor (2011)
  - Member of the AVIO Steering Board "**Preliminary Design Review of the SRM Zefiro 40**" (2013)
  - Member of the ESA Board for "**Ariane 5ME Verification Key Point (VKP)**" (December 2013)
  - Member of IIC-ESA on "**Independent Investigation Committee on the IXV VV04 Launch Delay**" (2014-15)
  - Member of the ESA Panel for "**Ariane 6 Programme Implementation Review**" (July 2016)

Typical studies carried out are listed here in the following page.

## Typical studies carried out are:

- SNIA BPD on "Simulation Models for Solid Propellant Propulsion Systems" (80-89);
- NASA Ames Research Center on "Fast Numerical Solver for Euler Equations." (1986);
- CIRA on "Numerical Methods for Chemical Kinetics in Hypersonic Flows" (1988-90);
- CNR-IAC-Istituto Applicazioni del Calcolo on "Simulation of Combustion Phenomena" (1988-92);
- AVIONS MARCEL DASSAULT on "Simulation of Hypersonic Flows" for HERMES Project of ESA (1988-90);
- FIAT AVIAZIONE on "Hypersonic Propulsion" (1990-92);
- GRUMMAN Corpo. Tech. at Bethpage Research Center for a study on "Numerical Simulation of Shock-Boundary Layer Interaction", (1992);
- MBB Deutsche Aerospace for the ELITE Project of ESA on "Nozzle Side Loads" (1992-95);
- ASI "Simulation models of high-speed viscous flowfields", (1992/95)
- ITALFER on "Analysis of Aerodynamic Phenomena in Tunnels" (1994-96);
- ESA ESTEC on "CFD for Axisymmetric Plug Nozzles" (1996-99); in the framework of this activity, cooperation with VOLVO Aero to the GSTP Project;
- MIUR "Numerical analysis of advanced propulsion nozzles", (1998-99)
- ASI: "Study of plug nozzle flowfields for future launchers", (1998/2000)
- DASA (Daimler-Benz Aerospace) "Advanced Nozzle Technology: Flow Separation and Side Loads in Nozzles", n.R 5598-8687, (1992-94)
- DASA Daimler Benz Aerospace on "Linear Plug Nozzles" for the FESTIP Tech Project of ESA (1996-97);
- TECHSPACE AERO on "Air Intake Design for ACE" for the FESTIP Heat Management Project of ESA (1996-97);
- SEP-SNECMA on "Clustered Module Plug Nozzles" for the ARPT Project of ESA (1997-99).
- ESA ESTEC for "Flow Separation Control in Rocket Nozzles" (1999-2001);
- ESA ESTEC for "Analysis and Design of Advanced Rocket Nozzles" (2001-2003);  
in the framework of this activity, cooperation with VOLVO Aero; ASTRIUM, SNECMA.
- ESA ESTEC TRP: Study on the origin of Side Loads, no. 15575/01/NL/CK, (2001-03)
- ESA ESTEC GSTP: Investigation of self-adaptable rocket nozzles, no. 16301/02/NL/SF, (2002-03)
- ASTRIUM on "Linear Plug Nozzles" (2003);
- ESA ESTEC on "Wall Heat Transfer Prediction in Cooling Channels" (2005-07);
- ASTRIUM ST for "CFD Analysis and AeroTermoData Base for the IXV Configuration" (2008-09);
- AVIO "Modelli di predizione dell'ablazione degli ugelli nei motori a propellente solido", (2004-05)
- VOLVO AERO "Support to the design of Annular Plug Nozzle", ESA/ESTEC TRP (2004-05)
- AVIO "Study on Cooling System for LRE", CTR19152, (2005-06)
- ESA/ESTEC TRP "Multiphysic modelling of Near Surface Phenomena", no. 19168, (2005-07)
- THALES ALENIA SPACE IT "Study on CSTS-Crew Space Transportation System" (2007)
- CIRA "CAST\_Configurazioni Aerotermodinamiche Innovative per Sistemi di Trasporto Spaziale", (2008-11)
- AVIO "LM10-MIRA Demonstrator Design Cross Check Activities" (2009-11)
- SNECMA SA, on "In-Space Propulsion", EU/FP7 Space, (2009-12)
- DASSAULT AVIATION "CFD Support for the IXV Aerothermodynamic Data Base", (2009-11)
- CIRA "Accordo per supporto scientifico per il Programma HYPROB", (2010)
- ESA ESTEC "Hypersonic Flow Analysis with Gas Surface Interaction Modeling", (2010-12)
- AVIO "Program-THESEUS: Ablative chamber design for liquid propulsion engine", (2011-12)
- CIRA "Combustion and Cooling System for LRE Lox-Methane", (2011-13)
- THALES ALENIA SPACE IT "Numerical Study on IXV Configuration", (2011-13)
- ESA ESTEC "Modeling and Simulation of Rocket Engine Propulsion Systems", (2011-13)
- ESA/HQ "Analysis of Vulcain 2 engine operational anomalies", Contract no. 4000106961/12/ (2012-13)
- ASTRIUM ST "CEA-based Solver for Gas -Surface Thermochemistry", CTR no. 4572038019 , (2012-13)
- DLR, "Launcher Base Flow and Shock Interaction Regions Improved Loads", (2013-14)
- AVIO "High Thrust in Space Advanced Liquid Propulsion Stages", ESA TRP, (2013)
- AVIO "Simulation For Solid Rocket Motor Ignition Transient" (2013)
- ASI "Microthruster Design and Manufacturing with MEMS Technology" (2013)
- DLR, "Ariane 5 Launcher Base Flow and Shock Interaction Regions Improved Loads", (2013-14)
- ESA/ESRIN "VEGA Post Flight Data Analysis", (2014)

## Publications and Editorial activity

- Member of the Editorial Boards of Space Journals, and Reviewer for International Journals.
- More than 120 scientific papers published on Books, Journals and Conference Proceedings.
- Impact Index in Scopus Database on 2017: H-index 16, with Citations: 762 e Citing documents:431; Main Journals : *Journal of Propulsion and Power, AIAA Journal, Shock Waves, Computers and Fluids*

List of some of the most relevant Publications in <i>International Journals</i>
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- ONOFRI M. , PACIORRI R. (Editors) (2017). "*Shock Fitting: Classical Techniques, Recent Developments and Memoirs of Gino Moretti*", SPRINGER BOOK\_426973, ISBN: 978-3-319-68426-0
- BONFIGLIOLI A., PACIORRI R., NASUTI F., ONOFRI M. (2016). *Moretti's Shock-Fitting Methods on Structured and Unstructured Meshes*. In: Remi Abgrall and Chi-Wang Shu (Editors). HANDBOOK OF NUMERICAL ANALYSIS, vol. 17, p. 403-439, ELSEVIER B.V., ISBN: 9780444637895
- PIZZARELLI, M., NASUTI, F., ONOFRI, M. (2016). *Evolution of Cooling-Channel Properties for Varying Aspect Ratio*. PROGRESS IN PROPULSION PHYSICS. vol. 8, p. 117-128,
- D. BIANCHI, F. NASUTI, M. ONOFRI (2015). *Radius of Curvature Effects on Throat Thermochemical Erosion in Solid Rocket Motors*, JOURNAL OF SPACECRAFT AND ROCKETS, Vol. 52, No. 2, pp. 320-330.
- M. PIZZARELLI, F. NASUTI, M. ONOFRI, P. RONCIONI, R. VOTTA, F. BATTISTA (2015). *Heat transfer modeling for supercritical methane flowing in rocket engine cooling channels*. APPLIED THERMAL ENGINEERING, Volume 75, 22 January 2015, Pages 600-607
- M. PIZZARELLI, F. NASUTI, M. ONOFRI (2014). *Effect of cooling channel aspect ratio on rocket thermal behavior*. JOURNAL OF THERMOPHYSICS AND HEAT TRANSFER, Volume 28, Issue 3, July-September 2014, Pages 410-416
- A. TURCHI, D. BIANCHI, F. NASUTI, M. ONOFRI (2013). *A numerical approach for the study of the gas-surface interaction in carbon-phenolic solid rocket nozzles*. AEROSPACE SCIENCE AND TECHNOLOGY, ISSN: 1270-9638, doi: 10.1016/j.ast.2012.06.003
- M. PIZZARELLI, F. NASUTI, M. ONOFRI (2013). *Coupled Wall Heat Conduction and Coolant Flow Analysis for Liquid Rocket Engines*. JOURNAL OF PROPULSION AND POWER, vol. 29, p. 34-41, ISSN: 0748-4658, doi: 10.2514/1.B34533
- MARCO PIZZARELLI, FRANCESCO NASUTI, MARCELLO ONOFRI (2012). *CFD analysis of transcritical methane in rocket engine cooling channels*. THE JOURNAL OF SUPERCRITICAL FLUIDS, vol. 62, p. 79-87, ISSN: 0896-8446, doi: 10.1016/j.supflu.2011.10.014
- M. PIZZARELLI, F. NASUTI, M. ONOFRI (2011). *Analysis of Curved Cooling Channel Flow and Heat Transfer in Rocket Engines*. JOURNAL OF PROPULSION AND POWER, vol. 27, p. 1045-1053, ISSN: 0748-4658, doi: 10.2514/1.B34163
- D. BIANCHI, F. NASUTI, M. ONOFRI, E. MARTELLI (2011). *Thermochemical Erosion Analysis for Graphite/Carbon-Carbon Rocket Nozzles*. JOURNAL OF PROPULSION AND POWER, vol. 27, p. 197-205, ISSN: 0748-4658, doi: 10.2514/1.47754
- E. MARTELLI, F. NASUTI, M. ONOFRI (2010). *Numerical calculation of FSS/RSS transition in highly overexpanded rocket nozzle flows*. SHOCK WAVES, vol. 20, p. 139-146, ISSN: 0938-1287, doi: 10.1007/s00193-009-0244-4
- HADJADJ A, ONOFRI M. (2009). *Nozzle Flow Separation*. SHOCK WAVES, vol. 19; p. 163-169, ISSN: 0938-1287, doi: 10.1007/s00193-009-0209-7.
- E. MARTELLI, F. NASUTI, M. ONOFRI, (2009). *Numerical Analysis of Film Cooling in Advanced Rocket Nozzles*, AIAA JOURNAL, Vol. 47, n. 11, pp. 2558-2566, ISSN: 0001-1452, doi: 10.2514/1.39217,.

- M. PIZZARELLI, F. NASUTI, R. PACIORRI, M. ONOFRI, (2009). *Numerical Analysis of 3D Flow of Supercritical Fluid in Asymmetrically Heated Channels*, AIAA JOURNAL,, Vol. 47, n. 11, pp. 2534-2543, ISSN: 0001-1452, doi: 10.2514/1.38542.
- NASUTI F, ONOFRI M. (2009). *Shock Structure in Separated Nozzle Flows*. SHOCK WAVES, vol. 19; p. 229-237, ISSN: 0938-1287, doi: 10.1007/s00193-008-0173-7
- ONOFRI M. (2007). *Report on the 17th International Shock Interaction Symposium*. SHOCK WAVES, vol. 16; p. 403-404, ISSN: 0938-1287, doi: 10.1007/s00193-007-0078-x
- MARTELLI E, NASUTI F, ONOFRI M. (2007). *Numerical Parametric Analysis of Dual-Bell Nozzle Flows*. AIAA JOURNAL. vol. 45, pp. 640-650 ISSN: 0001-1452.
- NASUTI F., ONOFRI M., MARTELLI E. (2005). *Role of wall shape on the transition in axisymmetric dual-bell nozzles*. JOURNAL OF PROPULSION AND POWER. vol. 21, pp. 243-250 ISSN: 0748-4658.
- NASUTI F., ONOFRI M. (2001). *Analysis of In-Flight Behavior of Truncated Plug Nozzles*. JOURNAL OF PROPULSION AND POWER. vol. 17, pp. 809-817 ISSN: 0748-4658.
- ONOFRI M., NASUTI F. (2001). *Theoretical Considerations on Shock Reflections and Their Implications on the Evaluations of Air Intake Performance*. SHOCK WAVES. vol. 11, pp. 151-156 ISSN: 0938-1287.
- NASUTI F., ONOFRI M. (1999). *Theoretical Analysis and Engineering Modeling of Flowfields in Clustered Module Plug Nozzles*. JOURNAL OF PROPULSION AND POWER. vol. 15, pp. 544-551 ISSN: 0748-4658.
- NASUTI F., ONOFRI M. (1999). *The Use of Shock-Fitting Techniques to Simulate Discontinuities in Transonic and Supersonic Flows*. INTERNATIONAL JOURNAL OF APPLIED SCIENCE AND COMPUTATION. vol. 6, pp. 61-68.
- VALORANI M., NASUTI F., ONOFRI M., BUONGIORNO C. (1999). *Optimal Supersonic Intake Design for Air Collection Engines (ACE)*. ACTA ASTRONAUTICA. vol. 45, pp. 729-745 ISSN: 0094-5765.
- NASUTI F., NICCOLI R., ONOFRI M. (1998). *A Numerical Methodology to Predict Exhaust Plumes of Propulsion Nozzles*. JOURNAL OF FLUIDS ENGINEERING. vol. 120, pp. 563-569 ISSN: 0098-2202.
- NASUTI F., ONOFRI M. (1998). *Viscous and Inviscid Vortex Generation during Start-up of Rocket Nozzles*. AIAA JOURNAL. vol. 36, pp. 809-815 ISSN: 0001-1452.
- NASUTI F., ONOFRI M. (1998). *Methodology to Solve Flowfields of Plug Nozzles for Future Launchers*. JOURNAL OF PROPULSION AND POWER. vol. 14, pp. 318-326 ISSN: 0748-4658.
- NASUTI F., ONOFRI M. (1996). *Analysis of Unsteady Viscous Flows by a Shock Fitting Technique*. AIAA JOURNAL. vol. 34, pp. 1428-1434 ISSN: 0001-1452.
- ONOFRI M., NASUTI F. (1996). *Numerical Aspects of the Solution of the Non-Conservative Navier-Stokes Equations for High Speed Flows*. INTERNATIONAL JOURNAL OF APPLIED SCIENCE AND COMPUTATION. vol. 2, pp. 437-451.
- F. NASUTI, M. ONOFRI, (1994). *Transient Flow Analysis of Nozzle Start-Up by a Shock-Fitting Technique, Unsteady Flows in Aeropropulsion*, ASME AD-Vol.40, pp.127-135,.
- F. SABETTA, B. FAVINI, M. ONOFRI, (1993). *Equilibrium and nonequilibrium modeling of hypersonic inviscid flows*, COMPUTERS AND FLUIDS, 22 (2-3), pp. 369-380,
- M. VALORANI, M. ONOFRI, B. FAVINI, F. SABETTA, (1992). *Nonequilibrium hypersonic inviscid steady flows* AIAA Journal, 30 (1), pp. 86-93, ISSN: 0001-1452, doi: 10.2514/3.10886.
- M. ONOFRI, A. TESEI Editors (1991): "*Fluid Dynamical Aspects of Combustion Theory*", LONGMAN Scient & Technical.

- M. ONOFRI, D. LENTINI, (1989). *Fast numerical solver for transonic flows*, COMPUTERS AND FLUIDS, 17 (1),
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