

Air Force Institute of Technology



IDE 2007

Dr Bob Mills

U.S. AIR FORCE



Educating the World's Best Air Force



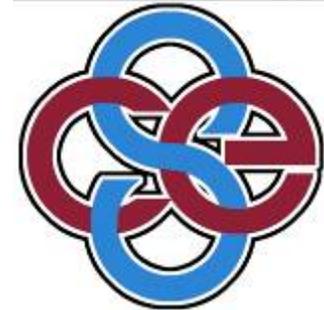
AFIT



**Graduate School of
Engineering
&
Management**



**AIR FORCE INSTITUTE
OF TECHNOLOGY**



**Center for
Systems Engineering**



**School of
Systems & Logistics**



**Civil Engineer
& Services School**



Graduate School of Engineering and Management



- Strong MS/PhD programs focused on AF/DoD needs
 - Regional Accreditation through North Central Association
 - Seven engineering programs accredited at MS level by Accreditation Board for Engineering Technology (ABET)
- Outstanding students from diverse backgrounds
 - Resident graduate student population over 900
- Top-quality faculty with 50/50 military/civilian mix
- Defense focused research program
 - Established centers in Info Assurance, Ops Analysis, Systems Engineering, MASINT, Advanced Navigation, and Directed Energy Weapons
 - 35 science and engineering laboratories
 - Committed to collaboration



AFIT IDE Program



- 12-month Masters degree in a technical field
- Changed for 2007 to address AF needs and type of job AFIT IDE grads typically hold
 - Operations Analysis
 - Logistics Sciences
 - Systems Engineering
 - Cyber Warfare
 - Culminates in Graduate Warfighter Project (GWP)
- ACSC Distance Learning via seminar

Providing Air Force warfighters with technical education



IDE 2007



- Quota of 88 students for 2007
- Academic Requirements
 - Undergrad GPA 3.0
 - GRE 1100 total
 - Technical undergraduate degree or strong tech background
- More details
 - 12 months, no thesis degree (18 mo w/ thesis option)
 - 48 hours core curriculum → 8 hours GWP
 - ACSC seminar if correspondence not completed



Msg to IDE Selects and Candidates



Message to AF IDE Selects and Candidates

The Chief of Staff of the Air Force, General Moseley, and the Secretary of the Air Force, Sec Michael Wynne, recently released the AF 2006 Vision Document. This vision emphasizes, "Worldwide advances in air, space, and anti-access technologies will make more capable enemies in the near future.... Innovative Airmen understand this need to fight differently, and they keep the Air Force at the forefront of cutting edge technology so they can do so."

As the Vision Document indicates, advanced education in cutting-edge technologies is critical to our Air Force future. To this end, the Air Force Institute of Technology (AFIT) has developed a special integrated program that is tailored to sharpen your technical skills as you complete your Intermediate Development Education (IDE). Our program is not just for officers whose careers have focused on science and engineering, but those from across all disciplines, operational and support. The Air Force needs your experiences, bolstered by a strong academic underpinning, to help us make the tough choices we'll face in the future.

To this end, AFIT has streamlined its 12 month IDE program to focus on four key, strategic areas for IDE Advanced Academic Degrees. These focus areas include:

- Air & Space Systems Engineering
- Operations Analysis
- Cyber Warfare
- Logistics Sciences

In addition to graduate classes, you will participate as a team member in a challenging Graduate Warfighter Project, helping to solve Air Force and Combatant Commanders' problems across the warfighting spectrum. Your AFIT technical degree and IDE studies will provide you unique preparation for follow-on assignments at Joint Headquarters, Air Staff, MAJCOMs, and key operational units.

We've only room for less than 90 of you and it's my intent to play a hand in your selection and assignment. If you'd like additional details, please check www.afit.edu or write me at mark.matthews@afit.edu.

Mark T. Matthews

Mark T. Matthews, Brig Gen, USAF
Commandant
Air Force Institute of Technology

Sent via email
on 19 March

Similar email
to Senior Raters



Logistics Sciences



- Education in the application of logistics principles of
 - Lean operations management, transportation, supply, and strategy to support and sustain warfare
- Past / Ongoing efforts
 - Defense transportation: strategic airlift, RFID, hazardous cargo, airdrop analysis, Intratheater airlift
 - Deployed logistics: force beddown, FOL cost structures, FARP performance, enroute support
 - Aircraft Maintenance: centralization, phase scheduling, avionics unique item identification
- GWP potential: AFSO 21 / LEAN, reconstruction, deployment, sustainment, and redeployment of combat forces



Operations Analysis



- Educates military and civilian personnel in the operational sciences
- Emphasis on the application of quantitative analysis techniques to defense decision-making
- Recent GWP projects include
 - Operations Research Approaches to Capabilities Analysis for Combat Identification (Sponsor: ACC/DR)
 - Assigning UTCs in the AEF Window, (Sponsor: AEF Center)
 - Simulation of AWACS Training (Sponsor: 552 ACW)
 - Simulation and Value Model of F-16 UPT (Sponsor: 56FW)
 - Global En Route Base Infrastructure Location Model (Sponsor: TRANSCOM J5)



Systems Engineering



- Educates officers to effectively apply sound Systems Engineering principles
 - Analyze large and complex problems and concepts
 - Design feasible solutions
 - Select appropriate solutions
 - Officers normally come from traditional engineering backgrounds
- Past / Ongoing efforts
 - AOC, Micro UAV, High Energy Laser Fighters
 - Constellations of Tac Satellites, Time Sensitive Targeting
 - Integrated Structural Health Monitoring For Aging Aircraft
 - Non-traditional Joint Close Air Support
 - SOF Air Mission Planning



Cyber Warfare



Deliver sovereign options for the defense of the United States of America, and its global interests – in air, space, and cyberspace.

USAF Mission Statement (7 Dec 2005)

- Intent
 - Educate officers in application of cyber power
 - Not training hackers...educating critical thinkers
 - Develop & challenge ideas; help formulate doctrine; explore what can and cannot be done via cyber operations
- GWP potential:
 - Cyber warfare, AFSO 21 / LEAN, and Net Centric Warfare... tying them all together
 - Past / ongoing research: growing a “cyber force”, enterprise security architectures, multilevel security, ...



Cyber Warfare



- Well suited for officers with an academic and/or operational background in
 - Network security / operations, operations, and *intelligence*
 - Bachelor's degree with above average GPA (3.0+) and one year of college level mathematics
 - Significant information technology (IT)-related work experience (programming, network operations, systems acquisition, integration)
 - Operational experience in various cyber war activities, such as network operations, electronic warfare, C4ISR, systems acquisition
- ***Bottom line: not limited to technical officers***
 - Past experiences of IDE students are extremely valuable
 - Highly motivated students can and will complete the program



GWP Summary

Relevant Research, Engineering & Analysis Applied to DoD Problems



Sponsored Projects by:



Overarching Program Themes



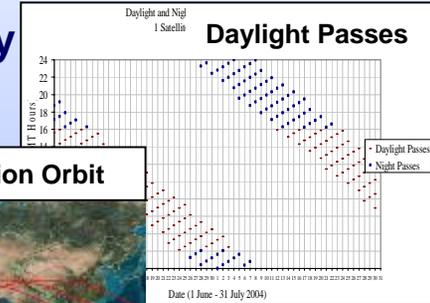
Senior Leadership Sponsor Outbrief

COCOMS
MAJCOMS

Focused Groups
of 4-8 students



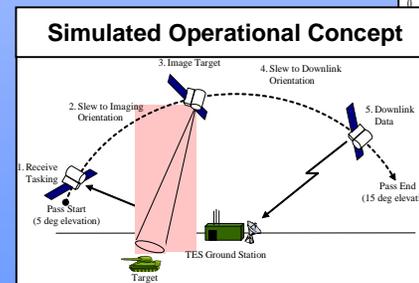
Coursework/ tools directly applicable to GWP!



Match Student Experience to GWP



Longitude	Latitude	Percent Access
41	39	0
42	39	0
43	39	0
44	39	0
45	39	0
46	39	0
47	39	0
48	39	0
49	39	0
50	39	0
41	38	0
42	38	0
43	38	0
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46	38	0
47	38	0
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49	25	0
50	25	0



Target Area Coverage (Iraqi Theater)

Student Pool

- Pilots
- Intel Officers
- Space Operators
- Maintainers
- Acquisition
- Civil Engineering
- Computer Communications
- Testers
- Sustainers

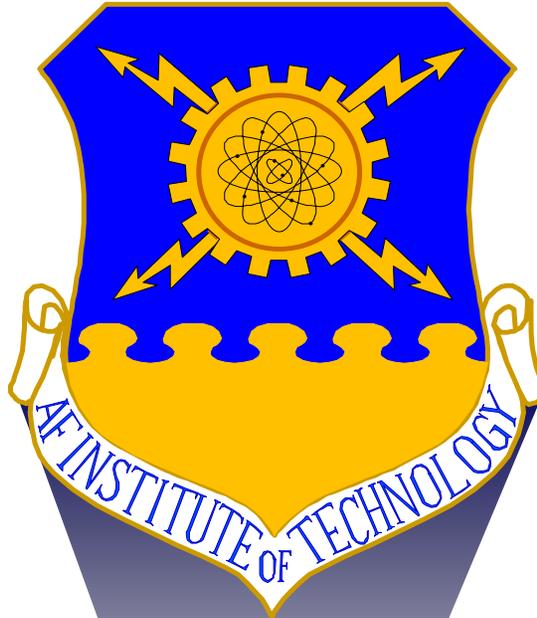
Can Provide Systems Analysis, Trade Studies, Design, Operations Concept and Requirement Analysis in 6 months!



Air Force Institute of Technology



AFIT



Defense-focused Education, Research and Consultation



Backup Slides





Academic Degree Programs



- Programs offering MS & PhD Degrees:
 - Aeronautical Engineering
 - Astronautical Engineering
 - Electrical Engineering
 - Computer Engineering
 - Nuclear Engineering
 - Systems Engineering
 - Applied Physics
 - Applied Mathematics
 - Electro-Optics
 - Operations Research
 - Materials Science
- Programs offering Master's Degrees only:
 - Cost Analysis
 - Engineering Management
 - Environmental Eng and Science
 - Information Resource/Systems Mgt
 - Research & Development Mgt
 - Information Assurance
 - Logistics Management
 - Computer Systems/Science
 - Space Systems
 - Mobility Management

MS prog w/ thesis – 18 months; PhD prog – 36 months



AFIT/AFRL Interactions



Formal agreements:

- Library Space and Resource Sharing
- Joint Assignment of Scientists and Engineers
- AFIT Research Support Fund MOA with AFOSR
- Support anti-terrorism efforts
- Wright-Patterson AFB MASINT Development Consortium (WMDC)
- Cyberspace Center of Excellence



Advanced Study of Air Mobility



- AFIT-administered IDE graduate education program
 - Sponsored by AMC Warfare Center at Fort Dix, NJ
 - Class size limited to 12-16 students
 - 12 month program, begins in June, requires PCS to McGuire AFB
 - Requires officer be pre-qualified before selection
- Undergrad degrees preferred:
 - Transportation, Logistics, Business Administration, Economics, Math, or Engineering
- Program Topics:
 - Transportation, logistics, contracting, quantitative decision making, statistics, management, maintenance, and production



Cyber Warfare



Graduates will:

- Understand cyber warfare in its various forms and the disciplines necessary to support it
- Demonstrate systems-level understanding of information systems, vulnerabilities, and capabilities
- Understand organizational planning and decision processes
- Understand how cyber war integrates with other aspects of joint warfare
- Be able to think strategically, applying the concepts of cyber warfare to the problem of national security



Cyber War IDE Program



Intro to Cyber / Info Warfare
 Computer Networks & Security
Policy, Doctrine, & Ethics
 Influence Operations
 Cyber Research
 Decision Making

Foundation



Application

Network Attack & Exploitation
 Cyber Defense Exercise
Cyber War Theory
Cyber Warfare Capstone



Graduate Warfighter Project

Relevant, operational, real world problems
 War gaming, battlefield C2, transformation, net centric warfare, doctrine, etc., ...



Critical thinker, innovative, network-knowledgeable cyber warrior



New or substantially modified courses
 Need to consider classified instruction and research



And a little bit more on cyber...



- Specific topics of study:
 - Encompass the traditional info ops tenets of computer network ops (attack and defend), psy ops, electronic warfare
 - Include evolutionary GIG architecture, mgmt of this architecture, enterprise security, data discovery, and information mgmt
 - Emphasize the design, development, and implementation of protocols, policies, doctrine, and procedures to support the GIG architecture
- Primary Topics
 - Information Warfare, communications networks, cyber defense
 - Cyber attack & exploitation
 - Policy, doctrine, ethics
 - Influence operations, cyber forensics
 - Decision making



IDE 2007 - Logistics Sciences



- **Description:** establish a base of logistics knowledge, to develop a core of quantitative excellence, to develop problem solving skills and potential for research excellence, and to establish a base management theory.
- Prepares officers to apply quantitative and analytic methods to assist high-level decision makers in the management of logistics, transportation, maintenance, and inventory systems
- Provides students with the opportunity to learn and exercise state-of-the-art management knowledge and tools to solve logistics problems
- Program Topics: statistics, operations research, organization and management theory, inventory systems, transportation and strategic mobility, maintenance and production management, financial management, and economics



IDE 2008+

Distance Learning Programs



- Systems Engineering DL Certificate & MS programs
 - Available Fall 06
 - Live VTC with students once/week
 - Requires some TDY to AFIT (paid by unit)
- DL IDE program in SE available in 2008
 - Will require two TDY visits to AFIT (paid by unit)
- Future DL IDE courses - ops analysis & logistics mgt
- AFIT is seeking feedback on potential customer base



AFIT Vision and Mission



VISION

A **premier team** providing **universally respected** engineering and management education to **sustain the technological supremacy** of America's Air and Space Forces

MISSION

Provide responsive, **defense-focused** graduate and continuing education, research, and consultation to improve Air Force and **joint operational capability**