Participatory technology assessment for Mars mission planning: Public values and rationales☆

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Abstract

Public support and interest are needed to design an ambitious human spaceflight program. However, it is difficult to understand what the public values and would support. And it is even more challenging and rare to consider public views prior to actually developing a mission. Participatory technology assessment (pTA) is a method that aims to understand public preferences and values in order to inform upstream government decision-making. We assess a recently completed experiment in pTA, the “Informing NASA's Asteroid Initiative” project. Through a cooperative agreement with NASA, the Expert and Citizen Assessment of Science and Technology (ECAST) network conducted a pTA-based forum on NASA's Asteroid Initiative and the Journey to Mars. ECAST organized two citizen forums in Phoenix, Arizona and Boston, Massachusetts in November 2014, with a total of 183 citizens selected so as to minimize self-selection biases. This paper focuses on the “Journey to Mars” session, which had the primary goal of soliciting citizen perceptions about different Mars exploration scenarios and mission planning approaches. Citizens were given background information about three potential Mars exploration scenarios that NASA could carry out: 1) Crewed orbital mission to direct robots on the surface of Mars; 2) Short exploratory crewed mission to the surface of Mars; and 3) establishing a permanent settlement. Citizens then engaged in structured facilitated discussions about their preferences among the scenarios and NASA's mission planning approach. Using a grounded theory coding approach, we

analyzed participants' written rationales and dialogue about Mars exploration. In general, participants did not show a strong preference for any particular mission profile, but there was a slight preference for the crewed orbital robotics scenario. Participants who supported this approach saw it as the quickest, safest, and least costly road to a successful mission. However, many participants were interested in seeing “boots on the ground,” as they believed this would propel scientific advancement, increase excitement about space exploration, and make humans a “two-planet species.”