

Enabling Space Mission Operations with Artificial Intelligence.

Dr. Jeremy Frank

For over 50 years, NASA's crewed missions have been confined to the Earth-Moon system, where speed-of-light communications delays between crew and ground are practically nonexistent. This ground-centered mode of operations, with a large, ground-based support team, is not sustainable for NASA's future human exploration missions to Mars. Future astronauts will need smarter tools employing Artificial Intelligence (AI) techniques make decisions without inefficient communication back and forth with ground-based mission control. In this talk we will describe several demonstrations of astronaut decision support tools using AI techniques as a foundation. These demonstrations show that astronaut tasks ranging from living and working to piloting can benefit from AI technology development.

Short Bio

Dr. Jeremy Frank is the Group Lead of Planning and Scheduling Group, in the Intelligent Systems Division, at NASA Ames Research Center. He received his Ph. D. from the Department of Computer Science, at the University of California at Davis, in June 1997. He also has a B.A. in Mathematics from Pomona College. Dr. Frank's work involves the development of automated planning and scheduling systems for use in space mission operations, the integration of technologies for planning, plan execution, and fault detection for space applications, and the development of technology to enable astronauts to autonomously operate spacecraft. Dr. Frank has led many research and application development projects at NASA for 15 years. He has contributed to several NASA and national technology roadmaps (U.S. Robotics Roadmap, NASA Office of Technology Roadmaps). He has received over 30 NASA awards, including the Exceptional Achievement Medal, the Silver Snoopy, and the NASA Engineering and Safety Center Award. He has served many roles (Program Committee, Doctoral Consortium chair, Sponsorship Chair, System Demonstration Chair) on many conferences (International Conference on Automated Planning and Scheduling National Conference on Artificial Intelligence, Principles and Practices of Constraint Programming). He has served as a National Science Foundation reviewer. He has served on the Ph.D. committees of three students. He has published over 40 conference papers, six journal papers, and two book chapters, and led or participated in 9 system demonstrations. He has given invited talks at conferences, universities, and in industry.