

PATHFINDER



AIR POWER DEVELOPMENT CENTRE BULLETIN

Issue 53, September 2006

TURNING EFFICIENCY INTO EFFECTIVENESS – SWING-ROLE AIR COMBAT CAPABILITY

With the widespread growth of terrorism and insurgency as methods-of-choice in modern conflicts, one could be drawn into thinking that the future of conflict resides in the asymmetric and the unconventional. Certainly the War on Terror is likely to be with us for a significant period yet, and achieving success will require adoption of unique methods to counter such an unconventional adversary. However, while ‘informal violence’ is on the rise, the threat posed by conventional nation-states fielding similar forces to our own is not necessarily diminishing.

For the RAAF this dichotomy provides some unique challenges. It would be wrong to think that low-end conflicts require low-end capability. If anything the reverse is true. In complex terrain such as an urban environment the requirement for high-end airborne ISR capabilities pushes the very edge of the technological envelope—after all, detecting and discriminating terrorists or insurgents who deliberately conceal themselves among the civilian population is a much more demanding task than identifying a tank in an open battlefield. Likewise, the ability to engage these elements using tailorable weapons while minimising harm to innocent bystanders is by no means a low-end capability. Simultaneously, the requirement still exists to defeat advanced adversary air combat aircraft and engage surface targets in complex air defence environments.

For the RAAF there is a clear imperative to maintain a range of capabilities able to contribute across the spectrum. To do this requires an agile force—incorporating versatility and responsiveness—that allows for successful force application at whatever level it is required, whenever and wherever it is needed. At the same time the size of our force requires us to seek efficiencies while still maintaining, even increasing, effectiveness. One of the ways of achieving this agility and of turning efficiency into increased effectiveness is through swing-rolling.

Platforms that are capable of performing more than one air power role are considered to be multi-role. The AP-3C Orion is an advanced ISR platform, a search and survivor assistance aircraft, and an anti-submarine and anti-ship weapon system. The F/A-18 Hornet is capable of counter

air, counter land and counter sea missions. While there are different crew training requirements for each of the different roles, generally only reconfiguration of a multi-role platform before a sortie is required to suit it to a particular type of mission.

Swing-rolling takes this to the next level by allowing for responsive and flexible role change after takeoff and therefore during a sortie. This is not a new concept. Since their introduction, RAAF F/A-18s have been capable of conducting ‘self-escorted strike’ requiring them to be able to both defeat an air threat and deliver air-to-ground munitions. Similarly, the AP-3C is capable of conducting reconnaissance and surveillance, and counter sea roles within the same sortie. However, recent developments in networked communications and flexible munitions have produced significant enhancements to the swing-role capability of single-seat air combat aircraft such as the F/A-18 and the F-35 Lighting II—the Joint Strike Fighter—that will replace it.



The Lockheed Martin X-35 JSF in development. The RAAF will start to induct the F-35 Lighting II around 2012.

In the past the principal issue with swing-rolling was the lack of a suitable command, control and communications system to enable the timely direction and redirection of aircraft following take-off. In the 1991 Gulf War, aircraft were tasked on a 24-hour air tasking order cycle.

Targets were selected days in advance and there was very little, if any, flexibility for a swing-role capability. When operations in Afghanistan began in 2001 the focus had shifted towards time-sensitive targeting, which allowed a degree of flexibility during a mission to attack a target of opportunity. Although this was not generally conducted as a swing-role task but rather through use of 'loitering' single-role aircraft, this shift in thinking was facilitated by a significant increase in the ability to get quality information to the aircrew in a usable and timely fashion.

During the early stages of the 2003 conflict in Iraq, RAAF F/A-18s were able to show just how effective true swing-rolling could be. Launching on a defensive counter air sortie carrying three external fuel tanks, five medium- and short-range air-to-air missiles, a targeting pod and a single laser-guided bomb, RAAF Hornets were able to switch during the mission to undertake air interdiction or close air support, and then return to the air defence role. This both maximised the use of available air hours and allowed the deployment of only a handful of aircraft to achieve results well in excess of their mass. To this end, it is clearly not only the flexibility of the platform, but also the adaptability and professional mastery of the people involved, that enables a true swing-role capability.

The introduction to service of the F-35 in the period from 2012 will allow for even greater flexibility to switch roles during a mission. The F-35 has been designed from the ground up as a swing-role aircraft able to carry a diverse suite of weapons simultaneously and be adept in both the counter air and precision attack roles. The key to enabling the unique swing-role capabilities of the F-35 will be an enhanced network capability that will allow for high-fidelity command and control information to be relayed to an airborne aircraft faster, enabling quicker and more astute action, whether that is the engagement of an airborne threat or a surface target.

In addition to its 18,000 pounds of internal fuel, the F-35 will be able to carry two AMRAAM air-to-air missiles and either two 2,000-pound laser-guided bombs or eight GPS-guided Small Diameter Bombs (SDB), as well as its inbuilt Electro-Optical Targeting System. All of these will be carried inside the body of the aircraft, ensuring that its inherent low-observability characteristics are not compromised, and the endurance and range efficiencies of the aircraft are maximised. A further

16 SDBs could be carried on external pylons if required. With the SDB having an approximate range of 60 nautical miles, the F-35 will be in a position to launch a precision attack without leaving, or departing only briefly from, the counter air role. The SDB will itself be an inherently flexible weapon that can be programmed after take-off to deliver differing kinetic effects matched to the type and nature of the target and operational requirements.

This fusing of air power roles within a single mission will provide a unique capability to the Joint Force commander. Where targets are identified by surface forces, the F-35's networked-capability, responsiveness and flexible munitions will enable swift and decisive engagement. At the same time the measured control of the air essential for any manoeuvre of the Joint Force will benefit from a highly capable, stealthy and well-armed platform. Both of these functions will be realised by a single platform type on a single mission. This inherent swing-role capability of the F-35 will give the RAAF, and through it the Joint Force, a degree of agility significantly greater than it has previously and currently enjoyed, and will ensure that platform efficiency delivers operational effectiveness.

- ✓ *Agility must be a key attribute of a small force for it to be successful against both conventional and unconventional threats.*
- ✓ *Small air forces must seek effectiveness through efficiency to be successful and relevant against a range of threats.*
- ✓ *Swing-rolling is the ability of an airborne system to change responsively from one air power role to another during a single sortie.*
- ✓ *Advances in command, control and communications and flexible munitions have enhanced the swing-role capability of modern and next-generation air combat aircraft.*

It is not the strongest ... that survive, nor the most intelligent, but the one most responsive to change.

– Charles Darwin



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