2019 INTERNATIONAL CONCEPT DEVELOPMENT & EXPERIMENTATION CONFERENCE SYNOPSIS

MADRID, SPAIN
29 TO 31 OCTOBER 2019

INTRODUCTION

Now in its 19th year, the 2019 International Concept Development and Experimentation (ICD&E) Conference was hosted by the Ministry of Defence of the Kingdom of Spain. It took place in Madrid from 29 to 31 October 2019.

The conference again proved to be a great platform for the international exchange of visions in the area of Concept Development and Experimentation (CD&E). In total, 291 delegates from over 30 nations participated in 8 different workshops and multiple discussions inspired by high profile guest speakers. They also used the available time to exchange ideas with partners from throughout the CD&E community.

KEYNOTE ADDRESS
ADM FRANCISCO JAVIER GONZALEZ-HUIX FERNANDEZ
CHIEF OF STAFF AT THE SPANISH DEFENCE JOINT STAFF

ADM Gonzalez-Huix opened his speech by stressing that the future is in constant change, not only in the military sphere, but in all aspects of society. In order to maintain our advantage, he continued, we need to be able to predict the operating environment. The goal of these conferences is to understand the origins and potential of emerging technologies.

ADM Gonzalez-Huix emphasized three crucial aspects to maintaining the competitive advantage: technology, human factors, and collaboration. The key he explained, is early identification and the technologies' use in the environment. Human factors will always play a key role in technological innovation however, no matter how sophisticated the technology, human error can render the outcomes useless. He closed by saying that collaboration is not only needed but is unavoidable.

WELCOME REMARKS
RADM JOHN TAMMEN
DCOS STRATEGIC PLANS AND POLICY (SPP), HQ SACT

As RADM Tammen welcomed attendees he pointed out, given this year's record-breaking attendance, the importance of CD&E with the exponential change driven by technology. He explained that industry is comfortable with failure and, while NATO in general agrees with this concept, it is vital that we do not become risk averse while developing technologies.

RADM Tammen stressed HQ SACT's role as NATO's Warfare Development Command and informed about efforts developing NATO's Warfighting Capstone Concept as a foundation for future capability development with a 20 year warfare horizon.

On average, it takes 16.4 years in NATO to field a capability concept. Because of this long implementation time, he asserted, we must decide on concepts early and move forward. He pointed out, in conclusion, the importance of the human factor in implementing these new technologies.

GUEST SPEAKERS

MR JOHN KAO
AUTHOR AND STRATEGIC ADVISOR

'The Innovation Playbook – NATO Edition'

Mr John Kao, an experienced innovator and author, discussed the unprecedented era of change and the constant need for innovation. NATO and many other organizations are focused on innovation strategies and a solid transformation agenda. Throughout his briefing, Mr Kao highlighted unsolved complexities and dilemmas associated with innovation.

Humans must have teachable and learnable capabilities that allow them to invest in ideas. Non-traditional skills such as creativity and leadership can be taught, encouraged, and learned, but must be put into constant practice. He presented his playbook, consisting of a 7-step framework, as a guide to achieve innovation in strategic transformation. He used his own piano performance to illustrate improvisation while discussing his book "The Art and Discipline of Business Creativity"; the book highlights what jazz musicians could teach leaders about creativity and innovation.

MS ISABEL AGUILERA
FORMER CEO GOOGLE IBERIA, DELL SPAIN & PORTUGAL, GE SPAIN & PORTUGAL; NAMED ONE OF TOP 50 INFLUENTIAL EXECUTIVES

'Hybridization':

Isabel Aguilera discussed how to "Answer the Challenge Ahead – Hybridization: How to Become Human More than Digital." She opened with a discussion on global uncertainty leading humans towards a digital transformation. The use of technology, she explained, is transforming our lives for the better. For example, technology can assist the handicapped to walk, the deaf to hear, and the blind to see. As we become more dependent on technology, we are "hybrids," partially human and partially technology dependent.

Humans, she asserted, need to stay challenged and successful while maintaining strong ethics. Ethics is the foundation that differentiates humans from our robotic counterparts.

Technology is ever expanding and evolving on a global scale. She explained that we must learn to accept the changes in technology, particularly when science fiction becomes science fact. In the future, she suggested, NATO should accept digital changes while still valuing the human element. Specifically, "We have to define the future for ourselves. Use the best of us and the best of technology."

BRIGADIER GENERAL (RETIRED) PHILIP VAN IMPE
CHAIR OF THE NEWLY ESTABLISHED PLATFORM FOR LEADERSHIP AT THE BELGIAN DEFENCE COLLEGE

'Innovation and Leadership':

Brig Gen (Retd) Van Impe focused his discussion on cultivating innovation in organizations. He provided recommendations on improving individuals, organizations, and organizational stakeholders. The primary focus of the discussion was to encourage creativity and the use of multiple leadership styles, through situational awareness, to achieve organizational goals. He stressed the importance of identifying creative individuals within the organizations in order to generate innovation. According to Brig Gen (Retd) Van Impe, creative people enjoy the freedom of expression, individualization, and autonomy – they only feel restricted by authority. Therefore, leaders should identify, protect, reward, and stimulate creative individuals and surround themselves with creativity. "*Innovation must be explained, stimulated and supported by leaders on all levels.*"

Innovation is about transformation and should be managed every day by situationally aware leaders. Leaders need to be cognizant of change opportunities and avoid over-controlling the innovation process; restrictions limit the creative process from generating change. There is no one specific leadership style to cultivate innovation. If leaders find that their followers are hesitant to adopt innovative changes, they should ask the question why. Some of these reasons may include doubts, fear of replacement, mistrust of leadership, etc.

Ambidextrous leadership is about switching between behaviours as the situation changes. "Opening behaviours" allow followers to make errors while fostering creativity. "Closing behaviours" monitor and control goal attainment, establish control and adherence to rules. Task or relationship-oriented leadership style also can be integrated; flexibility is key.

In conclusion, Brig Gen (Retd) Van Impe remarked that leaders can't be strong in everything and understanding this truth is key. Leadership is a never-ending process. A leader must discover their competencies and weaknesses and, in turn, recognize those of other people. Knowing their aspirations and stimulating them will encourage innovation in the organization. "*Create a supportive climate where people feel safe and protected.*" He stressed that success comes from team cohesion and, when leaders care about their people and lead by example, they can change the organizational culture.

MR JULIEN S BOURRELLE
AUTHOR

'How Culture Shapes Behaviours'

Mr Bourrelle, a best-selling author, speaker, and scientist, uses cultural differences and stories of verbal and non-verbal communication, emotional feedback, social norms and values to highlight how they influence interpersonal interactions across cultures.

He described the "Layers of Culture" as an onion, the outer most layer being Behaviours through which we perceive and interpret communications. The next layer is Heroes, those that we respect and emulate, followed by Rituals, and at the core, Values.

He provided guidance and strategies to better connect with people from other cultures and, more importantly, how to build trust. Cultural differences should promote constructive discussion, not conflict, focusing on the benefits of cultural diversity with everyone involved. He challenged attendees to gain better cultural understanding of interactions by flipping their perspective 180 degrees.

Mr Bourrelle encouraged everyone to challenge themselves to feel more comfortable in uncomfortable situations in order to build trust with other cultures.

MR RAMSES GALLEGO
STRATEGIST AT SYMANTEC

'*Disruptive Technologies in the Decision-Making Process*'

Mr Gallego opened by asserting "the world is changing at the speed of light"; the enemy is trying to think outside the box, including digital decision making. Everything digital is growing bigger and faster, he explained, for example machine learning, one of the five subsets of Artificial Intelligence (AI).

He described the four aspects of machine learning: supervised, unsupervised, reinforcement learning, and deep learning. Supervised and unsupervised machine learning, he explained, are already a thing of the past; reinforcement learning is an algorithm that is self-capable and learns from its mistakes; whereas deep learning is an algorithm that mimics the human brain.

The human brain works as a series of electrical signals and, Mr Gallego asserted, in a digital world it's easy to simulate electrical signals on a digital plane. When combining artificial intelligence and quantum computing, he went on, the algorithm can solve any encryption known by humans today, including those protecting nuclear power plants and drones. "*Quantum computing will change the world as we know it.*" "*The result will be a world without secrets.*"

PANEL SESSION

The panel discussion was facilitated by Mr John Kao and included Brig Gen (Retd) Phillip Van Impe, Mr Julien S Bourrelle, RADM John Tammen, and Ms Isabel Aguilera. Mr Kao opened by asking each of the panel participants to share their most challenging questions during morning plenary speeches and further explored those questions. The questions focused around cultivating a culture of innovation. One audience comment focused on frustrations cultivating a culture of innovation, particularly in the military where young officers are trained to follow regulations and, once they are more senior, are suddenly required to be a disrupter and innovator. The panel unanimously recommended younger officers be included earlier in decision making processes.

Further discussion touched on: How do we overcome cultural and organizational differences and harness the benefits in HQ SACT? How do we draw on best practices of individual nations to enhance both daily business activities and approach to warfare development? Can we overcome inertia; push-back against conventional caution/wisdom; persuade our leadership to be brave? In this information, data centric age, how do we turn 'need to know' behaviors into 'keen to share'?

The last part of the panel discussion focused on learning from failures. The consensus was that failure does need to be encouraged, but failing fast and learning from that failure can provide some of the greatest lessons. The panel cautioned against accepting failure too readily, as sometimes it happens for the wrong reasons.

ICEBREAKER

On the evening of the first day the conference attendees were kindly hosted by Ministry of Defence of the Kingdom of Spain at home to the Centro Superior de Estudios de la Defensa Nacional (CESEDEN), the main joint military teaching centre of the Spanish Armed Forces.

Welcome remarks were given by LtGen Bisbal. The guest of honour was the Spanish Chief of Staff at the Spanish Defence Joint Staff, ADM Gonzalez-Huix. Delegates were able to exchange ideas and network to build deeper and more collaborative engagements in the future.

ANNUAL CD&E EXCHANGE

The Annual CD&E Exchange once again provided a valuable platform to keep the CD&E community informed about the many different ongoing projects across NATO, partners and individual nations. The NATO Centres of Excellence were particularly well supported.

This year's exchange main focus was on Joint Capabilities demonstrating a wide range of topics: technologies that included AI, automation, various flavours of warfare, innovative solutions and how technologies / capabilities can be employed in NATO.

Delegates gravitated naturally towards the booths that had interactive technologies, but conversations took place at every stand and in the common areas where food and drink were served.

Extensive networking was facilitated by the overall setting.

CONFERENCE WORKSHOPS

WORKSHOP 1 - "MILITARY CAPABILITIES FOR THE GREY ZONE OF CONFLICT"

LED BY PROF. JAVIER JORDÁN OF THE SPANISH CONCEPT DEVELOPMENT JOINT CENTRE (CCDC)

NATO allies confront the challenge of revisionist international powers that operate below the threshold of direct armed confrontation. In order to achieve their strategic goals, those adversaries resort to hybrid approaches in the context of the so-called 'grey zone' conflicts.

A broad consensus exists about the primacy of non-military tools to counter those strategies, commonly known as 'hybrid threats'. Nevertheless, the military instrument still has an important role to play in detection and deterrence of new aggressions and further escalation.

The workshop focused on addressing the definition of the Grey Zone, the role of Special Operations Forces (SOF), cyber as a tool, and intelligence.

Source attribution is becoming increasing difficult in modern warfare; when there is an attack combining cyber, information and physical means, it can be difficult to identify a responsible party. Therefore, having reliable Human Intelligence remains an important source inside the decision cycle of the political arena.

The workshop recommended that NATO establish a doctrine and/or guidance that defines the Grey Zone and develops agreed standard responses for nations to be paired with established rules of engagement.

WORKSHOP 2 - "FUTURE LEADERSHIP"

LED BY WG CDR COLIN WEST OF THE UK DEVELOPMENT CONCEPTS & DOCTRINE CENTRE AND COL SOENKE MARAHRENS OF THE GERMAN INSTITUTE FOR DEFENCE AND STRATEGIC STUDIES FOR THE MULTINATIONAL CAPABILITY DEVELOPMENT CAMPAIGN.

In NATO and individual nations there is a need to understand the impact of the future operating environment on leadership capability, and to identify and analyse these implications to determine how best to prepare and support future leaders.

Within this environment leaders may be required to face a broader range of problems, operate at a different ops tempo, above and below the thresholds of armed conflict, while leading a much wider diversity of people and even (autonomous) machines.

It included how leadership is viewed differently by others, in terms of definitions, styles, values, and how we see ourselves as leaders. This generated several questions about leadership and how it can, or should be, shaped for the future while recognizing the existing challenges and the appropriate way(s) to prepare tomorrow's leaders.

Against scenarios rooted in the development of AI, human augmentation and other technological developments, participants took part in interactive and practical exercises allowing for scenario-based discussions on topics that could be viewed differently by the nations that make up NATO. The workshop supported the conclusions of previous events; that it is essential that present day leaders are prepared to develop future leaders responsible to resolve complexities of future unknown environments.

WORKSHOP 3 - "COUNTERING SMALL UNMANNED AIRCRAFT SYSTEMS (C-SUAS) - HANDBOOK REFINEMENT EXPERIMENT"
LED BY LTC DANIELE PIPERNO OF HQ SACT OPERATIONAL EXPERIMENTATION BRANCH

The "Countering Small Unmanned Aircraft Systems (C-sUAS) - Handbook Refinement Experiment" workshop was led by HQ SACT Operational Experimentation Branch with support from NATO Headquarters Emerging Security Challenges Division (ESCD). The workshop was divided into four syndicates to work on separate aspects of a project intended to provide recommendations on C-sUAS guidelines and planning tools for NATO commanders. The handbook is not intended to provide tactical guidance for individual commanders, but rather it will provide C-sUAS strategic and operational guidance.

The 1st syndicate, "strategic considerations," used the Doctrine, Organization, Training, Interoperability (DOTI) framework to determine several strategic considerations for C-sUAS. These considerations included: focusing C-sUAS doctrine on the threat not the problem, recognizing that the sUAS threat is primarily a force protection challenge tied with local law enforcement and of limited air defence concern, recommending the incorporation of C-sUAS training into basic pipelines, and the identification of a need for alliance-wide information sharing.

The 2nd syndicate, "protection model" considered if the planning model was the right model to incorporate into the C-sUAS problem. The group concluded that the protection model, which includes prevention, situational awareness, response, and post event actions, should be applied instead.

The 3rd syndicate, "mission planning and execution" group identified key considerations regarding mission planning and execution for C-sUAS and were able to support the content development.

The 4th syndicate, "Application of the Comprehensive Operations Planning Directive (COPD) in C-sUAS," addressed several key strategic and operational questions on the application of C-sUAS in the first four phases of the COPD. The group concluded that the

COPD could be used as a framework for C-sUAS operations in certain situations and could be used as a general guide in others.

The team will now take all of the work completed by each syndicate to create the initial draft recommendation and use this as a starting point to develop a C-sUAS document for NATO commanders.

WORKSHOP 4 - "WARGAMING THE FUTURE"
LED BY MRS SUE COLLINS OF HQ SACT IN PARTNERSHIP WITH THE NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH

HQ SACT is committed to improving NATO's capability for Wargaming. Examples of recent efforts include creating opportunities to use wargames on projects, education-related events, and research into state-of-the-art wargaming.

Attendees were exposed to the benefits of wargaming participating in three separate games, Matrix, Hybrid, and" Disruptive Technology Assessment" games. The Wargame scenarios reflected future scenarios based on current trends or the confluence of several trends identified in the Strategic Foresight Analysis (SFA).

By exploring the themes and trends in a wargame environment, the findings support the next iteration of SFA development with a sound, analytical base, complementing the SFA's workshop programme. These conclusions will further aid development of forthcoming Programmes of work, allowing Nations to influence the topics for development, and providing HQ SACT with evidence of national issues and concerns, resulting in a well-prioritised program of work.

Wargaming can help mitigate unnecessary investments in risky technological and defence capital assets through practical simulations with stakeholders. These types of discussions can help prioritize technical options be selecting a range of opportunities that meet the military's contemporary needs.

WORKSHOP 5 - "MILITARY USES OF AI, AUTOMATION AND ROBOTICS (MUAAR)"

LED BY MR LOU DURKAC OF US JOINT STAFF, JOINT FIRES DIVISION AND LTC VALENTIN VELKOV OF HQ SACT CONCEPT DEVELOPMENT BRANCH

Artificial intelligence (AI) technologies, automation, and robotics capabilities have gained significant investments and have made significant technical progress in recent years. The rise in technological capability has already invaded and impacted most aspects of our lives, and transformed our social, political, and economic systems.

The MUAAR project commenced as part of the Multinational Capability development Campaign (MCDC) Programme of Work for 2019-2020. The MCDC series is a multinational force development initiative that focuses on collaboratively developing and accessing concepts and capabilities to address the challenges associated with conducting coalition and multinational operations. The deliverable from the MUAAR project will be a proposed standardized process, repeatable across additional projects that will provide guidance when developing, prototyping, testing, and operationalizing AI, Automation and Robotics (AA&R)-enabled systems.

The workshop brought together "users, makers, and framers" of AI, Automation, and Robotics who were then split into breakout groups. Using Analysis of Alternative (AoA) facilitation techniques, all groups identified their individual information requirements and prepared project initiating templates containing a framework of standardized activities for development of AI-enabled capabilities.

WORKSHOP 6 - "ENABLING COHERENT DETERRENCE"

LED BY LTC STEPHEN MURRAY OF HQ SACT CONCEPT DEVELOPMENT BRANCH, CDR DAVID SPINKS RN OF HQ ACO COMPREHENSIVE CRISIS AND OPERATIONS MANAGEMENT CENTRE, AND DR MICHELLE BLACK OF THE UNIVERSITY OF NEBRASKA

NATO approaches security from a holistic perspective intended to deter and defend against any threat of aggression and emerging security challenges. This requires the Alliance to understand and adapt deterrence postures to address emerging security challenges arising from a complex system of integrated, interacting, and rapidly evolving threats that are enabled by emerging technologies, unconstrained by traditional domains, and reliant on ambiguity, deception, and surprise.

This workshop considered a proposed, broad-spectrum deterrence assessment methodology intended to enhance understanding and strategic anticipation in a complex spectrum of both state and non-state actors.

This methodology is intended to identify and deter potential adversaries. It includes a rigorous analysis of their potential courses of action and aims to establish a deterrence profile, deterrence options in peacetime and crisis, and influence points. The ultimate goal of the research project is to provide NATO with a standardized methodology and framework to improve the development of deterrence policies and help NATO adapt deterrence postures as new threats emerge.

The workshop also conducted discovery experimentation to explore the maturity of the draft concept. Potential improvements in the methodology were discussed to better apply the methodology to the development of NATO deterrence policy and improve the understanding of the concept by analysts.

WORKSHOP 7 - "ARTIFICIAL INTELLIGENCE IN EDUCATION TRAINING EXERCISE & EVALUATION (ETEE)"

LED BY MAJ FISNIK SHTINI OF HQ SACT EDUCATION AND TRAINING PLANS AND PROGRAMMES BRANCH AND LTC STEFAN GULPEN OF THE GERMAN MINISTRY OF DEFENCE

As part of its Autonomy program, HQ SACT is considering the practical approach to the integration of autonomous systems and the impact of AI as part of the incorporation of innovative concepts to enable the future of ETEE. This has involved exploring the expansion of applications, approaches, and advances being made in the field of Artificial Intelligence. To this end, NATO is engaged with a German funded study to explore the use of AI in Air Command and Control (C2) training. Results will be used to steer a NATO approach on the incorporation of AI in NATO ETE. The objective of the Study has been to improve individual competency development, generation, and operations. The main considerations are assessing the role of AI in accelerating decision-making; outlining the roadmap for development and reducing the cognitive load on the personnel. The end goal is the integration of disruptive technologies to retain the competitive edge in complex operating environments.

The ETEE workshop looked at developing a prototype for a persona in order to increase the quality of training to become a better Air C2 planner and continue developing concepts into the NATO architecture framework. The participants identified for a fictitious air planner, traits and relevant competencies needed for good decision making. From these competencies, participants sought to identify necessary developments that might drive potential AI solutions. The development of a prototype to describe these solutions will enable better tailoring of the potential use of current AI-capabilities, and turn it into solutions that might further drive capability development.

WORKSHOP 8 - "MILITARY CONTRIBUTION TO HUMAN SECURITY "
LED BY MRS TRACY CHEASLEY OF HQ SACT STRATEGIC PARTNERSHIPS BRANCH

In the past five years, NATO has conducted significant work on Protection of Civilians (PoC), as well as on cross-cutting topics such as Children and Armed Conflict (CAAC), Cultural Property Protection (CPP), Women, Peace and Security (WPS), and Conflict Related Sexual and Gender-Based Violence (CR-SGBV). All of these topics have long-term consequences and impact NATO's missions, including the overall mission success. However, these topics are at different stages of development and there are a variety of tools which have been developed to support individual topics. It is, therefore, necessary to gain a better understanding of the relationships, gaps and overlaps between the topics and explore how they contribute to Human Security (HS).

The workshop members tackled defining the NATO´s Military Contribution to Human Security (MC2PS) across the conflict spectrum. As a starting point, they explored national and non-NATO organizations´ perspectives on HS. Under the UN evolved framework on HS, based on Freedom from Fear, Want and Indignity, NATO's main military contribution will focus on the Freedom from Fear less on Freedom of Want or Freedom from Indignity.

The question of whether a concept is necessary for MC2HS or if other areas of work is yet to be determined. Considerations such as the expansion of the PoC concept to cover additional areas identified during the workshop are possibilities.

Coming out of the workshop, the recommended way ahead is to use experimentation as a tool to refine MC2HS through participation in the upcoming 2020 Steadfast Jupiter Jackal exercise support exploration of a training curriculum.

CLOSING REMARKS
RADM JOHN TAMMEN
DCOS STRATEGIC PLANS AND POLICY (SPP), HQ SACT

RADM Tammen was grateful to the attendees and appreciated the important issues that were raised during the conference. There were three common threads identified throughout the workshops and guest speakers remarks that resonated.

First, is the human element that is present and important while we try to address the disruptive technologies.

Second, the trust that serves as a critical element between people and human and machine interactions, and how to build it.

Third, the acceptance of failure and the need to learn from our failures and incorporate it into our leadership and educational programs. "It is best to fail early," he reiterated, and we need to be able to get past the inertia and rigidity that keeps us from moving from legacy equipment to capabilities we need in the future. He stressed the need to "re-culturalize" ourselves in order to maintain a competitive technological edge and maintain the human factor as key elements in the future. We need to build a muscle memory, he stated. When it comes to innovative techniques it must be second nature to us.

2020 INTERNATIONAL CONCEPT DEVELOPMENT & EXPERIMENTATION CONFERENCE

In 2020, the ICD&E will celebrate its 20th year. HQ SACT is working with France to host the 2020 ICD&E Conference and we look forward to seeing you there. Attendees of the 2019 ICD&E Conference can expect an email in the Summer of 2020 with information and registration details.

FOR MORE INFORMATION CONTACT

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International Concept Development & Experimentation Conference

https://cde.cnf.io/