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## Singapore's Aerospace Development 'Model'

Ron Matthews and Nellie Zhang

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*Singapore's aerospace industry is the country's best-kept secret. Un-trumpeted, it has developed rapidly in just over three decades to become one of the world's most competitive suppliers of aerospace systems and services. It does suggest that size may not always matter.*

THE DEVELOPMENT of Singapore's aerospace industry represents a remarkable success story. For a small country that is at the same time a late-comer to industrialisation, to be able to penetrate such a global high technology industry where scale and accumulated technological expertise dominate is the exception rather than the rule. What are the ingredients for Singapore's success? More importantly, is such a 'model' sustainable into the future?

### Aerospace development drivers

The first and most telling factor behind Singapore's aerospace success was the 1975 establishment of ST Aerospace, just 10 years after the country's independence. Its growth was fuelled by the needs of the emerging air force, but also by Singapore's growth as an airline hub. The provision of maintenance and servicing support contracts facilitated diversification of ST Aerospace into the commercial aerospace market through the 1990 launch of its subsidiary company, ST Aviation Services (SASCO). This was the growth tipping point, with ST Aerospace enjoying fast annual expansion over the subsequent two decades, such that by 2008, it was generating almost S\$2 billion of output value.

Moreover, for the same period, the entire Singaporean aerospace industry enjoyed economic take-off, with manufacturing growing at an annual compound rate of 10 per cent and 'nose-to-tail' maintenance, repair and overhaul (MRO) activities growing at 13 per cent. The industry's workforce has grown, in parallel, to an impressive 19,000 skilled workers, requiring annual additional employment inputs of 1,500 workers. Singapore is now widely regarded as amongst the top three Asian aerospace technology players (along with Japan and South Korea), and also hosts one of Asia's leading aerospace hubs, with more than 100 international firms operating in the island-state. At the core of this remarkable development push is ST Aerospace. With a global payroll of over 7,000

engineers and technical specialists, it is now acknowledged to be the world's biggest third-party airframe MRO provider, measured by commercial airframe man-hours.

A second important factor under-pinning the development of Singapore's aerospace industry is a strong focus: ST Aerospace was deliberately developed as a dedicated division within a rapidly expanding industrial conglomerate, ST Engineering. This is a government-owned enterprise that in February 2008 was capitalised at S\$10.24 billion. In that year, ST Engineering generated S\$5.34 billion in revenue, making it the ninth biggest company in Singapore. It presently employs more than 20,000 employees worldwide, having over 100 subsidiaries and associated companies in 42 cities and 24 countries. The contribution of ST Aerospace to its holding company is considerable, accounting today for some 35% of corporate earnings and around 38% of total employment. Its industrial fortunes are, and always have been, wedded to those of its parent company. It benefits from the technological diversity and synergy of its three sister Strategic Business Units (SBUs) -- these being Electronics, Kinetics and Marine. The ST Aerospace SBU thus leverages its development on the breadth and depth of high quality engineering services available in the other three ST divisions, exploiting especially the 'dual use' (civil-military) interfaces existing within the conglomerate's productive structure.

### **Strategy of Not Making Complete Aircraft**

Thirdly, in harmony with the ST Group's international market focus, ST Aerospace has pursued a growth strategy of penetrating global markets. Its strategic imperative, therefore, necessarily focuses on the dynamic of continuously creating, maintaining and refreshing a sustainable competitive advantage in aerospace. From the outset, the crucially important decision was taken of not developing and producing complete aircraft. Instead, a more rational strategy adopted was to target the high value services associated with MRO, modification, upgrade and technology insertion.

A fourth factor has been the visionary leadership by government. Beyond developing aerospace capacity, the government's principal objective has been to ensure the sustainability of the industry through implementation of complementary long-term strategic policies. One such policy has been aimed at creating a local aerospace industrial hub. A key policy thrust was to transform the World War II-era Seletar airfield into a national, regional and, more ambitiously, a global aerospace industrial and technological centre.

This mammoth venture is expected to be completed by 2018, creating 10,000, mostly, high-skilled jobs, contributing annually approximately S\$3.3 billion in value-added (around 1% of GDP) to Singapore's economy. Significantly, the government aims to develop Seletar into a cluster of high-tech local and foreign aerospace primary players and sub-contractors. It is envisaged that their geographical proximity will encourage development of innovational linkages across the aerospace value chain, incorporating not just companies, but also local universities and specialist R&D institutes.

A fifth driver for Singapore's aerospace success has been the intent to integrate Singapore into foreign global aerospace networks for OEM or original equipment manufacturers. Several global aerospace 'brands', such as General Electric, Honeywell, and Rolls-Royce have already begun operations at Seletar. It is Rolls-Royce, the British 'blue-chip' company that has arguably made the biggest impact, thus providing compelling evidence that Singapore's aerospace cluster strategy is working effectively. In late 2007, for instance, Rolls-Royce announced plans to build its first Asia-based aerospace facility at Seletar park. Market size was not a factor in its decision; rather, it was influenced by Singapore's stable and dynamic high technology economy.

Rolls-Royce's S\$320 million 'factory of the future' is anticipated to create around 330 jobs working on next-generation 'Trent' aero-engines for both the Boeing 787 Dreamliner and Airbus A350 aircraft. Rolls-Royce already employs 1,000 workers in Singapore, with the company's contracts accounting for 10% of Singaporean aerospace industrial output value. Rolls-Royce operates at the technological

frontier and thus its knowledge investment focus is on training and R&D. A good example of its strategic investment is the company's involvement in the Singaporean consortium, Enertek, and its S\$100 million development of a commercially viable propulsion system based on fuel-cell technology at Nanyang Technological University.

### **Interventionist Government Strategy**

There are many other factors that account for the Singaporean aerospace industry's success, but the above list provides a sense of the key attributes of the strategic model. Other environmental factors that have undoubtedly contributed to this success story include: the availability of highly skilled and productive workers; a knowledge-base economy that is science and technology-oriented; a politico-economic system favourable to long-term investment; and a dynamic business culture, prioritising the ease of doing business.

However, arguably, the most important contributory factor in promoting and sustaining Singapore's aerospace competitiveness is the island-state's interventionist government strategy. This strategy targets the active promotion of training facilities, infrastructural investment, and broader economic benefits, particularly through the pro-active initiatives of the Economic Development Board. It would seem that Adam Smith's 'invisible hand' market-driven approach is of marginal consequence in forging Singapore's knowledge-intensive economy.

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