

—TO ALL KEY DEFENSE CONTRACTORS—DECEMBER 2, 1963

"It is my desire that you establish an affirmative program of cost reduction in the performance of defense contracts, both those which you now hold and those which you may subsequently receive. If you already have such a program in being, then I call on you to accelerate, expand and intensify this effort."

President Lyndon B. Johnson

"I suggest you give particular attention to reducing defense procurement costs by assisting the defense department in achieving its three primary cost reduction objectives.

- Buying only what is needed.
- Buying at lowest sound price.
- Reducing operating expenses.

"Defense contractors can reduce the overall cost of government by assuring that their own internal operations are conducted in the most economical manner.

"I urge that you give to these and other cost reduction ideas which I know will occur to you, your immediate personal attention and that you join with me in achieving full value for every dollar spent in support of our national defense."

Secretary of Defense
Robert McNamara

In 1964, Raytheon instituted a formal cost reduction program to put increased emphasis on our continuing efforts to minimize operating and product costs.

Maximum cost effectiveness is of vital importance to the nation, to the national defense effort, to the individual taxpayer, and to Raytheon.

By maintaining and enhancing our reputation for product excellence and by exercising stringent cost control at all levels, we improve our competitive strength, provide our customers with better value for dollars spent, and increase sales and earnings.

There is no doubt but that our cost reduction program is effective. We must continue, however, to strive for even greater cost effectiveness.

As we expand our present markets, extend our product lines and capabilities into new areas, and enter entirely new markets, our cost competitiveness increases in importance.

The competition, we must remember, is also constantly striving to improve its cost proficiency.

As the letters from President Johnson and Secretary of Defense McNamara attest, cost reduction is a responsibility which we, as a major defense contractor, have to the nation. In the interest of our continued success and progress our cost reduction efforts must be vigorously applied in both our government and in commercial and consumer divisions.

The Raytheon Cost Reduction Program is described fully in the pages of this brochure. I ask that each employee of the company read this brochure and apply the cost reduction principles and procedures described on its pages to his or her own job. Cost reduction is an important part of your position responsibility.

Our cost reduction potentials will only be realized through a conscientious effort by each of us. We should apply value analysis to every program and product line in the company to identify and eliminate all unnecessary cost no matter how small.

I ask each of you to participate wholeheartedly, every day and in every possible way, in the Raytheon Cost Reduction Program.

Thomas L. Phillips
President, Raytheon Co.



It is Raytheon's objective to provide every customer with the best product at the lowest possible price. The company-wide cost reduction program is the master plan which integrates the efforts of every division and each employee to minimize all operating and product manufacturing costs.

Each one of us is responsible for contributing to the program, since every decision and action taken by both management and individual contributors influences the cost of doing business.

Cost reduction is important to both employee and company not because of what it is but because of the important benefits which it brings. More intense competition for both government and commercial business makes it essential that the company exert every effort to control total costs as well as maintain product performance and delivery schedules. Today's customers carefully evaluate not only the purchase price of equipment but also operating and maintenance costs. Thus, it is extremely important for any company competing in this market to establish formal programs which improve proficiency in minimizing total costs to its customers.

The benefits of an effective cost reduction program are:

- Increased Sales,
- Increased Employment,
- Increased Profits,
- Increased Growth, and
- Increased Employee Benefits and Opportunities.

In addition to these incentives, the government has encouraged its major contractors to participate in the Defense Contractor Cost Reduction Program (Department of Defense Instruction 7720.12). Briefly, this instruction sets forth the minimum criteria for an effective contractor cost reduction program and explains how the government will monitor and evaluate the program. Raytheon's cost reduction program is structured to meet all these criteria as the following summary descriptions indicate.

TOP MANAGEMENT SPONSORSHIP—The Executive Office has established this company-wide program and assigned the Vice President-Controller the responsibility for the program administration. The Assistant Controller-Management Analysis has been assigned as the Program Administrator and the Director of Value Engineering (Office of the Vice President, Engineering and Research) as Program Coordinator.

COMPREHENSIVE SCOPE—The program is organized to provide continuing emphasis on cost reduction throughout the entire company. The program includes several sub-programs and more than twenty principal technique categories of cost reduction work. Responsibility for all these elements is assigned to various functional groups throughout the company.

A company-wide steering committee, chaired by the cost reduction coordinator and comprised of the cost reduction administrator, cost reduction chairmen, value engineering coordinators and functional staff heads, provides unified guidance and direction for the program.

Program Objective

Significance of Cost Reduction



Cost Reduction Program Criteria

SUBCONTRACTORS AND SUPPLIERS—Raytheon extends cost reduction emphasis to principal subcontractors and suppliers by providing motivation for their participation in the program, and cost-saving sharing incentives for value engineering proposals.

ORGANIZATIONAL STRUCTURE—A Corporate, Division, Operations, Plant and Laboratory organization exists to carry out the functional and administrative responsibilities of the program. Basically, cost reduction committees and chairmen exist in all operating segments of the company.

GOALS AND OBJECTIVES — Goals are established to provide targets for divisions and functional areas. General level of goals are established by top management based on business volume.

Every six months, goals are established which represent the annual rate of savings expected from projects instituted during that period. Goals are constructed for each division, as well as for the major divisional organizational entities, and cover the half-year periods between January 1 and June 30, and from July 1 through December 31.

RULES AND PROCEDURES—The company has established rules and procedures for administering the program. These include definition of savings, computational methods and formats, techniques of documentation and reporting, and frequency of reporting.*

Cost reduction projects which have been developed will be submitted to the cost reduction chairmen on CS101 forms. Each division will report monthly to the corporate cost reduction program administrator on CS102 forms. Semi-annual reporting will be done on CS102 and CS103 forms. A6100 gives further details on reporting and computational methods.

VALIDATION OF SAVINGS—An effective system to validate reported savings exists and includes periodic division, corporate, and government audits.

EMPLOYEE MOTIVATION—The company has instituted positive efforts to promote cost conscious attitudes among its employees and recognize outstanding individual contributions to the cost reduction program.

Employee's cost reduction efforts are rewarded by the employee compensation and promotion program, by awards for suggestions in the PEP program, and by news releases in company publications.

IDEA INTERCHANGE—Publication and dissemination of cost reduction achievements among all divisions is a vital part of the overall program.

The best projects are given special recognition and information about such projects is circulated to all divisions where there may be further potential application.

Definitions of Key Terms

COST REDUCTION—A broad term which identifies the results of all actions which lower costs; specifically, a cost reduction is achieved when the total cost, individually or collectively, of material, labor

*Raytheon Company Cost Reduction Program—Guideline Policy and Procedure A6100.



and overhead is decreased through improved management, techniques, procedures or processes as compared with previous methods without sacrifice of product quality and reliability.

The Department of Defense acknowledges cost reduction actions which result in savings through the contractor's reduction, elimination, or avoidance of expenditures of funds which, had they been incurred, would have been recognized as allowable costs or reimbursed by the Department of Defense.

Cost reductions result from changes made to improve the present way of doing things.

COST AVOIDANCE—This term is used to describe savings resulting from doing a job differently from the way it might have been done or was planned to have been done. Thus, a cost avoidance results from a specific action which changes the anticipated way of doing a new job. To be acceptable as a "cost avoidance," it must be determined that there was an acceptable planned way of doing the job which would have been followed except for a specific improvement action.

Both cost reductions and cost avoidances are reportable as net savings into the Company cost reduction program and are identified by principal techniques employed. More definitive guidelines on cost reductions and avoidances are given in policy and procedure A6100.

COST EFFECTIVENESS—A term used to indicate both the proficiency of people to minimize costs and the optimum relationship of the overall functional effectiveness of an equipment or system to its procurement and operating costs.

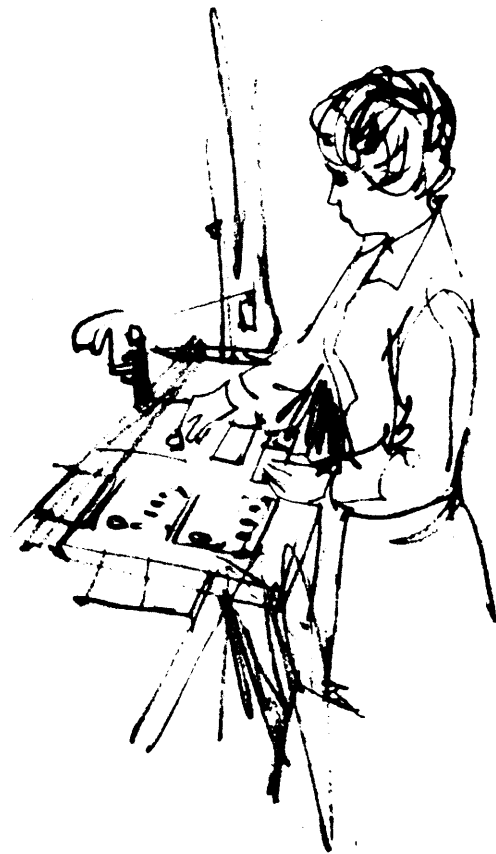
The Government and other customers often evaluate the cost effectiveness of both the manufacturer and his product prior to purchase. Thus, skill in achieving cost effectiveness is essential, and the application of the principal techniques of the cost reduction program are the means to attain this proficiency. These techniques are applied within the framework of various sub-programs.

The total Raytheon cost reduction program includes a number of sub-programs, each of which contributes in part to help achieve the overall cost reduction program objectives. These subprograms are:

- Product Excellence Program (PEP)
- Value Engineering/Value Analysis Program
- Design Improvement Program
- Unit Product Cost Control/Cost Target Program
- Manufacturing Cost Reduction Program
- Purchasing Cost Reduction Program
- Management Analysis & Improvement Program

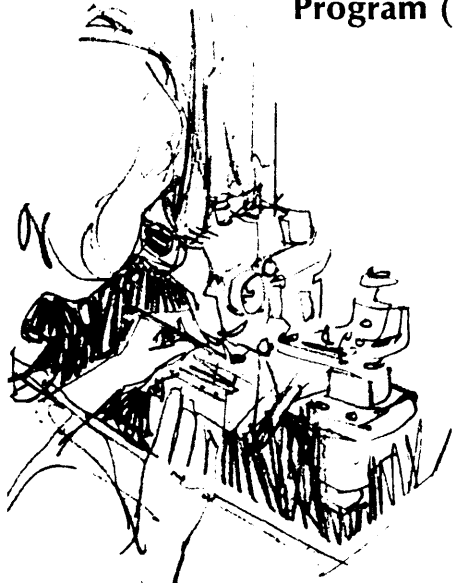
A totally effective cost reduction program depends on the proper balance of management emphasis, attention and effort in each of these areas. Moreover, since there are some areas of overlap and inter-functional responsibilities, it is important that effort in all areas be properly integrated to achieve the greatest results.

Each subprogram of the cost reduction program has many subelements and employs various principal techniques as indicated by the following descriptions. Important interfaces are also identified to improve integration of efforts when programs cross normal functional and organizational lines.



Sub Programs of the Cost Reduction Program

Product Excellence Program (Pep)



Value Engineering/ Value Analysis Program

DEFINITION. A program for motivating all employees to do the best job possible to help the company produce the most reliable, highest quality products for the least cost. It encourages error-free performance by each employee in his job and also provides incentives for submitting quality improvement and cost reduction suggestions.

ELEMENTS. Employees receive special management recognition in the form of publicity, certificates, pins, prizes or other awards for outstanding accomplishments in error-free performance, written suggestions for improving product quality, and reducing costs.

Continuous publicity, management endorsement and support, and good administration are essential elements.

ADMINISTRATION. The PEP program is under the joint coordination and administration of Quality Control, Reliability, Industrial Relations, and the Cost Reduction Program Committee Chairmen throughout the company.

The company-wide program is coordinated by the Director of Quality Assurance in the Office of the Vice-President, Engineering and Research.

PEP suggestions which result in cost savings are processed through the Cost Reduction Committees and reported on standard Company CS-101 forms.

DEFINITION—A program directed at helping all key decision-making employees to know and use an organized, creative, systematic method to help them design and produce highest quality products for the lowest overall cost.

Value Engineering/Value Analysis are terms used to identify an organized decision-making method which is directed at reliably achieving the essential function for least total cost. These functional-oriented principles can be applied to systems, procedures, products or supplies. When value analysis techniques are used by engineering personnel, the term value engineering is used. The techniques, however, can be widely applied to help identify and remove unnecessary costs in many areas.

ELEMENTS—Value Engineering/Value Analysis orientation and workshop training courses are conducted to acquaint people from Engineering, Manufacturing, Purchasing and Financial and Marketing areas with value engineering techniques.

Value analysis/engineering specialists are assigned to various areas to provide educational, consulting, evaluating and value data development services.

It is Department of Defense policy as stated by the Armed Services Procurement Regulations (ASPR) and other directives such as Defense Procurement Circulars (DPC No. 11 on Value Engineering) that all contracts over certain dollar amounts have value engineering program or incentive clauses. Program clauses require the contractor to engage in certain stated levels of value engineering effort as a line item. Incentive clauses provide contractors an opportunity to share cost savings with the Government when value engineering change proposals (VECP's) are submitted and accepted. Sharing arrangements exist in all types of value engineering clauses and run as high as 50 percent or 75 percent (normally 50 percent) on instant (current) contracts with lesser ratios on future acquisitions (regardless of source) and collateral (operating, maintenance or logistics) costs. This provides contractors with an excellent

opportunity to increase earnings and profits. Contractors are measured on value engineering performance by data bank records which are used in contractor performance evaluations and weighted guidelines methods to determine source selections, fee and profit rates.

Subcontractor and Supplier Value Analysis/Engineering Program is another element which encourages all suppliers to participate in Raytheon's Value Engineering Program. Suppliers are motivated to participate by means of check lists, requests for suggestions, recognition and awards, additional business and value engineering contract clauses which enable them to share in cost savings when VECP's are submitted.

ADMINISTRATION—This company-wide program is under the functional direction of the Director of Value Engineering Services, Office of the Vice President, Engineering and Research.

Each division, operation, plant and laboratory has Value Engineering management and specialists who are responsible for carrying out value analysis/engineering activities.

The Subcontractor Value Engineering Program is under the administration of the Corporate and Divisional Procurement Groups.

Cost avoidances and cost reductions achieved by people employing value engineering techniques, both formally and informally, are submitted and processed through the cost reduction program administration procedures.

DEFINITION—This is an engineering program aimed at initiating and improving product designs so that the costs to manufacture, install, maintain and operate the equipment will be minimized.

ELEMENTS—This program is closely allied and has strong interfaces with several other key element programs. Basically, it involves all efforts on the part of design engineering people to minimize costs. In so doing, in addition to using sound engineering principles, a number of techniques are employed such as:

- Value Engineering
- Engineering Standardization
- Cost Target or Control Concepts

In addition, specialists and consultants may be used by the engineering department to assist in their effort. Some of these may be within or some from outside the engineering function. These support areas are:

- Components Engineering
- Value Engineering
- Standards Engineering
- Manufacturing Engineering or Liaison Engineering
- Reliability, Maintainability, Quality Assurance Engineering
- Materials and Process Specialists
- Cost Estimating
- Procurement Specialists
- Industrial Engineering

ADMINISTRATION—The program is under the direction and administration of laboratory, engineering or program management. Cost reductions or avoidances resulting from this program may be identified by one of several principal techniques and would be processed by standard procedure (CS101 form) into the cost reduction program.

Design Improvement Program



Unit Product Cost Control/ Cost Target Programs



Manufacturing Cost Reduction Program

DEFINITION—a program which is product-design oriented and is directed at insuring that the manufacturing cost of a product is below certain predetermined levels, taking quantities and schedules into account.

ELEMENTS—At an early stage in product design and development, cost objectives are established for as many key functional areas of the product as practical. Targets are agreed to by a team recruited from different areas such as engineering, manufacturing, purchasing, financial and marketing. Various techniques are used to establish targets such as: market research and analysis, reduction from anticipated or estimated costs, or value analysis functional evaluation.

Design progress is measured against targets by periodic cost estimates, design review and other evaluations by various specialists to determine if design is progressing satisfactorily.

The effort is adjusted as needed to provide assistance required to meet the target; or targets are revised based on additional information gained during preliminary design.

The results are documented by comparing the cost estimates of final designs with the original anticipated costs and the cost targets. In cases where specific redesign efforts reduced the anticipated costs of the original (acceptable) design, a cost avoidance will have been achieved and can be submitted into the cost reduction program.

ADMINISTRATION—Cost target programs are sponsored by divisional management with specific responsibility for administration and direction assigned to engineering or program management. The integrated and coordinated efforts of a number of line and support personnel are required.

Cost avoidances and reductions generated by this program would be identified by a principal technique and processed by standard procedures.

DEFINITION — A program directed at optimizing labor and capital utilization in the manufacture of all company products. This is a broad program covering all areas of plant and manufacturing expenses from material procurement and handling, through processing to packaging, shipping and delivery to the customer.

ELEMENTS—Work measurement program aimed at increasing efficiency on productive effort or reduction of nonproductive effort. It involves the development of output (work) standards; the analysis and measurement of existing methods; design and introduction of control reports; corrective action by supervision as a result of analysis of comparisons between actuals and standards of labor utilization.

Methods improvement program directed at improving work methods through work simplification and small tooling techniques. This program includes better methods and work simplification training. Other industrial engineering techniques are applicable in this program such as: tool improvement, material handling studies, and jig and fixture design.

Facilities or process consolidations which are aimed at higher utilization of equipment and facilities coupled with the profitable concentration of organizations, skills, capital investments, and purchasing leverage.

Advanced manufacturing engineering which concentrates on modernizing manufacturing techniques and on the introduction of these up-dated capabilities to the design engineering areas so that new designs take advantage of the best manufacturing methods and those that are most feasible for production.

Maintenance improvement programs involving the application of work-time scheduling and measurement techniques, improvement in methods and equipment, preventive maintenance, and better control of maintenance materials inventories.

Salvage programs aimed at economic reclamation of otherwise waste material.

ADMINISTRATION—Office of the Vice President, Manufacturing, has functional responsibility to provide guidance, direction, coordination, and to stimulate efforts in these areas. This office also conducts training programs, assists in establishing and monitoring goals, and in establishing short-and-long-range manufacturing cost reduction programs.

The administration of these programs in the divisions falls into a number of different areas such as: Industrial Engineering, Manufacturing Engineering, Production Engineering, and Manufacturing Management. There are interfaces with other line functions such as Purchasing, Accounting, Materials Management, Engineering, Marketing, and Financial.

Results of efforts in these areas contribute to many of the principal techniques in the cost reduction program as indicated and are processed through regular channels into the program.

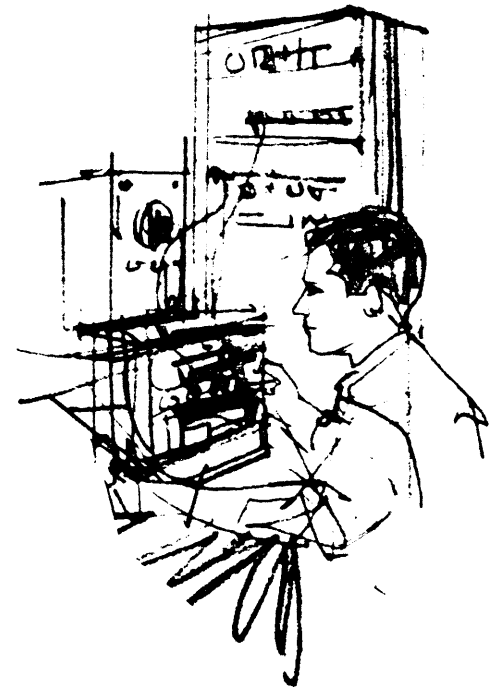
DEFINITION—A program directed at assuring that all materials and services are purchased for the lowest sound price consistent with company quality and delivery requirements.

ELEMENTS—Reduction in the cost of procured material and services by techniques such as:

- Price Negotiation Based on Price and Cost Analysis
- Alternate Manufacturer Methods
- Company-wide Agreements
- Value Analysis or Engineering Changes
- Development of Multiple Sources
- Make or Buy Analysis

The company-wide buying program negotiates and executes agreements on commodities which are common to several company locations. Four areas are covered: Office Supplies and Equipment, Factory Supplies and Equipment, Production Materials and Components.

Another program encourages suppliers and subcontractors to suggest cost reduction ideas and to engage in formal value engineering studies on purchases over certain dollar amounts.



Purchasing Cost Reduction Program

ADMINISTRATION—Each division procurement function is responsible for meeting goals and directing activities in the reduction of purchased material costs.

The Corporate Office of the Director of Procurement provides functional guidance and assistance to the divisions and establishes company procurement policies. In addition, this office conducts the company-wide buying program.

All cost reductions achieved by division purchasing programs are submitted into the cost reduction program through regular channels and are identified by the appropriate technique as indicated.

Management Analysis and Improvement Programs

DEFINITION—Management Improvement Programs are directed at reducing operating expenses by focusing top-level management attention and efforts on needed improvements through requirements, operations and organizational analysis, value analysis, systems and procedures, and other expense area analyses.



Elements

- Organization Analysis
- Systems Improvement (Business Oriented Data Mechanization)
- Overhead Expense Analysis
- Inventory Analysis
- Technical Manuals
- Technical Data and Reports
- Material Utilization Analysis
- Excess Contractor Inventory
- Transportation and Traffic Management
- Wage Analysis

ADMINISTRATION—These are broad cost reduction areas which are directed and administered by various managers in different functional areas including general management. Accomplishments are submitted on CS101 forms.

Your Part in Raytheon's Cost Reduction Program

YOU are important to this program because, in the course of your daily work, actions taken and decisions made have a direct impact on the cost of doing business; and these determine whether the company is successful in competing for its share of business and can profit and grow thereby.

The following is a check list of opportunities and responsibilities you have in this program. You can best help by reviewing them regularly and taking the necessary actions:

Managerial Responsibilities

1. Know the company and division cost reduction program policy guidelines and procedures (Policy & Procedure A6100).
2. Inform your employees of significant aspects of the cost reduction program.
3. Encourage each employee to participate in the program actively and enthusiastically through the use of PEP idea forms and by constructive efforts in each applicable sub-program.

4. Define individual responsibilities in the program in area of: goals; project selection, completion and submission; project implementation and documentation.
5. Measure the contribution and efforts of each employee, insert in his records and use for salary reviews and merit increase determination.
6. Submit goals which help meet divisional objectives and are difficult to attain. Encourage meeting goals on a *monthly* basis.
7. Assist in the completion of PEP idea, idea rating, and CS101 reporting forms.
8. Encourage each employee to learn and use techniques such as value analysis, work simplification, etc., which can assist him in reducing and avoiding unnecessary cost.
9. Encourage teamwork and integration of efforts with other areas wherever feasible and desirable.
10. Stimulate creativity and encourage changes which benefit the company and promote the exchange of ideas.
11. Discuss cost reduction program progress, problems, goals, and projects in staff meetings.

Individual Responsibilities

1. Learn those parts of the cost reduction program policy and procedures which apply to your work. If in doubt consult your supervisor.
2. Recognize and accept personal responsibility for contribution to the program goals and objectives.
3. Search for and select cost reduction projects.
4. Document and submit cost reduction suggestions resulting from cost avoidance or reduction studies.
5. Notify management of opportunities for savings in all areas in addition to your own.
6. Submit PEP suggestions which are *complete* and *practical*.
7. Learn and utilize value analysis, work simplification, and other techniques applicable to your work.
8. Cooperate with others and participate in teamwork or task force programs to reduce costs whenever possible.
9. Participate in value analysis/value engineering, manufacturing, purchasing, and other cost reduction programs whenever possible.
10. Consider *cost* as an important element *in all your* actions and decisions, along with reliable performance and schedule.
11. Utilize specialists, consultants, vendor representatives, and other support personnel or staff to assist you in your work. Actively seek out information.
12. Be receptive to ideas and alternate solutions.

