Paolo Racioppa

EXPERTISE

Aerospace engineer

Many years of experience in radio science experiments onboard deep space exploration missions.

Areas of competence: Orbit Determination, Tracking Systems, Deep Space Missions, Astrodynamics, Satellite Communications, Signal Processing, Space Environment, Planetary Science.

WORK EXPERIENCE

[Sep 2006 – Current]

Research Collaborator/Engineer

Sapienza Università di Roma   https://web.uniroma1.it/cras/

Address: Via Eudossiana 18, 00184, Rome, Italy

City: Roma

Country: Italy

Email address: infocras@uniroma1.it

Name of unit or department: Center for Aerospace Research (CRAS)

- Development of a multi-arc filtering tool for orbit determination with batch processing or very large data sets, stochstic process noise, and multi-mission support;
- Orbit determination and radio-metric data analysis of the Cassini And Juno missions for the measurements of Titan, Saturn and Jupiter gravity fields.
- Simulations of mission scenarios and performance assessment of the radio science experiments onboard the Veritas (proposal), Cassini, Juno, Bepi Colombo, and Juice missions;
- Science requirements definition and management support for the radio science experiment onboard the BepiColombo mission;
- Error budget and link budget analyses, implementation of a breadboard signal simulator and correlator with spread-spectrum modulation for the ESA/ESOC contract: "Improvement of Delta- DOR performances for 1 nrad accuracy for precise landing support".
- Error budget analysis of current Doppler, Range and Delta-DOR tracking system at ESA, Error budget validation with navigation data of currently flying missions, definition of a tracking system with one order of magnitude improved performances for the ESA/ESOC contract: "Interdisciplinary study on enhancement of end-to-end accuracy for spacecraft tracking techniques".
- Development of a planetary rotation model including polar motion, precession, nutation, and libration effects, link budget analysis for Mars and Moon landers with direct-to-earth communication capability in X-band and Ka-band, support for development of an end-to-end mission simulator for the ESA/ESTEC contract "Radiocomm signals: A new way of probing the surface of planets".
- Analysis of Mars environment effect and system architecture definition for a GNSS on Mars employing small satellites under the ESA/ESTEC contract "Investigation of Key Technologies for a Mars Positioning and Communication System using Small Satellites - EXPRO+"
- Analysis of advanced orbit determination techniques and algorithms for a GNSS constellation on Mars based on small spacecrafts under the ASI contract "Autonomous Orbit Determination System for a Smallsat Constellation"
- Analysis of advanced orbit determination techniques, algorithms and development of a software simulator for a GNSS on the Moon under the ESA/ESTEC contract "Fundamental techniques, models and algorithms for a lunar radio Navigation system"

[Jan 2006 – Jul 2006] ## Trainee

European Space Operation Centre

City: Darmstadt
Country: Germany
- Support for the test, validation and performance analysis of the software correlator for the ESA Delta-DOR tracking system at the Operations-Ground Segment and Signal processing (OPS-GSS) section.

HONOURS AND AWARDS

Group Achievement Award to Cassini Radio Science Team Awarding institution: NASA

For outstanding contributions leading to the success of the Cassini Radio Science investigation at Saturn.

EDUCATION AND TRAINING

[25 May 2006] ## M.Sc. in Astronautical Engineering

Sapienza Università di Roma - Scuola dI Ingegneria Aerospaziale

Address: Via Eudossiana 18, 00184, Roma, Italy
Field(s) of study: Aerospace Engeneering
Final grade: 110/110summacumlaude.
Thesis: Angular position determination of interplanetary spacecrafts by means of VLBI techniques
Orbit Determination, Tracking Systems, Deep Space Missions, Astrodynamics, Satellite Communications, Signal Processing, Space Environment, Planetary Science

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING C1 **READING** C2 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

DIGITAL SKILLS

Specialized Software

Expert user of MONTE | Expert user of DPTRJ-ODP | Expert user of NAIF-SPICE | Proficient user of GODOT

Programming

Expert user of Python | Expert user of FORTRAN 90952003 | Proficient User of MATLAB | Proficient user of bash

Other

Debian Linux | Latex Software | Microsoft Office