Cost as an Independent Variable

CAIV Templates

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Cost as an Independent Variable (CAIV) is an important tool that integrates the developers, builders, and users of systems in an effort to make rigorous requirements and cost tradeoffs. CAIV can result in the development, production, and fielding of systems where performance, reliability, and life cycle cost have all been given their appropriate weight in designing the system. It is important to establish aggressive cost targets for development, production, and support as early as possible in the development cycle, because it is the early design decisions that will have the most effect on cost. But programs at a much later stage of the life cycle can still benefit from aggressive implementation of CAIV. These templates are provided to assist the PM and his staff in the preparation of an acquisition strategy. They are intended to assist and should be tailored to specific program circumstances. The use of these templates is optional.

1. Introduction to CAIV

CAIV is a methodology for reducing Total Ownership Cost and improving performance. It involves developing, setting, and refining aggressive unit production cost objectives and O&S objectives while meeting warfighter requirements. It is essential to involve the user community in the tradeoff process from the beginning to achieve the best outcome for all parties involved. But like any good investment, applying CAIV will not be free. It is necessary to invest resources in the tradeoff analyses required in the up-front requirement generation process. One of the most important aspects of making CAIV a success is investing in the training of key personnel and making sure the CAIV process is understood.

Under Secretary of Defense (AT&L) E.C. Aldridge established CAIV implementation as one of his key metrics under his first acquisition goal, "achieve credibility and effectiveness in the acquisition and logistics support process." Under this goal, he approved a metric to require, by the end of FY02, 100% of defense programs to incorporate a CAIV plan and to have an evolutionary acquisition or spiral development plan in place. These plans are to be discrete parts of each ACAT I acquisition strategy and will be executed throughout the acquisition cycle and updated as necessary.

In a January 2002 memorandum, Under Secretary Aldridge instructed the Reduction of Total Ownership Costs (R-TOC) Working Group to develop DoD templates to be used by DoD program managers as guidelines to the development of these plans. This document is the CAIV Template developed under that memorandum.

CAIV is applicable to all programs and throughout all acquisition phases including modifications and upgrades in the O&S phase. However, the single greatest point of leverage for CAIV to affect program requirements, Total Ownership Cost (TOC), schedule, and performance is at the beginning of a program's life. CAIV means the user and requirements communities work the requirements, cost, performance, and schedule tradeoffs first, using a small number of key performance parameters (KPPs), with the production unit cost as a real, independent, input variable. These initial estimates should be refined as the program progresses.

Numerous CAIV implementation scenarios exist, depending on Phase and acquisition category. In accordance with (IAW) DoD 5000.2-R, the PM shall formulate a CAIV plan, as part of the acquisition strategy, to achieve program objectives. In establishing realistic objectives, the user should treat cost as a requirement. The acquisition

community, including technology and logistics, and the requirements community should review the use of the CAIV process to develop total ownership cost (TOC), schedule, and performance thresholds and objectives. These objectives should be reviewed at each milestone.

Challenging unit production cost and O&S cost goals can be set and achieved because acquisition reform and changes in industrial practices have made it possible to obtain more performance for less than the previous generations of similar systems. Performance as used here includes in-service or O&S performance as well as operational suitability or design factors. An essential element of the CAIV process is to specify only a minimum set of KPPs along with the cost goals. This allows industry the flexibility to tradeoff system designs to meet the KPPs and to use commercial processes where applicable.

CAIV should be applied flexibly to give the program manager as much freedom as is possible. However, experience with the CAIV Flagship programs shows that the greatest leverage can be obtained by executing some elements of a CAIV program at certain specified times in the acquisition cycle.

These templates are prepared as a guide for programs in the implementation of CAIV. These templates attempt to distill the lessons learned from CAIV implementations and highlight key issues for other programs attempting to implement CAIV.

Numerous CAIV implementation scenarios exist, depending on the type of system and its current stage in the system life cycle. The CAIV templates in this document have been developed to meet the most common scenarios. These templates are organized around three stages of a program's life cycle:

- **Chapter 2.** New start and modification and upgrade programs
- **Chapter 3.** Programs at or beyond Milestone B (entering or in System Development and Demonstration)
- **Chapter 4.** Programs at or beyond Milestone C (in Production and Deployment or later).

A Gantt chart is shown in each chapter to detail the CAIV-related activities and their associated execution times. The chart shown in Chapter 2 is representative of activities for new start programs, but should also be used as guidance in modification and upgrade programs. For programs other than new starts, the tables in Chapters 3 and 4 show the likely necessity to compress the time schedule and perform many of the CAIV activities concurrently.

2. CAIV Plan Template for New Start and Modification and Upgrade programs

From the viewpoint of the Cost as an Independent Variable (CAIV) program, new start and modification/upgrade programs are quite similar because they generally should consider the same issues in the same sequence. Each new start and modification and upgrade program should address the following topics to most effectively execute the CAIV process. Although specific time phasing is described in this document, program managers have considerable freedom in implementing CAIV, and activities may progress at rates commensurate with program risks and needs.

Establishment of the CPIPT

CAIV relies on partnering among the warfighter, acquisition, sustainment, and industry communities. It takes the involvement of the entire Government/Industry team to achieve maximum benefit. The PM should strive for strong trust and teaming among all parties in order to meet warfighter needs. The CAIV plan should show the establishment of the Cost Performance Integrated Product Team (CPIPT) no later than Milestone A. The CPIPT should include users, acquisition, test, logistics, and program office personnel.

Select Key Performance Parameters

Only a few Key Performance Parameters (KPPs) should be selected; all other requirements should be treated as tradable. These KPPs are carried forward as performance requirements in the RFP, tradeoff studies, and the Operational Requirements Document (ORD). However, all "requirements" should be treated as tradable. This allows industry maximum flexibility in designing a solution that satisfies the mission need. KPPs are an input to current phase tradeoff studies and are firmed up by the end of the concept phase.

Perform Requirements/Cost/Performance Tradeoff Studies

The best time to reduce TOC and program schedule is early in the acquisition process. Continuous cost/schedule/performance trade-off analyses help program managers (PM) accomplish cost and schedule reductions. Also, analyses should be broad enough that all costs are considered during the early decisions on system design alternatives

Cost, schedule, and performance may be traded within the "trade space" between the objective and the threshold. The PM and the operational requirements developer should jointly coordinate all trade-off decisions. Validated key performance parameters (KPPs) may not be traded-off without Requirements Authority approval.

The CAIV plan should show the timing and the content of the trade studies to be used to establish realistic and aggressive cost targets and KPPs. These studies should be

performed in a team environment consisting of the requirements community, Users, developers, and contractors. The studies should address both production and O&S costs. Supporting studies need to focus on establishing the critical few mission requirements and the associated unit cost and life cycle cost targets. The objective of these studies is to obtain an acceptable balance of the lowest cost versus an acceptable set of requirements. This is the critical new element of CAIV: making trades of requirements to achieve lower costs.

O&S costs are essentially "locked in" as a result of the requirements/cost/performance tradeoff studies. In order to support setting O&S cost targets, tradeoffs should specifically examine interactions between unit costs, logistics footprint, infrastructure response time, and readiness posture.

Setting Aggressive Unit Procurement Cost and O&S Cost Goals

Aggressive goals mean taking full advantage of cost savings possible through the application of all tools such as commercial-off-the-shelf (COTS) products, competition via an open systems approach, single process initiative, Mil Spec reform, etc. It is important to establish goals for unit procurement cost and O&S cost drivers as early as possible and include these goals in the acquisition documents. An approach should be outlined for setting and achieving aggressive unit cost and O&S cost goals. Tradeoff studies and affordability analyses will be major inputs to setting aggressive cost goals. Cost targets should be set for MS A DAB approval and included in the MS A RFP and ORD.

Alignment of the RFP and ORD

The results of the tradeoff studies should be structured to support timely inputs into the overall program acquisition plans. The CAIV plan should clearly indicate the input points in the schedule and show the timing and coordination of both the ORD and the Milestone RFP. The RFP should also contain incentives and metrics. The CAIV plan should also explain how unit cost and O&S cost targets, performance parameters (KPPs), and operating scenarios will be aligned throughout all documents. Unit production and O&S cost goals should be identical throughout all documents in order to align team efforts.

Providing Incentives

The Milestone A RFP package should address and include contractor and government incentives to meet unit cost and O&S cost objectives. Price credibility (the extent to which the contractor has thought through acquisition and ownership costs and can document its plans) should be a primary evaluation factor. Unit price commitment curves (UPCCs) should be considered for early production lots; their inclusion in source selection for MS B and later phases should also be discussed. Competition, award fees, warranties, and "carrot and stick" incentive approaches should be included as appropriate.

The PM should review the use of incentives to achieve CAIV and schedule objectives. As an example, incentives might stress up-front investments to minimize production costs, operating and support costs, and/or cycle time, where applicable. Use of both

monetary and non-monetary awards encourages creativity. Also, "shared savings" programs should be reviewed as a creative method to encourage the generation of cost- and schedule-saving ideas throughout all phases of the life cycle.

Establishing Metrics

Metrics should be established to track achievement of unit production and O&S cost goals. Metrics should relate directly to program objectives and act as the gauge by which incentives are awarded. The metric system should focus on accomplishments and reward-oriented categories. Each metric should be simple to understand and use existing reporting mechanisms. Cost effective data collection is a key to success.

CAIV metrics include both unit production price for early production lots and unit production price developed over the buy period. Additionally, O&S related metrics should be established and tracked. The O&S metrics may include reasonable parameters as well as a model to track these O&S costs. These initial metrics should be established by MS I. The ability to set and reach cost objectives will largely depend on early trade-offs in performance versus costs. In many cases, metrics and observables will reflect the degree to which a program is structured for success. Some examples of identifiable metrics include but are not limited to:

- Identification of the cost baselines for comparison of progress. Prime example of this would be separate identification of development, unit procurement, and operating costs for the system being replaced. Secondary (less desirable) would be identification of initial program estimates for these same cost parameters.
- Identification of cost goals relative to the identified baselines.
- Identification of how progress toward achieving the goals will be measured and how it will be monitored and reported.
- Assignment of responsibility for efforts intended to achieve each goal.
- Identification of allocations among cost elements expected to contribute toward achievement of overall goals (e.g. manpower reductions have a goal of certain reductions, and within those certain operational aspects such as maintenance are allocated certain sub-goals).
- Identification of events/times at which progress toward achieving goals, and reviews of goals, will be held (presumably major milestones).

Implementing Risk Management

The CAIV plan should include a series of demonstrations during Concept and Technology Development and early System Development and Demonstration to prove out the program's approaches to aggressive cost target implementation. These will include demonstrations of innovative performance features and of critical manufacturing processes and their maturity, e.g., yield and Cpk. Additionally, the plan should address

assessment and development (if needed) of the models needed to track and predict cost and performance based on demonstrated subsystem parameters.

Table 2-1. CAIV Template for new start and modification and upgrade programs.

Action	Activity	Milestone: A / Concept & Technology Development	B / System Development & Demonstration	C / Production & Deployment	Support
A	Cost Performance IPT (CPIPT) formed to oversee ongoing trade studies (includes user) and metrics.	◆			
B	Initial Concept phase RFP includes cost goals, metrics, and essential few mission requirements.	◆			
C	Ongoing requirements-cost-performance tradeoff studies.		▬	▬	▬
D	O&S cost target tradeoff studies.		▬	▬	▬
E	CPIPT reviews cost objectives and advises on need for additional trades. Output is integrated into program plans at appropriate points in time.		◆ ▬ ◆	◆ ▬ ◆	◆ ▬ ◆
F	Initial CPIPT report recommends cost objectives and outlines risks.		◆		
G	Selection for System Development & Demonstration (SDD) weights unit price credibility.		◆		
H	Initial ORD includes unit price objectives, critical few mission requirements, and the initial support concept while future ORDs are revised as needed.		◆		
I	Include CAIV cost objectives (unit procurement cost and O&S cost goals) and metrics in acquisition strategy.		◆ ▬	◆ ▬	◆
J	DAB approval for unit price objectives, O&S targets, and demonstrations.		◆ ▬	◆ ▬	◆
K	RFPs include unit price objectives and O&S cost objectives. Demonstrations, requirements for Unit Price Commitment Curve (UPCC), and critical few KPPs.		◆ ▬	◆ ▬	◆ ▬
L	Contractual incentives in each phase must be put in place to achieve unit cost and O&S cost objectives.		◆ ▬	◆ ▬	◆ ▬
M	IPTs and CPIPTs augmented to include contractors.		◆		
N	Selection for production includes XX% (e.g., 50% or greater) weighting on unit cost and O&S cost credibility.			◆	
O	Unit Price objectives updated in revised ORD.			◆	
P	CPIPT recommends unit price and O&S cost objective for SDD/production phase.		◆	◆	

3. CAIV Plan Template for Programs at or Beyond Milestone B

Programs at or past Milestone B should compress the implementation schedule shown for new start and modification and upgrade programs since several tasks will need to be performed concurrently to accomplish the CAIV process effectively. Each program past Milestone I should address the following topics to most effectively execute the CAIV process. Although specific time phasing of CAIV implementation activities is described in this document, program managers have considerable freedom in implementing CAIV, and activities may progress at rates commensurate with program risks and needs.

Establishment of the CPIPT

CAIV relies on partnering among the warfighter, acquisition, sustainment, and industry communities. It takes the involvement of the entire Government/Industry team to achieve maximum benefit. The PM should strive for strong trust and teaming among all parties in order to meet warfighter needs. The CAIV plan should show the establishment of the Cost Performance Integrated Product Team (CPIPT) as soon as possible after Milestone I. The CPIPT should include users, acquisition, test, logistics, and program office personnel.

Select Key Performance Parameters

Only a few Key Performance Parameters (KPPs) should be selected; all other requirements should be treated as tradable. This allows industry maximum flexibility in designing a solution that satisfies the mission need. KPPs are an input to current phase tradeoff studies and are firmed up by the end of the concept phase.

Performing Requirements/Cost/Performance Tradeoff studies

The best time to reduce TOC and program schedule is early in the acquisition process. Continuous cost/schedule/performance trade-off analyses help program managers (PM) accomplish cost and schedule reductions. Also, analyses should be broad enough that all costs are considered during the early decisions on system design alternatives.

Cost, schedule, and performance may be traded within the "trade space" between the objective and the threshold. The PM and the operational requirements developer should jointly coordinate all trade-off decisions. Validated key performance parameters (KPPs) may not be traded-off without Requirements Authority approval.

The plan should show the timing and the content of the trade studies to be used to establish realistic and aggressive cost targets and KPPs. These studies should be performed in a team environment consisting of the requirements community, users, developers, and contractors. The studies should address both production and O&S costs. Supporting studies should focus on establishing the critical few mission requirements and the associated unit cost and life cycle cost targets. The objective of these studies is to obtain an acceptable balance of the lowest cost vs. an acceptable set of requirements.

This is the critical new element of CAIV: making trades of requirements to achieve lower costs.

O&S costs are essentially "locked in" as a result of the requirements/cost/performance tradeoff studies. In order to support setting O&S cost targets, tradeoffs should specifically examine interactions between unit costs, logistics footprint, infrastructure response time and readiness posture.

Revising the ORD

To identify all possible cost reduction opportunities, the ORD should be revisited (based on requirements/cost/performance trade studies) to include only the few critical KPPs and O&S concepts. Teams involved with the tradeoff process should re-examine the original requirements and needs statement and make appropriate changes. The contractors should be told to identify ORD revisions, which will enable unit cost and O&S cost reductions while meeting the user's needs. The team should review this work and gain approval for ORD changes.

The contractors should be asked to submit proposals for innovative design approaches to achieve unit cost and O&S cost goals and to improve overall weapon system affordability. They should be allowed design flexibility and the opportunity to present their 80 to 100 percent solutions as early as possible. A revised set of documentation outlining the changed selection criteria and incentives associated with the RFP should be prepared and circulated to the contractors.

Alignment of the RFP and ORD

The results of the tradeoff studies should be structured to support timely inputs into the overall program acquisition plans. The CAIV plan should clearly indicate the input points in the schedule and show the timing and coordination of both the ORD and the Milestone RFP. The RFP should also contain incentives and metrics. The CAIV plan should also explain how unit cost and O&S cost targets, performance parameters (KPPs), and operating scenarios will be aligned throughout all documents. Unit production and O&S cost goals should be identical throughout all documents in order to align team efforts.

Setting Aggressive Unit Procurement Cost and O&S Cost Goals

It is important to establish goals for unit procurement cost and O&S cost drivers as early as possible and include these goals in revised acquisition documents. An approach should be outlined for setting and achieving aggressive unit cost and O&S cost goals. Tradeoff studies and affordability analyses will be major inputs to setting aggressive cost goals. Cost targets should be set for MS B DAB approval and included in the RFP and ORD.

Depending on circumstances, the plan may be to establish aggressive unit cost goals during the phase or at the end of the evaluation of contractor proposals. This choice depends on whether the unit production costs are "in the ballpark" and on difficulties expected with changes in the work statement. An approach should be outlined for setting

and achieving aggressive unit cost and O&S cost goals and included in revised acquisition documents such as the Program Baseline and Analysis of Alternatives (AoA). Cost visibility and analyses methods may need to be funded to obtain a basis for setting O&S cost goals.

Providing Incentives

The RFP package should address and include contractor and government incentives to meet unit cost and O&S cost objectives. Price credibility (the extent to which the contractor has thought through acquisition and ownership costs and can document its plans) should be a primary evaluation factor. Unit price commitment curves (UPCCs) should be considered for early production lots; their inclusion in source selection for later phases should also be discussed. Competition, award fees, warranties, and "carrot and stick" incentive approaches should be included as appropriate.

The PM should review the use of incentives to achieve CAIV and schedule objectives. As an example, incentives might stress up-front investments to minimize production costs, operating and support costs, and/or cycle time, where applicable. Use of both monetary and non-monetary awards encourages creativity. Also, “shared savings” programs should be reviewed as a creative method to encourage the generation of cost- and schedule-saving ideas throughout all phases of the life cycle.

Establishing Metrics

Metrics should be established to track achievement of unit production and O&S cost goals. Metrics should relate directly to program objectives and act as the gauge by which incentives are awarded. The metric system should focus on accomplishments and reward-oriented categories. Each metric should be simple to understand and use existing reporting mechanisms. Cost effective data collection is a key to success.

CAIV metrics include both unit production price for early production lots and unit production price developed over the buy period. Additionally, O&S related metrics should be established and tracked. The O&S metrics may include reasonable parameters as well as a model to track these O&S costs. These initial metrics should be established as soon as possible after the CAIV process is initiated. The ability to set and reach cost objectives will largely depend on early trade-offs in performance versus costs. In many cases, metrics and observables will reflect the degree to which a program is structured for success. Some examples of identifiable metrics include but are not limited to:

- Identification of the cost baselines for comparison of progress. Prime example of this would be separate identification of development, unit procurement, and operating costs for the system being replaced. Secondary (less desirable) would be identification of initial program estimates for these same cost parameters.
- Identification of cost goals relative to the identified baselines.
- Identification of how progress toward achieving the goals will be measured and how it will be monitored and reported.

- Assignment of responsibility for efforts intended to achieve each goal.
- Identification of allocations among cost elements expected to contribute toward achievement of overall goals (e.g. manpower reductions have a goal of certain reductions, and within those certain operational aspects such as maintenance are allocated certain sub-goals).
- Identification of events/times at which progress toward achieving goals, and reviews of goals, will be held (presumably major milestones).

Implementing Risk Management

The plan should include a series of demonstrations during System Development and Demonstration to prove out the program's approaches to aggressive cost target implementation. These will include demonstrations of innovative performance features and of critical manufacturing processes and their maturity, e.g., yield and Cpk. Additionally, the plan needs to address assessment and development (if needed) of the models needed to track and predict cost and performance based on demonstrated subsystem parameters.

Table 3-1. CAIV Plan Template for programs at or past Milestone B.

Action	Activity	Milestone: A / Concept & Technology Development	B / System Development & Demonstration	C / Production & Deployment	Support
A	CPIPT formed to oversee ongoing trade studies (includes user and contractor as well as acquisition, logistics and test).		◆		
B	Initial CPIPT report recommends cost objectives and outlines risks.		◆		
C	Revise the ORD to accommodate tradeoffs identified by contractor. Include unit price objectives, critical few mission requirements, & the initial support concept.		◆		
D	Ongoing requirements-cost-performance tradeoff studies.		▬	▬	▬
E	O&S cost target tradeoff studies.		▬	▬	▬
F	CPIPT reviews cost objectives and metrics and advises on need for trades. Requests contractor to identify areas of cost reduction/performance improvement		◆ ▬	◆ ▬	◆ ▬
G	Include CAIV cost objectives (unit procurement cost and O&S cost goals) and metrics in acquisition strategy.			◆ ▬	◆ ▬
H	DAB approval for unit price objectives and O&S targets.			◆ ▬	◆ ▬
I	RFPs include unit price objectives and O&S cost objectives, requirements for UPCC, demonstrations, and critical few KPPs.			◆ ▬	◆ ▬
J	Contractual incentives in each phase must be put in place to achieve unit cost and O&S cost objectives.			◆ ▬	◆ ▬
K	Selection for production includes XX% (e.g., 50% or greater) weighting on unit cost and O&S cost credibility.			◆	
L	Unit Price objectives updated in revised ORD.			◆	
M	CPIPT recommends unit price and O&S cost objective for SDD/production phase.		◆	◆	

4. CAIV Plan Template for Programs at or Beyond Milestone C

For programs at Milestone C, the decision should include an aggressive CAIV target, which requires rethinking the program. In this case, the ORD should be re-examined to include only the few critical KPPs and the new cost targets. The RFP should also be revised to include an aggressive cost goal and incentives to achieve them.

Programs past the MS C decision point should develop a plan to seek aggressive unit cost and O&S cost reductions during the remainder of EMD and production and fielding. The CAIV plan for programs past MS C should include a specific decision point as early as possible to set or review unit cost and O&S cost goals. Leading to this decision should be tradeoff studies overseen by the CPIPT that involve contractor input and participation. These tradeoff studies should identify changes in the ORD and specifications that could result in cost reductions.

Given that a decision is reached to seek more aggressive cost goals, then the ORD baseline, deliverables, and incentives associated with the current contract should be revisited to ensure that they adequately address the cost reduction issues.

Establishment of the CPIPT

CAIV relies on partnering among the warfighter, acquisition, sustainment, and industry communities. It takes the involvement of the entire Government/Industry team to achieve maximum benefit. The PM should strive for strong trust and teaming among all parties in order to meet warfighter needs. The CAIV plan should show the establishment of the Cost Performance Integrated Product Team (CPIPT) as soon as possible. The CPIPT should include users, acquisition, test, logistics, and program office personnel.

Select Key Performance Parameters

Only a few Key Performance Parameters (KPPs) should be selected; all other requirements should be treated as tradable. This allows industry maximum flexibility in designing a solution that satisfies the mission need. KPPs are an input to current phase tradeoff studies and are normally firmed up by the end of the concept phase.

Performing Requirements/Cost/Performance Tradeoff studies

Cost, schedule, and performance may be traded within the "trade space" between the objective and the threshold. The PM and the operational requirements developer should jointly coordinate all trade-off decisions. Validated key performance parameters (KPPs) may not be traded-off without Requirements Authority approval.

The plan should show the timing and the content of the trade studies to be used to establish realistic and aggressive cost targets and KPPs. These studies should be performed in a team environment consisting of the requirements community, users, developers, and contractors. The studies should address both production and O&S costs.

Supporting studies should focus on establishing the critical few mission requirements and the associated unit cost and life cycle cost targets. The objective of these studies is to obtain an acceptable balance of the lowest cost vs. an acceptable set of requirements. This is the critical new element of CAIV: making trades of requirements to achieve lower costs.

Revision of the ORD

To identify all possible cost reduction opportunities, the ORD should be revisited (based on requirements/cost/performance trade studies) to include only the few critical KPPs and O&S concepts. Teams involved with the tradeoff process should re-examine the original requirements and needs statement and make appropriate changes. The contractors should be told to identify ORD revisions, which will enable unit cost and O&S cost reductions while meeting the user's needs. The team should review this work and gain approval for ORD changes.

The contractors should be asked to submit proposals for innovative design approaches to achieve unit cost and O&S cost goals and to improve overall weapon system affordability. They should be allowed design flexibility and the opportunity to present their 80 to 100 percent solutions as early as possible. A revised set of documentation outlining the changed selection criteria and incentives associated with the RFP should be prepared and circulated to the contractors.

Alignment of the RFP and ORD

The results of the tradeoff studies should be structured to support timely inputs into the overall program acquisition plans. The CAIV plan should show the timing and coordination of both the ORD and the Milestone RFPs and should explain how unit cost and O&S cost targets, performance parameters (KPPs), and operating scenarios will be aligned throughout all documents. Unit production and O&S cost goals should be identical throughout all documents in order to align team efforts.

Contractor RFPs

The contractors should be requested to submit proposals for innovative design, contract, specifications, deliverables and manufacturing approaches to achieve unit cost and O&S cost goals and to improve overall weapon system affordability. They should be allowed design flexibility and the opportunity to present their 80 to 100 percent solutions.

Many tools are available to motivate and provide incentives to contractors: competitions, component breakout, value engineering opportunities, and multi-year or sole source awards are just a few. PMs should establish an integrated contracting strategy that:

- Determine if source selection criteria reflect the importance of achieving production and TOC objectives.

- Look for flexible contracting techniques to allow the use of CAIV.

- Identify innovative methods for competitive contracting.

- Determine if incentives can be developed that help the program meet or beat TOC reduction targets, not just near term cost objectives.

- Emphasize the use of modular contracts in which large acquisitions are broken into smaller, more manageable modules which may support the implementation of CAIV.

Setting Aggressive Unit Procurement Cost and O&S Cost Goals

O&S costs are essentially "locked in" as a result of the requirements/cost/performance tradeoff studies. In order to support setting O&S cost targets there should be tradeoffs that specifically examine interactions between unit costs, logistics footprint, infrastructure response time and readiness posture.

It is important to establish goals for unit procurement cost and O&S cost drivers as early as possible, and include these goals in revised acquisition documents. An approach should be outlined for setting and achieving aggressive unit cost and O&S cost goals.

Providing Incentives

If not already in place, award fees for reducing unit cost may be added. A series of contractor and government incentives should be developed for inclusion in the next Milestone. If competition is maintained, these incentives will include source selection based on unit cost and O&S cost goals Incentives should consider unit price commitment curves (UPCCs) for early production lots and later phases. Competition, award fees, warranties, and "carrot and stick" incentive approaches should be included as appropriate for O&S costs.

The PM should review the use of incentives to achieve CAIV and schedule objectives. As an example, incentives might stress up-front investments to minimize production costs, operating and support costs, and/or cycle time, where applicable. Use of both monetary and non-monetary awards encourages creativity. Also, “shared savings” programs should be reviewed as a creative method to encourage the generation of cost- and schedule-saving ideas throughout all phases of the life cycle.

Establishing Metrics

Metrics should be established to track achievement of unit production and O&S cost goals. Metrics should relate directly to program objectives and act as the gauge by which incentives are awarded. The metric system should focus on accomplishments and reward-oriented categories. Each metric should be simple to understand and use existing reporting mechanisms. Cost effective data collection is a key to success.

CAIV metrics include both unit production price for early production lots and unit production price developed over the buy period. Additionally, O&S-related metrics should be established and tracked. The O&S metrics may include reasonable parameters

as well as a model to track these O&S costs. These initial metrics should be established as early as possible.

Some examples of identifiable metrics include but are not limited to:

- Identification of the cost baselines for comparison of progress. Prime example of this would be separate identification of development, unit procurement, and operating costs for the system being replaced. Secondary (less desirable) would be identification of initial program estimates for these same cost parameters.
- Identification of cost goals relative to the identified baselines.
- Identification of how progress toward achieving the goals will be measured and how it will be monitored and reported.
- Assignment of responsibility for efforts intended to achieve each goal.
- Identification of allocations among cost elements expected to contribute toward achievement of overall goals (e.g. manpower reductions have a goal of certain reductions, and within those certain operational aspects such as maintenance are allocated certain sub-goals).
- Identification of events/times at which progress toward achieving goals, and reviews of goals, will be held (presumably major milestones).

Implementing Risk Management

The plan should include a series of demonstrations as soon as possible after Milestone B to prove out the program's approaches to aggressive cost target implementation. These will include demonstrations of innovative performance features and of critical manufacturing processes and their maturity, e.g., yield and Cpk. Additionally, the plan should address assessment and development (if needed) of the models needed to track and predict cost and performance based on demonstrated subsystem parameters.

Table 4-1. CAIV Plan Template for programs at or past Milestone C.

Action	Activity	Concept & Technology Development	System Development & Demonstration	Production & Deployment	Support
		Milestone: A	B	C	
A	CPIPT formed to oversee ongoing trade studies (includes user and contractor as well as acquisition, logistics and test).				
B	Initial CPIPT report recommends cost objectives and outlines risks.				
C	Revise the ORD to accommodate tradeoffs identified by contractor. Include unit price objectives, critical few mission requirements, and the initial support concept.				
D	Ongoing requirements-cost-performance tradeoff studies.				
E	O&S cost target tradeoff studies.				
F	CPIPT reviews cost objectives and metrics and advises on need for trades. Requests contractor to identify areas of cost reduction/performance improvement.				
G	CAIV cost target review point to decide upon further cost reduction tradeoff studies and efforts.				
H	Include CAIV cost objectives (unit procurement cost and O&S cost goals) and metrics in acquisition strategy.				
I	DAB approval for unit price objectives, O&S targets, and demonstrations.				
J	RFPs include unit price objectives and O&S cost objectives, requirements for UPCC demonstrations, and critical few KPPs. Should incorporate contractor suggestions.				
K	Contractual incentives in each phase must be put in place to achieve unit cost and O&S cost objectives.				
L	Unit Price objectives updated in revised ORD.				
M	CPIPT recommends unit price and O&S costs objectives for SDD/production.				