

**Call for Participation**  
**2<sup>nd</sup> International NASA Workshop on Planning and Scheduling for Space**  
<http://ic.arc.nasa.gov/ic/psworkshop>

**March 16<sup>th</sup> to 18<sup>th</sup> 2000, San Francisco**  
**California, USA**

This meeting is the second in a regular series started in October 1997 at Oxnard, California. Since then, the importance of automated planning and scheduling for the space enterprise has become increasingly clear. NASA technologists and computer scientists have also demonstrated the practical feasibility of these technologies in the context of real missions. For example, the Deep Space 1 Remote Agent Experiment in May 1999 for the first time demonstrated the use of a planner/scheduler operating within the high-level closed-loop control of a spacecraft traveling in interplanetary space. However, to make Planning and Scheduling a ubiquitous technology for space missions, many challenges still remain, including issues in design, development and fielding of such systems in mission critical areas of spacecraft operations. For example:

- **Responsiveness:** When operating within a closed-loop control system, issues related to responsiveness and balance between deliberation and reactivity become more and more important. So far we do not have good answers on how to coherently insert planning activities with different reactivity guarantees at the different levels of an optimizing, hierarchical control system.
- **Validation:** Validating the behavior of an automated planner/scheduler in an operational context is a major challenge. An automated planner makes it possible for a system to adapt its actions to changing execution conditions. However, we still do not know how to guarantee that a plan generated in a previously untested situation will indeed operate the system correctly and safely.
- **Mixed-Initiative autonomy:** As planning systems become an integral part of mission operation concepts, it becomes crucial to solve the problem of guaranteeing a seamless collaboration between automated schedulers and human operators. This includes support for variable levels of autonomy, representational formalisms for doing mixed-initiative reasoning, resolving conflicts between operator requests and existing plans or flight rules and providing the operator with explanations or insight into the behavior of the planning system.
- **Mission acceptance:** Gaining acceptance of planning and scheduling technology for real missions requires balancing the promise of advanced technology with the need for safety and reliability. The underlying representation, algorithms, interface with existing tools, and user interface all play important roles in the final usefulness and usability of the technology.

This workshop aims to debate these and other issues in the context of space missions and applications involving both completely automated systems and those with human intervention in the exploration of space. Within this area, planning and scheduling is important in (but not restricted to)

- Spacecraft commanding and payload operations;
- Operations of air, space and ground based scientific observatories;
- Scheduling of critical resources whether on the ground or onboard;
- Science data analysis;
- Design and analysis of spacecraft systems;
- Planning and scheduling of scientific experiments;
- Planning and scheduling for life support systems;
- Operations and payload scheduling for space transportation systems.

To guarantee a lively debate grounded in actual operational needs, the workshop will bring together:

- Researchers addressing basic research relevant to realistic applications for space;
- Technologists working on planning and scheduling applications for space;
- Mission representatives that have direct experience with planning and scheduling technology or want to contribute in formulating problems and requirements for the area.

To foster a lively and intensive interchange of ideas between the different groups, paper selection to this workshop will follow a slightly different process than the previous workshop.

Papers will be submitted to the program committee by the submission deadline. The program committee will perform a preliminary review of papers for acceptance to the workshop and for each selected paper suggest an additional commentator, explicitly selected from a different community than that of the paper's authors. For example, a basic research paper may be assigned to an individual who is active in the development of applications or in mission operations. Authors should therefore ensure that paper submissions are understandable and contain adequate background material for the commentator. The commentator will then be asked to write up a short write-up on the paper and encouraged to have a dialogue with the paper's authors either via e-mail or through a web-based posting system provided by the workshop organizers. At the end of this phase, the program committee will select 22 papers for inclusion in the plenary session of the workshop. The format of the paper presentation will include the presentation of the paper, the presentation of the commentary, a brief response by the author(s), and time for questions from the floor. All other accepted papers will be presented at the poster sessions. All accepted papers *and commentaries* will be included in the workshop proceedings. The workshop will also include invited talks and panel discussions.

### Timetable

Submission deadline:	December 15 <sup>th</sup> 1999
Invitations sent:	January 21 <sup>st</sup> 2000
End of commentator/author dialogue:	February 15 <sup>th</sup> 2000
Camera Ready papers due:	February 25 <sup>th</sup> 2000
Date of Conference:	March 16 <sup>th</sup> 2000

### Organizing Committee (email: [nasa\\_ps2000\\_org@ptolemy.arc.nasa.gov](mailto:nasa_ps2000_org@ptolemy.arc.nasa.gov))

Jeremy Frank    NASA Ames  
 Keith Golden    NASA Ames  
 Rich Washington NASA Ames

### Program Committee (email: [nasa\\_ps2000\\_pc@ptolemy.arc.nasa.gov](mailto:nasa_ps2000_pc@ptolemy.arc.nasa.gov))

Steve Chien	Jet Propulsion Laboratory ( <i>co-chair</i> )	Nicola Muscettola	NASA Ames ( <i>chair</i> )
Richard Creasey	European Space Agency	Karen Myers	SRI International
Tara Estlin	Jet Propulsion Laboratory	Martha Pollack	Univ. of Pittsburgh
Paul Hempel	NASA Goddard	Kanna Rajan	NASA Ames
David Kortenkamp	NASA Johnson	Steve Smith	Carnegie Mellon Univ.

Participants are encouraged to submit a paper of up to **ten** pages in *12 point Times Roman font*, for inclusion in the workshop proceedings. Authors should email electronic versions directly to:

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 Moffett Field, California 94035-1000, USA  
 Email: [nasa\\_ps2000@ptolemy.arc.nasa.gov](mailto:nasa_ps2000@ptolemy.arc.nasa.gov)

Email is the preferred method of submission and papers in PDF format are strongly encouraged, although postscript format will also be accepted. The workshop URL is at: <http://ic.arc.nasa.gov/ic/psworkshop>. Please watch for the latest information and details on this site.