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X-BAND AND BEYOND: THE ADVENT OF A PURE-SOFTWARE WIDE-BAND RECEIVER FOR
EO SATELLITE PAYLOAD

Abstract

Conventional wide-band satellite modems share a common architecture: they use RF electronics to digitize a satellite's signal and FPGA chips running signal processing logic. This is because processing 300+ MHz X-band transmissions in real-time requires carrying out an extraordinary amount of calculations very fast and the challenge is getting even harder with missions looking towards K-band, 1+ GHz-wide channels, requiring extreme amounts of compute capability.

But computing is changing and taking satellite technology with it. Amphinicy Technologies created Blink, a new kind of pure-software satellite modem, running at over 1Gb/s - by far the fastest pure-software satellite modem to date.

A software implementation raises a host of questions: forwarding the signal to the Cloud and processing it there; scaling up and down, new costs optimisation opportunities, room for sophistication of the receiver, speed of deployment, infrastructure consolidation, true multi-mission solutions. It raises questions of speed of receiver evolution, limits to its complexity, capabilities, raw signal recording and re-processing, inspecting the signal at each processing stage, use of COTS digitizers as separate components, and many other questions.

In the paper, the current status of the receiver will be provided, concentrating on the architecture, throughput and other performance results, roadmap highlights. The results will be followed by an analysis of architectural and other effects of introducing a software receiver into the ground segment.