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# Airpower and its role in conflicts

Budgets in the US and Europe will remain constrained for years to come, accelerating a number of paradigm shifts in military aviation. Sophisticated aircraft may be increasingly designed and produced by emerging powers, and the number and nature of both manned and unmanned platforms will change in the coming decade. At the same time, greater efficacies and savings will be sought at both ends of the aircraft lifecycle, resulting in more fuel-efficient engine design and greater competition for the increasingly important maintenance, repair, and overhaul market.

Photo: Airbus

Shifts in funding and requirements drive changes in military aviation

## “Top 5 Trends” in military aviation

by Christina Balis, Doug Berenson and Aleksander Jovovic, Avascent, Paris/Washington

The future of aviation is as much about predicting obsolescence as it is about imagining the “next big thing.” Five trends, in particular, illustrate the underlining shifts in supply and demand within a rapidly globalizing military aviation market.

### 1. Fighters vs. Logisticians

Notwithstanding the attention paid to global fighter jet competitions – from India to Brazil to South Korea – transport and cargo aircraft of various sizes have shown considerably more staying power. Economics explains much of this trend. While the unit cost of fighter aircraft has grown exponentially in line with their growing sophistication, production volumes have steadily declined. In 1980, an F-16A could still be acquired at a

price tag of less than US\$ 20 million and produced in very large volumes (175 aircraft for the US Air Force alone). By 1993, the inflation-adjusted unit cost of an F-16C had exceeded US\$ 42 million (based on a US production volume of just 24 aircraft). In fiscal year 2013, the US Air Force expects to pay more than US\$ 176 million per aircraft for 19 F-35 (in anticipation of an overall production run of 1,763 for its own requirements and nearly 700 F-35B and F-35C aircraft for the Marine Corps and Navy, respectively). Even light attack aircraft such as India’s Tejas or Korea’s TA-50 have proven costly, and relatively cost-effective options like Sweden’s Gripen will likely satisfy the needs of only a small number of countries. Moreover, as emerging countries like India, Turkey and Korea have



The French fighter aircraft Rafale in the naval version landing on the runway of aircraft carrier Charles de Gaulle

photo: Pascal Subtil

ploughed significant funds into costly and uncertain fifth-generation Research & Development programs, upgrades and life extension of existing aircraft become increasingly preferable. Transport aircraft, on the other hand, have fared well in the era of expeditionary warfare. In addition to new offerings by established players such as Lockheed Martin and new entrants such as Airbus's A400M, suppliers from Russia, China and Brazil are entering the fray. Beyond their relative affordability, the increasingly multi-purpose nature of such aircraft – ranging from combat support and maritime patrol to search-and-rescue operations and disaster response – accounts for much of their attractiveness.

## 2. A shifting battlefield for UAS

Even before last month's cancellation of Germany's Euro Hawk program, France's decision to procure Reaper surveillance drones – a potential setback to the development of a European alternative – and US president Obama's national security speech on 23 May marking a shift in US policy for drone strikes, the future for the relatively new breed of remotely piloted aircraft looked uncertain. The next five years are unlikely to be a repeat of the past five years, when unmanned aerial systems (UAS) saw a near-doubling of spending. The obstacles are as much political and regulatory in origin as they are economic and technological in nature. High-end systems, in particular, will face significant challenges. The next wave of UAS and high altitude long-endurance (HALE) systems, such as Boeing's Phantom Eye and QinetiQ's Zephyr, are early in their lifecycle and will require significant investment to materialize. Budgets in the US and Europe will remain constrained for years to come, risking further delays for some programs. More likely in the near term is the conversion of a large part of the existing UAS inventory, originally designed for fairly benign

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environments, to more capable aircraft through hardening of communication links and improving survivability.

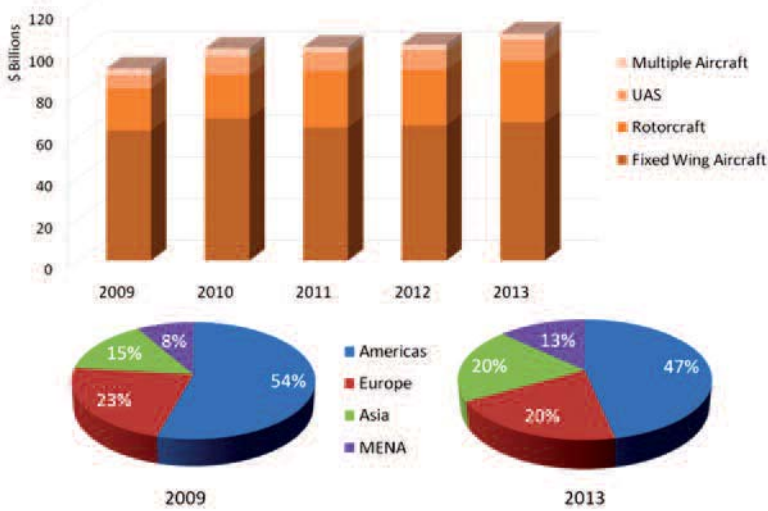
## 3. The rise of the rest

In few areas is indigenization among emerging countries more uncertain, and yet potentially most disruptive to established procurement patterns, than in the aviation space. Aspiring powers across the globe are investing in advanced aircraft



The Ukrainian airlifter Antonov 124, the biggest transport aircraft in service around the world

photo: Dave Ashton



Data captures investment spending in 42 of the world's largest defence markets, excluding China and Russia, accounting for more than 90% of the industry-addressable market.

Source: Avascent Analytics

designs in an effort to strengthen indigenous industrial capabilities. Bolstered by their experience in commercial aerospace, local government support, and defence offset programs, firms such as Korea's KAI, Turkey's TAI, India's HAL, Brazil's Embraer, and China's AVIC have embarked on complex and tenuous military aviation programs. In many instances the end-state remains unclear: are these countries simply priming their industrial base or will these programs result in true platforms? Some countries may split the difference opting for a hybrid solution, as is the case with India's fifth-generation fighter aircraft, largely based on a Russian design. Others may in the end settle for proven foreign solutions. The day, however, when emerging countries will be able to showcase their own successful advanced military aviation programs is not too distant.

#### 4. Fuelling efficiency

While Western Research & Development spending on new military aircraft engines is fairly meagre, one trend driving

future acquisition programs is greater fuel efficiency. Like their civilian counterparts, military aircraft operators are looking for ways to reduce total cost, to which fuel is a key contributor. Military planners, however, have additional operational challenges to contend with, including fewer available domestic and foreign air bases and increased loads in terms of sensors and weapons. One current example is the US Air Force's ADVENT program, aimed at deriving 25 per cent fuel efficiencies, likely through a sophisticated combination of high- and low-bypass turbofan technology. For most countries, however, the answer lies in commercial engine improvements that can trickle down to the military aircraft market. Even China, rare in its willingness to invest significant resources in new jet engine development (estimated by some at €37 billion over the next two decades), will sooner or later have to grapple with the more mundane challenge of fuel efficiency.

#### 5. The next race: MRO

Over the past decades, air forces have amassed an impressive inventory of fixed-wing aircraft and rotorcraft. Lockheed F-16s and C-130s, Boeing F-15 variants, Bell Hueys, Sikorsky Blackhawks and Eurocopter Cougars, trainers like the BAE Systems Hawk and Embraer EMB-312 Tucano and EMB-314 Super Tucano, and MiGs of various designations – to list some notable ones. The sheer diversity of these platforms, combined with countries' increasing propensity to upgrade legacy aircraft rather than procuring new platforms, suggest strong future demand for maintenance, repair and overhaul (MRO) requirements, ranging from life extension to capability upgrades and outright repurposing. The 2012 award to BAE Systems to upgrade more than 130 F-16s in South Korea's fleet was the first time such a major contract on a military aircraft went to a firm other than the original equipment manufacturer (OEM). While this may set only a limited precedent for combat aircraft, platforms closer to commercial technical standards can be expected to attract strong competition by non-OEMs relatively early in their lifespans.



Eurofighter Typhoon over Austria

photo: Max Pfandl, cc