

**National Institute for Rocket Propulsion  
Stewardship Team  
Industry Perspectives Panel Discussion**

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**Presented @:**  
**NIRPS Workshop in conjunction with**  
**JANNAF CS / APS / EPSS / PSHS Joint Subcommittee Meeting**  
**Monterey CA**  
**6 December 2012**

- ❖ What is your view of the health of the propulsion industrial base?
- ❖ What is your organization doing to
  - a) Sustain your supplier base?
  - b) Sustain your internal capabilities?
- ❖ What areas of emphasis would enable NIRPS to provide the best value to address industrial base issues?



Aerojet Heritage



GD Space Systems (Redmond Operations)

Atlantic Research Corporation (ARC)

Pratt & Whitney's Chemical Systems Division (CSD)

Complementary Acquisitions

**Current Business Units**

**Space & Launch Systems**

**Tactical Systems**

**Missile Defense and Strategic Systems**

**Advanced Programs**

**A Growing Company Focused on Aerospace and Defense**

# What is your view of the health of the propulsion industrial base?

What is Healthy? (IB Health Risk Assessment)	Score *
❖ Right-sized competitors (competitive opportunities)	C
❖ Technology at least equivalent to peer countries	C
❖ Enabling of affordable solutions	C
❖ Demand and production capacity in balance at a sustainable level	C
❖ Balanced, experienced workforce with healthy demographics	D
❖ Continuous activity in all aspects of the product life cycle	C

\* Aerojet scoring based upon an amalgamation of diverse product areas and offerings.

Key: A - Wonderful  
 B - Workable  
 C - Challenged  
 D - Dismal  
 E - Rotten

***Demanding Extraordinary Efforts  
 to Sustain Corporate Health and Productivity***

## Pressures and Challenges

- ❖ Budget austerity
- ❖ Sparsity of competitive opportunities (in some product sectors)
- ❖ Divergency between demand and production capacity
- ❖ Programs imbalance (maldistribution of R&D thru production phases)

## Workforce Concerns

- ❖ Skewed workforce demographics
- ❖ Challenge with transition of knowledge (to next generation)
- ❖ Waning # of STEM graduates

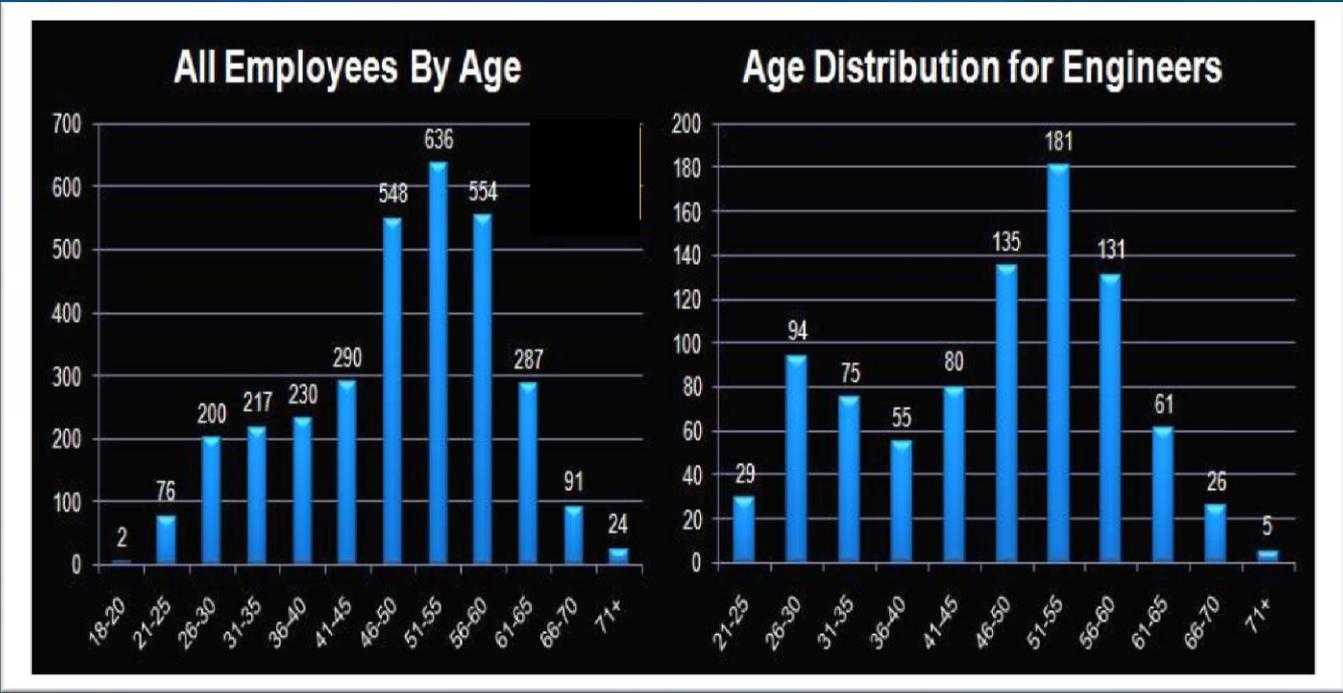
and

Waning interest in engineering careers (even for STEM and engineering graduates)

- ❖ Perceived lack of job stability
- ❖ Weakness of public interest and engagement

*Relentless Challenge Coupled with Long Term Concern*

# Our Workforce Demographics are Similar to those of U.S. Aerospace and Defense Workforce



- ❖ Successful corporate right sizing in the 1990s
- ❖ Continual hiring since 2000
- ❖ Current hiring rate is 3.5 % for newly hired engineers each year

*Workforce Transition Depends on Continued Success in Winning the New Programs that Support New Workers*

## **What is your organization doing to sustain your supplier base?**

- ❖ **The Aerojet supply chain is relatively strong due to:**
  - ❖ **Diversified product portfolio**
  - ❖ **Selection of suppliers with a healthy and diversified mix of A&D, aircraft, and commercial businesses.**

(There are exceptions - such as the solid propellant supply base operating at minimal capacity utilization.)
- ❖ **Aerojet has an established make/buy procedure that ensures that requirements are met where the best capability and capacity exist.**
- ❖ **Aerojet is consolidating our supply base to put greater content into fewer qualified suppliers.**
  - ❖ **Focus on the best (the better 50%)**
    - ❖ The majority of the suppliers will not (given market choices) have any key customer representing >40% of their business. (Multiple revenue streams from multiple marketplaces is a sustainable strategy.)
    - ❖ Many of our suppliers (even the best of the best) are operating at less than 70% total capacity.
    - ❖ Increased content drives efficiency and rates for sustainable affordability.

***Managing for Capability, Affordability and Sustainability***

## ***What is your organization doing to sustain your internal capabilities?***

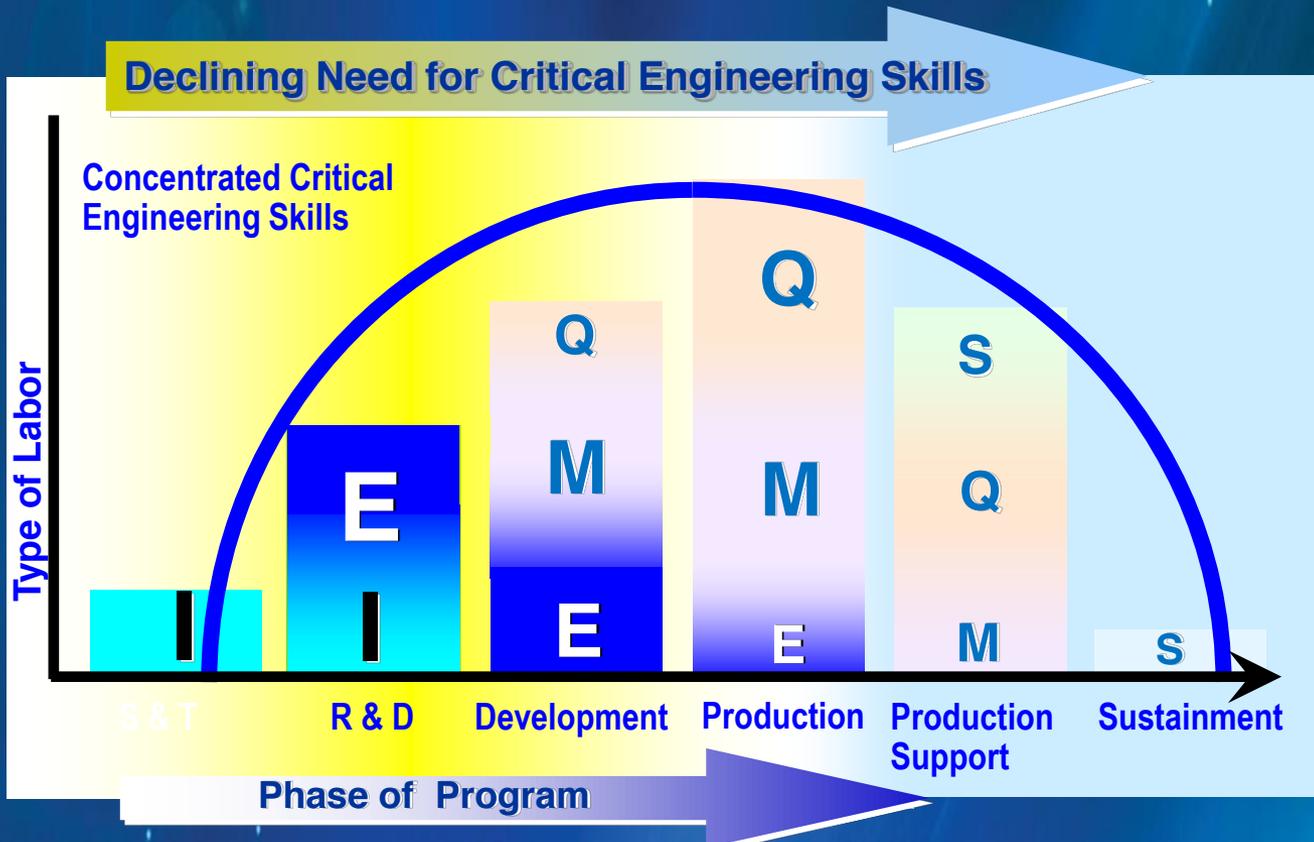
- ❖ Aerojet internal capabilities benefit from diversified portfolio.
- ❖ Employee cross-training (working solids and liquids, big and small, development / production / sustainment phases) boosts:
  - ❖ Capability, agility, challenge, engagement and opportunity.
- ❖ Innovative staffing (“marketplace”) approach enhances staffing efficiency and employee morale (ensuring broad exposure and minimal transition downtime)

### **Policies to retain younger workers**

- ❖ Retention plans allow engineers increasing responsibility quickly.
  - ❖ Mentors provide a life line of help and training for younger workers as their responsibility increases.
- ❖ Focus on individual development plans
- ❖ Today’s workers demand a balanced lifestyle.
  - ❖ Aerojet multiple sites provide options for workers to choose their location.
  - ❖ Modern work scheduling (like 9/80 work weeks) to provide more time for family and recreation.

***Managing for Capability, Challenge, Engagement and Opportunity***

# Product Life Cycle Dictates Engineering Skill Mix



- ❖ R&D programs are a key training avenue for new workers
- ❖ Need for critical engineering skills decreases as programs mature
- ❖ Production programs are primarily maintaining quality and manufacturing skills

Decade #1	Decade #2	Decade #3+
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**I** - Inventor/Entrepreneur    **M** - Manufacturing    **S** - Sustainment  
**E** - Engineering    **Q** - Quality Assurance

**Balance of Programs Ensures Sustained Balance of Skills**

## ***What areas of emphasis would enable NIRPS to provide the best value to address IB issues?***

- ❖ **Relative to industrial base health, NIRPS can:**
  - ❖ **Expose and spotlight institutional blockades**
  - ❖ **Identify convergences of opportunities**
  - ❖ **Establish metrics and track progress**
  
- ❖ **Specific to IB and supply base, NIRPS might:**
  - ❖ **Sponsor industry-wide evaluation of obsolescence issues**
  - ❖ **Create technological springboards for individual programs to proceed to qualification.**
    - Recently there was an “Energetics Summit” for the industry to look at materials and issues as a community.
  
- ❖ **Specific to people attraction and retention, NIRPS can:**
  - ❖ **Advocate about criticality of R&D and balance of programs within the product life cycle**
  - ❖ **Effect an enhanced linkage/dialogue between academia, industry and government.**

***NIRPS can Support (but not Save) the Industrial Base.***

## **NIRPS Mandates**

- ❖ NIRPS must be broad and diverse - with multi-agency and across-industry “constituency”.
  - ❖ NIRPS must remain “pure” and impartial to maintain credibility
- ❖ NIRPS should:
  - ❖ Act as “agent provocateur” and stimulate debate
  - ❖ Challenge the status quo
  - ❖ Identify opportunities for efficiency and collaboration
  - ❖ Be custodian of the “knowledge”
- ❖ NIRPS could support SEBs and selection processes by:
  - ❖ Providing / accessing the data
  - ❖ Filtering out parochial interest and identifying “pure” technical solutions
- ❖ NIRPS could sponsor nurturing technology approaches
- ❖ NIRPS should NOT
  - ❖ Make program or funding selections
  - ❖ Compete with industry
    - ❖ NIRPS should not do anything that could be done by an industry entity (or entities)

***NIRPS can Filter Diverse Interests and Moderate an Informed Debate***