

Summary of the Office of Science FY 2021 Accelerator Science & Technology Supplier Data Call

September 2021

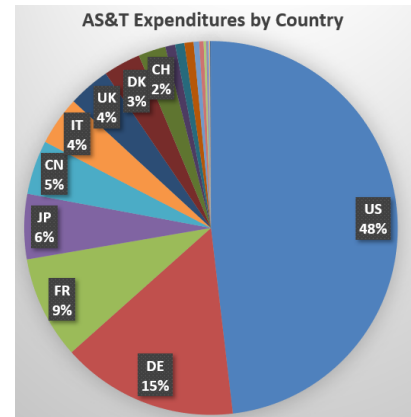
Background

A data call was issued to DOE National Laboratories and to FRIB to gather information about the types of accelerator science & technology (AS&T) purchases for current construction projects and currently operating accelerators (including purchases in FY 2019-FY 2020). Information about vendor, cost, component type, reason for vendor selection, and general comments were collected from 34 entities and comprised nearly \$900M in transactions with 256 vendors. The intent of the data call was to identify dominant suppliers of AS&T for DOE's accelerator-based facilities. Data were received in January 2021 in most cases.

Summary

After data cleanup, vendor name disambiguation, and resolving equipment purchased through U.S. resellers to their original manufacturer, a data analysis revealed the following points (all conclusions are in terms of the monetary value of the purchases unless otherwise noted):

1. **48% of recent purchases of AS&T were sourced from U.S. vendors.**
 - a. RF products led the U.S.-sourced procurements with CPI, Cree/Wolfspeed, and L3Harris the top 3 vendors.
 - b. 140 U.S. manufacturers were represented
2. **"Best value to the project" was the dominant reason (53% of cases) given for selecting a particular vendor,**
 - a. 16% cited "previous experience with the vendor",
 - b. 11% cited "lowest cost meeting specifications", and
 - c. 5% cited "highest quality".
3. **"Nonavailability-insufficient quality" was the dominant reason (41% of cases) for selecting a foreign vendor,**
 - a. 22% cited "Unreasonable cost", and
 - b. 11% cited "Nonavailability-insufficient quantity".



4. **Several key technologies were purchased dominantly from foreign vendors.** Highest foreign procurement value was purchased from:

- a. DE: Research Instruments \$64M
- b. FR: Sigma Phi \$31M
- c. FR: Air Liquide \$27M
- d. DK: Danphysik \$26M
- e. CN: Wuxi Creative \$18M
- f. JP: R&K Company \$18M
- g. IT: Ettore Zanon \$17M
- h. DE: Bruker OST \$16M
- i. UK: Tesla Engineering \$15M
- j. CN: Ningxia Orient TI \$13M
- k. CH: Linde Cryogenics \$11M

Technology	Specific Areas	Value [M\$]	% Foreign
Optics (incl. x-ray optics)	Specialty mat'ls, coatings, optics	\$ 11	100%
Superconducting Accelerators	Accelerator Cavity Manufacturing	\$ 149	70%
Laser Systems	Advanced ultrafast laser systems	\$ 16	67%
HV/UHV Systems	Pumps, chambers	\$ 40	66%
Conventional Magnets	Manufacturing, Perm. Magnet Mat'ls	\$ 117	61%
Cryogenic Systems	Large capacity liquid helium cryoplants	\$ 110	56%
RF Power Systems	High power klystrons, gyrotrons, solid state systems	\$ 156	51%
Superconducting Magnets	Superconducting cable and wire	\$ 49	50%
Power supplies	DC, high current, high voltage, pulsed	\$ 62	20%
Precision Mounts	Precision movers, ultrastable bases, alignment equipment	\$ 15	17%
Advanced Mfr Techniques and equipment	UHV furnaces, Add Mfr tools, advanced CMMs/CNC tools	\$ 38	15%
Particle Sources	Cathodes, Ion source expertise	\$ 28	15%
Specialized dielectrics	HV insulators	\$ 2	8%

AS&T procurement by technical area, value, and % foreign-sourced.

5. **Purchases are weighted towards integrated subsystems and stand-alone equipment,** shifting integration cost and risk to vendors. This favors AS&T vendors with high value-added products, and such vendors tend to be foreign.
 - a. \$60M Materials (e.g., PM blocks, HTS cable, Nb sheet) – US 34%, DE 28%, CN 20%
 - b. \$133M Components (e.g., coils, cavities, x-ray optics, WG components) – US 61%, DE 14%, IT 5%
 - c. \$486M Subsystems (e.g., magnets, klystrons, power supplies) – US 41%, DE 19%, FR 10%, JP 6%
 - d. \$164M Equipment (e.g., test equipment, cryoplants, laser systems) – US 64%, FR 15%, CH 7%, IT 5%