# MINUTES

<table>
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<th>Item No</th>
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<tr>
<td>1.</td>
<td>OPENING</td>
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<td>2.</td>
<td>REVIEW OF ACTION ITEMS</td>
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<td>3.</td>
<td>REGIONAL SAFETY MATTERS</td>
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<td>4.</td>
<td>CHANGE PROPOSALS</td>
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<td>5.</td>
<td>AGENCY BRIEFINGS AND UPDATES</td>
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<td>5.1</td>
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<td>5.3</td>
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<td>6.</td>
<td>OTHER BUSINESS</td>
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<td>6.1</td>
<td>CDSCC High Power Operations Implications to Canberra Airspace</td>
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<tr>
<td>6.2</td>
<td>Airspace Modernisation Program (Airservices)</td>
<td>13:45</td>
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1. OPENING
The Chair thanked attendees for making their time available and welcomed them to the second RAPAC for 2019. All attendees introduced themselves.

The Chair noted that he had corresponded with representatives from Wing who stated that they were unable to attend the RAPAC meeting but are interested in attending meetings in the future.

2. REVIEW OF ACTION ITEMS
The status of outstanding action items was reviewed with comment included in the attached table.

3. REGIONAL SAFETY MATTERS
There were no regional safety matters raised.

4. CHANGE PROPOSALS
There were no change proposals raised.

5. AGENCY BRIEFINGS AND UPDATES

5.1 Bureau of Meteorology
Representatives from the Bureau of Meteorology were unable to attend and therefore unable to provide a briefing to the RAPAC.

5.2 Airservices Australia
Mr Binh Huynh (Airservices) provided a general update to the RAPAC. Members enquired about the operation of the stop bars at Canberra Airport, particularly in relation to compliance by general aviation users. Mr Huynh informed the RAPAC that there have not been any issues relating to the stop bars and that GA users have been compliant. He also stated that there will be a post-implementation review in the near future.

5.3 Defence
Mr Martyn Silver provided a general update to the RAPAC.

6. OTHER BUSINESS

6.1 CDSCC High Power Operations Implications to Canberra Airspace
The ACT and NSW RAPACs were joined via videoconference.

Ms Cheryl Allman (Landrum & Brown) presented to the RAPAC “CDSCC High Power Transmissions – Stakeholder Briefing & Consultation” to inform members on proposed changes to R430ABC to accommodate increased High Intensity Radiated Field (HIRF) power transmissions from the CSIRO Canberra Deep Space Communication Complex (CDSCC). She noted that CASA, NASA and the FAA have been working together under a bilateral agreement between the US and Australian governments for the purposes of supporting future deep space exploration. Ms Allman also highlighted that the first of the stakeholder consultations being held was on 1 May 2019. Feedback
is being sought on the draft airspace volume by 28 June 2019.

Whilst unable to attend the RAPAC meeting, Mr John Hogan (ACT Convenor) asked that his concerns regarding the late involvement of RAPAC be communicated at the meeting and recorded in the minutes. Ms Allman emphasised that this is the beginning of the consultation process and noted that a stakeholder risk workshop was conducted on 1 May 2019 which helped to inform the draft airspace design. There will be a series of consultations with industry prior to the Airspace Change Proposal (ACP) being developed and the airspace is unlikely to be established for another three to five years. The RAPACs will continue to be engaged in this process, and members can contact Ms Allman directly for further discussion.

Mr Stewart Dennis (HGFA) enquired whether the operation of the HIRF will restrict cross-country flying. The RAPAC were informed that the Restricted Area (RA) is being designed to ensure that there will be limited risk to flights in the area, but airspace users would need to remain outside of the airspace. If for some reason, an aircraft enters the RA, then there is an emergency procedure activation process which would take appropriate action including shutting off the transmission. However, the transmission will not be shut off if there are mission critical events taking place, e.g., providing communications for manned space missions.

Mr Jeff Hunt (Regional Express – NSW RAPAC) highlighted potential issues that will be faced by Rex with their Sydney – Albury routes and enquired about individuals and aircraft equipment experiencing multiple exposures by the HIRF. Ms Allman acknowledged that the team was aware of the issues of the Sydney-Albury route and that Airservices had already commenced work on alternatives. Mr Hunt advised that due to the age of the REX Fleet they may not have the required shielding to alleviate the effects of the HIRF. Ms Heather Selwyn (Landrum & Brown) stated that the concern for human exposure is related to heating effects on the body. After a short period, likely minutes, the exposure is reset and therefore there is minimal risk to crew who are frequently flying these air routes. She also stated that aircraft equipment would be unaffected if there is sufficient shielding in place for the avionics and that the aircraft are certified for repeat exposure. Ms Allman requested REX to provide aircraft technical details to enable further understanding of the certification levels of the aircraft avionics. The meeting was informed that a focus of the project team has been to reduce the impact on airspace users by developing a volume that will accommodate high level, high speed operations that will not be affected by HIRF. There is potential for the opportunity to further reduce the airspace volume, vertically, if other procedures are able to be accepted by the aviation agencies and airspace users. There is more work to be done on this topic.

Ms Allman also informed the RAPAC that the decision for the airspace to be RA2 or RA3 is yet to be decided. The objective at this stage is to only allow emergency aircraft to safely access the airspace in accordance with predetermined procedures, however this will be reliant upon the further work to be done as discussed above.

Written feedback to the draft airspace volume is requested to be provided by Friday 28 June. Details of how to submit feedback are contained within the technical paper and summary presentation.

6.2 Airspace Modernisation Program – Tranche III
The ACT and NSW RAPACs were joined via videoconference.

Mr Adrian Fitzgerald (Airservices) presented on Airservices’ Airspace Modernisation Program – Tranche 3 (attached). He outlined the proposed changes including, but not limited to Class E above regional terminal airspace, Class G in terminal airspace out of tower hours, and lower Class E airspace at Ayers Rock. The changes are proposed to occur at May 2020 AIRAC. Mr Fitzgerald also noted that CASA is consulting on the ACPs until 23 June 2019.
7. ATTENDANCE LIST

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<tr>
<th>Name</th>
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<tr>
<td>Matthew Di Toro (Chair)</td>
<td>CASA</td>
</tr>
<tr>
<td>Martyn Silver</td>
<td>ADF CASA LO</td>
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<td>Ian Mallett</td>
<td>AusALPA</td>
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<td>Binh Huynh</td>
<td>Airservices</td>
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<td>Gary McGivern</td>
<td>Canberra Airport</td>
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<td>Heather Selwyn (Phone)</td>
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<td>Cheryl Allman (Phone)</td>
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<td>Peter White (Phone)</td>
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<td>John Hogan</td>
<td>ACT RAPAC Convenor</td>
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<td>Reference</td>
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<td>2019-1/1</td>
<td>Airservices to advise what transponder requirements are proposed for Gliders in relation to the changing of vertical airspace boundaries associated with the Airspace Modernisation Project.</td>
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<tr>
<td>2019-1/2</td>
<td>Airservices requested to provide a copy of the Airspace Change Proposal (ACP) submitted to CASA regarding the Ayers Rock airspace change.</td>
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CDSCC High Power Transmissions – Stakeholder Briefing & Consultation

• Project Background
• DSN & HIRF
• HIRF Safety Impacts
• Current Airspace
• Proposed Change
• RA Concept Development
• Assessment Process
• Stakeholder Consultation
• ACP

May, 2019
NASA's Deep Space Network (DSN) has 3 Communication Complexes:

- Madrid DSCC - Robledo Spain
- Goldstone DSCC - California USA
- Canberra DSCC – ACT Australia

Comms with approx 35 spacecraft including Voyager 2.

CDSCC’s operational antennas produce high intensity radiation fields (HIRF).

Strategically significant for Australia.
Continuous ‘follow the sun’ operations
RA430 – Current Airspace

R430 currently protects for HIRF from:
- 34m dish @ 20kW on S- and X- bands, and
- 70m dish @ 100kw on S-band & 80kw on X-band

Transmissions have a minimum elevation of 10°
- R430A: SFC – A035, 2.0nm Radius
- R430B: A035 – A045, 3.0nm Radius
- R430C: A045 – A100, 5.0nm Radius
- RA2 – Entry via coordinated Request

2017 CASA Post Implementation Review:
- Confirmed acceptability and added interim step (R430B) to maximise low level airspace access.
- Changed status to RA2 to facilitate emergency operator access
Communication with Mars missions (including manned), and continuing Voyagers require higher power

80kW X-Band transmitter on 34m dish required by NASA at all 3 DSCC locations

Operating Requirements:
- Elevation minimum 13.5°
- Azimuth 360°
- 24/7 and 365 days per year

Result:
- Increased HIRF field strength on X-Band up to 316V/m peak.
HIRF Safety Implications

• Flight Critical Systems
  • Electronic Systems (e.g. widely used in avionics, engine control & navigation systems) can be vulnerable to HIRF
  • HIRF interactions with Electronic systems are complex

• Certification Level (Env 1 = 200V/m for X-band)
  • Flight critical functions must be shown to be immune / resilient to HIRF environments up to certification levels
  • Functional Resilience – must be able to withstand the HIRF test levels without adverse impact

• History / CASA Assessment
  • To date, known cases of HIRF adverse impact are few and mainly anecdotal, none fatal
  • No cases of RPT aircraft affected – A330 level change incident at Learmonth: investigation ruled out HIRF as trigger

• Human Exposure
  • ARPANSA Public Exposure Limit reached after 43s @ 200V/m, 13s @ 316V/m continuous exposure hovering in the beam.
Maximum HIRF 34m 80kW X-Band field strength is 316V/m:

- < “peak” limit in Env 1 (1,000V/m)
- > “time average” limit in both Env1 (200V/m) and Env 2 (170V/m)
- Application of the Peak 316V/m unnecessarily restricts a significant chunk of airspace up to approx. FL515.

NASA (JPL) / DSC have developed “spatial averaging” which takes account of the reduced exposure time due to the speed of the moving target (aircraft):

- The FAA and CASA have approved the methodology
- CSIRO have utilised the methodology to calculate RA dimensions required for 79kts (min) ground speed to ensure average HIRF exposure remains < Env 1.
Factors affecting beam transit time:

- Ground Speed
- Transit angle: combinations of (climb/descent) & beam angle (elevations)
- Turn through beam (insignificant)
- Min elevation mask primarily determines low level airspace
- Lateral RA dimension dominated by far field drop off.

Example:

- 79kt GS
- Climb at 8°
- Minimum Beam elevation 13.5°
- RA up to FL250 (dependent on buffer to be applied)
- Assumption: ACFT above FL250 >79kts ground speed
• Deterministically Safe by Design – RA430xx designed to exclude all airspace users from potential HIRF Event (HIRF Event = 1s avg exposure > 200V/m);
• Historical Lowest ground speeds above elevation mask (79kts) identified and used as basis for design;
• Conservative Assumptions (e.g.79kts GS and @ 8° climb / descent)
• As with any RA, pilot compliance / avoidance required;
• ATC Monitoring of Class A & Instrument Flights;
• Additional Barriers:
  • Entry into RA does not automatically mean HIRF exposure (narrow beam in large volume);
  • HIRF Event does not automatically result in Flight Critical System Failure
  • Standard Equipment Failure Response
HAZID & Risk Assessment

Hazard Register has been developed & input to be provided by stakeholders

Scenarios will be developed into Bowties

Safety controls (preventative & mitigative) identified and ranked in terms of effectiveness (probability of failure)

Qualitative / Semi-Quantitative assessment of residual risk for all identified consequences.

Validation of identified controls – e.g. Shutdown coordination, Compliance with RAs, Transmission Power control
RA430xx Development Stages

- CSIRO gained approval from FAA & CASA to utilise spatial averaging methodology to develop an airspace concept;
- AirServices have had input to the initial concept design to ensure feasibility - e.g. current airspace users, minimum GS & possible RA implications;
- Draft Hazard Register with consultation from key Stakeholders;
- Safety Assessment to be developed in support of ACP for CASA review & approval;
- Detailed design of RA430xx to support high power transmissions;
- RA430xx Published, activated by NOTAM to support construction, commissioning;
- RA430xx active - Operation of 80kW transmitter.
Airspace Design & Safety Assessment Process

1. Early Concept Design Review – Stakeholder Input
   - HAZID developed – incl Stakeholder Input
   - HAZID scenarios developed into Bowties
   - Safety controls ranked in terms of effectiveness (probability of failure)
   - Residual Risk Assessed
   - Validation of critical controls
   - Safety Assessment Report Approval

2. Detailed Design Developed

3. Airservices Airspace Assessment & Consultation

4. ACP Review, Approval & RA430xx Activation (by 2022)
Stakeholder Consultation Processes

Opportunities (stages)

• Draft Concept Discussion & Hazard Register Review meeting
• ACT & NSW RAPACs May 2019
• Direct Communication with L&B representatives
• Future RAPAC meetings
• Analysis of stakeholder feedback
• Final airspace design for ACP
Impact on Low Level Class G Airspace

- 10° elevation mask (existing transmissions) supports low power operations
- No anticipated changes to existing lower limits of R430 A-C for high power operations
- Possible overlay of 2(?) extra tiers from A090 up to FL250
Impact on Flight Tracks

- Based on input from stakeholders, proposed RA will be assessed by Airservices
- Necessary Flight Track changes (& options) will be identified
- Any Flight Tracks changes will go through the full Airservices consultative process
Stakeholder Workshop – Key Feedback

- Draft HAZID register reviewed, added to & verified
- Proposed Step at 6.5nm, A090–FL120 needs input from other potential airspace users
- High sensitivity to additional track miles – all options to be assessed including the economic impact
- 8° climb or descent is conservative
- 79kts GS (for ops above elevation mask) is conservative
- Speed requirement on tracks through RA requested - pilot responsibility to manage during planning phase
- RA design buffers, rounding and addition of operating buffers conservative
- RA2 – definitions and applications in practice need review
For feedback and comments on this work, please contact:

Cheryl Allman, ACP Project Lead
E: CAllman@landrum-brown.com

Feedback is requested by 4pm Friday 28 June 2019
Aim of today’s presentation

PART 1

Explaining what Tranche 3 of the AMP is and the change detail

PART 2

Questions and answers
The ever changing ATM environment

- Changes to technology (eg Performance based navigation)
- Mandated avionics (eg IFR ADS-B mandate)
- Changes to the ATM platform capability (eg CMATS)
- General aviation expectations (eg VFR access)
- New airspace users (eg Drones, RPAS)
- Changed government expectations (eg Airspace Policy Paper)
- Differing international practice (eg FAA airspace)

- Emerging airports (eg Western Sydney)
- Emerging services (eg Ballina)
- New runways (eg Brisbane and Melbourne)
- New service offerings (eg Digital aerodrome services)
- Enhanced surveillance (eg Satellite ADS-B)
- Modernised communications (eg SATCOM)
- New aircraft capability (eg increased velocity, altitude, range)
PART 1
Airspace in context

Air Traffic Flow Management
- Setting the platform for effective Air traffic Management (ATM)

Air Traffic Control
- Delivering safe and efficient services

Airspace Management
- Enabling a predictable air transport network
AMP Changes roadmap

**Change Principles**

**CP1.** The class of airspace should be commensurate with the service level required to appropriately manage the assessed level of risk.

**CP2.** There should be national consistency and standardisation of airspace and procedures to reduce complexity for air traffic controllers and pilots and enhance service resilience.

**CP3.** The class of airspace should leverage the implementation of air traffic management technologies (such as ADS-B surveillance) to improve safety, mitigate risk and enhance access to airspace for all airspace users.

**CP4.** Airspace design should facilitate the delivery of surveillance services and enhanced communication channels where the capability exists.

**Service Outcomes**

- **SO1.** Ensure the safety of air navigation is the most important consideration while fostering and promoting civil aviation.
- **SO2.** Provide a predictable, efficient and effective service to the aviation industry.
- **SO3.** Innovate for airspace user value aligned with global industry expectations.

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- safety
- protection of the environment
- efficient use of airspace
- equitable access
- national security
- current and future needs of the Australian aviation industry
- advances in technology
- international best practice as may be adapted to benefit Australia’s aviation environment
- ICAO Standards and Recommended Practices.

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**CASA OAR ARASMM 3.3**
## Part 1
### Current State

### Before Tranche 3

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**Today’s regional airport airspace environment**

- 5 different tower configurations
- Inefficient use of resources
- Surveillance coverage not leveraged
- Inconsistent risk to service level application
- Not conducive to a generic endorsement environment
- Difficult for pilots operating multiple flight sectors
Airspace Modernisation Program – Tranche 3

Part 1
Current State

Tower Active

Tower Deactivated

Note: Base LT A015 (Class D)
Note: AS base CTA LL E FL180
**Tranche 3**

**Proposed changes: May 2020 AIRAC**

3.1 **Class E above all regional terminal airspace**

Replacing class C airspace with class E airspace above regional airports

(Airports include AY, AS, CFS, HM, HB, LT, MK, RK & TW)

3.2 **Out of tower hours Class G**

Introducing class G terminal airspace at HB, LT, MK & RK when the tower is deactivated

(replacing class D at HB & LT and class E at MK & RK)

3.3 **Lower Class E steps outside of tower hours**

Leave the class E steps active down to A045 at AS, AY & TW when the tower is deactivated

(replacing >4000 ft. of class G airspace with Class E when the tower is deactivated)

3.4 **Lower Class E at BRM & KA & transfer jurisdiction to Enroute**

Lower the Class E steps down from A055 to A045 at BRM & KA

(replacing 1000 ft. of class D during tower hours and class G when tower is deactivated)

3.5 **Lower Class E at AYE**

Lower the Class E steps down from A055 to A045 at AYE

(replacing 1000 ft. of class G airspace)
Part 1
End state overview of Tranche 3 model
### Part 1
Tranche 3 operating state

#### Tomorrow's regional airport airspace environment
- A single, generic service configuration
- ATC resources optimised and flexible
- Consistent risk model applied to service level
- Surveillance coverage maximised

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Airspace Modernisation Program – Tranche 3

Part 1
Tranche 3 operating state

Tower Active

Tower Deactivated
WHY?

- There are no airspace triggers, only tower triggers.
- There is no rapid response to capability uplift as locations grow.
- We need to match the airspace to the level of service commensurate with the location using a consistent model, not simply leaving it ‘as is’ and ‘over servicing’ while a location grows into its classification.
- Because ultimately it costs you.
- As it uses valuable and scarce ATC resources.
- Where collectively we think they are better used elsewhere.
- e.g. // Runways, UTM, high density.

Because we can’t have everything?
# How big is big?

## Towered Vs. Un-towered

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<th>VFR Source</th>
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<td><strong>460,154</strong></td>
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<tr>
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<td><strong>28,628</strong></td>
<td><strong>629,226</strong></td>
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<td><strong>16,659</strong></td>
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<td><strong>19,942</strong></td>
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<tr>
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<td>YMEM - ESSENDON</td>
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<tr>
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<tr>
<td>YPFF - PARAFIELD</td>
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<tr>
<td>YMAT - ALBURY</td>
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<td>43,310</td>
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## Base Trigger Criteria

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<thead>
<tr>
<th>Criteria</th>
<th>Value</th>
<th>Legend</th>
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<tbody>
<tr>
<td>Movements</td>
<td>80,000</td>
<td>Exceeds trigger</td>
</tr>
<tr>
<td>Air Transport Movements</td>
<td>16,000</td>
<td>Within 10% of trigger</td>
</tr>
<tr>
<td>Passenger</td>
<td>350,000</td>
<td>Does not exceed trigger</td>
</tr>
</tbody>
</table>
Indicative Schedule

- Safety modelling and risk assessment has commenced.
  - Your input will be part of this.
- Stakeholder engagement started Monday 15 April (5-6 weeks)
  - Feedback welcome via stakeholder@airservicesaustralia.com
- ACP submission in July 2019
- ACP approval prior to October 2019 cut-off for May 2020 AIRAC
- ATC training and pilot education April 2020
- May 2020 AIRAC implementation

Your training impact?