THE CASE FOR TEAMING ON THE ALS-STME PROGRAM

AGENDA

- BACKGROUND
- VIABILITY OF INDUSTRY COMPETITIVENESS
- POLICY
- ACQUISITION STRATEGY
  - PROCUREMENT OBJECTIVES
  - TEAMING BENEFITS
- CONCLUSION/SUMMARY
BACKGROUND

DOD BUDGET UNCERTAINTIES AND CUTS
- PRECLUDES FY 92 ALS VEHICLE AND ENGINE FSD START
- MAJOR CUTS TO VEHICLE STUDIES & NON PROP. ADP'S

DOD & NASA HAVE AGREED TO PROCEED WITH A PROTOTYPE ENGINE PROGRAM IN FY-92
- CONSISTENT WITH NASA ADV COMMITTEE RECOMMENDATIONS
- CONSISTENT WITH DSB RECOMMENDATIONS
- ENDORSED BY ALS SYSTEM CONTRACTORS
- NASA CONSIDERING SIGNIFICANT BUDGET SUPPORT
VIABILITY
OF THE ROCKET ENGINE
INDUSTRY
COMPETITIVENESS

CONCERN

- USA COMPETITIVENESS IN LARGE LIQUID ROCKET ENGINES IN SERIOUS JEOPARDY
  - THIS NATION NO LONGER LEADS THE WORLD IN ROCKET ENGINE DEVELOPMENT
    - NEW LOX/LH2 ENGINES ARE UNDER DEVELOPMENT IN:
      - EUROPE (1st FLIGHT EXPECTED IN 1995)
      - JAPAN (1st FLIGHT EXPECTED IN 1995)
      - USSR (UNDER DEVELOPMENT SINCE MID 1980'S)
  - NO NEW LARGE ROCKET ENGINE DEV INITIATED IN USA SINCE 1970
### Large Liquid Rocket Engine Development Programs in the USA

<table>
<thead>
<tr>
<th>ENGINE</th>
<th>THRUST</th>
<th>PROPELLANT</th>
<th>CONTRACTOR</th>
<th>APPLICATION</th>
<th>STATUS</th>
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<tbody>
<tr>
<td>S-3 (S-3D/E/F)</td>
<td>150K</td>
<td>LOX/Kerosene</td>
<td>Rocketdyne</td>
<td>Jupiter Thor</td>
<td>Dev &amp; Prod. Comp. 1960</td>
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<td>H-1</td>
<td>188K</td>
<td>LOX/RP-1</td>
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<td>Saturn 1/1B</td>
<td>Dev &amp; Prod. Comp. 1961</td>
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<td>1,500K</td>
<td>LOX/RP-1</td>
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<td>Saturn V</td>
<td>Dev &amp; Prod. Comp. 1967</td>
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<td>15K</td>
<td>LOX/LH2</td>
<td>Pratt &amp; Whitney</td>
<td>Centaur</td>
<td>D &amp; P Comp 1963</td>
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<td>16.5K</td>
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<td>Pratt &amp; Whitney</td>
<td>S-IV</td>
<td>D &amp; P Comp 1964</td>
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<td>J-2</td>
<td>205K</td>
<td>LOX/LH2</td>
<td>Rocketdyne</td>
<td>S-II/S-IVB</td>
<td>D &amp; P Comp 1966</td>
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* NOTE: THIS A STRICTLY COMMERCIAL ENGINE DEVELOPED FOR GENERAL DYNAMICS COMMERCIAL ATLAS/CENTAUR PROGRAM.

**Conclusion:** Competitiveness of the three (3) large liquid engine contractors in the USA seriously eroded since the 1960's.
CONCERN

• COMPETITION WITHIN USA ON LARGE LIQUID ROCKET ENGINES IN SERIOUS JEOPARDY
  
  • OF THE THREE RECOGNIZED ENGINE PRIME CONTRACTORS...
    - ONLY TWO HAVE RECENT LOX/LH2 ENGINE DEV EXPERIENCE
    - ONLY ONE HAS LARGE LOX/LH2 SYSTEM LEVEL EXPERIENCE
  
  • OPPORTUNITIES FOR NEW ENGINE DEVELOPMENTS IN THE NEAR FUTURE ARE VERY LIMITED.

CONCERN

• OPEN COMPETITION CAN BE DETRIMENTAL TO THE BEST INTERESTS OF THE GOVERNMENT UNDER CERTAIN CIRCUMSTANCES
  
  • WHERE BUDGETS DO NOT ALLOW FOR THE DEVELOPMENT OF MULTIPLE SOURCES AND ALTERNATE COMPETING DESIGNS, AND.......]
  
  • WHERE VERY SMALL MARKETS EXISTS, AND.....
  
  • WHERE LIMITED QUALIFIED COMPETITORS EXIST.......
  
  • A SOLE SOURCE WILL RESULT !!!
**POLICY**

- SUPPORT AND PROVIDE FOR THE LARGE LIQUID ROCKET ENGINE NEEDS OF THIS NATION

- MAINTAIN A VIGOROUS ROCKET ENGINE INDUSTRY IN THE USA FOR LARGE SIZE, LATEST TECHNOLOGY LIQUID ROCKET ENGINES.
  
  - KEEP USA FROM RELINQUISHING ITS PREEMINENCE IN LARGE LIQUID ROCKET ENGINES.
  
  - ALLOW USA TO BETTER COMPETE IN THE INTERNATIONAL COMMERCIAL ARENA.
  
  - AVOID POTENTIAL DEPENDENCY ON OTHER NATIONS FOR OUR NEXT GENERATION OF LARGE LIQUID ROCKET ENGINES.
ADVANCED LAUNCH SYSTEM

STME

PROTOTYPE PROGRAM

POLICY SPECIFIC

- CONDUCT AN STME PROTOTYPE ENGINE PROGRAM THAT:

  - PROVIDES FOR THE LARGE LIQUID ROCKET ENGINE NEEDS OF THE NATION

  - MINIMIZES FULL SCALE DEVELOPMENT COST AND SCHEDULE OF NEXT GENERATION LARGE LIQUID ROCKET ENGINE
    - SIMILAR DOD/AF PROTOTYPE APPROACHES HIGHLY SUCCESSFUL (ie. F-16)

  - FACILITATES SYNERGISM BETWEEN THE PARTICIPATING CONTRACTORS TO OBTAIN THE BEST AND UNIQUE IDEAS, CAPABILITIES, AND TECHNOLOGIES LEADING TO THE BEST OVERALL DESIGN.

  - PRECLUDES A SINGLE CONTRACTOR FROM BECOMING A FUTURE "SOLE SOURCE".
    - AVOID A "WINNER TAKE ALL" PROCUREMENT APPROACH.
ACQUISITION STRATEGY

PROCUREMENT OBJECTIVE

- IMPLEMENT TEAMING NOW ON THE EXISTING ARRAY OF PHASE B, AND ADP CONTRACTS.
  - TEAM AEROJET, PRATT & WHITNEY, AND ROCKETDYNE
  - USE TEAM TO FACILITATE ENGINE CYCLE DECISION
  - USE TEAM TO HELP RESTRUCTURE TOTAL PROGRAM TO ARRIVE AT AN INTEGRATED PLAN CONVERGING TO A PROTOTYPE ENGINE DESIGN.

- CONDUCT THE PROTOTYPE PROGRAM WITH TEAM OF THE 3 STME PRIME CONTRACTORS.
  - AWARD CONTRACT IN FY-92 TO TEAM OF AEROJET, PRATT & WHITNEY, AND ROCKETDYNE
  - PROTOTYPE PROVIDES PROOF OF CONCEPT
BENEFITS OF TEAMING

- Maintains a vigorous industry for large liquid rocket engines in the USA.
- Retains USA's preeminence and leadership in the field
- Makes USA more competitive in the international arena
- Avoids single contractor from becoming a sole source for large liquid rocket engines
- Enhances competition for the future

BENEFITS OF TEAMING (cont'd)

- Within the budget constraints, teaming has the potential for the best product at reduced development costs
- Synergism of the prime companies and gov't work
- Avoids contractors withholding best ideas and technologies because of the competitive environment
  - Allows best component designs to emerge within best engine system design
  - Consistent with ALS total quality management req't
  - Allows early convergence to a single engine design
- Eliminates duplication of efforts at the 3 contractors
CONCLUSION/SUMMARY

- THE NATION NEEDS TO PROCEED WITH A NEW LOX/LH2 ROCKET ENGINE PROGRAM NOW!

- OPEN COMPETITION NOW WILL HAVE DELETERIOUS IMPACTS ON THE COMPETITIVE VIABILITY OF THE LIQUID ROCKET ENGINE INDUSTRY

- TEAMING PROVIDES A WAY TO SOLVE TODAY'S CONCERNS WHILE ENHANCING THE OPTION FOR OPEN COMPETITION IN THE FUTURE