

The Technical Proposal

How to Prepare!

PRESENTED BY
Jenny C. Servo, Ph.D., Dawnbreaker



Agenda

- Double check the Schedule
- Review the Proposal Deliverables
- Review the Technical Proposal Guidelines
- Sequencing the content development





Important Dates

EVENT	DATE
Pre-Solicitation Issued	November 13, 2024
Direct questions to Topic POC permitted	November 13, 2024 – December 11, 2024
Solicitation Open	December 17, 2024
Solicitation Question Deadline	January 6, 2025
Q&A Posted on SAM.gov	January 10, 2025
Deadline for receipt of Proposals	January 21, 2025, 1:00 pm ET
Phase I begins	~ Early May, 2025

Week of December 1

We are currently in the Pre-Solicitation Period (ends 12/11)

4 weeks SAM registration

Week of	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
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Dec 1...	Review elements of the DHS proposal submission package. Review the evaluation criteria on page 15 of the pre-solicitation. Review guidelines for the technical proposal. Conduct lit review and draft Section 1 Technical Proposal						
Dec 8....				Pre-solicitation period ends 12/11			
Dec 15...			DHS Solicitation released 12/17				
Dec 22...				Christmas Day 12/25, Hanukkah starts	Kwanzaa starts		
Dec 29...			New Years 12/31	New Years Day observed 1/1			
Jan. 5		Solicitation question deadline 1/6				Q&A posted on SAM.gov 1/10	
Jan. 12							
Jan. 19			Proposals due Jan 21, 1:00 PM ET				

The SAM registration process takes 4 weeks to complete

What are the Key Elements of the Proposal?

System Generated	Cover sheet	As generated by the system
	Cost Proposal	As generated by the system
	Project Plan	As generated by the system
	Foreign Access Management Screening, Form 11055	As generated by the system
PDF Uploads	Technical Proposal	Limited to 15 pages
	Briefing Chart	Limited to 1 page
	SBA Company Registration	Limited to 1 page
	Disclosure of Foreign Relationships	No page limit
	Commercialization Report	N/A
	Non-Disclosure Agreement	Topic DHS241-006 ONLY

The full proposal is due on January 17th, 1:00PM ET

Proposals are submitted to DHS via the DHS SBIR Portal at <https://sbir.dhs.gov/sbir/public>

What topics are in the Pre-solicitation?

DHS25.1

DHS251-001	Fentanyl Attribution Forensics/Source Profiling
DHS251-002	Enabling Data Analysis, Situational Awareness and Cyber Security for NG911 Public Safety Answering Points (PSAP)
DHS251-003	On-Person Screening Stream of Commerce Analysis Tool
DHS251-004	Securing Video Communications to Prevent Digital Injection Attacks
DHS251-005	Wired Interconnection Cable/Adapter from Mobile Device to Biometric Collection



Sample Topic DHS251-003

Small Business Innovation Research (SBIR) Program
Pre-Solicitation

SBIR Topic Number: DHS251-003

TITLE: On-Person Screening Stream of Commerce Analysis Tool

TECHNOLOGY AREAS: Screening at Speed

OBJECTIVE: Develop video analysis tool to identify airline passenger characteristics such as height, weight, clothing article types, shoe types, and visible accessories in real time without any image data or other personally identifiable information and characteristics being collected or stored.

DESCRIPTION: Stream of commerce data is crucial for walk-through threat detection system algorithm development because it provides real-world diversity in the traveler's physical characteristics, clothing, and personal belongings that people carry through security checkpoints. This data helps the algorithm distinguish between harmless objects and potential threats, improving detection accuracy and reducing false positives (false alarms) and false negatives (missed threats). By training the algorithm to a wide range of real-world scenarios, including different body shapes, and clothing, stream of commerce data ensures that body scanners can operate effectively in dynamic, high-traffic environments. It helps the system developer adapt algorithms to evolving trends in clothing and personal items, allowing the algorithm to recognize new threats hidden among everyday objects.

Additionally, the data supports machine learning models by defining large, varied datasets, essential for training algorithms to handle complex real-world conditions. This enhances the algorithm's performance in diverse cultural and geographical contexts. Stream of commerce data also plays a vital role in validating body scanner algorithms, ensuring they perform well in realistic environments. Overall, it is key to building robust, efficient, and adaptable body scanner systems that meet modern security needs.

Currently, the only potential solution is to send people to observe airport checkpoints and other common public areas to estimate the characteristics of the travelers. To ensure demographic and clothing diversity is accounted for, data would need to be captured in different regions, category of airports, seasons, and time of day. This solution is labor intensive, introduces human perception disparities, and not easily repeatable over time. Also, the brute-force human observer method is slow and will likely only be able to sample a very small population of travelers. This topic is seeking an innovative solution that will address the need to understand the distribution of characteristics of the travelling public to properly train and test machine learning models used in walk-through threat detection systems currently being developed/sponsored by the Screening at Speed program.

The proposed solution should:

- Provide results in real time on streaming video data from uncontrolled operational environment, including varied lighting and orientation of subject.
- Be able to verify that no images/video/PII is being stored.
- Minimize chance of redundancy (same person analyzed twice).
- Demonstrate high categorization accuracy (>95%) in an Independent Technical Assessment of algorithm using non-training data.
- Identify and catalogue anthropometric characteristics that are important to On-Person Screening as defined by the Government such as: height, weight, body mass index, girth.
- Identify and catalogue clothing articles such as jacket type (e.g., button-up, zipper, blazer, denim, leather) clothing types (e.g., shorts, dress, blouse, long sleeves, short sleeves, jeans, etc.), headwear types (e.g., turbans, ski cap, baseball cap, derby, scarves), shoe types (e.g., dress shoe, high-heels, sneakers, sandals, boots, etc.)

A-5

Small Business Innovation Research (SBIR) Program
Pre-Solicitation

- Identify and catalogue visible accessories such as watch, belt, bracelet, glasses, neckless, rings, cell phone, etc.

PHASE I:

Determine the technical feasibility of the proposed on-person screening stream of commerce analysis tool. Demonstrate analysis on preliminary proof of concept algorithm to develop the software/hardware requirements.

PHASE II:

Develop prototype of proposed on-person screening stream of commerce analysis tool solution based on the results of feasibility demonstrated in Phase I. Phase II should include demonstration of PoC algorithm that address the requirements defined in the topic description.

PHASE III: COMMERCIAL OR GOVERNMENT APPLICATIONS:

Government Application: Periodic monitoring of passenger stream of commerce in airport environments. The results can be utilized to provide data to the Government and vendors of walk-through threat detection devices to reduce false alarm rates. Reduction of false alarm rates will significantly reduce costs for TSA and other operational components. An authority to operate may be required.

REFERENCES:

4. <https://www.dhs.gov/science-and-technology/screening-at-speed>
5. <https://arxiv.org/abs/2203.12338v2>, March 2022, "Real-time Object Detection for Streaming Perception"
6. <https://arxiv.org/abs/2204.02008>, April 2022, "Learning Video Salient Object Detection Progressively from Unlabeled Videos"

KEYWORDS: Aviation Security Technology, On-Person Screening, Machine Learning, Threat Detection, Image Processing, Video Analytics

TECHNICAL POINT OF CONTACT:

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A-6

The Technical Proposal is the Most Important!

Phase I Proposal

- I. Identification and Significance of the Problem or Opportunity
- II. Phase I Technical Objectives
- III. Phase I Work Plan
- IV. Related R/R&D
- V. Key Individuals and Bibliography of Directly Related Work
- VI. Relationship with Future R/R&D
- VII. Commercialization Strategy
- VIII. Facilities/Equipment
- IX. Subcontractors/Consultants
- X. Potential Post Applications
- XI. Prior, Current, or Pending Support of Similar Proposals or Awards

**More detailed guidelines start on Page 8 of the Pre-Solicitation
Use the outline proposed in the Pre-Solicitation**

I. Identification and Significance of the Problem

Phase I Proposal

I. Identification and Significance of the Problem or Opportunity


“Succinctly define the specific technical problem or opportunity addressed; the proposed innovation; the relevance and significance of the proposed innovation to a need(s) within the topic description; the proposed innovation relative to the state of the art; and the importance of the work proposed.” [from Page 8 of Pre-Solicitation]

Important points:

- You must do more than repeat the problem as stated in the topic
- Review the references provided and then restate the technical problem or opportunity as you understand it
- Make sure that you review the state of the art
 - At a minimum, conduct a quick search in Google Scholar
- Clearly indicate what your innovation is and why this is important

Search Google Scholar?



Google Scholar "stream of commerce" and "threat detection" 

Articles About 15 results (0.09 sec)

Any time
Since 2024
Since 2023
Since 2020
Custom range...

Sort by relevance
Sort by date

Any type
Review articles

include patents
 include citations

Create alert

Comparison of Supervised and Un-Supervised Machine Learning Algorithms for Threat Detection and Scintillator Performance for Radiation Portal Monitoring
[ML Klasky](#), [MT McCann](#), [JR Haack](#), [JR Matheny](#) - 2023 - [osti.gov](#)
... algorithms, eg, total counts or energy windowing, and exhibit relatively poor performance in detecting threats at the low false alarm rates required to support the **stream of commerce**. ...
[☆ Save](#) [🔗 Cite](#) [Related articles](#) [🔗](#)

Classifiers for material discrimination with dual modality x-ray transmission and coherent x-ray diffraction system
[R Thamvichai](#), [D Pike](#), [J Greenberg](#)... - *Anomaly Detection and ...*, 2023 - [spiedigitallibrary.org](#)
... the overall system **threat detection** performance for material ... of items representing **stream of commerce** and a threat item. ... of non-threat or **stream of commerce** items and the matching ...
[☆ Save](#) [🔗 Cite](#) [Related articles](#) [All 3 versions](#)

Seeing through the data: A statistical evaluation of prohibited item detection benchmark datasets for X-ray security screening
[BKS Isaac-Medina](#), [S Yucer](#)... - *Proceedings of the ...*, 2023 - [openaccess.thecvf.com](#)
... knife) and represents cluttered and overlapping **stream-of-commerce** baggage items. SIXray [26] ... , pliers, scissors) originating from **stream-of-commerce** baggage and parcel X-ray scans ...
[☆ Save](#) [🔗 Cite](#) [Cited by 4](#) [Related articles](#) [All 6 versions](#) [🔗](#)

A literature review on deep learning algorithms for analysis of X-ray images
[G Seyfi](#), [E Esmé](#), [M Yilmaz](#), [MS Kiran](#) - *International Journal of Machine ...*, 2024 - Springer
... In this field, **threat detection** applications using machine learning and image processing on X-ray ... purposed datasets and in cargo screening **Stream of Commerce** datasets were used. ...
[☆ Save](#) [🔗 Cite](#) [Cited by 5](#) [Related articles](#) [All 2 versions](#)



Week of December 8

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II. Phase I Technical Objectives

Phase I Proposal

II. Phase I Technical Objectives

“State the specific objectives of the Phase I R/R&D effort, including the technical questions that must be answered to determine the feasibility, as described in the solicitation topic, of the proposed innovation/approach

.” [from Page 8 of Pre-Solicitation]

Important points:

- Phase I is for Concept Development
- What technical questions must you answer during this 5-month period to determine if the approach will work?

III. The Phase I Work Plan

Phase I Proposal

III. Phase I Work Plan

“including the efforts of the subcontractor(s)/consultant(s), if applicable) – Provide an explicit, detailed description of the Phase I approach. The Plan should elaborate on project tasks to explain **how, when, and where the work will be conducted, a schedule of major events, and the final product(s) to be delivered.** The Phase I effort should determine the technical feasibility of the proposed concept, and address the questions cited in the Technical Objectives immediately above. The methods planned to achieve each objective or task should be discussed explicitly and in detail. Task descriptions, schedules, resource allocations, estimated task hours for each key personnel and planned accomplishments, including project milestones, should be included. This section will be a substantial portion of the total Technical Proposal.”

Important points:

- Who will do the work?
- How much can you do within the budget and timeframe?

Week of December 15

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4 weeks SAM registration

IV. Related R/R&D

Phase I Proposal

IV. Related R/R&D

“Describe significant (current and/or previous) R/R&D activities that are directly related to the proposed effort, including any conducted by the principal investigator, the Offeror, consultants, or others. Discuss any planned coordination with outside sources. Describe how these activities relate to the proposed project. Describe previous efforts similar but directly related to the proposed effort. For each effort, provide the following: (a) short description, (b) client for which work was performed (including individual to be contacted and phone number), and (c) date of completion. The Offeror should persuade reviewers of his or her awareness of key, recent R/R&D conducted by others in the specific topic area.”

Important points:

- This section builds on your understanding of the State of the Art
- Staffing considerations and budget are important
- Allow enough time to engage others – be mindful of holidays

V. Key Individuals and Bibliography of Directly Related Work

Phase I Proposal

V. Key Individuals and Bibliography of Directly Related Work

Identify key personnel who will be involved in the effort including information on directly related education, experience, and bibliographic information. A concise resume for the Principal Investigator and all key personnel, including a list of relevant publications (if any), should be included. All resumes will count toward the appropriate page limitation, see **Section 3.1. Offerors must identify any foreign national(s) expected to be involved on proposed project** [including direct employees, subcontractors and consultants], their country of origin, type of visa or work permit under which they are performing, and an explanation of their anticipated level of involvement on this project. **Do not include Privacy Act Information.** SB foreign national(s) must first be cleared by S&T's Foreign Disclosure Office prior to working and accessing data or information on awarded SBIR efforts. Foreign nationals must receive separate clearances for each award including awards from multiple topics and multiple awards on the same topic. All foreign nationals who will perform work under the proposed SBIR effort must complete the DHS Foreign Access Management Screening, Form 11055 as part of the proposal submission process. Failure to include this information for each foreign national will impact the ability for them to participate in the event of an award

NOTE: The “concise resumes” are part of the 15 pages for the entire technical proposal

VI. Relationship with Future R/R&D

Phase I Proposal

VI. Relationship with Future R/R&D

State the anticipated results of the proposed approach if the project is successful through Phase I and Phase II. Discuss the significance of the Phase I effort in providing a foundation for Phase II research or research and development effort, application and commercialization efforts (Phase III). ”

Comment: This is your punch line. Indicate the reason why what you are proposing is significant

VII. Commercialization Strategy

Phase I Proposal

VII. Commercialization Strategy

(1) Explicitly describe the company's strategy (vision) for commercializing the proposed technology and how it will transition to the specific operational component in DHS, other Federal Agencies, and/or private sector markets. (2) **Provide specific information on what related technologies, if any, already exist in the market and why the technology being proposed will be superior and how this information was ascertained.** (3) Include a discussion on the Offeror's current capability to commercialize previously developed technologies, as well as how the Offeror intends to develop the proposed technology all the way to the market. **Responses to (1), (2), and (3) should be specific to the technology being proposed. Failure to respond to any of the items listed will result in a lower valuation for criterion c (See Section 4.1 for Phase I evaluation criteria). If the Offeror has no commercial experience (item (3)) this should clearly be stated, and Offeror should describe how Offeror intends to bring the necessary experience to the company.**

Comment: Conduct a quick Google search ; notice the focus on dual-use "market"

VIII. Facilities/Equipment

Phase I Proposal

VIII. Facilities/Equipment

“Provide information to allow the evaluators to assess the ability of the Offeror to carry out the activities of the proposed phase as well as all subsequent phases. Describe available instrumentation and physical facilities necessary to carry out the proposed effort. Equipment to be purchased, as detailed in the Cost Proposal, should be justified under this section. Also state whether the facilities where the proposed work will be performed meet environmental laws and regulations of federal, state, and local governments for, but not limited to, the following groupings: airborne emissions, waterborne effluents, external radiation levels, outdoor noise, solid and bulk waste disposal practices, and handling and storage of toxic and hazardous materials .

Comment: The facilities needed will vary widely depending on the topic. If you don't have appropriate facilities, consider teaming with others who can provide needed facilities

IX. Subcontractors/Consultants

Phase I Proposal

IX. Subcontractors/Consultants

“Involvement of any subcontractor(s) or consultant(s) (including universities, and technical assistance providers) is permitted. If such involvement is proposed, it should be described in detail in this section and in the Cost Proposal. Subcontractors’ or consultants’ involvement under Technical and Business Assistance (see **Section 5.11**) should be clearly delineated from involvement by other subcontractors and consultants. A minimum of two-thirds of the research and/or analytical work in Phase I, as measured by total contract value, should be carried out by the proposing Offeror. A minimum of one-half of the research and/or analytical work in Phase II, as measured by total contract value, should be carried out by the proposing Offeror. If the Offeror determines that it needs to acquire services from a non-U.S. source, it must fully explain in its proposal why a non-U.S. source must be used, and why no qualified U.S. source exists to perform the same services.

Comment:

- New companies often involve subcontractors and consultants
- Phase I Technical and Business Assistance (TABA) is an additional \$6 500 (See page 21)

X. Potential Post Applications

Phase I Proposal

X. Potential Post Applications

“Briefly describe the following: (1) whether and by what means the proposed project appears to have potential commercial application; and (2) whether and by what means the proposed project appears to have potential use by the Federal Government. ”

Comment:

- Remember that DHS is a contracting organization which means that they are a potential customer for the technology
- Many DHS funded technologies are dual-use

XI. Prior, Current or Pending Support

Phase I Proposal

XI. Prior, Current, or Pending Support of Similar Proposals or Awards

WARNING – While it is permissible, with proposal notification, to submit identical proposals or proposals containing a significant amount of essentially equivalent work (see **Appendix B**) for consideration under numerous Federal program solicitations, it is unlawful to enter into funding agreements (contracts or grants) requiring essentially equivalent effort. If there is any question concerning this, it must be disclosed to the soliciting agency or agencies before award.

Comment:

See additional cautionary notes on page 11 and 12 of the pre-solicitation

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Proposal Evaluation Criteria

Proposers should write to the evaluation criteria

(1) Technical Merit

- the soundness, technical merit, and innovation of the proposed approach and its incremental progress toward topic or subtopic solution.

(2) Staff Qualifications and Capability

- the qualifications of the proposed principal investigator, key personnel, supporting staff, and consultants. Qualifications include the ability to perform the research and development.

(3) Potential for Commercialization

- the potential for commercial application, either in the Government or private sector, and the benefits expected to accrue from this commercialization.

(4) Cost/Price

- The reasonableness of the cost proposal. The evaluation of cost/price will include whether the level of effort and other direct costs are appropriate for the proposed work.

Thank-you for joining us today!

- Sign up for the webinar series
- If you have never written a proposal before and would like to receive mentoring assistance, please complete the registration form
- Please take a moment to provide your feedback on today's webinar <https://forms.office.com/r/uvHuZWS5x4>
- **See the website for [Phase 0 SBIR program for DHS!](#)**