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Media Streaming in a High-Rate Delay Tolerant Network

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Media Streaming in a High-Rate Delay Tolerant Network

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Abstract



Audio and video streaming across delay tolerant networks are relatively new phenomena. During the Apollo 11 mission, video and audio were streamed directly back to Earth using fully analog radios. This streaming capability atrophied over time. The gradual conversion to digital electronics contributed greatly to this. Additionally, 21st century space systems face the new requirement of interconnectedness. Delay Tolerant Networking (DTN) attempts to solve this requirement by uniting traditional point to point links into a robust and dynamic network. However, DTN implementations present bottlenecks due to low performance. High-Rate Delay Tolerant Networking (HDTN) is a performance-optimized DTN implementation. This work implements audio and video streaming in HDTN. Streaming at high bit rates demonstrates that HDTN makes DTN practical. A series of network topologies were created including simple point to point links and multi-node multi-hop networks. Test media in the form of prerecorded and live footage was streamed across the network. A set of objective quality metrics were established in order to measure the stream quality. A lunar network was emulated using a mixture of embedded ARM platforms.

This work will be published at AIAA SciTech 2024 under a similar title.