

System of Systems Engineering and Geographical Simulation: Towards a Smart Tourism Industry Information System

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Abstract—The last few decades proves to be an era of booming communication and information disciplines, bringing about profound influence on people's life and every socio-economic sector. In this dramatically changed world, it is being found that many of the systems engineering principles and business practices that some industries have purposely pursued no longer function effectively in a System of Systems environment. This paper is inspired by the embedded, “system of systems (SoS) thinking” in the context of military programming. The purpose of this paper is to draw a conceptual framework for a smart tourism industry information system in responding to competitive challenges. The approach here is to illustrate how this SoS thinking and corresponding SoS engineering (SoSE) may be applied through the top-level design for the smart system. For designing a policy maker-responsive, informative system, an emerging complex spatial information approach, geographical simulation, is introduced. This holistic means includes: 1) simulation of the tourism SoS' architecture and evolution process through cellular automata (CA) and multi-agent systems (MAS) techniques, based on remote sensing data and GIS instrument; 2) illustration of the mechanism of industrial evolution by scale-free network analysis and social influence network with dynamic Bayesian network theory. This paper calls for a particular attention of communication specialists to concern the forefront of information (esp. spatial information) and systems engineering disciplines.

Keyword—System of systems (SoS), system of systems engineering (SoSE), geographical simulation, tourism, smart industry information system



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