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***Display Technologies and
Applications for Defense,
Security, and Avionics III***

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Daniel D. Desjardins**
Editors

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Contents

- v *Conference Committee*
- vii *Introduction*

SESSION 1 MILITARY DISPLAY SYSTEMS AND APPLICATIONS

- 7327 02 **High definition wide format COTS displays for next-generation vetronic applications** [7327-01]
T. J. Barnidge, B. D. Hufnagel, J. L. Tchon, Rockwell Collins, Inc. (United States)
- 7327 03 **Digital map and situation surface: a team-oriented multidisplay workspace for network enabled situation analysis** [7327-02]
E. Peinsipp-Byma, J. Geisler, T. Bader, Fraunhofer-Institut für Informations-und Datenverarbeitung (Germany)
- 7327 04 **Performance and cost improvements in the display control module for DVE** [7327-03]
J. Thomas, S. Lorimer, General Dynamics Canada Ltd. (Canada)
- 7327 05 **Military display market: update to fourth comprehensive edition (Invited Paper)** [7327-04]
D. D. Desjardins, J. C. Byrd, D. G. Hopper, Air Force Research Lab. (United States)

SESSION 2 HUDS, HMDS, AND PROJECTION

- 7327 06 **Head up and head mounted display performance improvements through advanced techniques in the manipulation of light (Best Paper Award)** [7327-06]
P. L. Wisely, BAE Systems (United Kingdom)

SESSION 3 3D DISPLAY SYSTEMS: HARDWARE AND PERSPECTIVES

- 7327 08 **Toward the establishment of design guidelines for effective 3D perspective interfaces** [7327-08]
E. Fitzhugh, SRA International, Inc. (United States); S. Dixon, D. Aleva, Wright-Patterson Air Force Base (United States); E. Smith, SRA International, Inc. (United States); J. Ghrayeb, L. Douglas, Wright-Patterson Air Force Base (United States)
- 7327 09 **Flat panel stereoscopic display: description and applications** [7327-09]
J. L. Pezzaniti, R. Edmondson, J. Vaden, B. Hyatt, D. B. Chenault, Polaris Sensor Technologies, Inc. (United States); J. L. Tchon, T. J. Barnidge, Rockwell Collins, Inc. (United States); B. Pettijohn, Army Research Lab. (United States)
- 7327 0A **Understanding the operational environment: implications for advanced visualizations** [7327-10]
D. Aleva, Air Force Research Lab. (United States); E. Fitzhugh, SRA International, Inc. (United States); S. Dixon, Air Force Research Lab. (United States)

7327 0C **Three D displays in military applications** [7327-12]
M. Trakalo, General Dynamics Canada Ltd. (Canada)

SESSION 4 NEW DISPLAY TECHNOLOGY FOR MILITARY AND CIVIL APPLICATIONS

7327 0D **FSC LCD technology for military and avionics applications** [7327-18]
K. R. Sarma, J. Schmidt, J. Roush, Honeywell International Inc. (United States)

7327 0E **Next-generation AMLCD microdisplays** [7327-13]
T. Bacarella, T. Hogan, H. Choi, M. Presz, Kopin Corp. (United States)

7327 0F **Ethernet direct display: a new dimension for in-vehicle video connectivity solutions**
[7327-14]
V. Rowley, Pleora Technologies (Canada)

7327 0G **Utility of an airframe referenced spatial auditory display for general aviation operations**
[7327-15]
M. H. Naqvi, Canadian Forces Aerospace Engineering Test Establishment (Canada);
A. J. Wigdahl, U.S. Air Force (United States); R. J. Ranaudo, Univ. of Tennessee Space Institute
(United States)

7327 0H **Polymeric optical filters are not all created equal....** [7327-16]
C. Gaudette, Wamco, Inc. (United States)

7327 0I **An OLED-based MRC measurement bench** [7327-17]
B. Mohring, M. Gangl, H. Böhm, A. Fendt, LFK-Lenkflugkörpersysteme GmbH (Germany)

7327 0J **Image compression with Iris-C** [7327-21]
D. Gains, General Dynamics Canada Ltd. (Canada)

SESSION 5 HUMAN/DISPLAY INTERACTION

7327 0K **Human factors guidelines for applications of 3D perspectives: a literature review** [7327-19]
S. Dixon, Wright-Patterson Air Force Base (United States); E. Fitzhugh, SRA International, Inc.
(United States); D. Aleva, Wright-Patterson Air Force Base (United States)

7327 0L **The placement of visual alerts in a shared display system** [7327-20]
L. J. Douglas, Consortium Research Fellows Program (United States); D. L. Aleva, E. L. Heft,
Wright-Patterson Air Force Base (United States)

Author Index

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Paul L. Wisely, BAE Systems plc (United Kingdom)

Session Chairs

- 1 Military Display Systems and Applications
David C. Huffman, L-3 Display Systems (United States)
- 2 HUDs, HMDs, and Projection
John Tudor Thomas, General Dynamics Canada Ltd. (Canada)
- 3 3D Display Systems: Hardware and Perspectives
Kalluri R. Sarma, Honeywell International Inc. (United States)
- 4 New Display Technology for Military and Civil Applications
Paul L. Wisely, BAE Systems plc (United Kingdom)
- 5 Human/Display Interaction
Daniel D. Desjardins, Air Force Research Laboratory Space Vehicles Directorate (United States)

Introduction

The 2009 Display Technologies and Applications for Defense, Security and Avionics III conference addressed recent developments and a wide range of technologies surrounding visual displays.

The session on military display systems and applications focused on how military procurement has evolved through acceptance of solutions based on commercial technologies and a realization of the benefits of commonality. Papers from Rockwell Collins and GD Canada present a comprehensive analysis of COTS display usage, complemented by statistical data on display commonality from AFRL, highlighting how well the U.S. military services are doing as they strive to rationalize systems across platforms and systems.

This year includes announcement of "game changing" technology for high performance HUDs. The paper on BAE's work in this area will undoubtedly have significant impact on the market for these devices. This paper, "Head-up and head-mounted display performance improvements through advanced techniques in the advanced manipulation of light" from Paul L. Wisely, was in fact awarded the "best paper" prize.

3D displays are fast gaining traction in military space applications. Included here are papers describing state of the art 3D display technology as well as critical design guidelines from human factors experts in industry and AFRL. A counterpoint to this generally unbridled enthusiasm for 3D technology is provided in an analysis explaining why 3D may not be a big advantage for a driver's vision aid.

The session on new display technology includes a paper from Honeywell describing the state of the art in OCB technology, highlighting recent improvements to counter color breakup in fast-video compatible technology. Detailed examination of video rate performance across temperature extremes makes this paper relevant to many military product developers. Also highlighted were recent advances by Kopin regarding LCD based microdisplays for dismounted soldier applications.

Sound analysis can replicate some functions of visual displays. We have an exciting paper on the application of spatially referenced audio information applied to general aviation operations. Its thrust shows that spatial information can improve pilot performance in critical phases of high workload situations.

Moving video data for display within vehicles and for analysis between units is receiving much attention in modern battle and surveillance systems. We have two papers addressing these problems, one from Pleora Systems dealing with the

application of gigabit Ethernet, and a second from General Dynamics Canada regarding a novel solution for lossless compression of video images using Iris-C compression.

Another paper on the difficulties and risks inherent in selecting and applying polymeric materials for military NVG filter requirements will be of great interest to a wide range of military display designers and providers.

The human/display interaction session provides new information on guidelines for the application of 3D displays, generated by the Human Effectiveness group at WPAFB and SRA International. A paper on the placement of visual alerts provides essential data for developing the operator environment relative to critical display systems.

In summary, these 19 excellent papers represent a significant contribution to our understanding of military display technology from a wide ranging group of contributors: the U.S. Department of Defense (Air Force and Army), the Canadian Aerospace Engineering Test Establishment, the University of Tennessee Space Institute, and a body of papers from private industry in the United States, the United Kingdom, Canada, and Germany. The themes range across direct-view display systems and applications to head-up, helmet-mounted, and 3-D displays, to new display technologies such as OCB LCD, next-generation AMLCD, and video distribution, with the concluding theme of human/display interaction.

These proceedings document the continuing work that is being done for both military and civil-consumer displays. The future of displays is a dynamic one filled with as yet unmet needs and requirements for the defense and consumer markets.

We look forward to the conference in 2010 and another stimulating exchange of ideas, research, product and field application data into all aspects of display technology and application.

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Daniel D. Desjardins