Revaluing Mobile Satellite Spectrum: The Impact of ATC on Inmarsat's IPO

Now that Inmarsat's first I4 satellite has been launched successfully, the stage is set for Inmarsat to join the host of satellite operators planning an IPO during 2005. Inmarsat was sold to a private equity consortium in December 2003 for approximately $1.5 Billion, but now some of the uncertainty about the I4 satellites has been removed, it looks set to achieve a significantly higher valuation in its IPO. In addition to its fleet of 3 new (I4) and 9 older satellites, one of Inmarsat's most important assets is its worldwide access to as much as 68 MHz (34 MHz on the uplink and 34 MHz on the downlink) of irreplaceable L-band spectrum, which if it were allocated for terrestrial cellular use would be worth many tens of billions of dollars.

In February 2005, the FCC finalized the regulations for mobile satellite operators to re-use their spectrum for auxiliary terrestrial services (the so-called Additional Terrestrial Component or ATC) in the US. Given that Inmarsat has stated its intention to apply for ATC authorization in the US, one natural question is whether this provides a potentially large valuation upside for Inmarsat's IPO? This question is all the more relevant because MSV, another operator which shares the L-band spectrum with Inmarsat in the US, is already valued at more than $3 Billion, based almost entirely on its plans to develop a new North American mobile satellite system incorporating ATC. By way of comparison, MSV's current annual revenue from its existing satellite system is around $30M, compared to Inmarsat's 2004 revenue of $474M.

In order to understand the rationale for MSV's current valuation, one can look to the explanations given by investment analysts, who value the company at upwards of $7 Billion[1]. Implicit in this rationale is that MSV's spectrum position (it has access to 2 x 14 MHz out of the 2 x 34 MHz allocated to geostationary L-band operators in the US) can be valued on the same basis as, or at a modest discount to, cellular spectrum valuations of around $2/MHz/POP, because MSV will be able to offer a similar service to cellular, at least in the areas covered by its ATC base stations.

While this might seem to be a reasonable assumption, a note of caution should be sounded. As part of the FCC regulations, it is incumbent upon providers of ATC services to ensure that the terrestrial

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[1] See for example Chris Roberts of Tejas Securities, quoted at http://www.tmronline.com/A55951/tmrarticles.nsf/0/b23f3b75b39459ef86256fa5001ad470?OpenDocument

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component is truly auxiliary to the satellite service, and most importantly that all user terminals should be dual mode (i.e. capable of establishing a link via the satellite as well as via the terrestrial network)[2]. This inevitably imposes an additional burden on the handset: it must include a radio and antenna with sufficient power to communicate with a geostationary satellite over 22,000 miles away, as well as with a terrestrial base station less than 10 miles away. This is clearly a non-trivial exercise for a small cellular handset.

There are a handful of geostationary satellites capable of communicating with handheld phones today, the best known of which is Thuraya. This satellite was built by Boeing and launched in 2000 to provide coverage across the Middle East, Europe and much of Africa and Asia. The handset, while considerably smaller than those sold by Iridium and Globalstar, is still quite large, with a volume of at least 12 cu in, compared to modern cellular handsets, which are typically around 4-6 cu in. It also has a fairly large quadrifilar helix antenna, roughly 0.5 inches in diameter, which extends to almost 9 inches in length, so as to ensure head clearance while communicating with the satellite. To ensure link closure in the satellite, a large unfurlable antenna 12 meters in diameter is used to receive the very faint signals from the handset[3]. However, the Thuraya service only works in open areas where there is a clear line of sight to the satellite, and not inside buildings or cars, or under dense foliage.

Satellite technology has advanced in the eight or so years since Thuraya was designed. It is now possible to build much larger unfurlable antennas (potentially up to 25 meters in diameter), which can receive even fainter signals. Also, MSV has apparently developed novel techniques to improve the satellite's ability to pick out the radio signal from background noise. Offsetting this is the fact that to truly remove the burden on the handset, a much smaller antenna is needed, which does not have to be raised above the user's head. In addition, the handset must operate at lower power, in order to reduce the need for custom circuitry such as the power amplifier, with most of the functions integrated onto a single chip (or even implemented in software on a single processor). Minimizing the impact of this burden on the handset, so that it is indistinguishable from terrestrial cellular handsets, is therefore a major driver of MSV's design for its next generation satellite. Even with the improvements noted above, it is still unclear whether sufficient link margin will exist to enable the satellite link to operate

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[2] Though the requirement for an integrated dual mode handset is only given as one 'safe harbor' option for determining whether the terrestrial component is auxiliary to the satellite service, the FCC made clear that all handsets must be capable of communicating with the satellite, and use of an external detachable antenna will not be considered to satisfy this condition.

[3] See http://www.st.northropgrumman.com/astro-aerospace/Content.cfm?ContentID=287

in 'difficult' environments such as inside cars and buildings. This creates a potential risk to MSV's successful implementation of a truly ubiquitous service in which the satellite link provides a seamless extension of the terrestrial service.

MSV has spent several years planning its next generation system incorporating ATC and has developed a large patent portfolio covering various techniques for integrating the satellite and terrestrial services. Nevertheless, since the FCC's ruling in February 2005, Globalstar has already filed an application to deploy ATC, and Inmarsat has stated its intention to do so. Will these companies benefit from a similar uplift in valuation to that experienced by MSV from its planned ATC implementation?

The problem for Globalstar and Inmarsat is that their existing satellite systems were not optimized for ATC. Even though Inmarsat's new I4 satellites are some of the most advanced commercial satellites ever launched, they are designed to provide the high speed BGAN service to laptop-sized terminals, and as it noted in a recent FCC filing[4]: "The Inmarsat I4 satellites were designed and procured before the ATC concept was dreamed of". As discussed above, it will be an extremely difficult challenge for MSV to eliminate the handset penalty in a new satellite system specifically designed for the purpose. For Inmarsat and Globalstar the task is essentially impossible.

Thus the immediate benefits of ATC to these companies are not so significant. There are some ways in which ATC could add value to their existing customers. Since these customers are relatively few in number and principally located in rural and remote areas, and they would typically already possess a much smaller cellphone for use in urban areas, it seems unlikely that adding urban ATC coverage without addressing the handset penalty would be of much value. Perhaps, however, by providing a custom base station for a mine or public safety user, who is less concerned about the size of their handset than about improving the ability of the system to work indoors at their primary operating location, a Globalstar handset could be used in terrestrial mode in the immediate area of the base station, providing indoor non-line of sight coverage, and in satellite mode in the surrounding area, extending coverage in a region which may be poorly served by terrestrial cellular. This concept is not dissimilar to the Eagle Broadband solution developed for use on Iridium[5]. Similarly, an Inmarsat C

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[4] Inmarsat comments to the FCC, proceeding 01-185, February 3, 2005

[5] See http://www.eaglebroadband.com/sate_comm.asp

data terminal could communicate via a terrestrial base station when in transit at a port (where volumes may justify a terrestrial link), but via the satellite when being shipped by land or sea. In addition, when Globalstar and Inmarsat eventually implement their next generation systems, then if MSV has proved successful in exploiting the market for its ATC solution, these operators will be able to develop similar capabilities. If MSV proves highly successful, it would be reasonable to expect Inmarsat to implement such a solution well before the end of life of its I4 satellites (around 2020).

Thus we conclude that ATC brings only limited short term upside to Inmarsat's IPO. By highlighting the potential value of Inmarsat's global L-band spectrum allocation, and providing certain more limited short term opportunities, it does however provide some additional support to Inmarsat's valuation. Within the next five years, it will become clear if MSV can deliver on the vision of ubiquitous MSS, and at that point the true value of Inmarsat's MSS spectrum will be established.

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