Implementing the Vision
2nd Space Exploration Conference

J-2X Engine
Steve Bouley
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PWR Corporate History

North American Aviation 1928-1967

NAA Aircraft Operations 1928 - 1946

Aerophysics Laboratory 1928 - 1948

Propulsion Field Laboratory (SSFL) 1948-2005

Four New Divisions Formed 1955

North American Rockwell 1967-1973

Rocketdyne 1946-1948

Atomics International 1948-2005

Space Systems

Autonetics (Electronics Systems)

Rocketdyne Propulsion & Power 1984-2005


North American Avionics 1928-1967

The Boeing Company 1996-2005

United Technologies 2005

Pratt & Whitney Aircraft Company 1925

Pratt & Whitney 1925

Pratt & Whitney 1925

Vought Sikorsky 1934

Hamilton Standard

United Technologies

Pratt & Whitney Rocketdyne Inc.

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Pratt & Whitney Rocketdyne
3,700 Total Employees

- Canoga Facility (California) - 1,100 Employees
- De Soto Facility (California) - 1,250 Employees
- Kennedy Space Center (Florida) - 235 Employees
- Marshall Space Flight Center (Alabama) - 80 Employees
- Stennis Space Center (Mississippi) - 235 Employees
- West Palm Beach (Florida) - 880 Employees
- San Jose Facility (California) - 35 Employees
- 120 Employees Kennedy Space Center (Florida)

Consolidation 2008
J-2X: Apollo-era Derivative Engine
CEV Upper Stage and CaLV EDS Engine

Crew Launch Vehicle
- Height: 309 ft
- Gross Liftoff Mass: 2.0 Mlb
- Upper Stage (1 J-2X)
  - 280 klb LOx/LH₂
- Segment
  - 5 Segment RSRM
- Core Stage (5 RS-68)
  - 2.6 Mlb LOx/LH₂
- Earth Departure Stage (1 J-2X)
  - 450 klb LOx/LH₂

Cargo Launch Vehicle
- Height: 358 ft
- Gross Liftoff Mass: 6.4 Mlb
- S-IVB (1 J-2)
  - 240 klb LOx/LH₂
- S-II (5 J-2)
  - 1 Mlb LOx/LH₂
- S-IC (5 F-1)
  - 3.9 Mlb LOx/RP

Saturn V
- Height: 364 ft
- Gross Liftoff Mass: 6.5 Mlb

Implementing the Vision
## J-2 Engine Lineage

### J-2X: Adding a new member to the family

<table>
<thead>
<tr>
<th></th>
<th>J-2</th>
<th>J-2S</th>
<th>X-33</th>
<th>J-2X</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Configuration</strong></td>
<td>J-2</td>
<td>J-2S</td>
<td>X-33</td>
<td>J-2X</td>
</tr>
<tr>
<td><strong>Thrust</strong></td>
<td>230 klb</td>
<td>265 klb</td>
<td>261 klb</td>
<td>294 klb</td>
</tr>
<tr>
<td><strong>Isp</strong></td>
<td>425 sec</td>
<td>436 sec</td>
<td>419 sec</td>
<td>448 sec</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>3,492 lb</td>
<td>3,800 lb</td>
<td>7,500 lb</td>
<td>5,360 lb</td>
</tr>
<tr>
<td><strong>Length</strong></td>
<td>116 in</td>
<td>116 in</td>
<td>79 in</td>
<td>185 in</td>
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</tbody>
</table>
J-2X & RS-68 Size Comparison

Implementing the Vision
System Development Test Plan:

2 Power Pack Assy - 40 starts / 11880 sec
5 Dev. Engines - 128 starts / 23920 sec
2 Certification Engines - 44 starts / 11015 sec
1 Test Flight Engine - 7 starts / 1695 sec
J-2 Legacy Expertise Support

Recurring NAR team established
J-2X Powers the Vision for Space Exploration

- PWR on contract now and executing
- Working to definitize DDT&E contract in parallel
- Accelerated schedule - early testing / fab critical
- Rely on heritage & flight proven technology
- J-2X success critical to Exploration sustainability

Low risk propulsion for Exploration