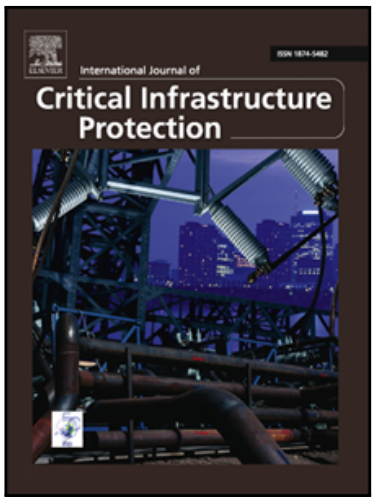

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Samir Puuska[1], Lauri Rummukainen, Jussi Timonen, Lauri Lääperi, Markus Klemetti, Lauri Oksama, Jouko Vankka

Department of Military Technology, National Defence University, PL 7, 00861 Helsinki, Finland

Abstract

This paper describes the efforts involved in designing a common operating picture system for monitoring large-scale critical infrastructures. The design leverages the Joint Directors of Laboratories (JDL) data fusion model to enable the integration of different critical infrastructure systems with their dependency relations. The resulting Situational Awareness of Critical Infrastructure and Networks (SACIN) framework offers a platform that provides a common operating picture of a critical infrastructure.

A generic data collection component customized to each source system generates events and facilitates JDL level 0 integration. An analysis component collects events and data to produce meaningful information about the current state and future impact estimates in accordance with JDL levels 1 to 3. A brokered architecture supports level 4 control by various components and a JDL level 5 user interface is offered via a web application. Interviews of infrastructure subject matter experts were conducted to obtain the situational awareness requirements. By applying key situational awareness oriented design principles to the situational awareness requirements, a user interface was created for organizing information based on operator situational awareness needs and supporting key cognitive mechanisms that transform data into high levels of situational awareness.

Situational awareness measures were used to assess operator performance during critical infrastructure tasks – a "freeze-probe" recall approach (Situational Awareness Global Assessment Technique (SAGAT)), a post-trial sub-

[1]Corresponding author: Samir Puuska (samir.puuska@mil.fi)