



# 2008 DCS World Users Conference

October 7-8, 2008

*Hilton Detroit/Troy Michigan United States*



**Hands-on Workshop**

October 9, 2008

*DCS Headquarters, Troy Michigan*



# 2008 DCS World Users Conference

## Hilton Detroit/Troy Michigan United States

### Why Attend?

- By attending the 2008 DCS World Users Conference you'll have access to a community of DCS users from around the world.
- **Don't Miss Out.** Learn the best practices from community experts for applying DCS technologies.
- Be a part of the 'revolution' in thinking that is changing the way products are designed.
- Preview leading edge DCS products and services.
- Improve your existing infrastructure and processes by hearing about pilot projects and learning different ways of incorporating DCS technologies into your business.
- Learn tips and tricks to boost your productivity.
- Review your use of Dimensional Management and get the highest return on investment.
- Join your peers, partners and DCS at this event and walk away with the knowledge you need to succeed. Register today!

# Schedule at a Glance cont...

Tuesday, October 7th, 2008

7:00 a.m. – 9:00 a.m.

Conference Registration & Continental Breakfast

9:00 a.m. – 12:00 p.m.

DCS Welcome and Guest Speaker Presentations

Conference Introduction

**Robert Kaphengst**, President & CEO, *DCS Inc.*

Dimensional Engineering at General Motors

**Rich Korynski**, Global Dimensional Engineering, *GM*

**Robert Frutiger**, Global CAX Methods & Integration, *GM*

**Phil Oh**, Global ISS, CAE, KBE, *GM*



Reducing costs using Variation Management, The Boeing Company

**Mark Nestleroad**, 787 Senior Variation Analyst, *Boeing Commercial Airplanes*

**Mike Geddes**, 787 Variation Management Leader, *Boeing Commercial Airplanes*

Leveraging CATIA V6 capabilities inside of 3DCS

**Minal Santhosh**, Manager - CAA Partnerships, *Dassault Systemes*

**Dave Johnson**, Software Development Manager, *DCS Inc.*

12:00 p.m. – 1:00 p.m.

Lunch

1:00 p.m. – 2:30 p.m.

Modeling non-rigid assemblies with 3DCS Compliant Modeler – Capabilities, Benefits & FEA Compatibility

**Ralf Voss**, Group Research and Advanced Engineering, *Universität Erlangen-Nürnberg c/o Daimler AG*

**Gerhard Bell**, ASME Senior Certified GD&T Specialist, *DCS Inc.*

New approach to analyzing modeling results with 3DCS Advanced Analyzer/Optimizer - Capabilities and Benefits

**Armin Schöne**, - Tolerance Management Specialist, *CENIT AG*

**Gerhard Bell**, ASME Senior Certified GD&T Specialist, *DCS Inc.*

2:30 p.m. – 3:00 p.m.

Afternoon Snack Break

3:00 p.m. – 5:00 p.m.

The Fundamentals in DCS Solutions (non-linearity, DOE, constraint-based variation simulation, compliant simulation, kinematical simulation, and diagnosis)

**Dr. Ying Q. Zhou**, Director Research & Development, *DCS Inc.*

Open Forum – Q&A

Wednesday, October 8<sup>th</sup>, 2008

8:00 a.m. – 9:00 a.m. Continental Breakfast

## Schedule at a Glance cont...

9:00 a.m. – 12:00 p.m. Guest Speaker Presentations

"Dimensional Management: The challenge of simulating reality"

**Markus Schrader**, Dimensional Management *AIRBUS Deutschland GmbH*

3DCS Advanced Analyzer Optimizer - Case analysis on aircraft structural assemblies

**Jose Augusto Nunes Figueira**, Dimensional Engineering Team Member, *Embraer*

Tolerance Simulation embedded in the "Mercedes-Development Process"

**Dr. Christian Gloeggler**, Group Research and Advanced Engineering, *Daimler AG*

**Marcus Herfter**, Group Research and Advanced Engineering, *Daimler AG*

12:00 p.m. – 1:00 p.m. Lunch

1:00 p.m. – 2:30 p.m. A paradigm shift from a basic variation calculation to a virtual quality assessment

**Dr. Michael Rund**, Team Leader Body Design Analysis, *Volkswagen AG*

**Georg Ungemach**, Body Design Analysis, *Volkswagen AG*

**Andrey Sergejev**, Software Specialist, *DCS Inc.*

"Closing the Loop" on tolerance analysis with GDM-Web Corporate Data Management Reporting System

**Thagu Vivek**, GDM Software Development Manager, *DCS Inc.*

2:30 p.m. – 3:00 p.m. Afternoon Snack Break

3:00 p.m. – 5:00 p.m. DCS Software Development Roadmap

**Dave Johnson**, DCS Software Development Manager, *DCS Inc.*

Open Forum – Q&A

Conference Closing Session



# Schedule at a Glance cont...

Thursday, October 9<sup>th</sup>, 2008

9:00 a.m. – 5:00 p.m.

Hands-on Workshop at DCS HQ (OPTIONAL)  
(Seating is limited to the first 15 registrants)

3DCS FEA Compliant Modeler – basic training

Lunch

3DCS Advanced Analyzer/Optimizer – basic training



# Hotel Accommodations

**Reserve your Hotel Room Now!**

DCS has negotiated rooms at the **Hilton Detroit/Troy** at a rate of \$109 per night (*regularly \$149.00/night*).

Reservations can be made by calling the hotel directly, 1-248-879-2100 or online at [www.detroitroy.hilton.com](http://www.detroitroy.hilton.com). Simply identify yourself as part of the DCS World Users Conference to receive the discounted rate.

## Other Hotels in the area

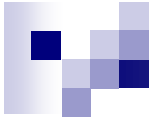
**Marriott Detroit/Troy**  
Phone: 1-248-680-9797  
Website: [Marriott - Troy](http://Marriott - Troy)

**Drury Inn and Suites Troy**  
Phone: 1-248-528-3330  
Website: [Drury Inn](http://Drury Inn)



# Pricing

- DCS World Users Conference Event – October 7th & 8th, 2008
  - Attendee fee = \$375 per person
  - Includes admission fee, continental breakfasts, lunches and afternoon snacks.
- Early Bird Registration Special
  - \$350 per person (before August 1st)
- Seating is limited so book early!
- Hands-on Workshop – October 9th, 2008
  - Attendee fee + \$150 per person
  - Seating is limited to the first 15 registrants
  - Must be participating in the conference to join workshop



# Presentation Abstracts



# Dimensional Engineering at General Motors

Rich Korynski, Global Dimensional Engineering, GM

Robert Frutiger Global CAX Methods & Integration, GM

Phil Oh, Global ISS, CAE, KBE, GM

## **Abstract:**

The purpose of the presentation is to overview the GM Dimensional Engineering work process and to discuss how Virtual Analysis methods and tools help support that activity. Areas will include the Dimensional Engineering scope of work, work method standardization, global application and leveraging and future trend direction. Additional high level focus will include specific types of analysis methods and their application to areas of vehicle assembly. These applications will include body and closure assembly, body on frame, front and rear exterior assembly, interior trim assembly, flexible assembly methods and digital assembly. Additional trend areas include enhanced visualization work, compliant modeling, system integration and efficiency initiatives.



# Reducing Costs using Variation Management, The Boeing Company

Mark Nestleroad, 787 Senior Variation Analyst, *Boeing Commercial Airplanes*

Mike Geddes, 787 Variation Management Leader, *Boeing Commercial Airplanes*

## **Abstract:**

Due to the sheer size of commercial airplanes and the continued globalization of manufacturing processes, a cost reduction plan has made it necessary to design, build, and ship major fuselage sections across the world. The challenge then becomes how to integrate such components without experiencing significant production problems. In the case of integrating two fuselage sections, Boeing uses the latest new functions in 3DCS CATIA to align the body sections using each section's Datum Reference Frames. The result of this Variation Analysis is a reduction in assembly flowtime and recurring fuel costs as the drag allowance requirements are met.

Upon completion of the Variation Analysis, Key Characteristics are selected next to achieve high production rates at minimal cost. However, the value of this task can be under estimated without following a Requirement focused methodology. Many times a feature or process attribute is identified as a KC because a tolerance / specification cannot be met, without any regards to a higher level Requirement; a Requirement specifically identified because of its known adverse impact to production. By clearly identifying a customer's Requirements and correlation to the impacting KCs, a value based approach is accomplished during the KC selection process. The value of this process is further increased by identifying specific criteria used to select a process attribute or geometric feature as a KC. Criteria considerations will be presented as well as methods to determine an established criterion will be met per desired confidence level.



# Tolerance Simulation embedded in the “Mercedes Development Process”

Dr. Christian Gloeggler, Group Research and Advanced Engineering, *Daimler AG*  
Marcus Herfter, Group Research and Advanced Engineering, *Daimler AG*

*Key words: Innovative 3DCS modeling techniques, VA processes and collaborations*

## **Abstract:**

Digital tolerance analysis combines the demand of design engineers and manufacturing capabilities. It supports the development departments in finding robust and optimized design approaches regarding functionality, quality and cost.

To tap the full potentials in this emerging area, the 3DCS software is applied for tolerance analysis in order to enrich processes in and across divisions in the company and suppliers.

Key issues are standardized and reproducible digital models and methods for motor and box scenarios as well as for Body in White assemblies. Especially when sheet metal assembly sequences and fixture concepts can be checked more realistically by using compliant models instead of rigid parts. The CATIA V5 integration offers the possibility to combine template based design methods with tolerance analysis in closer concurrent engineering cycles.



## Modeling non-rigid assemblies with 3DCS Compliant Modeler – Capabilities, Benefits & FEA Compatibility

Ralf Voss, Group Research and Advanced Engineering, *Universität Erlangen-Nürnberg c/o Daimler AG*  
Gerhard Bell, ASME Senior Certified GD&T Specialist, *DCS Inc.*

### ***Abstract:***

Manufacturers need to manage risk associated with product quality. Simulating dimensional variation is a key component in assessing the digital design's relationship to product quality. Material deformation can often be a significant contributor to this variation. Manufacturers need to make decisions during digital phases that influence costs, timing and tooling. 3DCS FEA Compliant Modeler solves this challenging aspect of simulating assembly variation for deformable parts and assemblies.

3DCS FEA Compliant Modeler enhances the ability to easily and quickly model deformable parts and assemblies. With 3DCS FEA Compliant Modeler, engineers can more accurately simulate dimensional variation within assemblies that contain deformable parts such as sheet-metal, plastics, composites, glass, etc. 3DCS FEA Compliant Modeler simulates the dimensional variation of part deformation resulting from spring-back, gravity or fabrication/assembly manufacturing operations (clamping, unclamping, welding, fastening, force application etc.) Learn how 3DCS FEA Compliant Modeler opens up a whole new world of tolerance simulation capabilities.



## New approach to analyzing modeling results with 3DCS Advanced Analyzer/Optimizer - Capabilities and Benefits

Armin Schöne, - Tolerance Management Specialist, *CENIT AG*  
Gerhard Bell, ASME Senior Certified GD&T Specialist, *DCS Inc.*

### ***Abstract:***

Now more than ever, global manufacturing companies need to employ efficient and comprehensive Product Lifecycle Management while still meeting demanding cost and quality targets. Program timing is shrinking and first-time-right engineering is key. It is imperative to simulate assembly variation in the digital prototype phase. It is just as important to get fast analysis results based on design, engineering and process changes. Pinpointing the source of assembly variation during the digital phase provides manufacturing agility to address dimensional challenges. Learn how 3DCS Advanced Analyzer/Optimizer gives engineers the necessary tool they need to analyze variation results quickly, and to make engineering decisions early - *and at a lower cost* - in the challenging game of product quality risk management.




# The Fundamentals in DCS Solution Tools

Dr. Ying Q. Zhou, Director Research & Development, *DCS Inc.*

## **Abstract:**

The presentation covers the dimensional variation simulation principles and challenges in general. The challenging issues are elaborated and discussed around non-linearity and DOE, constraint-based variation simulation, compliant simulation, kinematical simulation, and diagnosis.



# Dimensional Management: The challenge of simulating reality

Markus Schrader, Dimensional Management *AIRBUS Deutschland GmbH*

## **Abstract:**

The increasing decentralization of the development and manufacture of large structure components in the aerospace industries requires a continuous tolerance and dimensional management process methodology. It is essential to share tolerance information between the involved departments during the development phase in order to match quality requirements and cost targets. As a powerful concurrent engineering enabler throughout the Extended Enterprise, the dimensional management process has the goal to provide meaningful information about product data and process quality criteria as early as possible. Simulation of manufacturing and assembly processes is a key point within the tolerance and dimensional management process. A further step towards simulating the reality will be the additional input of information on material properties and its assembly behavior, in addition to the geometric information currently used in the virtual development / production-planning process.



## "3DCS Advanced Analyzer/Optimizer - Case analysis on aircraft structural assemblies"

Jose Augusto Nunes Figueira, Dimensional Engineering Team Member, *Embraer*

### ***Abstract:***

One of the key benefits of generating tolerance analysis models has always been the possibility to evaluate which parts and tolerances are the major contributors that influence product quality requirements. But there has been a limitation where current tools on the market are targeted to evaluate one requirement at a time.

For more complex and multistage assemblies with multiple requirements to be met at the same time current techniques fail to give a tolerance effect overview and lack the ability to optimize the whole system aiming reduced costs or improved quality. The same applies when multiple scenarios of concepts, tolerances, manufacturing and assembly processes have to be compared during product development. Such situations are common on complex product OEMs like in the aircraft industry.

Dimensional Control System has developed a tool called 3DCS Advanced Analyzer/Optimizer which aims to bring new possibilities to evaluate several tolerances influencing several requirements at the same time. In this sense Embraer decided to evaluate the benefits of this tool for the dimensional management of structural assemblies as well as support and influence the development of the product towards its intended utilization.



## Leveraging CATIA V6 capabilities inside of 3DCS

Minal Santhosh , Manager - CAA Partnerships, *Dassault Systemes*  
Dave Johnson, Software Development Manager, *DCS Inc.*

### **Abstract:**

Dimensional Control Systems was the 1st CAA V5 partner. Now with the inevitability of CATIA V6, DCS is on the cutting edge again. This session will include a live demonstration of 3DCS in CATIA V6 along with all the benefits of V5 plus the new unparalleled capabilities and benefits of V6.



## A paradigm shift from a basic variation calculation to a virtual quality assessment

Dr. Michael Rund, Team Leader Body Design Analysis, *Volkswagen AG*

Georg Ungemach, Body Design Analysis, *Volkswagen AG*

Andrey Sergejev, Software Specialist, *DCS Inc.*

### **Abstract:**

In cooperation with DCS, Volkswagen AG and Helmut-Schmidt University took on the challenge of enhancing the existing capabilities of 3DCS FEA Compliant Modeler based on research work done by Volkswagen AG. A major objective of the project was to produce high quality visualization of the combined effects of part variation with deformation without sacrificing PC computing performance. Additionally, the project focused on refining the process of integrating arbitrary Finite Element Calculation results and expanding the functional range of variation analysis.

The aim of 3DCS FEA Compliant Modeler is to simulate the dimensional variation resulting from deformation of compliant parts and assemblies due to the clamping, welding and unclamping during the assembly process. In a majority of the cases, thousands of simulations must be performed, placing a high demand on the underlying simulation methods utilized. 3DCS uses the *Finite Element Superelements* to achieve both high performance and high precision. One disadvantage of this method is that the visualization quality is strongly dependent on the number of degrees of freedom that are taken into account by the *Superelement* generation. Increasing the number of degrees of freedom leads to a decrease in PC computing performance. The results of the shared development are presented which solve this conflict by introducing a new *Deformation Visualization method*. Along with the improvements to the visualization quality in the case of clamping and welding, this method also implements a new function that utilizes deformation to visualize part shape variation while superimposing it with common point-based tolerance modeling techniques.



## “Closing the Loop” on tolerance analysis with GDM-Web Corporate Data Management Reporting System

Thagu Vivek, GDM Software Development Manager, *DCS Inc.*

### ***Abstract:***

In the globally distributed era of manufacturing phases of any assembled parts – data becomes the lifeline connecting and ensuring the quality of the product. This globalization creates a disconnect between the design & engineering centers and the parts and assembly suppliers. To close the loop and bring synergy between these two critical centers to continuously improve quality of the final product, DCS has developed a technology and a suite of software tools. Using manufacturing data for design optimizations provides a higher accuracy and degree of confidence in the results, as data collected on the shop floor is an amalgamation of all the factors effecting the true process and is not based on a few assumptions. The paper discusses the process and procedures with real life examples on the data flow between the engineering tools used in these centers to accomplish design Improvements and validation based on manufacturing data.

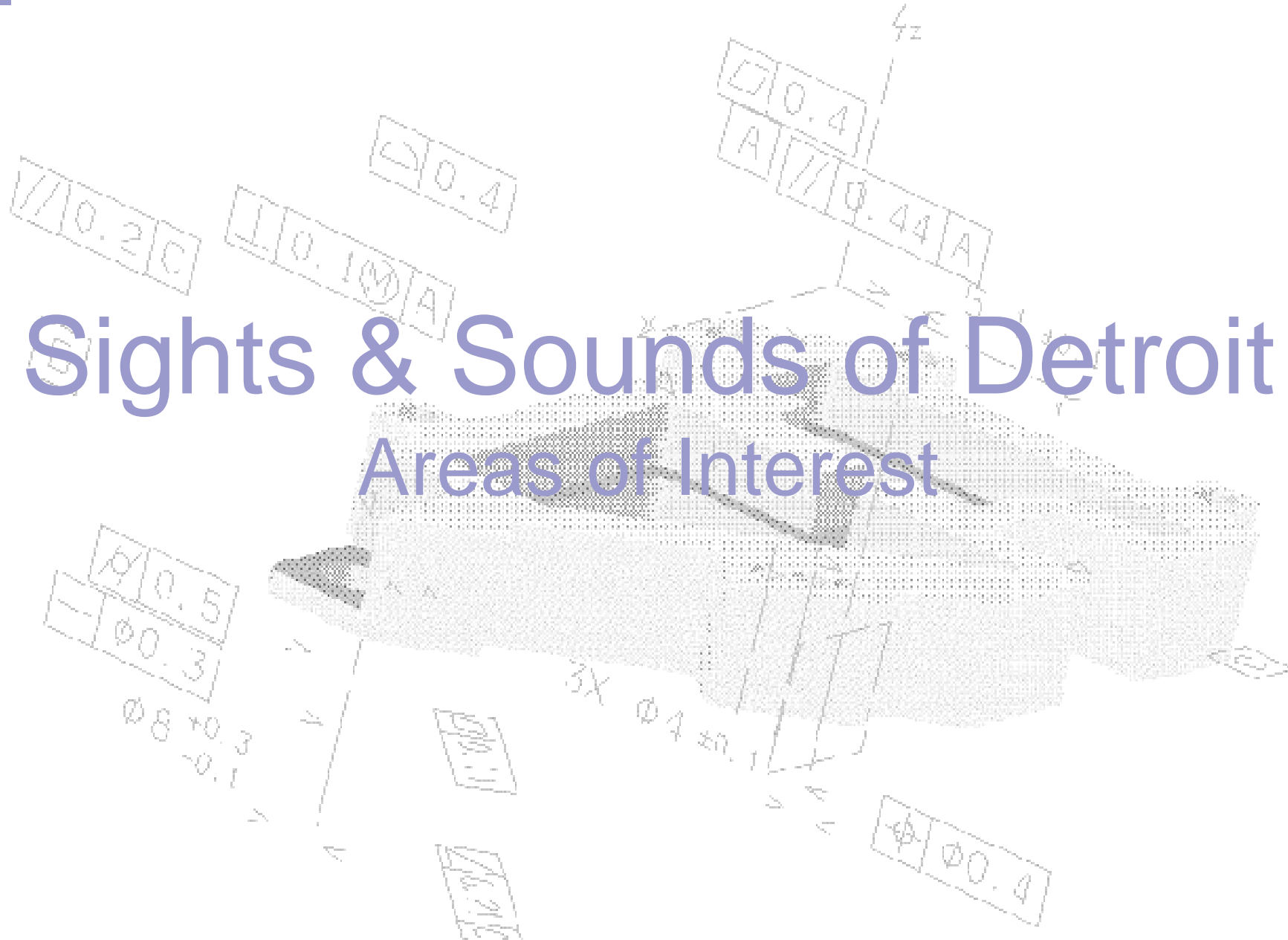
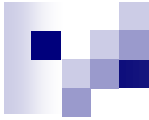


# 3DCS Software Development Road Map

Dave Johnson, Software Development Manager, *DCS Inc.*

## **Abstract:**

You have invested in Dimensional Control Systems and need to know how to maximize our current solutions and prepare for our future capabilities. This Software Development Road Map will give an overview of our "State of the Art" 3DCS CAA V5 and Stand Alone solutions. You will also get a glimpse of our major development efforts including Compliant Modeler, Model Reporting and our New "Designer" product.



# Sights & Sounds of Detroit

## Areas of Interest

# Detroit Areas of Interest...

- Greenfield Village & Henry Ford Museum
  - Henry Ford Museum & Greenfield Village

Greenfield Village



Henry Ford Museum



- Detroit Riverfront
  - Detroit Riverfront
- Cruise on the Detroit River
  - Detroit River Cruise

- Greektown
  - Greektown



# Detroit Areas of Interest cont...

- **Detroit Casinos**

- [Greektown Casino](#)
- [Motor City Casino](#)
- [MGM Grand Casino](#)



## DETROIT ZOO

- **Detroit Zoo**

- [Detroit Zoo](#)

- **Shopping**

- [Somerset Collection](#)
- [Great Lakes Crossing](#)
- [Birch Run Outlet Mall](#)



- **Cedar Point Amusement Park, Sandusky Ohio**

- Worlds Largest Amusement Park!
- (only 2-hour drive from Detroit)
- [Cedar Point](#)



We look forward to seeing  
you at the event!!

To reserve your seat at the DCS Users Conference, please register  
at [https://www.regonline.com/DCS\\_WorldUserConf\\_2008](https://www.regonline.com/DCS_WorldUserConf_2008)