

A Bumpy Take-Off?

The Future of Connexion-By-Boeing

With its Connexion service, offering broadband Internet access on long haul aircraft around the world, Boeing is seeking to open up a completely new market for satellite services. Years of effort have gone into securing regulatory authorizations, creating a new global network infrastructure and developing terminals for the service, with Boeing's total investment estimated at close to \$1 billion. The service was launched commercially on Lufthansa in May 2004, and is now available on Japan Airlines, ANA and SAS. Boeing is also developing a similar maritime service for ships in the Atlantic and Pacific oceans, with a trial completed in late 2004. Meanwhile, there is considerable interest in the potential of cellphones on aircraft, with trials conducted in the US and Europe, and regulatory authorization expected in 2006. Boeing also expects to provide this capability in the future.

However, questions persist about the long term future of Connexion. One reason for this is the difficulty that has been experienced in persuading airlines to pay the reported \$500,000 cost per aircraft to install the Connexion terminal, while the returns remain unproven. Boeing management has repeatedly stated its commitment to the service, but recently expressed doubts about whether growth would be as rapid as originally expected. In this article we estimate the operating costs of the Connexion business and analyze the market size required to achieve profitability.

Connexion provides a contended bandwidth on demand service to aircraft via a customized terminal, using a specially adapted modem, which allows it to operate with a small Ku-band antenna. Connexion has secured near global Ku-band coverage, striking agreements with satellite operators to adapt the footprints of several new satellites to provide oceanic coverage, most notably in the Pacific, using SES's new Worldsat 3 satellite which is scheduled to enter service in late 2005.

A larger antenna is used on ships, allowing more efficient satellite capacity utilization, but the same modem is employed, so that capacity can be freely shared between ships and aircraft. Because of the custom modem, the maritime terminal is relatively expensive, costing upwards of \$60,000, compared to other bandwidth-on-demand Ku-band services (e.g. based on the iDirect platform) at around \$25,000. Boeing's network architecture requires a full Ku-band transponder to be allocated in each beam, leading to a relative high cost for global coverage (estimated at around \$50 Million per year in transponder lease costs). Boeing's regulatory, service and terminal development efforts have also

required a relatively large staff, estimated at around 400 people. We thus estimate the total operating costs of Connexion at upwards of \$150M per year, excluding any terminal subsidies.

Boeing has previously forecast that in the first year it projects around 5% of passengers on each flight will use the service, paying \$30 each. Assuming 1.5 flights per aircraft per day, and 200 passengers per flight, the gross revenues per aircraft would be around \$160,000 per year at this level of usage. Even if the take-up ultimately doubled to 10% of passengers on average (probably the maximum realistic level, since nighttime flights will have much lower usage) then the gross revenue is only \$320,000 per year. If 30% of revenue is paid to channel partners and airlines, then Boeing's revenue would amount to \$225,000 per aircraft per year. However, cellular calls could provide an additional source of revenues in the future. If Boeing received \$5 (net) in roaming charges from an extra 10% of passengers for use of their mobile phone on each Connexion equipped flight, then this would provide an additional \$55,000 per aircraft per year, increasing Boeing's revenues to around \$280,000 per aircraft per year. This assumes that Boeing does not have to subsidize the cost of terminals in the future, even though its current agreements have been entered into on this basis. It should also be remembered that Inmarsat's total net revenues in 2004 from providing aeronautical services to around 6000 aircraft (a combination of commercial aircraft and business jets), were around \$17M, or less than \$3000 per terminal.

A similar calculation can be performed in the maritime market. Connexion's revenues per ship may be around \$2500 per month after customer support costs, assuming Boeing is able to charge a slight premium over other regional Ku-band offerings and sets its prices at a level comparable to the typical expenditure of Inmarsat customers. Assuming some subsidies are required for the terminals, Boeing could realize net revenues of around \$25,000 per ship per year. Boeing also plans to target larger business jets, where we estimate that broadly similar revenues per aircraft could be achieved, providing an alternative source of revenues to the maritime market.

Based on the above estimates, Boeing would need to serve at least 450 commercial aircraft plus another 1000 ships or business jets before it made a profit, even ignoring any recovery of either its initial investment or the terminal subsidies offered to date. If cellphone service is less popular than expected, or airlines continue to demand substantial subsidies for installation, then the breakeven point could increase further, perhaps to as many as 1000 commercial aircraft in a worst case scenario.

For comparison, Boeing had signed contracts to install its service on just over 200 aircraft at the end of 2004, though the actual installations will be spread over several years, and we estimate that only around 100 Connexion terminals have been installed to date. Because of the need to wait for aircraft to undergo an overhaul before time is available for the terminal to be installed, it seems unlikely that installations will exceed 100 aircraft per year in the near future.

Boeing management has already stated that Connexion will not be profitable in 2005. Our analysis shows that in reality it may be another four years before profitability is achieved. Will Boeing wait this long? Will lower cost upgrades to existing Inmarsat equipment undermine Connexion's business case by meeting the demand for cellphone connectivity? Will Internet connectivity on passenger aircraft become a must have, so that airlines can be persuaded to pay for the terminals? Connexion still has a long way to go before take-off.

The above article was written in March 2005. Since then it has become clear that the running costs of Connexion were even higher than our conservative estimates, at over \$200M per year, while usage was at the lower end of our expectations, at an average of roughly 10 users per flight. In August 2006, Boeing announced that the Connexion service would be shutdown at the end of 2006.

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