The communications architecture (Fig. 3) was based on previous testing [1-3]. Crewmembers communicated with each other exclusively on the Big Loop, which was always being transmitted to the Mission Control Center (MCC). Flight controllers and scientists MCC would receive audio and video on the Big Loop but would not transmit on it; instead, they would transmit voice and text primarily on the Small Loop to the DSH IV crewmember(s) who would then respond to MCC and/or synthesize and pass on relevant information to the MMSEV and EVA crewmembers at an appropriate time.

The methods section describes the experimental setup and procedures. Test subjects operated the MMSEV and interacted with the simulation environment from inside the Generation 2A MMSEV prototype while viewing the simulation on video walls within the MMSEV windows. Head-mounted virtual reality (VR) displays, instrumented gloves, and an EVA jetpack control module were used during simulated free-flying EVAs while a gravity offloading system was used during simulated anchored EVAs for evaluation of EVA translation and geologic sampling tasks (Fig. 1).

Simulation telemetry and consensus subjective ratings were used to assess, evaluate, and compare EVA tasks while keeping at a safe distance. The Communications architecture (Condition 6A FF shown) was used to assess each test condition and associated capabilities. The test conditions were illustrated in the results section (Fig. 8) and represent variations on operating modes (Conditions 6 and 7) rated as acceptable by Science and Crewmembers teams during DRATS11. Anchored modes for the MMSEV are attached to the NEA.

RESULTS

The same metrics used during DRATS11 and NEEMO 15 and 16 missions [2, 3] (Figs. 4-7) were used to assess each test condition and associated capabilities. The test conditions are illustrated in the results section (Fig. 8) and represent variations on operating modes (Conditions 6 and 7) rated as acceptable by Science and Crewmembers teams during DRATS11. Anchored modes for the MMSEV are attached to the NEA.

Fig. 3. Communications architecture (Condition 6A FF shown).

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