

Bid for funded project to develop resources around CyBOK 1.0

Development of redistributable laboratory materials for GSM

Proposers

- Dr Denis A Nicole. Co-leader of outreach programmes, ACE CSE & Reader in Electronics and Computer Science, University of Southampton.
- Mr Joshua S Curry. Postgraduate research student, Electronics and Computer Science, University of Southampton.

Purpose

This bid intends to develop tools to support HEI educators in developing student understanding of the CyBOK *Physical Layer & Telecommunications Security Knowledge Area*, in particular item 6.3 *Cellular Networks*. It also touches on item 5.2.5 *Two-factor Authentication 2FA* of the *Authentication, Authorisation & Accountability (AAA) Knowledge Area* and item 4.2.1 *Host-based and Network-Based Monitoring* of the *Malware and Attack Technologies Knowledge Area*. Through practical use of a live on-the-air GSM network, students will develop an understanding of the vulnerability of legacy (e.g. 2G) networks, of the risks posed by *downgrade attacks*, and the risks posed by repurposing such systems to support *two-factor authentication (2FA)*.

Background

In the *Security of Cyber-Physical Systems* module which forms part of our GCHQ-accredited MEng and MSc degrees, we have pioneered the use of a low cost (Lime SDR and Raspberry Pi based) GSM network, along with an *Ofcom Innovation and Research* license to allow students to monitor and penetrate a live over-the-air GSM network. This not only gives hands-on understanding of real protocols, it also allows wider lessons to be drawn about longevity, legacy networks, and the risks associated with repurposing for 2FA.

We now seek funding to allow us to develop the laboratory into a form suitable for sharing with the wider community, including documentation of safety and regulatory aspects. Within the funding, we will also extend the laboratory to include 4G (LTE) experiments; these will give a sound grounding for upcoming 5G rollout and some insight into controversies surrounding 5G technology providers.

Value of Bid

