Via Satellite's
Tech Focus
REPORT

Solving the Need for
SPEED

A perfect storm is approaching the satellite industry. Exploding demand for bandwidth is running in lock step with technology innovation. It's a time of significant business opportunity, and iDirect is ready to help its partners reach the next level. The company's re-engineered, next-generation platform capabilities are built to deliver breakthrough performance achievements. Service providers and network operators can build faster, high powered networks that will lead to new revenue gains, lower business costs and increased customer satisfaction. Get the story inside.

iDIRECT

Higher Demands, Higher Performance

The VSAT industry is surging. In nearly every market, end users are relying on satellite communications to do more – to run higher bandwidth applications, scale to thousands of locations and play a more integral role in their global operations.

Take the maritime industry. Vessel operators have outgrown basic voice and data connectivity.

They need to provide crew and passengers with higher speeds to access the Internet, view streaming video and stay in touch with family and friends. And they're eager to implement business

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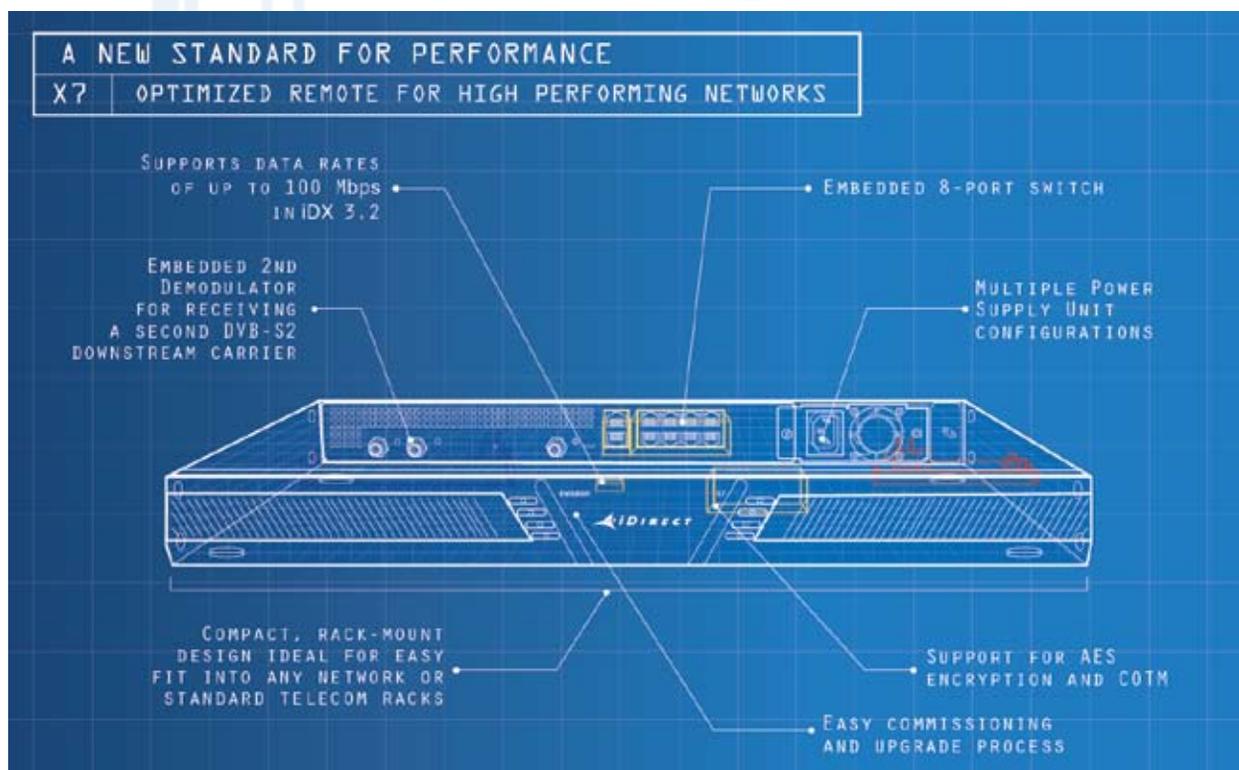
applications that dramatically increase information exchange between ship and shore.

Cellular backhaul is another fast growing market. But a whole new level of growth is coming as mobile data traffic is projected to increase 26-fold globally by 2015 from 2010 levels, according to Cisco, and small-cell mobile infrastructure makes network expansion into rural area significantly more affordable.

"Enterprises, organizations and consumers are devouring satellite bandwidth as quickly as service providers can deliver it," says Simon Bull, a

senior consultant with satellite industry research firm, COMSYS. "VSAT is a much more lucrative and viable industry than it has ever been before."

Next-Generation Ground Infrastructure

The demand for bandwidth will only increase as high throughput satellites (HTS) begin to populate the skies – adding at least 1.6 Tbps of capacity by 2020, according to Northern Sky Research, and enabling higher data rates at lower space segment costs.

To meet these escalating customer requirements, service providers and network operators require the right ground infrastructure platform – one built for much greater speed, reliability and scale.

Today, iDirect is set to begin rolling out its next-generation platform. Engineered from the ground up on a new architecture, the platform's hardware and software capabilities will help its partners reach new levels of network performance and increase their competitive advantage in a dynamic market.

High Performance Evolution X7

The first product out of the gate is the Evolution® X7 remote. Built on a new multi-core hardware system, the X7 is optimized to deliver best-in-class Adaptive TDMA performance and operate with high throughput satellites and all frequency bands.

The X7 can reach up to 100 Mbps of combined inbound and outbound throughput, with more than 20 Mbps on the return channel alone.

"With the development of the X7, iDirect has achieved data speeds on a TDMA platform that until now have only been possible on an SCPC dedicated link," says Dave Bettinger, iDirect's chief technology officer.

"This is another major step in our ambitious plan to help our partners meet mounting demands for satellite bandwidth, while capturing the market opportunities that high throughput satellites will bring."

The X7 features dual DVB-S2 demodulators with fully independent RF chains. This makes it uniquely suited for a range of enterprise voice and data services while simultaneously receiving 12 shared, high definition multicast channels over the same or a second transponder or satellite. And it can combine spot-beam HTS capacity and Ku- and C-band capacity in the most optimal way.

Service providers in the maritime, cruise, oil & gas, and mining markets can efficiently deliver

A NEW STANDARD FOR PERFORMANCE

X7 | OPTIMIZED REMOTE FOR HIGH PERFORMING NETWORKS

SUPPORTS DATA RATES OF UP TO 100 Mbps IN iDX 3.2

EMBEDDED 2ND DEMODULATOR FOR RECEIVING A SECOND DVB-S2 DOWNSTREAM CARRIER

EMBEDDED 8-PORT SWITCH

MULTIPLE POWER SUPPLY UNIT CONFIGURATIONS

COMPACT, RACK-MOUNT DESIGN IDEAL FOR EASY FIT INTO ANY NETWORK OR STANDARD TELECOM RACKS

SUPPORT FOR AES ENCRYPTION AND COTM

EASY COMMISSIONING AND UPGRADE PROCESS

basic voice and data traffic, while also managing bandwidth-heavy business applications and multicast services like IPTV. Cellular backhaul providers can meet the throughput requirements for demanding, large cell sites as mobile operators expand 3G and 4G networks in remote areas.

Another major X7 feature is an embedded 8-port switch, which provides unrivaled flexibility for physically segregating multiple end user traffic groups based on VLAN tags, when coupled with the iDirect Platform's best-in-class Group Quality of Service (GQoS) technology and Network Management System (NMS). Additionally, the X7 remote comes with multiple choices of embedded Power Supply Unit configurations to power higher wattage Block Up Converters.

Adaptive TDMA on the Return Channel

iDirect is also introducing a critical update to its operating software. iDX 3.2 will deliver several major efficiency enhancements across the iDirect Platform. The most significant of these is Adaptive TDMA, which enhances return channel performance and increases network availability under rain fade and spectral degradation.

An in-route group can support carriers with different symbol rates, MODCODs and spread factors, for spread spectrum in-route carriers, dynamically adjusting to changing uplink conditions based on each remote's demand and the system's QoS configuration.

With iDX 3.2, VSAT networks can be designed to provide more than 20 dB in fade margin without compromising clear weather throughput. A typical fixed VSAT system can achieve a 20-40% throughput gain. And a typical mobile network can gain about twice as much with improvements in handling rain fade and beam contours.

Adaptive TDMA also enables up to five times faster remote acquisitions than current software releases, which is especially important in mobility networks where beam switching occurs.

Waveform Enhancements

With iDX 3.2, iDirect has enhanced the frequency and phase tracking of waveforms on inbound channels. More efficient modulation and coding can net an up to 40% increase in data throughput. On the outbound channel, the minimum roll-off factor has been reduced from 20% to 5%. This allows for tighter spacing of DVB-S2 carriers and offers up to 13% in bandwidth savings.

"The X7 and iDX 3.2 deliver an exciting range of new features that change the game for our partners," says Greg Quiggle, vice president of product management at iDirect.

"Service providers and network operators can leverage their existing hub infrastructure to meet increased bandwidth demands, offer more reliable and efficient service levels, and grow a profitable, competitive business that is ready for every new challenge and opportunity." ∎

5 Ways to Gain

The significant performance and efficiency gains delivered by the Evolution X7 and iDX 3.2 give service providers greater versatility in how they support their business strategy and meet customer needs.

1. Maximize Throughput

Service providers gain up to an 80% increase in throughput for fixed VSAT, and even more for mobile networks. As a result, they can deliver higher data rates to end users eager to run bandwidth-intensive applications and critical operations over satellite.

2. Maximize Revenue

Service providers can also sell more bandwidth to customers using their existing satellite capacity, which creates new revenue streams. For example, service providers in the oil & gas market can serve an increasing number of end users who need access to satellite coverage – from maintenance crew on oil rigs to numerous service vessels and even onshore staff.

3. Maximize Savings

Adaptive TDMA and waveform optimizations combine to deliver an up to 80% improvement in bandwidth efficiency for fixed remotes, and even more for mobile remotes. Service providers can lower capacity costs while meeting

existing customer Service level Agreements (SLAs). And they can realize additional capex savings by deploying smaller terminals.
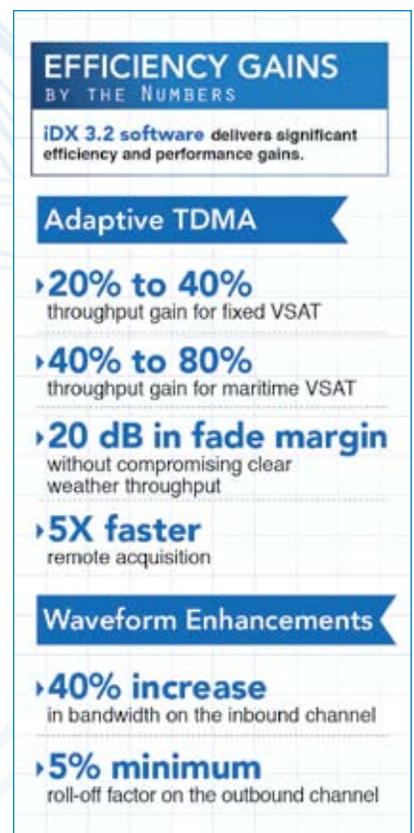
4. Maximize Network Availability

Service providers can choose to leverage performance gains to provide customers with higher levels of availability without designing the entire link budget around worst–case conditions. They can ensure greater protection against rain fade and adjust for spectrum degradation, especially for maritime and aviation applications. In addition, faster remote acquisition and dual image support mean less time out of network for customers in any market.

5. Enhance Service Differentiation

With throughput gains and enhanced availability, service providers will be able to fulfill SLAs with confidence. All existing iDirect GQoS features are fully supported with Adaptive TDMA, and hence all existing traffic prioritization is supported. Furthermore, service providers can configure how far a particular remote under fade will be allowed to influence the system adaptivity, allowing for another way to offer service tiers.

With the X7, service providers can support different user communities by securely segregating traffic with VLANs to specific

EFFICIENCY GAINS
BY THE NUMBERS

iDX 3.2 software delivers significant efficiency and performance gains.

Adaptive TDMA

▶ **20% to 40%**
throughput gain for fixed VSAT

▶ **40% to 80%**
throughput gain for maritime VSAT

▶ **20 dB in fade margin**
without compromising clear weather throughput

▶ **5X faster**
remote acquisition

Waveform Enhancements

▶ **40% increase**
in bandwidth on the inbound channel

▶ **5% minimum**
roll-off factor on the outbound channel

switch ports and customizing SLAs for each unique user group. They can offer faster two-way services through a single remote, simultaneously supporting core voice, data and video applications, while offering multicast services such as IPTV and remote training. ∎

Extending iDirect's Vision

As the satellite market heats up, iDirect is making significant investments in engineering to achieve new levels of innovation. CTO Dave Bettinger shares the company's vision for the next-generation design of its Intelligent Platform and reveals how it will help its partners prosper in the era of high throughput satellite opportunities.

What is the strategic vision for iDirect's next-generation platform?

High throughput satellites will intensify end user expectations for network performance, ease of use and affordability. So we are focused today on a major redesign of the core technology that powers our platform to handle higher data rates and scale much more broadly.

The Evolution X7 is one example. We've completely re-engineered our remote product to achieve major processing gains and operate over high throughput satellites. Above that, we are making iDirect terminals easier to install and quicker to deploy. Longer term, our vision is to create an even larger selection of terminals that are tightly customized to distinct market requirements.

On the operational side, we are advancing the capabilities of our hub system. We're designing new line cards so the platform can handle exponentially more bandwidth, reaching data rates in the tens of Gbs.

With these improvements in scale, satellite operators and service providers can leverage iDirect's hub infrastructure to deploy high bandwidth networks that exceed hundreds of megabits per remote site and that can support hundreds of thousands of terminals.

And as our platform grows in scale, we'll ensure it can deliver carrier-class service reliability – both in the field and at the hub. And we'll continue to invest heavily in the capabilities of our Network Management System, enabling our partners to reach new levels of network and business performance.

How is iDirect enabling its partners to offer HTS services?

High throughput satellites span a wide range of bands, beam sizes, earth orbits and technical designs. Increasingly, service providers will manage a blended service portfolio that combines multiple frequencies and integrates traditional and high throughput capacity. And they will need to accommodate diverse business models – from sharing network infrastructure with satellite operators to re-selling a managed service.

In this scenario, we see a clear advantage for our partners. With our universal hub-and-line card system, they can leverage their existing infrastructure to launch and scale HTS networks, accessing bandwidth from any type of satellite over any frequency. And they can add line cards to introduce new HTS services in a measured approach to growth. Further, the iDirect platform provides our partners with the flexibility to adapt to any business model present or future.

With the introduction of the X7, what is iDirect's broader plan to address the need for speed?

Reaching 100 Mbps on the X7 is a major achievement, but it is only the beginning. Our next-generation platform is built on an entirely new architecture. And as we continue to develop our software, we will see further performance advancements that will improve processing power on already manufactured and deployed remotes and line cards through over-the-air upgrades.

In future releases, the X7 will take greater advantage of the second demodulator and will support 32 APSK on the outbound and a 16-ary modulation on the inbound. These advancements, combined with new high performance line cards, will further increase packets-per-second processing to 39,000 PPS and throughput rates to more than 150 Mbps.

As data rates escalate, what's the long-term role of TDMA?

An SCPC network by definition is over-dimensioned to account for peak traffic and future traffic growth. Since most traffic profiles are bursty by nature, SCPC networks are inherently inefficient. By contrast, TDMA networks will always remain valuable, because no network operates consistently at peak traffic.

Traditionally, SCPC held an advantage over TDMA in that it could deliver higher throughput when you need it – and those moments have become increasingly common today. But TDMA technology has made tremendous strides to the point now where TDMA remotes can deliver data rates as good as SCPC, while retaining the efficiencies of dynamically sharing bandwidth across a large number of sites. Additionally, with iDirect's advanced NMS, operators and service providers have tremendous visibility into the performance of their networks for advanced customer service.

The satellite industry has seen increased market share for TDMA at the expense of SCPC. For example, COMSYS reports that in the maritime market SCPC systems dropped from 80% of implementations in 2003 to less than 33% today. Mobile operators are also shifting from legacy SCPC to TDMA backhaul networks at a 15% rate, according to NSR. We expect TDMA to continue to be the dominant platform in the coming years. ∎