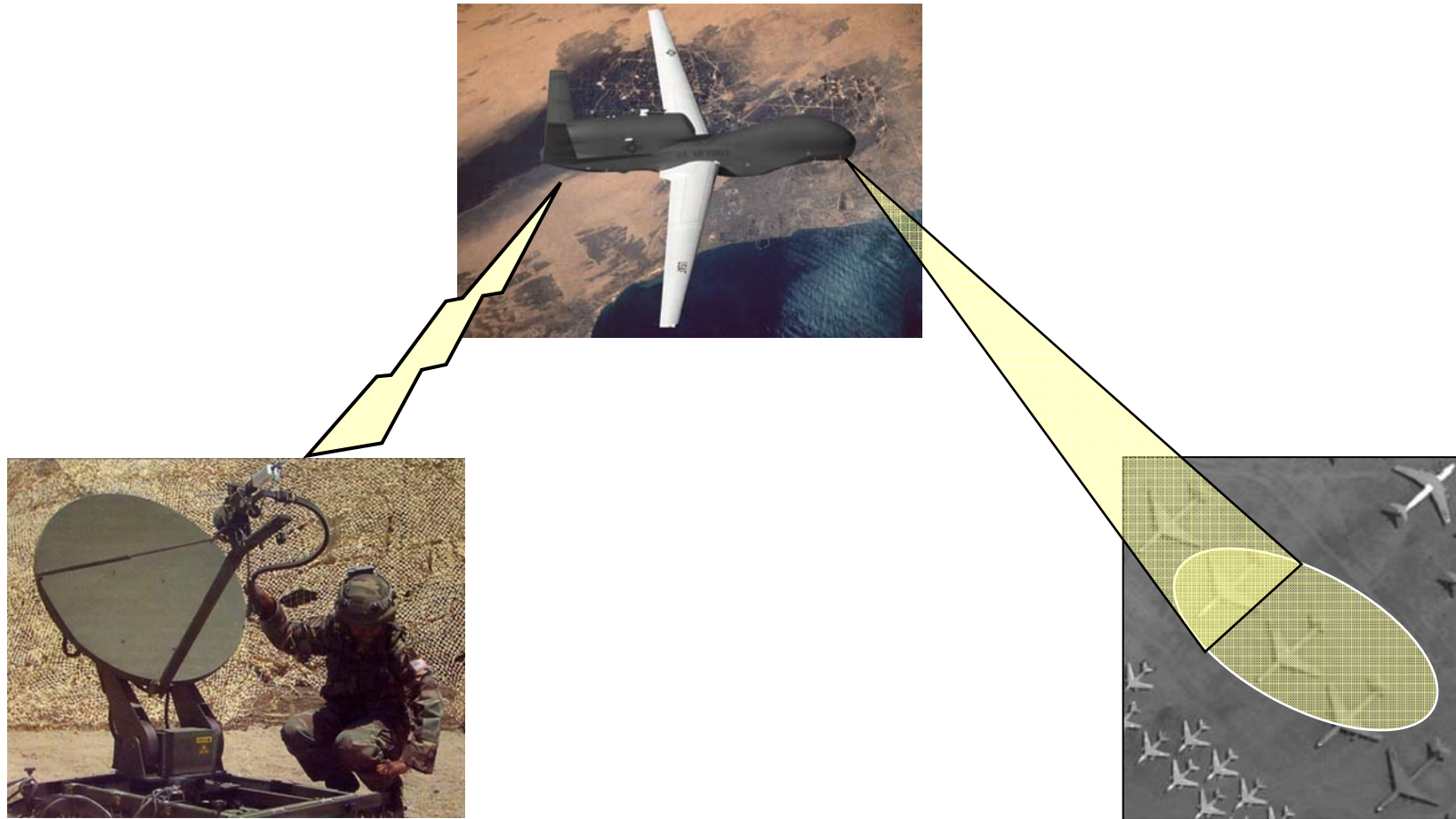


Developing Communications and ISR Systems Using MATLAB® and Simulink®

MathWorks Symposium

Adopting Model-Based Design
within Aerospace and Defense

UAV-based Communications and ISR



Key Challenges

- Conventional UAVs
 - Need to evaluate upgrade options
 - Require mission-specific re-configurability
 - Need “try-before-you-fly” evaluation
- Micro-UAVs
 - Require highly integrated designs
 - Have extreme dynamics
 - Need first-pass success

Your Mission: Design and Integrate a Video-Comms System for a Micro-UAV

- Evaluate COTS video compression capabilities
- Design and simulate communications capabilities
- Integrate and test



Demonstration

End Results

- Integrated a COTS video codec using the legacy code tool
- Designed and verified a communications sub-system
- Performed integration and simulation
- Performed verification with a variety of real-world test conditions
- Next step: incorporate this model into a broader system simulation that models flight dynamics, target tracking, etc.

Products Used

- Simulink
 - Embedded MATLAB block
- Video and Image Processing Blockset™
 - Segmentation, motion estimation, morphology, and more
- Communications Blockset™
 - Source coding, error correction, modulation, and more
 - Interfaces to RF blockset for modeling front-end effects
- Signal Processing Blockset™
 - Estimation, filtering, linear algebra, statistics, FFT, and more

Key Take-Aways

- Sub-system verification is necessary but not sufficient
- System modeling allows system verification
- System modeling and verification:
 - Verify mission/scenario performance
 - Supports “what-if” analyses at system and sub-system levels

Thank You for Attending

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