Proceedings of the

6th ESA Workshop on

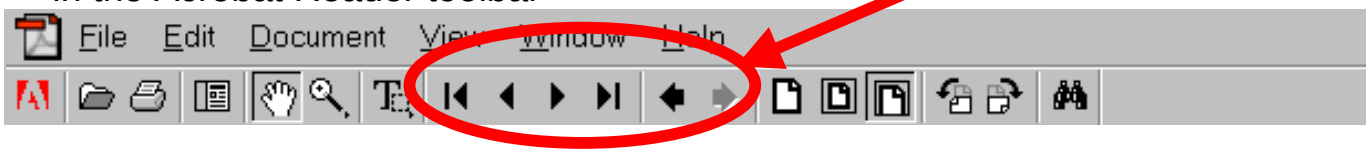
Advanced Space Technologies for Robotics and Automation

ASTRA 2000

NOTE: THIS is a hypertextual document

Navigation instructions:
Titles of sessions and papers are hyperlinked, that means that:

- when you see the pointer changing from  to  you can click over to open the hyperlinked document.
- to go back (and forth) in your navigation you can use the navigation buttons in the Acrobat Reader toolbar



- To start the navigation click HERE

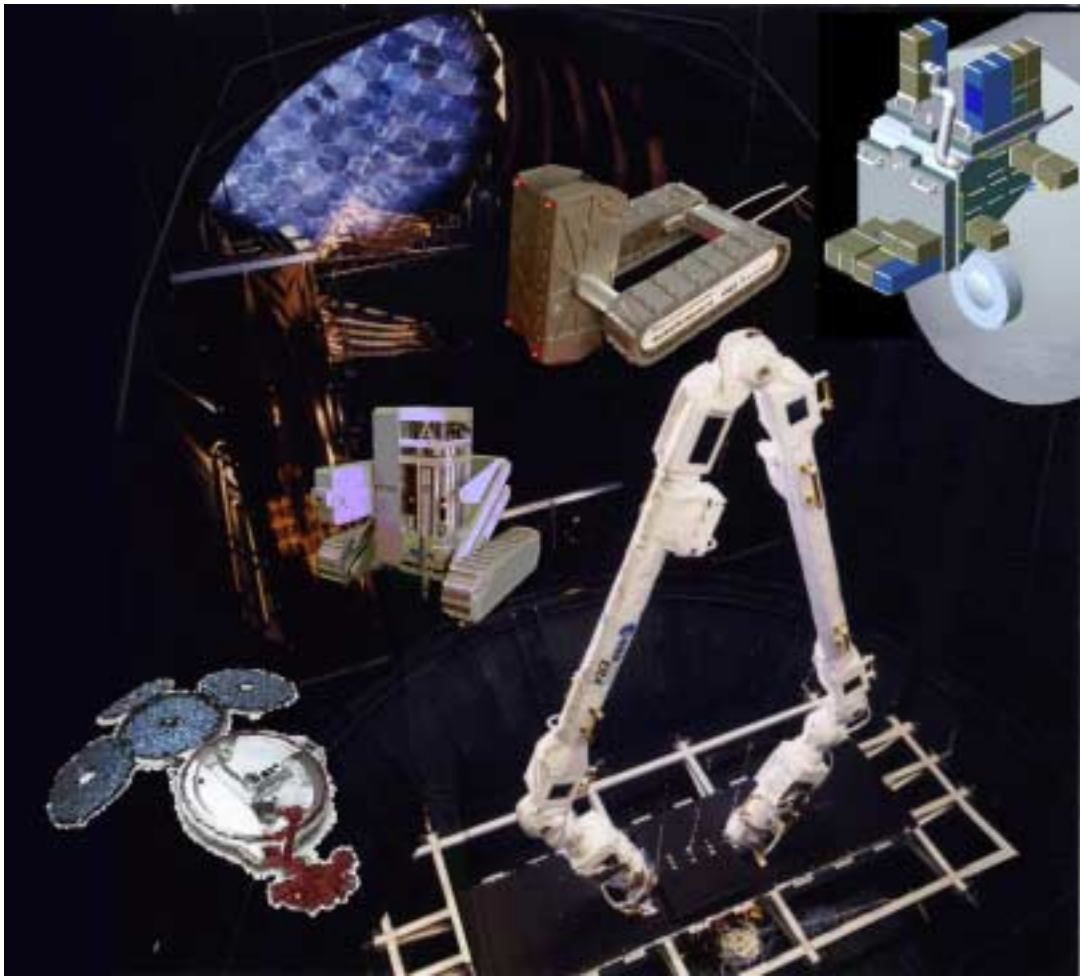
ESA WPP-179

Proceedings

6th ESA Workshop on

Advanced Space Technologies for Robotics and Automation

ASTRA 2000



5-7 December 2000
ESTEC, Noordwijk, The Netherlands

esa

ORGANISATION AND PROGRAMME COMMITTEE

Workshop Chairman:

H.-P. Lutz ESA D/TOS, Head of Mechanical Systems Division

Programme Committee:

R.H. Bentall	ESA D/MSM, Head of ERA Project Division
A. Chicarro	ESA D/SCI, Mars Express Project Scientist
P. Clancy	ESA D/MSM, Microgravity Programme Planning Coordinator
G. Gianfiglio	ESA D/MSM, Head of Mission Implementation of External Payloads Section
M. Novara	ESA D/SCI, Future Projects & Technology Office
P. Putz	ESA D/TOS, Head of Automation and Robotics Section
G. Reibaldi	ESA D/MSM, Head of Microgravity Facilities for Columbus Division
M. Van Winnendael	ESA D/TOS, Automation and Robotics Section (Workshop Organiser)

Editors (ASTRA 2000- ESA WPP179)

P. Putz	ESA D/TOS, Head of Automation and Robotics Section
M. Van Winnendael	ESA D/TOS, Automation and Robotics Section

CONTACT ADDRESS

ESA/ESTEC Conference Bureau (ADM-ZRC)
PO Box 299
NL-2200 AG Noordwijk
The Netherlands

Fax +31-71-565 5658,
Telephone +31-71-565 5005
E-mail: confburo@esa.int

ASTRA 2000

The Automation and Robotics Section of the European Space Agency (ESA) Directorate of Technical and Operational Support organised the sixth Workshop on "Advanced Space Technologies for Robotics and Automation (ASTRA)". ASTRA 2000 has been held from December 5th to 7th, 2000, at the European Space Research and Technology Centre (ESTEC) in Noordwijk, The Netherlands.

OBJECTIVES OF THE ASTRA WORKSHOP

ASTRA 2000 has been built on the tradition of the previous five ASTRA Workshops. It has been a forum for information exchange and discussion of the European space Automation and Robotics (A&R) community. Representatives from industry and research in the ESA member states obtained an up-to-date picture of

- currently envisaged space missions and application scenarios where A&R could play a major role,
- the A&R technology needs which can be derived from these application scenarios,
- the current status of European research and development programmes in the field of space A&R, and
- new technology trends for space A&R.

ASTRA provided an overview of technologies which are available or being developed in the ESA member states, or which should be included in future ESA-managed R&D activities.

SCOPE

The scope of the ASTRA Workshop is A&R technology and its application in space. The following areas has been covered:

- automation and robot system technologies (design and development methodologies, operational concepts, simulation and calibration techniques, multi-robot cooperation architectures, "evolutionary" robotics, micro-system technologies, etc.)
- robotic support equipment technologies (testbeds, simulators, training equipment, etc.)
- robot ground segment technologies (for programming and verification, commanding and monitoring, teleoperation at various levels of abstraction)
- robotic mobility technologies (arm relocatability, rover locomotion on / above / under the surface, etc.)
- manipulation subsystem technologies (kinematics, structures, actuators, proprioceptive sensors, harnesses)
- end-effector and sensor instrumentation technologies (grippers, hands, tools, drilling and sampling devices, payload interfaces, exteroceptive sensors including robotic vision, etc.)
- robot control technologies (space compatible hardware platforms, rover navigation and piloting techniques, control algorithms, intelligent sensor based control, human-computer interfaces, etc.).
- robot-friendly payload technology and design methodologies
- (non-robotic) technologies for space laboratory automation (payload control systems, data communications and imaging technologies, user interface and "telepresence" technologies)
- test and operations.

TABLE OF CONTENTS

Session 3.8: Technologies for Vision-Based Robot Control