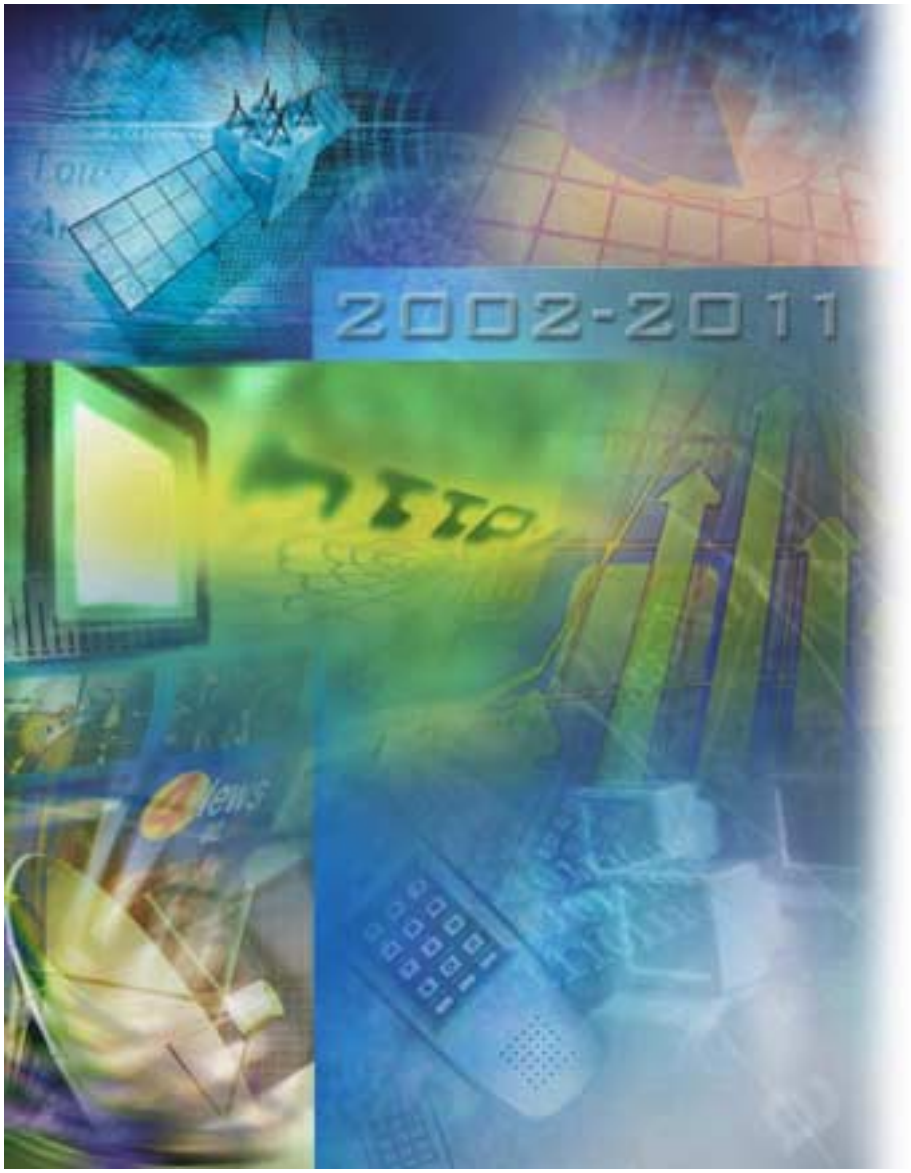
Satellites Steer Into the Future: Course is Strong, If Not Steady

August 12, 2002



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Preface

"He who does not look ahead remains behind."
Spanish proverb

In these complex times for the satellite industry and the businesses around it, Futron has developed an updated forecast model of the worldwide demand for satellite services. This, our seventh annual forecast, incorporates several enhancements and more sophisticated methodologies, producing an in-depth global analysis, which is summarized in this White Paper.

Futron has developed its forecasting capability because of the unique nature of the commercial satellite industry. There is probably no more difficult task in business than trying to anticipate what customers will want. However, the satellite industry has several added layers of complexity:

- Customer needs have to be anticipated years in advance because of the long lead-time associated with manufacturing and launching a satellite.
- Markets can develop and disappear within that timeframe (e.g., the content delivery network market).
- The regulatory environment, to which the satellite industry is inexorably tied, can change dramatically with new licensing procedures, reversals in policies, and changing political realities.
- Almost every aspect of the commercial satellite industry requires large outlays of capital. Thus, the financial impact on a satellite-related organization of not accurately anticipating market demand can be devastating.

Given this complexity, satellite operators, satellite manufacturers, launch service providers, and ground equipment manufacturers may be tempted to just throw their hands up and guess at what the market will demand in the future. This approach is a prescription for missed opportunities, wasted resources, and, potentially, bankruptcies – things that have been all too common in the satellite industry recently.

Comprehensive, rigorous market analysis can significantly reduce the risk inherent in the commercial satellite business. This is the reason Futron has invested so much time and energy developing its forecasting capability. There are several aspects to this capability that should be noted:

- Futron's forecast model is internally funded – it is completely independent of all current or proposed satellite systems or organizations.
- It is based on the demand for satellite services – this is a more rigorous and comprehensive approach than a supply-based forecast for a ten-year period.
- It is a global forecast, evaluating over 200 countries and territories individually. It also uniquely forecasts sixteen different satellite markets.
- It is a *capability*, not a product. Futron does not sell its forecast. Rather, we develop the forecast model so that we have the capability and understanding to perform business-related consulting projects for our customers. While top-level, generic forecasts can be useful in some situations, we at Futron like to solve our customers hardest problems, which are not as effectively addressed by an off-the-shelf report.

After reading this White Paper, if you or your organization require further definition or understanding of any satellite market, please contact Eileen McGowan at 301-347-3431 or emcgowan@futron.com.

Executive Summary

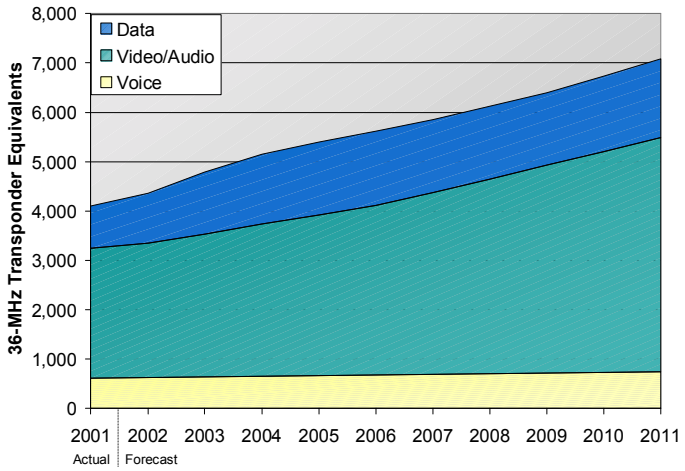
Dot-com bombs, telecom meltdowns, mobile satellite bankruptcies, fiber everywhere. These and other issues have raised alarms about the future of the satellite business. And while that future is not likely to follow a straightforward path, opportunities do exist for those willing to navigate a flexible course.

Futron Corporation's latest ten-year forecast of the demand for satellite services shows that the business, while somewhat volatile, has a solid base and strong growth potential still ahead. Satellites will continue to be required to meet key telecommunications service needs. These needs are not spread uniformly in either time or geography, and each individual market demonstrates distinct patterns of demand. Key findings of the forecast show that in both the short and longer term, there are opportunities as well as issues to be faced.

- The number of on-orbit geostationary commercial satellites grows by some 30% from 2001 to 2011.

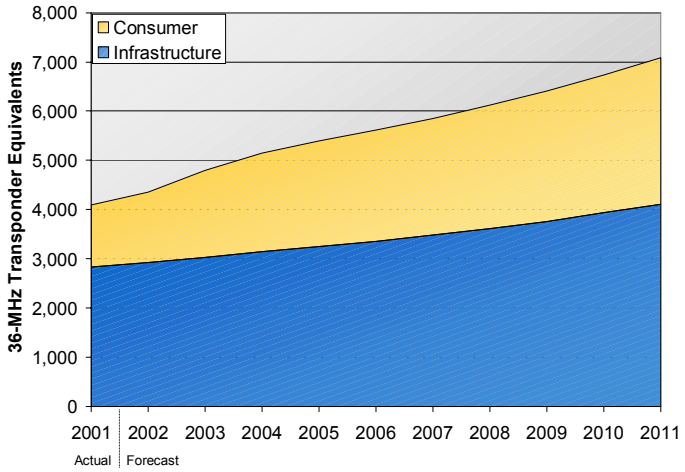
- Demand for satellite services grows much more quickly than the number of satellites as a result of data compression, increasing number of transponders per satellite, and longer satellite life. Thus, in 36-MHz transponder equivalents, underlying demand grows by more than 75% (see Figure 1).

Figure 1: Global Demand for Satellite Services



- The largest demand growth will come in consumer services, such as last-mile broadband and DTH, expanding at a much faster pace than infrastructure services such as trunk telephony or ISP-to-backbone services (see Figure 2).

Figure 2: Demand for Consumer vs. Infrastructure Services



- Success for satellite services will require careful timing to catch windows of opportunity as they appear in different regions. This is particularly true for the large, fast-growing, and extremely price-sensitive consumer services markets. As shown in the summaries for Asia and Europe in Figures 3 and 4, demand must be evaluated separately within each region and market if the patterns are to be understood effectively.

Figure 3: Summary of Demand - Asia Region

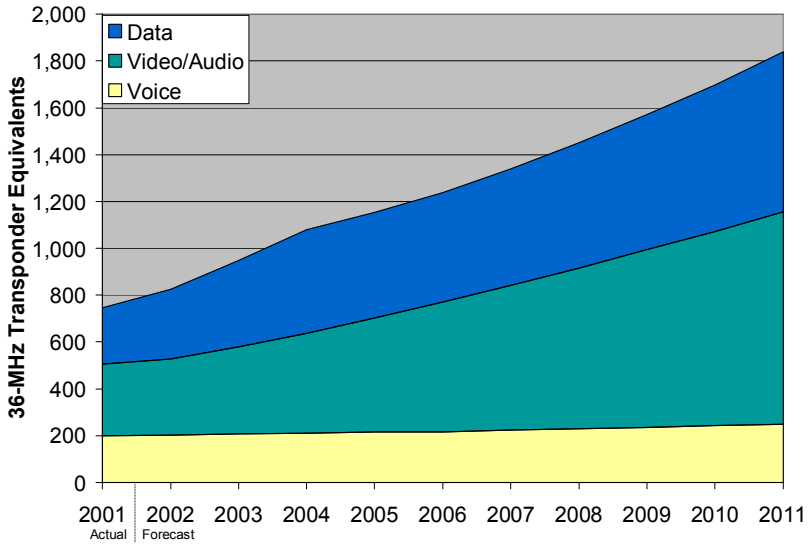
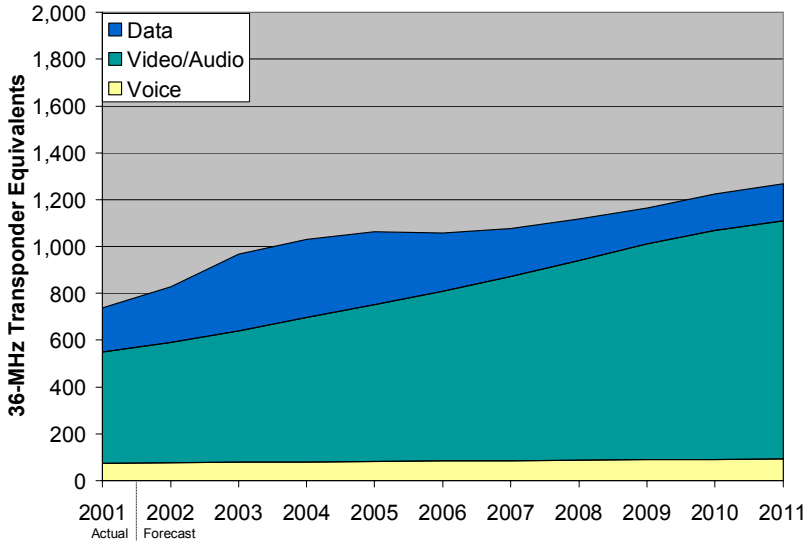


Figure 4: Summary of Demand - Europe Region

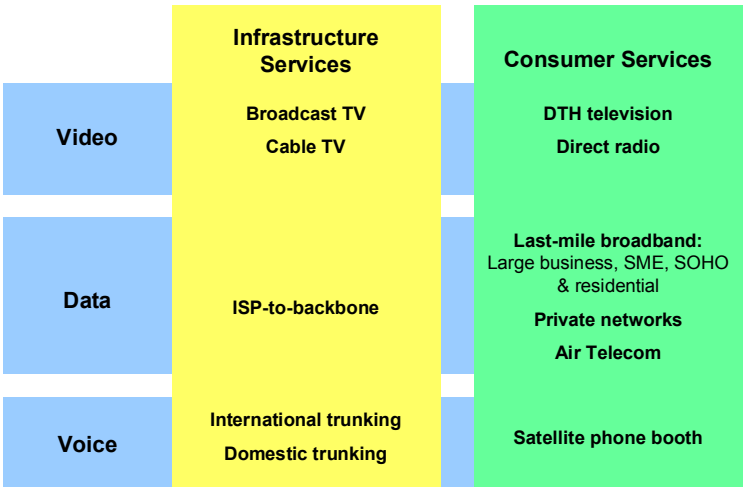


Futron's Forecasting Methodology

Every year since 1996 the Futron Corporation has undertaken a detailed review of the future demand for geostationary commercial satellites. From these detailed assessments we have historically been successful in predicting the numbers and types of future satellites.

This year, as in the past, we have analyzed over a dozen separate markets, evaluating the ten-year trends in user demand for each market in over 200 countries. Futron has refined its classifications of satellite services as the telecommunications and media industries have evolved (see Figure 5).

Figure 5: Futron's Satellite Service Classifications



Futron's analytically rigorous forecasting methodology is summarized below.

- Identify fundamental drivers of demand for telecom and broadcast services
  - Historical trends
  - Emerging applications
- Apply constraints on satellite demand looking at key environmental factors
  - Terrestrial competition – build-out, uptake, and pricing
  - Regulatory environment
  - Price and affordability
  - Customer equipment distribution and uptake
- Translate into demand for transponders reflecting satellite industry trends
  - Technology (e.g., data compression, frequency reuse)
  - Communications payload profiles
- Normalize for current usage of commercial geostationary satellites
  - Analysis transponder-level usage via Futron's Supply Database

Some of the key drivers for the Video, Data, and Voice markets are discussed in the following sections.

Video Dominates

The figures above demonstrate the clear dominance of video services over the next ten years. While demand for the various video services grows at differing levels in each region, its sheer size makes it key for all sectors of the satellite industry. Broadcast and Cable markets continue to serve as the bread and butter of the satellite industry, offering prospects for steady long-term growth. However, it is the consumer side – primarily DTH – that provides the most dynamic market.

Highlights of Futron's video services forecast include:

- Eastern Europe and the nations of the former Soviet Union lead in growth of broadcast channels, posting an average annual growth of 15 percent.

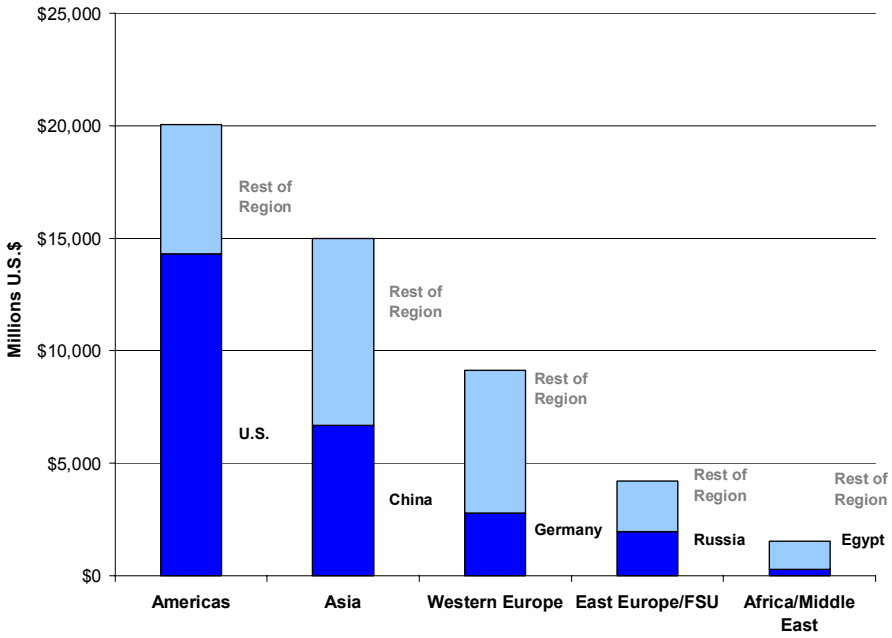
- Asia just beats out Eastern Europe for leadership in cable channel growth, with an anticipated 13 percent average annual gain forecast through 2011. Advances in digitization and compression keep transponder growth below the growth in channels for both the broadcast and cable markets, however.

- Modest successes in high-definition and interactive television applications in the Western economies and Japan help keep broadcast and cable transponder requirements steady in North America and Japan, and in healthy growth figures of about 5 percent annually in Western Europe.

- High growth in DTH television applications, including aggressive growth in the developing economies of Asia and Eastern Europe and the former Soviet Union, lead to a global forecast of DTH transponders that grows at an average annual rate of 10 percent. However, higher revenues per subscriber allow the Americas to retain its position as the leading market for DTH revenues.

Figure 6 depicts Futron's forecast of DTH revenue growth in terms of the absolute gain in DTH service revenues between 2001-2011 by region, with a breakout of each region's leader. While the Americas have a smaller gain in total transponders than Asia, it has the highest gain in overall DTH revenues over the period, due to the timing of service uptake, as well as variations in service pricing.

Figure 6: Total Projected New Revenue to DTH Service Providers per Region, 2001-2011



Data Delivers – But for How Long?

More than the Video and Voice markets, the data markets have faced the greatest volatility as a result of recent tumult in the telecommunications and Internet services businesses. After analysis of the nature of these changes, Futron has slightly modified the Data forecast to reflect greater segmentation between Large Enterprise last-mile applications and Private Business Networks, often generically called VSAT services.

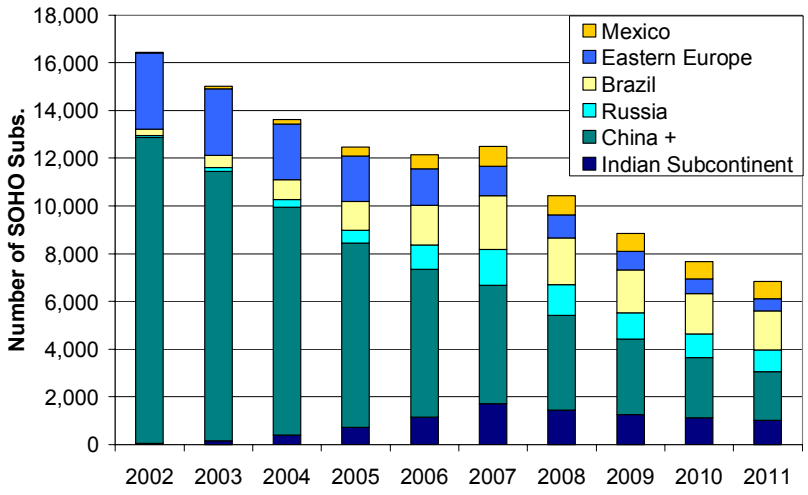
The key message for all of these markets, varying somewhat by time and geography, is that there is a window of opportunity, in particular for the business segments, which begins to close after 2004-2005. This window of opportunity closes first in the developed world with its increasingly rapid terrestrial broadband penetration.

The later-years decline in demand for satellite capacity is expedited by the phased introduction of Ka-Band capacity on a region-specific basis, which reduces the number of transponders and satellites required to serve a still-increasing bandwidth demand.

Last Mile Broadband Access – Consumers are King, but Subject to Change

Each of the last-mile broadband segments exhibits a different pattern of demand, and these are all highly sensitive to change over time. As Figure 7 shows, just within the SOHO sector (Small Office Home Office – up to 10 users per site) demand rises and falls at different rates in individual emerging markets.

Figure 7: Total Projected SOHO Satellite Broadband Subscribers for Selected Emerging Markets



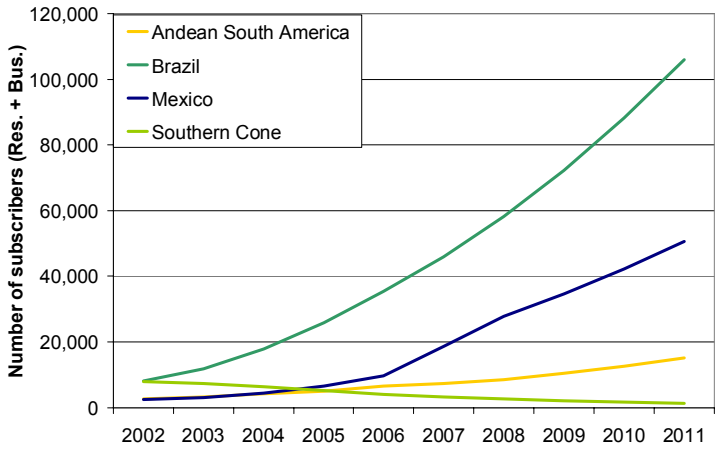
Despite these variations, the key drivers and sensitivities for all the last mile access segments are basically the same:

- Exponential growth in content availability and user bandwidth needs – the average user's bandwidth requirements grow ten-fold from 2001-2011.

- Price competitiveness of satellite delivery, including user equipment.

The impact of these factors varies greatly by country, as different economic, regulatory, political, and technology drivers interact with consumer desires. Even within a single region, such as Latin America, the subscribers for satellite-delivered broadband do not always grow evenly (see Figure 8).

Figure 8: Total Satellite Broadband Subscriber Projections for Latin America Sub-Regions



Private Corporate Networks: VSAT = Very Strong Attractive Target

Traditionally referred to as the VSAT market, the Private Corporate Networks sector encompasses a range of closed data communication networks for businesses with multiple locations. This is a stable market with sustained growth. It is not as glamorous as newer applications. However, it is a strong business, which accounts for the majority of current and future Data services demand due to bandwidth-intense applications surpassing the more traditional narrowband requirements.

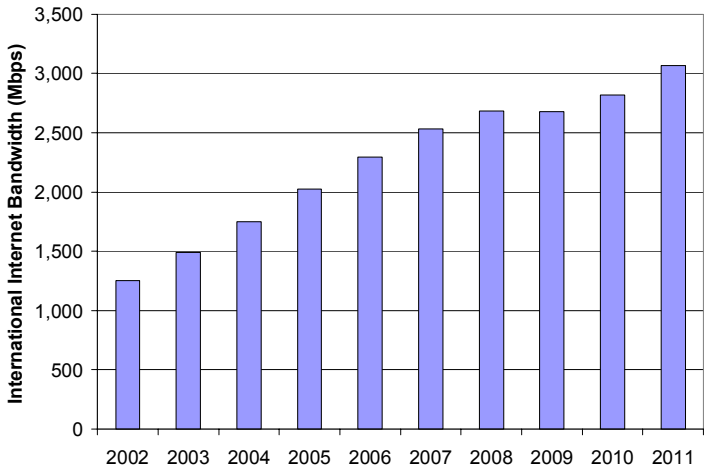
While North America is the largest market, and continues to grow, the growth rate is fairly low. Asia exhibits the highest growth rates – in terms of both total number of terminals sold and transponders required.

ISP-to-Backbone: The Ultimate Infrastructure Service

The direct connection to the fiber backbone for national operators serving ISPs and ISPs serving individual users has been a surprising growth area for satellites, and we forecast that growth to continue for the next 4-5 years, despite the large quantities of fiber that have been deployed around the world.

In the longer-term, however, demand will fall back to current levels. Some markets, such as Africa/Middle East, do appear likely to sustain the higher levels of use, as the pace of bandwidth demand and the timing of fiber extensions are not always exactly matched (see Figure 9).

Figure 9: Projected ISP to International Internet Backbone Connectivity, Middle East and Africa



Voice – Not a Satellite's Best Friend

This market includes domestic and international trunking as well as satellite mainlines and satellite phone booths. Since the forecast data reported in this white paper is limited to geostationary satellites, it does not include demand for non-geostationary (e.g., LEO) systems such as Iridium and Globalstar.

The trunking markets have for years been turning away from satellite to fiber-optic cables, especially on the large, transoceanic routes. Nevertheless, telephone trunking experiences modest growth as total telecommunications traffic worldwide increases, including traffic with/among less developed markets.

- Growth in and size of end-user satellite telephone services markets will depend on ability of satellite companies to build out their services to the most rural of the rural markets.

- Price is a major factor in the ability of end-user satellite services to penetrate these markets, and the LEO experiences to date suggest price may be a showstopper.

What Will Happen With All This Demand?

Perhaps the greatest challenge for satellite operators is how to use the capacity they now have in orbit and are still launching at a rapid rate. Twelve commercial geostationary communications satellites were placed in orbit in the first half of 2002, introducing more than 629 transponder equivalents. At least ten more such satellites are slated to launch this year. Many of these are among the biggest and most complex spacecraft ever launched, including the Intelsat 9s, NSS-8, and the first of the Inmarsat 4s. The challenge for satellite operators is to put these satellites to work in the near term to meet demand in those markets and countries where demand is most time-sensitive, and reshape their fleets to ensure they can be retooled or redeployed in different roles as demand changes.

The message from Futron's forecast is that the demand will be there, it just won't stay in the same markets, and strong business skills will be needed to follow its course. Thus, the challenge is not just for satellite operators, but also for satellite manufacturers and launch companies to offer opportunistic platforms that allow operators to capture the demand from emerging markets during critical service windows. And, of course, there is a challenge – and a very solid opportunity – for the manufacturers of ground stations and other user equipment to help shape the timing of new service windows by providing the infrastructure needed to turn this potential demand into actual calls, downloads, emails, and program viewing.

The detailed data and analysis underlying this White Paper can provide all of these companies with the tools they need to navigate these shifting waters.

Futron Overview

Futron's headquarters in Bethesda, Maryland

Futron Corporation is a technology management consulting firm. Since its founding in 1986, Futron Corporation has established an outstanding track-record as a high performance consultant. Futron is headquartered in Bethesda, Maryland with offices in Houston, Texas and Washington D.C. Currently, Futron employs over 100 professionals and has annual revenues over $11M.

Summary of Capabilities

Futron's Space and Telecommunications Division is the industry leader in researching, analyzing, and forecasting space and telecommunications markets and programs. Futron offers our commercial and government clients a suite of proprietary, leading-edge analytic methodologies. Our world-class team of market and policy analysts, economists, and engineers bring unparalleled skills and expertise to each account.

- We have surveyed hundreds of aerospace firms to develop a unique revenue, employment, and productivity profile of the industry.
- We have developed country-by-country models of demand for telecommunication services that aggregate a global forecast up from the individual household PC or business network; these models have accurately predicted future launch levels and business changes in the satellite industry.
- Futron helps clients win competitions, analyze competitors, estimate costs and prices, and track opportunities.
- Futron also performs cost estimates and economic analyses. Futron generates bottoms up, parametric, and analogous cost estimates for commercial satellite and launch vehicle programs.
- Futron provides a subscription-based service providing information on every FCC satellite application filed since 1990. Futron's FCCFilings.com is the only source for competitive intelligence and business data contained in FCC satellite licensing documents.

For information about this or other Futron reports, or to inquire about Futron's consulting services, contact Eileen McGowan at 301-347-3431 or emcgowan@futron.com.