NDIA
National Defense Industrial Association

PHYSICS-BASED MODELING IN DESIGN & DEVELOPMENT

FOR U.S. DEFENSE CONFERENCE

NOVEMBER 5-8, 2012

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HYATT REGENCY DENVER TECH CENTER ▶ **DENVER, CO**

MONDAY, NOVEMBER 5, 2012

7:30 AM - 8:30 AM **REGISTRATION & CONTINENTAL BREAKFAST - GRAND MESA FOYER**

9:00 AM - 12:00 PM **TOOL SEMINARS - ADDITIONAL FEE TO ATTEND**

TOOL SEMINARS - CHASM CREEK A	
8:30 AM - 10:00 AM	HYGIE TECH USA
MORNING BREAK - TOOL SEMINAR ATTENDEES ONLY	

12:30 PM - 1:30 PM **LUNCHEON - TOOL SEMINAR ATTENDEES ONLY**

5:00 PM - 6:00 PM **NETWORKING RECEPTION - GRAND MESA FOYER**

TUESDAY, NOVEMBER 6, 2012

7:30 AM - 8:30 AM   **REGISTRATION & CONTINENTAL BREAKFAST - GRAND MESA FOYER**

8:30 AM - 12:00 PM   **GENERAL SESSION**

8:00 AM - 8:30 AM   **WELCOME AND OPENING REMARKS**

- Mr. Sam Campagna, *Assistant Vice President, Operations, NDIA*

8:30 AM - 9:15 AM   **KEYNOTE**
Dr. Ed Kraft, *Chief Technologist, Arnold Engineering Development Complex*

9:15 AM - 10:00 AM   **KEYNOTE**
Mr. Adrian Mackenna, *NAVSEA*

10:00 AM - 10:30 AM   **MORNING BREAK - ATRIUM**

10:30 AM - 12:00 PM   **SERVICES VIEWS ON BENEFITS OF CREATE**
Moderator: Dr. Ed Kraft, *Chief Technologist, Arnold Engineering Development Complex*

Panelists:
- Mr. Adrian Mackenna, *NAVSEA*
- Dr. E. Thomas Moyer, *Naval Surface Warfare Center, Carderock Division*

12:00 PM - 1:30 PM   **LUNCHEON WITH SPEAKER**
Lt Gen Larry Farrell, USAF (Ret), *President & CEO, NDIA*

1:30 PM - 5:00 PM   **GENERAL SESSION**

1:30 PM - 3:00 PM   **INDUSTRY USE OF CREATE MODELS**
Panelists:
- Mr. Kurt Elkins *Raytheon Company*
- Mr. Jeff Bergenthal, *Lockheed Martin*

3:00 PM - 3:30 PM   **AFTERNOON BREAK - ATRIUM**

3:30 PM - 5:00 PM   **IMPROVING TEST & EVALUATION WITH PHYSICS-BASED MODELING**
Moderator: Dr. Ed Kraft, *Chief Technologist, Arnold Engineering Development Complex*

Panelists:
- Col James Sturim, USAF, *Director, SEEK EAGLE Program, Eglin AFB*
- Dr. James Heidmann, *NASA*

5:00 PM - 6:00 PM   **NETWORKING RECEPTION - ATRIUM**

WEDNESDAY, NOVEMBER 7, 2012

7:30 AM - 8:30 AM REGISTRATION & CONTINENTAL BREAKFAST - GRAND MESA FOYER

8:30 AM - 10:00 AM BREAKOUT SESSIONS

	8:30 AM - 9:15 AM	9:15 AM - 10:00 AM
CREATE COMPONENT OVERVIEWS **CHASM CREEK A**	15102 - CREATE-AV DaVinci: Informed Systems Engineering Decision Making for DoD Acquisition Dr. Ed Kraft, *Arnold Engineering Development Complex*	15082 - Modeling Antennas with CREATE-RF's SENTRi Application Dr. John D'Angelo, *Air Force Research Laboratory*
BLAST/ FRAGMENTATION AND SURVIVABILITY/ LETHALITY/ VULNERABILITY MODELING **CHASM CREEK B**	**NEW** 14961 - 2012 Highlights of the CREATE Program *to be given by:* Dr. Saikat Dey, *Naval Research Laboratory*	15019 - Analysis of Underbody Blast and Blast in Urban Areas Using the MSU Loci/BLAST Code Dr. Richard Weed, *Center for Advanced Vehicular Systems*
MESHES/GRIDS **GRAND MESA D**		14973 - Automated Discretization of Digital Curves Through Local or Global Constrained Optimization Dr. David McLaurin, *Mississippi State University*
VERIFICATION & VALIDATION **GRAND MESA E**	15050 - Verification & Validation of Physics-Based Models for Blast Applications Ms. Amy Tank, *SURVICE Engineering Company*	15103 - Uncertainty Quantification and Validation of Equipment Response to Underwater Shock Loading Dr. Kenneth Hu, *Sandia National Laboratories*

MORNING BREAK - ATRIUM

	10:30 AM - 11:15 AM	11:15 AM - 12:00 PM
CREATE COMPONENT OVERVIEWS **CHASM CREEK A**	14965 - Using CREATE's Rapid Ship Design Environment to Perform Design Space Exploration for a Ship Design Mr. Adrian Mackenna, *NAVSEA*	15285 - Development and Validation of NavyFOAM - Multi-Physics Multi-Domain Computational Fluid Dynamics Software for Naval Applications Sung-Eun Kim, *Naval Surface Warfare Center Carderock Division*
BLAST/ FRAGMENTATION AND SURVIVABILITY/ LETHALITY/ VULNERABILITY MODELING **CHASM CREEK B**	**NEW** 15028 - Using Kestrel in the Cloud Mr. Joshua Calahan, *Chenega Federal Systems, LLC* *to be given by:* Mr. Jeff Houchard, *Maui High Performance Computing Center*	15110 - A Blast Model Comparison Between Hydrocode and CFD Mr. John Adams, *Booz Allen Hamilton*
FINITE ELEMANT ANALYSIS **GRAND MESA D**	15095 - Isogeometric Analysis for Higher-Order Damage and Phase-Field Fracture Models Mr. Michael Borden, *The University of Texas at Austin*	15049 - Finite Element Analysis Simulation & Design Optimization for Defense Training Systems Dr. Jose Gonzalez, *Kratos Defense & Security Solutions*
VERIFICATION & VALIDATION **GRAND MESA E**	15048 - PREDICTION OF SHIP SHOCK RESPONSE & DAMAGE WITH THE NAVY ENHANCED SIERRA MECHANICS CODE Dr. E. Thomas Moyer, *Naval Surface Warfare Center, Carderock Division*	**NEW** 15039 - VERIFICATION, VALIDATION AND UNCERTAINTY QUANTIFICATION IN CREATE—A CASE STUDY Dr. Larry Votta, *HPCMO- CREATES-BASED MODELING INIT* *to be given by:* Dr. John D'Angelo, *Air Force Research Laboratory*

12:00 PM - 1:30 PM LUNCHEON - GRAND MESA ABC BALLROOM

	1:30 PM - 2:15 PM	2:15 PM - 3:00 PM
CREATE COMPONENT OVERVIEWS **CHASM CREEK A**	**15286 - CREATE-Ships Integrated Hydrodynamic Design Environment (IHDE)** Mr. Adrian Mackenna, *NAVSEA*	**15088 - Capstone: A Platform for Geometry, Meshing and Attribution Modeling for Physics-Based Analysis and Design** Dr. Saikat Dey, *Naval Research Laboratory*
BLAST/ FRAGMENTATION AND SURVIVABILITY/ LETHALITY/ VULNERABILITY MODELING **CHASM CREEK B**	**15006 - Determining Constitutive Response and Adjusting Johnson-Cook Failure Parameters Based on Simple Experiment and Simulations for Asis 4340 Steel for Fragmentation Simulations** Dr. Matthew Barham, *Lawrence Livermore National Laboratory*	**15136 - ALE3D: Arbitrary Lagrange Eulerian Three- and Two- Dimensional Modeling and Simulation Capability** Dr. Samuel Schofield, *Lawrence Livermore National Laboratory*
COMPUTATIONAL FLUID DYNAMICS **GRAND MESA D**	**14985 - Parallel Hexahedral Mesh Generation from Eulerian Volume Fraction Data** Mr. Steven Owen, *Sandia National Laboratories*	
ENVIRONMENT AND PHENOMENOLOGY **GRAND MESA E**	**15034 - Integrating Four-Dimensional Weather Data into a Flight Simulator** Dr. Daniel Weber, *559th Software Maintenance Squadron*	**15084 - Risk Oriented CFD** Dr. Philippe Le Goff, *HyGie-Tech USA*

AFTERNOON BREAK - ATRIUM

	3:30 PM - 4:15 PM	4:15 PM - 5:00 PM
50 YEARS OF PHYSICS OF FAILURE **CHASM CREEK A**		**14976 - SoftWare for the Optimization of Radiation Detectors (SWORD)** Dr. Chul Gwon, *Naval Research Laboratory*
SOFTWARE ENGINEERING **CHASM CREEK B**	**14749 - Taking Advantage of Plant Modeling in the Software Development Process** Mr. David Stamm, *Pi Innovo*	**NEW** **15040 - SOFTWARE ENGINEERING IN CREATE— LESSONS DEPLOYED** Dr. Richard Kendall, *HPCMO – CREATE* *to be given by:* Dr. Saikat Dey, *Naval Research Laboratory*
COMPUTATIONAL FLUID DYNAMICS **GRAND MESA D**	**15042 - A Performance-based Code Assessment for Low Mach Large Eddy Simulations** Dr. Stefan Domino, *Sandia National Laboratories*	**15035 - Accelerating Finite Difference Computations Using General Purpose GPU Computing** Mr. James Stevens, *559th Software Maintenance Squadron*
ENVIRONMENT AND PHENOMENOLOGY **GRAND MESA E**	**15152 - Predicting RF Signal Attenuation in Urban Environments through Ray-Tracing** Dr. Evens Jean, *Dynamics Research Corporation*	**NEW** **15010 - FIRST-PRINCIPLES HOVER PREDICTION FOR MULTIPLE ROTOR BLADES USING CREATE-AV HELIOS** Dr. Nathan Hariharan, *CREATE-AV* *to be given by:* Dr. Venke Sankaran, *Air Force Research Laboratory*

THURSDAY, NOVEMBER 8, 2012

7:30 AM - 8:30 AM   REGISTRATION & CONTINENTAL BREAKFAST - GRAND MESA FOYER

8:30 AM - 12:00 PM   BREAKOUT SESSIONS

	8:30 AM - 9:15 AM	9:15 AM - 10:00 AM
REQUIREMENTS AND SYSTEMS MODELING **CHASM CREEK A**	14731 - Leveraging Service-Oriented Architectures with MBSE Mr. Zane Scott, *Vitech Corporation*	15080 - Efficient Modeling and Simulation (M&S) Using Sequential Design of Experiments (DOE) Methods Dr. Tom Donnelly, *SAS Institute Inc.*
PHYSICS BASED MODELING ENVIRONMENTS AND USABILITY **CHASM CREEK B**	14974 - The Sandia Analysis Workbench: Leveraging a COTS Framework to Provide Integrated Engineering Analysis Workflows on HPC Systems Dr. Robert Clay, *Sandia National Laboratories*	15120 - Virtual Prototyping Dr. Ab Hashemi, *Lockheed Martin Space Systems Company*
PROPELLANT & FUEL MODELING **GRAND MESA D**	14986 - Physics-Based Model for Online Fault Detection in Autonomous Cryogenic Loading System Dr. Vadim Smelyanskiy, *Physics Based Methods, Exploration Systems Directorate, NASA Ames Research Center*	14989 - Comparative Scaling Analysis of the Vehicle' LH2 and LOX Tanks in Blowdown Regime Dr. Vadim Smelyanskiy, *Physics Based Methods, Exploration Systems Directorate, NASA Ames Research Center*
PHYSICS BASED MODELING ACCESSIBILITY AND SERVICES **GRAND MESA E**	14489 - WARP – A Centralized Repository for Physics-Based Models Mr. David Nicholls, *Reliability Information Analysis Center*	14769 - Portal Development for HPC at Maui High Performance Computing Center DoD Supercomputing Resource Center Mr. David Morton, *Maui High Performance Computing Center*

MORNING BREAK

	10:30 AM - 11:15 AM	11:15 AM - 12:00 PM
REQUIREMENTS AND SYSTEMS MODELING **CHASM CREEK A**	14732 - The Power of Iterative Interviews in Modeling Existing Systems Mr. Zane Scott, *Vitech Corporation*	
PHYSICS BASED MODELING ENVIRONMENTS AND USABILITY **CHASM CREEK B**	**NEW** **14961 - 2012 HIGHLIGHTS OF THE CREATE PROGRAM,** Dr. Douglass Post, *DoD High Performance Computing Modernization Program* *to be given by:* Dr. Saikat Dey, *Naval Research Laboratory*	15092 - Use of Plugin Architecture and Full Source Licensing in the Deployment and Support of the Conflict Analysis & Simulation Tool (CAST) Mr. John Shue, *ManTech International Corporation*
PROPELLANT & FUEL MODELING **GRAND MESA D**	14977 - Hazards Induced by Breach of Liquid Rocket Fuel Tanks: Physics-Based Modeling of Cavitation-Induced Self-Ignition and Radiation-Induced Aerosol Explosion of Cryogenic H2-Ox Fluids Dr. Vadim Smelyanskiy, *Physics Based Methods, Exploration Systems Directorate, NASA Ames Research Center*	15111 - AFRL's ALREST Physics-Based Combustion Stability Prediction Program Dr. Venke Sankaran, *Air Force Research Laboratory*

Abstract ID	Abstract Title	Secondary Authors
14489	WARP – A Centralized Repository for Physics-Based Models	Paul Lein, Alex MacDiarmid, Kaushik Chatterjee, Dr. Mohammad Modarres
14493	Fifty Years of Physics of Failure	Dr. Mohammad Modarres, Dr. Joseph Bernstein, Mr. David Nicholls
14974	The Sandia Analysis Workbench: Leveraging a COTS Framework To Provide Integrated Engineering Analysis Workflows On HPC Systems	Dr. Ernest Friedman-Hill, Ed Hoffman
14976	SoftWare for the Optimization of Radiation Detectors (SWORD)	Bernard Phlips, Mark Strickman, Lori Jackson, Byron Leas
14977	Hazards Induced by Breach of Liquid Rocket Fuel Tanks: Physics-Based Modeling of Cavitation-Induced Self-Ignition and Radiation-Induced Aerosol Explosion of Cryogenic H2-Ox Fluids	Dr. Viatcheslav Osipov, Dr. Halyna Hafiychuk, Dr. Ekaterina Ponizovskya-Devine, Dr. Cyrill Muratov
14979	Initial Validation of Physics-Based Modeling to Support Test and Evaluation of Army Vehicles against Mine Threats	Ms. Raquel Ciappi
14986	Physics Based Model for Online Fault Detection in Autonomous Cryogenic Loading System	Dr. Dmitry Luchinsky, Dr. Ekaterina Ponizhovskaya, Dr. Veyatcheslav Osipov, Dr. Barbara Brown
14989	Comparative Scaling Analysis of the Vehicle' LH2 and LOX tanks in Blowdown regime	Dr. Dmitry Luchinsky, Dr. Ekaterina Ponizhovskaya, Dr. Veyatcheslav Osipov, Dr. Halyna Hafiychuk
15006	Determining Constitutive Response and Adjusting Johnson-Cook Failure Parameters Based on Simple Experiment and Simulations for Asis 4340 Steel for Fragmentation Simulations	Dr. James Stolken, Dr. Mukul Kumar
15011	Implications of Real Gas Effects on Surface Heat Flux of Hypersonic Vehicles	Dr. Jonathan Burt, Eswar Josyula
15012	Prediction of Unsteady Flow in UCAV Weapon's Bay Using CREATE-AV's Kestrel	Dr. Nathan Hariharan
15019	Analysis of Underbody Blast and Blast in Urban Areas using the MSU Loci/BLAST code	Dr. Edward Luke, Dr. Mark Janus, Dr. Xiao Wang, Dr. David Thompson
15034	Integrating Four-Dimensional Weather Data into a Flight Simulator	James Stevens, Joseph Babb, Jesse Robertson, Greg Woodward
15035	Accelerating Finite Difference Computations Using General Purpose GPU Computing	Dr. Daniel Weber, Greg Woodward
15039	Verification, Validation and Uncertainty Quantification in CREATE– A Case Study	Dr. Richard Kendall, Mrs. Deborah Borovitcky
15040	Software Engineering in CREATE—Lessons Deployed	Dr. Larry Votta, Dr. Doug Post
15050	Verification & Validation of Physics-Based Models for Blast Applications	Dr. James Walbert
15082	MODELING ANTENNAS WITH CREATE-RF'S SENTRI APPLICATION	Dr. Ryan Chilton, Dr. Jorge Villa-Giron
15088	Capstone: A Platform for Geometry, Meshing and Attribution Modeling for Physics-Based Analysis and Design	Mr. Eric Mestreau, Dr. Kaan Karamete, Dr. Romain Aubry
15095	Isogeometric Analysis for Higher-Order Damage and Phase-Field Fracture Models	Dr. Thomas Hughes, Dr. Chad Landis, Dr. Michael Scott
15102	CREATE-AV DaVinci: Informed Systems Engineering Decision Making for DoD Acquisition	Mr. Gregory Roth
15103	Uncertainty Quantification and Validation of Equipment Response to Underwater Shock Loading	Dr. David Manko, Dr. John Red-horse, Dr. Thomas Paez
15110	A Blast Model Comparison between Hydrocode and CFD	Mr. John Adams, Mr. Alexander Sweeney
15111	AFRL's ALREST Physics-Based Combustion Stability Prediction Program	Dr. Douglas Talley
15120	Virtual Prototyping	Jennifer Batson
15152	Predicting RF Signal Attenuation in Urban environments through Ray-Tracing	Dr. Brian Henz

THANK YOU FOR ATTENDING THE

Physics-Based Modeling in Design & Development for U.S. Defense Conference

The Attendee Roster and Conference Proceedings link will be emailed to all attendees within the next week.

All proceedings for public release will be posted to:
http://www.dtic.mil/ndia/2012physics/2012physics.html