

# Integrating the Joint Strike Fighter into the Australian Defence Force



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**Air Operations Division**

# Report Documentation Page

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## New Air Combat Capability (NACC) Project

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- In June 2002, Australia decided to join JSF development phase.
- Proposed replacement of the Air Combat and Strike capabilities provided by F/A-18 Hornet and F-111.
- Replacement required next decade.
- NACC Project
  - Provide S&T advice to support JSF acquisition approval.
  - Large scale participation across Government, Defence and Industry.
  - Focus of presentation is on Operational Analysis activities.

## Presentation Outline

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- Key Questions
- Operational Issues for the JSF
- Methodology to Answer Key Questions
- Examples of Studies for Operational Concepts Development

## Key Questions for Project NACC

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- What are the operational requirements for Air Combat and Strike?
- How can the JSF be used to best meet these requirements?
- What are the required numbers of JSF aircraft?
- What are the force balance issues for the New Air Combat Capability?



Air-to-Air Refueling  
(AAR) tanker



Airborne Early  
Warning and Control  
(AEW&C)



Unmanned Aerial Vehicle  
(UAV)

# JSF capability as a platform

## Cockpit

- Helmet Mounted Display and voice control

## AESA Active Radar

- Agile beam steering
- Includes continuous Multi-Target Track and SAR modes

## Electro-Optical Targeting System (EOTS)

- Targeting FLIR andIRST

## EW

- ESM
- Radar Warning
- Jammer
- Counter-Measures

## Distributed Aperture System (DAS)

- Multiple distributed IR sensors for all-aspect passive IR sensing

## Weapons

- Air-to-Air
- Air-to-Surface

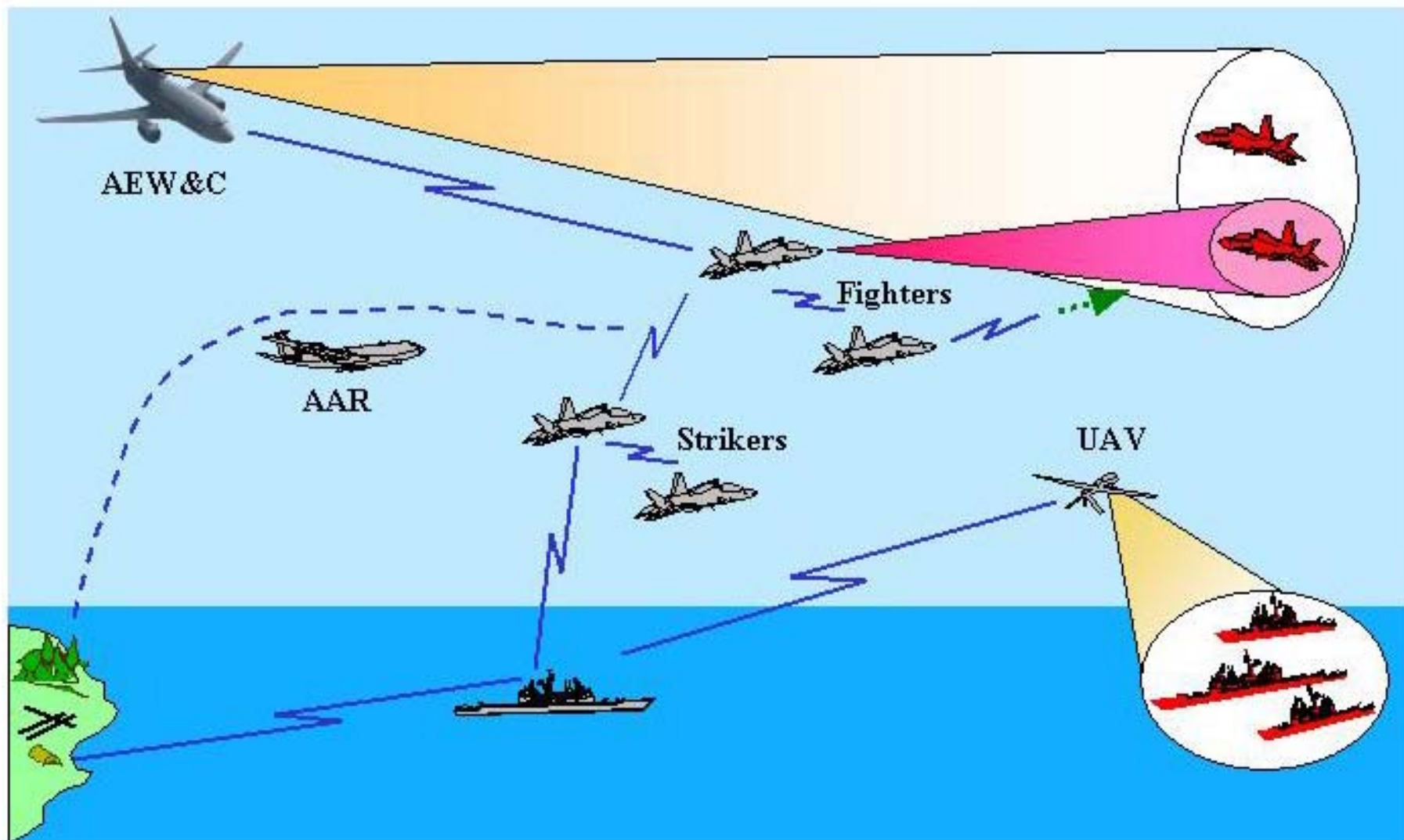
## Single Engine

## Stealth

- Shaping and radar absorbing materials
- Internal weapon carriage



# JSF capability in a Network Centric Environment



# Overall Methodology to Answer Key Questions

## WHY

Establish the operational requirements



## WHAT

Determine what systems can be used to achieve the operational requirements



## HOW

Determine how to best use systems in Missions



## HOW

Determine how to best use systems in Theatre



Theatre requirements  
for deployed systems

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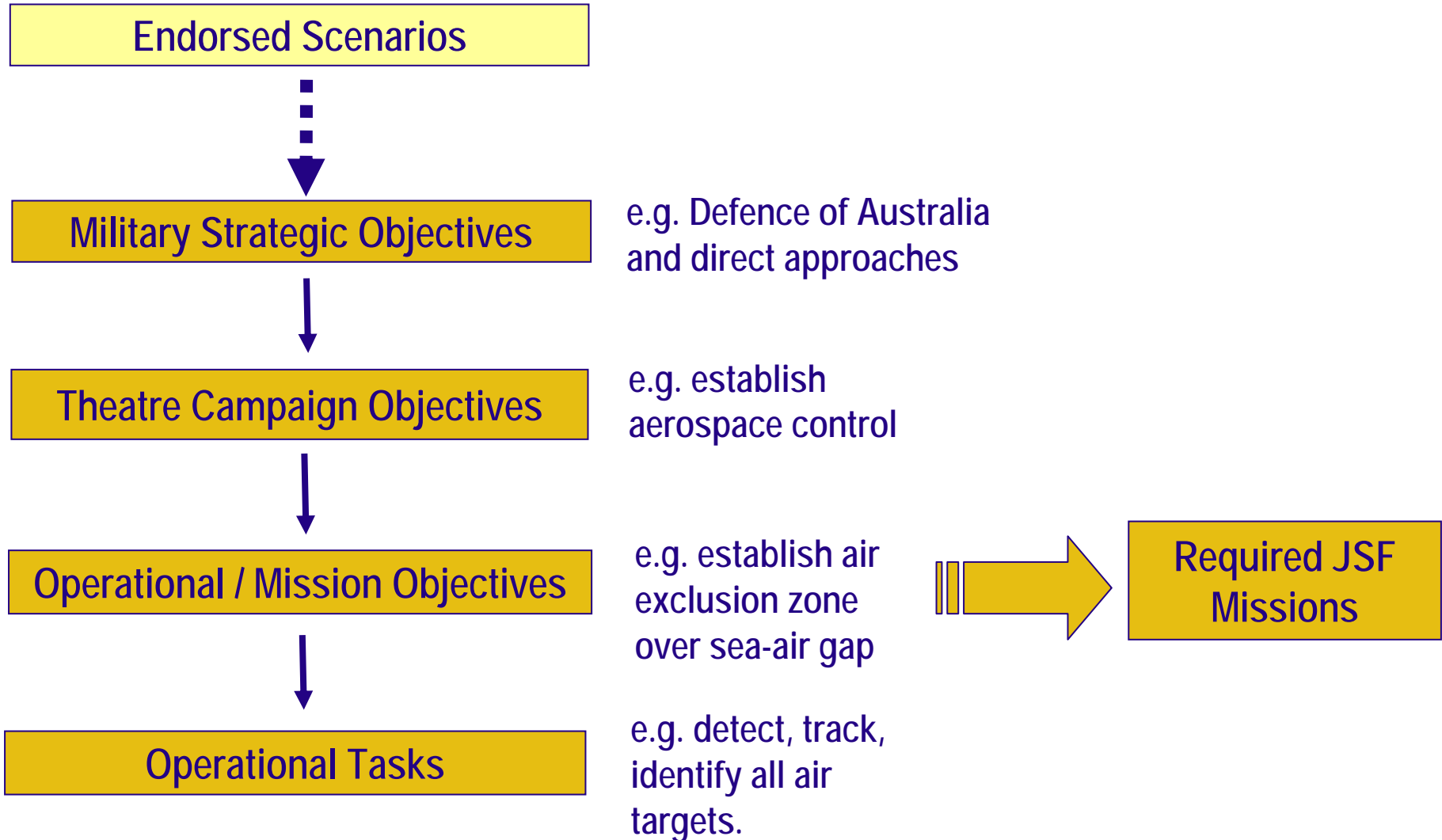


## HOW

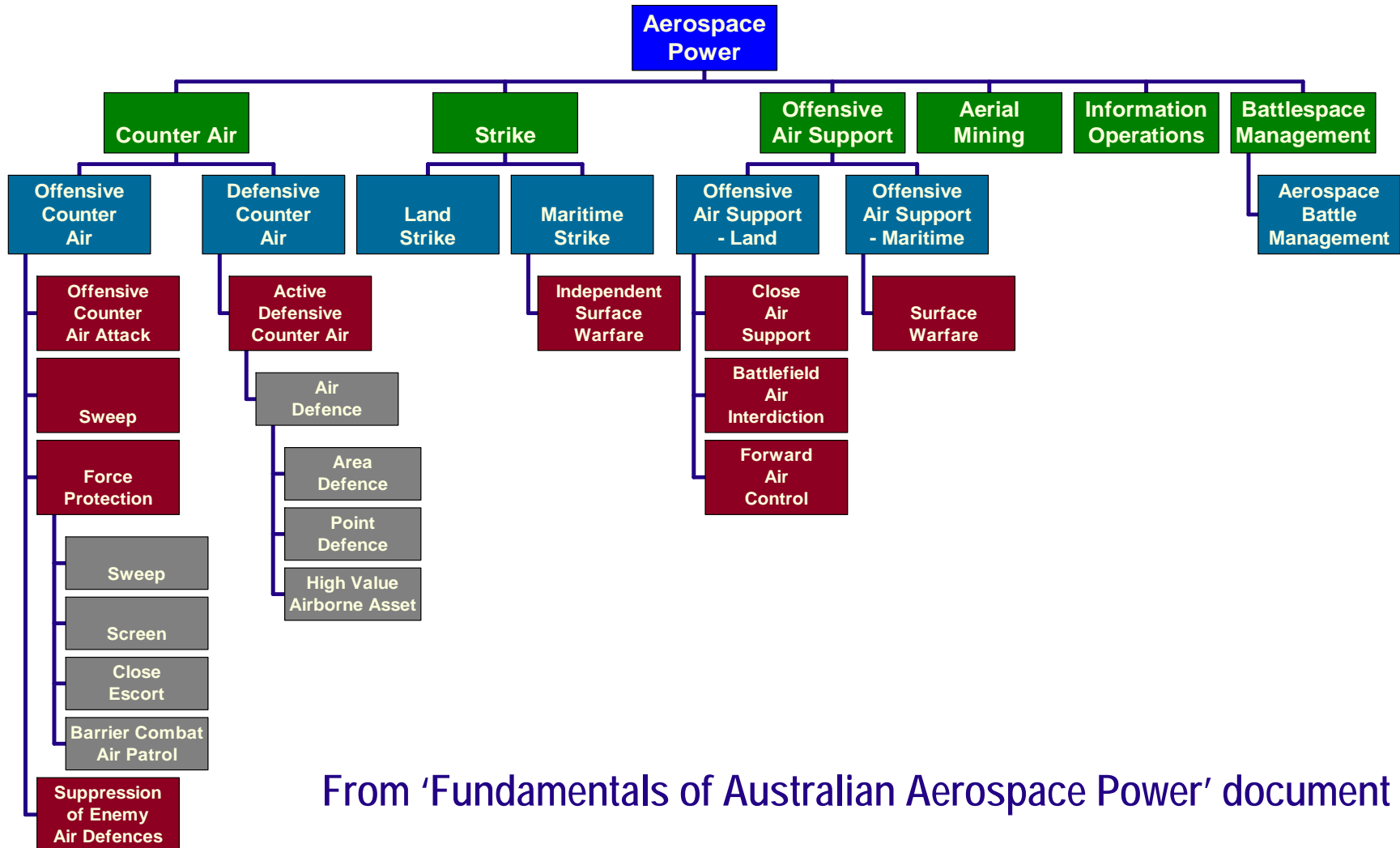
Determine how to best use systems in Theatre

# Strategy-To-Task

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# Mission Considerations



From 'Fundamentals of Australian Aerospace Power' document

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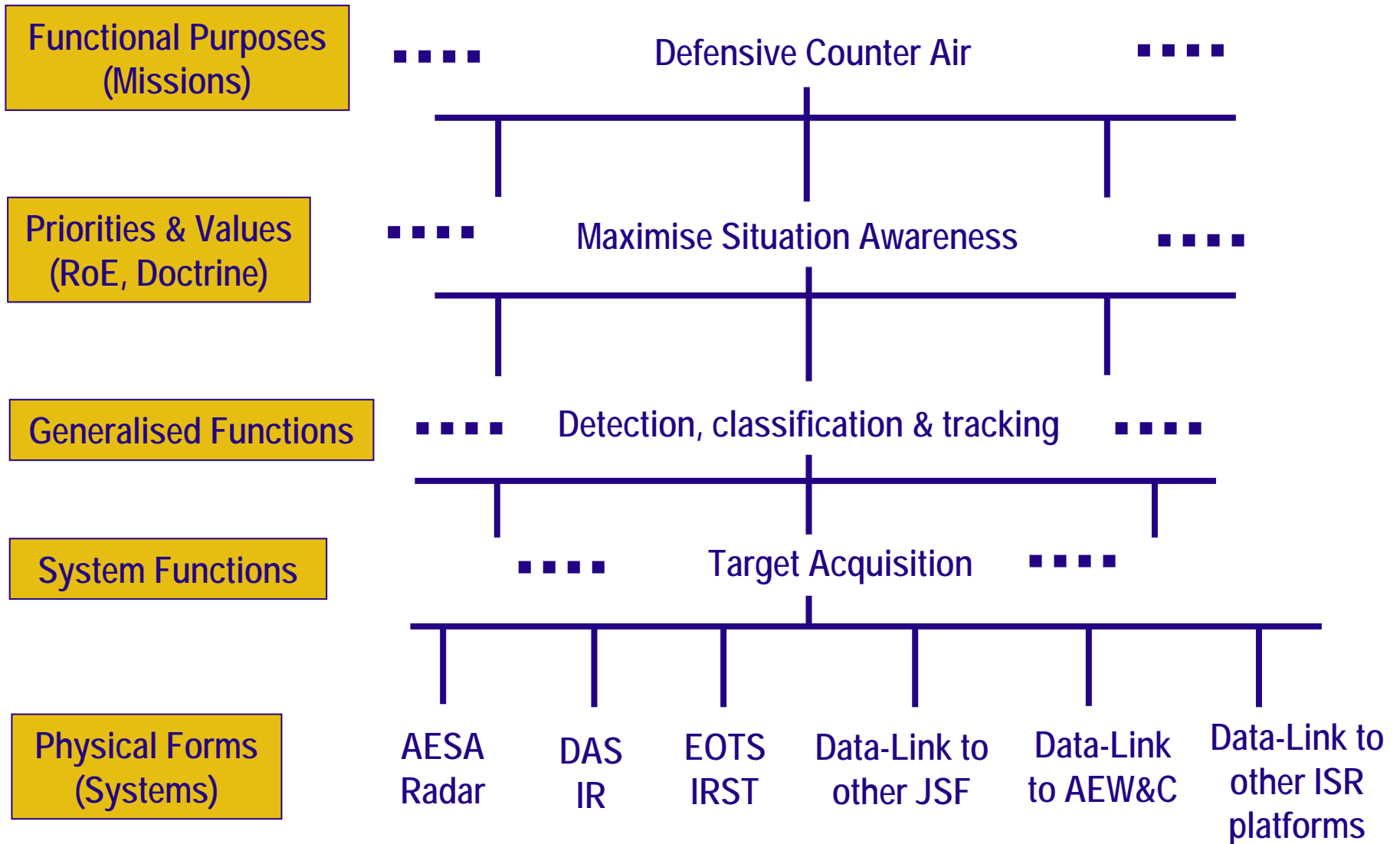
Determine how to best use systems in Missions



HOW

Determine how to best use systems in Theatre

# Work Domain Analysis



# Overall Methodology to Answer Key Questions

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## Definitions

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➤ Concepts of Operation (CONOPS)

How to use current equipment, today, or in near future.

➤ Tactical Procedures

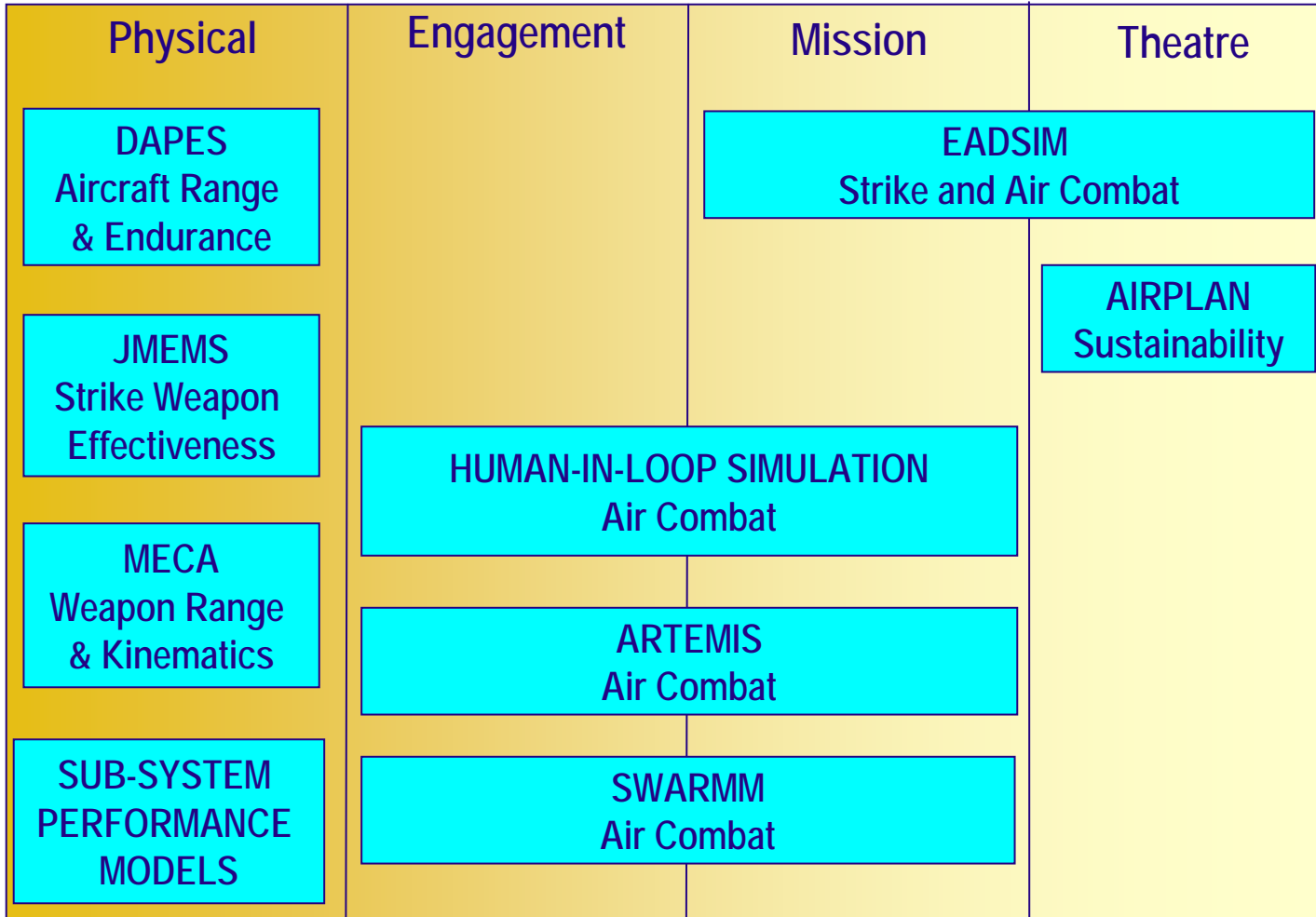
Put CONOPS into practice.

Developed at the ADF Unit level.

➤ Operational Concepts (Op. Concepts)

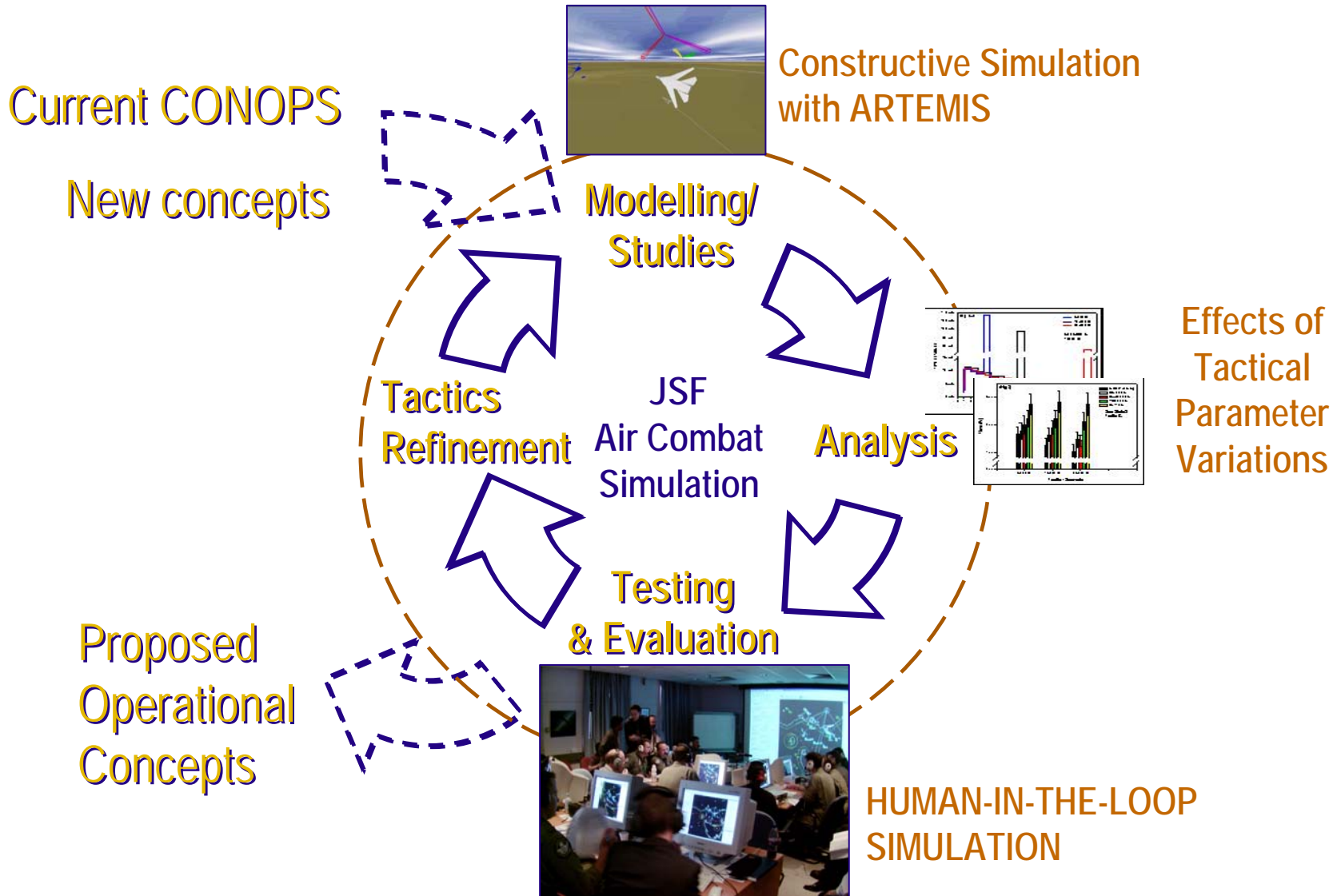
Conceived use of current or future systems.

# Categories of Models



————— Increasing Scale —————>

# Developing Operational Concepts for Air Combat

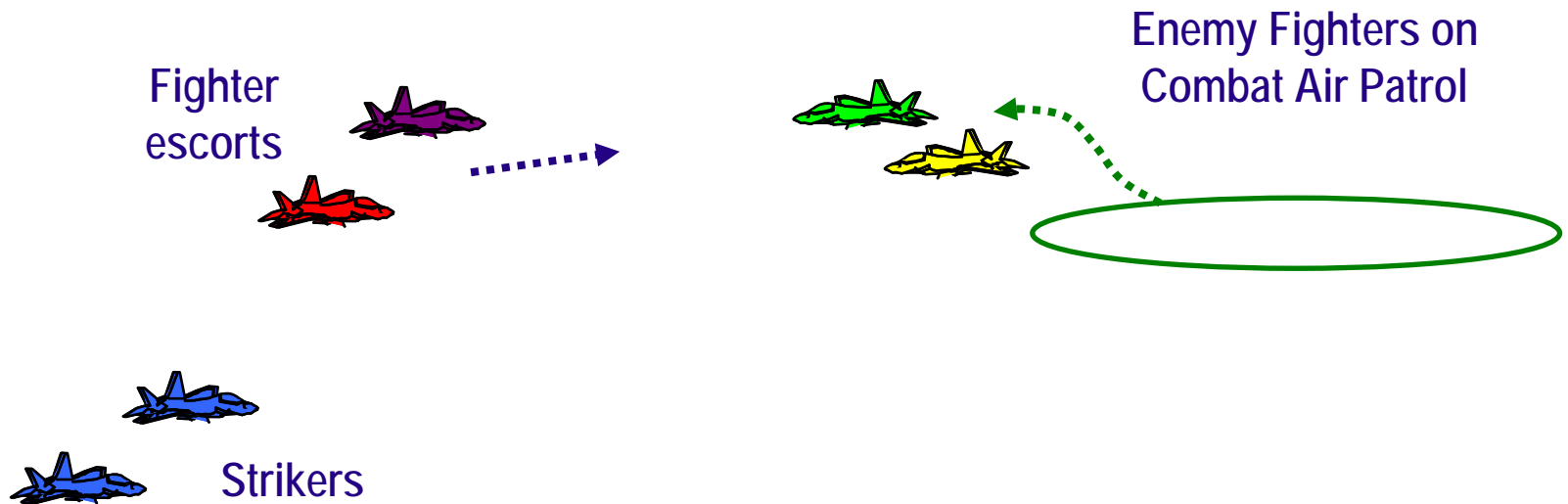


## An example Air Combat study

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Escort mission: Two fighter escorts protecting two strikers against two enemy CAP fighters

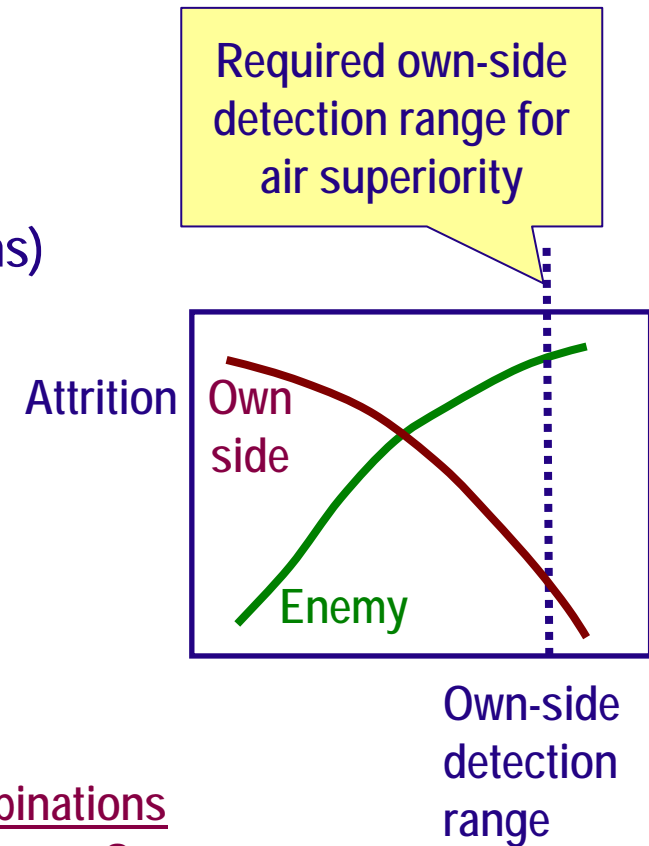
Beyond Visual Range fighter engagement



## An example Air Combat study (continued)

Examine effect of tactical parameter variations on mission outcomes:

- **Detection range relative to threat detection range**
  - On-board sensor range
  - Extended sensor range (via data-link to fighter teams)
  - Enhanced sensor range (via data-link to AEW&C)
- **Team-coordinated manoeuvre types**  
Influences who has first weapon shot
- **Weapon types and launch conditions**  
Influences weapon effectiveness



Which tactical parameter combinations lead to desired mission outcomes?

# Current Strike studies

Analysis of Weapon Effectiveness against target  
Select weapon to match target

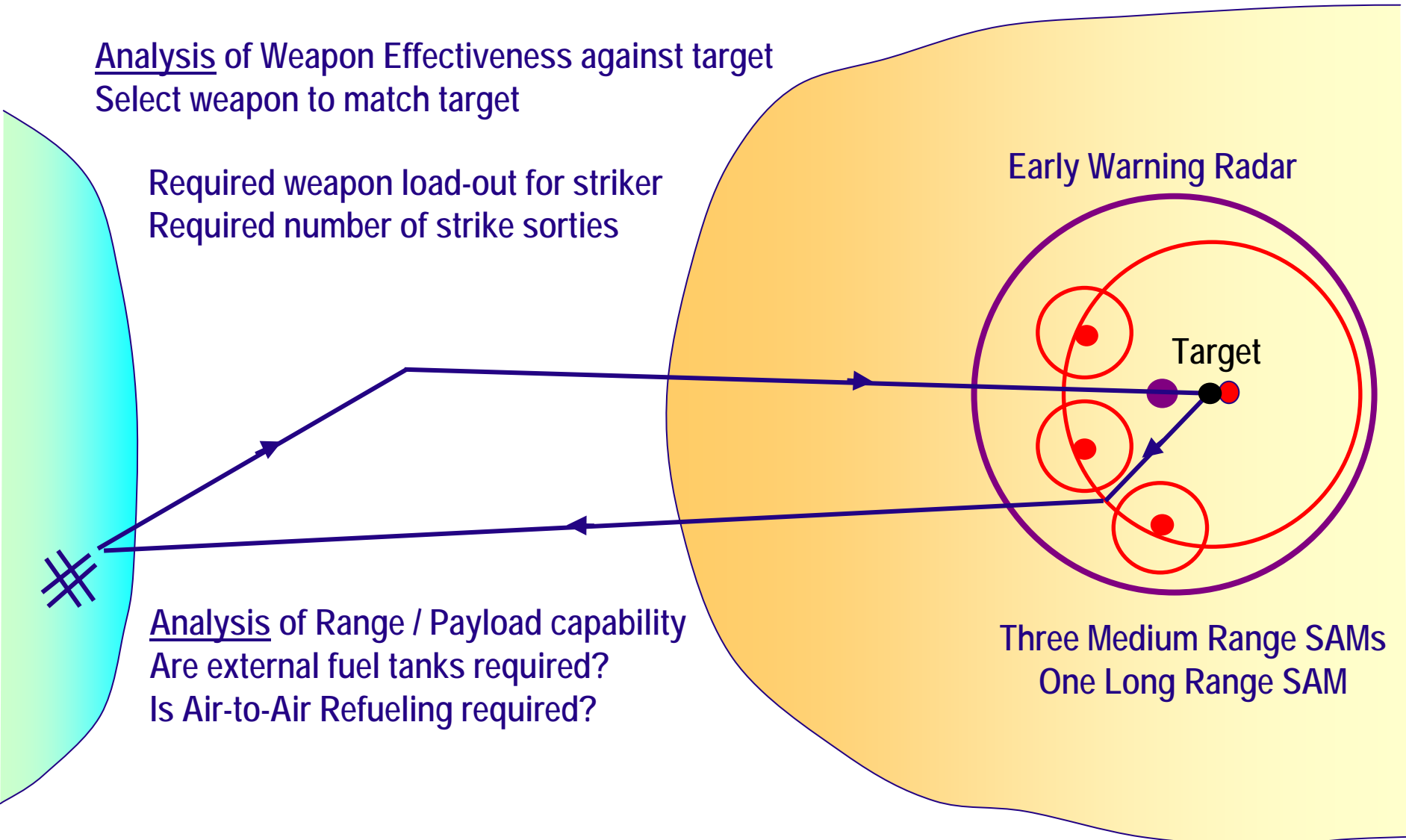
Required weapon load-out for striker  
Required number of strike sorties

Analysis of Range / Payload capability  
Are external fuel tanks required?  
Is Air-to-Air Refueling required?

Early Warning Radar

Target

Three Medium Range SAMs  
One Long Range SAM



# Overall Methodology to Answer Key Questions

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HOW

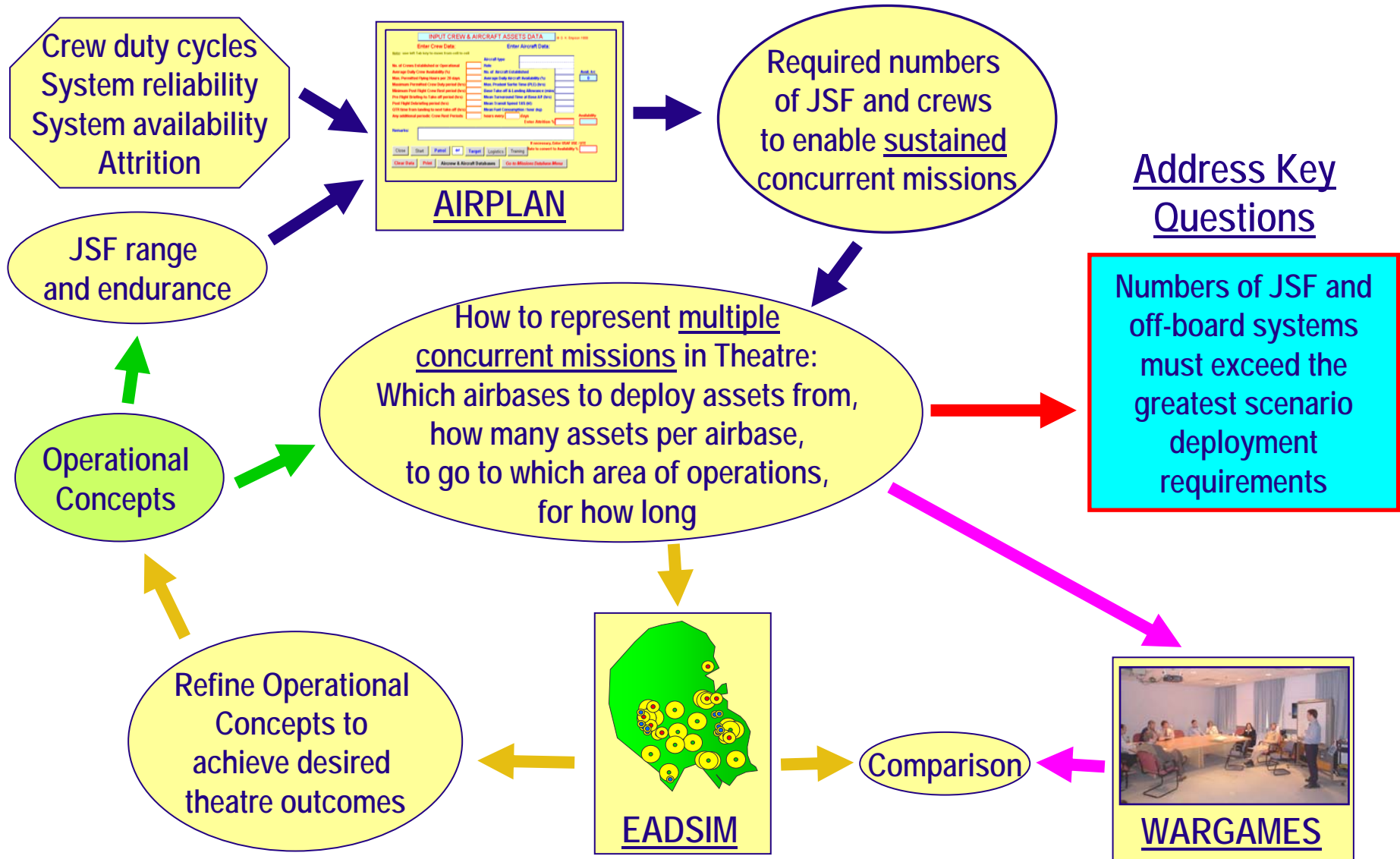
Determine how to best use systems in Missions



HOW

Determine how to best use systems in Theatre

# Theatre-level Analysis



## Summary

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- Required numbers of JSF and off-board systems depend on how they are used.
- Operational Concepts:
  - To exploit stealth, teaming and Network Centric Warfare
  - Evaluated using a theatre-level capability study
  - To maximise JSF capability for meeting Australian Strategic requirements, primarily Defence of Australia.

# Questions?

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