



# Health of the Space Industrial Base (SIB)

Presentation to the

## Supply Chain 2011 Conference

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# Premise

- A less than healthy space industrial base is a multifaceted risk to mission success.
- Threats can appear from (at least)
  - Instability/lack of investment in product lines to reflect technology evolution
  - Over lean workforce/process resulting in design and/or process escapes
  - Demographic imbalances with long term risks to knowledge capture and transfer
  - Shifting supply chains with inapparent loss of qualification heritage



# Topics

- Brief summary of the Commerce Department Space Industrial Base Survey(s)
- NASA Industrial Base Intra-Agency Working Group (IBIWG)
- Interagency Space Industrial Base Forums



# COMMERCE SPACE SURVEYS

“The Secretary of Commerce, in coordination with other departments and agencies, shall develop and maintain a report on the health of the U.S. space industrial base and related issues, and recommendations for improving the state of the space industrial base. [Due March 31, 2011]

-- National Space Policy, June 2010

- Similar to the decadal census of the US population, the Commerce Department has broad powers to conduct surveys of businesses
- Initial Report delivered to the White House in the last few weeks
  - Interagency working group reviewed 28 prior studies/reports/surveys.
  - Report written internally by Commerce with 2 reviews by working group
- Commerce is now focused on a space “deep dive” survey
  - Commerce is leading an interagency effort
  - NASA has provided a list of more than 12,000 suppliers



# Initial Report on Health of Space Industrial Base

- Based on review of 28 prior reports/surveys/studies
- Assessed “health” based on
  - 11 Measures of Merit [MoM]
  - Assessed each MoM according to Findings found in the 28 reports
    - (Not All Reports addressed each of the 11 MoMs)



# Initial Report's Measures of Merit

<b>Measure</b>	<b>Definition/Components</b>
Financial Performance	Size of the industry, net sales, industry and market growth, dependency on government, net margins and profitability, product/service demand
Financing	Availability of loans/financing, access to credit and capital, insurance availability, cost of capital
Human Capital	Employment levels, availability of qualified workers, age of workforce, capability retention, attrition rates, education levels, hiring and retention rates, Science Technology Engineering Mathematics (STEM) issues
Innovation	Research & Development (R&D) spending and sourcing, USG R&D support, advanced technology development
Investment	Internal and external capital expenditure investment measures
Market Share	Market sizes, percent of market ownership, market position, foreign and domestic competition, barriers to market entry, export and import growth rates, import penetration
Production Capability	Capacity utilization rates, inventory turnover, production runs, barriers to production, product line flexibility, industry standards and certifications
Business and Supplier Relationships	Mergers and acquisitions, joint ventures, ability to collaborate, consolidation rates, State of the supply chain, domestic and foreign sourcing practices, level of competition, sole/single suppliers and customers, integration levels
Revenue Make-Up	Commercial vs. government-based revenues, market segment revenue, domestic vs. foreign sales revenue and growth, defense vs. non-defense sales
Cross-Sector/ Industry Impact	Impact on other industries/sectors (economic, suppliers, etc.)
U.S. Policy/ Regulatory Action	Actions affecting industry health/viability (e.g. export controls such as the International Traffic in Arms Regulations (ITAR), program fluctuation/cancellation, acquisition policy, budgets, environmental regulations, etc.)



# Initial Report's Overall MoM's Findings

- Based on the MOM findings, the overall health of the U.S. space industrial base for the 2006-2010 period seems to be marginally healthy. This determination is because of aggregate industry growth and related profitability despite the economic downturn, steady and slowly escalating employment levels, global leadership in space-related technology development, broad production and R&D capability, and continuing revenue from USG-sponsored programs and projects. However, there are multiple indications that this position is deteriorating based on current and future domestic and global challenges and declining product and service demand requirements. These indicators include:



# Initial Report's Overall MoM's Findings

- Net profits are lagging behind other comparable U.S. high-tech industries and seem to be trending lower in some space segments;
- Access to capital continues to be constrained for small and start-up companies and limits their ability to transition from product development to commercialization;
- Industry has a high dependency on USG business, which is, in turn, dependent on fluctuating budgets and changing priorities;
- The industry and USG workforce is aging and there is difficulty retaining skills and attracting new workers, as well as fewer programmatic opportunities to build experience (technical and acquisition personnel);
- Cost overruns, project delays, and other factors have resulted in a risk-adverse USG, which trickles down to industry and stifles innovation;
- Visibility into corporate investment (e.g., research & development, infrastructure) and other proprietary elements is lacking;
- This limited visibility extends into the supply chain, specifically lower-tier and sole-source companies;
- U.S. market share of launch and satellite exports is down from previous levels, as U.S. companies lost global and some U.S. satellite and launch sales to foreign competitors;
- USG financial tools to promote exports have not been flexible or timely enough to support competitive bids of U.S. companies, especially against state-owned enterprises;
- Loss of current and future commercial space business could result in the U.S. space industry becoming an expensive “arsenal industry” virtually dependent on USG business;
- There is excess production capacity in launch and other areas, which has led to consolidation, vertical integration, and business closures;
- Future USG budget and programmatic cuts could lead to additional excess capacity, consolidation, and closures;
- There is a lack of understanding of U.S. space markets by lower tier suppliers and a concurrent lack of understanding of non-traditional U.S. suppliers by prime contractors;
- Cross-sector/industry impacts exist, but are not well understood;
- The NASA-DOC data collection highlights cross-dependencies of DOD and intelligence community programs on NASA human space flight suppliers;
- U.S. policies and regulatory structures may have unintended deleterious impacts on U.S. space industrial base (e.g., export controls, “Buy America” waivers, disposition of excess government property, environmental regulations, and business terms of international agreements); and
- There is no effective unifying executive structure in the USG for short-term tactical and long-term strategic planning and oversight regarding the space industrial base (defense, intelligence community, civil, and commercial); current structures only address agency programmatic and national security issues.



# Initial Report's Recommendations

- U.S. Space Industrial Base:
  - DOC, in partnership with the U.S. Air Force, NASA and NRO, in cooperation with other agencies in the U.S. space community, should continue to lead a comprehensive and periodic survey of the multiple tiers that comprise the space industrial base.
  - Conduct targeted industrial base assessments that would determine the financial and workforce impacts of various government actions on the industrial base, identify potential risks and benefits including cross-agency impacts, and develop risk mitigation plans if necessary.
  - Excess U.S. Government Furnished Property (GFP) utilized for space-related and other aerospace programs and projects, specifically tooling and equipment, should be evaluated for targeted distribution to local, state, and regional communities and educational institutions to stimulate employment, economic development, and STEM objectives.
  - The Administration should work expeditiously with the Congress to provide the President authority to determine the jurisdiction of satellites and related items for export control purposes. At the same time, the Administration should complete its assessment of the U.S. Munitions List items to determine what items should be transferred to the Commerce Control List, particularly communication satellites and parts and components, to enhance both national security and the competitiveness of U.S. exporters of space-related items.



# Initial Report's Recommendations

- **Workforce:**
  - Current and future projected USG shortages of qualified scientific, engineering and technical staff can be abated by more aggressive outreach and recruiting at select colleges and universities, combined with increased scholarship and financial aid to target programs/students of particular interest to agencies.
  - With a smaller pool of programs and projects to train workers and build experience, enhanced mechanisms are needed to rotate staff between various USG defense, intelligence community and civil programs to maintain and expand skill sets.
- Rotation of scientific, engineering, technical, acquisition and program managers should also be increased between industry and USG program offices, to maintain the pool of qualified and skilled candidates for both USG and industry career positions.
- **Interagency Cooperation/Collaboration:**
  - Option 1 – Create a USG Executive Agent and Committee for Space
  - Option 2 – Expand the National Security Space Industrial Base Council (SIBC)
  - Option 3 – Expand the Use of Existing Cooperation/Collaboration Means



# Space “Deep Dive” Survey

- Phase One:
  - Identifying and prioritizing a list of companies to be surveyed for each agency’s programs.
  - Identifying production, employment, financial, research & development and other competitive statistics to be collected and assessed.
- Phase Two:
  - Developing, field testing and obtaining Office of Management and Budget (OMB) approval for the survey.
  - Finalizing the industry survey in Excel and coding survey database.
- Phase Three:
  - Disseminating industry survey and monitoring survey completion progress. **[Target release January]**
  - Handling phone and e-mail inquiries regarding survey process.
- Phase Four:
  - Reviewing, validating and tabulating survey responses.
  - Analyzing data, and creating a comprehensive database for each agency to benchmark space industry performance.
  - Provide written analysis and findings of aggregate survey data.



# NASA's Industrial Base Working Group

- DA is designated as senior Agency official responsible for integration of industrial base/supply chain management issues

Deputy Administrator



Executive Council (EC)

- Implementation delegated to AA

Associate Administrator



Program Management Council (PMC)

or

Mission Support Council (MSC)

- OCE assigned responsibility to staff the integration/coordination of all industrial base and related issues

Office of Chief Engineer

Industrial Base Intra-Agency Working Group (IBIWG)  
**NEW**

- IBIWG serves as NASA forum for developing consensus and recommending resolution of issues associated with ensuring a viable space-related industrial base

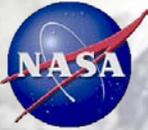
HQ Ofc(s)

Centers



# NASA's Industrial Base Working Group

- Facilitate coordination of intra-Agency space industrial base (SIB) issues
  - Forum to discuss and share information
  - Responsible to staff SIB recommendations for decisions by Agency Management Councils (EC, PMC, or MSC)
- Principal support for senior Agency officials attending SIBC or other interagency SIB forums
  - Responsible to coordinate Agency-wide responses to action items
- Oversee NASA representation on SIB working groups and to coordinate NASA responses to action items



# IBIWG MEMBERSHIP

## **Industrial Base Intra-Agency Working Group (IBIWG)**

Rodney Liesveld, Chair, OCE

Doug Comstock, Deputy Chair, Office of Chief Technologist

Carl Weber, Deputy Chair, Office of Procurement

### **Headquarters Offices**

OCE: Hal Bell

HEOMD: Ted Bujewski

SMD: Mike Moore

ARMD: Jon Montgomery

MSD-OSI: Sue Kinney

OSMA: Vicky Hwa

OCIO: Gene Sullivan

OIIR: David Flynn

OSBP: Richard Mann

OHRC: Kevin Ortegel

OGC: Scott Barber

### **Centers**

ARC: Phil Luna

DFRC: Jim Smolka

GRC: Bryan Smith

GSFC: Christyl Johnson

JPL: Rene Fradet

JSC: Kevin Templin

KSC: Miguel Rodriguez

LaRC: Steve Jurczyk

MSFC: Dale Thomas

SSC: Freddie Douglas



# Interagency Space Industrial Base Forums

## Defense Production Act Committee (DPAC) **NEW**

- Established by Congress to advise the President on the effective use of the authority under the Defense Production Act to expedite supply of and expand productive capacity for materials and services essential to the national defense.
- [Space industrial base only part of broad portfolio]

## National Security Space Industrial Base Council (SIBC)

- Identify and address national security space industrial base issues, on behalf of SecDef and DNI
- Seek to coordinate similar activities with civil & commercial space sector
- EXCOM: DoD EA(Space), D/NRO, D/MDA, A/NASA

**BEING RESTRUCTURED**

NASA

## Instrument/Sensor Payload Alliance (ISPA) **NEW**

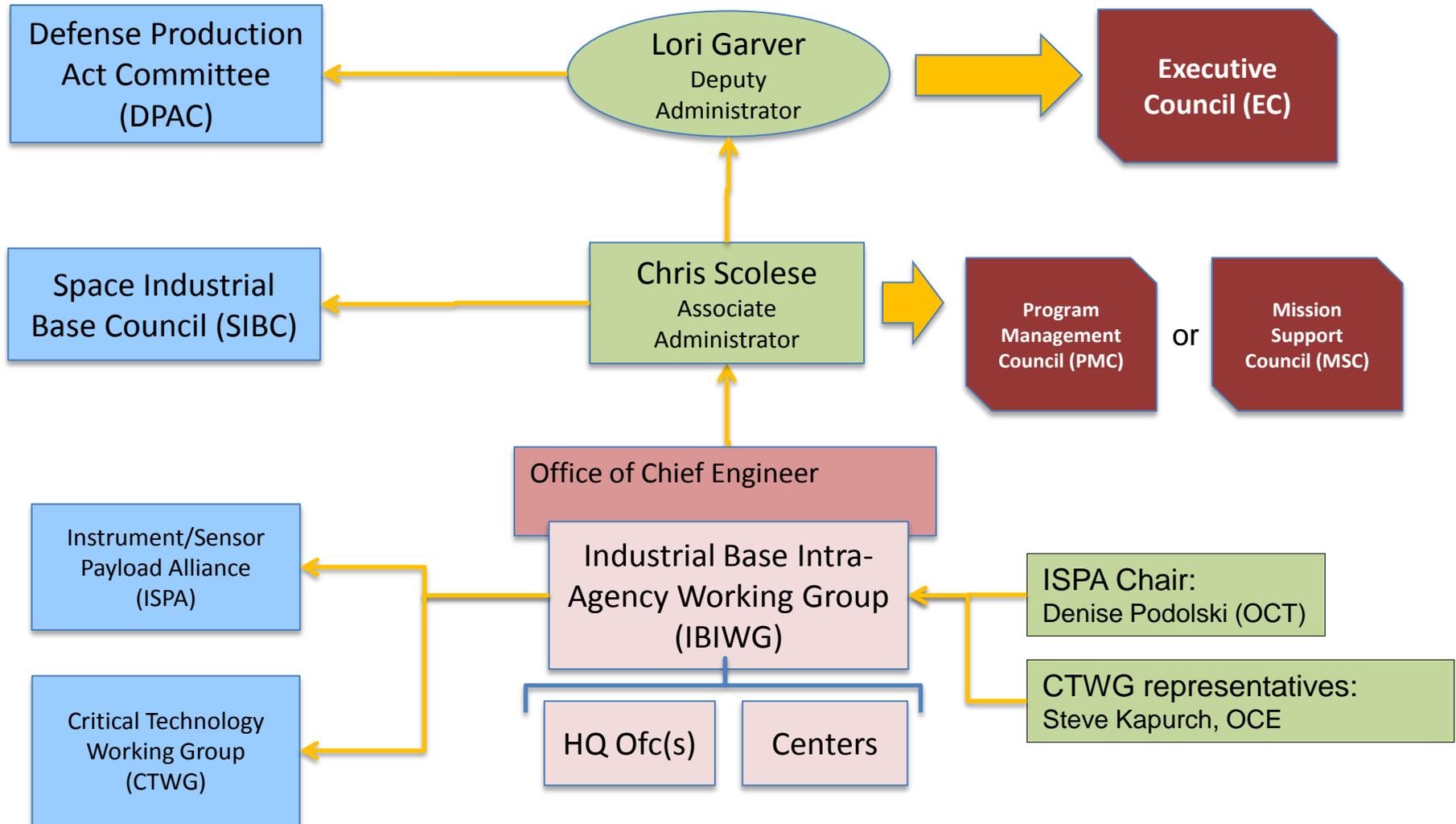
- Provide a forum for sharing critical expertise and process enhancements
- Facilitate understanding of common space instrument/payload development issues and lessons learned across multiple agencies

## Critical Technology Working Group (CTWG)

- Identify and provide recommendations to sustain space technologies/capabilities whose health and viability are "at risk"
- Tactical perspective of industrial base issues



# NASA SIB Support Structure





# Backup Slides



# Space “Deep Dive” Survey

- Task 1: Create a Supplier Master List
  - Excel Spreadsheet with the following column headers:
    - ✓ Entity/Facility/Company
    - ✓ Street Address
    - ✓ State
    - ✓ Zip Code
    - ✓ Country
    - ✓ Web Address
    - ✓ Point of Contact Name
    - ✓ E-mail Address
    - ✓ Phone Number
    - ✓ Program Affiliation/Participation--Agency Space Program(s)
    - ✓ Primary Technology/Product/Service Acquired
    - ✓ Other Technology/Product/Service Acquired
    - ✓ Date of most Recent Contract
    - ✓ Contract Number/Code



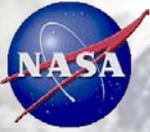
# Space “Deep Dive” Survey

- Task 1: Create a Supplier Master List
  - Include any foreign suppliers, as most will have an office located here in the U.S., and thus be subject to Commerce’s authority
  - Due to Commerce September 1, 2011



# Space “Deep Dive” Survey

- Task 2: Create the survey questionnaire
  - Use DoC/NASA Human Space Flight Survey as starting point
  - Also due September 1, 2011



# NASA's Industrial Base Working Group Actions

- Each Mission Directorate representative to take lead for creating the 'master supplier list' of the technology, product, or service for its programs and projects with support from the relevant Center representatives and submit a consolidated list using the Excel template back to the IBIWG chair not later than August 26, 2011, with weekly updates in the interim.
- Other HQs representatives also to create a 'master supplier list' with support from the relevant Center representatives for the technologies, products, or services within their purview. Submit by August 26, 2011, with weekly updates in the interim.
- Center representatives to submit, by August 26, 2011, additional inputs not otherwise covered, with weekly updates in the interim.
- Everyone to review the HSF questionnaire and submit comments/additional items by August 12, 2011. (When updated questionnaire from Commerce is available it will be sent to everyone for final review and comment.)



# Initial Report's

## 28 Reference Documents (page 1)

- 1 The Aerospace Corporation Barriers to Progress and Sustainability of National Security Space Technology Advancement – 2009
- 2 Aerospace Industry Association (AIA) Tipping Point: Maintaining the Health of the National Security Space Industrial Base – 2010
- 3 AFRL Space Industrial Base Decision Framework in a Globalized Marketplace – 2007
- 4 Aviation Week Workforce Study – 2010
- 5 CSIS Health of the U.S. Space Industrial Base and the Impact of Export Controls – 2008
- 6 CSIS National Security and the Commercial-Space Sector – 2010
- 7 DOD Annual Industrial Capabilities Report to – 2009
- 8 DOD Defense Acquisition Performance Assessment Report – 2006
- 9 DSB Creating an Effective National Security Industrial Base for the 21st Century, An Action Plan to Address the Coming Crisis – 2008
- 10 FAA Commercial Space Transportation Forecasts – 2010
- 11 FAA The Economic Impact of Commercial Space Transportation on the U.S. Economy in 2009 – 2010
- 12 Fortresses and Icebergs: The Evolution of the Transatlantic Defense Market and the Implications for U.S. National Security Policy, Vol. I and II – 2009
- 13 Futron's Space Competitiveness Index – 2010
- 14 GAO NASA Supplier Base: Challenges Exist in Transitioning from the Space Shuttle Program to the Next Generation of Human Space Flight Systems – 2007



# Initial Report's

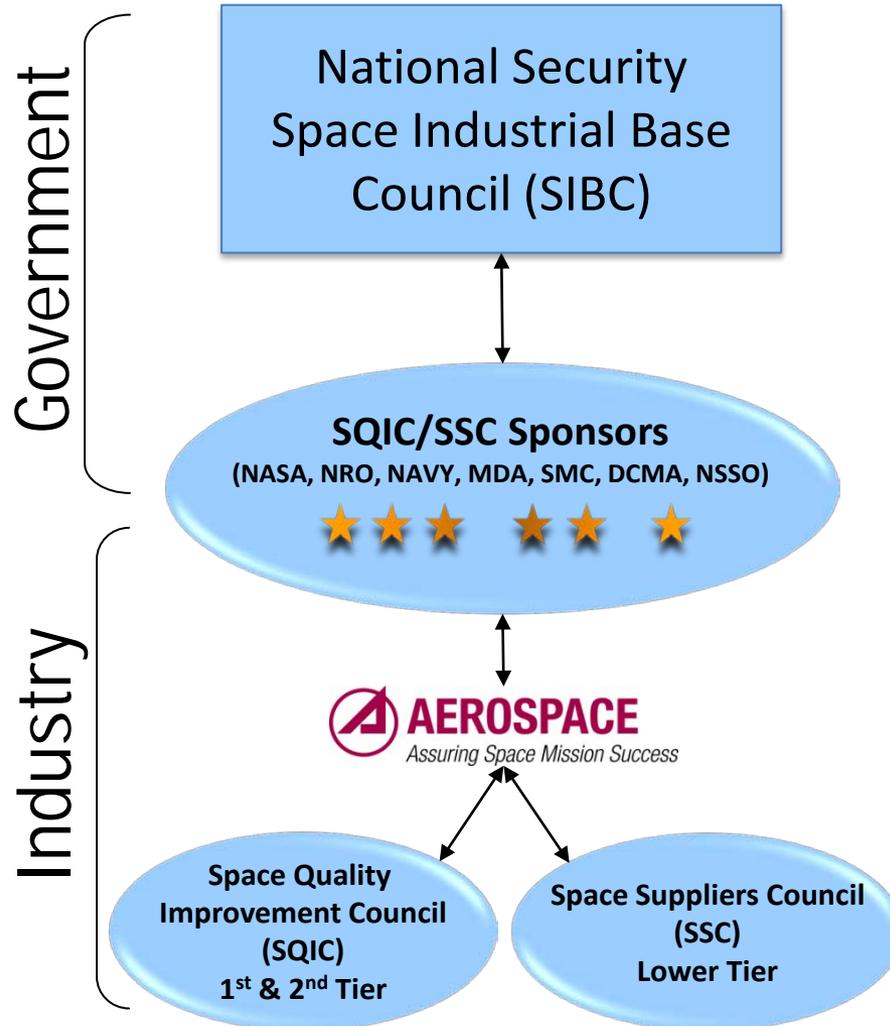
## 28 Reference Documents (page 2)

- 15 Institute of Defense Analysis (IDA) Export Controls and the U.S. Defense Industrial Base – 2007
- 16 NASA Instrument Capability Study – 2008
- 17 National Research Council Beyond Fortress America – 2009
- 18 National Security Space Industrial Base Study and 2010 Update (OSD CAPE) – 2008
- 19 National Security Space Office (NSSO) Barriers to Entry and Sustainability in the US Space Industry – 2008
- 20 Office of Science and Technology Progress Assessment of the U.S. Space Launch Propulsion Industrial Base – 2009
- 21 Presidential Study Directive-3 (PSD-3), Task D
- 22 Presidential Task Force on Space Industry Workforce & Economic Development Report to the President – 2010
- 23 Review of US Human Spaceflight Plans Committee, Seeking a Human Spaceflight Program Worthy of a Great Nation – 2009
- 24 Satellite Industry Association State of the Satellite Industry – 2010
- 25 Solid Rocket Motor Industrial Base Interim Sustainment Plan Report to Congress – 2010
- 26 The Space Foundation Space Report – 2010
- 27 NASA/DOC Supply Chain Network Survey Data - 2010
- 28 USAF/DOC Space Industry Survey Data – 2007



# Space Industrial Base Council

(Current Interagency/Industry Coordination)





# Space Industrial Base Support Requirements

- Participate in SIBC collaborative forums and assume leadership roles where assigned those duties
  - ❑ Oversee NASA implementation of SIBC decisions and coordinate NASA contributions to those decisions
  - ❑ Coordinate NASA contributions and collaboratively create government wide strategies which sustain SIBC identified technologies/capabilities whose health and viability are identified to be at risk (tactical perspective)
  - ❑ Collect NASA information on health of space industrial base and collaboratively create government wide strategies to ensure continued health and viability (strategic perspective)
  - ❑ Coordinate common understanding of instrument/payload issues and lessons learned and prepare short and long range strategies to address issues identified (operational feedback into production, expansion of capability to new levels of performance and applications, identify gaps in the workforce and build strategies to close the gaps...)
  - ❑ Conduct and coordinate require NASA field work to support all elements of the SIBC structure and functions
  - ❑ As various ad-hoc working groups are formed, facilitate and coordinate focused activities required by the working groups
- Generate and enter into Space Act Agreements/Research Grants which support the technologies identified to be critical to the national security space industrial base and approved by the SIBC for funding



# National Space Policy

## Relevant Goals & Guidelines

- Among the new goals of the new National Space Policy is to:
  - ❑ “energize competitive domestic industries to participate in global markets and advance the development of: satellite manufacturing; satellite-based services; space launch; terrestrial applications; and increased entrepreneurship.”
- Additionally, one of the inter-sector guidelines provides additional emphasis:
  - ❑ “Strengthen U.S. Leadership In Space-Related Science, Technology, and Industrial Bases. Departments and agencies shall: conduct basic and applied research that increases capabilities and decreases costs, where this research is best supported by the government; encourage an innovative and entrepreneurial commercial space sector; and help ensure the availability of space-related industrial capabilities in support of critical government functions”
- Lastly, one of the implementation actions directs:
  - ❑ “The Secretary of Commerce, in coordination with other departments and agencies, shall develop and maintain a report on the health of the U.S. space industrial base and related issues, and recommendations for improving the state of the space industrial base.”