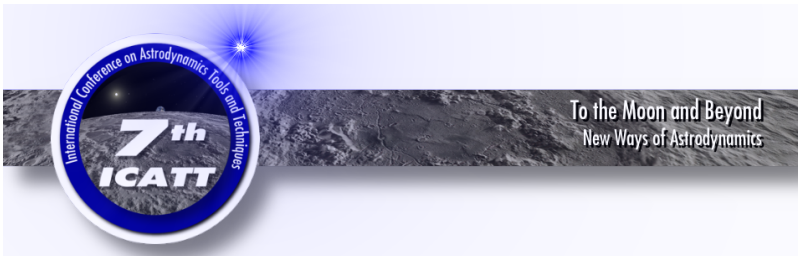
7th International Conference on Astrodynamics Tools and Techniques (ICATT)



Tuesday, November 6, 2018 - Friday, November 9, 2018

DLR Oberpfaffenhofen, Germany

Scientific Program

01: Ascent

Ascent trajectories for expendable and reusable launch vehicles; computation of payload injection and deployment; branching and abort trajectories; launcher separation and boosters come back; safe trajectories and splash down of rocket stages; ascent from planets and Moons;

02: Loitering, and Orbiting

Low Earth Orbits (LEO), Medium Earth Orbits (MEO), High Earth Orbits (HEO), Geostationary Orbits (GEO); station-keeping; optimization of loitering arcs; computation of drag-free orbits; circular and elliptical orbits around planets and Moons; resonant orbits and fuel-efficient trajectories;

03: Low Thrust

Computation of low thrust orbits in any given mission arc; optimal trajectories involving low thrust; low thrust transfer to LEO and GEO; comparison of electric and chemical propulsion trajectories; design and optimization of low thrust orbit transfers; low thrust station keeping; low thrust orbital transfers in the Two-Body problem;

04: Satellite Constellations and Formations

Computation of trajectories where two or more spacecraft are involved; relative motion; computation of placement and replacement of satellites; launch analysis of formations and constellations; mega-constellations and its orbital slots; trailing formations; cluster formations; trajectories for fractionated spacecraft; constellations decay and orbital life;

05: Interplanetary Flight and Non-Earth Orbits

Interplanetary trajectories and fly-by; rendezvous with asteroids and comets; libration point transfers and orbits; resonant orbits; near-Earth objects trajectories; sample return missions; trajectories involving 3rd-body perturbations; coverage of instruments and ground contacts; maintenance or orbital positions around planetary bodies; planetary tours and encounters;

06: On-orbit servicing and proximity

Astrodynamics for re-fuelling, payload exchange, and tugging; rendezvous approach (far and close); computation of optimal phasing conditions; docking and mating; contact dynamics; berthing; docking in R-bar and V-bar; optimal ground contacts during rendezvous;

07: Intelligent Tools and Assistants

artificial intelligence computing approaches like neural networks, Bayesian probability, fuzzy logic, machine learning, evolutionary computation and genetic algorithms.

08: Re-Entry and Aero-Assisted Manoeuvres

Computation of planetary re-entry trajectories; optimal guidance; skipped and bounced trajectories; aerocapture, aerobraking, and aerogravity assist manoeuvres; descent and landing trajectories; re-targeting guidance; hazard-avoidance trajectories;

09: Optimization and Dynamics

Trajectory design and optimization; new mathematical methods and principles; multi-objective optimization; local and global optimization techniques; stability; dynamic systems theory; dynamical models; space flight mechanics mathematical foundations;

10: Clean Space and Environment Modelling

Clean Space astrodynamics tools and techniques; nature friendly techniques; safe trajectories; disposal and recycling; sustainability; disposal of spacecraft; collision warning techniques and tools; debris population models; design for demise trajectories; prediction of debris fall out; footprints analysis; collision avoidance (risk computation, avoidance strategies, delta-v budget estimation); end of life disposal; tools for long-term environment; gravity models and atmospheric models; magnetic models; solar radiation and solar wind pressure models; perturbations; tools and techniques to model perturbations; shielding analysis tools and radiation analysis tools and techniques; meteoroid and space debris terrestrial environment databases;

11: Open Source Tools and Smart Computing

Tools using any open source license; use and perspectives; core repositories and code re-use for astrodynamics computations; free use of astrodynamics code; code repositories; astrodynamics applications and astrodynamics code running on smartphones and tablets;

12: Verification and Validation Methods

Methods to verify and validate tools, techniques, orbits, and models; comparison of tools; performance analysis of astrodynamics methods; quality and of software quality assurance of astrodynamics tools; independent verification and validation; validation checks that the product design satisfies or fits the intended use;

13: Orbit Determination and Prediction Techniques

Propagators and integrators; position and velocity prediction; ephemeris computations; conjunctions; numerical integration methods applied to astrodynamics; precise orbit determination for LEO, MEO, HEO, GEO missions; tools and technique for high precision orbit determination for planetary missions; observational data; parameter estimation; orbit determination with multiple tracking techniques;

14: Multidisciplinary Design Optimization

Recent multi-disciplinary design methods; commercial and non-commercial tools; aerodynamics, structural analysis, propulsion, control theory; gradient-based and non-gradient based methods; decomposition methods, approximation methods, evolutionary algorithms, memetic algorithms, response surface methodology, reliability-based optimization, and multi-objective optimization approaches;

15: Young Professionals, Trainees, and Students

Recently graduated, undergraduate MSc or PhD students to encourage them to share results from their research projects; research fellows work in the area of astrodynamics tools and techniques;