

# THE FEDERAL WARFARE SYSTEMS LABORATORY

## EXECUTIVE SUMMARY

### THE WHAT.

***“Our competitive military advantage has been eroding. We are facing increased global disorder, characterized by a decline in the long-standing rules-based international order.”***

*2018 National Defense Strategy*

**This global shift ushers in a high-stakes epoch.** Without commensurate change, the Department of Defense cannot achieve the pivot velocities required to stay ahead of our adversaries.

### THE SO WHAT.

***“The current bureaucratic approach, centered on exacting thoroughness and minimizing risk above all else, is proving to be increasingly unresponsive.”***

*2018 National Defense Strategy*

**Why this matters** – from 1945 to 1974, the mean time to develop a new aircraft from program start to Initial Operational Capability (IOC) was five years. In 1975, the DoD 5000-series acquisition policy was published. Since then, time-to-IOC has increased at rate of approximately five years per decade. *Exempli gratia:* The F-18 achieved IOC in 11 years (1985), the B-2 in 16 years (1996), and F-22 in 19 years (2005)<sup>1</sup>.

In 2016, after over two decades of development, the F-35 achieved IOC. In the time it took F-35 to undergo testing and evaluation, the Chinese J-20 underwent nine hardware/software iterations (ultimately converging on a mature platform). Even scarier, in that same time, six major IADS threat generations were fielded<sup>1</sup>.

Warfighters are, by nature, imperfect at capturing physical or functional needs in writing. This is attributed to problems of scope, understanding, or requirement volatility. In response, the aforementioned acquisition policy was created to ensure *exacting thoroughness*<sup>2</sup> and abate risk. Also, as seen, the results came at cost.

### WHAT RIGHT LOOKS LIKE.

***“Prototyping and experimentation should be used prior to defining requirements.”***

*2018 National Defense Strategy*

**No amount of policy modification (±) will correct this problem.** The boundaries of the known marketplace (DoD 5000-series, JCIDS, & PPBE) are well defined and unilaterally accepted – yielding limited freedom of maneuver to reconcile inefficiency. This environment can be characterized as a ‘*Red Ocean.*’

**It is possible, however, to approach the issue externally** – from the vantage of an unknown, uncontested marketplace which exists ‘pre-requirement.’ In this space, *cumbersome approval chains, wasteful applications of resources in uncompetitive space, or overly risk-averse thinking that impedes change*<sup>2</sup> can be eliminated by virtue of the unregulated nature of the space. Touch-points to Milestone B are reduced. Access and knowledge (e.g. STEM, Acquisitions, Contracting, & Financial) at the warfighter level are raised. And new MWS Federal Laboratories and Laboratory Accreditation Programs are created. This, is a ‘*Blue Ocean.*’

**Tierney Philosophical Razor: To change a system, a requirement cannot exist that the system must change.** The value of this model is that it does not demand any modification to existing DoD 5000-series, JCIDS, and/or PPBE systems. Implementation is external and seamless.

**Why this works – direct Warfighter integration.** MWS Federal Laboratories empower Warfighters with the access and knowledge required to rigorously mature requirements to well-vetted, high-TRL solutions – reducing risk, compressing milestones to field, and front-loading the system to mitigate unknown-unknowns.

<sup>1</sup>HAF AF Rapid Acquisition Authorities: A Summary

<sup>2</sup>Excerpts from the 2018 National Defense Strategy

# THE FEDERAL WARFARE SYSTEMS LABORATORY

## EXECUTIVE SUMMARY

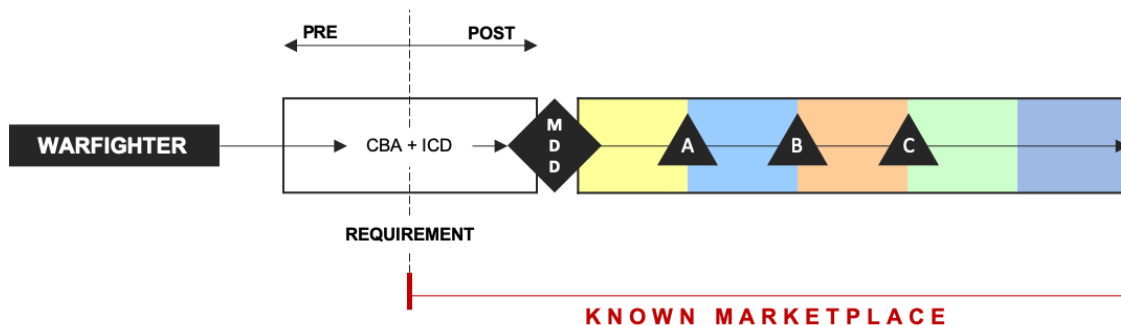
**Differentiation from current approaches.** AFWERX, Defense Innovation Unit, and similar programs are inspiring efforts designed to kindle emerging businesses which develop technologies with promising defense application. Although these companies are involved with the warfighter as part of the process, they are not integrated. Access (to Authorization Officials, operators, weapon systems, program engineers, cyber security expertise, industry partners, etc.) and knowledge (of requirements, Tactics/Techniques/Procedures, government acquisitions, program management, contracting, STEM, etc.) remains limited. For this reason, the burden to shepherd these technologies from concept to field remains with the warfighter. Additionally, they must compete with incumbent efforts (backed by a robust industrial base) for funding and sustainment.

### THE HOW.

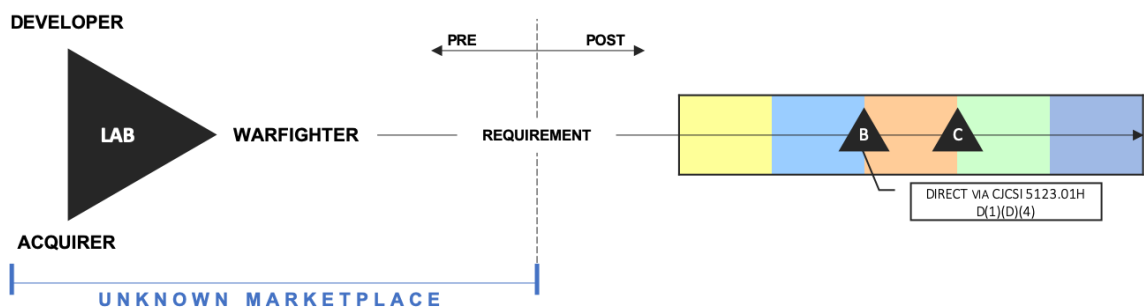
*“Individuals and interactions over processes and tools.  
Working systems over comprehensive documentation...[and] as a primary measure of success.”*

*agilemanifesto.org*

**Old World.** Mated diagram showing JCIDS and Defense Acquisition Process – as it exists today.

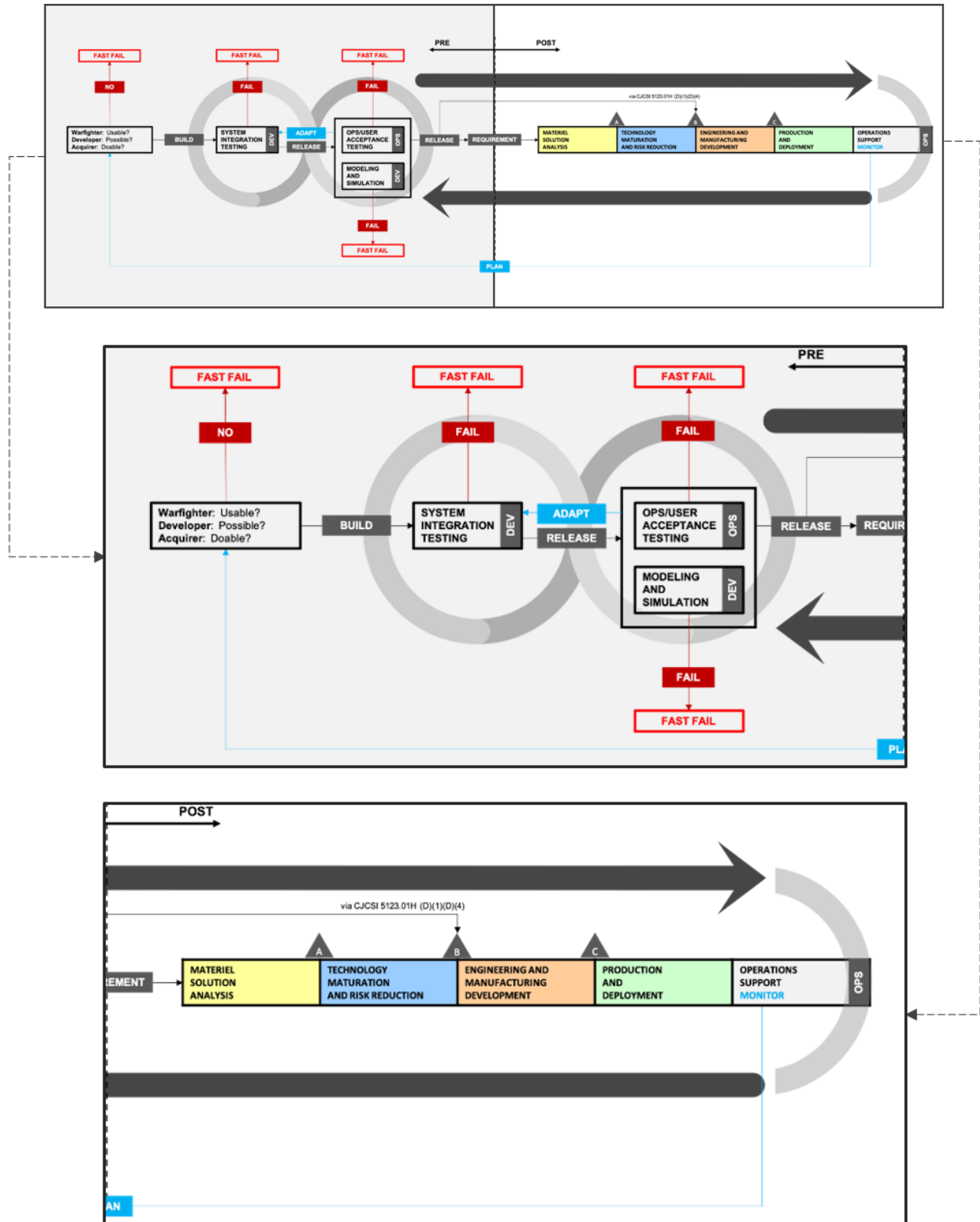


**New World.** New Federal Warfare Systems Laboratories are introduced. These laboratories are specialized to specific defense systems and provide a standardized means to meet the 2018 National Defense Strategy (NDS) directive that, “prototyping and experimentation should be used prior to defining requirements.”. Their mission, ‘Compress time-to-field of advanced technologies at a speed relevant to the Warfighter.’ Their vision, accomplish their mission through the ‘Confluence of Warfighter, Developer, and Acquirer,’ vertically integrated under the same operational roof.



# THE FEDERAL WARFARE SYSTEMS LABORATORY

## FEDERAL WARFARE SYSTEMS LABORATORY PROCESS VIEW



# THE FEDERAL WARFARE SYSTEMS LABORATORY

## VALUE.

The Federal Warfare Systems Laboratory construct exploits an unregulated space that exists left of “Requirement,” as defined by the Department of Defense (DoD) Directive 5000.01. Business would characterize this environment as an uncontested market space – a proper “Blue Ocean.” Under this framework, advanced technologies can be developed or integrated to determine technical feasibility (“Is it possible?”). Embedded developers then hand the technology to the Warfighter to determine operational utility (“Is it useful?”). This process continuously cycles between development and operations, with a fluidity impossible to realize by current DoD processes. End-state is achieved when the technology has evolved to a high-Technology Readiness Level (TRL), Warfighter-useful solution. At this point, the technology graduates normally into the Joint Capabilities Integration and Development System and Defense Acquisition System (DoD Directive 5000.01 and DoD Instruction 5000.02) as a vetted, mature requirement. In this way, the acquisitions process is compressed, and cost offsets realized, by (a) front-loading development with the end-user & (b) abatement of the problems of scope, understanding, and volatility associated with the requirements process. As a Federal Science & Technology laboratory, and in accordance with the Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 5123.01H, “For evolutionary technologies that support an expeditious deployment of successful weapon system component or technology prototypes IAW reference m, JCIDS is flexible enough to consider entry at Milestone B.”

## EVIDENCE THIS IS REAL.

### U-2 Federal Laboratory successes –

- **First in DoD: In-flight Pilot-AI teaming (First Flight: 2020DEC15).** Utilized the  $\mu$ Zero algorithm to demonstrate two onboard workers (Pilot and ‘ARTU $\mu$ ’) – each with individual, competing missions, a shared common resource, and human actions unknown to AI. Dr. Roper (SAF/AQ) challenged the U-2 Fed Lab on 10 Nov 20. Time from challenge to response: 35 days.
- **First in DoD: In-flight Software Update (First Flight: 2020OCT16).** Uploaded and deployed mission critical software in-flight on a U-2. End-end data transfer leveraged operationally-representative U-2 ground-air link architecture. Dr. Roper (SAF/AQ) challenged the U-2 Fed Lab in-person (13 Oct 20) to achieve this milestone. Time from challenge to response: 2 days, 22 hours.
- **First in DoD: In-flight utilization of Kubernetes (First Flight: 2020SEP22).** Container orchestration / processing distribution across four single-board computers onboard a U-2S in-flight.
- **Advanced Virtualized Enterprise Reconfigurable Architecture (AVERA™; First Flight: 2019NOV13).** Microservices-based, containerized open software architecture. 100% Government-owned. OMS/UCI-compliant. First line of code to U-2 flight with operational sensor in 4 months.
- **Fusion Algorithms for Sensor Error Reduction (FASER™; First Flight: 2020SEP01).** In-flight, entity-level, multi-modal sensor fusion to increase object classification and localization accuracy and improve assigned confidence scores using non-Boolean Logic. Manages probability distribution uncertainties. Features uncertainty bias/weighting based on electron cloud model.
- **Simulation-based Heuristic Assessment of Divergent Options for Warfare (SHADOW™; First Flight: 2020SEP01).** In-flight, low-SWAP simulation. Injects real and synthetic scenario-based data, refined via tunable uncertainty modulation. Intent to appropriately stress the system with without complex, individual IA efforts. Portable to any Major Weapon System in the DoD.
- **Automatic Target Recognition (First Flight: 2019NOV13).** SAR and EO/IR ATR developed and trained by Sandia National Laboratories. Trained against COCOM-prioritized targets. Training features historic, practical, and synthetic methods in partnership with the U-2 Federal Laboratory.

# THE FEDERAL WARFARE SYSTEMS LABORATORY

## ACCREDITATION

### TYPES OF LABORATORIES.

There are several types of laboratories in the U.S. Government – all derive from different statutory authorities. First are **Federally Funded Research & Development Centers (FFRDCs)** – **also called National Laboratories** (48 U.S.C. § 35.017). These are Public-Private Partnerships with the U.S. Government. The second are **University Affiliated Research Centers (UARCs)**; 10 U.S.C. § 2304). These are established by the Under Secretary of Defense (R&E) and are DoD research centers affiliated with universities. Finally, there are **Federal Research Laboratories** (Title 15 U.S.C. § 3710 & 10 U.S.C § 2500). These are established by Federal Agencies, and must be, “*a facility or group of facilities owned, leased, or otherwise used by a Federal agency, a substantial purpose of which is the performance of research, development, or engineering by employees of the Federal Government.*” The U-2 Federal Laboratory is a Federal Research Laboratory.

### UNDERSTANDING ACCREDITATION.

**Laboratories are not accredited – only laboratory processes are accredited.** Put another way, the service that a laboratory performs is accredited – not the organization itself. Laboratory Accreditation Programs (or LAPs) are necessary for laboratories to develop the management and technical schema required to govern testing operations. LAPs also set requirements to standardize the competence, impartiality, and operational consistency of laboratories. In the U.S., the National Voluntary Laboratory Accreditation Program (NVLAP) exists under the National Institute of Standards and Technology (NIST; Department of Commerce) to provide unbiased, third-party evaluation to accredit laboratories (in their respective fields) in accordance with the International Organization for Standardization (ISO) 17025 standard (Testing and Calibration Laboratories).

### THE 20<sup>TH</sup> LABORATORY ACCREDITATION PROGRAM IN THE U.S. GOVERNMENT.

Currently, NVLAP offers 19 separate LAPs (e.g. Calibration, Biometrics, etc.). None, however, best address the needs of Federal Major Weapon Systems. To reconcile this gap, the U-2 Federal Laboratory proposed, and has been approved by NIST/NVLAP to establish the 20<sup>th</sup> LAP in the U.S. Government, entitled – the ‘*Federal Warfare System(s) LAP.*’ This LAP will be available to all new Federal Laboratories in the DoD, and more than 700 accredited testing laboratories in the United States. The scope of this LAP, in terms of services proposed for inclusion (in accordance with NIST Handbook 150-2016, 2.1.3.1), is detailed below:

(1) **System Integration Testing (SIT; answers, “Is it possible?”)**: The testing of a system as the aggregate of many subsystem components and/or elements. The system(s) tested may be composed of hardware, software, and/or hardware with embedded software. Proposed methods will adopt a continuous integration model with established configuration controls, integration entry/exit criteria, and will:

- Verify that the system(s) meets requirements; and
- Validate that the system(s) performs in accordance with pre-defined use cases.

Following SIT, passing systems are forwarded to Operational/User Acceptance Testing.

(2) **Operational/User Acceptance Testing (OAT/UAT; answers, “Is it useful?”)**: The testing of systems post-SIT in collaboration with MWS Operators (e.g. airplane pilots). OAT/UAT test cases will include operational logic evaluations and representative environmental conditions. MWS Operators will be the primary stakeholders of these tests. OAT/UAT will have established entry/exit criteria and will:

- Verify that the system meets user acceptance criteria as defined by MWS Operators in common operator language; and
- Verify that the system meets operational acceptance criteria as defined by functional and non-functional requirements. These requirements cover attributes including, but not limited to: functional stability, portability, and reliability.

Concurrent to OAT/UAT, systems are evaluated (via modeling & simulation) to derive objective value. Passing systems are exited to Milestone B, as MWS program requirements, or by other means.

# THE FEDERAL WARFARE SYSTEMS LABORATORY

## ACCREDITATION

### NVLAP | POTENTIAL LAP ACKNOWLEDGEMENT.



UNITED STATES DEPARTMENT OF COMMERCE  
National Institute of Standards and Technology  
Gaithersburg, Maryland 20899

August 8, 2019

Raymond G. Tierney, Maj, USAF  
Director, Federal U-2 Laboratory  
99<sup>th</sup> Reconnaissance Squadron  
19351 McGregor Street, Building 1025  
Beal AFB, CA 95903

Dear Major Tierney,

Thank you for the opportunity to meet with you and your team on August 6, 2019, regarding the written request submitted to NVLAP on May 7, 2019, for the development of a NVLAP laboratory accreditation program (LAP). It was a pleasure to discuss the potential program for accreditation of federal major weapon system (MWS) laboratories and gain an understanding of the testing concepts that would be encompassed as part of the proposed LAP.

Based on our discussions and in accordance with NIST Handbook 150, § 2.1.3.5, NVLAP's next step is to consult with interested parties through a public workshop in an effort to determine the need for the proposed program. As agreed, we have outlined a tentative date of November 14, 2019 to hold this public workshop.

The NVLAP team and I look forward to the opportunity for further collaboration with you and your team. We will be in touch with you in the coming weeks as we begin the development of the federal register notice to announce this public workshop.

Kind Regards,

A handwritten signature in black ink, appearing to read "Dana S. Leaman".

Dana S. Leaman  
Chief, National Voluntary Laboratory Accreditation Program (NVLAP)



NIST/NVLAP • 100 Bureau Drive, Stop 2140 • Gaithersburg, MD 20899-2140  
<http://www.nist.gov/nvlap>





# THE FEDERAL WARFARE SYSTEMS LABORATORY

## ACCREDITATION

### FEDERAL REGISTER | PUBLIC WORKSHOP ANNOUNCEMENT.



55142

Federal Register / Vol. 84, No. 199 / Tuesday, October 15, 2019 / Notices

Company	Subsidy rate (percent <i>ad valorem</i> )
Rolex Fittings India Pvt. Ltd	5.63
Rollwell Forge Pvt. Ltd .....	5.63
SHM (Shin-Heung Machinery)	5.63
Siddhagiri Metal & Tubes .....	5.63
Sizer India .....	5.63
Steel Shape India .....	5.63
Sudhir Forgings Pvt. Ld .....	5.63
Tirupati Forge .....	5.63

#### Assessment Rate

Consistent with section 751(a)(2)(C) of the Act, upon issuance of the final results, Commerce shall determine, and Customs and Border Protection (CBP) shall assess, countervailing duties on all appropriate entries covered by this review. We intend to issue instructions to CBP 15 days after publication of the final results of this review.

#### Cash Deposit Rate

Pursuant to section 751(a)(1) of the Act, Commerce intends to instruct CBP to collect cash deposits of estimated countervailing duties in the amount indicated above with regard to shipments of subject merchandise entered, or withdrawn from warehouse, for consumption on or after the date of publication of the final results of this review. For all non-reviewed firms, we will instruct CBP to continue to collect cash deposits of estimated countervailing duties at the most recent company-specific or all-others rate applicable to the company, as appropriate. These cash deposit instructions, when imposed, shall remain in effect until further notice.

#### Disclosure and Public Comment

We will disclose to parties to this proceeding the calculations performed in reaching the preliminary results within five days of the date of publication of these preliminary results.<sup>7</sup> Interested parties may submit written comments (case briefs) within 30 days of publication of the preliminary results and rebuttal comments (rebuttal briefs) within five days after the time limit for filing case briefs.<sup>8</sup> Pursuant to 19 CFR 351.309(d)(2), rebuttal briefs must be limited to issues raised in the case briefs. Parties who submit arguments are requested to submit with the argument: (1) A statement of the issue; (2) a brief summary of the argument; and (3) a table of authorities.<sup>9</sup>

Interested parties who wish to request a hearing must do so within 30 days of

publication of these preliminary results by submitting a written request to the Assistant Secretary for Enforcement and Compliance using Enforcement and Compliance's ACCESS system.<sup>10</sup> Requests should contain the party's name, address, and telephone number, the number of participants, whether any participant is a foreign national, and a list of the issues to be discussed. If a request for a hearing is made, Commerce will inform parties of the scheduled date of the hearing which will be held at the U.S. Department of Commerce, 1401 Constitution Avenue NW, Washington, DC 20230, at a time and date to be determined.<sup>11</sup> Issues addressed during the hearing will be limited to those raised in the briefs.<sup>12</sup> Parties should confirm by telephone the date, time, and location of the hearing two days before the scheduled date.

Parties are reminded that all briefs and hearing requests must be filed electronically using ACCESS and received successfully in their entirety by 5 p.m. Eastern Time on the due date.

Unless the deadline is extended pursuant to section 751(a)(3)(A) of the Act, Commerce intends to issue the final results of this administrative review, including the results of our analysis of the issues raised by the parties in their comments, within 120 days after publication of these preliminary results.

This administrative review and notice are in accordance with sections 751(a)(1) and 777(i)(1) of the Act and 19 CFR 351.213.

Dated: October 8, 2019.

**Jeffrey I. Kessler,**  
*Assistant Secretary for Enforcement and Compliance.*

#### Appendix

#### List of Topics Discussed in the Preliminary Decision Memorandum

- I. Summary
- II. Background
- III. Scope of the Order
- IV. Period of Review
- V. Use of Facts Otherwise Available and Application of Adverse Inferences
- VI. Subsidies Valuation Information
- VII. Benchmark Interest Rates
- VIII. Analysis of Programs
- IX. Conclusion

[FR Doc. 2019-22430 Filed 10-11-19; 8:45 am]

**BILLING CODE 3510-DS-P**

<sup>7</sup> See 19 CFR 224(b).

<sup>8</sup> See 19 CFR 351.309(c)(1)(ii) and 351.309(d)(1).

<sup>9</sup> See 19 CFR 351.309(c)(2) and 351.309(d)(2).

<sup>10</sup> See 19 CFR 351.310(c).

<sup>11</sup> See 19 CFR 351.310.

<sup>12</sup> See 19 CFR 351.310(c).

#### DEPARTMENT OF COMMERCE

#### National Institute of Standards and Technology

#### National Voluntary Laboratory Accreditation Program (NVLAP); Workshop for Establishing the System Integration Testing and Operational/ User Acceptance Testing Accreditation Program

**AGENCY:** National Institute of Standards and Technology, Commerce.

**ACTION:** Announcement of public workshop.

**SUMMARY:** The National Institute of Standards and Technology (NIST) announces a public workshop to be held on November 19, 2019, at Joint Base Langley-Eustis, Hampton Virginia. The purpose of the workshop is the exchange of information among the National Voluntary Laboratory Accreditation Program (NVLAP), the United States Department of Defense (DoD), and any national and federal laboratories interested in seeking accreditation to perform System Integration Testing (SIT) and Operational/User Acceptance Testing (OAT/UAT).

**DATES:** The workshop will be held 9:00 a.m.–4:00 p.m. Eastern Time on November 19, 2019.

**ADDRESSES:** The meeting will be held at the Creech Conference Center (Amphitheater), located at 190 Dodd Boulevard, Joint Base Langley-Eustis, Virginia 23665. Please note registration and admittance instructions under the **SUPPLEMENTARY INFORMATION** section of this notice.

**FOR FURTHER INFORMATION CONTACT:** Brad Moore, Program Manager, NIST/NVLAP, 100 Bureau Drive, Stop 2140, Gaithersburg, MD 20899-2140, *Phone:* (301) 975-5740 or email: [bradley.moore@nist.gov](mailto:bradley.moore@nist.gov).

Information regarding the National Voluntary Laboratory Accreditation Program (NVLAP) and the accreditation process can be obtained from <http://www.nist.gov/nvlap>.

**SUPPLEMENTARY INFORMATION:** The U–2 Federal Laboratory requested that NIST establish a laboratory accreditation program to evaluate the technical qualifications and competence of DoD laboratories performing System Integration Testing (SIT) and Operational/User Acceptance Testing (OAT/UAT) in support of Federal Major Weapon Systems (MWS). NIST will hold a public workshop to solicit comments on the proposed establishment of this laboratory accreditation program. The public

# THE FEDERAL WARFARE SYSTEMS LABORATORY

## REQUIREMENT

### PROVENANCE OF THE NEED.

The **Report of the Committee on Armed Services, House of Representatives, on H.R. 5515 / FY 2019 National Defense Authorization Act (H. Rept. 115-676; p.72)**, states, *“The committee has continuing interest in the Department of Defense laboratories...their responsiveness to Department of Defense requirements, and maximizing their expertise and reach. The Department’s laboratories are integral to the Department’s ability to retain capability in areas where the private sector has no commercial interest, and ensuring that commercial solutions are adapted for warfighter needs in a timely manner so that the United States remains dominant in the land, air, sea, space, and cyber domains. The committee recommends that the Department better enable laboratories and centers to embrace an open and innovative posture, while simultaneously becoming more active in the Department’s requirements process.”*

The **2018 National Defense Strategy (NDS)**, P.11, furthers this thought by directing that, *“prototyping and experimentation should be used prior to defining requirements.”* This is intended as a method to streamline rapid, iterative approaches from development to fielding. The NDS (P. 10; *Organize for Innovation*) directs Department leaders to, *“adapt their organizational structures to best support the Joint Force.”*

The **Congressionally-mandated response to the 2018 NDS (Providing for the Common Defense: The Assessment and Recommendations of the National Defense Strategy Commission; P. 65)**, Recommendation No. 7, states that, *“The Secretary of Defense should... make maximum use of...government R&D labs.”*

In accordance with the **CJCSI 3170.01(2)(a)(1)** (Joint Capabilities Integration and Development System; JCIDS), *“Prior to entering the JCIDS process...assess capability requirements and associated capability gaps and risks.”* MWS stakeholders are responsible for assessing capability gaps, risks, and generating requirements germane to that weapon system. To meet 2018 NDS intent, MWS stakeholders **now require a capability to prototype and experiment prior to requirement generation.**

In response to the aforementioned Congressional and Defense policies, the U-2 Federal Laboratory was organizationally established – compliant with **Title 15 U.S.C § 3710a(d)(2)(A)**, **Title 10 U.S.C § 2500(5)**, and **Air Force Instruction (AFI) 61-301 (The Domestic Technology Transfer Process and the Offices of Research and Technology Applications)** and **AFI 1-2 (Commander’s Responsibilities)**.

### THE IMPERATIVE.

***“Discover the Future.”***

*Lt. Col. Matthew ‘Chaos’ Nussbaum*

#### **Excerpts from the 2018 National Defense Strategy –**

*“Delivering performance means we will shed outdated management practices and structures while integrating insights from business innovation.*

*If current structures hinder substantial increases in lethality or performance, it is expected that Service Secretaries and Agency heads will consolidate, eliminate, or restructure as needed.”*

#### **Change is not optional – it is expected.**

*What if we fail to change? How much time is left?*