



# The Emerging Aviation Sector - Challenges and Opportunities

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## Overview

- **Emerging sectors**
  - Overview
  - Use cases
  - Timelines
- **Challenges**

## What most of us think when we hear “drone”

DJI – Avata



DJI – Mavic



DJI – Matrice 600

### Consumer item

- Affordable & accessible
- Hundreds of thousands sold
- Capable...

### Wide range of use cases

- Sport and rec (including racing)
- R&D / science
- Infrastructure / construction
- Surveying / mapping
- Agriculture / mining
- Insurance
- Emergency services
- Videography
- ...

## SUAS - Delivery

### Roles:

- Last mile delivery
- Point to point logistics (e.g. mine sites, farms)
- Search and Aid

### Example Type:

### Wing / Alphabet

<b>MTOW:</b>	6.4 kg + 1.2 kg
<b>Max Speed:</b>	100 km/h
<b>Range:</b>	20 km (limited)



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## SUAS

### **Roles:**

ISR, EW, Search, remote inspection

### **Example Type:**

### **Insitu Integrator**

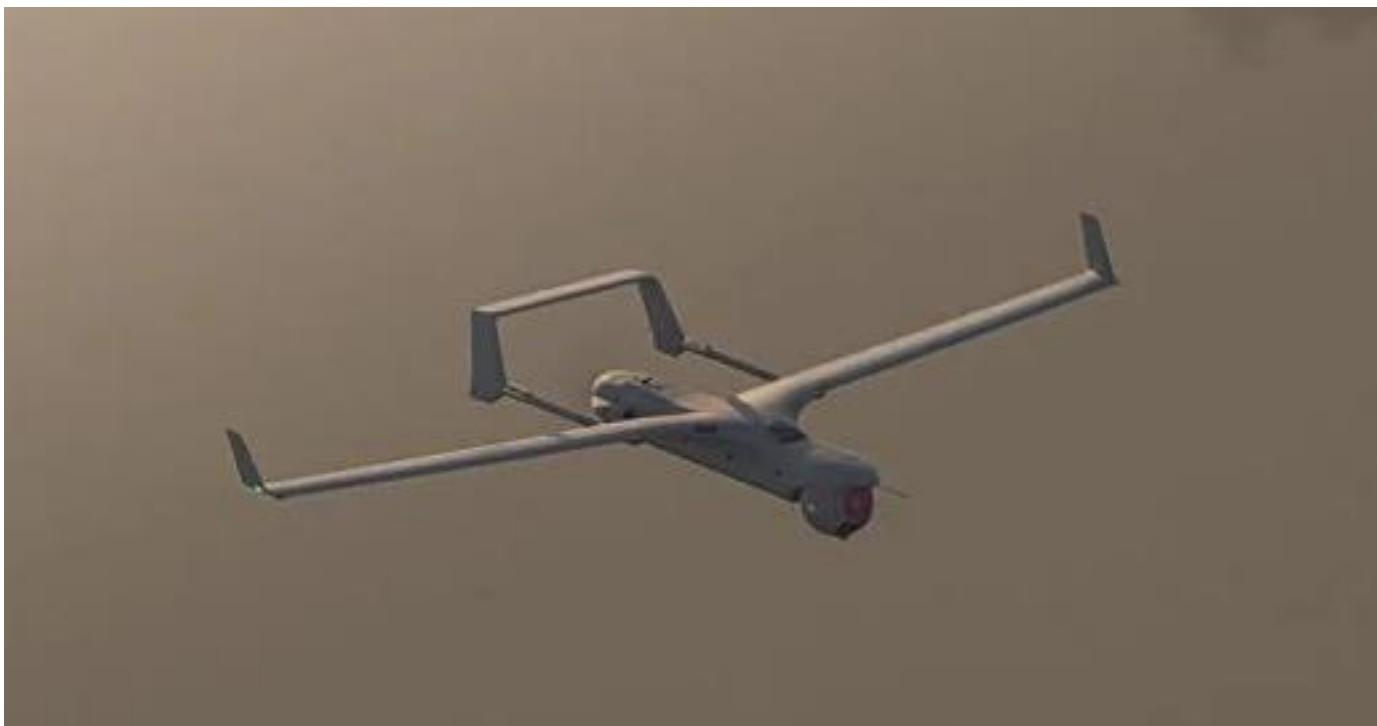
**Wingspan:** 2.5m

**MTOW:** 75 kg

**Max Speed:** 90+ knots

**Endurance:** > 24 hours

**Ceiling:** > 20,000 ft





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## UNCREWED CARGO

Where it's headed!



Pipistrel – Nuuva V300



Xwing - Cessna Grand Caravan 208B



Lockheed Martin – K-Max V300



## COMBAT

### MQ-28A Ghost Bat

**Role:** Uncrewed Wingman, EW, ISR

**Range:** 2,000 nmi



### MQ-25 Stingray

**Role:** Tanker, surveillance

**Wingspan:** 22.9 m / 75 ft

**Range:** 500 nmi (with 7,500lbs fuel)



## High Altitude Long Endurance

### Roles:

ISR, Comms, SIGINT

### Example Type:

#### MQ-4C Triton

<b>Wingspan:</b>	~131 ft
<b>GTOW:</b>	14,630 kg
<b>Max Speed:</b>	320 kn
<b>Range:</b>	15,200 km
<b>Endurance:</b>	30 hours
<b>Ceiling:</b>	56,000 ft
<b>Crew:</b>	4





## High Altitude Pseudo Satellite

### **Roles:**

Remote earth observation

Disaster relief / SAR

Persistent ISR

Comms

### **Example Type:**

#### **Zephyr**

**Wingspan:**

~82 ft

**GTOW:**

75 kg (24 kg batteries)

**Range:**

30,000 nmi

**Endurance:**

> 64 days

**Ceiling:**

FL600+



## Urban Air Mobility

### **Roles:**

Semi-urban connector, airport transfer, emergency services

### **Example Type:**

### **Eve Mobility**

Electric, lift cruise

**MTOW:**

1,000 kg

**Range:**

~ 50 nmi

**Endurance:**

< hour

**Op Alt:**

< 5,000 ft

**PAX:**

4 in piloted mode

6 in autonomous



XTURISMO



Doroni H1



Joby



Wisk



AMSL Aero – Vertiia, electric/H<sub>2</sub> Tilt rotor



## Regional Air Mobility

### Roles:

Regional PAX / freight

Medivac and emergency services

### Example Type:

**Vertiia**

**Cruise:**

320 kn

**Range:**

250 km (electric)

1000 km (H<sub>2</sub>)



BETA Tech – Alia, electric lift-cruise



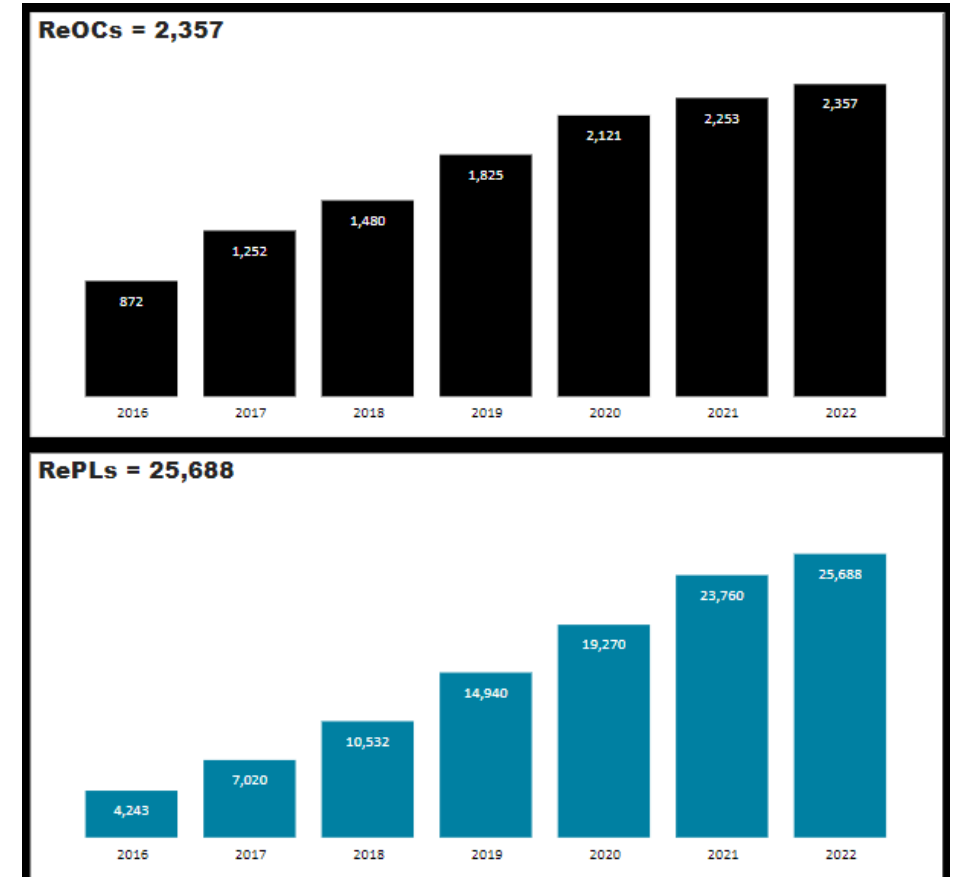
Electra Aero – blown lift, eSTOL

## Challenge Areas



### Regulatory / Safety and Security

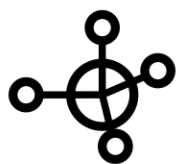
- Flexible, adaptable, tailored / proportionate, scalable
  - Ground and mid-air collision risks
  - Public acceptance
- Assurance of complex systems
- Certification
  - What needs to be certified?
  - Roots aren't in aviation safety ecosystem
  - Boundary of systems
- Changing role of the “pilot”
- Drone incursion
- Security / misuse
- Global fragmentation



CASA 30<sup>th</sup> JUN 2022



## Challenge Areas



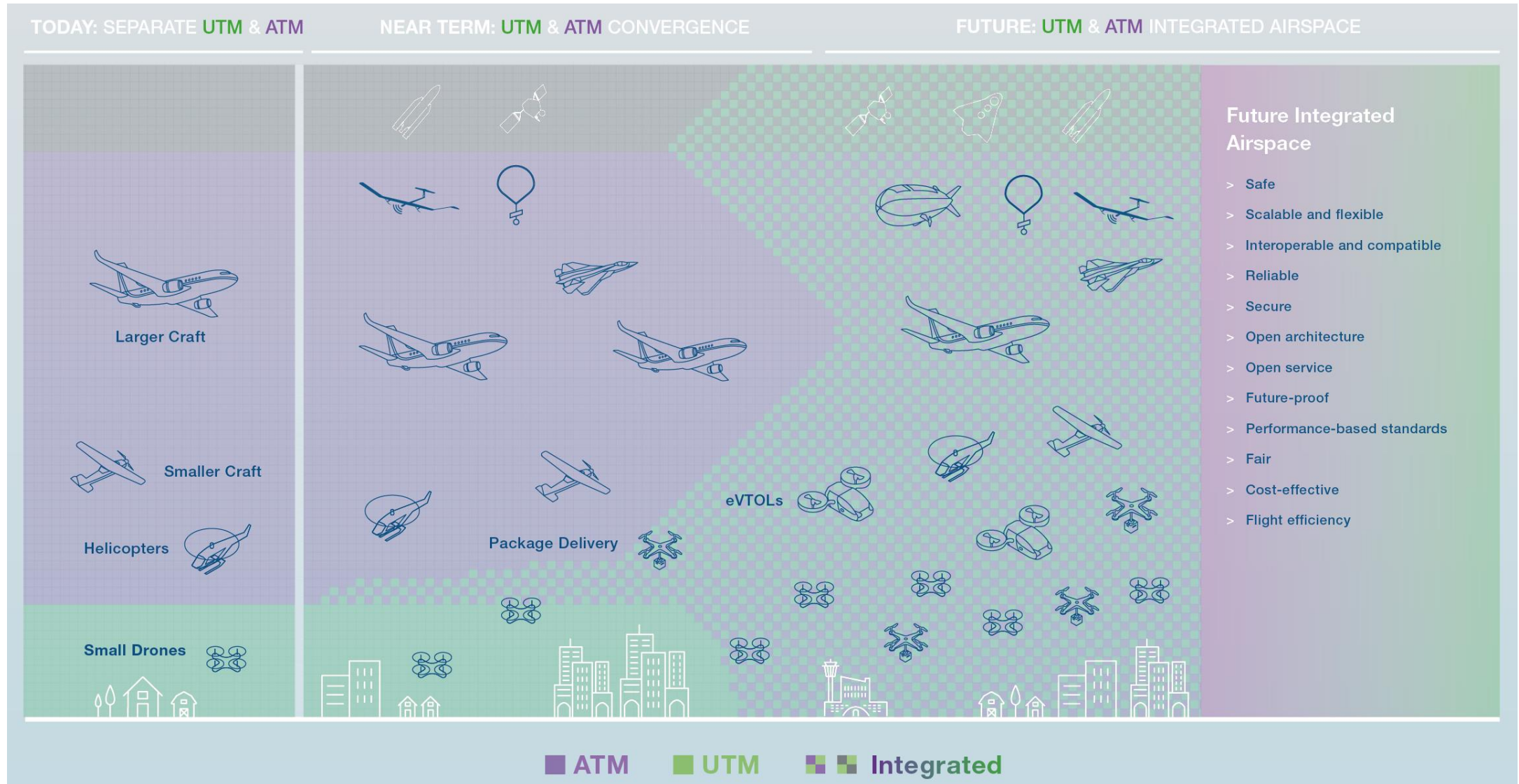
### Airspace Integration

- Exclusion, accommodation, integration, evolution!
- VFR, IFR, or DFR??
  - Right of way, see and avoid
- ATC integration
- Flight Information Management System (FIMS)
- Spectrum
  - Protected use (SoL) vs unlicensed vs commercial



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## Detect And Avoid



## Challenge Areas



### Community Perception

- Risk perception
- Privacy
- Noise
- Sensitive areas
- Consumer acceptance



#ACA #ACurrentAffair #TracyGrimshaw

Residents say drone deliveries are driving them mad | A Current Affair

<https://youtu.be/g6fjk6GYFTk>



## Challenge Areas

### Keeping up with an evolving battlespace

- Combat
- Surveillance / Intelligence
- Logistics
- Medivac
- ...
- Strategy
  - Use
  - Counter



## Final Messages

- **Not a pipe dream**
- **Decade ahead will be extremely exciting**
- **Lots of hype, there will be consolidation**
- **The whole aviation sector will benefit / path of convergence**
  - Opportunity not threat
- **Australia is well positioned to continue in its leading role**
  - Regulatory environment
  - Use cases
  - “Critical mass” in industry capability
  - Right-size
  - National policy approach