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Modelling and Assessing Air-Surface Integration

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Outline of Presentation

What is Air Surface Integration (ASI)?
What did we do?
What did we find?

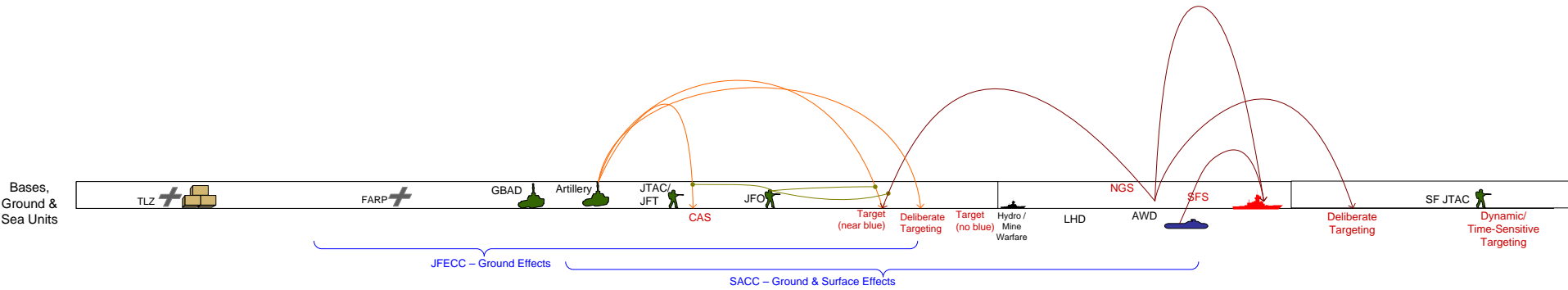Our systems analysis approach to ASI in an Australian context…
- ASI models that describe the structure, function, and behaviour of the ASI system.

■ Key issues are:
- Cross boundary
- Response to Events (R2E) activities
- Operational specific ASI organisations
- Islands of automation
- How to monitor airspace
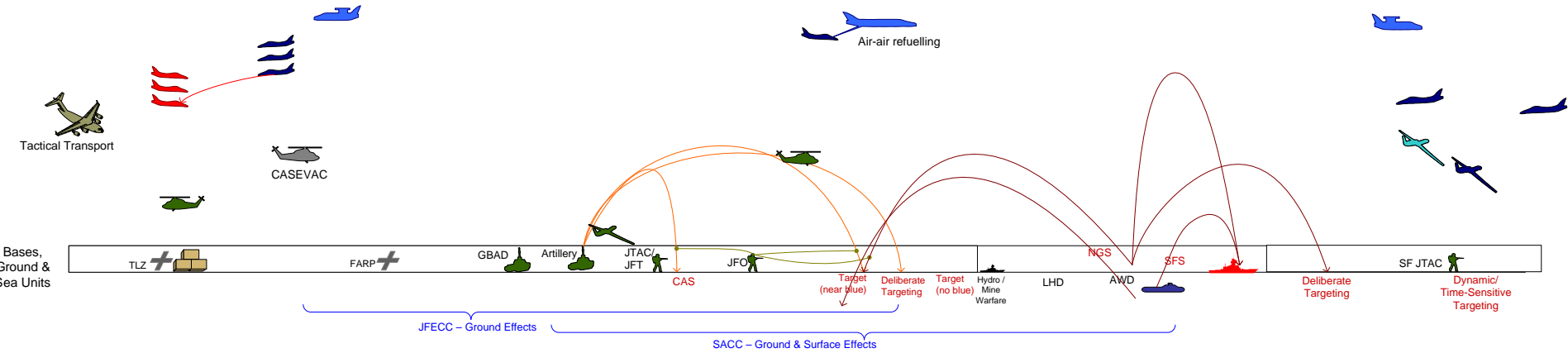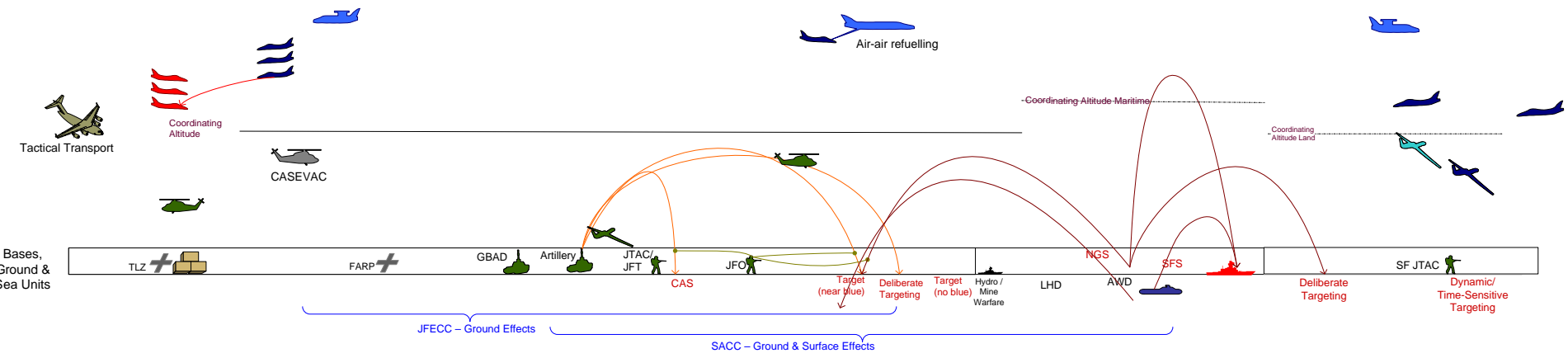 (what is a RASP – Recognised Air Surface Picture)
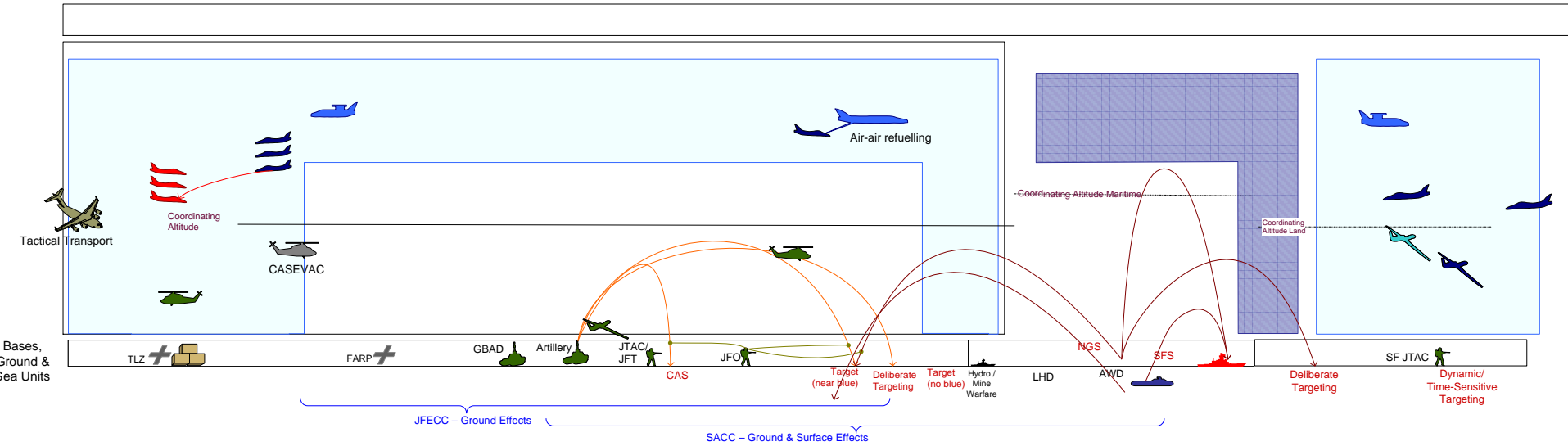
Battlespace

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Air – Surface Battlespace

Air-air refuelling

Tactical Transport

CASEVAC

Bases,
Ground &
Sea Units

TLZ

FARP

GBAD

Artillery

JTAC/
JFT

CAS

JFO

Target
(near blue)

Deliberate
Targeting

Target
(no blue)

Hydro /
Mine
Warfare

LHD

AWD

NGS

SFS

Deliberate
Targeting

SF JTAC

Dynamic/
Time-Sensitive
Targeting

JFECC – Ground Effects

SACC – Ground & Surface Effects

Air-air refuelling

Coordinating Altitude Maritime

Coordinating
Altitude

Tactical Transport

CASEVAC

Coordinating
Altitude Land

Bases,
Ground &
Sea Units

TLZ

FARP

GBAD

Artillery

JTAC/
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SACC – Ground & Surface Effects

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Airspace Control Measures

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What is ASI?

- *ASI …all the processes and mechanisms used to plan, coordinate, control and deconflict the use of airspace ….*
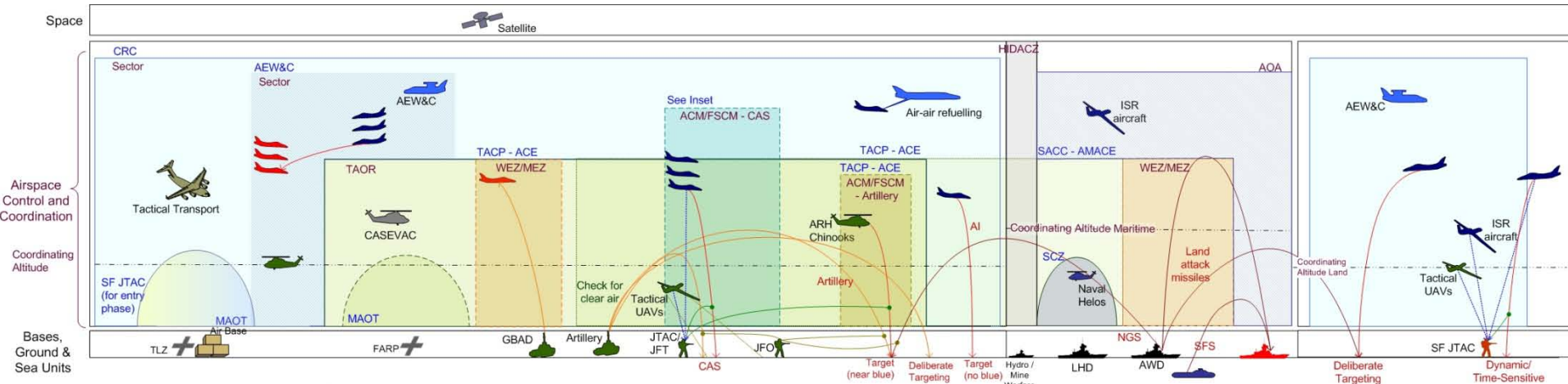
- effective ASI allows intelligence collection, air defence and the execution of the Joint Scheme of Manouevre in the same battlespace without fratricide, or physical or electromagnetic interference.

- Adaptive ASI views the battlespace as having both physical and information dimensions and enables the use of real-time information flows to facilitate dynamic event-based activities concurrently with other activities in the battlespace.

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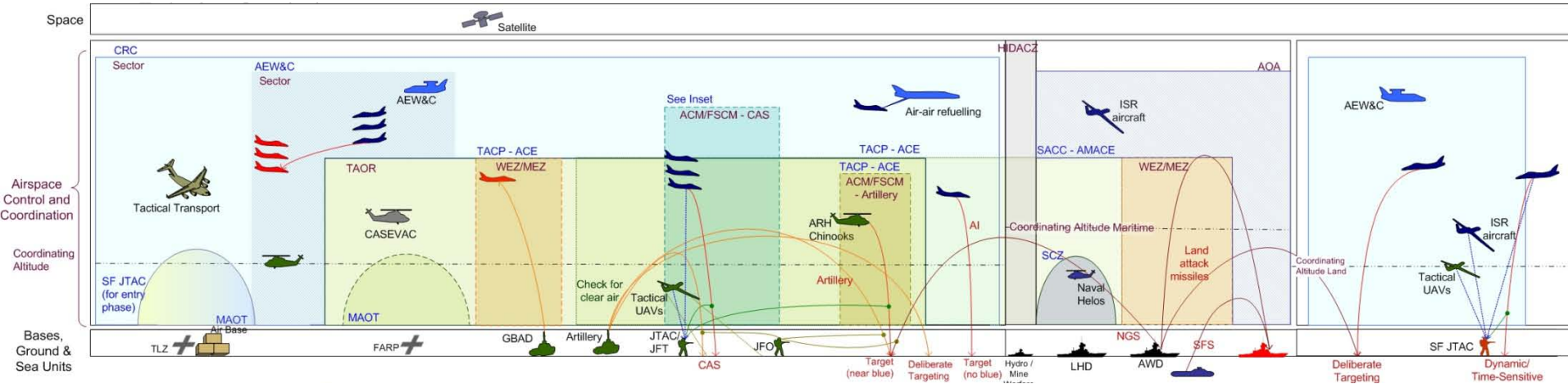
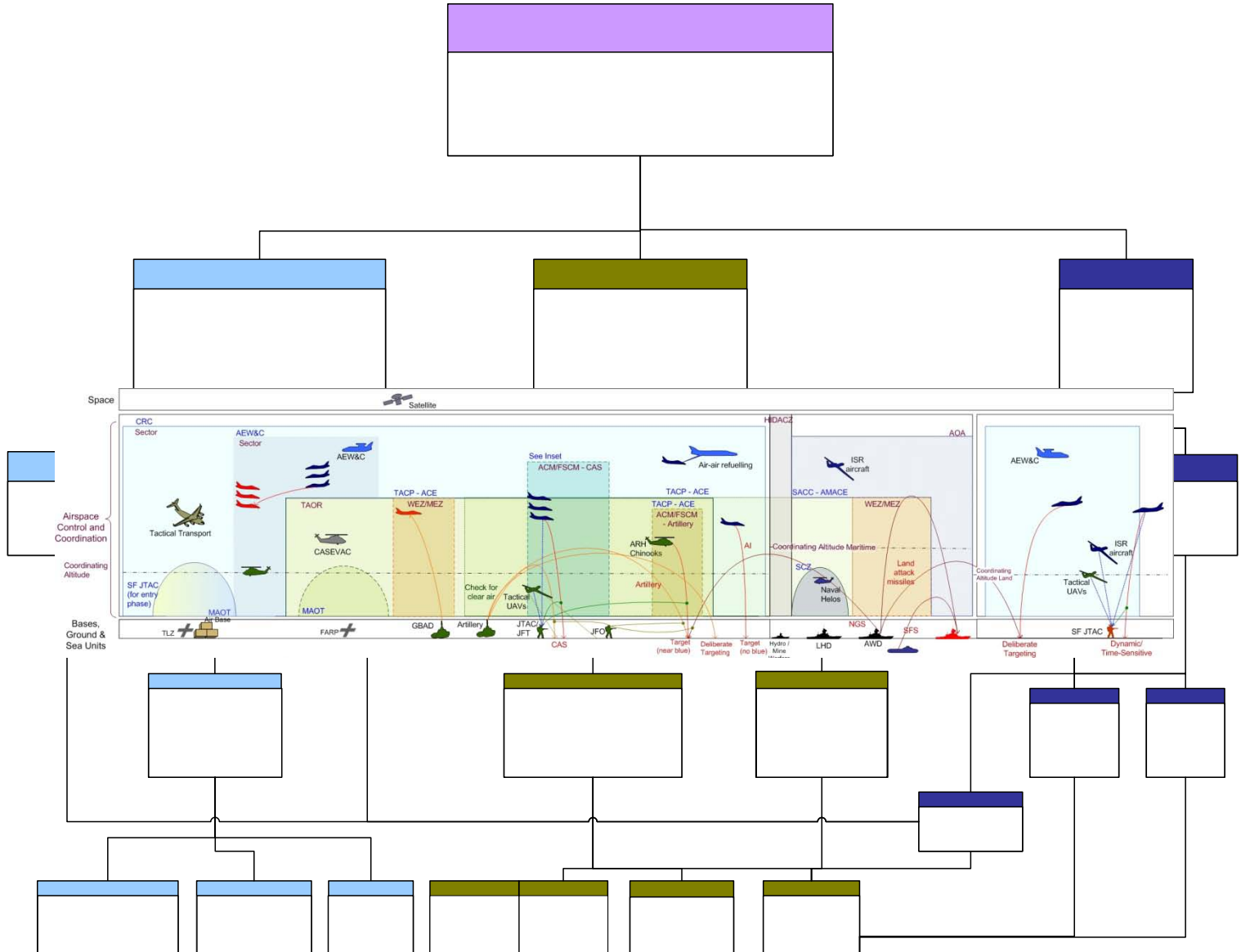# Cross Boundary issues

Some of the cross-boundary aspects include:

- assets transiting across multiple ACMs (air space control measures)
- assets transiting across multiple ACMs owned by **different roles**

- assets transiting across multiple ACMs owned by roles from **different Services** (Navy, Army, Air Force, Special Forces) and **civilian agencies** (civilian air traffic control)
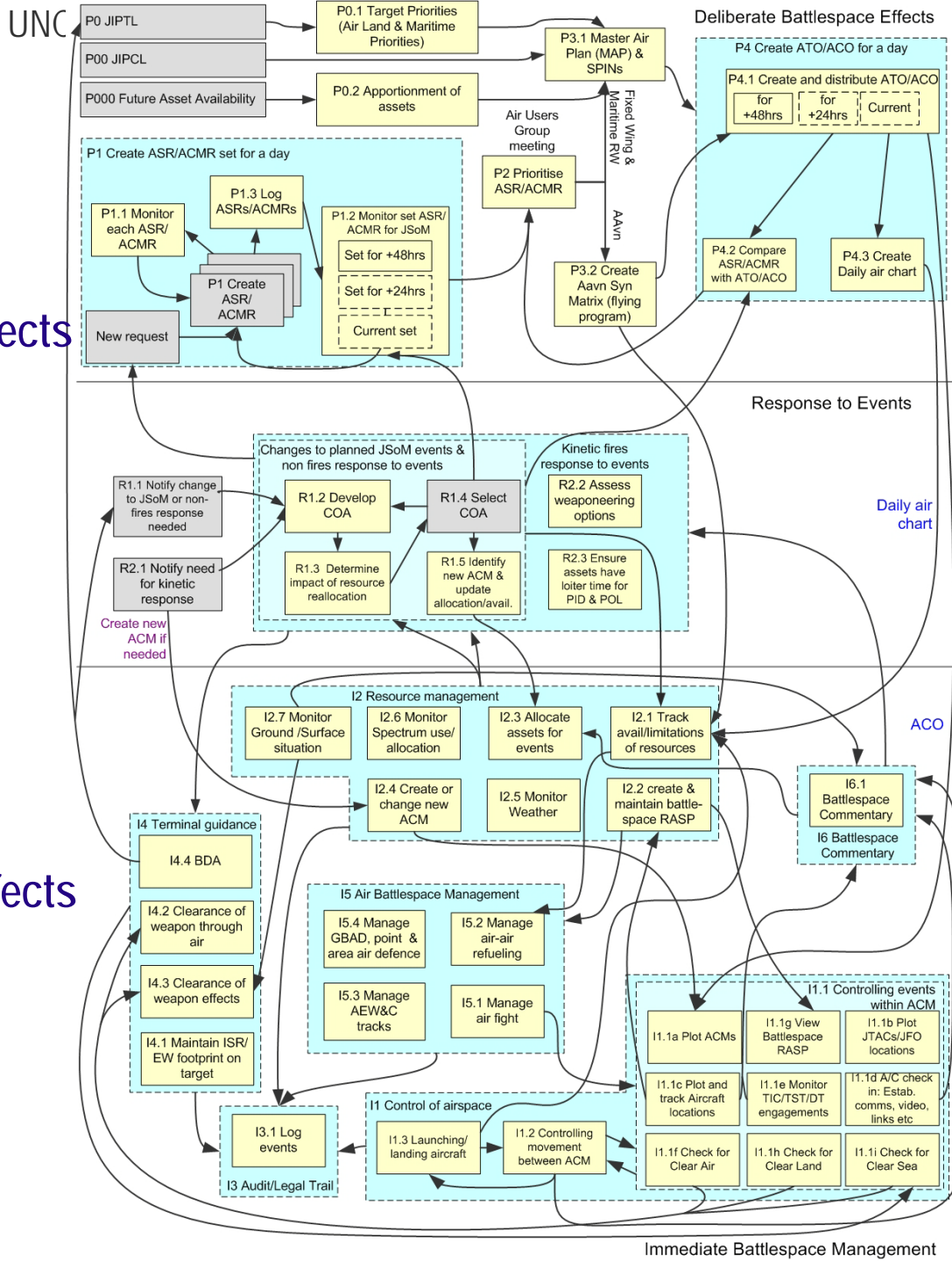
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ALI C2 structure – depends upon Operation

ASI Activity Model

Three sets of activities

- Deliberate Battle space Effects

- Response to Events

- Immediate Battle space Effects

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What is RASP or Islands of Automation?

- *ASI …all the processes and mechanisms used to plan, coordinate, control and deconflict the use of airspace*

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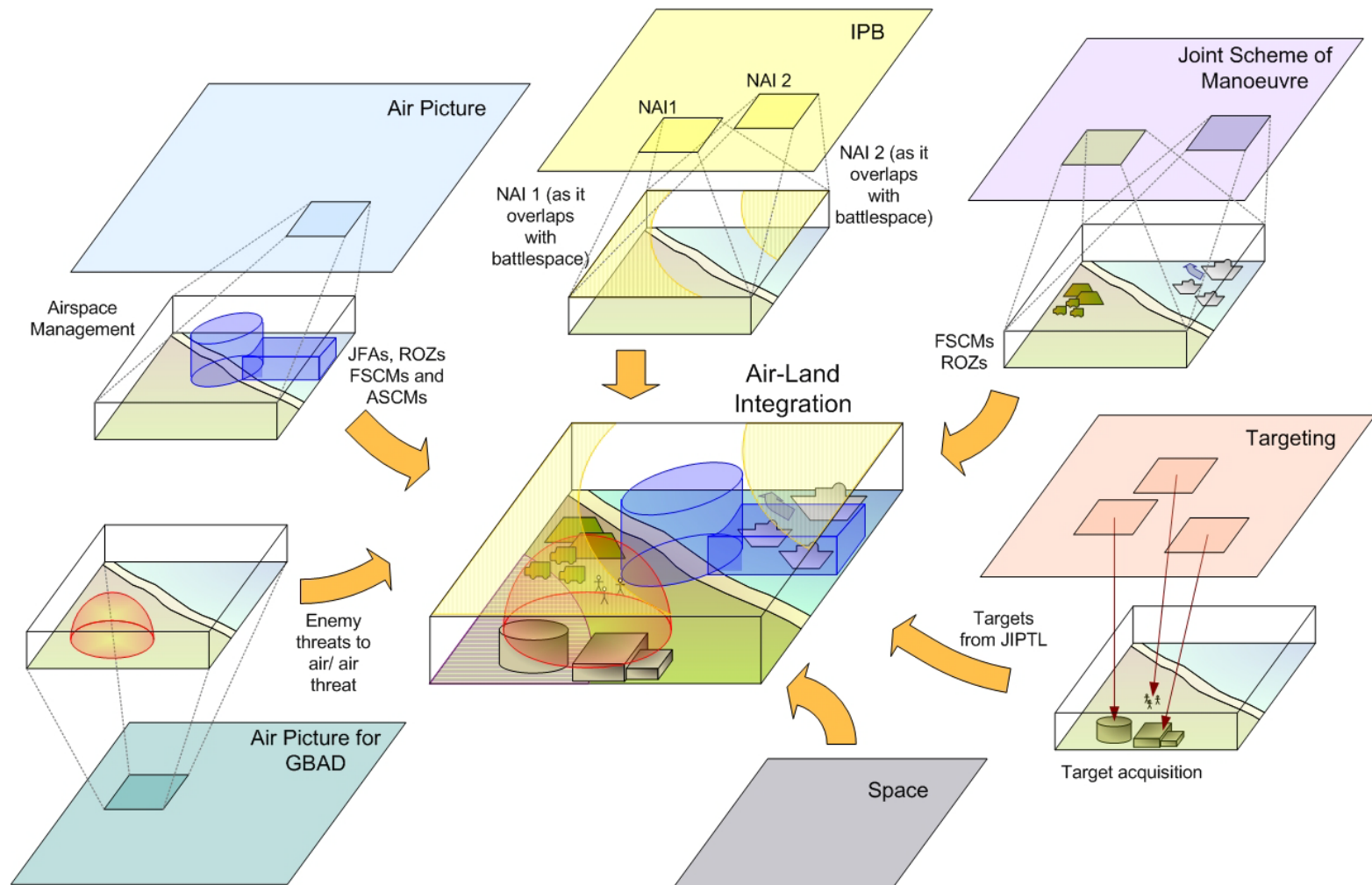
Modeling and Assessing ASI

- ASI C2 organisational structure is generated for operational specific configurations (i.e. it changes)

- Response to events (mid layer of the activity model) people bringing together information sets from organic sources not functional sources

- Cross boundary issues have C2 implications as discussed with the ALI visualisation model

- Islands of automation shown in the C2 structure and components models

- RASP – also shown in the components model & brings together different organic information for different mission types [e.g. TST CASEVAC].

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Summary

What did we do:
- A systems analysis approach to ASI in an Australian context,
- ASI models for structure, function, and behaviour

What did we find:
The key issues that emerge are primarily at the cross-boundary system integration level from a socio-technical perspective.
- Cross boundary
- R2E
- How to assemble an operational specific ASI organisation
- Islands of automation
- How to monitor airspace (what is a RASP)

Next Steps:
Future work will apply the ASI models to evaluate future socio-technical options.
The options will be examined in terms of:
- roles performing activities from the ASI systems inventory remains valid (a simple substitution)
- reallocation of activities between roles
- some roles are no longer required or additional roles need to be created

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Air Surface Integration... Any Questions?