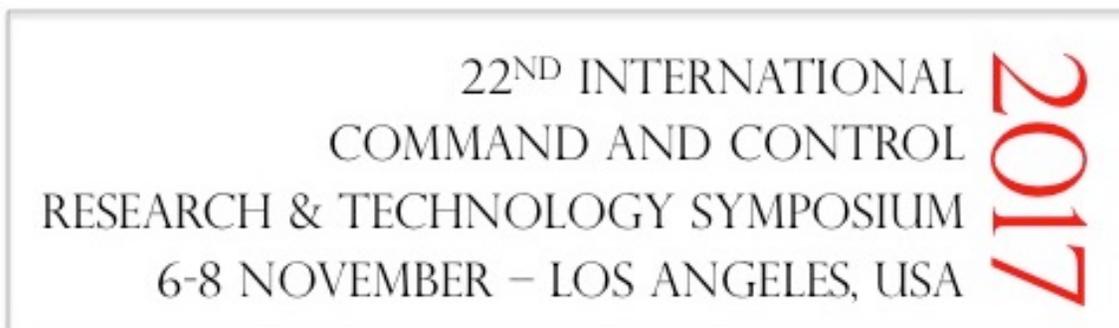


CALL FOR PAPERS



Frontiers of C2

History of the ICCRTS

In 1995, the US DoD Command and Control Research Program (CCRP), within the Office of the Secretary of Defense, organized the first International Command and Control Research and Technology Symposium (ICCRTS) at the National Defense University in Washington, D.C. This meeting built upon a series of meetings during the 1970s by the Office of Naval Research and the Massachusetts Institute of Technology that brought together interested researchers to exchange ideas on command and control (C2), its measurement and assessment, and the impact of new technologies on C2 processes.

While the initial meeting was modest in size (63 participants) and included only a handful of non-U.S. participants, ICCRTS has grown substantially, to include hundreds of participants from dozens of nations. Nowadays, this Symposium provides an unparalleled, opportunity for professional researchers, academics, active duty and reserve officers, and policymakers to interact with one another, understand the state of the art of C2, and influence the state of the practice among defense coalition partners. The ICCRTS focuses on leading-edge issues involving (a) new concepts in C2 (b) new technologies and their potential impact on C2, and (c) feedback and evidence from experiments, exercises, and real-world operations. The Symposium is also an important forum for discussion of coalition and collective C2 issues and for examining the complex endeavors (stabilization, operations, disaster relief) involving a variety of entities including military, civilian, government, international organizations, Private Voluntary Organizations (PVOs) and Non-Governmental Organizations (NGOs).

The efforts of the community to ensure that the CCRP and its annual symposium products and events endure are strong evidences of their value to the community. The non-profit International Command and Control Institute has assumed responsibility for the CCRP website and its research archives, found at www.dodccrp.org. In 2016, the UK MoD joined with researchers from around the world to plan and hosted the 21st ICCRTS in London, UK in September 2016. This event was co-located with the 8th Knowledge Systems for Coalition Operations (KSCO) 2016. In 2017, the US Army Research Laboratory (ARL) will be our host for the 22nd ICCRTS in the Los Angeles area, to be held November 6-8, 2017. This event will once again be co-located with the 9th Knowledge Systems for Coalition Operations (KSCO) <http://ksco.info/ksco-2017.html>

Theme: Frontiers of C2

ICCRTS themes, over the years, have served to highlight C2-related challenges that needed attention. Participants are encouraged, not required, to consider the theme in the preparation of their submissions.

This year's theme was selected because there are a number of trends that make it necessary for us to rethink, explore, and expand the frontiers of knowledge and practice -- C2 concepts, approaches, processes, practices, and systems. Among these are the continued proliferation of cyberattack tools and capabilities that are resulting in a persistent and increasingly sophisticated threat to our networks and systems and the increasing utilization of automation and software agents and robots that operate with some degree of autonomy to create the battlefield "Internet of Intelligent Things." A variety of actors are able to mount attacks in cyberspace that will, if not adequately defended or mitigated, limit C2 options and constrain C2 capabilities. This, in turn, will reduce C2 effectiveness and increase mission risk, making C2 Agility an essential consideration. Thus, "C2 of Cyber" is on the critical path to being able to manage our cyber defenses so that we can ensure the C2 of our forces. The increased employment of embedded automation and autonomous systems significantly increases the complexity of our systems and makes them less understandable, predictable, and controllable. The "C2 of Autonomy" is also on the critical path to being able to shape network behaviors in ways that reduce unexpected and dysfunctional behaviors and appropriately support C2.

The 22nd ICCRTS will, in both plenary and track sessions, explore these and related C2 challenges. Among the varied set of questions this year's ICCRTS will address are: How can human be better prepared to deal with the challenges associated with this complex, contested environment and the requirement for agility? What are the C2 challenges associated with ubiquitous information that is potentially compromised? How will trust relationships be established and maintained? How will the multiple perspectives of Joint, Interagency, Multi-National, and the Public be impacted? What are the challenges associated with the management of national and coalition activities in the expanded multi-dimensional battlespace (including land, sea, air, space, electromagnetic spectrum, information, time and human/social) in such connected environments? How can we better manage heterogeneous, composite networks, including autonomous nodes, upon which we depend for C2, situational awareness, and task execution?

Review and Acceptance Process

Abstracts constitute a first submission step and are used to validate the potential interest of the paper for the symposium. However, since the submission approval will be undertaken on receipt of the complete paper, we ask authors to submit complete papers for review as soon as possible. Timely feedback will be provided to authors in order to maximize the time available for authors to improve their papers before the final submission deadline.

All accepted papers will be included in the Symposium proceedings posted on the DoD CCRP website (www.dodccrp.org) and, in due course, will become part of the ICCRTS archive. Please review the author guidelines and timelines to ensure that you are aware of, and adhere to, the ICCRTS submission process.

Demonstration Session

This year's event will feature a "Demonstration Session" that will give Government Organizations an opportunity to explain, show, and get feedback about C2-related simulations, decision aids, analysis tools, etc. These include those that have been designed and developed in-house and well as those sponsored by Government organizations. All proposed demonstrations must be submitted by a Government representative to be considered. For more information, about this opportunity, please contact 2017iccrts@dodccrp.org

Key Dates

15 March 2017	Last day to submit an abstract
15 April 2017	Latest you will receive an invitation to submit a formal draft paper
15 June 2017	Last day to submit your formal draft paper
15 August 2017	Latest you will receive reviewer comments
15 September 2017	Last day to submit your revised paper
15 October 2017	Last day to submit your final paper
1 November 2017	Last day to submit your presentation

Topics of Interest

The 22nd ICCRTS will be comprised of tracks on various topics that explore C2 from a number of different perspectives. Authors are asked to think about this year's theme as they prepare their papers and discuss the theme in the context of their research and analyses. However, any submissions that contribute to a critical examination of C2-related subjects are always welcome.

Topic 1: Operational Issues: Coalition Command and Control

This topic explores the varied C2 challenges associated with working with many different mission partners from a number of different perspectives (e.g. human, social, cultural, technology, activities). How can these environments be better understood? What are their unique C2-related needs, gaps in capability? What are the lessons learned and best practices for working with a mix of different mission partners including: Ministries, Departments, Bureaus, Agencies, Governments, Special Operations, and Conventional Forces?

Topic 2: C2 Concepts, Theory, Policy, and Approaches

This topic is concerned with exploring the evolution of C2 concepts, theory, policy and approaches driven by the need to integrate C2 of Cyber and C2 of Autonomy and enhance C2 Agility to meet the challenges of a complex, connected, and contested environment.

Topic 3: Implications of the Internet of Intelligent Things

Rapid development and deployment of the Internet of Things (IoT) by both the military and civilian sectors, and their evolution towards the Internet of Intelligent Things (IoIT) are likely to have a profound impact on many military C2, processes, and procedures. This topic will explore the opportunities and challenges of adopting, adapting, and leveraging commercial IoIT

technologies to the forces and battlefields of the future including urban (smart city) environments that have advanced infrastructures that afford unique opportunities for exploitation but present a set of unique challenges as well.

Topic 4: Cognitive and Socio-technical Challenges

This topic is concerned with the challenge of organizing, orchestrating, and leveraging a variety of humans, teams, organizations, intelligent entities and systems to improve understanding, shared understanding, decision-making, and collaboration to create a variety of synergistic effects in multiple domains. This topic also includes ways of enhancing the agility of these entities.

Topic 5: Highly Connected, Automated, and Autonomous Forces

This topic is concerned with understanding the impact of rapid developments and deployments of networking and information-related technologies on the state of the art and practice of C2. These technologies include the continued evolution of networked ubiquitous sensors and collectors, embedded automation, and autonomous systems.

Topic 6: Interoperability, Integration and Security

This topic is concerned with the challenges of working with a wide range of partners (Joint, Interagency, Multinational, and Public organizations) that are inter-related and inter-dependent in a multitude of different ways in a connected battlespace. Secure interoperability, enabling effective integration between and among partners is essential and must be achieved at different levels (human, technology, processes) between and among different set of entities.

Topic 7: Human Information Interaction

This topic is focused on the relatively new research area focused on operators and the numerous ways in which they interact with information to improve C2. Interaction encompasses mechanisms for querying / searching, visualization, comprehension, sharing, and exploitation of information across multiple modalities (visual, auditory, somatosensory) in real, virtual, and augmented/mixed reality environments. This topic also welcomes papers on components (e.g., intelligent agents) that help to improve the information interaction process.

Topic 8: Methodology, Experimentation, Analysis, Assessment and Metrics

This topic is concerned with approaches for designing and undertaking experiments, developing scenarios, defining metrics and conducting analyses that are related to any aspect of command and control. These include networking, management or governance, information sharing, trust, shared awareness, shared understanding, decision-making, planning, execution, and assessment of ongoing operations.

Topic 9: Battlefields of the Future

This topic is concerned with the challenges associated with operating in a variety of contested and inter-related battlefield domains (physical, cyber, cognitive) with and in the presence of augmented humans, robots and systems.

Should you find that your proposed paper does not easily fit into any of these areas or cuts across areas, please contact us at 2017iccrtts@dodccrp.org for further guidance regarding your submission.

Instructions for the submission of abstracts and papers are provided at 2017 ICCRTS Information Central link located at <http://www.dodccrp.org/>

Student submissions are encouraged.

Paper Acceptance Criteria

The following criteria will be used by track chairs and symposium staff in their review process:

- The paper is appropriate for the theme and topics of Symposium.
- The paper is intellectually stimulating.
- The literature review is adequate/appropriate.
- The research design is adequate/appropriate.
- The data analysis is adequate/appropriate.
- The conclusions are reasonable.
- The paper advances the state of knowledge.
- The paper is logical and consistent.
- The paper's argument is persuasive.
- The writing is clear and readable.

Papers will not be accepted if:

- Topics stray from the conceptual focus of the Symposium.
- Attempts are made to promote or sell specific goods and/or services.
- Claims are unsubstantiated or facts are inaccurate.
- Scientific merit is lacking.
- Writing/explanations are poor.

Questions related to the 22nd ICCRTS can be sent to: 2017iccrtts@dodccrp.org