

# Via Satellite

March 1998

The Leader in Global Satellite Coverage

## THE LATIN AMERICAN SATELLITE MARKET

- Data Broadcasting
- Retail VSATs
- LEOs and MEOs

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#### South Africa Update

Recent efforts by South Africa to overhaul its broadcast law and regulations may have profound implications for satellite broadcasting as well. Since the country is a major hub for services across Africa, these efforts might have implications for the entire continent.

—Gerald E. Oberst Jr.

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#### A Prophecy Fulfilled

By now, everyone knows that Latin America has evolved from an ignored entity into the next hot market. All the predictions for the Latin American satellite surge are finally coming to fruition with the numerous launches and new satellites being developed to serve the region. —Kathy McConnell-Kessler

### RETAIL VSATS .....28

#### Coming to a Store Near You

Retail VSAT applications are a very important component in world VSAT sales. Out of the world's 240,000 VSAT terminals, direct retailers make up the largest sector with 51,000 units. And by far the biggest number of retail VSAT users are in the United States.

—James Careless

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#### Applications of the Future Today

Recent headlines in the satellite industry have been filled with speculation on the promise of data broadcasting. But most of the spotlight has gone to the proposed systems seeking to operate in the Ka- and V-bands. The lesser-known success story in data broadcasting is that a variety of systems are already operating today, as many providers of paging, financial information and BTV networks can attest.

—Robustiano Fernandez

### LEOS AND MEOS .....46

#### Countdown to Launch

1998 will be a banner year for the mobile satellite industry. In this overview, *Via Satellite* looks at the latest developments taking place at some of the world's most prominent

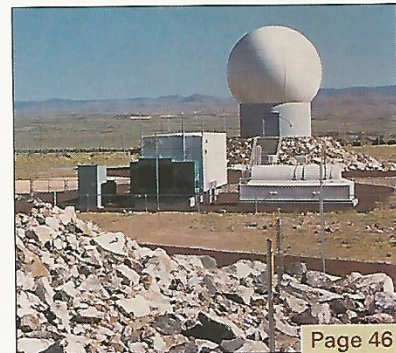
LEO and MEO programs. —Honey Berman



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**About the Cover:** This month, *Via Satellite* revisits the promising satellite markets of Latin America. Artwork courtesy of Intelsat.

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# LEOs *and* MEOs

by Honey Berman

1998 WILL BE A BANNER YEAR FOR THE MOBILE SATELLITE INDUSTRY. WITH ORBCOMM, IRIDIUM AND GLOBALSTAR LEADING THE WAY IN TERMS OF SATELLITES LAUNCHED, AN ARRAY OF NEW PRODUCTS AND SERVICES ARE COMING TO MARKET. THE INDUSTRY'S FOCUS NOW MOVES BEYOND THE DESIGN AND MANUFACTURING PHASE TO MARKETING AND DISTRIBUTION. IN THIS OVERVIEW, *VIA SATELLITE* LOOKS AT THE LATEST DEVELOPMENTS TAKING PLACE AT SOME OF THE WORLD'S MOST PROMINENT LEO AND MEO PROGRAMS FOR BOTH FIXED AND MOBILE APPLICATIONS.

Countdown  
to Launch

## ORBCOMM

Orbcomm Global L.P. (Orbcomm) is completing a three-month testing and deployment phase following its December launch of eight LEO satellites. With a total of 10 orbiting satellites, Orbcomm President and CEO Alan Parker calls Orbcomm, "The world's first commercial wireless data and messaging communications service giving industries 'just what they need to know' at any point on the globe."

As an MSS (mobile satellite system) provider, Orbcomm offers two-way data and messaging communications globally through international service licensees. In the United States, Orbcomm will be available through value added resellers (VARs), system integrators and direct sales to businesses. Current applications include intermittent monitoring of industrial assets such as pipelines, storage tanks and construction equipment, and tracking of mobile assets such as trailers, railway cars and shipping containers. These services will only be available in the United States at first, but will eventually be offered worldwide.

Orbcomm uses two types of subscriber communicators (SCs). One enables fixed, remote data communications while the other is designed for mobile, two-way data and messaging communications. For fixed data applications the small SC uses low-cost VHF electronics and a simple antenna design to provide installation flexibility. The low-power electronics allow for extended operations using batteries, a solar panel or available power. The SC for mobile two-way messaging is a handheld, standalone pocket-sized unit. It features an alphanumeric keyboard and a small display screen.

Messages and data can be sent to a remote SC from any computer using common e-mail systems. The Orbcomm Network Control Center or Gateway Control Center then transmits the information using Orbcomm's global telecommunications network.

Once testing is completed, the new satellites will increase Orbcomm's communications availability in the United States and in temperate latitudes to 12 hours per day. Eighteen more satellites will launch in the third quarter of 1998, bringing Orbcomm closer to its goal of providing affordable, portable, real-time communications

everywhere on the planet, via a 28 satellite constellation. Eight additional spacecraft are being built as ground spares. Top priorities are installing a custom designed customer care and billing system, and completing the gateways in key locations around the world.

Later this year Orbcomm will begin promoting a new handheld messaging device being built by Magellan and distributed by West Marine. Orbcomm will

be the service provider to the retail consumer market in the United States and Canada. Initially, after a one-time activation fee of \$49.95, \$29.95 will buy 10 messages a month of up to 500 characters, and 30 message checks. Additional messages cost a penny a character and 20 cents a message check. Parker believes the system will be used for both convenience and distress reporting situations, "or simply to give peace of mind to your

*"If I have seen further,  
it is because I have stood  
on the shoulders of giants."*  
~ Sir Isaac Newton

Seamless, worldwide connectivity is on the global horizon. Today's organizations are demanding immediate access to cutting-edge telecommunications technology. As the leader in the industry, we have the vision.

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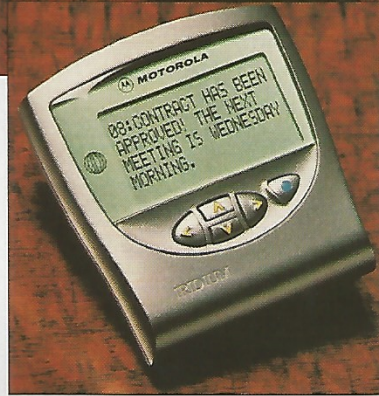
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Photos courtesy of Iridium.



**Iridium handsets such as these will soon be seen in the hands of global travellers when the service goes commercial, an event scheduled to occur on September 23, 1998.**

company or family that you have arrived or are going to be late."

Orbcomm currently has 12 international licensees. Parker says the market is just waking up to the advantages of two-way data and messaging over voice communication. "The big job remains to educate the public as to its benefits and to build solutions that offer great value to our customers," he says. "We are in the process of doing that."

#### IRIDIUM

Scheduled to begin service September 23, 1998, the Iridium system combines the convenience of terrestrial wireless systems with the global reach of a 66-satellite LEO constellation. Iridium will provide voice, data, fax and paging services to those individuals and businesses who need global communications capability and are willing to pay for the convenience of a hand-

held wireless phone or belt-worn pager.

Its prime contractor and investor, Motorola Inc., has been responsible for the design and manufacture of the satellite constellation as well as Iridium phones and pagers. The pager is designed to receive alphanumeric messages virtually anywhere in the world. Handheld phones manufactured by Motorola and Kyocera Corp. will be available in single mode for Iridium satellite service only and multi-mode for cellular and satellite service. The handset kit, including satellite phone, cellular phone, pager, extra batteries and charger, is expected to retail for \$3,000 and be available for commercial service in September.

Using their personalized number and Iridium phone, customers will be able to place and receive calls (or pages) virtually anywhere in the world. Twelve gateways will provide global service initially. These gateways will be owned, operated and financed by Iridium investors or their affiliates.

Pricing for voice services rates will reflect two components: a charge based on the landline "dial-up" rate for a comparable call, plus a 25 percent mobility premium (including roaming charges).

Iridium expects international calls to make up the majority of volume. The "dial up" rate will approximate rates for comparable landline point-to-point international long distance calls; the global mobility premium will be added on to that rate. Local service providers will establish the final retail price, which Iridium expects to be competitive with other global MSS systems for international wireless calls.

An aggressive marketing campaign is planned in the coming months. Iridium's gateway operators, service providers and roaming partners will all participate in promotional and advertising activities to brand the service. Roaming partner and service provider agreements have been negotiated with 100 distribution partners, and negotiations are underway with more than 500 additional service partners.

Iridium senior manager of corporate communications, Michelle Lyle, highlighted the past year's significant achievements. These included "46 satellites deployed in less than eight months; another \$2.4 billion raised through debt financing; nine of 11 gateways were constructed; and we successfully completed on-orbit testing of satellite crosslinks as well as voice and paging functionality." So far, the critical milestones necessary to begin commercial service in September have been met.

#### GLOBALSTAR

Close on Iridium's heels is Globalstar with its planned 48-satellite LEO constellation. Globalstar will provide low-cost, high-quality telephony and other digital telecommunications services such as data transmission, paging, fax and position location to areas currently underserved, or not served, by existing wireline and cellular telecommunications systems. Having secured commitments for \$2.6 billion, Globalstar is fully funded.

Service provider agreements have been signed in 106 countries with regulatory approval secured in 23. Satellite launches and gateway construction are all proceeding on schedule, with the Globalstar Control Center in San Jose, CA, undergoing final training/rehearsals to support the launch of its first four satellites in February, soon after we went to press.

Beyond international business travelers, Globalstar expects its customers to include commercial vehicle operators traveling nationally and internationally, commercial ships and pleasure boats, and general aviation aircraft. The Globalstar phone will be useful for geologists, field scientists and civil engineers as well as rural communications. Company spokesperson John Cunningham says, "The introduction of Globalstar's affordable fixed site telephone will rapidly advance telecommunications in the developing world and bring the progress necessary for effective internal and external development."

Globalstar's handheld, dual mode mobile phones will cost roughly \$750. Remote villages or business facilities can

**Hot on  
Iridium's heels  
is Globalstar.  
Having secured  
committments  
for \$2.6 bil-  
lion, Globalstar  
is now fully  
funded.**

purchase mobile or portable units expected to cost approximately \$750 each. Fixed units (e.g. public telephone booths, which are multi-line units) will range from \$1,000 to \$2,500, depending upon line size and the number of units sharing a fixed antenna.

Qualcomm is manufacturing a tri-mode handset that will switch automatically from terrestrial analog or digital cellular to the Globalstar satellite network. Dual mode handsets are being developed by Ericsson and Telital. Globalstar is final-

izing production contracts with manufacturers to ensure that consumer units are available prior to service introduction.

Local service providers will be responsible for marketing, selling and supporting Globalstar services within their territories. These local service providers will determine the best means of distribution and sales, which may involve retail outlets, catalog, online and direct sales. This

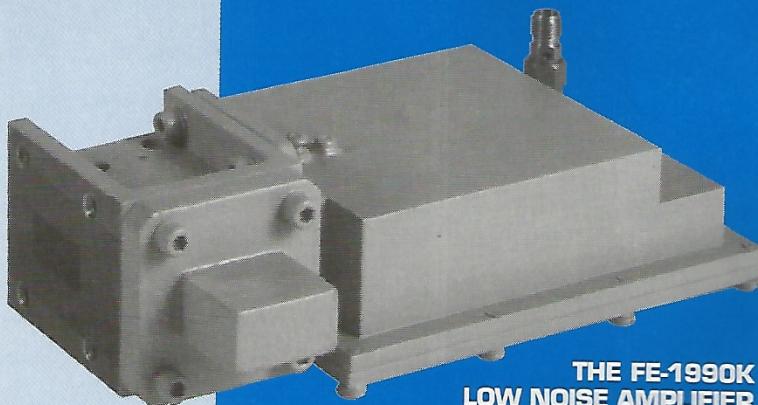
flexible approach allows service providers to tailor their message to local market conditions and consumer demands.

#### ICO

Digital voice, data, fax and a variety of messaging services are planned for ICO Global Communications' MEO satellite mobile communications service. Set to debut in 2000, ICO recently received a boost from TRW. Instead of launching its own MEO service (Odyssey),

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TRW became one of ICO's largest investors, nearing the top of the list of more than 55 international strategic partners.

ICO believes its potential customers fall into four categories: existing cellular users who want service in areas covered by incompatible cellular systems; users in areas with no terrestrial coverage; specialty sectors, such as aeronautical, maritime and long-distance land transport operators; and people living in rural and remote areas lacking adequate telecommunications infrastructure.

The basic terminal will be handheld and similar in size, weight and design to current

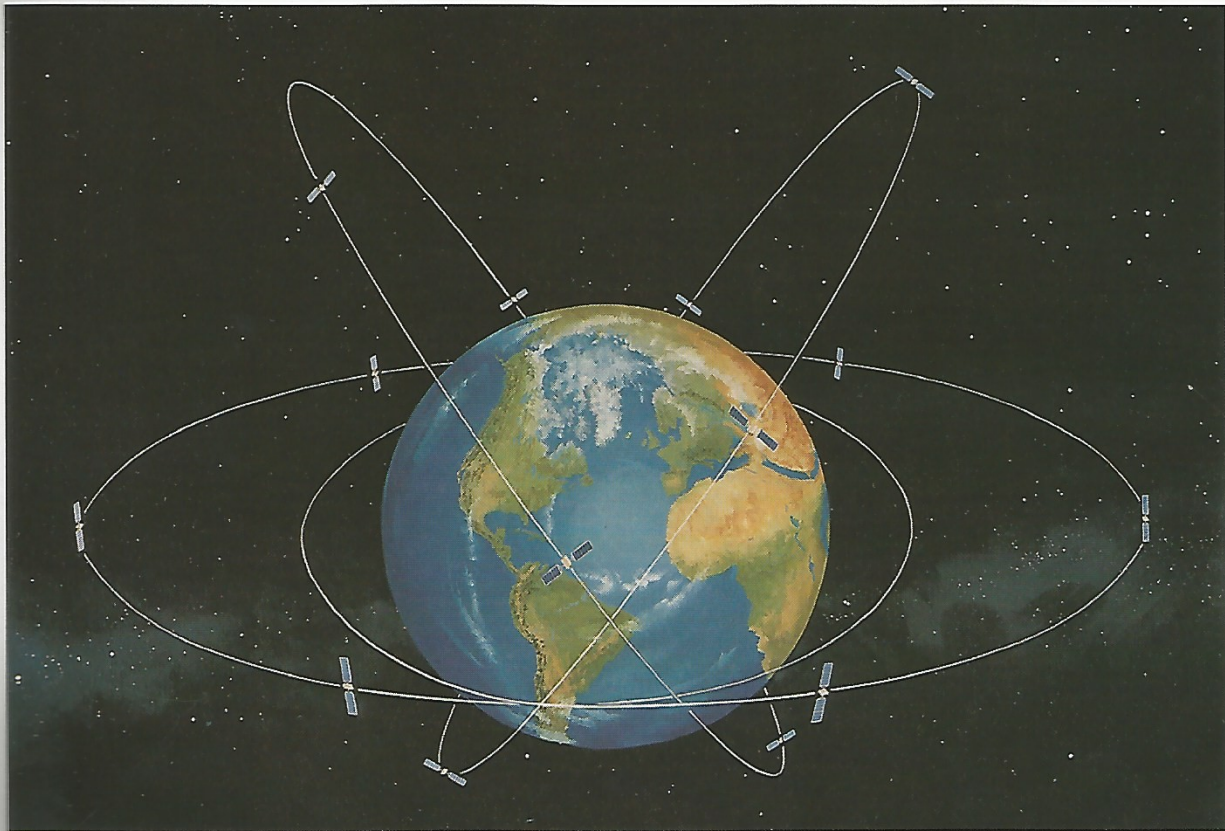
tions manufacturers NEC, Samsung and Mitsubishi are developing the terminals.

ICO is planning a distribution chain of national wholesalers (service partners) and retailers. The latter will include cellular and PCS operators, VARs, application developers and system integrators. ICO will market itself regionally through a combination of public relations, marketing and advertising support. Distributors and retailers will manage local promotional activities.

Thus far, ICO has raised over \$2 billion in equity contributions. Investors such as British Telecom selected ICO because of its flexible

and equatorial elliptical orbits. Its unique, patented orbital design allows Ellipso to maximize coverage of high population areas with fewer satellites.

Once the Ellipso network begins service in 2000, users will choose from handheld, vehicle mounted and fixed site terminals. The terminals are being developed by L-3 Communications. Ellipso's handheld units will resemble current cellular handsets in size, weight, radiated power and battery life. Dual mode for cellular and satellite operation is planned. Mobile phone mounts will be available for both land vehicles and boats. The fixed termi-



Artwork courtesy of MCHI.

Ellipso's unique, patented orbital design allows the system to maximize coverage of high population areas with fewer satellites.

pocket-sized cellular units. Phones will be dual mode, capable of working with satellite, cellular and PCS systems based on GSM as well as U.S., Japanese and other cellular standards such as CDMA, D-AMPS and PDC. Terminal types are expected to include dedicated data, car, commercial vehicle, maritime, aeronautical, semi-fixed and supervisory control and data acquisition (SCADA) units. Consumer units are currently in the design stage. They are scheduled for service rollout in the year 2000. Leading mobile communica-

commercial model, commitment to serving early and future data markets, and mass market strategy. ICO's international investors are already laying the groundwork for its successful launch in their local markets.

#### ELLIPSO

Mobile Communications Holdings Inc.'s (MCHI) FCC-licensed big LEO, Ellipso, will provide worldwide mobile voice, fax and positioning data communications via a constellation of 17 satellites in innovative inclined

nals will use a narrow beam antenna design while the handheld and mobile units will feature omni-directional antennas.

Production is scheduled to begin this spring, with multiple manufacturers to be announced shortly. Units will be sold through VARs and retail outlets. Prices for the Ellipso dual mode handsets are expected to be about \$740, with fixed terminals starting at \$1,000, depending on the application.

Consumers who need basic telephony will purchase an Ellipso terminal from an autho-

rized retailer/installer and Ellipso service from the local service provider. Service providers will buy airtime from MCHI directly or a regional service provider. One stop shopping for telephone equipment and enhanced services such as fax or data will be available through the local Ellipso VAR. VARs will buy airtime from the local service provider for their Ellipso customers.

"We are committed to providing the best service at the lowest possible cost to the user, so that anyone, in developing countries or in highly developed countries, will find it practical to make use of Ellipso services to conduct business and stay in touch with family and

**The ECCO system seeks to focus on the delivery of low-cost basic telephony and related services to underserved rural and remote regions.**

friends," says Joseph Tedino, MCHI's director of corporate communications. Promotional campaigns will be coordinated with Ellipso's regional and local service providers, VARs, user terminal manufacturers, and retailers to maximize consumer awareness.

MCHI has applied for another FCC license to launch Ellipso 2G. This second constellation of 26 non-geostationary satellites, in the recently opened 2 GHz spectrum, would expand its MSS capacity. Subject to FCC approval, Ellipso 2G could be operational as early as 2003. Orbital Sciences Corp., Lockheed Martin Management and Data Sys-

tems, Harris Corp., Israeli Aircraft Industries and Spectrum Astro are lending expertise to the Ellipso project.

#### **ECCO**

Constellation Communications Inc. (CCI) is developing a big LEO global satellite system. But first, it will launch ECCO Equatorial, a 12-satellite constellation providing communications service to the world's equatorial

regions—targeting populations with the greatest demand for basic telephony service.

Deployment of the ECCO Equatorial system requires an infrastructure investment of approximately \$860 million. According to Bruce Kraselsky, CCI's senior vice president, one satellite ring covering the equatorial regions of Asia, Africa, and Central and South America can reach 25 to 30 percent of the world's population. This strategy will

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allow CCI to begin service quickly, providing a revenue stream while its global system is being completed.

CCI will offer both fixed site and mobile telephony. Dual mode mobile handsets will be a little bigger than cellular phones. Retail prices will run approximately \$900 for mobile terminals, \$700 for fixed site terminals, and \$2,000 for solar powered public terminals. Terminal manufacturers are expected to be announced later this year.

Per minute mobile phone charges (air-time) are projected at \$1.00 for peak times, \$.50 for off peak, plus interconnect charges for connection to the global public

Dr. C.J. Waylan, CCI's president, says, "By focusing on the delivery of low-cost basic telephony and related services to unserved rural and remote regions, CCI is positioned to emerge as a successful participant in the global LEO satellite marketplace."

### SKYBRIDGE

Alcatel Telecom, a strategic partner and supplier for Globalstar, is also the general partner in Skybridge L.P. Its Skybridge system, budgeted at \$3.5 billion, premieres in 2001 with the deployment of 32 satellites covering temperate latitudes. The planned 64 satellite LEO constellation will provide global access to a wide

Skybridge's marketing strategy is three tiered: Skybridge L.P. will lease local operators the orbital capacity above their territories. Gateway operators will own the gateways, providing capacity to local service providers. Service providers will be responsible for user management and marketing of the services. These three levels will work together to set up the local Skybridge distribution networks. Services will be marketed through local telecom operators and service providers, who will reach the end users. The local operators will be involved in all distribution and marketing decisions.

Both residential and professional terminals are currently in development. The satellite dishes will range from 40 to 50 cm in diameter for homes and up to 80 cm for business users. Sharp will be very much involved in the design and manufacturing of Skybridge terminals. Various antenna technologies are under study for the user terminals. Residential customer hardware costs are projected at \$700, with an average estimate of \$30 to \$40 per month in subscription fees as defined by local service providers. Product rollout is scheduled for the beginning of 2001.

Nicolas Brun, Skybridge's communication director, says the company is projecting 15 to 20 million users for its multimedia services, a 20 percent market share. He cites several advantages over rival projects including: economies of scale due to worldwide coverage and huge capacity; simple architecture which does not require links between satellites; and traffic routing functions that are managed by the gateways (local connection stations), significantly reducing implementation costs. Skybridge can also adapt its services to local demand, and provide a high degree of local content.

Despite the emergence of cable modems and xDSL (digital subscriber lines), Skybridge is confident that satellites will remain the most cost-effective solution for bringing high-speed data to medium and low population density areas.

### TELEDESIC

Envisioned as a global, broadband "Internet-in-the-Sky," Teledesic has received FCC approval to provide advanced, two-way telecommunications services via a 288-satellite LEO constellation. The Teledesic Network will use 500 MHz of domestic radio frequency in the 28 GHz band—the uplink portion of the Ka-band—and a corresponding 500 MHz of downlink spectrum.



These 30-foot-tall Orbcomm gateway earth station antennas, located in the Arizona desert, provide communications links between the passing Orbcomm satellites and the network control center in Dulles, VA.

switched network. Per minute rates from fixed terminals are \$.65 peak, \$.35 off peak, plus interconnect charges. The local service providers will provide appropriate subscriber equipment and continuing service to those customers in the service provider's area.

Plantations, logging and mining operations, and transportation services are all potential target markets. According to CCI, low-income residential markets will be served by cost-efficient subscriber solutions such as village-based kiosks.

Once ECCO Equatorial deploys in 2001, CCI will launch an additional 42 satellites in seven planes, completing its global coverage.

range of multimedia services, by extending the reach of terrestrial broadband networks.

In addition to high-speed access to Internet and online services, Skybridge will offer employees remote access to company servers and local area networks (LANs), electronic mail and file transfers, videoconferencing and videophones. Targeting both business and residential customers, other planned services include tele-shopping, tele-banking, distance learning and training, telemedicine, remote control and maintenance, and interactive video games. Skybridge will also provide enhanced narrowband services such as voice, low data rate videoconferencing and data transmission.

In addition to broadband Internet access, Teledesic plans to provide capacity for telecommunications services such as videoconferencing and high-quality voice and digital data delivery to businesses around the world.

Chairman Craig McCaw is counting on business sector demand for broadband (high-capacity, high-speed) network connections to drive revenues. Beginning in 2002, the Teledesic network will enable businesses to connect branch offices throughout the world to existing global networks and allow workers to telecommute from anywhere.

To fund the \$9 billion venture, McCaw has enlisted Microsoft's Bill Gates and aerospace giant The Boeing Company. Boeing will also lead the international industrial team in charge of manufacturing and launching the satellite constellation.

Meanwhile, Teledesic is forging alliances with service provider partners in host countries worldwide. These service providers will utilize the Teledesic network to expand their networks, both in geographic scope and the types of services they can offer subscribers. The network is marketed "as a seamless extension of the existing fiber-based terrestrial infrastructure, providing bandwidth on demand."

The local service providers will set the end-user rates, which Teledesic expects to be comparable to broadband access rates for future urban wireline services. Marketing to end users will also be handled by the service providers. As company spokesperson Roger Nyhus explains, "They know their markets better than we do. It would be difficult for us sitting here in Seattle to know how to market a broadband service in Indonesia."

Standard user terminals, the size of a laptop computer, will be mounted flat on a roof or office building. Data retrieval will be 2,000 times faster than a 28.8 kbps modem. Announcements of terminal manufacturers are expected later this year. Now that Teledesic has completed the detailed technical design of the network, it is beginning the early development phase.

## CELESTRI

Motorola's Celestri is a planned hybrid system of nine GSO (geosynchronous station orbit) satellites plus a 63-satellite LEO constellation, able to deliver information virtually anywhere on the planet. Its GSO system's switching will enable flexible multipoint to multipoint appli-

cations, such as national and local TV programming, while its LEO system will support multimedia and interactive applications such as desktop videoconferencing. Products fall into three main categories: constant rate services, variable rate services and demand access/multiple access (DAMA) services.

Promising easy, affordable access to a virtually global broadband infrastructure, Celestri executives believe large and small businesses will embrace the technology to expand their reach into new markets. For residential customers there will be myriad entertainment and educational/informational choices.

Celestri gateways are planned for carrier customers while multinational corporations will use transport terminals and information servers to connect their data centers. The four Celestri terminal types are designed for residential, small business, multinational corporation and telecom users.

equipment status and security. This system will allow regulatory agencies to monitor and control access to transmissions into and out of a country's borders.

Motorola's total system approach to the broadband market promises flexibility. And prices are expected to be competitive, since customers will pay only for the bandwidth they use instead of having to buy a T1 line. Celestri is also counting on the goodwill of consumers who know and trust the Motorola name.

## THE FUTURE

Leslie Taylor, the respected telecommunications consultant/attorney, believes, "The regulatory and service challenges of delivering MSS to millions of customers are of such magnitude that the technical risks in building and launching multiple satellite constellations will appear minimal by comparison." Adding to the daunting task, service delivery will be car-

# The technical risks of MSS systems pale in comparison to the regulatory and service challenges.

For homes and small businesses, Celestri terminal products will be "user-friendly and easy to connect to PCs, telephones and televisions," says company spokesperson Robert Edwards. He sees their fast installation as a major advantage. Rather than waiting the days, weeks or months it takes to have fiber-optic cable, basic cable or even new telephone lines brought into a home, the Celestri system could be operational within hours, according to Motorola.

Motorola believes its experience constructing gateways around the world for Iridium is significant. Edwards says, "The ground segment is equally as important to the satellite endeavor as the satellites themselves. You have to have something to download the information and send it back up to the satellite. We've done a lot of work in this area; it's an advantage over our competitors."

While Motorola will design the terminals, it will not be the sole manufacturer. Its terminals will use software to establish network connections, billing service and user identification, as well as continuously monitoring

carried out by various entities not under the control of the satellite owners.

As the mobile and broadband satellite constellation operators grapple with the process of developing and maintaining complex business relationships with local service providers and gateway operators, they are well aware that billions of dollars are at stake. Taylor predicts that while the race for market share will be hotly contested, the growing demand for global telecommunications assures participants who successfully manage the technical, regulatory and business aspects their pot of gold.

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