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## INITIAL ON-ORBIT RESULTS OF A COMMERCIAL DATA-RELAY

**Abstract**

End users are demanding more from optical and radar images: finer spectral and spatial resolution, increased frequency and greater volume. The earth observation (EO) industry has responded with more satellites and increasingly advanced imaging sensors - yet the potential of these systems cannot be fully realized as the downlink throughput significantly lags acquisition rates. The number and quality of images is often limited by a satellite's access to ground terminals, meaning observation systems are operating at a fraction of their full potential. Dedicated relay satellites in low earth orbit (LEO) can enable sizeable increases in downlink capability for modern earth observation platforms.

Analytical Space, Inc. (ASI) is addressing the downlink bottleneck with a planned LEO network capable of drastically improving data offload capacity through a combination of bidirectional radio-frequency crosslinks and high speed optical downlinks. When fully deployed and operational, our network of relay satellites in LEO will enable EO assets to downlink at any time over their entire orbital period.

ASI will be the first commercial entity to harness optical communication technology on a CubeSat platform. The initial flight will be immediately capable of pairing with a variety of legacy downlink systems and supplementing a wide assortment of satellites currently in orbit. Utilizing the CubeSat form factor has allowed ASI to capitalize on lower unit costs and faster development cycles, ensuring that the relay network is continuously refreshed with the newest technologies.

With its May 2018 launch, we will explore the Radix satellite mission results. This maiden flight will demonstrate the ability to perform RF data links and high speed laser downlink on a CubeSat platform. In addition to expanding on these accomplishments, the presentation will outline a few future use cases – the downlink utility of a single relay satellite, and the impact of growing a network of ASI relay satellites. Finally, it dives into long-term, prospective capabilities of the network and the impact of upcoming developments.