

## Hughes JUPITER™ Aeronautical Solution

Hughes has extensive experience developing and implementing aeronautical broadband solutions for commercial, government and private aircraft. Working with Global Eagle Entertainment (formerly Row 44), our Ku-band aeronautical system is currently deployed on more than 600 commercial airliners (YE2014) operating around the world by IcelandAir, Mango Air, NokAir, Norwegian Airlines, SouthWest Airlines, Transaero, and UTAir.

Soon to be released is our next-generation aeronautical solution based on the award-winning JUPITER System. Designed to extract maximum capacity and efficiency from High-Throughput Satellites (HTS), such as EchoStar® XIX, the JUPITER System features a dense and robust gateway architecture with lights-out operation and high-performance terminals. Powered by its novel “System on a Chip” (SoC) technology, including an enhanced air interface featuring wideband carriers, JUPITER is the ideal, future-proof platform for service operators seeking to deliver the widest range of fixed and mobile applications. As the cornerstone for HughesNet® broadband satellite Internet service in North America—now with more than 1 million active users, the world’s largest satellite service—JUPITER is the system of choice by HTS operators across the globe in Latin America, Russia, Canada, Mexico, Malaysia, Europe and the Middle East. For all of these reasons, Hughes JUPITER System was named the Technology Innovation of the Year at VSAT 2014.

### Enterprise Class, In-Flight Connectivity

The JUPITER aeronautical solution delivers enterprise-class, broadband connectivity for commercial aviation operating over next-generation HTS satellites. Incorporating advanced mobility features, such as Doppler correction, adaptive coding and modulation, and enhanced beam switching capabilities, it supports multiple satellites and seamless handoffs from satellite to satellite—all managed by a single Network Management System (NMS).

The overall architecture of the JUPITER aero solution is illustrated in Figure 1. Key elements include:

- Transport using wideband forward channel carriers and adaptive coding on the return channel carriers
- Integrated gateway stations, which provide the satellite communication link between the aircraft and ground
- Network access points to the Internet
- Global Network Management Systems (NMS), which manages the entire system and provides real-time tracking of every active aero terminal in the system
- ARINC 600 DO-160-certified aeronautical terminal and Ka-band aero antenna working in conjunction with customer-furnished In-Flight Entertainment (IFE) equipment, service management, and in-cabin distribution system

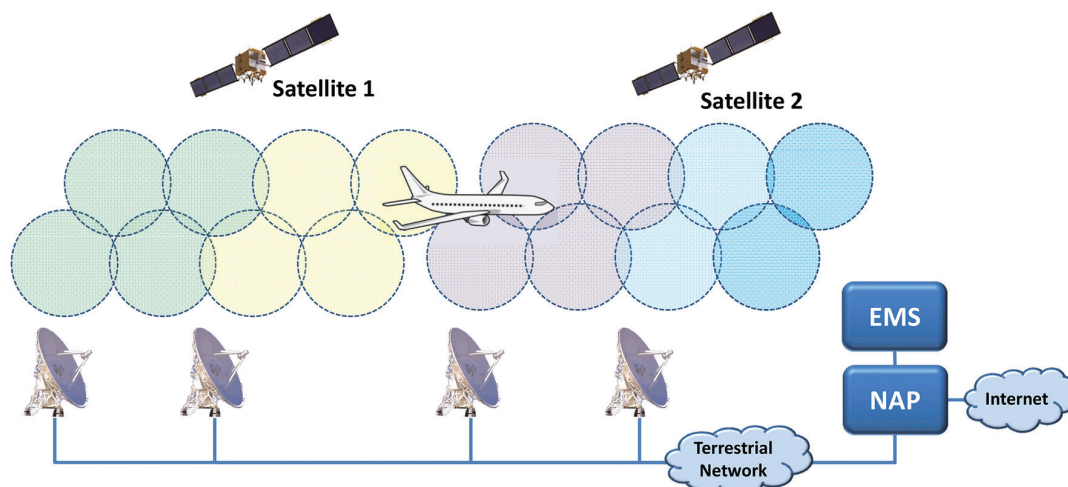


Figure 1 – JUPITER Aero Solution Architecture

## JUPITER Aero Terminal

The next-generation JUPITER Ka-band aeronautical terminal achieves high throughputs of 100 Mbps and supports large aircraft with many users and will be housed onboard in an ARINC 600-compatible MODem MANager (MODMAN) chassis. Its comprehensive capabilities include Doppler correction; dynamic power control with link adaptation; managing power spectral density through the application of dynamic spreading; and support for rapid beam, gateway, and satellite handovers while maintaining end-to-end TCP connectivity. In addition, it delivers a variety of advanced features, including onboard traffic management and Quality of Service (QoS), compression, and Web and TCP acceleration. Figure 2 illustrates the JUPITER aero terminal integrated on an aircraft.

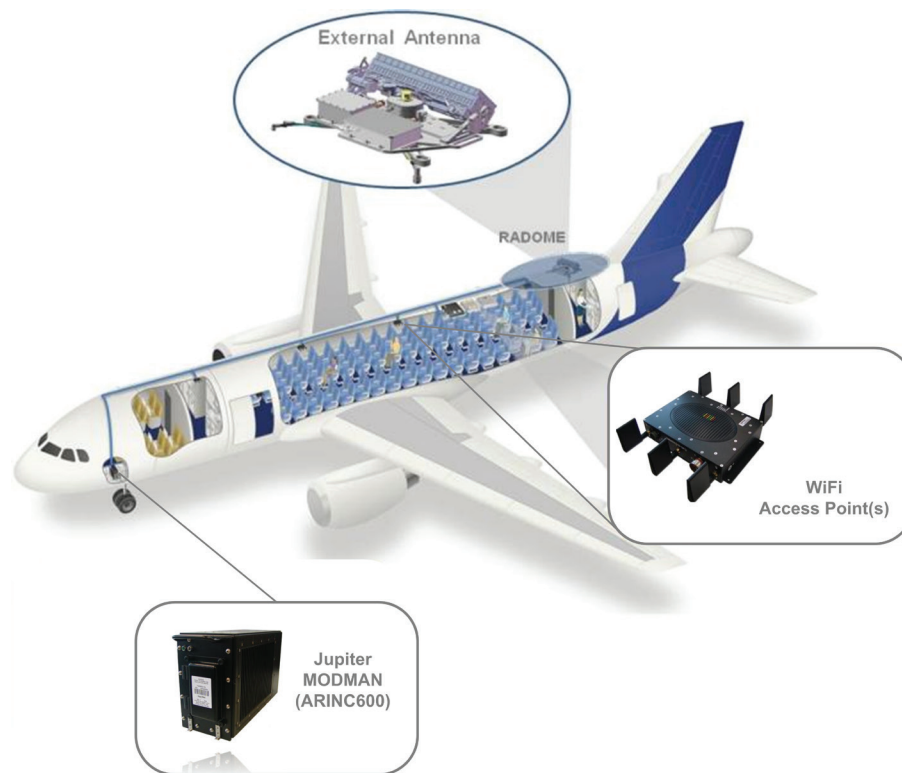


Figure 2 – JUPITER Aero Terminal Integrated on Aircraft

For more information about the JUPITER System, please visit  
[www.hughes.com](http://www.hughes.com) or email [globalsales@hughes.com](mailto:globalsales@hughes.com).

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