



The 15<sup>th</sup> International Conference on Space Operations  
Inspiring Humankind's Future

# Call for papers

Abstract submission Deadline:  
July 6, 2017

## Welcome to SpaceOps 2018

May 28 - June 1, 2018

CNES is delighted to welcome you to Marseille, France, for SpaceOps 2018.

The International Committee on Technical Interchange for Space Mission Operations and Ground Data Systems (also known as the SpaceOps) is a spacecraft operations oriented international association consisting of representatives from the major space-faring institutions of the world.

For more than 25 years, the SpaceOps Conference has been the technical forum for the space operations community that addresses state-of-the-art operations principles, methods, and tools. The scope is intended to cover all spaceflight missions, including human and robotic, near Earth and deep space.

SpaceOps provides a technical and managerial forum for experts of Space Operations (Mission and Ground Segment Designers, Mission Operators, Engineers in charge of mission logistic support, Technical and Administrations Managers, Industry, Academia, etc.) to present, discuss and promote technical concepts, emerging methodologies and measures for advanced Space Operations. The overall aim is to maximize mission return whilst still maintaining the required mission safety within the framework of today's increasingly demanding and complex Space Missions.

If your organization is new to the Space Operations domain, we encourage you to come to SpaceOps conference to share your ideas, plans, techniques and technologies with others.

If your organization is already familiar with the Space Operations domain, you will find again a great opportunity to gather necessary feedback for your projects and missions at SpaceOps conference, as well as a chance to develop new ties with colleagues devoted to the space sector, which may one day be your partners.

We, the SpaceOps Community, firmly believe that with an enthusiastically communicating and networking Space Operations community, we all become stronger – and mankind's dream to utilize and explore space becomes a reality.



# SpaceOps 2018 is hosted and organized by CNES (Centre National d'Etudes Spatiales)

CNES plays a key role in the French, European and International space arena, driving initiatives, stimulating new proposals and providing technical expertise to support the design, development and operation of space systems. While some programs remain within national boundaries, many more would not see the light of day were it not for international partnership.

Founded to implement France's space policy and true to its vocation, CNES is constantly reinventing Space. After creating the Ariane family of launchers, today its teams are federating European efforts around Ariane 6 and conceiving the key projects that will shape the future.

CNES is continuously stimulating space innovation to help French and European industry stay ahead in the competitive global market.

CNES focuses on five strategic areas covering all the expertise needed to conceive and implement French space policy, encapsulated in the Spaceops 2018 title: Inspiring Humankind's Future:

- **Access to space** via new launchers programs and stratospheric balloons
- **Science** and Deep Space exploration
- **Earth Observation** and monitoring providing crucial data for the protection of mankind and its environment
- **Telecommunications** that play a vital role in worldwide telecommunications, positioning, environmental data collection, search and rescue
- **Defense** and space situational awareness that help to assure citizen's peace and security

2 500 men and women working at CNES with a passion for space and its infinite innovative applications for society.

#### 4 centres of excellence:

Paris Les Halles (CNES's Head Office), Paris Daumesnil (home to the Launch Vehicles Directorate), Toulouse Space Centre (agency's biggest technical and operational field centre) and the Guiana Space Centre (Launch Center for all European launchers).





# Welcome to Marseille!

With a magical natural location, 2600 years of fascinating history, the charm of picturesque districts, an idyllic climate and easy access, Marseille is France's 2<sup>nd</sup> largest city.

With its international airport serving over 100 destinations, Marseille is just a few hours away from the major European capitals. Saint Charles station is right at the centre of the city with connections to Paris in 3 hours, Geneva in 3 hrs 30 mins and Brussels in 5 hrs 30 mins.

This ancient city of trade is open to the world and has built connections with the South of France and Europe, and is on its way to becoming one of the Top 20 European cities. With the development of an advanced service sector, leading scientific and academic institutions, research activities and a network of innovative companies, Marseille has attracted the regional and international headquarters of major companies focused on projects in numerous sectors.

Based on a diversified economy and high-level skills, Marseille and its region showcase their abilities in the most innovative sectors and now boast 10 centres of economic excellence.

Marseille hosts a unique natural heritage, lit by 300 days of sunshine every year. At the entrance of the city, nature reclaims the upper hand over stretch of 20 km with the Parc National des Calanques. The Parc National des Calanques is France's tenth national park and was created in 2012. It lies on the edge of an agglomeration with a population of around 1 million, and is the first in Europe to combine land, sea, suburban areas and landscapes that take your breath away!

Marseille is a starting point for discovering Provence, the most visited region in France, famous for its contrasting landscapes and way of life. Along the coast, take a swim off the calanques and coves. Further inland, explore authentic and colourful places with a uniquely simple pace of life. Provence has everything all in one place!



## Palais du Pharo

The Conference will take place in an exceptional venue, the Palais du Pharo. This historic Palace was built by the Emperor Napoleon III for the Empress Eugénie who then decided to offer it to the city of Marseille. Nowadays the Palais du Pharo is an outstanding workplace for conferences, conventions and symposia. It overlooks the entrance to the Old Port and offers the most scenic view of Marseille between sky and sea.



# Topic and Sub-Topics

- 1 **MISSION DESIGN AND MANAGEMENT**
- 2 **OPERATIONS CONCEPTS AND FLIGHT EXECUTION**
- 3 GROUND SYSTEMS ENGINEERING AND DATA MANAGEMENT
- 4 PLANNING AND SCHEDULING
- 5 GUIDANCE, NAVIGATION, AND CONTROL
- 6 COMMUNICATIONS ARCHITECTURES AND NETWORKS
- 7 HUMAN SYSTEMS AND OPERATIONS
- 8 CROSS SUPPORT, INTEROPERABILITY, AND STANDARDS
- 9 TRAINING AND KNOWLEDGE TRANSFER
- 10 LAUNCHER, ROCKET, AND BALLOON OPERATIONS
- 11 SMALL SATELLITE OPERATIONS
- 12 COMMERCIAL SPACE OPERATIONS
- 13 INSPIRING THE NEXT GENERATIONS **NEW**
- 14 "DECISION ON THE ALLOCATION TO ONE TOPIC IS LEFT TO SELECTION COMMITTEE **NEW**"

The SpaceOps 2018 Technical Program Committee, composed of experts from the major space organizations in the world, will prepare an ambitious program focused on today's achievements in space operations and outlining trends in the operations of future missions.

The conference program will bring together experienced and young professionals, as well as Students, from all over the world to discuss the current status and future ideas of space operations.

**The program consists of presentations (oral, e-posters and posters) on the following areas:**

## 1 MISSION DESIGN AND MANAGEMENT

- Mission Design
- Mission Architectures
- Mission Engineering and Planning
- Mission Simulation and Modelling
- Early Concepts for Advanced Missions
- Evolving Mission Capabilities
- Long-Range Planning and Mission Optimization
- Mission Design for Complex Constellations
- Mission Design for Robotic Missions
- Multi-mission approaches and strategies
- Planning for Planetary Relay and Surface Communications
- Revectoring Old Missions to New Tasks
- Space Debris and Mission Design Mission Management
- Cost-Effective Operations Approaches
- International Cooperation for Mission Management
- Managing Mission Risks and Opportunities
- Public Engagement
- Regulations and Laws Affecting Operations
- International, Public, and Private Cooperation
- International Cooperation on Other Planets

## 2 OPERATIONS CONCEPTS AND FLIGHT EXECUTION

- Mission Operations Concepts (application layer)
- Flight Operations Concepts (end-to-end)
- Flight Execution Processes
- Real-time flight control, lessons and plans
- Operations Automation and Optimization
- Operations Engineering
- Operations Procedures Management
- Operational Validation
- Operations Management
- Operations Concepts for Constellation & In Situ Operations
- Operations Concepts for robotic missions
- Payload Operations Concepts
- End of Life Operations
- Fault Management and Recovery
- Processes for Designing Operations
- Spacecraft Emergency and Contingency Operations

# Topic and Sub-Topics

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## 2 OPERATIONS CONCEPTS AND FLIGHT EXECUTION

## 3 GROUND SYSTEMS ENGINEERING AND DATA MANAGEMENT

## 4 PLANNING AND SCHEDULING

## 5 GUIDANCE, NAVIGATION, AND CONTROL

## 6 COMMUNICATIONS ARCHITECTURES AND NETWORKS

## 7 HUMAN SYSTEMS AND OPERATIONS

## 8 CROSS SUPPORT, INTEROPERABILITY, AND STANDARDS

## 9 TRAINING AND KNOWLEDGE TRANSFER

## 10 LAUNCHER, ROCKET, AND BALLOON OPERATIONS

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### 3 GROUND SYSTEMS ENGINEERING AND DATA MANAGEMENT

- Ground Segment Engineering
- Ground Systems Engineering
- Control Centre Architectures
- Ground Data Systems Development, Validation and Maintenance
- Advanced Technologies for Space Operations
- Flight Control Systems and EGSE
- Ground Segment Architectures and Design
- Payload Monitor and Control
- On-board/ground Interfaces
- Data Management
- Space Cyber Security
- Archive Systems and Data Mining
- Automation and health monitoring, flight and ground
- Data Distribution
- Information Architectures and Information Models
- Operations System Architectures and Services
- Payload and Science Data Handling
- Service Oriented Architectures
- Software Development and Maintenance
- Systems Engineering and System Design for Operability
- Ground Systems Testing and Validation

### 4 PLANNING AND SCHEDULING

- Mission Planning and Scheduling Methods
- Mission Planning Systems
- Planning and Scheduling Systems
- Asset Scheduling
- Merging Plans from different/many Agencies
- Merging Plans from MOCs and SOCs
- Resource Management
- Realtime Replanning Techniques
- Science Observation Planning
- Detailed Crew Planning versus "Job Jars"

### 5 GUIDANCE, NAVIGATION, AND CONTROL

- Flight Dynamics and Navigation
- Attitude Determination and Control
- Challenges in Trajectory Design and Analysis
- Interplanetary Missions
- Formation/Constellation Management
- Global Navigation Systems and Applications
- GNC and Astrodynamics Software
- Space Debris and Collision Avoidance
- Techniques for Using Earth-Orbital GPS at Lunar Distances
- GPS Constellations for Other Planetary Bodies

### 6 COMMUNICATIONS ARCHITECTURES AND NETWORKS

- Communications, Ground and Space Networking
- Network Operations and Management
- Ground Network Implementation
- Integrating Communications Networks
- Ground Communications
- Ground Network and Antenna Concepts
- Communications Architectures for Complex Constellations
- The Operational Impact of Spectrum Allocations
- Layered Versus Integrated Architectures
- Network Transitions During Operations
- Reliance on Public Networks
- Backup Communications Approaches
- Interplanetary Networking
- Integrating space and ground networks

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## 7 HUMAN SYSTEMS AND OPERATIONS

- Human Spaceflight
- ISS Operations
- Training for Human Operations
- Mission Architectures for Human Spaceflight
- Flight Crew Operations Techniques
- Human Operations with long lightspeed delays
- Long Duration Human Missions – New Concepts
- International Factors for Crew Operations
- Crew-driven requirements (videoconference, comm bandwidth, etc.)
- Medical Operations in Human Missions (not an emphasis on medical techniques)
- Reliability (RMA) Standards and Methods, Unique for Human Spaceflight
- Human/Robotic Integration and Cooperation
- Habitat Operations, Orbital and Planetary Surface
- Mission Analog Operations on Earth
- Space Environment Factors For Human Lunar/ Mars Mission Design

## 9 TRAINING AND KNOWLEDGE TRANSFER

- Knowledge Management
- Knowledge Transfer
- Lessons Learned Assessment & Management
- Training Methodologies
- Simulation Methods & Tools
- Human Factor & Behavior in Operations
- Training simulators
- Simulation and training operations, techniques

## 8 CROSS SUPPORT, INTEROPERABILITY, AND STANDARDS

- Communications Standards (Link Layer, Network Layer, Application Layer etc.)
- Communications Standards - Network
- Communications Standards - Application Layer
- Software Standards
- Interoperability and Cross Support Standards
- Telerobotics Standards
- Advanced Standards for Future Missions
- Secure Interoperability and Cross Support
- Other relevant Standards
- Applying Commercial Standards to Space Missions
- Control Center Interoperability for International Missions
- Cross Support Catalogs, Development and Utilization
- Influencing Missions to Adopt Cutting-Edge Standards
- Interoperability Successes and Failures
- Security and Secure Interoperability
- Space Internetworking Standards
- Standardizing at the Architecture Level
- Systems of Systems Interoperability



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## 10 LAUNCHER, ROCKET, AND BALLOON OPERATIONS

- Operations Concepts for Launchers and Ground Facilities
- Launch Vehicle Operations
- Launch Facilities Operations
- Launch Vehicle Systems Operability
- Pre-Launch Integration and Test
- Launch Vehicle Availability, Reliability, and Risk Management
- Launcher Integrated Health Monitoring
- Engine Test Stand Operations
- Ground Processing for vehicles and payloads
- Integrated Vehicle Health Monitoring and Operations
- Launch Monitoring Strategies: Sensors, Cameras, etc.
- Launch Pad Conversion for New Launch Vehicles
- Launch Pad Infrastructure – Complex to Clean
- Launch Site Logistics
- Launch Site Selection Strategies
- Payload and Customer Integration
- Realtime Launch Operations
- Responsive (Fast) Launch Processes
- The Special Challenges of Commercial Launch Operations
- Balloons and Sounding Rockets

## 11 SMALL SATELLITE OPERATIONS

- Cubesat and Nanosat Operations
- TT&C Systems
- Flight Operations
- Frequency Allocation Challenges
- Regulations and their Challenges
- Challenges with Small Satellite Operations
- Small Satellite End of Life Operations
- Cubesat Networks/Swarms; Constellation Operations
- Nano-Technologies
- Small Satellite Control Center Ops Concepts

## 12 COMMERCIAL SPACE OPERATIONS

- Air and Space Traffic Management
- Commercial Manned Spaceflight
- Commercial Orbital Transportation Services
- Commercial Spaceports
- Lean and Lights-out Commercial Control Centers
- Managing a Constellation of Satellites
- Operations with Space Tourists On-board
- Training Spaceflight Participants
- Operations with Space Tourists Onboard
- Commercial Utilization of ISS

## 13 INSPIRING THE NEXT GENERATIONS **NEW**

- Educational and Inspirational applications of Space Operations
- Space operations challenges in the New Space World
- Space Education Initiatives
- Government, Agencies and corporate outreach programs
- Educators, students and young professionals' projects
- Satellite and Science Operations by academia
- New ideas for conducting operations on academia side
- Mission operations support from academia to others

## 14 DECISION ON THE ALLOCATION TO ONE TOPIC IS LEFT TO SELECTION COMMITTEE **NEW**

This Topic will be exposed only at the time of the Call for Paper, to offer an option to those who are not sure which Topic best fits their Abstract. The final allocation to one of the above Topics will be made by the Selection Committee who is composed of members of the Technical Program Committee.

# Abstract Requirements

The SpaceOps 2018 conference organizing committee's highest priority is to accept abstracts and papers that emphasize unique and innovative practices, technologies, and experiences from which others in the space operations community will benefit. When all abstracts are received, the Technical Program Committee (TPC) – staffed by volunteers from the agencies, academia and industry partners of the SpaceOps Organization – will evaluate the **submitted abstracts** based upon (but not limited to) the following four evaluation criteria:



- ① Relevance to space operations
- ② Innovation
- ③ Substance merit (content and realism)
- ④ Applicability and benefit to future missions

## Presentation approach

**When you submit your abstract, you will be able to choose your preferred presentation approach: Oral Session, Traditional (Paper) Poster Session, Electronic Presentation Session.**

The characteristics of these sessions are:

**ORAL SESSIONS** are 20 minute lectures followed by 5 minutes of Q&A. The recommended file types for Oral are MS Power Point and Adobe PDF.

**NEW** Software demonstrations are eligible to Oral Sessions, with the understanding that the presentation must comply with the 20 + 5 minutes duration constraint.

**NEW** Some interactive sessions will be included in the program ; such sessions will be in the format of mini-workshops with three presentations followed by an interactive discussion between authors and audience, around the theme selected for each of those sessions.

**TRADITIONAL POSTER SESSION** presentations are run for several days and are centered on the presenter's hardcopy display. The recommended size is A0 portrait format (841x1189 mm, 33.1x46.8 inch, same with 16 sheets of A4 size). It can't exceed A0 size.

**ELECTRONIC PRESENTATIONS** encompass two formats of presentation:

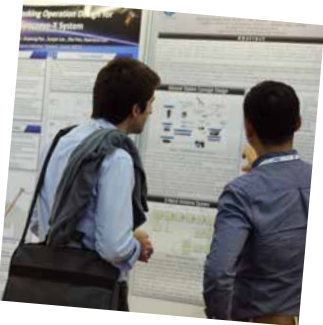
Electronic Poster sessions will be supported by a conference-provided active electronic display. They will give the opportunity to interact with attendees. The recommend file types for e-Poster are MS Power Point and Adobe PDF. In addition, Electronic Poster Sessions may include software demonstrations.

**NEW** Open Access Presentations will provide a standalone access thru menus to presentations that were not submitted or selected for oral or poster presentations, or to presentations that were already presented in Oral Sessions on the previous day(s). They will be supported by a conference-provided active electronic display. Software demonstrations are not eligible to Open Access Presentations.



# Procedures for Abstract Submission

## Abstract Submission



SpaceOps 2018 Technical Program Committee (TPC) requests that you submit your **one or (maximum) two pages abstract electronically** through the conference website at [www.spaceops2018.org](http://www.spaceops2018.org). This website will be open for the submission of abstracts until **July 06, 2017**, at 23:00 UTC (19:00 EDT). Simply click on "Abstract Submission" and you will be forwarded to our web-based abstract and paper submission tool, where you will find detailed guidelines.

We request that you limit your abstract to **text only, no graphics**. You will have the opportunity to **indicate your preference of presentation style** (oral/poster/e-Presentation) and the most appropriate topic area. The TPC will then make the best effort at placing your submission in the program in a way that best connects you with your audience. Please consider that due to the overall scheduling constraints, the allocation of the topic area could be changed by the decision of the TPC.

**NEW** You will have the opportunity to either indicate your choice of the Topic that better suits your presentation or to leave the choice of the Topic to the selection committee, in case you hesitate among several Topics.

Authors having issues submitting abstracts electronically should contact ScholarOne Technical Support at [ts.acsupport@thomson.com](mailto:ts.acsupport@thomson.com) or 1.434.964.4100/1.888.503.1050. Questions about the abstract or technical topics, or about the program format or policies of the conference, should be directed to the Technical Program Committee Chair: Jean-Marc Soula (CNES, [jean-marc.soula@cnes.fr](mailto:jean-marc.soula@cnes.fr)).



## Best papers

The TPC has a plan to award "**Best Papers**" for the conference. The TPC will review final papers just prior to the conference and will select for approximately 10% of final papers.

The TPC has a plan to award a "**Best Student Paper**" for the conference. So, we are asking that student primary authors identify themselves when submitting an abstract. To qualify, the abstract and manuscript must be the primary work of a student, as indicated by being the lead author, and the presentation must be made by the student. Note that some of the national space agencies may provide monetary support for student participants. Consult the SpaceOps2018 web site [www.spaceops2018.org](http://www.spaceops2018.org) for information relating to student assistance programs offered by your country's agency.



# Special Reminder

## Participation to this Conference

- To be allowed to present at any session, you have to submit in advance an abstract that complies with the requirements for abstracts, as documented in the template for abstracts that is supplied on the Conference and the AIAA web sites.
- All conference presenters in all types of sessions are required to submit manuscripts that comply with the standard requirements for professional conferences, as documented in the "Author's Kit" that is supplied to accepted authors.
- If the presenter does not appear in person to present at the scheduled session, the paper will not be published in the (electronic) proceedings. Videotaped presentations will not be allowed.
- If the author's organization/agency/nation requires export approval of the material for this international conference, the author must follow that process, and must do it on a schedule that allows to meet the conference deadlines.
- All authors are required to register for the conference in the same fashion as all other attendees.

For all manuscripts submitted, and for all presentations in the oral/poster/e-poster sessions, we will not accept overt marketing material or "sales pitches." These forums and products are for the exchange of technical information, not for marketing. The information must impart some benefit to the space operations community independent of any product or service that may be incidentally mentioned in the presentation materials. Nevertheless, oral presentations are allowed to include software demonstrations as a way to better present such benefits.

For the marketing or commercial purpose, please look at the Exhibition Opportunities.

# Important Dates



Abstract submission opens	<b>APRIL, 2017</b>
Abstract submission closes	<b>JULY 6, 2017</b> (23:00 UTC OR 19:00 EDT)
Notification to authors	<b>Nov 13, 2017</b>
Registration opens	<b>Nov 24, 2017</b>
Final paper submission deadline	<b>APRIL 25, 2018</b>
Presentation material submission	<b>MAY 19, 2018</b>
Student & Young Professional Workshop	<b>MAY 27, 2018</b>
Conference dates	<b>MAY 28-JUNE 1, 2018</b>



# Students and Young Professionals Program (SYP)



A "Students and Young Professionals" (SYP) program will be coordinated and organized by CNES and Space Generation Advisory Council (SGAC).

A dedicated Workshop on the Sunday before the SpaceOps conference, titled "Nanosatellites Operations and their Launch activities" **will be offered to Students and young professionals.**

A Speed Mentoring event scheduled on Tuesday after the SpaceOps sessions will offer opportunities to talk about careers in space business and operations. Discussions among Spaceops mentors and SYP will be organized using the round tables format. It will be followed by a joint networking event.

During the week, technical visits will be organized for students.

To attend this SYP program, please follow the registration process on the SGAC web site: [www.spacegeneration.org](http://www.spacegeneration.org)

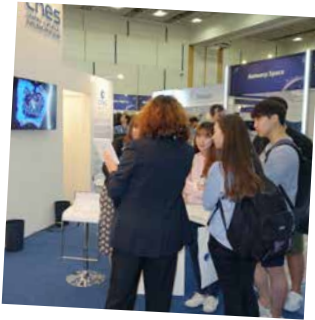
This SYP program is free of charge and open to students and young professionals.



## Exhibition Opportunities

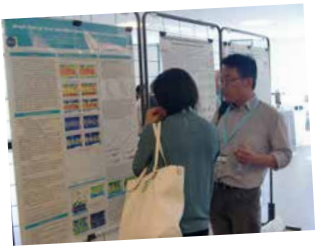
Marketing and commercial promotion is welcome and encouraged in the exhibition venue. The conference venue at the **Pharo Palace** provides ample space for exhibitors. We encourage industry members to bring their best and most innovative products, systems, and services to the SpaceOps 2018.

Exhibition for broad exposure to the space operations professionals in attendance. The Exhibition forum excels at connecting industry providers with space operations customers, bringing maximum benefit to both. Exhibition space is currently available for SpaceOps 2018.



## Sponsorship Opportunities

Various sponsorship opportunities are available for SpaceOps 2018. Sign in as a sponsor and demonstrate your support for the space operations community.



For more information about the exhibition and sponsorship opportunities, go to [www.spaceops2018.org](http://www.spaceops2018.org) or contact SpaceOps 2018 Secretariat at [contact@spaceops2018.org](mailto:contact@spaceops2018.org)







# Contacts

## Technical Program Committee

Jean-Marc Soula, Chair  
CNES, Toulouse

## Local Organizing Committee

Laurence Amen, CNES  
CNES, Toulouse

For more information regarding SpaceOps 2018, please visit

[www.spaceops2018.org](http://www.spaceops2018.org)

or SpaceOps 2018 Secretariat at  
[contact@spaceops2018.org](mailto:contact@spaceops2018.org)

