

Transcending Societal Issues for Space Exploration (12)
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ROBOTIC EDUCATION FOR SPACE EXPLORATION. TRANSCENDING SOCIETAL BARRIERS
BETWEEN HUMANS AND ROBOTS FOR EDUCATION AND EXPLORATION.

Abstract

Space exploration has relied on robots as exploratory tools on their own, as well as an enhancement of human crews. Recently a robot has been deployed to the ISS that served a slightly different purpose. The CIMON (Crew Interactive Mobile companion) robot is an AI based robot that is considered to be a 'buddy' to the Astronauts. CIMON can be understood as a non-human crew member. Including a robot as part of a human crew opens questions of crew composition, role attribution as well as the perception the crew has of said robot. With the advent of AI and the rising use of robots as companion devices in (health) care and education scenarios on Earth, the use of robots as 'non-human crew-members' or 'non-human agents' in space exploration serves as test-bed for their societal and educational impact. We are testing for a mixed society of humans and AI robots through analogue mission and education scenarios. Methodologically we will be using data from a questionnaire on human perception and expectations of as well as attitudes towards robots as companions to construct human-robot-interaction scenarios that are relevant for education and analogue exploration. With the authors' expertise in humanities- and science-education, these scenarios will address basic questions for introducing robots into astronaut crews as well as into classroom settings. One-on-one scenarios between humans and robots will be compared to human-human settings. The data from the educational studies will be applied to astronaut-crew based scenarios and tested during EMM analogue missions, feeding back into education scenarios. Basing the project on educational research serves the purpose of opening up education scenarios from the humanities, social sciences as well as science education for fundamental questions of human space-exploration. Education scenarios as well as analogue missions serve as simulations for future human endeavors and societal structure. Both also are characterized by an analytical stance toward the simulated setting. The paper addresses a framework for robotic involvement in a human crew from an anthropological, educational and a technical standpoint Using the humanoid NAO-robot the project assesses the abilities of the robot and showcases a set of scenarios of including the NAO as an individual agent into a human crew, based on our educational research. Questions of gathering data during the human-robot interactions will be addressed on a methodological and empirical level. The paper will present empirical research data and the resulting application scenarios in classrooms and analogue habitats.