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The Future of Unmanned Air Power



Multiple Independent Levels of Security (MILS) - A Program's Perspective



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Presentation Overview

The Future of Unmanned Air Power

- Background
- MILS Drivers
- Observations and Lessons
- Summary



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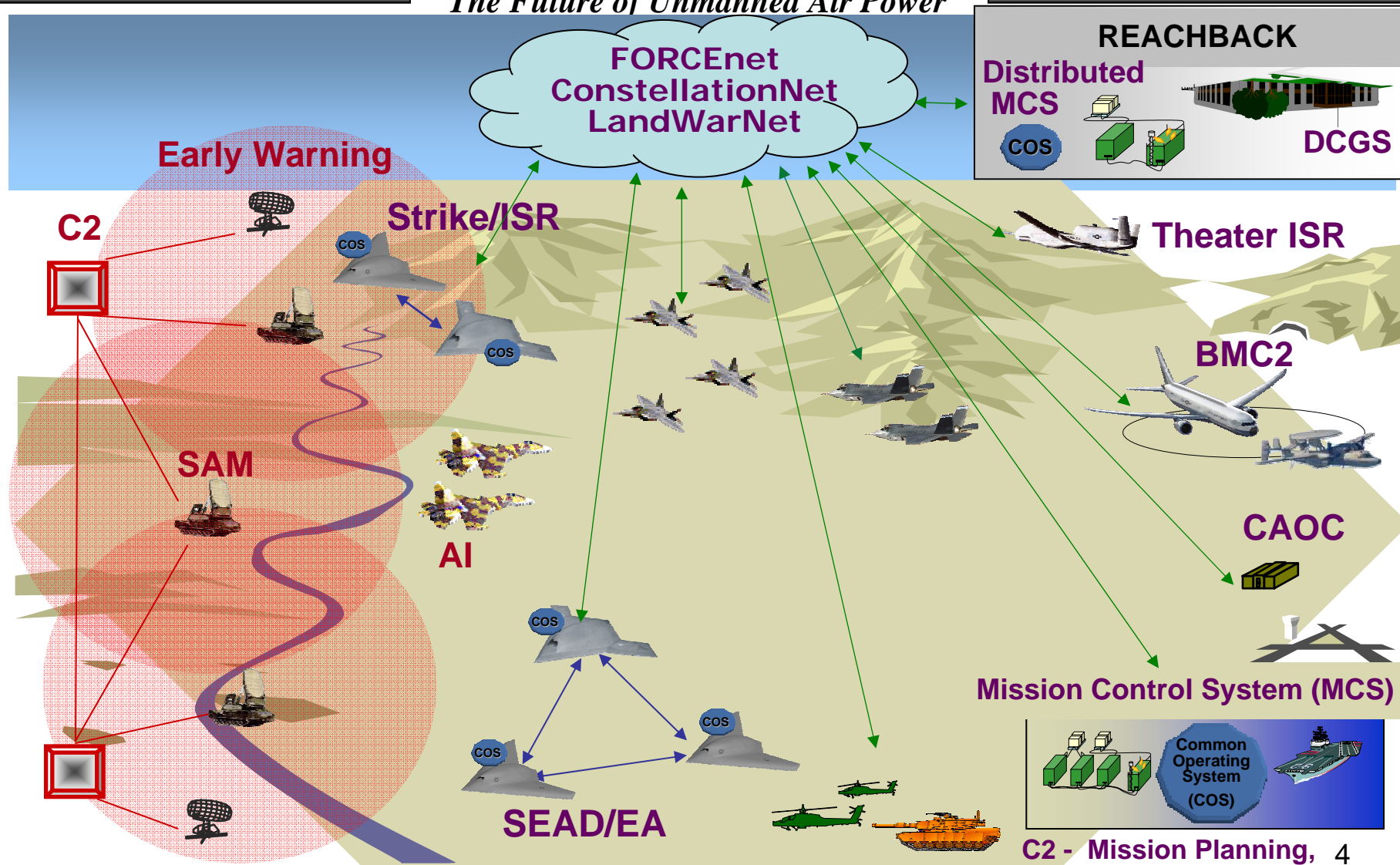
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J-UCAS OV-1

High Level Operational Concept



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C2 - Mission Planning, Intelligence, Launch/Recovery 4

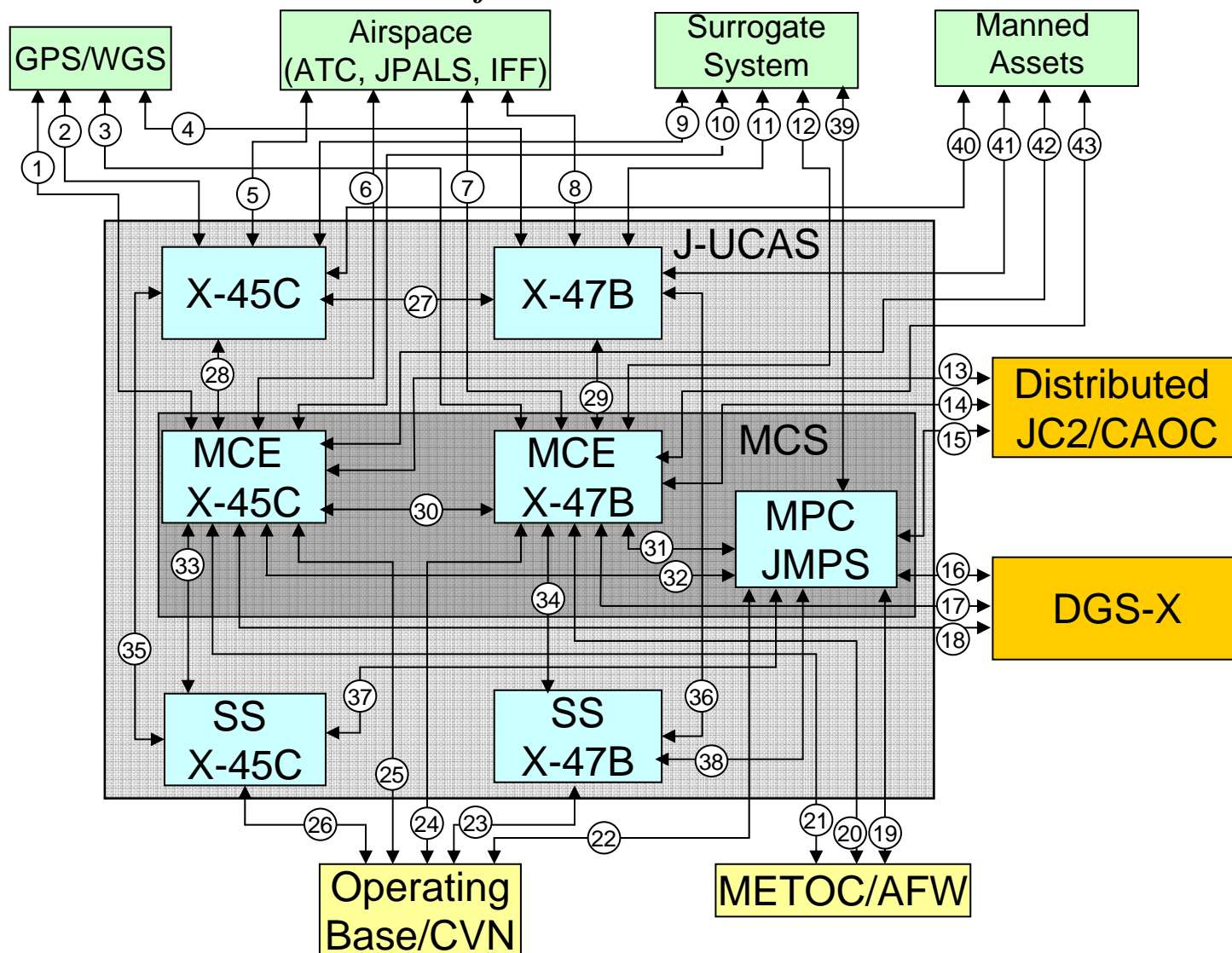
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J-UCAS SV-1

System Interface Description

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GIG/Net Centric Ops

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- **GIG expects data to be at appropriate level passed over encrypted links**
 - **Platforms cannot publish System High all inclusive data**
- **GIG will originally be System-High Security Domains**
 - **JWICS, SIPRNet, NIPRNet**
 - **How will the GIG handle Special Access Program (SAP) data?**
- **GIG will move toward multi-level, U – TS/SCI domain**



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MILS/MLS Requirement Drivers

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- Many interfaces at different levels of security
- GIG compliance/Net Centric Requirements
 - Information sharing
 - Cross domain
 - Inter service
 - Coalition partners
- Interoperability/Communications
- Supportability

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J-UCAS Interfaces

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- SIPRNet
- NIPRNet
- Comm Links (LOS & BLOS) at different levels
 - Air Vehicle (AV) to AV
 - AV to manned assets



J-UCAS Interfaces

The Future of Unmanned Air Power

- **Combined Air Operations Center: SIPRNet (Secret Data)**
- **Mission Control Segment (MCS) to MCS: NIPRNet (Unclassified Data)**
- **MCS to Mission Planning Cell**
- **Communication Links at different levels**
 - Air Vehicle (AV) to AV
 - AV to manned assets
 - AV to MCS



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J-UCAS



Interoperability/Communications

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- Platforms must be able to communicate at appropriate levels of security
 - Stealthy vehicles (Position data)
 - Maintain separation
 - Triangulating targets
 - Manned assets using Link 16
 - Air Traffic Control (ATC)

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J-UCAS Supportability

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- **Maintenance Data should be unclassified**
 - **Reduces clearance level required for maintainers**
 - **Makes it easier to plug into central logistics databases**
 - **System High data requires 2-person downgrade of data – manpower intensive**



J-UCAS Workarounds for Demo Phase

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- **Data to be sent to CAOC/Intel Cell on SIPRNet**
 - **Read by operator in Mission Control Shelter**
 - **Copied to media**
 - **Hand carried to SIPRNet workstation to send out**
- **This approach would have to be automated since in combat operations, an operator may be controlling 4 vehicles**
 - **Additional workload**
 - **Space at a premium in MCS for extra people**
 - **2 man rule for downgrading from System High**



J-UCAS Workarounds for Demo Phase (Cont.)

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- **ATC Communications voice relay**
 - **Security evaluation and testing by NSA of a communications implementation which would separate out unclassified data to send to ATC**
- **Communications with manned assets**
 - **Need approval for a dual keying approach from NSA for using multiple security levels over Link 16 (different sub-nets)**
 - **Else, no communication with manned assets during demo phase**



J-UCAS Workarounds for Demo Phase (Cont.)

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➤ **Support Systems**

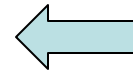
- **Security Evaluation and testing by NSA of a device to separate maintenance data from all other data**
- **Requires comprehensive testing to ensure no classified data was erroneously sent to maintenance computers**



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Observations

A Program Manager's Perspective

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- MILS/MLS certifications should not be left up to individual programs
- GIG/Net Centric Requirements/KPPs are being levied on increasingly more platforms
- Use of multiple processors to enforce security separation is not an ideal solution
 - Space, power, cooling for multiple processors is a concern for unmanned vehicles
- Need to encourage a top down list of expectations and off-the-shelf solutions



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Summary

The Future of Unmanned Air Power

- **J-UCAS embraced network-centric operations and force interoperability**
- **Many factors influenced J-UCAS towards MILS**
- **Numerous lessons**