**Live Ultra-High Definition from the International Space Station**

The first ever live downlink of Ultra-High Definition (UHD) video from the International Space Station (ISS) was the highlight of a "Super Session" at the National Association of Broadcasters (NAB) in April 2017. The Ultra-High Definition video downlink from the ISS all the way to the Las Vegas Convention Center required considerable planning, pushed the limits of conventional video distribution from a space-craft, and was the first use of High Efficiency Video Coding (HEVC) from a space-craft.

The live event at NAB will serve as a pathfinder for more routine downlinks of UHD as well as use of HEVC for conventional HD downlinks to save bandwidth. HEVC may also enable live Virtual Reality video downlinks from the ISS.

This paper will describe the overall work flow and routing of the UHD video, how audio was synchronized even though the video and audio were received many seconds apart from each other, and how the demonstration paves the way for not only more efficient video distribution from the ISS, but also serves as a pathfinder for more complex video distribution from deep space.

The paper will also describe how a "live" event was staged when the UHD coming from the ISS had a latency of 10+ seconds. Finally, the paper will discuss how NASA is leveraging commercial technologies for use on-orbit vs. creating technology as was required during the Apollo Moon Program and early space age.

Authors
Rodney Grubbs
Sandy George