# **2012 IEEE/AIAA 31st Digital Avionics Systems Conference**

# (DASC 2012)

# Williamsburg, Virginia, USA 14-18 October 2012

Pages 1-933



IEEE Catalog Number: ISBN: CFP12DAV-PRT 978-1-4673-1699-6

Special Event Presentation				
Papers	Present.	Title	Author(s)	
	<u>Special</u> <u>Event</u>	"Taking Flight: Aviation from Antiquity to the 21stCentury"	Dr. Richard P. Hallion	
Track	1 - Our	History, Our Future		
Al Helf	frick, E	mbry-Riddle Aeronautical University a	nd	
Eric I	heuniss	en, Delft University of Technology		
Session	A - Spec	ial Topics in Avionics History		
Al Helfr Eric Th	rick, Eml eunissen	bry-Riddle Aeronautical University and , Delft University of Technology		
<u>1A1</u>	1	From Instruments to Decision Support: History, Trends and (Missed) Opportunities		
<u>1A2</u>	<u>28</u>	From Captain Jeppesen's Little Black Book to the iPad and Beyond	Christian Pschierer, Ted Thompson, Rick Ellerbrock, Skip Haffner	
<u>1A3</u>	<u>69</u>	TRN History, Trends and the Unused Potential	Daniela Vaman	
<u>1A4</u>	<u>99</u>	Aircraft Radio Corporation and their Role in the Development of Avionics	Albert Helfrick	
<u>1A5</u>	<u>; 8</u>	WWII Avionics Finds a New Home After the War	Albert Helfrick	
<u>1A6</u>	<u>133</u>	Data Convergence for Efficiency: A Holistic Rethink of the Passenger Experience	Hugh Blair-Smith	
Track	2 - Flig	ht Deck Systems		
Bernd	Korn, I	DLR and Al Herndon, MITRE		
Session	B - Terra	ain Awareness and Collision Avoidance		
Todd Lo	ovell, Ra	ytheon and Art Tank, Lockheed Martin		
<u>2B1</u>	<u>354</u>	A400M Tactical Ground Collision Avoidance System (T-GCAS)	Roland Goerke, Werner Berger	
<u>2B2</u>	<u>374</u>	Modeling Terrain Awareness and Warning Systems for Airspace and Procedure Design	Jason Lee	
	<u>393</u>	Influence of Pilot's Demographics on Compliance to TCAS Resolution Advisories	Leihong Li	
<u>2B4</u>	<u>3: 6</u>	Design of a Pilot-Centered Visual Decision-Support System for Airborne Collision Avoidance	Emre Koyuncu, Ugur Ozdemir, Guliz Tokadli, Ziya Bahcivan, Gokhan Inalhan	
<u>2B5</u>	438	Implicit Maneuver Coordination: Issues and Potential Solutions	Maarten Kastelein	

Session C - Operations and Procedure Design				
Christian Pschierer, Jeppesen and Colleen Donavon, Federal Aviation Administration				
<u>2C1</u>	<u>266</u>	Flying Schedule-Matching Descents to Explore Flight Crews' Perceptions of Their Load and Task Feasibility	Lynne Martin, Shivanjli Sharma, Sandra Lozito, John Kaneshige, Victoria Dulchinos	
<u>2C2</u>	<u>286</u>	Human Centered Design of an In-Trail Procedures (ITP) System	Ratan Khatwa , Emmanuel Letsu-Dake , Santosh Mathan , Olu Olofinboba	
<u>2C3</u>	<u>2; 5</u>	Development and Flight Evaluation of Airborne Weather Information System	Tomoko Iijima, Naoki Matayoshi, Takayuki Nishi, Osame Wada	
<u>2C4</u>	<u>545</u>	General Aviation Landing Assistance Using Formal Methods-Based System Design	Wolfgang Pointner, Gabriele Kotsis, Michael Naderhirn	
	<u>563</u>	Standards and Requirements for Synthetic, Enhanced, and Combined Vision Systems - Status of RTCA SC- 213 Activities	Tim Etherington	
Session	D - Adva	anced Displays		
Erik Th	eunissen	, Delft University of Technology and Divya Ch	andra, US DOT/Volpe Center	
<u>2D1</u>	572	Review of Visual Clutter and Its Effects on Pilot	Philippe Doyon-Poulin, Benoit Qualletta, Jaan Mara Robert	
<u>2D2</u>	<u>59;</u>	Evaluating a De-Cluttering Technique for NextGen RNAV and RNP Charts	Abhizna Butchibabu, Rebecca Grayhem, R. John Hansman, Divva Chandra	
<u>2D3</u>	<u>626</u>	Touch Screen Technology in Flight Deck, How Far is it Helpful?	Sridher Kaminani	
<u>2D4</u>	<u>645</u>	Motion-Base Simulator Evaluation of an Aircraft using an eXternal Vision System	Lynda Kramer,	
<u>2D5</u>	<u>677</u>	Synthetic and Enhanced Vision Systems (SEVS) for Nextgen Simulation And Flight Test Performance Evaluation	Kevin Shelton, Lynda Kramer, Kyle Ellis, Sherri Rehfeld	
	<u>699</u>	Graphical Diisplay of NOTAMs & Other Aeronautical Information in the Cockpit	Kathlyn Hoekstra	
Session	E - Syste	em Design and Simulation		
Randy H	Bailey, N	ASA Langley Research Center and Mike Bryc	hcy, Boeing	
<u>2E1</u>	<u>69:</u>	Pilot Suit with Integrated Avionics	Petr Frantis	
<u>2E2</u>	<u>6; 9</u>	Trans Dimensional System for Situational Awareness and I.S.R.	Hector Gomez-Acevedo	
<u>2E3</u>	<u>743</u>	Terrain Rendering Algorithm Performance Analysis	Lukas Polok, Radek Barton, Petr Chudy, Pavel Smrz, Petr Dittrich	
<u>2E4</u>	<u>758</u>	A Simulation Environment for Evaluation of Integrated Alerting and Notification (IAN) Concepts	Pengfei Duan, Maarten Uijt de Haag	
<u>2E5</u>	<u>783</u>	Creating a RealisticWeather Environment for Motion- Based Piloted Flight Simulation	Taumi Daniels, Philip Schaffner, Emory Evans, Robert Neece, Steven Young	
<u>2E6</u>	<u>7: 8</u>	Design Considerations For A Helmet-Mounted Synthetic Degraded Visual Environment Display	Niklas Peinecke, Patrizia Knabl	

# Track 3 - Air Traffic Management - 1 Elly Smith, MITRE and Liling Ren, GE Aviation

### Session A - Arrival Management Optimization

### Craig Johnson, MITRE

8	,		
<u>3A1</u>	<u>826</u>	Weather Avoidance Optimal Routing for Extended Terminal Airspace in Support of Dynamic Airspace Configuration	Arash Yousefi, Jit-Tat Chen, Shubh Krishna, Ben Sliney, Phil Smith
<u>3A2</u>	<u>856</u>	A Comparative Study of Interval Management Control Law Capabilities	Bryan Barmore, Colin Smith, Susan Palmer, Terence Abbott
<u>3A3</u>	<u>87;</u>	Development and Evaluation of the Terminal Precision Scheduling and Spacing System for Off-Nominal Condition Operations	Harry Swenson, Jaewoo Jung, Liang Chen, Lynne Martin, Jimmy Nguyen
<u>3A4</u>	<u>89:</u>	Modeling Off-Nominal Events and Mitigation Strategies for Super Density Operations	Jit-Tat Chen, Moein Ganji, Jimmy Krozel, Rafal Kicinger, Shang Yang
<u>3A5</u>	<u>92:</u>	Benefits of Precision Scheduling and Spacing for Arrival Operations	Shannon Zelinski
<u>3A6</u>	<u>962</u>	Effects of Weather Condition on Aircraft Emissions in Climb Phase	Gabriella Serafino, Marcello Bernabò , Stefano Mininel, Gabriella Stecco , Massimiliano Nolich

### Session B - Arrival Management: Operations and Benefits

### Leihong Li, Georgia Tech

<u>3B1</u>	<u>985</u>	NASA'S ATM Technology Demonstration-1: Integrated Concept of Arrival Operations	Brian Baxley, Harry Swenson, Thomas Prevot, Todd Callantine
<u>3B2</u>	<u>9: 8</u>	A Functional Analysis Of Integrated Arrival, Departure, And Surface Operations In Nextgen	Mark Simons
<u>3B3</u>	<u>: 34</u>	Use of Near-Term Terminal Automation Capabilities for Meeting an Evolving Operating Environment	Simon Heitin, Elida Smith
	<u>: 57</u>	Air Traffic Controller Usage of Terminal Area Speed Advisories	Joey Mercer

# Session C - TBO: Measurement and Effect of Uncertainties

### Travis Gaydos, MITRE

3C1	: 72	Analysis of S-Turn Approaches at John. F. Kennedy	Sebastian Timar, Katy Griffin, Sherry
<u>501</u>	<u>.,,</u>	Airport	Borener, C. J. Knickerbocker
202	. 02	Automated Arrival Management: Effects of Descent	Epifanio Munoz, Todd Lauderdale,
<u>3C2</u>	<u>. 92</u>	Trajectory Prediction Errors on Metering Conformance	Andrew Cone
202	<u>:;9</u>	Prediction of Weather Impacted Airport Capacity Using	Vac Wang
<u>3C3</u>		RUC-2 forecast	I do wallg
<u>3C4</u>	<u>; 42</u>	Aircraft Time-2D Longitudinal Guidance Based on	Hakim Bouadi, Felix Mora-Camino,
		Spatial Inversion of Flight Dynamics	Daniel Choukroun
		Planning Considerations for Developing Automated	
	;78	Advisory Solution Concepts for Meeting the Meter	Travis Gaydos
		Schedule	

Session D - TBO Modeling Gaurav Nagle, Saab Sensis Corporation			
<u>3D1</u>	<u>; 8:</u>	Genetic Algorithm and Support Vector Machine Based Aircraft Intent Inference Algorithm in Terminal Area	Yang Yang, Jun Zhang, Xian-bin Cao, Kai-quan Cai
<u>3D2</u>	<u>;:;</u>	A Predictive Aircraft Landing Speed Model Using Neural Network	Ousmane Diallo
<u>3D3</u>	<u>3238</u>	Fixed RTA Fuel Optimal Profile Descent Based on Analysis of Trajectory Performance Bound	Sang Gyun Park, John-Paul Clarke
<u>3D4</u>	3265	Airborne 4-dimensional trajectory management	Bohumil Honzik, Martin Herodes
<u>3D5</u>	<u>3282</u>	How to Compute a Slot Marker - Calculation of Controller-Managed Spacing Tools for Efficient Descents	Thomas Prevot
<u>3D6</u>	<u>32; :</u>	A Practical Approach for Optimizing Aircraft Trajectories in Winds	Hok Kwan Ng, Banavar Sridhar, Shon Grabbe

### Session E - Traffic Flow Management

### Bernd Korn, DLR

<u>3E1</u>	<u>3344</u>	Measuring the Effects of Aborted Takeoffs and Landings on Traffic Flow at JFK	Michael Carter, Sherry Borener, Lawrence Berk, Ruth Hunter, C.J. Knickerbocker
<u>3E2</u>	<u>336;</u>	A Spatial Database for Reroute Planning	Joseph Rios, Rich Jehlen, Zhifan Zhu
<u>3E3</u>	<u>33: 6</u>	First Results of Coupling ATM Planning Systems with Different Time Horizons	Meilin Schaper, Andreas Pick, Olga Gluchshenko, Lothar Christoffels, Heiko Ehr
<u>3E4</u>	<u>3433</u>	Analysis of Airspace Degradation and Optimization of En-Route Traffic Under Degraded Conditions	Aude Marzuoli, Eric Feron, Adan Vela
<u>3E5</u>	<u>345:</u>	NAS-Wide Traffic Flow Management Concept Using Required Time of Arrival, Separation Assurance and Weather Routing	Benjamin Boisvert , George Hunter, Ty Marien, Jeremy Smith
<u>3E6</u>	<u>34: 5</u>	An Integrated Approach to Air Traffic Management to Achieve Trajectory Based Operations	Sergio Torres, Kelly Delpome

# Track 4 - Air Traffic Management - 2

# Suzanne Porter, MITRE and John Moore, Boeing

# Session A - Benefits/Performance Analysis Through Simulation

# Tom Becher, MITRE and Dan Howell, MCI

<u>4A1</u>	<u>3539</u>	Exploring Tactical Interaction between Dynamic Airspace Configuration and Traffic Flow Management (DAC-TFM)	Alexander Klein, Panta Lucic, Mark Rodgers, Kenneth Leiden, Chris Brinton
<u>4A2</u>	<u>355;</u>	Global Time-Based Conflict Solution: Towards the Overall Optimum	Alexander Kuenz, Gunnar Schwoch
<u>4A3</u>	<u>357;</u>	Jaguar: Time Shifting Air Traffic Scenarios Using a Genetic Algorithm	Bryan Petzinger, Robert Oaks, Nicole Nelson
<u>4A4</u>	<u>3597</u>	Combined Performance/Environmental Analysis of Q- Routes	Ankit Tyagi, Frederick Wieland, Scott Usdrowski
<u>4A5</u>	<u>35; 8</u>	An Improved Methodology for ARN Crossing Waypoints Location Problem	Chen Jin, Yan-bo Zhu, Jing Fang, Yi- tong Li
<u>4A6</u>	<u>3639</u>	Concept and Benefits of a Unified Departure Operation Spacing Standard	Ralf H. Mayer, Dennis J. Zondervan

Session B - Optimization of Procedures				
William Johnson, NASA Langley Research Center				
<u>4B1</u>	<u>3657</u>	Optimization of Aircraft Arrival Procedures in TMA: Proposal of a Method Based on a New Concept of Airspace Structure	Vincent Kapp, Morad Hripane, Charlie Madier	
<u>4B2</u>	<u>3695</u>	A Graph-Based Approach to Nominal Terminal Routing	Shannon Zelinski	
<u>4B3</u>	<u>3724</u>	Optimized Vertical Separation in Europe	Cyril Allignol, Nicolas Barnier, Alexandre Gondran	
<u>4B4</u>	<u>3775</u>	An Improved Multi-Objective Particle Swarm Optimizer for Air Traffic Flow Network Rerouting Problem	Miao Zhang, Kai-quan Cai, Yan-bo Zhu	
<u>4B5</u>	<u>379;</u>	A New Geographical Routing Protocol for Heterogeneous Aircraft Ad Hoc Networks	Khan Saifullah , Ki-Il Kim	
	<u>37; ;</u>	ATM Technology Demonstration – 1 (ATD-1) Overview and Avionics Development	William Johnson	
Session	C - Sepa	ration and Safety 1		
Jonatha	n Lee an	nd Stephen Mackey, US DOT/Volpe Center		
<u>4C1</u>	<u>3832</u>	Phase-2 Evaluation of a Tactical Conflict Detection Tool in the Terminal Area	Thomas Kozon, Savita Verma, Huabin Tang, Amir Farrahi, Debbi Ballinger	
<u>4C2</u>	<u>385:</u>	Safety Analysis Tool for Automated Airspace Concepts (SafeATAC)	Arash Yousefi, Richard Xie, Shubh Krishna, John Shortle, Yimin Zhang	
<u>4C3</u>	<u>388:</u>	An Initial Examination for Verifying Separation Algorithms by Simulation	Allan White, Natasha Neogi, Heber Herencia-Zapana	
<u>4C4</u>	<u>38; 3</u>	Safety Net For A Sectorless Air Traffic Management Concept	Bettina Birkmeier, Marcus Biella	
<u>4C5</u>	<u>3937</u>	Improving General Aviation Safety Using Low-Cost Iridium Devices	Michael J. Glasgow, Gregory A. Niehus	
	<u>3954</u>	Tower Controller Response to Runway Safety Alerts	Elida Smith	
Session Ralf Ma	D - Sepa yer, MI	ration and Safety 2 FRE and Mykel Kochenderfer, MIT Lincoln L	ab	
<u>4D1</u>	<u>395:</u>	Design and Evaluation of NextGen Aircraft Separation Assurance Concepts	Nhut Ho, Walter Johnson, Vladimir Arutyunov, John-Luke Laue, Ian Wilmoth	
<u>4D2</u>	<u>3988.</u>	The Search For Effective Algorithms For Recovery From Loss of Separation	Ricky Butler, George Hagen, Jeffrey Maddalon, César Muñoz, Anthony Narkawicz	
<u>4D3</u>	<u>39; 5</u>	An Improved Ant Colony Optimization Approach for Multi-aircraft Horizontal Escape Maneuvers	Gang Xiao, Bo Gu, Zhongliang Jing, Chaopeng Yu	
<u>4D4</u>	<u>3: 32</u>	A posteriori Aircraft Control Signal Recovery via Sparsity-Inducing Norm Minimization	Adan Vela, Peter Karasev, Patricio Vela	
<u>4D5</u>	<u>3: 64</u>	Assessing the Operational Benefits of Automated Conformance Monitor for RNP-to-Final Operations	Ronald Chong	
<u>4D6</u>	<u>3: 86</u>	Management of Dynamic Airborne Network Using Cloud Computing	Xiaojie Tu, Qiao Li, Mingyan Kou, Changxiao Zhao, Huagang Xiong	

Session E - Surface Management Mary Ellen Miller, Mosaic ATM and Benjamin Levy, Saab Sensis Corporation				
<u>4E1</u>	<u>3::3</u>	A Comparison of Two Optimization Approaches for Airport Taxiway and Runway Scheduling	Hanbong Lee, Hamsa Balakrishnan	
<u>4E2</u>	<u>3; 32</u>	Fast-Time Simulations of Detroit Airport Operations for Evaluating Performance in the Presence of Uncertainties	Hanbong Lee, Hamsa Balakrishnan	
<u>4E3</u>	<u>3; 55</u>	Impact of Gate Assignment on Gate-Holding Departure Control Strategies	Sang Hyun Kim, Eric Feron	
<u>4E4</u>	<u>3; 72</u>	Supporting Distributed Management of the Airport Surface	Philip Smith, Kristen Weaver, Alicia Fernandes, Durham Ken, Spencer Amy	
<u>4E5</u>	<u>3; 97</u>	Estimation of Departure Metering Benefits at Major Airports Using Queuing Analysis	Ni Shen, Husni Idris, Vincent Orlando	
<u>4E6</u>	<u>3; ; :</u>	Ground Control Support Functions to Optimize Surface Traffic Flow in a CDM Environment	Joris Koeners, Richard Rademaker	

# Track 5 - Communications, Navigation, and Surveillance

### Wolfgang Schuster, Imperial College London and Robert Kerczewski, NASA Glenn Research Center

### Session A - Navigation 1

### Wouter Pelgrum, Ohio University

	0	•	
<u>5A1</u>	<u>4242</u>	Implementation of the GPS-C/A tracking loops in FPGA	Bac Nghia Vu, Petr Bojda
<u>5A2</u>	<u>4252</u>	The Hardware Platform for the Tests and Evaluation of the Airborne GNSS Receiver Algorithms	Adam Novotny, Petr Bojda
<u>5A3</u>	<u>4268</u>	NextGen Aircraft and Mixed Equipage Capabilities	Sean McCourt, Douglas Vandermade, Quang Nguyen, James Nickum, Donald Nicolson
<u>5A4</u>	4288	LDACS1 for APNT – Planning and Realization of a Flight Measurement Campaign	Dmitriy Shutin, Nicolas Schnekenburger, Michael Schnell
<u>5A5</u>	<u>42: 8</u>	Hybrid APNT Architecture Using DME/DME and Multilateration	Euiho Kim
	<u>432;</u>	eDME Architecture Development and Flight-Test Evaluation	Wouter Pelgrum

# Session B - Navigation 2

Chris negarty, whitke				
<u>5B1</u>	<u>434:</u>	IMU Aiding Using Two AHRS Units	Pavel Pačes, Jan Popelka	
<u>5B2</u>	<u>4373</u>	FMC Field Observations Trials: Standard Instrument Departure with Radius-to-Fix Path Terminators	Albert Herndon, Michael Cramer, Tommy Nicholson, Sam Miller, Laura Rodriguez	
<u>5B3</u>	<u>2189</u>	Curved Approach Procedures Enabled by a Ground Based Augmentation System	Robert Geister, Christian Hanses, Hayung Becker	
<u>5B4</u>	<u>2214</u>	Alternative Terminal Navigation Based on Modified Airport Multilateration System	Ryan Wu	
<u>5B5</u>	<u>2235</u>	Human Factors Research on Performance-Based Navigation Instrument Procedures for NextGen	Divya Chandra, Rebecca Grayhem	
<u>5B6</u>	2258	TCAS-Aided Multilateration for Terminal Surveillance with Improved Accuracy	Ryan Wu	

Session	Session C - Surveillance 1			
Chris Daskalakis, Aurora Flight Sciences				
<u>5C1</u>	<u>2279</u>	Transmitting Raw GNSS Measurements as Part of ADS-B: Why, How, and Flight Test Results	Pengfei Duan, Maarten Uijt de Haag	
<u>5C2</u>	<u>2304</u>	Wind Analysis in Aviation Applications	Christopher Wynnyk	
<u>5C3</u>	<u>2323</u>	Technical Standard Order (TSO) Authorization And Airworthiness Approval Considerations For Aircraft Weather Radar System	Lee Nguyen	
Session	D - Surv	eillance 2 / Communications 1		
Benjami	in Levy,	Saab Sensis Corporation		
<u>5D1</u>	2345	Comparison of Coordinated and Uncoordinated PHY/MAC Schemes for Beaconing	Nico Franzen	
<u>5D2</u>	<u>2367</u>	Aeronautical Relay Network Performance for Several Duplexing, Multiplexing, and Multiple Access Schemes	Qian Zhang, David Matolak	
<u>5D3</u>	<u>2394</u>	Airport Traffic Conflict Detection and Resolution	Denise Jones, Ryan Chartrand, Sara Wilson, Sharon Otero, Glover Barker	
<u>5D4</u>	2426	SURF IA Conflict Detection and Resolution Algorithm Evaluation	Denise Jones, Ryan Chartrand, Sara Wilson, Sharon Otero, Glover Barker	
<u>5D5</u>	<u>2458</u>	Using TCAS Surveillance to Enable Legacy ADS-B Transponder Use for In-Trail Procedures	Christine Haissig, Ruy Brandao	
<u>5D6</u>	<u>2478</u>	Modeling ADS-B Out System Latency	Ian Levitt	
Session	E - Com	munications 2		
Michael	Schnell,	, DLR		
<u>5E1</u>	<u>2497</u>	Feasibility of LDACS1 Cell Planning in European Airspace	Felix Hoffmann, Ulrich Epple, Michael Schnell, Uwe-Carsten Fiebig	
<u>5E2</u>	<u>2519</u>	VHF Data Link Communications to Provide Air Traffic Services in Colombia	Edgar Leonardo Gomez Gomez, Jorge Eduardo Ortiz Trivino	
<u>5E3</u>	<u>2554</u>	Investigation and Measurement of Aircraft Communication System Immunity	Petr Makula, Jan Leuchter	
<u>5E4</u>	<u>2581</u>	Task Allocation for Integrated Tactical Data Links	Changxiao Zhao, Mingyan Kou, Jianmin Wu	
Track	6 - Svst	ems and Software Engineering		
Susan	Cheng	Boeing and Justin Littlefield CF Aviati	ion	
Susan	circing,	boeing and sustin Entrenend, GE Aviat		
Session .	A - Certi	ification/Safety		
Pavel Pa	ıčes, Cze	ech Technical University		
<u>6A1</u>	<u>2599</u>	Reusing Certified, Safety-Critical Avionics Software	Tim King	
<u>6A2</u>	<u>4835</u>	Avionics Hard Real-Time Systems' Design Concerning Fault Tolerance	Denis Loubach, Adilson Cunha	
<u>6A3</u>	<u>4888</u>	Realizing DO-178's Value by Using New Technology: OOT, MBDV, TQC & FM	Luc Marcil, Mark Hawthornthwaite	
<u>6A4</u>	<u>48; 2</u>	Civil Certification of MIL-STD-1553B	Tobias Schneider	
	4934	Integrating the Quantitative and Qualitative Aspects of Safety Assessment	John Knight, Kimberly Wasson, M. Anthony Aiello, John McDermid	
<u>6A6</u>	<u>4944</u>	Is the Current DO-254 Verification Process Adequate for the Future?	Brian Butka	

Session B - Integrated Modular Avionics - 1				
	4060	An Overview of APINC 652 Part 4	Tim King	
<u>0D1</u>	4909	Multi-Objective Mapping Optimization for Distributed		
<u>6B2</u>	<u>4977</u>	Integrated Modular Avionics	Bjoern Annighoefer, Frank Thielecke	
<u>6B3</u>	<u>49: 3</u>	The COTS Based IMA Prototype for Hosted Applications Development	Yunsheng Wang	
<u>6B4</u>	<u>49; 7</u>	ARINC 653 and Multi-Core Microprocessors - Considerations and Potential Impacts	Patrick Huyck	
<u>6B5</u>	<u>4:32</u>	Small Aircraft Flight Safety Increasing Using Integrated Modular Avionics	Tomáš Levora, Ondrej Bruna, Pavel Pačes	
<u>6B6</u>	<u>4: 52</u>	Rapid Prototyping Enhanced IMA System Design and Verification	Jian Min Wu, Jin Yan Wang	
Session	C - Integ	grated Modular Avionics - 2		
William	Johnson	n, NASA Langley Research Center		
<u>6C1</u>	<u>4:74</u>	Allocation of Avionics Communication Using Boolean Satisfiability	Daniela Cristina Carta, José Maria Parente de Oliveira, Rodrigo Rizzi Starr	
<u>6C2</u>	<u>4::5</u>	A Feasibility Study for ARINC 653 Based Operational Flight Program Development	Sungshin Lim, Jongsoo Hyun, Sang Myun Shin, In Gyu Kim, Byung Moon Hwang	
<u>6C3</u>	<u>4:;:</u>	A Fault-Tolerant Temporal Partitioning Scheme for Safety-Critical Mission Computers	Jongsoo Hyun, Kyong Hoon Kim, Sungshin Lim, Yeodeuk Park, Kun Su Yoon	
<u>6C5</u>	<u>4;3:</u>	Full Virtualizing Micro Hypervisor for Spacecraft Flight Computer	hyungshin kim	
<u>6C6</u>	<u>4; 5;</u>	Filling the Gap Between IMA Development and Safety Assessment Through Safety-Driven Model-Based System Engineering	Dajiang Suo, Jinxia An, Jianmin Wu, Jihong Zhu	
Session	D - Mod	eling/Simulation		
Jonatha	n Lee ar	nd Vince Orlando, US DOT/Volpe Center		
<u>6D1</u>	<u>4;7;</u>	HIL Simulation of a Light Aircraft Flight Control System	Petr Dittrich, Peter Chudy, Pawel Rzucidlo	
<u>6D2</u>	<u>4;:7</u>	Terminal Area Visualization Tool for Approach Analysis	Alexander Buchholz, Robert Eftekari	
<u>6D3</u>	<u>522;</u>	Visual Demonstrations of Performance Characteristics of Surface Surveillance	Raymond Stanley, Anthony Colavito, Kurt Rammelsberg, Emily Stelzer, David Tuomey	
<u>6D4</u>	<u>5253</u>	The EDICT Tool Platform for Model Based Architecture Modeling and Analysis	Chris Walter, Brian LaValley, Peter Ellis	
	<u>5276</u>	Effects of Modeling Flight Management Systems on Delays Determined for Simulated Time-Based Merging and Spacing Operations	Michel Santos	
	528:	Software Simplicity and Safety Thwarted for 40 Years	Edward Lowry	

Session E - Systems Scott Crawford, Raytheon			
<u>6E1</u>	<u>5297</u>	A Systems Approach for Technology Assessment and Selection	Zuhal Kale Demirkiran, Taner Altunok
<u>6E2</u>	<u>5322</u>	Process for Diagnosis Method Selection of Flight Critical Systems	Romain Martin, Guillaume Terrasson, Renaud Briand, Olivier Guerineau, Marc Gatti
<u>6E3</u>	<u>534;</u>	Exploring an Approach to Capability Maturity Assessment: Towards an Evidence-Based Framework	Constance Morgan, Raymond Stanley
<u>6E4</u>	<u>5373</u>	Avionics Clouds: A Generic Scheme for Future Avionics Systems	Zheng Li, Qiao Li, Huagang Xiong
<u>6E5</u>	<u>539;</u>	Mastering The Behavior Of Multi-Core Systems To Match Avionics Requirements	Hicham Agrou
<u>6E6</u>	<u>544:</u>	Streamlining the Development of Complex Systems through Model-based Systems Engineering	Hans-Peter Hoffmann

# Track 7 - Avionics Information Management, Networks, and Architecture

### Paul Miner, NASA Langley Research Center and Peter Skaves, Federal Aviation Administration

### Session A - Onboard Networks and IMA

### Wilfried Steiner, TTTech

		,	
<u>7A1</u>	<u>5466</u>	Comparison of IEEE AVB and AFDX	Stefan Schneele, Fabien Geyer
<u>7A2</u>	<u>5487</u>	Maximizing Fault Tolerance in a Low-SWaP Data Network	Kevin Driscoll, Brendan Hall, Srivatsan Varadarajan
<u>7A3</u>	<u>54; 3</u>	Towards Optimal Design of Avionics Networking Infrastructures	Oscar Acevedo, Dimitri Kagaris, Kaushik Poluri, Harini Ramaprasad, Shawn Warner
<u>7A4</u>	<u>5537</u>	Ensuring Robust Partitioning in Multicore Platforms For IMA Systems	Xavier Jean, Marc Gatti, Laurent Pautet, David Faura, Thomas Robert
<u>7A5</u>	<u>5555</u>	Incremental Functional Certification For Avionic Functions Reuse & Evolution	Stéphanie Gatti, Franck Aimé, Stéphane Treuchot, Jean Jourdan
<u>7A6</u>	<u>557:</u>	Research on Resource Fusion for Integrated Modular Avionics System	Qingfan Gu, Guoqing Wang, Wenping Xu

### Session B - Cyber-Security

### Radha Poovendran, University of Washington and Krishna Sampigethaya, Boeing

		MILS-Based Information Flow Control in the Avionic	Kevin Mueller, Michael Paulitsch,	
<u>7B1</u>	<u>5599</u>	Domain: A Case Study on Compositional Architecture	Reinhard Schwarz, Sergey Tverdyshev,	
		and Verification	Holger Blasum	
	5622	Lessons Learned from an Active Cyber Defense	Doul Dorking	
	<u>3022</u>	Deployment Pilot Program	r auf r cikilis	
<u>7B4</u>	<u>562:</u>	A Flight Data Storage System with Efficient	Yong Ho Moon, Seung-Hoon Cho,	
		Compression and Enhanced Security	Chan-Bok Jeong, Seok-Wun Ha	
7D5	5616	Drivery of Conserval Assistion Aircraft in the Newt Con	Krishna Sampigethaya, Radha	
<u>/B3</u>	<u>3646</u>	Privacy of General Aviation Afferant in the NextGen	Poovendran, Stephen Taylor	
<u>7B6</u>	<u>5666</u>	A Key Agreement Scheme for Avionics	Dahai Du, Qiao Li, Zheng Li, Hong Fan,	
		Communications Security	Chengyuan Li	

Session C - Information and Health Management				
Cynthia DeBisschop, CNA				
<u>7C1</u>	<u>567:</u>	Architecture and Technical Alternatives for Connecting Cockpits to FAA Data	Claude Speed	
<u>7C2</u>	<u>5699</u>	Cyber-Physical Integration in Future Aviation Information Systems	Krishna Sampigethaya, Radha Poovendran	
<u>7C3</u>	<u>56; :</u>	Archival Service in the Aviation Domain	Samet Ayhan, Paul Comitz, Gary Gerberick, Steve Bliesner, John Pesce	
<u>7C4</u>	<u>5739</u>	Semi-Supervised Learning of Decision Making for Parts Faults to System-Level Failures Diagnosis in Avionics System	Wei Yin, Guo-qing Wang, Wan-sheng Miao, Wei-guo Zhang, Min Zhang	
<u>7C5</u>	<u>P IC</u>	A Novel Aircraft Fault Diagnosis and Prognosis System Based on Support Center Machine	ZeFeng Wang	
<u>7C6</u>	<u>5766</u>	Integration Technology for Avionics System	Guoqing Wang	
Session	D - Arch	itecture & Design Methods		
Kurt W	oodham,	NASA Langley Research Center		
<u>7D1</u>	<u>57: 2</u>	Optimizing An Incremental Modular Open System Approach (MOSA) In Avionics Systems For Balanced Architecture Decisions	Thomas Gaska	
<u>7D2</u>	<u>5833</u>	Architecture Analysis and Design Language & Harmony System Engineering Process	Teng-teng Zhang, Wu Jian-min, Lin Qi, Hai-yu Xu	
<u>7D3</u>	<u>5857</u>	Designing and Testing Avionics Digital Video Bus (ARINC 818) Interfaces	Tim Keller, Jon Alexander, Paul Grunwald	
<u>7D5</u>	<u>587;</u>	Model-Based Fault Detection and Isolation Design for Flight-Critical Actuators in a Harsh Environment	Alexandre Bobrinskoy, Franck Cazaurang, Marc Gatti, Olivier Guerineau, Bruno Bluteau	
Session	E - Nove	l Network Topics		
Mahyar	Malekp	our, NASA Langley Research Center		
<u>7E1</u>	<u>5898</u>	The Application of Commercial Power Line Communications Technology for Avionics Systems	Stephen Dominiak, Sabina Serbu, Stefan Schneele, Franz Nuscheler, Tobias Mayer	
<u>7E2</u>	<u>5923</u>	Spectrum Sensing for Cognitive Wireless Applications Inside Aircraft Cabins	Christoph Heller	
<u>7E3</u>	<u>5942</u>	Network Connectivity for Permanent, Transient, Independent, and Correlated Faults	Allan White, Courtney Sicher, Courtney Henry	
<u>7E4</u>	<u>5958</u>	Experimental Approach to an Optical Wireless Interface for an Avionics Data Bus	Javier Perez-Mato, Rafael Perez- Jimenez, Joshua Tristancho, Curd S. Zechmeister	
<u>7E5</u>	<u>5979</u>	Implementation of Optical Networks in Aerospace	John Mazurowski	
<u>7E6</u>	<u>5994</u>	Optimization of Multicast Light-Trees in Real-Time Avionics WDM Network	Ying Xiong, Feng He, Huagang Xiong	

### Track 8 - Unmanned Aircraft Systems and Automation

# Terry Morris, NASA Langley Research Center and Denise Ponchak, NASA Glenn Research Center

### Session A - UAS Sense and Avoid

### Kevin Clark, US DOT/Volpe Center and Jim Griner, NASA Glenn Research Center

		-	
<u>8A1</u>	<u>59; 7</u>	Simulation and Flight Test Capability for Testing	Charles Howell, Todd Stock, Paul
		Prototype Sense and Avoid System Elements	Wehner, Harry Verstynen
842	5.16	GDTI: A Ground Station Display of Traffic Information	Steven Bell, Jill Drury, Steven Estes,
<u>0A2</u>	<u>J. 40</u>	for Use in Sense and Avoid	Steven Bell, Jill Drury, Steven Estes,   Chris Reynolds   Luis Mejias Alvarez, Duncan Greer
		Flight Guardian: A Common Avionics Architecture for	
<u>8A3</u>	<u>5:83</u>	Collision Avoidance and Safe Emergency Landing for	Luis Mejias Alvarez, Duncan Greer
		UAS	
<u>8A4</u> <u>5</u>	<u>58: :</u>	Computing Risk for Unmanned Aircraft Self Separation	Jacon A dagka
		with Maneuvering Intruders	Jason Adaska
<u>8A5</u>	<u>5; 28</u>	Modeling Unmanned Aircraft System Conflicts	Inaldo Capistrano Costa, José Maria
		Resolution Based on a Real-time Services Approach	Parente de Oliveira
	5. 4.	Challenges to using Ground Based Sense and Avoid	Davil Comphell
	<u>5;4:</u>	(GBSAA) for UAS Operations	raui Campoen

#### **Session B - Management of UAS Resources**

### Maurico Castillo-Effen, GE and Gib Winter, Verizon Federal Network Systems

<u>8B1</u>	<u>5; 66</u>	Earliest Deadline First Scheduling Algorithm and Its Use In ANKA UAV	Erhan Okuyan, Barış Kayayurt	
<u>8B2</u>	<u>5; 84</u>	Implementing Control and Mission Software of UAV by Exploiting Open Source Software-Based ARINC 653	Hyun-Chul Jo, Sanghyun Han, Sang- Hun Lee, Hyun-Wook Jin	
<u>8B3</u>	5;:: Cognitive UAV Resource Management Allowing Tas Based Mission Execution Under Data Link Limitation		Florian Böhm, Sebastian Clauss, Stefan Brüggenwirth, Axel Schulte	
	6233	NASA UAS Communication Project Overview	James Griner	
	<u>6243</u>	FAA's Unmanned Aircraft Systems Integration Office	James Sizemore	

### Session C - Human-Automation Functional Allocation

### Dave Matolak, Ohio University and Stephen Pledgie, Mosaic ATM

<u>8C1</u>	<u>6252</u>	Expanding AirSTAR Capability for Flight Research in an Existing Avionics Design	Sean Laughter	
<u>8C2</u>	<u>626;</u>	Exploring Opportunities for an Evolutionary Integration of Level 3 Conflict Awareness Support into ATC/C2 Systems	Tom Verboon, Erik Theunissen	
<u>8C3</u>	<u>6293</u>	Integrating UAS Into Nextgen Automation Systems	Nathan Paczan, Jeremy Cooper, Eric Zakrzewski	
<u>8C4</u>	<u>62: 9</u>	Automated Return-To-Route Maneuvers For Unmanned Aircraft Systems	Chi Kin Lai, James Whidborne	
<u>8C5</u>	<u>6329</u>	On the Transition and Migration of Flight Functions in the Airspace System	Terry Morris, Steven Young	
<u>8C6</u>	<u>634:</u>	Design and Evaluation of Operator Support Functions for the CSHIELD Platform	Erik Theunissen	

Track 9 - Verification and Validation of Complex Systems					
Session	Session D - Assurance of On-Board Systems - Network Assurance and Testing Techniques				
Natasha	Neogi,	National Institute of Aerospace			
<u>9D1</u>	<u>6373</u>	Model Checking a Self-Stabilizing Synchronization Protocol for Arbitrary Digraphs	Mahyar Malekpour		
<u>9D2</u>	<u>6398</u>	Model-Based Analysis of Timed-Triggered Ethernet	Bruno Dutertre, Arvind Easwaran, Brendan Hall, Wilfried Steiner		
<u>9D3</u>	<u>6422</u>	Verification and Validation of Distributed Flight Critical Systems	Brendan Hall, Kevin Driscoll, Kevin Schweiker		
<u>9D5</u>	<u>6443</u>	Designing Fault-Injection Experiments for the Reliability of Embedded Systems	Allan White		
Session	Session E - Uncertainty in NextGen - Trajectory Models and Visualization				
Eric Fei	ron, Geo	rgia Tech			
<u>9E1</u>	<u>6469</u>	A Framework for Probabilistic Evaluation of Interval Management Tolerance in the Terminal Radar Control Area	Heber Herencia-Zapana, George Hagen, Natasha Neogi		
<u>9E2</u>	<u>6492</u>	Comparison of Aircraft Models and Integration Schemes for Interval Management in the TRACON	Natasha Neogi, George Hagen, Heber Herencia-Zapana		
<u>9E3</u>	<u>6524</u>	Streamlining Test and Evaluation with Cloud Computing	Jeff Beyer, Hamid Elhrouz, Khalid El Seed		
<u>9E4</u>	<u>6535</u>	An Interactive 4D Visualization System for Air Traffic Concept Analysis	Andrew Crowell, Andrew Fabian, Nicole Nelson		
<u>9E5</u>	<u>6557</u>	Considerations in the Presentation of Evidence	Kevin Schweiker, Brendan Hall		
<u>9E6</u>	<u>6577</u>	Visualizing Concurrency Faults in ARINC-653 Real- Time Applications	Guy Martin Tchamgoue, Lin Gan, Ok- Kyoon Ha, Sang-Woo Yang, Yong-Kee Jun		
Track 10 - Poster Papers					
Session	B - Spec	ial Topics			

### Steven Young, NASA Langley Research Center

10B1   6595   Efficient Data Transmission Scheme for Real-Time   Yong Ho Moon, Min-Woo	o Kang, Seok-
	-
Operation of Mission Computer wun Ha	
10B2 65:6 Design of Multi-Source and Multi-Dimension Zhiying Mou, Minyang Ka	ang, Jianmin
Information Fusion of Avionics System   Wu	Wu
10P3 65:6 Miniaturization and Sensor Fusion of a Measurement Ian Populka Pavel Pačas	
TOBS   Ost of Unit for a Trailing Bomb   Jail Toperka, Taver Taves	
10P4 6627 Passive Optical Network For Integrated Modular Viacomin Line Hugging Via	ong Qing Wu
Avionics Alabim Elu, Huagang Al	ong, Qing wu
Smart Sensor Data Processing for Aerospace Bayel Bayes Jan Banalka	Emidia
10B5 6636 Applications in Education Illustrated by Small Satellite Marchates, sall Poperka,	Ellindio
Platform Demonstrator National Ecology	
10B6 5647 Standalone Trailing Probe for Aero Metrical Pavel Pačes Jan Popelka	Ian Auersvald
<u>1000</u> Measurements	Jali Auersvalu

### CffkkkpcnRcrgtu

6658	Information Fusion of Avionics System Vcnkpi "Htki j v<"Cxkcvkqp"htqo "Cpvks vkv{ "vq"vj g"43uv Egpwt{ "	Tkej ctf 'ROJ cmkqp
6684	Cxkqpkeu'Tgcrkx{ "Ej gem*"C'J kuxqt { "cpf "43uv/Egpwat { " Ej crngpi gu	Lqj p'Dqti j gug
6694	"Mgm{)u'I tgcvgu'Ej cmgpi g"∕"Vj g"Dncendktfu""	Dw 'Ectr gpvgt
6763	Qwuqqmihqt 'Dwukpguu'Igv'( 'Eqo o gtekcn'Cktetchv'' O ctngvu'''	Dtkep'Dej thqtu
6778	Vgej plecn'Ej cmppi gu'lø'Cxlcvlqp''Uchgv{	Fqwincu'C0Tqjp