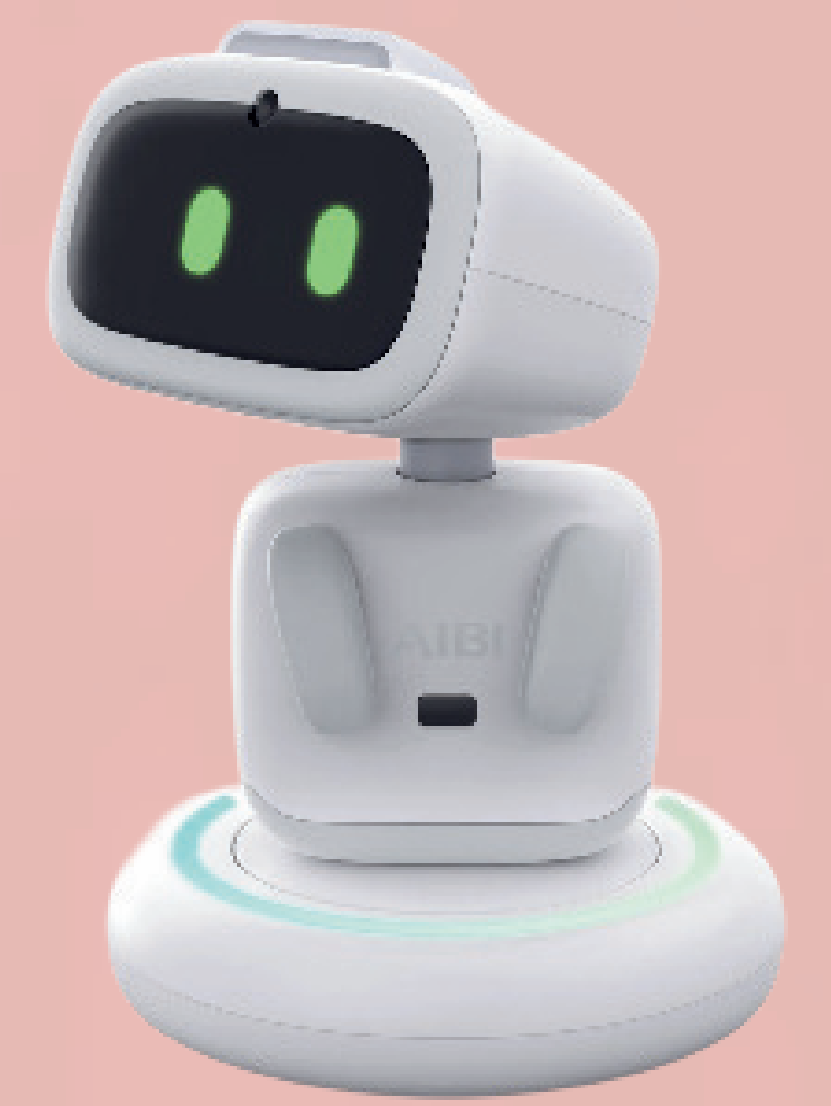


WEARABLE SOCIAL ROBOTS IN SPACE

AIBI – A POCKET SIZED ROBOT AS A SOCIAL COMPANION ON MANNED MARS MISSIONS

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Facts and Figures

Wearable Social Robots

- Robots or robotic components that are worn, carried, or contained
- AI integration (e.g., facial recognition, generative AI with LLMs)
- AIBI known as the world's smallest AI robot, measuring 66.70 mm in height and 48.80 mm in width
- Can be worn around the neck or attached to intravehicular activity suits
- Can easily be taken along when moving between modules and vehicles

On Board

- Mars-Earth communication via radio connection and with up to 24 signal delays
- Outbound flight: up to 9 months, return flight: up to 3 years
- No real time communication with friends and family on Earth

AIBI Use Cases

- **Daily routine support:** Assists with planning, reminders, and task organization
- **Operational assistance:** Provides technical and organizational information, including motivational support and malfunction recognition
- **Emotional support:** Capable of simulating empathy and emotional expression to support astronauts under psychological strain
- **Intimacy-related support:** In controlled contexts, can respond to suggestive language and haptic input to help manage intimacy needs
- **Communication enhancement:** Functions as a conversational partner, translator, and game companion, both on board and with Earth
- **Social facilitation:** Acts as a social catalyst, mediating between humans, technology, and their environment

Abstract

Social robots have been developed on Earth since the 1990s. This article shows that they can also provide added value in space – particularly on a manned flight to Mars. The focus in this paper is on wearable social robots, which seem to be an obvious type due to their small size and low weight. First, the environment and situation of the astronauts are described. Then, using AIBI as an example, it is shown how it fits into these conditions and requirements and what tasks it can perform. Possible further developments and improvements of a wearable social robot are also mentioned in this context. It becomes clear that a model like AIBI is well suited to accompany astronauts on a Mars flight. However, further developments and improvements in interaction and communication are desirable before application.