



# INCOSE UK Chapter Rail Interest Group



## System resilience: Measurement of resilience through system performance measures and the time value of resilience

Timothy L.J. Ferris, Cranfield University



Wednesday, 22<sup>nd</sup> July, Webinar  
8PM – 9:30PM Presentation

The presentation will discuss a measure of resilience which was developed to guide system design and management. The measure of resilience is based on the lifecycle delivery of the intended performance of the system and utilises the system performance trade study approach usually used to select between alternative system design proposals. The reasoning behind this approach will be explained. The contrast between using this and other measures of resilience will be explained. The measurement method should balance the interest in resilience with all other proposal evaluation criteria, and incorporate the effect of the sequence of unknown future events affecting the system. The resilience measure should also be useful to guide management decisions re maintenance or upgrade during the system life, where a digital twin model containing the appropriate data exists. The resilience measure can be applied across system types, is threat type agnostic, and does not presuppose any 'desirable' outcome allowing a system specific determination of 'desirable' outcomes.

The way in which time is factored into the measure of resilience has analogy with the Time Value of Money use of time (in engineering economics). This similarity is developed through several illustrative case, to show that the concept of Time Value of Resilience is meaningful and results in different desirable resilience characteristics of systems depending on characteristics of those systems.

Timothy L.J. Ferris, from Cranfield University. Tim is an educator and researcher in systems engineering. He

22<sup>nd</sup> July 2020



# INCOSE UK Chapter Rail Interest Group

sees education as an activity in which his role, as an educator, is to create a space that enables the student to be challenged to learn. Tim is currently a Senior Lecturer at Cranfield University. From 1991 to 2015, he was a senior lecturer at the University of South Australia in Adelaide.

*The meeting will be presented as a Webinar on Team Meeting. To receive an invite, please send Mike Morua an email at [michael.morua@altran.com](mailto:michael.morua@altran.com) requesting an invite.*

*The International Council on Systems Engineering (INCOSE) is an international professional society for systems engineers whose mission is to foster the definition, understanding, and practice of world-class systems engineering in industry, academia, and government*

*The INCOSE UK Rail Interest Group has been formed:*

- *To provide a forum for those interested in Systems Engineering in rail to network in a less formal environment, to exchange good practice and to provide mutual support in an area which can require some sustained perseverance;*
- *To promote, improve and share the practice of Systems Engineering within the rail industry;*
- *To foster connections with other professional bodies within rail and thereby promote cross fertilisation of knowledge and experience across sectors and community disciplines; and*
- *To promote awareness of INCOSE UK and encourage membership within the rail industry.*

*For further information about the RIG, see [www.incoseonline.org.uk](http://www.incoseonline.org.uk) and follow the 'Groups' link.*