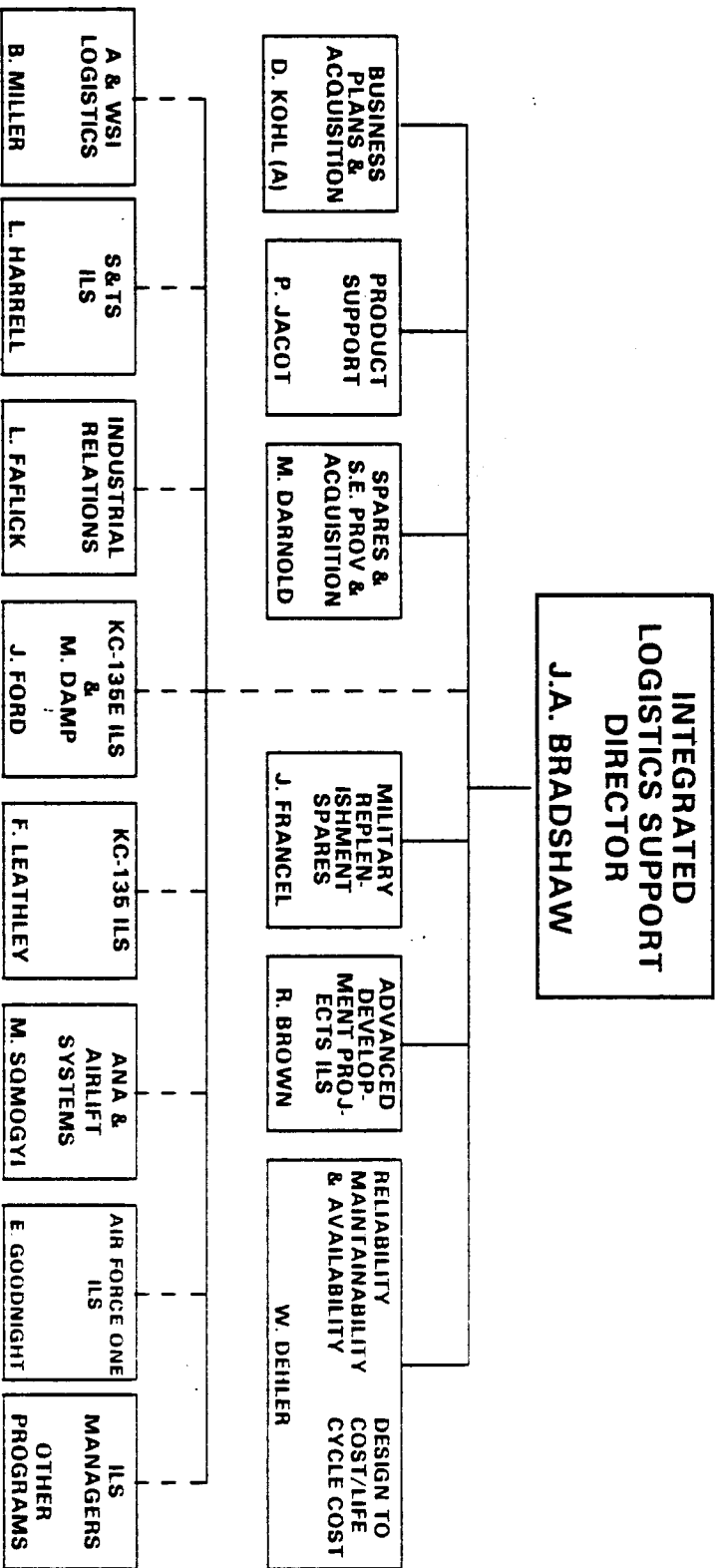


DESIGN-TO-COST/LIFE CYCLE COST

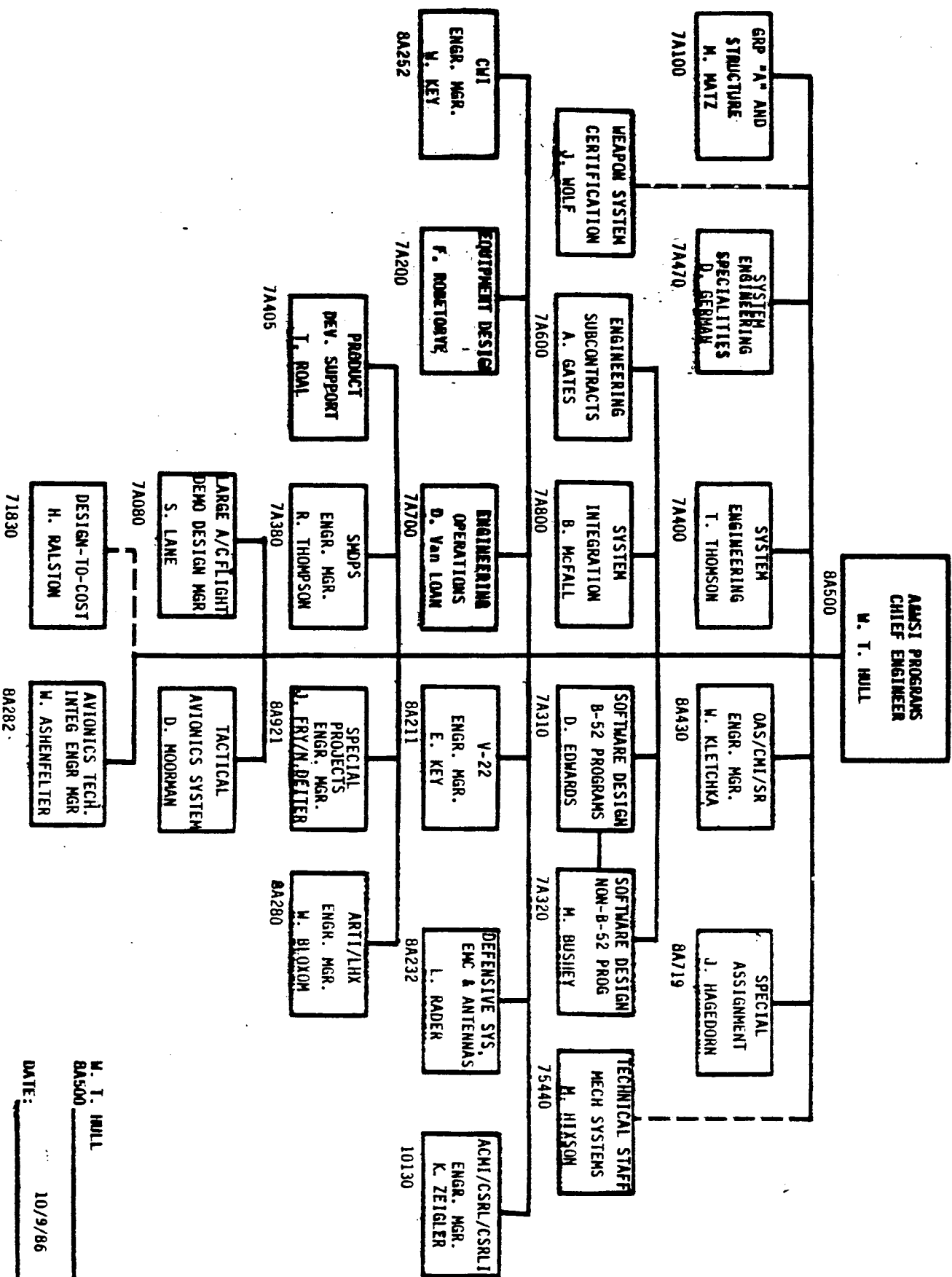
H. RALSTON
71830
526-4366

BMAC INTEGRATED LOGISTICS SUPPORT



16 JANUARY 1987

SFPR01001



M. T. HULL
8A500

DATE: 10/9/86

Org. 7180

B. DEHLER
L. MAHANEY

Org. 7181

M. AKERS
**S. LEAT
K. RECHKEMMER
S. YBARRA

Org. 7182

M. BOOTHE
K. BRADFORD
S. CONNAKER
J. FLINN
S. GIBBONS
B. JACOBS
L. JARMAN
T. KENNEDY
F. LUEBBERT
M. MARTINEZ
J. MARR
J. MCCAY
D. MCKINNEY
H. MERTEL
L. MEYER
J. NORRIS
*D. PAVELSKI
J. POOLE
C. POWELL
B. ROBERTS(CE)
S. SCHROEDER
D. SCOTT(CE)
D. SLUSS
D. TOTTON
D. TRUE(CE)

DIC

J. BENNETT
K. FORTNER
B. ROHR
B. ROLLER
H. TAYLOR
M. TOOLE

Org. 7183

*H. RALSTON

LCC

J. DOUTY
K. REILLEY
G. TRUDEAU

VE

B. SMITH

DIC/LCC

G. ANDERSON
M. BENEDICT
K. COVERT
R. GARTON
J. LANCASTER
J. RUSCHEN
K. SCHAEDE
M. SCHROEDER
T. TAYLOR
M. WALKER

TOTALS

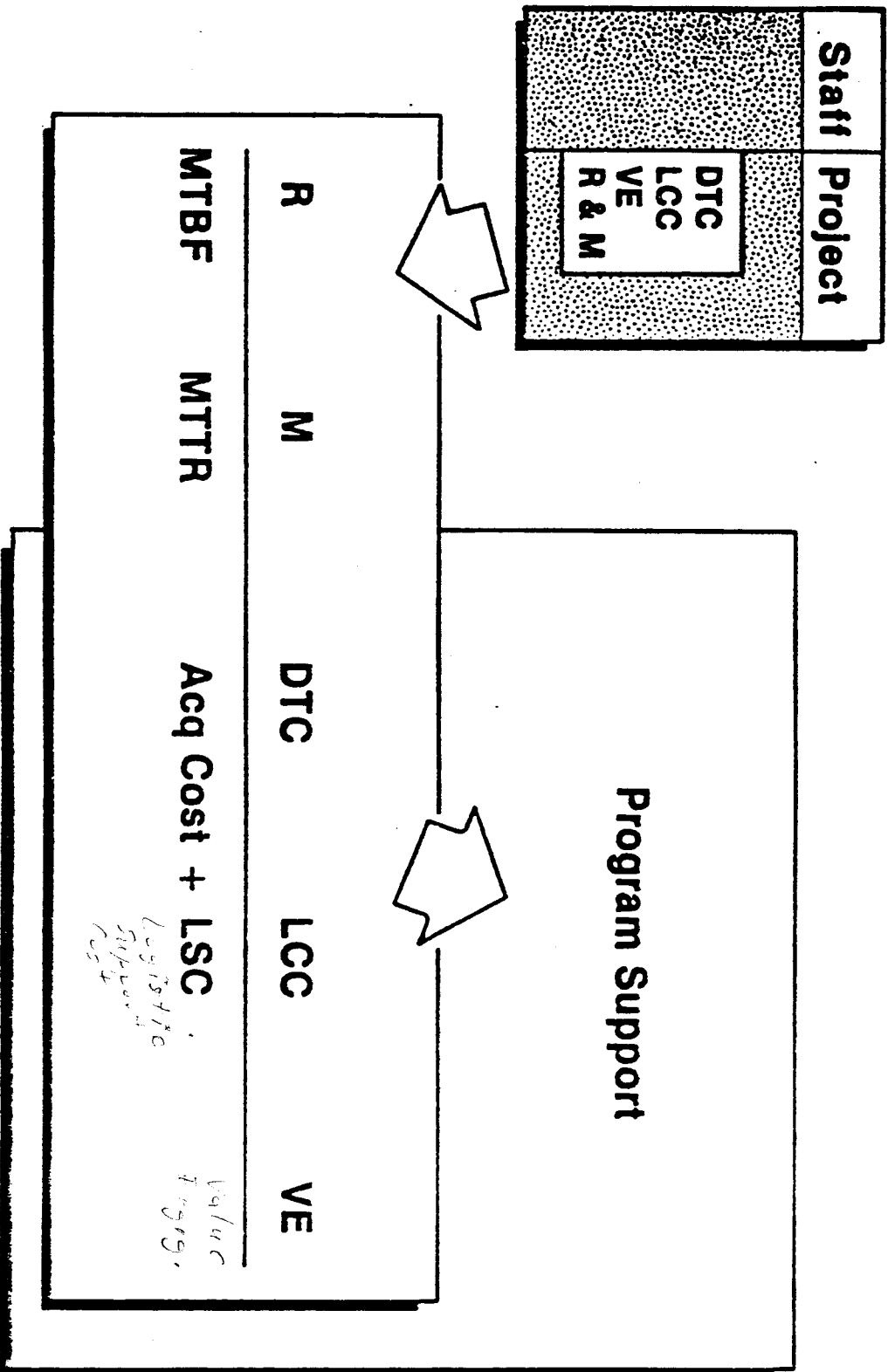
Org. 7180 2
Org. 7181 4
Org. 7182 30
Org. 7183 21

GRAND TOTAL: 57

*MANAGER

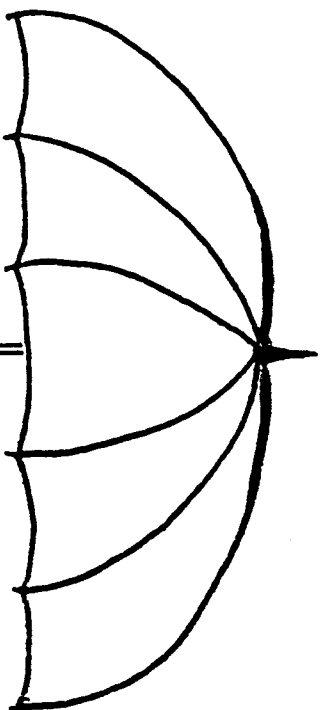
**ACTING MANAGER

DTC/LCC Relationship to the Weapon System Development Process





COST REDUCTION



VALUE ENGINEERING

DESIGN-TO-COST

COST TRADE STUDIES

COST IMPROVEMENT PROGRAM

SUGGESTION SYSTEM

VALUE ENGINEERING CHANGE PROPOSAL

VECP DOCUMENTATION



BMAC POLICIES AND PROCEDURES

- BOEING CORPORATE POLICY 8E10-3
- BMAC OPERATING PROCEDURE #46

DOD POLICY

- IT IS DOD POLICY THAT ALL CONTRACTS OVER \$100,000 SHALL INCLUDE A V.E.

DOD INCENTIVE PROGRAM

- FOR EACH DOLLAR SAVED UNDER A VECP, THE CONTRACTOR WILL RECEIVE A SHARE OF THE SAVINGS AS AN INCENTIVE PAYMENT FOR VALUE ANALYSIS.

VALUE ENGINEERING

DEFINITIONS

VALUE ENGINEERING (VE) - A SYSTEMATIC AND CREATIVE ANALYSIS OF EACH CONTRACT ITEM OR TASK TO ENSURE THAT ITS ESSENTIAL FUNCTION IS PROVIDED AT THE LOWEST OVER-ALL COST. OVER-ALL COST MAY INCLUDE, BUT IS NOT LIMITED TO, THE COSTS OF ACQUIRING, OPERATING, AND LOGISTICALLY SUPPORTING AN ITEM OR A SYSTEM.

VALUE ENGINEERING CHANGE PROPOSAL (VECP) - A FORMAL PROPOSAL WHICH MUST MEET THE FOLLOWING CRITERIA:

- o RESULTS IN A CHANGE IN THE CONTRACT; SPECIFICATIONS, PURCHASE DESCRIPTION, STATEMENT OF WORK, ETC..
- o RESULTS IN REDUCING THE OVER-ALL PROJECTED COST TO THE CUSTOMER WITHOUT IMPAIRING ESSENTIAL FUNCTIONS OR CHARACTERISTICS, PROVIDED THAT IT DOES NOT INVOLVE A CHANGE:
 - IN DELIVERABLE QUANTITIES ONLY;
 - IN RESEARCH AND DEVELOPMENT (R&D) QUANTITIES OR TEST QUANTITIES DUE SOLELY TO RESULTS OF PREVIOUS TESTING UNDER THE INSTANT CONTRACT; OR;
 - TO THE CONTRACT TYPE ONLY.

WHAT IS VALUE ANALYSIS/VALUE ENGINEERING?



MR. L. D. MILES, GENERAL ELECTRIC CO., DEVELOPED THE CONCEPT OF VALUE ANALYSIS DURING WORLD WAR II AS AN OUT-GROWTH OF MATERIAL SHORTAGES FORCING USE OF SUBSTITUTES. IT WAS OBSERVED THAT SUBSTITUTES OFTEN RESULTED IN LOWER COST AND AN IMPROVED FINAL PRODUCT. THESE OBSERVATIONS RESULTED IN THE DEVELOPMENT OF COST IMPROVEMENT TECHNIQUES OF FUNCTIONAL ANALYSIS, COST EVALUATION BY COMPARISON, AND VALUE/WORTH INDEXES.

HOW TO USE VALUE ANALYSIS

- o WHAT IS IT?
- o WHAT DOES IT DO?
- o WHAT DOES IT COST?
- o WHAT ELSE WILL DO THE JOB WITHOUT DEGRADING THE PERFORMANCE?
- o WHAT DOES THE OPTION COST?
- o WHAT IS THE SAVINGS?

VALUE ENGINEERING
VECP CANDIDATE FACT SHEET

THESE FORMS ARE AVAILABLE FROM BILL DEHLER, OR YOUR V.E. POSTER.

BMAC
VALUE ENGINEERING
VECP CANDIDATE FACT SHEET

INSTRUCTIONS

1. This form is supported by BMAC Library Systems Operating Procedure #199-11, Form BMAC Operating Procedure 7100-1, 7100-20 and 7100-21 for implementation and updating for individual users.
2. The VE Committee will review the candidate to determine whether it would benefit being in section 8 of our contract. Please provide the following information:
 - a. Name of candidate
 - b. Quantity of work per year and total over 5 years
 - c. Estimated cost of work per year and total over 5 years
 - d. Estimated savings per year and total over 5 years
 - e. Estimated benefits per year and total over 5 years
3. Answer must complete Part I and 2. Add space if more space is needed.
4. Part II should be as complete as possible. The data is needed to aid VE Committee members.
5. When completed to select projects, please submit this form through the Value Engineering Administrator.

Part I (to be completed by Initiator)

SHORT TITLE _____ DATE _____
 NAME OF INITIATOR _____
 TELEPHONE NO. _____ FAX _____
 SUBCONTRACTOR INITIATED NAME _____ SPEC. NO. _____
 SUBSTANT DESCRIPTION OF PRESENT WAY _____
 SUBSTANT DESCRIPTION OF PROPOSED WAY _____
 SUBSTANT DESCRIPTION OF THE RESULTS OF THE CHANGE, BENEFITS TO BE GAINED, AND LOSSES TO BE AVOIDED _____
 CONTRACT(S) AFFECTED _____
 RECOMMENDED EFFECTIVITY (IMPLEMENTATION SPECIFICATION, ETC.) _____
 CONTRACTUAL CHANGES REQUIRED (SPECIFICATION, CONTRACT CLAUSES, ETC.) _____

FORM 0001, 1998, BMAC

Part II (to be developed by Initiator with help from Design or Cost)

1. ESTIMATED QUANTITIES ASSOCIATED BY THE CHANGE
2. ESTIMATED OPERATIONS AND MAINTENANCE WORK (GROSS ACTIVITY) MONTHLY, QUARTERLY, ANNUAL, 5 YEAR ESTIMATES AND BENEFITS AND COST SAVINGS
3. IMPLEMENTATION EFFORT REQUIRED (LABOR, MATERIALS) AND ESTIMATED COST OF IMPLEMENTATION (INCLUDING ELEMETS)

Part III (to be completed by VE Committee)

1. APPROVED (INCLUDE BUDGETARY DATES FOR IMPLEMENTATION HEREIN)
2. DISAPPROVED (GIVE REASONS)
3. THIS IS A POTENTIAL CANDIDATE FOR A FURTHER TYPE OF COST REDUCTION (E. G. FOR COST SAVINGS SIMULATION PROGRAMS SUBJECT TO INITIATION)
4. ADDITIONAL INFORMATION TO MAKE A DECISION (LIST INFORMATION INCLUDED)

VE Committee Chairman (Signature and Date) _____

FORM 0001, 1998, BMAC

DTC/LCC

A PLACE TO START

DEFINITIONS

DESIGN-TO-COST (DTC) - A MANAGEMENT CONCEPT WHEREIN PRODUCTION COST GOALS ARE ESTABLISHED DURING THE DEVELOPMENT PHASE. THE CONTROL OF SYSTEMS COSTS (ACQUISITION, OPERATING AND SUPPORT) TO THESE GOALS IS ACHIEVED BY TRADEOFFS BETWEEN OPERATIONAL CAPABILITY, PERFORMANCE, MAKE/BUY DECISIONS, PRODUCTION PROCESSES, AND SCHEDULE. COST, AS A KEY DESIGN PARAMETER, IS ADDRESSED AS AN INHERENT PART OF THE DEVELOPMENT AND PRODUCTION PROCESS.

DESIGN-TO-COST GOAL - A SPECIFIC TARGET COST BASED UPON A SPECIFIED PRODUCTION QUANTITY AND RATE, ESTABLISHED EARLY DURING SYSTEM DEVELOPMENT AS A MANAGEMENT OBJECTIVE AND DESIGN PARAMETER FOR SUBSEQUENT PHASES OF THE ACQUISITION CYCLE.

DESIGN TO UNIT PRODUCTION COST (DTUPC) - A TERM USED TO ADDRESS THE REQUIREMENT IMPOSED UPON DEVELOPMENT CONTRACTORS. IT INCLUDES ALL COST OVER WHICH THE CONTRACTOR HAS CONTROL AND DETERMINES THE TARGET/NEGOTIATED UNIT HARDWARE COST FOR PRODUCTION.

LIFE CYCLE COST (LCC) - THE TOTAL COST TO THE GOVERNMENT OF DEVELOPMENT, ACQUISITION AND OWNERSHIP OF THAT SYSTEM OVER ITS FULL LIFE. IT INCLUDES THE COST OF DEVELOPMENT, ACQUISITION, OPERATION, SUPPORT, AND WHERE APPLICABLE, DISPOSAL.

CUSTOMER PERSPECTIVE

THE IMPACT OF REDUCED EFFECTIVE MILITARY BUYING POWER COUPLED WITH THE INCREASED SCRUTINY OF MILITARY PROGRAMS BY CONGRESS INCREASES PRESSURE TO MEET MILITARY OBJECTIVES WITH LESS FUNDING.

DESIGN-TO-COST OBJECTIVE

BY MAKING PRODUCT COST AN ENGINEERING REQUIREMENT,

DESIGNERS HAVE THE OPPORTUNITY TO EVALUATE

ECONOMIC CONSEQUENCES OF THEIR

DECISIONS.

DTC RELATED PUBLICATIONS

0 BMAC POLICY NO. 26 DESIGN-TO-COST
OPERATING PROCEDURE NO. 46

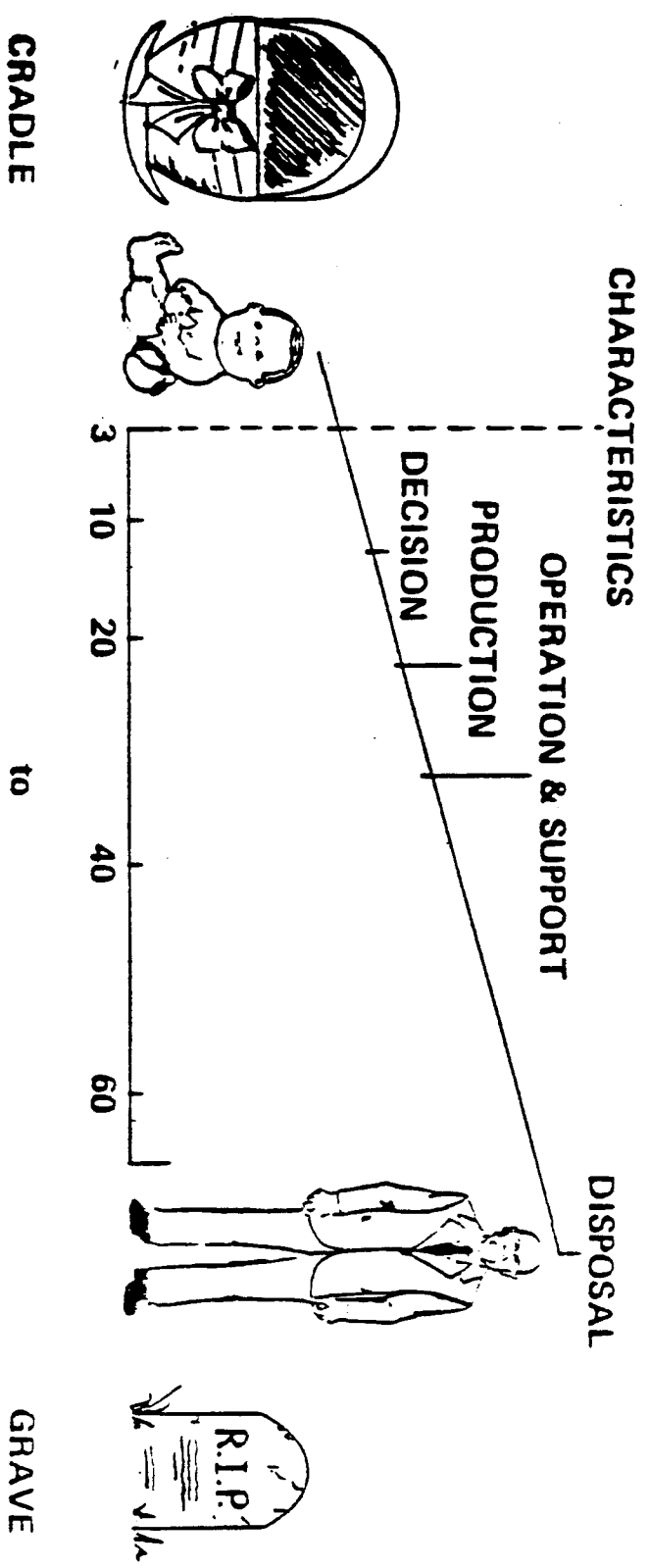
0 AVIONICS AND WEAPON SYSTEMS INTEGRATION
ENGINEERING PROGRAM DIRECTIVE
EPD NO. 37 DESIGN-TO-COST

0 DOD 4245.3 DESIGN-TO-COST

0 BOEING CORPORATE POLICY 8E10 VALUE ENGINEERING
OPERATING PROCEDURE NO. 46

What is it?

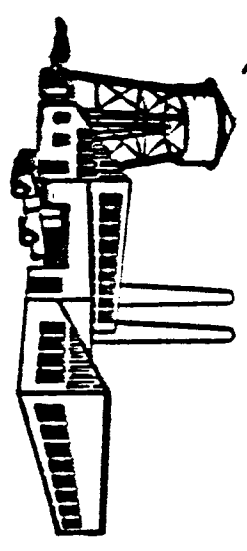
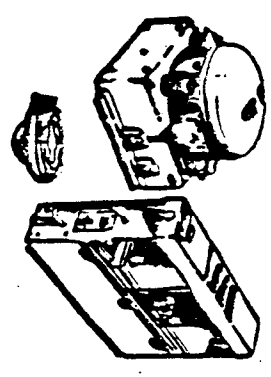
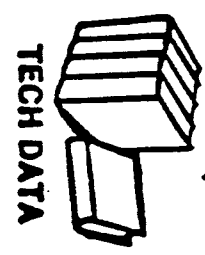
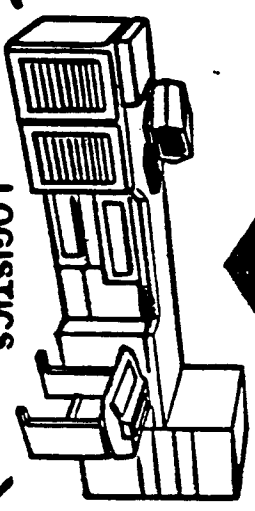
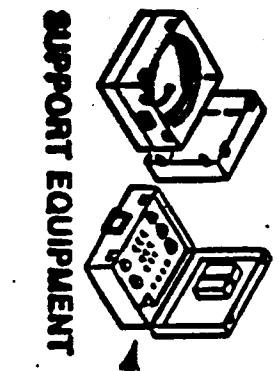
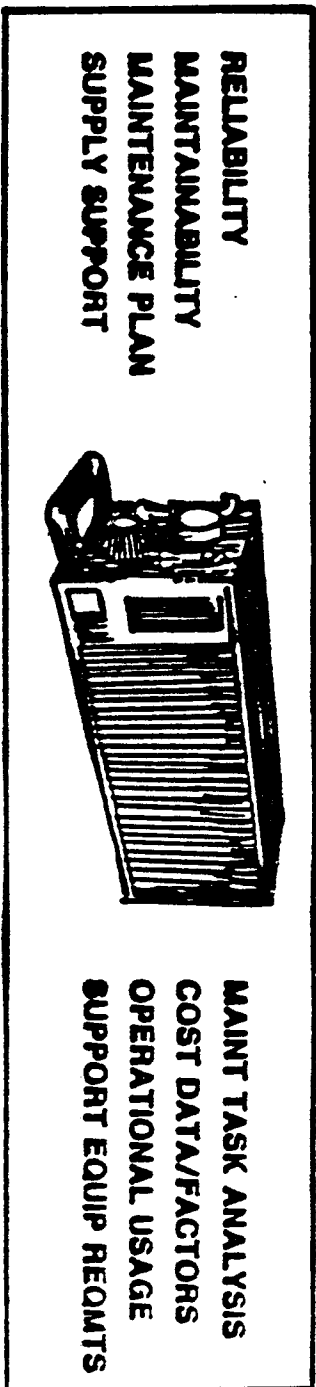
A management concept wherein rigorous cost goals are established during development and the control of systems costs (acquisition, operating and support) to these goals is achieved by practical tradeoffs between operational capability, performance, cost, and schedule. Cost, as a key design parameter, is addressed on a continuing basis and as an inherent part of the development and production process.



LOGISTICS SUPPORT ANALYSIS

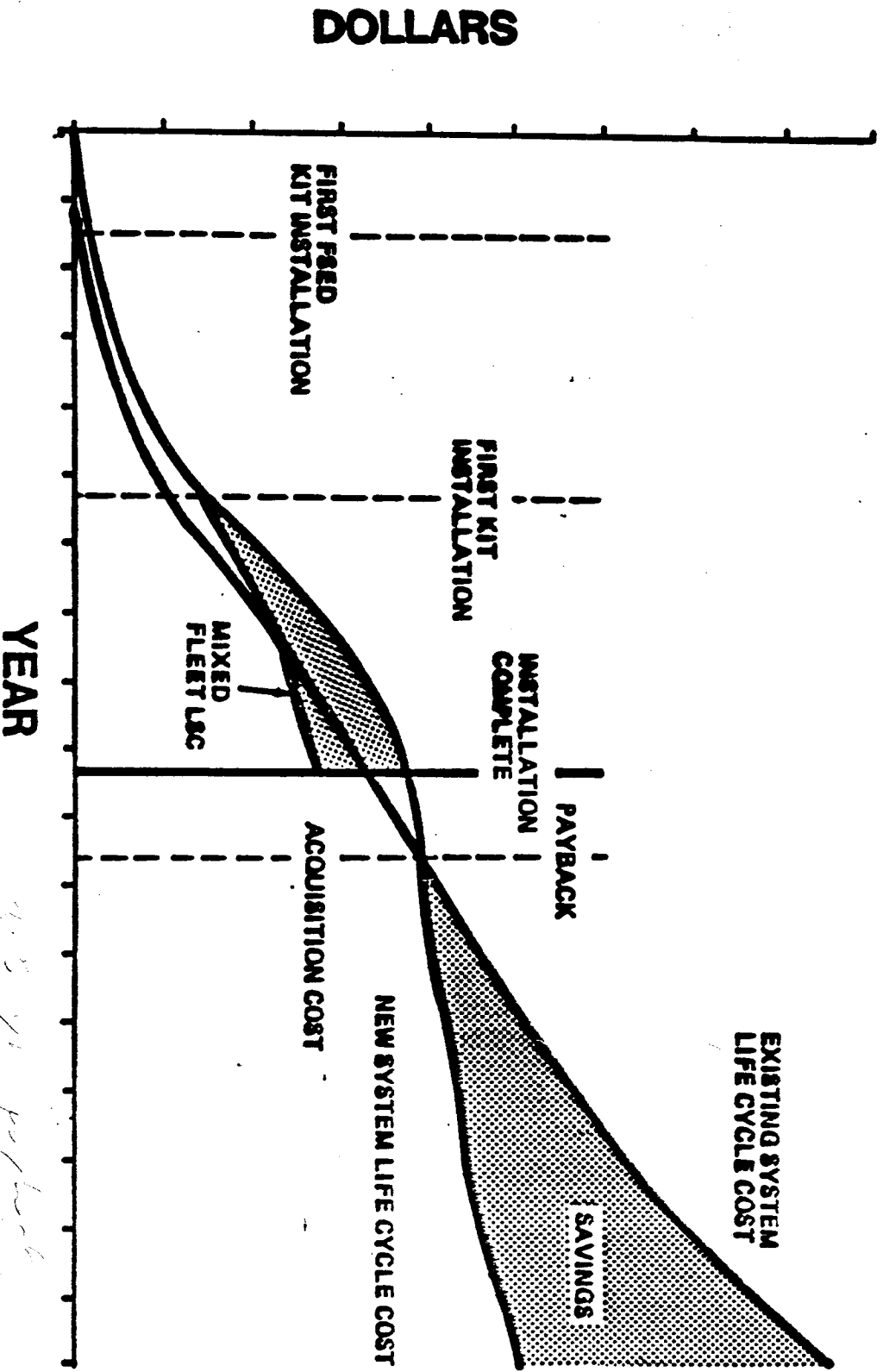
ASSISTS IN THE DEVELOPMENT OF THE REQUIREMENTS
NEEDED TO IMPLEMENT AND SUPPORT NEW EQUIPMENT

DATA INPUT



PAYBACK - 15 YEARS (THEN YEAR DOLLARS)

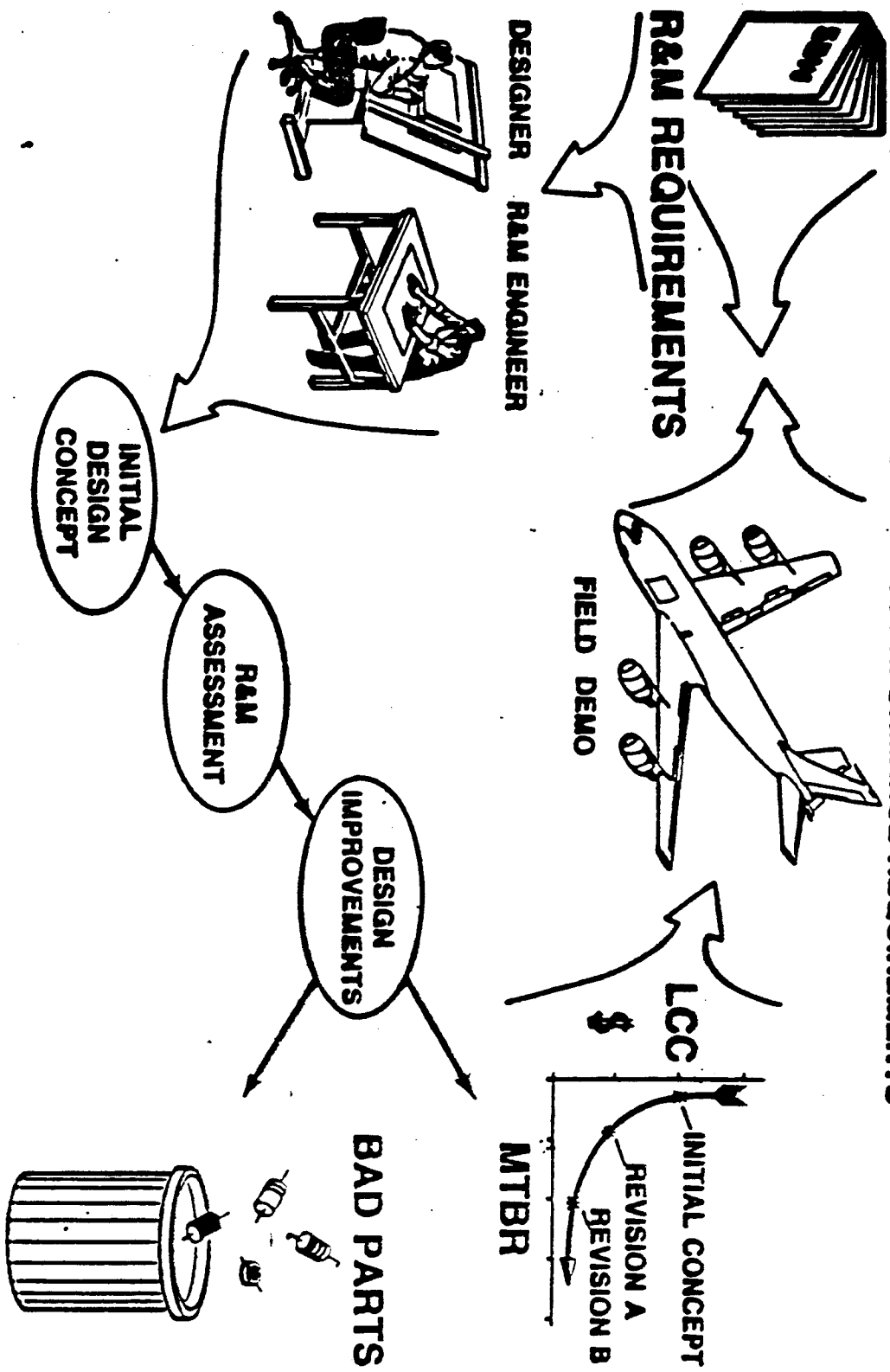
AN LCC PLOT IS CONSTRUCTED FOR ALTERNATE DESIGNS TO ASSIST
MANAGEMENT IN THE DETERMINATION OF THE MOST COST EFFECTIVE APPROACH



4.5 Year Payback

RELIABILITY & LCC WARRANTY

THROUGH THE DESIGN & MANUFACTURING PROCESS R&M MUST BE EQUAL TO OTHER PERFORMANCE REQUIREMENTS



Availability report of 10/25/84

PRODUCT PERFORMANCE AGREEMENT

THE AIR FORCE HAS IMPLEMENTED NEW WARRANTY PROGRAMS
TO ASSURE CONTRACT R&M REQUIREMENTS

RELIABILITY WARRANTY

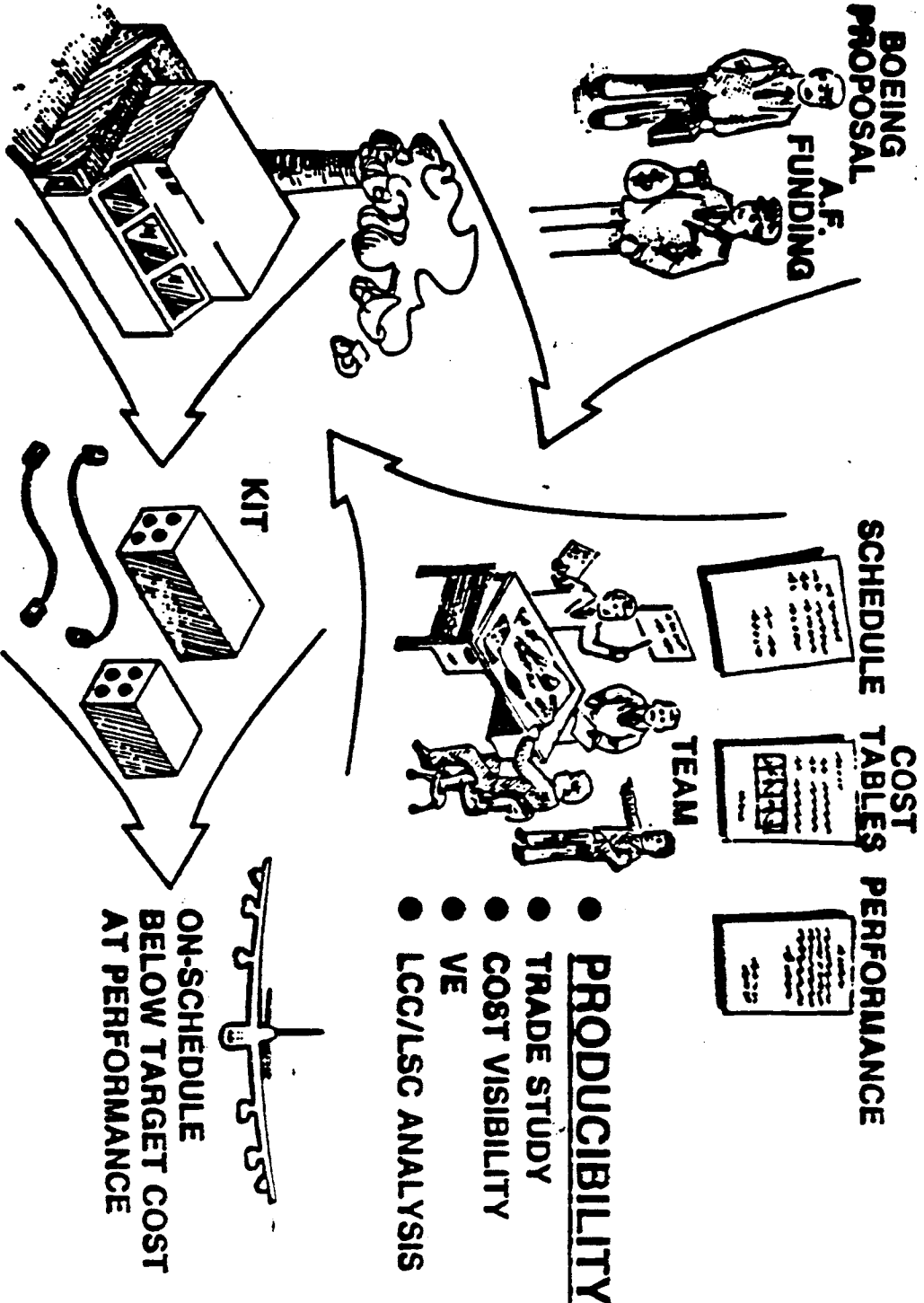
- WARRANTY REMOVALS
- PIPELINE SPARES
- WARRANTY EXAMINATION PERIODS
- MTBR
MTBMA
OBSERVED
PREDICTED

LOGISTIC SUPPORT COST GUARANTEE

- ON-EQUIPMENT MAINTENANCE
- CONDEMNATION SPARES
- INVENTORY MANAGEMENT COST
- MTBR VERIFICATION TEST
- NEW ITEM COUNT VERIFICATION
- MTBR
PROVISIONING LIST

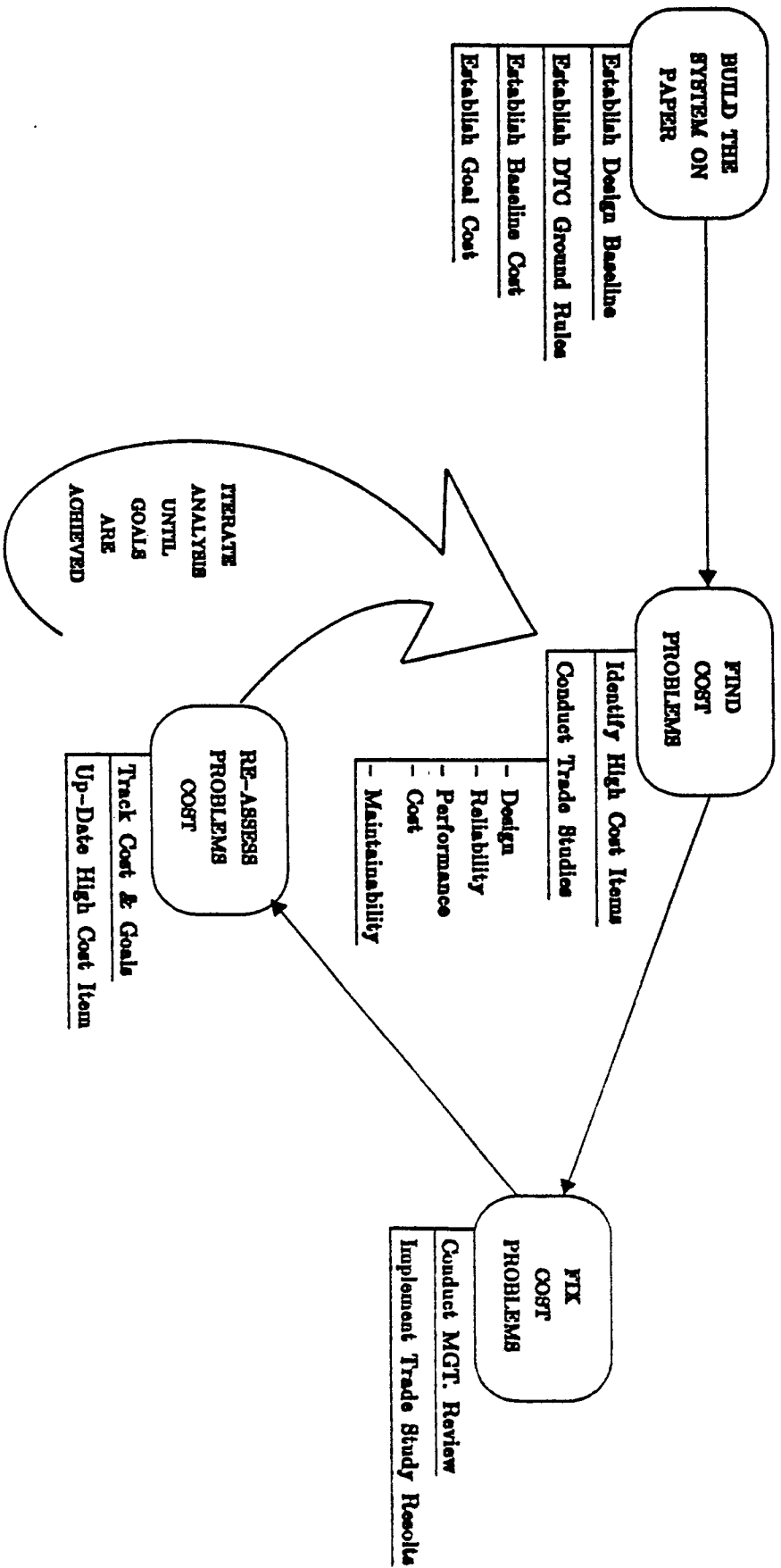
DTC/LCC

TRADE STUDIES ARE CONDUCTED THROUGHOUT THE DESIGN PHASE TO
ACHIEVE LOWER COSTS WITHOUT JEOPARDIZING SPECIFIED REQUIREMENTS

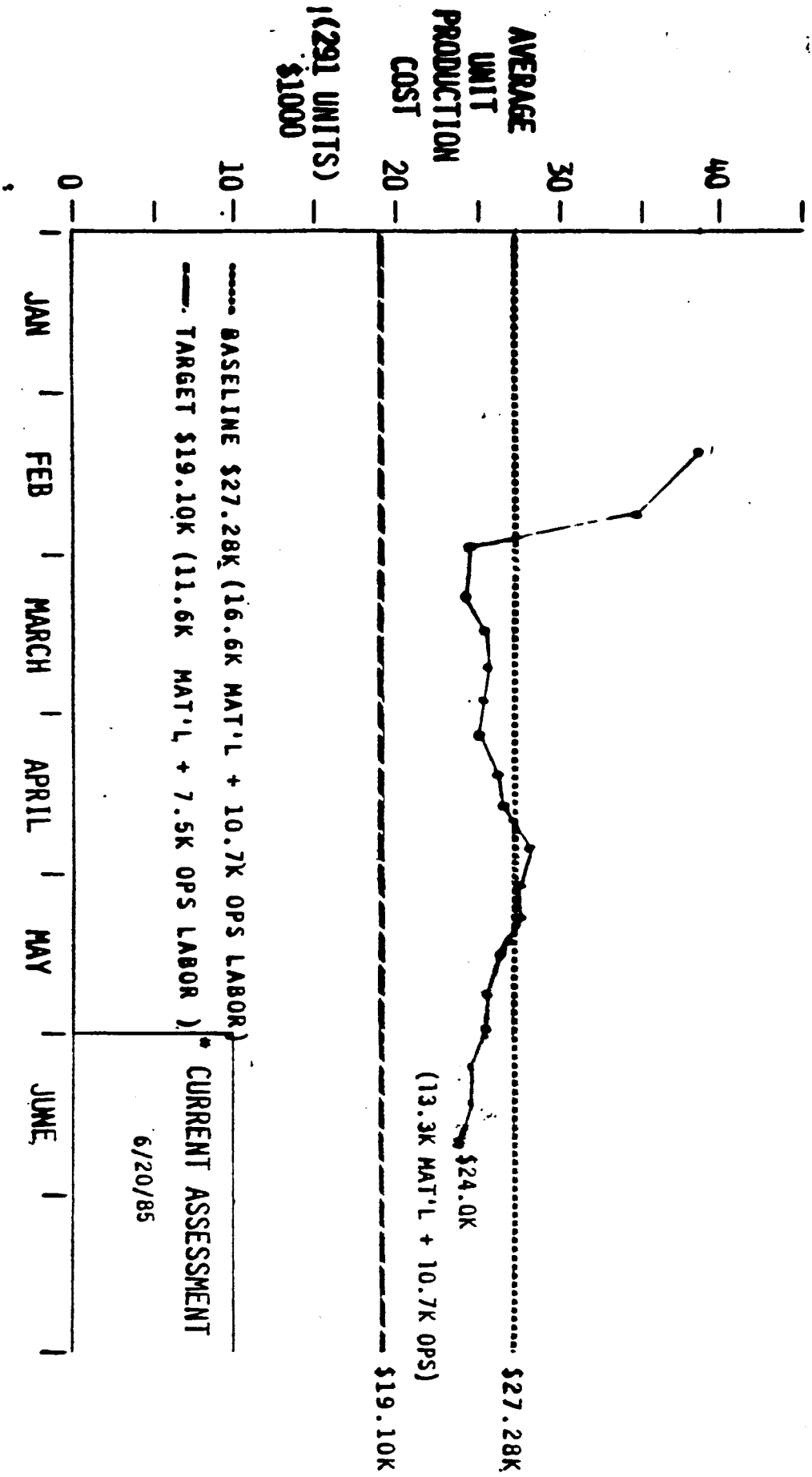


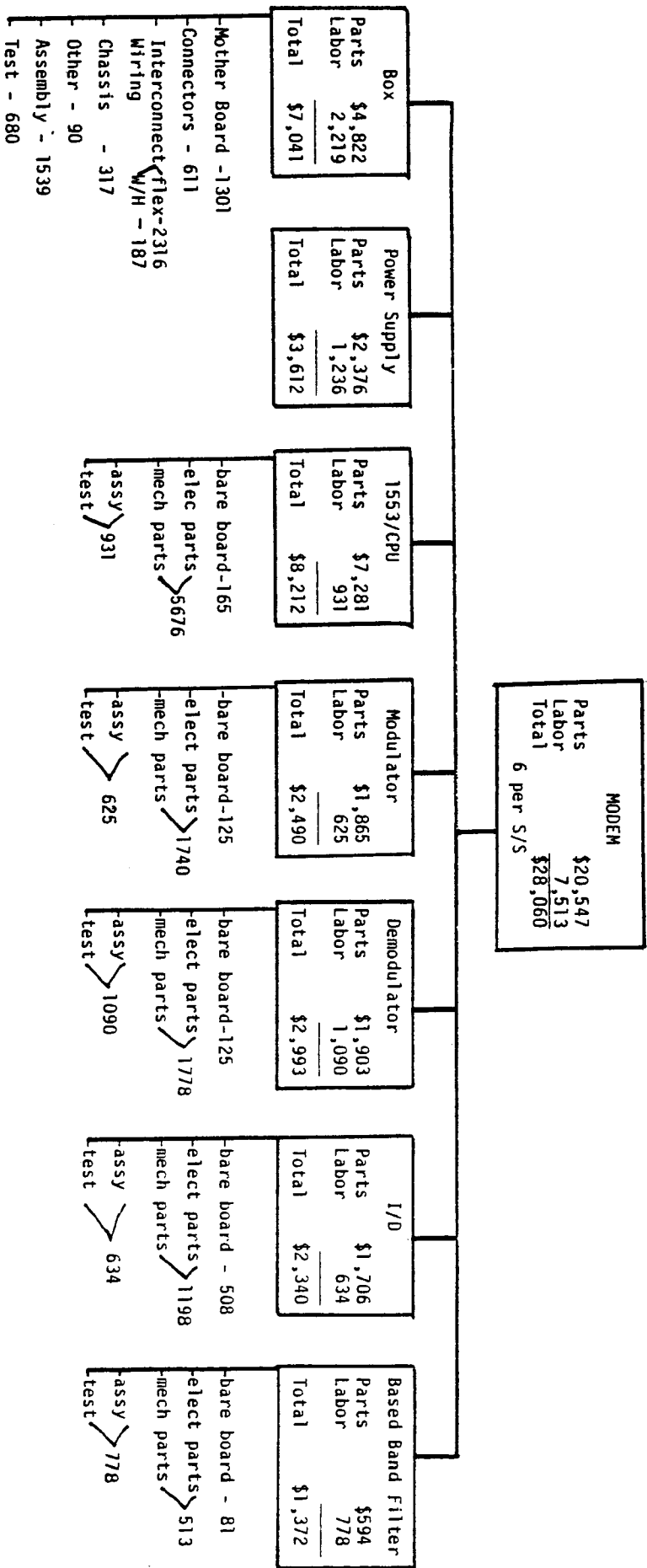
- PRODUCIBILITY
- TRADE STUDY
- COST VISIBILITY
- VE
- LCC/LSC ANALYSIS

DTC PROCESS

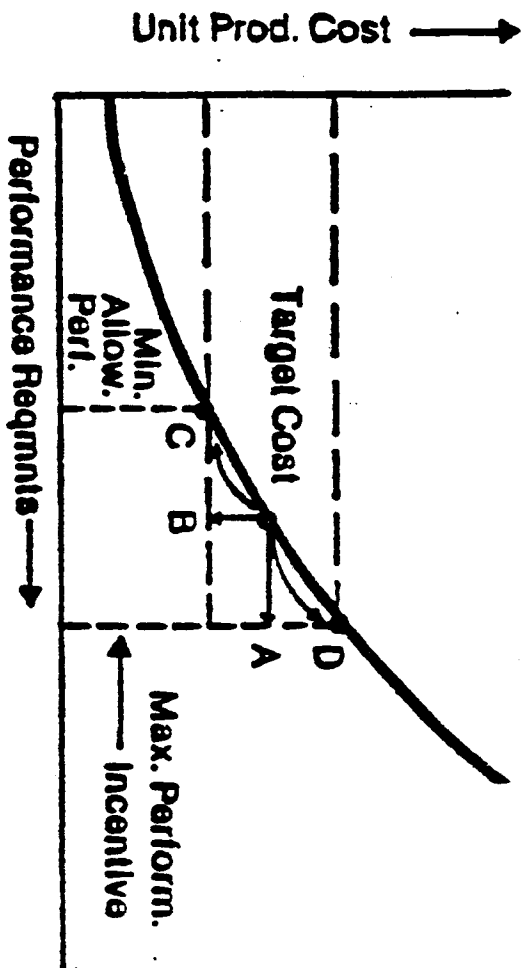


DSC
 COST PERFORMANCE
 (MATERIAL + LABOR)



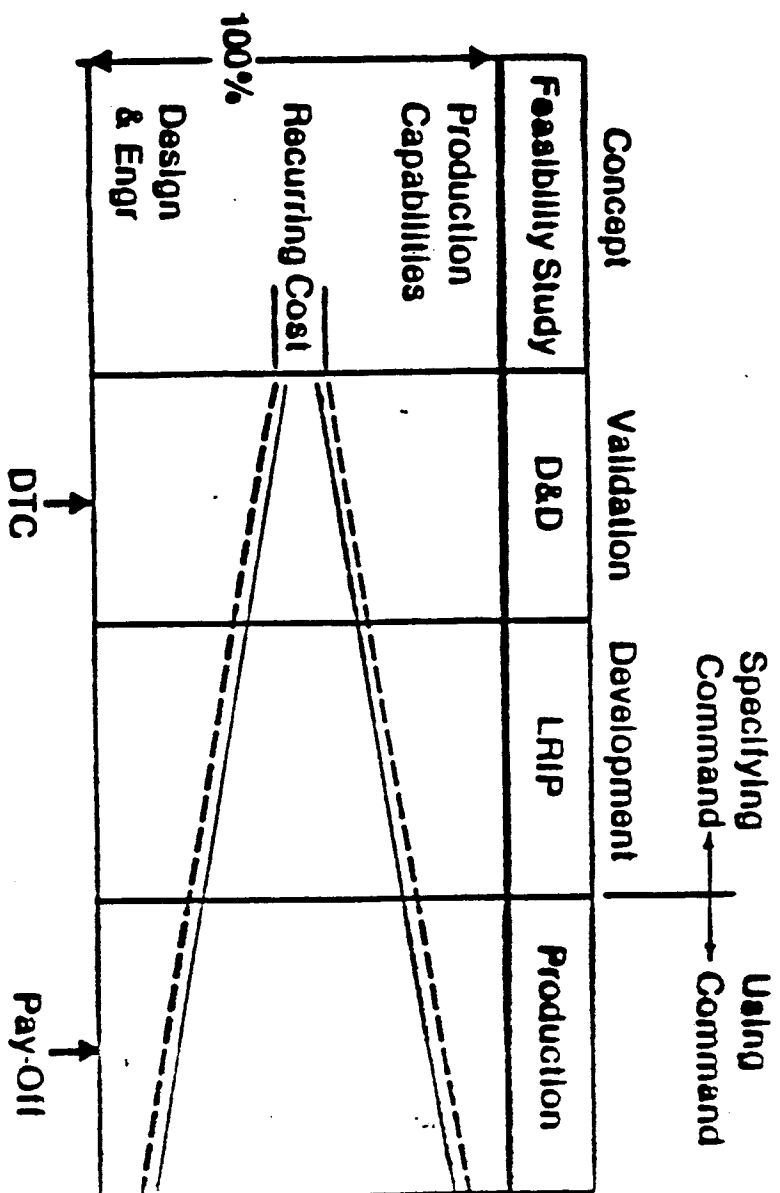


The Cost/Performance Relationship In Design To Cost - (Compliment Or Conflict)

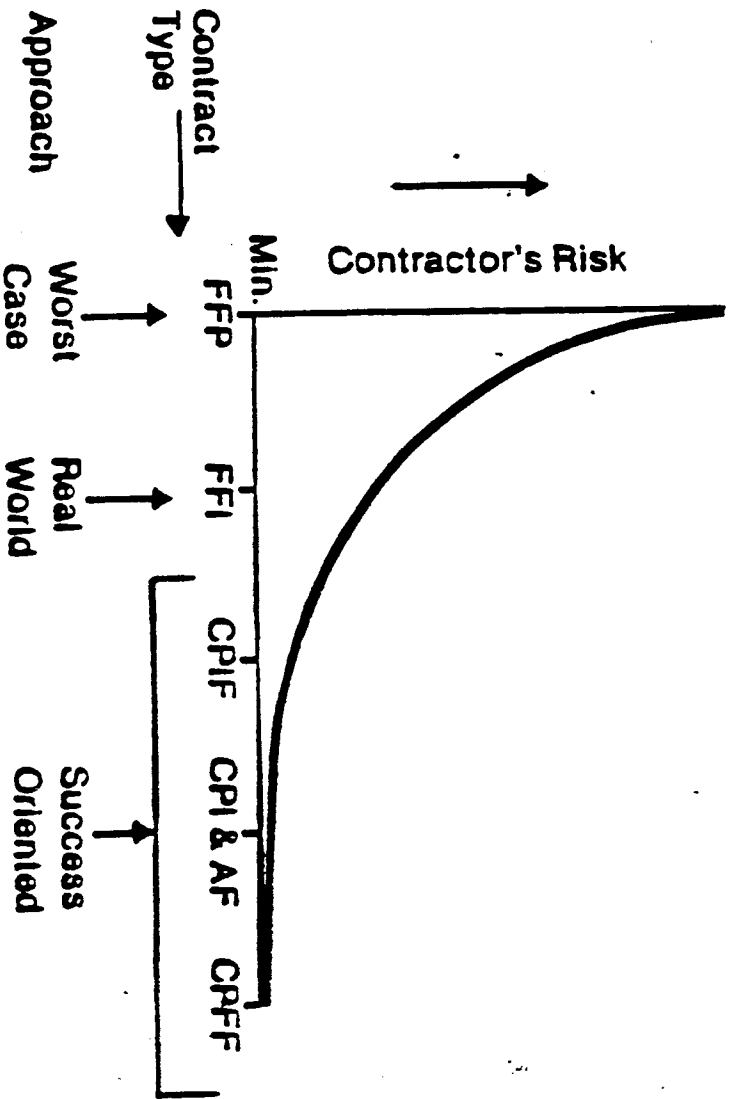


- Perform Incent
- Cost Incent
- A. Incr Perform, Same Cost
 - B. Same Perform, Lower Cost
 - C. Lower Perform, Lower Cost
 - D. Incr Perform, Higher Cost

The Fan-Out Effect



Risk As A Function Of DTC



DESIGN-TO-A-COST
Symposium

NOVEMBER 1972 SEATTLE WASHINGTON

OPENING REMARKS - T.A. WILSON

**"I THINK THAT WHEN OUR SPECIALISTS,
PARTICULARLY ENGINEERS, UNDERSTAND
COST, THEY SOON RECOGNIZE THEIR
POTENCY IN MANAGEMENT."**

**"UNFORTUNATELY, SOME NEVER QUITE GET
THE MESSAGE OR WON'T ALLOW THEMSELVES
TO BE MOTIVATED AND THEREBY LIMIT
THEIR GROWTH POTENTIAL."**

ACRONYMS

AF AIR FORCE OR ALARM FILE OR AUTO FIX
CPI COST + INCENTIVE
CPIF COST + INCENTIVE FEE
CPFF COST + FIXED FEE
DOD DEPARTMENT OF DEFENSE
DTC DESIGN-TO-COST
DTUPC DESIGN TO UNIT PRODUCTION COST
FFI FIRM FIXED INCENTIVE
FFP FIRM FIXED PRICE
LCC LIFE CYCLE COST
LSC LOGISTICS SUPPORT COST
M MAINTAINABILITY
MTBMA MEANTIME BETWEEN MAINTENANCE ACTION
MTBF MEANTIME BETWEEN FAILURES
MTBR MEANTIME BETWEEN REMOVALS (REPAIRS)
MTTR MEANTIME TO REPAIR
R RELIABILITY
R&D RESEARCH AND DEVELOPMENT
VE VALUE ENGINEERING
VECP VALUE ENGINEERING CHANGE PROPOSAL