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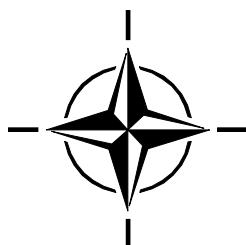
RTO TECHNICAL REPORT

TR-MSG-054

# Risk-Based Tailoring of the Verification, Validation, and Accreditation/ Acceptance Processes

(Adaptation fondée sur le risque, des  
processus de vérification, de validation,  
et d'accréditation/d'acceptation)

This Report documents the findings of the Modelling and Simulation  
Group 054 (MSG-054) / Task Group 037 (TG-037).



Published April 2012





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Group 054 (MSG-054) / Task Group 037 (TG-037).

by

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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.

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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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## List of Acronyms

AGARD	Advisory Group for Aerospace Research and Development
AVT	Applied Vehicle Technology
CM	Composite Model
DRG	Defence Research Group
FEDEP	Federation Development and Execution Process
HFM	Human Factors and Medicine
IEEE-SA	Institute of Electrical and Electronics Engineers Standards Association
IST	Information Systems Technology
IT IS	Institut für Technik Intelligenter Systeme
M&S	Modeling & Simulation, model(s) and simulation(s)
MSG-019	Modelling & Simulation Group 019
MSG-054	Modelling & Simulation Group 054
NATO	North Atlantic Treaty Organisation
NMSG	NATO Modelling and Simulation Group
OWL	Web Ontology Language
PAR	Project Authorization Request
PDG	Product Development Group
PfP	Partners for Peace
R&T	Research and Technology
RBA	Risk-Based VV&A
RTA	Research and Technology Agency
RTB	Research Technology Board
RTO	Research and Technology Organisation
SAS	System Analysis and Studies
SCI	Systems Concepts and Integration
SET	Sensors and Electronics Technology
SISO	Simulation Interoperability Standards Organization
SIW	Simulation Interoperability Workshop
STANAG	Standardization Agreement
TG	Task Group
TG-016	Task Group 016
TG-037	Task Group 037
USA	United States of America
V&V	Verification and Validation
VV&A	Verification, Validation, and Accreditation

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## Definitions

**Acceptability Criteria:** A set of standards that a particular model or simulation and its associated data must meet to be acceptable for its intended use.

**Acceptance:** The decision to use the results produced by a model or simulation and its associated data for an intended use.

**Activity:** A set of tasks that consumes time and resources and whose performance is necessary for the execution of the VV&A processes.

**Accreditation:** The official certification that a model or simulation and its associated data are acceptable for use for a specific purpose.

**Development Product:** Any artifact of the M&S development or modification processes.

**M&S Use Risk:** The risk incurred by the application of M&S results and that is calculated as a function of M&S uncertainty, VV&A assessment uncertainty, and the importance of the M&S results based on the intended use.

**Risk:** A measure of the probability and severity of undesired effects often taken as the simple product of probability and consequence.

**Validation:** The process of determining the degree to which a model or simulation and its associated data are an accurate representation of the real world from the perspective of the intended uses of the model.

**Verification:** The process of determining that a model or simulation and its associated data accurately represent the developer's conceptual description and specifications.

# History of Meetings and Significant Events

Year	Month	Meeting Location	Event
<b>MSG-019/TG-016</b>			
2000	September		MSG-019/TG-016 Opened
2006	September		MSG-019/TG-016 Closed
<b>MSG-054/TG-037</b>			
2006	March-May		First round of comment by SISO VV&A PDG
2006	August-September		Second round of comments by SISO VV&A PDG
2006	September	Orlando, FL, US	First Technical Activity Meeting held in conjunction with 2006 Fall SIW
2006	September		SISO Standards Activity Committee approved beginning IEEE balloting
2006	October		IEEE Project Authorization Request (PAR) submitted
2006	December		IEEE PAR approved by IEEE Standards Board
2007	April-May		IEEE Sponsor Ballot achieved consensus and was approved by the majority of balloters
2007	June-July		IEEE Recirculation Ballot completed
2007	September	Ottawa, Canada	Work on Composite Model
2007	September		IEEE 1516.4-2007 <sup>TM</sup> approved by IEEE Standards Board
2008	February	Washington, DC, US	Work on Composite Model
2008	April		TR-MSG-019 published
2008	June	Edinburgh, UK	Held in conjunction with 2008 Euro-SIW
2008	September	Laurel, MD, US	Work on Composite Model
2008	December	Orlando, FL, US	Work on Composite Model
2009	March	San Diego, CA	Held in conjunction with 2009 Spring SIW, work on Composite Model
2009	September	Orlando, FL, US	Held in conjunction with 2009 Fall SIW, work on Composite Model
2009	December		Draft RTO-TR-MSG-054

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- Scott Harmon, VV&A Composite Model coordinator;
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- Mallory McDonald, report contributor.

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<b>14. Abstract</b>	MSG-054/TG-037 was tasked to finalize an overlay standard for Verification, Validation, and Accreditation (VV&A) of Federations and then formalize the draft as an international industry standard by vetting the document through the Institute of Electrical and Electronics Engineers Standards Association's (IEEE-SA) standards processes. Additionally, foundational work was produced and documented on applying risk as a tailoring mechanism for the VV&A overlay.		





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