

12th World Congress of MIRCE SCIENCE

Launch Anomalies of Space Rockets as a Mechanisms of Motion in MIRCE Space

Woodbury Park, Exeter, United Kingdom, 28 - 30 June 2023

During last twelve months there have been over 175 orbital and sub-orbital rocket launches. However, some of them have either never made it to space or failed to deploy their payloads once they got there. The common denominator for all failed missions, according to publicly available information provided by their management and sponsoring teams, was a launch anomaly.

Thus, the main objective of the Congress is to address specific actions and mechanisms that prevented launched satellites from reaching the expected orbit. The real life case studies addressed are related to the launch anomalies of the following space missions: *Arianespace VEGA C Rocket and Virgin Orbit ABL Space Systems, ASTRA, iSPACE Hyperbola-1, Indian's Small Satellite Launch Vehicle, Blue Origin-New Shepard, FIREFLY Alpha Rocket, Skyrora, Japan's Epsilon, China's Long March 6A*. The principles of MIRCE Science: Philosophy, Mechanics and Mathematics are applied to the analysis of the orbital rocket launch anomalies presented to generate the main lessons learnt that could be applied to reduce the probabilities of their occurrences in the future.

The Congress Programme at a Glance

The Congress Programme: Wednesday 28 June 2023

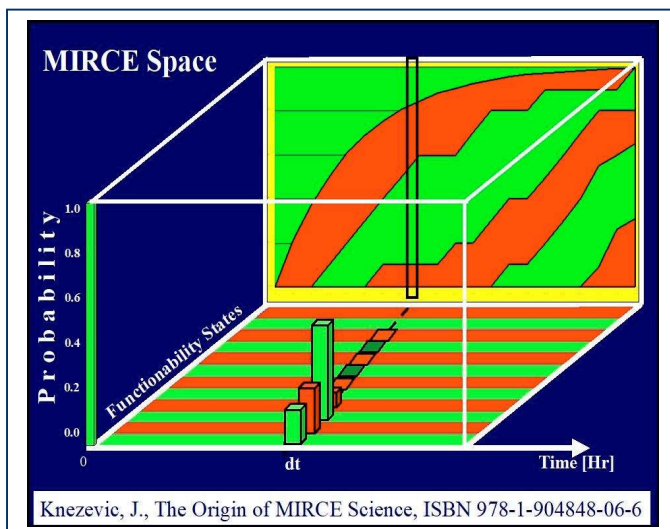
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|-------------|---|
| 08.30-09.00 | Registration and welcome coffee, Woodbury Park Hotel, |
| 09.00-09.05 | Welcome by Dr Knezevic, Founder & President of the MIRCE Akademy |
| 09.05-10.35 | <p style="text-align: center;">MIRCE Science Philosophy</p> <p>The philosophy of MIRCE Science is based on the premise that the purpose of the existence of any functionable system is to do expected work. The work is considered to be done when a system is delivering a measurable function(s) through time under continuous impact of natural and human actions. MIRCE Science focuses on the scientific understanding and description of actions that govern the motion of functionable systems through MIRCE Space (more details on day 3). A full understanding of the mechanisms that generate this motion is essential for the accurate predictions of the expected performance of a given functionable system using the mathematical scheme of MIRCE Science.</p> <p>The functionable system type is operationally defined functional system, which includes physical location, environmental conditions, available resources, imposing constraints, maintenance policies, support strategies and other influential issues.</p> |
| 10.35-11.00 | Coffee break |
| 11.00-13.00 | <p>According to MIRCE Science, at any instant of calendar time, a given functionable system could be in one of the following two macro states:</p> <ul style="list-style-type: none"> • Positive Functionability State (PFS), a generic name for a state in which a functionable system type is able to deliver the expected measurable function(s), • Negative Functionability State (NFS), a generic name for a state in which a functionable system is unable to deliver the expected measurable function(s), resulting from any natural or human action(s) whatsoever. |
| 13.00-14.00 | Lunch |
| 14.00-15.30 | <p style="text-align: center;">Physically observed launch anomalies:</p> <ul style="list-style-type: none"> • 23 March 2023: The First 3D Printed Rocket Fails Shortly After Launch • 6 March 2023: Japan Destroys H3 Rocket In Space After Second Stage Ignition Anomaly • 10 January 2023: Launch Anomaly of First ABL Space RS1 Rocket • 9 January 2023 Launch Anomaly of Virgin Orbit's First UK Satellite Launch |
| 15.30-15.50 | Tea Break |
| 15.50-17.30 | <p style="text-align: center;">Physically observed launch anomalies continues:</p> <ul style="list-style-type: none"> • Launch Anomalies of Arianespace Vega Rocket • 10 July 2019: First Launch Anomaly of Arianespace Vega Rocket • 17 November 2020: Second Launch Anomaly of Arianespace Vega Rocket • 20 December 2022: Third Launch Anomaly of Arianespace Vega Rocket. |
| 19.00-22.00 | <p style="text-align: center;">Traditional English Fish & Chips in the Traditional English Pub</p> <p>XVII Century English Pub, Topsham (5 miles from Woodbury Park, transport provided)</p> |

The Congress Programme: Thursday 29th June 2023

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| 08.30-09.00 | Registration and welcome coffee, Woodbury Park Hotel |
| 09.00-10.30 | <p>MIRCE Science: Mechanics</p> <p>MIRCE Science is a theory of the motion of functionable systems through MIRCE Space resulting from any functionability actions whatsoever and the actions required to produce any functionability related motions. To that end a scientific understanding of mechanisms that generate positive and negative functionability events is an imperative. Without full understanding of these mechanisms the prediction of occurrences of functionability events is not possible, and without the ability to predict the future, the use of the word science becomes inappropriate.</p> |
| 10.30-11.00 | <p>Coffee break</p> |
| 11.00-13.00 | <p>Research studies conducted at the MIRCE Academy have shown that any serious studies of the functionability mechanisms have to be based between the following two boundaries:</p> <ul style="list-style-type: none">• the “bottom end” of the physical world, which is at the level of the atoms and molecules that exists in the region of 10^{-10} of a metre.• the “top end” of the physical world, which is at the level of the solar system that stretches in the physical scale around 10^{+10} of a metre. <p>This range is the minimum sufficient “physical scale” which enables scientific understanding of relationships between the physical phenomena that take place in the natural environment and the physical mechanisms govern functionability events during the life of functionable systems.</p> |
| 13.00-14.00 | <p>Lunch Break</p> |
| | <p>Physically observed launch anomalies continues:</p> <ul style="list-style-type: none">• 14 December 2022: Launch Anomaly of LandSpace - world's 1st methane-fuelled orbital rocket• 11 November 2022: Launch Anomaly of Long March 6A rocket by China Aerospace and Technology Corporation• 11 October 2022: Launch Anomaly of Japan's Epsilon rocket• 8 October 2022: Launch Anomaly of Skyrora space launch attempt |
| 15.30-16.00 | <p>Tea Break</p> |
| 16.00-17.30 | <p>Physically observed launch anomalies continues:</p> <ul style="list-style-type: none">• 1 October 2022: Launch Anomaly of Firefly Alpha rocket• 12 September 2022: Launch Anomaly of New Shepard reusable sub-orbital rocket• 6 August 2022; Launch Anomaly of India's small satellite launch vehicle at first flight test• 25 July 2022 Launch Anomaly of iSpace’s Hyperbola 1 rocket |
| 19.00-22.30 | <p>Sherry Reception</p> <p>Gala Dinner – 12th Congress of MIRCE Science</p> <p><i>History Lesson Talk: Apollo 13 negative functionability event took place over 50 years ago, and causing functionability mechanism is still existent.</i></p> <p>The MIRCE Academy Fellowship Awards Ceremony</p> |

The Congress Programme: Friday 30th June 2023

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| 08.30-09.00 | Registration and welcome coffee, Woodbury Park Hotel |
| 09.00-10.30 | <p style="text-align: center;">MIRCE Science: Mathematics</p> <p>MIRCE Space is a conceptual 3-dimensional coordinate system containing a sequence of probability functions that mathematically define the physical motion of a given functionable systems through positive and negative functionability states in respect to time and corresponding works done. (graphical representation shown below).</p> |
| 10.30-11.00 | Coffee Break |
| 11.00-13.00 | <p>The physical motion of a functionable system through MIRCE Space is mathematically defined by the MIRCE Functionability Equation, for any functionable system, thus:</p> $y(t) = P(TFS_S, t) = \sum_{i=1}^{\infty} [P(PFS_S^{i-1}, t) - P(NFS_S^{i-1}, t)]$ <p>enabling predictions of the expected work statistics to be made for a stated mission length, T.</p> |
| 13.00-14.00 | Lunch Break |
| 14.00-15.30 | <p>The main objective of Congress was to briefly describe several orbital launch missions where space rockets of different types have either never made it to space or failed to deploy their payloads once they got there. The common denominator for a failure of each individual rocket, according to publicly available information provided by their management and sponsoring teams, is a launch anomaly. Based on the almost non-existent information regarding some missions and thr total absence for others Dr Knezevic made the following conclusions, based on the knowledge contained in MIRCE Science:</p> <ol style="list-style-type: none"> 1. As all missions considered experienced anomalies during an extremely short period of time, the most probable mechanisms that caused the launch anomalies have been induced into rockets by human actions during: design, production, assembly, transportation or launch processes. As the anomalies occurred on rockets that are designed, made and launched by different companies, located in different countries, it could be concluded that human errors are generic phenomena of the human race! 2. The analysis of the failed launches covered in the Congress has shown that the majority of them were postponed once, or more times, due to unsatisfactory weather conditions during the launch window available. Thus, it could be concluded that environmental actions at the launch did not contributed to the anomalies experienced. 3. Finally, it could be concluded that the least probable causes of launch anomalies observed are generated by time-dependent mechanisms, like: fatigue, wear, corrosion, creep and similar, which require extensive periods of operation for the damage to be accumulated. However, if any of the components installed have been stored for a very long period of time or have been used on previous missions, there is a probability that cumulative damage could cause launch anomaly. <p>The launch anomalies addressed in this Congress are in agreement with the 5th Axiom of MIRCE Science that states, that</p> <p style="text-align: center;"><i>“Probability of human error in execution of any task is greater than zero”.</i></p> |
| 15.30-16.00 | 2023 Group Photograph Tea and Departure |





Dr Knezevic:

- the “father” of MIRCE Science,
- Founder of MIRCE Akademy
- host of the 12th MIRCE Congress,
- wholeheartedly welcomes you to this Annual International Event.

Administrative and Financial Information

For the planning purpose, of the participants, exhibitors and presenters, the following Price structure will be applied regarding all services related to the 12th World Congress of MIRCE Science.

| Service Available | Cost | | |
|--|-------------------|---------|----------------|
| All prices are in GB Pounds | Price | VAT | Total |
| Participant for 3 Days | 795.00 | 159.00 | 954.00 |
| Participant per Day | 295.00 | 59.00 | 354.00 |
| Presenter on the day of presentation | Free | | |
| Presenter for 3 Days | 300.00 | 60.00 | 360.00 |
| Retired participants for 3 Days | 295.00 | 59.00 | 354.00 |
| University students for 3 Days | 495.00 | 99.00 | 594.00 |
| Congress Proceedings on CD | 175.00 | 35.00 | 210.00 |
| MIRCE Akademy Members | 650.00 | 130.00 | 780.00 |
| MIRCE Akademy Fellows | 675.00 | 135.00 | 810.00 |
| MIRCE Akademy Students | 595.00 | 119.00 | 714.00 |
| Partners Programme for 3 Days | 295.00 | 59.00 | 354.00 |
| Congress Dinner only | 82.00 | 16.40 | 98.40 |
| Sherry, 3 course meal & wine | | | |
| Exhibitors - Gold Package | 5000.00 | 1000.00 | 6000.00 |
| Exhibitors - Silver Package | 3000.00 | 600.00 | 3600.00 |
| Exhibitors - Bronze Package | 1500.00 | 300.00 | 1800.00 |
| B&B at Woodbury Park Hotel - single | Rooms are | | 135.00 |
| B&B at Woodbury Park Hotel - double | guaranteed | | 155.00 |

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.

Terms and Conditions

Substitution of participants may be made at any time. If you intend to do this, please advise the MIRCE Akademy ('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 Congress. The MIRCE Akademy regrets that no refunds or credits will be made after the deadline unless the organiser cancels the Congress. The organiser reserves the right to alter the programme or cancel the Congress at its discretion. All places offered are subject to availability.

For any other information please contact us:

Phone; + 44 (0)1392 874 318
 Email: office@mirceakademy.com
 Website: www.mirceakademy.com



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, Exeter, EX5 1JJ, UK

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Exeter 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.



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

2th World Congress of MIRCE Science 28-30 June 2023

BOOKING FORM

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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
- Congress Papers and Supporting Materials
- Lunches and Light Refreshments
- Gala Dinner on 29th June
- Free Parking for 3 days
- Fish & Chips Event on 28th June

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. _____

Payment is due on receipt of the invoice and can be made either:

By **cheque** for the full amount of the invoice in GB Pounds, which should be made payable to **Mirce Science**. Your cheque, with remittance advice, should be sent by post to: MIRCE Science, Woodbury Park, Exeter EX5 1JJ, UK

By **bank transfer** for the full amount of the invoice excluding any transaction charges. Please inform us by remittance advice when the payment is made

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 Congress. The 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.