Contractor Cost Data Reporting (CCDR)

Current Status and Future Directions
for
Cost Information Reporting in the DoD

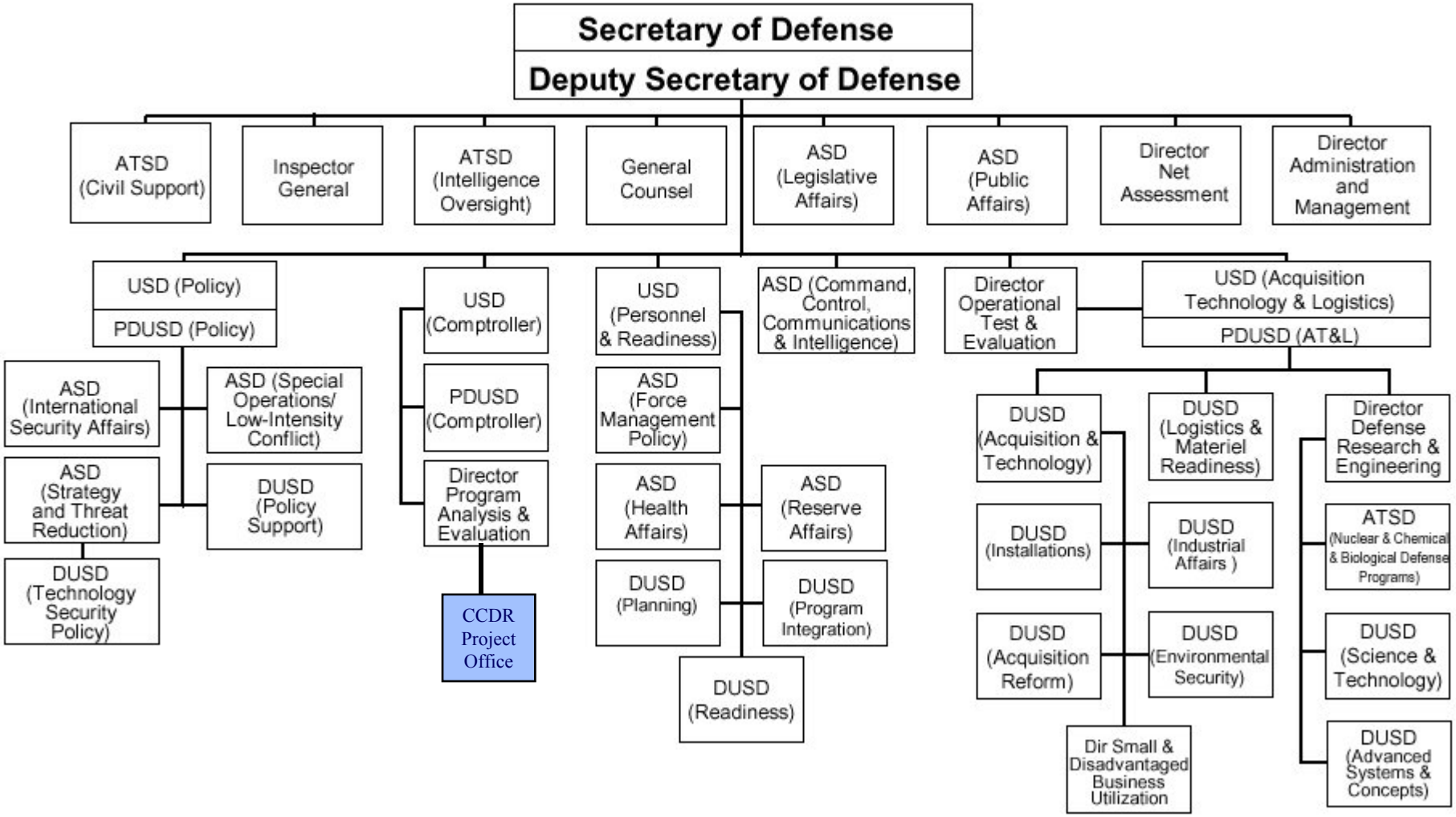
David M. Robinson, CDFM
Lieutenant Colonel, U.S. Marine Corps
Director, CCDR Project Office
OSD, Program Analysis & Evaluation

Agenda

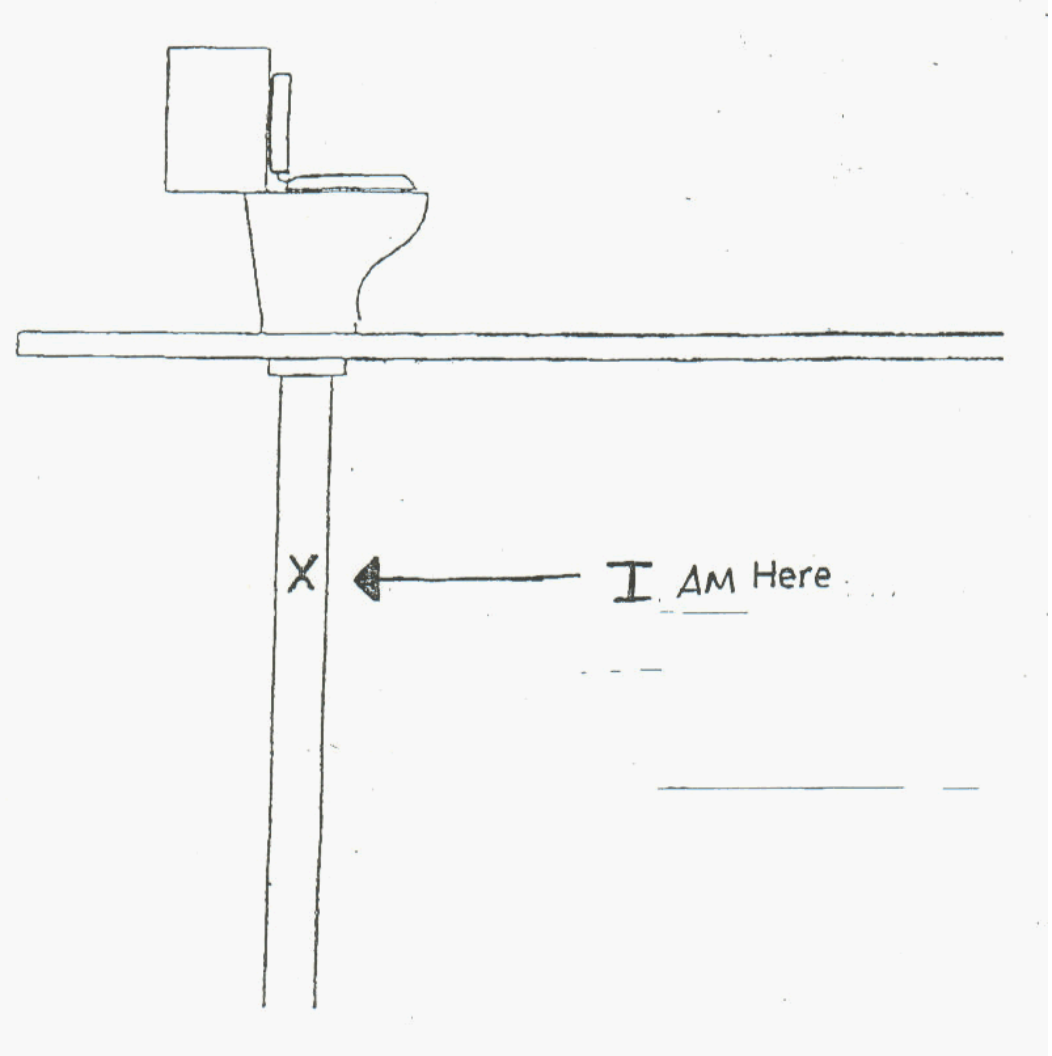
- Background
- CCDR Environment Today
- Basic CCDR Foundations
- Report Validation
- Software Metrics Proposal
- Future Directions

Background

Office of the Secretary of Defense



Organizational Reality



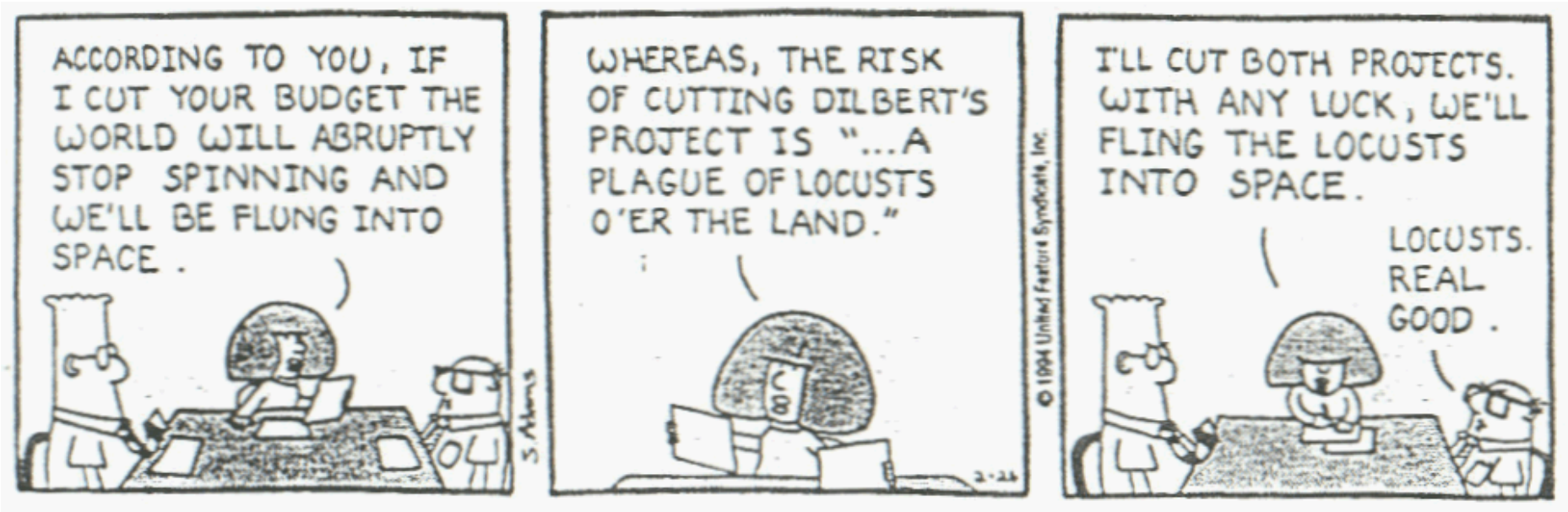
CCDR History

- Over 40 years ago, DoD committed to collecting actual cost data on DoD programs
  - Actual costs provide basis of projections of costs of future systems
  - Without CCDRs, the cost of performing cost analysis would rise and analyses become less accurate
- CCDR became primary method used to collect historical cost
- Feeds DoD's cost analysis data base that serves all DoD cost analysts and program offices
- In the early 1990s, the CCDR came under criticism by contractors and the DoD Inspector General
- Major changes made in 1996...Memo from USD(A&T)

Re-Engineering Efforts

- Director, Program Analysis & Evaluation (PA&E) launched a re-engineering effort
  - Establish a timely, accurate, and consistent cost database readily accessible to DoD cost estimators
  - Revise CCDR policies/guidance
- CCDR-Project Office (CCDR-PO) was formed
- Steps for improving the system were developed

Why do we need good cost reporting?



So that Acquisition Executives can make decisions based on actual cost experience instead of exaggerated anecdotal information.

Acquisition Program Categories

Program Category	RDT&E	Production	Annual	Acquisition	Life Cycle
ACAT 1 (D & C)[a]	>$365M	>$2.190B			
ACAT 1A[b]			>$31.5M	>$126M	>$378M
ACAT II[c]	>$140 to ≤$365M	>$660 to ≤$2.190B			
ACAT III	≤$140M	≤$660M	≤$31.5M	≤$126M	≤$378M

Note: All costs are shown in FY 2000 constant dollars.

[a] Major Defense Acquisition Program (MDAP).

[b] Major Automated Information System (MAIS).

[c] Major System.

CCDR Environment Today

CCDR-PO Mission & Objectives

- Mission
  - To collect historical Major Defense Acquisition Program cost data in a joint service environment and make those data available for use by authorized government analysts to estimate the cost of ongoing and future government programs, particularly DoD weapon systems.
- Objectives
  - Make CCDR reporting as inexpensive and least disruptive as possible for contractors.
  - Provide wide availability of CCDR data to legitimate government users.
  - Maintain integrity and accuracy of data collected.

Primary Objective:
Ensure that DoD cost estimates provided to senior management reflect as accurately as possible DoD's cost experience.

Major Players

- CCDR-PO
- CCDR Focus Group
- Cost Analysis Improvement Group (CAIG)
- Service cost centers and cost analysis organizations
  - includes major systems commands
- Defense Contractors/Materiel Developers
- Cost Working-Level Integrated Product Team (CWIPT)

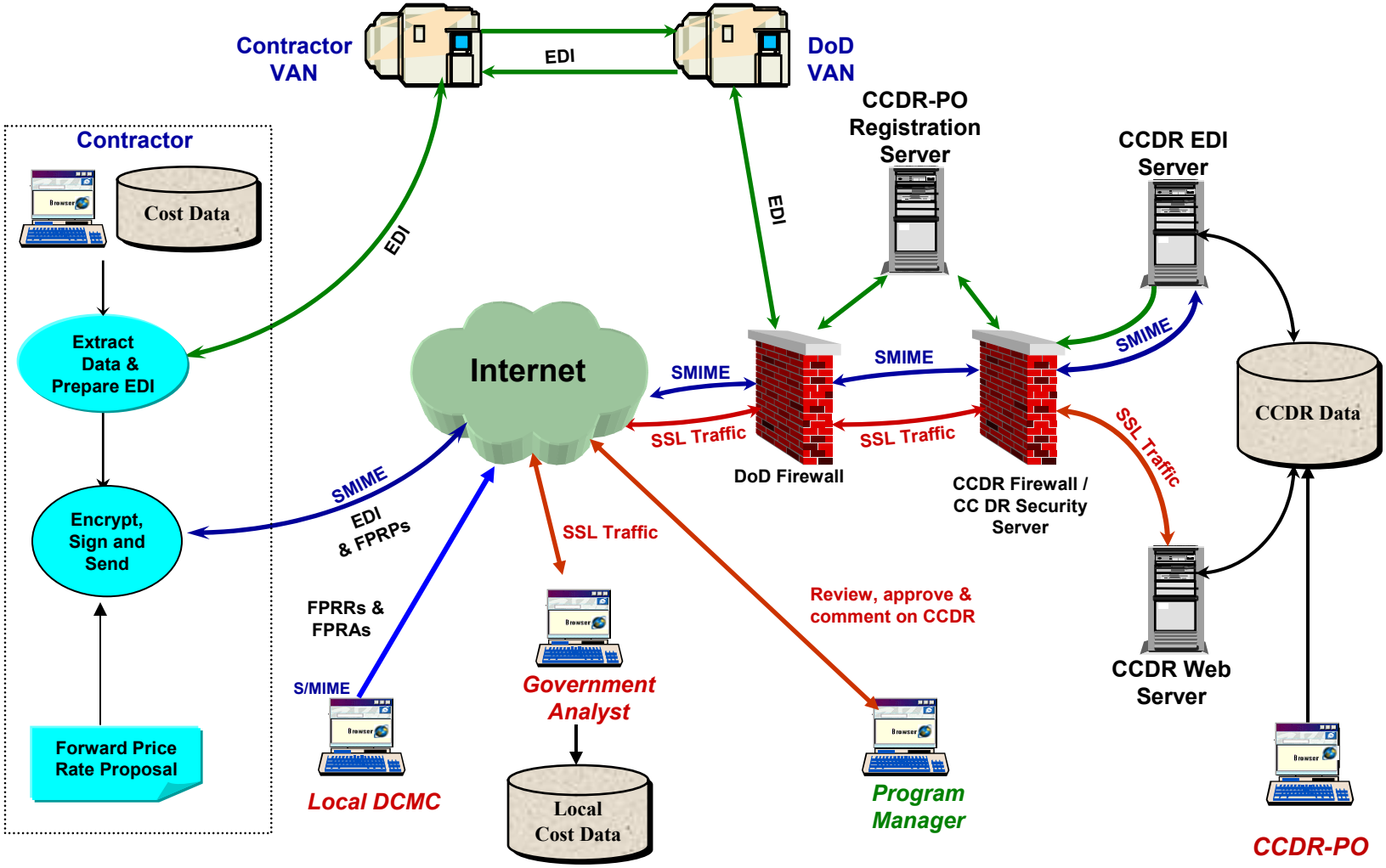
Government-Industry Partnering

- CCDR Focus Group is primary vehicle for vetting proposals and improvements to CCDR processes.
- Representatives include:
  - Senior financial officials from all major defense contractors
  - DoD & Military Service cost analysis and acquisition officials
- Major accomplishments include:
  - Developed standards for security of contractor proprietary data in the CCDR data base
  - Reduced the number of cost reports required
  - Streamlined existing report formats
  - Developed standard formats for electronic submission of data
- Participation by all concerned parties is welcome

CCDR Central Database

- Approximately 36,000 paper files scanned into the system
  - all ACAT I, II, & III programs complete
  - scanning CCDR Plans and other supporting documents
- Cataloging data records into standard categories to enhance user search capability
  - system type, program name, model, contractor, etc.
- Database searchable from Internet
  - paged results, view or download documents
- Accepting EDI and Excel type electronic files
- Allows for Program Manager approval of CCDRs on-line
- Version 1.0 completed
  - Version 2.0 & 2.1 development underway simultaneously

CCDR System Today



Breakdown of CCDRs Available

	Report Type				
881 Category	**1921**	**1921-1**	**1921-2**	**Other**	**Grand Total**
Aircraft Systems	2028	4051	2401	7684	16164
Electrical/Automatic Software Systems	666	1739	625	1196	4226
Missile Systems	2839	4067	1957	4234	13097
Ordnance Systems		199	115	207	521
Ship Systems		27	6	59	92
Space Systems		313	88	477	878
Surface Vehicle Systems		106	71	174	351
Grand Total	5533	10502	5263	14031	35329

CCDR Training

- Conducting one-day off-site training for
  - » government analysts
  - » industry personnel involved in CCDR preparation
  - » program management personnel
- Course topics include:
  - » CCDR background & regulations
  - » Typical uses of CCDR reports
  - » On-line CCDR Data Base
  - » CCDR preparation & validation
- Future sites include
  - » Orlando, New York/New Jersey, Denver
  - » Wash DC, St. Louis, Tucson

Basic CCDR Foundations

CCDR Tools

- CCDR Plan (DD Form 2794)
  - Work Breakdown Structure (WBS)
  - Report frequency
- Cost Data Summary Report (DD Form 1921)
- Functional Cost-Hour Report (DD Form 1921-1)
- Progress Curve Report (DD Form 1921-2)
- Forward Pricing Rate Data

COST DATA REPORTING PLAN

The reporting burden for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provisions of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

Form Appoved OMB No. 0704-0188

1. WEAPON SYSTEM TYPE

2. PROGRAM

3. SUBMISSION TYPE
___ INITIAL SUB
___ CHANGE

4. WBS
___ PROGRAM
___ CONTRACT

5. DATA AS OF

6. REPORT DATE

7. REVIEW AND REFERENCE NUMBER

8. PREPARING ORGANIZATION

9. POINT OF CONTACT (POC) INFORMATION

a. POC AND ADDRESS (Include Zip Code)

b. TELEPHONE NUMBER (Include Area Code)

c. FAX NUMBER

d. E-MAIL ADDRESS

10. WBS CODE	11. BREAKDOWN STRUCTURE ELEMENTS	12. Contractor (DUNS Code)	13. Contract Number	14. Report Media	15. REPORT FREQUENCY					
					a. DD Form 1921		b. DD Form 1921-1		c. DD Form 1921-2	
					Freq	Date	Freq	Date	Freq	Date
	1.0 MISSILE SYSTEM				A		A		A	
	1.1 AIR VEHICLE				A		A		A	
	1.1.1 PROPULSION				A		A		A	
	1.1.2 AIRFRAME				A		A		AR	
	1.1.3 WARHEAD				A		A		A	
	1.1.4 POST BOOST SYSTEM				A		A		A	
	1.1.5 GUIDANCE AND CONTROL EQUIPMENT				A		A		A	
	1.1.5.1 GUIDANCE SECTION				A		A		A	
	1.1.5.1.1 SEEKER				A		A		A	
	1.1.5.1.2 GUIDANCE ELECTRONICS				A		A			
	1.1.5.2 CONTROL DEVICES				A		A			
	1.1.5.3 STRUCTURE				A		A			
	1.1.5.4 POWER AND NETWORKS				A		A		AR	
	1.1.6 ORDNANCE INITIATION SET				A		A		A	
	1.1.7 AIRBORNE TEST EQUIPMENT				A		A		A	
	1.1.8 AIRBORNE TRAINING EQUIPMENT				A		A			
	1.1.9 AUXILIARY EQUIPMENT				A		A		AR	
	1.1.10 IAT&C				A		A			
	1.2 INTEGRATION, ASSEMBLY, TEST, AND CHECKOUT				A		A		A	
	1.3 SYSTEMS ENGINEERING/PROGRAM MANAGEMENT				A		A		AR	
	1.4 SYSTEMS TEST AND EVALUATION				A		A		A	
	Subcontractor G&A									
	Other Subcontractor Miscellaneous									
	Subcontractor Profit or Fee									
	Total Cost (less Reporting Contractor's G&A & Profit or Fee)									
	Reporting Contractor's G&A									
	Other Reporting Contractor Miscellaneous Items									
	FCCM									
	Reporting Contractor's Profit or Fee									
	Total Cost (Through Reporting Contractor's G&A & Profit or Fee)									

DD Form 2794, May 2000

PREVIOUS EDITION IS OBSOLETE

1921 Cost Data Summary Report (CDSR)

- Estimating Uses
  - Recurring lot data (Production)
  - Average unit recurring costs.
    - » Derive cost improvement slope if no 1921-2 (Progress Curve Report) supplied
  - Non-recurring and recurring costs
  - Factors
    - » Pay attention to schedule and dollar value
  - If 1921-1 (FCHR) is also provided, you may not need any data from this report

UNCLASSIFIED
SECURITY CLASSIFICATION

Public reporting burden for this collection of information is estimated to average 10 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, D.C. 20503.

COST DATA SUMMARY REPORT
(Dollars In Thousads)

1. PROGRAM: Missile X LRIP Surface-to-Air Interceptor

2. [X] CONTRACT NO: XXXXXX-98-C-XXXX
LATEST AMENDMENT:
[ ] RFP NO:
[ ] PROGRAM ESTIMATE

3. [ ] RDT&E
[X] PROCUREMENT

4. MULTIPLE YEAR CONTRACT
[ ] YES [X] NO

5. REPORT AS OF: 9/10/00

6. FY FUNDED: 1999

7. CONTRACT TYPE: Cost Plus Incentive Fee

8. CONTRACT PRICE EST. $344,618

9. CONTRACT CEILING $396,310

10. [X] PRIME/ASSOCIATE [ ] SUBCONTRACTOR
Company Y

11. NAME OF CUSTOMER: (Subcontractor Use Only)

CONTRACT LINE ITEM A	REPORTING ELEMENTS B	ELEMENT CODE C	TO DATE COSTS INCURRED NONRECURRING D	TO DATE COSTS INCURRED RECURRING E	TO DATE COSTS INCURRED TOTAL F	NUMBER OF UNITS G	AT COMPLETION COSTS INCURRED NONRECURRING H	AT COMPLETION COSTS INCURRED RECURRING I	AT COMPLETION COSTS INCURRED TOTAL J
	1.0 MISSILE SYSTEM	1.0	$23,528	$70,582	$94,110	75	$47,801	$213,839	$261,640
0001	1.1 AIR VEHICLE	1.1	$8,328	$65,282	$73,610	75	$25,001	$190,839	$215,840
	1.1.1 PROPULSION	1.1.1	$750	$5,625	$6,375	75	$2,250	$16,875	$19,125
	1.1.2 AIRFRAME	1.1.2	$1,000	$10,405	$11,406	75	$3,000	$26,040	$29,040
	1.1.3 WARHEAD	1.1.3	$333	$2,500	$2,833	75	$1,000	$7,500	$8,500
	1.1.4 POST BOOST SYSTEM	1.1.4	$1,000	$7,500	$8,501	75	$3,000	$22,500	$25,500
	1.1.5 GUIDANCE AND CONTROL EQUIPMENT	1.1.5	$2,497	$18,750	$21,247	75	$7,500	$56,249	$63,749
	1.1.5.1 GUIDANCE SECTION	1.1.5.1	$1,415	$10,626	$12,041	75	$4,251	$31,875	$36,125
	1.1.5.1.1 SEEKER	1.1.5.1.1	$833	$6,250	$7,083	75	$2,500	$18,750	$21,250
	1.1.5.1.2 GUIDANCE ELECTRONICS	1.1.5.1.2	$583	$4,375	$4,958	75	$1,750	$13,125	$14,875
	1.1.5.2 CONTROL DEVICES	1.1.5.2	$333	$2,500	$2,833	75	$1,000	$7,500	$8,499
	1.1.5.3 STRUCTURE	1.1.5.3	$333	$2,500	$2,833	75	$1,000	$7,500	$8,500
	1.1.5.4 POWER AND NETWORKS	1.1.5.4	$416	$3,125	$3,541	75	$1,250	$9,375	$10,625
	1.1.6 ORDNANCE INITIATION SET	1.1.6	$416	$3,125	$3,541		$1,250	$9,375	$10,625
	1.1.7 AIRBORNE TEST EQUIPMENT	1.1.7	$416	$3,125	$3,541		$1,250	$9,375	$10,625
	1.1.8 AIRBORNE TRAINING EQUIPMENT	1.1.8	$500	$3,750	$4,251		$1,500	$11,250	$12,750
	1.1.9 AUXILIARY EQUIPMENT	1.1.9	$583	$4,375	$4,958		$1,750	$13,125	$14,875
	1.1.10 IAT&C	1.1.10	$833	$6,125	$6,958		$2,500	$18,550	$21,050
0002	1.2 INTEGRATION, ASSEMBLY, TEST, AND CHECKOUT	1.2	$6,000	$1,500	$7,500		$9,000	$9,000	$18,000
0003	1.3 SYSTEMS ENGINEERING/PROGRAM MANAGEMENT	1.3	$4,500	$2,300	$6,800		$6,750	$6,000	$12,750
0004	1.4 SYSTEMS TEST AND EVALUATION	1.4	$4,700	$1,500	$6,200		$7,050	$8,000	$15,050
	Subcontractor G&A				$599				$1,451
	Other Subcontractor Miscellaneous				$0				$0
	Subcontractor Profit or Fee								$1,113
	Total Cost (less Reporting Contractor's G&A & Profit or Fee)				$94,708.1				$264,204
	Reporting Contractor's G&A				$599				$39,631
	Other Reporting Contractor Miscellaneous Items								$4,000
	FCCM								$6,000
	Reporting Contractor's Profit or Fee								$30,783
	Total Cost (Through Reporting Contractor's G&A & Profit or Fee)								$344,618

12. REMARKS:

13. NAME OF THE PERSON TO BE CONTACTED: SMITH, JOHN

14. TELEPHONE NO. 215-555-1789

15. SIGNATURE

16. DATE 1-Jun-00

FACSIMILE: DD FORM 1921, JUL 98

UNCLASSIFIED - SECURITY CLASSIFICATION

1921-1 Functional Cost Hour Report (FCHR)

- Estimating Uses
  - Recurring labor hours by function
    - » manufacturing, engineering, tooling, & quality control
  - Derive learning curve slopes if no 1921-2
  - Segregation of material & labor
  - Functional Cost visibility by WBS!
    - » Cost driver ID, % functional costs
  - Non-recurring and recurring costs by function
  - Factors
    - » Pay attention to schedule and dollar value
  - Considered **BEST OVERALL** for estimators!

Functional Cost Hour Report

1. Program: Missile X LRIP Surface to Air Interceptor
2. Report As of: 9/10/00

3. Dollars In: Thousands
4. Hours In: Thousands
5 X Contract No: XXXXXX-98-C-XXXX
RFP No:
Latest Amendment:
Program Estimate:

6 NON-Recurring x Recurring Total
7 X RDT&E Procurement OTHER

8. Multiple Year Contract: Yes X No
10 X Prime/Associate Subcontractor
(Name and address: Include zip codes): Company X
11. Name of Customer (Subcontractor use only):

9. FY Funded: FY1999

12. Reporting Element: 1.1.10 IAT&C

FUNCTIONAL CATEGORIES	ADJUST-MENTS TO PREVIOUS REPORTS A	CONTRACTOR TO DATE B	CONTRACTOR AT COMPL. C	Subcontract or Outside Production and Services TO DATE D	Subcontract or Outside Production and Services AT COMPL. E	TOTAL TO DATE F	TOTAL AT COMPL. G
ENGINEERING							
1. DIRECT LABOR HOURS		15	19			15	19
2. DIRECT LABOR DOLLARS		300	380			300	380
3. OVERHEAD		375	475			375	475
4. MATERIAL		97	151			97	151
5. OTHER DIRECT CHARGES (Specify)		6	31			6	31
6. TOTAL ENGINEERING DOLLARS		778	1037			778	1037
TOOLING							
7. DIRECT LABOR HOURS		22	26			22	26
8. DIRECT LABOR DOLLARS		462	546			462	546
9. OVERHEAD		600.6	709.8			600.6	709.8
10. MATERIALS AND PURCHASED TOOLS		12	36			12	36
11. OTHER DIRECT CHARGES (Specify)		37	81			37	81
12. TOTAL TOOLING DOLLARS		1111.6	1372.8			1111.6	1372.8
QUALITY CONTROL							
13. DIRECT LABOR HOURS		24	29			24	29
14. DIRECT LABOR DOLLARS		528	638			528	638
15. OVERHEAD		686.4	829.4			686.4	829.4
16. OTHER DIRECT CHARGES (Specify)		19	65			19	65
17. TOTAL QUALITY CONTROL DOLLARS		1233.4	1532.4			1233.4	1532.4
MANUFACTURING							
18. DIRECT LABOR HOURS		41	240			41	240
19. DIRECT LABOR DOLLARS		943	5520			943	5520
20. OVERHEAD		1320.2	7728			1320.2	7728
21. MATERIALS AND PURCHASED PARTS		93	209			93	209
22. OTHER DIRECT CHARGES (Specify)		54	79	100	200	154	279
23. TOTAL MANUFACTURING DOLLARS		2410.2	13536	100	200	2510.2	13736
24. PURCHASED EQUIPMENT		120	198			120	198
25. MATERIAL OVERHEAD		132	217.8			132	217.8

1921-2 Progress Curve Report

- Estimating Uses
  - Characteristics
    - » specified by the Procuring Contracting Officer (PCO)
    - » May be used for CER development
      - (note: weight is required for all aircraft programs)
    - » Allows correlation between cost and technical parameters
  - Segregation of material vs. labor
  - % Subcontracted
  - Recurring costs/hours
  - Costs for prototype and LRIP units

PROGRESS CURVE REPORT

(Recurring Costs Only)

1. PROGRAM: Missile X LRIP Surface to Air Interceptor

2. DOLLARS IN: Thousands

3. HOURS IN: Thousands

4. TOTAL CUMULATIVE UNITS ACCEPTED AS OF LAST REPORT: 25

5. CONTRACT NO.: XXXXXX-98-C-XXXX

6. REPORT FOR 12 MONTHS ENDING 9/10/00

7. MUTIPLE YEAR CONTRACT: [ ] [X] NO

8. FY FUNDED: 1999

9. [X] PRIME/ASSOCIATE [ ] SUBCONTRACTOR: Company X

10. NAME OF CUSTOMER:

11. REPORTING ELEMENT: **1.1.2 - AIRFRAME**

SECTION A

ITEM	UNITS/LOTS ACCEPTED — SPECIFY : UNIT/LOT TOTAL [ ] OR UNIT/LOT AVERAGE [X] A	B	C	D	E	ESTIMATE OF NEXT UNIT/LOT TO BE ACCEPTED F	TO COMPLETE CONTRACT G
1. MODEL AND SERIES	T						
2. FIRST UNIT OF LOT	1					26	51
3. LAST UNIT OF LOT	25					50	75
4. CONCURRENT LOTS	25					25	25
CHARACTERISTICS 5. Launch Weight, lbs	2,000					2,000	2,000
CHARACTERISTICS 6. Length, Ft	16					16	16
CHARACTERISTICS 7. Diameter, in.	14					14	14
CONTRACTOR DATA (Per Unit/Lot)							
8. DIRECT QUALITY CONTROL LABOR HOURS	1.32					0.96	0.84
9. DIRECT MANUFACTURING LABOR HOURS	0.85					0.61	0.54
10. QUALITY CONTROL DIRECT LABOR DOLLARS	$ 29.1					$ 21.0	$ 18.8
11. MANUFACTURING DIRECT LABOR DOLLARS	$ 19.5					$ 14.1	$ 12.5
12. RAW MATERIAL & PURCHASED PARTS DOLLARS	$ 18.7					$ 15.2	$ 14.1
13. PURCHASED EQUIPMENT DOLLARS	$ 16.2					$ 15.9	$ 15.8
14. TOTAL DOLLARS	$ 83.5					$ 66.2	$ 60.9
SUBCONTRACT/OUTSIDE PRODUCTS & SERVICES							
15. DIRECT QUALITY CONTROL LABOR HOURS							
16. DIRECT MANUFACTURING LABOR HOURS							
17. TOTAL LABOR HOURS							
18. QUALITY CONTROL DIRECT LABOR DOLLARS							
19. MANUFACTURING DIRECT LABOR DOLLARS							
20. RAW MATERIALS & PURCHASED PARTS DOLLARS	$ 46.76					$ 38.06	$ 35.17
21. PURCHASED EQUIPMENT DOLLARS	$ 46.70					$ 45.82	$ 45.48
22. TOTAL DOLLARS	$ 93.46					$ 83.89	$ 80.65
TOTAL PER UNIT/LOT							
23. DIRECT QUALITY CONTROL LABOR HOURS	1.32					0.96	0.84
24. DIRECT MANUFACTURING LABOR HOURS	0.85					0.61	0.54
25. TOTAL LABOR HOURS	2.17					1.57	1.39
26. QUALITY CONTROL DIRECT LABOR DOLLARS	$ 29.1					$ 14.1	$ 12.5
27. MANUFACTURING DIRECT LABOR DOLLARS	$ 19.5					$ 15.2	$ 14.1
28. RAW MATERIALS & PURCHASED PARTS DOLLARS	$ 65.5					$ 54.0	$ 51.0
29. PURCHASED EQUIPMENT DOLLARS	$ 62.9					$ 112.1	$ 106.4
30. TOTAL DOLLARS	$ 176.9					$ 195.4	$ 183.9

SECTION B

Forward Pricing Rate Data

- Estimating Uses
  - Understanding of the plant business base
  - Develop indirect cost estimating models
  - Understand overhead structures of prime contractors

Acquisition Strategy Support

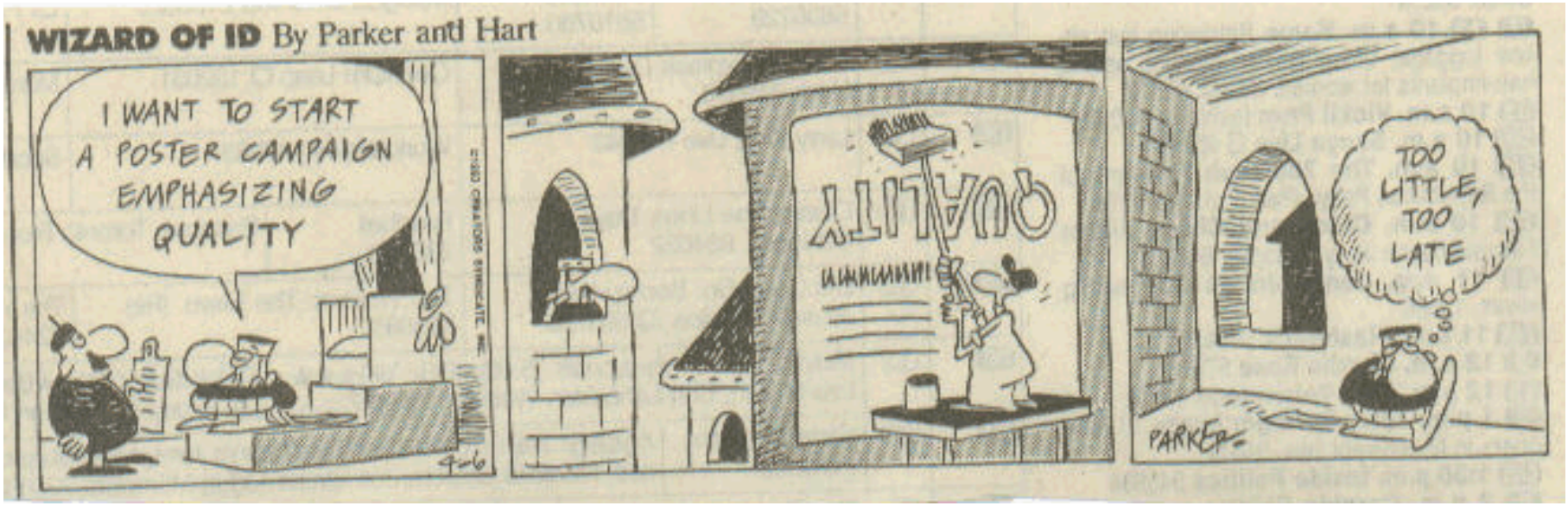
- Cost reports submitted on major systems
  - ACAT I, II, & III
- Subcontractor reporting requirements consistent with the prime's (>$42M)
- CCDR analysis allows the CWIPT to monitor, forecast, and estimate program and contract costs
- CCDR data can influence the Acquisition Strategy pursued and act as an indicator of whether or not the program is maintaining its planned course

General Policy

- Level of Cost Reporting
  - Contract WBS Level 3
  - Reporting below Level 3 required ONLY for
    - » high-risk, high-value, high-technological interest areas
  - Driven by CWIPT decisions with CAIG approval
- Frequency
  - For Production - upon delivery of each lot
  - Development - defined by needs of program
    - » at a minimum after major events (e.g. First Flight, prototype) or major milestone reviews
  - 1921-2
    - » only for high quantity or risk programs
    - » Concept and Technology Development through LRIP
  - Additional requirements left to CWIPT process to propose with approval or disapproval from CAIG Chair

Report Validation

Why Worry About Quality?



Validation of CCDR Reports

- Ensures ***quality data*** with every CCDR submittal
- Validation Team examines CCDR Plans (Prime & Subs) & compares to report submittals
  - Reporting Element Consistency between each Plan and Submittal
  - Consistency between Prime and Sub reports
- Perform Arithmetic Evaluations
- Notify PM of any Discrepancies
- PM works to correct problems
- If necessary, new reports are submitted
- When correct, report put in CRS system for use by Gov't analysts.

Lessons Learned

- Missing or inaccurate admin data
- Parent cost ≠ sum of children cost
- Quantities not reported
- WBS element codes not reported
- WBS elements reported ≠ CCDR plan
- Functional categories not reported
- Functional categories expanded
- Ripple effect of errors
- Data inconsistent

Necessity & Benefits

- Provides continual flow of "Actuals"
- Increases success for meaningful, and error free data
- Saves time
- Improves feedback process
- Enforces discipline & structure
- Reduces costly resubmits (if done correctly first time)

Software Metrics

Why do we care?

- **Little or no data** supporting software estimates
  - Includes weapon systems with embedded software & Major Automated Information Systems (MAIS)
  - Software data reported as **"red"** at DoD Cost Research Symposium
  - No data to compare estimated cost and size with actual program results
    - » tried and failed to match CARDs with CCDR data
- Who has to do what?
  - **CAIG**: ICEs on weapon systems (ACAT IC & ID programs)
  - **Service Cost Centers**: Develop estimates for MAIS (ACAT IA), & ACAT IC & ID programs
  - **PA&E**: Review ACAT IA program estimates and advise C3I on problems and progress

Goal is to collect a common limited set of software data from ACAT IA, ACAT IC, and ACAT ID programs

Software Metric Proposal Overview

- **Objective:** Improve cost estimates of software intensive systems
- Proposed software metric data
  - Two pages; **Tailored for Program** -- not a DD Form
  - Based on core metrics recommended by Software Engineering Institute (SEI)
    - » **size, effort, schedule, and quality**
- Scope
  - ACAT IA, IC, and ID
  - WBS elements determined by CWIPT
  - Commercial developers and CDAs submit to PM and CCDR-PO
- Frequency
  - With Cost Analysis Requirement Description (CARD) submission
  - 60 days after contract or Memorandum of Understanding (MOU)
  - When final product is delivered to the government

Summary of Activities to Date

- Established Software Metrics Working Group (SMWG) with reps from:
  - Military Service Cost Centers
  - Industry representatives
    - » earned value and software experts
  - PA&E (CAIG and MAIS reps)
- Held SMWG meetings (January 1999 to present)
  - Developed sample two-page form using CARD inputs
  - Developed planning and collection process
  - Developed detailed proposal and implementing documentation
- Currently pilot testing the proposal
  - Placing on contract
    - » JSF, JTRS, & WIN-T
  - Collecting feedback
    - » E2C, B-2, MIDS, AEHF

Software Product Development Report - Final Report, Page 1

SECURITY CLASSIFICATION

Sample SPDR version (date) 02.16.01

Software Product Development Report (Final, at Contract End)
Page 1: Report Context, Project Description and Size

1. Report Context

1. System/Element Name (version/release):	2. Report As Of:
3. Authorizing Vehicle (MOU, contract/amendment, etc.):	4. Reporting Event **Contract End** Submission # _____ (Supersedes # _____, if applicable)

Description of Actual Development Organization

5. Development Organization:	6. Certified CMM Level (or equivalent):	8. Lead Evaluator:
	7. Certification Date:	9. Affiliation:

10. Precedents (list up to five similar systems by the same organization or team):

2. Product and Development Description	**Percent of Product**	**Actual Development Process**	**Upgrade or New?**
1. Primary Application Type:	2. %	3.	4.
5. Secondary Application Type:	6. %	7.	8.
9. Third Application Type:	10. %	11.	12.
13. Fourth Application Type:	14. %	15.	16.
17. Primary Language Used:	18. %		
19. Secondary Language Used:	20. %		

21. List COTS/GOTS Applications Used:

22. Peak staff (maximum team size in FTE) that worked on and charged to this project: _____

23. Percent of personnel that was: Highly experienced in domain: ____% Nominally experienced: ____% Entry level, no experience: __

3. Product Size Reporting	**Provide Actuals at Final Delivery**
1. Number of Software Requirements, not including External Interface Requirements (unless noted in associated Data Dictionary)	
2. Number of External Interface Requirements (i.e., not under project control)	
3. Code Size Measures for items 4 through 6. For each, indicate S for physical SLOC (carriage returns); Snc for noncomment SLOC only; LS for logical statements; or provide abbreviation _____ and explain in associated Data Dictionary.	
4. Amount of New Code developed and delivered (Size in _____)	
5. Amount of Modified Code developed and delivered (Size in _____)	
6. Amount of Unmodified, Reused Code developed and delivered (Size in _____)	

Page 1 of 2

Software Product Development Report - Final Report, Page 2

SECURITY CLASSIFICATION

Sample SPDR version (date) 02.16.01

Software Product Development Report (Final, at Contract End)
Page 2: Project Resources, Schedule and Quality

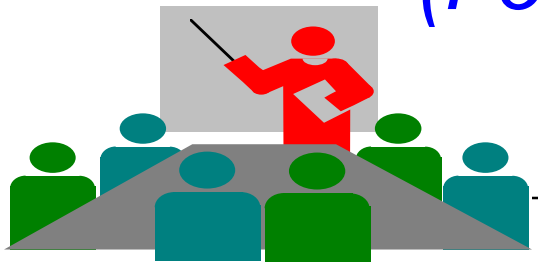
4. Resource and Schedule Reporting	**Provide Actuals at Final Delivery**		
Counting from month 1 at contract award, provide Actual Start and End Month for each activity shown. Provide the Actual Total Labor Hours for each activity shown.	**Start Month**	**End Month**	**Total Hours**
The following seven items should account for all direct hours charged to the software development project (use item 7 for any direct hours not accounted for in items 1 through 6). Explain any contribution of indirect hours in the associated Data Dictiona			
1. Software Requirements Analysis			
2. Software Architecture and Detailed Design			
3. Software Coding and Unit Testing			
4. Software Integration and System/Software Integration			
5. Software Qualification Testing			
6. Software Operational Test and Evaluation			
7. All Other Direct Software Engineering Development Effort (Describe:_____ _____) Report hours only:			

5. Product Quality Reporting		
Report cumulative defect counts since project start in each category. Use associated Data Dictionary to define counting rules as necessary.	**Actuals at Completion of Software Qualification Test**	**Actuals at Completion of Operational Test and Evaluation**
2. Cumulative Number of Critical Defects Discovered		
3. Cumulative Number of Serious Defects Discovered		
4. Cumulative Number of Defects Discovered, all severity levels		
5. Cumulative Number of Critical Defects Resolved		
6. Cumulative Number of Serious Defects Resolved		
7. Cumulative Number of Defects Resolved, all severity levels		

Filename and Revision Date of Applicable ***Software Product Development Report Data Dictionary*:**

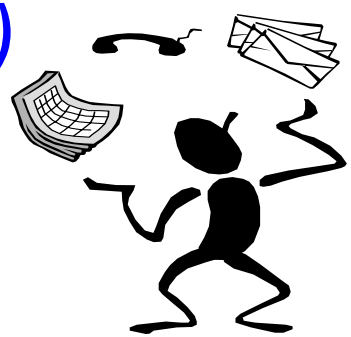
Name of person to be Contacted	**Signature**	**Telephone Number**	**E-Mail**	**Date**

Software Metrics Planning Process (For ACAT ICs and IDs)

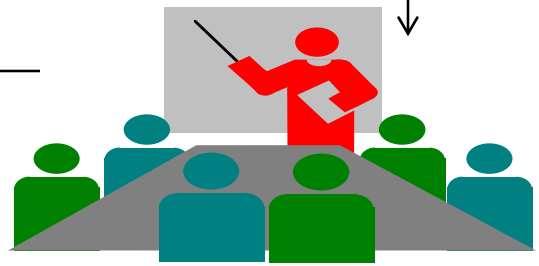


Cost Working Integrated Product Team (CWIPT) identifies software data needs. PM develops sample SDPR data dictionary, RFP language, and CDRL

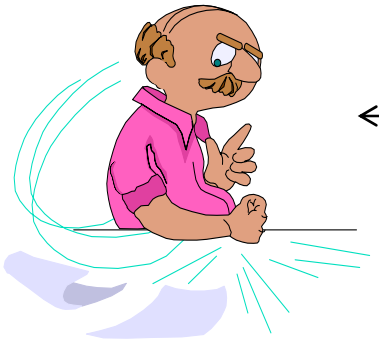
Draft Software Metrics Requirements



Contractor analyzes and comments on SW metric requirements



(CWIPT) evaluates comments, revises SPDR, data dictionary, RFP language, and CDRL. Summarizes into Software Metrics Plan for CAIG approval.



CAIG Chair approves Software Metrics Plan

RFP Language & CDRL

Data Dictionary

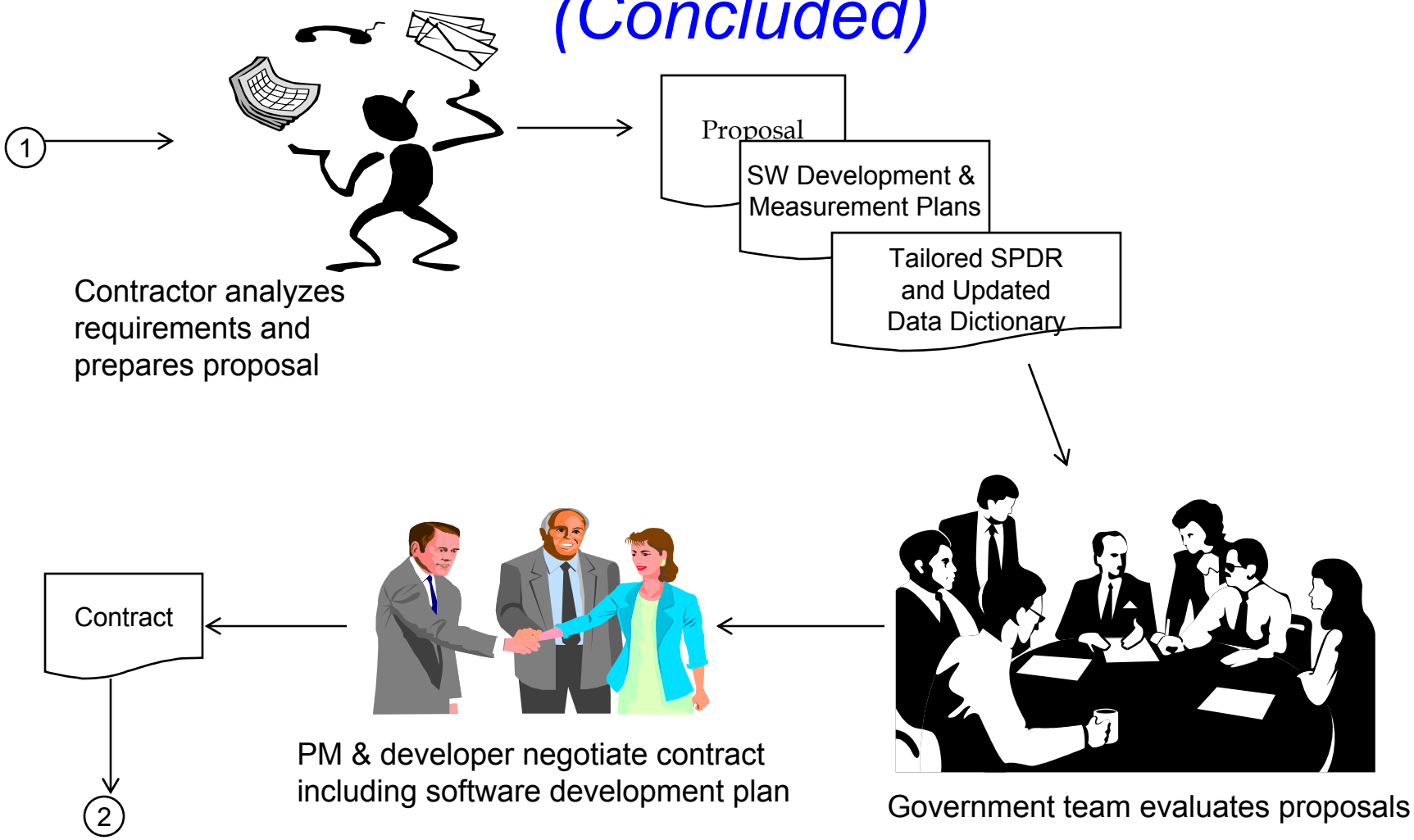
Tailored SPDR

Software Metrics Plan

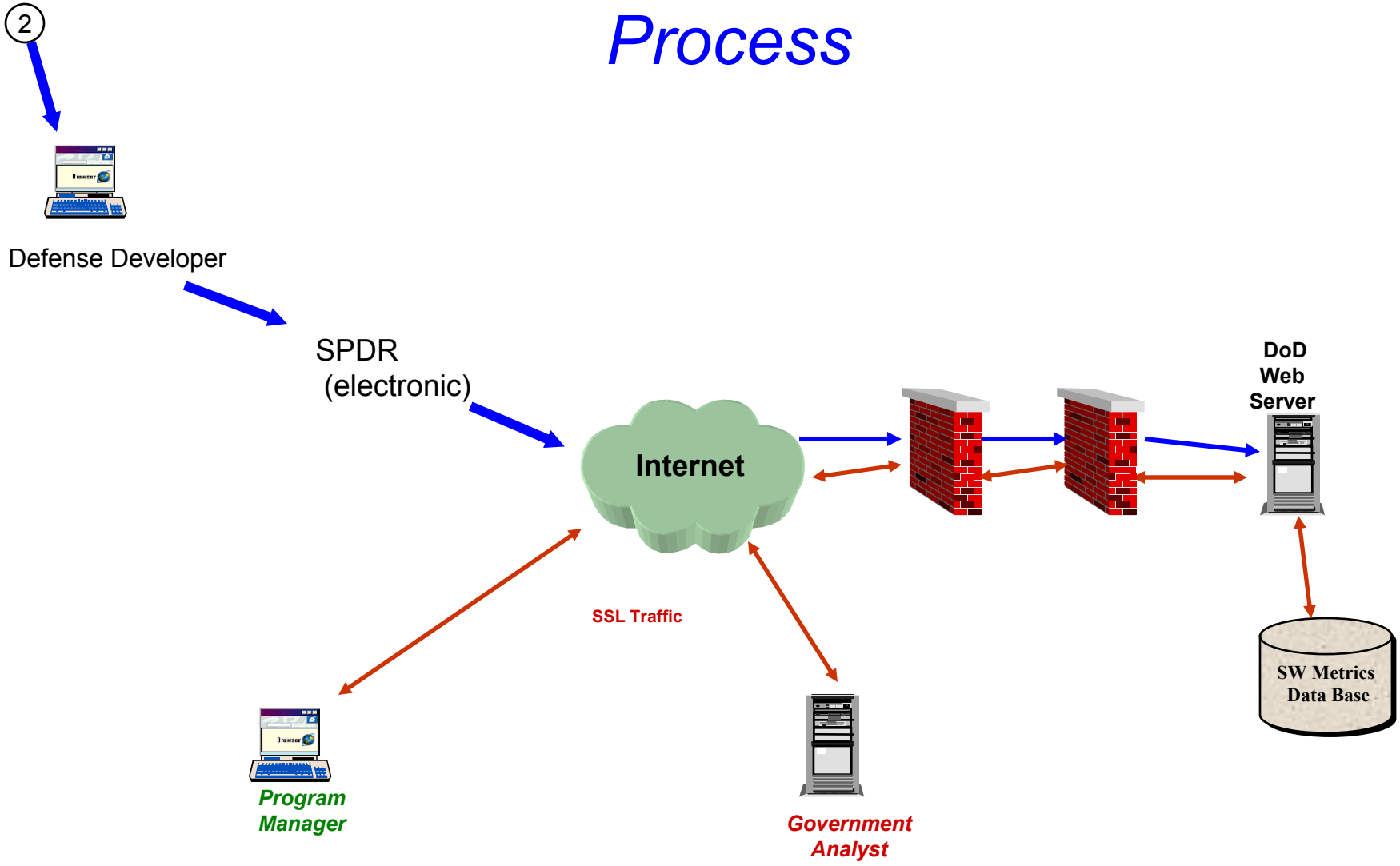
Approval Letter

1

Software Metrics Planning Process (Concluded)



Software Metrics Data Collection Process



Feedback Received From Pilot Testing

- Don't make form standard -- require tailoring
- Obtain developer comments prior to final RFP
- Allow developers to document ground rules, assumptions, and special circumstances that explain data
- Allow government PMs to request SPDR more frequently for oversight purposes. Would eliminate two reports
- Developers believe proposal is reasonable provided report is tailored
  - All collect these data already to manage programs
- May be minimal effort to provide reports ~ 200 hours for initial and final. If reports are more frequent, cost is greater.
- Developers concerned about use of data
  - Requirements, code, effort, and schedule growth
  - Defects remaining at product delivery

Next Steps

- Complete pilot testing
- Modify proposal based on pilot test feedback
- Obtain SMWG concurrence at Jun 21 Focus Group
- Obtain formal comments from National Defense Industrial Association (NDIA)
- Draft change to DoD 5000 series
- Obtain Department approval

For more info:

http://ccdr.pae.osd.mil

(What's New), Software Metrics Proposal

Future Directions

Expanded Mission Statement

- **Overarching Mission**
  - **Enhance the cost analysis capabilities of the DoD**

- Supporting Goals
  - Provide easy access to cost related information
  - Diversify information sources
    - » one-stop-shop
  - Improve the quality of cost information available
  - Educate the user community
    - » includes providers of cost information
  - Ensure continuity of operations

A New Look is Coming!

- CCDR Version 2.0 enhancements
  - Allows for simple searches
  - Users can save and retrieve searches
  - User selectable results style
  - Enhanced viewer
- More information….**more user friendly!!**
- Completion target - June 01

DACIMS
Enhancing DoD Cost Analysis

Home
Search
Explore
Activities
Preferences
Links
Sign Out

Search
Look for: Go! Advanced Search

Search on the Document Title.
Document titles are comprised of the following elements:

1. Report format (example: 1921)
2. Report as of Date (example: 12-22-1979)
3. Program Name (example: Trident SSBN)
4. Contract Number (example: N00024-79-C-2014)
5. Contractor Name (example: General Dynamics Corporation)

Saved Searches:

- Trident
- V22 Transport
- Seawolf
- THAAD
- Ratheon

For questions or comments regarding this site email: crsadminr@crs.pae.osd.mil
Last updated: July 22, 1999

New Directions

- Automated Cost Information Management System (ACIMS)
  - System of systems
  - Single point of entry for cost information
  - Simplified search/query for documents and data
  - New databases become separate modules of the system
    - » Internal systems
      - CCDR, CAIG Library, Service Cost Center Libraries, OSD Cost Growth Database
    - » External systems
      - O&S Systems, ACDBs, C4I cost data,

Automated Cost Information Management System (ACIMS)

Government Analyst

DoD Firewall

ACIMS Security

Internet

ACIMS User Search/Query Interface to Unclassified Systems

Version 2.0
Current System

CCDR

Cost Data Library

Version 2.1
Currently Under Development

Future
Currently not Web-enabled

ACDB Performance Data

Army Air Force Navy

Version 3.0

VAMOSC Data

Army Air Force Navy

Version 3.1

Cost Growth Data Base

Future

C4I Cost Data

Still in conceptual stages

Cost Data Library Module

- Cost Document Retrieval System
  - Same secure internet technology developed for CCDR
  - Cost Data Library will include
    - » CAIG and Service estimates, reports, cost models
    - » Cost Analysis Requirements Documents (CARDs)
    - » CWIPT, OIPT, & DAB briefing material
    - » Other documents as appropriate
  - May segregate sections for Service Cost Center and Service Systems Command documents
- Other data sources
  - VAMOSC & ACDB databases maintained by the military services
    - » Same search pages may be used to get document-based and data-based information

Next Steps

- Continued improvement of automated systems
  - Develop enhanced search/query functionality
  - Prepare for addition of new modules
    - » hardware, software
- Further reduce the cost of reporting to industry
- Improve cost data awareness and availability
- Improve data quality through timely CCDR validation
- Additional cost reporting process refinements
- Links to other analytical tools available
  - cost models, studies & research

What can YOU do?

- Register for CCDR system access
  - **http://ccdr.pae.osd.mil** (public site)
- Make your voice heard
  - Focus group representatives
  - off-line suggestions
    - » e-mail, telephone
- Be pro-active with CCDR-PO, PMs, and Services on cost reporting
- Schedule training

Questions???

David M. Robinson, CDFM
Lieutenant Colonel, U.S. Marine Corps
Director, CCDR Project Office
OSD, Program Analysis & Evaluation
(703) 602-3301
(703) 602-8944 fax
robinson.david@osd.pentagon.mil
http://ccdr.pae.osd.mil

Available for International Travel…