## Mirce Mechanics

According to Einstein **"***Everything that the human race has done and thought is concerned with the satisfaction of felt needs*".

During the history of civilisation needs for transporting, communicating, navigating and many others have been satisfied by transpiration, communication, navigation and other human created systems. The mechanics of the functioning of maintainable systems are well-understood processes, which are predictable by the laws of natural sciences, such as: Newton's laws of motion, Coulomb's law of solid friction, Hook's law of stress and strain, Maxwell's law of electrodynamics, Boltzmann's law of thermodynamics, to name a few.

Needs satisfying systems are constructed by assembling a well-defined number of parts in a precise and preestablished way. As they are functioning in predetermined linear chains of cause and effect, their performance measured through speed, acceleration, power, range, energy usage, capacity and similar is also predictable. The reason for the predictability of the system design-in functionality performance is the fact that they are based on the physical and chemical processes that are characterised by certainty, continuity, reversibility, separability and independence of time, location and humans.

Regarding the long-term satisfaction of human needs, the ability of a system to function beyond the delivery day is an essential property of its in-service performance. Due to complex interactions between consisting parts and impacts from environment and humans, disturbances of mechanical, electrical, chemical, thermal, radiant and other types are created, some of which cause occurrence of events that prevent systems from functioning. Thus, to provide the flow of functionality through time maintenance tasks like servicing, repairs, overhauls, replacements and similar are undertaken by humans, making them maintainable systems. Thus, from the point of view of the ability to function during the in-service life, known as f**unctionability**[1]**,** maintainable systems could be in a positive or a negative functionability state, at any instant of time.

Experience teaches us that unlike quantitative information regarding the design-in functionality performance of a system that is available on the delivery day, the in-service functionability performance is not. Instead, years later the statistics for various functionability measures become available. The reason for this is the fact that they are emerging properties of the complex interactions between system in-service processes, which are characterised by indeterminism, discontinuity, irreversibility, inseparability, and dependence on time, location and humans.

To rationally understand motion of functionability through the life of maintainable systems resulting from any actions whatsoever and of any actions required to produce any motion, Dr Knezevic established the MIRCE Akademy at Woodbury Park in 1999. Staff, Fellows, Members and students of the Akademy have endeavoured to subject phenomena of functionability to the laws of science and mathematics to:

- Determine the patterns of the motion of functionability through the life of maintainable systems and to measure functionability properties.
- Understand mechanisms of the motion of functionability through the life of maintainable systems, within the physical scale from $10^{-10}$ to $10^{10}$ metre,
- Define the mathematical scheme for the prediction of functionability measures for a given: maintainable system in a given in-service conditions.

A generated body of scientific knowledge constitutes Mirce Mechanics whose axioms, formulas, methods and rules enable predictions of the emerging functionability trajectory of the future transportation, communication, navigation and many other maintainable systems to be made.

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[1] Knezevic, J., Reliability, Maintainability and Supportability – A probabilistic Approach, Text and Software package, pp. 291, McGraw Hill, London 1993. ISBN 0-07-707691-5