

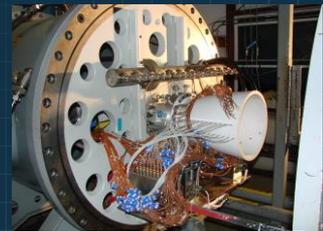


NATIONAL INSTITUTE FOR ROCKET PROPULSION SYSTEMS

NIRPS Planning Team Monthly Review

April 9, 2014

Host: Wyle Laboratories/NTS



Agenda

Topic	Presenter	Time
→ Month-In-Review	D. Thomas	5
Upcoming Engagements/Reviews	R. Doreswamy	5
NIRPS Hot Topics		
Goals Status	R. Doreswamy	5
Supply Chain Update	B. Perkins	5
SLS Advanced Development	B. Perkins	5
Additive Manufacturing TIM	J. Cannon	5
Wyle Laboratories/NTS		25
Closing Remarks	R. Doreswamy	5

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Upcoming Engagements/Important Dates

May 19-22, 2014

JANNAF - 61st JANNAF Propulsion Meeting / 42nd Structures and Mechanical Behavior / 38th Propellant and Explosives Development and Characterization / 29th Rocket Nozzle Technology / 27th Safety and Environmental Protection Joint Subcommittee Meeting <http://www.jannaf.org/meetings.php>
Charleston, SC

July 28-30, 2014

50th AIAA/ASME/SAE/ASEE Joint Propulsion Conference
<http://www.aiaa.org/EventDetail.aspx?id=18582>
Cleveland, OH

August 11-14, 2014

Space and Missile Defense (SMD)
<http://smdsymposium.org/>

September 2-5, 2014

JANNAF Rocket Propulsion Additive Manufacturing Technical Interchange Meeting
<https://www2.cpiac.jhu.edu/meetings/Sep2014/pages/index.html>
Huntsville, AL

FedBizOpps – Industry Meetings at JANNAF

A Joint Army-Navy-NASA-Air Force Interagency Propulsion Committee Working Group is inviting the rocket propulsion industry to provide informal input on the status, health and issues in the rocket propulsion industry base. Industry representatives may meet with the Working Group on Monday, **May 19th**, during the JANNAF - 42nd SMBS/38th PEDCS/29th RNTS/27th SEPS Joint Subcommittee Meetings in Charleston, South Carolina. Registration for the 30 minute individual sessions will be available on a first-come, first-served basis with a maximum of 14 slots reserved. **To schedule your session contact Tina.M.Swindell@nasa.gov by May 1, 2014.**

This information gathering activity is not related to any future procurement activity.

LINK:

https://www.fbo.gov/index?s=opportunity&mode=form&id=d702fec30332bf2cc1e9c2f4068c7d45&tab=core&_cview=0

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NIRPS FY14 Goals

Grand Challenges	FY14	Collaboration Area	Status
1. Support the Competitiveness and resilience of the industrial Base	1.1 Implement Supply Chain Analyses Phase II & III.	Ecosystem Modeling	On Plan
	1.2 Validate Health Metrics and begin reporting.	Health Metrics	Known Issues
	1.3 Establish/maintain Industry and academia relationships.	Community Solutions	On Plan
2. Invigorate the STEM pipeline	2.1 Provide propulsion engineering students and staff with practical experience utilizing propulsion design and analysis tools and methodologies.	Community Solutions	On Plan
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 Road Mapping	Known Issues
4. Reduce development and sustainment costs for missiles and rocket systems	4.1 Develop/maintain technology collaborations for missiles and rocket systems to support the enhancement of current and future RPIB workforce and U. S. capabilities.	Technology Road Mapping	On Plan
5. Collaborate across agencies for missile and rocket propulsion system development	5.1 Implement NIRPS - JANNAF Contract Administration.	Community Solutions	On Plan
6. Foster access to facilities and expertise across Government, industry, and academia	6.1 Implement Phase II & III NIRPS Solutions Web Portal.	Community Solutions	On Plan
	6.2 Continue development of streamlined access to government skills and capabilities.	Community Solutions	On Plan
Operations/Communication	IG.1 Continue NIRPS Operations and Communications including creation of an internal NIRPS NASA Charter and CONOPS and engagement of the other NASA Centers, industry and Academia.	Integrated	On Plan

Have not started

On Plan

Known Issues

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Supply Chain Analyses

Objective: Inform Agency Decision makers of the impacts to the Propulsion Industrial Base, due to potential SLS (and other) architecture decisions

➤ Approach: Develop a supply chain visualization tool database which interacts with a probabilistic demand and production rate model

➤ NIRPS and Aerospace Corporation executing in conjunction with HEOMD, SLS Program Office

➤ Phase 1 focus on development of prototype tool/environment

➤ Phase 2 focus on Exploration Upper Stage liquid engine options (Test Phase 1)

➤ Estimates of supplier financial health, dependency on prime and “importancy” are based on best available information and subject matter experts (SME’s) best estimate

$$\text{Importancy} = \frac{\text{Percentage of Hardware Cost for Engine}}{\text{Number of supplier's touches in our database}}$$

➤ Baseline engine demand based on the current launch manifest combined with the National Mission Model (out years)

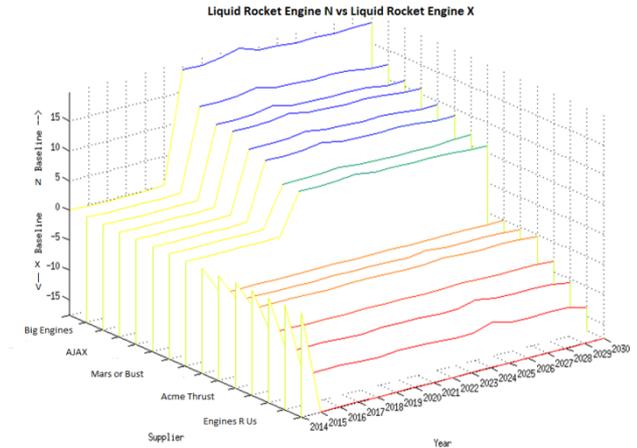
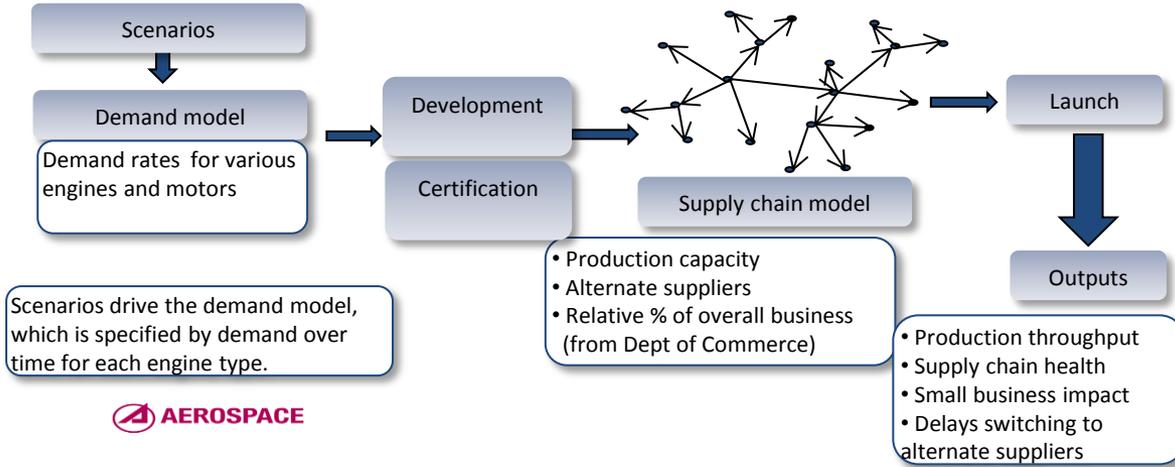
➤ Phase 3 will study liquids/solids booster applications in conjunction with US Air Force

➤ Additional Phases will include tactical/strategic applications and possibly other Subsystems



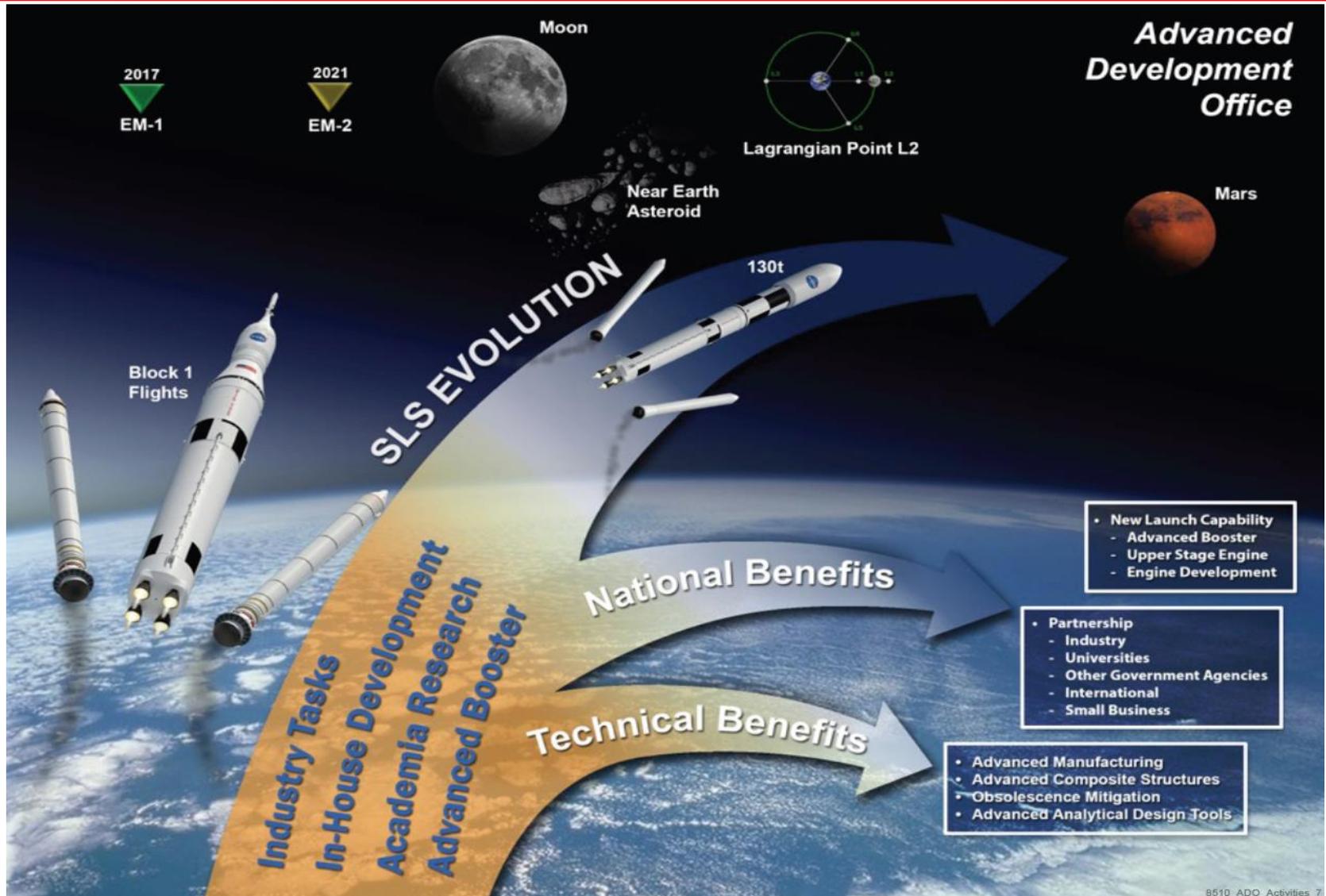
PropSIMA Example: LRE “N” Baseline vs. LRE “X” Baseline

PROPulsion Supplier Integrated Modeling and Analyses (PropSIMA) Environment



Scenario A:	LRE N Baseline	
Scenario B:	LRE X Baseline	
Overall Industrial Base Difference Between Scenarios:	1758	(Positive favors scenario A; negative favors scenario B)
Number of Companies Benefiting Overall in Scenario A:	67	*measured by cumulative performance over 17 years
Number of Companies Benefiting Overall in Scenario B:	48	*measured by cumulative performance over 17 years
Cumulative Benefit to Companies Benefiting in Scenario A:	6542	(integrated volume under companies benefiting in Scenario A)
Cumulative Benefit to Companies Benefiting in Scenario B:	4784	(integrated volume under companies benefiting in Scenario B)
Cumulative Number of LRE N Produced in Scenario A:	5Y	
Cumulative Number of LRE X Produced in Scenario B:	Y	
Maximum Negative Disruption in One Year (based on means):	-200	
Company Experiencing Maximum Negative Disruption:	Big Engine Guys	
Year of Maximum Negative Disruption:	2015	
Maximum Positive Disruption in One Year (based on means):	425	
Company Experiencing Maximum Positive Disruption:	Engines R Us	
Year of Maximum Positive Disruption:	2020	

SLS Advanced Development



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Rocket Propulsion Additive Manufacturing Technical Interchange Meeting

- JANNAF Liquid Propulsion Subcommittee (LPS) Advanced Materials Panel will be hosting an Additive Manufacturing (AM) TIM September 3-5, 2014, at the Jackson Center, Huntsville, AL
 - Focus is on AM for Rocket Propulsion
 - Understanding the State of Art AM for fabricating parts for Rocket Propulsion application, where are we today
 - Understanding what is required to take AM parts to flight
- The scope of the JANNAF LPS Advanced Materials Panel Additive Manufacturing for Propulsion Applications TIM includes:
 - Technology Roadmaps
 - Additive Manufacturing Techniques and Machines
 - Post Build Processing, Finishing, and Inspection
 - Materials
 - Design for Additive Manufacturing
 - Component Fabrication and Test
 - Process Qualification & Specifications
 - Process Analysis, Sensing, and Control, Non-Destructive Evaluation
 - Economic Considerations, ROI, Schedule
 - Panel Discussion

Rocket Propulsion Additive Manufacturing Technical Interchange Meeting

- Call for presentations open April 8th
- Presentation abstracts will be due June 4th
- CPIAC will be handling the administration of the panel/TIM just like other JANNAF meetings
 - CPIAC JANNAF Website
 - Collecting abstracts
 - Registration
 - Etc.
- Since this TIM is about building parts it would advantageous for organizations to bring hardware examples
 - We will have tables available at the back of the conference room to display hardware
- A bus tour of MFSC's Advanced Manufacturing facility is being considered on the afternoon Tuesday September 2nd.
 - Sign-up for the tour will be through the JANNAF web site
 - The tour will need to have a minimum number people to sign-up in order to make it worth the cost of the bus rental
 - [Website](https://www2.cpiac.jhu.edu/meetings/Sep2014/pages/index.html)
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Thanks for hosting us!

wyle

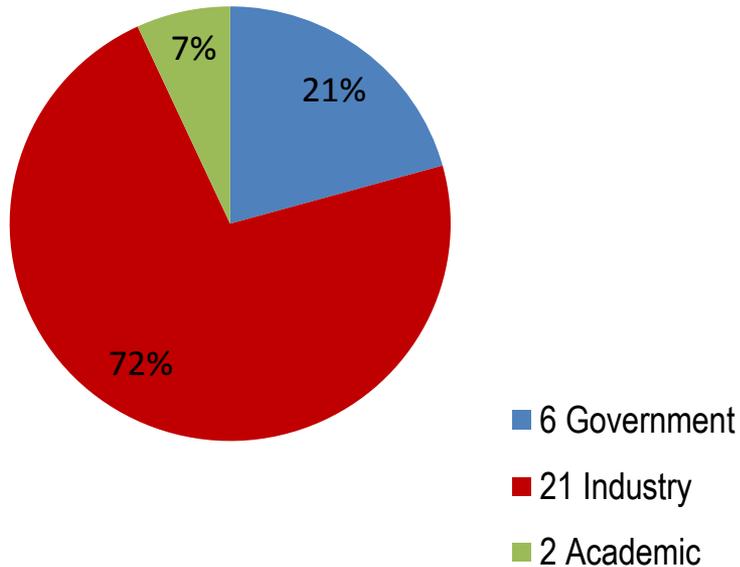


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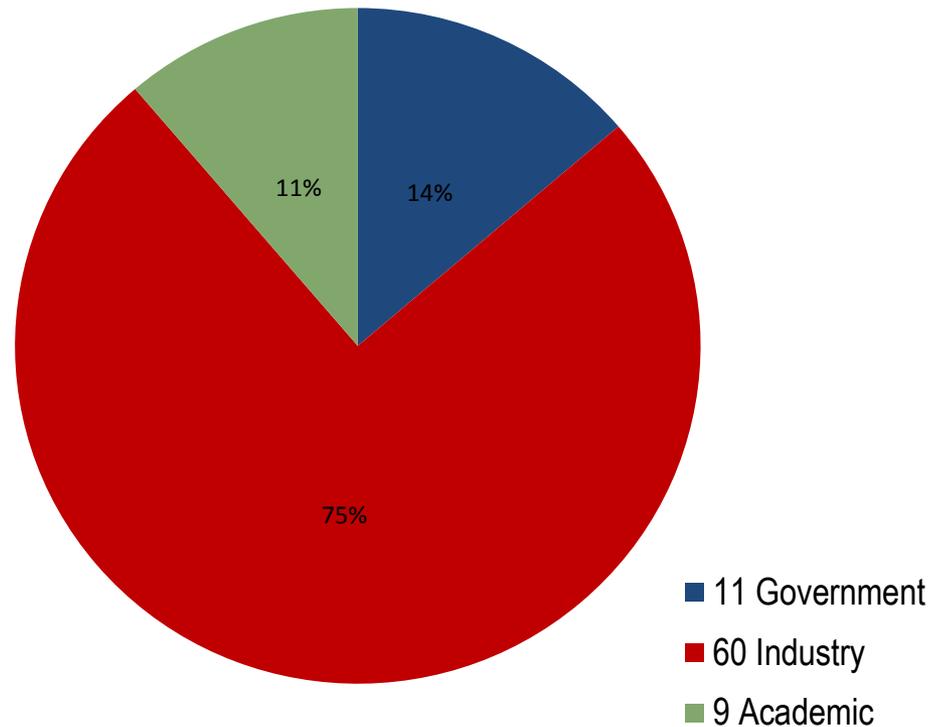
Growing Participation

November 2011



**80 Individuals
29 Organizations Represented**

April 01, 2014



**221 Individuals Representing
80 Organizations**

**Next Planning Meeting
TBD**