



ACQUISITION RESEARCH SYMPOSIUM

ADVANCING U.S. COMPETITIVENESS THROUGH DECISION SCIENCE

May 10, 2023

STUDY BACKGROUND



RESEARCH QUESTION

Without the ability to adopt cutting edge technology from the manufacturing sector into the Fleet sustainment and readiness missions, the U.S. Navy risks diminished or loss of advantage in the maritime domain. How can the USN speed up the time to access key technology and capability and identify those avenues quickly?



GOVINI SOLUTION

- Technology area: Additive Manufacturing (27 subtechnology areas that can be seen in appendix)
- Fiscal year filter: FY17-22
- Organization filter: Organizations with US Federal Awards and/or Patents and English language Academic Research

ANALYTICAL METHODOLOGY



- Explore and collect the necessary data sources to accomplish the analysis to include contracts, subcontracts, OTAs, grants, academic research and patents.
- Clean and collate all relevant data into a normalized format and store in a centralized database.

- Scope Additive Manufacturing Market based on relevant keywords to surface key vendors.
- Identify key subtechnology areas within the Additive Manufacturing Market and tag identified vendors to appropriate subtechnologies.

- Leveraging Govini contracts data, analyze period of performance (PoP) and ceiling on USG contracts awarded to vendors identified in the Additive Manufacturing Market baseline.
- Further filter to include only contracts with available PoP and ceiling, thus highlighting those available for USN AM contracting.

- Determine which subtechnology is best positioned in terms of maturity and technical community acceptance to have the largest impact to increase current fleet readiness.
- Identify potential contracting avenues based on surfaced contracts with available PoP and ceiling for desired subtechnology.

KEY FINDINGS

- **\$1.3B of contract ceiling is currently available on active Additive Manufacturing contracts across USG.**
 - Available contract ceiling means that the USG has available contract vehicles to potentially leverage to quickly access this innovative technology.

- **USG Demand for Additive Manufacturing (AM) Technology is at its highest point since FY17.**
 - There are 210 active contracts for AM technology or services across the USG.
 - The Air Force contracted roughly five times as much as the Navy on AM from FY18-FY22.

- **The industrial base for Additive Manufacturing is large, but underutilized by USG.**
 - There are 7,800 vendors in this space and USG is only using- 135 representing less than 2% of the entire vendor ecosystem.
 - AM vendors span the spectrum from small, private, start-ups to large, publicly traded, and well-known defense companies.

HIGH NUMBER OF VENDORS FOR THE USN TO LEVERAGE

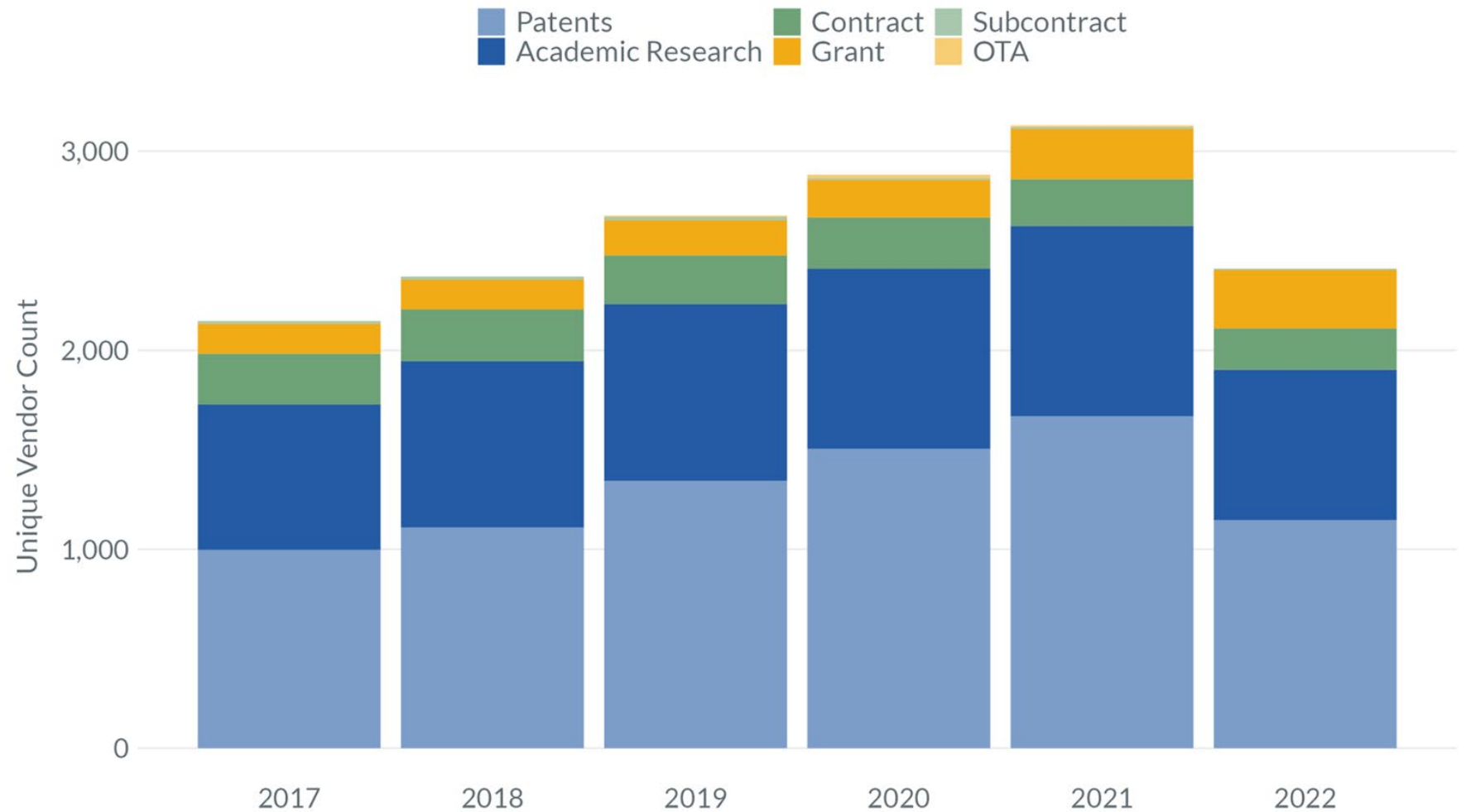
IMPACT

The entire market must be baselined to understand the scope of vendors capable of providing the services and products required by the USN.

INSIGHTS

- There are approximately 7,800 unique vendors who have historically operated in the U.S. commercial and government AM market over the entire time frame of 2017-2022.
- The dip in FY22 is a result of lower patent awards and academic research during that time period, which seems in line with an overall decrease in innovation in that time (Data Journalism Team, 2022).

ADDITIVE MANUFACTURING UNIQUE VENDOR COUNT
BY SOURCE & CALENDAR YEAR, 2017-2022



DIVERSE VENDOR LOCATIONS ALLOW SELECTION TO SUPPORT SPECIFIC USN PRIORITIES

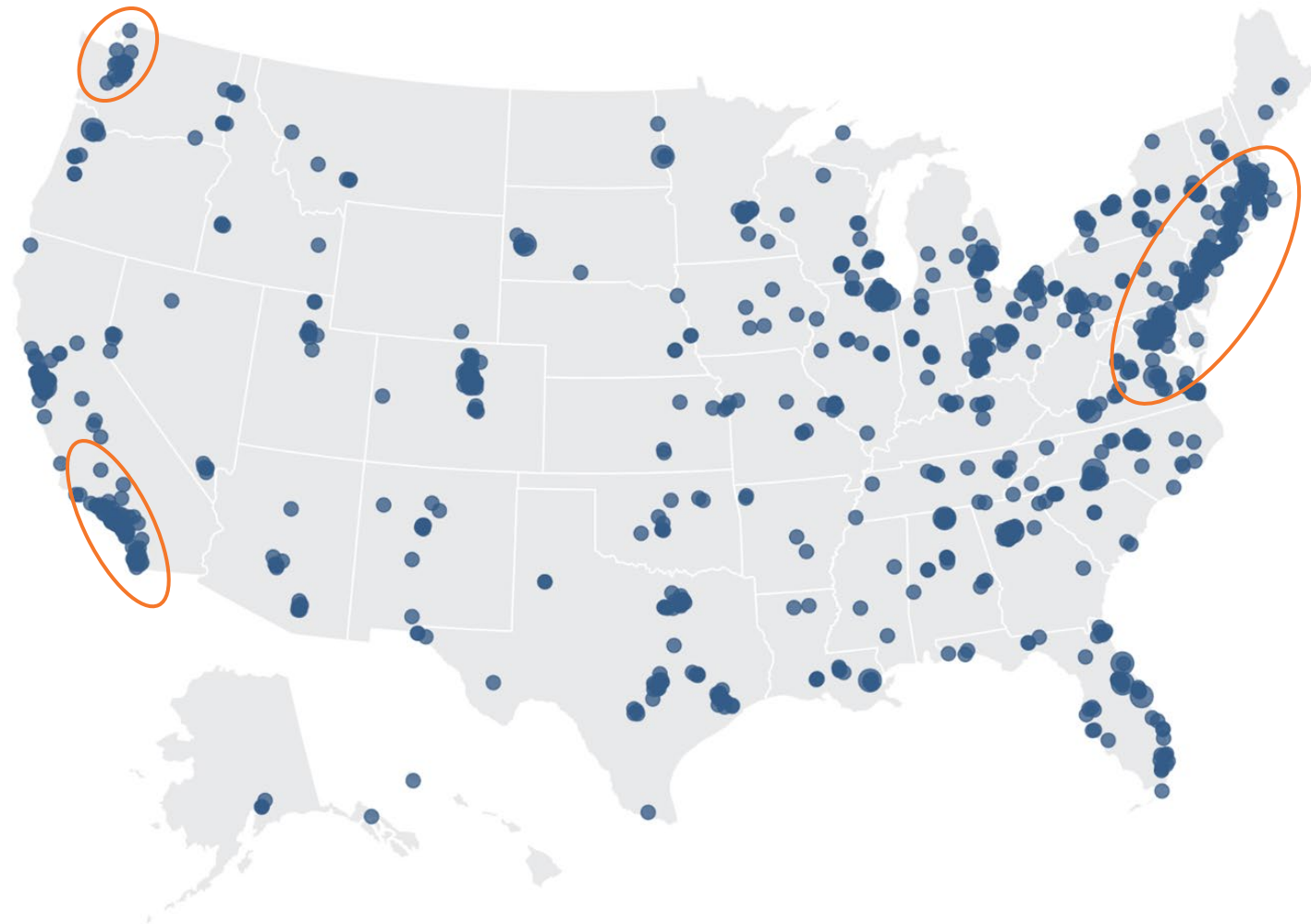
IMPACT

Vendor location can be analyzed to illuminate specific vendors who are easy to partner with for future work. Based on the AM technology application, it may be beneficial to work with vendors in geographical proximity to a Naval base or laboratory location.

INSIGHTS

- There are high concentrations of AM vendors in the Southern California, the Pacific Northwest and Northeastern Regions, which coincides with a number of Fleet Concentration Areas, U.S. Navy bases, and Naval Surface, Undersea, and Aviation Warfare Centers.

ADDITIVE MANUFACTURING CALENDAR YEAR 2017-2022
VENDOR LOCATION



ACTIVE CONTRACTS WITH AVAILABLE CEILING AND POP

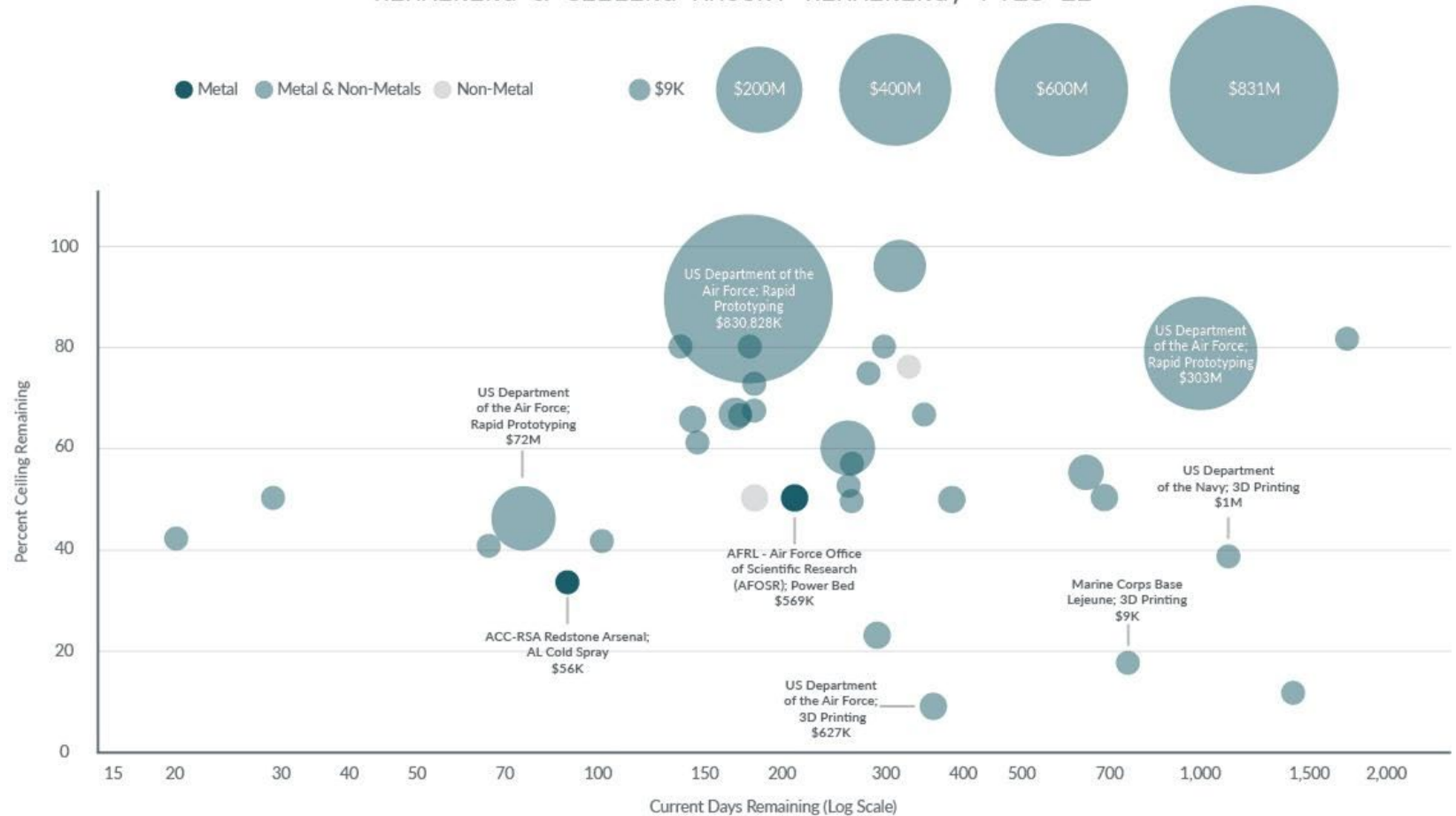
IMPACT

Reviewing the ecosystem of active contracts allows decision makers to understand the type, as well as the availability of active contracts, related to the technology area of interest to determine the ideal combination of factors for their unique use case. Current day remaining, percent ceiling remaining, and ceiling amount remaining can help narrow viable contracting options.

INSIGHTS

- A majority of active contracts across the USG pertain to broader technology areas such as 3D printing and rapid prototyping that can be suited for both metal and non-metal applications.
- When leveraging existing contracts with available ceiling and period of performance, rapid prototyping and 3D printing contracts may allow a higher degree of flexibility in the type of AM products or services procured

ADDITIVE MANUFACTURING ACTIVE CONTRACTS CURRENT DAYS REMAINING BY PERCENT CEILING REMAINING & CEILING AMOUNT REMAINING, FY18-22



AREAS FOR FUTURE ANALYSIS



Incorporate U.S. Navy Leadership and technical subject matter expert knowledge and input to better understand immediate production and sustainment needs and what technology and applicable use cases have currently been approved by the appropriate technical communities for shipboard usage



Identify other emerging technologies areas to apply this methodology to, such as unmanned vehicles, materials informatics, or biomanufacturing as well.



Develop targeted list of potential parts that additive manufacturing methods can be utilized to manufacture based on available technical documentation and material type.

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APPENDIX

AM SUBTECHNOLOGY AREAS UTILIZED IN ANALYSIS

Rank	Additive Manufacturing Technology Group	Material Type	Total Awarded Amount (FY18-22)	Average Contract Awarded Amount (FY18-22)
1	Plasma Atomization	Metal	\$46,904,250	\$2,931,516
2	Rapid Reaction Technologies	Metal & Non-Metal	\$44,465,915	\$2,021,178
3	Thermoset Manufacturing	Non-Metal	\$9,582,114	\$1,368,873
4	Rapid Prototyping	Metal & Non-Metal	\$204,130,732	\$1,222,340
5	Prototype Integration Facility (PIF)	Metal & Non-Metal	\$225,607,965	\$964,137
6	Cold Spray	Metal	\$176,370,955	\$683,608
7	Photopolymerization	Non-Metal	\$6,112,151	\$555,650
8	Material Jetting	Non-Metal	\$2,108,233	\$421,647
9	Open Manufacturing	Metal & Non-Metal	\$7,463,226	\$414,624
10	Atomic Layer Deposition	Metal	\$29,975,864	\$389,297
11	Powder Bed	Metal	\$19,075,809	\$381,516
12	Nanophotonic	Metal & Non-Metal	\$22,953,190	\$376,282
13	Metal Additive Manufacturing & Printing	Metal	\$25,610,036	\$346,082
14	3D Printing	Metal & Non-Metal	\$1,073,783,490	\$303,414
15	3D Printing	Metal	\$849,781	\$283,260

AM SUBTECHNOLOGY AREAS UTILIZED IN ANALYSIS CONTINUED

Rank	Additive Manufacturing Technology Group	Material Type	Total Awarded Amount (FY18-22)	Average Contract Awarded Amount (FY18-22)
16	Vapor Deposition	Metal & Non-Metal	\$32,479,809	\$253,749
17	Laser Sintering	Non-Metal	\$3,850,277	\$167,403
18	Stereolithography	Non-Metal	\$2,478,892	\$137,716
19	Binder Jet	Metal & Non-Metal	\$1,812,870	\$129,491
20	Selective Laser Melting	Metal	\$3,609,206	\$124,455
21	Fused Deposition Modeling	Non-Metal	\$9,591,697	\$112,843
22	3D Printing	Non-Metal	\$1,182,376	\$90,952
23	3D Scanning	Metal & Non-Metal	\$14,152,701	\$80,413
24	Electron Beam Melting	Metal	\$3,797,163	\$79,108
25	Adv. Concept Tech Prototyping	Metal & Non-Metal	\$434,843	\$36,237
26	Laser Cutting	Non-Metal	\$57,025	\$28,513
27	Digital Light Processing	Non-Metal	\$0	\$0