Foundation Elements of an Australian Defence Unmanned Aircraft Systems (UAS) Industrial Ecosystem

A submission to the Senate Foreign Affairs, Defence and Trade References Committee inquiry into the potential use by the Australian Defence Force of unmanned air, maritime and land platforms.

5 February 2015

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Executive Summary

This submission to the Senate Foreign Affairs, Defence and Trade References Committee proposes the development of a national Unmanned Aircraft Systems (UAS) industry strategy which links Defence requirements with broader national capacities, providing expanded operational capability and support through enhanced links with the commercial sector.

It is observed that Defence's existing UAS capability development measures are reflective of a learning organisation with outcomes unaligned with the significant capital expenditures seen over the course of the past decade. Since 1 July 2000, Defence has placed UAS capability related contracts to a value estimated to be now nearing A$750 million, yet has little to show for this in current capability terms.

This submission holds that Defence's future UAS capability needs are best addressed by developing and adopting a national Unmanned Aircraft Industry Strategy which links its requirements with the rapidly expanding domestic commercial UAS sector. The proposed national UAS strategy would be jointly developed by Defence; the Federal Department of Industry; Australian research and development organisations; Australian manufacturing industry at a broad level; Australian UAS manufacturing industry in the particular, and Australian commercial UAS operators. Deeper engagement of DSTO with domestic industry is sought as part of this initiative.

This submission calls for the establishment of domestic sourcing thresholds for Group I and Group II UAS adopted by the Australian Defence Force (ADF) as a means of reducing its costs of acquisition, operation and support by linking with commercial development activity. Defence's historical experience with Group I UAS such as the Elbit Skylark 1 clearly demonstrates that acquisition is in fact a lesser expense than maintenance, sustainment and repair.

This submission calls for a revised approach to the development of industry engagement for the planned acquisition of the Northrop Grumman MQ-4C Triton as the objective solution for Project Air 7000 Phase 1B. Specifically, ACUO calls for an extensive review before Second Pass approvals examining how Australian industry can engage constructively and meaningfully with this important project to provide enduring and efficient support for Triton in Australian service.

This submission proposes formal establishment of project offices for developing ADF Group IV UAS and Royal Australian Navy maritime UAS capabilities. Such project offices should be structured to allow for increased force experimentation, phased capability development, and intelligent approaches to future system acquisition and fielding through deep and

continuing engagement with Australia's UAS industrial base at the broadest possible level. Australia significantly lags allied and partner nations in their development of VTOL UAS capabilities and ACUO recommends a phased approach which would begin with Group II or Group III systems optimised to meet the needs of the RAN.

This submission proposes establishment of a commercially provided UAS training capability for the ADF at the Group I and Group II level by leveraging the near 200 commercially certified UAS operators already trading in the Australian domestic market. An indigenous Australians UAS training and development initiative is proposed as an extension of Defence's existing NORFORCE and Defence Indigenous Development Programs. This proposal aims to link Defence, other Federal and state government and commercial requirements for imagery and spatial data across northern Australia with employment and opportunity creation in remote communities.

Australia's role as a member of the western alliance is identified by this submission as providing opportunity for stepped up cooperation across the Asia Pacific based on common interests in UAS capability development and countering hostile UAS proliferation. This submission proposes formation of user communities addressing common interests and system fielding in Group IV and Group V, and establishment of an Australian hosted counter-UAS initiative.

Lastly, this submission proposes stepped up engagement of Defence in the development of a coherent national and international regulatory regimes for UAS of both civil and military types. The ADF cannot attain the level of proficiency it seeks in UAS operations without wider regulatory restructuring and reform. At the same time civil aviation regulators are under-resourced to meet extant civil as well as emergent Defence specific requirements. A cooperative approach is urged with Defence taking on responsibility for a number of key regulatory steps, including development of science-based safety cases for Group I and Group II systems, and initial work on regulations for beyond visual line of sight operations.

This submission presents a total of 41 specific recommendations aligned with the broad goals set out above. ACUO accepts that not all of these recommendations will attain support, but intentionally presents a wide field of prospective activities to help the current Committee inquiry develop a coherent assessment of the broad opportunities which are inherent in the ADF's ongoing UAS capability development program. ACUO holds that there are a significant opportunities waiting to be leveraged, and it is in the national interest that these be explored at every opportunity given the benefits on offer.

ACUO approves the public release of this submission by the Senate Foreign Affairs, Defence and Trade References Committee.

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This submission by ACUO is approved for public release and publication in its entirety by the Australian Senate Foreign Affairs, Defence and Trade References Committee inquiry into the potential use by the Australian Defence Force of unmanned air, maritime and land platforms.

Acknowledgement: ACUO wishes to publicly express its appreciation of the extensive contribution made by Peter La Franchi, Australian Head of Mission, UVS International and Head of Strategy and Commercial, LFRG Pty Ltd, to the researching, writing and coordination of this submission.

Inquiry Terms of Reference

The potential use by the Australian Defence Force of unmanned air, maritime and land platforms, with particular reference to:

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

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

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

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

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

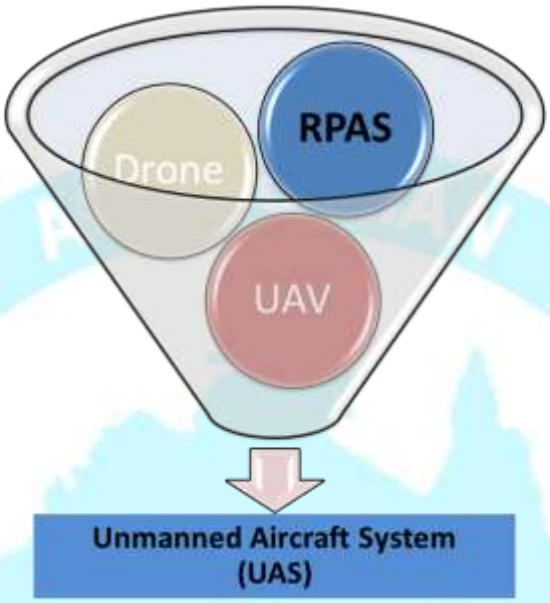
(f) Research and development capabilities and Australia's industrial expertise;

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

(h) Other related matters.

Notes

1. Terminology:



This submission uses standard International Civil Aviation Organisation (ICAO) terminology for unmanned aircraft systems as promulgated in ICAO Circular 328, AN/190, of 3 March 2011.

Under this guidance, unmanned aircraft system (UAS) is the capstone, all-encompassing term referring to all classes of aircraft which are operated *with no pilot on board*. The plural of UAS is *UAS*.

The ICAO terminological guidance identifies two primary families or classes of UAS types: autonomous aircraft and remotely piloted aircraft.

An autonomous aircraft is classified as an unmanned aircraft that *does not allow* pilot intervention in the management of flight.

A Remotely Piloted Aircraft (RPA) is an aircraft where the *flying* pilot is not on board the aircraft. The plural of RPA is *RPA.*

A Remotely Pilot Aircraft System (RPAS) is a system of elements consisting of an RPA, its associated remote piloting station, command and control links and other architecture elements as required. The plural of RPAS is *RPAS.*

It should be noted that an RPAS can, at a variety of stages of flight, engage in *autonomous operation* where the pilot is not directly intervening in the management of the flight, however this is a concept distinct from *autonomous aircraft* in the broad. ICAO reserves the term *autonomous aircraft* to designate those future systems characterised by extremely high levels

of artificial intelligence which would facilitate operation independent of human beings at all stages of their operation. There is no such technological capability in existence today.

The term Unmanned Air Vehicle (UAV) is the product of earlier terminological systems used prior to the issuing of Circular 328. The term UAV is used in this document as part of the correct names of organisations as legally established and incorporated in Australia.

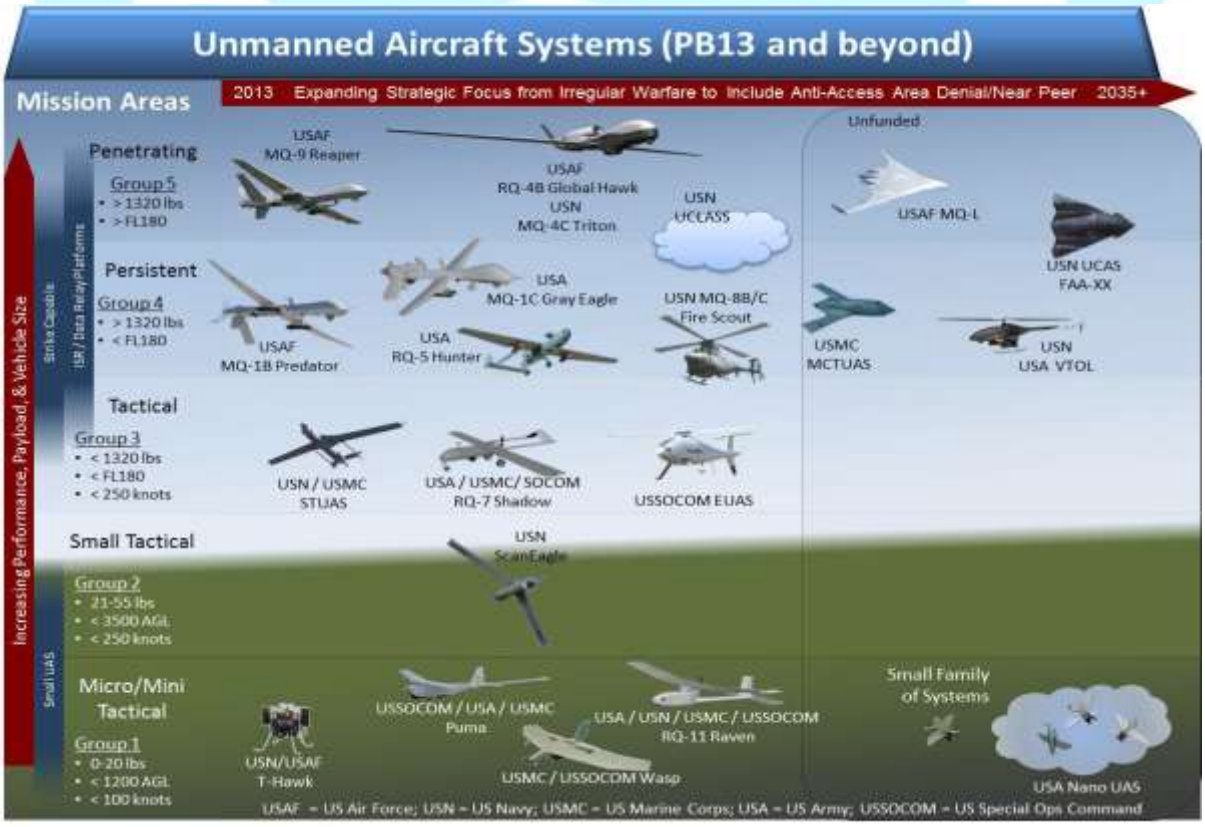
The term 'drone' technically refers to an RPAS optimised for use as a target for live weapons training by military air defence systems, but is also popularly used to refer to UAS in the broad. All usage of the term drone in this submission is based on that technical meaning rather than the populist usage.

ICAO Circular 328 forms the basis of all relevant terminology used in aviation regulations as developed and promulgated by the Australian Civil Aviation Safety Authority.

2. Classification:

This submission uses the standard US Department of Defence UAS classification of air vehicles by Group, this same taxonomy having been adopted by most western defence forces including the Australian Department of Defence.

The following table, taken from the US Department of Defense UAS roadmap to 2038, illustrates the Group concept by reference to a variety of US operational military types. References to a specific Group level as contained in this submission can be cross referenced against this table to identify a representative UAS type and the respective place that representative type holds or would hold in the overall Australian Defence Force UAS capability mix.

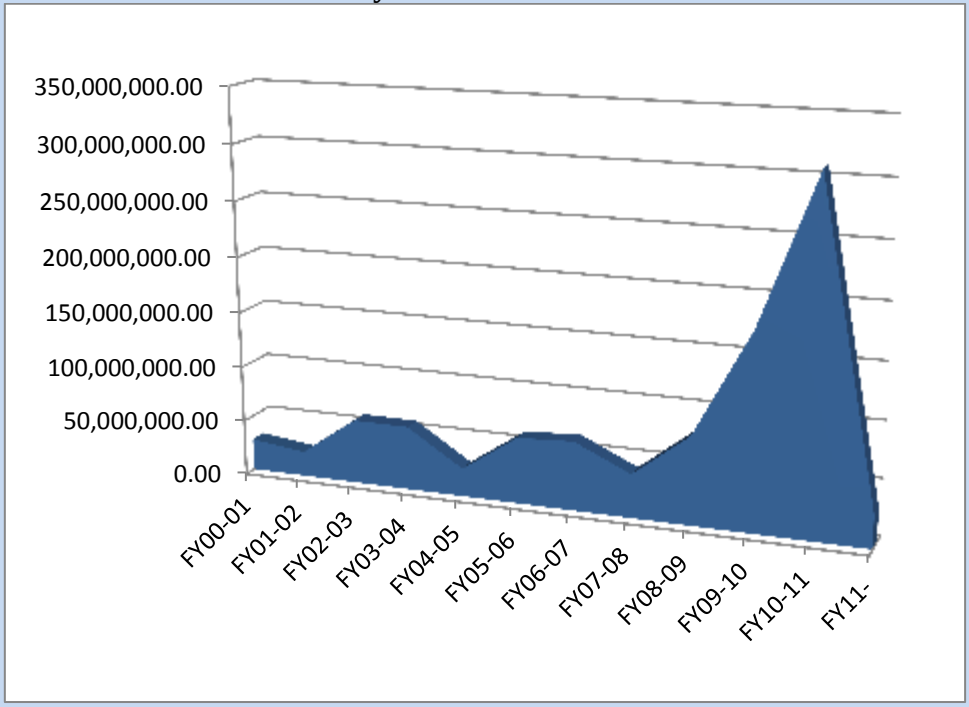


1. Introduction

The Australian Defence Organisation has been progressively developing unmanned aircraft systems capabilities through a variety of programs and experimentation activities since the end of the Second World War. Despite this enduring engagement, the actual capabilities currently fielded by the Australian Defence Force (ADF) are thin when examined in comparative terms with Asian neighbours such as Singapore and India. This same disparity can likewise be seen when examining the respective UAS capabilities of key allies such as the United States, the United Kingdom and, as a result of new relationships structured in mid-2014 with NATO.

This disparity comes despite efforts within the Defence Capability organisation to develop coherent approaches to UAS capability in the broad, the most enduring expression of which was a short lived roadmap for unmanned systems which was first made available to industry in June 2004 and updated in November 2006. That document is understood to have since been discontinued by Defence, specifically in its releasable form. This is despite its enormous potential and past value as living guidance to the entire Defence Organisation and the Australian unmanned systems industrial base in its broadest possible context.

Table 1: Whole of Australian Federal Government UAS spending by contract award values 1 July 2000 to 31 December 2011.



Note: Amounts are in Australian dollars. Trend line shows contract award values average across 12 year period. Source: LFRG Pty Ltd. Used with permission.

The limited UAS capability now fielded by the ADF comes after significant financial outlays over the past 14 years. Analysis of whole of Australian Federal Government contract awards for the period July 2000 to December 2011 (see Table One) reveals commitments for UAS-specific capabilities totalling A$548.2 million, only one percent of which was not in support of Defence requirements.

Preliminary analysis of whole of Federal Government contract awards for the additional period January 2012 to June 2014 suggests that combined total since July 2000 is now in the order of A$0.75 billion, this remaining dominated by Defence outlays. This spending is significant in terms of its shaping effect on the Australian market for UAS in the broad, vastly outweighing the monetary value of the commercial sector as has come into being. Likewise this spending is dominated by contracting with international original equipment manufacturers, with few opportunities emerging from domestic industry as a whole.

The discrepancy between those fiscal commitments and extant ADF operational capability as now exists points to a problematic engagement by Defence with the Australian UAS industrial base at a broad level, with Table Two (below) analysing and summarising this history for the period 1995-2014.

Table 2: Primary Characteristics of Australian Defence Force UAS Acquisition Projects 1995+

Thematic	Specific Project Examples
Outright project failures	• Joint Project 129 Phase 2, where the initial competition was predicted on acquiring proven capability but instead DMO purchased a wholly developmental system ultimately requiring Ministerial intervention and contract cancellation, followed by sole sourcing of the Textron Shadow 200B via the United States Foreign Military Sales program with limited local industry involvement. • Joint Project 7, acquisition of a replacement air defence target system, with tender documents mandating proven capability. In 1997 the then Defence Acquisition Organisation selected the Tracor MQM-107E, a developmental system based an existing US Navy target drone, rejecting a number of systems that were commercially available and in series production for a variety of armed forces. The MQM-107E, designated Kalkara by the ADF, suffered extensive technical problems which prevented initial operational certification until April 2002 with full operational release finally achieved in mid-2007. The system was then withdrawn from ADF service just eight months later, in February 2008.
Continually sliding milestones for new capability developments as a result of poor Defence budget management	• Air 7000 Phase 1B, originally entered into the Defence Capability Plan in 2004 as Joint Project 2062 but only received first pass approval in 2014. • Joint Project 66, intended as a fully integrated aerial targets acquisition effort only to repeatedly slide in priority and funding allocations. Five years passed between the release of tenders in February 2008 and a decision to scrap that competition in favour of adoption of a US Navy Foreign Military Sales solution for high level capabilities and ad hoc sourcing structures for low end capabilities. • Joint Project 129 Phase 4, now Project Land 129 Phase 4, originally scheduled for approvals in 2012 with the intention to acquire the Aerovironment Raven B via the US Foreign Military Sales but then deferred with a new first pass approval rescheduled for 2015. In December 2014 Defence sole sourced acquisition of Aerovironment Puma AE and Raven B systems. It remains unclear whether this deal is an objective solution for JP 129 Phase 4 or an interim step linked to operational needs.

Missed opportunities	• Australia trialled a base model, Australian-designed Aerosonde air vehicle during Solomon Island intervention mission of 2003 but rejected the option of it as a solution for Joint Project 129 Phase 2 despite a clear capability growth path. The next generation of the Aerosonde is now in operational service with the US Navy with series production underway at the Textron Aerosonde plant in Melbourne. That the ADF is not a user, while the USN is, raises significant questions regarding Australian Defence attitudes to domestic industry product in the broad. • BAE Systems Australia once hosted one of the world's premier autonomous systems centres with over 100 employees, this evolved in part from work on the Nulka active decoy program. In 2004 the capability resident in the centre began flowing directly into the UK Ministry of Defence's future offensive air system capability demonstration program, including the Taranis unmanned combat air vehicle demonstrator project. BAE Systems bid the original JP 129 Phase 2 teamed with AAI, offering Shadow 200. The bid proposed an industry program which would have made BAE Systems vast technical expertise directly available to the Australian Defence Force, put the AAI Shadow 200 into Australian operational service in 2007-2008, and provide a means by which Australia could have directly influenced the evolution of the parent US-Army program. Australian instead selected a developmental solution, with BAE Systems since relocating the bulk of the Australian autonomous systems centre to the UK and redeploying other staff internally.
Failed multinational cooperation activities	• Air 7000 Phase 1B formal and funded membership of the United States Navy Broad Area Maritime Surveillance program during project definition and source selection phases, Australia then withdrawing from that program due to poor management of the Defence Capability Plan, only to re-engage in the BAMS program in 2014 but with reduced global supply chain roles for Australian industry.
Lease arrangements for provision of UAS as intelligence, surveillance and reconnaissance assets for deployed forces with only limited returns to Australian industry and limited enduring operational capability for the ADF	• Scan Eagle services from Boeing Australia and Insitu Pacific initially created a domestic industrial entity capable of manufacturing and modifying Group II UAS in Australia and supporting a workforce of more than 100 highly skilled individuals, however ending of that lease arrangement resulted in significant job losses. • Heron services from MDA of Canada has provided some opportunity for Australian industry but the overall cost of service operations over the lease period could have funded the outright acquisition of a Group IV UAS direct from an OEM as a permanent ADF capability.
Poor in-service support planning	• Aerovironment Raven A, acquired commercially in 2004 to provide capability to deployed Australian Special Forces but with the systems overall service life less than two years because no structured in service support was contracted. • Elbit Skylark, acquired in 2005 as objective replacement for Raven in Afghanistan and Iraq but with the cost of in service support and operation higher than the cost of acquisition and system retired from regular Army service within five years.

Short term experimentation and research and development activities with no residual operational capability	• Multiple DSTO Concept Technology Demonstration projects, examples being FURI and BIOSEEKER, which have not transitioned into operational capabilities due to a lack of correlation between Defence's acquisition and CTD programs. • Stand-alone projects such as the DMO-led Sonobuoy delivery UAS project which was sole-sourced despite total outlays passing the threshold for creation of a Minor Capital Equipment project and developed as a totally separate activity to the Royal Australian Navy's own UAS capability development program. The ultimate failure of this specific project comes despite there being widespread technical expertise within Australian industry which could have readily resolved the challenges encountered, expertise which the DMO maritime ranges project office never sought to engage.

The global UAS sector has undergone a revolution between 2000 and 2014 with leading edge capabilities now no longer restricted to traditional aerospace and defence manufacturing conglomerates. Nor is the underpinning technology associated with UAS subject to the lengthy research and development lead times associated with defence products. Contemporary UAS development cycles are instead more closely aligned with consumer technology trends, this facilitating a tempo which is also well ahead of the timeframes associated with research and development as conducted by traditional academic institutions. Small to medium enterprises, leveraging their inherent nimbleness and adaptivity, are playing a key role in shaping the future of the sector in its wholly commercial as well as defence dimensions. This shift poses challenges for the Australian Defence Organisation in the broad, requiring adoption of a posture of continual learning in its doctrinal, technological and acquisition practices if it is to attain the full benefits of the ongoing UAS revolution.

Defence is not alone in the challenge of coming to terms with this rapid pace of change within the UAS sector, the industry itself being under constant pressure to adapt and evolve. ACUO holds that the commonality of that challenge presents very real opportunities for Defence and industry to develop a more cohesive approach which delivers substantive benefits to all participants. There is an immediate need for Defence to examine options for higher order linkages between the Australian national UAS industrial base and its own requirements, one where the innovative and unstoppable growth of the commercial sector can be leveraged in positive ways.

Adopting the forward-looking stance of the Senate inquiry, this paper explores existing and emergent ADF capability requirements and initiatives, and links these with corresponding attributes of the national UAS industrial base. The outcomes of that analysis have been expressed in this paper as recommendations for action on a necessarily broad level. ACUO holds that the initiatives proposed by this submission stand to facilitate more successful capability development, broader capability reach and inter-service interoperability, and an overall better return on investment in this technology for the Australian Defence Organisation as a whole. The key to achieving this, ACUO contends, is the development of a national UAS sector strategy.

2. A national UAS Industry Strategy

Australia is unusual in global terms in that it does not have a national strategy for its UAS sector, neither in the Defence specific nor the broader commercial market contexts. Defence's own short-lived public domain Unmanned Systems roadmap was last issued in November 2006, almost a decade ago (see Table Three). Likewise, in wholly commercial terms the only consideration of UAS industrial capacity as a national asset was a brief inclusion in the Australian Federal Government Aviation White Paper of 2003. The 2009 Aviation White Paper was wholly silent on UAS industry policy. For an industry undergoing extraordinary global growth and innovation, this national strategy void contrasts sharply with the priority being accorded to the sector by governments in the United States, Europe, Asia and the Middle East.

Australia's UAS industry has achieved much in the past decade.

- There are now some 200 certified commercial UAS operators serving all Australian states and territories, with these same firms having significant links with the global UAS supply chain.

- There are a multitude of small airframe, sensor, avionics and operating system developers.

- There are a small number of more capable entities which have UAS in limited rates of series production for commercial and military customers globally.

This national industrial base will grow regardless of what actions governments do or do not take; but the absence of considered national planning means the sector is also exposed to headwinds and shackles that only benefit the industrial bases of other nations.

These domestic headwinds and shackles include:

- Australian universities regularly launch new research programs with funding support from the Australian Research Council to develop capabilities which are already available commercially in the national and international marketplace.

- CSIRO and DSTO launch programs that have extraordinary potential but conduct their research largely in isolation to the domestic industrial base which might be capable of supporting the extension of these initiatives into the global market.

- Federal and State government law enforcement entities buy UAS at significant cost but, as with the early history of railways in Australia, different systems with different capabilities and support needs are adopted by different states with the result being that efficiencies cannot be developed in the broad.

- Defence buys and operates a variety of UAS types, but by not engaging with the national industrial base in effective ways, is then required to carry alone the heavy fiscal burden of research and development, testing, production, training, operational work up and all allied costs associated with such technology shifts.

Australia cannot afford to approach Defence capability planning and development in isolation from extant national realities, particularly given the demands this places on the Federal budget. Defence may be partially unique in its capability needs, but it nonetheless remains an intrinsic element of the Australian economy.

Likewise, Australian industry cannot provide cost effective and efficient means of capability supply and support to Defence if the overall patterns of demand operate in isolation to wider market realities. The interests of both sides of this complex supply and demand dynamic require considered approaches lest economics alone render one or both parties incapable of playing their respective roles to the satisfaction of the other. In this context, the absence of a national UAS industry strategy stands as a reflection of disparate interests, whose collective strength remains under developed and whose potential to support Defence needs is likewise compromised. A coherent industrial ecosystem is now required to address these challenges.

ACUO proposes:

Recommendation 1: Defence, as part of the new Defence industry policy framework emerging out of the 2015 White Paper, commit to supporting creation of a national UAS industry strategy with this to be first issued by the end of CY2016.

Recommendation 2: That this national UAS industry strategy be coordinated by either the Department of Industry or the Department of Prime Minister as a functional extension of both the 2015 Defence White Paper and ongoing reviews of the Australian innovation system. Via this leadership, the UAS industry strategy will engage with all Australian Federal and State agencies, Australian industry in the broad and Australian research and development entities.

Recommendation 3: That the proposed national UAS industry strategy be treated as a living document, the evolution of which provides currency with the demands of the full spectrum of civil and military users in Australia, as well as prospective international markets.

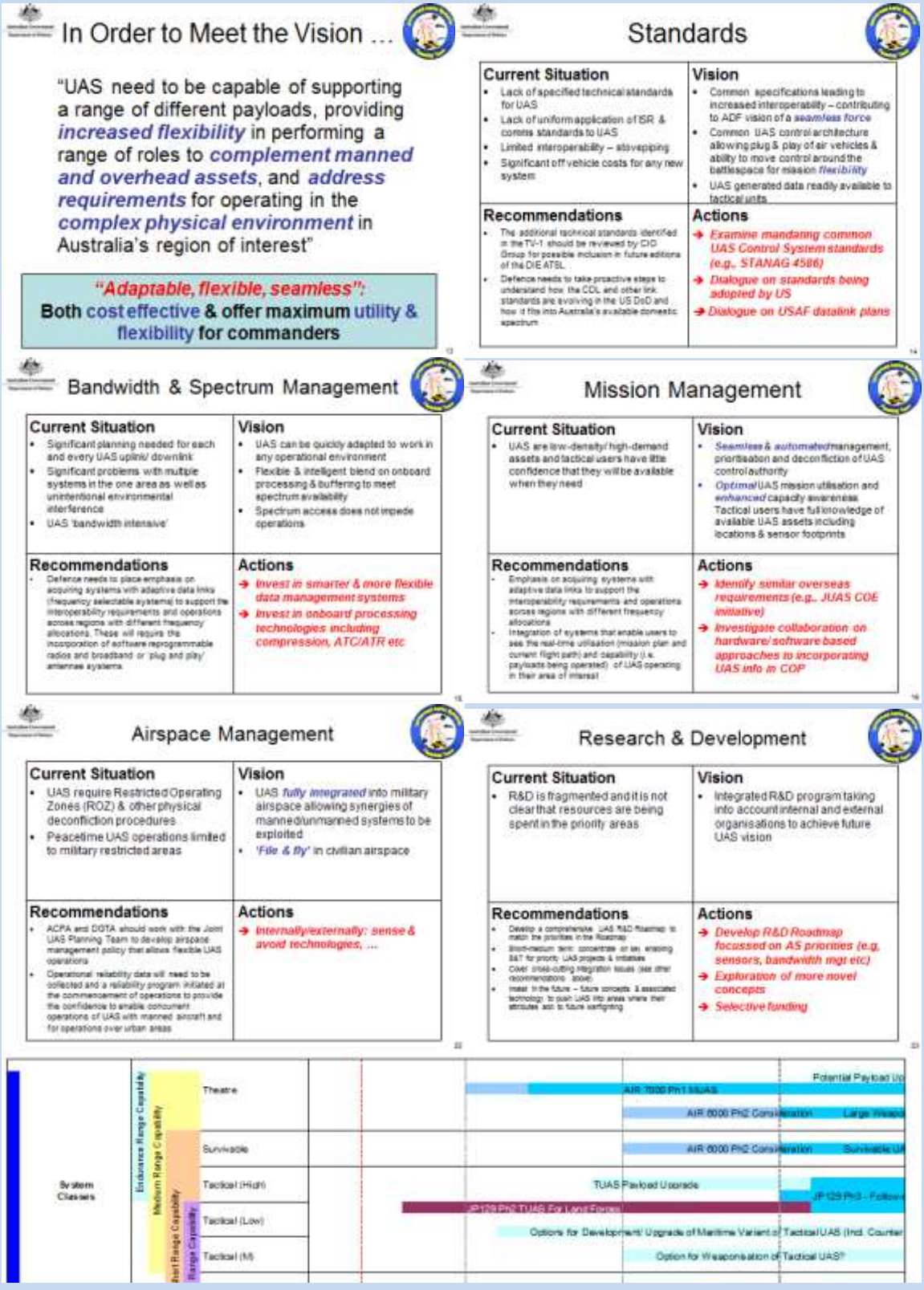
Recommendation 4: That the proposed national UAS industry strategy be identified and accepted as a key source of guidance by Defence in its planning of future UAS capabilities, including all UAS related research and development activities by DSTO and the RPDE organisation.

"Every defence force in the world is trying to get a competitive advantage in relation to UAVs and the fact that we are developing some local technologies within Australia which will help give us an edge in certain areas, I think, is something that's very good to see"

Defence Minister, Senator Robert Hill,
Doorstop interview transcript, 22 September 2004
http://parlinfo.aph.gov.au/parlInfo/download/media/pressrel/4IVD6/upload_binary/4ivd63.pdf;fileType=application%2Fpdf#search=%22UAV%202000s%22

Table 3: Extracts from the November 2006 update of the Australian Defence Force Unmanned Air Systems Roadmap.

- As presented by Dr Peter Maguire, Head UAS Planning Team, Capability Development Executive, Australian Defence Headquarters, to the Defence Air Environment Working Group meeting of 17 November 2006



In Order to Meet the Vision …

"UAS need to be capable of supporting a range of different payloads, providing *increased flexibility* in performing a range of roles to *complement manned and overhead assets*, and *address requirements* for operating in the *complex physical environment* in Australia's region of interest"

"Adaptable, flexible, seamless":
Both cost effective & offer maximum utility & flexibility for commanders

Standards

Current Situation	Vision
• Lack of specified technical standards for UAS • Lack of uniform application of ISR & comms standards to UAS • Limited interoperability – stovepiping • Significant off vehicle costs for any new system	• Common specifications leading to increased interoperability – contributing to ADF vision of a *seamless force* • Common UAS control architecture allowing plug & play of air vehicles & ability to move control around the battlespace for mission *flexibility* • UAS generated data readily available to tactical units
Recommendations	**Actions**
• The additional technical standards identified in the TV-1 should be reviewed by CIO Group for possible inclusion in future editions of the DIE ATSL • Defence needs to take proactive steps to understand how the CDL and other link standards are evolving in the US DoD and how it fits into Australia's available domestic spectrum	→ *Examine mandating common UAS Control System standards (e.g., STANAG 4586)* → *Dialogue on standards being adopted by US* → *Dialogue on USAF datalink plans*

Bandwidth & Spectrum Management

Current Situation	Vision
• Significant planning needed for each and every UAS uplink/ downlink • Significant problems with multiple systems in the one area as well as unintentional environmental interference • UAS 'bandwidth intensive'	• UAS can be quickly adapted to work in any operational environment • Flexible & intelligent blend on onboard processing & buffering to meet spectrum availability • Spectrum access does not impede operations
Recommendations	**Actions**
• Defence needs to place emphasis on acquiring systems with adaptive data links (frequency selectable systems) to support the interoperability requirements and operations across regions with different frequency allocations. These will require the incorporation of software reprogrammable radios and broadband or 'plug and play' antennae systems	→ *Invest in smarter & more flexible data management systems* → *Invest in onboard processing technologies including compression, ATC/ATR etc*

Mission Management

Current Situation	Vision
• UAS are low-density/ high-demand assets and tactical users have little confidence that they will be available when they need	• *Seamless & automated* management, prioritisation and deconfliction of UAS control authority • *Optimal* UAS mission utilisation and *enhanced* capacity awareness. Tactical users have full knowledge of available UAS assets including locations & sensor footprints
Recommendations	**Actions**
• Emphasis on acquiring systems with adaptive data links to support the interoperability requirements and operations across regions with different frequency allocations • Integration of systems that enable users to see the real-time utilisation (mission plan and current flight path) and capability (i.e. payloads being operated) of UAS operating in their area of interest	→ *Identify similar overseas requirements (e.g., JUAS COE initiative)* → *Investigate collaboration on hardware/ software based approaches to incorporating UAS info in COP*

Airspace Management

Current Situation	Vision
• UAS require Restricted Operating Zones (ROZ) & other physical deconfliction procedures • Peacetime UAS operations limited to military restricted areas	• UAS *fully integrated* into military airspace allowing synergies of manned/unmanned systems to be exploited • *'File & fly'* in civilian airspace
Recommendations	**Actions**
• ACPA and DOTA should work with the Joint UAS Planning Team to develop airspace management policy that allows flexible UAS operations • Operational reliability data will need to be collected and a reliability program initiated at the commencement of operations to provide the confidence to enable concurrent operations of UAS with manned aircraft and for operations over urban areas	→ *Internally/externally: sense & avoid technologies; …*

Research & Development

Current Situation	Vision
• R&D is fragmented and it is not clear that resources are being spent in the priority areas	• Integrated R&D program taking into account internal and external organisations to achieve future UAS vision
Recommendations	**Actions**
• Develop a comprehensive UAS R&D Roadmap to match the priorities in the Roadmap • Short-medium term: concentrate on key ensuring S&T for priority UAS projects & initiatives • Cover cross-cutting integration issues (see other recommendations above) • Invest in the future – future concepts & associated technology to push UAS into areas where their attributes add to future warfighting	→ *Develop R&D Roadmap focussed on AS priorities (e.g. sensors, bandwidth mgt etc)* → *Exploration of more novel concepts* → *Selective funding*

3. A Domestic Industry Sourcing Threshold.

Australia is somewhat unusual in global military UAS market terms in that Defence does not have any established domestic industry capability thresholds in place for the sourcing of systems. This contrasts markedly with the examples of Germany, France, Italy, Turkey, South Korea, Japan and Singapore where domestic sourcing rules apply to tactical class UAS between Groups I and III. This domestic sourcing policy can be understood from several perspectives:

- First, it provides a basis for sustaining high levels of in-country technical capability specific to the UAS sector, this supporting not only current operational needs but also future requirements, including support and operation of higher Group capabilities which may be acquired on the international market.

- Second, recognising UAS are the result of a convergence of multiple technology domains, it facilitates ongoing cross pollination between concepts, knowledge and applications. This is an essential feature of national technological competency in the broad, and more specifically underpins the rapid pace of UAS technological development.

- Third, it facilitates the use of spiral acquisition methods, wherein 'build, operate, learn, redesign and modify' methods act to offset system obsolescence and attrition.

- Fourth, it facilitates wider sourcing of relevant technologies in the international marketplace, meaning currency can be maintained with leading edge initiatives and concepts from any specific nation, as well as incorporating domestic research and development outcomes. Group I and II UAS tend to reflect commercial technology trends in the first instance, rather than the closed loop development-cycles of military grade technology as applies to higher platform classes.

- Fifth, it facilitates offsetting cost overheads of developing and sustaining manufacture of small military UAS by exploiting the existing and rapidly evolving commercial market for these same low end technologies.

ACUO proposes:

Recommendation 5: Defence, in conjunction with the Department of Industry and CSIRO, establish a joint working party of Australian UAS sector manufacturers, certified operators, research and development agencies, Cooperative Research Centres and universities, to prepare and complete a detailed feasibility study of a national Group I, II and III UAS program by the end of CY2015.

Recommendation 6: In parallel to the feasibility study of a national Group I, II and III UAS program, the joint working party proposed by Recommendation 5 conduct an audit of Australian government agency funded UAS-related technology development in the broad over the past decade, including that of DSTO, CSIRO and the Australian Research Council, to identify what developments have been undertaken already in Australia, how these stand with respect to international UAS sector trends, and what opportunities may exist for

leveraging of these as part of future Australian Defence Force requirements as well as commercial usage. This study is also essential to ensuring future Australian government funded research and development activities do not result in the duplication of technologies already available in the commercial market or already part of other research initiatives.

Recommendation 7: Based on a positive recommendation by the studies at Recommendation 5 and 6, that Defence, the Department of Industry, CSIRO and the Australian Research Council explore joint funding of a national Group I and II UAS development program, involving civil and defence variants with common core technologies, manufacturing methods and support structures. Development of this program would occur between CY2016 and CY2018.

Recommendation 8: Defence establish a domestic sourcing regime for its Group I and Group II tactical UAS, with this to be first applied with respect to forward Group 1 and II requirements.

Recommendation 9: Defence launch a long range technology demonstration program to run 2017 to 2027 exploring the requirements of fixed wing Group III tactical UAS optimised for operations in denied environments AND capable of short take-off and landing from an LHD as a means of assessing capability requirements for a next generation Group III solution in the 2030-2035 timeframe. Elements of this proposed technology demonstration program should include specific sub projects examining optimisation of ground support and logistics footprints, sensor technology mixes, autonomy, materials and manufacture. As a technology demonstration program, this initiative should remain widely open to Australian companies in the first instance, rather than being progressed as a restricted scope DSTO Concept Technology Demonstration. The overarching objective of this program is not development of a complete technical solution in the first instance, but rather a comprehensive suite of technologies and capabilities which Australia can leverage in any ultimate acquisition activity for the replacement of Shadow in Army service and any potential second generation Australian Defence Force Group IV platform.

Recommendation 10: That Defence use the studies proposed in recommendations 6-9 as additional guidance in policy and capability terms for developing the Pacific UAS program now being jointly developed with the Departments of Prime Minister and Cabinet and Foreign Affairs and Trade as a means of linking that initiative with the goals of long term Australian industry policy in both its Defence and its Department of Industry contexts.

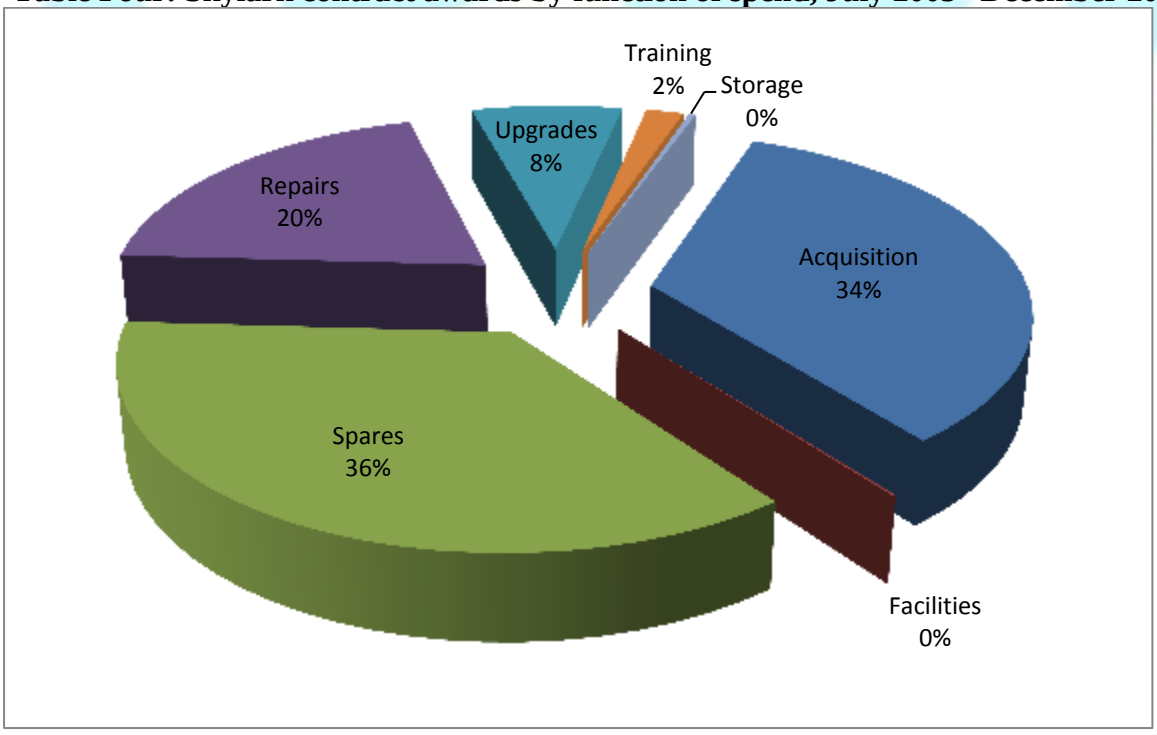
ACUO notes that Australia already has necessary caveats in place as a part of its free trade agreements with strategic allies such as the United States and Japan which permit exclusion of Defence related capabilities from open international competition as would be required under these proposals. ACUO likewise notes that key UAS supplier nations such as the USA, Israel, the United Kingdom and France are already used to working with customer nation domestic sourcing obligations, with flow on benefits including technology transfer as well as job creation.

CASE STUDY: Elbit Skylark in Australian service

The rapid lifecycle of Group I and II UAS is well illustrated by Defence's own experience with the Elbit Skylark 1 system. First ordered in 2005 to equip Special Forces and regular Army units taking up force protection duties in Afghanistan, the purchase was conducted as a select rather than open tender and resulted in the removal from service of the small number of Aerovironment Raven systems which had only been purchased a year earlier.

Between 2005 and the end of CY2011, Defence committed to contracts totalling A$14.1 million to acquire, sustain and maintain the Skylark system, which was then withdrawn from regular Army service at the end of 2010. The Special Forces continued to sustain the system through until recent times. Of the total A$14.1 million spend, 79 percent of awards went direct to prime contractor Elbit Systems. The remaining 21 percent went to Elbit's Australian teaming partner Flight Data Systems. Actual acquisition of the systems represented just 34 percent of total award values, with the bulk of expenditure going on spares, repairs and system upgrades (see Table Four). Military Group I and II UAS have high in-service costs by virtue of their operation in very low altitude battlefield environments, while the underpinning technology evolves at a rate more aligned with consumer mobile phones than military combat aircraft, meaning short lifecycles.

Table Four: Skylark contract awards by function of spend, July 2005 –December 2011.



Note: Amounts are rounded to whole figures meaning minor recorded outlays for storage and facilities works are recorded as zero percent. Source: LFRG Pty Ltd. Used with Permission.

4. Air 7000 Phase 1B and FMS Sourcing

The reliance on the US Foreign Military Sales (FMS) program for sourcing ADF capabilities is a historical reflection of troubled programmatic experiences by the Defence Material Organisation in handling complex system acquisitions. Defence now plans FMS acquisition of the Northrop Grumman MQ-4C Triton, a derivative of the RQ-4B Global Hawk, under Project Air 7000 Phase 1B. As a maturing system, it is already clear an FMS acquisition of Triton will provide few opportunities for Australian industry, and where such does emerge, will tend to be of a generic nature or offering. The classes of Australian industry work already announced by Northrop Grumman for the project reinforce this assessment. ACUO holds that Northrop Grumman, as one of the world's largest defence and aerospace contractors, is capable of providing far greater opportunities for Australian industry through this project with direct flow on benefits to Australian Defence capabilities.

ACUO notes that the high level global supply chain opportunity that did exist for involvement with Triton when Australia had formal membership of the US Navy BAMS program no longer exists, this being a direct result of Defence and Federal Government decisions to terminate that bilateral arrangement as a budget expedient.

ACUO reiterates the concerns expressed relative to the FMS system as expressed by the Australian Business Defence Industry unit in their 30 September 2014 submission to the Australian Defence White Paper review, specifically that the logical end state of offshore purchasing in this form will result in an industrial base not capable of providing the necessary levels of through life support for ADF operational capabilities. ACUO is of the view that in such conditions, alternative approaches need to be taken to explore how Australian fielding of this type of UAS can be exploited in scientific, industrial and technological terms, to the direct benefit of Defence.

ACUO proposes:

> **Recommendation 11: That as part of its progress towards Second Pass approvals for Air 7000 Phase 1B, Defence initiate an open review of Northrop Grumman's proposed Australian industry engagement strategy. That this review include scope for full input by Australian industry, Australian universities and research agencies, and other government agencies at the State and Federal level who may have an interest in leveraging this unique form of national capability. That this review be used as a test bed for a formal program of industry engagement reviews for all FMS acquisitions as a standing element of forward Defence policy for Industry.**
>
> **Recommendation 12: That in the event Defence chooses not to conduct an open review of the industry opportunities emerging from Air 7000 Phase 1B, the Senate Standing Committee on Foreign Affairs, Defence and Trade place monitoring of Air 7000 Phase 1B on its forward work program for CY2016 and CY2017 to undertake the same requisite review process on behalf of Australian industry.**

ACUO observes that the introduction of the MQ-4C into Australian service will provide a unique capability which necessarily demands consideration in whole of government terms, not just Defence. That unique status is compounded by virtue of Triton being a non-weapons

capable platform. Two critical areas of such consideration are the role Triton can play in support of national objectives in Australia's Southern Oceans and Antarctic territories, and in response to national disasters both domestically and regionally.

ACUO notes that the 2014 Senate Foreign Affairs, Defence and Trade References Committee inquiry into Australia's Future Activities and Responsibilities in the Southern Ocean and Antarctic Waters saw Defence remain non-committal on its preparedness to make the MQ-4C Triton available for support operations in these regions, this being despite historical evidence of a key role for military aviation assets in maintaining jurisdictional responsibility over the same. All variants of the Global Hawk family of UAS as flown to date have been proven capable of operations in very high latitude and polar regions through actual deployments. There is no evidence that the MQ-4C will differ in this regard.

The Senate References Committee's attention is drawn in this regard to the use of two ACTD-build, Northrop Grumman-owned Global Hawks by NASA as scientific observation platforms. This arrangement is based on a form of public private partnership engagement, wherein Northrop Grumman can also access the aircraft to support company funded research and development activities. The capacity to make these two aircraft available for generic science purposes by NASA is facilitated in part by the separation of the air vehicle guidance and control systems from the payload management systems, meaning simplified arrangements for fitting of alternate civil payloads. That same separation of air vehicle guidance and control and payload management systems features in the MQ-4C.

ACUO proposes:

Recommendation 13: That as part of its Second Pass pre-approvals process for Air 7000 Phase 1B, the Federal Government seek inputs from the Australian Antarctic Survey, Australian Fisheries Management Agency, the Australian Research Council, Border Protection Command and CSIRO on the prospective roles Australian owned and operated MQ-4C UAS could play in support of Australian interests in Antarctica and the Southern Oceans and use this as the basis for developing a coherent access strategy which leverages security capability as a part of wider national interests.

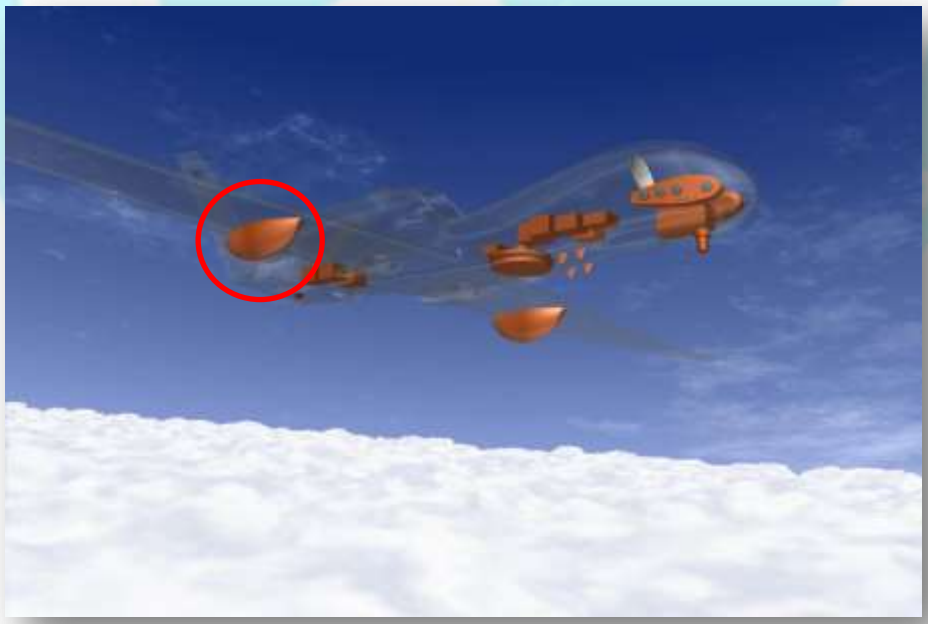
Recommendation 14: That as part of the proposed national UAS industry strategy, a study be conducted into the potential development of a wholly Australian-industry developed, stand-alone universal payload pod with integrated commercial standard datalink which can be fitted to the wing hard points of an MQ-4 series UAS, and apart from the power supply, be operated independently of all air vehicle flight control management systems.

Recommendation 15: That if found to be technically feasible, DSTO and CSIRO jointly lead a project which engages Australian industry in development of such a pod as a commercial product for all Global Hawk series aircraft internationally. That once developed, Defence make access to this pod available on a commercial fee-for-carriage basis to companies, research agencies and government agencies seeking to collect commercial or scientific data in pre-negotiated regions otherwise largely inaccessible by extant sensor means. That as part of this initiative, Defence contract out customer development, payload integration and pod preparation to Australian industry on a multiyear basis.

ACUO believes that users for such a pod could include:

- The Australian Antarctic Survey, the Australian Bureau of Meteorology and universities (remote area mid atmospheric sampling missions).
- The Australian Geological Survey and Federal and state environmental agencies (wide area hyperspectral monitoring).
- The National Aviation Fire Fighting Centre and state fire authorities (alternate infra-red and thermal mapping payloads to support bushfire operations).
- National and state fisheries management agencies (alternate payloads to support collection of evidence against illegal operators).
- Commercial airborne data survey companies (as an alternate to own aircraft operations in wide area operations).
- Internationally, NASA, NOAA and related national scientific research agencies. In this later regard, the life of type of the ACTD-build Global Hawk aircraft operated by NASA is nearing its end with that agency now in the early stages of examining replacement capability development from 2018. This provides Australia with an opportunity for establishing new bilateral scientific collaboration arrangements with one of the world's premier research entities.

ACUO notes that Australian SMEs have a strong record of commercial achievement in development of airborne pod systems, for example, the 'Airpod 101' from Air Affairs Australia. Northrop Grumman is known to have itself explored the concept of an external sensor pod during the period 2004-2005. Stand alone, wing fitted pods were also developed by Northrop Grumman in cooperation with the former EADS Deutschland (now Airbus) to carry German-national ELINT and COMINT sensors as part of the now suspended Eurohawk program.



Sensor and processor locations for the former German air force 'Eurohawk' program, showing wing sensor pod configuration and location. EADS (now Airbus) image, 2007.

The capacity of the Global Hawk family of systems to provide significant imagery support in the event of national or international disasters is well illustrated by the usage of US Air Force RQ-4B aircraft to conduct wildfire surveillance missions on a repeated basis across over the past decade. USAF Global Hawk UAS have also been used to conduct environmental imaging support missions for use by civilian government agencies in Central America and the Caribbean as part of US military aid programs, and to provide post tsunami imagery for the Government of Japan with this including imaging heat patterns around the failed Fukushima Dai-Ichi nuclear plant.

A key challenge in the use of all Global Hawk family members in support of civil operations is the requirement to process imagery gathered by military grade sensors to a non-classified level before releasing it to civilian users. With respect to the use of USAF Global Hawks to monitor wildfires in the US State of California, this has resulted in the development of work methods wherein imagery is downloaded to a military ground station, imagery is reprocessed and then released to firefighters via a Google Earth overlay. Australia's acquisition of the MQ-4C via the US Foreign Military Sales system will result in a ground station architecture identical to that being acquired by the US Navy, meaning system arrangements which facilitate expedited transfer of imagery to Australian civil users from military grade sensors will likewise require tailoring of the overall system package. Noting the parameters of the Australian Defence organisations imagery architectures, some aspects of the requisite capability will already be in place, but will involve a longer processing 'trail' before imagery can be released. ACUO sees that processing trail challenge as one which again strengthens the case for a stand-alone sensor pod being developed for Australian MQ-4C UAS, but as also meaning early identification of the needs of prospective civil users' must be conducted well ahead of Second Pass Approvals for Air 7000 Phase 1B.

ACUO recommends:

> **Recommendation 16: That at the end of the 2014-15 bushfire season, the Air 7000 Phase 1B project office, with the aid of Northrop Grumman and the national Aviation Firefighting Centre (NAFC) conduct a detailed study of the potential of the MQ-4C to support fire control operations. That this study seek to identify the necessary architectural modifications required of the MQ-4C system AND the wider Australian Defence imagery architecture to ensure that bushfire control operations are a mission set which can be taken on by Triton at the earliest possible phase of it entering Australian service.**

5. ADF Group IV UAS Capability

The Australian Defence Force has for a number of years fielded leased IAI Heron Group IV UAS via the Project Nankeen services arrangement with Canadian firm MDA. This lease agreement represents the largest single expenditure outlay on UAS capabilities for the ADF since July 2000, its first three years between FY2008 and FY2011 seeing contract awards totalling A$230 million, the bulk of which was direct payment for services. ACUO accepts the compelling and urgent operational basis which gave rise to the decision to instigate and sustain this leased capability but notes the expenditure levels in the first three years of service could have also supported the outright purchase of a similar level of capability on the open market. Indeed Defence had been actively assessing Group IV capability as an option for Air 7000 Phase 1B for close to a decade before the Nankeen lease deal was negotiated. Defence should have been well aware of the cost differentials here.

Following the cessation of Australia's standing operations in Afghanistan, Defence has retained two of the four Heron air vehicles involved in the Nankeen lease arrangement via new project designated Air 7100 Phase 1. This sees two Heron aircraft based at RAAF Woomera along with its associated command and control infrastructure. This development, effective from the end of 2014, also sees the retention of the valuable Australian-developed imagery processing and dissemination Ground Mission Station jointly developed by BAE Systems, Fujitsu Australia, Geospatial Intelligence, KAZ Group, Nova Group and Simlat amongst others. ACUO accepts this retention decision as a means of ensuring hard won operational expertise is not lost as has occurred in the case of other ADF UAS service arrangements such as the Insitu Scan Eagle. ACUO also notes that the capacity for Australian industry to be able to access and experiment with an evolution of the Australian-developed Heron ISR processing architecture, represents an important stepping stone and risk mitigation opportunity directly related to Joint Project 2096, Intelligence Surveillance and Reconnaissance Integration.

Heron in its Project Nankeen configuration: Australian Defence Force image.

Defence consideration of the future role Group IV UAS will be expected to play in its force structure is necessarily going to require complex capability evaluations, with this including decisions relating to capacity to perform armed strike operations. This consideration comes as Europe, under the leadership of the European Defence Agency, and the individual United States Services each explore the parameters of next generation Group IV and Group V capabilities with accompanying industrial programs.

In this context, any Australian acquisition of a military off the shelf Group IV or Group V system from United States or Israeli manufacturers in the time frame out to 2025 can only be considered as an interim capability measure. In turn, such interim steps are highly unlikely to provide direct opportunities for Australian industry to support Defence given the maturity of the systems which are available and the already extensive support infrastructure available in the world marketplace for those extant types.

While that maturity may be attractive to Defence in terms of risk mitigation, the rapid pace of development of Group IV and Group V technology in the broad, particularly that associated with operations in denied environments, means the generational shifts that are likely to occur relative to this type of UAS will be significant. Retention of Heron out to 2025, in this regard, is an equally effective form of risk mitigation and corresponds with the widespread adoption of this platform by a significant number of other Defence forces, both globally and in Australia's region of direct strategic interest.

ACUO recommends:

> **Recommendation 17: That Defence continue to sustain a basic Group IV capability in the form of Heron under Air 7100, but with an objective timeframe for that platform extended out to at least 2025. That via Air 7100, the ending of Heron's active operational deployment to Afghanistan be used as an opportunity to competitively develop cost effective Australian industry support activities for the next decade of service.**
>
> **Recommendation 18: That as an interim step towards any future Group IV or Group V capability, Defence instigate a broader 'holding pen' future advanced UAS project with a wider remit than Air 7100. This will provide a focal point for early and highly informed engagement with emerging next generation Group IV and Group V development programs in both the United States and Europe. The raising of such a project now, and distinct from Air 7100 Phase 1 as the continuation of Heron operations, is expressly for the purposes of ensuring Defence is pre-positioned to engage meaningfully and comprehensively with such development programs as they arise and while parallel capability analysis reviews are conducted to clarify the ultimate capability need. This holding pen project should be explicitly chartered to include a detailed examination of opportunities for Australian industry on an ongoing basis, the staffing to include placement of Defence Exports unit and Department of Industry personnel from the outset. It should also be made clear that the raising of this project does not constitute an acquisition program per se, rather a structured and focussed mechanism for intelligent and systematic review of a very real capability option at the deepest level.**

Case Study: Australian industry and Project Nankeen.

Between May 2009 and December 2011 Defence awarded contracts totalling A$230 million for the lease of three Israel Aerospace Industries Heron UAS via MDA of Canada. This lease was initially structured as an extension of a similar arrangement between MDA and the Canadian Defence Force.

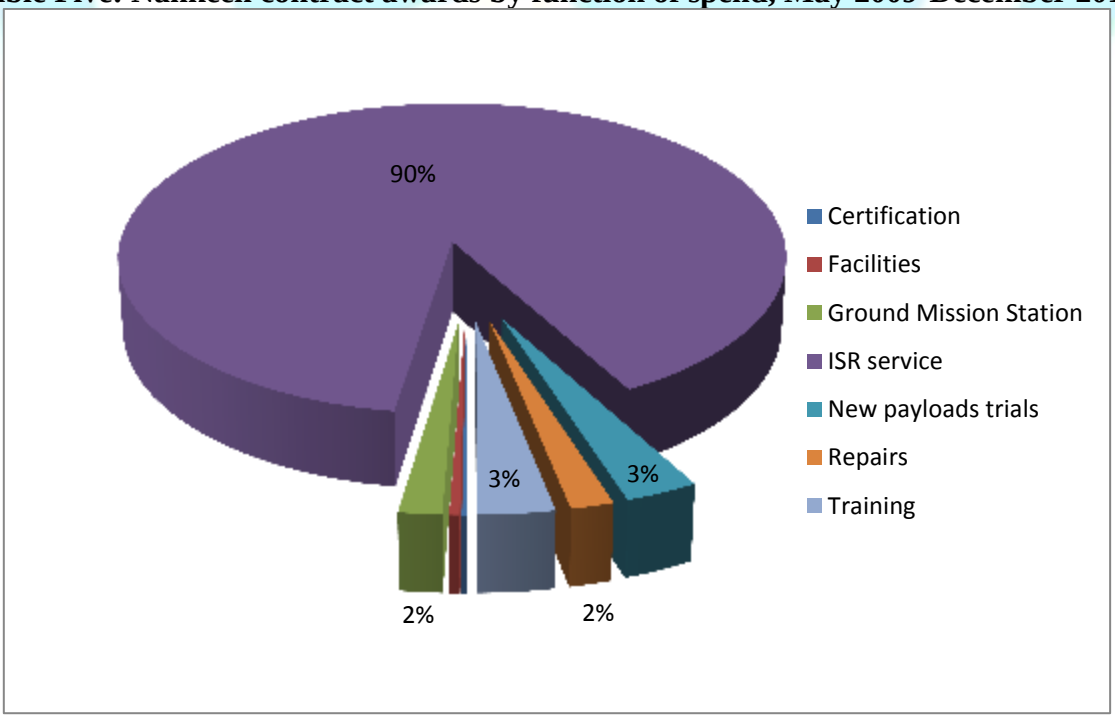
The Australian lease took on a markedly different aspect at an early stage through the extension of the arrangement to encompass a fourth air vehicle with this to be stationed at RAAF Woomera as a training asset.

In parallel Defence undertook development of a purpose-created, deployable intelligence, surveillance and reconnaissance imagery processing and dissemination capability (or Ground Mission Station) optimised to work with both the Heron ground control architecture, the ADF's battlefield command and control system and higher order Australian defence command, control and imagery architectures.

Defence also commissioned a range of trials for alternative sensor payloads for prospective theatre deployment, these trials undertaken using the Woomera-based aircraft.

Combined, these additional measures accounted for just five percent of the overall outlays for the ISR capability over its first three years of operation. This evidences that even with low levels of investment through Australian industry, enhanced operational capabilities can be readily brought into being as a result of considered action by Defence. ACUO holds this precedent should be examined closely by Defence and the Australian Federal Government as they plan future UAS capability development.

Table Five: Nankeen contract awards by function of spend, May 2009-December 2011.



Note: Amounts are rounded to whole figures meaning minor recorded outlays for facilities and specialist training are recorded as zero. Source: LFRG Pty Ltd. Used with permission.

6. RAN UAS Capability

The RAN has been considering options for the development of maritime tactical UAS capabilities for well over a decade, with more considered analysis resulting in the raising of a Navy UAS Development Unit and the creation of Project NMP1942 as a mechanism to acquire a basic tactical capability for deployment aboard Armidale class patrol boats.

The Navy UAS Development Unit, while small, has an active trials and experimentation program underway and is an important step in the development of operational concepts, doctrine, and identification of capability roles.

Project NMP1942 is most likely to result in an acquisition of a small number of fixed wing Group II or Group III systems which will clearly be extensible to other RAN platforms and ACUO welcomes this project as capability entry point for the RAN. ACUO observes however, that as with warship types, no single form of UAS can fulfil all prospective maritime missions. Australia's acquisition and introduction into service of the Canberra-Class LHDs, the Hobart Class AWDs and the proposed Project Sea 5000 Future Frigate provide opportunities for consideration of more sophisticated UAS, including vertical take-off and landing (VTOL) types, as operational enablers.

VTOL UAS are the focus of intensive and generationally rapid development globally, with navies assessing a wide variety of platforms with equally wide operational capabilities. In parallel, a corresponding trend is emerging in manned rotary wing aviation with the provision of optionally piloted capabilities as a means of allowing a single type to operate in expanded operational modes. ACUO believes this hybrid capability should be assessed by Defence as a matter of priority given that optional piloting conversion kits are already being developed for a variety of existing manned rotary wing types. This may facilitate evolution of significant VTOL UAS capability as part of a mid-life upgrade for existing ADF rotary wing assets in the decade ahead, rather than the prospect of another stand-alone system.

Rapid evolution in the VTOL UAS sector in the broad raises challenges, but also represents a clear opportunity for Australia to explore this market segment at an early and intelligent way well before committing to outright purchase of an objective capability solution. Such exploration brings with it corresponding opportunities to assess, identify and pursue potential Australian industry engagement at the global supply chain level, and on an enduring basis.

ACUO proposes:

> **Recommendation 19: Defence formally raise a maritime UAS 'holding pen' project to act as a focal point for early and highly informed exploration of all classes of UAS in all maritime warfare profiles and as the next logical step from establishment of the Navy UAS Development Unit. The raising of such a holding pen project now is expressly for the purposes of ensuring Defence is pre-positioned to engage meaningfully and comprehensively with the rapidly evolving domain of maritime UAS in the broad, particularly that of VTOL UAS and including 'optionally-piloted' VTOL solutions. This holding pen project should be explicitly chartered to include detailed examination of opportunities for Australian industry on an ongoing basis.**

Recommendation 20: That Phase One Alpha of the proposed maritime UAS 'holding pen' project, be structured around the existing NMP1942 project, with a follow on Phase One Beta providing a conduit for ongoing system acquisition and evolution of fixed wing tactical UAS to support whole of service requirements across multiple platform types, noting the proposed national sourcing threshold contained at Recommendation 7 of this submission.

Recommendation 21: That Phase Two of the proposed maritime UAS 'holding pen' project, competitively acquire a number of Group II or Group III VTOL UAS in the 2016-2017 timeframe, as a means of facilitating 'intelligent experimentation' at sea ahead of seeking to develop an objective operational capability in later years. That these VTOL systems be first integrated aboard the Canberra Class LHDs and then widened to include other major combatants. This proposal, specifically its focus on Group II and Group III capability, mirrors the incremental approach being taken by France and Italy with respect to their own naval VTOL UAS requirements. Incremental capability development rather than capability leaps is seen by those respective programs as a means of ensuring capability creep does not result in project failure.

Recommendation 22: That Phase Three of the proposed maritime UAS 'holding pen' project, be structured as a whole of Federal Government agency initiative which includes the active participation of the Australian Customs and Border Protection Service, the Australian Antarctic Survey and other interrelated agencies to facilitate access to Group II and Group III UAS in a cost effective manner. This approach is aimed at removing duplication of acquisition processes and support structures, and facilitate development of a wider capability mix where assets are transferrable between user groups on an 'as required' basis.

Recommendation 23: That as part of the development of an Australian national UAS industry strategy, a detailed 'Technology and Industry Capacity Study' be jointly conducted by the RAN, the Australian Army and Australian industry examining the nature of the Australian rotary wing aviation support base and its relationship to European and US-developed VTOL UAS of all classes, particularly those air vehicles of comparable size and capability to manned rotary wing aircraft, and the emerging optionally piloted rotary wing aircraft. The objective of this study is to inform the national UAS industry strategy on prospective opportunities in the VTOL domain and link it with the Australian Defence Force's rotary wing aviation master plan. The study would aim to identify early stage opportunities for Australian technologies and industry in the global supply chain for VTOL RPAS, and guide Defence consideration of its most effective options by which to acquire more capable VTOL UAS or VTOL OPVs as part of the future Australian Defence Force rotary wing aviation force mix.

7. Defence UAS Operator Training and Exercise Support

Access to UAS capabilities within the Australian Defence Force are currently limited due to the withdrawal from general service of the Group I Elbit Skylark system and the restricted scope of access to regular non-segregated airspace for Shadow 200B and Heron. While purchase of replacement Group I systems is planned under Project Land 129 Phase 4, those new systems can be expected to be likewise restricted in their ability to operate outside of designated defence airspace and be limited in the overall number of systems acquired. Defence has in recent years periodically sought to overcome this training capability shortfall via short services contracts with Insitu Pacific and others to provide UAS for exercises.

Training is a critical element of successful UAS operations in terms of control of air vehicles, understanding of operations and implementation of doctrine for usage. Without such exposure, the Australian Defence Force is inherently limited in how far it can leverage UAS as a standard element of operations in the broad. The ADF's combination of few assets and restricted operating environments contrasts significantly with the extant reach of the Australian national commercial UAS operator base across all state and territories.

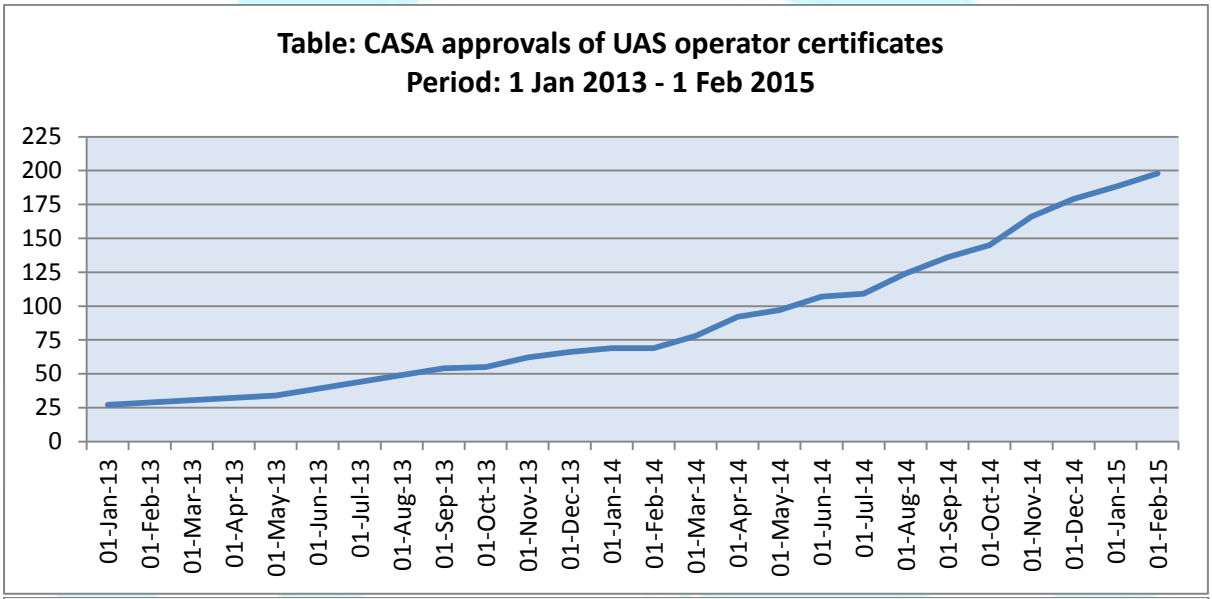
ACUO proposes:

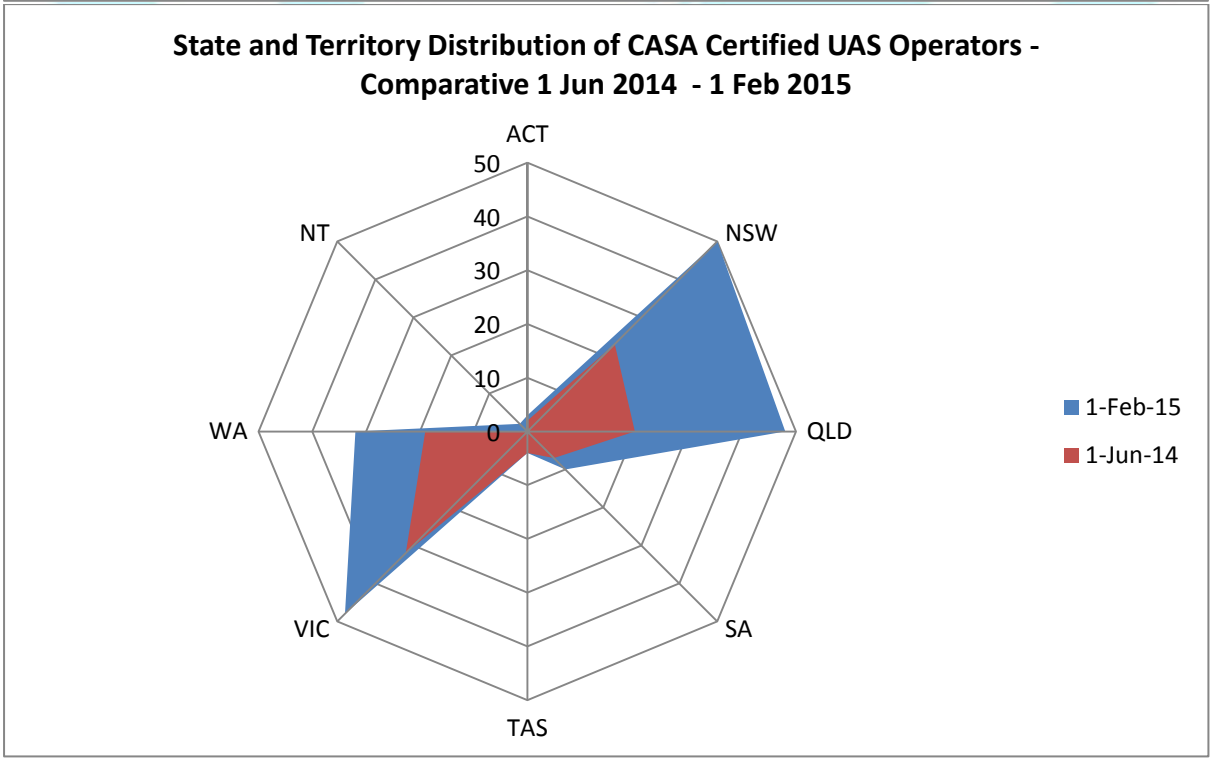
> **Recommendation 24: Defence investigate the potential for contracting-in of commercially certified UAS operators to provide familiarisation exposure, basic operator training to an RPL 1 level, and low level exercise support for small unit training by Reserve as well as regular force units. That this contracting-in model be predicated on standard commercially available UAS, at corresponding commercial market rates to ensure cost effective supply rather than premium mark-ups for specialised and highly optimised solutions, unless these are specifically sought for a particular exercise or training requirement with unique characteristics. That this contracting-in model likewise be structured to link locally based Defence units, with local commercial UAS service providers in order to keep service overheads low for both parties, and to provide flexibility in sourcing and delivery arrangements.**
>
> **Recommendation 25: That Defence investigate the creation of a form of Special Reserve service wherein holders of commercial RPL1 licences can engage directly with the ADF to provide depth of knowledge and experience with Group I and Group II systems which can be drawn upon as required for operational purposes.**

ACUO notes that the relative cost per hour of contracting small commercially supplied Group I fixed wing and multicopter type UAS is far below that of specialist military grade systems, making this option highly affordable to Defence. While commercial products will be restricted in the ultimate level of capability they can provide, the focus of this recommendation should be understood at all times as basic training and familiarisation. Defence already accepts this approach as a basis for its ab-initio and basic training of pilots for manned aircraft, the training aircraft used in those roles having few modifications or specialisations. The proposed Special Reserve concept is predicated on the awareness that many commercial RPL1 licence holders have a Defence background or a personal interest in Defence career opportunities. Creation of such a reserve could also be extremely beneficial where ADF resources are tasked in support of aid to the civil community.

Background: Australia's Commercial UAS Operators Base.

The Australian commercial UAS operator base has undergone rapid growth over the course of the past two years with the Civil Aviation Safety Authority having certified 197 operators as at 1 February 2015. The bulk of these entities are small to micro companies which are pursuing commercial aerial photography as their primary line of business, but with roles such as aerial mapping, aerial surveying and aerial monitoring of infrastructure all seeing significant growth rates. The certified operator base is located in every state and territory, with New South Wales, Queensland and Victoria seeing the largest numbers. The fastest growth of this base is currently occurring in New South Wales and Queensland. Of the total number of certified operators, 40 percent are located in regional Australia.





8. NORFORCE

Defence has an enduring interest in the development of an enhanced domestic intelligence, surveillance and reconnaissance capability across the north of Australia with this seeing not only a sustained program of redisposition of force elements over the past three decades but also enduring role for engagement with indigenous Australians through NORFORCE. Defence, in this regard, has emerged as an important participant in the social and economic fabric of regional communities, particularly remote communities, across northern Australia. This engagement is directly reflected in the establishment of the Defence Indigenous Development Program (DIDP) as an element of Australian Defence Force Recruitment.

As part of the development process for the 2015 Defence White Paper, the consultative process established by the Federal Government received a submission from the Indigenous Land Corporation which proposed expansion of the DIDP to include a second tier of engagement providing opportunity for training and employment in complementary industries. ACUO believes there is strong merit in this concept and as an emergent sector, Australia's UAS industry can play a significant role.

AUCO proposes:

> **Recommendation 26: That Defence, the Indigenous Land Corporation, the Cape York Institute, Generation One, the governments of Queensland and Western Australia and the Northern Territory, and the association of Australian Certified UAV Operators form a working group to study creation of a remote communities training and employment program based on provision of commercial UAS services to government and private sector customers. That the working group examine the full costing requirements of such a program and examine a prospective launch customer base built upon the needs of Defence; the Australian Customs and Border Protection Command; the Australian Federal Police and state and territory police; the Australian Fisheries Management Agency and the Great Barrier Reef Marine Authority. That the working group likewise engage with the mining, pastoral, agricultural and fisheries industry base of Northern Australia to identify prospective commercial users. That the working group seek to optimise the proposed program to include provision of training in all facets of UAS operation, including imagery processing and the use of geographic information systems so that skills developed within the indigenous communities allow participants to seek employment in sectors making high level use of spatial data, including mining, land and environmental management.**

"The Australian Defence Force is itself an important existing source of Indigenous training and employment, as well as a pathway to broader employment opportunities in north Australia. Additional investment in and development of current initiatives such as the Defence Indigenous Development Program (DIDP) could provide enhanced opportunities for more participants and deepen the available pool of Indigenous Australians in north Australia with capacity to contribute to the strategic goals of Defence. An extension of the DIDP that was effectively articulated with training and employment initiatives in complementary industries would contribute to broader security, social and economic development outcomes."

- Indigenous Land Corporation submission to the 2015 Australian Defence White Paper public consultation process.
http://defence.gov.au/Whitepaper/docs/101-IndigenousLandCorporation.pdf.

9. Regional Military to Military Engagement

In global terms Australia is a small actor in UAS capability terms at present, however forward capability planning will reshape and rebalance this posture over the course of the coming decade. If extant Defence Capability Plan UAS projects progress as per guidance issued to date, overall Australian Defence Force capability around 2020 will balance with regional capabilities as exist in Groups I and II, lag in Groups III and IV, but have assumed a partial leadership posture in Group V. This evolved level of capability provides Defence with an opportunity to leverage its UAS capabilities as a tool of regional defence engagement, particularly in regards to harmonisation of procedures and practices with respect to future coalition operations, including those in aid of disaster relief and humanitarian aid. Australia is also largely unique in regional terms in its possession of extensive training ranges and vast oceanic territories, these already being used by Singapore to facilitate its own military UAS training operations.

Recommendation 27: Noting that South Korea and Japan have active programs to acquire Global Hawk derivatives while the United States continues to expand the numbers of Guam-based RQ-4 and MQ-4 series aircraft, Defence propose formation of an Asian-Oceania Operators Working Group hosted by Australia. That this working group seek as a first order priority to examine enabling structures for use of Global Hawk capabilities as part of emergency operations in support of the civil communities across the region in the event of disaster and humanitarian crisis. That this group secondly examine how Global Hawk systems operated by participating nations can be best utilised to leverage enhanced maritime security for the protection of individual nation resources and communities against threats such as piracy, illegal fisheries and maritime disasters. That thirdly, this group seek to conduct an annual series of cooperative training and operational exercise activities using Australian facilities as the host State. ACUO notes that a similar concept was previously flagged by the United States in the mid-2000s however this failed to gain traction due to a lack of international Global Hawk operators. The acquisition announcements by Australia and South Korea during CY2014 substantially change this dynamic making creation of such a community now opportune.

Recommendation 28: Noting that India is the world's largest fleet operator of IAI Heron aircraft, with that same type also in established service with Singapore and on order by South Korea, that Defence propose establishment of a regional user community for that type with this to act as a mechanism for information sharing, exchange of operational lessons and experiences, and prospective exchanges of personnel to expand overall knowledge of the type. That Australia seeks to conduct an annual series of cooperative training and operational exercises for this user community using a variety of geographically distinct environments as offered by this island continent. ACUO notes the close correlation here with Recommendation 26 above, but observes there are significant and dissimilar operational and capability profiles of Heron as a Group IV system and the Global Hawk family as Group V systems. Those differences may be best addressed via participation of these two separate air vehicle families in established bilateral and multilateral regional training exercises.

ACUO notes the significant proliferation of all forms of UAS technology at a global level, this bringing with it new operational challenges for the Australian Defence Force. Australia is not alone in facing the problem of hostile UAS operations, however there are few research, development and experimentation programs occurring at an international level. ACUO notes that a significant focal point of the hostile UAS challenge is in the lower Groups of systems, an area where Australia does have significant domestic industrial capabilities.

Recommendation 29: Defence establish a multiyear counter-UAS technical initiative seeking to engage with domestic industry and research capabilities in a comprehensive manner with the objective of using experimentation, targeted research and development (leveraging low cost commercial technologies wherever possible) and rolling acquisition to develop doctrine, tactics and operational means to facilitate counter-UAS capabilities for the ADF.

Recommendation 30: That as part of this multiyear counter-UAS technical initiative a domestic sourcing program is implemented for very low cost target drones and basic capability UAS of multiple types and configurations to be used as a representative target and threat training assets by the Australian Defence Force and partner nations. This sourcing program would seek to leverage technical developments emerging from extant Australian industry capability, which has proven capacity to design, develop and manufacture low cost target drones, as well as that coming into being via the proposed national UAS industry strategy.

Recommendation 31: Defence look to the establishment of an annual international counter-UAS exercise using Australian range facilities as a means of engaging coalition partners in this important area of underdeveloped operational capability. This exercise would include providing Australian industry with direct opportunity to demonstrate emergent capabilities to prospective second nation buyers.

ACUO notes that a counter-UAS program of this type has potential to act as an important focal point for achieving horizontal linkages across a number of Defence's designated priority industry capability areas, particularly acoustic technologies and systems; electronic warfare; system of system integration; phased array radar and signature management.

Australian developed target drone-class systems. Phoenix (left) by Air Affairs and Cybird V (right) by Cyber Technology.

10. Air Traffic Integration

A fundamental operational limitation on the extant capabilities held by the Australian Defence Force is the absence of a national air traffic integration regime for all forms of UAS. While this is a policy matter where Defence is a stakeholder amongst wider aviation interests, Defence has unfulfilled opportunities available to it which are not being progressed, either domestically or internationally.

Primary policy responsibility for UAS integration into the national airspace resides with the Australian Civil Aviation Safety Authority (CASA), with extensive work now underway on revised regulatory structures as exist under CASR Part 101 and initial work emerging on a proposed CASA Part 102 which would facilitate beyond line of sight operations. CASR Part 102 is critical to the future capacity of Australian Defence Force UAS, particularly those in Groups III and above, to operate in non-segregated airspace in normalised operations at large. Defence currently engages with these regulatory efforts via CASA's UAS Standards Consultative Committee (SCC), participation of which is strongly supported by ACUO as a starting point.

ACUO proposes:

Recommendation 32: Noting CASA is significantly under resourced in handling UAS regulatory and policy matters, Defence initiate, host and resource a twelve month, broad consultation and development process with industry which results in a first draft of a proposed CASR Part 102. That this be initiated as a means of expediting the development of UAS regulations in a manner which ensures Australian Defence Force airspace access needs can be progressed in a timely manner. This initiative would run in parallel to the existing CASA UAS SCC process addressing the evolution of Part 101 and its day to day requirements. This 'division of labour' would allow separate, focussed, but parallel consideration of effective regulatory provisions as required for the significantly different capabilities of UAS when assessed in Group terms.

Recommendation 33: That Defence mandate compliance by all of its Group One, Two and Three UAS suppliers, at all stages of its capability development process, with CASA regulatory requirements for the operator to be certified under CASR Part 101 and the future CASR Part 102. Defence has in the past allowed original equipment manufacturers to fly their systems in demonstrations, participate in evaluations and exercises without CASA certification being held. It is noted that Defence would not allow a manned aircraft to be flown in any demonstration, evaluation or exercise without a certificated pilot in command being aboard. UAS should be treated no differently and in the absence of a Defence administered military qualification certification regime open to industry operators, the CASA qualification and certification requirements should be accepted by Defence as the national standard.

Recommendation 34: That as part of its current inquiry, the Senate Foreign Affairs, Defence and Trade references committee seek release by the Department of Defence of the full content of all aviation safety occurrence reports (ASOR) involving a UAS since 2000. That the inquiry uses this data to perform an analysis of safety trends, incident types, loss rates and causes, and key emergent

safety issues associated with the operation of UAS by the Australian Defence Force. Based on the findings of that analysis, that the Committee seek to make recommendations on the forward safety regulations and standards to be applied internally by the ADF. That in addition, this analysis be used as the basis for making recommendations to the ADF on what steps it needs to take to ensure effective integration of ADF safety regulations with the wider national air safety system as regulated by the Civil Aviation Safety Authority and Airservices Australia. That the top level findings of this analysis be included in the final Committee public report in sufficient detail so as to provide other national airspace users with awareness of Defence's requirements as well as its challenges, allowing for more considered evaluation of future Defence UAS operations in the national airspace.

Recommendation 35: The Australian Defence Science and Technology Organisation, in conjunction with the CSIRO, commission and conduct a detailed technical safety analysis of kinetic energy impacts of Group I and Group II UAS on human beings in the event of accident or incident. CASA has identified a need for such research but is not resourced to conduct this form of research on an objective basis. The absence of authoritative and independent research of this kind has an ongoing impact on the capacity of the regulator to make informed, evidence-based decisions on appropriate rules for the operation of UAS of all types, whether civil or military. The final report of this joint study must be prepared in a format allowing its public release if the full value of the study is to be achieved.

Recommendation 36: The Australian Defence Science and Technology Organisation, in conjunction with the Australian Army (via 20STA), CSIRO, CASA and the peak industry association of Australian Certified UAV Operators (ACUO), establish a national operations research initiative to explore the parameters of safe operation of Group I and Group II UAS in urban areas. The specific objectives of this program would be to examine and develop a step by step approach to facilitating small UAS operations by military and civil systems in increasingly dense urban environments, in a manner consistent with existing and emerging regulatory guidance under CASA existing Part 101 and proposed Part 102. This initiative should use Brisbane as its focus, noting the existence of significant urban corridors in that city as well as the home-base presence of 20STA and the CSIRO's Australian Research Centre for Aerospace Automation (ARCAA). CASA's UAS program office is likewise Brisbane based.

ACUO notes the siting of Defence operational bases in a number of parts of Australia, including Amberley, Darwin, Newcastle and Townsville, giving rise to challenges for the safe operation of commercial UAS in areas subject to military air traffic control, but over non-Defence lands. ACUO is aware that current procedural arrangements for such area approvals are largely being left to development at a base by base level, rather than being the subject of clearly articulated and promulgated guidance at a national level. Noting the development of the 'OneSKY' architecture linking civil and military air traffic control is now being progressed with Federal Government approval, as well as Defence's own evolving UAS airspace access requirements, it is appropriate that Defence take the functional lead to resolve these matters.

ACUO proposes:

> **Recommendation 37: That Defence, Air Services Australia, CASA and the association of Australian Certified UAV Operators, form a focussed working party to address specific issues of commercial UAS area approvals in regions where military controlled airspace restrictions apply over non-Defence lands. That this working party aim to complete its work within a 12 month period after its formation. That the subsequent policy structures automatically be subject to review by the same entities on an 24 month cycle to ensure currency with broader regulatory provisions as required by CASA.**

Defence is also at an early stage of a more sophisticated level of engagement with regulatory agencies on UAS matters at a global level, with this lead by Defence's Director Airworthiness Coordination and Policy Agency. That engagement during 2014 has included discussions with the United Kingdom's Civil Aviation Authority; the European Aviation Safety Agency (EASA) and the United States Federal Aviation Administration (FAA) on the civil side, and NATO on the military specific side. ACUO welcomes this broadening, aviation being inherently international with stand-alone national regulatory postures unsustainable.

This stepped up international engagement by Defence also comes as the International Civil Aviation Organisation (ICAO) ramps up its efforts to develop a coherent global regulatory structure for civil UAS, with this necessarily having a significant impact on the safe operation of military UAS when operating in civil airspace. The primary functional mechanism supporting ICAO in its mission is the EASA-led Joint Authorities for Rulemaking on Unmanned Systems (JARUS) initiative. JARUS already operates at a transatlantic level with the FAA having formal membership, with efforts underway to develop Asian and Pacific region participation during 2015.

ACUO proposes:

> **Recommendation 38: Defence, as part of its international cooperation activities, and in cooperation with CASA, directly engage and support moves by EASA and the FAA for the expansion of the transatlantic JARUS regulatory standardisation initiative to involve all Asian and Pacific Rim states.**

This recommendation also links closely with emergent issues of safe air traffic integration for UAS as emerges from combined planning by Defence, the Department of Prime Minister and Cabinet, and the Department of Foreign Affairs and Trade for the launch of a Pacific UAS program for South Pacific island nations. CASA already provides some support for South Pacific island states with respect to their compliance with international safety requirements linked directly with commercial air transport services. However, support for the safe integration of UAS into the respective national airspace architectures is, in the majority of cases, going to be a major leap in operational capacity and management capabilities for each recipient state. CASA's UAS program office is not resourced to handle challenges of this scale, nor is CASA's international liaison and support team. Given the challenges involved, it is clear that additional steps must be taken lest airspace safety emerge as a significant risk factor jeopardizing not only public aviation safety across the region but the prospective success of the Pacific UAS initiative as a whole.

Recommendation 39: Defence, the Department of Prime Minister and Cabinet, the Department of Foreign Affairs and Trade, the Department of Transport and CASA form a working party to examine the regulatory compliance requirements to allow the safe integration of UAS into the respective airspace architectures of each of the proposed Pacific UAS program recipient nations. That the findings of this working party be expressed as a report which scopes what scale of activity will be required to ensure successful air regulatory capacity development for each planned recipient state, provides a draft strategy by which this can be achieved, and details what opportunities can be developed for Australian industry as part of this activity.

Background: Australia's Pacific UAS Concept

Australia has long played a role in aiding South Pacific regional states manage their maritime security challenges through a combination of patrol missions by ADF platforms and the provision of own assets under the highly successful Pacific Patrol Boat program. During 2014 the Australian Government began discussing with regional states the potential for not only a Pacific Patrol Boat II program to replace ageing vessels, but also augmenting this with the provision of notional Group II UAS optimised for fisheries surveillance.

The proposed program was made public on 3 June 2014 by former Defence Minister Senator David Johnston as part of discussion of Pacific Patrol Boat II during Senate budget estimates hearings. The then Minister proposed supply of "some very simple but Australian UAVs and do some training for them to augment as an accessory [to] the Pacific patrol boat and its future replacement... We provide the patrol boat, but the patrol boat is ever more expensive if it is just cruising around looking for things and does not have a good handle on the ISR status of the region. If we gave them some efficient but cost-effective way of surveilling reasonably large - 30 kilometre by 30 kilometre - areas to keep track of who is doing what in their fishing grounds, I think this would be of assistance."

Senator Johnston also confirmed in his Senate estimates testimony that the concept had been discussed directly with the Governments of Tonga and Papua New Guinea, and with the Defence Ministers of France and New Zealand as significant regional actors.

The Pacific UAS program has a precedent in the highly successful trial of Australian-developed Textron Aerosonde series UAS by Palau in the second half of 2013. That trial, privately financed by the Australian Minderoo Foundation, was intended to assess what role a UAS could play in monitoring of the island state's exclusive economic zone and provide evidence to aid legal prosecution of illegal fishing vessels.

There are a number of Australian companies already capable of providing complete and wholly Australian designed and manufactured UAS of the class and capability as foreshadowed by Senator Johnston. These include Avitus, with the Petrel system; BAE Systems Australia, with Brumby Mk II; Cyber Technology (WA), with Cyber Eye 2V2; Silvertone, with Flamingo; and Textron Aerosonde, with the Aerosonde family of aircraft. The prospective role the Pacific UAS program could play in forward Defence policy for the Australian UAS industry is discussed at Recommendation 10 earlier in this submission. There is also potential for the Pacific UAS program to be linked to the proposed Australian indigenous community initiative outlined at Recommendation 26.

11. Defence Science and Technology Organisation

DSTO acts as an import focal point for Defence's experimentation with UAS on a broad frontage, this ranging from airframes, propulsion systems, sensors, guidance and control and flight testing of complete systems, subsystems, and unit items. Through these activities DSTO engages with a broad spectrum of the national and international UAS industry, at levels ranging from prime contractors to small and micro supply chain vendors. ACUO believes that as a key actor in the national Defence research and development base in the broad, DSTO has a key role to play as the domestic UAS sector evolves both in Defence and commercial terms.

However, DSTO's overall level of engagement with the national UAS industrial base is not reflective of the realities of the sector as currently exists and is likely to exist in short years. This situation is not new, with the November 2006 edition of the Defence Unmanned Systems roadmap noting that Defence's research and development structures and arrangements for this class of technology were, in the broad, "fragmented" and not aligned with priority areas of capability development.

ACUO proposes:

Recommendation 40: DSTO prepare and release, on an annual basis, guidance on its proposed research activities related to UAS technologies and systems, with this including identification of areas where Australian industry can engage on a meaningful basis with that specific project. ACUO notes that the United States Department of Defence and individual service arms, via the United States Small Business Innovative Research (SBIR) program, issues such guidance three times a year with this acting as an essential reference for industry in the broad on what priorities they may be able to align with, and what technology priorities they themselves need to consider. This recommendation is not a call for the launch of an SBIR program in the outright, but rather a call for release of substantive forward guidance and opportunity for industry participation.

Recommendation 41: That DSTO, given its flight test activities, secure a CASA UAS Operator Certificate and ensure that all of its personnel involved in direct piloting of UAS hold appropriate CASA licences. While DSTO has some exemptions from CASA regulations given its status as a Government agency, DSTO is not permitted to fly UAS outside of designated Defence range and airspace areas. Securing appropriate certification would allow DSTO to legally extend its flight activities into civil airspace, meaning the agency also gains considerable benefits in terms of expanding the operational environments available to it.

Annex: ACUO the organisation

The Association of Australian Certified UAV Operators Inc. (ACUO) is the peak body representing the interests of commercial unmanned aircraft system operators in Australia. The association was established in 2009 and is formally registered as a not for profit entity in the State of Queensland since March 2010. ACUO is chartered by its Constitution to:

- Protect the interests of CASA Certified UAV Operators
- Establish the association as a responsible authority and;
- Promote the growth and expansion of the commercial UAV/UAS/RPAS industry in Australia

Specific objects of ACUO as an industry association are:

- To improve the standards of unmanned aviation for commercial purposes whilst promoting and maintaining a sound regulatory framework in which to do so.
- To improve the safe and responsible flight activities of commercial unmanned aircraft within an easily accessible and low cost environment.
- To foster and encourage the formation and growth of development of unmanned aviation controllers, and to provide the guidance and training impetus for inexperienced controllers and new entrants to the industry.
- To revive, encourage and promote interest in Australian commercial unmanned aviation by encouraging participation in unmanned flying.
- To act as an information resource for counsel to organisations or individuals whose decisions may affect commercial unmanned aviation activities and operator rights.

ACUO's membership base, as professional unmanned aircraft operators, represents a significant source of innovation, research and technical development in the Australian context. Our member companies are continually engaged in all elements of the technical lifecycle of unmanned aircraft systems with many also actively participating in the overall national sector supply chain as airframe manufacturers, component manufacturers, sub-system suppliers, sub systems integrators, full system integrators, payload developers and training suppliers. ACUO actively seeks to support this important national capability as an integral part of its mission, particularly given the fundamental nexus which exists between operational experience and practical product development in the open market.

ACUO currently has 41 ordinary members, two associate members and two industry members, representing approximately one fifth of all commercially certified UAV Operators in Australia. Our membership has doubled in the past twelve months, this reflecting our enduring relevance to the ever increasing numbers of CASA certified UAV operators in Australia.

The seven founding members of ACUO were the first certified UAV Operators in Australia, with a combined experience of more than 100 years in commercial UAV operations of all types, from fixed-wing UAVs to conventional rotary UAVs and the new multicopter types, both in Australia and internationally.

The ACUO membership has decades of experience in commercial UAV/RPAS operations and an impeccable record of safety. Since commercial UAV/UAS/RPAS operations formally began in this country in November 2002, there has not been a single accident or incident resulting from ACUO member's thousands of hours of commercial UAV flight operations. This record is one ACUO members are understandably proud of, and one they are eager to protect by maintaining the highest standards of safety & risk management.

ACUO is proud of its status as the first commercial operations focussed unmanned aircraft sector industry association of its type in the world, as distinct from the significant number of marketing focussed associations largely operating to promote multinational defence and aerospace contractor business development interests. ACUO's model has since resulted in the emergence of similar operator community focussed associations being formed in Europe and the Americas.

ACUO is a non-corporate partner organisation member of UVS International, the global unmanned systems industry association headquartered in Paris. ACUO is Australia's representative on the International RPAS Coordination Council, a prestigious industry body initiated by UVS International to coordinate RPAS standards globally. ACUO also participates in a variety of international RPAS committees focusing on issues of importance to the commercial sector of unmanned aviation, including RPAS Insurance, RPAS Flight-Crew Training & RPAS Airworthiness & Maintenance.

ACUO regularly provides advice on UAS related issued to governments, public and private enterprise, businesses and organizations on the fundamentals of UAV/RPAS operations in the Australian national airspace, and associated issues.

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