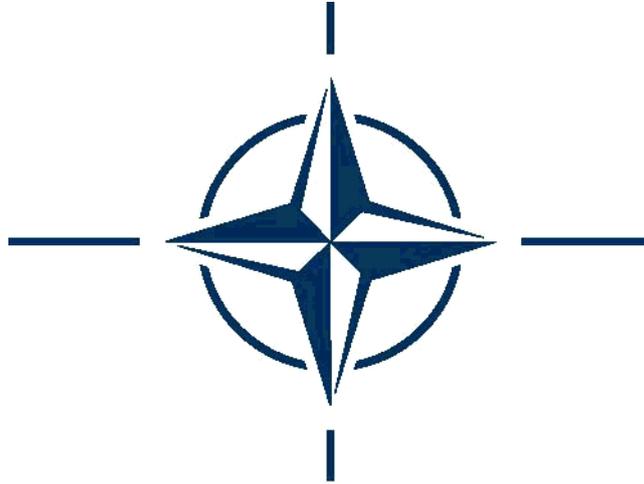


**AMSP-02**  
**NATO MODELLING AND SIMULATION**  
**GLOSSARY OF TERMS**



Edition (A) Draft Version 0.8

MONTH YEAR

**NORTH ATLANTIC TREATY ORGANISATION**  
**ALLIED MODELLING AND SIMULATION PUBLICATION**

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NATO LETTER OF PROMULGATION

DD MONTH YY

1. AMSP-02 (A) - NATO MODELLING AND SIMULATION GLOSSARY of TERMS is a non classified publication.
2. AMSP-02 (A) is effective upon receipt.

## ACKNOWLEDGEMENTS

This document was created as a community effort by the Modelling and Simulation Standards Subgroup (MS3). This subgroup was chartered by the NATO Modelling and Simulation Group in March 2007. This document would not have been possible without the hard work and dedicated efforts of the following individuals:

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## Background

Continued work on the maintenance of the NATO Modelling & Simulation (M&S) Standards Profile (NMSSP but also known as AMSP-01), and other work in the M&S domain, has revealed that there is a clear lack of coherence and co-ordination in terminology across NATO that hampers work to achieve interoperability. Individual countries have created their own M&S glossaries to describe terminologies but there is no coherence or co-ordination across these extant glossaries with variations on definitions and explanations.

## Justification

With ever closer work between nations, MSG-112 examined the issue which resulted with a recommendation to proceed with the creation of a NATO M&S Glossary of Terms that could be agreed across nations.

A co-operative approach was justified by the fact that the glossary should be as relevant and pertinent to as many NMSG participating nations as possible. Moreover, the NATO M&S Glossary of Terms will be a NATO Allied Standard (AP type) and covered by a STANAG.

## Objectives

The main objective of the task group was to produce a NMSG common M&S Glossary of Terms also to be known as AMSP-02 (to be published by the NATO Standardisation Agency). In more detail, this glossary will:

- Be a web-based living Allied Standard.
- Be covered by a STANAG.
- Include common terms that are M&S specific only.
- Be not too detailed.

Sources to create the glossary will be extant specific glossaries and documents which will be referenced in drafts but not the first version.

A list of nations and organisations which have participated in the effort is given below:

- Australia,
- Bulgaria
- France,
- NCIA,
- Sweden
- Switzerland,
- Turkey,
- USA,
- UK.

**A**

preferred term(s):	<b>Accreditation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	The official certification that a model, simulation, or federation of models and simulations and its associated data are acceptable for use for a specific purpose.
source:	MSG-120

preferred term(s):	<b>Activity Model</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A model of the processes that make up the functional activity showing inputs, outputs, controls, and mechanisms through which the processes of the functional activity are (or will be) conducted.
source:	MSG-120

preferred term(s):	<b>Agent</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A computer system capable of autonomous action - of deciding for itself what they need to do to satisfy its design objectives, and capable of interacting with other agents.
source:	MSG-120

preferred term(s):	<b>Aggregate</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A group of entities considered as a single unit. Note: the substitution of the word "unit" is used to avoid phrases like "aggregate aggregate."
source:	MSG-120

preferred term(s):	<b>Aggregation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	The ability to group entities while preserving the salient effects of entity behaviour and interaction while grouped.
source:	MSG-120

preferred term(s):	<b>Augmented Reality</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A type of virtual reality in which synthetic stimuli are registered with and superimposed on real world objects; often used to make information otherwise imperceptible to human senses perceptible.
source:	MSG-120

preferred term(s):	<b>Avatar</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A virtual object used to represent a participant or physical object in a simulation; the (typically visual) representation may take any form.
source:	

## B

preferred term(s):	<b>Base Object Model</b>
abbreviation:	BOM
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
Definition:	A single aspect of federation interplay, which can be used as a building block of Federation Object Models (FOMs) and Simulation Object Models (SOMs).
source:	Australian Defence Simulation Glossary

preferred term(s):	<b>Battlespace</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
Definition:	Refers to both the physical environment in which the simulated warfare will take place, and the forces that will conduct the simulated warfare.
source:	Australian Defence Simulation Glossary

preferred term(s):	<b>Battlespace Entity</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
Definition:	A simulation entity that corresponds to actual equipment, supplies, and personnel, which typically is seen or sensed on a real operational environment.
source:	Australian Defence Simulation Glossary

preferred term(s):	<b>Behavioural Modelling</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
Definition:	Modelling of representative entity behaviours in which individual or group behaviours are derived from the physical, psychological or social characteristics of the sentient and non-sentient systems represented.
source:	Australian Defence Simulation Glossary

## C

preferred term(s):	<b>Closed-Loop Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulator or simulation system with an active feedback loop.
source:	Australian_Defence_Simulation_Glossary_2012_11.doc

preferred term(s):	<b>Combat Modelling</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	Any structural activity that is undertaken to represent higher level strategic guidance, doctrine operational concepts, concepts of operation and combat scenarios in terms of varying degrees of abstraction and reality.
source:	NATO MSG MS Glossary and Acronym List 1.2 - 22Apr2008.pdf

preferred term(s):	<b>Common Services, Applications And Data</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	Services, applications and data which are, or potentially can be, used (and reused) by more than one simulation system/user (client) and for which benefits can be realised by making them discoverable and available.
source:	Australian_Defence_Simulation_Glossary_2012_11.doc

preferred term(s):	<b>Computer Generated Force</b>
abbreviation:	CGF
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	<p>A generic term used to describe the computer representation of forces in simulations which attempt to model human behaviour sufficiently so that forces will take some actions automatically, without requiring human-in-the-loop interaction.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>1. CGF's may be fully autonomous, requiring no human direction, or semi-autonomous, requiring some direction by a human controller.</li> <li>2. CGF's represent friendly, opposing, and neutral battlespace entities not portrayed by manned simulators.</li> </ol>
source:	Australian Defence Simulation Glossary, modified for NATO use.

preferred term(s):	<b>Conceptual Model</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	<p>A statement of the content and internal representations that are the user's and developer's combined concept of the model.</p> <p>Note: it includes logic and algorithms and explicitly recognises assumptions and limitations.</p>
source:	US DoD 2011, modified for NATO use.

preferred term(s):	<b>Constrained Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation where time advances are paced to have a specific relationship to wallclock time. Note: these are commonly referred to as real-time or scaled-real-time simulations.
source:	NATO MSG MS Glossary and Acronym List 1.2 - 22Apr2008.pdf

preferred term(s):	<b>Constructive Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A form of simulation, commonly called war game, that involves software representation of two or more opposing forces, using rules, data and procedures designed to depict an actual or real life situation.
source:	IEEE GLOSSARY.DOC

preferred term(s):	<b>Constructive Model</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	Models that involve simulated people operating simulated systems. Note: real people stimulate (make inputs) to such simulations, but are not involved in determining the outcomes.
source:	US DoD Final Glossary - 20101222.pdf

preferred term(s):	<b>Constructive Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation involving simulated control entities (including agents) operating simulated battlespace systems. Note: real people make inputs to such simulations, but are not directly involved in determining the outcomes.
source:	Australian Defence Simulation Glossary version

preferred term(s):	<b>Continuous Model</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A mathematical or computational model whose output variables change in a continuous manner.
source:	IEEE GLOSSARY.DOC

preferred term(s):	<b>Control Loading System</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A system that produces feel forces, on the simulators controls, which accurately reflect those felt by the operator in real world conditions.
source:	US DoD Final Glossary - 20101222.pdf

preferred term(s):	<b>Control Station</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	Facility which provides the individual responsible for controlling the Simulation and which provides the capability to implement Simulation control as Protocol Data Units on the Distributed Interactive Simulation network.
source:	NATO MSG MS Glossary and Acronym List 1.2 - 22Apr2008.pdf

preferred term(s):	<b>Critical Event Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A Simulation that is terminated by the occurrence of a certain event. Example: a model depicting the year-by-year forces leading up to a volcanic eruption, that is terminated when the volcano in the model erupts.
source:	NATO MSG MS Glossary and Acronym List 1.2 - 22Apr2008.pdf

**D**

preferred term(s):	<b>Degrees of freedom</b>
abbreviation:	DOF
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	Refers to the number of simultaneous directions or inputs a sensor can measure or a simulator system can replicate. Note: typically used to describe the combination of spatial positions and orientation.
source:	MSG-120

preferred term(s):	<b>Deterministic Simulation Model</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation model that does not contain any probabilistic (or random) components.
source:	MSG-120

preferred term(s):	<b>Disaggregation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A process that decomposes an aggregated entity into multiple entities representing its components.
source:	US DoD 2013

preferred term(s):	<b>Discrete Event Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation that uses a discrete model where the dependent variables (i.e. state indicators) change discretely at points in time referred to as events.
source:	MSG-120

preferred term(s):	<b>Distributed Interactive Simulation</b>
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abbreviation:	DIS
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	An IEEE standard (1278) for conducting real-time distributed simulation across one or more host computers.
source:	Australian Defence Simulation Glossary, modified for NATO use.

preferred term(s):	<b>Distributed simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation system built on components linked to a network.
source:	MSG-120

## E

preferred term(s):	<b>Embedded Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
Definition:	A simulation that is built into, or added into, operational systems to enhance capability. Note: modern battlespace systems typically include embedded simulation to aid training outcomes.
source:	Australian Defence Simulation Glossary

preferred term(s):	<b>Entity</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
Definition:	Any component in a system that requires explicit representation in a model.
source:	Australian Defence Simulation Glossary

preferred term(s):	<b>Environment</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
Definition:	The texture or detail of the natural domain that is terrain relief, weather, day/night, terrain cultural features; and the external objects, conditions, and processes that influence the behaviour of a system.
source:	Australian Defence Simulation Glossary

## F

preferred term(s):	<b>Fair Fight</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A condition when the differences between the performance characteristics of two or more interoperating simulations have significantly less effect on the outcome of a simulated situation than actions taken by or resources available to the simulation participants.
source:	SISO-REF-020-2007

preferred term(s):	<b>Feature</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	An element of the synthetic environment that exists but does not actively participate in interactions.
source:	MSG-120

preferred term(s):	<b>Federate</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A member of a High Level Architecture (HLA) federation.
source:	MSG-120

preferred term(s):	<b>Federation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A named set of interacting federates, a common Federation Object Model (FOM) and supporting Runtime Infrastructure that are used as a whole to achieve some specific objective.
source:	MSG-120

preferred term(s):	<b>Federation Object Model</b>
abbreviation:	FOM
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A High Level Architecture (HLA) specification that defines the information exchanged at runtime to achieve a given set of federation objectives.
source:	MSG-120

preferred term(s):	<b>Fidelity</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	The degree to which the representation within a model or simulation is similar to a real-world object, feature, or condition in a measurable or perceived manner.
source:	MSG-120

preferred term(s):	<b>Field-of-View</b>
abbreviation:	FOV
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	The angular extent of the observable world that is seen at any given moment.
source:	MSG-120

## G

No entries.

## H

preferred term(s):	<b>Hardware in-the-loop</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	Simulation and simulators that employ one or more pieces of operational equipment (including computer hardware) within the simulation/simulator system.
source:	MSG-120

preferred term(s):	<b>High Level Architecture</b>
abbreviation:	HLA
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A family of related standards that together describe the functional elements, interfaces, and design rules for a unified approach and common architecture to constructing interoperable simulation systems.
source:	MSG-120

preferred term(s):	<b>Human-In-the-Loop</b>
abbreviation:	HIL
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation or simulators that employ one or more human operators in direct control of the simulation or simulator or in some key support function.
source:	MSG-120

preferred term(s):	<b>Hybrid Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	<ol style="list-style-type: none"> <li>1. A simulation that combines constructive, live, and/or virtual simulations, typically in a distributed environment.</li> <li>2. A simulation, portions of which are designed to be executed on an analogue system and portions on a digital system.</li> </ol>
source:	MSG-120

**I**

No entries.

**J**

No entries.

**K**

No entries.

**L**

preferred term(s):	<b>Live Instrumented Simulation</b>
abbreviation:	LIS
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation involving real people, operating instrumented weapon systems on training, test, or exercise ranges.
source:	Australian_Defence_Simulation_Glossary_2012_11.doc

preferred term(s):	<b>Live Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation involving real people operating real systems.
source:	MSG-120

preferred term(s):	<b>Live, Virtual, And Constructive Simulation</b>
abbreviation:	LVC
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A broadly used taxonomy describing a mixture of live, virtual, and constructive simulation.
source:	MSG-120

## M

preferred term(s):	<b>Metamodel</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A model of a model. Note: metamodels are abstractions of the modelling and simulation (M&S) being developed that use functional decomposition to show relationships, paths of data and algorithms, ordering, and interactions between model components and subcomponents.
source:	MSG-120

preferred term(s):	<b>Model</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A physical, mathematical or otherwise logical representation of a system, entity, phenomenon, or process.
source:	MSG-120

preferred term(s):	<b>Modelling and Simulation</b>
abbreviation:	M&S
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A discipline that comprises of the development and/or use of models and simulations.
source:	US DoD 2013

**N**

No entries.

**O**

No entries.

**P**

preferred term(s):	<b>Physical Immersion</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	Is accomplished by presenting a virtual world to users based on their location and orientation and providing synthetic stimuli to one or more of their senses in response to their position and actions.
source:	MSG-120

preferred term(s):	<b>Protocol Data Unit</b>
abbreviation:	PDU
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	Distributed Interactive Simulation (DIS) terminology for a unit of data that is passed on a network between simulation applications.
source:	MSG-120

**Q**

No entries.

**R**

preferred term(s):	<b>Real-Time</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	
source:	

preferred term(s):	<b>Referent</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A codified body of knowledge about a thing being simulated
source:	

## S

preferred term(s):	<b>Scenario</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A specific description of the situation and course of action at a moment in time for each element of the situation. Note: the description conveys both reality and perceived reality.
source:	MSDL, modified for NATO use.

preferred term(s):	<b>Semi-Automated Forces</b>
abbreviation:	SAF
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A subset of computer generated forces (CGFs).
source:	MSG 120

preferred term(s):	<b>Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	The execution of a model over time.
source:	MSG 120

preferred term(s):	<b>Simulator</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A device, computer program or system that performs simulation to replace a real-world system or apparatus.
source:	MSG 120

preferred term(s):	<b>Synthetic Environment</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A synthesised representation of the real world.
source:	MSG 120

## T

preferred term(s):	<b>Terrain Data Set</b>
abbreviation:	TDS
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A collection of related layers of geospatial data, consisting primarily of terrain elevation data, object geometry, imagery for features and terrain, and feature data and attributes (often in vector format).
source:	UK MoD

preferred term(s):	<b>Test and Training Enabling Architecture</b>
abbreviation:	TENA
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A distributed simulation communication protocol, described as middleware, designed to enable interoperability among range systems, facilities, simulations, C4ISR systems in a quick, cost-efficient manner.
source:	MSG-120

preferred term(s):	<b>Training Device</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A physical representation of a piece of operational equipment designed to impart skills and knowledge related to achieving tasks in an operational environment.
source:	MSG-120

## U

No entries.

## V

preferred term(s):	<b>Validation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	The process of determining the degree to which a model or simulation and its associated data is an accurate representation of the real-world from the perspective of the intended uses of the model or simulation.
source:	MSG-120

preferred term(s):	<b>Verification</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	The process of determining that a model or simulation implementation and its associated data accurately represent the developer's conceptual description and specifications.
source:	MSG-120

preferred term(s):	<b>Verification, Validation &amp; Accreditation</b>
abbreviation:	VV&A
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	The combined process of performing verification, validation and accreditation.
source:	US DoD Final Glossary - 20101222.pdf

preferred term(s):	<b>Virtual Simulation</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation involving real people operating simulated systems.
source:	MSG-120

**W**

preferred term(s):	<b>War Game</b>
abbreviation:	
admitted term(s):	
deprecated term(s):	
obsolete term(s):	
definition:	A simulation game in which participants seek to achieve a specified military objective given pre-established resources and constraints. Note: the process is called wargaming.
source:	MSG 120

**X**

No entries

**Y**

No entries

**Z**

No entries