RISKNOUGHT: Stress-testing platform for cyber-physical water distribution networks

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Emergent threats in the water sector have the form of cyber-physical attacks that target SCADA systems of water utilities. Examples of attacks include chemical/biological contamination, disruption of communications between network elements and manipulating sensor data. RISKNOUGHT is an innovative cyber-physical stress testing platform, capable of modelling water distribution networks as cyber-physical systems. The platform simulates information flow of the cyber layer’s networking and computational elements and the feedback interactions with the physical processes under control. RISKNOUGHT utilizes an EPANET-based solver with pressure-driven analysis functionality for the physical process and a customizable network model for the SCADA system representation, which is capable of implementing complex control logic schemes within a simulation. The platform enables the development of composite cyber-physical attacks on various elements of the SCADA including sensors, actuators and PLCs, assessing the impact they have on the hydraulic response of the distribution network, the quality of supplied water and the level of service to consumers. It is envisaged that this platform could help water utilities navigate the ever-changing risk landscape of the digital era and help address some of the modern challenges due to the ongoing transformation of water infrastructure into cyber-physical systems.