

Joint HSI Considerations in UAV System of Systems

Dr. Daniel T. Risser,
Sr. Behavioral Scientist, AEPCO

Dr. Michael Drillings,
Dir. Army MANPRINT Office

Ms. Nancy Dolan,
Navy HSI, Office CNO (N125)

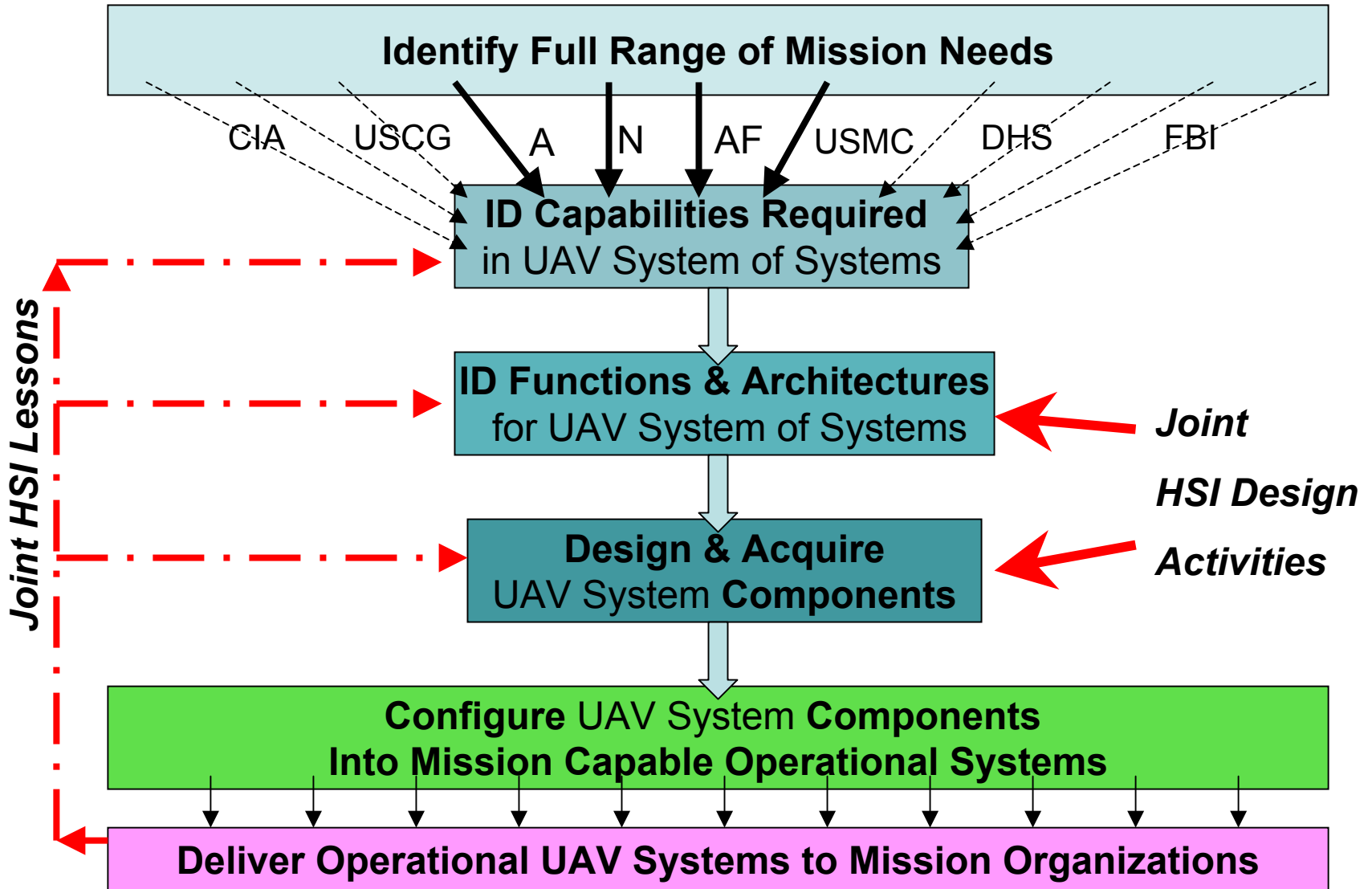
LtCol. Glenn Hover,
USAFSAM, Perf. Enhancement Div.

HF in UAVs Workshop, Chandler, AZ - 5/24/04

Joint HSI Considerations

- New DoD Acquisition Strategy
- Core UAV HSI Considerations
 - Network HSI Issues
 - Human Controller: “In” and “Off” the Vehicle
 - HSI Resource Risks for UAV Units
- Strengthening HSI through Joint Efforts

New DoD Acquisition Strategy



Network HSI Issues

Simplified UAV Operational Network



- **Off-vehicle controllers:**

- Have a narrowed sensory awareness of the air vehicle
- Trigger new teamwork system issues/explorations
- Survival is not directly linked to air vehicle survival
- Report “Detached Warrior” stress

- **Limited bandwidth:**

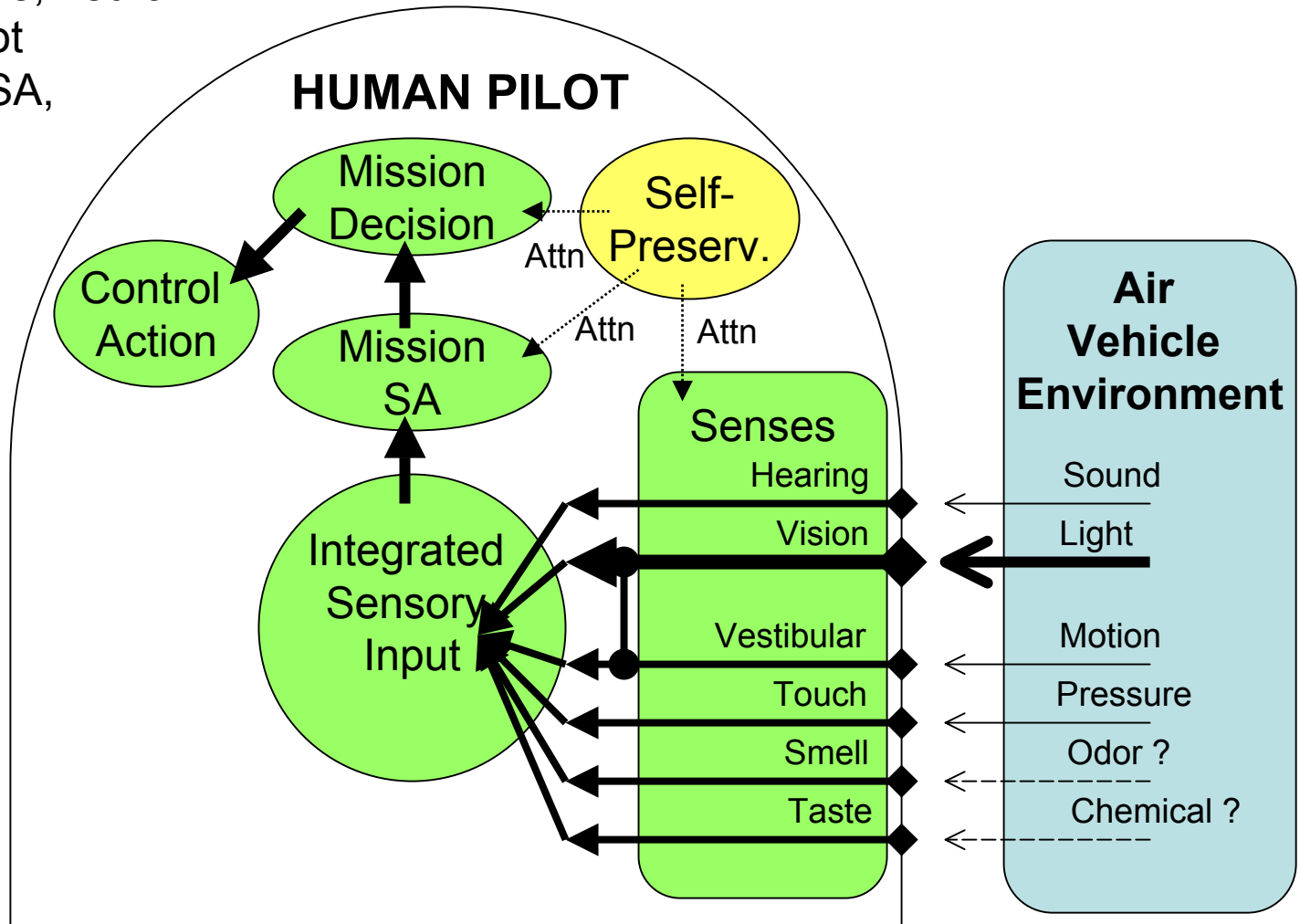
- Undermines performance
- Must be managed
 - + Low resolution images
 - + Signal compression
 - + Limit UAVs in use
 - + Pre-mission bandwidth planning
- Graceful network degradation strategies needed

- **Sensory input quality:**

- Visual image resolution: needs vs. wants
- Transducers to bring non-visual sensory inputs from air vehicle to controller

Human Pilot “In” Aircraft

Inherent, real-time, neural integration of pilot sensory inputs, SA, and mission decisions.



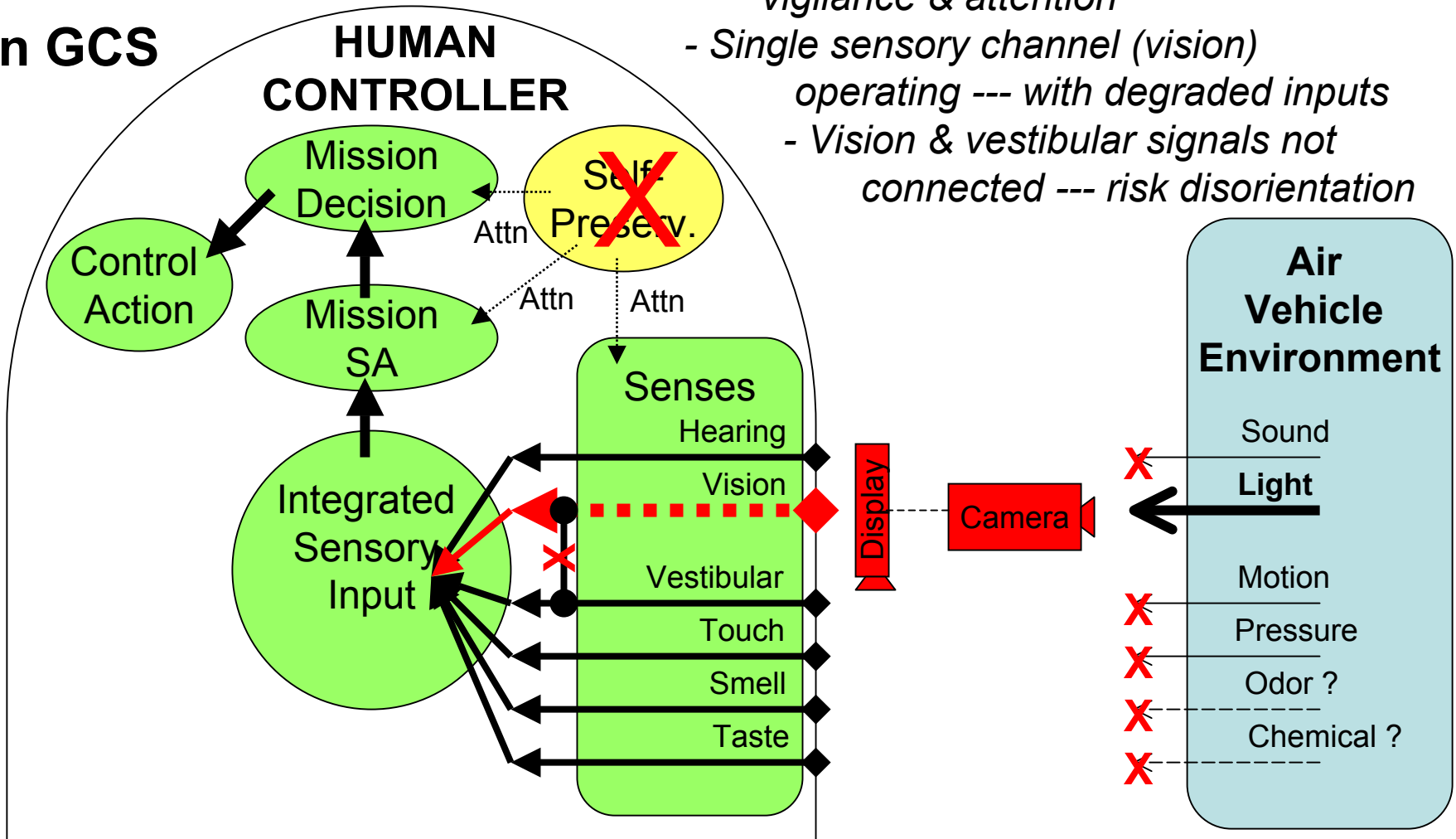
Human Controller “Off” Vehicle

- No self-preservation motivation to sustain vigilance & attention

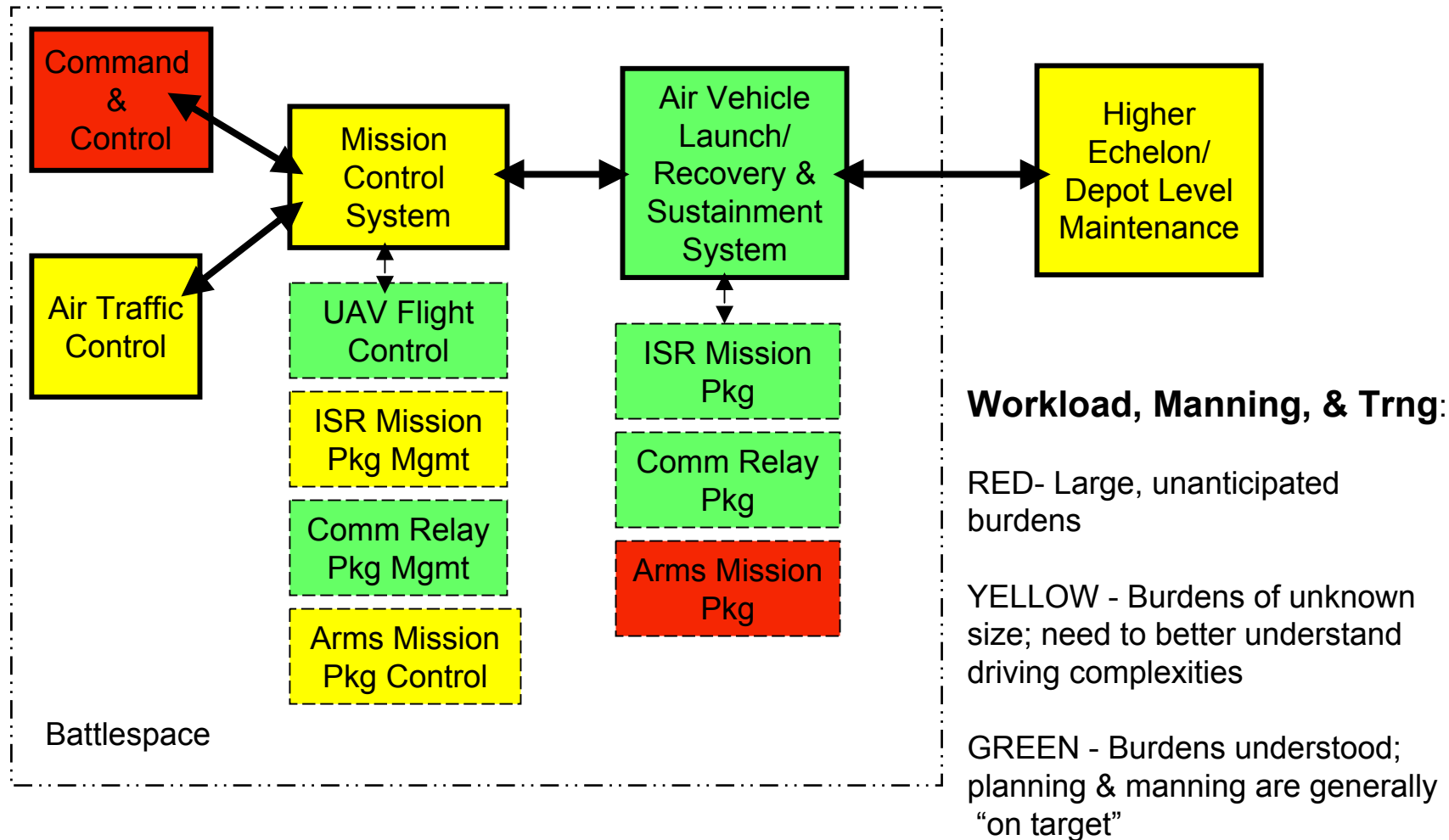
- Single sensory channel (vision) operating --- with degraded inputs

- Vision & vestibular signals not connected --- risk disorientation

In GCS



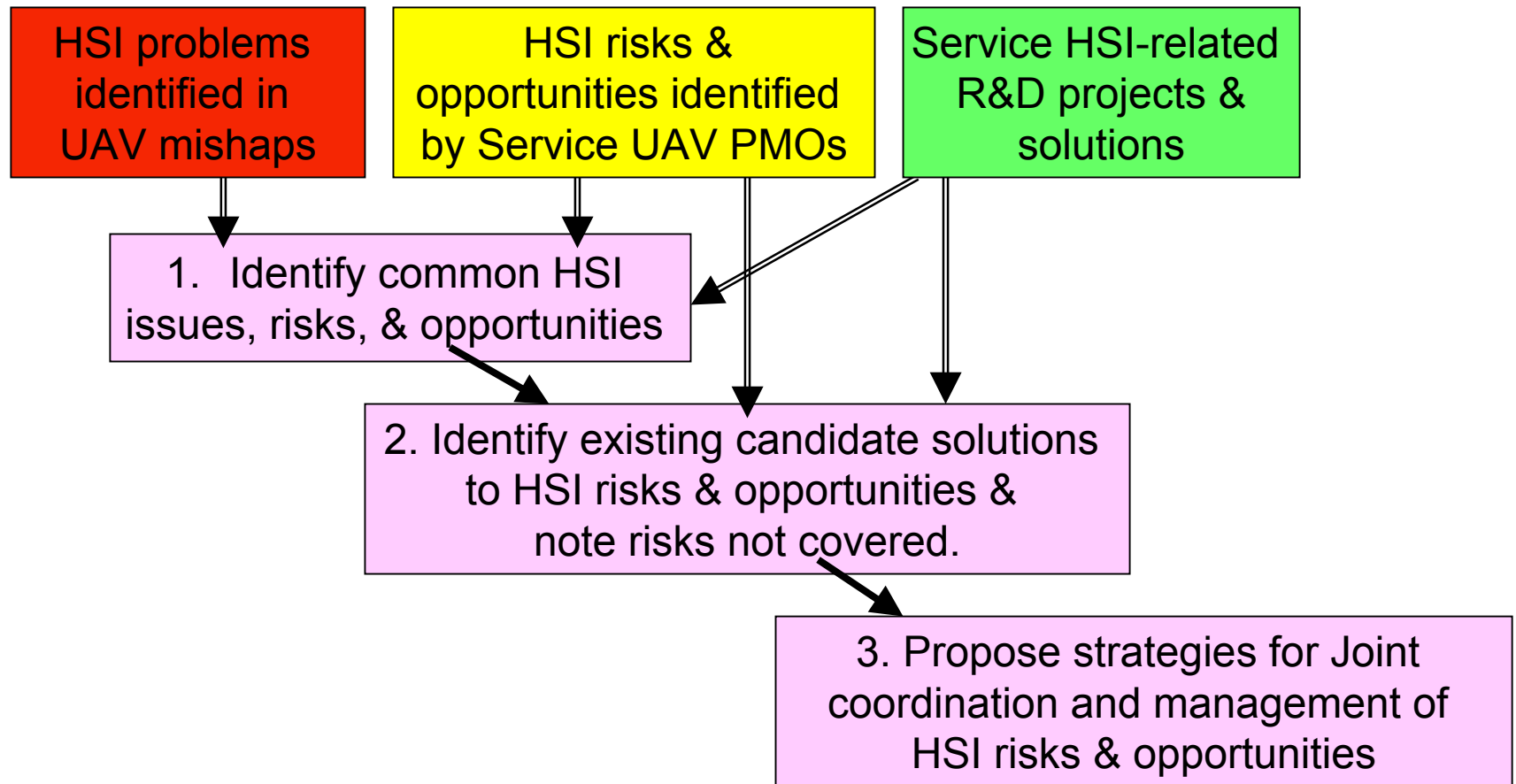
HSI Resource Risks for UAV Units



Major Joint HSI Opportunities

- HSI community needs to be involved in overarching architecture and HSI-related standard module decisions for UAV ---- great potential returns
- How can non-visual sensory cues (e.g vibration, G-force, sound) be transmitted from air vehicle to non-visual senses of “off-vehicle” controllers --- and do the cues improve performance?
- SA & Team Processes are key, complex, interactive issues ---- that will require extended exploration
- Ordnance on UAVs adds operational complexity and safety issues --- diligent resource planning needed
- Must pursue commonality payoffs in training & personnel areas --- especially embedded training opportunities

Joint HSI Issue Identification & Solution Coordination



Catalysts to Joint Efforts

- Build researcher and combat developer working relationships across Service boundaries ---- find the common interests, issues, passions.
- Learn to think “Born-Joint” --- practice, practice, practice
- Look for win-win Joint circumstances that Service leaders will recognize and pursue
- OSD must plant the seed money and incentives to move Services to Joint Concepts, Joint R&D, and Joint Development actions

Finding Joint HSI Focus for UAVs

- You tell us:
 - What are the five most important Joint HSI issues to address for development of effective & sustainable UAV system of systems?
 - What Joint HSI/HF goals should be included in next update to DoD UAV Roadmap?
 - What Joint management strategies might work for Joint HSI issue management?

Send Your Ideas

- Send E-mail by 30 June 2004
- TO: *One of the below or All*
 - Michael.Drillings@hqda.army.mil
 - Nancy.Dolan@navy.mil
 - Glenn Hover@brooks.af.mil
- CC: Daniel.Risser@aepco.com *And to Dan*
- SUBJECT: put “HSI Joint Issues/Roadmap Goals”
 1. Top five issues, risks, opportunities
 2. Recommended HSI goals for Roadmap
 3. Joint Management Strategy ideas
 4. Services for which you have worked

E-mail one page in length

(Privacy honored; only aggregate information reported; no names)