PERSONAL INFORMATION

Mauro Di Benedetto

WORK EXPERIENCE

from November 2014

Project Engineer

"HERO – High performance time & frequency link" - ESA/ESTEC ITT AO17583/13/NL/HB

- Review of scientific requirements for an Earth mission (STE-Quest)
- Microwave links specifications
- Analysis of E2E experiment performance
- Writing and review of technical reports

Business or sector Space missions

from March 2014

Experiment Manager

3GM radio science experiment of the ESA/JUICE mission to Jupiter:

- Definition of scientific requirements
- Review of radio science instruments specifications
- Support to instrument development and test activities (AIV/AIT)
- Writing and maintaining technical and programmatic documentation
- Reporting team monthly activities to ESA
- Participation to ESA formal reviews

Business or sector Project management for space missions

from 2010 to 2014

System Engineer / Post Doc researcher

Sapienza, University of Rome, Radio Science Lab, 18, via Eudossiana, 00084 Rome, Italy

- orbit determination and numerical simulations with operational OD codes:
    - propagation of spacecraft trajectories (creation of SPICE/Naif .spk files)
    - orbit reconstruction and covariance/sensitivity analysis during BepiColombo critical flybys of Mercury
    - mission analysis for a polar orbiter of the Jovian moon Europa
- software development (Python/Shell, FORTRAN):
    - tools for statistical data analysis
    - pipeline for automated data analysis
    - ground station visibility predictions
- architectural design of advanced tracking systems for spacecraft navigation (Doppler, ranging and DDOR)
- error budget analysis:
    - breakdown and statistical assessment of leading noise sources on ESA and NASA tracking systems
    - validation of noise models
    - creation of databases with radio metric and media calibration data

Part of the work funded by ESA/ESOC ITT AO/1-6221/09/F/MOS - "ASTRA - Interdisciplinary study on enhancement of end-to-end accuracy for spacecraft tracking techniques"

Business or sector Spacecraft Communications, Tracking systems and data analysis

from 2009 to 2010

Project Engineer

ESA/ESTEC ITT AO/1-5915/08/NL/AF - Radiocomm signals: "A new way of probing the surface of planets"

- architectural design of a software simulator (Matlab) for mission analysis purposes
- definition and simulation of different mission scenarios
- Ka band microwave links specifications and noise modeling
- software validation and testing

Business or sector Spacecraft communications

from 2006 to 2011

PhD Student and Research assistant

Sapienza, University of Rome, Radio Science Lab, 18, via Eudossiana, 00084 Rome, Italy

- orbit determination of the Cassini spacecraft (in collaboration with Cassini NAV team):
  - modeling and estimation of the non-gravitational accelerations
  - use of different filtering techniques (batch, sequential and multi-arc)
  - estimation of Titan's gravity field and tidal response
  - evaluation of scientific performances for different Cassini Extended Solstice Mission options

Business or sector Orbit determination, Planetary Geodesy and Physics

EDUCATION AND TRAINING

2007-2011

PhD in Aerospace Engineering - "The non-gravitational accelerations of the Cassini spacecraft and the nature of the Pioneer anomaly

Sapienza, University of Rome, 8, via Eudossiana, 00084 Rome, Italy

- Orbit Determination – Data reduction – Mission operations – Fundamental physics

2010

ISAEA (International School of Aerospace Engineering Applications) 1st edition: “Estimation Theory”, Bertinoro, Italy (July, 12-16)

- Kalman filter – Inertial navigation

2006

MSc in Aerospace Engineering - "Pioneer anomaly detectability with planetary probe measurements"

Sapienza, University of Rome, 8, via Eudossiana, 00084 Rome, Italy

- General perturbative methods (Lagrange/Gauss equations) and special techniques (Encke method) - Spacecraft trajectory propagation

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
	TOEFL - 98				

German	A1	A2	A1	A1	A2
French	A1	A2	A2	A1	A2
Portuguese	B1	A2	B1	A2	A2

Communication skills
- Good communication skills gained teaching martial arts and swimming.

Computer skills
- Orbit Determination Programs (DPTraj and MONTE, of JPL property) - Shell and Python scripting - FORTRAN 77/90 - Matlab - C++ - Microsoft Office Suite - LaTeX - Gnuplot - NAIF toolkit - PHP - MySQL - R - Unix/Linux - Windows and Mac OS platforms

Other skills
- Playing guitar, Bricolage

Driving licence
- Car: B Motorbike: A3

ADDITIONAL INFORMATION

Publications
- L. Iess, M. Di Benedetto, N. James, M. Mercolino, L. Simone, P. Tortora, “ASTRA: interdisciplinary study for enhancement of the end-to-end accuracy for spacecraft tracking techniques”, Acta Astronautica, Volume 94, (2014) 699-707
- L. Iess, M. Di Benedetto, , M. Marabucci, P. Racioppa, “Improved Doppler tracking systems for deep space navigation”, 23rd ISSFD, Oct 29 to Nov 5, 2012, Pasadena
- S. E. Centuori, F. E. Aleman, M. Di Benedetto, L. Iess, A. Graziani, A. Palli, N. Pierdicca, R. P. Cerdeira, P. Racioppa, D. T. Sanchez, P. Tortora, ‘RC-SIM: Radiocomm signals for retrieval of planetary geophysical parameters’ IAC-11.A3.5.6, 62nd International Astronautical Congress, Cape Town, SA, 3-7 October 2011
- M. Di Benedetto, L. Iess, D. C. Roth, “The non-gravitational accelerations of the Cassini spacecraft”, ISSFD 2009, Toulouse
- N. J. Rappaport, R. Jacobson, L. Iess, P. Racioppa, J.W. Armstrong, S.W. Asmar, D.J. Stevenson, P. Tortora, M. Di Benedetto, A. Graziani, R. Meriggiola, “The gravity field of Titan”, AGU 2008
- N. J. Rappaport, L. Iess, J. Wahr, J. I. Lunine, J. W. Armstrong, S. W. Asmar, P. Tortora, M. Di Benedetto and P. Racioppa, “Can Cassini detect a subsurface ocean in Titan from gravity measurements?”, Icarus, Volume 194, Issue 2, April 2008, pp. 711-720
- N. J. Rappaport, L. Iess, P. Tortora J. Wahr, J. I. Lunine, R. Mackenzie, J. W. Armstrong, S. W. Asmar, A. Ardito, M. Di Benedetto and P. Racioppa, “The Gravity Science Analysis of Cassini Flybys T11 and T22 and Future Work”, EOS Trans. AGU,88(52), Fall Meet. Suppl 2007.
- S. Asmar, N. Rappaport, L. Iess, J. Wahr, J. Lunine, J. W. Armstrong, P. Tortora, M. Di Benedetto, P. Racioppa, R. MacKenzie, R. Jacobson: “The search for Titan’s ocean”, 39 DPS Meeting (AAS), Orlando (FL), 7-12 Oct. 2007
- L. Iess, J.W. Armstrong, S.W. Asmar, M. Di Benedetto, A. Graziani, R. Mackenzie, P.Racioppa, N.Rappaport, P. Tortora, “The Determination of Titan Gravity Field from Doppler Tracking of the Cassini Spacecraft”, Proceedings of the XX International Symposium on Space Flight Dynamics (ISSFD), September 24-28, 2007, Annapolis, MD, USA

Honours and awards
- NASA Group Achievement award to Cassini Radio Science team for outstanding contributions leading to the success of the Cassini Radio Science investigations at Saturn