An Interchange of Ideas.

ENGINE + VEHICLE TEST FACILITY FORUM

June 9 – June 11, 2015 o Madison, Wisconsin

TUESDAY, JUNE 9

6:00PM - 9:00PM	Welcome Reception at the Madison Club

WEDNESDAY, JUNE 10

7:00AM - 8:00AM	Registration/Grand European Continental Breakfast
8:00AM - 8:15AM	Welcome
8:15AM - 9:30AM	Session 1**:** *A Transformative Process to Assure Project Success*
10:00AM - 11:30AM	Session 2: *Operational Readiness*
11:30AM - 1:00PM	Lunch
	Keynote (12:15PM – 12:45PM) *HABITS: Putting Common Sense into Common Practice*
1:00PM - 2:30PM	Session 3**:** *Total Cost of Ownership/Test Cell Utilization*
3:00PM - 4:30PM	Session 4: *HSE in the Test Environment*
6:00PM - 9:00PM	Networking Night Out in Madison: "A Taste of Wisconsin" at Olin Park *Transportation included*

THURSDAY, JUNE 11

7:00AM - 8:00AM	Grand European Continental Breakfast
8:00AM - 9:30AM	Session 5: *Planning & Operating a Global Test Facility*
10:00AM - 11:30AM	Session 6: *Test Cell of the Future/Emerging Technologies*
11:30AM - 1:00PM	Lunch
	Key Note (12:00PM – 1:00PM) *Testing: Lessons Learned in Engineering and Safety, Space Shuttle Video*
1:00PM	Program concludes
1:30 PM - 4:00PM	Optional Tour* New ACS Manufacturing Facility - Middleton

*Transportation to and from Middleton will be provided. The bus will be returning to the Monona Terrace and downtown hotels. We are happy to help with travel arrangements to meet your flight schedule.

Please note: Exact session times are subject to change

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2015 Industry Forum Sessions

Session 1: Transformative Processes to Assure Project Success – Case Studies

An Educational and Entertaining Presentation including Case Studies

Presenters:
Joerg Klisch, VP Operations, North America
MTU America

Savya Rafai, Co-founder
Planstrat Inc.

When managing a capital project, the project manager understands the need for protecting project delivery from cost and time overruns. Cost contingencies are often used to create a protective provision against uncertainties or Murphy's Law-type overruns. But when it comes to time overruns, a common practice is to address it by protecting duration estimates at the task-level. In many cases the cost contingencies also serve as the means for containing recognizable time overruns. Despite this genuine effort on the part of project management professionals to manage project delivery risk, they are often completely blind-sided by a stealthy phenomenon called *the effects of Parkinson's Law*. It is very elusive to observe, let alone measure or control.

In this educational and *entertaining* presentation the undesirable effects of Parkinson's Law will be identified and illustrated. We will learn how to measure, control and ultimately leverage this phenomenon to protect project delivery from time overruns. Case studies will demonstrate the drawbacks of traditional PM practices that inadvertently fail, despite the project management professional's best intentions to succeed. Finally, through case examples we will be lead through an applied solution (that weaves through PMBOK, Critical Chain PM and Lean Thinking Processes) to quantify results.

Session 2: Operational Readiness Planning

Facilitator: Mike Brezonick, Executive VP & Associate Publisher & Editor In Chief - Diesel Progress
Panelists: Todd Culp, Facility Engineer – Ford
Randy Rozema, Dir. of Technology Implementation/ Mechanical Engineer - Vibration/Acoustic – ACS
Kelly Van Duyn, Manager, Engineering Test Department - eXmark

Operational readiness is the process of preparing the management structure and supporting organization of an asset under construction such that at the point of delivery/handover, you are fully ready to assume ownership and functional performance of the asset. Furthermore, operational readiness means that the facility is prepared to perform the safe and efficient operation in a

sustainable manner. This session will discuss critical factors required to achieve operational readiness including:

- Definition of operational readiness criteria
- Defining acceptance criteria
- Measuring readiness progress
- Linking Front End Planning to handover (Case Study)
- Transition from project execution team to operations team
- Achieving customer (test engineer) buy-in
- Impacts of automation
- Tools to achieve readiness

Wednesday Lunch Keynote: HABITS: Putting Common Sense into Common Practice

Presenter: Terry Siebert, Dale Carnegie Training

Terry will explore what drives high performance teams, as well as the opposite. More often than not, it is the habits, "the way we do things around here," that will determine whether the workplace fosters team synergy or a lack of teamwork. Time-tested principles will serve as the foundation for building and maintaining positive business relationships. You will be reminded that it is usually a very good idea to put more common sense into common practice. Not only will you learn—this session will also be FUN!!

Session 3: Test Cell Utilization/Total Cost of Ownership

Facilitator: Sam Rosa, Chief Engineer, Test Operations – Navistar, Inc.
Panelists: Harvey Restaino, Director Powertrain Development & Calibration – Ricardo
Jason Lusher, Engineering Manager – Caterpillar
Jason Barton, Senior Manager, Detroit Test Center– Detroit Diesel

The biggest cost impact of owning and operating a technical center is maximizing the utilization of the test facility. Optimizing operating costs requires the definition and documentation of customer requirements, business unit and test program goals, and a clear understanding of operational costs. Presented by managers and integrators from across the transportation market, this discussion will define utilization strategy, present a process to evaluate and improve test operational effectiveness, introduce a process to optimize the test process from work order through test setup and execution to data acquisition and data management, discuss labor impacts, and review the challenges of accelerated life testing as an example.
Key components of this session include:

- Definition of Key Performance Indicators (KPIs)
- Aligning customer requirements with test facility output
- Measurements to support utilization strategy
- Metrics – ROI
- How to measure and charge costs of personnel, test time, retest
- Leveraging capital investment as a % of overall cost of ownership
- Automation and technology impacts
- Costs of quality data and assessing data validity
- Sustainability impact on facility operations
- Test cell utilization strategies

Session 4: HSE in the Test Environment

Facilitator: Prof. Bernard Challen, Chief Executive - Shoreham Services, Engineering Consultancy

Panelists: Mark Blackwell, Technical Advisor – Cummins
Chris Brogli, Global Business Development Manager for Safety, TUV Functional Safety Expert – Rockwell
Dennis Volpe, Special Projects Manager–ACS

Technology advancement has allowed operators and engineers to execute and troubleshoot remotely. However, testing remains a physical process that requires personal interaction with the *Device Under Test*. At the same time, HSE remains a top priority of all organizations. In this session, we will exam the unique safety issues associated with engine and vehicle test cells and define strategies for creating a safe working environment.

- Zero entrance
- Safety measure effectiveness
- Impacts of automation
- Operator access to dangerous test spaces – rotating equipment, combustibles, climatic areas
- Balancing code requirements vs. best in class
- Retrofitting for alternative fuels (my space wasn't designed with that in mind!)
- The "cost of safety", where to draw the line
- Using technology to create a safe work place

Session 5: Planning & Operating a Global Test Facility

Facilitator: Mike Brezonick, Executive VP & Assoc. Publisher & Editor In Chief - Diesel Progress

Panelists: Juergen Hoehne, Director Test Center Technology – Umicore AG & Co. KG
Hal Johnson, Chief Engineer – Product Development – MAHLE Industries, Inc.

The successful planning and operating of a Research & Development facility to support global organizations requires a strategic understanding of the asset goals and aligning and validating the processes required to achieve these goals. This discussion will focus on key impacts to these challenges including:

- Planning process to align business & technical drivers
- Defining test protocols to achieve desired results
- Selecting the appropriate technology
- Global R&D impact of solving problems for local markets
- Maximizing labor effectiveness
- Flexibility with a global team
- Accounting for regional variances

Session 6: Test Cell of the Future

Facilitator: Prof. Bernard Challen, Chief Executive, Shoreham Services, Engineering Consultancy

Panelists: Mike Busateri, Engine Lab Supervisor – Briggs & Stratton
Steve Gibson, Director Technical Sales – AVL
Randy Hettema, Manager, Lab Operations – Toyota

New product development and advancements in testing technology, in combination with global platform requirements and asset management optimization continue to have significant impact on the design and operation of test cells. Technology advancements have allowed operators and engineers to execute and troubleshoot remotely; however, testing still remains a physical process that requires personal interaction with the Device Under Test. At the same time, HSE remains a top priority of all organizations. How do you plan for the test cell of the future?
In this session, our panelists will discuss:

- How does one define *the future*? Infrastructure vs. Device Under Test planning
- Flexible Facility/Systems Modularity/Diversity of Configurations
- Standardization / utilization/optimization/automation
- Data collection & management
- Budget development
- Understanding your customers' needs and translating them into facility requirements
- Creating real-world simulation and test environments

  - Virtual product/systems design and modeling
  - Integrating simulation into the test cell
- Emerging test technologies and their impact:
  - DAQ, Mechanical, Structural
  - "Future proofing" for emerging powertrain technologies
- Accelerated product development times and shift to testing earlier in the cycle
- Safety
- Retrofitting for alternative fuels (my space wasn't designed with that in mind!)

Thursday Lunch Keynote: Testing - Lessons Learned in Engineering and Safety and Space Shuttle Video

Presenter:
Dr. Ravi Margasahayam, M.S., M.B.A.
International Space Station Program

Is it safe for humans to go to Mars? It is a billion dollar question. Human spaceflight is a risky proposition. Safety is often a myth. However, risk is a reality. NASA has a great heritage in Space Systems programs that have been extremely successful; however, we dare to push the limits of technology in order to defeat gravity, survive extreme environments, and meet other programmatic goals. Spacecraft design, construction, operation, and maintenance are all vital to this endeavor. However, testing of Spacecraft systems, subsystems and components is paramount when getting a new Spacecraft ready for launch. Test what you fly and fly what you test, has been NASA's philosophy to ensure mission success. Without testing risk of flight failures are too great. You test before the first flight, or you need lot of testing after a failure.

Learning about test and engineering failures offers valuable insights and practical experience into the technical, project management, experimental, ethical, and professional issues faced by practicing engineers and managers on a daily basis. Even though space missions and spacecraft systems are designed to operate in the presence of multiple failures, often these systems fail spectacularly. The reasons of failure include incorrect design decisions, operator error, manufacturing defects, and lack of proper subsystem and system level integration and test. The odds of these failures occurring can be significantly reduced through good systems engineering practice. But, in some cases, the very systems engineering practices themselves contribute to a failure. The lessons learned from success and failures are vital for mission assurance and have helped NASA maintain its' global leadership in space exploration.

NASA has maintained an extensive database of all the anomalies that occurred on past space missions and spacecraft systems. The benefit of understanding the root cause analyses of historical failures has tremendously enhanced mission success. Root cause analyses are quintessential in understanding what engineering is and what test engineers do. Mistakes often occur when we

forget the rules of physics and try to bypass them in our designs. Learning from our mistakes saves time, money, and even lives. Lecture will take the audience on a pictorial journey of past explorations, while emphasizing on how to avoid known unknowns and unknown unknowns in systems engineering, integration and test activities that define mission success.

Space Shuttle Video Description

By the end of its final mission, Space Shuttle Atlantis had orbited the Earth a total of 4848 times, traveling nearly 126 million miles or more than 525 times the distance from the earth to the Moon. As humanity's first reusable spacecraft (designed to return to Earth and land like a glider), the Space Shuttle pushed the frontiers of technological innovation and by expanding the possibilities of human achievement to explore the universe in as many as 33 total missions.

Many notable interplanetary missions that were launched by Atlantis include Magellan probe to Venus, Galileo probe to Jupiter, and Compton Gamma Ray observatory. Last but not least, Atlantis enhanced the capabilities of window to the universe - Hubble Space Telescope.

The video depicts many phases of ground activities and preparation, that culminates in the launch of Atlantis on its' final mission of the Space Shuttle program in 2011. The video honors the Space Shuttle's role in building the greatest engineering project in the history of mankind, the International Space Station. This 17 minute video symbolizes the excellence of NASA engineers and will leave the audience spell bound forever watching the spectacular light and sound show of the Space Shuttle.