The Study of Productivity Measurement and Incentive Methodology (Phase III - Paper Test)

Volume III

Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061

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The Study of
Productivity Measurement
and Incentive Methodology
(Phase III - Paper Test)
Volume III

FINAL REPORT
March, 1986

Defense Supply Service - Washington
Contract MDA 903-85-C-0237

VIRGINIA PRODUCTIVITY CENTER
VPI & STATE UNIVERSITY
Blacksburg, VA 24061
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VPI AND STATE UNIVERSITY

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DEFENSE SYSTEMS MANAGEMENT COLLEGE

7. ADDRESS (City, State and Zip Code)
BLACKSBURG, VA 24061

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D. Scott Sink and Marvin H. Agee

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PRODUCTIVITY MEASUREMENT; PRODUCTIVITY EVALUATION; PRODUCTIVITY
MULTI-FACETED MEASUREMENT; INTEGRATED COST BASELINE GENERATION;
DISCOUNTED CASH FLOW/SHARED SAVINGS MODELS; COST DEFINITION METHODOLOGY

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

THE OVERALL GOAL OF THE FIVE-PHASE STUDY WAS TO IDENTIFY AND DEVELOP
"PRODUCTIVITY" MEASUREMENT AND METHODOLOGIES AND MODELS THAT WILL
EFFECTIVELY INTEGRATE WITH GOVERNMENT TO CONTRACT INCENTIVE
METHODOLOGIES. THE PHASE III REPORT CONSISTS OF THREE VOLUMES. VOLUME
I CONSISTS OF A DETAILED SUMMARY OF THE PHASE III STUDY. VOLUME II, A DETAILED
ANALYSIS OF THE MODELS TESTED; VOLUME III, FINAL REPORT BRIEFING AT DSMC

IN PHASE III, THREE PRODUCTIVITY MEASUREMENT/EVALUATION MODELS WERE "PAIRED"
TESTED AGAINST A GENERIC SET OF CRITERIA TO DEPICT THE RELATIVE
STRENGTHS AND WEAKNESSES OF EACH MODEL AS DIRECTLY RELATED TO THE
INTENDED APPLICATION.

THE PAIR TEST REVEALED THE CRITICAL NEED TO DEVELOP A PRODUCTIVITY MEASURE
MENT METHODOLOGY FOR DEFENSE CONTRACTORS THAT REPRESENTS A GRAND STRATEGY
WHICH CAN BE TAILORED TO SUIT SPECIFIC SITUATIONS AND CIRCUMSTANCES.

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THE STUDY OF
PRODUCTIVITY MEASUREMENT
AND
INCENTIVE METHODOLOGY
(Phase III - Paper Test)

FINAL REPORT
14 March 1986

Contract MDA 903-85-C-0237
Defense Supply Service - Washington

Contract No. N00039-84-C-0346
VPI and State University

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Virginia Productivity Center, VPI
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Marvin H. Agee, Ph.D. (Co-Director)
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Marty Simpson (Administrative Assistant)

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Vought Aero Products Division
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Ray Thornton, Productivity Measurement Staff
Len Thorpe, Manager Productivity Measurement

Price Waterhouse
William T. Muir, Principal
Eugene J. Klein, Manager
Betty B. Thayer, Senior Consultant

Westinghouse Electric Corporation
Defense Group, Manufacturing Systems and Technology Center
Richard L. Engwall, Manager Systems Planning Analysis, and Assurance

Maryland Center for Productivity and Quality of Working Life
University of Maryland
Thomas C. Tuttle, Director
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   2. LTV/VAPD Integrated Approach
      a. LTV Presentation
      b. VPC Paper Test

   3. CDEF
      a. Price Waterhouse Presentation
      b. LTV Paper Test

   4. MFPNM
      a. VPC Presentation
      b. LTV Paper Test

   5. DCF/SSA
      a. Westinghouse Presentation
      b. LTV Paper Test

   6. Summary Remarks/Conclusions and Recommendations (VPC)
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      b. Conclusions & Recommendations

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   February 18, 1986, Pentagon, Washington, D.C.

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The Study
of
Productivity Measurement
and
Incentive Methodology

(Phase III Paper Test)

Final Presentation

17 January 1986

Fort Belvoir, Virginia
ITEM 2

FINAL AGENDA
FOR
FINAL PRESENTATION

17 January 1985
Fort Belvoir, VA

0900  Introduction(s)  Mr. David Acker (TCO)

0920  Introduction, Review Agenda, and Executive Summary  D. Scott Sink (PI)

Paper Tests:
LTV Integrated Approach  S. Dhir
VPC Evaluation  Sink

1000  LUNCH

1330  CDEF:
Price Waterhouse  Thayer/Cline
LTV/VAPD  Dhir

1415  MFP/M:
VPC  Sink/Roberts
LTV/VAPD  Dhir/Thorpe

1500  BREAK

1515  DCF/LMI/Westinghouse
Wentinghouse  Engwall/
LTV/VAPD  Thornton/Dhir
VPC  Agee

1600  Summary/Conclusions/Recommendations  Sink/Agee

1615  Q&A’s, Recommendations from Advisory Board, Next Steps

1630  Adjourn
PHASE III PROJECT MANAGEMENT OBJECTIVES

010 -- DEVELOP DETAILED PLAN FOR PHASE III EXECUTION. HOLD INITIAL PLANNING SESSION.

011 -- SUBMIT SUMMARY REPORT FOR INITIAL PLANNING SESSION.

012 -- SUBMIT PROGRESS REPORTS ON A AS SCHEDULED/NEEDED BASIS.

013 -- PROVIDE PROGRESS BRIEFINGS AS SCHEDULED/REQUESTED.

014 -- EXECUTE PAPER TEST.

015 -- PROVIDE A DRAFT REPORT SUMMARIZING THE PAPER TEST 18 WEEKS AFTER CONTRACT APPROVAL.

016 -- PREPARE AND SUBMIT FINAL REPORT ON OR BEFORE 26TH WEEK AFTER CONTRACT APPROVAL. (NOTE: ONE MONTH EXTENTION HAS BEEN REQUESTED)
PHASE III

REPORTS AND PROJECT DELIVERABLES

- INITIAL PLANNING MEETING AND REPORT
  - JULY 26, 1985
  - MID AUGUST REPORT

- PLANS FOR PAPER TESTS
  - LTV PLANNING SESSION
  - LATE AUGUST

- PROGRESS REPORTS AND PRESENTATIONS
  - FIVE SCHEDULED
  - SCHEDULE TO BE DETERMINED

- DRAFT REPORT OF PAPER TESTS
  - LATE NOVEMBER

- FINAL REPORT OF PAPER TESTS
  - JANUARY 1986
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<td>MFFHM</td>
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<td>2.</td>
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<td>3.</td>
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VII. Detailed Analysis of Each Model (Objectives 2 & 4)  
(Paper Test) ........................................ 308

A. CDEF  
B. DCF/SSA  
C. KYPGM  
D. LTV Paper Test of Three Models  

(Each Detailed Analysis Contains the Following Elements)

1. Purpose of the Model  
2. Applications — how the model is intended/has been applied  
3. Unit of Analysis for Model  
4. Input Data Requirements  
5. Output Data  
6. Operating Scenario — how it functions, paper test methodology  
7. Resource Requirements — person hours, equipment, software, expertise  
8. Analysis of Model for Test Site  
9. Recommendations  

E. Responses to Questions Raised in Paper Tests  .... 670
Major Findings

- None of the three models tested will accomplish all of the objectives desired by the Government or contractors.

- A methodology which integrates the use of these and perhaps other models is needed.

- Each of the three models has certain "soft spots" but all have excellent potential.

- The issue of translation, transfer, and effective implementation at other sites needs to be studied further.
Major Findings Cont'd

- Final report shows how these three models, with derivations, can be combined into an effective approach.

- There is a need to differentiate between the notion of models versus methodologies.

- Major deficiencies in the software for the LMI/DCF/SSA model exist.

- The MFPMFM must be modified rather significantly to work in the defense contractor environment.
FIGURE 11-1
Generic Productivity Management Methodology
as Related to Defense Industry

STAGE 1
- Corporate Strategic Plan
  - Disclosure Statement
  - CDEF
  - HFPMM (LTV)

STAGE 2
- Factory/Division/Project Analysis
  - Developmental Plans
  - Challenge Budgets (LTV)
  - Cost Driver Analysis (LTV)
  - Top Down IDEF, Node Structure Macro

STAGE 3
- Identification of Projects
  - MEP vs. MIP
    - Nominal Group Technique (LTV)
    - IDEF (CDEF)
    - ROM Potential Savings/ROI

STAGE 4
- Selection of Projects
  - Decision Analysis
  - MCP/PMT (LTV)
  - CBA
Figure III-1 (cont.)
Generic Productivity Management Methodology
As Related to Defense Industry

<table>
<thead>
<tr>
<th>Sources of Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Man Tech • Budget • IR&amp;D • IMIP • Profit</td>
</tr>
</tbody>
</table>

Various Return Analysis/Decision Analysis Techniques Depending Upon Audience/Funding (i.e. LMI, CBA, Westinghouse, DCF)

\[ \begin{align*}
\text{Defera Different} & \\
\text{Source of} & \\
\text{Funds (Lost} & \\
\text{Profit in} & \\
\text{Case of no} & \\
\text{go IMIP)} & \\
\text{Negotiations} & \\
\text{GO} & \\
\text{GO} & \\
\end{align*} \]

IMPLEMENTATION

\[ \begin{align*}
\text{Cost-Benefit Tracking} & \\
\text{Shared Savings Approach} & \\
\text{Incentive} & \\
\end{align*} \]

• Rates and Factors Issues
• Projects vs. Overall Improvement Issue
• Validation Issues
• CBT

• Improved Productivity
• Improved Competitiveness
• Improved Performance
• Reduced Costs; Improved Quality, Improved Overall Acquisition for Government

(STAGE 5)

(STAGE 6)

(STAGE 7)

(STAGE 8)

(STAGE 9)

(STAGE 10)

(OUTCOMES)
VIII.A.2 - LTV/VAPD Integrated Approach

a. LTV Presentation
PRODUCTIVITY IMPROVEMENT THEME BUILT INTO

- STRATEGIC PLAN
- DEVELOPMENT PLAN
- BUDGETS
- OPERATIONS
- PROFITS
- PROPOSALS
\[ \frac{\Delta \text{ Resource Price}}{\Delta \text{ Product Price}} \times \Delta \text{ Productivity} = \Delta \text{ Profitability} \]

\[ \frac{\Delta \text{ Resource Price}}{\Delta \text{ Profitability}} \times \Delta \text{ Productivity} = \Delta \text{ Product Price} \]

FORECASTED

RELATED
STRATEGIC PRICING

Δ PRODUCT PRICE
OVER (+)/UNDER (-)
INDUSTRY AVERAGE

Δ PRODUCTIVITY
ANNUAL IMPROVEMENT
PROJECT SELECTION AND ANALYSIS

HUMAN RESOURCES (HR)

EXAMPLE OF EMPLOYEE PARTICIPATION (NGT) RESULTS FOR ONE PROJECT

<table>
<thead>
<tr>
<th>RANKING</th>
<th>PROJECT</th>
<th>VOTES</th>
<th>SCORE</th>
</tr>
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<tbody>
<tr>
<td>11 2</td>
<td>EMPLOYEE BADGE BASED AUTOMATION:</td>
<td>7</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>• CLOSED CIRCUIT TV CHECK AT ENTRY AND EXIT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• AUTOMATED ATTENDANCE - ELIMINATE TIME CARDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASSIGNED TO IMOD</td>
<td></td>
<td></td>
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</table>

COST ANALYSIS FOR PROJECT: EMPLOYEE BADGE BASED AUTOMATION

<table>
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<tr>
<th>FOCUS</th>
<th>AS-IS BASELINE</th>
<th>EXPECTED IMPROVEMENT</th>
<th>IMPLEMENTATION $M</th>
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<tbody>
<tr>
<td></td>
<td>HEADCOUNT</td>
<td>% OF HR COST</td>
<td>% OF BASELINE</td>
</tr>
<tr>
<td>SECURITY</td>
<td>96</td>
<td>38</td>
<td>15.0</td>
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<tr>
<td>MAIL ROOM</td>
<td>18</td>
<td>7</td>
<td>6.0</td>
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<tr>
<td>GENERAL</td>
<td>4000</td>
<td>1400</td>
<td>0.8</td>
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<tr>
<td>INTEREST</td>
<td>-</td>
<td>210</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
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<td></td>
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</table>
# PRODUCTIVITY PROJECTS (PARTIAL LIST)

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<tr>
<td>FLEXIBLE MANUFACTURING</td>
<td>PRODUCTION</td>
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<tr>
<td>COMPUTER-AIDED DESIGN</td>
<td>ENGINEERING SUPPORT</td>
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<tr>
<td>COMPUTER-AIDED MANUFACTURING</td>
<td>OVERHEAD</td>
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<tr>
<td>INVENTORY REDUCTION/JUST-IN-TIME</td>
<td>MATERIALS</td>
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<tr>
<td>AUTOMATED PROCUREMENT</td>
<td>WHITE COLLAR</td>
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<td>OFFICE OF THE FUTURE</td>
<td>SECURITY AND FINANCE</td>
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<td>EMPLOYEE BADGE BASED AUTOMATION (ENTRY, ATTENDANCE, PAYROLL)</td>
<td>ENERGY</td>
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<td>ENERGY MANAGEMENT SYSTEMS</td>
<td>SALES</td>
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<td>ARTIFICIAL INTELLIGENCE BASED BIDS AND PROPOSALS</td>
<td>WAREHOUSING</td>
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<td>AUTOMATED WAREHOUSING SYSTEMS</td>
<td>GENERAL</td>
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<tr>
<td>EMPLOYEE MOTIVATION AND GAINSHARING</td>
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</tbody>
</table>
BUDGET CONTROL

PROFITABILITY

PRODUCTIVITY

BUDGET/OUTPUT (IN CONSTANT $)

84%

91%

95%

1983 1984 1985

COST ≡ BUDGET
SALES ≡ OUTPUT (SALES ± Δ INVENTORY)
PROFITABILITY INCENTIVE

INCENTIVE ABSENT  INCENTIVE PRESENT

% ALLOWED PROFIT MARGIN

PRODUCTIVITY

$ PROFITS

$ PROFITS
PROFITABILITY INCENTIVE

SIMPLE
UNIVERSAL
MACRO
MEASURABLE
AUDITABLE
PERFORMANCE CRITERIA

PRODUCTIVITY

QUALITY

INNOVATION

EFFECTIVENESS

QUALITY OF WORK LIFE

PROFITABILITY

* Book on "Productivity Management" by Dr. D. Scott Slink
DIVISION
$ (A + B)

FUNCTION
$ A

DEPARTMENT
$ A_1

DEPARTMENT
$ A_2

FUNCTION
$ B

DEPARTMENT
$ B_1

DEPARTMENT
$ B_2

PERFORMANCE
MAN-HOURS/UNIT

BUDGET
INTERNAL GAINSHARING

DEPARTMENTAL MEASUREMENTS ARE DIRECTLY RELATED TO BUDGETS

DEPARTMENTAL CONTRIBUTION TO COMPANY WIDE IMPROVEMENTS CAN BE ASSESSED

DEPARTMENTAL CONTRIBUTIONS ARE SUBJECT TO MEETING OVERVIEW PERFORMANCE

MEASUREMENT SYSTEM PROVIDES THE MEANS FOR INTERNAL GAINSHARING
TWO TYPES OF IMIP PROJECTS

MODERNIZATION INVESTMENT (MIP)
- CAPITAL INTENSIVE
- EQUIPMENT & FACILITIES
- RETURN-ON-INVESTMENT

MODERNIZATION EFFICIENCY (MEP)
- NO SIGNIFICANT CAPITAL
- MANAGEMENT & SYSTEMS
- NEGOTIATED REWARDS

FOCUS: MANUFACTURING

FOCUS: OVERHEAD
TRACKING ACTUAL RESULTS

MEP PROJECT-FRINGE COST
# SHARED SAVINGS

<table>
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<tr>
<th>FLEXIBLE MACHINING</th>
<th>PROJECT DESCRIPTION</th>
<th>MEP PROJECT</th>
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<tr>
<td>$ COST OF AFFECTED PARTS AS-IS STANDARD HOURS</td>
<td>1. DEFINE MEASUREMENT</td>
<td>FRINGE COST</td>
</tr>
<tr>
<td>$ 279 PER STD. HOUR</td>
<td>2. DEFINE BASELINE</td>
<td>FRINGE BENEFIT $</td>
</tr>
<tr>
<td>$ 195 PER STD. HOUR</td>
<td>3. MEASURE ACTUAL PERFORMANCE</td>
<td>LABOR $</td>
</tr>
<tr>
<td>30%</td>
<td>4. DETERMINE IMPROVEMENT</td>
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<tr>
<td>$ 35,000</td>
<td>5. CALCULATE INCREMENTAL SAVINGS PER % IMPROVEMENT</td>
<td>$2,700,000</td>
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<td>% ALLOCATION</td>
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<td>3000</td>
<td>14000</td>
<td>25000</td>
<td>77000</td>
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<td>% ALLOCATION</td>
<td></td>
<td>2.5</td>
<td>11.8</td>
<td>21</td>
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LTV AEROSPACE AND DEFENSE COMPANY
DISCOUNTED CASH FLOW R & D ANALYSIS

Vought Aero Products Division

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**SECTION I - INVESTMENT DATA**

1. EQUIPMENT
2. BUILDINGS
3. OTHER
4. CAPITAL INVESTMENT SUBTOTAL
5. EXPENSES
6. TOTAL INVESTMENT

**SECTION II - PROJECT CASH FLOW**

7. PRODUCTIVITY SAVINGS RECOV.
8. RETAINED PROGRAM SAVINGS
9. COMMERCIAL PROGRAM SAVINGS
10. TOTAL CONTRACTOR SAVINGS
11. COST OF MONEY RECOVERY
12. CS-499 DEPRECIATION
13. EXPENSE RECOVERY
14. LOSS PROFIT EFFECT
15. DEPRECIATION PROFIT
16. SAVAGE VALUE
17. BEFORE TAX CASH FLOW

**SECTION III - TAX CALCULATIONS**

18. ACS DEPRECIATION
19. TAXABLE INCOME
20. INCOME TAX
21. INVESTMENT TAX CREDIT
22. EXPENSE TAX ADJUSTMENT
23. AFTER TAX CASH FLOW

**SECTION IV - DOD BENEFIT SUMMARY**

24. DOD PROGRAM BENEFIT (NO INCENTIVE)
25. DOD PROGRAM BENEFIT (WITH INCENTIVE)
26. DOD FUNDING
27. DOD NET CASH FLOW
28. DOD CUMULATIVE CASH FLOW NET PRESENT VALUE
29. DOD PAYBACK PERIOD YEARS
30. DOD NPV
31. CASH FLOW RATIO

**SECTION V - CONTRACTOR BENEFIT SUMMARY**

32. CUMULATIVE CASH FLOW NET PRESENT VALUE
33. RATE OF RETURN WITH INCENTIVE
34. RATIO OF RETURN WITH INCENTIVE
35. PAYBACK PERIOD YEARS
36. INVESTMENT COST TO SAVINGS RATIO

**DATA INPUTS**

- EQUIPMENT CAPITAL
- EQUIPMENT SAVAGE VALUE
- BUILDING CAPITAL
- BUILDING SAVAGE VALUE
- OTHER CAPITAL
- OTHER SAVAGE VALUE
- EXPENSES
- CS-499 DEPRECIATION
- DEPRECIATION METHOD

**PROJECT CASH FLOW AND KEY INDICATORS**

- MIP PROJECTS
- MEP PROJECTS

GP8-414-24
PROJECT CASH FLOW AND KEY INDICATORS

SECTION IV - DOD BENEFIT SUMMARY
24. DOD Program Benefit (without incentive)
   Cumulative Total
25. DOD Program Benefits (with incentive)
   Cumulative Total
26. DOD Funding
   Cumulative Total
27. DOD Net Cash Flow
28. DOD Cumulative Cash Flow Net Present Value

31. Cash Flow Ratio
   (DOD to contractor, cumulative)

SECTION V - CONTRACTOR BENEFIT SUMMARY
32. Cumulative Cash Flow Net Present Value

36. Investment Cost to Savings Ratio
MORE IMPORTANT THAN PROGRAM STRUCTURE IS THE DEGREE TO WHICH PRODUCTIVITY TOOLS ARE INHERENT IN COMPANY OPERATIONS
VIII.A.2 - LTV/VAPD Integrated Approach

b. VPC Paper Test
FIGURE III-2
Depiction of LTV/VAPD's Basic Approach
to Productivity Management

Comments:
• Process should be self-motivated
• IMIP utilized to minimize lost profit impact
• If there were overall total productivity improvement incentives the company would likely do what Government is after anyway and with less difficulty than by way of project focussed incentives.
<table>
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<tr>
<th>Criteria:</th>
<th>NGT</th>
<th>TPM</th>
<th>Cost-Driver Analysis</th>
<th>MCPM</th>
<th>DCF</th>
<th>Budgets</th>
<th>Overall System</th>
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<td>3. Champion</td>
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<td>Yes-Council</td>
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<td>4. Managing Change</td>
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<td>6. Productivity Restraints dealt w/ Stages of Evolution</td>
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<td>7. Top Mgmt. Support</td>
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<td>15. Control vs. Top, Mgmt. &amp; Eval.</td>
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<td>Improve, Improv,</td>
<td>Plann, Control</td>
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<td>17. Personalized Scoreboards</td>
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<td>20. Reward A While Hope for B</td>
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<td>22. Cost-Driver Analysis</td>
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<td>23. M&amp;I</td>
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<td>25. Win/Win Situations Set Up</td>
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<td></td>
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<td></td>
<td>Good</td>
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<td>28. Accountability</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
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<td>29. Maintain Excellence</td>
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<td>(councils promote this)</td>
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<td>31. Self Motivating</td>
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<td>32. Simplicity</td>
<td></td>
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<td></td>
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<td>A Major Weakness</td>
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</table>
VIII.A.3 - CDEF

a. Price Waterhouse Presentation
PAPER TEST

COST DEFINITION

(CDEF)

METHODOLOGY
CDEF SCOPE

CDEF is:

- A technology modernization planning and management methodology
- A cost-benefit analysis process
- A cost-benefit tracking approach
- A performance measurement technique
CASE EXAMPLE

Opportunity Matrix

Improvement Potential Baselines

High

Good Potential

Greatest Potential

Low

Modest Potential

Good Potential

Low Cost Baselines

High

Manufacturing & Cost Management Services
SUCCESS STORY

"As Is" Architecture

Function Group "N"

Manufacturing & Cost Management Services
SUCCESS STORY

Function Group

"Mini" Factory
- Related Operations
- Material Handling
- Tooling
- Quality
- etc.

"Finished" Product

Purchased Services (Internal/External)

Function Group A

"Services" Factory
- Design
- Procurement
- Data Processing
- Marketing
- Maintenance
- etc.

Purchased Services (Internal/External)

Materials
People
Equipment

Manufacturing & Cost Management Services
SUCCESS STORY

Performance Measurement Criteria

- Direct Labor Hours
- Indirect Labor Hours
- Equipment Availability
- Schedule Adherence
- Equivalent Production Units
- Utility Consumption
- Set Up Hours
- Throughput Time

Manufacturing & Cost Management Services
CASE EXAMPLE

Cost Baseline Logic

GENERAL LEDGER → AS IS COST POOL (Base Period)

ADJUSTMENTS
- DEPRECIATION
- INVENTORY SUPPORT

COST CENTER
PRODUCT (Base Period)
VOL/MIX

CONTRACT (C/SCSC)

FUNCTION GROUP

IMPROVEMENT PROGRAMS

Manufacturing & Cost Management Services
TOOLS

AUTOMATIC COST BASELINE GENERATOR (ACBG)

- PROVIDES FOCUSED STRUCTURE
- SIMPLIFIES ALLOCATION CALCULATIONS
- PROVIDES "WHAT IF" CAPABILITY

Manufacturing & Cost Management Services
CASE EXAMPLE

Cost Baseline - Logic (cont.)

- IMPROVEMENT PROGRAMS
- TO BE COST POOL (Base Period)
- COST CENTER
- PRODUCT
- CONTRACT
- FUNCTION GROUP
- VARIANCES

Manufacturing & Cost Management Services
EXPERIENCES

- CLEVELAND PNEUMATIC
- EX-CELL-O / ACE
- EX-CELL-O / ELWOOD
- BOEING MILITARY (ISMC)
- GENERAL DYNAMICS/FORT WORTH (AMS)
- BOEING AEROSPACE
- GOODYEAR AEROSPACE
- MCDONNELL DOUGLAS (C17)
- MCDONNELL DOUGLAS (ICC)
- ONTARIO FORGE
- DURADYNE
- ALUMINUM FORGE
- HONEYWELL UNDERSEA

Manufacturing &
Cost Management
Services
PAPER TEST

LTV TEST SITE MEETING

PROJECT TEAM:

RAY THORNTON - LTV
LEN THORPE - LTV
GENE KLEIN - PW
BETTY THAYER - PW
MARVIN AGEE - VPI

Manufacturing & Cost Management Services
CONCLUSIONS / RECOMMENDATIONS

- DEVELOP BETTER CDEF DESCRIPTION MANUAl
- DEVELOP CDEF USERS TRAINING
- DEVELOP USER FRIENDLY DOCUMENTATION FOR CDEF AND ACBG
- DEVELOP BETTER EXAMPLE OF COST MODEL AND GENERAL LEDGER ALLOCATION PROCESS
CONCLUSIONS / RECOMMENDATIONS (CONT.)

- DOCUMENT INFORMATION FLOW FROM DATA COLLECTION TO SHARED SAVINGS CALCULATION

- FULL SCOPE FIELD TEST OF CDEF AT LTV TOO EXPENSIVE

- DEVELOP / TEST COMPREHENSIVE PRODUCTIVITY GUIDE
VIII.A.3 - CDEF

b. LTV Paper Test
<table>
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<th>PAPER TEST RESULT FORMAT</th>
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<tbody>
<tr>
<td><strong>PRICE WATERHOUSE CDEF COST BENEFIT ANALYSIS MODEL</strong></td>
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<tr>
<td><strong>DIFFICULTY IN USE</strong></td>
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<tr>
<td><strong>EASE OF USE</strong></td>
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<tr>
<td><strong>REQUIREMENTS</strong></td>
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<tr>
<td><strong>OUTPUT</strong></td>
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<tr>
<td><strong>INPUT</strong></td>
</tr>
<tr>
<td><strong>DATA SOURCE DESCRIPTION</strong></td>
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</table>

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760
Price Waterhouse's CDEF model is very detailed and probes to the lowest level of contractor's activity. The model offers the opportunity to mimic company cost characteristics. The model relies on activity-based costing that is not always compatible with contractor's organizational structure-based cost data. Resource requirements are extensive and output format is detailed and voluminous. "To-be" cost development is derived from alterations to "as-is" cost case. In some instances, detailed cost data is not available to match the detail found in the node tree structure.
Model could require the creation of a separate cost allocation/tracking infrastructure

Extensive resource requirements will limit field test viability

Utilizing the model on a company-wide field test would entail efforts beyond the scope or timetable available in this contract

Field test will need to be scaled down in scope to match contractual resource constraints

The model can be applied to a functional area of the test site and generate the necessary evaluative data within contractual constraints
VIII.A.4 - MFPM

a. VPC Presentation
(1) Basic MFPMM eqtn. \[ \text{Profit} = \text{Productivity} \times \text{Price Recovery} \]

(2) \[
\begin{array}{ccc}
\text{SALES} & \text{OUTPUT} & \text{OUTPUT PRICE} \\
\text{COSTS} & \text{INPUT} & \text{INPUT PRICE}
\end{array}
\]

(3) \[ \Delta \text{Profit} = \Delta \text{Productivity} \times \Delta \text{Price Recovery} \]

(4) \[
\Delta \text{Profit} = \Delta \text{Prod.} \times \frac{\Delta \text{OUTPUT PRICE}}{\Delta \text{INPUT PRICE}}
\]

Forecasted (i.e. — we know these from published data or can constrain \( \Delta \text{Output price} \) to gain competitive edge.

(5) \[ \Delta \text{Product Price or} = \Delta \text{Prod.} \times \frac{\Delta \text{Input Price}}{\Delta \text{Profit}} \]

forecasted

from eqtn. (5), we can develop strategic objectives for product pricing and annual productivity improvement that are interrelated.

FIGURE VII-C-1: Basic MFPMM Equation
and its Derivation to Show How
the Model is Utilized by LTV.
VIII.A.4 - MFPMM

b. LTV Paper Test
MFPMM PAPER TEST

The model examines contractor effort at the company or macro level.
Practical application of the model is found in the total factor productivity model used at LTV's Vought Aero Products Division.
The model is driven by unit measures of price and quantity to yield "value"; these unit measures are not always available, but total value for cost categories will be available.
The lack of price and quantity data could affect model-generated indices and ratios.
Due to long cycle times, product mix changes, customizations and other configuration changes, the product and resources from one period to the next are often not identical.
The model's period-to-period comparisons are meaningful, but are restricted at LTV to "program output values."
The model can be customized to fit the long cycle times and ever-changing product mix in the aerospace environment by defining output at the program level—one entry per program per period.

This alternative approach to defining the product would overcome problems due to product mix changes and partial quantities to allow application of the model to LTV cost data bases.

The model can be adapted to a field test.
VIII.A.5 - DCF/SSA

a. Westinghouse Presentation
IMIP DCF / SSA Approach

- Expense
- Building
- EDP Equipment (5 Years)
- MFG Equipment (8 Years)
- Total Investment

- Expense Recovery (Var Formula)
- Depreciation Recovery (Var Formula) & Combinations (CAS 409)

- Profit Percentage on Recovered Costs
- Profit Lost on Savings (Negative)
- Incentive Savings (Share of Major Program Savings)
- Retained Savings (Govt FP Plus Commercial Savings)
- CAS 414 Cost of Money
- IBT

Note: The IRR represents the rate at which the sum of the yearly returns are equal to the sum of the yearly investments.
Westinghouse DCF / SSA Model

- Based on Execucom Systems Corporation's Interactive Financial Planning System (IFPS) Software Package

- Inputs
  - Project Expense
  - Project Capital
  - Savings
    - Total Government
    - Major Program
    - Commercial

- Outputs
  - Depreciation Recovery (CAS 409)
  - Expense Recovery
  - Cost of Money (CAS 414)
  - Profit on Recoverables
  - Loss on Savings
  - Retained Savings
### DATAFILE FOR SAMPLE ROI ANALYSIS

#### DATAFILE IN

```
FILE FOR EDIT. LAST LINE IS 0

   1 EXPENSE: 75.0, 375.0, 2500.2500.500.0.0.0.0.
   2 BUILDING: 0 PER 10
   3 EQUIPMENT: 0 PER 10
   4 EQUIPMENT RC: 0.250.5000.400.000.1000.0.0.0.0.
   5 CASH FLOW ADJ: 0 PER 10
   6 COST SAVINGS: 0.250.5000.250.9500.10000.10500.12000.12500.15000
   7 COMM SAVINGS: 0.0.50.75.100.150.250.700.750
   8 MAJOR PIECE SAVINGS: 0.150.4500.5000.5000.7500.9000.9500.10000.10500
```
REPORT FILE FOR SAMPLE ROI ANALYSIS

REPORT FILE VERSION OF 08/01/75 10:54

COLUMN TITLES YEAR 1, YEAR 2, YEAR 3, YEAR 4, YEAR 5, YEAR 6,

YEAR 7, YEAR 8, YEAR 9, YEAR 10, TOTAL

END OF REPORT
### LMI Discounted Cash Flow Model

#### Section 1. Core Data

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<td>3. Taxable Income (less 10%)</td>
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<td>3. End Program Benefits</td>
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<td>6. Government Benefits</td>
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### End Notes

- Contractor Investment
- Contractor Expense
- Cost/Income Available to End User
- Present Value Available to End User
- Profit Expense
- Cash Flow
- Cash Flow
- Present Value
- Present Value

### Methodology

1. **Initial Capital**: 1000
2. **Revenue**: 1050
3. **Cost of Money**: 0.1
4. **Taxable Income**: 1000
5. **Cash Flow**: 1000
6. **Investment**: 1000
7. **Present Value**: 1000

### Additional Notes

- **Markdown Syntax**: Used for formatting
- **Tables**: Generated for data presentation
- **Diagrams**: Not present in the image
- **Graphs**: Not present in the image
- **Charts**: Not present in the image
DCF/SSA Model Comparison

- **LMI Model**
  - Flexible (Not Controllable)
  - Based on Lotus 1-2-3
  - Requires Extensive Off-Line Development of Some Inputs and Most Outputs
DCF / SSA Model Comparison

- **Westinghouse IFPS Model**
  - Features: On Line Calculation of Most Inputs
  - Requires Specific Inputs:
    - Total Government Savings
    - Commercial Savings
    - Major Program Savings
    - Captial Investment by Category

- **Calculates On-Line**
  - Incentive Savings
  - Depreciation Recovery (CAS 409)
  - Expense Recovery
  - Cost of Money (CAS 414)
  - Profit on Recoverables
  - Loss on Savings
  - Retained Savings

- **Does Not Calculate DoD / Government Benefits**
  (Can Be Added)
<table>
<thead>
<tr>
<th>Inputs</th>
<th>LMI</th>
<th>Westinghouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Expense</td>
<td>Similar</td>
<td>Similar</td>
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<tr>
<td>Project Capital</td>
<td>One Lump Sum</td>
<td>Multiple Inputs</td>
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<tr>
<td>Total Govt Savings</td>
<td>C.O.-Line</td>
<td>Accommodates</td>
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<tr>
<td>Major Program Savings</td>
<td>Off-Line</td>
<td>Accommodates</td>
</tr>
<tr>
<td>Commercial Savings</td>
<td>Off-Line</td>
<td>Accommodates</td>
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# DCF / SSA Model Comparison

<table>
<thead>
<tr>
<th>Outputs</th>
<th>LMI</th>
<th>Westinghouse</th>
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<tr>
<td>Depreciation Recovery (CAS 409)</td>
<td>Five Methods</td>
<td>Set Any Method</td>
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<tr>
<td>Expense Recovery</td>
<td>Extraneous</td>
<td>Included</td>
</tr>
<tr>
<td>Cost of Money</td>
<td>No Discount for Commercial Business</td>
<td>Discounts for Commercial Business</td>
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<tr>
<td>Profit on Recoverables</td>
<td>Extraneous</td>
<td>Included</td>
</tr>
<tr>
<td>Loss on Savings</td>
<td>Extraneous</td>
<td>Included</td>
</tr>
<tr>
<td>Retained Savings</td>
<td>Extraneous</td>
<td>Included</td>
</tr>
</tbody>
</table>
DCF / SSA Model Application

- Perform Top-Down Structured Factory-Wide Analysis
- Utilize Structured Cost Benefits Analysis Methods
- CBA MUST BE IN COMPLIANCE With:
  - DD633 Format
  - Cost Accounting Standards
  - Contractor Disclosure Statement
  - Negotiated Rates and Factors
- Perform DCF Rate-of-Return Analysis
  - Establish Acceptable Hurdle Rate
  - Calculate Appropriate Shared Savings Incentive
  - Dollar Value Needed To Realize Hurdle Rate
IDEF φ Function Model

Product Requirements

Product Design

Plan Mfg

Manufacturing Plan

Provide Materials and Resources

Materials Resources

Planners

Buyers

Perform Mfg

Product

Resources

Key

Control

Input

Function

Output

Mechanism
Cost/Benefits Analysis Methodology
Technology Modernization Project Evaluation

Business Planning Systems

Go-Ahead Summary

Projected Business Base

Resource Demands by Commodity Area

Analysis
- Feasibility
- Cost and Benefits
- Socio-Technical
- Risk

Manpower Capacity Plan

Facility Plan

Calculations of Hours Before and After Project Application

Conversion of Hour Savings to Dollar Savings

Escalation of Constant Dollars to Current Year Dollars

Savings by Program
DoD Cost/Pricing Format (DD633)

1. Purchased Materials and Services
   A. Purchased Parts
   B. Subcontracted Items
   C. Development Materials

2. Procurement Burden

3. Interdivisional Transfers

4. Engineering
   A. Labor
   B. Overhead

5. Factory
   A. Labor
   B. Overhead

6. Other Costs
   A. Computer
   B. Travel
   C. Tooling
   D. Miscellaneous
Aggregate Costing Rates
Sample Business Unit Rates Breakdown

- Composite Assembly Rate
  - Simple
  - Average
  - Complex

- Composite Test Rate
  - Simple
  - Average
  - Complex

- Composite Fabrication Rate
  - Simple
  - Average
  - Complex
Aggregate Costing Rates

- Direct Labor
- Departmental Overhead
- Allocations
Aggregate Costing Rates

- Direct Labor
  - Wage Rate
  - Holiday/Vacation
  - Benefits
Aggregate Costing Rates

- Departmental Overhead
  - Meetings / Training / Travel
  - Supervision / Administration
  - Support
  - Equipment Depreciation
  - Utilities
  - Maintenance
  - Space
  - Expendables
  - Miscellaneous
Aggregate Costing Rates

- Allocations
  - Management Administration
  - Materials
  - Technical
  - Product Assurance
  - Computer
  - Finance
  - Miscellaneous
### DISCOUNTED CASH FLOW MODEL (Version 1.00)

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<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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### SECTION II. INCREMENTAL CASH FLOW

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<tr>
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</thead>
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<td>Total</td>
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<td>720.0</td>
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### SECTION III. TAX CALCULATIONS

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### SECTION IV. SUMMARY

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<td>23 Contractor Payback Period</td>
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### 10/29/05

#### SAMPLE ROI ANALYSIS REPORT

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<th>YEAR 3</th>
<th>YEAR 4</th>
<th>YEAR 5</th>
<th>YEAR 6</th>
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<th>YEAR 8</th>
<th>YEAR 9</th>
<th>YEAR 10</th>
<th>TOTAL</th>
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<td>EQUIPMENT PURCHASES</td>
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<td>25.5</td>
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</tbody>
</table>

#### ATTACHMENT 3

**EPS SAMPLE ROI MODEL**
VIII.A.5 - DCF/SSA

b. LTV Paper Test
Westinghouse model's cash flow analysis realistically follows the accounting/pricing methodology employed by defense contractors. LMI model's cash flow analysis has the following deficiencies:

- Does not recognize savings realized from commercial application of project technology
- Does not allow differing classes of depreciable capital investment
- Does not consider depreciation and expense as recoverable costs generating taxable income

LMI model is cumbersome requiring numerous side calculations outside the model; this deficiency is overcome in the Westinghouse model's performing many internal calculations that simplify user effort.

Understandably, Westinghouse rates and factors are utilized in their model's formulas; with some modification these rates and factors could become user data inputs.

Westinghouse model has good flexibility with multiple year expenditure entries, asset classes and service lives.

Model data requirements are compatible with test site data bases.
DCF/LMI/WESTINGHOUSE PAPER TEST

Resource requirements are reasonable and output format provides good analysis visibility
Models provide good evaluative measures for manufacturing investment projects; rate of return and contractor’s cash flow
Modification of the models for adaptation in a similar fashion to manufacturing efficiency projects could be accomplished by inclusion of evaluative measures such as the ratio of government cash flow to contractor cash flow
VIII.6 - Summary Remarks/Conclusion and Recommendations

a. Summary Remarks
<table>
<thead>
<tr>
<th>PMGC</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMGC₁</td>
<td>Does the methodology incorporate a 2-5 year strategic planning process?</td>
</tr>
<tr>
<td>PMGC₂</td>
<td>Does the methodology recognize the need for a competent &quot;champion&quot;?</td>
</tr>
<tr>
<td>PMGC₃</td>
<td>Does the methodology incorporate mechanisms for managing change within a political and sociological culture?</td>
</tr>
<tr>
<td>PMGC₄</td>
<td>Does the methodology ensure that productivity basics are understood consistently by all persons in the organization?</td>
</tr>
<tr>
<td>PMGC₅</td>
<td>Does the methodology consider and incorporate a process by which general awareness about the win-win features of productivity improvement can be developed?</td>
</tr>
<tr>
<td>PMGC₆</td>
<td>Does the methodology incorporate the notion of stages of development or evolution for the productivity effort?</td>
</tr>
<tr>
<td>PMGC₇</td>
<td>Is there genuine, real, long-lasting top management support for the effort? Does the methodology provide a mechanism for getting and keeping the support?</td>
</tr>
<tr>
<td>PMGC₈</td>
<td>Does the methodology adequately provide for integration of specific models, techniques, and steps within the methodology and a mechanism for integrating these with other management systems?</td>
</tr>
<tr>
<td>PMGC₉</td>
<td>Does the methodology define how the productivity management plan will integrate with the business plan, marketing plan, capital budgeting plan, long-range (5-25 year) strategy plan, etc.?</td>
</tr>
<tr>
<td>PMGC₁₀</td>
<td>Does the methodology utilize state-of-the-art participative management techniques, at all levels of management, to drive productivity improvement plans?</td>
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</tbody>
</table>
Table V.-D.-1.1. (cont.)

<table>
<thead>
<tr>
<th>PMGC12</th>
<th>Does the methodology specifically deal with how to link strategic productivity improvement planning to action planning and effective implementation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMGC13</td>
<td>Does the methodology incorporate mechanisms that encourage and promote disciplined management of budgets (all resources) at various levels of management and supervision?</td>
</tr>
<tr>
<td>PMGC14</td>
<td>Does the methodology incorporate continuing and proactive development of improvement measurement and evaluation systems? Does the methodology specifically incorporate state-of-the-art productivity measurement and evaluation techniques?</td>
</tr>
<tr>
<td>PMGC15</td>
<td>Does the methodology strongly encourage periodic measurement and evaluation system audits that check to ensure that those things which truly constitute system performance are measured?</td>
</tr>
<tr>
<td>PMGC16</td>
<td>Does the methodology recognize the difference between measurement and evaluation systems for control purposes versus those for development and improvement purposes?</td>
</tr>
<tr>
<td>PMGC17</td>
<td>Does the methodology discourage measuring A while hoping for B?</td>
</tr>
<tr>
<td>PMGC18</td>
<td>Does the methodology define how various measurement and evaluation systems will integrate into a cohesive, effective management system that supports proactive productivity management?</td>
</tr>
<tr>
<td>PMGC19</td>
<td>Does the methodology allow for personalized scoreboard building by sections, work groups, departments, etc.?</td>
</tr>
<tr>
<td>PMGC20</td>
<td>Does the methodology promote continuing, proactive development of control and improvement techniques related to all resources? Does the methodology specifically incorporate state-of-the-art productivity control and improvement approaches and techniques for labor, capital, energy, materials, and data/information?</td>
</tr>
<tr>
<td>PMGC21</td>
<td>Does the methodology encourage periodic audits of control and improvement procedures? Do we audit what we really reward?</td>
</tr>
<tr>
<td>PMGC22</td>
<td>Does the methodology discourage rewarding A while hoping for B?</td>
</tr>
</tbody>
</table>
Table V.-D.-L.1. (cont.)

PMGC\textsubscript{23}  
- Does the methodology encourage and promote innovation at all levels of the organization?

PMGC\textsubscript{24}  
- Does the methodology utilize a "cost-driver" analysis to identify where improvement efforts are best directed?

PMGC\textsubscript{25}  
- Does the methodology define how to successfully link control and improvement to measurement and evaluation, and vice versa?

PMGC\textsubscript{26}  
- Does the methodology focus on building effective management systems as opposed to just automating? Are our improvement efforts piecemeal attempts to optimize subsystems at the expense of larger system performance?

PMGC\textsubscript{27}  
- Does the methodology strive to create goal-congruity/win-win situations? If the organization wins, will the individual win also?

PMGC\textsubscript{28}  
- Does the methodology successfully utilize state-of-the-art participative management techniques for productivity improvement plan identification, development, and implementation?

PMGC\textsubscript{29}  
- Does the methodology focus on execution of management basics as an early step in productivity improvement?

PMGC\textsubscript{30}  
- Does the methodology hold management, staff, and employees accountable in a disciplined, consistent fashion?

PMGC\textsubscript{31}  
- Does the methodology incorporate planning for maintaining excellence once it is achieved?

PMGC\textsubscript{32}  
- Do all levels of management and staff understand the methodology? Does the methodology incorporate plans to involve management in its development and to continue education as to the methodologies execution?

PMGC\textsubscript{33}  
- Is the methodology designed so as to be self-motivating?

PMGC\textsubscript{34}  
- Is the methodology as simple as possible?
Table V.-D.-1.-2. Generic Criteria Useful in Evaluating Productivity Measurement and Evaluation Models that will also Support Incentive methodology (PHEM GC)

<table>
<thead>
<tr>
<th>Code</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHEMGC1</td>
<td>- Is the model easy to use?</td>
</tr>
<tr>
<td></td>
<td>- Ease of Application</td>
</tr>
<tr>
<td>PHEMGC2</td>
<td>- Ease of Application for Prime Contractors.</td>
</tr>
<tr>
<td></td>
<td>- Ease of Application for Subcontractors.</td>
</tr>
<tr>
<td>PHEMGC3a</td>
<td>- Does model utilize existing company data bases?</td>
</tr>
<tr>
<td></td>
<td>- Percent of data needed that is available.</td>
</tr>
<tr>
<td>PHEMGC3b</td>
<td>- Does the model require developing new company data bases?</td>
</tr>
<tr>
<td></td>
<td>- If needed data is not available, can model be modified to provide</td>
</tr>
<tr>
<td></td>
<td>valuable information?</td>
</tr>
<tr>
<td></td>
<td>- New data bases that must be developed to use model.</td>
</tr>
<tr>
<td>PHEMGC4a</td>
<td>- What does the model measure? (directly &amp; indirectly)</td>
</tr>
<tr>
<td></td>
<td>- Effectiveness</td>
</tr>
<tr>
<td></td>
<td>- Efficiency</td>
</tr>
<tr>
<td></td>
<td>- Quality</td>
</tr>
<tr>
<td></td>
<td>- Productivity</td>
</tr>
<tr>
<td></td>
<td>- Quality of Work Life</td>
</tr>
<tr>
<td></td>
<td>- Innovation</td>
</tr>
<tr>
<td></td>
<td>- Profitability</td>
</tr>
<tr>
<td>PHEMGC4b</td>
<td>- Is the model primarily designed for:</td>
</tr>
<tr>
<td></td>
<td>- cost/benefit, cash flow projection and analysis?</td>
</tr>
<tr>
<td></td>
<td>- cost/benefit, cash flow tracking &amp; validation?</td>
</tr>
<tr>
<td></td>
<td>- productivity measurement &amp; evaluation?</td>
</tr>
<tr>
<td></td>
<td>- a control tool?</td>
</tr>
<tr>
<td></td>
<td>- an improvement tool?</td>
</tr>
<tr>
<td></td>
<td>- a department, function, or workgroup analysis tool?</td>
</tr>
<tr>
<td></td>
<td>- a plant, division, or company analysis tool?</td>
</tr>
<tr>
<td></td>
<td>- a project or program analysis tool?</td>
</tr>
<tr>
<td>PHEMGC5</td>
<td>- Model usefulness for Manufacturing Efficiency Projects? for Manufacturing Investment Projects?</td>
</tr>
<tr>
<td>PHEMGC6</td>
<td>- Implementation Costs?</td>
</tr>
<tr>
<td></td>
<td>- general magnitude</td>
</tr>
<tr>
<td></td>
<td>- design &amp; development</td>
</tr>
<tr>
<td></td>
<td>- implementation</td>
</tr>
<tr>
<td></td>
<td>- operation and maintenance</td>
</tr>
</tbody>
</table>

* Incentive Methodology in this application infers Government to Contractor Incentive Systems such as IMIP.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHEMGC7</td>
<td>Ability to measure and allocate savings to multiple programs?</td>
</tr>
<tr>
<td>PHEMGC8</td>
<td>Ability to have productivity improvement projects and business programs added and deleted? Flexibility of model?</td>
</tr>
<tr>
<td>PHEMGC9</td>
<td>Ability to delineate commercial and government program benefits?</td>
</tr>
<tr>
<td>PHEMGC10</td>
<td>Quality of model output? Appropriateness of model output portrayal? Flexibility of output for variable audiences?</td>
</tr>
<tr>
<td>PHEMGC11</td>
<td>Accessibility of necessary input data? Preprocessing of input data required?</td>
</tr>
<tr>
<td>PHEMGC12</td>
<td>Auditability of model?</td>
</tr>
<tr>
<td>PHEMGC13</td>
<td>Ability of model to handle long cycle times, multiple products, frequent design changes, product mix changes?</td>
</tr>
<tr>
<td>PHEMGC14</td>
<td>Ease of translation and transfer of model within defense industry?</td>
</tr>
<tr>
<td>PHEMGC15</td>
<td>Perceived complexity of model?</td>
</tr>
<tr>
<td>PHEMGC16</td>
<td>Ability of model to satisfy needs of multiple users (i.e., Congress, DoD, contractor, managers, staff, etc.)?</td>
</tr>
<tr>
<td>PHEMGC17</td>
<td>Uniqueness and perceived utility of information provided by model?</td>
</tr>
<tr>
<td>PHEMGC18</td>
<td>Perceived implementation cost?</td>
</tr>
<tr>
<td>PHEMGC19</td>
<td>Ease of linkage, and quality of the link between what the model measures and incentive methodology?</td>
</tr>
<tr>
<td>PHEMGC20</td>
<td>Model's conformance to accepted cost accounting practices?</td>
</tr>
<tr>
<td>PHEMGC21</td>
<td>Does the model follow functional (organizational chart) analysis or a cost-structured approach?</td>
</tr>
<tr>
<td>PHEMGC22</td>
<td>Model's allowance for comparing and contrasting &quot;As Is and As Were&quot; cost baselines vs. &quot;To Be&quot; cost baselines?</td>
</tr>
<tr>
<td>PMEMGC</td>
<td>Question</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PMEMGC23</td>
<td>Ability of model to incorporate uncertainty and risk?</td>
</tr>
<tr>
<td>PMEMGC24</td>
<td>Ability of model, using existing data, to track productivity improvement?</td>
</tr>
<tr>
<td>PMEMGC25</td>
<td>Ability of model to treat multi-dimensionality of performance and productivity, i.e., ability of model to examine cost factors and non-economic factors?</td>
</tr>
<tr>
<td>PMEMGC26</td>
<td>Ability of model to substantively involve users and people in the system in its development, evolution and use?</td>
</tr>
<tr>
<td>PMEMGC27</td>
<td>Ability of model to guide, direct, and even motivate action and implementation?</td>
</tr>
<tr>
<td>PMEMGC28</td>
<td>Ability of model to support decisions?</td>
</tr>
<tr>
<td>PMEMGC29</td>
<td>Ability of model to satisfy the goals of DoD and contractors?</td>
</tr>
<tr>
<td>PMEMGC30</td>
<td>Ability of model to be integrated successfully into typical defense industry management systems?</td>
</tr>
</tbody>
</table>
D. Comparison and Evaluation Methodology

2. Specific Criteria

CDEF: a) Has a functional structure been used?

b) Have function groups been identified?

c) Has the financial reporting structure been "mapped" against the functional structure?

d) Has a comprehensive Manufacturing Cost Model been identified?

e) Have Critical Success Factors and the related performance measures been identified?

f) Have "as is" and "to be" cost baselines been established?

g) Has project risk been considered?

h) Has the synergistic impact of the technology improvements been considered?

i) Has a benefits tracking plan been developed?

WIPM: Does the model:

a) provide an overall, integrated measure of productivity for a plant, division, firm, etc.?

b) provide an analytical mechanism for evaluating past performance?

c) provide important information for budget control?

d) provide constant value information on performance?

e) assess and evaluate bottom-line impact on profits from shifts in productivity and price-recovery?

f) track results of specific productivity improvement interventions or track total results of all productivity improvement interventions?

g) assist with establishment of productivity management planning?
h) provide in a succinct, integrated report containing information related to:
- changes in resource utilization and output composition.
- traditional "pie chart," cost driver analysis data.
- partial factor, multi-factor, and total productivity ratios.
- performance indexes, changes in productivity, price-recovery and profits from period to period.
- the constant-value dollar impact of productivity and price-recovery changes on profits.

i) provide management teams with the ability to forecast and simulate business conditions, cost patterns, productivity trends, and to analyze these changes (controlled, constrained or otherwise) on overall performance.

j) motivate more proactive productivity management efforts on part of management teams.

k) reflect good management system design (i.e., consider who is managing and what is being managed in relation to what we are managing with).

l) promote total factor (energy, capital, labor, materials, data/information) productivity management decision-making.
<table>
<thead>
<tr>
<th></th>
<th>MFPMM</th>
<th>CDEF</th>
<th>DCF(LMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ease of Use</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>2</td>
<td>Ease of Use: Primes</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Ease of Use: Subs</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>3a</td>
<td>Data Availability</td>
<td>Good at Macro Analysis</td>
<td>Usually not available</td>
</tr>
<tr>
<td>3b</td>
<td>Data Base Development</td>
<td>Not necessary for LTV type application</td>
<td>Necessary</td>
</tr>
<tr>
<td>4a</td>
<td>Measure: Effec.</td>
<td>Not Directly</td>
<td>Not Directly</td>
</tr>
<tr>
<td></td>
<td>Effic.</td>
<td>Indirectly</td>
<td>Yes (costs)</td>
</tr>
<tr>
<td></td>
<td>Qual.</td>
<td>Indirectly</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Prod.</td>
<td>Directly</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>QWL</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Prof.</td>
<td>Directly</td>
<td>Yes (costs)</td>
</tr>
<tr>
<td>4b</td>
<td>Focus: CBA</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CBT</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>PM&amp;EE</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Improvement</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Group/Fnt.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Plant/Firm</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Project/Program</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>Useful for: MEP</td>
<td>X</td>
<td>Not Intended Focus</td>
</tr>
<tr>
<td></td>
<td>MIP</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>Implementation Costs</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>General Mag.</td>
<td>Mod</td>
<td>Hi</td>
</tr>
<tr>
<td></td>
<td>Design &amp; Devel.</td>
<td>Mod</td>
<td>Hi</td>
</tr>
<tr>
<td></td>
<td>Implement.</td>
<td>Lo</td>
<td>Lo</td>
</tr>
<tr>
<td></td>
<td>Optns &amp; Maint.</td>
<td>Lo</td>
<td>Lo</td>
</tr>
<tr>
<td>7</td>
<td>Measure &amp; Allocate Savings to Multi. Programs</td>
<td>Good in LTV Type Applic.</td>
<td>Good once sys. set up</td>
</tr>
<tr>
<td>8</td>
<td>Flexibility</td>
<td>Depends on data avail.</td>
<td>?</td>
</tr>
<tr>
<td>9</td>
<td>Commercial vs. Government</td>
<td>Needs improvement</td>
<td>Needs Improvement</td>
</tr>
<tr>
<td>10</td>
<td>Output Quality</td>
<td>Needs improvement</td>
<td>Needs Improvement</td>
</tr>
<tr>
<td></td>
<td>MFPMM</td>
<td>CDEF</td>
<td>DCF(LHI)</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------</td>
<td>--------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>11</td>
<td>Access of Input Data</td>
<td>Good in LTV-type Applic.</td>
<td>Needs to be Developed</td>
</tr>
<tr>
<td>12</td>
<td>Auditability Primes</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>13</td>
<td>Appropriateness in Typical</td>
<td>Requires Modification</td>
<td>At program level is designed for this</td>
</tr>
<tr>
<td></td>
<td>Defense Setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Translation &amp; Transfer</td>
<td>No Data</td>
<td>Situation specific</td>
</tr>
<tr>
<td>15</td>
<td>Perceived Complexityt</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>16</td>
<td>Satisfy Multiple Users</td>
<td>Feasible</td>
<td>Not Clear</td>
</tr>
<tr>
<td>17</td>
<td>Utility of Info. Provided</td>
<td>Not Clear</td>
<td>Not Clear</td>
</tr>
<tr>
<td></td>
<td>Uniqueness of Info Provided</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>18</td>
<td>Perceived Implementation Cost</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>19</td>
<td>Link to Inc. Method.</td>
<td>Very Good</td>
<td>Not Sure/CBT</td>
</tr>
<tr>
<td>20</td>
<td>Conform to Acctng.</td>
<td>Possible</td>
<td>Forced</td>
</tr>
<tr>
<td>21</td>
<td>Functional (org.chart) vs.</td>
<td>X LTV Applic.</td>
<td>X Possible</td>
</tr>
<tr>
<td></td>
<td>Cost Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>&quot;As Is&quot; to &quot;To Be&quot; Comp.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>23</td>
<td>Incorp. Uncert. &amp; Risk</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>24</td>
<td>Track Prod. Imp.</td>
<td>Yes</td>
<td>CBT Data Avail.?</td>
</tr>
<tr>
<td>25</td>
<td>Multi Dimensionality</td>
<td>Yes (Partial)</td>
<td>?</td>
</tr>
<tr>
<td>26</td>
<td>User Involvement</td>
<td>Not High in LTV Applic.</td>
<td>Lo</td>
</tr>
<tr>
<td>27</td>
<td>Motivate Improvement</td>
<td>Possible, not high in LTV Applic.</td>
<td>Weak</td>
</tr>
<tr>
<td>28</td>
<td>Support Decisions</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>29</td>
<td>Satisfy DoD?</td>
<td>Possible</td>
<td>Assume So</td>
</tr>
<tr>
<td></td>
<td>Contractors?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>30</td>
<td>Integratable into Mgmt Systems</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
VIII.A.6 - Summary Remarks/Conclusions and Recommendations

b. Conclusions and Recommendations
General Recommendations and Conclusions

Overall conclusion:

Contractors need to institute, promote, and maintain a broad-scope productivity management methodology which would represent a "grand strategy" for their business unit(s).
Overall Conclusion Cont’d

A productivity management methodology should encompass the productivity elements of:

Planning
Measurement
Evaluation
Control
Improvement

LTV/VAPD has developed, instituted, promoted, and is maintaining such a methodology. (Development is a continuing process).
Other Conclusions

- Individually, none of the three "models" (or methodology as the case may be) can accomplish:

  1) An integrated productivity management methodology, and

  2) All the performance improvement goals desired by the Government and contractors.

- Collectively, the three models (or methodologies) can be integrated into an effective productivity management methodology. Development work on each is still required.
Other Conclusions Cont'd

- The CDEF "model" performs well against objectives and criteria for which it was designed.
  - The node-tree activity structure (IDEF Analysis*) can differ significantly from a company's organizational/accounting structure, thus requiring significant effort to develop.
  - LTV has perceived the cost of implementing the complete CDEF methodology at VAPD to be high, relative to other approaches (e.g., develop separate cost center accounting for each MIP).

* IMIP Guide 5000-XX.G requires that an IDEF-type analysis be performed.
Other Conclusions Cont’d

- The MFPMM must be modified to function in the defense industry environment.
  - LTV/VAPD has made conversions to the MFPMM and has found the model useful.
  - Of the three models tested, only the MFPMM actually measures input-output productivity.*

* Possible exception, the DCF model is an aggregate, end-result profitability measure. (Capital investment input; Annual savings output).
Other Conclusions Cont’d

- The DCF/SSA model is primarily an analysis and decision-making tool for planning and forecasting purposes.

  - There are major deficiencies in the software developed by LMI for IMIP implementation purposes.

  - Also, there is an inadequate user’s manual for the software.
Other Conclusions Cont’d

- IMIP guidelines are inadequate with reference to submitting/justifying manufacturing efficiency projects.

- The impact of an IMIP project on the aggregate rates used by a contractor for pricing purposes may not be clearly understood by either contractor or Government.

- The translation and transfer of productivity models and methodologies from one company to another may be difficult.

- A generic methodology for productivity management efforts within the defense industry needs to be further developed and communicated.
Recommendations

Primary

- Combine Phases IV and V into a single, eighteen month project which would:

1) Resolve specific developmental needs of the three models by a limited field test at LTV/VAPD.

2) Complete the development of an integrated productivity management methodology.
Primary Recommendations Cont'd

3) Review and evaluate the models and the integrated methodology with other defense contractors in a workshop setting.

4) Develop an Implementation Guide for the integrated methodology.
Other Recommendations Cont’d

- Investigate and define a more precise set of specifications required by DoD for cost-tracking purposes.

- Develop a comprehensive treatise on the impact of aggregate versus project-related cost accounting rates and factors on IMIP-related projects.

- DoD needs to expand the range of incentives to encompass a contractor’s "total" productivity improvements.
Other Recommendations

*Note: The implementation of these are judged to be outside-the-scope of Phases IV and V.*

- Modify the LMI version of the DCF/SSA model software. Develop a more comprehensive user’s manual.

- An Implementation Guide needs to be developed to fully describe the methodology and criteria requirements to use the DCF/SSA model for IMIP purposes.

- Develop a more definitive set of IMIP guidelines for submitting and justifying a manufacturing efficiency project (MEP).
VIII.B. Final Report Briefing Materials

(Presented by VPC to Dr. John Mittino, Deputy Assistant, Secretary of Defense)
The Study of Productivity Measurement and Incentive Methodology

Phase III
Final Report
Briefing
18 February 1986
OVERALL GOALS OF FIVE-PHASE PROJECT

Superordinate Goal: To Improve The Performance of Defense Contractors and Subcontractors

- To identify and describe current productivity measurement practices in the defense contractor community.

- To identify and describe currently available productivity measurement techniques.
OVERALL GOALS (Contd.)

• To test, evaluate and develop (if necessary) specific productivity measurement models and methodologies at a field test site.

• To develop an Implementation Guide that would be useful to a broad spectrum of defense contractors relative to productivity management & measurement.
OVERALL GOALS (Contd.)

- To validate (as well as possible) that the models and methodologies developed and presented in the Implementation Guide are useful in a wide spectrum of defense contractor settings.

- To ensure that models and methodologies developed and described link to incentive methodologies.
Phase I

Title:
Contractor Survey of Productivity Measurement Practices

Principals:
Army Procurement Research Office

Goals:
To identify and describe current productivity measurement practices in the defense community.

To develop specific definitions of contractor productivity appropriate for the products concerned and contracts involved.
Phase I (Contd.)

Activities:
Design and distribute a survey to defense contractors.
Analyze survey responses.
Visit selected contractors for more detailed follow-up.

Results:
Survey completed.
Recommendation to test selected models.
Description of state-of-the-art practice for productivity measurement in defense contractor industry.
Phase II

Title:
Development of a Taxonomy of Productivity Measurement Theories and Techniques.

Principals:
D. Scott Sink
Thomas C. Tuttle

Goals:
To identify and describe state-of-the-art productivity measurement techniques and theories, and those being practiced.

To develop a taxonomy for those theories and techniques.
Phase II (Contd.)

Activities:
Detailed literature search.

Selected contractor site visits.

Development of taxonomy.

Results:
Comprehensive document describing productivity measurement theories and techniques.

Recommendation of which models to test in phases III and IV.
PROJECT STAFFING

P.I.: D. SCOTT SINK, Ph.D., P.E. (MFPMM TEST AND DIRECTOR, VPC ANALYSIS COORDINATOR)

FACULTY ASSOC.: MARVIN H. AGEE, Ph.D CO-DIRECTOR, VPC

FIELD SITE COORDINATOR: MR. SHONI DHIR LTV/VOUGHT AEROSPACE

CBA/TS TEST AND ANALYSIS COORDINATOR: MS. BETTY THAYER PRICE WATERHOUSE

IMIP/DCF/SSA TEST AND ANALYSIS COORDINATOR: MR. RICHARD ENGMALL WESTINGHOUSE MANUFACTURING SYSTEMS AND TECHNOLOGY CENTER

OVERALL PROJECT SUPPORT: DR. THOMAS C. TUTTLE DIRECTOR, MCP&L
ADVISORY BOARD AND SUPPORT GROUP

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MR. MONTE NORTON, APRO
MR. WAYNE ZABEL, APRO
COL. RONALD DEEP, AFBRMC
DR. TOMAS C. VARLEY
MR. DICK POWER, DOD

DEFENSE SYSTEMS MANAGEMENT COLLEGE:

MR. DAVID D. ACKER, TECHNICAL CONTRACT OFFICER
MR. WILBUR V. ARNOLD
LT. COL. JOHN R. BRAMBLETT
MR. WILLIAM MOTLEY
DEFENSE SUBCONTRACTORS:

MR. GLEN PETERS, HONEYWELL AEROSPACE AND DEFENSE
MR. BILL FALER, BOEING AEROSPACE CORP.
MR. A.R. AFFLECK, NORTH AMERICAN AIRCRAFT OPERATIONS
MR. DICK BETKE, TRW SPACE AND TECHNOLOGY GROUP
MR. HAROLD GORDON, BELL HELICOPTER
PHASE III

GOAL -- TO EXECUTE A "PAPER TEST" OF THE THREE MODELS AND EVALUATE MODEL APPLICATIONS AT A FIELD SITE

OBJECTIVES --

01 -- EVALUATE EASE OF MEASURING AND EVALUATING PRODUCTIVITY (PERFORMANCE) WITH THESE THREE MODELS.

02 -- DEVELOP COMPREHENSIVE DESCRIPTION OF INPUTS AND OUTPUTS FOR EACH MODEL.

03 -- COMPARE, CONTRAST RESULTS OF PAPER TEST FOR THREE MODELS

04 -- IDENTIFY AND DESCRIBE IN DETAIL DATA REQUIRED TO DRIVE EACH MODEL.

05 -- DESCRIBE UNIT OF ANALYSIS (i.e., APPLICATION) FOR EACH MODEL IN THE PAPER TEST. DESCRIBE MOST APPROPRIATE APPLICATION.
PHASE III
OBJECTIVES CONTINUED --

06 -- EVALUATE ABILITIES OF THE MODELS.

07 -- DESCRIBE INCENTIVE/REWARD SYSTEMS IN USE AT FIELD TEST SITE.

08 -- RECOMMEND MODIFICATIONS TO MODELS FOR MORE EFFECTIVE APPLICATION.

09 -- ADVISE AS TO WHETHER PHASE IV IS WORTHWHILE.
VI.B. General Recommendations and Conclusions

Overall conclusion:

Contractors need to institute, promote, and maintain a broad-scope productivity management methodology which would represent a "grand strategy" for their business unit(s).
Overall Conclusion Cont'd

A productivity management methodology should encompass the productivity elements of:

Planning
Measurement
Evaluation
Control
Improvement

LTV/VAPD has developed, instituted, promoted, and is maintaining such a methodology. (Development is a continuing process).
Other Conclusions

- Individually, none of the three "models" (or methodology as the case may be) can accomplish:

  1) An integrated productivity management methodology, and

  2) All the performance improvement goals desired by the Government and contractors.

- Collectively, the three models (or methodologies) can be integrated into an effective productivity management methodology. Development work on each is still required.
Other Conclusions Cont’d

- The CDEF "model" performs well against objectives and criteria for which it was designed.

- The node-tree activity structure (IDEF Analysis*) can differ significantly from a company’s organizational/accounting structure, thus requiring significant effort to develop.

- LTV has perceived the cost of implementing the complete CDEF methodology at VAPD to be high, relative to other approaches (e.g., develop separate cost center accounting for each MIP).

* IMIP Guide 5000-XX.G requires that an IDEF-type analysis be performed.
Other Conclusions Cont’d

- The DCF/SSA model is primarily an analysis and decision-making tool for planning and forecasting purposes.

  - There are major deficiencies in the software developed by LMI for IMIP implementation purposes.

  - Also, there is an inadequate user’s manual for the software.
Other Conclusions Cont’d

- The MFPMM must be modified to function in the defense industry environment.

- LTV/VAPD has made conversions to the MFPMM and has found the model useful.

- Of the three models tested, only the MFPMM actually measures input-output productivity.*

* Possible exception, the DCF model is an aggregate, end-result profitability measure. (Capital investment input; Annual savings output).
Other Conclusions Cont’d

- IMIP guidelines are inadequate with reference to submitting/justifying manufacturing efficiency projects.

- The impact of an IMIP project on the aggregate rates used by a contractor for pricing purposes may not be clearly understood by either contractor or Government.

- The translation and transfer of productivity models and methodologies from one company to another may be difficult.

- A generic methodology for productivity management efforts within the defense industry needs to be further developed and communicated.
FIGURE III-1
Generic Productivity Management Methodology
as Related to Defense Industry

1. Corporate Strategic Plan
   - Disclosure Statement
   - CDEF
   - MFPMM (LTV)

2. Factory/Division/Project Analysis
   - Developmental Plans
   - Challenge Budgets (LTV)
   - Cost Driver Analysis (LTV)
   - Top Down IDEF, Node Structure
     Macro

3. Identification of Projects
   - Nominal Group Technique (LTV)
   - IDEF (CDEF)
   - ROM Potential Savings/ROI

4. Selection of Projects
   - Decision Analysis
   - MCP/PMT (LTV)
   - CBA
Figure III-1 (cont.)
Generic Productivity Management Methodology
As Related to Defense Industry

Sources of Funds
- Man Tech - Budget - IR&D - IMIP - Profit

Various Return Analysis/Decision Analysis
Techniques Depending Upon
Audience/Funding (i.e. LMI, CBA, Westinghouse, DCF)

STAGE 5

Negotiations

GO

Different Source of Funds (Lost Profit in Case of no go IMIP)

STAGE 6

IMPLEMENTATION

STAGE 7

Cost-Benefit Tracking

STAGE 8

Shared Savings Approach

Incentive

STAGE 9

- Rates and Factors Issues
- Projects vs. Overall Improvement Issue
- Validation Issues
- CBT

STAGE 10

(OUTCOMES)

- Improved Productivity
- Improved Competitiveness
- Improved Performance
- Reduced Costs; Improved Quality, Improved Overall Acquisition for Government
FIGURE III-2
Depiction of LTV/VAPD's Basic Approach to Productivity Management

Project Incentives (i.e. IMIP)

Cost-Benefit Anal/Track.
Use the MCPMM

IMIP SS Negot.
DCF Model

Strategic Plan
(Productivity Targets)

Development Plan
• Projects

Budgets
Prod. Targets

Performance
MCPM

Profits

Learning Curves

Future Bids

Comments:
• Process should be self-motivated
• IMIP utilized to minimize lost profit impact
• If there were overall total productivity improvement incentives the company would likely do what Government is after anyway and with less difficulty than by way of project focussed incentives.
Recommendations

Primary

- Combine Phases IV and V into a single, eighteen month project which would:

  1) Resolve specific developmental needs of the three models by a limited field test at LTV/VAPD.

  2) Complete the development of an integrated productivity management methodology.
Primary Recommendations Cont’d

3) Review and evaluate the models and the integrated methodology with other defense contractors in a workshop setting.

4) Develop an Implementation Guide for the integrated methodology.
Phase IV

Title:
The Study of Productivity Measurement and Incentive Methodology - Field Test

Participants:
D. Scott Sink, Principal Investigator, VPC
Marvin H. Agee, Investigator, VPC
Shoni Dhir, LTV/VAPD
Betty Thayer, Price Waterhouse
Thomas Tuttle, The Maryland Center for Productivity and Quality of Worklife
Other Recommendations Cont’d

- Investigate and define a more precise set of specifications required by DoD for cost-tracking purposes.

- Develop a comprehensive treatise on the impact of aggregate versus project-related cost accounting rates and factors on IMIP-related projects.

- DoD needs to expand the range of incentives to encompass a contractor’s "total" productivity improvements.
Phase IV (Contd.)

Objectives:
Field test the MFPMM, CDEF, DCF/SSA, models and generic methodologies at LTV/VAPD

Develop a draft Implementation Guide

Implement at least three evaluation workshops with defense contractors (representative cross-section)
APPENDIX A

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