Is Bigger Better? The Trend in GEO Satellite Size

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Bigger has been better in the past, but will it be so in the future? Satellites have continued to grow in size, in terms of bandwidth launched, over the last fifteen years. Although the pattern is not perfectly smooth, the general trend has continued upward at around one 36 MHz transponder equivalent per year. The future, however, may not follow the past.

Futron compiled data on all C, Ku, and Ka band GEO communications satellites launched from 1990 to 2003, and then calculated the average number of 36 MHz transponder equivalents per satellite for each year (see graph). Though the averages are erratic, a trend towards bigger satellites is apparent in the data. The same analysis was performed for satellites on the slate to be launched in 2004-2006, which includes satellites ordered in the last three years.

This year will see the launch of several large satellites, including the Intelsat 10 02 and the Telstar 8, both of which carry over one hundred transponder equivalents. The average number of transponder equivalents per satellite for the year is expected to be 54, exceeding the 2002 average by six. The following two years, however, show significant declines in size. Is this part of the cyclical nature of the numbers, or does it indicate a new trend?

The satellites to be launched in 2005 and 2006 were mostly ordered in 2002 and 2003. The excess supply of on-orbit capacity experienced in these years, which lead to severe declines in lease prices, may explain the lack of orders for high-capacity satellites. It is more economical for satellite operators to reconfigure the excess capacity they have on orbit in order to satisfy current demand than to launch more satellites. While this explains some short-term drivers for decreased satellite size, other drivers could lead to longer-term changes in the trend.

The wave of the satellite future may well be heading away from the oversized, multi-function satellites to more customized, market-focused architectures. Emphases on high-power, frequency reuse, and spot beam configurations may de-emphasize the massive, all-in-one satellites ordered. The satellites expected to launch in 2006 include several DBS satellites with fewer and smaller transponders, but much higher-powered.

Additionally, Futron's forecast of GEO satellite demand shows that consumer services, which currently constitute less than one-third of demand, will grow to half of demand within ten years. As the satellite industry turns its attention to the higher margin consumer niche markets, business models and on-orbit architectures will need to adapt as well. Niche markets will undoubtedly call for more specialized satellites.