Human Systems Integration (HSI)

711 HPW/HP
Implementation of HSI
in Acquisition

NDIA Systems Engineering Conference

Sarah Orr
Contractor, Human Systems Integration
711th Human Performance Wing
Air Force Research Laboratory
30 October 2013

- **Increase awareness of HSI**
  - **Re-energizing HSI**
  - **Positive impact on programs**
  - **711 HPW/HP Resources working within program offices**

711th Human Systems Integration Directorate

Mission

Optimize warfighter capability
through a human-centric approach
to system development, acquisition
and sustainment

What is Human Systems Integration?

- **The systematic *integration* of nine human-centered domains to optimize total system performance, decrease cost**

- ***Much* more than simply Human Factors Engineering (HFE)**

- **HSI affects every mission w/in DoD**

- **Requires extensive & pervasive *teamwork* (e.g., program manager, systems engineer, acquisition team, etc.)**

  HSI is NOT:

- **Another name for human factors**
- **"Just good Systems Engineering"**
- **What we've always done**
- **Another stovepipe**

Manpower | Environment | Personnel | Survivability | Human Systems Integration | Training | Habitability | Human Factors | Occupational Health | Safety
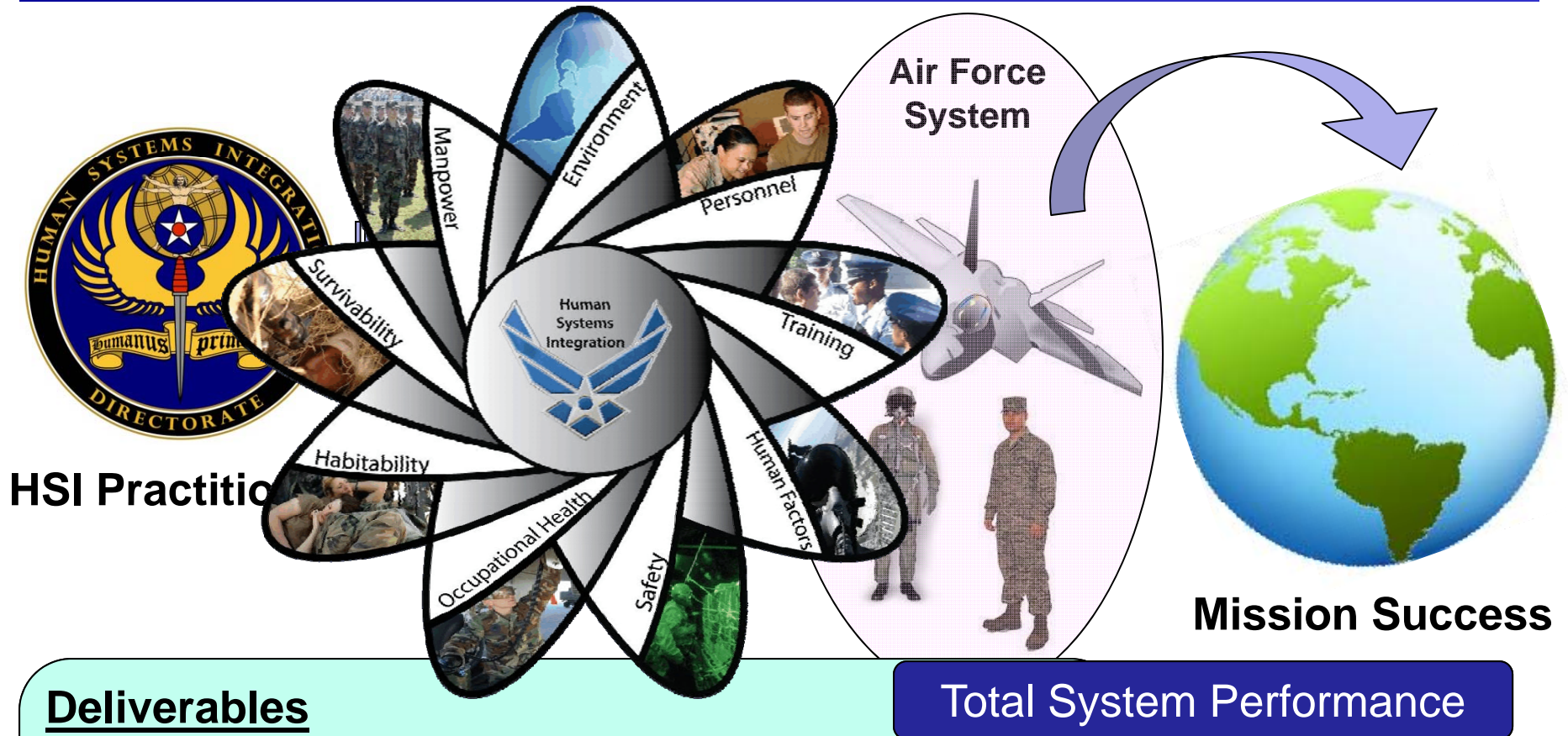
Recommendation:

"Re-energize the emphasis on Human Systems Integration throughout a weapon system's lifecycle, with much greater emphasis during Pre-Milestone A and Engineering & Manufacturing Development phases."

HP Role in the USAF

Air Force System

Mission Success

HSI Practitioners

Manpower · Environment · Personnel · Training · Human Factors · Safety · Occupational Health · Habitability · Survivability

Human Systems Integration

Total System Performance

Deliverables
-Provide HSI Risk assessments at key program decision points
--*Inform* decision makers
--Provide *risk reduction*
--Optimize human *performance*
--Reduce life cycle *costs*

- **HSI provides greater ability to:**
  - Increase performance
  - Reduce safety hazards
  - Achieve greater availability and reliability
  - Improve maintainability
  - Decrease sustainment costs
  - Reduce reworks/modifications

Hardware + Software + Human System Integration = Life-cycle Savings & Improved System Performance

Air Combat Command, Air Education and Training Command, Air Mobility Command, and Air Force Special Operations Command

- **Capability Based Assessments**
- **Analysis of Alternatives**
- **Capability Documents: ICD, CDD, CPD**
- **Modification Requests (AF Form 1067)**
- **Safety Reports**
- **Contractual Documents & Contractor Deliverables**
- **Working Groups and Integrated Product Teams**
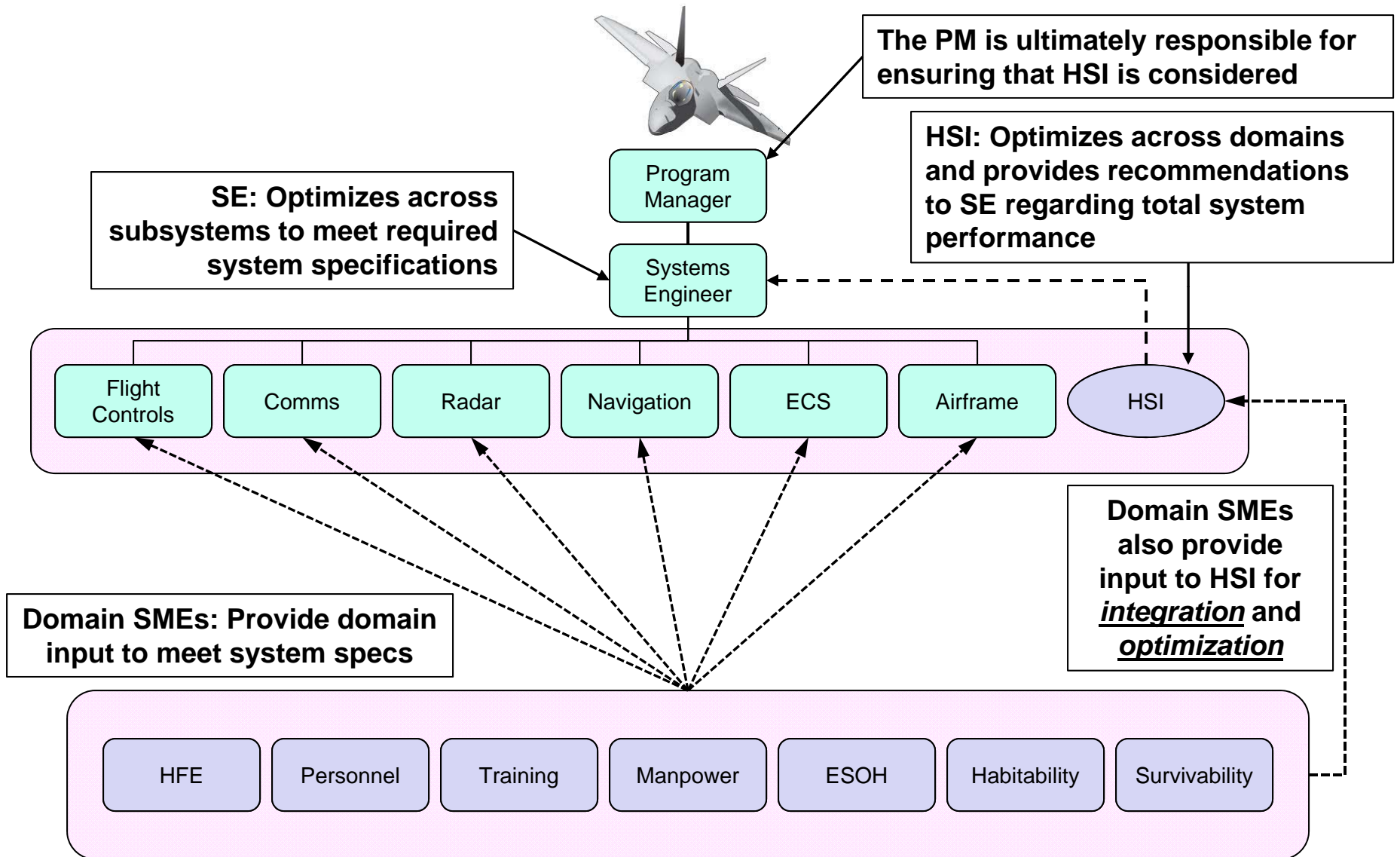- **Hands-on Test and Developmental Activities**

HSI Program Office Support

• **Perform HSI Assessments**	Identify gaps, concerns, trade offs, and risks
• **Integrate within SPO**	PM, IPT & WG activities: SE, Test, Safety, Logistics, HSI
• **Develop HSI Plan**	HSI strategy tailored specifically for program
• **Develop Requirements**	JCIDS level (ICD, CDD, CPD) & SRD
• **Develop Contract Language**	RFP, SOW, SOO, CDRLs, …
• **Review Program Documents**	SEP, IMP/IMS, TEMP, Test plans, LCMP/LCSP, MER, …
• **Participate in Technical and Design Reviews**	HSI risk input for design decisions and reviews HSI domain interrelationships and tradeoffs
• **Review/ Assess Deliverables**	Review of contractor deliverables and test reports
• **Participate in Logistics planning**	Maintainability, affordability
• **Analyze Trade Space**	Assess complex HSI domain interrelationships
• **Provide Training**	Enable SPOs to carry out HSI activities
• **Participate in Risk Assessments**	Minimize HSI domains from being traded off

HP Support to PM and Chief Engineer = Program Risk Reduction

HSI Involvement in 'notional' SPO

The PM is ultimately responsible for ensuring that HSI is considered

HSI: Optimizes across domains and provides recommendations to SE regarding total system performance

SE: Optimizes across subsystems to meet required system specifications

Program Manager

Systems Engineer

Flight Controls | Comms | Radar | Navigation | ECS | Airframe | HSI

Domain SMEs also provide input to HSI for *integration* and *optimization*

Domain SMEs: Provide domain input to meet system specs

HFE | Personnel | Training | Manpower | ESOH | Habitability | Survivability

HSI Program Office Support

Example of involvement in a program office for an aircraft program:

- **Initially embedded in program office**

  - **Increased awareness of HSI at Contractor**

  - **Developed strategy to include HSI in the overall Systems Engineering process**

  - **Authored HSI plan**

- **Now providing reach-back support**

- **Anticipated results include:**

  - **HSI inclusion early on to optimize modifications/upgrades**

  - **HSI Working Group to drive resolution on HSI issues and risks**

Final Message

- **HSI is here**
- **HSI is a real part of the Systems Engineering process**
- **HSI is a key component of logistics**
- **HSI will be used by AF to manage programs**

Questions?