By Gerry Oberst

Green Satellites

Is the satellite industry green? The issue of the environmental impact of satellites was raised by Eutelsat CEO Giuliano Berretta at the SATELLITE 2008 conference in February. "It's the only type of transmission that works on solar energy," he said during the opening panel session. "I think we are the most ecological means of transportation."

Satellites also contribute in a variety of ways to environmental protection. Europe recently has been emphasizing the Global Monitoring for Environment and Security (GMES) as a system to provide better information on Earth's atmosphere and climate change. Replacing old terrestrial radar networks with satellite technology could substantially reduce aviation CO2 emissions by allowing planes to fly more efficient patterns. Satellite navigation tools can be used to make many industries more efficient as well as enable individuals to track their carbon footprint while traveling. Satellite technology even has helped with solar energy, primarily through the use of meteorological satellites to assess placement and viability of solar panels.

But do satellite services themselves provide a better environmental solution than terrestrial-based services — taking into account the impact of satellite launches and other infrastructure use?

The entire information and communications technology (ICT) sector is said to be responsible for about 2 percent of overall carbon dioxide emissions. This estimate includes equipment manufacturing as well as telecommunications infrastructure and operation. The validity of the estimate and how it might break down by communications sector is unknown. Nevertheless, the satellite industry is starting to argue that replacing or complementing an entire ground-based infrastructure, including the enormous number of masts, antennas and other equipment that the satellite platform makes redundant, could have an impact.

Some argue that digital television transmitters produce significantly greater carbon emissions than satellite television systems, because satellites rely on solar power for most of their power and thus provide a greener alternative to expensive terrestrial buildouts. A U.K. trade group, "UK Space," estimated in 2006 that just the 50 most powerful analog television transmitters in that country (out of a total of 1,400) required 54 megawatts of electricity, representing a quarter of a million tons of CO2 per year that could be replaced by satellites that essentially use no terrestrial electricity at all.

Satellite manufacturer EADS Astrium more recently noted that satellite would have provided "a greener infrastructure choice" for the digital switchover in the United Kingdom than digital terrestrial and could provide a green next-generation access network for the whole of the United Kingdom.

The trade group Intellect, also based in the United Kingdom, took a stab at assessing how ICT technologies generally could affect environmental change. "Space and satellite applications are truly disruptive technologies that offer dramatic potential for replacing traditional terrestrial processes with low energy alternatives," the group said in its publication "High Tech: Low Carbon," released in February during an energy and environmental conference in London.

Intellect's report took into account the satellite launch industry when analyzing how satellite technology could save energy and carbon emissions. It noted that a satellite launch vehicle emits less CO2 than a single transatlantic flight and the mission is a one-off event for each satellite. Intellect also pointed out that at least one launch site, Arianespace's Kourou facility, relies on hydroelectric and ethanol power. Satellite manufacturer EADS Astrium added that once placed into orbit, a communications satellite consumes such a small amount of fuel that it averages about "3 million miles to the gallon." Future satellite systems "provide a greener ICT network alternative for a wide range of service providers," says Intellect.

Additional information can be gleaned from environmental impact statements about launch sites, at least in the United States. Those documents assess all types of environmental impact but do not examine the quantity of CO2 emissions. There also is older research on clean launch propellants which could take additional work in the new context of climate change theory.

To take this argument to its conclusion probably will require a more rigorous assessment of the full satellite supply chain. That is likely true for all industries, however, and satellite is already starting to make the case that it is greener than the rest.

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