U.S. SPACE INDUSTRY "DEEP DIVE"

A COLLABORATION BETWEEN THE DOC AND THE USAF, NASA, AND NRO

FINAL DATASET FINDINGS

International Symposium for Personal and Commercial Spaceflight 2014

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OTE Industry Assessments – Background

- Under the Defense Production Act of 1950 and Executive Order 13603, ability to survey and assess:
  - Economic health and competitiveness
  - Defense capabilities and readiness
- Mandatory Data Collection Authority under Section 705 of the Defense Production Act.
- Enable industry and government agencies to:
  - Share data and collaborate in order to ensure a healthy and competitive industrial base
  - Monitor trends and benchmark industry performance
  - Raise awareness of diminishing manufacturing and technological capabilities

U.S. Space Industry "Deep Dive" Assessment Background

- Partnership with the U.S. Air Force, National Aeronautics and Space Administration, and the National Reconnaissance Office.
- The principle goal is to gain an understanding of the intricate supply chain network supporting the development, production, and sustainment of products and services across the defense, intelligence, civil, and commercial space sectors.
- Objectives:

a) Map the space industrial base supply chain in unprecedented detail;

b) Identify interdependencies between respondents, suppliers, customers, and USG agencies;

c) Benchmark trends in business practices, competitiveness issues, financial health, etc. across many tiers of the industrial base; and

d) Share data with USG stakeholders to better inform strategic planning, targeted outreach, and collaborative problem resolution.

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Overview of Respondents

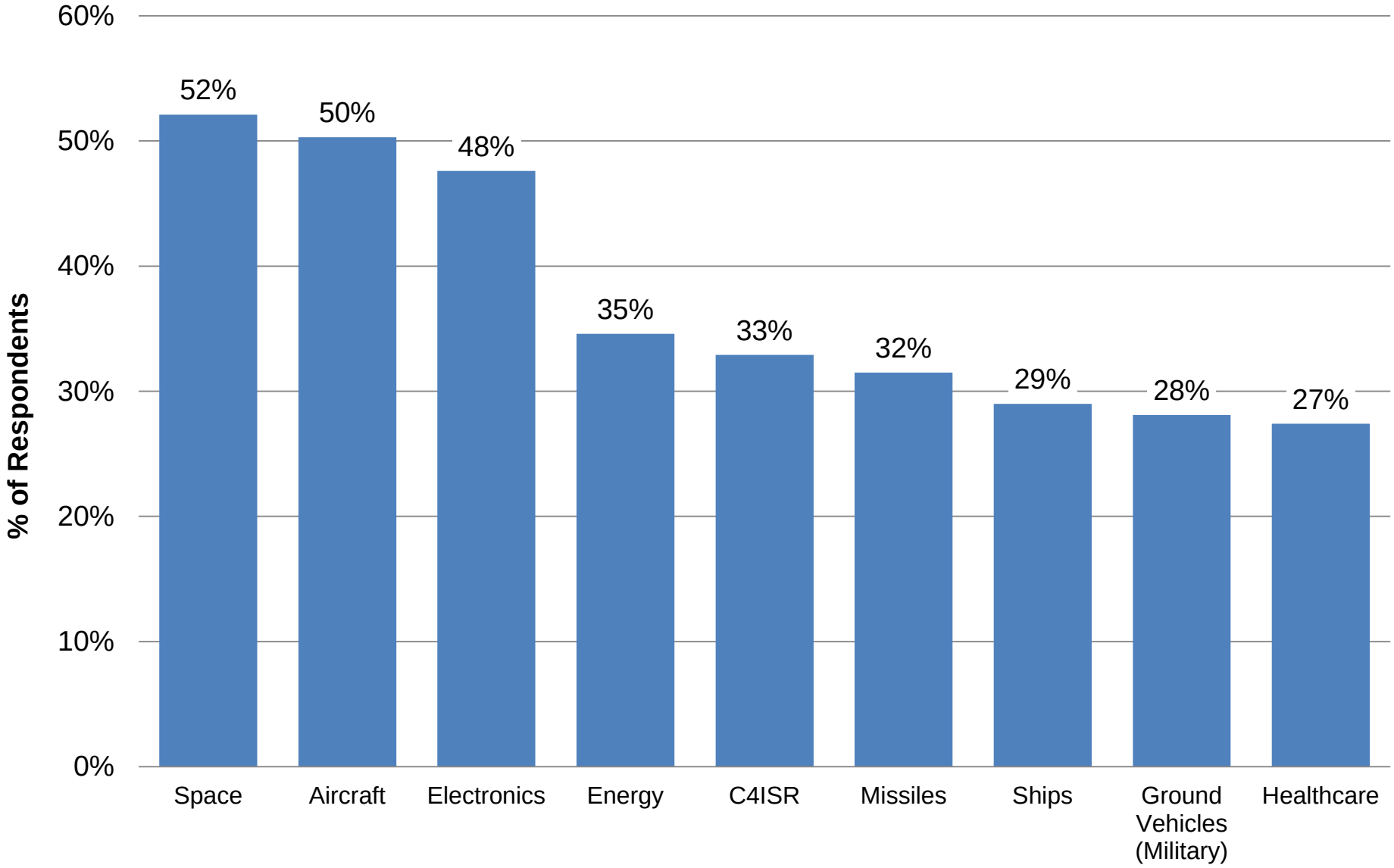
Respondents by Type of Organization	
Commercial Companies	3,585
Universities	125
Non-Profit Organizations	49
U.S. Government Agencies	21
Total	**3,780**

62% of respondents are small businesses, as defined by the Small Business Administration

Respondents by Average Annual Net Sales (2009-2012)	
Very Small (Less than $10M)	1,648
Small ($10 – 50M)	929
Medium ($50 – 250M)	498
Large ($250M – 1B)	234
Very Large (Greater than $1B)	165
No Sales	306

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Involvement in Market Segments



Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Structure of the DOC Survey

Created 16 general segments comprised of 360 individual products & services.

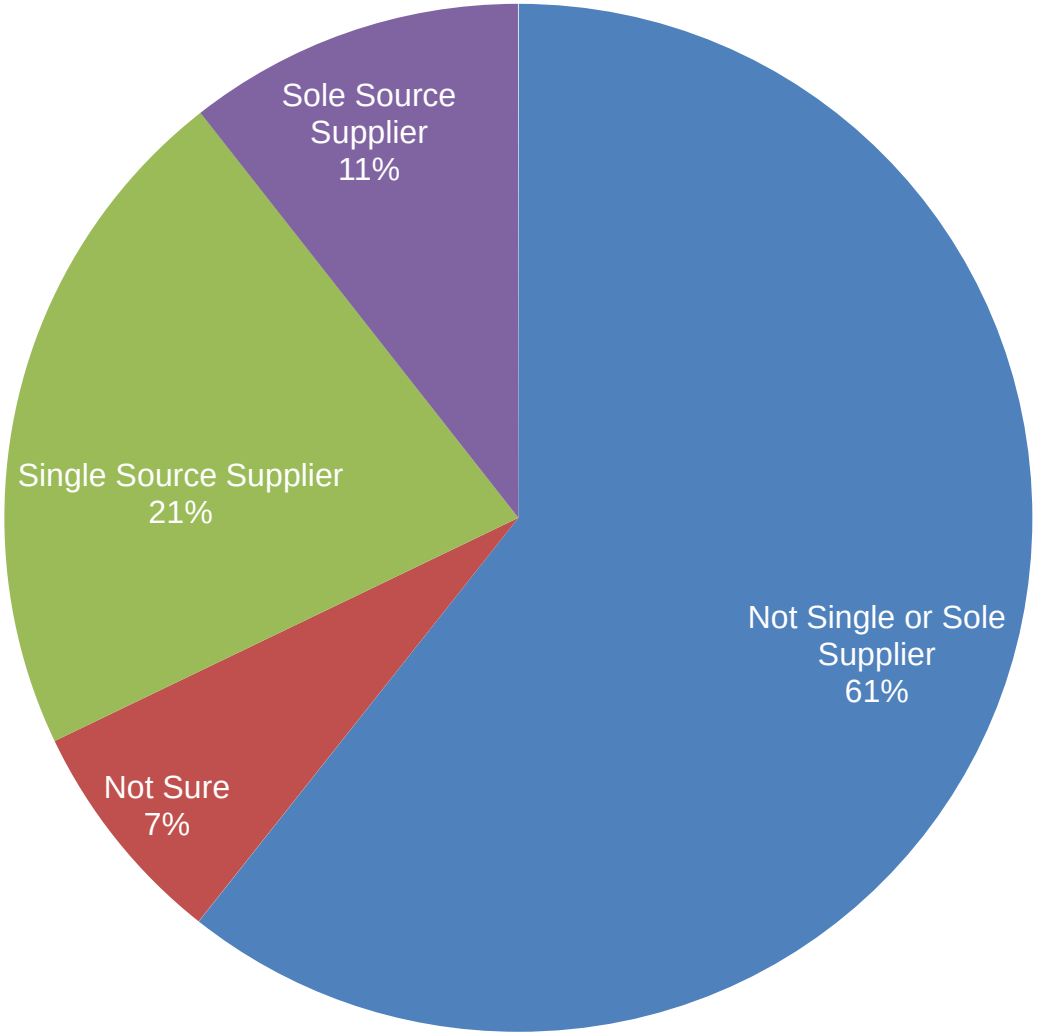
Product and Service Segments:

A. Spacecraft & Launch Vehicles
B. Propulsion Systems & Fuels
C. Navigation & Control
D. Communications Systems
E. Space Survivability, Environmental Control/Monitoring, and Life Support
F. Payload Instruments & Measurement Tools
G. Ground Systems
H. Non-Earth Based Surface Systems
I. Power Sources & Energy Storage
J. Electronic Equipment
K. Computer Hardware & Robotics
L. Software
M. Materials, Structures, and Mechanical Systems
N. Manufacturing Tools & Specialty Equipment
O. Services
P. Research & Development

Respondents detail their critical suppliers, customers, and involvement in over 205 USG space programs.

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Single and Sole Source Suppliers*



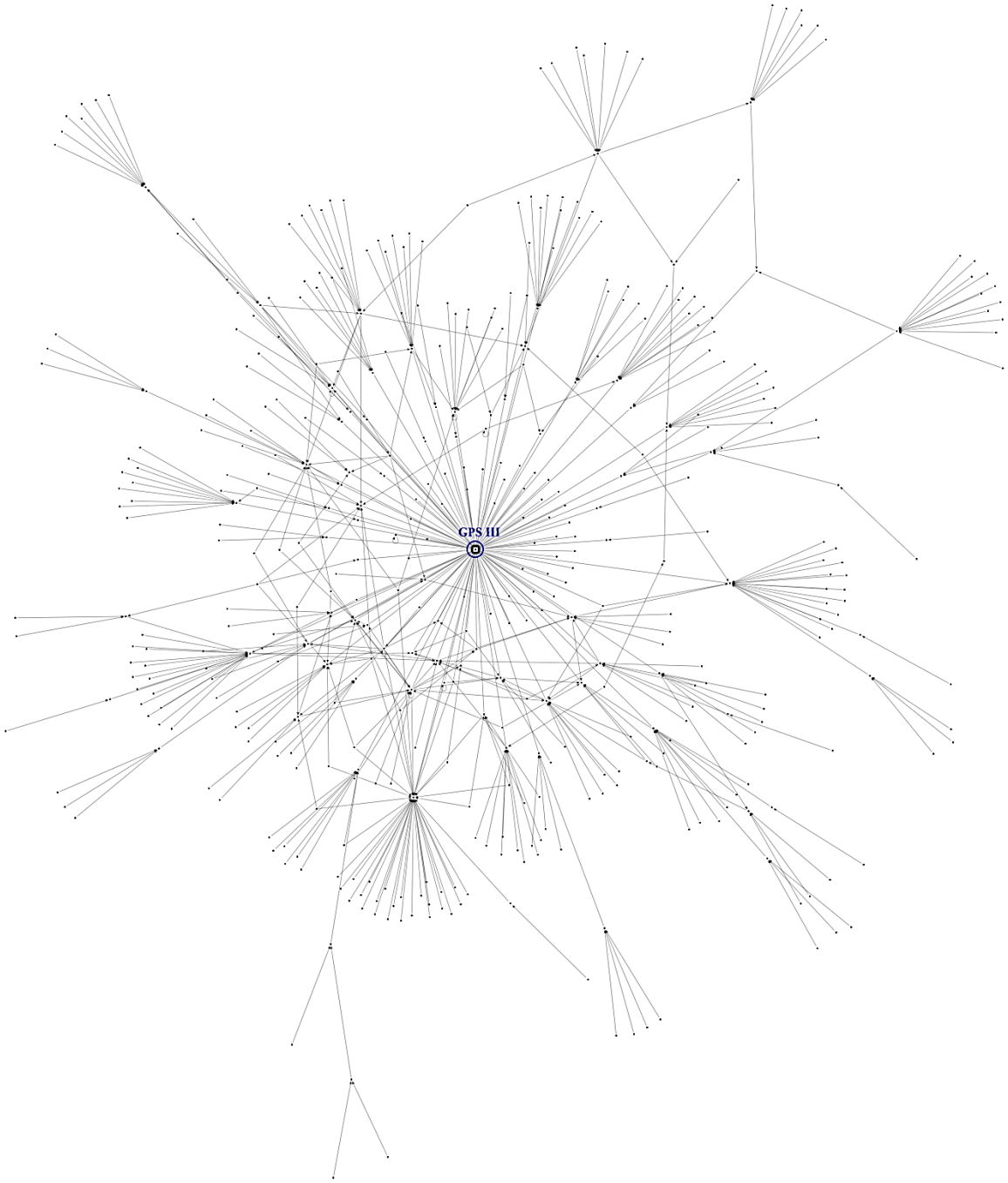
7,361 unique critical suppliers.

Top 5 Sole Source Product/Service Areas:

1. Integrated circuits/ semiconductors
2. Adhesives
3. Chemicals
4. Machining services
5. Antennas/antenna systems

* As a percentage of total products/services provided.

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.



Supply Chain Mapping: GPS III

462 entities in supply chain map.

43 respondents – indicated potential loss of viability/solvency with a sudden decrease in USG demand.

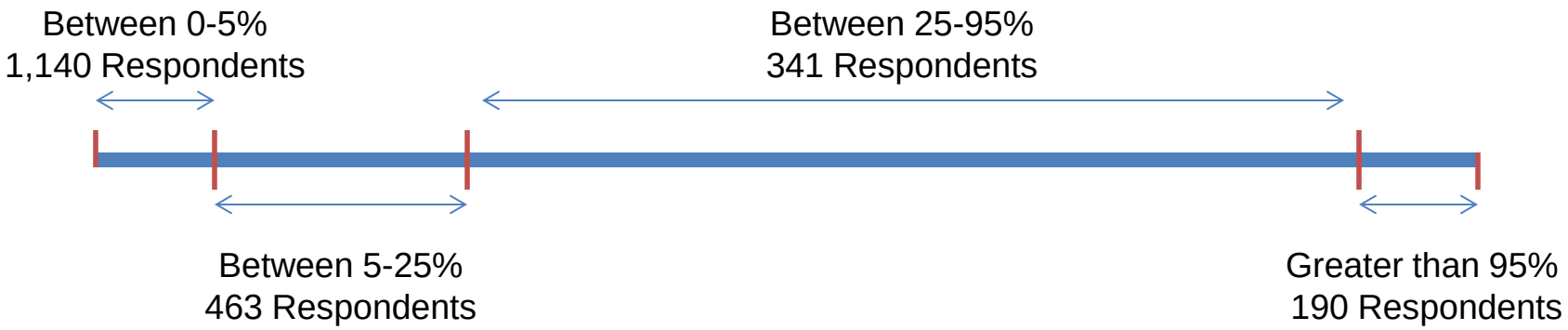
12 respondents were identified as high/severe financial risk.

GPS III respondents support over 236 USG space programs.

Most prominently:

- GOES-R (NOAA)
- AEHF (USAF)
- MUOS (U.S. Navy)
- SBIRS (USAF)
- Other GPS Systems

Exposure to Space-Related Sales*

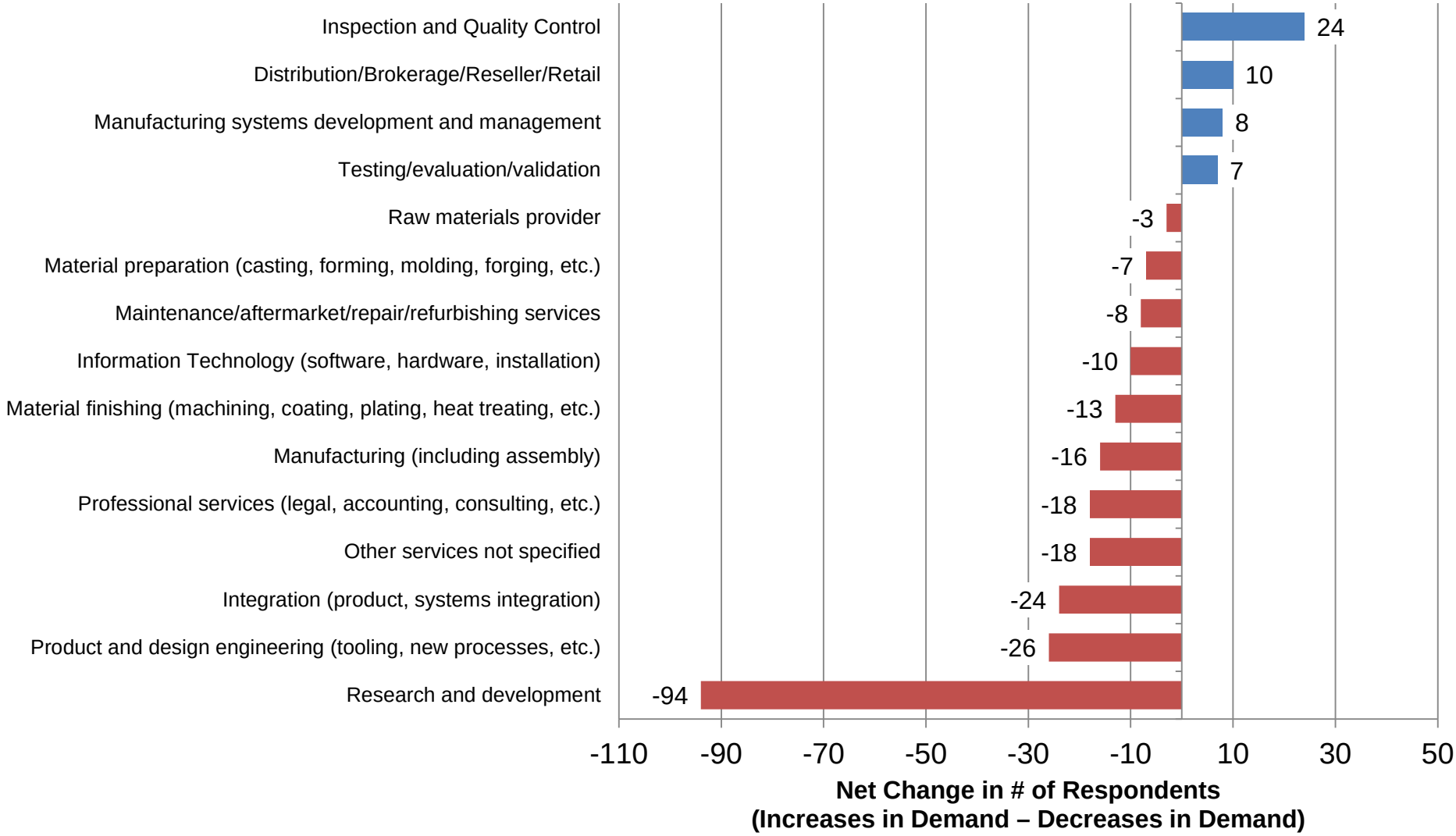


Need to understand the potential impact of USG policy decisions on respondents, space-related or otherwise.

* 1,646 respondents declared that they had no “space-related” sales.

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Net Change in Space-Related Customer Demand for Respondents' Business Lines (2009-2012)

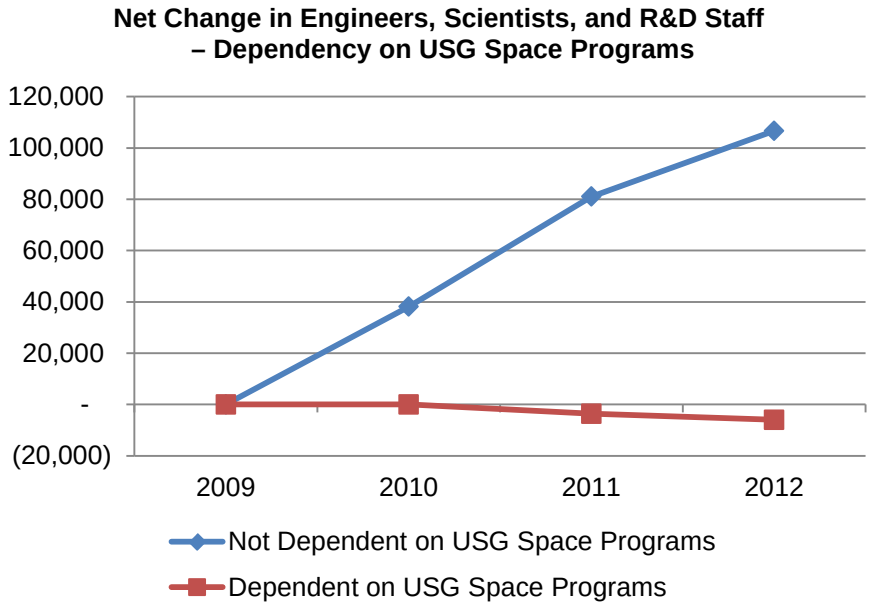


Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Workforce:
Fluctuations in Engineers, Scientists, and R&D Staff

2009-2012 Change in Engineers, Scientists, and R&D Staff:

- Universities: **+9,958**
- Small businesses: **+4,762**
- Respondents that worked on Space Shuttle/Constellation: **-7,955**
- Respondents with no space-related sales: **+13,788**
- Respondents with >35% space-related sales: **-6,307**



Very Large respondents dependent on current USG space programs constituted the majority of decreases.

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Strategic Environment: "Understand the Collective Problem"

Top 10 Issues and Challenges Affecting Respondents' Long-Term Viability
Domestic Competition
Labor Costs
Proposed Cuts to USG Space Programs
Foreign Competition
Variability of Demand
Healthcare
Taxes
Government Acquisition Process
Skills Retention
Government Regulatory Burden

Issues More Commonly Affecting Larger Respondents
Domestic Competition
Foreign Competition
Variability of Demand
Export Controls

Issues More Commonly Affecting Smaller Respondents
Healthcare
Taxes
Labor Costs
Difficulty Presenting Innovative Products to the USG
Barriers to Entry in Commercial Space Market

We have 2,000+ comments from respondents on these topics.

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Potential Impact of Export Control Reform

- Based on proposed regulations, OTE identified 155 product/service areas in the survey that *may* move to the CCL under Export Control Reform

- 1,941 respondents provide at least one of these 155 product/service areas
  - 1,288 of these respondents do not currently utilize the U.S. export control system for space-related products/services
  - 865 of those 1,288 respondents are small businesses

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Location of Top Space-Related Customers*

Canada
France
United Kingdom
Germany
Japan
India
Italy
Spain
China
South Korea
Russia
Israel
The Netherlands
Australia
Sweden
Mexico
Brazil
Singapore
Turkey
Norway
* Based on total number of products/services sent to customers in each country.

Space-related exports to highlighted country destinations may be eligible for Strategic Trade Authorization (STA) license exception.**

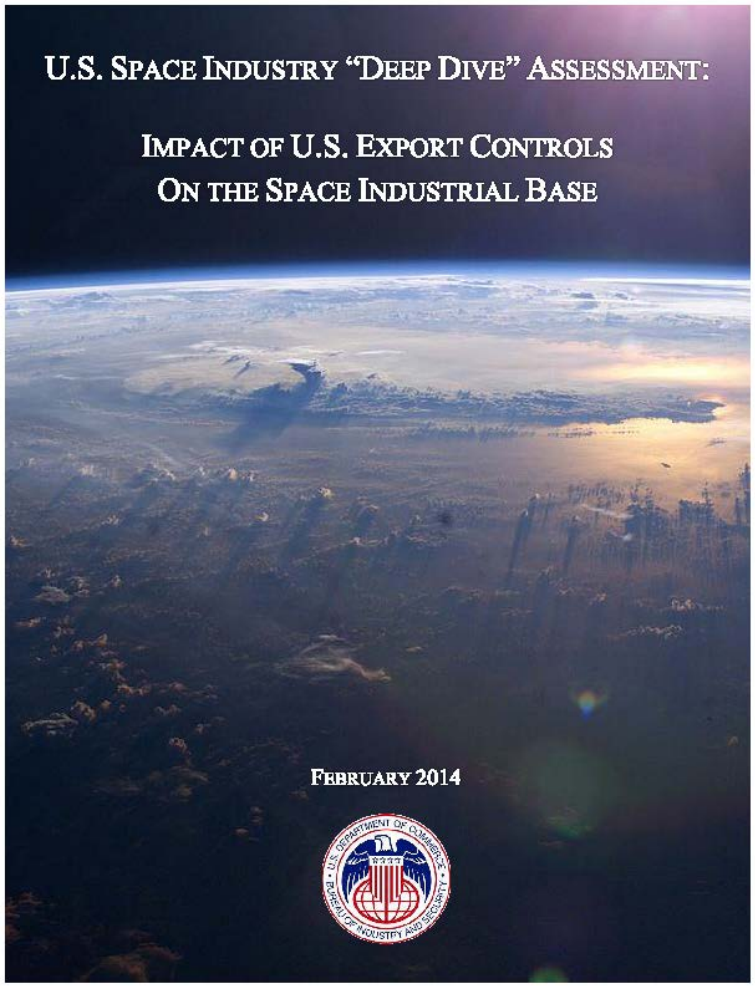
754 non-U.S. customers identified in the 13 highlighted countries.

** Only includes countries in Country Group A:5

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

New Report Released:
Impact of U.S. Export Controls on the Space Industrial Base

www.bis.doc.gov/DIB



More Reports to Come:

- Employment in the Space Industrial Base
- Small Businesses and the Space Industrial Base
- Challenges in the Space Industrial Base

New Project: Space-Related Propulsion Systems

- Working with NASA's Marshall Space Flight Center and the National Institute for Rocket Propulsion Systems (NIRPS).
- Gather detailed data on U.S. propulsion supply chain to assess impact of USG procurement decisions on the industrial base.
- Using Defense Production Act (DPA) authority to expand and refresh data collected by OTE Space Deep Dive and the Aerospace Corporation.

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

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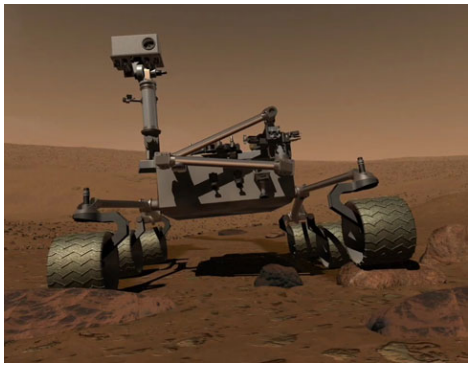
- http://www.bis.doc.gov/DIB
- For further results from this assessment, see: www.bis.doc.gov/SpaceDeepDiveResults
- **Visit us in Booth _____.**

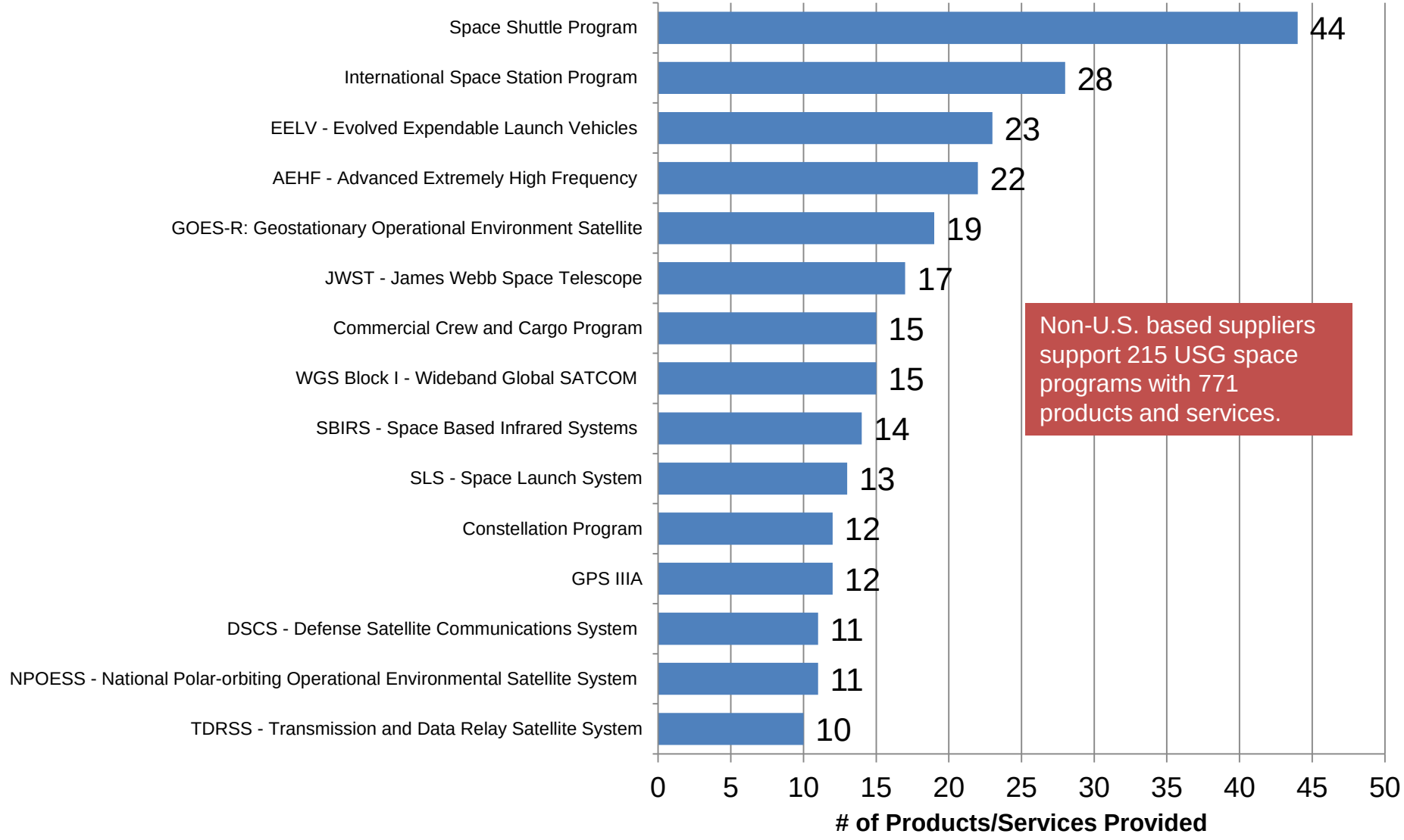


Space Deep Dive – NDIA Collaboration

- In March 2014 both the House and Senate Armed Services Committees requested input from the National Defense Industrial Association (NDIA) to support ongoing legislative initiatives concerning acquisition reform.
- Initiative allowed for industry and USG stakeholders to identify problems currently in the acquisition process, discuss their root causes and recommend possible legislative and regulatory solutions.
- OTE provided NDIA top-level findings and comments on acquisition reform and implications for the defense supply chain based on aggregated results from its 'Deep Dive' assessment.
- In late September NDIA's draft report will be shared with the stakeholders, then finalized and delivered to both Congress and the Pentagon.
- Issue areas communicated by OTE concerning USG acquisition reform include:
  - Insufficient upfront and timely information on contract requirements;
  - Cost of bid process is prohibitive for many small companies;
  - USG contracts are seen as less attractive than commercial contracts; and
  - Difficulty presenting USG with new & innovative products to meet current/future requirements.

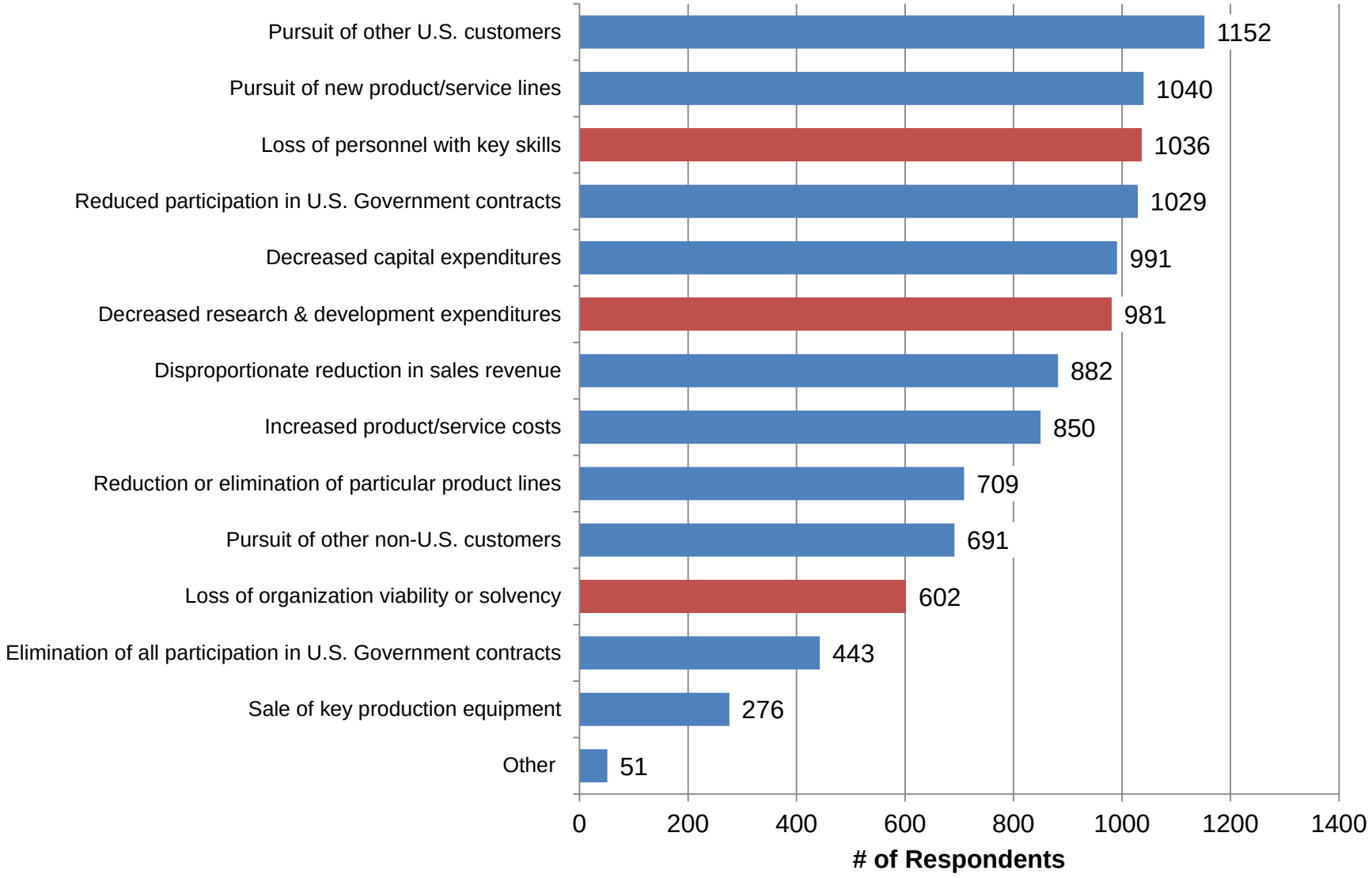
Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

USG Space Programs with the Greatest Non-U.S. Based Supplier Support



Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Potential Impacts of a Sudden Decrease in USG Space-Related Demand

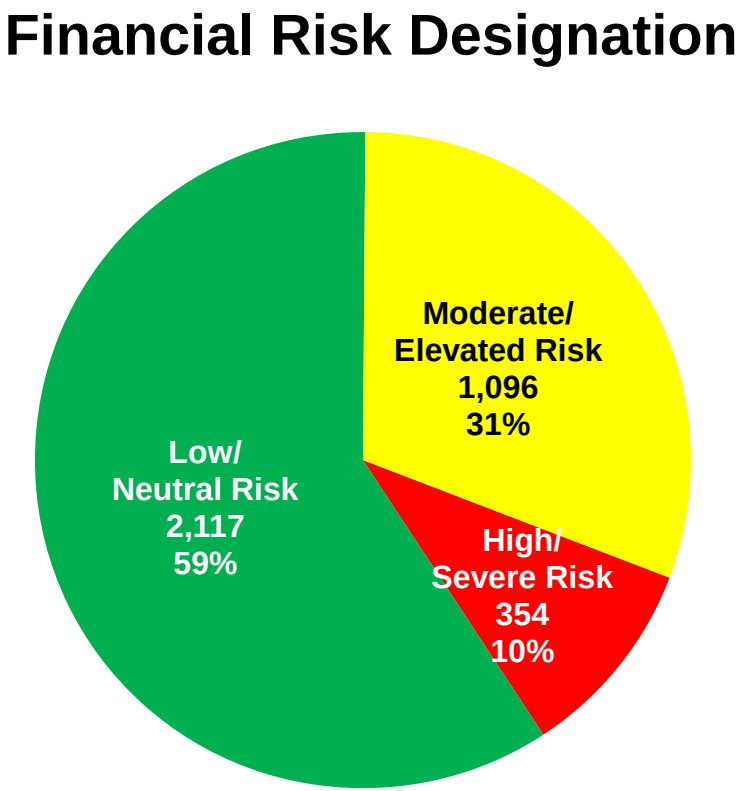


Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Overview of Financial Risk Metrics

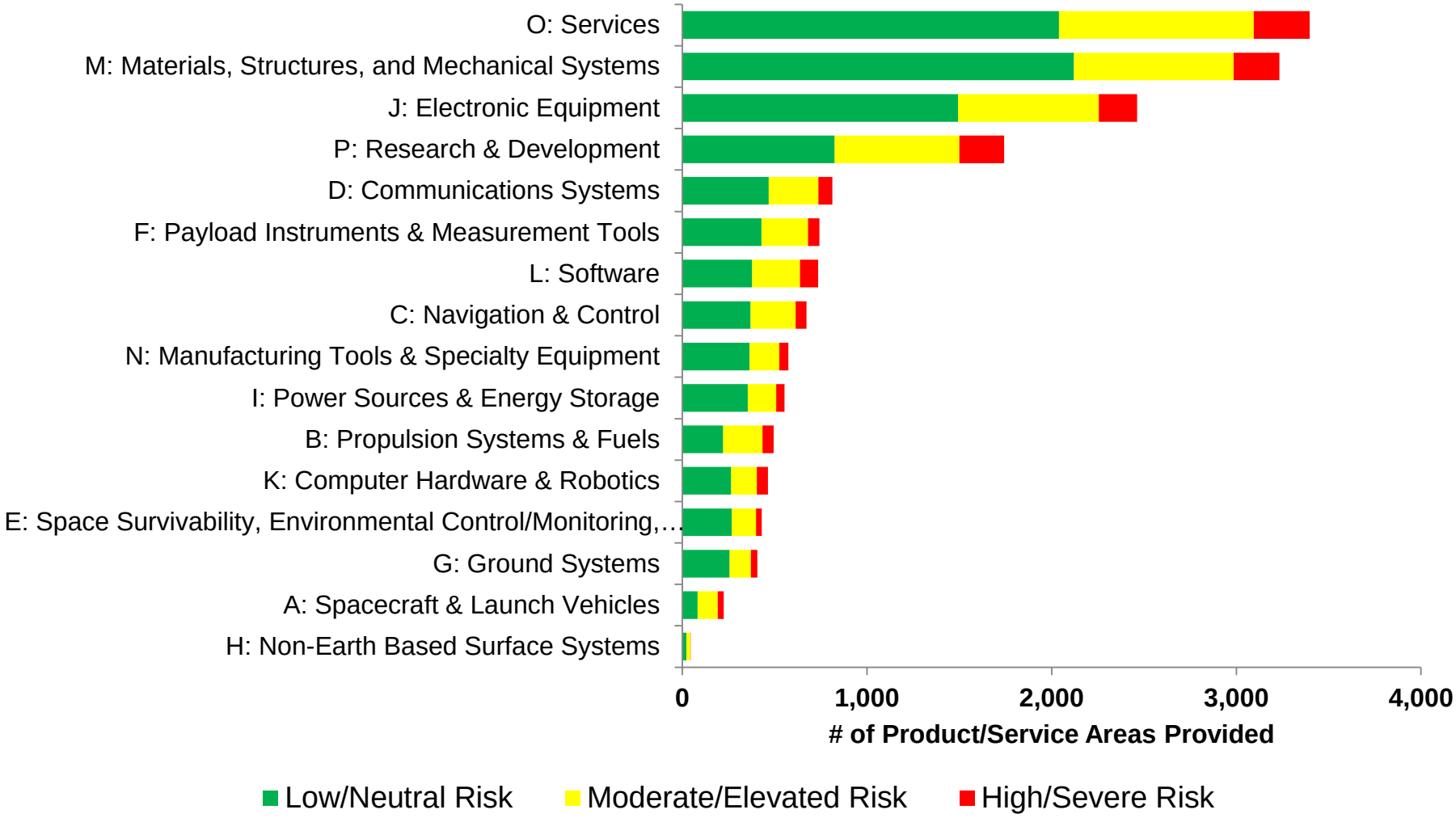
Metrics:

- Operating Margin
- EBIT/Pre-Tax Margin
- Net Profit Margin
- Debt Ratio
- Debt-to-Equity Ratio
- Current Ratio
- Quick Ratio
- Inventory Turnover
- R&D Intensity
- Z-Score



Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.

Financial Health – At Risk Product/Service Areas by Segment*



* Based on 354 high, 1,096 moderate and 2,117 low risk respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security, *U.S. Space Industry Deep Dive Assessment*, September 2014.