HITB+ CyberWeek

Cybersecurity Research Award

HITB+CyberWeek
Abu Dhabi, United Arab Emirates, 2019

Request for Proposals
June 2019

SMART AND SAFE DIGITAL

DARKMATTER

Content

00 Executive Summary

01 Research Context

02 Cybersecurity Research Award Overview

03 Program Description and Goals

- Milestone 1: Pre-Proposal
- Milestone 2: Poster Talk
- Milestone 3: Full Proposal

04 Preparation and Submission Instruction of Pre-Proposals

05 Proposal Processing and Review Procedures

Executive Summary

*"Calling all Graduate research assistants, Researchers and Faculties from universities & think tanks for innovative and original research ideas focused on **Cybersecurity threats to Smart Cities** with an opportunity to win **USD $1,500,000**!"*

All awards will be selected by a rigorous, **three-stage merit review process**:

Stage 1: Call for Pre-Proposals

- Begins: June 2019
- Closes: August 30, 2019
- Notification of acceptance: September 19, 2019

Stage 2: Call for Posters

- Begins: September 20, 2019
- Closes: September 26, 2019
- Notification of winners: October 31, 2019

Stage 3: Call for Full Proposals

- Begins: November 2019
- Closes: February 18, 2020
- Notification of winners: May 2020

Selected teams from Pre-proposals stage will be **flown to Abu Dhabi, UAE** to present their poster talks during **HITB+ CyberWeek 2019.**

HackInTheBox (HITB) is a series of network security and hacking related conferences held annually around the world. **HITB+ CyberWeek UAE 2019** is a new flagship event where one of the main programs being delivered is the **University Pavilion,** which showcases the **Cybersecurity Research Award** and career fairs related to cyber security.

Our Partners

STRATEGIC PARTNER

جامعة خليفة
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ADVISORY PARTNER

Dubai Electronic Security Center

KNOWLEDGE PARTNERS

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"Building the future of UAE technologies"
بوليتكنك أبوظبي
POLYTECHNIC

Abu Dhabi Polytechnic (ADPoly)

جامعة نيويورك أبوظبي
NYU ABU DHABI

New York University Abu Dhabi

جامعة الشارقة
UNIVERSITY OF SHARJAH

Sharjah University

Executive Summary

CALL FOR PRE-PROPOSALS

Submit pre-proposals by filling the Pre-proposal cover page and send it along with your pre-proposals at csra@darkmatter.ae. All applicants must read and agree to the Call for Pre-proposal Submission Requirements prior to making a submission. All submissions must be received on or before August 30, 2019.

SUBMISSION REQUIREMENTS AND RECOMMENDATIONS

Please read carefully the grant process and requirements included in pages 27-39.

RESEARCH AWARD REVIEW & CONTENT SELECTION

All awards will be selected by a rigorous, three-stage merit review process, and announced in May 2020. To identify which projects to support, the Cybersecurity Research Award (CRA) committee will rely on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to the security of Smart Cities.

PARTICIPANTS BENEFITS

The award fund totaling to **USD $1.5M** will be dispersed across a period of 3 years (not exceeding USD $500,000 per year). The institution/s working on the product/idea will own the IP. However, DarkMatter will have first right to license the product/idea.

01

The Context

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HITB+ CyberWeek UAE 2019

HITB+CyberWeek
Abu Dhabi, United Arab Emirates, 2019

- **HITB+CyberWeek UAE 2019** is a new flagship event of HackInTheBox (HITB) based in Abu Dhabi.
- This event will be conducted across a six-day period from **October 12th –17th 2019.**
- Event will combine over 20 activities and programs simultaneously across **four main themes**:

Trainings

Competitions

Talks

Open Areas and R&D

The **HITB+ Cyber Week UAE 2019** has three key work streams:

Digital Oasis

Teachers Development

University Pavilion

The **University Pavilion** workstream consists of two elements:

1. **UAE Cybersecurity Research Award**
2. **Career Zone**

The Cybersecurity Research Award

Three pillars underpin the award scheme

THE 2019 THEME:

Cybersecurity threats to Smart Cities being a mandate to address to both DMG and national cybersecurity strategies

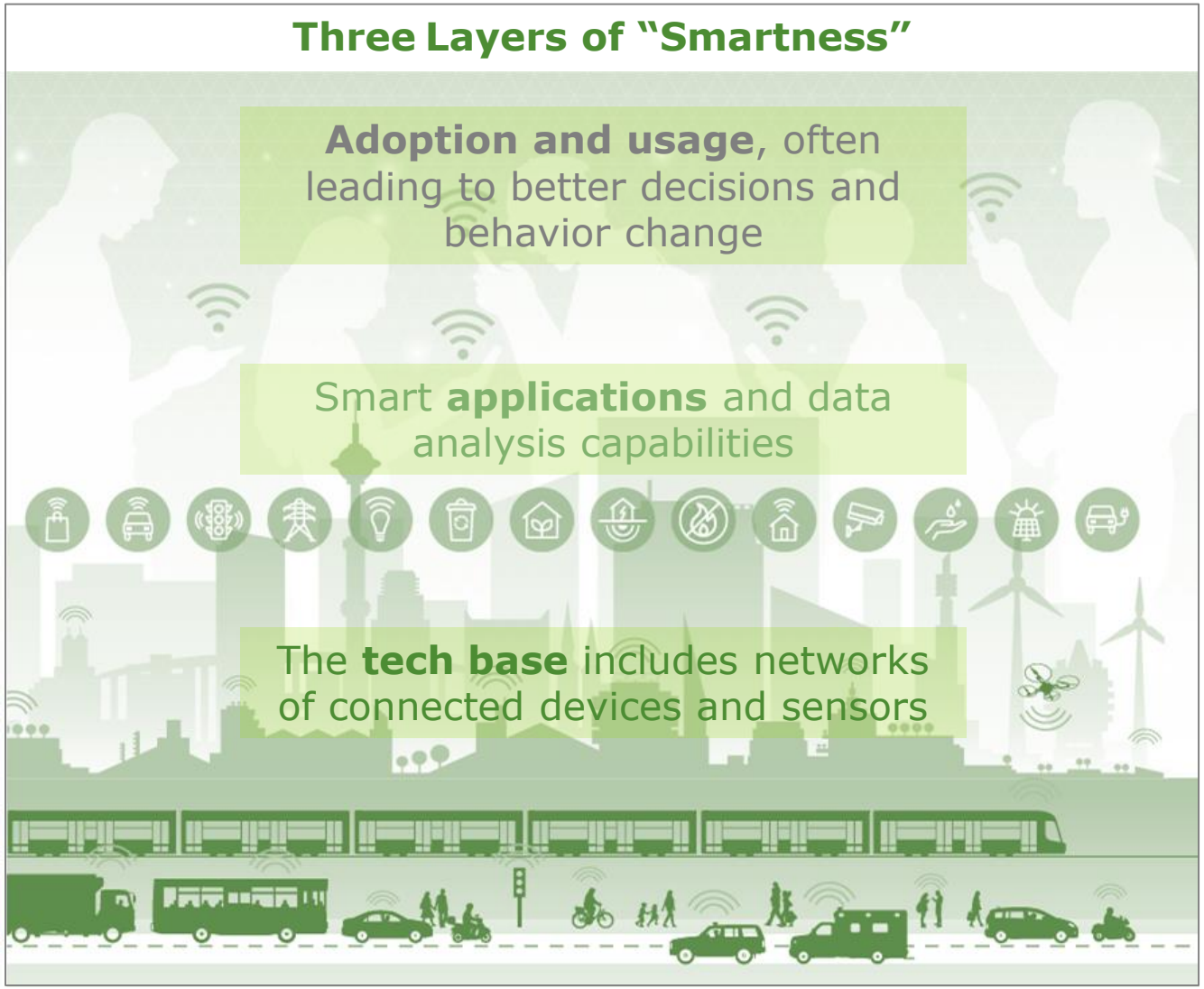
EIGHT APPLICATIONS TO SMART CITIES:

1. Security
2. Energy
3. Healthcare
4. Water
5. Economic Development and housing
6. Engagement and community
7. Mobility
8. Waste

TECHNOLOGY FOCUS:

1. Artificial Intelligence (Machine Learning)
2. Blockchain/Cryptography (e.g., side channel analysis techniques and post quantum crypto)
3. Big Data
4. IoT
5. Edge Computing
6. Mobile and the cloud

To ensure secure and resilient cities in the UAE, it is fundamental that we are able to avoid and respond to threats across three levels



Cybersecurity vulnerabilities in smart cities:

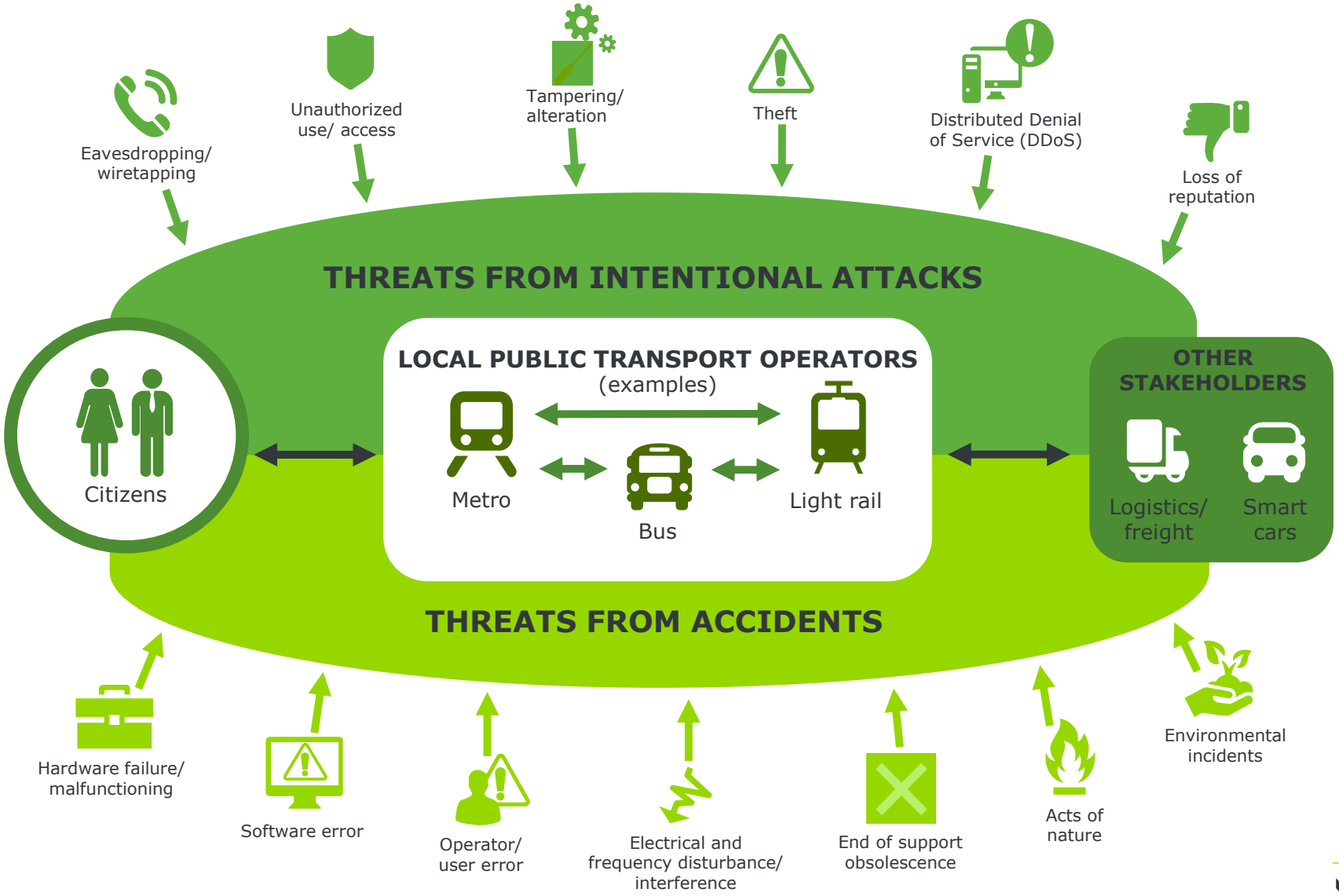
- The Internet of Things provides extensive **"surface area"** for hackers to attack.
  - Life-and-death risks from compromised security systems, medical monitors, and self-driving cars
  - Severe consequences if bad actors shut down a city's power grid or water supply.

Rigorous defense mechanisms needed to protect city assets:

- **Mission-critical IoT applications** should have high levels of security before they are adopted on a large scale.
- Cities will have to develop cybersecurity expertise, and **stay abreast of the constantly evolving threat environment**.
- Cities should prepare for how to respond to breaches:
  - Technical remediation
  - Plan to maintain calm
  - Communication plan

SOURCE: McKinsey Global Institute, June 2018

An illustrated example of how advances in the transport sector are vulnerable to potential accidents and cyber attacks



SOURCE: Cyber Security for Smart Cities, by the European Union Agency for Network and Information Security, December 2015

Research ideas can examine eight important applications that will be relevant for cities through 2025

Economic Development and Housing

- Digital business licensing and permitting
- Digital business tax filing
- Online retraining programmes
- Personalized education
- Local e-career centers
- Digital land-use and building permitting
- Open cadastral database
- Peer-to-peer accommodation platforms

Energy

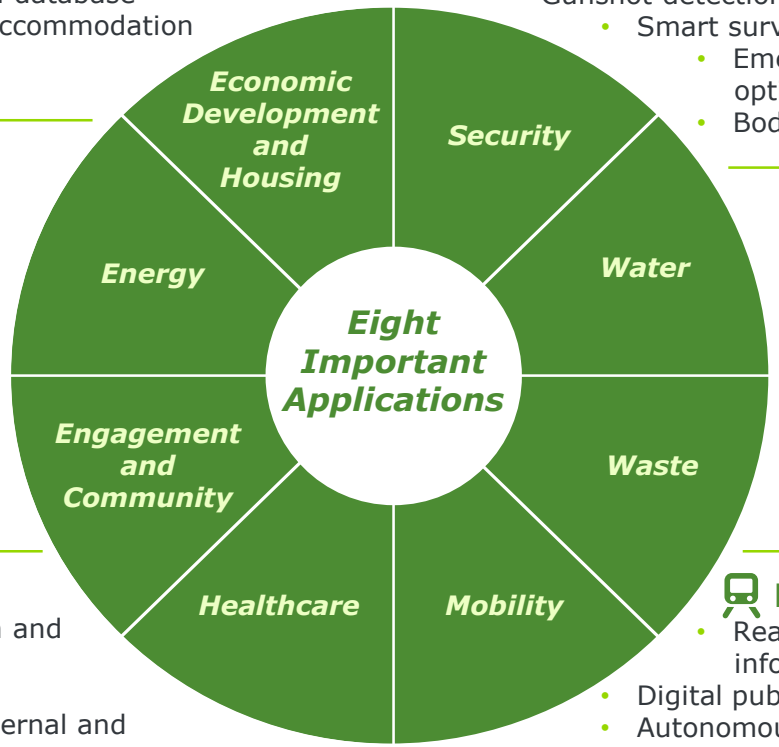
- Building automation systems
- Home energy automation systems
- Home energy consumption tracking
- Smart streetlights
- Dynamic electricity pricing
- Distribution automation systems

Engagement and Community

- Local civic engagement applications
- Local connection platforms
- Digital citizen services

Healthcare

- Telemedicine
- Remote patient monitoring
- Lifestyle wearables
- First aid alerts
- Real-time air quality information
- Infectious disease surveillance
- Integrated patient flow management systems
- Online care search and scheduling
- Data-based health interventions: Maternal and child health
- Data-based health interventions: Sanitation and hygiene



Security

- Predictive policing
- Real-time crime mapping
- Gunshot detection
- Smart surveillance
- Emergency response optimization
- Body-worn cameras
- Data-driven building inspections
- Disaster early-warning systems
- Personal alert applications
- Home security systems
- Crowd Management

Water

- Water consumption tracking
- Leakage detection and control
- Smart irrigation
- Water quality monitoring

Waste

- Digital tracking and payment for waste disposal
- Optimization of waste collection routes

Mobility

- Real-time public transit information
- Digital public transit payment
- Autonomous vehicles
- Predictive maintenance of transportation infrastructure
- Intelligent traffic signals
- Congestion pricing
- Demand-based microtransit
- Smart parking
- E-hailing (private/pooled)
- Car sharing
- Bike sharing
- Integrated mutlimodal information
- Real-time road navigation
- Parcel load pooling
- Smart parcel lockers

SOURCE: McKinsey Global Institute, June 2018

The mechanism for launching the cybersecurity research award

STAKEHOLDERS:

- **Sponsor:** DarkMatter
- **Participants**: University students, Graduate research assistants, Researchers, and Faculty from local and international universities and think tanks

Starting Point: Research theme **"Cybersecurity Threats in smart cities"**

Call for Pre-proposals
Participants will be invited to submit pre-proposals
June 2019

Submission date
Review pre-proposals for shortlisting teams for poster presentations
August 2019

Poster Talks
Invite stakeholders and a committee that will assess the impact and presentations of contestants
Oct 2019

Call for Full Proposals
Shortlisted teams to be invited to submit full proposals
Feb 2020

Award Ceremony
The duration of the event is 2 hours and will be attended by DM and partners' senior leadership will be invited
May 2020

June 2020

Cybersecurity Research Award

The winning team will receive AED 1.84M each year

A **total of AED 5.52M** will be allocated to this award over the period of 3 years

02

Cybersecurity Research Award Overview

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The Research Award Overview - Program Contact Information

The Program's Web Portal is : https://researchawards.cyberweek.ae

For general information about the program, please refer to the FAQ section at: researchawards.cyberweek.ae

For specific questions about application preparation, please contact us at: csra@darkmatter.ae

The Research Award Overview – Milestones

Pre-Proposal

Required

Due Date: August 30, 2019, Midnight Greenwich Mean Time (GMT)

Poster Talks

Invitation Only

Due Date: September 26, 2019

Full Proposal

Invitation Only

Due Date: February 18, 2020 Midnight GMT

The Research Award Overview - Anticipated Award

Type of Award

Cooperative Agreement - Anticipated commitment of three years

Funding Amount

USD $1.5M for the winning team distributed over three years in maximum annual amount of USD $500,000

Indirect Cost (F&A)

20% maximum of the budgeted direct costs

Notification of Award

May 2020, with an anticipated start date of the project of June 1, 2020

The Research Award Overview - Key Components

The Research Program for Threats to Smart Cities requests innovative research and technology proposals that advance the field of cybersecurity, to protect against threats to Smart Cities, particularly in a highly connected environment.

- Each proposal will be required to address how it will enhance training and capacity building in the area of cybersecurity for smart cities globally.
- An open data policy on experimental results (after a period of time for validation and initial analysis by the experimental team) will be the program's fundamental policy. This sharing of data to facilitate the translation and dissemination of research results is important to accelerate the advancement of the field.
- All proposers will be asked to address social aspects of the proposed work (public outreach and engagement).

Fundamental Understanding of Threats to Smart Cities

Vulnerability Scanning and Discovery

General Risk Awareness of End Users

Emphasis on Development of Secure Devices and Apps

Incident Response and System Resilience

Assessment of Potential Impact of Cyber Attacks

Live System Updates and Incident Recovery

Establishment of National Security Standards for IoT Devices

03

Program Description and Goals

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Program Description and Goals

The purpose of this international competition is to stimulate and promote cybersecurity for Smart Cities.

1. Advance the techniques, technology and implementation of cybersecurity practice.

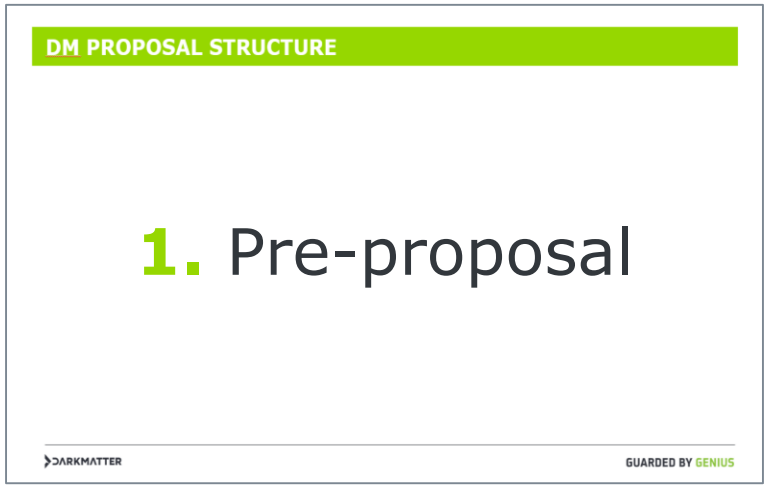
DarkMatter sees the program as an opportunity to bring international recognition to the potential of research in cybersecurity for Smart Cities to improve citizens' security, and spur additional investments in research funding and research partnerships to advance the field.

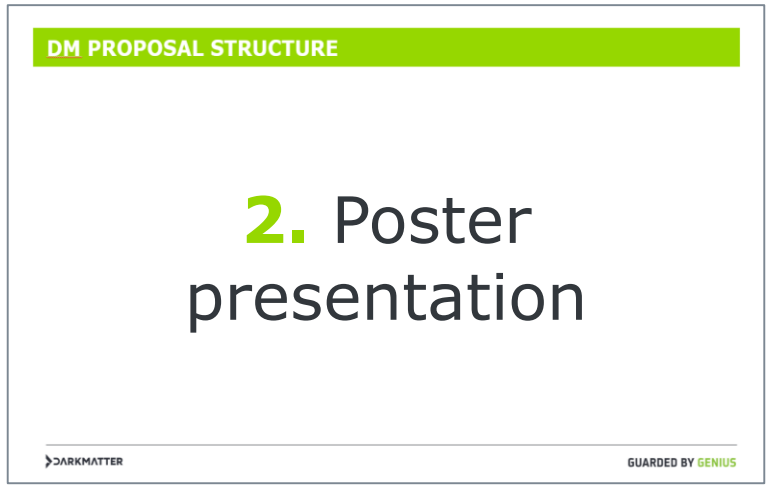
2. Increase the reliability and, therefore, the adoption of Smart Cities solutions

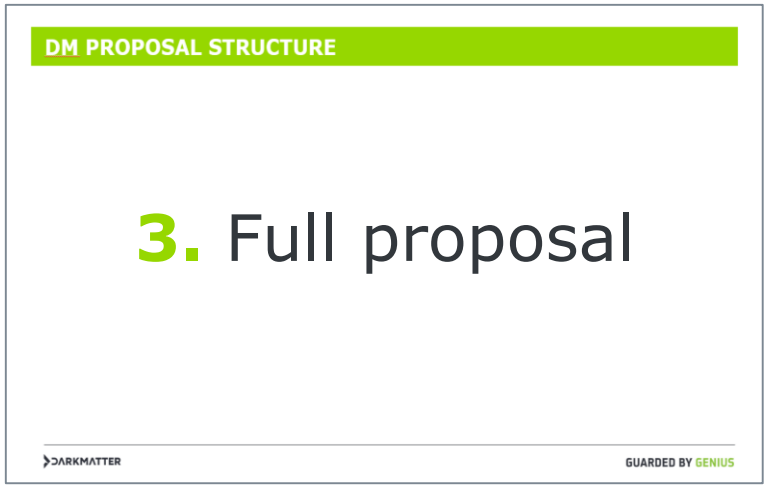
We're looking for improved security on various services offered by Smart Cities to citizens and seek to establish Dubai and Abu Dhabi as models for safe and functional Smart Cities. We additionally seek new technologies and methodologies, allowing for maintaining the highest level of security at any time in all the systems involved in the Smart City environment.

The Cybersecurity Research Award Milestones

There will be three milestones for the research participation:







Milestone 1: Key Requirements for the Pre-Proposals

(Pre-proposals meeting criteria will be eligible for selection to participate in the Poster Talk)

Theme: Cybersecurity Threats to Smart Cities
Submission Date: August 30, 2019

Title of Proposed Project

Proposed Team

Include a table that has four columns

1. Name of the PI or co-PIs
2. Institution
3. Department(s)
4. Most Relevant Field(s) of Expertise

* All Pre-proposal responses should be along with the Pre-proposal cover page

Pre-Proposal - Project Description

1. Identify the Smart City application(s): Applications for Smart Cities may include: Security, Energy, Healthcare, Water, Economic Development and housing, Engagement and community, Mobility and Waste.

2. Targeted Cybersecurity Threat: Describe the specific cybersecurity threat that the research will potentially target. Technologies may include any of the following: Artificial Intelligence (Machine Learning), Blockchain/Cryptography (e.g., side channel analysis techniques and post quantum crypto), Big Data, IoT, Edge Computing and Mobile and the cloud

3. Rationale: Identify some key, enabling ideas that will be built upon. Describe the intellectual approach and qualifications for carrying out the proposed strategies.

4. Stakeholder community: identify and describe strategies for engaging the stakeholders involved in the research

5. Anticipated Impacts: How will the research impact Smart Cities?

Milestone 2: Key Requirements for the Poster Talks

(The 15 best pre-proposals will be invited to present their posters in October 2019)

Identify Smart City Application(s) and Technology: How do they interact?

Targeted Cybersecurity Threat: Describe the specific cybersecurity threat that the research will potentially target

Anticipated Impacts: How will the research impact Smart Cities.

Rationale: Identify key ideas that will be built upon. Describe the approach and qualifications for carrying out the proposed strategies.

Stakeholders: Identify & describe strategies for engaging stakeholders.

Milestone 3: Key Requirements for Winning Proposals

(The 5 best poster talks will be invited to submit full proposals in February 2020)

A focus on revolutionary research in cybersecurity

Scope and scale that fully justifies the proposed funding request

Demonstrate sufficient expertise and experience of the project team to conduct the proposed research with excellence

Demonstrate institutional commitment to achieving strategic goals that are shared by the lead and any partnering institutions

Establish multi-institutional, multi-national collaborations or linkages with universities/colleges, national laboratories, private sector research laboratories, and state and local government organizations, as appropriate to the project

Successful Full Proposals Will Include:

* All Full Proposal responses should also have a filled detailed budget form (Template will be provided)

Plan for social stewardship through community outreach and impact assessment and mitigation, as appropriate to the project

No redundancy with work being done in currently or previously funded program projects and when overlaps are foreseen, clear articulation of how the newly proposed work compliments current efforts

Appropriate mechanisms for project oversight and guidance

Management plan that integrates research, capacity building/education and knowledge transfer activities with inclusion of all partners and affiliates as appropriate

Plan for knowledge transfer through significant intellectual exchange within the DarkMatter team

Award Information

THE PROGRAM WILL AWARD FUNDS ANNUALLY

The award fund totaling to USD $1.5M will be dispersed over a period of 3 years (not exceeding USD $500,000 per year). All awards will be selected by a rigorous, three-stage merit review process, announced in May 2020.

FUNDS WILL BE AWARDED THROUGH A COOPERATIVE AGREEMENT

Which gives the Cybersecurity Research Award (CRA) committee additional responsibilities over and above what is usually associated with a grant. The PI has control and directs the project, with the assistance of any Co-PIs. The PI and the PI's institution have fiscal responsibility for the award and primary management responsibility for the conduct of the proposed activities. The cooperative agreements will state the nature and extent of expected CRA committee involvement, such as receipt of periodic reports and conduct of regular evaluations. A detailed agreement ensures that the responsibilities of each party are fully understood.

SUPPORT FOR EACH YEAR OF THE AWARD WILL BE CONTINGENT UPON A SATISFACTORY OUTCOME OF PROGRESS REPORTS

In addition, one formal visit to UAE will be held approximately every 6 months from the start of the project in order to evaluate the progress and future plans, with an emphasis on the quality of the research and expected ability to meet the project goals and objectives.

Eligibility Information

Who may submit proposals?

Domestic (UAE) or foreign, academic universities/institutions/think tanks are eligible to receive this cooperative agreement award.

All eligible entities must clearly demonstrate that they have access to facilities and infrastructure necessary to carry out the proposed project and agree to the fiscal arrangements that the CRA committee requires to clearly prove the ability to responsibly manage the funds.

Who may serve as Principal Investigator (PI)?

The PI must have substantial research and management experience in a field of science and/or engineering to lead the Project.

Co-PIs may share in the responsibility of the scientific or technical direction of the project. The first name listed on the application will serve as the primary liaison to the CRA committee and have responsibility for the project management and the submission of reports.

Eligibility Information

There is **NO LIMIT** on the number of pre-proposals that can be submitted to this competition. However, it should be noted that any one organization may only receive one award per competition cycle.

There is **NO LIMIT** on the number of pre-proposals that can be submitted by a PI or Co-PI, but it should be noted that a PI or Co-PI may only receive one award per competitive cycle.

Pre-Proposals submitted to the program must not have been previously submitted to other agencies and either awarded or currently under review.

Based on the merit review of the pre-proposals, a select number of PIs will be invited to present their research posters. Then a select number of poster talks will be then invited to submit their full proposals for eligibility for the award.

04

Preparation and Submission Instructions

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Milestone 1: Preparation and Submission Instruction of Pre-Proposals

(Pre-proposals are required)

All Pre-proposals with Cover page must be submitted by email at csra@darkmatter.ae no later than Midnight (GMT), **August 30, 2019**.
Pre-proposals not compliant with the guidelines may be returned without review.

Requirements

The pre-proposal shall comply with the following specifications:

- Written in English
- Paper size when printed: ISO A4
- Margins: 2.5 cm (top, bottom and sides)
- Spacing: Single spaced
- Font: No smaller or more condensed than Times New Roman (acceptable fonts include Arial, Helvetica, Palatino, Linotype or Georgia), 12 point for text and 10 point for figures and tables
- The pre-proposal will contain the following elements:
  - Cover Page (Template provided)
    - Consists of project title, PI and Co-PI (if any) information and sponsoring organizational information, and list of senior personnel and their institutional affiliations
  - A pdf file containing the following sections (shown in the following pages):

Milestone 1: Preparation and Submission Instruction of Pre-Proposals

(Pre-proposals are required)

Project Summary and Description
(1-page minimum, 3-page maximum)

- The Project Summary and Description should articulate a vision that clearly outlines the research being addressed or breakthroughs being sought.
- It should provide sufficient information on the research (hypotheses, concepts, methods, approaches, data measurements and analyses) and anticipated outcomes.
- The proposed approaches must be innovative, and it must be clear how the proposed project will transform or significantly impact the research area and its broader implications for cybersecurity and solutions to threats against Smart Cities.
- It should identify the roles and responsibilities of the PI and/or other senior leadership, if relevant, along with their respective institutions and institutional roles.
- The project summary and description should be informative to those working in the same or related field(s), and understandable to a scientifically or technically literate reader. Links to URLs or other supplementary information may not be used.

Note: For the pre-proposals, descriptions of facilities, equipment and other resources are not required. If this information is an essential component of the research being proposed, it should be indicated briefly within the Project Summary and Description.

Milestone 1: Preparation and Submission Instruction of Pre-Proposals
(Pre-proposals are required)

References cited
(no minimum, 2-page maximum)

- Each reference must include the full citation. Applicants must be especially careful to follow accepted scholarly practices in providing citations for source materials relied upon when preparing any section of the document. This section must include bibliographic citations only and is not be used to provide parenthetical information outside of the project description. It is important to be succinct and select only those references pertinent to the proposed research. Reference numbers should also be shown in the text of the project description. Use of published works should conform with international copyright treaties and best scholarly practices.

CVs of PI, Co-PI(s), and Senior Personnel
(Maximum 1-page per individual)

- For the PI, Co-PI(s) and each senior personnel listed on the project's cover page, one-page should be provided that includes full name and title, institutional affiliation, brief summary of expertise and relevant experience, and several sentences elucidating role in the project and how background is relevant to the competition, along with other information (e.g. publications, patents, etc.) deemed relevant.

Required Supplementary Documents

- List of suggested reviewers or reviewers <u>not</u> to include *(with a brief explanation or justification for why the reviewer should be excluded)*
- Up to three keywords/phrases that pertain to your research topics, listed in order of priority
- Additional Information *(if applicable, in a single pdf document)*
- Identification of proprietary or privileged information *(if applicable)*

Milestone 2: Preparation and Submission Instruction of Poster Talks

(Research Posters are by invitation only)

The acceptance of poster talk invitation must be sent through email at csra@darkmatter.ae no later than Midnight (GMT), **September 26, 2019**. Teams can directly bring their posters for their talks at the event. However, the evaluation of the posters will be as per the following guidelines and criteria.

Requirements

- Dimensions of Poster: no larger than 22” height x 28” width
- Targeted Cybersecurity threat: Describe the specific threat to Smart Cities that the research will aim to address.
- Required information on the poster:
  - Identify Smart City application(s) and technology used to address the threat. How do they interact in a meaningful way to address the problem?
  - Rationale: Identify key ideas that will be built upon. Describe the approach and qualifications for carrying out the proposed strategies.
  - Anticipated Impacts: How will the research impact Smart Cities?
  - Timeline: include key research milestones
  - Budget: Outline the required resources to conduct the research
  - Graphics or visual representations of data as needed

PROJECT TITLE HERE

First Name Last Name, First Name Last Name, First Name Last Name

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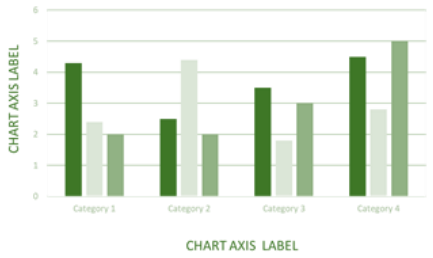

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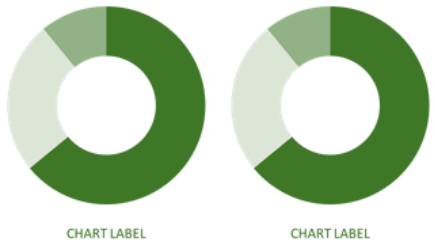

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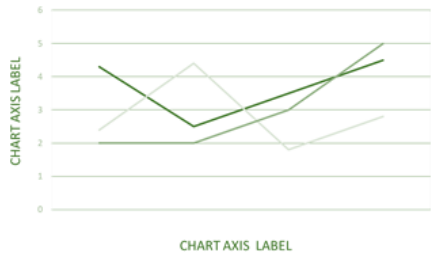

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Source: https://www.washington.edu/brand/templates/research-posters/

Milestone 3: Preparation and Submission Instruction of Full Proposals

(Full proposals are by invitation only)

Overview

- All full proposals along with detailed budget sheet must be submitted through email at csra@darkmatter.ae no later than midnight (GMT) on **February 18, 2020**.
- Questions relating to submittal process may be directed to CRA committee at csra@darkmatter.ae. Once required forms have been submitted, proposers will receive an e-mail notification from the CRA committee that their application was received.
- Full proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the guidelines mentioned in this section. Full proposals will be accepted only if invited by the CRA committee. When preparing a full proposal for this competition, proposers are advised to review the Program Description and the Proposal Review Information found in this solicitation for general guidance pertinent to this program.
- Proposers are encouraged to refer to the web portal frequently for updated information and answers to frequently asked questions.

Milestone 3: Preparation and Submission Instruction of Full Proposals

(Full proposals are by invitation only)

Requirements

- Written in English
- Paper size when printed: ISO A4
  - Margins: 2.5 cm (top, bottom and sides)
  - Spacing: Single spaced
  - Font: No smaller or more condensed than Times New Roman (acceptable fonts include Arial, Helvetica, Palatino, Linotype or Georgia), 12 point for text and 10 point for figures and tables
- Cover Page
- Executive Summary
- Project Description
- Facilities, Equipment and Other Resources description
- Biographical Sketch Including Current and Pending Research Support
- References Cited
- Supplementary Documents
- Budget pages for each year and cumulative budget (Sample template will be provided)

Milestone 3: Preparation and Submission Instruction of Full Proposals

(Full proposals are by invitation only)

Cover Page

Consists of project title, PI and Co-PI (if any) information and sponsoring organizational information, proposed total budget, and list of senior personnel and their institutional affiliations.

Executive Summary

(500 words maximum)

- The Executive Summary should include the rationale, mission and vision and potential impact of the proposed research program, including how it substantially contributes to advancing the field of cybersecurity and addresses threats to Smart Cities.
- It should be an overall description of the proposed activity, a statement of objectives, methods to be employed, and major partners and their respective contributions.
- The summary should be targeted towards those working in the same or related fields, but also understandable to a scientific or technically literate audience.

Project Description

(20 pages maximum)

- **Table of Contents:** List project narrative sections and corresponding page numbers. It does not count against any page limit.

Milestone 3: Preparation and Submission Instruction of Full Proposals

(Full proposals are by invitation only)

Project Description (continued)
(20 pages maximum)

- **Research Program, Approach, and Methods (Minimum 8-pages)**
  - The Research Program should include a compelling vision that clearly outlines specific aims and objectives. Describe in detail the research to be undertaken and specifically how it will build upon and/or compliment cybersecurity and address overall cybersecurity threats to Smart Cities. The narrative should include the overarching goal or question and how it is relevant to the Program. Within the research plan, provide background, objectives, including hypotheses to be tested, and specific aims.
  - The research approach should include a description of the experimental design, methodologies and techniques, and analyses, as well as proposed assessment and validation methodologies. If available, provide preliminary data to support the feasibility of the proposed work. However, in cases where preliminary results are not available, demonstrate the promise of the approach. The approach and methods to be employed should be clearly articulated. Address any potential pitfalls and consider other methods and approaches.
  - The description should also specifically include how any data obtained will be validated and analyzed, and offer a full description of any required data management plan, including activities to make data available and widely accessible.
  - Major partners and their respective contributions should be identified as appropriate. If the project is collaborative or multi-PI, explain the contribution of each partner to the integrated research goals, such that the total effort is integrated and greater than the sum of the separate efforts.

Milestone 3: Preparation and Submission Instruction of Full Proposals

(Full proposals are by invitation only)

Project Description (continued)
(20 pages maximum)

- **Research Program, Approach, and Methods (Minimum 8-pages) (continued)**
  - Any potential social or environmental impacts of the project should be identified, with appropriate plans to address or mitigate them.
  - The significance of the proposed cybersecurity should be fully elaborated. The summary should identify milestones and timeline for completion of the project
- **Capacity Building (1 page minimum):** Provide a plan on how the research is integrated with education for training a globally engaged technical and educated workforce in cybersecurity and, where relevant, related disciplines. Include impact of the purchase or deployment of research infrastructure. Provide the plan for engaging DarkMatter and its partners to enhance regional capability and involvement.
- **Knowledge Transfer (1 page minimum):** Discuss the impact of proposed activities on availability and accessibility of relevant data obtained or knowledge created. Describe training and educational opportunities that will be created for researchers or workers for DarkMatter team. Describe mechanisms that may attract new small businesses or enhance their capability to compete in the field.
- **Management Plan (2 page minimum):** Provide a clear description of how you plan to manage this activity. Detail should include lines of authority; how decisions are made and who makes them; how partnerships are integrated; how unforeseen pitfalls and mid-course corrections will be handled (if necessary); how external advice is incorporated; incorporation of outreach to ensure meaningful national and international collaborations; mechanisms that will be used to involve various stakeholders.

Milestone 3: Preparation and Submission Instruction of Full Proposals

(Full proposals are by invitation only)

Project Description (continued)

(20 pages maximum)

- **Timeline (1 page):** Provide an anticipated timeline, including planned activities, project milestones, and deliverables for the three years of the award.

Facilities, Equipment, and Other Resources

(No page limit)

- Provide a detailed description of institutional and other resources that will be available to this project, including information on the availability of sufficient infrastructure and technical expertise to ensure effective usage of any major equipment or instrumentation. Include technical specifications of new equipment or instrumentation if the developments of these are part of the proposal.
- This section is descriptive only, and not to be used as additional space to describe the project goals, approach, or management.

Reference cited

(No page limit)

- Each reference must include the full citation. Applicants must be especially careful to follow accepted scholarly practices in providing citations for source materials relied upon when preparing any section of the document. This section must include bibliographic citations only. Reference numbers should be shown in the text of the research proposal. Use of published works should conform to international copyright treaties and the best scholarly practices.

Milestone 3: Preparation and Submission Instruction of Full Proposals

(Full proposals are by invitation only)

Biographical sketches

(2 page limit per person)

- Biographical sketches, including current support for research projects of relevance to the program, are required for the PI, Co-PIs and all senior personnel. They should convey the information that demonstrates the individual's expertise as related to the proposed research, and should include:
  - Vitae, listing professional and academic essentials and present affiliation.
  - A brief description (not more than five sentences) on how the stated expertise is relevant to the proposal.
  - List of up to 5 publications most closely related to the proposed project and up to 5 other significant publications. Provide the number of total publications by articles, book chapters, etc. Patents, copyrights or software systems developed may be substituted for publications. Only the list of up to 10 items will be used in the merit review.

Required supplementary documents

(Combined into single pdf document)

- **Letters of Collaboration/Support:** A support letter must be provided by the lead institution. Include only other letters from organizations that are integral parts of the proposed project whether or not they are receiving financial support. Please ensure that the letters specifically address involvement in some aspect of the project, cooperation on education or documentation of permission to access facilities or other such factors. Endorsement letters are not appropriate.

Milestone 3: Preparation and Submission Instruction of Full Proposals

(Full proposals are by invitation only)

Required supplementary documents (continued)

(Combined into single pdf document)

- List of suggested reviewers, or reviewers not to include (with a brief explanation or justification for why the reviewer should be excluded)
- Up to three keywords/phrases that pertain to the research topics, listed in order of priority
- Identification of proprietary or privileged information and/or relevant background intellectual property (if applicable)

Budget and budget justification

- Provide a budget for each of the three years and a cumulative budget, in the format specified in the Excel spreadsheet (to be provided). The proposed budget should be consistent with the needs and complexity of the proposed activity. This competition provides awardees with up to USD $1.5M, with an annual cap of USD $500,000.
- Note that indirect costs are limited to 20%. If additional support beyond what is requested from the sponsoring committee is necessary and anticipated to complete the proposed project, the PI must provide documentation on how those funds will be provided by other means.

05

Proposal Processing and Review Procedures

DARKMATTER

Proposal Processing and Review Procedures

Merit Review Principles and Criteria

The CRA committee relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to the security of Smart Cities. **The reviewers will be instructed to base their critique and scores solely on the written materials provided in the application.** Therefore, links to URLs or other supplementary information not otherwise specifically allowed for this competition shall not be used as part of the evaluation process.

The reviewers will be selected based on the following criteria:

- Scientific and engineering expertise pertinent to the submitted proposals to ensure ability to evaluate competence, significance and impact of the proposed activity;
- Generalized knowledge of cybersecurity and Smart Cities;
- Extensive knowledge of the scientific and engineering enterprise, including managing and evaluation of large research projects. All reviewers will be instructed in the Program's confidentiality, conflict of interest, and ethics guidelines and required to sign confidentially and conflicts of interest forms to indicate their assent to abide by these policies.

The CRA committee will be responsible for overseeing the proposal submission process, review of conflicts of interests (COIs), panel selection and assignments, and overseeing the review and award processes. The CRA committee makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects. In all cases the decision of the CRA committee is final.

Milestone 1: Criteria for Pre-Proposals

Criteria for Pre proposals

- Given that the evaluation of the pre-proposals will be based on limited written materials, the merit review process will address the critical elements deemed necessary to determine whether the applicants should be invited to submit a full proposal to the competition. Pre-proposal evaluations will be based on the following criteria:
  - Research excellence, impact and quality;
  - Experience and/or expertise of the proposers, and potential for success;
  - Potential to enhance or transform the cybersecurity research community and industry, specifically in the context of security for Smart Cities.

Milestone 2: Criteria for Poster Talks

Criteria for Poster Talks

- Is the research seeking Intellectual Merit (the potential to advance knowledge) or Broader Merit (the potential to benefit society and to contribute to the achievement of specific, desired societal outcomes)?
- Does the poster/presenter clearly identify what will change/improve as a result of the research activities? Is it specifically linked to improving security for Smart Cities?
- Is the proposed strategy appropriate for addressing a cybersecurity threat to the identified specific smart city application(s) and technologies?
- Is the proposed timeline and budget/resources appropriate?
- Are the graphics or visual representations of the data compelling and easy to interpret? Is the overall poster aesthetically pleasing?
- Does the presenter demonstrate full knowledge of the material? Is the presenter able to explain and elaborate on expected questions?

Milestone 3: Criteria for Full-Proposals

Full proposals will have an extensive panel review based on defined criteria. Reviewers will address all criteria and provide an overall impact score based on their assessment of likelihood of success in advancing the field and Award objectives. Each criterion will receive a number score and the final score will be calculated based on the percent weight of each criterion

Criteria for Full Proposal

Overall Scientific & Technical Merit, Significance and Innovation - 30%

- How does the proposed activity address important challenge(s), gaps in knowledge and/or critical barriers to the progress of the field?
- If the aims of the proposal are achieved, how will scientific knowledge, techniques and technologies be advanced?
- Is the research based on sound and testable physical hypotheses - and if so how?
- Does the application clearly challenge or seek to validate current research or technology paradigms - and if so, how?
- How are the concepts, approaches and technologies proposed novel either to the field or in a broad sense?
- How significant are the potential contributions with regard to impact on the stated program goals?
- What are the broader impacts/benefits for the field?

Approach - 20%

- How well conceived and organized is the proposed activity?
- Does the plan incorporate a mechanism to assess success?

Milestone 3: Criteria for Full-Proposals

Criteria for Full Proposal

Approach (continued) – 20%

- If experimental, will the design adequately test, and the evaluation plan adequately validate, the hypotheses?
- Are the computational models, laboratory equipment, or field experimental equipment and infrastructure supported with commitments, appropriate, and well planned?
- Is there a correct use of statistics as a supporting tool?
- Is the data plan consistent with the research proposed and with the solicitation's fundamental data principles?
- Does the application identify major risks and, if so, are plans in place to minimize and/or mitigate?
- Does the approach identify and account for any potential environmental and social consequences?

Investigator/Team - 20%

- How well qualified is the proposer (individual or team) to conduct the project?
- If early stage researchers are involved, how adequate is their training and experience?
- For established researchers, have they demonstrated an ongoing record of accomplishments that have advanced the field?
- If the project is collaborative or multi-PI, do the researchers have complementary and integrated expertise and to what extent does the collaboration provide added benefit?
- Is the leadership approach, governance and management structure appropriate for success of the project?
- What are the features of the management plan that will ensure success?

Milestone 3: Criteria for Full-Proposals

Criteria for Full Proposal

Resources and Budget – 20%

- Have additional sponsors or means of support been identified to complement the proposed project budget?
- Does the research team have access to adequate facilities and infrastructure to conduct the proposed research, and has the team demonstrated the necessary institutional commitment(s) to be successful?
- Are the project costs complete and fully documented?
- Is the budget fully justified and reasonable in relation to the proposed research?
- Are additional resources and in-kind contributions stated in the proposal logical, justified, and providing clear addition to the project impact? (e.g. Does the award leverage other research activities or funding to increase its impact?)

Capacity Building - 10%

- How is capacity building integrated within the research plan and what is the plan for knowledge transfer within the DarkMatter team?
- What is the potential to increase the visibility and reputation of the field, or to grow the field regionally and/or globally?
- Are there educational and experiential opportunities for graduate students, new researchers, and/or technical workforce?
- Partnership with local universities is encouraged.

Proposal Processing and Review Procedures

Review and Selection process

- As a means to reduce the proposer's cost of proposal preparation, as well as the workload on the scientific community drawn upon for the merit reviews, the Program solicits in a multi-phase (Pre-proposal, poster talks, full proposal) process. Applications (pre-proposals, posters and proposals) submitted in response to this program solicitation will be evaluated by panel review and augmented by ad hoc review. The less-detailed pre-proposals must be recommended by the CRA review panel to be invited to submit posters. After additional review, a selected few will be invited to provide more extensive, and time consuming, full proposal applications.
- The reviewers will be required to base their comments on the review criteria described previously. **Each application will be evaluated by at least two expert reviewers.** The applications will be scored based on the below rating system.

Criteria Scores of Pre-proposals & Proposals		
Criterion	**Score**	**Description**
High	5	Outstanding/Exceptional
	4	Excellent
Medium	3	Very Good
	2	Good/Satisfactory
Low	1	Fair/Marginal
	0	Poor/Non-compliant

Proposal Processing and Review Procedures

Review and Selection process (continued)

- A limited number of pre-proposals judged the most promising by a distinguished panel of experts, and agreed upon by the CRA committee, will be invited to participate in the poster talks. After additional review, a select few will be invited to submit full proposals. All applicants will be notified of results. Each applicant will subsequently be provided with the reviewers' comments on the pre-proposal's and poster's merits. The CRA committee's decision whether to invite is final.
- The full proposal review panel will use the previous criteria to identify one full proposal deemed worthy to be considered by the CRA committee for final selection and the selected PI and institution will be contacted. Proposers are cautioned that no commitment should be inferred until the cooperative agreement is officially signed by both the sponsoring committee, as funder, and the PI's institution.

Proposal Processing and Review Procedures
Award Administration Information

Notification of the Award

Awards will be announced in May 2020.

Award details

- The Award consists of:
  - the Award letter, which includes any special provisions applicable to this cooperative agreement; and
  - the Budget, which indicates the amounts, by categories of expense, on which the CRA committee has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures).

- The awards are made in the form of Cooperative Agreements. The Cooperative Agreements will have an extensive section of negotiated conditions relating to the period of performance, statement of work, awardee responsibilities, sponsoring committee responsibilities, joint sponsoring committee -awardee responsibilities, funding and funding schedule, reporting requirements, management and performance indicators, key personnel, and other conditions. The sponsoring committee has responsibility for providing general oversight and monitoring to help assure effective performance and administration. Although individual contracts are negotiated, and thus will vary depending on the requirements of the project and performers, **the awards will comply with the following basic agreement policies.**

- **Roles and Responsibilities:** The agreement will elaborate the roles and responsibilities between the funder and the awardee and among awardee partners, including who has final managerial and decision authority within the project if disputes arise, how decisions are made, how and when funds are distributed and under what conditions, and how disagreements are handled.

Proposal Processing and Review Procedures
Award Administration Information

Award conditions (continued)

- **Data Policy:** Data generated are expected, except in exceptional circumstances, to be available for open dissemination and use after a limited time of exclusive performer access for validation and initial analysis.
- **Intellectual Property (IP) and Property Rights:** In general, the institution/s working on the product/idea will co-own the IP. However, DarkMatter will have first right to license the product/idea. No funds will be awarded until DarkMatter is convinced that all project partners have negotiated and agreed on divisions of roles and funding, and on IP ownership questions.
- **Reporting Requirements and Evaluations of Performance:** Discussed separately below, but detailed as elements of the cooperative agreements.
- **Allowable Uses of Award Funds:** The award should be restricted to a maximum of 20% overhead for any institution, and budget items of fee or profit will not be allowed. It is important to note that the 20% may be applied to all direct costs. Equipment purchased in excess of $5,000 (US) will be exclusively for the use of the project during the duration of the award. Ownership of such purchased property will generally be retained by the awardee, unless stipulated otherwise. Expenditures must meet a "fair and reasonable" standard, and the Research Award Review committee retains the right to audit awardees to determine acceptable use of funds.
- **Settlement of Disputes:** The award must stipulate how disputes and disagreements between performers will be settled. Between awardee and funder, appeals will be allowed on decisions made relevant to evaluations, but the funder may limit the number of such appeals and retains ultimate decision authority.
- **Changes to Personnel:** The PI or Co-PIs on the project must not be changed without the express agreement of the funder. Funder must also be notified in a timely fashion of any changes to senior personnel or partner roles.

Proposal Processing and Review Procedures
Award Administration Information

Reporting and Evaluation requirements

- The Principal Investigator must submit an annual project report to the CRA committee at least 30 days prior to the end of every six months period, including process and plans, which will serve as the basis for annual performance review and for ensuring the continued level of funding.
- To augment this review, during the course of the three-year cooperate agreement the CRA committee will conduct one formal site visit in UAE (every 6 months) that may also involve other experts in the field. This committee of visitors will prepare site visit reports, evaluating progress and highlighting any concerns. Within 60 days following expiration of the award, the PI also is required to submit a final project report, and a project outcomes report for the general public, which is intended to be made available on the research award website.
- Failure to provide the required annual or final project reports, or the project outcomes report, will delay review and processing of any future funding increments.

Other Information

- **ABOUT DARKMATTER AND ITS PARTNERS**

About DarkMatter

- DarkMatter is a young company with a big ambition. We want to enable secure nations and businesses through **smart and safe digital** in the face of accelerating cybercrime.
- DarkMatter unites the world's brightest minds with **the most innovative technology** against the world's greatest digital enablement challenges and threats: holistic digital transformation and enablement vs. advanced cyber attacks targeting individuals, infrastructures, businesses and nation states.
- **Employees:** Over 650 people from **75 nationalities**.
- **Cyber security:** deliver our promise of smart and safe digital by conducting cyber assessments to find security gaps and fix them as well as keeping vital infrastructure safe from the catastrophic results of cyberattack.
- **KATIM®:** we built the world's first ultra-secure smartphone (KATIM®R01 for extreme field conditions) to keep data safe from prying eyes.
- **National Digital ID**: we partner with UAE leaders with the goal of becoming the most digitally advanced nation in the world. Central to this has been the vision of integrated government services with the launch of the UAEPASS, a national Digital Identity and Signature Solution that puts services at the fingertips of all citizens, residents and visitors.
- **Cyber Education:** we develop cyber awareness education programs so people can play their part in safe digital practices. And we're developing the next generation of smart digital leaders with over 1500 students, aged 7-14 years, learning programming, coding, app development and robotics. We provide scholarship programs for college students and advanced technical skills courses for digital professionals.
- **Smart and Safe Digital**: we have achieved much in just four years. Our work with government entities has seen the adoption of innovative technologies that will transform the lives of nine million citizens and residents. Our work fulfills the aspirations of people everywhere for smart and safe digital communities and societies.

Our Partners

STRATEGIC PARTNER

جامعة خليفة
Khalifa University

ADVISORY PARTNER

Dubai Electronic Security Center (DESC)

FOUR KNOWLEDGE PARTNERS

مؤسسة محمد بن راشد آل مكتوم للمعرفة
MOHAMMED BIN RASHID AL MAKTOUM KNOWLEDGE FOUNDATION

Mohammed Bin Rashid Al Maktoum Knowledge Foundation (MBRF)

جامعة نيويورك أبوظبي
NYU ABU DHABI

New York University Abu Dhabi (NYU Abu Dhabi)

جامعة الشارقة
UNIVERSITY OF SHARJAH

Sharjah University

أبوظبي Abu Dhabi
بوليتكنك
POLYTECHNIC
"Building the Future of UAE Technologies"

Abu Dhabi Polytechnic (ADPoly)

DarkMatter – Academic Partnerships 2019

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