Global moves and our path

- Preference for alignment with EASA or CASA
  - EASA: Emerging benchmark, future EMAR compatibility
  - CASA: Single Australian approach

- Principles behind both regulation sets reasonably aligned
  - Both have a higher Type Certificated category
  - Both have middle (risk-based) categories that require Authority approval
  - Both have lower categories that don’t require Authority approval

- Decision: Hybrid of both
  - Adapt EASA approach for Certified and Specific
  - Adapt CASA Excluded approach
  - Re-assess when EASA and CASA evolve their approach
# EASA vs. CASA Approach

<table>
<thead>
<tr>
<th>Weight Class</th>
<th>EASA</th>
<th>CASA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPEN</strong></td>
<td></td>
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</tr>
<tr>
<td>No Auth</td>
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<tr>
<td>No Auth</td>
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<tr>
<td>Auth Reqd</td>
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<tr>
<td><strong>SPECIFIC</strong></td>
<td></td>
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</tr>
<tr>
<td>if within standard scenarios</td>
<td></td>
<td>VLOS Height &lt; 120m Dist from pers &gt; 30m Not populous Cont Aero &gt; 3nm + landowner + RePL</td>
</tr>
<tr>
<td>if outside standard scenarios</td>
<td></td>
<td>VLOS Height &lt; 120m Dist from pers &gt; 30m Not populous Cont Aero &gt; 3nm + landowner + RePL</td>
</tr>
<tr>
<td>if risk beyond Specific</td>
<td></td>
<td>VLOS Height &lt; 120m Dist from pers &gt; 30m Not populous Cont Aero &gt; 3nm + landowner + RePL</td>
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<tr>
<td><strong>CERTIFIED</strong></td>
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<td></td>
</tr>
<tr>
<td>TC, RPL, ReOC</td>
<td></td>
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<tr>
<td><strong>EXCLUDED</strong></td>
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<td>VLOS Height &lt; 120m Dist from pers &gt; 30m Not populous Cont Aero &gt; 3nm + landowner + RePL</td>
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<tr>
<td><strong>AREA APPROVAL</strong></td>
<td></td>
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</tbody>
</table>

### 150kg+
- if within standard scenarios
- if outside standard scenarios
- if risk beyond Specific

### 25-150kg
- Cat A1, A2, A3
  - VLOS
  - Height < 50/150m
  - Dist from pers > 0/50m + equipage + design reqts

### 2-25kg
- Cat A1, A2, A3
  - VLOS
  - Height < 50/150m
  - Dist from pers > 0/50m + equipage + design reqts

### 250g-2kg
- Cat A0
  - Height < 50m
  - Range < 100m
  - Speed < 15m/s

### 100-250g
- Cat A0
  - Height < 50m
  - Range < 100m
  - Speed < 15m/s

### <100g
- Height < 50m
- Range < 100m
- Speed < 15m/s
Categories of UAS Operation in DASR UAS

- Concept + naming from EASA prototype regulations
- Open category analogous to CASA Excluded

- Categories:
  - Certified
  - Specific
    - Type A – UASOP
    - Type B – Standard Scenario
  - Open
    - Small
    - Very small
    - Micro
### Risk to Other Aircraft

- **Airspace**: Risk assessment + treatment
- **Ground**: Risk assessment + treatment

### Risk to Personnel + Critical Infrastructure

- **Airspace**: Unlimited* (with equipage)
- **Ground**: Unlimited

### Limitations

**Category**
- **Certified**
  - Airspace: unlimited
  - Ground: unlimited
  - INSTRUMENT: MTC, MAOC
- **Specific**
  - Standard Scenario #1: <design>, <ops>, <RP training>
  - Standard Scenario #2: <design>, <ops>, <RP training>
  - Standard Scenario #x: <design>, <ops>, <RP training>
  - Airspace: risk assessment + treatment
  - Ground: risk assessment + treatment
  - INSTRUMENT: UASOP
- **Open**
  - Small (<25kg): “Very Small” limits, operate over Defence land/water, ops in controlled airspace require approval
  - Very Small (<2kg): “Micro” limits, >30m from GP, not over populous, <3nm from aerodrome requires approval, 1RP/UA
  - Micro (<100g): VLOS, <400’, day VMC, not in Rest or movt areas (etc) without approval, RP trained

* With equipage
Categories of UAS Operation in DASR UAS

• Operate in Open if:
  – < 25 kg
  – Meets Standard Operating Conditions

• Operate in Specific Type B if:
  – Meets requirements of a Standard Scenario

• Operate in Specific Type A if:
  – Issued a Defence AA UASOP

• Operate in Certified if:
  – Meets similar requirements to manned aircraft

Standard Scenarios:
  – < 100 g
  – < 2 kg
  – Defence exercises
  – High seas
  – Trials and experimentation
DASR UAS: Applicability

• DASR UAS is applicable to UAS operated by or on behalf of Defence – other than those regulated under DASR NDR.

• These are UAS:
  – unmanned targets
  – decoys
  – simulated weapons with a programmed or remote piloted flight path and which have a recoverable and reusable airframe.
  – (perhaps) disposable/one time use UA such as air dropped target

• These are not UAS:
  – guided missiles/rockets designed for single flight
  – guided weapons with a loiter capability*
## DASR UAS

<table>
<thead>
<tr>
<th>UAS.10</th>
<th>UAS Approval and Authorisation</th>
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<tr>
<td>UAS.20</td>
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<tr>
<td>UAS.35</td>
<td>Standard Scenario for UAS Operations</td>
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<td>Open Category UAS</td>
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<td>Support for Authority Compliance Assurance</td>
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<td>UAS.80</td>
<td>Foreign UAS Operations</td>
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</tbody>
</table>
UAS.10 - UAS Approval and Authorisation

• Provides GM on:
  – Concept of Authority Approval and Command Authorisation
  – Applicability
  – Definitions

• Requires all UAS operations to be authorised by Command or Defence Group

• Requires persons authorising and/or operating UAS to eliminate or otherwise minimise risks SFARP

• Requires all UAS to be operated IAW Certified, Specific or Open categories
MEP, GP and Critical Infrastructure

**MEP**
- All persons directly associated with the operation of the UAS or briefed as part of the UAS mission

**GP**
- All persons not classed as Mission Essential Personnel

**Critical Infrastructure**
- A facility that, if damaged by a UA, may have an immediate and adverse effect on MEP or GP health and safety
UAS.20 - Certified Category UAS

• Allowed to operate in all classes of airspace
  – Suitable equipage
  – Able to meet the same rules as manned aircraft
  – Capable of detect and avoid?

• Allowed to operate over all populous areas
  – Meet requirements for Military Type Certification
Certified Category - Eligibility

- UAS eligible if they:
  - are Defence registered
  - have an SOIU
  - are Type Certified (per DASR 21)
  - comply with all initial and continuing airworthiness DASRs
  - are operated under a MAOC
  - comply with DASR Air Operations and Standard Rules of the Air regulation.
  - are controlled by a remote pilot who is:
    - a qualified military pilot, or
    - qualified in accordance with relevant service requirements.
UAS.30 – Specific Category

• Operate under Specific Type B if a Standard Scenario covers the required operation.
• Operate under Specific Type A if no suitable Standard Scenario.

• **Specific Type A**
  – UASOP
  – Defence AA approval
  – Command authorisation

• **Specific Type B**
  – Standard Scenarios developed by DASA
  – Command authorisation
Eligibility – Specific Type A (UASOP)

- UAS eligible if they:
  - are registered as directed by the Authority
  - have its role and operating environment documented in an SOIU when directed by the Authority
  - comply with DASR initial and continuing airworthiness regulations to the extent directed by the Authority
  - Comply with MAO requirements of DASR ARO.100, to the extent directed by the Authority
  - comply with DASR under Air Operations and Standard Rules of the Air to the extent directed by the Authority
  - be controlled by a remote pilot who is qualified as specified in the UASOP
  - operate within the requirements and limitations included on the UASOP.
DASA AC 001/2018 – Risk Controls for UAS Operations

• Applicants for a UASOP under DASR UAS.30 may utilise the list of candidate risk controls in AC 001/2018 to assist in identifying and applying robust and appropriate risk controls.

• Command/Group authorising UAS operations under other categories may also utilise the list of candidate risk controls in the AC 001/2018 to identify additional risk controls.

• AC 001/2018 provides:
  – a tool for identifying where risk controls might contribute to managing hazards presented by a particular UAS in a particular operating environment, and
  – a non-exhaustive list of candidate risk controls.
Eligibility – Specific Type B (Standard Scenario)

- UAS eligible if they:
  - are operated under Standard Scenarios published by the Authority (i.e., within the requirements and limitations specified in the Standard Scenario)
  - are notified to the Authority prior to commencement of operations (via a Form 150).
Standard Scenarios

• Essentially a collection of risk controls in the form of requirements and limitations
  – Would have warranted UASOP if proposed

• Provided all risk controls are in place, Command can authorise operations and notify Authority of intent to operate.
Published Standard Scenarios

• Found at DASR UAS.35
  – Regulation contains requirements and limitations
  – GM contains details on the use and applicability of the scenario
  – AMC contains details on risk controls (technical, operations and RP training and management)

• 5 initial Standard Scenarios:
  – Micro UAS outside SOC
  – Very small UAS outside SOC
  – Defence exercises
  – High seas
  – Trials and experimentation
Standard Scenario – Micro UAS

- UAS < 0.1kg
- Operations outside Open category SOC
- Allows operations:
  - BVLOS
  - At night
  - In cloud
  - >400’ AGL
- Technical risk controls
  - Autonomous recovery system
  - Geo-fencing/tether
  - EO/IR cameras
  - Manual termination capability
- Operational risk controls
  - Pre-flight checks
  - Documented UA limitations
  - Emergency procedures
- RP training & qualification system
Standard Scenario – Very Small UAS

- **UAS < 2kg**
- **Operations outside Open category SOC**
- **Allows operations:**
  - BVLOS
  - At night
  - In cloud
  - >400’ AGL
  - <30m from GP
  - Over populous areas
  - <3nm from controlled aerodrome
- **Technical risk controls**
  - Autonomous recovery system
  - Geo-fencing/tether
  - EO/IR cameras
  - Manual termination capability
  - Battery/fuel display
  - UA visibility features (eg lighting)
- **Operational risk controls**
  - Pre-flight checks
  - Documented UA limitations
  - Planning & procedures for airspace and operational area
  - Emergency procedures
- **RP training & qualification system**
Standard Scenario – Defence Exercises

• UAS < 150kg
• Op in military restricted airspace
• Op over:
  • Defence controlled land OR
  • Water allocated for Defence exercise
• Allows operations:
  – BVLOS
  – At night
  – In cloud
  – >400’ AGL
  – Over vessels

• Tech risk controls
  – Autonomous recovery system
  – Geo-fencing/tether
  – EO/IR cameras
  – Manual termination capability
  – Battery/fuel display
  – UA visibility features (eg lighting)
  – Datalink redundancy
  – Backup power for RPS
  – Inspection and maintenance of UAS

• Op risk controls
  – Pre-flight checks
  – Documented UA limitations
  – Spectrum and EMI planning
  – Planning & procedures for airspace and operational area
  – Emergency procedures
  – Handover procedures

• RP training & qualification system, RP fatigue management
Standard Scenario – High Seas

- **UAS < 150kg**
- **Operations >12 nm from inhabited land**
- **Allows operations:**
  - BVLOS
  - At night
  - In cloud
  - >400’ AGL
  - Over vessels

- **Tech risk controls**
  - Autonomous recovery system
  - Geo-fencing/tether
  - EO/IR cameras
  - Manual termination capability
  - Battery/fuel display
  - UA visibility features (eg lighting)
  - Datalink redundancy
  - Backup power for RPS
  - Inspection and maintenance of UAS

- **Op risk controls**
  - Pre-flight checks
  - Documented UA limitations
  - Spectrum and EMI planning
  - Planning & procedures for airspace and operational area
  - Emergency procedures
  - Handover procedures

RP training & qualification system, RP fatigue management
Standard Scenario – Trials and Experimentation

• Operations in military restricted airspace
• Operations over Defence controlled land or range
• Not in vicinity of GP
• Allows operations:
  – BVLOS
  – At night
  – In cloud
  – >400’ AGL
  – More than one UA per remote pilot

• Tech risk controls
  – Autonomous recovery system
  – Geo-fencing/tether
  – Manual termination capability

• Operational risk controls
  – Pre-flight checks
  – Documented UA limitations
  – Spectrum and EMI planning
  – Planning & procedures for airspace and operational area
  – Emergency procedures
  – Handover procedures

• RP training & qualification system
UAS.40 - Open category

- Can operate in Open Category if able to meet Standard Operating Conditions (SOC) for relevant weight class
  - Micro (< 0.1 kg)
  - Very Small (0.1 – 2 kg)
  - Small (2 – 25 kg)
UAS.40 - Open category

<table>
<thead>
<tr>
<th>Applicable to</th>
<th>Standard Operating Conditions</th>
</tr>
</thead>
</table>
| Micro + Very Small + Small | • be operated within **visual line of sight**  
| | • be operated no higher than **400 ft** Above Ground Level (AGL)  
| | • be operated during **daytime** and not in cloud  
| | • not operate in a way that creates a hazard to another aircraft, person or critical infrastructure  
| | • not operate in a Prohibited Area, or a Restricted Area unless approved by the authority controlling the area  
| | • not operate in the movement area or the approach or departure path of a runway of an aerodrome / ship without approval from the relevant authority.  
| | • not operate in such a manner as to create an obstruction to an aircraft  
| | • be controlled by a RP who meets training, qualification and experience requirements defined by the relevant Command / Group  
| | • allow RP intervention during all stages of the flight |
| Very Small + Small | • not be operated within **30 m of the general public** (GP)  
| | • not operate over **populous areas**  
| | • not operate **within 3 nm** (5.5 km) of the movement area of a **controlled aerodrome** without approval of the relevant airspace authority AMC  
| | • not operate over an area where a fire, police or other public safety or emergency operation is being conducted without approval of the person in charge of the operation  
| | • for each air vehicle, have a dedicated RP |
| Small | • only operate over **land / water controlled by Defence**  
| | • not operate in controlled airspace without approval of the relevant airspace authority |
## DASR UAS

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</tbody>
</table>
UAS.50 - Weaponisation and Pax
- Weaponisation requires Authority approval
  - GM provides flexibility for inert stores
- Carriage of pax requires Authority approval
  - GM provides flexibility in level of safety

UAS.60 - Occurrence reporting
- Requires occurrence reporting
  - GM provides scaled down criteria for Specific and (especially) open category

UAS.70 - Compliance Assurance
- Support for Authority compliance assurance

UAS.80 - Foreign UAS operations
- Require Defence organisation authorisation
  - GM: no Authority Approval required
<table>
<thead>
<tr>
<th>Category</th>
<th>Certified</th>
<th>Specific A</th>
<th>Specific B</th>
<th>Small UAS &lt;25kg</th>
<th>Very Small &lt;2kg</th>
<th>Micro &lt;0.1kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is an Airworthiness Instrument required?</td>
<td>Yes. MTC/MRTC</td>
<td>Yes. UASOP</td>
<td>No. Command approval with notification to DASA</td>
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<td>Command approval</td>
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<tr>
<td>Is production and design organisation approval required?</td>
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<td>May be</td>
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<td>Operational restrictions</td>
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<td>Standard Operating Conditions</td>
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<td>Populous Overfly</td>
<td>Yes</td>
<td>Subject to SFARP</td>
<td>Dependent on Standard Scenario</td>
<td>No</td>
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<td></td>
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<td>Is continuing airworthiness organisation approval required?</td>
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<td>No</td>
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<td>UAS Operator Requirement</td>
<td>Mil Pilot</td>
<td>Specified in UASOP</td>
<td>Command discretion</td>
<td>Command discretion</td>
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**UNCLASSIFIED**
Features and benefits of DASR UAS

Features

- UAS not constrained to a single category
- Emphasis on Command authorisation of UAS operations
- Variable level of Authority involvement
- Flexibility for weaponisation and pax carriage
- Caters for UAS operations by Groups
Features and benefits of DASR UAS

Benefits

• Many UAS operations conducted without Authority-issued instrument
• Common nomenclature
• Compatible with emerging global UAS regulatory convention
• Commonalities with CASA for smaller UAS
QUESTIONS

Email: dasa.uas@defence.gov.au