How Industry Can Leverage the Resources of NSWC Crane for Small Arms Weapons Development

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How Industry Can Leverage the Resources of NSWC Crane for Small Arms Weapon Development

A Case Study on CRADAs

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Agenda

- The Need for Collaboration
- NSWC Crane Small Arms Testing Resources
- Types of Agreements
- CRADA Case Study: Flex Force Enterprises
- Brief Review of CRADA Results
- Typical CRADA Language
- Benefits to Government and Industry
- Summary / Conclusions

Why We Need to Collaborate

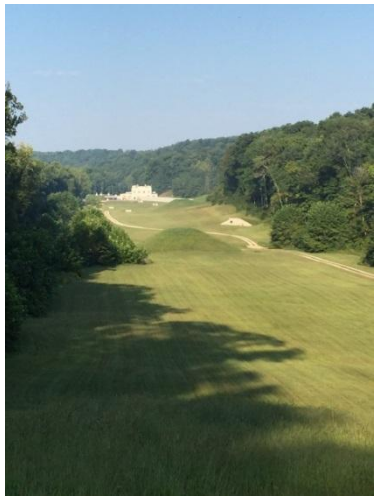
- R&D budgets are shrinking in Government and industry
- Recent trend of reduction in Government purchases
- Small Arms Weapons can pose expensive testing requirements with high capital investment costs

Mechanisms already exist to improve collaboration between industry and Government, but these are underutilized or not well understood

- Industry can enter into one of several types of agreements with the Government to use specialized equipment or facilities to perform testing.
- Access to specialized equipment and personnel can save companies both time and money while giving the Government a small glimpse of the new technologies on the horizon.

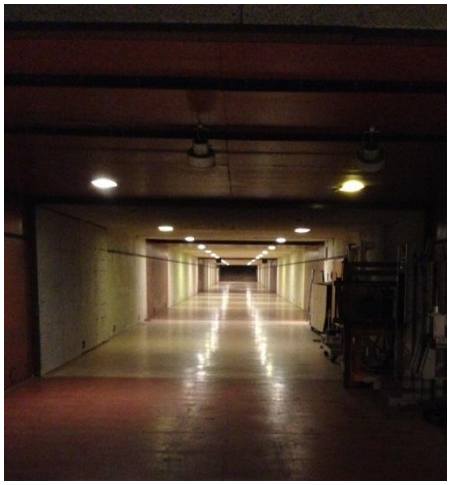
At Naval Surface Warfare Center Crane (NSWC Crane), there is an active Technology Transfer office that can help industry pursue agreements to access the facilities, equipment, and expertise in the NSWC Crane Small Arms Weapons Division.

Small Arms Testing Resources at NSWC Crane



Outdoor firing ranges

Elevated firing position
for high depression angles

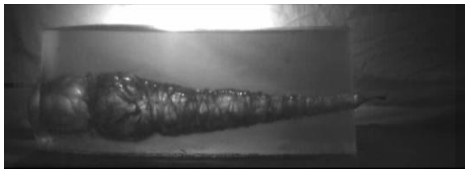


Indoor firing range

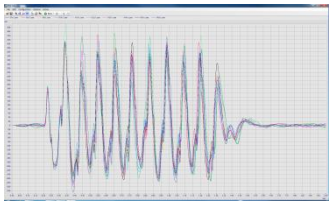
Outdoor (live-fire)
motion platform

Indoor (tracking)
motion platform

Acoustic signature
measurements based on
new NATO standard



High-speed video and
ballistic gelatin testing



Data acquisition
and analysis

Types of Agreements

- The three most common Agreements are:
  - Work for Private Parties: Testing Services Agreement (TSA)
  - Work for Private Parties: Engineering Services Agreement (ESA)
  - Cooperative Research and Development Agreement (CRADA)

- A TSA allows a company to pay the Government to perform testing, and test data is the only deliverable.

- An ESA is less restrictive than a TSA, allowing some feedback and suggestions for test or product enhancement. ESAs can also allow the sale of goods and services to sources outside of the DoD.

- A CRADA is an agreement between the Government and industry to leverage each other's resources when conducting research and development that is mutually beneficial. CRADAs permit collaboration, open feedback, and some cost-sharing.

NOTE: Government is forbidden from competing with private industry, but these agreements can be used when existing industry cannot meet **timeframe**, **quantity** or **quality** requirements.

Testing Services Agreement (TSA)

The simple case is a TSA. The Government provides testing services to the vendor by performing specific tests and reporting results for an agreed-upon fee. No real collaboration occurs.

Intellectual property rights for the items under test remain with the vendor. No new IP is developed since the Government is merely following a vendor-provided test plan.

TSA “Example”

The Pizza and Bullets company wants to obtain test data on their new Veggie Supreme cartridges. However, P&B has limited internal testing capabilities and would like to leverage the facilities at NSWC Crane. Crane and P&B enter into a Testing Services Agreement wherein P&B provides test items, a detailed test procedure, and funding to Crane to perform the tests. The funding details, schedule and reporting requirements are negotiated when executing the Agreement. Crane performs the test procedure and returns the results to P&B without collaboration.

TSAs are authorized under 10 U.S.C. 2539b

Engineering Services Agreement (ESA)

While similar to a TSA, an ESA can also include limited collaboration by allowing for the sale of goods and services to entities outside of the DoD. In this case the Government can act as an engineering service provider to a company. Collaboration can occur in determining how items should be tested to obtain the most relevant or useful data and in providing analyses and recommendations for improvements. As with a TSA, the test results are presented to the vendor for an agreed-upon fee in an ESA.

Intellectual property rights for the items under test remain with the vendor. New IP developed for test procedures or fixtures may be jointly owned.

ESA “Example”

Frank’s Auto Emporium is branching out to produce M4 upper receiver assemblies. The company wants to obtain test data and advice on how to improve their new Muffler receiver design. With limited internal testing capabilities and no private industry capabilities to meet their needs, the company would like to leverage the facilities and expertise at NSWC Crane. Crane and the company enter into an Engineering Services Agreement wherein the company provides test items and funding to Crane to develop and perform the tests and to provide feedback on how to improve the cartridges. The funding details, schedule and reporting requirements are negotiated when executing the Agreement. Crane performs the test procedures, provides feedback on improvements, and returns the results to the company.

ESAs are authorized under 10 U.S.C. 2563

Cooperative R&D Agreement (CRADA)

A CRADA is a flexible, non-contractual agreement that allows NSWC Crane to partner with a non-federal entity (such as a company) to conduct joint research & development. Through a CRADA, NSWC Crane can commit resources such as personnel, facilities, equipment, intellectual property or other resources to the partnership, though no funding can be provided. The partner entity can provide similar resources and also can provide funds in support of the partnership (for testing costs, for example).

Intellectual property rights are well-defined through the Agreement language. Typically, the vendor retains their IP, the Government retains its IP, and any new IP developed under the CRADA is jointly owned.

CRADA Example

Case study on next slides…

CRADAs are authorized under 15 U.S.C. 3710a

CRADA Case Study: Flex Force

- **Overview**
  - Flex Force is a small business with Army SBIR Phase II/III awards for stabilized weapons mounts on helicopter platforms based on their Agile, Small-Deflection, Stabilized Platform (ASP) technology. The company's technologies also include pre-shot sniper detection systems.
  - Flex Force's stabilization technologies are potentially useful for both crew-served helicopter (Army Aviation, NAVAIR) and maritime (NAVSEA) applications.
  - Flex Force needed access to specialized testing equipment and facilities (such as NSWC Crane's indoor motion platform) to develop their crew-served stabilized mount. The company also wanted to collaborate on the technology rather than simply assigning testing tasks under a Testing Services Agreement.
  - Potential benefits from the technology: increased engagement range, decreased target acquisition time, higher hit probability, and reduced training time and costs.
- **CRADA goals**
  - Test and refine Flex Force's stabilized mount technologies
  - Evaluate prototypes at Crane facilities, particularly with the 6DOF motion table and live-fire testing
- **Agreement execution:** 4-6 months to initiate agreement
- **CRADA length:** 3 years (amendable to longer timeframe)
- **Intellectual property:** Flex Force owns its previous IP, Government owns its previous IP, and any new IP developed under the CRADA is jointly owned.

Brief Review of CRADA Results

- **6DOF motion platform testing of Flex Force ASP prototypes**
  - Identified ASP performance limitations and collaborated on improvements
  - Identified 6DOF measurement limitations and path forward
  - Greatly improved ASP pointing accuracy and system functionality
- **Live-fire testing of Flex Force ASP prototypes**
  - Easy access to live-fire ranges and instrumentation
  - Iterative and efficient “test – change – test” process
  - Significantly improved ASP live-fire dispersion performance
- **Open discussions and analysis of results**
  - Government feedback on design and suggestions for refinement
  - Flex Force feedback on stabilization technology details
  - Free and open discussions on results (both successes and challenges)

Live-Fire testing of .50 Caliber M2HB Machine Gun on Flex Force Maritime ASP

.50 Caliber GAU-18 Machine Gun on Flex Force Maritime ASP

Typical CRADA Language

CRADA LANGUAGE INCLUDES:

- **Scope of the Agreement / Statement of Work / Timeframe**
- **Processes for Data Collection or Specific Testing**
- **Reporting Requirements**
  - Typically both interim and final reports
  - Includes the results obtained and a list of all IP developed
  - Reports are submitted bilaterally within the CRADA
- **Agreements to Confer Prior to Publication or Public Disclosure**
- **Testing at Other Government Facilities**
- **Proprietary Information Procedures**
  - Often comes up within a CRADA.
  - Must be marked and handled appropriately.
- **Classified Information Procedures**
  - Possible under a CRADA with appropriate markings, precautions and procedures
  - Any presentation that includes Classified Information or otherwise restricted Data must have prior review and approval by NSWC Crane pursuant to the pertinent security laws, regulations, and directives.

GOVERNMENT CANNOT DISCUSS:

- **Future Procurement Information**
- **Government Technical Requirements**

CRADA Benefits

- Government benefits
  - “First look” at new technologies or systems
  - Chance to influence design choices based on SME experience
  - Increased technical experience for Government personnel

- Industry benefits
  - Reduced development and testing costs
  - Open technical discussions and collaboration with Government SMEs / engineers
  - Opportunity to test in a more realistic environment
  - Access to unique facilities / equipment (reduced capital investment)

Summary / Conclusions

- Industry can partner with the Government to perform testing and to collaborate
  - Testing Services Agreement (TSA)
  - Engineering Services Agreement (ESA)
  - Cooperative Research and Development Agreement (CRADA)

- Entering into an Agreement does not affect a company's ability to respond to future solicitations.

- Identify your needs and start early!

NSWC Crane has facilities and personnel for in-depth small arms testing and evaluation, and we want to work with you!

Questions?

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NSWC Crane Tech Transfer Partnerships

MECHANISM	AUTHORITY	ELIGIBILITY	PURPOSE & ADVANTAGE	DESCRIPTION
Cooperative Research and Development Agreement (CRADA)	15 U.S.C. 3710a	Any non-federal government entity	Joint development and sharing of facilities, knowledge, experience and/or intellectual property. Provides data and intellectual property protection from Freedom of Information Act for an established period of time.	An agreement that provides for joint research and development; however, NAVSEA Division personnel and facilities costs may be paid for by the non-government partner. Approval by Division Commander. Not subject to Federal Acquisition Regulations.
Educational Partnership Agreement (EPA)	10 U.S.C. 2194	Any educational institution	Allows Division scientists and engineers to work with educational institutions to enhance STEM education.	Allows for equipment loans, help with STEM course development, guest lectures and demonstrations, workshops for teacher and student science and technology education.
Partnership Intermediary Agreement (PIA)	15 U.S.C. 3715	Any semi-private entity set up by state or local governments	Allows the Division to partner with semi-private institutions to develop potential interactions with State and local business entities.	Allows for the development of interactions that would increase the utilization of Division facilities and expertise.
Patent License Agreement (PLA)	35 U.S.C. 207	Any entity	Joint development and sharing of facilities, knowledge, experience and/or intellectual property. Provides data and intellectual property protection from the Freedom of Information Act for an established period of time.	Assigns the right to make, use or sell government intellectual property. License fees and/or royalties may be involved. Approved by the Division Commander.
Memorandum of Understanding or Agreement (MOU/MOA)	DoDI 4000.19	Any entity	Allows for the defining of understanding and areas of responsibility between two or more parties.	Defines general and detailed areas of responsibility and understanding between two or more entities.
Work For Private Parties Agreement (WFPP)	10 U.S.C. 2539b 10 U.S.C. 2563 22 U.S.C. 2770	Any business, university or private entity	Provides a working alliance with the Divisions' unique technical personnel and use of the facility for an appropriate fee through the authorization testing services, sales or articles or services outside of the Department of Defense under specific conditions as well as the sale of articles and services to U.S. companies for incorporation into end items that may be sold to friendly foreign countries or international organizations.	Perform work efforts within the Divisions' technical capabilities under authorized statutes 22 USC 2770, 10 USC 2539b(a)(3), 2539b(a)(4), and 10 USC 2563. Approval at the Division and/or Headquarters' level.
Centers for Industrial and Technical Excellence (CITE)	10 U.S.C. 2474	Any private, non-Government entity	CITE designation as an arsenal- and/or depot-level activity allows the Navy to more efficiently maintain an in-house, energetics capability by enabling designated activities to effectively address and manage under-utilized capacity. This has a positive impact on operations due to increased direct investments in equipment and facilities, combined with cost sharing of a larger revenue base, resulting in higher levels of readiness with lower stabilized rates.	A statutory authority (10 USC 2474) that permits CITE-designated depot maintenance and military arsenal facilities to (1) enter into public-private partnerships with private, non-Government entities to perform work related to core competencies; (2) received reimbursement for use of under-utilized Government resources where capacities exist; and (3) be excluded from requirements limiting the amount of Government work contracted out to private industry within a fiscal year.

Small Arms Testing Resources at NSWC Crane

- **Special Weapons Assessment Facility (SWAF) – Outdoor Firing Ranges**

  The range offers two lanes divided by a wall where operations can occur simultaneously and with impact pits at ranges up to 1400 yards. The range supports live-fire testing of systems up to 30mm for direct fire and 40mm inert grenade rounds. Downrange observation bunkers for efficient test execution. Elevated shooting is supported from a rooftop position, and a separate elevated firing pad enables crew-served air platform weapons testing at high depression angles. The outdoor range is instrumented with weather stations and acoustic scoring systems, hot/cold environmental chambers, and salt fog capabilities as well as a full repair facility and ammunition storage. It also features indoor firing bays with accuracy fixtures that further facilitates multiple test operations at once.

- **Indoor Firing Ranges**
  - Underground 100 meter firing range certified for use in direct-fire weapons up to 30mm. Ball, Tracer and AP rounds allowed. Instrumented for chronograph and dispersion with stable environmental conditions and weapon/ammunition temperature conditioning on-site. Full darkness is possible for night vision, laser, electro-optic sight, or flash testing. Myriad fixtures, Mann barrels, pressure test barrels, and other equipment available.
  - Indoor 25 meter 5-lane firing range for functional testing of small arms weapons up to .50 caliber.

- **Other Instrumentation**

  Crane has equipment for Doppler radar tracking, high-speed video, bore mapping, optical ballistic systems, SAAMI and NATO test barrels, and a ballistic gelatin laboratory to further enhance testing capabilities.

- **Unique Crane Capabilities**
  - Indoor and outdoor 6DOF motion platforms for stabilized systems up to 4000 lbs. Simulation of realistic motions for small boats, land vehicles, and rotary-wing aircraft. Indoor system is fitted with laser-based pointing accuracy measurement system. Outdoor system is portable and can support live-fire testing at NSWC Crane or other firing ranges with minimal on-site setup.
  - Weapon shock simulators for both shoulder-fired and crew-served weapons.
  - Acoustic test equipment designed specifically for the new NATO weapon acoustic measurement standard.

- **Associated Facilities**
  - Camp Atterbury Joint Maneuver Training Center (Indiana Army National Guard) – Crane is a regular user of the ranges and maintains approved SOPs for live-fire testing.
  - Lake Glendora facility – Crane is a regular user of the ranges and maintains approved SOPs for live-fire testing.
  - Muscatatuck Urban Training Center
  - NSWC Crane Fallbrook Detachment – Hawthorne test range