



Nova Systems

Uninhabited Systems

T&E Practices

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Uninhabited Systems Defence Requirements

- ▶ **Border Protection - Boat people**
- ▶ **Protection of Resources – North West Shelf**
- ▶ **Iraq and Afghanistan – Tactical/ISR**



Woomera Ideal for Uninhabited Systems T&E

- ▶ **Worlds Largest Land Based Range
127,000 km²**
- ▶ **Restricted Airspace Managed by Defence**
- ▶ **Ground access controlled - Safety**
- ▶ **Remote for security and commercial**
- ▶ **Very Low Population Density**
- ▶ **Quite RF environment**
- ▶ **Weather is good**
- ▶ **Cyber and EW Environments possible**



Woomera T&E Practices

- ▶ **Safety Case independently reviewed**
- ▶ **On board navigations systems and TM validated using range radars if required**
- ▶ **Airspace is managed to suite T&E activity**
 - ▶ **Airspace managements plans for certified systems**
 - ▶ **ACAUST provides permits (with limitations)**
- ▶ **Containment approached for flexibility**
- ▶ **Typically incorporate redundant FTS**



Woomera T&E Practices

- ▶ **Typically incorporate FTS**
 - ▶ **FTS redundancy**
 - ▶ **Loss of data link RTB**
 - ▶ **Safety approaches include:**
 - ▶ **Cut power/fuel**
 - ▶ **Adverse control inputs**
 - ▶ **Return to Base**



Test Range Investment

- ▶ Woomera approx \$300M Instrumentation and Infrastructure
- ▶ IOC 2018
- ▶ Mission going from 1 Complex to 2 Concurrent Complex trials – Staffing freeze “challenge”
- ▶ **Connected to distributed test environment** - Very limited LVC T&E domain experience.
- ▶ Idea to support testing in complex networked joint/allied environment



The RAAF Woomera Test Range

– Australia's Strategic Defence Air & Space Test & Evaluation Capability



600km Range
Centreline



Space Launch
& Recovery



Emerging, Complex &
Novel Technology Test



Fully Instrumented Air
Weapons System Test



UAS/UCAS Test



National EW & NAVWAR
Test & Evaluation



Force Protection
Counter Measures Test



Time-Space-Position
Tracking



Large Scale
Explosive Test



Range Control Centre



Woomera Airbase



HE Air Weapons Test



Meteorological



Woomera Village

“At 127,000 sq km in area - roughly the size of England – the Woomera Test Range is the largest, fit-for-purpose, defence systems test & evaluation range in the Western World – and the only range capable of testing, wholly within its land borders, the next generation of air weapons systems coming into operational service over the next 30 years”

www.woomera.com.au

Closed-Loop Alternate Navigation (C-LAND)

Bilateral Agreement with AFRL (C-LAND)

Aim: Closed-Loop Alternative Navigation Development and Demonstrations

- Contested Environment navigation
- Integration and flight test in an airworthiness controlled environment (Woomera)
- Basic research on alternate navigation
 - Compassing
 - Drift containment
 - Land marking



Australian Military and Civil UAS Certification

- UAS Categorisation – Australian Defence Force, DI(G) OPS2-2
 - CATEGORY 1 UAS (Large – standards based assessment)
 - CATEGORY 2 UAS (Large – qualitative assessment)
 - CATEGORY 3 UAS (Small – Low to Medium Risk)
 - CATEGORY 4 UAS (Micro – Very Low Risk)

CURRENT

- UAS Categorisation – Civil Aviation Safety Authority, CASR Part 101
 - Micro Category (Gross Weight < 100 grams)
 - Small Category (100 grams < Gross Weight < 150 kilograms)
 - Large Category (Gross Weight > 150 kilograms)

CURRENT

- CASA approval not required UAS Gross Weight < 2 kilograms
- CASA approval required UAS Gross Weight > 2 kilograms

PROPOSED





Civil Aviation Safety Authority (CASA)

- ▶ **CASA is Australian Equivalent to FAA**
- ▶ **Lead the world in UAV regulations**
- ▶ **Update to align with ICAO/FAA work**
- ▶ **CASA following FAA approach of establishing UAV Test areas around the country**



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Long History of Uninhabited Systems- Jindivik





Jindivik

- ▶ Australian Design
 - ▶ Government Aircraft Factory
- ▶ Over 500 built
 - ▶ Woomera & Royal Australian Navy
 - ▶ UK
 - ▶ USN
- ▶ 1948-2000 (over 50 years service)



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Australian Defence Systems





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A lot is happens Down Under (UK Systems)





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JAXA Alflex and NEXST1





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MQ-4C Triton (\$2-3B AUD Investment)





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Questions