• Background of MCEA Program and NPS
• Why is this Program Important?
• What We are Doing: Overview
  • Master’s Overview
  • Cohort Demographics
  • Curriculum Overview
  • Capstone Projects
• MCEA graduation Ceremonies
• Success Stories / Testimonials
• Challenges and Issues
• Questions and Feedback
MCEA BACKGROUND

• Developed a Distributed Learning (Non-Resident) Cost Estimating and Analysis Master’s Degree Program
  • Master’s Program (16 courses)
  • Certificate Program (4 courses)

• Open to the following personnel:
  • DoD Civilians
  • Non-DoD/Government Civilians from agencies such as GAO, Census Bureau, DHS, DOE, etc.
  • U.S. Military (officers and enlisted)
  • Industry Contractors
  • University Affiliated Research Centers (UARCs) that have a Navy sponsor
Initial Request from NAVSEA in Winter 2010

- Specific interest in collaboration between Air Force Institute of Technology (AFIT) and NPS
- https://web.nps.edu/Video/Portal/Video.aspx?enc=WFTlDKoTCD0vtu9evjVgXBEij%2fjODsqM

Initial development funding received from NAVSEA and NAVAIR in summer 2010

Strong Stated Interest/Support

- All Services and the Office of Secretary of Defense (OSD)
- Service Cost Centers

We have received and incorporated numerous ideas concerning course content over the years
BACKGROUND OF NPS: 100+ YEARS OF GRADUATE MILITARY EDUCATION (FOUNDED: 1909)

- **Accredited** as a trustworthy Institution by:
  - WASC, ABET, AACSB, NASPAA

- **Operationally Relevant**
  - Unique advanced education and research programs increasing the combat effectiveness of U.S. and Allied armed forces

- **Accomplishing the Mission**
  - Program of Record-focused graduate schools, institutes, and research centers
  - Education built on operational experience
  - An innovative environment: solutions to current, near-term and long-term national security needs
  - Opportunity to experiment with the latest operational technologies in an academic environment

- **Postgraduate Masters, Engineering, and Doctorate Degrees**
- **Programs renewed every two years based on emerging requirements**
- **Clear focus on military systems and applications**
Over 43,000 graduates including
- Students from all U.S. Military Services as well as many government agencies and their supporting contractors
- Over 4,000 international officers from over 84 countries
- 34 astronauts
- 25% of U.S. active duty Flag and General officers

More than 50,000 non-degree participants
WHY THIS DEGREE PROGRAM IS IMPORTANT

• Cost Estimating is in the Department of Defense spotlight

• Weapons System Acquisition Reform Act of 2009
  • Combined OSD PA&E and the Cost Analysis Improvement Group (CAIG) into the Director of Cost Assessment and Program Evaluation (D-CAPE), with two deputy directors:
    • Deputy Director for Cost Assessment
    • Deputy Director for Program Evaluation
  • The D-CAPE Director was a newly created position requiring Senate confirmation
    • Director reporting to SECDEF and is responsible for annual Congressional reporting
• Most new hires will be recent college graduates, untutored in DoD and very inexperienced about cost estimating

• There are a number of GS-12’s to GS-15’s who are already cost estimators, but who lack formal education in the field

• Industry Contractors - This program provides a well-rounded education for all students and promotes important interaction between government and industry
“I don’t need more cost estimators; I need better cost estimators…”

Honorable Sean Stackley, ASN(RD&A)
• Two year program beginning April of each year - 7 cohorts (157 students) have graduated so far!
  • 2 classes per quarter
  • 4 quarters per year

• Delivery modes
  • Asynchronous (computer based; no face-to-face instructional time, one class each quarter)
  • Synchronous (live class with an instructor: one class each quarter)
    • VTC / Collaborate
    • Eighth cohort: Classes meet Thursdays, 1400-1700 (EST), same time slot for two years
    • Ninth cohort: Classes meet Wednesdays, 1400-1700 (EST) same time slot for two years
**FIRST NINE COHORTS: GOOD MIX OF YOUNG AND EXPERIENCED**

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<thead>
<tr>
<th>Cohort #</th>
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<th>Graduated**</th>
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<td>9</td>
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**Some move to a later cohort**
CURRICULUM OVERVIEW

• Foundational courses
  • Probability and Statistics (Two Courses)
  • Operations Research for Cost Analysts
  • Acquisition of Defense Systems
  • Defense Financial Management and Budgeting (Two Courses: one on policy, one on practice)
  • Systems Engineering (Two Courses)

• Cost Estimating courses
  • Cost Estimating IV: Applied Cost Analysis
  • Cost Estimating V: Cost/Engineering Economics, Case Studies
  • Cost Estimating VI: Decision Analysis

• Capstone Project (final two quarters)
CAPSTONE PROJECTS

• Final two quarters of program

• Students work in groups of three and select from real projects provided by the cost organizations
  
  • OSD-CAPE, NAVSEA, NAVAIR, AFCAA, DASA-CE, NCCA, MDA, TACOM, etc.

  • Either work on part of a larger or smaller program: “Bite-sized and focused”
  
  • Project Deliverables: Research paper and a formal presentation to sponsoring command

• Published?
Your capstone work could influence acquisition policy down the road

A capstone project from Cohort 4 was used by the “Section 809 Panel”

This panel was made up of a number of retired Flag officers and industry and acquisition professionals / leaders who were chartered to streamline the DOD acquisition process
BENEFITS

• All graduates will earn a Master of Cost Estimating and Analysis Degree upon completion

• Intent is for Master’s Program to always fulfill the Educational Requirements for Defense Acquisition Workforce Improvement Act (DAWIA) Level I, II, and III Certification (BUS-CE) for all services
  • Six years of experience still needed for completion
  • Each service has granted its approval for all cohorts
  • Annual updates required to ensure currency
TIMETABLE

- Cohort #1: Graduated March 2013
- Cohort #2: Graduated March 2014
- Cohort #3: Graduated March 2015
- Cohort #4: Graduated March 2016
- Cohort #5: Graduated March 2017
- Cohort #6: Graduated March 2018
- Cohort #7: Graduated March 2019
- Cohort #8: Commenced April 2018
- Cohort #9: Commenced April 2019

Our Focus: One cohort per year, 22 – 30 students per cohort with a feedback forum in Monterey on course material and student experience
CERTIFICATE PROGRAM AVAILABLE, AS WELL

- A four course sequence leading to a Certificate in Cost Estimating and Analysis
  - One class per quarter for four consecutive quarters
  - Certificate program commences in early July each year

*The Four Courses Include:*
- Operations Research Methods for Cost Analysts
- Cost I: Methods and Techniques
- Cost II: Advanced Concepts in Cost Estimating
- Cost III: Risk and Uncertainty Analysis
COHORT 4 GRADUATION @ MONTEREY
COHORT 4 GRADUATION @ PENTAGON IN APRIL
SOME BRAGGIN’ RIGHTS….SUCCESS STORIES FROM GRADUATES: COHORT 1

- I received the FY13 Acquisition Excellence Award as part of a team
  - We were able to establish a better Learning Curve and Rate Curve based on knowledge gained in that area
    - The Statistics classes helped to better prepare me to challenge the logic used on a contract, resulting in a lower overall “Should Cost”

- I was hired by the Center for Naval Analysis (CNA) as a Senior Research Scientist
  - They hired me specifically because they had no certified cost analysts on staff to work on cost analysis

- Within 3 months of graduating, I was promoted from an EVM analyst at Pax River to a Division Head of the Program Oversight and Training at the Center for EVM at the Pentagon

- I was moved from Pax River to Crystal City to become “Director of F-35 for Cost and EVM”
I was selected as the winner of the following awards:

- AFLCMC Cost Estimator of the Year for 2014,
- AFMC(FM) Civilian (GS-09 and above) of the Year for 2014, and
- SAF/FM(FM) Civilian (GS-09 and above) of the Year for 2014

I was promoted to a GS-15 position as the Chief of the AFCAA Hanscom Operating Location in November 2014

I was selected as the SAF/FM Senior Leader of Q3 in 2015

I won the Eagle Comptroller Award in 2015
SOME BRAGGIN’ RIGHTS....SUCCESS STORIES FROM GRADUATES: COHORT 3

• I was promoted to CFO of a small aero-defense contractor at the start of 2016 now that I have the MCEA credentials!

• I received a promotion that was directly related to having my MCEA degree
  • I now work as a cost analyst in the cost division at Air Force Materiel Command HQ -- the largest acquisition Major Command in the AF working on specialized projects and advising the commander on decision support items

• My company gave me a $2,500 bonus upon graduation
Thanks to my MCEA degree, I was also recently promoted to a GS-13 position and have been fortunate to have been nominated for four awards and won one in the past year including

- AFLCMC Mid-level Cost Estimator of the Year, Civilian Category III award, FY15
- AFMC Financial Management Quarterly Award, Civilian Category III award, 4th Quarter FY15
- ICEAA National Junior Technical Award nomination, FY16.
- ICEAA Greater Dayton Chapter Junior Technical Award winner, FY16

I have worked on numerous projects over the past two years which I can proudly say I would not have been able to successfully complete without my MCEA degree

- **Enrolling in NPS’s MCEA program was the best decision I have made for my career!**
SOME BRAGGIN’ RIGHTS….SUCCESS STORIES FROM GRADUATES: COHORT 4

- I was requested to apply for a GS-15 position after graduation that I would not have been asked to without the degree, so “Doors are Opening!”

- I presented the results of our capstone project “Consumable & Reparable Cost Factor Based on Vehicle Age" to the Collaborative Cost Review Group meeting in Crystal City

- I left private industry to accept a GS-14 Cost Chief position in the Air Force

- I received a promotion from GS-13 to GS-14 one year into the NPS program

- All four members of Cohort 4 at Hanscom AFB were promoted to GS-14 within 18 months of graduation
…AND WE EVEN ARRANGE MARRIAGES!

Four students who completed their MCEA degrees ended up getting married as a result of getting to know each other through this program!

(Who needs Match.com when you have MCEA?!)  😊
CHALLENGES AND ISSUES

• Tuition **MUST** be paid for by student’s command or organization
  • Command Endorsement a requirement
  • GI Bill and personal funds cannot be used for tuition

• Video Teleconference (VTC) Limitations
  • NPS IT can handle a maximum of 20 sites dialing in for one class
  • On average 10-15 sites are needed

• But the best news – *You will have no student loan debt from this program!!*
ADVERTISING

- Tri-folds available
- Website URL
  - https://my.nps.edu/web/dl/degProgs_MCEA
# POINTS OF CONTACT

<table>
<thead>
<tr>
<th>Name / Organization</th>
<th>Email</th>
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BACK UP SLIDES

Detailed Information on the Syllabus of each Cost Course
COST ESTIMATION I: SUBJECT AREAS

• Introduction to Cost Estimating
• Cost Processes
• Data Collection and Sources
  • CSDR, CPR, SAR, SRDR, …
• Data Bases Used
  • VAMOSC, DCARC, DAMIR, etc…. 
• Introduction to Earned Value Management
• Data Normalization
• Statistics for Cost Estimators
• Methodologies
  • Analogy, Parametric, Engineering Buildup, Extrapolation from Actuals
COST ESTIMATION I: SUBJECT AREAS (CONT.)

• Regression Analysis
• Learning Curves
  • Unit Theory,
  • Cum Average Theory,
  • Production Breaks,
  • Step Down Functions,
  • Production Rates
• Cost Factors
• Wrap Rates
• Analogy Technique
• Introduction to Software Cost Estimating
• Introduction to Risk and Uncertainty Analysis
COST ESTIMATION II: SUBJECT AREAS

- **Software Cost Estimating**
  - Waterfall and adaptive paradigms like Agile
  - Software sizing, function points and cost estimating relationships

- **Scheduling**
  - Best practices for creating reliable schedules
  - Logic Relationships
  - Critical path method
  - Schedule Risk Analysis
  - Updating and Baselining a schedule

- **Earned Value Management**
  - System Description and 32 ANSI Guidelines
  - Performance Measurement Baseline
  - Resource loaded Schedules
  - Cost and Schedule Variance analysis
  - EVM Techniques and Methods
    - Development of Metrics for Estimating Costs at Completion
  - The Role of DCMA including 14 Point Assessments, EVM Analysis and Surveillance
COST ESTIMATION III: SUBJECT AREAS

• Introduction to Cost and Schedule Risk and Uncertainty
  • Review of Probability for Cost Analysts
  • Monte Carlo Simulation with @Risk
  • Understanding the Nature of CER and Cost Driver Uncertainty
  • The Impact of Correlation
  • Schedule Risk Analysis
  • Phasing the Cost Estimate
  • Putting It All Together: Examining the technical and programmatic descriptions, then developing appropriate WBS’s for cost estimating
  • Course Project
COST ESTIMATION IV: SUBJECT AREAS

• Cost Estimating in the “Post-WSARA” Era
• Technology Readiness Assessment Best Practices
• Data-Centric Cost Estimating: CADE Flex Files
• Integrated Cost and Schedule Risk Analysis
• Case Studies of Major Defense Acquisition Programs
COST ESTIMATION V: SUBJECT AREAS

- **Engineering Economics**
  - Time Value of Money
  - Equivalence of Cash Flows

- **Analyzing a Project**
  - Present Worth
  - Equivalent Annual Worth
  - Return on Investment (ROI)

- **Comparing Alternatives and Projects**
  - Mutually Exclusive Investments
  - Replacement Analysis

- **Case Studies**
COST ESTIMATION VI: DECISION ANALYSIS

• Data visualization and storytelling
  • Determining best ways to visualize data and find patterns to enhance understanding and decision-making
  • Create briefings and reports that focus on the most important information
    • Communicate results in a data driven way
    • Rely on a visual hierarchy of data design to influence what your audience is seeing

• In-depth review of the GAO Cost Guide 12 step cost estimating process
  • Case study analysis of programs that fell short of meeting best practices
  • Team project that focuses on using the best practice criteria to assess the reliability and credibility of a cost estimate
  • Students will know what criteria GAO auditors will be using to assess a program
SAMPLE CAPSTONE PROJECTS, COHORT 7

• “Implications of Manufacturing Changes Over Time.” Sponsor: NAVAIR.
  - Task: Review and analyze production data from individual contracts of several major weapon system programs (e.g. F/A-18, H-60R, V-22, E-2D, F-35, etc.) over time, focusing on the individual elements/sub-elements (i.e., engineering, manufacturing, materials and other) contained in the Functional Cost-Hour Report (1921-1).

  - Problem: With the recent increase in consolidation within the aerospace and defense market, there is concern about the future of the industry’s industrial base and competitiveness.
  - Question: Should the U.S. government actively support contractors that may be in danger of bankruptcy or acquisition?

• “Production Data Analysis and Cost Estimating Relationships.” Sponsor: DASA-CE.
  - Task: Collection, organization, and analysis of selected cost and technical metrics associated with production of end items via 1921, -1, and -2 reports to determine if estimating recurring / non-recurring costs should be estimated discretely or combined via product improvement curves.
“Estimating Costs of Next Generation Unmanned Air Vehicles.” **Sponsor: MDA**

“Effects of Large Reuse in Software Estimates.” **Sponsor: MDA**

Previous NAVAIR Projects:

• “Analyze/Update SE/PM Analysis.” **Sponsor: NAVAIR**

• “Analysis of Contractor Cost Structures and Rates.” Evaluate impacts of factors such as business base changes, evolution away from defense work to commercial, and pension impacts.” **Sponsor: NAVAIR**