Air Force Institute of Technology

Integrity - Service - Excellence

The Air Force Center for Systems Engineering

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www.afit.edu/cse
Outline

- Mission
- Organization
- Practitioner Support
- SE Education
- Research Projects
- Case Studies
Mission & Services

- **Mission**
  - Influence and Institutionalize Systems Engineering
  - Educate the workforce

- **Services**
  - Vectors to the latest Systems Engineering Policy and Guidance
  - Seminars, workshops, remote and local SE continuing education and graduate education (Masters and Certificate programs)
  - Provide hands-on experience to government and industry engineers via the Rotational Systems Engineering Development program
  - Advocate the best SE practices to the AF, DoD and industry counterparts
  - Collaborate with leading SE minds to help further develop SE policy and guidance
  - Provide SE consultation services
Policy and Consulting

- Advice and consulting
  - Links to current policy
  - Plan reviews

- Policy advocacy and formulation
  - Implementation assistance
  - Guidance and policy creation
    - Guide for use of Robust Engineering in AF Acq Programs
    - AFMC SE Guide
    - SEP creation guide
Rotational Engineer Program

- Tailorable immersion experience
  - Case study development
  - SE Education
  - Refinement of tools, processes, practices
  - Systems engineering projects in program offices
  - Mentorship by experienced systems engineers

- Open to engineers and other functional professionals
- Available to government, academia, and industry personnel
Education and Training Division

- **Graduate Program**
  - **Masters and Doctoral Degrees (Resident)**
    - Targeted toward junior officers and civilians in acquisition & engineering – 18 months
  - **IDE Masters**
    - Broader in scope to include many career fields – 12 months

**Specialization**

**AF Core**
- Requirements-driven Design
- Software Engineering
- Systems Architecture
- SE Management

**Specialization**
- Space Systems
- C4ISR
- Airborne Systems
- Aero

**AF/DoD Sponsored Research**

**AF Customers**
- DoD Research Sponsors

**Engineers with Systems Perspective**

**Mechanical**
- **Aero/Astro**
- **Electrical**
- **Software**
Graduate Certificate Program

- **Target Audience**
  - Individuals with an MS degree in any science and engineering field or unable to commit to full MS timeline

- **Curriculum**
  - Four core courses & capstone project – part-time 12-15 months
  - Currently available
    - Distance Learning at Kirtland, LA, Peterson AFBs
    - Resident/DL at Wright Patterson AFB
  - Expanding
    - Hill AFB and Tinker AFB – Fall 2006
    - Vision – anywhere
  - Awarding 20-25 certificates/year

- **Collaborative Education Agreements**
  - Apply certificate courses towards local Masters degree
  - University of New Mexico @ Kirtland AFB
  - Loyola Marymount University @ Los Angeles AFB
Established Courses
- Systems Architecture (SYS183/283)
- Systems Engineering (SYS 182/282)
- Air Worthiness Certification (SYS 116)
- Operational Safety, Suitability and Effectiveness (OSS&E) (SYS 155)
- Software Professional Development Program

Custom Developed Courses
- NRO – Capability Development Course (SE 602)
- SAF/XC – Capability Based Systems Development (SENG 540-NC/SENG 539-NC)
- Focus Week Topics
AF and DoD-Sponsored Group Projects and Theses
- Relevant -- constantly soliciting topics
- Inexpensive and responsive

Examples
- Process Application
  - Implementing Capability-Based Development
    - C4ISR (JBMC2) - JFCOM
    - Weapon Data Link – Eglin AAC, AFRL/MN
- SE Process Management
  - Historical Analysis of Fighter Aircraft Development - AFMC
  - Case Study of Avionics Modernization Program - ASC

Improved Methods for Analysis and Design of Complex System of System level Concepts
- Role of architectures in concept analysis
- Appropriate metrics and models
- Example Applications
  - Net Centric Operations – SAF/XC, SOCOM
  - Cooperative Behavior and Control – AFRL/MN
SE Case Study Development

- **Purpose**: Support the teaching of SE principles
  - Consequences of SE & programmatic decisions on cost, schedule & effectiveness
  - Discussion of both successful and unsuccessful methods, processes, principles, tools and decision material
  - Highlight the importance of skills from multiple engineering disciplines

- Cover all portfolio domains – airborne, space, munitions, C2 and MIS

- Open to suggestions for future studies
Sample Case Study Learning Principles

• Requirements Feasibility (F-111) > JSF
• Aircraft Weight Growth (C-5) > F/A-22, JSF
• Concurrent Development (F-111) > Global Hawk
• Total Pkg Procure Concept (C-5) > Life Cycle Cost Mgmt
Coming Soon @ the AF CSE

- Late Spring 2006
  - B-2 Case Study (in final editing)

- Summer 2006
  - JASSM Case Study (external coordination)

- Fall 2006
  - New cohort for SE Graduate Certificate Program
  - SE Masters degree by distance learning (in as little as 21 months)

- Spring 2007
  - Global Positioning System (GPS) and A-10 Case Studies
Welcome!

Welcome to the Air Force Center for Systems Engineering (CSE) web site.

Our Center was created in Feb 2003 and we have been growing ever since. We are located...
Summary

AF Center for Systems Engineering is **YOUR** resource for
- Workforce education
- Consulting
- Policy advice
- Research
- Case studies
Questions