



NSF Convergence Accelerator's 2022 Cohort Phase 1 Award

Project Title

Secure Censor-resistant Overlay Resilient Networks (SCORE)

Awardee

Peraton Labs

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NSF Funded Directorate

Directorate for Technology,
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NSF Funded Program

NSF's Convergence Accelerator

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PROJECT ABSTRACT

SCORE or Secure Censor-resistant Overlay Resilient Networks, aims to provide the ability to securely operate through non-cooperative 5G infrastructures. Most designs for typical non-cooperative environments employ zero-trust architectures to address the lack of end-to-end confidentiality and integrity, with communication security to prevent eavesdropping and spoofing. SCORE goes beyond this and considers non-cooperative environments with malware, backdoors, in-path and on-path censors – which can detect – degrade or block prohibited communications.

SCORE constructs a novel, secure, censor-resistant overlay consisting of SCORE software on nodes/user equipment (UE) and channels hidden in whitelisted applications, in order to form communication paths among SCORE nodes. Specifically, SCORE determines: (i) the next-hop SCORE node toward the receiver, (ii) the application over which the data is transported to the next-hop, (iii) the communication parameters needed by the application, and (iv) the encoding/obfuscation method used to disguise the data. SCORE also provides a secure over-the-network software distribution and update mechanism so that SCORE software can be updated in the field without needing to be brought into a secure location.

Our multidisciplinary research team is composed of leading researchers and experts from industry and academia in wireless communication and networks, computer science and cryptographic mathematics, control and autonomous systems, formal methods, security and safety-critical, and networked cyber-physical systems.

In this convergence research effort, we will actively participate in the joint NSF/DOD-organized training and cross-cohort collaboration, innovation curriculum, and seek collaborators from other performer teams in international law, ethics and governance, and social and political science, to address deployment issues in real networks.

<https://beta.nsf.gov/funding/initiatives/convergence-accelerator>