

## **Internet routing in space takes IP ubiquity to a whole new level**

*By John Mazur*

**Cisco recently announced the successful launch and operational tests of its IRIS IP router, which was included in the payload of a geosynchronous satellite – Intelsat 14 – for the US government. Cisco hopes to partner with satellite operators, governments and service providers to help expand IP connectivity coverage anywhere on or off the globe.**

### **A new milestone for 'Internet Protocol everywhere'**

Originally an enterprise local and wide area networking technology complementing Ethernet access, IP routing technology is spreading across the globe thanks to the success and popularity of the Internet. It was only a matter of time until its reach included space.

Satellite communications is by no means new – telephone, data and video traffic have been carried on communications satellites for decades, and service providers such as Iridium Satellite operate 66 active orbiting satellites to offer global voice and low-speed data coverage – but we're told as few as three geosynchronous satellites can cover the globe.

What is new is placing IP routers in space rather than standard radio relay systems for ground-based TDM switching. This promises to reduce round-trip delays and improve bandwidth utilization with IP's statistical multiplexing and multimedia traffic support.

Back on earth, the trend has been for service providers to converge various communications networks on IP technology to support multimedia while reducing costs. Up in space, IRIS' first customer is the US military, which expects IRIS to improve ship-to-shore communications. Cisco's far-reaching vision for IRIS is 'create the Internet in space and to overcome last mile limitations, providing global access to anytime, anyplace, on-demand global services'.

### **Traditional service providers need to watch for new 'alien' competition**

Historically, satellite hasn't been economical for mass-market, two-way terrestrial broadband communications due to limited satellite bandwidth availability and the high cost of launching and maintaining 'birds'. But high-value, geographically remote or nomadic applications can be practical – for example, airline travelers would benefit from in-flight video surveillance and laptop/smartphone Internet connectivity with modest product development efforts.

Now Cisco and others believe new two-way, IP-enabled broadband satellites utilizing Ka-band frequencies can be made economical even for stationary broadband Internet access. Some telcos could benefit by avoiding investment to wire unprofitable areas, reducing the pressure on those designated with a universal service obligation.

### **Spot beam based broadband satellites are already on the horizon**

While Ku-band broadcast satellites use a single downlink to provide satellite TV coverage to a large area on earth, Ka-band broadband satellites alternate usage of spot beams, configured similarly to cellular mobile networks, to improve bandwidth utilization for two-way services. A single geosynchronous satellite, positioned at 22,300 miles above the equator, would use 30-40 spot beam 'cells' to provide Internet access to the continental US. For example, in Europe, a partnership between Eutelsat and ViaSat offers Internet access via 'Tooway' to help bridge the digital divide. In North America, WildBlue offers satellite broadband Internet access.

### **IP statistical multiplexing promises further bandwidth boost**

Replacing current satellite-ground radio relay systems with IP promises to multiply the benefits of spot beams for improved bandwidth utilization, providing more bandwidth for significantly more users. Cisco's IRIS also supports the same software as terrestrial IP service platforms, including VoIP, security, policy and bandwidth management and mobility, making the satellite more like an orbiting telco central office. As spot beam technology improves, service cells can be further split, just as mobile operators have done to improve available bandwidth.

Governments have been searching for solutions to the broadband digital divide in areas underserved or unserved by traditional providers. Clients should watch this space as it could be an option for underserved areas, including broadband-poor emerging nations, as long as satellite-based broadband Internet service can be priced accordingly.

Meanwhile, direct broadcast satellite providers have been searching for a solution to telco and cable triple-play bundles. See ['The triple-play opportunity for satellite operators'](#). Ovum believes the stars are aligning for broadband satellite as technology and market forces offer new opportunities for broadband access.