# System of Systems Engineering Collaborators Information Exchange (SoSECIE)

## ****March 23, 2021 11:00 a.m. to Noon Eastern Time****

**Fuzzy Architecture Description for Handling Uncertainty in Systems-of-Systems in the Internet-of-Things**

***Presenter: Flavio Oquendo, IRISA – UMR CNRS / Univ. Bretagne Sud, France***

#### Abstract

Uncertainty is intrinsically associated with the architectural design of Software-intensive Systems-of-Systems (SoS) by its very nature, e.g. SoS in Intelligent Transportation Systems (ITS). The consequent research question is thereby how to represent uncertainty in the description of an SoS architecture and subsequently use that representation to reason about SoS architectural properties. To address this research issue in the Internet-of-Things (IoT), this briefing will present the notion of epistemic uncertainty (i.e. uncertainty due to partial knowledge) in the architectural design of SoS in the IoT and how an SoS Architecture Description Language, named SosADL, was enhanced with fuzzy concepts and constructs underlain by Fuzzy Theory to handle epistemic uncertainty. The proposed approach will be demonstrated by its application for describing SoS architectures for self-driving vehicle platooning on highways.

#### Biography

Flavio Oquendo is a Full Professor of Computing and a Research Director on Formal Approaches for Architecting Software-intensive Systems and Systems-of-Systems at the IRISA Research Institute (UMR CNRS 6074), France. He received the B.Sc. Eng. degree from ITA, and the M.Sc., Ph.D., and H.D.R. (Research Direction Habilitation) degrees in Computer Science from the University of Grenoble, France. He has been a recipient of the Research Excellence Award from the French Ministry of Research and Higher Education.

Prof. Oquendo has over 35 years of experience in R&D on Software Systems Engineering. He published over 250 peer-reviewed research papers in international journals and conference proceedings and has been editor of over 25 special journal issues and research books. He has served on program committees of over 200 international conferences, including the key ones in his field of research, e.g. ACM/IEEE ICSE, ESEC/FSE, WICSA/ICSA, ECSA, SoSE, ICECCS, and has chaired 30 of them, in particular the French, European, and IEEE/IFIP International Conferences on Software Architecture.

He has been Principal Investigator in numerous European R&D Projects, since the first European Union Framework Program for Research and Innovation, in different areas of Software-intensive Systems and Systems-of-Systems, as well as has served as expert for the European Commission. Throughout the years, he has collaborated in joint R&D projects with many universities and more than 30 engineering companies in a dozen countries. Recently, he has coordinated the French R&D Network on Systems-of-Systems from the GDR GPL (CNRS).

His research interests are centered on formal languages, processes and tools to support the efficient architecture of Software-intensive Systems and Systems-of-Systems and their applications in industrial settings. His web page is http://people.irisa.fr/Flavio.Oquendo/