

XTAR IN ACTION



Efficiencies with Small Antennas in Any Weather

Honeywell Wavestorm AS-X and X-band

THE CHALLENGE

In July, 2018, XTAR and Honeywell, along with Leidos and Newtec, partnered for a demonstration at Fort A.P. Hill near Bowling Green, Virginia. The demo was designed to provide a SATCOM on the move (SOTM) data link from a SOTM terminal to a hub earth station at a data rate greater than 25 Mbps. The purpose of the demo was to show that high data rates can be achieved from small SOTM terminals without the use of HTS satellites. As an additional challenge, heavy rain began to fall during the demonstration.

THE APPROACH

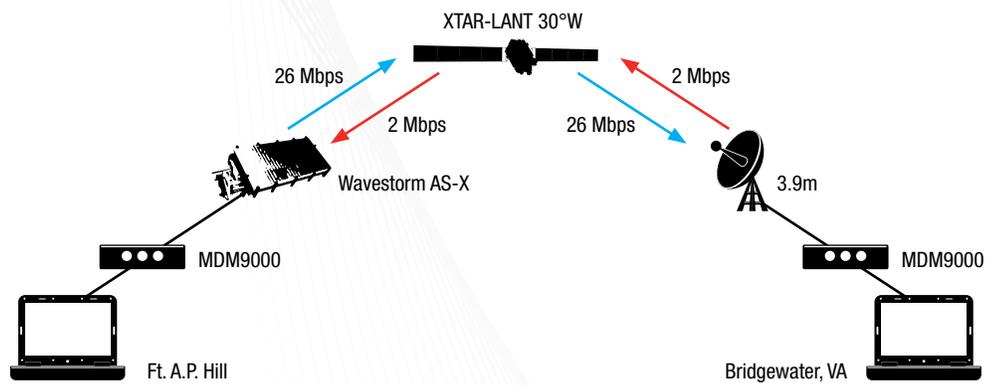
For the demonstration, the SOTM terminal used was Honeywell's Wavestorm AS-X. This terminal's antenna is a low profile slot array antenna, suitable for either airborne or ground-based applications. It measures 10" x 20" and is equivalent to a 17" parabolic antenna. The satellite used for this demonstration was the XTAR-LANT satellite located at 30°W longitude. This is an X-band satellite, compatible with WGS, with both global and spot beams. The satellite modem used for the demonstration was a Newtec MDM9000. A 26 Mbps satellite link was provided between the terminal and a fixed 3.9m ground station in Bridgewater, Virginia. A 2 Mbps data link was transmitted from the fixed ground terminal to the SOTM terminal.

THE RESULTS

The required space segment for this demonstration at 26/2 Mbps was 38.2 MHz. The bandwidth efficiency was 0.73 bits/Hz for this low profile sub-meter SOTM system, which is considered exceptionally high performance for a terminal of this size. Also of note - a similar demonstration was conducted in October, 2017, utilizing the identical equipment suite and conducted in Bridgewater, Virginia. Performance was similar with a data rate of 26.7 Mbps. Finally, even through the rain, the link held.

High data rates can be achieved from small terminals without the use of HTS satellites, even during heavy rain.

Decapsulation	
Output Bit Rate:	25.251628 Mbps
Output Bytes:	4230883044 bytes
Output Packets:	2934460 packets
Dropped Bytes:	0 bytes
Dropped Packets:	0 packets
LinkMargin:	NA



IMPLICATIONS

The demonstration successfully showed that data rates in excess of 25 Mbps from small SOTM terminals can be efficiently transmitted over a non-HTS X-band satellite using technology available today. X-band's natural characteristics allow transmissions, even for small terminals, at high power densities, providing greater bandwidth efficiencies (0.73 bits/Hz in this example) and therefore lower costs for the user. Performance is not hindered by poor weather.