



Altair

ProductDesign

One Day, Free to Attend Workshop

# Multi-Disciplinary Optimization Delivering to Project Timescales



Taking place at

## The 8<sup>th</sup> European Altair Technology Conference

Paris, France

29<sup>th</sup> September 2015

[altairatc.com/europe](http://altairatc.com/europe)

# Workshop Overview

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## **MDO – ‘The Gateway to Balanced Design’**

As products increase in complexity, design becomes more multi-disciplinary and the requirement to efficiently deploy Multi-Disciplinary Optimization (MDO) becomes a significant design differentiator. Increasingly, industry is successfully performing MDO studies to achieve optimized balanced design allowing trade-offs between mass, performance and even cost.

## **Altair’s MDO Tool – ‘Vertically Integrated End-to-End Process’**

In order to impact the product development process, MDO results must deliver to project timescales and in order to achieve this, a number of challenges need to be overcome. Typical challenges consist of efficiently performing MDO pre and post-processing and solution activities. To meet these challenges, Altair has utilised its expertise in model management, large dataflow, job submittal, optimization and visualization, leveraging HyperWorks technologies to create a vertically integrated end-to-end process software tool.

## **Workshop Contents**

The workshop will present the strategy and the unique functionality behind the Altair MDO tool. Key MDO functionalities are showcased including multi-model synchronization, rapid optimization set-up, different MDO processes, new efficient optimization strategies and unique MDO post processing strategies. A large scale industrial application, automotive Body-in-White structure is presented to demonstrate the efficiency of the MDO tool. Examples of MDO studies performed in other industrial sectors including the aerospace sector will be presented. The workshop is delivered by experts in MDO theory and industrial practise.

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## **Who should attend?**

This workshop is aimed at a wide audience from CAE Engineers with an interest in optimization and MDO together with CAE Managers and Strategists who wish to understand how the technology could be integrated into an established design process to achieve balanced design.

# Agenda

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- 10:30 **Reception and Coffee**
- 11:00 **Introductions, Overview of MDO & Challenges (R Jones)**
- **Introduction to the Topic of MDO**
  - **MDO in industry** - Example: Large industrial problems BIW
  - **Industry challenges** - Time Related, Large data sets, Cultural Change, Cross Functional Co-operation
  - **HPC Integration** - The Key to Successful Deployment
- 11:30 **Optimization Technology Review (V Toropov)**
- **Gradient Based** – OS (multiple start point facility) - Example: NVH Static
  - **Equivalent Static Load Method (ESLM)** - Example: Door Slam
  - **Response Surface** – (Global / Local / Adaptive) - Example: Crash Examples
- 12:15 **Meeting the Challenges – Model Set-up (J Ollar)**
- **Strategy** – Assume import of run ready decks
  - **Efficient MDO Set-up**
  - **DV Set-up** - No concept of Master Model, No numbering strategy required
  - **Industry Independent Templates** – BIW, Closures, Nacelle, Trucks, Rail
  - **Manufacturing Feasibility**
  - **Auto Overchecking**
- 13:00 **Lunch**
- 14:00 **Meeting the Challenges – Optimization Technologies (V Toropov)**
- **Global response surface limitations**
  - **Local response surface – Sub Space Technique – Test plan point flexibility**
  - **Test Plan – Space filling strategy – Error Estimation**
  - **Response Surface Fitting Technology**
  - **Efficient Utilization of HPC**
- 15:00 **Meeting the Challenges – Post Processing (F Kocer)**
- **Specialised Plots**
  - **Post-correlation sensitivities studies**
- 15:30 **Break**
- 16:00 **Live Demonstrations of the MDO Tool (J Ollar / R Jones)**
- **BIW Example**
    - Global response surface limitations
    - Local response surface – Sub Space Technique – Test plan point flexibility
  - **Powertrain, Nacelle, Truck, Rail etc.**
  - **Typical HPC Requirements & ROI Benefits**
- 17:00 **Interactive Feed-back Session (Attendees)**
- 17:30 **Closing Remarks – Feedback Form**

## Presented by

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**Vassili Toropov**  
Professor of Aerospace  
Engineering  
**Queen Mary,  
University of London**

Professor Toropov is an international expert in optimization having developed many of the techniques available today.



**Royston Jones**  
Exec VP, European  
Operations & Global CTO  
**Altair ProductDesign**

Dr. Jones has over 15 years' experience in applying optimization technology to deliver innovative solutions to industry.



**Jonathan Ollar**  
Technical Specialist  
**Altair ProductDesign**

Dedicated to advancing Multi-Disciplinary Optimization methodologies and has been involved in a Multi Year MDO Project.