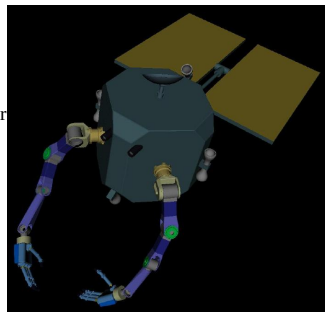
Human Frontier Environments
Organizers & Chairs: Paolo Fiorini, Gerd Hirzinger

Advances in Orbital Robotics
G. Hirzinger, B. Brunner, R. Lampariello, K. Landzettel, J. Schott and B. M. Steinmetz
German Aerospace Center (DLR)

- ROTEX - the first remotely controlled space robot
- Free-flying space robots - Experiences with the lab demonstrator ESS and the Japanese ETS VII
- DLR's task level, sensor-based teleprogramming system MARCO
- Future perspectives in space robotics

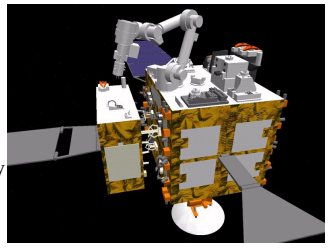


Ground Mobility Systems for Planetary Exploration
P. Fiorini
California Institute of Technology

- Summary of the state of the art of ground mobility of Planetary exploration
- The aim is to increase scientific return using different mobility paradigms
- A promising new approach is hopping, capable of large obstacle avoidance
- Mobility must be optimized depending on terrain type and exploration scope.

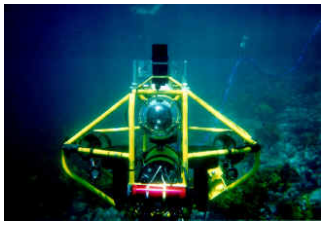
Experience and Lesson Learned From the ETS-VII Robot Satellite Mission
Mitsushige Oda
National Space Development Agency of Japan

- The world first satellite mounted space robot system, launched in Nov.1997
- Robot arm is tele-operated from the on-ground control station in Japan
- Automated satellite capture and many other experiments were conducted
- Tech. to be used in operation of the space station



Behavior-Based Control for Autonomous Underwater Exploration
J. Rosenblatt, S. Williams and H. F. Durrant-Whyte
University of Sydney

- Autonomous control of an underwater vehicle for surveillance of coral reefs
- Sonar and vision-based behaviors combined by fuzzy logic and utility fusion arbiters
- Behaviors selected by task-level controller according to mission plan
- AUV follows targets, maintains altitude, and avoids collisions in natural coastal terrain



Enhanced Mars Rover Navigation Techniques
R. Volpe, T. Estlin, S. Laubach, C. Olson and J. Balaram
California Institute of Technology

- Mars rover operations are constrained by infrequent communication, unknown terrain, low power, and limited computing.
- Robust navigation through natural Mars terrain is needed to maximize science return by missions.
- Progress has been made in four relevant areas: position estimation, visual localization, sensor constrained path planning, and dynamic activity planning.
- Ongoing simulation and experimentation demonstrate improved performance and autonomy.

Underwater Robotics
J. Yuh
University of Hawaii

- During 1990s, numerous worldwide research and development activities have occurred in underwater robotics, especially in the area of autonomous underwater vehicles (AUVs). As the ocean attracts great attention on environmental issues and resources as well as scientific and military tasks, the need for and use of underwater robotic systems has become more apparant. This paper surveys some key areas in current state-of-the art underwater robotic technologies.
- This paper focuses on several sub areas of underwater robotics: Dynamics, Control, Navigation and Sensors, Communications, Power systems, Pressure Hulls, and Manipulators.
- Evaluation and comparison on various subsystems are presented in this paper.
- While not providing a complete survey, it is hoped that this survey can help provide a direction for future advancements in the subject area and attract more researchers and potential users of underwate robots.