CINA Open RFP 2020-21: Submission and Review Process

CINA is seeking white papers presenting research ideas intended to address questions and challenges that CINA, DHS, and/or its federal partners are currently facing, or are expected to be facing in the near future. This is an open, rolling RFP. Submissions will be accepted at any time during the RFP open period (June 2020 - June 2021). CINA leadership and DHS center managers and sponsors will review white paper submissions as they are received to identify those for which a detailed statement of work will be requested. The process typically takes about eight weeks from white paper receipt to SOW request. A formal request for full SOW development does not guarantee a grant award. Projects typically range from 6-24 months in duration (pre-transition) and have funding levels from $50k to $250k per year.

A white paper submission should contain the following sections and is expected to be no more than five (5) pages in length, single-spaced, 11- or 12-point font with 1" margins. Appendices beyond five pages or external links should only be used when necessary to convey a critical aspect of the proposed research.

White paper sections:
- **Executive Summary**
- **Problem**: Description of the essential problem area.
- **Prior and Related Work**: Discussion of prior work, related work, and state of the art.
- **Approach**: A sufficiently detailed description of the proposed approach to address the identified problem.
- **Team Experience and Resources**: Provide evidence supporting the team's ability to perform the proposed effort.
- **DHS Relevance**: Identify the DHS component or components most likely to be interested in the conduct and outcomes of the proposed research.
- **Timeline**: A high level timeline for the project.
- **Cost Estimate**: Rough order of magnitude cost estimate for the project.
- **References**: Not included in page count.

White papers will be subject to a formal review process, including evaluation by external subject matter experts, to identify those proposals that will be invited for full SOW development and will be considered for potential grant awards. The full SOW, if requested, should contain the following sections and is expected to be no more than ten (10) pages in length, single-spaced, 11- or 12-point font with 1" margins. Appendices beyond ten pages or external links should only be used when necessary to convey a critical aspect of the proposed research.

Statement of Work sections:

- **Project Title**
- **List of Principal Investigators/Other Personnel**
- **Overall Budget**: Broken down by cost type (direct and indirect) and quarter.
- **Background and Purpose**: Including executive summary, purpose, operational need and alignment to DHS strategic goals, and impact to the HSE and specific stakeholders.

- **Research Objectives and Resulting Products**
- **Technical Approach and Risks**
- **Project Milestones**
- **Customer Engagement and Requirements**
- **Technology Transition Plan and Intellectual Property Management**
- **References**: Not included in page count.

Current Topics of Interest

Topics of interest may change over the open period for this RFP. The latest version of the RFP and topics can be found at https://cina.gmu.edu/rfps/.

1. **Content processing/extraction at the edge/sensor**

   Sensors acquire orders of magnitude more data than can be transmitted to a central location for processing. Algorithms and methods are sought to address this problem. Approaches may include processing at the sensor to reduce volume and identify critical data or create derivative data, distributed processing to include fog computing, and hybrid approaches. Imagery, video, audio, and other sensor data are all of interest.

2. **Digital video processing**

   Investigators are overwhelmed with the volume of digital video data available. Algorithms and methods are sought to aid in entity extraction, activity classification, contraband detection, and extraction and representation of linkable elements. Of particular interest are approaches which permit the identification of an arbitrary item of interest (e.g., analyst provides an image of a particular weapon or electronic component and the approach finds all similar occurrences), or approaches which find general classes of objects (e.g., all guns). Proposed approaches should provide at least one order of magnitude improvement over current methods (i.e., an analyst using the proposed solution should be able to effectively review 10 times the video footage compared to current methods).

3. **Traditional forensics**

   Of interest are methods which leverage existing traditional forensics to extract evidence characteristics which may be linked with other data sources. For example, the ability to perform chemical analysis on a substance or product and identify the sources and routes of its component elements, which may then be linked with geospatial, open source, supply chain, financial, or other data.

4. **Infer criminal network flow and structure from indirect observables**

   Of interest are methods to infer criminal network structures, flows, and operations from indirect observables. For example, past work has used illicit drug prices in different cities to infer drug flows (higher costs may be due to transportation expenses which implies drug

flow from lower cost to higher cost cities). All criminal activity is of interest, and sources of indirect observables may be open source, proxy, or synthetic data. Natural, randomized, and controlled experiments are all of interest.

5. **Automate network creation from data**

   Of interest are approaches to integrate and automate analysis of entities and linkable elements extracted from automated text and OCR processing, speech transcription, call record data, financial record data, video, imagery, audio, geospatial data, and other sources. Approaches are presumed to operate on the extracted or derived content from these sources (methods for such extraction are separate topics).

6. **Develop early and near real-time warning indicators for human smuggling activity**

   Of interest are algorithms and methods to derive early and near real-time warning indicators from financial data (especially money service businesses), second-order indicators (e.g., ER visits by undocumented individuals, media reports of unusual activity in warehouses, homes, etc.), and other data in the context of the logistics, communications, supply chains, and financial activity around human smuggling activities. Also of interest are human identification technologies to facilitate kinship identification and the incorporation of genomic data in the warning indicator algorithms and methods above.

7. **De-anonymizing network connections**

   Of interest are methods to de-anonymize network connections such as TOR, Private VPNs, and similar. Approaches may be passive (analyze available data) or active (generate traffic to facilitate the de-anonymization).

8. **Vehicle forensics: extraction and sanitization**

   Of interest are approaches to (a) extract potentially useful data from vehicle digital systems (infotainment and otherwise), and (b) sanitize vehicle digital systems (primarily infotainment). The first item is to collect evidence, and of particular interest are approaches which work across multiple platforms and via native interfaces. The second item is to support law enforcement operations where agents may use a vehicle and have reason to remove their digital exhaust from that vehicle.

9. **Cybercrime investigations and other training**

   Of interest are proposals to develop training materials specific to cybercrime investigations for federal law enforcement officers. Proposed training is expected to be delivered in a face-to-face format, should go beyond an introductory level and include practical skills and examples, and should include hands-on components. Training may include open source software or tools as well as software or tools known to be used by the federal law

enforcement community. Training should be designed to be delivered over 3-5 days, typically contiguous.

10. Models and signatures of specific criminal operations

Of interest are (a) algorithms and methods to develop models of criminal operations from data, and (b) signatures of specific criminal operations. The models in the first item should reflect and compensate for the inherent uncertainty in this domain (partial data from dynamic operations) while also allowing for network analytics (e.g., what are the critical nodes and flows), speculative action (what-if), and data gap analysis (e.g., what additional data would strengthen the model). The models are expected to be dynamic and allow for ingest of new data in near real time. The signatures of the second item are expected to be knowledge products relating to a specific criminal operation. Approaches for this second item may be (i) case studies to include identification of warning signs that may be applied to current operations, or (ii) development of a reusable method or process which can be subsequently applied to different data sources/sets in order to extract signatures unique to that data and criminal operation. Models and signatures may include suppliers and/or consumers in the criminal operation, and data sources for both items may be open source, proxy, or synthetic data.

11. Systematic reviews

Submissions under this topic will propose a systematic review of DHS law enforcement operations to identify evidence gaps and operational needs. The output of this topic will be a report detailing the data collected, analysis, and findings/recommendations.

12. Effect of COVID-19 and response on criminal organizations, criminal activity, and law enforcement

The CINA Science Committee produced a preliminary paper (May 2020) addressing the effects of the COVID-19 pandemic and response on criminal organizations and activity, arguing that criminal organizations changed in response to the pandemic. The paper also suggested ways that law enforcement might adapt to these changes and speculated that unanticipated opportunities may arise from these changes. This topic requests a more thorough and rigorous collection and examination of available data and analysis to validate or refute the observations, conclusions, and speculation in the preliminary paper, to identify any criminal organization and activity changes not yet identified, and to suggest law enforcement adaptations and actions to mitigate the changing threat and exploit potential opportunities.

13. Other

The Center will also consider submissions which do not address a topic listed above but do address a problem, challenge, gap, or need related to CINA's mission to support the detection, analysis, monitoring, and dismantling of criminal networks and activities.