Quantum-Resistance Cryptography Prototype
Request for White Papers
Project Number: DISA-OTA19-R-Quantum

DEFENSE INFORMATION SYSTEMS AGENCY
The IT Combat Support Agency

Other Transaction Authority (OTA)

Request for White Papers (RWP)

Project Number	DISA-OTA-19-R-Quantum
RWP Title	Quantum-Resistance Cryptography Prototype
Issued by	Defense Information Systems Agency (DISA) Other Transaction (OT) Agreement Team www.DISA.mil
White Papers Due Date/Time (Suspense)	**May 31, 2019 by 9:00 AM CST**
Submit White Papers To	disa.scott.ditco.mbx.pl84-other-transaction-authority@mail.mil

Note: Please advise DISA as soon as possible via email to disa.scott.ditco.mbx.pl84-other-transaction-authority@mail.mil if your organization intends to submit a White Paper to DISA in response to this RWP.

The Defense Information Systems Agency (DISA), Emerging Technology (EM) Directorate through the DISA Procurement Services Directorate (PSD) is seeking information from Industry to evaluate the use of quantum-safe algorithms and cryptographic solutions that can defend Department of Defense (DoD) Information Technology (IT) infrastructure from malicious cyber activities.

SECTION 1 OVERVIEW/DESCRIPTION

1.1 PURPOSE

One of the immediate concerns facing DoD has to do with public key cryptography data encryption. Theoretically, adversaries could utilize quantum computers to crack the code that is widely used for secure online transactions and communications. Certain algorithms currently utilized across the DoD on various systems are vulnerable to attacks from large-scale quantum computers. The exact time of the arrival of the quantum-computing era is unknown; however, DoD must begin now to prepare its information security systems to be able to resist attacks from large-scale quantum computers.

This request for White Paper (RWP) is being issued to conduct research, development, and testing activities associated with evaluating Quantum-Resistant algorithms, and cryptographic solution that can be used to enable quantum-encrypted information transfer using symmetric encryption.

1.2 STATEMENT OF NEED

Arrival of the quantum-computing era is inevitable, though its timing is unknown. DoD must begin now to prepare its information security systems to protect against quantum computing attacks. One of the immediate concerns facing DoD has to do with Public key cryptography data encryption.

Due to growing concerns related to quantum computers-machines, DISA has begun to investigate quantum-resistant or quantum-safe cryptography algorithms and solutions. The goal of this prototype Other Transaction Authority (OTA) is to research, evaluate, test, and deliver a prototype utilizing cryptographic algorithms and solutions that would secure DoD IT systems against both quantum and classical computers.

The Quantum-Resistant Cryptography prototype will support the following:

- Future improvements, technical feasibility, and optional challenges associated with implementing new algorithms and solutions on the current DoD PKI/PKE components, technology, and processes;

- Time to generate Public Key, Ciphertext, and Signature Size (i.e., key size) locally on DoD devices;

- The hardware and software efficiency of the public key (encryption, encapsulation, and signature verification) and private key (decryption, decapsulation, and signing) operations dealing with traffic volume;

- Decryption/decapsulation failures associated with application utilization and identify interactive protocols that establish key failures;

- Performance test results to contribute to the national discussion and build a case to recommend an algorithms and possible solutions to use as the industry standard.

SECTION 2 GENERAL SUBMISSION REQUIREMENTS

2.1 FORMATTING

Vendors are solely responsible for all expenses associated with responding to this RWP. White Papers shall follow the format described below. Evaluation and selection of the White Papers will be completed based on criteria in Sections 3 and 4. Responding to this RWP does not obligate the Government for costs associated with responding to this notice. The Government reserves the right to cancel this requirement if no White Papers satisfy the criteria contained in Section 3.4 and/or no funding becomes available.

Subject to the availability of funds, the DISA/Defense Information Technology Contracting Organization (DITCO) at Scott AFB, IL intends to competitively issue this effort as an OTA Agreement in accordance with 10 U.S.C. 2371b. If an OTA is awarded from this subject request, the Agreement is not considered a procurement contract and therefore not subject to the Federal Acquisition Regulation (FAR).

The following **White Paper** formatting requirements apply:

- Times New Roman 10 (or larger) single-spaced, single-sided, 21.6 x 27.9 cm (8.5 by 11 inches);
- Smaller type may be used in figures and tables, but must be clearly legible;
- Margins on all sides (top, bottom, left, and right) should be at least 2.5 cm (1 inch);
- Page limit is fifteen (15) pages, does not include cover sheet and the *Affirmation of Business Status Certification, Rough Order of Magnitude (ROM) Template, Intellectual Property Statement/Agreements/Disclosures*;
- *Italic Red* text with brackets borders (e.g. *[company name]*) indicated areas for entry of information by the vendor. Delete all italicized text, contained within brackets before submittal of the White Paper;

- Page limitations shall not be circumvented by including inserted text boxes/pop-ups or internet links to additional information. Such inclusions are not acceptable and will not be considered as part of the response to Request for White Papers; and
- **DO NOT SUBMIT ANY CLASSIFIED INFORMATION.**

A White Paper **Cover Sheet** is required for all submission and must include the following:

- OTA Project Number;
- Project Title;
- Company Title/Name of Proposed Cryptosystem;
- Date of Submittal;
- Primary point of contact (POC), including name, address, phone and e-mail contact information;
- Total ROM cost for the two (2) year period of performance; and
- Disclosure of Information Statement (section 5.2).

2.2 MINIMUM ACCEPTABILITY

The Government will evaluate RWP submissions that are deemed as "complete". To be considered "complete" submissions must contain at a minimum the following:

- Cover Sheet (section 2.1);
- Signed Intellectual Property Statements / Agreements / Disclosures (section 2.3);
- Signed Affirmation of Business Statement (section 2.4);
- Address all of the Evaluation Criteria Factors (sub-sections 3.4.1– 3.4.7).

If the vendor fails to include/address the minimum acceptability requirements (as defined above and throughout the RWP) the White Paper submission will/may be deemed non-compliant and inadequate for further evaluation.

2.3 INTELLECTUAL PROPERTY STATEMENT/AGREEMENTS/DISCLOSURES

2.3.1 SUBMITTER STATEMENT

Each participant shall complete the submitter statement below. The statement shall be included as an attachment to the White Paper and will not count toward the page limit.

I, *[insert submitter's full name]*, of *[insert full postal address]*, do hereby declare that the cryptosystem prototype, that I have submitted, known as *[insert name of cryptosystem[1]]*, is my own original work, or if submitted jointly with others, is the original work of the joint submitters.

I further declare that *[check one]*:

☐ I do not hold and do not intend to hold any patent or patent application with a claim which may cover the cryptosystem prototype that I have submitted, known as *[insert name of cryptosystem]*;

OR *[check one or both of the following]*:

☐ to the best of my knowledge, the practice of the cryptosystem, standards, or algorithms that I have submitted, known as *[insert name of cryptosystem]*, may be covered by the following U.S. and/or foreign patents: *[describe and enumerate or state "none" if applicable]*;

☐ I do hereby declare that, to the best of my knowledge, the following pending U.S. and/or foreign patent applications may cover the practice of my submitted cryptosystem, standards, or algorithms *[describe and enumerate or state "none" if applicable]*.

I certify that, to the best of my knowledge, I have fully disclosed all patents and patent applications, which may cover my cryptosystem, standards, or algorithms.

I do hereby agree to provide the statements required by Section 2.3.2 and 2.3.3, below, for any patent or patent application identified to cover the practice of my cryptosystem, standards, or algorithms and the right to use such for the purposes of the evaluation process.

Signature (electronic signature is acceptable)	X _____
Name	*[Insert Name of Representative]*
Title	*[Insert Title of Representative]*
Date	*[Insert Date of Signature]*

[1] A cryptosystem is a suite of cryptographic algorithms needed to implement a particular security service, most commonly for achieving confidentiality (encryption). Typically, a cryptosystem consists of three algorithms: one for key generation, one for encryption, and one for decryption.

2.3.2 PATENT OWNER(S) STATEMENT

Each participant shall complete the Patent Owner(s) statement below. The statement shall be included as an attachment to the White Paper and will not count toward the page limit.

If there are any patents (or patent applications) identified by the submitter, including those held by the submitter, the following statement must be signed by each and every owner, or each owner's authorized representative, of each patent and patent application identified.

I, *[insert full name]*, of *[insert full postal address]*, am the owner or authorized representative of the owner *[print full name, if different than the signer]* of the following patent(s) and/or patent application(s): *[enumerate]*, and do hereby commit and agree to grant to any interested party on a worldwide basis, if the cryptosystem known as *[insert name of cryptosystem]* is selected for the DoD prototype, in consideration of its evaluation and selection, a non-exclusive license for the purpose of implementing standards or algorithms *[check one]*:

☐ without compensation and under reasonable terms and conditions that are demonstrably free of any unfair discrimination,

OR

☐ under reasonable terms and conditions (identified in section 3.4.6 –Proposed Data Rights Assertion) that are demonstrably free of any unfair discrimination.

I further do hereby commit and agree to license such party on the same basis with respect to any other patent application or patent hereafter granted to me, or owned or controlled by me, that is or may be necessary for the purpose of evaluating the proposed cryptosystem prototype. Any future follow-on Production Contract could/will require re-negotiated terms and conditions.

I further do hereby commit and agree that I will include, in any documents transferring ownership of each patent and patent application, provisions to ensure that the commitments and assurances made by me are binding on the transferee and any future transferee.

I further do hereby commit and agree that these commitments and assurances are intended by me to be binding on successors-in-interest of each patent and patent application, regardless of whether such provisions are included in the relevant transfer documents.

I further do hereby grant to the U.S. Government, during the evaluation process, and during the lifetime of the standard, a nonexclusive, non-transferrable, irrevocable, paid-up worldwide license solely for the purpose of modifying my submitted cryptosystem's specifications (e.g., to protect against a newly discovered vulnerability) for incorporation into the prototype efforts.

Signature (electronic signature is acceptable)	X _____
Name	*[Insert Name of Representative]*
Title	*[Insert Title of Representative]*
Date	*[Insert Date of Signature]*

2.3.3 REFERENCE OWNER(S) STATEMENT

Each participant shall complete the Reference Statement below. The statement shall be included as an attachment to the White Paper and will not count toward the page limit.

I, *[insert full name]*, *[insert full postal address]*, am the owner or authorized representative of the owner *[insert full name, if different than the signer]* of the submitted reference cryptosystem's specifications and hereby grant the U.S. Government and any interested party the right to reproduce, prepare derivative works based upon, distribute copies of, and display such implementations for the purposes of the quantum-resistant evaluation process, and if the corresponding cryptosystem is selected for DoD quantum-safe algorithm and cryptographic standard prototype, notwithstanding that the implementations may be copyrighted or copyrightable.

Signature (electronic signature is acceptable)	X _____
Name	*[Insert Name of Representative]*
Title	*[Insert Title of Representative]*
Date	*[Insert Date of Signature]*

2.4 AFFIRMATION OF BUSINESS STATUS CERTIFICATION

Each participant shall complete the certification below. The certification shall be included as an attachment to the White Paper and will not count toward the page limit. Please note that some sections in the certification may be left blank due to the type of business completing this form (e.g. non-traditional contractor).

Please note that in order to be eligible to submit a response to the Request for White Paper (RWP), vendors must meet the requirements outlined in 10 U.S.C Section 2371b(d)(1). Vendors shall explain in their White Paper submission, not to exceed (NTE) 15 pages, how they will meet

these statutory requirements. Failure to provide the required explanation may result in your White Paper not being considered for this OTA effort.

Participant Name	*[Insert Participant Name]*
Proposed North American Industry Classification System (NAICS) Code	*[Insert NAICS Code]*
Industry Size Standard	*[Check one of the following boxes]* ☐ **Small** ☐ **Large** ☐ **Federally Funded Research & Development Center**
Data Universal Numbering Systems (DUNS) Number	*[Insert DUNS Number]*
Commercial & Government Entity (CAGE) Code	*[Insert CAGE Code]*
Active System for Award Management (SAM) Registration	*[Check one of the following boxes and insert date]* ☐ **Yes** ☐ **No** **Expiration Date:**
Address 1	*[Insert Address Number and Street]*
Address 2	*[Insert suite, office, etc. Number]*
City/State/Zip Code	*[Insert City, State, Zip Code]*
Point of Contact (POC) Name/Title	*[Insert POC Name and Title]*
POC Phone/Email	*[Insert POC Phone and Email]*

[Check one of the following boxes:]

☐ **Nontraditional Defense Contractor (NDC):** A NDC is an entity that is not currently performing and has not performed, for at least the one-year period preceding the issuance of this Request for White Papers by the DoD, any contract or subcontract for the DoD that is subject to full coverage under the cost accounting standards prescribed pursuant to section 1502 of title 41 of the U.S. Code and the regulations implementing such section. All small businesses are considered NDCs. A small business is a business concern as defined under section 3 of the Small Business Act (15 U.S.C. 632). To be considered a small business for the purposes of this RWP, a concern must qualify as a small business under the size standard for the North American Industry Classification System (NAICS) code, as described at 13 C.F.R. 121.201 and the proposed NAICS code above.

☐ **Traditional Defense Contractor:** A traditional defense contractor is an entity that does not meet the definition of a NDC. Any traditional defense contractors must comply with 10 U.S.C Section 2371b(d)(1)(C) in order to be eligible to submit an RWP.

This is to certify that the above is accurate, complete, and current as of *[MM/DD/YYYY]* for DISA-OTA-19-R-Quantum.

Signature (electronic signature is acceptable)	X _____
Name	*[Insert Name of Representative]*
Title	*[Insert Title of Representative]*
Date	*[Insert Date of Signature]*

SECTION 3 EVALUATION APPROACH

The Government will employ a three-phased evaluation approach for the award of the Quantum Key Protection/ Post Quantum Cryptography prototype OTA. An award may be made to the responsible vendor whose offer, conforming to the requirements outlined in the RWP, is determined to be the best overall value to the Government, price, and other factors considered. The evaluation criteria are outlined in sub section 3.4.1 – 3.4.7.

Throughout the evaluation, the Government reserves the right, but is not obligated, to ask questions about individual vendor solutions. However, any response to the RWP that does not fully address all of requirements will be/can be eliminated from further consideration. This RWP constitutes Phase I of the evaluation, described below.

3.1 PHASE I – WHITE PAPER EVALUATION

The Government will conduct an evaluation of all eligible White Paper(s) submitted in response to this RWP. The White Papers will be evaluated to identify viable solutions. Final selection(s) recommendation(s) will be made by the program management technical lead to the Agreements Officer (AO). After the evaluation of White Paper(s), the Government may select a solution and proceed to the next phase. Any vendor whose solution is not selected will be provided a letter containing brief explanation for non-selection.

3.2 PHASE II – ORAL PRESENTATIONS

The Government will invite selected vendors to provide oral presentations, which can be conducted in person, via videoconference, or phone. During the presentation, a vendor should be

prepared to discuss, in detail, its solution. After the presentation, the Government will conduct evaluations and determine whether a vendor will proceed to the next phase. Any vendor whose solution is not selected will be provided a letter with brief explanation for non-selection.

3.3 PHASE III – REQUEST FOR PROJECT PROPOSAL

The Government will issue a Request for Project Proposal (RFPP) to the selected vendor.. After the receipt of the RFPPs, the Government will conduct an evaluation to ensure it meets the requirements. The next step will be to invite the vendor to meet with the Government in order to engage in negotiations. The Government will provide an initial model OT Agreement to the selected vendor, which will be the Governments opening position for negotiations. Using a collaborative process, the Government and the selected vendor will develop a detailed Project Work Statement (PWS); negotiate Terms and Conditions (T&Cs); agree on milestones, performance standards, deliverables, and negotiate final price. Once complete and all parties are in agreement, the AO will award a prototype OTA to the selected vendor. In the event that the Government is unable to reach an agreement with the initial selectee, the Government may re-evaluate White Paper Responses and make other selections.

3.4 EVALUATION CRITERIA

The overall evaluation will be based on the integrated assessment of the criteria outlined in sub-sections 3.4.1 – 3.4.7.

Vendors are required to meet all of the evaluation requirements, objectives, and representations. Failure to respond to any of the follow evaluation factors listed below (sub-sections 3.4.1 – 3.4.7) may result in elimination from the competition. In addition, the Government has included several templates (e.g., tables, etc.) within several of the evaluation factors outlined below, that identify the minimum level of information that must be included with the final submission. If a vendor fails to include the Government provided templates (identified as required), then such failure may result in the vendor's White Paper submission being deemed non-compliant and inadequate for further evaluation.

3.4.1 TECHNICAL

The Government will evaluate the vendor's technical merit based on the criteria listed below:

- Identify if the proposed Public-key Encryption and Key-establishment Algorithm and Digital Signature Algorithm was part of the NIST PQC round 2 submission;
- An overview of the proposed integrated development environment (IDE) software suite and tools utilized to write, edit, and test the cryptosystem;

- Proposed approach for combining traditional cryptography with quantum cryptography to help provide unbreakable, end-to-end encryption with the ability to detect man-in-the-middle attacks;
- Describe the internet protocols packets size, hash key information, ensuring efficiency as the hardware and software implementation, matching the size of the selected key system;
- Cryptosystem must have the ability to support cross-platform, with the possibility of parallelization;
- Demonstrate mobile implementation suitable for 5-10 km link distances;
- Ability to support classical communication channel via Radio Frequency (RF) or optical.

3.4.2 SECURITY

The Government will evaluate the vendor's security approach based on the criteria listed below:

- Random number generation approach (e.g., entropy sources, secure conditioner of entropy data, and cryptographic pseudo random number generator) to establish cryptographic security;
- Support same key generation rate as the original decoy state BB84 Quantum Key Distribution (QKD), E91 methods/protocols and other cryptography standards;
- Allow for Continuous-Variable (CV) QKD encoded onto the amplitude and phase quadratures of a coherent laser, and methodology for measurement;
- A thorough description of the security strengths and analysis on known algorithm attacks;
- Describe how the proposed cryptosystem digital signatures and encryption algorithms are compliant with Indistinguishability Under Adaptive Chosen Ciphertext Attack (IND-CCA2) and Existential Unforgeability under Chosen Message Attack (EUF-CMA) security models; and resistance to side-channel attacks;
    (a) parameter sets should meet or exceed each of five target security strengths:
        (i) 128 bits classical security / 64 bits quantum security
        (ii) 128 bits classical security / 80 bits quantum security
        (iii) 192 bits classical security / 96 bits quantum security
        (iv) 192 bits classical security / 128 bits quantum security
        (v) 256 bits classical security / 128 bits quantum security
- Ability to provide or enable multiple security features (e.g. associated key establishment and authentication schemes);
- Detect manipulation based attacks such as, but not limited to:
    (a) Basis-Dependent (Control Attacks) – Perform Intercept-Resend on quantum channel and then hide the disturbance by blinding all signals measured in a different basis.
    (b) State-Dependent (Suppression Attacks) – Blind all detector results except for one pre-chosen state that is chosen uniformly at random for each signal. (e.g., the detector dead-time attack).

- Describe results from previous security audits or tests that show how the proposed solution successfully prevented an attack.

3.4.3 BUSINESS VIABILITY

Business viability shall be included as an attachment to the White Paper and will not count toward the page limit. Please address whether the company has the technical capability and resources to effectively accomplish the work. The White Paper should also address the following:

- Describe your company. How old is it?
- Where is it located (e.g. multiple locations, sales/R&D in U.S. and other countries)?
- How many employees does your company employ?
- Describe the management team – who are they? What are their backgrounds and history?
- What is your annual revenue (sales and costs)?

3.4.4 SCHEDULE

The Government will evaluate the vendors proposed schedule/timeline/sprints to include milestones, activities, and deliverables to research, evaluate, test, and deliver a prototype. The multifaceted concept exploration and design approach must demonstrate the vendors ability to provide the Government with a cryptosystem that in the future could be implemented on DoD approved devices and platforms (i.e. mobile phones, common access cards, and alternative credential form factors).

Table 1 – Schedule

Phase	Milestone	Deliverable	Estimated Delivery (Weeks/Months after Award)
[Insert Phase]	*[Insert list of Milestones]*	*[Insert list of deliverables associated with each milestone (as a minimum the proposed proof of concept and a "Final Report" must be included as deliverables)]*	*[Insert estimated lead time in terms of weeks or months after award for each milestone/deliverable]*

3.4.5 PRICE

The vendor shall submit pricing data utilizing the Government's supplied Rough Order of Magnitude (ROM) Template (i.e., table 3). Failure to include the information described within

this section may result in the vendor entire Price/Cost criteria/factor being deemed non-compliant and inadequate for further evaluation review.

In making a selection, the Government will consider affordability in comparison to the Government estimate to determine whether the proposed solution is in the best interest of the Government. The Government provided ROM (i.e., table 3) shall be included as an addendum or appendix to the White Paper and will not count toward the page limit. The vendor is responsible for verifying that the totals within table 3 are correctly calculated.

The vendor ROM narrative shall discuss the approach used to estimate the price of accomplishing all requirements. The Vendor shall assume the Government knows nothing about its capabilities or estimating approach.

At a minimum, the ROM narrative shall also include the following cost categories for the ROM:

- **Prime Vendor Labor:** The ROM Narrative shall include the basis for which the estimate labor was calculated. (i.e., Generic position titles and estimated rates and hours for those individuals).
- **Sub-Vendor/Consultant Labor:** Provide a list of sub-vendor/consultant effort required to meet the technical approach as described in the white paper and the estimated cost. Include the basis for which the estimated labor was calculated, (i.e., Generic position titles and estimated fully burdened hourly rates and hours for those individuals).
- **Material/Equipment:** Provide a list of the materials/equipment required to meet the technical approach as described in the White Paper and the estimated cost;
- **ODCs/Travel:** Provide a list of the other direct costs required to meet the technical approach as described in the White Paper and the estimated costs with basis; Identify any expenses incurred by an employee while those individuals are traveling for business purposes. (e.g., estimated costs for lodging, transportation, and meals) and identify the basis for how the travel costs were calculated.

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Table 2 – ROM Template

Elements	FY2019	FY2020	FY2021	Grand Total
Program/Project Management				
Prime Vendor Labor	*[Insert Total Cost for Prime Labor for Fiscal Year 2019]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2020]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2021]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2019-2021]*
Sub – Vendor/Consultant Labor	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2020]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2021]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019-2021]*
Material/Equipment	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2020]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2021]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019-2021]*
Other Direct Costs (ODCs)/Travel	*[Insert Total Cost for ODCs for Fiscal Year 2019]*	*[Insert Total Cost for ODCs for Fiscal Year 2020]*	*[Insert Total Cost for ODCs for Fiscal Year 2021]*	*[Insert Total Cost for ODCs for Fiscal Year 2019-2021]*
SUBTOTAL	*[Insert Total Cost for Program/Project Management for Fiscal Year 2019]*	*[Insert Total Cost for Program/Project Management for Fiscal Year 2020]*	*[Insert Total Cost for Program/Project Management for Fiscal Year 2021]*	*[Insert Total Cost for Program/Project Management for Fiscal Year 2019-2021]*
Concept Exploration				
Prime Vendor Labor	*[Insert Total Cost for Prime Labor for Fiscal Year 2019]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2020]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2021]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2019-2021]*
Sub – Vendor/Consultant Labor	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2020]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2021]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019-2021]*
Material/Equipment	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2020]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2021]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019-2021]*

Other Direct Costs (ODCs)/Travel	*[Insert Total Cost for ODCs for Fiscal Year 2019]*	*[Insert Total Cost for ODCs for Fiscal Year 2020]*	*[Insert Total Cost for ODCs for Fiscal Year 2021]*	*[Insert Total Cost for ODCs for Fiscal Year 2019-2021]*
SUBTOTAL	*[Insert Total Cost for Concept Exploration for Fiscal Year 2019]*	*[Insert Total Cost for Concept Exploration for Fiscal Year 2020]*	*[Insert Total Cost for Concept Exploration for Fiscal Year 2021]*	*[Insert Total Cost for Concept Exploration for Fiscal Year 2019-2021]*
Design Prototype				
Prime Vendor Labor	*[Insert Total Cost for Prime Labor for Fiscal Year 2019]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2020]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2021]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2019-2021]*
Sub – Vendor/Consultant Labor	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2020]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2021]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019-2021]*
Material/Equipment	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2020]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2021]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019-2021]*
Other Direct Costs (ODCs)/Travel	*[Insert Total Cost for ODCs for Fiscal Year 2019]*	*[Insert Total Cost for ODCs for Fiscal Year 2020]*	*[Insert Total Cost for ODCs for Fiscal Year 2021]*	*[Insert Total Cost for ODCs for Fiscal Year 2019-2021]*
SUBTOTAL	*[Insert Total Cost for Design Prototype for Fiscal Year 2019]*	*[Insert Total Cost for Design Prototype for Fiscal Year 2020]*	*[Insert Total Cost for Design Prototype for Fiscal Year 2021]*	*[Insert Total Cost for Design Prototype for Fiscal Year 2019-2021]*
Test and Evaluation (T&E)				
Prime Vendor Labor	*[Insert Total Cost for Prime Labor for Fiscal Year 2019]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2020]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2021]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2019-2021]*
Sub – Vendor/Consultant Labor	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2020]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2021]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019-2021]*

Material/Equipment	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2020]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2021]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019-2021]*
Other Direct Costs (ODCs)/Travel	*[Insert Total Cost for ODCs for Fiscal Year 2019]*	*[Insert Total Cost for ODCs for Fiscal Year 2020]*	*[Insert Total Cost for ODCs for Fiscal Year 2021]*	*[Insert Total Cost for ODCs for Fiscal Year 2019-2021]*
SUBTOTAL	*[Insert Total Cost for T&E for Fiscal Year 2019]*	*[Insert Total Cost for T&E for Fiscal Year 2020]*	*[Insert Total Cost for T&E for Fiscal Year 2021]*	*[Insert Total Cost for T&E for Fiscal Year 2019-2021]*
TOTAL ROM COSTS				
Prime Vendor Labor	*[Insert Total Cost for Prime Labor for Fiscal Year 2019]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2020]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2021]*	*[Insert Total Cost for Prime Labor for Fiscal Year 2019-2021]*
Sub – Vendor/Consultant Labor	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2020]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2021]*	*[Insert Total Cost for Sub-Vendor/Consultant Labor for Fiscal Year 2019-2021]*
Material/Equipment	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2020]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2021]*	*[Insert Total Cost for Material/Equipment for Fiscal Year 2019-2021]*
Other Direct Costs (ODCs)/Travel	*[Insert Total Cost for ODCs for Fiscal Year 2019]*	*[Insert Total Cost for ODCs for Fiscal Year 2020]*	*[Insert Total Cost for ODCs for Fiscal Year 2021]*	*[Insert Total Cost for ODCs for Fiscal Year 2019-2021]*
TOTAL	*[Insert Total Cost of All Elements for Fiscal Year 2019]*	*[Insert Total Cost of All Elements for Fiscal Year 2020]*	*[Insert Total Cost of All Elements for Fiscal Year 2021]*	*[Insert Total Cost of All Elements for Fiscal Year 2019-2021]*

The Government does not require supporting data to justify the estimated costs (e.g., copies of commercial/market price lists/rates, price history, subcontractor quotes, invoices) with the submission of the White Paper. However, vendors will be required to supply the supporting data upon the Request for Project Proposal, if selected.

3.4.6 DATA RIGHTS ASSERTION

State whether there are any data rights issues that the Government should be cognizant of moving forward. Specifically, please identify any intellectual property, patents and inventions involved in the proposed solution and associated restrictions on the Government's use of that intellectual property, patents and inventions. The following table shall be presented for all assertions.

Table 3 – Data Rights Assertion

Technical Data/Computers Software/ Patent to be Furnished with Restrictions	Basis for Assertion	Asserted Rights Category	Name of Entity Asserting Restrictions
[Identify the technical data/software/patent to be furnished with restriction]	*[Indicate whether development was exclusively or partially at private expense. If development was not at private expense, enter the specific reason for asserting that the Government's right should be restricted]*	*[Insert asserted rights category (e.g., limited rights (data), restricted rights (software), government purpose rights, SBIR data rights or specifically negotiated license)]*	*[Insert asserted rights category (e.g., limited rights (data), restricted rights (software), government purpose rights, SBIR data rights or specifically negotiated license)]*

3.4.7 PARTICIPANTS

List all participants (i.e. other vendors), including description of contributions and significance of each participant.

Table 4 – Participants

Participant	Business Status (Check one)	Participant Contribution and Significance to Overall Project
[Insert separate row(s) for each additional participant. Delete row(s) as applicable if Participant is the only participant.]	☐ *Traditional* ☐ *Non-Traditional*	*[Insert detailed, quantifiable description which addresses the following:* • *What is this Participant's significant contribution?* • *Why is this Participant's contribution significant to the overall project?* • *How is this Participant uniquely qualified to provide this significant contribution?*

		(Note: number of years of experience is not deemed a unique qualification.)]

The facility(ies) where the proposed work is to be performed and the equipment or other Participant property which will be utilized for the prototype include: *[Insert a brief description of facility(ies)/equipment proposed for use on the project]*.

SECTION 4 AWARD

4.1 SELECTION DECISION

It is the Government's intention to negotiate, select, and fund a Prototype Project at the conclusion of the three-phased evaluation approach, described in Section 3, which best meets the evaluation criteria listed in Sub-Section 3.4. The White Paper selection will be conducted in accordance with Government procedures and the evaluation criteria in Sub-Section 3.4. The Government will make a determination whether to:

- Select the White Paper(s), or some portion of the White Paper(s);
- Retain the White Paper(s) in a library for potential future requirements for three (3) years; or,
- Reject the White Paper(s) for further consideration.

The White Paper basis of selection decision will be formally communicated to vendors in writing. Once the selection of the best solution(s) is made, the Government team may proceed to the next phase of the evaluation. At any time during evaluations, the Government may choose to cancel this requirement. In case of cancellation, the Government will not be responsible for any expenses associated with responding to RWP.

4.2 FOLLOW ON PRODUCTION CONTRACT

The Government intends to award one (1) prototype OTA. Prior to awarding a prototype OTA, the Government will ensure that it is in compliance with 10 USC §2371b(d)(1). The Government will obtain approval from the appropriate approval authority, based on the dollar threshold projected for the prototype OTA. This will be done prior to entering into prototype OT with a selected vendor.

Provided that the prototype OTA is successfully completed, the Government may award a follow-on production FAR-based contract or OTA to the participant in the transaction for the prototype project, without further competition. Prior to this, the Government will ensure that it is in compliance with 10 USC 2371b(f). In addition, the Government will again obtain approval from the appropriate approval authority, based on the dollar threshold projected for the production FAR-based contract or production OTA.

SECTION 5 ADDITIONAL INFORMATION

5.1 DOCUMENTATION CLASSIFICATION

Vendors shall not submit any documentation that is classified as "Confidential," "Secret," or "Top Secret" throughout the evaluation process. This includes, but is not limited to submission of White Papers, Project Proposals, Project Work Statements, etc.

5.2 DISCLOSURE OF INFORMATION

White Papers, Project Proposals, PWS, etc. containing data that is not to be disclosed to the public for any purpose or used by the Government except for evaluation purposes shall include the following sentences on the cover page:

"This white paper includes data that shall not be disclosed outside the Government, except to non-Government personnel for evaluation purposes, and shall not be duplicated, used, or disclosed -- in whole or in part -- for any purpose other than to evaluate this submission. If, however, an agreement is issued to this Company as a result of -- or in connection with – the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent agreed upon by both parties in the resulting agreement. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in sheets *[insert numbers or other identification of sheets]."*

5.2.1 DATA SHEET MARKINGS

Marking requirements specify that data be "conspicuously and legibly" marked with a protective legend that identifies the OTA number, contractor's name and address, and the submittal date, along with the warning "*Use or disclosure of data contained on this sheet is subject to restriction"* on the title page of any restricted data sheets.

5.3 ANALYTICAL AND LABORATORY STUDIES

It is generally desired that active research and development (R&D) is underway for concepts submitted under this effort. Active R&D includes analytical studies and laboratory studies to physically validate the analytical predictions of separate elements of the technology, as well as software engineering and development. The Government is requesting information on any current or ongoing analytical or laboratory studies related to quantum-safe algorithms and cryptographic solutions. Any information related to ongoing efforts shall be included as an attachment to the White Paper and will not count toward the page limit.

5.4 RECORDS, FILES, AND DOCUMENTATION

All physical records, files, documents, and work papers, provided and/or generated by the Government and/or generated for the Government in performance of this OTA, maintained by the vendor which are to be transferred or released to the Government, shall become and remain Government property and shall be maintained and disposed of as applicable. Nothing in this section alters the rights of the Government or the vendor with respect to patents, data rights, copyrights, or any other intellectual property or proprietary information as set forth in any other part of this RWP (including all clauses that are or shall be included or incorporated by reference into the prototype OTA). The AO may at any time issue a hold notification in writing to the vendor. At such time, the vendor may not dispose of any Government data or Government-related data described in the hold notification until such time as the vendor is notified in writing by the AO, and shall preserve all such data IAW Agency instructions. The vendor shall provide the AO within ten (10) business days of receipt of any requests from a third party for Government-related data. When the Government is using a vendor's quantum-safe algorithms and cryptographic solutions, the vendor shall provide the Agency with access and the ability to search, retrieve, and produce Government data in a standard commercial format.

5.5 SECURITY CLEARANCES

The vendor is responsible for providing personnel with appropriate security clearances to ensure compliance with Government security regulations. The vendor shall fully cooperate on all security checks and investigations by furnishing requested information to verify the vendor employee's eligibility for any required clearance.

The vendors proposed solution (e.g., data, integration with supporting DoD Infrastructure, architecture) will determine the personnel security clearance requirements for the prototype effort. The Government will provided additional details regarding the required security clearances in the RFPP.

5.6 DATA STORAGE

To protect against seizure and improper use by non-United States (U.S.) persons and government entities, all data stored and processed by/for the DoD must reside in a facility under the exclusive legal jurisdiction of the U.S. The vendor will be required to maintain all government data that is not physically located on DoD premises[2] within the 50 States, the District of Columbia, and

[2] A facility (building/container) or IT infrastructure is On-Premises if it is physically on DoD owned or controlled property. That is, it is within the protected perimeter (walls or "fence line") of a DoD installation (i.e., Base, Camp, Post, or Station (B/C/P/S) or leased commercial space) which is under the direct control of DoD personnel and DoD security policies.

outlying areas of the U.S., unless otherwise authorized by the responsible Government, as described in DoDI 8510.01[3] and the DoD Cloud Computing Security Requirements Guide[4].

If the Government data is co-located with the non-Government data, the vendor shall isolate the Government data into an environment where it may be reviewed, scanned, or forensically evaluated in a secure space with access limited to authorized Government personnel identified by the Agreements Officer, and without the vendor's involvement. The vendor shall record all physical access to the cloud storage facilities and all logical access to the Government data. This may include the entrant's name, role, purpose, account identification, entry and exit time. Such records shall be provided to the Agreements Officer or designee in accordance with the agreement or upon request to comply with federal authorities.

5.7 LAW ENFORCEMENT

The vendor shall acknowledge and affirm that United States (U.S.) Federal law enforcement officials do not need a warrant or a subpoena to access Government data on any system or media employed by the vendor or their sub-vendors or other partners, or allies, to deliver or otherwise support the contracted service for the U.S. Government, subject to requirements for access to classified information and release thereof, if applicable. As specified by the Agreements Officer, the vendor shall provide immediate access to all Government data and Government-related data impacting Government data for review, scan, or conduct of a forensic evaluation and physical access to any contractor facility with Government data.

5.8 NOTIFICATION

The vendor shall notify the Government Security Contacts (Disa.meade.bd.mbx.sd-security-managers@mail.mil), and the AO within 60 minutes of any warrants, seizures, or subpoenas it receives, including those from another Federal Agency that could result in the loss or unauthorized disclosure of any Government data. The vendor shall cooperate with the Government to take all measures to protect Government data from any loss or unauthorized disclosure that might reasonably result from the execution of any such warrant, seizure, subpoena, or similar legal process.

5.9 VENDOR INCURRED EVALUATION COSTS

The costs associated with participating in Phases I through III, to include White Paper(s) preparation and submission, are not considered an allowable charges and should not be included within the ROM or any pricing information.

[3] https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/851001_2014.pdf
[4] https://iasecontent.disa.mil/cloud/Downloads/Cloud_Computing_SRG_v1r3.pdf

5.10 EXPORT CONTROLS

Research findings and technology developments arising from the resulting White Paper may constitute a significant enhancement to the national defense and to the economic vitality of the United States. As such, in the conduct of all work related to this effort, the recipient will comply strictly with the International Traffic in Arms Regulation (22 CFR 120-130), the National Industrial Security Program Operating Manual (DoD 5220.22-M) and the Department of Commerce Export Regulation (15 CFR 730-774).

SECTION 6 RESPONSES

Questions should be addressed to disa.scott.ditco.mbx.pl84-other-transaction-authority@mail.mil, Ms. Coni Jackson, constance.e.jackson4.civ@mail.mil, and Ms. Lisa Cravens, lisa.o.cravens.civ@mail.mil. Please provide any questions, in writing, no later than 17 May 2019 at 9:00am Central Standard Time (CST). The Government reserves the right to not answer questions submitted after this time. Any submissions that received after the close of the solicitation period will receive no further consideration.

The response shall be due no later than 9:00am CST on 31 May 2019. The responses shall be emailed to disa.scott.ditco.mbx.pl84-other-transaction-authority@mail.mil, Ms. Coni Jackson, constance.e.jackson4.civ@mail.mil and Ms. Lisa Cravens, lisa.o.cravens.civ@mail.mil.