

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Behaviour, Performance and Psychosocial Issues in Space (1)

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CREW-MC INTERACTION DURING COMMUNICATION DELAY IN MARS-500

Abstract

The increasing communication delay (up to 12 minutes one-way) is one of the important features of the manned Mars Mission. Certainly, this phenomenon and its impact on crew-Mission Control interaction's efficiency were one of the main objectives of Mars-500 international Space Project. Within the frame of 520-days chamber study its organizers simulated dynamically changing delay (35th – 490th days), as well as the sudden communication breakdown in the second half of the Mission.

During previous space simulations to interact with each other during the Mission chamber crew and MC could use written radiograms and reports, sent via electronic means of communication, as well as audio communication by telephone during fixed communication sessions. That reproduced the communication order during orbital flights. E-mail in package format, as on ISS, was used to interact with families and friends and receive psychological support. In Mars-500 both sides couldn't use the main source of data in previous Missions, telephone after day 35th till the day 490th. Special software was used in order to create the increasing delay for all in- and outgoing written messages, including E-mail.

In order to compensate the possible deficit of data for decision-making due to delay and to improve interaction, the new channel of communication was recommended. Web camera on personal laptops was used for recording video messages. That allowed the crew and Mission controllers not only to say, but to show some important details in logistics that increased the amount of data inside the message. Also it turned out that recording video is faster and more convenient, than to write. Finally, video was effective for expressing feelings that added to the content of the message. Subjects received the opportunity to transfer the negative emotions via this particular way of communication.

Both the crew and MC regarded video messages as the most effective during the delay period for doing operations. All crucial aspects of Martian crew's life concerning logistics, scheduling, scientific experiments were decided via video. Written messages just confirmed and doubled the information, first spread via video. At the same time, crewmembers preferred E-mail for the informal contacts with families and friends. They explained it by more privacy, that confidential E-mails provided, and by no need to get urgent feedback.