Fiscal Year:	FY 2021	**Task Last Updated:**	FY 10/22/2020
PI Name:	Dhamija, Rachna Ph.D.		
Project Title:	Conversational Intelligent Agents for Astronaut Behavioral Health and Performance		
Division Name:	Human Research		
Program/Discipline:			
Program/Discipline-- Element/Subdiscipline:	TRISH--TRISH		
Joint Agency Name:		**TechPort:**	No
Human Research Program Elements:	None		
Human Research Program Risks:	None		
Space Biology Element:	None		
Space Biology Cross-Element Discipline:	None		
Space Biology Special Category:	None		
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PI Organization Type:	INDUSTRY	**Phone:**	
Organization Name:	Ejenta		
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PI Address 2:			
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City:	San Francisco	**State:**	CA
Zip Code:	94105	**Congressional District:**	12
Comments:			
Project Type:	GROUND	**Solicitation / Funding Source:**	TRISH--Industry
Start Date:	11/01/2020	**End Date:**	12/31/2021
No. of Post Docs:		**No. of PhD Degrees:**	
No. of PhD Candidates:		**No. of Master' Degrees:**	
No. of Master's Candidates:		**No. of Bachelor's Degrees:**	
No. of Bachelor's Candidates:		**Monitoring Center:**	TRISH
Contact Monitor:		**Contact Phone:**	
Contact Email:			
Flight Program:			
Flight Assignment:	NOTE: End date changed to 12/31/2021 (originally 10/31/2021) per TRISH (Ed., 1/30/21)		
Key Personnel Changes/Previous PI:			
COI Name (Institution):	Sierhuis, Maarten Ph.D. (Ejenta)		
Grant/Contract No.:	NNX16AO69A-IND0101		
Performance Goal No.:			
Performance Goal Text:			
Task Description:	Industry Project Ejenta will develop a conversational intelligent agent to support the health and performance of crew members during long duration and exploration spaceflight. The intelligent agent facilitates communication, collaboration, and connection with an astronaut's Earth-based support network, despite time delays, and it acts as a proxy when real-time monitoring and advising is not available from Earth.		
Rationale for HRP Directed Research:			
Research Impact/Earth Benefits:			

Task Progress:	Astronauts experience various aspects of social isolation and confinement during their missions that impact physical health, behavioral health, and performance. As NASA prepares for missions that will take astronauts farther away from the Earth to the Moon and Mars, the experiences of isolation and confinement will only be magnified with communication time-lags that prohibit real-time interaction. Astronauts often say a phone call home provides tremendous support in mitigating behavioral health risks. Travel to Mars, with one-way communication delays up to 22 minutes, will make such real-time interaction extremely difficult. In this project, Ejenta developed a conversational intelligent agent, called TRISHA, to support the health and performance of crewmembers during long duration and exploration spaceflight, including future missions to the Moon and Mars. The intelligent agent facilitates communication, collaboration, and connection between an astronaut and his Earth-based support network, despite time delays. The agent can also act as a proxy for the astronaut's team when time-delayed communications prevent real-time monitoring and advising from Earth. Additionally, the system provides actionable health and behavioral data from the astronaut to the support team through passive non-intrusive instrumentation, including voice, video, and wearable technology. TRISHA continuously monitors data from connected and wearable medical devices, and it also non-intrusively captures data from cameras and smart speakers. The intelligent agent reasons and learns based on the sensed data to detect nominal or off-nominal conditions, activities, task performance, and behavioral health metrics (e.g., stress, social dynamics, and emotional state). The agent can then take autonomous actions (for example, to converse with the crew, ground, or family; to send alerts or notifications; or to automate documentation). Finally, the agent can provide advice and support, by answering questions, providing clinical decision support for medical management algorithms, and providing medical procedure guidance using voice and camera-based visual feedback. This work directly advances the development of intelligent agents in healthcare use cases on Earth. For patients on Earth, the greatest benefit of intelligent agents is to better engage and support patients outside of the hospital or doctor's office. Ejenta has developed a platform for automated remote health monitoring that is being deployed at leading healthcare organizations across the US. The platform allows patients, family, and caregivers to get real-time support and advice from an intelligent agent that continuously monitors and learns about the patient using connected devices and medical records. The agent uses the data to create a personalized machine learning model that can be used to detect changes in a person's baseline or to predict the onset of new symptoms or deterioration. Ejenta has demonstrated successful results in controlled clinical trials with patients with COVID-19, heart-failure, hypertension, and high risk pregnancy, showing that the platform dramatically reduces health system utilization, while improving health outcomes and increasing patient engagement from home.
Bibliography Type:	Description: (Last Updated: 01/11/2023)
Significant Media Coverage	Sarmah Hightower S. "Forbes: Startup adapts AI used in space to advance healthcare on Earth." Apr 6, 2021. "Forbes Article." Forbes. Apr 6, 2021. https://www.forbes.com/sites/awsstartups/2021/04/06/startup-adapts-ai-used-in-space-to-advance-healthcare-on-earth/?sh=58e4a6f45355 , Apr-2021