




PRIGENT Corporation

A Cost Control methodology designed to apply for defense acquisition of South Korea.

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PRIGENT Corporation

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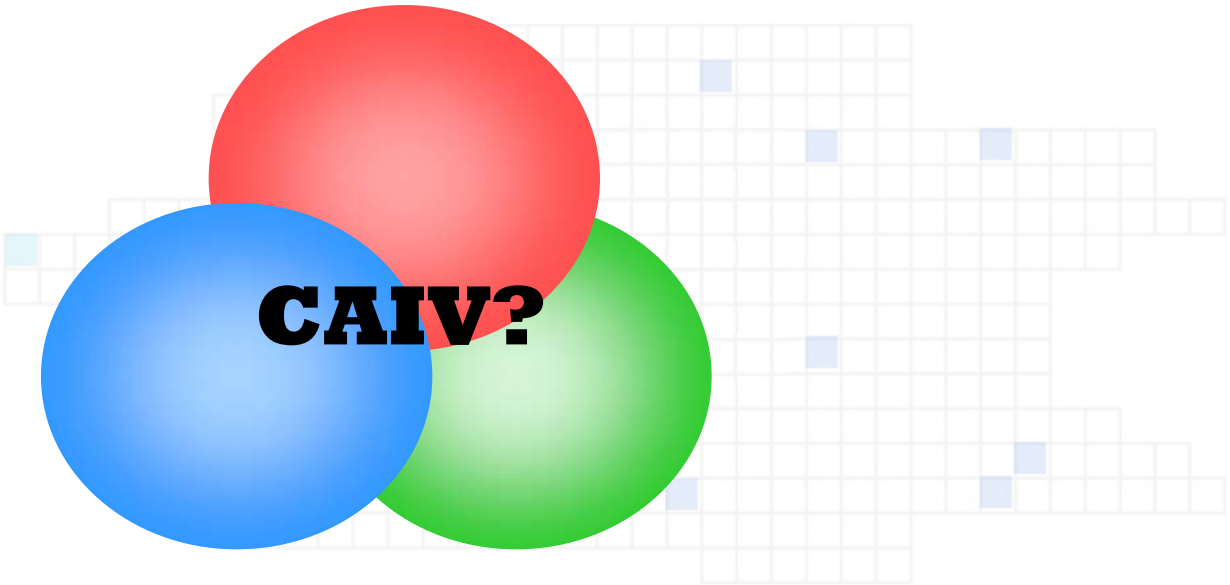
I. CAIV Introduction

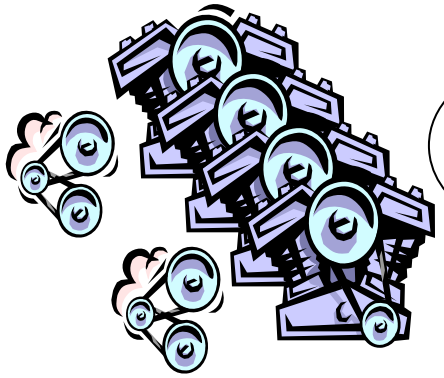


Cost as an Independent Variable

CAIV Concepts

- xxx Engine Development Program

Contracts	6 months		6 months	Program End
● Target : 1.2M$ ● Perform. : 500MPH ● Quantity : 100	→	● Estimates : 1.4M$ ● Perform. : 450MPH ● Quantity : 100	→	?



- Could it be economic?
- Could it meet the UPC goal?
- Could It meet the TOC goal?
- Could it be exported?

Who and how can answer these questions ?

CAIV Definiton

COST…

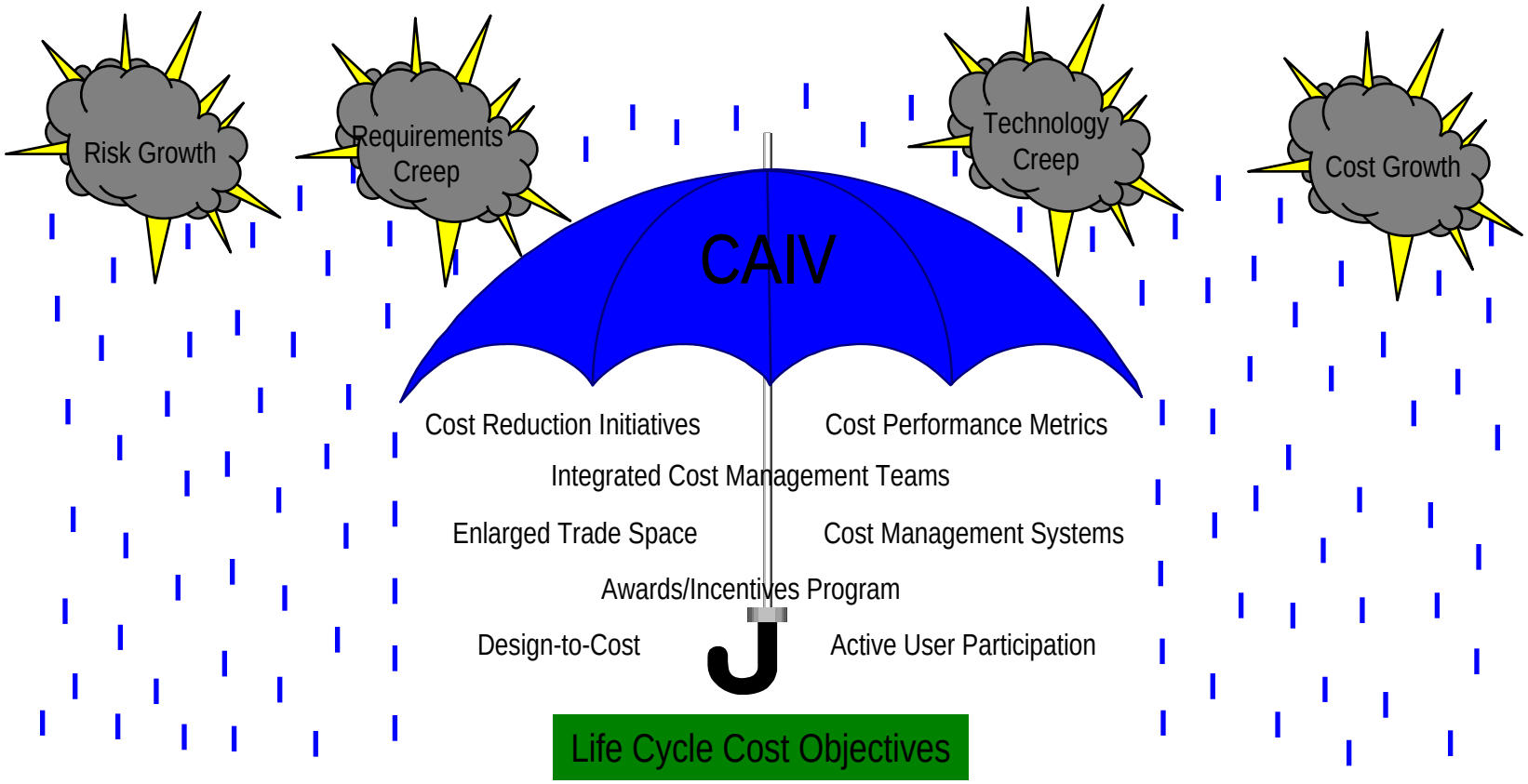
- The C stands for Cost
- Take into account the entire LCC when conducting CAIV trades
- CAIV trades make cost estimating and analysis more important
  - Traditionally neglected costs such as O&S and indirect costs require more attention
  - To facilitate CAIV trades, cost models must be related to relevant design parameters

…as An Independent Variable

- Captures the essential idea that cost must now be an input to the design process, not an output
- "An" is an important reminder that cost is only one consideration, along with performance and schedule
  - Risk will affect all three
- "Independent Variable"
  - Cost is not a "controlled" variable

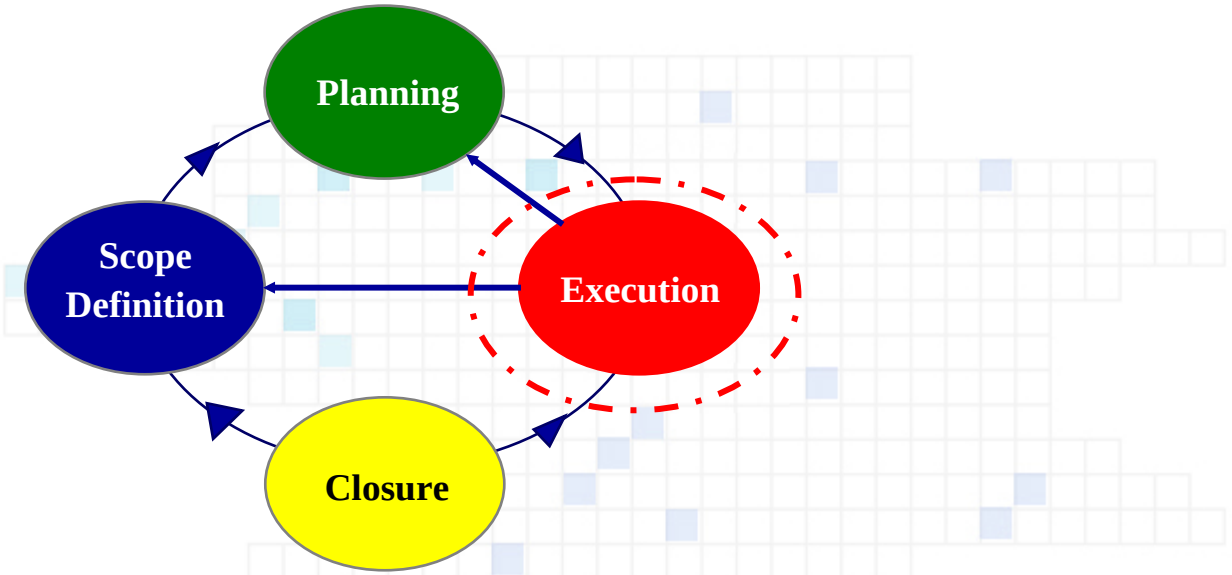
Why CAIV ?

CAIV is an Umbrella ***Strategy*** for Managing Life Cycle Costs as a Key Design Parameter

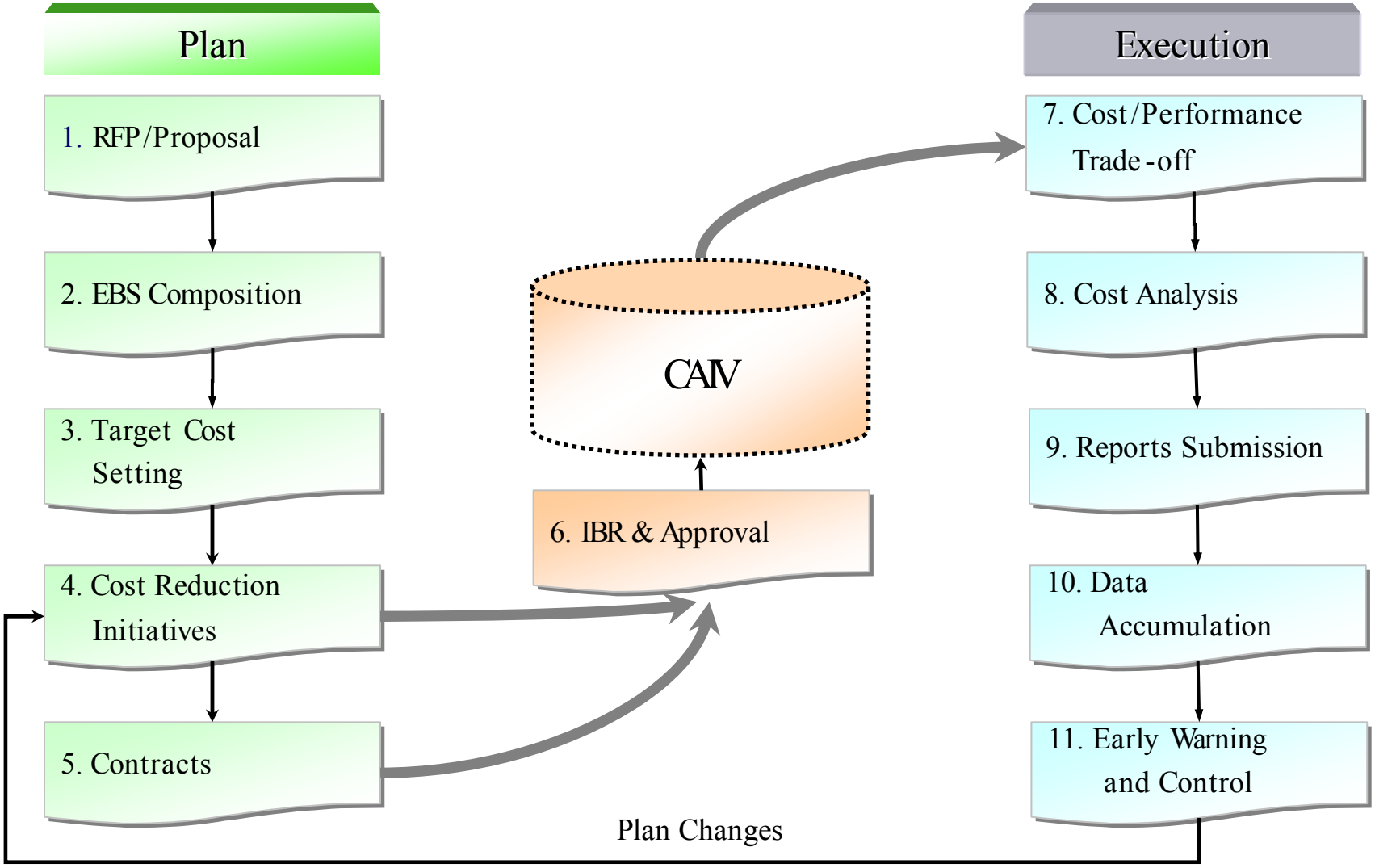


CAIV is a Philosophy, Not a Technique

II. CAIV Process for Korea



CAIV Process for Korea



1. RFP / Proposal

- Management by CAIV process
  - Inform CAIV plan
  - RFP for CAIV plan
    - Cost Analysis and Reports
    - Cost vs Performance Trade-off
    - System Implementation Plan
  - Cost Management Reports
    - UPC estimating and analysis reports
    - LCC estimation and analysis reports
  - Scoring methods for CAIV plan
  - CAIV results usage plan

2. EBS (Estimating Breakdown Structure)

EBS (Estimating Breakdown Structure)

- Cost Structure composed of CWBS
- Hardware and Software
- KHP EBS example

EBS					Type	Etc
1.	KHP Helicopter Program				Assembly	
1.1	Basic Helicopter				Assembly	
1.1.2.1			Rotor Assembly		Assembly	
1.1.2.1.1				Main Rotor Blade	Mechanical	
1.1.2.1.2				Main Rotor Hub	"	
1.1.2.1.3				Main Rotor Control	"	
1.1.2.1.4				Tail Rotor Blade	"	
1.1.2.1.5				Tail Rotor Hub	"	
1.1.2.1.6				Tail Rotor Control	"	
1.1.2.1.7				Rotor Integ. and Test	Integ./Test	

3. Target Cost Setting (1)

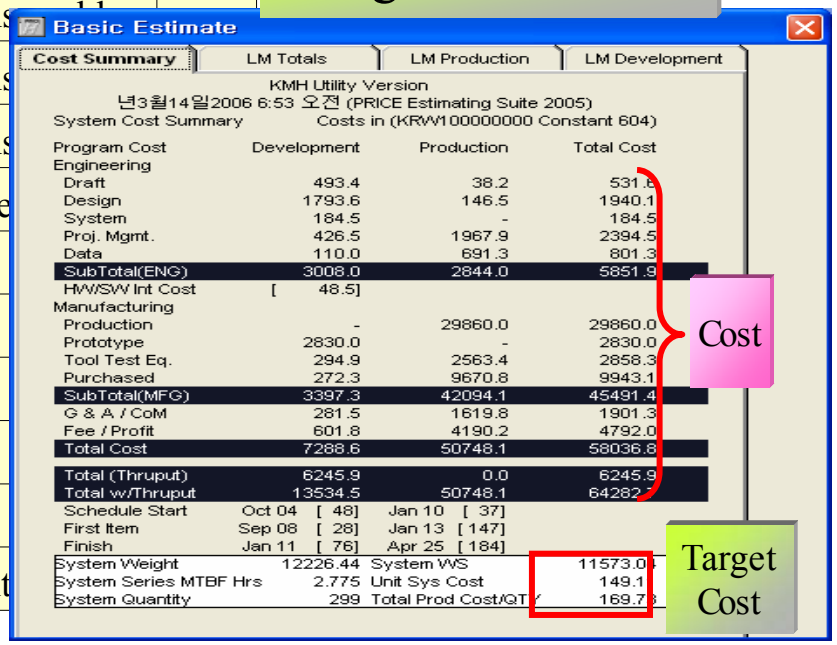
❑ System Target Cost (PRICE Model)

❍ Setting Target Cost using PRICE Model

Estimating Breakdown Structure

EBS		Type
1.	KHP Helicopter Program	As
1.1	Basic Helicopter	As
1.1.2.1	Rotor Assembly	As
1.1.2.1.1	Main Rotor Blade	Me
1.1.2.1.2	Main Rotor Hub	
1.1.2.1.3	Main Rotor Control	
1.1.2.1.4	Tail Rotor Blade	
1.1.2.1.5	Tail Rotor Hub	
1.1.2.1.6	Tail Rotor Control	
1.1.2.1.7	Rotor Integ. and Test	Int

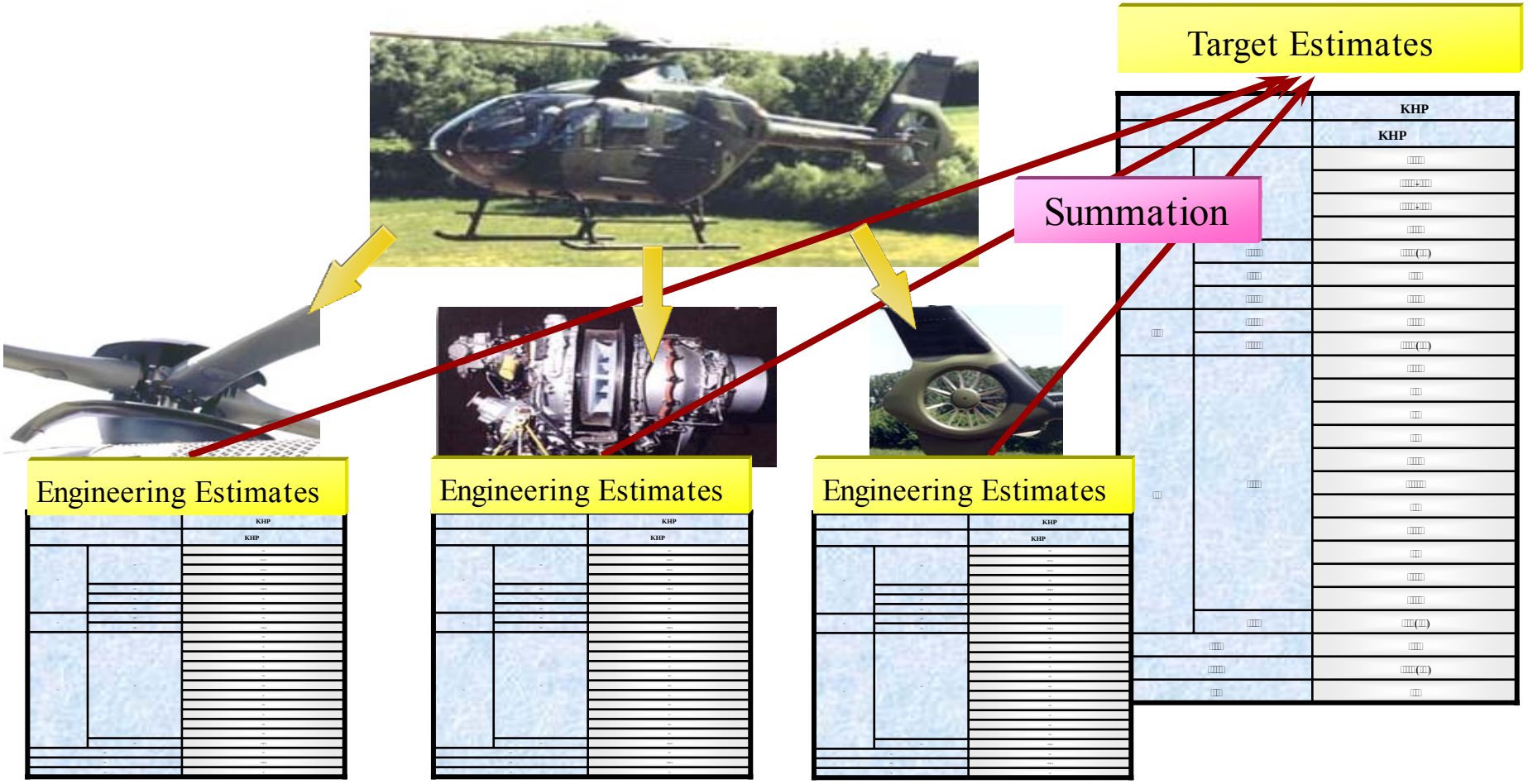
Target Estimates



3. Target Cost Setting (2)

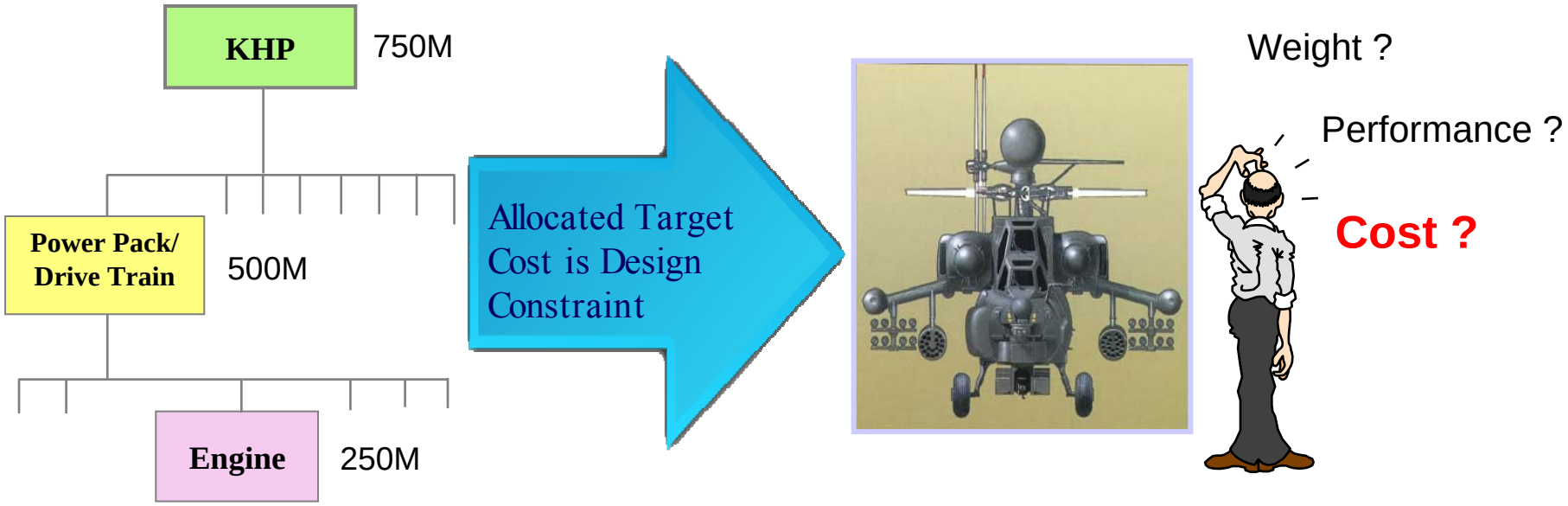
❑ System Target Cost (Engineering Method)

❍ Setting Target Cost using Engineering Methods



3. Target Cost Setting (3)

- Target Cost Allocation
  - Allocate System target cost to sub assembly component
  - Set allocated target cost to design constraint



3. Target Cost Setting (4)

- LCC (Life Cycle Cost)
  - Hardware Life Cycle Cost
  - Cost Categories
    - Development Cost
    - Production Cost

      Mission Equipment, Initial Spares, Common Support Equipment
    - Operation & Support Cost

      Spares, Maintenance Cost, Contractor Support,

      Store, Transportation

3. Target Cost Setting (5)

- TOC (Total Ownership Cost)
  - System Total Ownership Cost
  - Cost Categories
    - Development Cost
    - Procurement Cost

      Mission Equipment, Modification, Common Support Equipment, Replenishment Spares, Initial Spares, etc.
    - Construction Cost
    - Operation & Support Cost

      Mission Personnel, Organization Spares, Intermediate Maintenance, Depot Maintenance, Contractor Support, Indirect Supprot, etc.

4. Cost Management Plan (1)

❑ Cost Control Item

❍ Criteria

- ➢ WBS 3 or 4 level components
- ➢ Domestic developments items

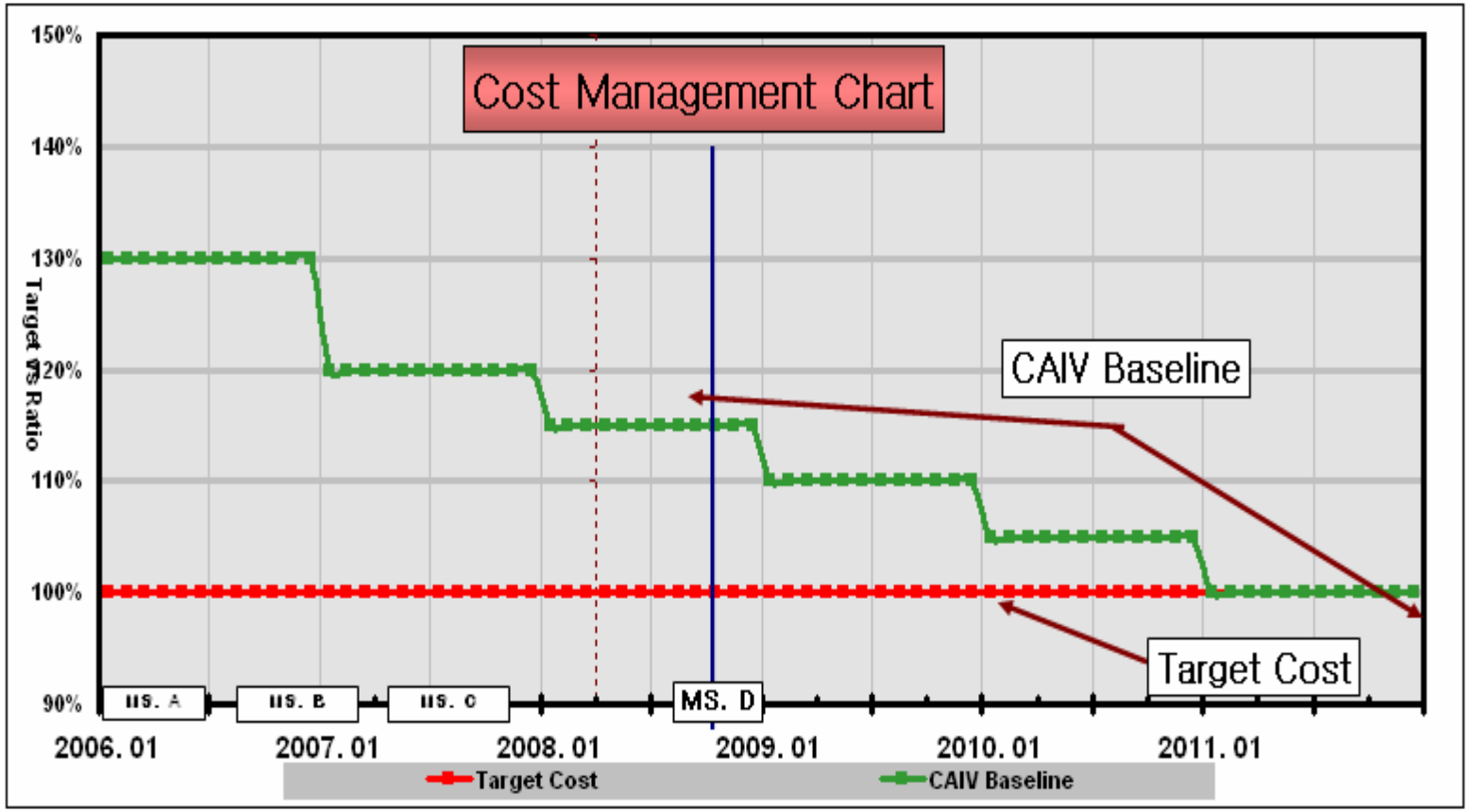
❍ KHP examples

KAI	41 items including Forward airframe
KARI	23 Items including Main Rotor
ADD	24 Items including U/VHF-AM
Total	98 Items

4. Cost Management Plan (2)

❑ CAIV Management Chart

❍ Cost Management Planning



5. Contracts (1)

- CAIV Contracts (KHP examples)
  - Major contractor and sub contractor have to adopt CAIV (Cost as An Independent Variable) for effectively managing KHP program.
  - Major Contractor have to submit UPC, LCC and TOC Target using PRICE models or Engineering methods to KHP PMO in 2 months after contracting.
  - After approval of target costs, Major contractor have to submit cost management reports every six months before preliminary design and every quarters after then.

5. Contracts (2)

CAIV Contracts (KHP examples)

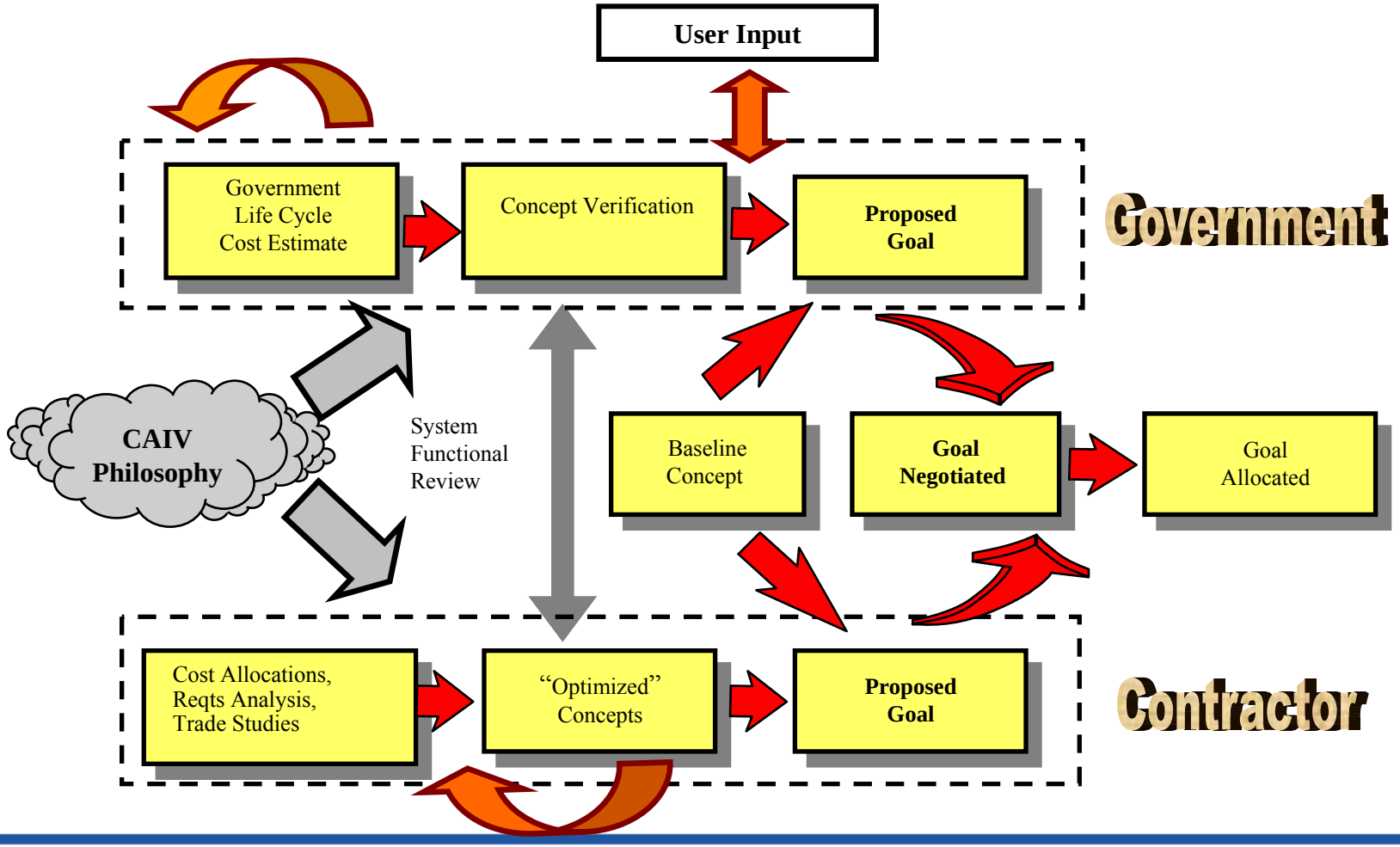
Schedule	X	X+1	X+2	X+3	X+4
Limits	30%	20%	10%	5%	0%

- Major contractor have to submit problem analysis reports if the current estimates of UPC, LCC and TOC exceeds the annual limits in the above table.
- KHP PMO could modify the procurement method and request engineering changes if the target cost is not to satisfy.

6. IBR and Approval (1)

Target Cost Negotiation

- Negotiating target cost after reviewing that of validity.



6. IBR and Approval (2)

❑ Target Cost Reports

❍ Unit Production Cost

Program :		Company :		Schedule :	
WBS	**Title**	**QTYNHA**	**UPC Target**	**Total Production Cost**	**Ratio**

6. IBR and Approval (3)

- Target Cost Reports
  - Life Cycle Cost

Program :		Company :		Schedule :	
WBS	**Title**	**QTYNHA**	**LCC Target**	**Total LCC Cost**	**Ratio**

6. IBR and Approval (4)

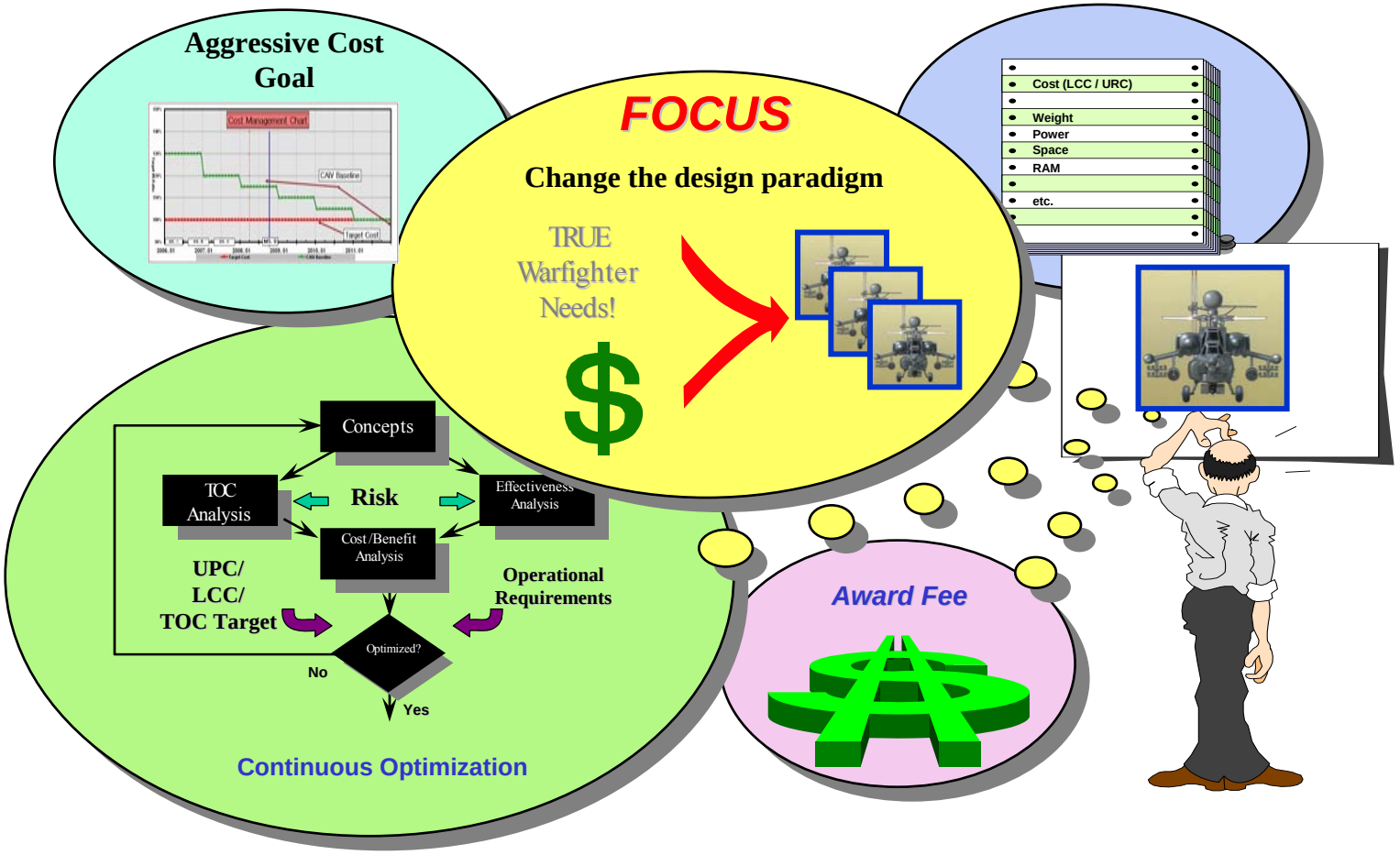
❑ Target Cost Reports

❍ Total Ownership Cost

Program :	Company :	Schedule :	
Total Ownership Cost	Categories	Target	Ratio
	Development Cost		
	Procurement Cost		
	Construction Cost		
	Operation & Support Cost		
	Total		

7. Cost / Performance Trade - off (1)

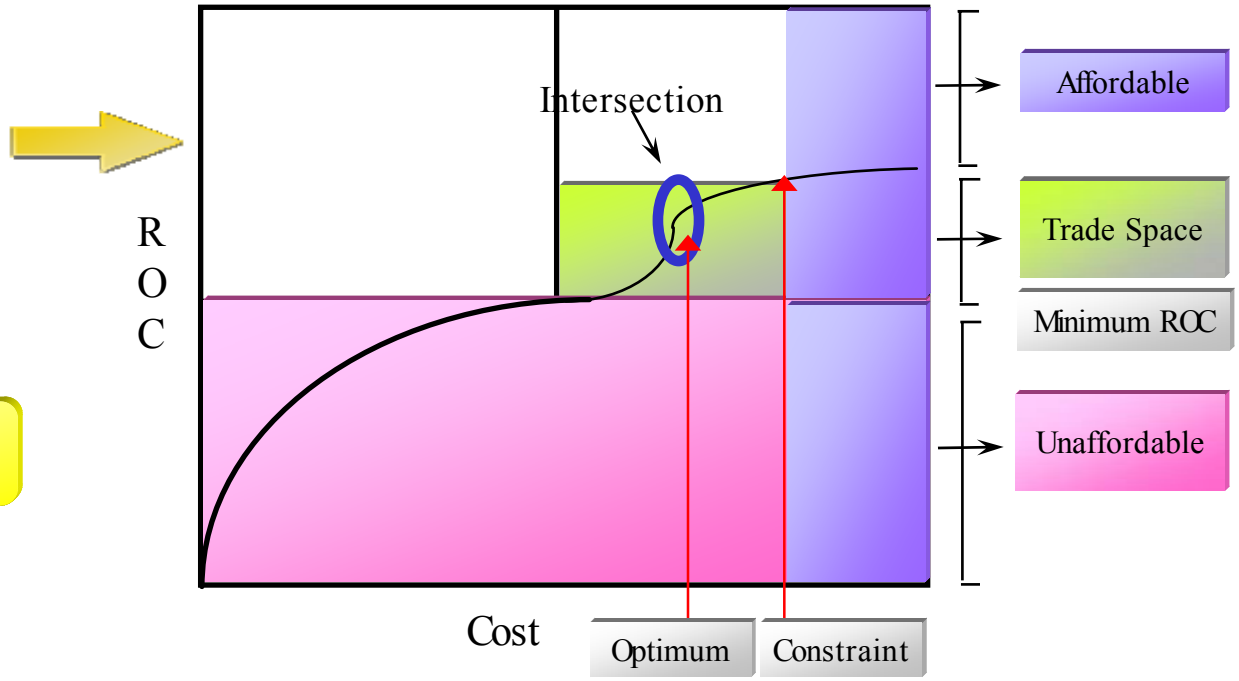
- Trade - off study on design alternatives



7. Cost / Performance Trade - off (2)

- Cost vs. Performance Trade-off

CAIV Team



Selection of optimal solution by trade-off study

8. Cost Analysis

- Monthly/Quarterly Cost Estimates

Estimating Breakdown Structure

EBS				Type
1.	KHP Helicopter Program			Assem
1.1	Basic Helicopter			Assem
1.1.2.1		Rotor Assembly		Assem
1.1.2.1.1			Main Rotor Blade	Mecha
1.1.2.1.2			Main Rotor Hub	"
1.1.2.1.3			Main Rotor Control	"
1.1.2.1.4			Tail Rotor Blade	"
1.1.2.1.5			Tail Rotor Hub	"
1.1.2.1.6			Tail Rotor Control	"
1.1.2.1.7			Rotor Integ. and Test	Integ./

Cost Estimates

Basic Estimate

Cost Summary | LM Totals | LM Production | LM Development

KMH Utility Version
년3월14일2006 6:53 오전 (PRICE Estimating Suite 2005)
System Cost Summary Costs in (KRW\100000000 Constant 604)

Program Cost	Development	Production	Total Cost
Engineering			
Draft	493.4	38.2	531.6
Design	1793.6	146.5	1940.1
System	184.5	-	184.5
Proj. Mgmt.	426.5	1967.9	2394.5
Data	110.0	691.3	801.3
SubTotal(ENG)	3008.0	2844.0	5851.9
HW/SW Int Cost	[48.5]		
Manufacturing			
Production	-	29860.0	29860.0
Prototype	2830.0	-	2830.0
Tool Test Eq.	294.9	2563.4	2858.3
Purchased	272.3	9670.8	9943.1
SubTotal(MFG)	3397.3	42094.1	45491.4
G & A / CoM	281.5	1619.8	1901.3
Fee / Profit	601.8	4190.2	4792.0
Total Cost	7288.6	50748.1	58036.8
Total (Thruput)	6245.9	0.0	6245.9
Total w/Thruput	13534.5	50748.1	64282.7
Schedule Start	Oct 04 [48]	Jan 10 [37]	
First Item	Sep 08 [28]	Jan 13 [147]	
Finish	Jan 11 [76]	Apr 25 [184]	
System Weight	12226.44	System WS	11573.04
System Series MTBF Hrs	2.775	Unit Sys Cost	149.11
System Quantity	299	Total Prod Cost/QTY	169.73

Cost

Cost Estimates

9. Reports Submission (1)

❑ Cost Management Reports

❍ Unit Production Report

Program :		Company :			Schedule :
Program Manager :		Unit Production Cost			
Title	Target Cost	Current Estimates	Variation	Variation Ratio	Risk Status

9. Reports Submission (2)

❑ Cost Management Reports

❍ Life Cycle Cost Report

Program :		Company :			Schedule :
Program Manager :		Life Cycle Cost			
Title	Target Cost	Current Estimates	Variation	Variation Ratio	Risk Status

9. Reports Submission (3)

❑ Cost Management Reports

❍ Total Ownership Cost Report

Program :	Company :		Schedule :	
Program Manager :	Total Ownership Cost			
Target Cost	Current Estimates	Variation	Variation Ratio	Risk Status

9. Reports Submission (4)

❑ Problem Analysis Report of UPC/LCC/TOC

Schedule	X	X+1	X+2	X+3	X+4
Limits	30%	20%	10%	5%	0%

○Program :	○Day :
○Company :	○Program Manager :

Target Cost	Current Estimates	Variation	Variation Ratio

○Problem :

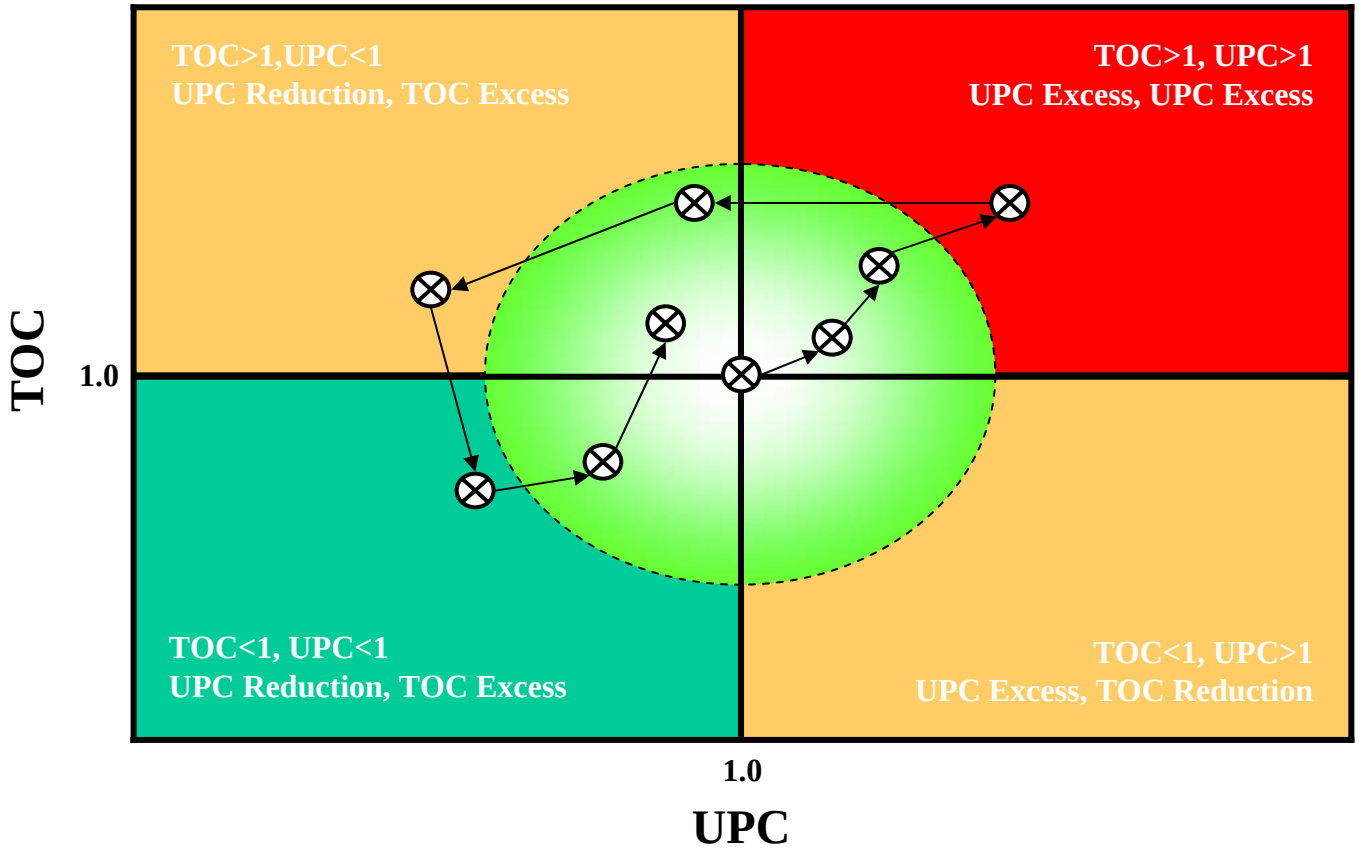
○Counterplan :

10. Data Accumulation

- Database Accumulation of Reports
  - Storing all of the cost database during the development
    - Proposal, prototype and production
  - Managing the historical cost data
    - Prototype/Production historical data
  - Using the cost data for estimating cost of similar system
    - Nominal UPC/LCC/TOC estimates of new system
    - Using the cost data for estimating target cost of new system

11. Early Warning and Control

- Bullseye Chart
  - Unit Production Cost vs. Total Ownership Cost



III. Conclusions

Conclusions

- CAIV process is necessary for guaranteeing the economic efficiency after completing
- CAIV process for Korea is designed for reforming the Korea defense acquisition system
- CAIV process managing unit production cost, life cycle cost and operation & support cost has to be adapted during development

Further Information

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