Investigation Into Computer Network Security
For Integrated Building Automation and Control Systems

Mechanical Systems and Controls Group
Building and Fire Research Laboratory
National Institute of Standards and Technology (NIST)

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Brief Summary of Research Project

(A) Security of Life Safety and Access Control Systems with External Connectivity

Life safety systems (fire and smoke control systems) and building access systems are critical to life safety of building occupants. The current tendency is to keep these systems separated from other building systems (HVAC, elevators, lighting, telecom…) in order to avoid compromising their performance in case of disruption of these other building systems. However, a desire of interoperability of the various building systems in general is leading to increased inter-connectivity between them using the Internet Protocol (IP). Unfortunately, this connectivity of the life safety, building access and HVAC systems engenders additional risks (both physical and cybernetic). The objectives of this project are to identify these new risks, identify possible limitations in BACnet to handle these risks, and suggest mitigation measures (which include both hardware redundancy as well as modifications to BACnet) which are price sensitive (both in terms of first cost and maintenance costs). The scope of this project will be limited to two broad scenarios: single building (intranet), and multiple buildings (intranet/internet). Further, under each scenario, two cases will be investigated: (i) when the building systems are not BACnet systems, and (ii) when they are native BACnet systems.