ANSIBLE – a Prototype Virtual World for Social and Psychological Support


Future multi-year space missions, such as those planned for Mars, will incur a number of potentially debilitating social and psychological issues for the crew and their friends, family and colleagues back on earth. Studies conducted within Isolated and Confined Environments such as earth-based analogs have shown that boredom, social monotony, and sensory deprivation are all threats to the psychological health of the crew during their mission.

In the past decade, online Virtual worlds (VWs) have taken the 3D environments of Virtual Reality and transformed them into rich, persistent, networked 3D spaces that tens of thousands of people inhabit using personalized, 3D representations called avatars. Both the use of such avatars as well as the immersion in the virtual space itself have been shown to provide effective real world psychological benefits to those who use them. In addition to ongoing social connectivity, expansive experiences such as virtual vacations, narrative, game-like activities and stress-reducing exercises are all increasingly available in the virtual world. Adding intelligent Virtual Agent (VA) technology to VWs makes possible a new range of human interaction opportunities that enable even more benefits to VW use, as VAs can be put to use as tutors, guides, conversational partners, and even as virtual therapists. VWs combined with VAs can be used to address human interactions in a diverse set of domains, from shared entertainment activities to language and culture training; from rehearsing team dynamics to engaging group social experiences.

Given the importance of behavioral health to mission success and the extreme conditions of space travel, new methods of maintaining psychological health and social connections to support systems are critical. Thus, in the space domain, Virtual Worlds, together with VAs, can provide a wide range of enhanced support. They can be an ongoing connection between flight crews and their Earth-based social support system, their family, friends, and colleagues, and provide social, spatial and psychological variety beyond the confines of the spacecraft.

In the ANSIBLE Project, we have taken the first step to combine Virtual Worlds and Virtual Agents specifically as countermeasures for long-duration space flight issues. We show their use as tools to facilitate asynchronous human-human communication, and counteract behavioral health challenges associated with prolonged isolation and deep space exploration. By spending time in a variety of customized virtual world spaces, crew members can travel beyond the confines of the spacecraft, participate in anxiety-relieving activities such as Mindfulness-Based Stress Reduction, and connect with family, friends and colleagues back home via an on-board virtual world that is regularly-synchronized with a similar ground-based server, which helps circumvent the communication delays that prohibit real-time communication links like real-time video conferencing. Carefully designed asynchronous experiences allow for a continuing close connection to loved ones, despite the delays. These are enhanced by crowd-sourced elements that enrich and refresh the virtual world offerings, such as seasonal weather videos and virtual vacations, which are submitted by people back home, vetted by NASA, and uploaded to the virtual world server.

Even at this early stage, ANSIBLE demonstrates the promise that VWs and VAs offer. As the technology continues to progress, we believe that such virtual environments will prove to be a necessary and valuable tool for all future space missions.