

CV OF ENRICO CAVALLINI

Education and Training

November 2006 – October 2009	
Title of qualification awarded	Doctor of Philosophy (Ph.D.) awarded on 20th April 2010
University	Sapienza Università di Roma - Ph.D. Course in "Aeronautical and Space Engineering" - in Italian "Tecnologia Aeronautica e Spaziale" (XXII ciclo)
Thesis title	Modeling and Numerical Simulation of Solid Rocket Motors Internal Ballistics
Tutor	Prof. Maurizio di Giacinto
October 1999 – October 2006	
Degree	Master's Degree, 5 years course
Title of qualification awarded	Laurea in Ingegneria Aerospaziale (vecchio ordinamento - ante DM 509/99) awarded on October 25th 2006
University	Sapienza Università di Roma
Final Grade	110/110 cum laude
Thesis title	Numerical Simulation of SRM internal ballistic in quasi steady state - in Italian "Simulazione Numerica della Balistica Interna di un SRM in fase Quasi-Stazionaria"
Supervisors	Prof. M. Di Giacinto and Prof. B. Favini
Fundamentals teachings	Rocket Propulsion, Gasdynamics, Space Flight Mechanics, Jet Propulsion, Flight Mechanics, Mechanics, Constructions Science, Aerospace Structures, Informatics

Professional Experience

March 2014 – Present	
Employer	Dipartimento di Ingegneria Meccanica e Aerospaziale (DIMA), Sapienza Università di Roma
Working Place	Rome, Italy
Qualification	Research Fellow on the subject: "Modelling, Numerical Simulation and Analysis of the Internal Ballistics of Solid Rocket Motors of VEGA and VECEP"
Activities/Duties	Technical activities/technical interface/work package manager for the contract "Modelling, Numerical Simulation and Analysis of the Internal Ballistics of Solid Rocket Motors of VEGA and VECEP" ESA ESRIN/Contract 4000101871/10/NL/JD CCN 1 & CCN 2, Sapienza Università di Roma - Dipartimento di Ingegneria Meccanica e Aerospaziale - ESA Technical Officer: Mr. A. Neri. Involved in the analysis of the solid propellant motors of the European launch vehicle VEGA: cross-check activities for SRM post-flight analyses and anomaly studies; preliminary studies/analysis/cross-check on VECEP Program – collaborations with ESA-ESRIN, ESA-ESTEC, ELV and AVIO.
March 2010 – February 2014	
Employer	Dipartimento di Ingegneria Meccanica e Aerospaziale (DIMA) - formerly Dipartimento di Meccanica e Aeronautica (DMA), Sapienza Università di Roma
Working Place	Rome, Italy
Qualification	Research Fellow on the subject: "Modeling and Numerical Simulation of SRM Internal Ballistics during Ignition Transient"
Activities/Duties	Technical activities for the contract "Simulation models for solid rocket motor (SRM) ignition transient (IT)" ESA ESTEC/Contract No. 22711/09/NL/RA, Sapienza Università di Roma - Centro Ricerca Aerospaziale Sapienza (CRAS) - ESA Technical Officer: Mr. J. Steelant.

	Technical activities for the contract “Support to Analysis of VEGA Motors” ESA ESRIN/Contract 4000101871/10/NL/JD, Sapienza Università di Roma - Dipartimento di Meccanica e Aeronautica - ESA Technical Officer: Mr. M. Bonnet. Involved in the analysis and development of the solid propellant motors of the European launch vehicle VEGA: cross-check activities for SRM design analyses and anomaly studies, collaborations with ESA-ESRIN, ESA-ESTEC, ELV and AVIO. September 2011 – March 2012 Employer Dipartimento di Ingegneria Meccanica e Aerospaziale (DIMA), Sapienza Università di Roma Working Place Rome, Italy Activity/Duties Research Contractor for the research project “<i>Analysis and Reconstruction of the Performance of VEGA Solid Stages – Study of the Internal Ballistics of Zefiro SRMs Igniters</i>” (respectively financed by ESA-ESRIN and AVIO). December 2010 – July 2011 Employer Dipartimento di Ingegneria Meccanica e Aerospaziale (DIMA), Sapienza Università di Roma Working Place Rome, Italy Activity/Duties Research Contractor for the research project “<i>Modelling and Numerical Simulation of SRM Internal Ballistics</i>” (financed by ESA-ESRIN). May 2009 – December 2009 Employer Dipartimento di Meccanica e Aeronautica (DMA), Sapienza Università di Roma Working Place Rome, Italy Activity/Duties Research Contractor for the research project “<i>Development of SRM internal ballistics models and SRM 3D grain regression model</i>” (financed by ESA-ESRIN). June 2008 - December 2008 Employer Dipartimento di Meccanica e Aeronautica (DMA), Sapienza Università di Roma Working Place Rome, Italy Activity/Duties Research Contractor for the research project “<i>3D model for the propellant grain burnback analysis</i>” (financed by ESA-ESRIN). May 2007 - December 2007 Employer Dipartimento di Meccanica e Aeronautica (DMA), Sapienza Università di Roma Working Place Rome, Italy Activity/Duties Research Contractor for the research project “<i>Development of propellant grain regression model</i>” (financed by ESA-ESRIN).
Publications	
from 2008	2 journal publication - 32 conference publications - 1 Ph.D. Thesis
Membership	
2013-Present	Reviewer and Chairman of the Solid Rocket Sessions of the Joint Propulsion Conference of the American Institute of Aeronautics and Astronautics
2011-Present	International Member of the “Solid Rocket Technical Committee” of the American Institute of Aeronautics and Astronautics
September 2011 – March 2013	Member of the International Ballistics Society
2009-Present	Member of the American Institute of Aeronautics and Astronautics
Participation to Commissions/Working Groups/Seminars	
December 2014-Present	Participant to the VEGA Finite Element Model Working Group of the European Space Agency
April 2015	Invited Lecturer at Italian Space Agency Workshop: “Il Lanciatore Vega: una storia italiana di successo” Rome

May 2015	Member of the "Solid Propulsion Panel" for the Level 1 Meeting of the VEGA 4th Flight (VV04)
March 2015	Member of the "Solid Propulsion Panel" for the Level 0 Meeting of the VEGA 4th Flight (VV04)
September 2014	Member of the "Solid Propulsion Panel" for the Level 1 Meeting of the VEGA 3rd Flight (VV03)
October 2013	Member of the "Solid Propulsion Panel" for the Level 1 Meeting of the VEGA 2nd Flight (VV02)

Participation to Interdisciplinary Projects

2011	"Analisi ed approssimazione di modelli differenziali nonlineari in fluidodinamica e scienza dei materiali", Resp. Prof. Maurizio Falcone, Progetto Ateneo 2011 – prot. C26A10ZT3Z - Theme 1. Part 2. "Metodi level-set per la regressione geometrica del grano propellente", B. Favini and E. Cavallini. Seminar: "On the Reconstruction of Geometrical Properties in Level Set Methods with Application to SRM" (in Italian "Ricostruzione di alcune grandezze geometriche nella applicazione dei metodi level-set ai motori a propellente solido"), E. Cavallini and B. Favini Seminario di Modellistica Differenziale Numerica presso il Dipartimento di Matematica, Sapienza Università di Roma, 15 March 2011.
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Technical Reports

June 2015	Co-author of the proposal for the contract: "SUPPORT AND CROSS-CHECK OF VEGA-LEAP AND VECEP SOLID PROPULSION AND SYSTEM ACTIVITIES (PERIOD Q2 2015-Q2 2017)" in response to the Statement of Work Ref. VG-CT-1-C-30000-ESA Issued on 13/04/2015, E. Cavallini and B. Favini, Sapienza - University of Rome, Dipartimento di Ingegneria Meccanica e Aerospaziale
2009–present	Technical notes, technical reports, presentations and private communications in the frame of the consultancy and cross-check activities for the development and analysis of the solid stages of the European launcher VEGA, for the contract ESA ES-RIN/Contract 4000101871/10/NL/JD
2010–2012	Technical notes, technical reports and presentations for the contract "Simulation models for solid rocket motor (SRM) ignition transient (IT)" ESA ESTEC/Contract No. 22711/09/NL/RA, Sapienza Università di Roma - Centro Ricerca Aerospaziale Sapienza (CRAS)
November 2013	Co-author of the proposal for the contract: "SUPPORT & CROSS CHECK ACTIVITIES OF VEGA & VECEP SOLID PROPULSION" IN RESPONSE TO THE STATEMENT OF WORK VG-CT-1-C-001-IPT ISSUED ON 11 OCTOBER 2013, E. Cavallini and B. Favini, Sapienza - University of Rome, Dipartimento di Ingegneria Meccanica e Aerospaziale - Area Propulsione Spaziale.
June 2010	Co-author of the proposal for the contract: "SUPPORT TO ANALYSIS OF VEGA MOTORS" IN RESPONSE TO THE RFQ/3-13080/10/I/JD, ISSUED ON 17TH JUNE 2010, M. Di Giacinto, B. Favini and E. Cavallini, Sapienza - University of Rome, Dipartimento di Meccanica e Aeronautica.
April 2009	Co-author of the proposal for the contract: "SIMULATION MODELS FOR SOLID ROCKET MOTOR (SRM) IGNITION TRANSIENT (IT) (RE-ISSUE)" IN RESPONSE TO THE RFQ/ITT ESA/IPC(2009), ITEM NO. 09.123.1 - AO/1-6051/09/NL/RA ISSUED ON 26 FEBRUARY 2009, M. Di Giacinto, B. Favini and E. Cavallini, Sapienza - University of Rome Aerospace Research Center Sapienza (CRAS) Department of Mechanics and Aeronautics (DMA) – Aerospace Propulsion Branch.
January 2008	NUMERICAL SIMULATION OF THE SRM COMBUSTION SURFACE EVOLUTION WITH TIME, E. Cavallini and B. Favini, Internal Report for ESA-ESRIN, Frascati, Italy.

Grants

- 2010 CASPUR (Consorzio Interuniversitario per le Applicazioni di Supercalcolo Per Università e Ricerca) - Standard HPC grant for the project "Solid Rocket Motors Ignition Transient Numerical Simulation" B. Favini, E. Cavallini, V. Ferretti and S. Zaghi.
- 2009 CASPUR (Consorzio Interuniversitario per le Applicazioni di Supercalcolo Per Università e Ricerca) - Standard HPC grant for the project "Solid Rocket Motor Numerical Simulation" B. Favini, E. Cavallini, V. Ferretti and S. Zaghi.

Post-Graduate Courses

- 2014 International Workshop on "New Energetic Materials & Propulsion Techniques for Space Exploration" Politecnico di Milano, 9-10 June 2014
- 2013 Lectures Series on "Fluid Dynamics associated to Launcher Developers (AVT-STO)" tenuto presso il von Karman Institute for Fluid Dynamics, Rhode-Saint-Genèse, Belgium, 15-17 April 2013
- 2007 Course of "Numerical Analysis" - in Italian "Analisi numerica" by Dr. Roberto Natalini - Consiglio Nazionale delle Ricerche - Istituto per le Applicazioni del Calcolo (IAC) "M. Picone", in the frame of the Ph.D. Course of Dipartimento di Metodi e Modelli Matematici per le Scienze Applicate, Sapienza Università di Roma, 7 February - 9 May 2007 (24 hour of course + 8 hours of Matlab Lab)

Teaching Experience

- Academic Year 2015**
- Lecture Solid Rocket Motor Ignition Transient, Solid Rocket Motor Internal Ballistic, Pressure and Thrust Oscillations in Solid Rocket Motors, SRM Static Firing Tests and Flights Performance Analysis
- University Sapienza Università di Roma - Master in Space Transportation Systems - in Italian, Master Universitario di Secondo Livello in "Sistemi di Trasporto Spaziale"
- Activity Lecturer
- Academic Year 2014**
- Lecture SRM Static Firing Tests Analysis
- University Sapienza Università di Roma - Master in Space Transportation Systems - in Italian, Master Universitario di Secondo Livello in "Sistemi di Trasporto Spaziale"
- Activity Lecturer
- Academic Years 2012, 2013 and 2014**
- Lecture SRM Ignition Transients
- University Sapienza Università di Roma - Master in Space Transportation Systems - in Italian, Master Universitario di Secondo Livello in "Sistemi di Trasporto Spaziale"
- Activity Lecturer
- Academic Years 2012-2013, 2013-2014 and 2014-2015**
- Course Flight Mechanics
- Entity Dipartimento di Ingegneria Meccanica e Aerospaziale (DIMA) - Sapienza Università di Roma
- Activity Students tutoring and assistance for exams
- Academic Year 2010-2011**
- Course Flight Mechanics
- University Faculty of Ingegneria Aeronautica e dello Spazio - Sapienza Università di Roma
- Activity Students tutoring and assistance for exams
- Academic Year 2008-2009**
- Course Flight Mechanics
- University Faculty of Ingegneria Aerospaziale - Sapienza Università di Roma
- Activity Students tutoring and assistance for exams
- Academic Year 2007-2008**

Courses	Flight Mechanics and Fundamentals of Aerospace Science
University	Faculty of Ingegneria Aerospaziale - Sapienza Università di Roma
Activity	Students tutoring and assistance for exams from Academic Year 2006–2007
Courses	Rocket Science – Solid Rocket Motors – Space Propulsion
University	Sapienza Università di Roma
Activity	Assistant for the course and the exams Academic Years 2008–2009 2009–2010
Course	Liquid Rocket Engines
University	Sapienza Università di Roma
Activity	Assistant for the course and the exams Academic Year 2011–2012
Course	Gasdynamics
University	Sapienza Università di Roma
Activity	Exercises for the course Academic Year 2008–2009 2009–2010 2010–2011 2014–2015
Courses	Aerothermochemistry (prof. B. Favini) - Modelling for Solid Rocket Propulsion (proff. M. Di Giacinto e B. Favini)
University	Sapienza Università di Roma
Activity	Seminars for the courses: “A Grain Regression Numerical Model”, “Modeling and Numerical Simulation of Solid Rocket Motors Internal Ballistics”, “Burning Rate Models”, “Static Firing Test Analysis and Performance Reconstruction”

Personal Skills

OS	Unix, Linux, MS Windows, Mac OS
Programming	Fortran, UNIX shell scripting, Matlab, Scilab, Mathematica, Pascal, LaTeX
Development Environment	Matlab, Matlab-Simulink, Mathematica, MS Visual Studio, Codeblocks
Scientific Applications	Tecplot, Paraview, CEA (Nasa), Adina
Office Applications	MS Office, OpenOffice, LibreOffice and similar
Computer Graphics	CATIA, 3D Studio Max, Blender, Autocad, Gimp, Inkscape and similar

Rome, Friday 26th June, 2015

Enrico Cavallini