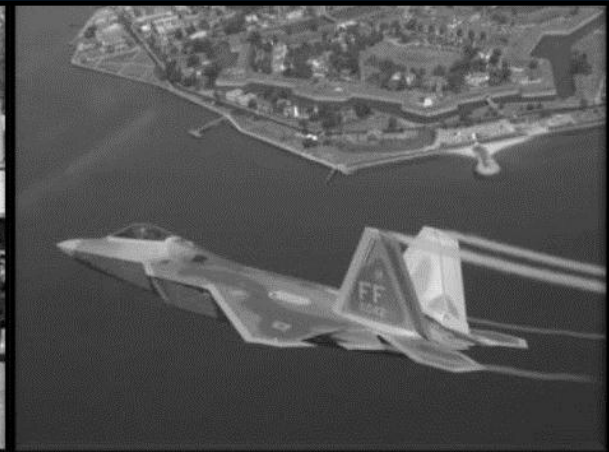




DEFENSE LOGISTICS AGENCY

AMERICA'S COMBAT LOGISTICS SUPPORT AGENCY



NATO Concern of Scarcity of Materials in Military Systems

Stephen Surface
DLA Strategic Materials

May 23, 2012

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE 23 MAY 2012		2. REPORT TYPE		3. DATES COVERED 00-00-2012 to 00-00-2012	
4. TITLE AND SUBTITLE NATO Concern of Scarcity of Materials in Military Systems				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Defense Logistics Agency, Strategic Materials, 8725 John J Kingman Road, Ste 3229, Fort Belvoir, VA, 22060-6223				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES Presented at the NDIA Environment, Energy Security & Sustainability (E2S2) Symposium & Exhibition held 21-24 May 2012 in New Orleans, LA.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 17	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



Agenda

- Issues
- NATO Research & Development
- Material Use and Origin
- AVT-196 Progress





Concern

- In 2009 NATO identified significant material supply chain vulnerabilities with potential impact on vehicle parts/components
- Exploratory team recommended a full Working Group effort
- Similar and parallel concerns raised in U.S.
- **Material shortages lead to production delays or stoppage & *security threats***



Nations Involved in NATO Research & Technology Organisation (RTO)

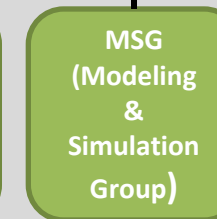
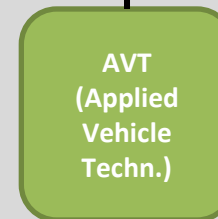
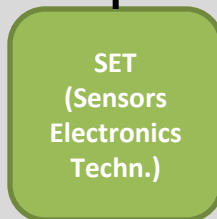
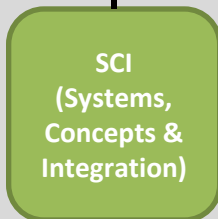
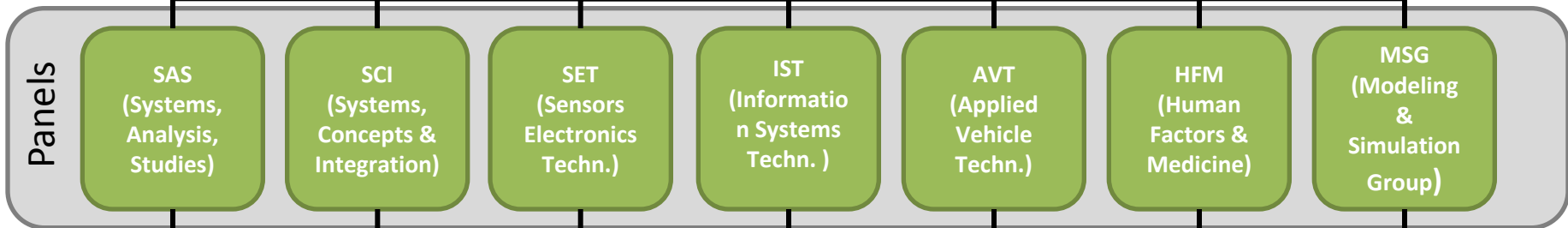
- NATO countries: ALB, BEL, BGR, CAN, CZE, DNK, EST, FRA, LVA, LTU, LUX*, NLD, NOR, POL, PRT, ROM, SVK, DEU, GRC, HUN, ISL*, ITA, SVN, ESP, TUR, GBR, and USA
 - * denotes countries not participating in RTO activities.
- Additional Partners
 - PfP: ARM, AUT, AZE, BLR, BIH, FIN, FYR, GEO, IRL, KAZ, KGZ, MLT, MDA, MNE, RUS, SRB, SWE, CHE, TJK, TKM, UKR, UZB
 - MD: DZA, EGY, ISR, JOR, MRT, MAR, TUN
 - GLOBAL PARTNERS: AFG, AUS, IRQ, JPN, KOR, NZL, PAK



Research and Technology Organization -Today



S&T Reform

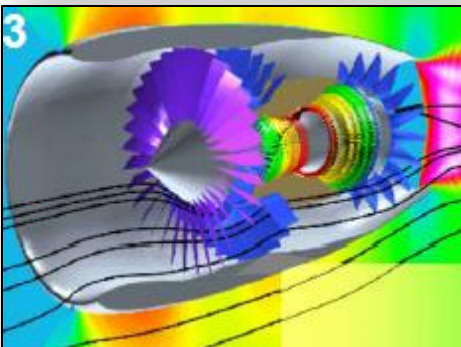
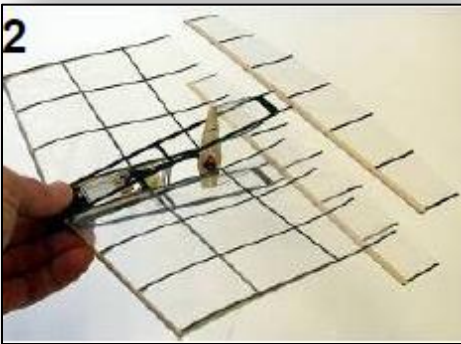
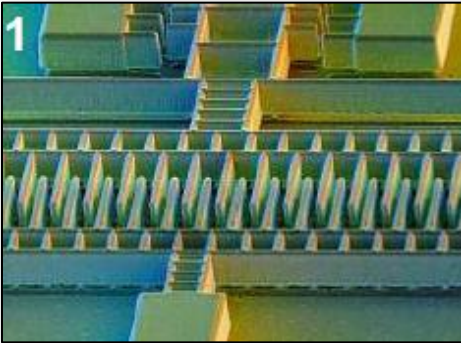


Constant Average of 150 Technical Teams
approx. 3,500 NATO and National Scientists and Experts

❖ Of the seven panels, only AVT conducts semi-annual Panel Business Meetings and has done so for 14 years.



Technology Areas in AVT



1. Mechanical Systems, Structures, and Materials

- vehicle and platform design; structural loads and dynamics; noise and vibration control; smart and multifunctional materials and structures; structural materials and manufacturing processes; non-structural materials; corrosion, fatigue and other degradation mechanisms; affordability, availability, survivability and supportability; reliability and maintenance

2. Performance, Stability & Control, Fluid Physics

- performance; stability and control; aerodynamic and hydrodynamic analysis and design; theoretical, experimental and computational fluid dynamics; aerothermodynamics; aero-and hydro-acoustics; aeroservoelastics

3. Propulsion and Power Systems

- focusing on engineering of propulsion systems; fuels and energy conversion; fluid and gas dynamics
- Addressing airbreathing engines, auxiliary onboard power generation units, solid and liquid propellant rockets, electrical systems, and fire protection and suppression



AVT-196 Impact of Scarcity of Materials in Military Mechanical, Structural, Propulsion, and Power Systems

- Members from USA, GBR, CAN, FRA, DEU, NLD, ITA, and TUR project an official start date of Jan 2012, end of Oct 2014
- Due to the importance, unofficial start May 2011 with follow-on Oct 2011
- Deliverable is NATO technical report, NATO NU, and possibly a workshop



AVT-196 Impact on Scarcity of Material Availability in Military Systems

Why the Concern?

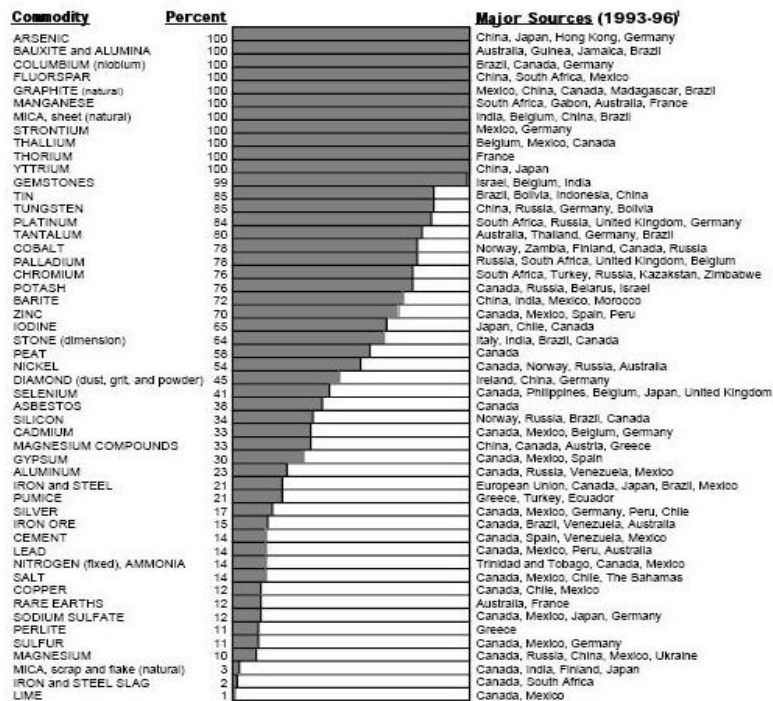
- Supply chain vulnerabilities and foreign supply
 - China and Rare Earths
 - Africa and conflict minerals
- Declining budgets and emphasis maintaining systems
- Production delays or non-availability

National Security Jeopardized



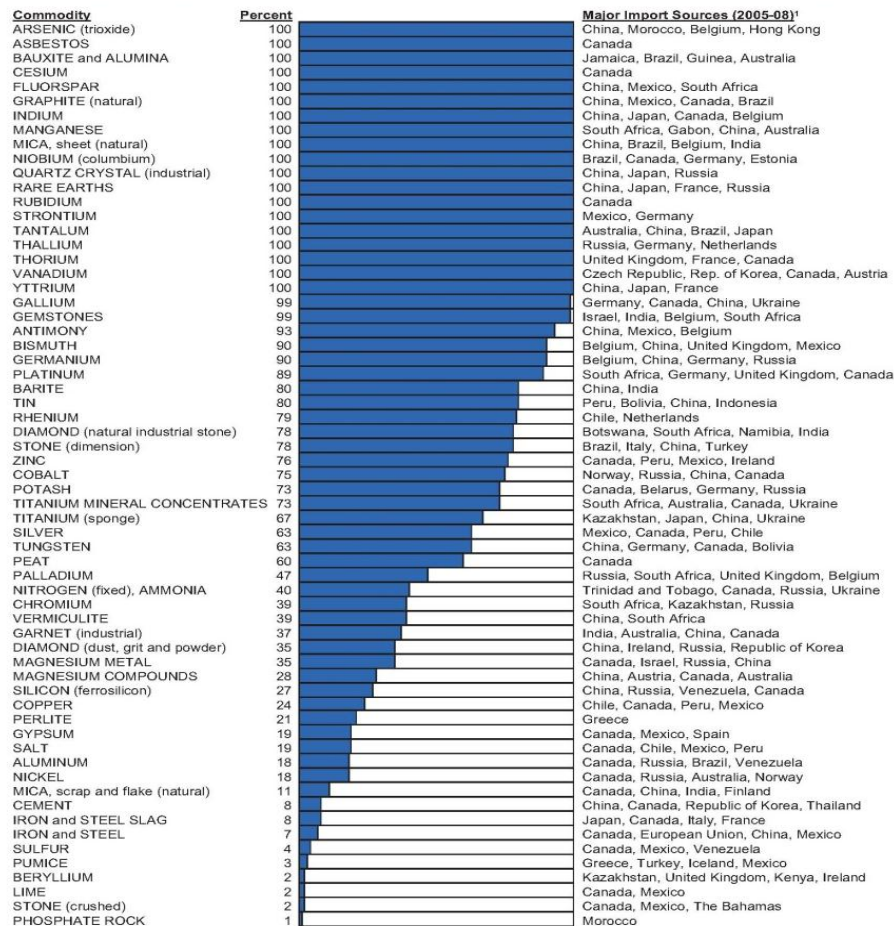
US Reliance on Imports is Expanding at an Accelerated Rate

1997 U.S. NET IMPORT RELIANCE FOR SELECTED NONFUEL MINERAL MATERIALS



6

2009 U.S. NET IMPORT RELIANCE FOR SELECTED NONFUEL MINERAL MATERIALS

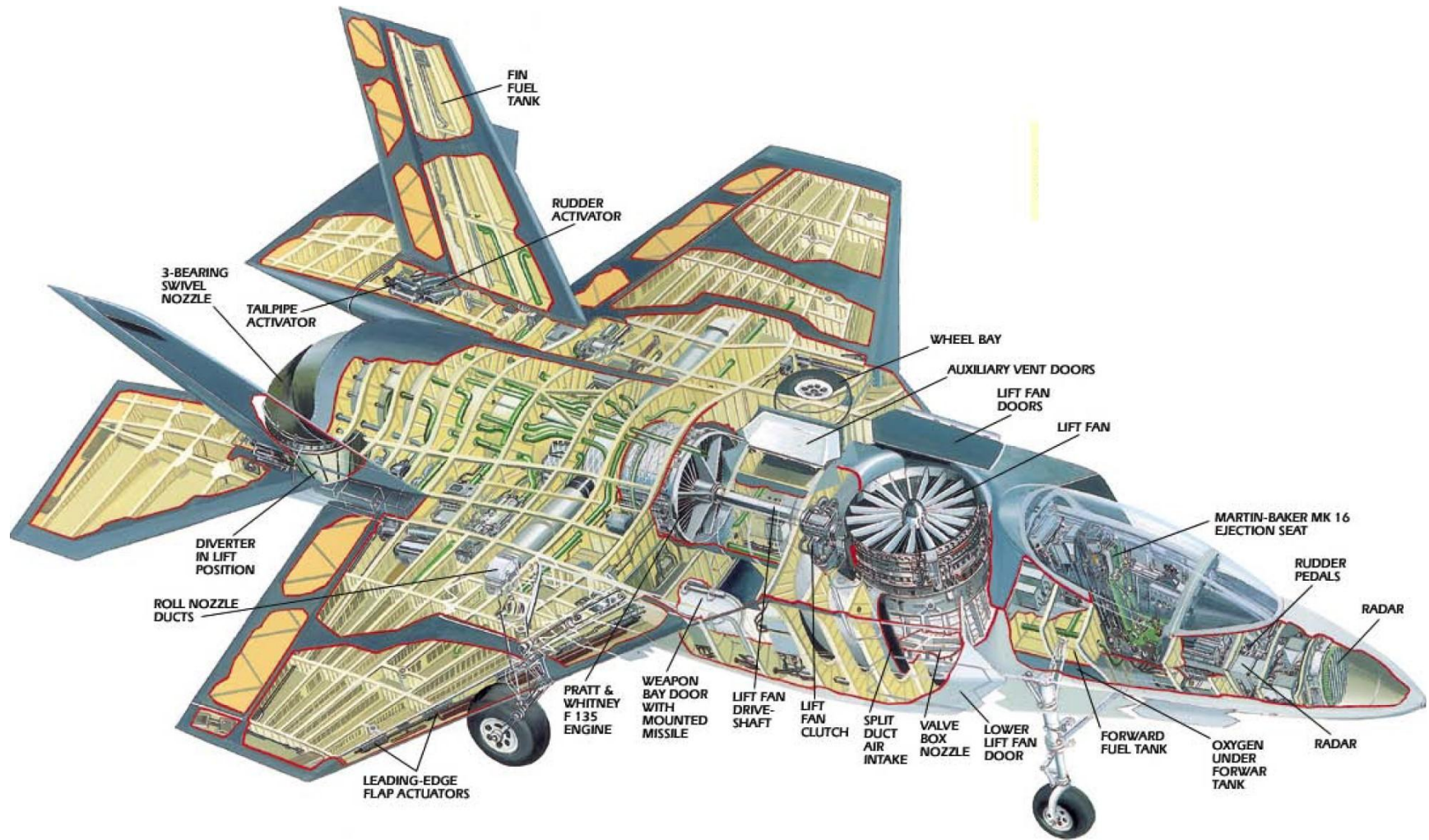


Additional commodities for which there is some import dependency but data are withheld or are insufficient to determine import-reliance levels:

Antimony	China, Mexico, Bolivia, South Africa	Mercury	Russia, Canada, Spain, Kyrgyzstan
Bismuth	Mexico, Belgium, China, United Kingdom, Canada	Rhenium	Chile, Germany, Netherlands, United Kingdom, Russia
Gallium	France, Russia, Canada, Germany, Hungary	Rutile	Australia, South Africa, Sierra Leone
Germanium	Russia, United Kingdom, China, Belgium, Ukraine	Titanium (sponge)	Russia, Japan, China, Kazakhstan
Ilmenite	South Africa, Australia, Canada	Vanadium (ferrovanadium)	Russia, Canada, Belgium, Austria
Indium	Canada, Russia, France, Italy, China	Vermiculite	South Africa, China
Kyanite	South Africa	Zirconium	Australia, South Africa

¹In descending order of import share.

from USGS Mineral Commodity Summaries



- Strategic or critical materials used in virtually every part of aircraft



The 14 “EU Critical Materials” Are Essential for the Manufacture of Many Important Ground Vehicle Components and Systems





AVT-196 Progress

- Identify military vehicle examples and material content
 - Identify materials
 - Prioritize materials by use, availability
 - Assess impact of material non-availability on production
- Review/Analyze Global Supply Chains for vulnerable materials



AVT-196 Progress (continued)

- Develop mitigation strategies to include:
 - Alternate/new technologies
 - Substitute materials
 - Material buffer stocks or strategic sourcing
 - Limited stockpiling
- Provide recommendations



Advantages of Collaborative Effort

- U.S. and NATO share common concern
- Working Group represents an expanded and diversified technical base and expertise that benefits DoD and NATO
- Potential to partner to share key strategic/critical materials, common parts and components
- Potential to partner with allies to introduce additional projects of mutual interest



Future Meetings

- 2012 Spring meeting—San Diego, CA (completed)
- 2012 Fall meeting— France
- 2013 Spring meeting—Sweden
- 2013 Fall meeting—Latvia



Questions??

Contact: Steve Surface, DLA Strategic Materials
Fort Belvoir, VA 22060-6773

Stephen.Surface@dla.mil

(703) 767-6520

DEFENSE LOGISTICS AGENCY

AMERICA'S COMBAT LOGISTICS SUPPORT AGENCY

