



Embraer eyes options for growth

Since its privatization, Embraer has enjoyed remarkable growth. Not only has its business base expanded, but its capabilities and reputation now put it among the top four aircraft builders in the world, an elite group.

Sustaining these growth rates will prove difficult, but there are intriguing business development options for the company. It might have a very different product portfolio in 20 years, based on decisions to be made in the near future.

A successful non-model

Born as a government-owned manufacturer in 1969, Embraer had a difficult first few decades. Its initial products served the Brazilian military market and global general aviation markets. The most important program in the company's first 20 years was the EMB-120, a 30-seat turboprop regional aircraft that never generated



profits. Efforts to develop new products in the late 1980s and early 1990s almost destroyed the company. The CBA-123 turboprop was killed by an unreceptive market, and the ERJ 145 regional jet had serious development difficulties.

But in the mid-1990s, Embraer got an enormous boost from two events. One was from airlines' wholesale adoption of regional jets, particularly in North America. The ERJ 145, despite its troubled development, was in the right place at the right time—at its peak in the late 1990s and early 2000s, production exceeded 10

per month. Embraer also introduced shortened variants, the ERJ 135 and 140.

The second event was privatization. This move, completed in 1994, gave Embraer access to global capital and instilled the discipline it needed to become a world-class aircraft manufacturer. The company's transformation from a government-run money loser to a respected and profitable first-tier jet maker was well established by the turn of the century.

Embraer deftly leveraged these two developments to fund the creation of an all-new larger RJ family, the 70/108-seat ERJ 170/190. The 170 is the basic 70-seat design, while stretched versions include the 175 (78 seats), the 190 (98 seats), and the 195 (108 seats). All are powered by GE CF34 engines. The 170 entered service in March 2004, with 190 certification in August 2005 and 195 certification in June 2006.

The ERJ 170/190 series has boosted the company's revenues and more than compensated for the fall-off in 50-seat regional jet demand (which all but eliminated the ERJ 135/145 series airline market). The company's backlog stands at an impressive \$16 billion. But its revenues basically revolve around one jet family. As with many aircraft, there is the risk of an up-front order surge followed by a gradual build-down of the backlog, as customer needs are satisfied.

There are few signs of the ERJ 170/190 breaking out of the regional airline customer niche. While a significant delivery downturn likely will not happen before 2015 at the earliest, and while that downturn will likely be much less severe than the ERJ 135/145 collapse, the company needs to start planning for its commercial future.

Nonetheless, Embraer is in an unusual position. Many new producers have attempted to enter the aircraft market since 1960, but Embraer was the only company in the world to succeed. The other new market entrants either failed or

took a different path, seeking to build a broad portfolio of work, partnering with international players like Airbus and Boeing. In short, the only other successful new aircraft market entrants did not actually build complete aircraft.

Thus, Embraer is something of an anomaly: a very successful result of a flawed strategy. Companies and countries wishing to enter the market today seldom realize that for its first 30 years, Embraer lost Brazil considerable sums of money. Nor do they recall that the other countries



and companies that wanted to be like Embraer burned through piles of cash and then failed anyway. Indonesia's IPTN is the best illustration of this, although Argentina's FMA and Taiwan's AIDC are also good examples. Other players such as Israel Aircraft Industries started down this complete aircraft path but then successfully switched strategies, avoiding failure as primes.

Because of this legacy and the skills it has generated, Embraer remains focused on being a prime aircraft contractor and has so far garnered relatively few subcontracts. Thus future growth efforts will likely revolve around entering new aircraft markets and introducing new aircraft models. This approach involves more program risk and longer product development times than would a subcontractor business development strategy. There are basically three directions for the company to pursue: business jets, military aircraft, and larger airplanes.

Business jets

Since the ERJ 145 family began, Embraer has used derivatives of these regional jets to pursue the business jet market. Its most successful offering by far has been the Legacy, an adaptation of the ERJ 135. So far over 110 Legacies have been delivered, although many of these have been to military customers.

This approach is continuing with the Lineage 1000, a business jet adaptation of the ERJ, priced at \$43 million including the interior. Embraer anticipates three or four corporate sales a year for the aircraft, which will enter service in 2008.

Being adaptations of aircraft that are optimized as regional airliners puts both the Legacy and Lineage at something of a disadvantage as business jets. But Embraer has announced plans to develop a family of aircraft specifically designed for this market. Known as the Phenom series, the new jets have received a very positive market reception, with a combined total of over 450 sales.

The first to arrive will be the Phenom 100, a very light jet with seating for six or seven passengers. Priced at \$3.4 million, it flew for the first time in July and will enter service in mid-2008. It will be followed by the Phenom 300, a light jet model with seating for nine passengers. Priced at \$6.7 million, it will enter service in mid-2009.



Embraer will also shortly introduce a new dedicated business jet, probably selling for about \$10 million-\$12 million (in today's money). This would bridge the gap between the Phenom 300 and the Legacy and would enter service around 2011 or 2012. It also will likely receive a Phenom designation.

Focusing on the business jet market makes great sense for Embraer's future strategy. The regional jet market peaked at \$7.7 billion in deliveries, and has declined since, recovering only to a forecast \$6.7 billion this year. By contrast, the business jet market has recently enjoyed unprecedented growth. It reached a new peak of \$13.8 billion in deliveries in

2006, with all manufacturers predicting growth for the next three years at least. Teal Group projects business jet deliveries will reach a new market peak of \$18 billion in 2010 compared with a relatively flat regional aircraft market.

Although these numbers sound appealing, there are hurdles to Embraer's progress in this market. The five established business jet players—Bombardier, Dassault, Cessna, Hawker Beechcraft, and Gulfstream—all have elaborate sales and product support networks. Embraer will not be able to develop such networks overnight, as they are considerably different from the kind of support presence the company has for its regional airliner products. The established players also have proven track records with new product development, and will be very effective at countering any new Embraer model introductions with competitive designs of their own.

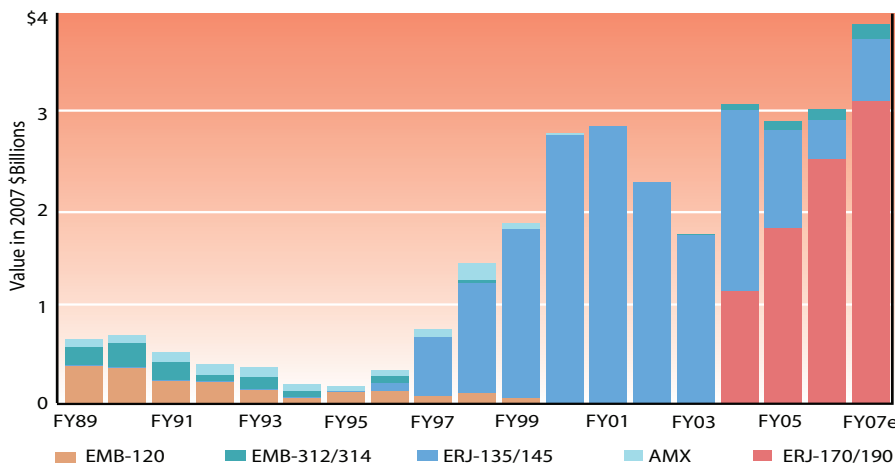
Military work

For decades, Embraer has touted its military side both as a source of growth and as a good way to insulate itself from cyclical downturns in the commercial jetliner market. Yet there have been serious limitations with this military diversification strategy, and good reasons to doubt that it will ever constitute more than a small fraction of Embraer's future revenues.

Embraer's main military products over the past 30 years have been the AMX light attack jet, jointly designed with Italy's Alenia, and the EMB-312 Tucano trainer series. Although the first was a relatively ambitious codesign effort, there were no exports, and Brazil's air force purchased just 56 planes. The Tucano series sold heavily abroad, but most of the 500 export sales occurred in the 1980s and early 1990s. For the past 15 years, the Tucano's survival has depended on Brazilian air force orders.

The first problem with this is the lack of a significant home defense market. Efforts to use Brazil's FX fighter competition to attract license production of a foreign fighter design failed when FX funding was canceled. Instead, Embraer has

EMBRAER AIRCRAFT DELIVERIES BY VALUE





been given some relatively modest work on an upgrade program for the country's Northrop F-5 fleet, although much of this work has gone to Israel's Elbit.

Predictably, the small size of Embraer's domestic defense market has resulted in a shrinking export market presence. The latest upgraded version of the Tucano, called the ALX, is a competitive product. But it is up against the Hawker Beechcraft T-6, which has the luxury of a 700-aircraft Air Force and Navy home base, a very healthy level of aftermarket support, and U.S. military product endorsement. Even though Brazil's air force is buying 99 ALXs, there has been only one export sale—25 aircraft to Colombia—since the ALX program began in 1995.

The second problem with a military strategy for Embraer is that the company lacks the skills it needs to take advantage of the growing special mission market. Embraer is a good airframer, but most of its military work involves integrating its commuter aircraft with sophisticated radars, sensors, network links, and other equipment. All of this value-added work has gone to partners such as Thales and Ericsson.

So far, entering the all-important U.S. military market has proven difficult for Embraer. In 2004 it won the U.S. Army/Navy Aerial Common Sensor (ACS) program, but this was canceled in January 2006. This should have been a major strategic victory for Embraer if the project had gone ahead, but again much of the

work would have gone to the systems integrator, not Embraer. Even though ACS would have been worth well over \$3 billion, the bulk of this would have gone to Lockheed Martin and other sensor and system providers. Embraer's share would have been a mere 57 ERJ 145 airframes. That is a respectable special mission aircraft project, but it represented about four months of ERJ 135/145 production at its historical peak.

Embraer's latest military market initiative is the C-390, a medium-sized troop and cargo lifter. It would have two turbofans and a fly-by-wire control system. In terms of capabilities, it would fit between the Alenia C-27J and Lockheed Martin C-130J. Powerplant selection or possible launch customers have not yet been announced, but Embraer says it could enter service in 2012. The estimated price is \$50 million.

If Embraer proceeds down this path, it will face considerable difficulties. First, there are already strong players in proximate market segments. The C-130J has a secure home market, and the C-27J was recently selected for the U.S. Army/Air Force Joint Cargo Aircraft requirement. The Brazilian air force has a very limited requirement for an aircraft in this class, with no firm plans to fund an acquisition. Even if it does secure funding, it is unlikely to provide more than 20 orders. Finally, the world market outside the U.S. for planes in this class is quite small—fewer than 30 annually, split among several competitors. So spending hundreds of millions of dollars on C-390 development does not appear to be a strong business case.

In short, the military market is unlikely to offer more than an occasional boost to Embraer's existing product offerings. While it offers some limited market diversification, it is unlikely to play a major role in sustaining the company's growth. But there is no denying the size and growth of the U.S. military market, and Embraer will likely continue to pursue opportunities there.

Something bigger

Embraer's third option for future business development would involve a larger jetliner, probably in the 120-150-seat range. The ERJ 195 represents the maximum stretch of the new jet family, so the next

step would need to involve a clean sheet of paper design.

Yet developing this family on its own would be extremely costly and risky for Embraer. Bombardier has so far balked at developing its 110-130-seat C-Series, largely because it would put too many scarce product development resources in one basket.

Much more appealing would be a cooperative venture with Airbus or Boeing. Both are looking to replace their current narrowbody families—A319/320/321 and 737 respectively—with new technology models in the 2015 timeframe.

On the positive side, any move to join Airbus in an A320 replacement venture would probably be met with a warm reception. Airbus is likely to be preoccu-



ried for the next seven years bringing its new A350XWB long-range widebody to market. Additional product development cash from a major risk-sharing partner would be very useful to the European prime. But a move toward a jetliner partnership would mean Embraer was shifting away from its cherished status as a jetliner prime.



Whichever path Embraer pursues, the future looks bright. While the company is not likely to continue seeing the kind of growth rates it has enjoyed in the past 10 years, numerous opportunities lie ahead. The company has the advantage of strong revenue streams from its existing regional jet programs, and a workforce with strong skills yet relatively low costs.

It is also important to note that despite this optimistic outlook, the company needs to prioritize from among these new business opportunities, and to commit the necessary resources to growing them. While Embraer has joined the elite ranks of the world's aviation primes, history indicates that staying in that group is an ongoing challenge.

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