Mirce Mechanics at glance

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

Human needs for transporting, communicating, defending, entertaining and many other functions are satisfied by ships, airplanes, tractors, computers, radios and other systems. As they are functioning in accordance to the laws of science, which are independent of time, place and human impact, their design-in performance, like speed, acceleration, power, fuel consumption and many others, are accurately predictable.

However, experience teaches us that in-service performance of systems is dominated by phenomena like fatigue, operator induced errors, the wind direction change, foreign object damage, a faulty weld, bird strike, perished rubber, carburettor icing, to name just a few. All of these phenomena generate energy exchanges between systems and environment, leading to the loss of the design-in performance. Hence, maintaining the deign-in performance beyond the delivery day requires actions like troubleshooting, repairs, modifications, replacements, "cannibalisations" and similar to be performed. Thus, the ability of being functional through time, known as **functionability,**[1] is an essential property of in-service performance of systems.

Also, experience teaches us that unlike quantitative information regarding the design-in performance of systems that is available on the delivery day, the in-service performance is not. Instead, the statistics for various functionability measures become known, much later. The reason for this is the fact that they are emerging properties of the complex and time-dependent interactions between systems, natural environment and human actions. Hence, in-service performance of systems, quantified through functionability measures, cannot be predicted by the laws of science used for the predictions of their design-in performance.

To address the question of predictions of the motion of a system through functionability states in respect to time, Dr Knezevic established the MIRCE Akademy at Woodbury Park, in 1999. Staff, Fellows, Members and students of the Akademy study in-service behaviour of systems to:

- Physically observe the emerging trajectory of the motion of a system, through functionability space and to measure in-service performance in respect to time
- Scientifically understand mechanisms that cause the motion of a system through functionability space, within the physical scale from 10^{-10} to 10^{10} metre
- Mathematically define the scheme for the prediction of in-service performance of a given design-in system for a given in-service conditions and rules.

A science based body of knowledge, formulated through axioms, formulas, methods, rules and algorithms for predicting the in-service performance of the future systems, resulting from the motion through the functionability space in respect to time constitutes Mirce Mechanics.

The ability to simultaneously predict the design-in and in-service performance of the future systems is of fundamental importance for the engineers, managers, investors, regulators and other specialists who are responsible for the satisfaction of the future "human felt needs" for reliable, economical and safe transportation, communication, defence, entertainment and other functions.

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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