

Ninth Annual NASA/Contractors Conference  
on Quality and Productivity

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**Title: Shared Visions: Partnership of Rockwell International & NASA  
Cost Effectiveness Enhancements (CEE) for the Space Shuttle  
System Integration Program**

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**Abstract:**

As a result of limited resources and tight fiscal constraints over the past several years, the defense and aerospace industries have experienced a downturn in business activity. The impact of fewer contracts being awarded has placed a greater emphasis for effectiveness and efficiency on industry contractors. It is clear that a reallocation of resources is required for America to continue to lead the world in space and technology. The key to technological and economic survival is the transforming of existing programs, such as the Space Shuttle Program, into more cost efficient programs so as to divert the savings to other NASA programs.

This presentation describes the partnership between Rockwell International and NASA and their joint improvement efforts that have resulted in significant streamlining and cost reduction measures to Rockwell International Space System Division's work on the Space Shuttle System Integration Contract. This work was a result of an established Cost Effectiveness Enhancement (CEE) Team formed initially in Fiscal Year 1991, and more recently expanded to a larger scale CEE Initiative in 1992. By working closely with the customer in agreeing to contract content, obtaining management endorsement and commitment, and involving the employees in TQM and continuous improvement "teams," the initial annual cost reduction target has been exceeded significantly.

The CEE Initiative helped reduce the cost of the Shuttle Systems Integration contract while establishing a stronger program based upon customer needs, teamwork, quality enhancements, and cost effectiveness. This was accomplished by systematically analyzing, challenging, and changing the established processes, practices, and systems. This examination, in nature, was work intensive due to the depth and breadth of the activity.

The CEE Initiative has provided opportunities to make a difference in the way Rockwell and NASA work together -- to update the methods and processes of the organizations. The future success of NASA space programs and Rockwell hinges upon the ability to adopt new, more efficient and effective work processes. Efficiency, proficiency, cost effectiveness and teamwork are a necessity for economic survival. Continuous improvement initiatives like the CEE are, and will continue to be, vehicles by which the road can be traveled with a vision to the future.

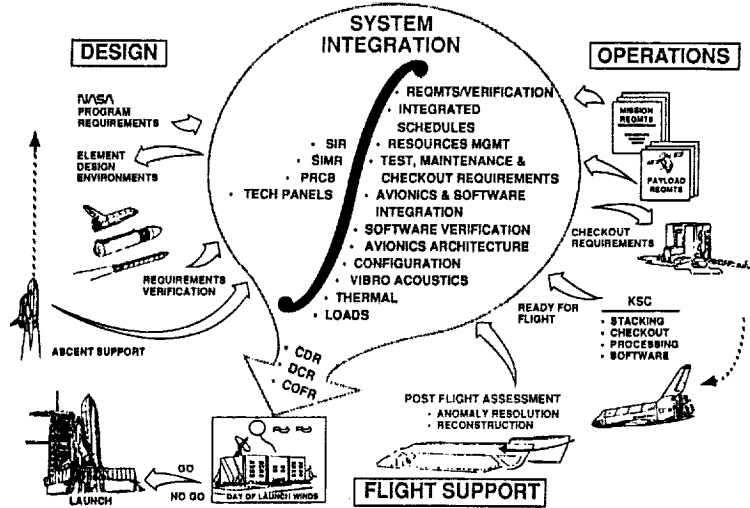
## Presentation Outline

- WHAT IS THE SYSTEM INTEGRATION CONTRACT?
- WHY PURSUE AN IMPROVEMENT INITIATIVE?
- WHAT WAS THE GOAL?
- HOW DID WE GET THERE?
- WHAT WERE THE RESULTS?
- WHAT DID WE LEARN?
- WHAT'S NEXT?

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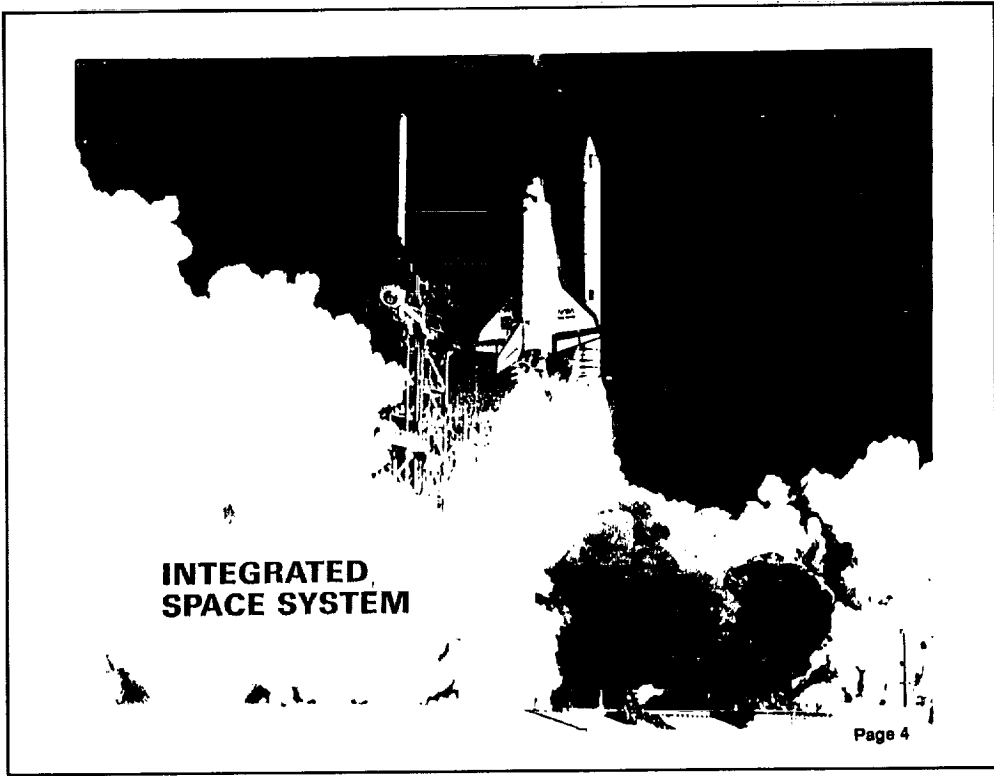
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## Rockwell Has Performed All System Integration Tasks On The Space Shuttle



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**INTEGRATED  
SPACE SYSTEM**

**Why Did We Start Cost Effectiveness Enhancement Initiative?**

NASA'S VIEW

- EXTERNAL CRITICISM OF SHUTTLE COST
- FREE UP FUNDS FOR OTHER PROGRAMS
- IMPROVE VALUE OF CONTRACTOR'S PRODUCTS
- BECOME A PATHFINDER FOR SHUTTLE PROGRAM

ROCKWELL'S VIEW

- DESIRE TO IMPROVE COMPETITIVENESS  
- STAY IN BUSINESS
- WANTED TO BE PROACTIVE IN COST EFFECTIVENESS

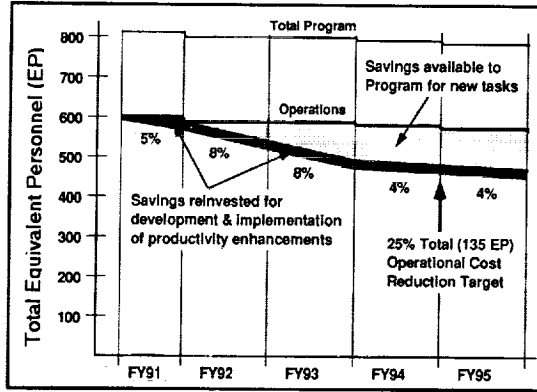


**- IMPROVED COST EFFECTIVENESS -  
WIN-WIN FOR ROCKWELL AND NASA**

## NASA/RI Common Goal: Make the System Integration Contract More Cost Efficient

### JOINTLY ESTABLISHED TWO PARAMETERS:

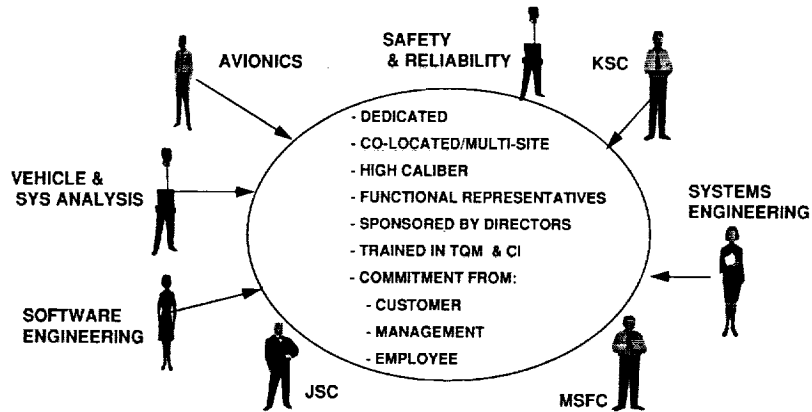
- LEVEL OF INVESTMENT
- EXPECTED COST SAVINGS



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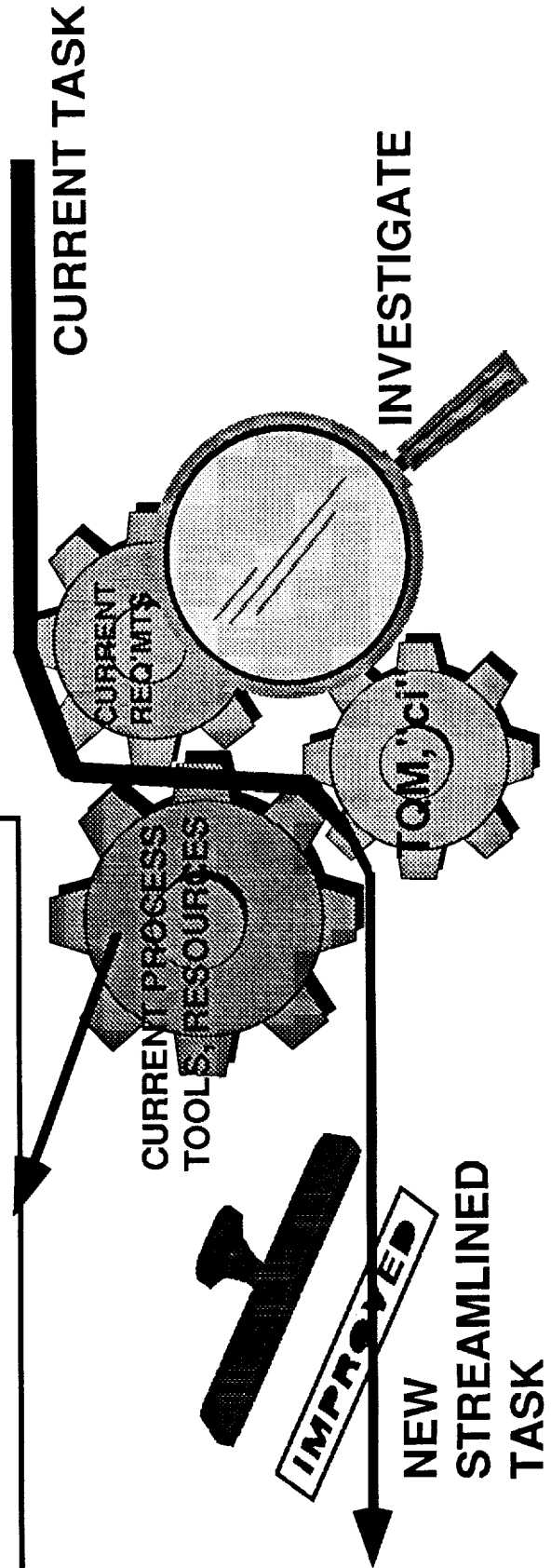
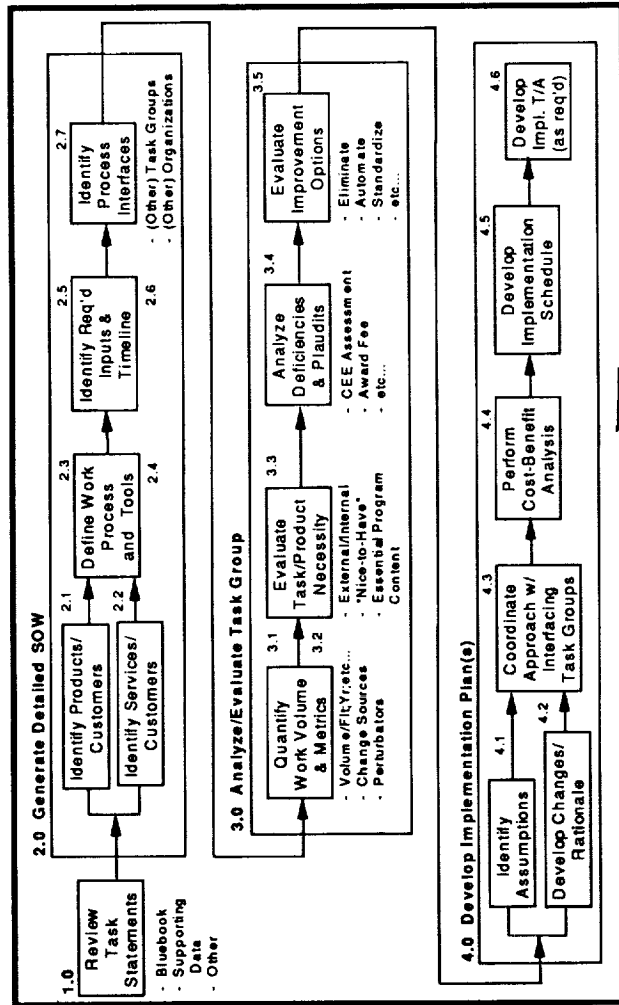
## A Dedicated Cross-Functional Core Team Was Tasked To Identify Cost Effectiveness Enhancements (CEE)



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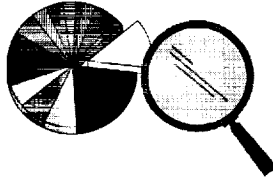
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# The CEE Approach Emphasized Process Improvement (1)



## The CEE Approach Emphasized Process Improvement (2)

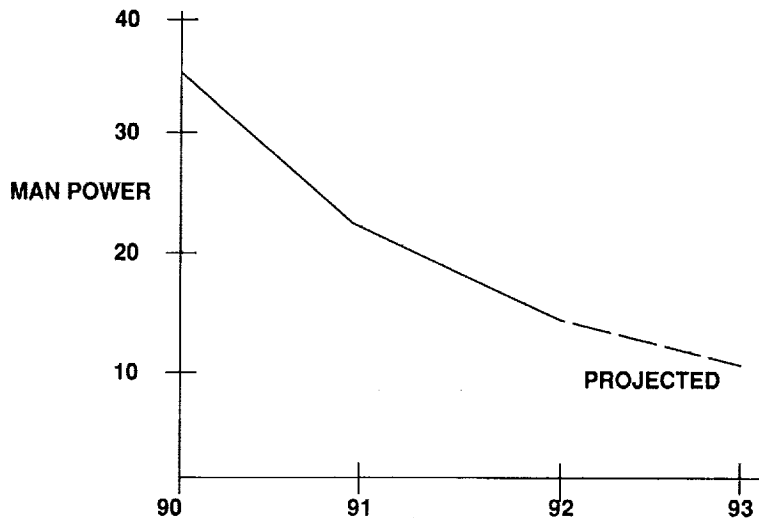
- GROUPED CONTRACT TASKS INTO SYNERGISTIC PIE SLICES
- REVIEWED CONTRACT WORK CONTENT AND PROCESSES
  - FORMED IMPROVEMENT TEAMS INVOLVING STAKEHOLDERS
  - CHALLENGED EXISTING PRODUCTS AND PROCESSES
  - APPLIED CONTINUOUS IMPROVEMENT AND TQM METHODS
- ELIMINATED LOW VALUE-ADDED WORK CONTENT
- NASA INVESTED IN IMPROVING PROCESSES FOR IDENTIFIED PAYBACK
- STREAMLINED AND AUTOMATED SEVERAL KEY PROCESSES



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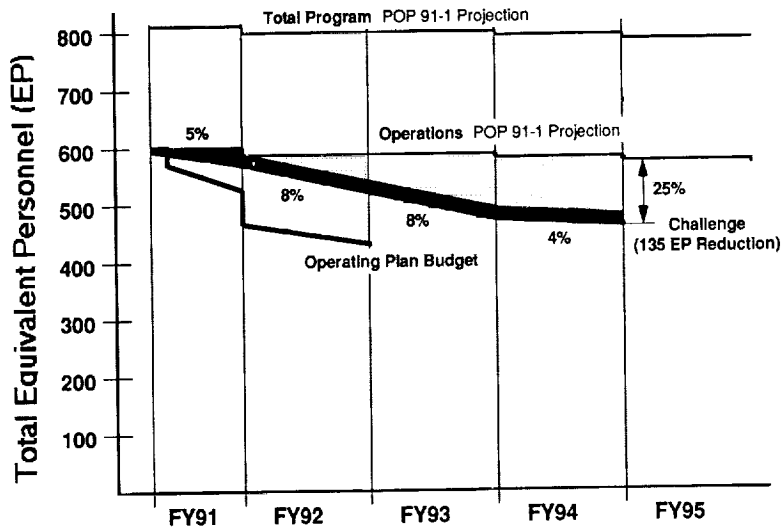
## Flight Margins Assessment Task Was A Successful Example of The CEE Initiative



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## Aggressive Pursuit Of The CEE Initiative Significantly Exceeded Initial Projections



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## Looking Back - Observations (1)

### ● WHAT WORKED?

- WE WERE SUCCESSFUL IN ESTABLISHING COST EFFECTIVENESS AWARENESS ACROSS ALL LEVELS OF THE PROGRAM
- WE HAVE GAINED TQM/QI EXPERIENCE AND CULTURE IN THE PROCESS
- WE EXCEEDED OUR COST GOALS

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## Looking Back - Observations (2)

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### ● WHAT DID NOT WORK?

- CEE TEAM BECAME ISOLATED & ULTIMATELY PERCEIVED AS "OUTSIDERS"
- DURING SECOND YEAR, CEE TEAM BECAME SELF-PERPETUATING ENTITY
- RETENTION OF EMPLOYEES WAS UNSUCCESSFUL DUE TO EXTERNAL CIRCUMSTANCES
  - LIMITED NEW IDEAS

### ● WHAT WOULD WE DO DIFFERENT?

- LIMIT TOP-DOWN APPROACH TO ONE YEAR
- INITIATED A TQM/QI INITIATIVE EARLIER

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## In Summary:

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- WIN-WIN PARTNERSHIP WITH CUSTOMER REQUIRED FOR SUCCESS
- OBTAIN COMMITMENT FROM MANAGEMENT AND STAFF
- COST EFFECTIVENESS FOCUS PRODUCES SIGNIFICANT RETURNS
  - ANNUAL GOALS EXCEEDED BY 100%
- "ci" IS AN INCREMENTAL PROCESS THAT REQUIRES STABILITY

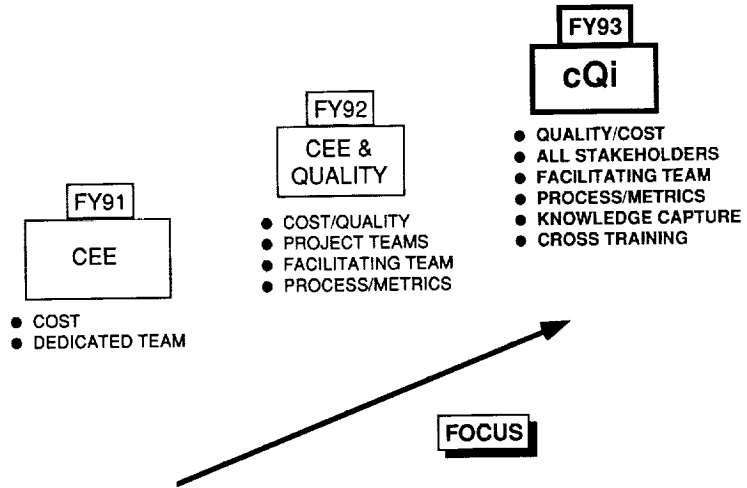
THE SYSTEM INTEGRATION CONTRACT IS MOVING TOWARDS  
"CONTINUOUS QUALITY IMPROVEMENT"

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## The System Integration Contract Is Moving Towards "Continuous Quality Improvement"



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