NATIONAL INSTITUTE FOR ROCKET PROPULSION SYSTEMS

Stewardship Team: Year in Review

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Today's Agenda

- Stewardship Year in Review
  - Rajiv Doreswamy, Ph.D., NIRPS Stewardship Facilitator
- Department of Commerce (DoC) Space Industrial Base "Deep Dive" Survey Preliminary Results
  - Ted Bujewski, Chief Industrial Base and Supply Chain Management, HEOMD, NASA HQ
- Panel Discussion "Industry Perspectives on Stewardship of the Industrial Base"
  - Ms. Carla Bossard, Business Development Director for Space & Launch Systems, Aerojet Corporation
  - Kent V. Rominger, Vice President, Strategy & Business Development Space Launch Division, ATK Aerospace Group
  - John Steinmeyer, Sr. Project Manager, Launch Systems Group-SCEC, Orbital Sciences Corporation
  - Ron Ramos, Vice President, Exploration & Missile Defense Systems,Pratt and Whitney Rocketdyne
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Stewardship Team Membership

- **Lead:** Dr. Jamie Neidert - AMRDEC
- **Facilitator:** Dr. Rajiv Doreswamy - NASA/MSFC
- **NASA members:**
  - James Cannon, Brad Perkins & Mark Cooper - MSFC
  - Mark Klem - GRC
- **USG:**
  - Bob Read - OSD
  - Stuart Blashill (NAWCWD), Al Stern, Bob Kaczmarek & Frank Tse (NSWCIHD) - Navy
  - Dr. Charles Lind/David Tritt – PEO M&S
  - Kirk Newman - MDA
  - Ken Davidian/Greg Dees – FAA
  - Charlene Smoot- Defense Logistics Agency (DLA)
- **Industry:** Carla Bossard (Aerojet), Shirley Brostmeyer (Florida Turbine), Charley Bown (ATK), James Clarke (LMMFC-D), Bob DaLee (Boeing), Michael Heil (OAI), Jay Littles/Chris Sanders (PWR), Phil Marshall (ULA), Dave Smith (Raytheon), Don Skinner (Jacobs), John Steinmeyer (Orbital), Brett Alexander (Blue Origin), Kent Richman (AMPAC).
- **Academia:**
  - Dr. Shankar Mahalingam - UAHuntsville
  - Dr. Vigor Yang – Georgia Institute of Technology

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Stewardship Team Strategies & Objectives

Strategy	Objectives	Grand Challenges					
		GC1	GC2	GC3	GC4	GC5	GC6
S1. Define a healthy industrial base.	1. Develop a series of metrics to measure health of Industrial Base (IB). 2. Understand ramification of declining IB on the ability to maintain DoD and NASA propulsion current needs. 3. Measure ability of Rocket Propulsion Systems (RPS) industry to react and support sudden changes in RPS needs.	P	S	S	S	P	S
S2. Create and implement a roadmap to achieve a unified US DoD/NASA policy regarding maintaining a healthy industrial base.	1. Define the pathway from the IB of today to a healthy IB. 2. Provide a briefing tool for senior DoD/NASA leaders for policy communication of NIRPS and its effect. 3. Achieve consensus form the US DoD/NASA, the RPS industry and academia on the vision for a healthy IB. 4. Utliize the roadmap as a tool to track progress in NIRPS activities and to identify leveraging of other contributing activities.	P	S	S	S	P	S
S3. Develop and promulgate options to improve US competitiveness in rocket propulsion systems.	1. Achieve coordination between DoD, NASA and the RPS industry on decisions regarding the sustainment, maintenance and use of motor test facilities. 2. Provide inputs to DoD, NASA and Congress on incentive programs for capital improvements to reduce production and testing costs. 3. Achieve coordination between DoD, NASA, academia and the RPS industry on IR&D, academic studies and Government-funded technology programs to reduce rocket propulsion costs and to improve motor/engine performance to enhance salability. 4. Establish a continuing forum to exchange lessons-learned on cost reduction/avoidance. 5. Conduct and/or promote the conduct of industry-wide stuides to improve production processes to minimize waste and to increase efficiencies.	P	P	S	P	P	S
S4. Promote 'Best Value' approaches.	1. Provide improved standards of selection criteria which may include cost, past performance, qualitiy of product or service, sustainment of strategic plans, critical technologies support, and teaming/supporting vendors and academia meeting the goals of a national industrial policy. 2. Achieve coordination between DoD, NASA and the RPS industry on decisions regarding the selection and resourcing of skills, capabilities, and critical technologies. 3. Provide inputs to DoD, NASA and Congress on programs and processes to modify procurement criteria to align with national propulsion industrial policy goals. 4. Achieve coordination between DoD, NASA, academia and the RPS industry on IR&D, academic studies and Government-funded technology programs to align with national propulsion industrial goals. 5. Conduct and/or promote the conduction of industry-wide studies to improve best value awards and processes.	P	S	S	P	P	S
S5. Suggest methods to increase STEM degrees applicable to RPS careers for US citizens.	1. Optimize the demographic distribution of technical workers in the RPS industrial base. 2. Increase in the both the percentage and actual number RPS related Bachelors, Masters, and Ph.D. degrees awarded to US citizens. 3. Steady or increasing funding to RPS researchers and graduate students.	P	P	S	S	P	S

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Team Update: Stewardship

- Developed and approved metrics for determining the health of the US Rocket Propulsion Industrial Base (RPIB)
- Developed survey to collect data for Industrial Base Health Metrics
  - Released: 22 October 2012
  - Input Deadline: 22 January 2013
- Supported NASA Industrial Base Working Group (IBWG) sponsored by NASA HQ
- Most USG members of the Stewardship team supported NDAA 1095 Action as part of the Interagency Task Team (IATT)
- Initiated Supply Chain Mapping for Liquid Rocket Engines in cooperation with MSFC Engines Project Office and Pratt and Whitney/Rocketdyne (PWR)
- Led MSFC efforts in responding to the Department of Commerce (DoC) “Deep Dive” survey of the US Space Industry

Industrial Base Metrics Survey

- **Original Survey released: 10/22/2012**
- **Suspense date: 1/22/2013**
- **URL:http://prod.nais.nasa.gov/cgi-bin/eps/synopsis.cgi?acqid=154272**
- Please provide a breakdown of number of degreed (broken out by BS, MS and PhD) and number of non-degreed STEM (Science, Technical Engineering and Mathematics) employees for Rocket Propulsion Systems (RPS) versus years of experience, in 5 year increments, as of 1 October 2002, 2007, and 2012. Please provide age demographics as well.
  - Average number of job offers from your company or organization received and accepted by STEM graduates for RPS positions
  - Retention rates for STEM hires (years of service) of record 1 October 2002 and 2007
- For the periods Government Fiscal Year (1OCT- 31SEPT) GFY02, GFY07 and GFY12, please provide:
  - The number of rocket engine/motor live fire tests conducted, broken down by liquid, solid, or other.
  - Total pounds of solid propellant or storable liquids or cryogenics produced for use development programs (including Independent Research and Development (IR&D))
  - Total pounds of solid propellant or storable liquids or cryogenics produced for production motors.
  - Number of Development motors or Liquid Rocket Engines (LREs) produced.
  - Number of production motors or LREs delivered.
  - The IR&D (in $'s) devoted to RPS by your company or organization.
  - IR&D devoted to Rocket Propulsion Systems(RPS) as a % of total sales.
  - The externally funded R&D value (in $'s) for RPS for your organization.
  - Total RPS sales ($M)

Industrial Base Metrics Survey

- Do you have an active supply chain management system in place for your lower-tier RPS vendors (tier 2 and 3, not just first level suppliers)?
  - How many sole or single source suppliers did/do you have for GFY 2002, 2007, and 2012? Of these, how many are US and how many are non-US? If non-US, please identify country.
  - Identify the percentage of non-US components used in your RPS products (treat each part, ingredient, circuit board, etc. equally as a single component).
  - For the years GFY2002, 2007, and 2012, how many sub-tier suppliers left the market? How many entered the market? How many re-qualifications occurred because of a supplier change or process change? Provide data for your company or organization only.
  - Are your production capabilities dependent on a stockpile of material? If so, what stockpiled material? Are there plans to develop a capability to produce the material?
  - How dependent is your sub-tier supply base on revenues from the rocket propulsion market? Identify vendors where RPS revenues are >50% of their revenue portfolio.
- If data is not available for any of these, please indicate what's missing.
- The term “rocket propulsion industrial base” (RPIB) refers to the nation's capability to conceive, design, develop, manufacture, test, and support missions using liquid rocket engines and solid rocket motors that are critical to its national security, economic health and growth, and future scientific needs. The RPIB encompasses US government, academic, and commercial (including industry primes and their supplier base) research, development, test, evaluation, and manufacturing capabilities and facilities. The RPIB includes the skilled workforce, related intellectual property, engineering and support services, and supply chain operations and management. This definition touches the five main segments of the U.S. RPIB as categorized by the USG: defense, intelligence community, civil government, academia, and commercial sector.

Looking Forward: Proposed NIRPS FY13 Goals

Grand Challenges	FY13 Goals	Team
1. Support the Competetiveness and resilience of the industrial Base	1.1 Develop Supply Chain Analysis for SLS Architecture Decisions.	Stewardship
	1.2 Develop Metrics to Determine Health of Industrial Base.	Stewardship
2. Invigorate the STEM pipeline	2.1 Provide engineering students with practical experience utilizing propulsion design and analysis tools and methodologies.	Solutions Facilitator
3. Develop and integrate a science and technology plan for propulsion systems	3.1 Use existing roadmaps to identify opportunities for collaborations and leveraging of complimentary activities.	Technology
4. Reduce development and sustainment costs for missiles and rocket systems	4.1 Conduct a study/survey of low cost technology test beds and/or other methods for transitioning propulsion component /sub-system technologies through the TRL valley of death (TRL 4-6).	Technology
5. Collaborate across agencies for missile and rocket propulsion system development	5.1 Develop initial community of interest capability.	Solutions Facilitator
	5.2 Establish a Cross-Cutting Collaborative Solutions Team that executes tasks of cross community interest, stimulating potential follow-on collaborations.	Solutions Facilitator
6. Foster access to facilities and expertise across Government, industry, and academia	6.1 Develop initial Propulsion Skills and Capabilities Directory & Web Tool.	Solutions Facilitator
	6.2 Complete study of mechanisms for potential pass through process to ease access to cross government skills and capabilities.	Solutions Facilitator
Integrated Goals		
Integrated Goals	IG.1 Develop operational model defining management concepts, operating principles and framework, and high-level goals including a concept of management oversight for periodic evaluation.	Integrated
	IG.2 Develop a comprehensive Strategic Communications Plan that addresses external and internal stakeholders, interactive websites, and outreach planning for public, STEM, and Agency/Industry engagement.	Integrated

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Looking Forward: Stewardship Team

- The Stewardship team builds the foundation for future NIRPS activities
  - Provides data on the state of the industrial base
  - Enables decision making on focusing investments
- Key strategic efforts need to be completed in FY2013
  - Complete analysis of Propulsion IB metrics and publish data
  - Build capability for supply chain analysis
  - Initiate supply chain analysis for SLS architecture decisions
- Stewardship needs to develop a strategic STEM goal
- Academic base needs to be expanded and engaged

Stewardship Team: Panel Discussion

- What is your view of the health of the propulsion industrial base?
- What is your organization doing to sustain your supplier base as well as internal capabilities?
- What areas of emphasis would enable NIRPS to provide the best value to address industrial base issues?