



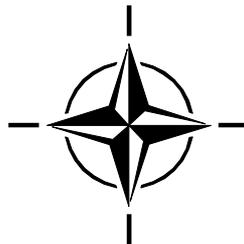
RTO TECHNICAL REPORT

TR-HFM-138

Adaptability in Coalition Teamwork
*Leader and Team Adaptability in
Multi-National Coalitions (LTAMC)*

(Adaptabilité dans le travail d'équipe en coalition
*Adaptabilité des chefs et des équipes dans
les coalitions multinationales*)

Findings of Task Group HFM-138.



Published November 2012





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The Research and Technology Organisation (RTO) of NATO

RTO is the single focus in NATO for Defence Research and Technology activities. Its mission is to conduct and promote co-operative research and information exchange. The objective is to support the development and effective use of national defence research and technology and to meet the military needs of the Alliance, to maintain a technological lead, and to provide advice to NATO and national decision makers. The RTO performs its mission with the support of an extensive network of national experts. It also ensures effective co-ordination with other NATO bodies involved in R&T activities.

RTO reports both to the Military Committee of NATO and to the Conference of National Armament Directors. It comprises a Research and Technology Board (RTB) as the highest level of national representation and the Research and Technology Agency (RTA), a dedicated staff with its headquarters in Neuilly, near Paris, France. In order to facilitate contacts with the military users and other NATO activities, a small part of the RTA staff is located in NATO Headquarters in Brussels. The Brussels staff also co-ordinates RTO's co-operation with nations in Middle and Eastern Europe, to which RTO attaches particular importance especially as working together in the field of research is one of the more promising areas of co-operation.

The total spectrum of R&T activities is covered by the following 7 bodies:

- AVT Applied Vehicle Technology Panel
- HFM Human Factors and Medicine Panel
- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS System Analysis and Studies Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

These bodies are made up of national representatives as well as generally recognised 'world class' scientists. They also provide a communication link to military users and other NATO bodies. RTO's scientific and technological work is carried out by Technical Teams, created for specific activities and with a specific duration. Such Technical Teams can organise workshops, symposia, field trials, lecture series and training courses. An important function of these Technical Teams is to ensure the continuity of the expert networks.

RTO builds upon earlier co-operation in defence research and technology as set-up under the Advisory Group for Aerospace Research and Development (AGARD) and the Defence Research Group (DRG). AGARD and the DRG share common roots in that they were both established at the initiative of Dr Theodore von Kármán, a leading aerospace scientist, who early on recognised the importance of scientific support for the Allied Armed Forces. RTO is capitalising on these common roots in order to provide the Alliance and the NATO nations with a strong scientific and technological basis that will guarantee a solid base for the future.

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Published November 2012

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ISBN 978-92-837-0173-6

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List of Acronyms

ACO	Allied Command Operations
ACT	Allied Command Transformation
AFRL	Air Force Research Laboratory
AGFI	Adjusted Goodness of Fit Index
ARI	Army Research Institute
ARL	Army Research Laboratory
AW04	Allied Warrior 04
AW05	Allied Warrior 05
BBN	BBN Technologies
C2	Command and Control
CCL	Culture and Cognition Laboratory
CD&E	Concept Development and Experimentation
CFEC	Canadian Forces Experimentation Centre
CJOC	Combined Joint Operations Centre
CJTF	Combined Joint Task Force
COTS	Commercial Off-The-Shelf
CPX	Command Post Exercise
CTA	Collaborative Technology Alliance
CTEF	Command Team Effectiveness
D/I	Direct/Indirect
DARI	Defence Advances Research Institute
DJTF	Deployable Joint Task Force
DMSO	Defence Modelling and Simulation Office
Dstl	Defence Science and Technology Laboratory
E/S	Egalitarian/Status
EBO	Effects Based Operations
FA	Factor Analysis
FFI	Norwegian Defence Research Establishment
FOI	Swedish Defence Research Agency
GFI	Goodness of Fit Index
HFM	Human Factors and Medicine
HRED	Human Research and Engineering Directorate
I/C	Individualism/Collectivism
I/I	Independence/Interdependence
ICCRTS	International Command and Control Research and Technology Symposium
IT	Information Technology
JET	Joint Education and Training
JFC (JFCOM)	Joint Force Command
JWC	Joint Warfare Centre
LISREL	Analysis of Linear Structural Relationships
LSA	Latent Semantic Analysis

LTAMC	Leader and Team Adaptability in Multinational Coalition
LTCR	Long-Term Capability Requirements
M/F	Masculinity/Femininity
MDS	Multi-Dimensional Scaling
MND	Multi-National Division
MNE	Multi-National Experiment
NATO	North Atlantic Treaty Organization
NAVAIR-ORL TSD	NAVAIR Orlando Training Systems Division
NEC	Network Enabled Capability
NES	Native English Speakers
NMSU	New Mexico State University
NNEC	NATO Network Enabled Capability
NNES	Non-Native English Speakers
NOR	Norwegian Defence Research Institute
NPC	Non-Player Characteristics
NRF	NATO Response Force
NST	NATO Staff Target
ONST	Outline NATO Staff Target
OSD	Office of the Secretary of Defense
PC	Personal Computer
Pd	Power distance
PfP	Partnership for Peace
POC	Point Of Contact
R/R	Risk/Restraint
RMR	Root Mean square Residual
RTG	Research Task Group
RTO	Research and Technology Organization
RYS	Research Symposium
SA	Situation Awareness
SABRE	Situational Authorable Behaviour Research Environment
SACT HQ	Supreme Allied Command Transformation Headquarters
SAP	Self-Assessment Profile
SAS	Studies Analysis and Simulation
SASO	Stability and Support Operations
SBIR	Small Business Innovative Research
Sfor Adapt	Simulations for Adaptability
SFOR HQ	Sustainment Force Headquarters
St/Lt	Short-term/Long-term
STANAG	Standardization Agreement
T/R	Task/Relationship
TACT	Training Adaptable Coalition Teamwork
TAP	Transition Assistance Programme
TOR	Terms Of Reference
Ua	Uncertainty avoidance
VSM	Hofstede Value Survey Module

Products

GLOBESMART[®] COMMANDER CULTURAL AWARENESS TRAINING TOOL

The primary deliverable to NATO Allied Command Transformation was the *GlobeSmart[®] Commander* Cultural Awareness training tool. This computer based training was designed to provide operational-level military personnel with the necessary skills to adapt, as needed, to cultural influences on communication, coordination, support behaviour and other teamwork functions. *GlobeSmart[®] Commander* features learning modules that not only raise one's awareness of culturally-based cognitive differences in thought and behaviour, it also provides concrete, relevant scenario-based training on how one can proactively adapt their behaviour, as necessary, to improve team performance. The training will enable officers to navigate the challenges of culture during information exchange involving team tasks, goals and mission, response sequencing, time and position coordination, load balancing, matching resources to task requirements, adjusting activities in response to errors and omissions, and general activity monitoring.

This high-quality, low-tech training has been transitioned to multiple military entities and institutions, including ACT in the Fall 2007, where training and documentation was delivered to Brigadier General Ernst Otto Berk. Other transitions include the U.K. Ministry of Defence Human Systems Group, Bulgaria Defense Advanced Research Institute at the Rakovski Defense and Staff College, U.S. Military Transition Team Training Center, U.S. Army Knowledge On-line, U.S. Military Academy at West Point, U.S. Air War College for Strategy and Technology, U.S. Marine Academy, U.S. Naval Post Graduate School, and U.S. Naval Health Research Center. Future plans include demonstrating *GlobeSmart[®] Commander* at NATO headquarters in Brussels (Fall 2008) and the NATO School at Oberammergau, Germany (Fall 2008). See Chapter 5 for details.

NATO RTO HFM RSY 142 INTERNATIONAL RESEARCH SYMPOSIUM

The primary deliverable to NATO Research and Technology Organization (RTO) Human Factors and Medicine (HFM) Panel was the HFM RSY 142 international research symposium, titled *Adaptability in Coalition Teamwork*. Details are summarized (and reported as a RTO publication) in the symposium's Technical Evaluator's Report (TER), submitted by Dr. Joseph Soeters, Professor of Organization and Social Studies, Netherlands Defence Academy, Tilburg University.

“In the HFM-142 symposium a total of 23 papers were given, in addition to four poster presentations, one featured speaker (Ms. Gail McGinn, U.S. Deputy Under Secretary of Defense for Plans) and two keynote addresses (Major General Ton van Loon, Chief of Staff, Allied Land Component Command HQ, Heidelberg, NLD) and Dr. Megan Thompsen (Defence Scientist, Canadian Defence Research and Development). The first speaker provided an overview of the policies of the Pentagon that were developed to improve the knowledge of relevant, strategic languages among U.S. military service personnel. Major General van Loon's address revolved around practical, operational experiences and the 'lessons learned' of a commander of the ISAF multinational coalition in Southern Afghanistan, whereas the Dr. Thompsen's address related to academic insights with respect to differences in personality traits of individuals.

The papers were organized into two tracks, one on Culture (chaired by Dr. David Matsumoto, Professor at San Francisco State University USA; Director and CEO The Ekman Group Research

Division) and the other on Teams (chaired by Dr. Peter Essens, Chief Scientist Human in Command, TNO Defence, Security and Safety, NLD; HFM-142 Program Committee). Two internationally acclaimed scholars in the field of international management were present and participated in an expert's panel discussion at the end of the symposium. They were Dr. David Matsumoto (editor of the International Journal of Cross-Cultural Psychology;) and Dr. Mansour Javidan (co-author of the famous GLOBE study; Professor and Director The Garvin Center for Cultures & Languages of International Management, USA). Also participating on the expert's panel were Dr. Linda Pierce (Chief, Organizational Performance Unit, U.S. Army Research Institute), Dr. Winston Sieck (Principal Scientist, Applied Research Associates, USA) Ms. Anne Lise Bjornstad (Researcher, Norwegian Defence Research Institute, NOR), and Dr. Peter Essens.

The research symposium on 'Adaptability in Coalition Teamwork' in Copenhagen intended to study the theme as mentioned above. The main results of the more than 35 theoretical and research papers were as follows:

- Training tools (games, simulations) really work and seem to be effective in dealing with cultural diversity in coalition teamwork, at least to some extent;
- Tested in different national teams, different responses to stimuli emerged in terms of performance but also in terms of goal setting and problem solution;
- Confirming previous studies in the civilian sector, differences evolved between national groups and multinational groups; these differences relate to trust, flexibility and performance;
- Training with role playing seems to work really well in developing cultural skills among servicemen;
- Feedback information on team morale and performance during operations is an instrument that is highly valued by commanders in the field;
- Differences in language proficiency in English confound research output as much as they do in everyday operational life.

Overall, these results have underlined the importance of the theme and they have indicated a number of ways of dealing with the issues at stake. These results may lead to basic insights on how to deal with training and selecting military people in order to perform successfully in multinational teams. This work, however, cannot be considered to be complete or finished. A number of challenges ahead have been formulated that will induce more researchers from more member nations to participate in future studies in this area. These studies need to be conducted closer to the field of operations, and in closer connection with 'reflective', experienced commanders."

The symposium was delivered 21-23 April 2008 in Copenhagen Denmark, chaired by Dr. Janet Sutton (U.S. Air Force Research Laboratory). See Chapter 6 for details.

ORGANIZATIONAL QUESTIONNAIRE

Significant contributions were made to the enhancement of a questionnaire being developed at the Norwegian Defence Research Establishment (FFI) to assess organizational and group processes, information sharing, decision making, language, group goals/process, social identify, and culture was enhanced. Recognized by exercise planners as one of the best survey instruments available for assessing factors that could contribute to organizational effectiveness in military operations, this questionnaire was implemented in the five-nation Multinational Experiment series (e.g., MNE4 and MNE5). See Chapter 3 for details.

CULTURAL ADAPTABILITY MODEL

A relational model of Cultural Adaptability, based on an examination of specific traits, characteristics, and cognitive styles that may be exhibited in individuals who adapt easily in multicultural environments, was empirically developed and validated. This model was the first step toward developing a predictive model of Cultural Adaptability that can be used to inform personnel selection, training requirements, and collaborative system design. Significant follow-on research was initiated by the Swedish Defence Research Agency (FOI), funded by the U.S. Air Force Office of Scientific Research European Office of Research and Development, to experimentally determine causality for a subset of model variables. See Chapter 4 for details.

MULTICULTURAL, DISTRIBUTED TEAM EXPERIMENT

A seminal research study, titled 'Leader and Team Adaptability in Multinational Coalitions (LTAMC)' established a baseline from which the international research community can explore mediating effects of culture on team process and outcomes. This study was the first large-scale (56 four-person teams of military officers, 224 participants total), five-nation distributed team experiment, using gaming technology to investigate information sharing, situation awareness, and team performance on culturally homogeneous and culturally heterogeneous military teams. See Chapter 2 for details.

PRESENTATIONS AND PUBLICATIONS (AS OF SEPTEMBER 2008)

The following publications were generated as a product of the combined NATO ACT CD&E – RTO HFM RTG 138 program of research as of September 2008:

1. Bjornstad, A. L. (2005). *Part I: Allied Warrior 2004 – Pilot study and analysis of cross-cultural organizational issues*. FFI/RAPPORT-2005/01709.
2. Bjornstad, A. L. (2006). *Part II: Allied Warrior 2004 - Pilot study and analysis of cross-cultural organizational issues*. FFI/RAPPORT-2006/00112.
3. Bjørnstad, A. L. (2008, Apr). Organization, culture and group processes in operational and simulated environments (MP-HFM-142-12). In J. L. Sutton's (Chair) *Adaptability in Coalition Teamwork. Symposium conducted at the NATO RTO HFM RSY 142*, Copenhagen, Denmark.
4. Burke, C. S., Klein, C., Christin L. Upshaw, C. L., Salas, E., Johnston, J. H., Sutton, J. L., Pierce, L. & Ungvarski, D. (2008, Apr) Examining Teamwork Dimensions in a Coalition Environment: Perspectives from a NATO Joint Task Force Exercise (MP-HFM-142-13). In J. L. Sutton's (Chair) *Adaptability in Coalition Teamwork. Symposium conducted at the NATO RTO HFM RSY 142*, Copenhagen, Denmark.
5. Johnston, J. H., & Mangos, P, (2008, Apr). Measuring Cultural Cognitive Biases in Multi-National Research (MP-HFM-142-07). In J. L. Sutton's (Chair) *Adaptability in Coalition Teamwork. Symposium conducted at the NATO RTO HFM RSY 142*, Copenhagen, Denmark.
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Acknowledgements

The NATO Allied Command Transformation (ACT) Concept Development and Experimentation (CD&E) program provided financial support and unprecedented access to conduct research at NATO Response Force (NRF) Certification Command Post Exercises and standing NATO headquarters. National support for research personnel contributions and national research facilities was provided by the following Nations: Bulgaria, Canada, Netherlands, Norway, Sweden, and the United States. The NATO Research and Technology Organization (RTO) provided support for identifying and advising Alliance and Partnership for Peace scientists interested in contributing their time and energy to studying culturally based aspects of multicultural operational level teams. The NATO Research and Technology Agency (RTA) provided administrative guidance and meeting facilities, as needed. A sincere thank you is extended to the leadership and support staff of these organizations and to the participating Nations for their contributions to the combined NATO ACT CD&E Leader and Team Adaptability in Coalition Teamwork / RTO HFM RTG/138 project.

Thank you: 1) Dr. Robert Foster, Chair, NATO RTO Human Factors and Medicine Panel. You gave our program wings. 2) Mr. Paul Chatelier. Mentorship at its best. 3) LtCol. Bjorn Jensen, Mr. Dave Beckwith, Mr. Van Edelmann, Mr. Pierre Marc, Mr. Bill Piersol, Yeoman Ken Dawson, Commander RNLN Dr. Mr. Marten Meijer, Ms. Danielle Pelat, and LtCol. Dr. Steffen Lydich. True artists in the challenging realm of programmatic. A special thank you is extended to MajGen. Rick Lynch (former Commander, Deployable Joint Task Force, JFC-Naples). Your enthusiastic support in both words and actions during the Allied Warrior 04 CPX, for the research team, our goals, and our methodology, was a primary motivating force behind our success.

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REPORT DOCUMENTATION PAGE													
1. Recipient's Reference	2. Originator's References	3. Further Reference	4. Security Classification of Document										
	RTO-TR-HFM-138 AC/323(HFM-138)TP/472	ISBN 978-92-837-0173-6	UNCLASSIFIED/ UNLIMITED										
5. Originator	Research and Technology Organisation North Atlantic Treaty Organisation BP 25, F-92201 Neuilly-sur-Seine Cedex, France												
6. Title	Adaptability in Coalition Teamwork <i>Leader and Team Adaptability in Multi-National Coalitions (LTAMC)</i>												
7. Presented at/Sponsored by	Findings of Task Group HFM-138.												
8. Author(s)/Editor(s)	Multiple		9. Date November 2012										
10. Author's/Editor's Address	Multiple		11. Pages 434										
12. Distribution Statement	There are no restrictions on the distribution of this document. Information about the availability of this and other RTO unclassified publications is given on the back cover.												
13. Keywords/Descriptors	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Adapt</td> <td style="width: 50%;">Multi-Cultural</td> </tr> <tr> <td>Adaptability</td> <td>Multi-National</td> </tr> <tr> <td>Coalition</td> <td>Operational</td> </tr> <tr> <td>Cultural</td> <td>Team</td> </tr> <tr> <td>Culture</td> <td>Teamwork</td> </tr> </table>			Adapt	Multi-Cultural	Adaptability	Multi-National	Coalition	Operational	Cultural	Team	Culture	Teamwork
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14. Abstract	<p>Coalitions are the norm in today's global theatre of operations with future operations regularly consisting of multiple branches of military service, government and non-government agencies, and nations. Several decades of research have led to the identification of dimensions of culture that shape behaviour in both civilian and military settings. Depending upon the situation that a coalition team encounters, any cultural perspective could be useful. Needed are models, methods, and tools that support rapid development of effective teams comprised of individuals that: a) Understand their own culturally based biases and predisposition to action; b) Recognize the need to adapt to cultural diversity; c) Understand how to adapt; and importantly d) Choose to adapt. To address these requirements, an international team of military research scientists collaborated to study operational-level military teamwork. Field data were collected via questionnaires, observation, and semi-structured interviews on the impact of culture, organization, language, and other individual and group difference on teamwork at two Command Post Exercises in Italy and Portugal and at Allied Command Transformation HQ in USA. National resources were utilized in a complex, multi-national, distributed team laboratory experiment investigating information sharing, situation awareness, and performance on multinational teams. Findings from these activities are reported.</p>												





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