

Proceedings of the

6th ESA Workshop on



Advanced Space Technologies for Robotics and Automation

ASTRA 2000

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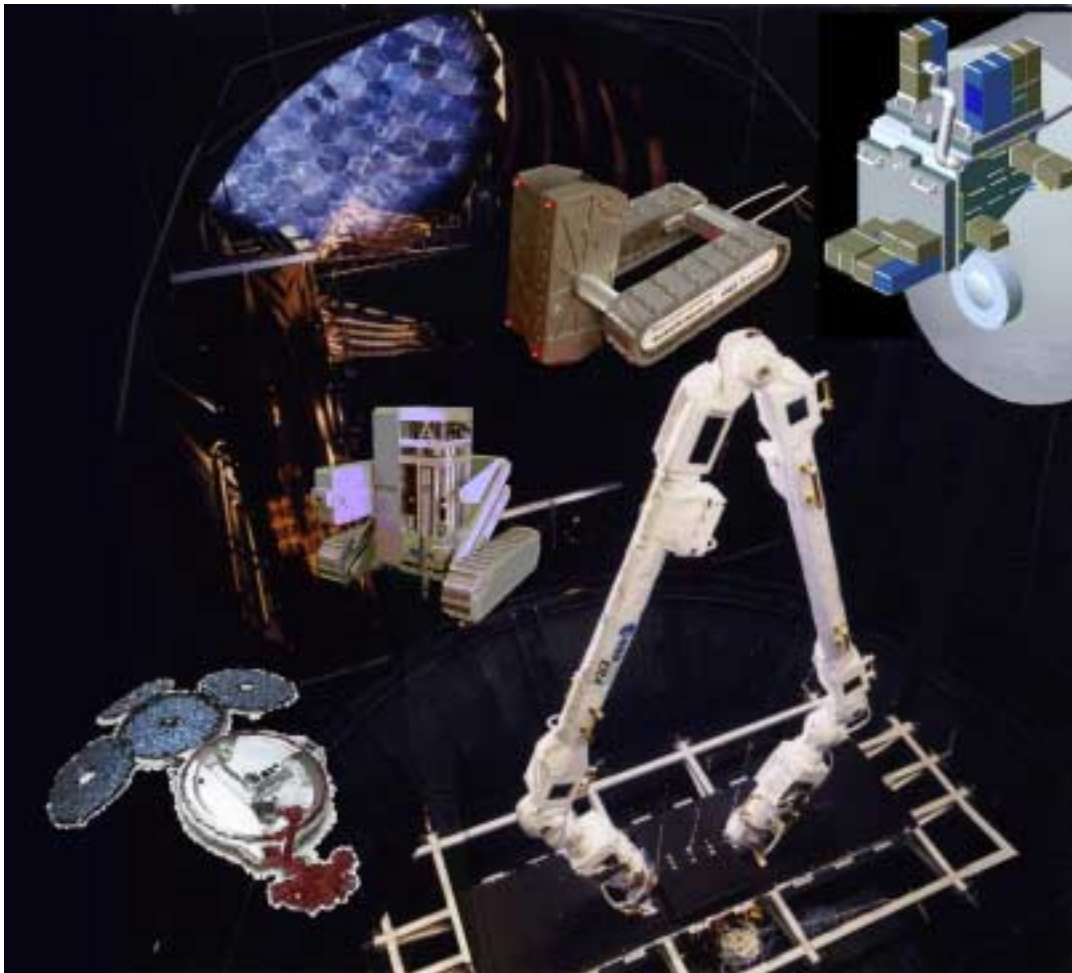
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6th ESA Workshop on
**Advanced Space Technologies for
Robotics and Automation**

ASTRA 2000



For Beagle2 Lander image: © Beagle2

5-7 December 2000
ESTEC, Noordwijk, The Netherlands

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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.

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