Panel on Artificial Intelligence and Space Exploration

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Over the last few years, the National Aeronautics and Space Administration (NASA) has become a major developer and user of artificial intelligence science and technology. This panel will discuss NASA's program for artificial intelligence research as well as current and planned future applications within its major missions. Panelists will be scientists and engineers managing a selection of the most important programs for AI within the Agency. In addition, an astronaut with extensive space flight experience will speak about the evolving partnership of men and intelligent machines for NASA's future long-duration missions.

Dr. Peter Friedland, Chief of the Artificial Intelligence Research Branch of NASA's Ames Research Center and Project Manager for the NASA-wide Artificial Intelligence Research Program, will chair the panel. He will provide a survey of the basic research program funded out of the Office of Aeronautics and Space Technology and conducted both within NASA's inhouse laboratories and by an extensive group of collaborators in academia and industry. Five broad topics form the core of the program: data analysis and theory formation; learning and problem solving; scheduling; intelligent agents; and the design of and reasoning about physical systems.

Mr. John Muratore, Chief Integrated Communications Officer (INCO) in the Mission Control Center of the Johnson Space Center, will describe current use of knowledge-based systems in ground control of the Space Shuttle. Starting with the INCO console, he has led an effort to replace the Apollo-era technology in Mission Control with modern hardware and software to provide intelligent assistance to ground controllers. The AI-based updated consoles are now in place for six positions and have been used since resumption of Shuttle flight in September, 1988.

Mr. Gregg Swietek, Manager of the Advanced Development Program, Office of Space Station Freedom at NASA Headquarters, will speak on the ambitious applied research and prototyping program he heads in the Space Station Freedom Program. AI is one of the core technologies being explored both for use on the Initial Operating Configuration of the space station as well as more extensively as the Freedom Space Station evolves over its 30-year lifetime. Domains being explored range from control, diagnosis, and reconfiguration of major subsystems like power, communications, or thermal control; to scheduling of scientific activities aboard Freedom; to managing the complex logistics of a multi-site, multi-billion-dollar design and construction effort.

Mr. David Atkinson, Head of the Information Sciences Section of the Jet Propulsion Laboratory, will describe current and potential applications of AI to planetary exploration. Among the topics discussed will be the SHARP system currently being tested for ground control of the Voyager Neptune encounter and semi-autonomous rover technology being developed for potential use in a Mars Rover/Sample Return mission.

An important realization within the NASA AI Program has been that, at least for

the forseeable future, totally autonomous systems will play only a minor part in the Agency's major missions. Of far greater importance will be intelligent systems capable of brief autonomy, but normally functioning in active partnership with human crew and ground control personnel. An astronaut with extensive flight experience will discuss the human end of intelligent machines in space flight applications.