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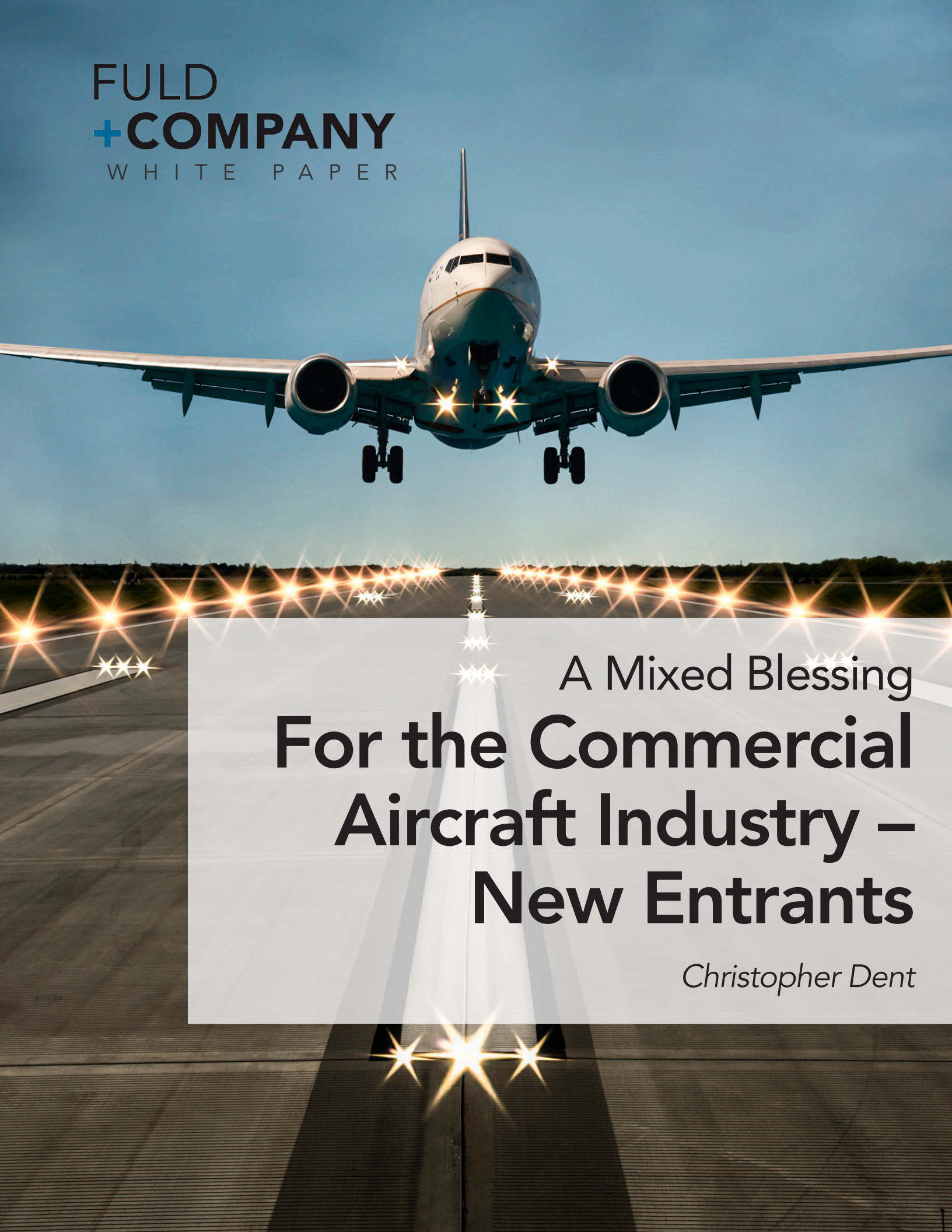

A Mixed Blessing

For the Commercial Aircraft Industry – New Entrants

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Contributions

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INTRODUCTION

The global fleet of commercial aircraft consists overwhelmingly of machines built by a handful of manufacturers in Western Europe, North America, and Brazil. Not since regional jets supplanted turboprops in the 1990's, sparking the popularity of Embraer's ERJ family of twin-engine regional jets, has aviation seen the successful commercialization of a turbo-fan powered commercial aircraft manufactured outside North America or Europe. That will likely change thanks to a slate of new designs expected to become operational over the next five years – a blessing to some, a curse to others.

An Enduring Duopoly

Over the last two decades, commercial aircraft operators encountered an effective duopoly when shopping for new aircraft. Since the 1997 merger of McDonnell-Douglas and Boeing, operators have had a choice of only two western manufacturers of full-size single and twin-aisle airliners: Boeing and Airbus. In the regional jet market, since the end of the Fairchild-Dornier production line in 2002, operators have been limited to Embraer and Bombardier. The limited choices in aircraft manufacturers persisted largely due to the tremendous barriers to entry in the commercial aircraft and jet engine markets.

The aviation industry in the former Soviet Union, thrown

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into chaos by that country's dissolution, has spent the last quarter-century catching up to the west in performance, efficiency and reliability. Former Soviet designers Ilyushin and Tupolev have struggled to find buyers for their aircraft and have severely lagged industry leaders Boing and Airbus in volume. The most successful post-Soviet Russian design, Sukoi's SuperJet 100 regional airliner, also lags segment leaders Embraer and Bombardier in order volume.

Market fragmentation is little better among engine manufacturers, with the twin and single-aisle segments each having only three manufacturers – Pratt & Whitney, Rolls-Royce, and General Electric (GE) – with engines in-service. In the regional jet market, only two OEMs – Rolls-Royce and GE – are major players.

Emerging Alternatives

As the third decade of the 21st Century edges closer, aircraft and engine manufacturers in Russia, China, and Japan threaten to disrupt the order which has persisted in the commercial aircraft market since the turn of the century. Over the next five years, four new types of commercial airliner are slated to enter service, produced by four manufacturers in three countries:

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- **COMAC C919 (CHINA)**

This twin-engine single-aisle 168-seat airliner is slated to enter revenue service in 2021. Manufacturer Commercial Aircraft Corporation of China (COMAC) claims to have nearly 800 orders already on the books.

- **IRKUT MC21 (RUSSIA)**

With a planned introduction of 2019, the 211-seat MC21 should join the C919 in competing with Boeing's 737 and the Airbus A320 family.

- **SUKHOI SUPERJET 130 (RUSSIA)**

Joining it's 100-seat little brother, the 145-seat SSJ-130 builds upon a proven, though modest-selling platform. Stalwart Russian aircraft manufacturer Sukhoi claims the aircraft will enter revenue service in 2020.

- **MITSUBISHI MRJ (JAPAN)**

Industrial giant Mitsubishi claims to have nearly 300 orders booked for their 92-seat Mitsubishi Regional Jet (MRJ) which they expect to enter service in 2020.

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Not resting on its laurels, regional jet heavyweight Embraer plans to introduce its next generation E2 version of its E195 platform, a 146-seat development of the original E-Jet family. The E195 E2 joins the Bombardier C-Series in competing on the smaller end of the full-size single-aisle segment.

Attendant to these new airframes approaching revenue service are new engine options also developed in Russia and China:

- **AVIADVIGATEL PD-14**

With certification expected in 2018, Russia's first new high-bypass turbofan in a generation will be an engine option for the SSJ-130.

- **AECC CJ-1000AX**

China's first indigenously-produced high-bypass turbofan, manufactured by the Aero Engine Corporation of China (AECC), was designed from the start for the C919 and could gain significant traction against the CFM LEAP currently used by the C919 program.

Russia has never had a problem producing commercial and transport aircraft; the challenge for Russian manufacturers has been gaining acceptance for their airframes in the West. Sukhoi's SuperJet 100 has begun to change that over its ten-year history, reaching revenue service with operators in Switzerland, Mexico, and Ireland. As an interesting aside, the SSJ-100's sole engine option is the SaM-146, produced in-part by Russian firm NPO Saturn.

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Assessing the Threat

Could the Boeing/Airbus and Embraer/Bombardier duopolies be so well entrenched as to be unassailable? Undoubtedly, these four incumbents enjoy immense expertise, experience, and brand strength in their respective segments. However, both economic and political factors could combine to give new entrants a fighting chance. According to forecasts from Boeing and Airbus, the global single-aisle fleet will grow by an additional 33,000 to 40,000 airframes over the next twenty years, implying annual deliveries of 1,600-2,000 new aircraft. According to Bombardier, less robust growth is expected in the regional jet market with about 3,000 new aircraft needed through 2034.

Assuming all the new entries reach service as projected (an unlikely prospect), their combined production could exceed 10% of global deliveries according to manufacturer forecasts. While the existing duopolies would still have 90% of the global market to split between them well into the next decade, the emergence of reliable and economical alternatives represents a significant long-term threat that cannot be ignored.

It is possible that one or more of these new programs will be a flop, but the emergence of just one credible third option could be disruptive. Even if confined to the Chinese market, the impact of the COMAC C919, with nearly 800 airframes claimed to be on order would be significant as China is expected to dominate growth in passenger traffic over the next two decades – a market that Boeing and Airbus are likely counting on to keep their order books filled.

The implications of multiple new entries into the commercial aircraft market for airframe and engine OEMs have worldwide economic and business impact. Let us examine some implications of these entries for companies at other levels of the value chain.

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Commercial Air Carriers

The emergence of alternative options for airframes and engines is a mixed blessing for aircraft operators. Conventional wisdom holds that competition lowers prices and this is likely true to a degree for commercial aircraft. The Sukhoi SSJ-100 lists for a very competitive price compared to segment rivals Embraer and Bombardier. However, introducing new types of aircraft into the fleet means increased operational costs for carriers including maintenance, training, and administration. Southwest Airlines attributes much of its notable success to the efficiencies of operating a single type of aircraft, the Boeing 737. Low-cost rival JetBlue operates only two types, the Airbus A320/321 and Embraer 190. Compare this to American Airlines which operates no fewer than nine types of aircraft.

Major American and European carriers are unlikely to change significant portions of their fleets for new types of aircraft from Russia or China for the foreseeable future. However, smaller airlines in growing Middle Eastern, African, and Asian markets could be lured away from incumbent Western manufacturers by low list prices, giving new entrant OEMs a foothold from which to grow.

Commercial Aircraft Maintenance, Repair, and Operations (MRO) Firms

Maintenance, repair and overhaul (MRO) companies find themselves between a rock and a hard place with new market entrant OEMs, especially on the engine side. These companies face engine manufacturers increasingly looking to maintenance and repair to supplement engine sales as a profit center. As new types of airframes and engines reach revenue service, MRO companies face additional costs to bring these new types into their portfolio (e.g., parts, training, facilities, administration, etc.) while facing direct competition from engine OEMs

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and a buyer community likely unsympathetic to the cost implications of servicing new types of engines and aircraft. There is no easy solution here. MRO companies could take one of several paths given pressure on multiple fronts:

- Position themselves as a value-price alternative to the service arms of engine OEMs.
- Partner with engine OEMs, offering existing infrastructure and client lists in exchange for a preferred or exclusive relationship.
- Concede engine MRO activity to OEMs over the long-term and position themselves or portions of their business for acquisition by engine OEMs.

For their part, Singapore-based MRO provider SIA Engineering Company has announced partnerships with both GE and French engine OEM Safran . Given the pressures on aviation MRO companies, SIA could be setting a trend that may continue over the next several years.

First and Second-Tier Suppliers to Airframe and Engine OEMs

Upstream component suppliers likely also see mixed effects from the emergence of new airframe and engine OEMs. Commercial aircraft and their engines are highly engineered and heavily regulated machines. The market for these machines and the thousands of parts which comprise them present tremendous barriers to entry for new players. The new Russian and Chinese entrants into the commercial aircraft and engine markets likely built their own supply chains (with a healthy dose of domestic suppliers out of political necessity) during the development of their products, limiting near-term opportunities for western suppliers to win business from Russian and Chinese OEMs. Should new Russian and Chinese entrants to the commercial aircraft engine market

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find trouble gaining acceptance by western aircraft OEMs and/or airlines, integrating venerable western first and second-tier component suppliers into their supply chains could be advantageous. Opportunities to work with additional buyers will likely be tempered by Russian and more likely Chinese firms looking to displace incumbent western suppliers through aggressive pricing enabled by advantaged labor costs.

Looking Ahead

Looking beyond airframes and engines, we see that the emergence of new entrants in the commercial aircraft market has mixed effects for companies at various points of the value chain. Airlines can benefit from new entrants offering low list prices which also place pressure on leading incumbent OEMs. This same diversity of offerings combined with engine OEMs pursuing an ever-greater share of the aftermarket presents a challenging outlook for MRO companies. These firms will have to navigate attractive substitute products (engine OEMs) and increasingly empowered customers demanding support for a more diverse fleet. OEM diversification will also likely be a mixed blessing for first and second-tier suppliers. More customers in the market place means more opportunities, an attractive prospect in an industry with high barriers to entry. However, most, if not all the new OEMs looking for a seat at the table are likely bringing their organically-developed supply chains with them, challenging venerable incumbents to displace existing suppliers.

Robust growth will continue to attract new entrants to the commercial aircraft industry over the next twenty years, especially as growing economies become more technically proficient. How long will it be until the budding Indian aerospace industry takes its turn? This robust growth and the new entrants will mitigate increasing competitive intensity as the small club of aircraft and engine OEMs becomes a little less exclusive.

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