WakeNet3-Europe

Specific Workshop hosted by TU Berlin:

Location: Technical University Berlin, Strasse des 17 Juni 135, 10623 Berlin, Room 1035 (1st floor)

Models and Methods for Wake Vortex Encounter Simulations

Workshop Agenda

1st day: Wake vortex models for real-time and fast-time encounter simulations

Tuesday, 01 June 2010 (1st day)

09:00 Coffee, informal get-together

Chairman: Robert Luckner

10:00 **Welcome & Introduction**
Robert Luckner, Vice Dean Faculty Mechanical Engineering and Transport Systems, TU Berlin
Professor Flight Mechanics, Flight Control and Aeroelasticity

10:00 **Overview of existing wake vortex models used in flight simulator studies**
Robert Luckner / Technical University Berlin

10:30 **Wake vortex models, and the associated 3-D velocity fields, for real-time and fast-time WVE simulations**
Ivan de Visscher / Université Catholique de Louvain

11:00 **Aircraft wake vortex curvature and resulting risk potential for following aircraft**
Ingo Hennemann / DLR Oberpfaffenhofen

11:30 **Wake vortex models for real-time flight simulations based on large eddy simulations**
Graham Spence / University of Sheffield

12:00 **Aircraft wake vortex evolution in ground proximity: analysis and parameterization**
Meiko Steen / Technical University Braunschweig, Frank Holzäpfel / DLR Oberpfaffenhofen

12:30 Lunch

Chairman: Sebastian Kauertz

13:30 **Curved wake vortices encounter simulation with pilots-in-the-loop**
Dennis Vechtel / DLR Braunschweig

14:00 **Flight-simulator study of airplane encounters with perturbed trailing vortices**
Jeffrey Crouch / Boeing

14:30 **Lessons learned: WakeScene-D, results of quantitative (Monte Carlo) simulation studies**
Jan Kladetzke / DLR Oberpfaffenhofen

15:00 Coffee break

Chairman: Jean-Pierre Nicolaon

15:15 **Application of wake vortex models in real-time and fast-time wake encounter simulation**
Sebastian Kauertz / Airbus TLS

15:45 **Re-categorisation Phase II and III requirements (wake vortex models)**
Jeffrey Tittsworth / FAA

16:15 **Workshop wrap-up**
Discussion about the workshop outcome, a state-of-the-art summary of existing wake vortex models: 1) that are useful for flight simulator investigations (real-time models); 2) that are applicable for Monte Carlo simulations (fast-time models)

17:00 Simulator Session

Visiting and flying of the SEPHIR Simulator (VFW-614-ATD) and THYRAS (Transall). Demonstration of different implemented wake vortex models

18:00 End of Day 1

20:00 Dinner

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2nd day: Models of pilot behaviour for real-time and fast-time wake vortex encounter simulations

Wednesday, 02 June 2010 (2nd day)

Chairman: Robert Luckner

09:00 **Opening**
Robert Luckner, Technical University Berlin

09:00 **Overview of existing pilot behaviour models used in flight simulator studies**
Robert Luckner / Technical University Berlin

09:30 **Multi-axis pilot modeling**
Ronald Hess / University of California

10:00 **Pilot model for take-off and departure and wake vortex recovery**
Swantje Amelsberg / Technical University Berlin

10:30 Coffee break

Chairman: Peter van der Geest

10:45 **Analysis of visual cues during landing phase using neural networks**
Jorg Entzinger / University of Tokyo

11:15 **Identifying human control behaviour in the SIMONA research simulator**
Herman Damveld / Delft University of Technology

11:45 **Probabilistic pilot model approach for wake vortex encounter simulations**
David Bieniek / Technical University Berlin

12:15 Lunch

Chairman: Jeffrey Crouch

13:15 **Characterizing wake vortex encounters for hazard analysis/ safety management system purpose**
Richard Greenhaw / FAA

13:45 **Wake vortex severity criteria developed by NLR**
Peter van der Geest / NLR

14:15 **Wake vortex severity criteria for departure**
Swantje Amelsberg / Technical University Berlin

14:45 Coffee break

Chairman: Andreas Reinke

15:00 **Modified optimal control model and wake vortex encounter**
Andrej Schoenfeld / Technical University Berlin

15:30 **Re- categorisation Phase II and III requirement (pilot models)**
Jeffrey Tittsworth / FAA

16:00 **Workshop wrap-up**
Discussion about the workshop outcome, a the state-of-the-art summary of existing pilot behaviour models for tracking tasks and high dynamic recovery tasks in real- and fast time flight simulations

17:00 End of the workshop