Foreign Affairs, Defence and Trade Committee
Department of the Senate
Parliament House
Canberra

Date: 6th February 2015

Dear Committee

Re: Inquiry into the potential use by the Australian Defence Force of unmanned air, maritime and land platforms.

Cobham Aviation Services welcomes the opportunity to provide the following response to the Senate Inquiry into the potential use by the Australian Defence Force of unmanned air, maritime and land platforms.

Cobham Aviation Services is a long established aviation services provider with global operations centred in Australia and the United Kingdom (UK). Cobham Aviation Services delivers outsourced aviation operations for military and civil customers focussing on military training, special mission flight operations, contracted commercial passenger operations and aircraft engineering.

Key customers include the Australian and UK governments, the UK Ministry of Defence (MoD), Qantas and many of the major mining companies operating in Australia and Papua New Guinea. We currently operate for our customers in excess of 140 aircraft both fixed and rotary wing delivering in excess of 120,000 flying hours per annum.

Cobham Unmanned Systems Experience

We well recognise the benefits that unmanned aircraft will bring to the Australian environment, particularly for the airborne surveillance operations we have provided to the Australian Customs and Border Protection Service over the last 20 years. In support of this operation we have actively monitored unmanned systems developments with the US Military and the US Customs and Border Protection Service and well understand the benefits that these systems offer.

We have developed a strong relationship with General Atomics, the world's largest manufacturer of the more sophisticated unmanned systems, which include the well-known Predator series of unmanned aircraft. We have supported Defence trials of unmanned systems in Australia, been involved in developments and trials with General Atomics and are an active participant in the industry body the Australian Association for Unmanned Systems (AAUS).

In our response we will restrict our detailed comments to those areas of which we have specific knowledge and expertise. In particular we will focus on the use of the larger more sophisticated airborne unmanned systems in the airborne surveillance role. To be consistent with Australian Defence Force (ADF) terminology, the Australian Civil Aviation Safety Authority (CASA) and the International Civil Aviation Organisation (ICAO), we will refer to them as Remotely Piloted Aircraft Systems (RPAS). This description correctly portrays what they are, how they are operated - particularly that there is a human involved in the operating process - and it removes the preconception of automatic operations and computer decision making without human involvement.

a) their role in intelligence, reconnaissance and surveillance operations, including in support of border security, civil emergencies and regional cooperation;

In general there are two core underlying benefits of RPAS. Firstly the removal of the human endurance and fatigue factor that requires manned aircraft to transit to and from a support base from the on task location to change out crews. This limits manned aircraft operations (generally 5 – 12 hours depending on aircraft type and crew complement).

Secondly, and specific to the military context and in some cases police operations, the removal of pilots and aircrew from harm's way. These two underlying benefits have driven the development and recent proliferation of RPAS in the military context. These core underlying benefits will similarly drive the initial adoption of RPAS in the civil environment in the short to medium term.

The underlying benefits provide an immediate gain for the Intelligence, Surveillance & Reconnaissance (ISR) role and hence this role has been the early adopter of military RPAS, particularly the larger RPAS with longer range and longer endurance and that can operate beyond line of sight.

Without humans on board, crew accommodations and life sustaining equipment can be removed and given over to carriage of fuel, sensor and communications equipment. Crew changes still occur but at a remote centralised location much like manning a 24 hour office, than the logistical intensity of a typical deployed manned aircraft operation.

This results in the larger class of RPAS able to sustain missions in excess of 40 hours at high altitude and in excess of 20 hours at lower altitudes. These long endurance capabilities result in two further advantages for the ISR role. Firstly, for the same number of flying hours the percentage of 'on task' compared to transit flying is dramatically increased (as the following simplified table exemplifies) resulting in a substantial operational efficiency and logistical investment benefit.

Transit Flight Time (Hrs) to On Task Position	On Task Flight Time (Hrs) / % of Flight Time On Task	
	Manned Aircraft (8 hour endurance)	RPAS (30 hour endurance)
1	6 hrs / 75%	28 hrs / 93%
2	4 hrs / 50%	26 hrs / 87%
3	2 hrs / 25%	24 hrs / 80%
4	0 hrs / 0%	22 hrs / 73%
Assumes Manned Aircraft & RPAS transit and on task speeds are equivalent		

(b) their cost- and combat-effectiveness in relation to conventional military platforms;

The second is an operational employment benefit where this unmanned efficiency factor leads directly to the ability to be able to conduct persistent surveillance. Persistent surveillance offers significant and unique advantages to the military planner as well as to civil surveillance operations.

The ability to provide constant surveillance to troops on the ground particularly in insurgency conflicts is an advantage that is well recognised and has featured in recent Australian military missions in both Iraq and Afghanistan. Albeit delivered via urgent operational requirements acquisition routes rather than from within existing Defence capability inventory. Whilst always possible to utilise manned aircraft, the logistical commitment, deployed manpower involved and resultant cost is operationally prohibitive as the following simplified table highlights.

Mission – 24 flight hours on task at 2 hours transit from base	Missions Required	Crew Shifts Required	Total Flight Time Required
Manned Aircraft (8 hr endurance)	6	6	48
RPAS (30 hr endurance)	1	4	28
Assumes Manned aircraft & RPAS transit and on task speeds are equivalent			

Irrespective of the civil or military operator of the RPAS or the role employed - Military ISR or support to border security, civil emergencies or regional cooperation - it is these key benefits that the larger RPAS bring to each of these tasks.

However it needs to be noted that the use of high end military ISR capability, RPAS or manned, to deliver civil surveillance outcomes is a misuse of military capability and is provided at very high cost to government. This is because military platforms are designed, developed, crewed, trained for and operated for use in complex hostile conflict environments. A good example of this is the current Border Protection airborne surveillance system where less than 10% of the operation is provided by military aircraft. Our experience has identified that the all up cost per unit of surveillance output delivered by the civil contracted operation is approximately one tenth the all up cost of the military contribution. A similar cost differential would be applicable to civil V military RPAS operations.

The Australian geographical circumstance both domestically and in our typical international spheres of influence are characterised by vast areas, huge distances and small distributed populations. Airborne surveillance operations in such areas are the only effective alternative but result in large surveillance focal areas and long transit distances from support bases to on task locations.

Hence RPAS operations with their extreme range and very favourable on task to transit flight time ratios, borne of their long endurance characteristics, are particularly suited to the Australian conditions, in addition to the obvious benefits from a conflict perspective of delivering force protection to ground troops whilst removing pilots and aircrew from harm's way environment in the close air support role.

c) the Government's force structure review and defence capability plan;

The rapid and exponential growth in the adoption of unmanned technology, particularly aircraft, by militaries is a worldwide phenomenon led by the US. The rapidity of this growth has outstripped the slow pace of Australia's military capability acquisition process. Such that the current Defence Capability Plan for unmanned systems is not reflective of the current capability requirements or thinking within the Defence Forces.

The current White Paper development and associated Force Structure Review, Defence Capability Plan and appropriate Defence budget are the opportunities for the capability acquisition process to catch up and deliver unmanned systems to the ADF that it requires to maintain Defence capability advantage in today's world.

RPAS retain all the characteristics of aircraft and hence their introduction and deployment can follow much the same route as applicable to manned aircraft. Their widespread introduction and use in shared and congested airspace and airports in Iraq and Afghanistan with almost no conflicts with manned aircraft provides a window into their introduction into wider military use and indeed into domestic civil airspace in due course. What risks exist are well known and can be treated.

(d) challenges, opportunities and risks associated with their deployment;

The challenge with RPAS are the communication links, as the sensors on board are able to collect a vast array of data that has to be passed to a ground station and/or troops on the ground in order to be able to become 'actionable intelligence'. Particularly where beyond line of sight operations are involved high bandwidth satellite datalinks are required.

Interestingly the vast majority of satellite communications for the US Military RPAS operations are provided by commercial satellites and the same is equally applicable to Australian RPAS operations when beyond line of sight operations are contemplated.

The real opportunity associated with deployed RPAS operations using beyond line of sight high bandwidth satellite communications is that it can be done with a very small forward logistical and manpower footprint. The vast majority of the manpower and intelligence processing can be done 'on base' back in Australia and yet be able to provide real time or near real time actionable intelligence to in theatre operations. This is a significant force multiplier development not often appreciated in the general conversation associated with RPAS operations.

(e) domestic and international legal, ethical and policy considerations;

Much of the public conversation is around the legal and ethical issues. It needs to be noted that there is no intent to amend or contravene the international law of armed conflict or exempt Australian RPAS operations or operators from the rules of engagement applicable to the employment of the rest of the Australian Military's armoury inventory.

(f) research and development capabilities and Australia's industrial expertise;

Australia was at the forefront of early RPAS developments, the Aerosonde RPAS being the extant example. Subsequently development has predominantly being driven from out of the USA on the back of the US Military's rapid adoption of airborne RPAS technology. From an Australian industry perspective it is most logical to follow the manned aircraft industry model driven by the market size where the larger more complex platforms originate from the established manufacturers and Australia's RPAS manufacturing opportunities focussed on the smaller platforms and the development of unique sensor packages for integration into the larger platforms.

There is an important distinction between RPAS program spending compared to a manned aircraft program expenditure which is particularly relevant for Australian industry. Because of the persistent surveillance capability and a greater proportion of the aircraft given over to fuel, sensor and communications equipment, the through life spend on the support elements are a far greater percentage of the total cost compared to the initial acquisition cost. This is important because typically aircraft acquisition outlays are predominantly spent overseas and through life outlays are predominantly spent within the Australian domestic economy. When looked at from a total cost of operation over the platform life, an RPAS will have a far higher percentage spent within the Australian domestic economy than an equivalent manned aircraft operation.

Integrated manned aircraft and RPAS operations have enjoyed a long development gestation in the Iraq and Afghanistan conflicts. The lessons from these operations in the context of the more congested airspace of the US and Europe are driving significant developments in 'see and avoid' technology. Whilst these technologies are essential for a smooth integration

(g) transport, health and air safety implications; and

(h) other related matters.

of manned aircraft and RPAS in civil airspace, the real benefit in our view will be the fairly rapid adoption of the RPAS 'see and avoid' technology back into manned aircraft operations.

The larger RPAS already carry the same see and avoid equipment as manned aircraft, such as 270 degree nose mounted cameras monitored real time by a pilot, transponder, TCAS, ADSB, aviation band radios. In addition their ISR sensors, radar, high end electro optic stabilised turrets, Direction Finding (DF) equipment and other payloads arguably provide better situational awareness than a pilot in a manned aircraft. The issue with much of this relates to lack of regulatory coverage and that then flows through to lack of an accepted standard and inability to certify against a standard. This lack of regulation and standards coverage is the real issue as most of the technology required is in existence.

In the Australian context our largely open uncongested skies (outside of the major population centres) are ideally suited to a risked based approach to RPAS operations whilst the regulatory and standards development processes catches up to the technology already in existence.

In summary

- Cobham Aviation Services sees the significant benefits that Unmanned Systems and specifically the larger RPAS will bring to ADF and other ISR operations.
- RPAS offer the following key benefits to the ADF;
    - the removal of pilots and aircrew from the harm's way environment whilst still being able to provide support to troops deployed on the ground;
    - a persistent surveillance capability;
    - an ISR efficiency not able to be matched by manned aircraft;
    - forward deployment with only a small logistical and manpower footprint; and,
    - the ability to utilise the significant 'on base' resources in Australia to deliver actionable intelligence to troops on the ground.
- RPAS operations are not strictly the domain of the ADF and civil contracted operations will have similar cost efficiencies as is experienced with manned aircraft operations.
- Australia's geography is ideally suited to reap the operational benefits that RPAS operations offer.

- Regulatory, standards and certification developments are under way but are currently restricting and limiting the pace of adoption of RPAS particularly where operations involve shared airspace.

Cobham appreciates the opportunity to contribute to the Senate Inquiry and if required will make ourselves available for any further follow up the Committee may require.

Yours sincerely

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