Dept. of Commerce
Office of Technology Evaluation,
Bureau of Industry and Security

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U.S. DEFENSE INDUSTRIAL BASE

Challenges Ahead

U.S. Department of Commerce
Bureau of Industry and Security

AMP SoCal
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Director, Industrial Studies
Office of Technology Evaluation
Bureau of Industry and Security (BIS)

• Mission:
  
  • Advance U.S. national security, foreign policy, and economic objectives by ensuring an effective export control and treaty compliance system and promoting continued U.S. strategic technology leadership
  
  • BIS also develops and implements policies and programs that ensure a strong, technologically superior defense industrial base
  
  • The Office of Technology Evaluation (OTE) is the focal point within BIS for analyzing the capabilities of the U.S. industrial base to support the national defense
OTE Industry Surveys & Assessments

Objectives

• Bring together 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, technological, and service capabilities
  • Provide detailed findings, recommendations, and proposed solutions

• OTE Customers:
  • Federal Departments and Agencies
  • Congress, State, and Local Governments
  • Industry Associations
OTE Industry Surveys & Assessments

• Over 55 U.S. industry studies and 150+ surveys since 1986, including:
  • Critical Facilities – Cleared/Unclassified Operations (in progress)
  • Bare Printed Circuit Boards (in progress)
  • Titanium, Magnesium, and REEs (in progress)
  • U.S. Rocket Propulsion Industry (in progress)
  • U.S. Strategic Material Supply Chain Assessment: Carbon Fiber Composites
  • U.S. Space Industrial Base “Deep Dive” Assessment
  • U.S. Underwater Acoustics Transducer Industry
  • Consumers of Electro-Optical Satellite Imagery
  • Cartridge and Propellant Actuated Devices (CAD/PADs) – 4th Review
  • Telecommunications Industry Infrastructure
  • NASA Industrial Base – Post-Space Shuttle/Constellation Program
  • Healthcare and Public Health Sector – Foreign Sourcing
  • Cost-Metric Assessment of Diminishing Manufacturing Sources and Material Shortages
  • Counterfeit Electronics
  • Imaging and Sensors Industry
  • U.S. Shipbuilding and Repair Industry
  • U.S. Integrated Circuit Design and Fabrication Capability (update in progress)
  • C-17 Aircraft Supplier Impact Assessment (update in progress)
  • Textiles, Apparel, and Footwear (update in progress)

www.bis.doc.gov/dib

Source: U.S. Department of Commerce, Bureau of Industry and Security. UNCLASSIFIED
BIS/OTE Critical Facilities Assessment:
Top Organizational Challenges

Respondents identified all challenges to operations and ranked their top five challenges.

- Government acquisition process
- Healthcare
- Domestic competition
- Labor availability/costs
- Government purchasing volatility
- Government regulatory burden
- Reduction in USG demand
- Worker/skills retention
- Taxes
- Qualifications/certifications
- Cyber security
- Aging workforce
- Aging equipment, facilities, or infrastructure
- Export controls/ITAR & EAR
- Proximity to customers

Q13a 2,091 respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security
Critical Facilities Assessment – Preliminary, 2016
Strategic Environment: “Understand the Collective Problem” – Space Sector

### Top 10 Issues and Challenges Affecting Respondents’ Long-Term Viability

<table>
<thead>
<tr>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Competition</td>
</tr>
<tr>
<td>Labor Costs</td>
</tr>
<tr>
<td>Proposed Cuts to USG Space Programs</td>
</tr>
<tr>
<td>Foreign Competition</td>
</tr>
<tr>
<td>Variability of Demand</td>
</tr>
<tr>
<td>Healthcare</td>
</tr>
<tr>
<td>Taxes</td>
</tr>
<tr>
<td>Government Acquisition Process</td>
</tr>
<tr>
<td>Skills Retention</td>
</tr>
<tr>
<td>Government Regulatory Burden</td>
</tr>
</tbody>
</table>

### 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.

Involvement in Market Segments – Space Sector

- **Space**: 52%
- **Aircraft**: 50%
- **Electronics**: 48%
- **Energy**: 35%
- **C4ISR**: 33%
- **Missiles**: 32%
- **Ships**: 29%
- **Ground Vehicles (Military)**: 28%
- **Healthcare**: 27%

U.S. Strategic Materials – Composites
Expected Changes in Defense Sector Participation

Source: U.S. Department of Commerce, Bureau of Industry and Security,
Strategic Materials Assessment – Preliminary, 2015
U.S. Strategic Materials – Composites
Expected Changes in Civilian Sector Participation, 2014-2018

Respondents providing carbon fiber-based products or services

<table>
<thead>
<tr>
<th>Category</th>
<th>Currently Participate</th>
<th>No Current Participation, But Expect to Participate in Next Five Years</th>
<th>Plan to Decrease Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>12</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Marine</td>
<td>22</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Rotary Wing</td>
<td>30</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>Energy</td>
<td>27</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Unmanned Aircraft</td>
<td>23</td>
<td>22</td>
<td>3</td>
</tr>
<tr>
<td>Space</td>
<td>34</td>
<td>33</td>
<td>2</td>
</tr>
<tr>
<td>Free Flight</td>
<td>29</td>
<td>22</td>
<td>2</td>
</tr>
</tbody>
</table>

Net Change in Space-Related Customer Demand for Respondents’ Business Lines – Space Sector

Source: U.S. Department of Commerce, Bureau of Industry and Security,
_U.S. Space Industry Deep Dive Assessment_, December 2014. UNCLASSIFIED.
U.S. Strategic Materials – Composites
Difficulty Hiring and Retaining Workers

- Engineers/Scientists/R&D
- Production Line
- Testing/Quality Control/Support Technicians
- All Others
- Information Technology

Number of Respondents

- Difficulty Hiring Only
- Difficulty Hiring & Retaining
- Difficulty Retaining Only

*98 Respondents

Source: U.S. Department of Commerce, Bureau of Industry and Security,
Strategic Materials Assessment – Preliminary, 2015
Unfilled Vacancies for Skilled Positions – Space Sector

- Respondents identified how many *unfilled vacancies* they currently have for the following positions:
  - Engineers, Scientists, and R&D Staff
  - Production Line Workers
  - Testing Operators, Quality Control, & Support Technicians
- 1,234 respondents (33 percent) currently have *24,836 vacancies* for these positions.
- These unfilled vacancies are primarily for engineers and machinists.

**Why are these vacancies unfilled?**

1. Lack of proper skills
2. Difficulty attracting workers to manufacturing
3. Geographic difficulties
4. Instability of demand

**Vacancies by State**

- California 22%
- Texas 10%
- Colorado 9%
- Pennsylvania 6%
- Massachusetts 6%
- Virginia 5%
- Maryland 4%
- Michigan 3%
- Tennessee 3%
- Ohio 3%
- Other 29%

Uncertainty About USG Strategic Direction

• 666 respondents indicated that “Variability in Space Demand” has adversely impacted their desire to continue to work with the USG.

<table>
<thead>
<tr>
<th>% Space-Related Sales</th>
<th>% With Lower Desire to Work With USG</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Space Sales</td>
<td>7.2%</td>
</tr>
<tr>
<td>Less than 1% ($1+)</td>
<td>9.9%</td>
</tr>
<tr>
<td>1-25%</td>
<td>27.4%</td>
</tr>
<tr>
<td>25%+</td>
<td>45.0%</td>
</tr>
</tbody>
</table>

• 565 respondents have had or anticipate having their R&D expenditures “moderately” or “significantly” adversely impacted by changes in USG space-related spending.

  • Commercial companies in this group represented 67% of space-related R&D expenditures in 2012.
  
  • Comments:
    • “Significant uncertainty in government requirements and objectives has made the business proposition for investment more difficult to justify as well as made unclear where targeted investment should be made” – Large company.
    
    • “Expenditures continue to be limited due to uncertainty in Return on Investment (ROI) based on the government’s volatile R&D appropriations” – Very large company.
Government Acquisition Process

Percent of respondents citing ‘Government Acquisition Process’ as one of the top five challenges to their long-term viability:

<table>
<thead>
<tr>
<th>% Space-Related Sales</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Space Sales</td>
<td>16%</td>
</tr>
<tr>
<td>Less than 1% ($1+)</td>
<td>20%</td>
</tr>
<tr>
<td>1-25%</td>
<td>28%</td>
</tr>
<tr>
<td>25%+</td>
<td>43%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% USG Sales*</th>
<th>% of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Sales</td>
<td>10%</td>
</tr>
<tr>
<td>Less than 1% ($1+)</td>
<td>9%</td>
</tr>
<tr>
<td>1-25%</td>
<td>16%</td>
</tr>
<tr>
<td>25%+</td>
<td>37%</td>
</tr>
</tbody>
</table>

* Respondents with no space-related sales, but had USG sales

Sub-Issues:

1. **Insufficient upfront information and timelines on contract requirements**
   - 125 respondents called for increased USG transparency on requirements, program application, qualification requirements, volume projections, and timing.

2. **Cost of bid process is prohibitive for many small companies**
   - 201 respondents commented on a need for reduced regulatory and administrative requirements in government contracts (despite no question specifically addressing this issue). Three quarters of these companies were medium sized or smaller.

3. **Government contracts are seen less attractive than commercial**
   - 49 respondents called for USG contracts to be more consistent across agencies and closer to commercial standards.

4. **Difficulty presenting the Government with new and innovative products**
   - 597 respondents cited this issue as a top challenge to their long-term viability. Smaller respondents, more directly involved in space.

Source: U.S. Department of Commerce, Bureau of Industry and Security,
*U.S. Space Industry Deep Dive Assessment*, December 2014. UNCLASSIFIED.
Leveraging Outside Resources

Have you considered working with these and other agencies to address IB concerns?

- NIST’s Manufacturing Extension Partnership
- Federal Laboratory Consortium
- State Economic Development Agencies
- Small Business Administration
- DOC International Trade Administration
- U.S. Department of Labor

<table>
<thead>
<tr>
<th>Assistance Type</th>
<th>Space Deep Dive Study (3,780 respondents)</th>
<th>Strategic Materials Study (269 respondents)</th>
<th>Critical Facilities Study (2,091 respondents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyber security</td>
<td>---</td>
<td>---</td>
<td>26%</td>
</tr>
<tr>
<td>Business development / Market expansion</td>
<td>19%</td>
<td>26%</td>
<td>24%</td>
</tr>
<tr>
<td>SBIR and STTR contracts</td>
<td>13%</td>
<td>17%</td>
<td>20%</td>
</tr>
<tr>
<td>R&amp;D programs / Technology acceleration</td>
<td>14%</td>
<td>26%</td>
<td>12%</td>
</tr>
<tr>
<td>Export licensing (ITAR/EAR)</td>
<td>11%</td>
<td>23%</td>
<td>9%</td>
</tr>
<tr>
<td>Global export opportunities</td>
<td>12%</td>
<td>26%</td>
<td>5%</td>
</tr>
<tr>
<td>Government procurement guidelines</td>
<td>9%</td>
<td>16%</td>
<td>16%</td>
</tr>
</tbody>
</table>
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Source: U.S. Department of Commerce, Bureau of Industry and Security
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