

# **Innovative Human-Machine Interfaces**

Papers Presented at the AIAA Aviation Forum 2024 and  
ASCEND 2024

Las Vegas, Nevada, USA  
29 July – 2 August 2024

ISBN: 979-8-3313-0576-5

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

The contents of this work are copyrighted and additional reproduction in whole or in part are expressly prohibited without the prior written permission of the Publisher or copyright holder. The resale of the entire proceeding as received from CURRAN is permitted.

For reprint permission, please contact AIAA's Business Manager, Technical Papers. Contact by phone at 703-264-7500; fax at 703-264-7551 or by mail at 34922 Uwytkug'Xcmg{'Ftkxg.'Uwky'422, Reston, VA 20191, USA.

# TABLE OF CONTENTS

## **INNOVATIVE HUMAN-MACHINE INTERFACES**

Identifying the Requirements of eVTOL Battery Information Displays .....	1
<i>Maureen Namukasa, Bhoomin Chauhan, Yarissee A. Oyola, Kendall Carmody, Dr. Meredith Carroll</i>	
Simplified Mixed Reality eVTOL Pilot Training: A Systemic Approach.....	16
<i>Sharina Kimura, Michael Zintl, Leonie Mangold, Claudius Hammann, Florian Holzapfel</i>	
Bridging the Gap: Adaptive HMI Innovations for Next-Gen Fighter Cockpits.....	38
<i>Jan-Paul Huttner, Lukas Tews, Tim Laudien, Max Friedrich</i>	
Analyzing the Physiological Effects of Cybersickness Onset by Virtual Reality Headsets.....	49
<i>Tabitha Hunter, James Montoya, Roya Bakzadeh, Pedram Roghanchi, Hassan Khaniani, Mostafa Hassanalian</i>	

## **HUMAN FACTORS AND HUMAN-MACHINE PERFORMANCE**

Identifying Unsafe Collaborative Control in an Airborne Laser Communication System .....	57
<i>Brittany E. Bishop, Nancy G. Leveson, Andrew N. Kopeikin</i>	
Operator Workload and Task Allocation in m:N Operational Architectures of Uncrewed Aerial Systems.....	69
<i>Yining "Elena" Zhang, Jing Chen, Tim Bautista, Nathan Lindsay, Liang Sun, Pooyan Ghodrati, Bin Hu, Michael Politowicz, Eric T. Chancey</i>	
A Human Factors Assessment of Crew Mental Workload in m:N sUAS BVLOS Surveillance Operations .....	77
<i>Radhika A. Bhopatkar, John A. Howarter, Wendy Ljungren</i>	
Evaluating the Crucial Influence of Aircraft Maintenance Records and Safety Control on Aviation Safety – a Comprehensive Analysis .....	99
<i>Manoj K. Paidisetty, Sanjay Singh, Vr Sanal Kumar, Om Prakash, Rahul Saladi</i>	

## **AI, XAI, AND ML FOR HUMAN-MACHINE TEAMING**

Subset Simulation Based Operational Risk Assessment of Procedures for Go-Around Handling Enabled by a Predictive Decision Support .....	124
<i>Lukas Beller, Gökay Özer, Florian Schwaiger, Florian Holzapfel</i>	
Towards Trust: An Analysis of a Deep Learning Tracker Agent .....	138
<i>Devon Hood, Micah Bryant, Anastacia Macallister, Rey Nicolas</i>	
Ergonomic Congruence of Using Synthesised Speech and Acoustic Sounds in Cockpit Systems.....	149
<i>Niall P. Miranda</i>	
Run Time Assurance and Human AI Fluency in Crewed Autonomous Intelligence Surveillance and Reconnaissance .....	162
<i>Richard Agbeyibor, Vedant Ruia, Carmen Jimenez Cortes, Jack Kolb, Adan Vela, Samuel Coogan, Karen M. Feigh</i>	

## **DATA-DRIVEN HUMAN-MACHINE SYSTEMS**

Employee Retention – a Post COVID Success Story .....	179
<i>Joseph R. Herdy</i>	
System Identification of a Multicopter Powertrain with Degradation for Simulation-Based Training of a Fault Detection Neural Network.....	199
<i>Arno Fallast, Arian Ghoddousi</i>	
Text Summarization in Aviation Safety: A Comparative Study of Large Language Models.....	215
<i>Jonathan Emmons, Taneesha Sharma, Bryan Matthews, Mariam Salloum</i>	
Automatic Speech Recognition Model Fine-Tuning and Development of a New Evaluation Metric for Terminal Airspace Safety Analysis .....	224
<i>Aditya Arra, Gabriel Achour, Alexia Payan, Evan Harrison, Dimitri Mavris</i>	

### **Author Index**