

# 26<sup>th</sup> ICCRTS

International Command and Control  
Research and Technology Symposium

## Program

October 18-22 and 25-28, 2021  
All times are Eastern Daylight Time (EDT)

### Symposium Chairs

David S. Alberts  
Ken D. Teske



International Command and Control Institute

## Track Overview

1	Complex Enterprise C2-Harmonization Chairs: Anthony Isenor and Aren Hunter	Day 4
2	C2 in Contested Cyber Environments Chair: Ken Teske	Days 3 and 7
3	Coping with Constraints, Complexity and Ambiguity Chair: David Alberts	Days 2 and 7
4	C2 and human-AI/Autonomy Teaming Chair: Abderrezak Benaskeur	Days 8 and 9
5	Emerging Concepts and Technologies, and their Implications for C2 Chair: Bruce Forrester	Days 1 and 6
6	Connected Battlespaces and Forces Chair: Mark Miller	Days 5 and 8
7	Experimentation, Analysis, Assessment and Metrics Chair: Marielle Mokhtari	Days 1 and 3
8	Military C2 Applications, Requirements, Concepts and Solutions	Days 5 and 6

Day 1 - Monday - October 18, 2021

800 EDT Noon GMT		26th ICCRTS Lobby Open
830		26th ICCRTS Welcome and Orientation <i>David S. Alberts and Ken Teske</i>
900	T5-P024	Human-in-the-Loop Disinformation Detection: Stance, Sentiment, or Something Else? <i>Alexander Michael Daniel</i>
930	T5-P072	Agile, Antifragile, Artificial–Intelligence–Enabled Command and Control <i>Jacob Simpson, Hussein Abbass, Rudolph Oosthuizen and Sondoss El Sawah</i>
1000	T5-P017	Arabic Script Textual Information Extraction from Image Sources via Deep Learning <i>Nariman Firoozy</i>
1030		Topic 5 Discussion
1100	T7-013	Predicting Success in Training of Navy Aviators <i>Neil Rowe and Arijit Das</i>
1130	T7-P028	A Corpus of Military Communication <i>Theresa Krumbiegel and Hans-Christian Schmitz</i>
1200	T7-018	A Proposed Hardware-Software Architecture for C5ISR System. in the Amazon Operations <i>Abel Oliveira and Nina Figueira</i>
1230		Topic 7 Discussion

Day 2 - Tuesday - October 19, 2021

800 EDT Noon GMT		Reflections
830	Plenary 1	<p>Agile C2 during the COVID Pandemic</p> <p><i>Maikel Lenssen, MCDM</i></p> <p><i>(Gold Commander at Safety Region Rotterdam-Rijnmond)</i></p> <p><i>Maartje Schuurmans, MSc</i></p> <p><i>(Researcher at TNO and Operational Analyst at the NLD Army)</i></p>
930	T3-P016	<p>Speed vs thought</p> <p><i>Martin Schüler and Erik Bjurström</i></p>
1000	T3-P026	<p>Improving Decisions: Conceptualising the Antecedents and Impact of Unique Opinion Expression</p> <p><i>William Tang, Sebastian Tsui, Yoona Choi and Wesley McTernan</i></p>
1030	T3-P042	<p>Assessing Distributed Sensemaking Performance in Command and Control: An Exploratory Study</p> <p><i>Andrew Leggatt, Chris Baber, Simon Attfield, Shailey Minocha, Emmeline Elliott, Bob Fields, Rob Hutton, Peter Cowell-Smith and James Harryman</i></p>
1100	T3-P054	<p>Outlining Future C2 Doctrine Using the Cynefin Framework</p> <p><i>Tim Grant</i></p>
1130		Topic 3 Discussion
1200		Open Discussion

Day 3 - Wednesday - October 20, 2021

800 EDT Noon GMT		Reflections
830	T2-P002	Predicting Cyber Risk to Mission <i>David Alberts</i>
900	T2-P010	The Swedish pandemic landscape on twitter <i>Martin Schöler, Josefa Vega Matuszczyk, Kristina Johansson and Yohan Robinson</i>
930	T2-P021	The Command and Control Concept for the 21st Century (TCCXXI) <i>David Connell</i>
1000		Topic 2 Discussion
1030	T7-P031	The eradication of barriers to organisational learning in a command and control environment <i>Uzma Qureshi</i>
1100	T7-P041	Perspectives on Command and Control: Implications for assessment and development of capability <i>Per Wikberg, Magdalena Gransåsen and Björn Johansson</i>
1130	T7-P066	Improving situation awareness by recognizing objects of interest and by understanding events of interest <i>Marielle Mokhtari</i>
1200		Open Discussion

Day 4- Thursday - October 21, 2021

800 EDT Noon GMT		Reflections
830	Plenary 2	<p>Creating AI-Enabled Systems                  Dr. John Piorkowski, Chief AI Architect                  Johns Hopkins University – Applied Physics Laboratory</p>
930		C2 and AI Discussion
1000	T1-P014	<p>MIP Information Model 5:                  The Next Generation of the C2 Semantic Reference Model and its Eco-System  <i>Michael Gerz and Nico Bau</i></p>
1030	T1-P029	<p>Towards cross-validation of C2-Harmonisation Hypotheses:                  Comparing ELICIT simulation and Network Synchronisation                  modelling approaches to Command and Control  <i>Mitchell Kiely and Alexander Kalloniatis</i></p>
1100	T1-P030	<p>Possible consequences for command and control of dynamically adapting                  coordination form: Navigating the murky waters of adverse situations and                  complex missions                  Rune Stensrud, Sigmund Valaker, Reidar Haugen and Bjoern Mikkelsen</p>
1130	T1-P038	<p>Plan MURA: The pathways to transforming an Operational Headquarters                  Alexander Kalloniatis, Nik Luketic, Irena Ali, Grant Cassar and Ivan Ingham</p>
1200		Topic 1 Discussion
1230		Open Discussion

Day 5- Friday - October 22, 2021

800 EDT Noon GMT		Reflections
830	T8-P006	Command and Control Across Air, Space and Cyber Domains at Speed and Scale for Dynamic Targets <i>Jinhong Guo, Jennifer Lautenschlager, David Van Brackle, Valerie Champagne, Emmary Webb, Benjamin Ritz and Paul Williams</i>
900	T8-P007	Understanding and Predicting the Future Cost of Readiness for an Aging Naval FA-18 Fleet <i>Jazlynn Wied and Jamal Rorie</i>
930	T8-P011	Clustering and Aggregating Battle Space Objects <i>Fahrettin Gökgöz, Piro Lena, Hans-Christian Schmitz and Sebastian Stucken</i>
1000		Discussion
1030	T6-P049	Military Applications of Internet of Things: Operational Concerns Explored in Context of a Prototype Wearable <i>Rune Langleite, Carsten Griwodz and Frank Johnsen</i>
1100	T6-P012	Internet of Hybrid UAV-UGV Things for Empowering Command and Control <i>Jahangir Sarker and Ahmed Ghanmi</i>
1130	T6-P032	A Distributed Architecture for Tactical Data Link Interoperability <i>Anderson Ferreira De Oliveira, Tomas Aquino Botelho and Edmundo Cecilio</i>
1200	T6-P045	NATO Federated Coalition Cloud with Kubernetes: A National Prototype Perspective <i>Hallvard Andersen, Borgar Flytør, Emil Onsøyen, Even Holmen, Niklas Sølvberg, Thomas Haugan, Oskar Gabrielsen and Frank Johnsen</i>
1230		Discussion

Day 6 - Monday - October 25, 2021

800 EDT Noon GMT		Reflections
900	T8-P037	Rethinking the perennial problem of generalists vs specialists: applications in a 5th Generation headquarters <i>Alexander Kalloniatis and Wesley McTernan</i>
930	T8-P050	Applying Commander's Information Requirements to Value of Information Modeling James Michaelis
1000	T8-P065	Kick the CANN: Modeling Effect of Cannibalization Maintenance Actions on Naval FA-18s <i>Dion Chung, Benjamin Michlin and Gary Williams</i>
1030		Topic 8 Discussion
1100	T5-P025	Command and control perspective of defence against intelligent hypersonic weapons <i>Paul Labbé</i>
1130	T5-P035	Towards a framework for autonomous defensive cyber operations in a network operations centre <i>Maxwell Dondo and Natalie Nakhla</i>
1200	T5-P053	Improving C2 and Decision Making Using the Joint Operations Fusion Lab <i>Mohamed Abdelazez and Ahmed Ghanmi</i>
1230		Topic 5 Discussion



Day 7 - Tuesday - October 26, 2021

800 EDT Noon GMT		Reflections
830	Plenary 3	Assurance Cases as a Grand Unified Theory of Weapon Systems and Platform Cyber Risk <i>Bill Bryant</i> MMTSI-VA
930	T3-P008	Soft actor-critic solution to a security game with deception and an informant <i>Jinhong Guo, Martin Hofmann, Carter Veldhuizen,</i> <i>Sidharth Satya and Valerie Champagne</i>
1000	T3-P051	A unified framework combining matchmaking and multi-objective optimization applied to dynamic collection and effect tasking problems <i>Anne-Claire Boury-Brisset and Jean Berger</i>
1030	T3-P055	Towards a multi-level theory of agility <i>Erik Bjurström, Nicholas Westbury, Alina Tarnawska and Johan Ivari</i>
1100		Topic 3 Discussion
1130	T2-P-068	Relating the Cultural Iceberg to Organisations and Information Warfare Jeremy Hilton
1200		Open Discussiion

Day 8 - Wednesday - October 27, 2021

800 EDT Noon GMT		Reflections
830	T6-P009	A Knowledge-Based Approach to Defining Decider Types for Decider Collaboration Implementing Agile Control <i>John O'Neill, Peter Brown and Josh McDonald</i>
900	T6-P062	Level 11 Automation <i>Marvin Simpson</i>
930	T6-P069	Application of Blockchain for Improving Future Canadian Armed Forces Supply Chain Efficiency <i>Yazan Qasrawi, Abdeslem Boukhtouta and Andrei Soeanu</i>
1000	T8-P022	A Joint Headquarters that Embeds Collaboration? <i>Ben Heslop</i>
1030	T4-P039	Human-AI Teaming for Exploring Wargame Strategies <i>Glenn Moy and Slava Shekh</i>
1100	T4-P005	<i>A mixed initiative effects planning tool</i> <i>Chris Baber</i>
1130	T4-P023	Categorization of AI-Enabled Command and Control in Ballistic Missile Defense <i>Muhyun Byun and Il Chul Moon</i>
1200	T4-P033	Multi Domain Battlespace Management Visualisation <i>Clare Borrás, Brett Carrier, Robert Guest and Jethro Gillgren</i>
1230		Discussion

Day 9 - Thursday - October 28, 2021

800 EDT Noon GMT		Reflections
830	Plenary 4	AI for Command and Control of Multi-Domain Operations <i>Dr. Priya Narayanan, Dr. Manny Vindiola, and Dr. Nick Waytowich</i> US Army Research Laboratory Director's Initiative Program
930	T4-P040	Analysis of Command and Control Technologies for Manned/Unmanned System Cooperative Operation <i>Ning Qian, Haoyu Li and Hong Zhu</i>
1000	T4-P063	Challenges in understanding AI <i>Kjell Staffas, Erik Bjurström and Git Roxström</i>
1030	T4-P070	The UK's Intelligent ship project Joshua Cox, Andrew Tate, Jennie Cowell-Butler, Ken Webster and Edward Pottrill
1100	T4-P071	Human Machine Interactions as Partnership Shelley Gallup and Mark Nissen
1130		Symposium Review and Discussion Shaping and Planning the 27th ICCRTS
1200		End of Symposium