

Results of Competition: Demonstrators Addressing Cyber Security Challenges in the Internet of Things: Round 2

Competition Code: 2001_SPF_DEMO_AIDE_CYBSECDEMO

Total available funding is £4m

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
TOSHIBA RESEARCH EUROPE LIMITED	SYNERGIA - Secure bY desigN End to end platfoRm for larGe scale resource constrained lot Applications	£726,545	£363,272
CONFIGURED THINGS LIMITED		£250,105	£175,074
IOETEC LIMITED		£258,485	£180,940
MULTIPLE ACCESS COMMUNICATIONS LIMITED		£136,236	£95,365
SMARTIA LTD		£205,330	£143,731
University of Bristol		£600,673	£600,673

Note: you can see all Innovate UK-funded projects here: <https://www.gov.uk/government/publications/innovate-uk-funded-projects>

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Project description - provided by applicants

Contemporary IoT platforms typically adopt a cloud-based approach, with some offering optional backend installation at customer premises. This approach implies a requirement to transmit, process and store all data points in the Cloud or user backend. This design pattern is unsustainable due to the volume of data generated, especially in the case of applications that rely on data collected by battery-powered, resource-constrained devices deployed at massively large scale.

Pushing some of the computation to the Edge and exploiting distributed AI can alleviate some of the burden from cloud infrastructures, and therefore decrease latency and improve scalability. However, this results in new challenges and a need for further industry research. How can we compute energy-efficiently at the Edge? How do we assure the security and resilience of such distributed systems, especially in the case of applications that target the digitisation of critical infrastructures?

SYNERGIA will devise, develop and demonstrate a novel secure-by-design, endpoint-to-core IoT platform for large-scale networks of low-power resource-constrained devices. The platform will provide users with distributed processing capability at the Edge as a service. Security issues will be addressed at all platform tiers: resource-constrained devices, Edge and backend. To achieve this, we will undertake industry R&D on scalable, secure configuration management and control of IoT systems; secure connectivity for battery-powered resource-constrained devices; edge-based AI for cyber security of IoT systems. SYNERGIA will leverage an edge platform currently under development by one of the project partners. It comprises a collection of interconnected edge nodes with sensing capabilities and a backend that enables end users to develop and deploy applications with distributed edge processing as a service.

Project outcomes will be showcased in an integrated fashion at two demonstration events. The project is led by a worldwide provider of secure IoT networks (Toshiba). The team consists of UK experts in secure communications for IoT devices (Ioetec, SME); a start-up in secure configuration management and control of IoT systems (Configured Things, SME); a UK leader in industrial AI technology (Smartia, SME). Developing an application use-case and leading engagement with end users will be Multiple Access Communications Limited (MAC Ltd, SME), with a track record of designing IoT solutions in several sectors including public safety, infrastructure monitoring, smart buildings and assisted living. The University of Bristol brings world-leading expertise in IoT networking, cybersecurity and distributed AI.

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VORTEX IOT LIMITED	Secure-AIM: Security for AI-enabled Mesh networks in IIoT Systems	£1,072,945	£751,062
TATA STEEL UK LIMITED		£422,198	£211,099
University College London		£510,085	£510,085

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Industry 4.0 adoption is proliferating.

Large Industrial plants, in particular Critical National Infrastructure (CNI), are rapidly moving towards adaptation of automation and digital transformation in their processes aligned with Industry 4.0 trends. This includes integration of Edge/Cloud computing, Industrial Internet of Things (IIoT), de-centralised intelligent sensors, digitisation of supply/value chain, digital twins and cyber-physical systems offering increased performance in manufacturing, safety and reduced waste/costs. However, interdependency of connected devices, processes and data exchange increase cybersecurity risks.

Secure-AIM is a project targeting the challenges of securing Industrial IoT systems, and brings together a multidisciplinary team from industry and academia. The project includes Artificial Intelligence techniques including machine learning and latest development from Deep Learning, and evolutionary computation to secure Industrial IoT systems.

Secure-AIM uses industrial Digital Twins as a test-bed and demonstrator platform to analyse the resilience and countermeasure effectiveness in a real industrial cyber-physical environment.

The project will be delivered by a consortium of industrial, pioneering SME and academic leaders -- namely TATA Steel, Vortex IoT and UCL respectively and supported by an equally enviable collection of sub-contractors and expert advisory group: Kainos, PETRAS, Deloitte and Gartner.

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