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ATC Spectrum Considerations for Globalstar

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Globalstar is unique amongst the ATC proponents in that its spectrum allocation is not balanced between uplink and downlink frequencies. While Globalstar has access to 11.35MHz of spectrum on the uplink (1610-1621.35MHz), it is licensed for 16.5MHz of spectrum on the downlink (2483.5-2500MHz), although it has to date only been licensed to use 5.5MHz of spectrum in each direction for ATC. Now that Globalstar has applied to the FCC for permission to use its entire licensed spectrum allocation for ATC, it is appropriate to consider the implications of this unbalanced allocation for the uses to which Globalstar's spectrum might be put.

If Globalstar is granted the right to use any of its licensed spectrum for ATC, subject to non-interference with other systems, then how much spectrum will Globalstar have available in the uplink and downlink bands? On its uplink, Globalstar must avoid interference with Iridium between 1618.25MHz and 1621.35MHz, while at the lower end of the band it must respect separation distances of around 100 miles for radioastronomy sites in spectrum below 1613.8MHz (accounting for roughly 10% of the total US land area). In addition, Globalstar currently reserves 2.5MHz of spectrum for simplex data services and at least 1 or 2 of its 1.23MHz channels for voice services. In comparison, at S-band Globalstar will not be able to use the 2495-2500MHz band for ATC deployment once relocated BRS (i.e. terrestrial WiMAX) services begin to use this band, and Globalstar must also reserve 1 or 2 channels for voice services. However, BRS services will likely be deployed mainly in urban areas, and thus Globalstar may be able to continue using the 2495-2500MHz band for satellite services in rural areas.

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Given this situation, it seems likely that Globalstar will be unable to use much more than about 5MHz its uplink spectrum for ATC, whereas it could potentially devote at least 10MHz of downlink spectrum to ATC applications. Since the large frequency separation between Globalstar's uplink and downlink bands (over 800MHz compared to around 100-200MHz for other MSS allocations and roughly 400MHz for terrestrial AWS bands) and the relatively high frequency of its S-band allocation could also be considered potential disadvantages for deployment of cellular-type networks (since both are likely to lead to a higher terrestrial network deployment cost, other factors being equal), it seems very likely that the best option for Globalstar to develop any mass market ATC application would be to offer broadcast services using only its S-band downlink frequencies. One example of a 10MHz allocation to such services would be to deploy the terrestrial component at 2483.5-2488.5MHz and the satellite broadcast at 2495-2500MHz, with



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interference from BRS buildout being mitigated by deployment of terrestrial repeater networks in the same geographic area. This would have the advantage of leaving plenty of spectrum available for its existing MSS voice and simplex data offerings. However, other schemes for use of the spectrum could also be envisaged.

While such a spectrum position could potentially be attractive to partners such as XM and Sirius (who are expected to need additional capacity in the future so they can add video delivery and additional channels to their satellite radio services) the question arises as to what value should be attached to this spectrum. Clearly valuations based on cellular spectrum (e.g. AWS) would no longer be directly applicable, since spectrum for broadcast applications (whether for satellite radio or mobile TV networks) has traditionally attracted much lower valuations. As a benchmark, XM paid \$90M and Sirius paid \$83M for their allocations of 12.5MHz of spectrum each in 1997. While spectrum values have generally increased since that date, MediaFLO and Modeo were both able to acquire near-national spectrum for their mobile TV networks in recent years for very modest sums. In addition, at least within the US, there are few plausible alternatives to the DARS operators as potential partners, since at least three mobile TV providers (MediaFLO, Modeo and HiWire) are already attempting to compete in the video broadcast market.

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On the other hand, mobile broadcast spectrum is becoming very sought after in other regions of the world, such as Asia, where several players are looking to deploy S-band mobile TV networks. Although we believe that operators would strongly prefer allocations of 15MHz or more; the availability of relatively low cost spectrum, including a satellite component whose cost will essentially be covered by Globalstar's existing MSS customer base, could prove a deciding factor in several countries. For this reason we consider that Globalstar could conceivably strike deals in a number of markets, and it could derive as much value from its spectrum position in international markets as in the US.

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Even with this upside, we consider that valuations based on cellular applications, applied across Globalstar's entire L-band and S-band spectrum holdings, would lead to a significant over-valuation of Globalstar's potential ATC spectrum opportunity, and we would therefore be cautious about placing any reliance upon analyses which take this approach. Instead, more appropriate valuation methodologies would consider benchmarks for other broadcast applications, discounted by the probability of such deals actually coming to fruition and would be likely to result in valuations in the low hundreds of millions of dollar or high tens of millions of dollar range, depending on one's view of the appropriate deal probability. Further details of this analysis are contained in our January 2007 research report, which provides projections for both Globalstar's core business and its associated spectrum opportunity.



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