26th MIRCE International Symposium
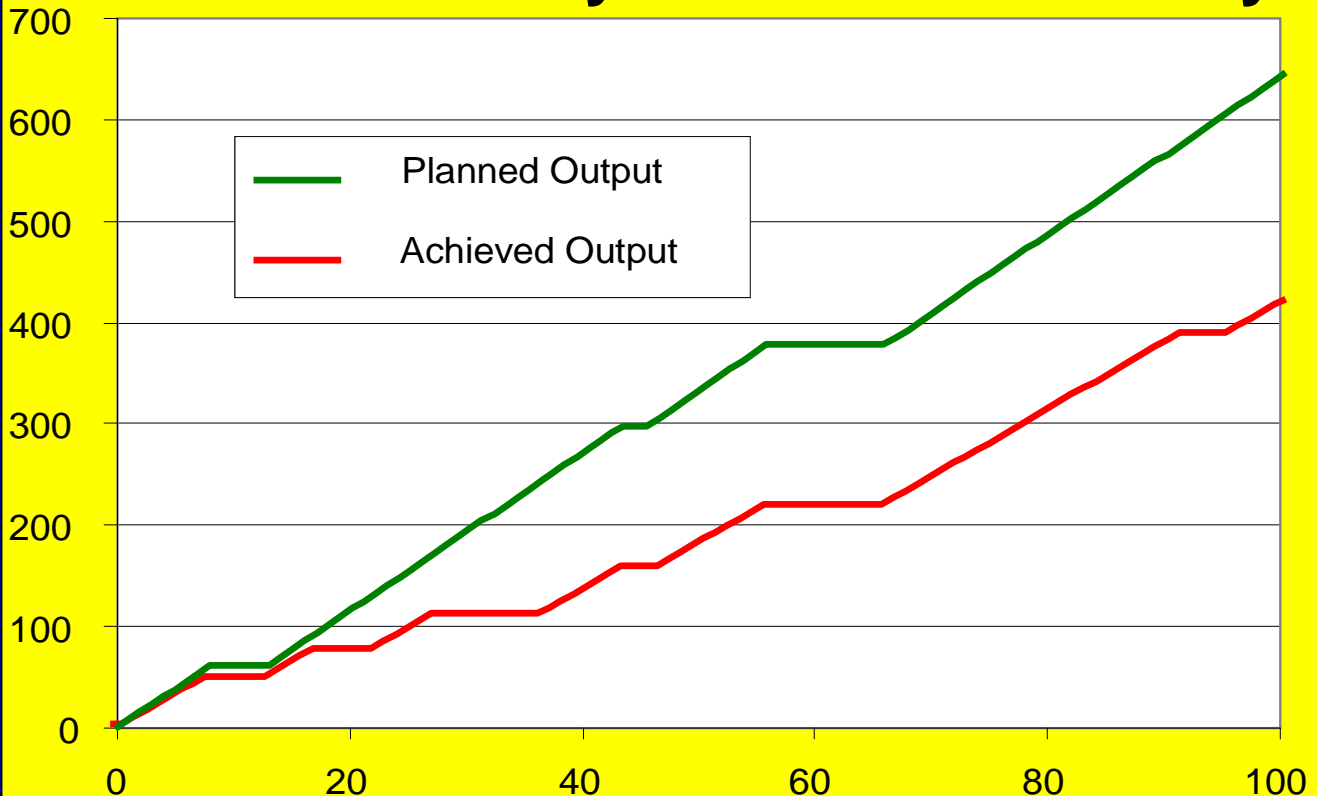
13 – 15 December 2016, Woodbury Park, Exeter, UK

Science Based Functionability Management

"Science deprives many from the right to have an opinion."   A. Dubi

15th December-Workshop: Monte Carlo Method for Engineers & Managers

Maintainable System Functionability

For all of those who would like to know: *Why, the meticulously prepared Business Plans, by experts who regularly attend Leadership and Team Building courses, hardly ever deliver Planned Business Output ?*

To effectively manage functionability of maintainable systems, based on the principles of Mirce Mechanics requires a full understanding of in-service phenomena that generates positive and negative functionability events through time. These phenomena are of a complex nature as they result from strong interactions between physical properties of a system, in-service environmental conditions and associated human actions.

Hence, you are warmly invited to join us and learn more about the body of knowledge, methods, principles and tools that we developed to manage functionability of maintainable systems at the level at which everybody is happy, producers, users, investors, legislators, insurers, general public and the life supporting natural environment.

Dr J. Knezevic, Founder & President of the MIRCE Akademy

The Symposium Programme at Glance

> > > > > **Tuesday 13th December 2016** < < < < <
0830-0900	**Registration and welcome coffee, Colin Chapman, Room, Woodbury Park Hotel,**
0900-1030	***Concept of Functionability and Profitability*** *The main business of business is to stay in business. To stay in business the expected "business function" must be provided through time at minimum investment in resources. Hence, the generated profit is equal to the revenue generated by the monetary value of the "business function", R, minus the cost of the resources used to run the business, C, during a given interval of time T, P(T)=R(T)-C(T). Hence, the main concerns of the owners and users of maintainable systems are related to how much of the "business function" will be delivered during the life time of a system and how much maintenance and support efforts are expected from them to keep the system going.* *For example, the business function of a passenger aircraft is to transport a passenger and cargo through air over a life time of 25-30 years. To stay in business an airline is required to maintain it in airworthy condition. Hence, for each of the business processes these two main factors are obtained at the end of each financial year or at the end of the life of a system* Dr J. Knezevic, Founder & President, Mirce Akademy, UK
1030-1100	**Morning Coffee**
1100-1200	***Functionability and Profitability (continue)***
1300-1400	**Lunch Break**
1400-1730	***Managing Consequences of Negative Functionability Events*** *In order to better manage functionability it is necessary to understand the consequences of the occurrence of negative functionability events on functionability performance. Thus:* • ***Safety*** *related consequences are those that jeopardises the safety of the maintainable system or places in peril environment or humans must be prevented. Safety significant maintainable systems, like aircraft, submarine, train, nuclear reactor and similar can not be of such design that any single failure of the device will have catastrophic results. Current design practice ensures that vital functions are protected, which means, that, if negative functionability event occurs, a given function will remain available from other sources to insure a safe completion of operation.* • ***Economic*** *(revenue, profit, reputation, etc) related consequences are those where the loss or deterioration of a particular function neither endangers the maintainable system nor its environment, but it affects the functionability performance of a maintainable system. Examples include systems, components, or features in a design that are not specifically required to demonstrate conformity to the basis of safety certifications. However, transition into negative functionability state of a single component or module can cause the loss of functionability of the maintainable system and causes a loss of business until the system is returned to the positive functionability state (repair, replacement, modification etc).* *Based on the above, it is possible to conclude that one of the fundamental "business" questions is how to manage the flow of functionability through in-service time at the most cost effective manner?*
1530-1600	**Afternoon Tea**
1600-1730	***Managing Consequences of Negative Functionability Events***
18.00-19.00	**MIRCE Akademy Annual Lecture** **Tribute to Joe Sutter (1921-2016) - Father of Boeing 747** Presented by Dr J. Knezevic, MIRCE Akademy, Exeter
1910-1930	**Get Together Sherry Reception at Woodbury Park Golf Hotel**
1930-22-30	**Symposium Dinner & MIRCE Akademy Members Christmas Dinner**

Functionability **1** - **R**esearch & **E**ducation Centre, of the MIRCE Akademy

Mirce Mechanics based Announcement and Award of the

• **2016 Formula 1 Driver Functionability Champion**
• **2016 Formula 1 Team Functionability Champion**

The Symposium Programme at Glance

> > > > > Wednesday 14ᵗʰ December 2016 < < < < <

0830-0900	**Registration and welcome coffee, Colin Chapman, Room, Woodbury Park Hotel,**
0900-1030	***Science Based Understanding of the Mechanisms of Functionability Actions*** All physical phenomena that cause the motion of a system from the positive to negative functionability states are known as negative functionability events. Actions that generate negative functionability events belong to the following categories: • **Inherent actions,** generated by mechanical, electrical, thermal, radiation, chemical and other types of energy, that have been introduced into systems prior to the operation process through activates associated with manufacturing, transportation, maintenance, storage and similar processes. • **Potential actions,** generated by mechanical, electrical, thermal, radiation, chemical and other types of energy, that exceed the strength of components and systems subjected, resulting from phenomena like foreign object damage (birds, hail, rain, snow), lightening, abuse by operator (pilots, drivers and user errors), single event upset and similar. • **Continuous actions,** generated by mechanical, electrical, thermal, radiation, chemical and other types of energy, that continuously act on a system through in-service life of systems and generate processes like, corrosion, fatigue, creep, wear and similar, which are the result of natural decay of matter.
1030-1100	**Morning Coffee**
1100-13.00	***Mirce Functionability Equation*** The trajectory of the motion of a maintainable system through functionability states is uniquely defined by the sequence of occurrences of functionability events, from the birth of the system to its decommissioning. Thus, the fundamental equation of Mirce Mechanics, the Mirce Functionability Equation enables accurate predictions of the trajectory of the motion of any given system through positive functionability states,
1300-1400	**Lunch Break**
1400-1515	***Mirce Profitability Equation*** The creation of Mirce Functionability Equation enabled the development of the Mirce Profitability Equation that links the revenue and cost sides of business at one place as a function of the engineering configurations of a system, adopted business methods associated with the relevant project management decisions and characteristics. Thus the expected revenue of a given industrial system, during the stated interval of time, expressed in the monetary units, is equal to the product of the Hourly Income generated by the provision of business function and the amount of work done by the system. In general term, the cost of doing business during the state period of time, is equal to the sum of the cost of operation, which is equal to the sum of the fix cost of operation, and variable cost of operation that is equal to the product of the Hourly Cost of Operation, and the work done by the system. Equivalent cost for maintaining a system in the "business as usual" state, during the stated period of time, which is equal to the sum of the fix cost of maintenance, and variable cost of maintenance that is equal to the product of the Hourly Cost of Maintenance, and the work done to the system.
1515-1545	**Afternoon Tea**
1545-1715	***Science Based Functionability Management: - A Case Study*** Although science has to be truthful, rather then useful, the body of knowledge of Mirce Mechanics is essential for scientists, mathematicians, engineers, managers, technicians and analysts in industry, government and academia to predict the work done by the system and to the system, for given configurations, in-service rules and conditions, in order to manage failures in the way that the functionability performance is delivered through the life of system, at least investment in resources and environmental impact. For that to happened, the science proven method is needed, very much different from the classical scientific knowledge, because functionability performance is defined in the following way. A numerical Case Study will be presented at the end of the Symposium to illustrate the concept presented and methodologies used to apply the theoretical principles of Mirce Mechanics to the successful Functionability management Process suitable to any Organisation.

	>>>>> **Thursday 15th December 2016** <<<<<
0830-0900	**Registration and welcome coffee, Colin Chapman, Room, Woodbury Park Hotel,**
0900-1030	**Monte Carlo Simulation:** Concept, Principles The Monte Carlo method is an application of the laws of probability and statistics to natural sciences. The essence of the method is to use various distributions of random numbers, each reflecting a particular process in a sequence of process, to calculate samples that approximate the real process history.
1030-1100	**Morning Coffee**
1100-13.00	**Concept, definition and basic principles of the Monte Carlo Method Elements** • Random Numbers • Probability Distributions • Statistical Sampling • Statistical Error and the Number of Histories
1300-1400	**Lunch Break**

1400-1515	**Monte Carlo Method (experimental mathematics)**
	• Monte Carlo Techniques
	   o Crude Monte Carlo
	   o Acceptance-rejection Monte Carlo
	   o Stratified Sampling
	   o Importance Sampling
	Mirce Mechanics based examples for all techniques are demonstrated through a simple application in Excel spreadsheet

1515-1545	**Afternoon Tea**

1545-1715	**Application of Monte Carlo Method to Scientific Functionability Management**
	• **Functionability of Maintainable Systems**
	   o Component Maintenance Policies
	   o System Maintenance Policy
	   o System Support Policy
	   o System Operational Scenarios
	   o System Functionability Measure
	   o System Operational Effectiveness
	   o System Economics (Revenue, Cost and Profit)
	A numerical Case Study will be presented at the end of the Workshop to illustrate the whole concept presented and methodologies used to apply the theoretical principles of Mirce Mechanics to the successful Functionability Management Process suitable to any Organisation. The algorithm used and corresponding programming process related to the Case Study presented at the end of the Symposium (Wednesday, 15.45-17.15) will be discussed.
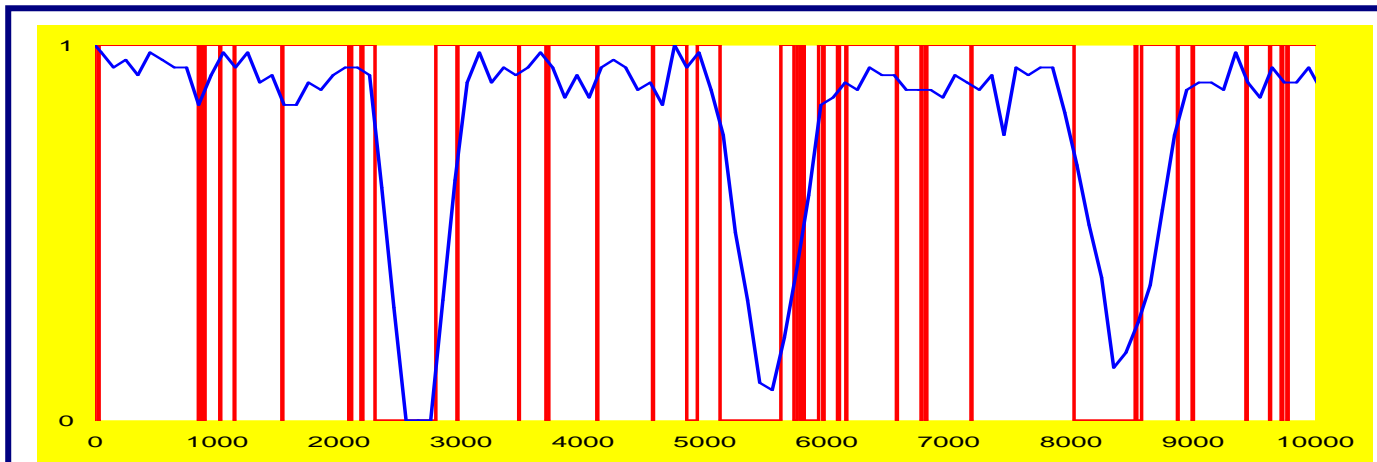
Workshop outcomes: By the end of the day participants will be able to:

• Appreciate the benefits of models and modelling of Maintainable Systems and Business Processes
• Identify operational processes in modelling terms and their simulation significant events
• Understand basic principles of Monte Carlo simulation
• Start build basic models using Excel spreadsheets
• Rationally Interpret the numerical result obtained

E x e t e r is the most southwesterly Roman fortified settlement in Britain. Exeter Cathedral was founded in the early 12th century and has several notable features, including an early set of misericord, an astronomical clock and the longest uninterrupted vaulted ceiling in England.

Today, Exeter is identified as one of the top ten most profitable locations for a business to be based or to gain University education.

All prices are in GB Pounds	13 - 14 December			15th December		
Service	Price	VAT	Total	Price	VAT	Total
Participant	395.00	79.00	474.00	295.00	59.00	354.00
Presenter	245.00	49.00	294.00	Not Applicable		
Retired participants	275.00	55.00	330.00	275.00	55.00	330.00
University students	255.00	51.00	306.00	255.00	51.00	306.00
Congress Proceedings on CD	150.00	30.00	180.00	Not Applicable		
MIRCE Akademy Members	350.00	70.00	420.00	275.00	55.00	330.00
MIRCE Akademy Fellows	375.00	75.00	450.00	285.00	57.00	342.00
MIRCE Akademy Students	275.00	55.00	330.00	225.00	45.00	270.00
Symposium Dinner only	50.00	10.00	60.00	Not Applicable		
B&B at Woodbury Park Hotel						
Single			75.00			75.00
Double			95.00			95.00

About the Venue

Woodbury Park is a magnificent 500 acre complex set among rolling hills above the South West English coastline, only a few miles from Exeter.

Communication between Exeter and other parts of the United Kingdom are excellent.

By road, the M5 motorway links Exeter to London, the Midlands, Scotland and Wales. Regular rapid coaches run services to and from London and Heathrow Airport.

By rail, a regular fast service is available to and from Exeter (St David's Station) and London (Paddington Station).

By air, Exeter Airport offers regular flights to many British and Continental destinations and is situated near to Woodbury Park.

Travel between Exeter and Woodbury normally requires a car or taxi.

Among the outstanding leisure facilities at Woodbury Park are two golf courses including the magnificent Oaks Championship course, tennis courts, a swimming pool, spa, sauna and fully equipped gymnasium and well appointed lounge areas and bars.

Woodbury Park, Woodbury, Exeter,
EX5 1JJ, United Kingdom

☎   +44 (0) 1395 233 382
🖨   +44 (0) 1395 233 384
💻   enquiries@woodburypark.co.uk
    www.woodburypark.co.uk

About the MIRCE Akademy

Mirce Akademy is an independent research and educational institution devoted to the enhancement and applications of Mirce Mechanics – scientific theory of the motion of functionability through the life of maintainable systems.

The knowledge and methods of Mirce Mechanics have benefited designers, manufacturers, constructors, operators, service-providers, regulators and others in the aerospace, automotive, communication, construction, defence, transport, service, utility sectors and other areas of business and government.

Benefits of scientific based knowledge are experienced through significant increase in system reliability and availability, while drastically reducing costs of making, running and disposing systems.

Phone: + 44 (0) 1395 233 856 Email: quest@mirceakademy.com Web: www.mirceakademy.com

Woodbury Park Hotel & Golf Club, Exeter, EX5 1JJ, UK – home of the MIRCE Akademy

26th MIRCE International Symposium: 13 – 15 December 2016
Science Based Functionability Management

Registration Form

Email: quest@mirceakademy.com
Phone: +44 (0) 1395 233 856
Mail: MIRCE Akademy, Woodbury Park, Exeter, EX5 1JJ, United Kingdom
Web site: www.mirceakademy.com

THIS FORM MAY BE COPIED

Please select appropriate level of service and corresponding fee.

Group discounts are available please contact us.

The Symposium Fees includes:

- Attendance
- Symposium Material and Supporting Materials
- Lunches and Light Refreshments
- MIRCE Akademy Annual Lecture
- Christmas Dinner on 13^{rth} December
- Free Parking

Value Added Tax (VAT)

Unless special exemption exists, under UK Customs and Excise regulations delegates from all countries are required to pay UK VAT @ 20 % on all courses taking place in the UK. Non-UK delegates may be able to recover VAT incurred via the relevant tax authority in the country of origin of the delegate.

PAYMENT DETAILS

Please invoice my organisation (**Note: UK MOD personnel can pay by BACS through the DBA – Contractor Number will be supplied with invoice**)

For the attention of _____

Purchase Order No. _____

Please Charge credit card   £ _____

Visa   MasterCard   Amex

Cardholder _____

Card No. _____

Expiry Date _____ Security Number_____

Signature _____

PERSONAL DETAILS (Please print clearly)

Surname   _____

First name   _____

Organisation _____

Department _____

Position   _____

Address   _____

_____

_____

Postcode _____ Country _____

Tel _____ Fax _____

E-mail _____

Special requirements   Yes   No

Please specify

I understand and accept the registration terms and conditions as shown

Signature _____ Date _____

Terms and Conditions

Substitution of participants may be made at any time. If you intend to do this, please advise the MIRCE Science ('the organiser') as soon as possible. Cancellation of a booking must be received in writing by the organiser at least 14 days before the commencement of the Symposium. MIRCE Science regrets that no refunds or credits will be made after the deadline unless the organiser cancels the Event.

The organiser reserves the right to alter the programme or cancel the Summer School at its discretion. All places offered are subject to availability.