

MIRCE Science

The philosophy of MIRCE Science is based on the premise that the purpose of existence of any functionable system¹ is to do functionability work. The work is done when the expected measurable function is performed through time. However, experience teaches us that expected work is frequently beset by undesirable negative functionability events, resulting from a variety of negative functionability actions (overstress, wearout, natural events, and human interventions). Hence, positive functionability actions must be performed on the systems to enable them to continue doing the work (servicing, repairing, testing, replacing, changing the mode of operation and similar). Thus, the complex interactions between positive and negative functionability actions determine functionability performance of functionable systems. Regrettably the information regarding the amount of positive and negative functionability work done and the resources used becomes known only at the end of functionable system in-service life², when nothing could be done to influence it. Undoubtedly, the ability to accurately and quantitatively predict functionability performance of the future functionability systems at the design stages would be invaluable for all project managers. Regardless of the proportion of engineering solutions and management methods chosen to govern occurrences of functionability events, it will have a direct impact on the expected work, the expected budget and the expected return on the investment (e.g. profit, public benefit, reputation and similar).

The body of knowledge contained in MIRCE Science can be used for the prediction of expected functionability performance of the future functionability system type to be made. Decades of research have generated a theoretical body of knowledge that comprises of axioms, mathematical equations and methods that enable predictions of functionability performance of each feasible option of the future functionability system type to be done, based on the complex, time, location and human dependent interactions between: physical properties of consisting components, operational rules, maintenance policies, support strategies and expected environmental conditions

MIRCE Science is based on the scientific understanding of the mechanisms that generates the occurrences of functionability events, considered within a physical scale between 10^{-10} m (atomic scale) and 10^{10} m (solar system scale). These mechanisms, together with the applied human rules, shape the expected pattern of the motion of a system through MIRCE Space³. The life-long pattern expected to be generated by each future functionability system type is predictable, from the early stages of the design, by making use of the MIRCE Functionability Equation, which is the bedrock for calculation of the expected functionability performance.

Reference: [1] Knezevic, J., The Origin of MIRCE Science, pp. 232, MIRCE Science, Exeter, UK, 2017, ISBN 978-1-904848-06-6

¹ Functionable system type: a conceptual set of physical entities and human made rules uniquely put together to do functionability work in a given environment.” [1]

² For example the Boeing 747, registration number N747PA, during the 22 years of in-service life, at Pan Am airlines has delivered 80,000 hours of positive work (transported 4,000,000 passengers, burned 271,000,000 gallons of fuel) while receiving 806,000 man-hours of maintenance work (consuming: 2,100 tyres, 350 brake systems, 125 engines, among other parts.

³ MIRCE Space: a conceptual 3-dimensional space containing MIRCE Functionability Field, which is an infinite but countable set of all possible functionability states that a functionable system type could be found in, and the probability of being in that state at each instance of calendar time. [1]