COCOMO IN THE SOFTWARE SUPPORT ENVIRONMENT

Edward J. Szwedo
IIT Research Institute
Rome, New York
COCOMO IN THE
SOFTWARE SUPPORT ENVIRONMENT

ED SZWEDO
DACs

The Data & Analysis Center for Software is operated for the Rome Air Development Center by IIT Research Institute
BRIEFING OUTLINE

- Army's Software Support Challenge
- LCSE Center Concept for Software Support
- Use of COCOMO for Life Cycle Costing
- Special Software Support Concerns

DACS
OBJECTIVE

Assist the Army Materiel Command in providing guidance and direction for the insertion of new software engineering technologies into software intensive systems involved in and associated with battlefield operations.

Current Thrust: Software support Cost Estimation using COCOMO.
PROGRAM SCOPE

o 200 Mission Critical Computer Systems

o $1.5 Billion (87 - 91)

DACS
DIVERSITY OF SYSTEMS
COMMUNICATIONS - 46 SYSTEMS

- 28 DISTINCT HOST COMPUTER TYPES
- 39 DISTINCT TARGET COMPUTER TYPES
- 30 INSTRUCTION SET ARCHITECTURES (ISAs)
- 45 DISTINCT LANGUAGES
  - 7 FORTRAN DIALECTS
  - CMS-2M
  - CMS-2Y
  - BASIC
  - C
  - PLM
  - PASCAL
  - ADA
  - COBOL
  - ASSEMBLY LANGUAGES

DACS
SYSTEM PERFORMANCE ENVELOPE

Design ->
Cap

Delivered->
Cap.

Fix
Bugs

Definition
Improvements
R&D

Enhancements
O&M

Maintenance
O&M

DACS
LCSE ACTIVITIES

HARDWARE DEVELOPMENT

HARDWARE PRODUCTION

HARDWARE DEPLOYMENT

Transition

SW DEV

SW MAINT

SW DEV

PRE-TRANSITION SUPPORT

SW MAINT

DACs
Funding for 87-91

$ in thousands

Total Program

Funded

FISCAL YEARS

DACS
**NUMBER OF SYSTEMS**

*Ada is a registered trademark of the Department of Defense (Ada Joint Program Office)*
KDSI

12000
11000
10000

5000
4000
3000
2000
1000

ASSEMBLY & HOL
ASSEMBLY
HOL
ADA & ASSEMBLY
ADA
ADA & HOL

84 85 86 87 88 89 90 91 92

DAC Americas
LCSE is defined as the sum of all activities required to ensure that, during the production/deployment phase of the system's life cycle, the implemented and fielded software continues to support its original mission, modification and product improvement efforts.
SOFTWARE SUPPORT CENTERS

PROVIDE:

- IN-THEATER SUPPORT DURING HOSTILITIES
- AN ALTERNATIVE TO THE SOLE SOURCE DEVELOPER
- RE-START CAPABILITY SHOULD CONTRACTOR DEFAULT
- REDUCTION OF SOFTWARE ENVIRONMENTS
- LEVERAGE THRU CENTRALIZATION
- SUPPORT AFTER PMO DISBANDS
- QUICK RESPONSE TEAM FOR PM's
- FACILITATE INTEROPERABILITY TESTING
## SOFTWARE SUPPORT CENTERS

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>INSTALLATION</th>
<th>SOFTWARE VOLATILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANEUVER</td>
<td>FT LEAVENWORTH (CECOM)</td>
<td>LARGE S/W, SUBJECT TO CHANGE, DOCTRINE,</td>
</tr>
<tr>
<td>INTEL</td>
<td>FT HUACHUCA (ERADCOM)</td>
<td>TRAINING, INTEROP</td>
</tr>
<tr>
<td>AIR DEF</td>
<td>FT BLISS (MICOM)</td>
<td></td>
</tr>
<tr>
<td>FIRE SUPPORT</td>
<td>FT SILL (CECOM)</td>
<td></td>
</tr>
<tr>
<td>COMMUNICATIONS</td>
<td>FT MONMOUTH (CECOM)</td>
<td></td>
</tr>
<tr>
<td>AVIATION</td>
<td>FT MONMOUTH (AVSCOM)</td>
<td>LESS USER INTER-ACTION WITH SOFTWARE, LESS</td>
</tr>
<tr>
<td>INTEL/EW</td>
<td>FT MONMOUTH (ERADCOM)</td>
<td>SUBJECT TO CHANGE</td>
</tr>
<tr>
<td>FIRE CONTROL</td>
<td>PICATINNY ARS (AMCOM)</td>
<td></td>
</tr>
<tr>
<td>AIR DEF</td>
<td>REDSTONE ARS (MICOM)</td>
<td></td>
</tr>
</tbody>
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PHASE 1

- Use COCOMO for Estimating SE Manpower Requirements

- Advantages
  - Defendable Predictions

- Problems encountered
  - Inconsistent Implementation
  - KDSI Estimation

DACS
PHASE 2

- Standardize Methodology
  - "Validate" Implementation of COCOMO
  - Manpower Standards for Center Ops
  - Mission & Function Statements

- Data Collection Effort
  - Collect Actual Software Support Data

- Tailor and Tune Model

DACS
SOFTWARE SUPPORT ISSUES

- Unique Center Environments
- Security Requirements
- MCDS Software Size vs Test and Support Software Size
- Multiple Versions, Evolutionary and high Interoperability Requirements

DACS
MULT VERSIONS - HIGH INTEROP.

- Req Coding Testing  Sys A
  - Req Coding Testing  Ver. 2
    - Req Coding Testing  Ver 3

- Sys B
- Sys C
- Sys D

DACCS
SUMMARY

- Support Costs Very High
- Support Effort Organized into Centers
- Scientific Estimation for Defendable Numbers
- Tuning and Tailoring Model

DACs