

CURRICULUM VITAE
G.Saccoccia

1. PERSONAL INFORMATION

Mr. Giorgio SACCOCCIA, born in BELLUNO, Italy, on January 11th 1963
Nationality: Italian

[REDACTED]
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2. EDUCATION

- July 1981 Scientific High School Diploma at Liceo Scientifico "G. Battaglini" of Taranto (Italy).
Final marks 60/60.
Major subjects: mathematics, physics, chemistry, literature, history, philosophy.
- March 1988 Degree in Aerospace Engineering at the University of Pisa (Italy).
Final marks 110/110 with honours.
Major subjects: aeronautics and space technologies.
- October 1985 Master in Business Administration at Webster University, Leiden (The Netherlands).
Major subjects: management, business administration, marketing, finance.

3. WORK EXPERIENCE

- May 1988 - Sept 1989 design engineer of a Very Light Aircraft (VLA) in composite material for an aerospace engineering and research SME (Pisa, Italy).
- Nov 1988 - Nov 1990 also assistant professor of "General Flight Mechanics", Dept. of Aerospace Engineering, University of Pisa, Italy.
- Oct 1989 - Nov 1990 project manager at Centropazio, a space technology research laboratory in Pisa (Italy). Responsible for the execution of an ESA contract regarding the design, development and testing of a Low-Power Arcjet thruster. Also responsible for the installation and technical management of the laboratory test facilities for spacecraft propulsion.
- Oct 1989 - Nov 1990 also private consultant engineer to BPD (now Avio) for the preliminary design of parts (Heat shields and Booster structural joints) of a new Small Italian Launcher (the precursor of Vega).
- Dec 1990 - Oct 1991 Chemical propulsion engineer at the European Space Research and Technology Centre (ESA/ESTEC) in Noordwijk, The Netherlands.
- Nov 1991 - Jan 1996 Electric propulsion engineer at ESA/ESTEC. Responsible for the monitoring and technical management of European contracts in the field of electric propulsion technologies for satellites and for the functional support for electric propulsion to ESA projects in different development phases.
- Feb 1996 - Feb 1997 acting Head of the Electric Propulsion Section of ESA.
- Mar 1997 - Jan 2003 Head of the Electric Propulsion Section of ESA. Responsible for the ESA Strategy in this technology field and for the preparation of the Technology Research and Development plans of ESA in electric propulsion. Point of contact for electric propulsion matters between ESA and other National Agencies, European industry and other International organisations. Also involved in studies and reviews outside the specific field of electric propulsion, such as launcher and advanced propulsion systems. Initiator and manager of the special project for the procurement of the SMART-1 Electric Propulsion Subsystem by DITEC.
- Feb 2003 to date Head of the Propulsion and Aerothermodynamics Division of ESA. Responsible for the ESA R&D strategy and support activities in the field of Propulsion for spacecraft, upper stages and launchers and in the field of Aerothermodynamics, which includes design, analysis, ground and flight test of aerothermodynamic phenomena for external flows around aerospace vehicles and for internal flows through vehicle propulsion systems. Also responsible at ESA for R&D in advanced propulsion concepts for both spacecraft and launchers. Other "ad-hoc" tasks listed below.

4. ADDITIONAL SIGNIFICANT TASKS PERFORMED AT ESA

- 1999 Initiator of a European assessment on trends and perspectives for the future of Space Propulsion, aiming to the definition of a European Strategy in this field (*Propulsion 2000*)
- 1999 Involved in the preparation of the 1st ESA/Industry Space Day and in other technology promotional activities for European space SMEs.
- 1999 Member of the D/TOS ESTEC Infrastructure Group
- 2000 Coordinator of the Electric Propulsion working group for the ECSS Space Engineering Standards
- 2000 Responsible for the Harmonisation Pilot Case dedicated to Electric Propulsion
- 2001 Involved in the set-up of the "ARTEMIS recovery mission" by using electric propulsion
- 2002 Initiator of an European assessment between launcher and commercial satellite actors on the impacts and constraints induced by the use of electric propulsion on GEO telecoms
- 2003 Chairman of the Working Group 4 (*Space Transportation and Re-entry technologies*) for the preparation of the TRP/GSTP workplan 2004-2006
- 2004 Initiator of a European Working Group with the Telecom Primes for the assessment of the Lessons Learnt and in-flight experiences from the SMART-1 electric propulsion mission.
- 2009-10 Member of Exploration Scenarios Working Group (ESWG) for ESA's Director General
- 2009- Officer and Coordinator for ESTEC Technical Support contract to the Italian Space Agency (ASI)
- 2011-14 Exploration Technology Coordinator for ESA Technical Directorate

5. TRAINING COURSES

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| Nov. 1992 | ESTEC (NL): | "Space System Engineering" - <i>Univ. of Southampton (UK)</i> |
| Jan. 1993 | ESTEC (NL): | "Project Management" - <i>Learning Tree International (UK)</i> |
| Feb. 1993 | ESTEC (NL): | "Space Mission Analysis & Design" - <i>Microcosm Inc. (USA)</i> |
| Mar. 1998 | ESTEC (NL): | "Design of Low Cost Space Missions" - <i>Larsson et al. (USA)</i> |
| Feb. 1999 | Cocoa Beach (USA): | "Payload Integration and Processing" - <i>Launchspace (USA)</i> |
| Jan.-Mar. 2002 | Bruxelles (B): | "ESA Management Development Programme" - <i>Oxford Group (UK)</i> |
| Mar. 2005 | ESTEC (NL): | "ESA Leadership and Management stream, Level 4" |
| Sept. 2005 | Bruxelles (B): | "ESA Lead. and Management stream, Level 5: Leading Teams" |
| Nov. 2008 | Fontainebleau (FR) | "Strategic R&D Management", INSEAD |
| Oct. 2010 | ESTEC (NL): | "Intercultural Awareness" |
| Dec. 2012 | ESTEC (NL): | "Business Negotiation Strategies" |

6. MEMBERSHIPS

- 1990 - 1998 Member of American Association for Aeronautics and Astronautics (AIAA)
- 1998 - 2006 Nominated Senior Member of the AIAA
- 2006 - Nominated Associate Fellow of the AIAA
- 1997 - Member of the AIAA International Technical Committee in Electric Propulsion
- 1999 - 2006 Member of the International Astronautical Federation (IAF) Space Propulsion Technical Comm.
- 2006 - Elected Chair of the IAF Technical Committee in Space Propulsion
- 2000 - Elected in the Board of Directors of the Electric Propulsion Rocket Society (EPRS)
- 2007 - 2012 Corresponding Member of International Academy of Astronautics (IAA)
- 2008 - Senior Member of 3AF
- 2009 - Appointed in the Board of Directors of Von Karman Institute for Fluid Dynamics (Bruxelles)
- 2012 - Full Member of International Academy of Astronautics (IAA)
- 2014 - Appointed to Scientific Committee of Italian Aerospace Research Centre (CIRA)

7. ORGANISATION OF INTERNATIONAL EVENTS

- May 1997 Technical Chairman and Organiser of the "Second European Spacecraft Propulsion Conference" (ESTEC, The Netherlands)
- Mar. 1998 Technical Chairman and Organiser of the "Workshop on Low Cost Propulsion Systems for Small Satellites" (ESTEC, The Netherlands)
- Oct. 2000 Organiser and Member of the Technical Committee of the "Third European Spacecraft Propulsion Conference" (Cannes, France; co-organised by CNES and ESA)
- Oct. 2001 International Chairman of the "25th International Electric Propulsion Conference" (JPL, USA)
- May 2002 General Chairman of the "Symposium on Propulsion for Space Transportation of the XXI Century" (Versailles, France; co-organised by AAAF, CNES and ESA)
- June 2004 General Chairman of Spacecraft Propulsion 2004, (Sardinia, Italy)
- May 2008 General Chairman of Space Propulsion 2008, (Crete, Greece)
- May 2010 General Chairman of Space Propulsion 2010, (San Sebastian, Spain)
- May 2012 General Chairman of Space Propulsion 2012, (Bordeaux, France)
- May 2014 General Chairman of Space Propulsion 2014, (Cologne, Germany)

8. PATENTS

ESAPAT/319: "Re-orbit Dedicated Arcjet System".

9. PUBLICATIONS AND SIGNIFICANT WORKS (available upon request)

- Graduation Thesis: *"Thermodynamic and Transport Properties of Dinitrogen Tetroxide (N₂O₄) in Supercritical Conditions, as Oxidizer and Cooling Fluid in Liquid Propellant Rocket Engines"*.
- More than 60 technical and technology review papers prepared in the period 1990-2012, for presentation during Conferences and Workshops and publication on technical magazines.
- Several ESA IPC papers and some articles for ESA internal magazines.
- A book of tutorials for the lectures on "General Flight Mechanics", prepared in 1989.
- Several informative articles published on the technical section of Dutch, French, Italian and Spanish newspapers and magazines.

Technical Papers (list not exhaustive)

1. G.Saccoccia, et al., "Experimental Performance of a 1 kW Arcjet", 21th IEPC, Orlando (FLA-USA), 1990
2. G.Saccoccia, et al., "Performance Study of a Laboratory Model of Low-Power Arcjet", 22nd IEPC, Viareggio (I), 1991
3. C.Bartoli, G.Saccoccia, "European Activities on Electric Propulsion", ESA Bulletin n.70, 1992
4. G.Saccoccia, F.Scortecchi, F.Paganucci, J.Gonzalez, "Experimental Investigation on Arcjets Performance and Possible Applications to Current Mission Concepts with Low-Power Availability", 23rd IEPC, Seattle (WA-USA), 1993
5. W.Deininger, M.Andrenucci, G.Saccoccia, "A Review of the ESA ASTP-3 MPD/Arcjet Development Program (1988-1993)", 23rd IEPC, Seattle (WA-USA), 1993
6. C.Bartoli, J.Gonzalez, G.Saccoccia et al., "Space-Borne Astronomical Gravity-Wave Interferometer Mission: the FEED Option" 23rd IEPC, Seattle (WA-USA), 1993
7. H.von Rohden, J.Gonzalez, G.Saccoccia, "FEED: Experimental Investigation on Microthrust FEED Thrusters", 23rd IEPC, Seattle (WA-USA), 1993
8. S.Marcuccio, A.Genovese, C.Bartoli, J.Gonzalez, G.Saccoccia, "FEED System Study", 23rd IEPC, Seattle (WA-USA), 1993
9. C.Bartoli, H.von Rohden, G.Saccoccia et al., "Review of the Qualification Activities on the Neutraliser for the RIT-10 Ion Thruster", 23rd IEPC, Seattle (WA-USA), 1993
10. C.Bartoli, G.Saccoccia, "European Electric Propulsion Activities in the Era of Application", 23rd IEPC, Seattle (WA-USA), 1993
11. G.Saccoccia, J.Gonzalez, "Electric Propulsion Technologies Comparative Analysis: Application to Current and Future Space Missions", 30th JPC, Indianapolis (IN-USA), Jun.1994
12. G.Saccoccia, J.Gonzalez, et al., "Life-time Test Set-up at ESTEC for RIT-10 Thruster Qualification for ARTEMIS", 31st JPC, San Diego (CA-USA), Jul.1995
13. G.Saccoccia, "Large Geostationary Telecommunication Satellites: Assessment of Mission Techniques and Key Technologies", ESA Internal Working Paper, Nov.1995
14. G.Saccoccia, "Electric Propulsion in Europe: Development and Applications", 34th JPC, Lake Buena Vista (FLA-USA), Jul.1996
15. M.Lange, J.Gonzalez, G.Saccoccia et al., "Application of Electric Propulsion to the Gravity and Ocean Circulation Explorer Mission (GOCE)", 34th JPC, Lake Buena Vista (FLA-USA), Jul.1996
16. J.Gonzalez, G.Saccoccia, "Electric Propulsion for ESA Science and Earth Observation Missions", 2nd Spacecraft propulsion Conference, Noordwijk (NL), May 1997
17. G.Saccoccia, "Electric Propulsion in Europe: Current Developments and Missions", 34th JPC, Cleveland (OH-USA), Jul.1998
18. G.Saccoccia, D.Estublier, "SMART-1: A Technology Demonstration Mission for Science Using Electric Propulsion", 34th JPC, Cleveland (OH-USA), Jul.1998
19. B.Hufenbach, G.Saccoccia, "Low Cost Propulsion Systems and Technologies for Small Satellites", 2nd European Symposium on Small Satellite and Services, Antibes (F), Sept.1998.
20. C.Koppel, M.Lyszyk, D.Valentian, G.Saccoccia, "PPS 1350 with Variable Power Feature for SMART-1", 36th JPC, Huntsville, (Al-USA), Jul.2000
21. H.Schöyer, G.Saccoccia et al., "The New European Propulsion Standard", 37th JPC, Salt Lake City, (Ut-USA), Jul.2001
22. D.Nicolini, J.Gonzalez, G.Saccoccia, "Plasma Measurements in the ESA Electric Propulsion Laboratory", 7th Spacecraft Charging Technology Conference, Noordwijk (NL), April 2001
23. G.Saccoccia, "The Trends in Electric Propulsion and European Collaborative Programmes", International Symposium on Propulsion for Space Transportation for the XX1st Century, Versailles (F), May 2002
24. M.-A.Luron, G.Saccoccia, "Impacts on Launcher Requirements and Operations of the Use of Electric Propulsion on Telecom Spacecraft", International Symposium on Propulsion for Space Transportation for the XX1st Century, Versailles (F), May 2002
25. M.Tajmar, G.Saccoccia et al., "Plasma Diagnostics and Simulation for the SMART-1 Mission", Planetary and Space Science, vol.50, n.14-15, pp.393-399, 2002
26. E.Chesta, J.Gonzalez, G.Saccoccia, "A Full Solar Electric Propulsion Concept for Mars Exobiology", 38th JPC, Indianapolis, (In-USA), Jul.2002
27. R.Killinger, G.Saccoccia et al., "Artemis Orbit Raising: in-orbit experience with electric propulsion", 26th IEPC, Toulouse (F), Oct.2003
28. R.Killinger, G.Saccoccia et al., "Final Report on the Artemis Salvage Mission using Electric Propulsion", 39th AIAA Joint Propulsion Conference, Huntsville (USA), July 2003
29. G.Saccoccia, "ESA Spacecraft Propulsion Activities", 4th Spacecraft propulsion Conference, Chia Laguna (I), May 2004
30. E.Chesta, G.Saccoccia et al., "Hybrid (coupled plasma/ion) Electric Propulsion Systems", 4th Spacecraft propulsion Conference, Chia Laguna (I), May 2004
31. J.Muyllaert, G.Saccoccia et al., "Flight Measurements Technique Developments for EXPERT, the ESA In-Flight Aerothermodynamics Research Programme", 55th IAF Congress, Vancouver (Ca), October 2004
32. J.Muyllaert, G.Saccoccia, W.Kordulla, "Aerothermodynamics in Europe: Achievements and Challenges", 5th International Aerothermodynamics Symposium for Space Vehicles, Koeln (D), December 2004
33. E.Chesta, G.Saccoccia et al., "Flexible Variable Specific impulse Electric Propulsion for Planetary Missions", Acta Astronautica, vol.59-2006, pp.931-945
34. A.Cervone, G.Saccoccia, et al., "Development of Hydrogen Peroxide Monopropellant Rockets", 42nd AIAA Joint Propulsion Conference, Sacramento (USA), July 2006
35. C.Bramanti, G.Saccoccia et al., "Experimental Characterization of Advanced Materials for the Catalytic Decomposition of Hydrogen Peroxide", 42nd AIAA Joint Propulsion Conference, Sacramento (USA), July 2006

36. C.Charles, R.W.Boswell, G.Saccoccia et al, "Helicon Double Layer Thrusters" 42nd AIAA Joint Propulsion Conference, Sacramento (USA), July 2006
37. A.Cervone, G.Saccoccia, et.al., "Development of Green Hydrogen Peroxide Monopropellant Engines and Testing of Advanced Cathalitic Beds", 3rd International Conference on Green Propellants for Space Propulsion, Poitiers (FR), Sept.2006
38. A.Pasini, L.Torre, G.Saccoccia et al., Experimental Characterisation of a 5N Hydrogen Peroxide Monopropellant Thruster Prototipe", 43rd AIAA Joint Propulsion Conference, Cincinnati (USA), July 2007
39. G.Saccoccia, Contribution and support to the preparation of a special issue of AIAA Journal of Propulsion and Power dedicated to SMART-1, 2008
40. D.Di Cara, G.Saccoccia et al, "Propulsion Solutions for Future Telecoms: Findings from Tomorrow's Bird Study", Space Propulsion 2010, San Sebastian (E), May 2010