

**Headquarters Supreme Allied Command Transformation Norfolk,
Virginia**



REQUEST FOR INFORMATION

RFI-ACT-SACT-24-33

This document contains a Request for Information (RFI) call
to nations for their input to NATO's
**Next Generation Modelling and Simulation (NexGen
M&S) Capability**

Nations wishing to respond to this RFI should read this document carefully and follow the
guidance for responding.

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 HQ Supreme Allied Commander Transformation
 RFI-ACT-SACT-24-33

General Information	
Request For Information No.	RFI-ACT-SACT-24-33
Project Title	3 rd Request for Nations input to provide elements of NATO Next Generation Modelling and Simulation (NexGen M&S) capability
Due date for questions concerning related information	5:00 pm EDT 29 March, 2024
Due date for submission of requested information	5:00 pm EDT 22 April 2024
Contracting Office Address	NATO, HQ Supreme Allied Commander Transformation (SACT) Purchasing & Contracting Suite 100 7857 Blandy Rd, Norfolk, VA, 23511-2490
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All request for clarifications, questions and responses to this RFI must be sent via email to ALL Points of Contact reported above. Individual emails will not be accepted and should not be sent. Contracting and Technical POCs must be included in ALL correspondence.	

1. INTRODUCTION

- 1.1. Headquarters Supreme Allied Commander Transformation (HQ SACT) is issuing this Request for Information (RFI) in order to engage with nations. The intention is to discover that which is immediately available, the art-of-the-possible and state-of-the-art with respect to systems, products, services, technology, and methodologies in the area of M&S, in order to support NATO Governance decision-making on Common Funded Capability Development.
- 1.2. **This Request for Information (RFI) does not constitute a commitment to issue a future request for proposal (RFP).** The purpose of this request is to involve nations through collaboration, in an examination of future capabilities related to the implementation of NATO Next Generation Modelling & Simulation Capability. Further, respondents are advised that HQ SACT will not pay for any information or administrative costs incurred in responding to this RFI. The costs for responding to this RFI shall be borne solely by the responding party. Not responding to this RFI does not preclude participation in any subsequent RFP if issued in the future. All information shared with ACT might be shared with contracted third parties in order to support the capability development process as needed. Provision of data, or lack of, will not prejudice any respondent in the event that there is a competitive bidding process later as part of NATO Common-Funded Capability Development.

2. BACKGROUND

2.1. HQ SACT Framework for Collaborative Interaction (FFCI)

- 2.1.1. HQ SACT has implemented an FFCI to increase opportunities for Nations, Industry and Academia to contribute to HQ SACT's capability development efforts through collaborative work. Such collaboration enables HQ SACT, and NATO as a whole, to benefit from Nations/Industry/Academia models, advice, capabilities and experience in the course of this work. In addition to the benefits HQ SACT gains from such projects, this collaborative effort will provide Nations/Industry/Academia with an improved understanding of NATO's Capability Requirements (CRs) and the associated issues and development challenges that need to be addressed by HQ SACT. Potential collaborative projects are on specific topics that are of mutual interest to all parties but shall be restricted to collaborations in non-procurement areas. Several mechanisms have been developed to support the initiation of collaborative projects between Nations/Industry/Academia and HQ SACT ranging from informal information exchanges, workshops, studies or more extensive collaboration on research and experimentation.
- 2.1.2. Depending on the level and type of interaction needed for a collaborative project, a specific agreement may be needed between parties. The FFCI agreement for any specific project, if required by either party for the project to proceed, will range from "Non-disclosure Agreements" (NDA) for projects involving exchange of specific information to more extensive "Declaration of Mutual Collaboration" (DOMC) to address intellectual property and other issues.

2.1.3. More extensive information on the HQ SACT FFCI initiative can be found on the ACT website being developed to support FFCI projects at <http://www.act.nato.int/ffci>. Note that respondents of this RFI are not required to initiate an FFCI agreement in order to respond to this RFI.

2.2. The Common Funded Capability Delivery Governance Model (CFCDGM)

2.2.1. The common funded capability delivery governance model aims to speed the delivery of capabilities required by NATO commanders and the NATO Enterprise. It consists of six life cycle stage, four NATO Governance level decision points, or Gates, and two optional decision Gates.

2.2.2. At the first decision Gate, the Military Committee (MC) approves the Operational Requirements (ORs) and determines whether or not the submission of a Capability Requirements Brief (CRB) is required at the first optional decision Gate. Factors that may lead the MC to require governance approval of this product include anticipated capability type, the expected level of complexity and/or likely existence of more than one viable alternative for filling the OR.

2.2.3. During stage 2 (Requirements Development), a CRB is developed to identify the specific CRs, to identify potential courses of action (COAs), and to examine and confirm the COAs that are best suited to deliver the capability within scope, cost and schedule. With respect to COAs, the CRB is intended to determine their viability to address the approved ORs, including consideration of the possibility of “Adopt” (an existing solution already in-service by Nations, Industry and Academia), “Buy” (acquiring a solution from industry), or “Create” (developing a solution bespoke to NATO). In the case of Buy or Create, solutions could either be delivered through a NATO agency or a Nation being the Host Nation.

2.2.4. On April 25, 2022, HQ SACT issued RFI #1 to discover the art-of-the-possible and state-of-the-art with respect to systems, products, services, technology, and methodologies. The intent of RFI #1 was to ‘test the market’ and determine relevant material and non-materiel solutions that may exist or could be created within Nations, Industry or Academia (as part of the consideration of “Adopt, “Buy or Create”). RFI #1 closed on July 15, 2022.

2.2.5. On November 1, 2022, HQ SACT issued RFI #2 to further discover potential solutions. The intent of RFI #2 was to further explore options and determine relevant material and non-materiel solutions that may exist or could be created within Nations, Industry or Academia (as part of the consideration of “Adopt, “Buy or Create”). RFI #2 closed on January 6, 2023.

2.2.6. During stage 3a (Capability Programme Planning), a Capability Programme Plan (CPP) is created, which includes details about programme scope, schedules, risks, through-life costs, and defines and analyses alternatives to determine acquisition strategies. The CPP is a comprehensive programme design, decomposed into outlined projects, addressing all DOTMLPFI aspects of

the required capability change. An Analysis of Alternatives (AoA) occurs during this stage, and involves an analytical comparison of the operational effectiveness, risk & lifecycle cost of alternatives that are under consideration to satisfy operational requirements as described in the Operational Requirement Statement (ORS) and CRs articulated in the Capability Requirements Brief (CRB). Alternatives identified can involve combinations of materiel and non-materiel solutions from multiple Nations, Industry and/or Academic sources. **The intent of this RFI (RFI-SACT-ACT-24-33) is to collect the information required to conduct these stage 3a activities and inform the development of the CPP.**

2.2.7. This is not a formal request for submissions as part of a procurement; but rather a general request intended to determine whether any possible solutions exist that should be included in one or many alternatives during the development of the CPP.

2.3. Expected Benefits to Respondents. Nations will have the chance to reveal state-of-the-art systems, products, services, and technology in the area of M&S to NATO.

2.4. Expected Benefits to NATO. Exposure to, and understanding of, current, emerging and future capabilities in the area of M&S.

3. Next Generation Modelling & Simulation Programme Description

3.1. Aim

3.1.1. Next Generation Modelling and Simulation (NexGen M&S) aims to provide a data centric, common simulation environment that supports computer-assisted exercises, operational planning, operational analysis, and computer-assisted wargames. NexGen M&S will allow the NATO simulation community the ability to load, parameterize, run, and analyse results of external models in a distributed, collaborative environment. NexGen M&S aims to provide web based capabilities to support geographically separated commands and the complexity of NATO operations that are focused on the political to tactical levels of war.

3.1.2. As NexGen M&S is intended to be operational for an extended period, it will have new models to interface with through its lifecycle. NexGen M&S will provide an architecture to support the M&S functions that is extensible to adapt to legacy and yet to be developed models. NexGen M&S will support comparable service modules that can be combined into a simulation environment for particular use cases. Guided workflows will assist users through the M&S process and orchestrate the other service components to provide the model management, analyses and visualization functions needs for each step in the M&S process. This includes not only user facing functions but the background services such as data storage and network transport provided by standardized architecture. NexGen

M&S is expected to significantly reduce the time and effort to exploit M&S in NATO settings.

3.2. Effects and Benefits

3.2.1. NexGen M&S desired effects are identified as:

- 3.2.1.1.** Accurately represent the complexity of NATO operations in modelling and simulation systems, in support of geographically distributed commands within NATO and the member nations.
- 3.2.1.2.** Provide ease of use and reuse of simulations, enabling more efficient use of resources for conducting simulations and their effective application to support planning, exercises, training, and operations in executing with increased efficiency.
- 3.2.1.3.** Persistent access to simulation capabilities with collaboration support to enable the complete simulation lifecycle from ideation to creation, execution, analyses, and lessons learned.
- 3.2.1.4.** Superior situation awareness of simulation scenarios.

3.2.2. NexGen M&S expected benefits are identified as:

- 3.2.2.1.** Effectiveness. NexGen M&S will provide a broader range of functions to a wider range of users; executed faster; producing higher quality simulation results that have greater veracity than current systems. NexGen M&S increased speed will allow use during operations to examine potential scenarios, and improved the speed and quality of decision making.
- 3.2.2.2.** Efficiency. NexGen M&S will reduce the time, personnel, and costs associated with developing and employing M&S. It will also improve interoperability, reduce the time needed to resource, and prepare M&S for use. It will expedite the planning lifecycle of a distributed simulation event or exercise and deliver training and exercise with increased fidelity.
- 3.2.2.3.** Availability. NexGen M&S will be persistent, easily configurable, and readily available. This will increase user access to M&S and NATO's overall capacity to exploit M&S technology.
- 3.2.2.4.** Flexibility. NexGen M&S will increase users' ability to customize the environment using shared M&S capabilities across the Alliance. This flexible environment increases NATO's ability to adapt M&S solutions to a dynamic operational environment and accommodate advances in technology.
- 3.2.2.5.** Risk. NexGen M&S will reduce risk for commanders by supporting more accurate scenario representations which allows an increased understanding of courses of action with improved visualization of the interdependencies that affect these scenarios.

4. REQUESTED INFORMATION

4.1. The response(s) to this RFI shall be submitted by e-mail. Submissions must include both the Contracting and Technical POCs listed on page 2. The responses shall not contain proprietary and/or classified information. HQ SACT reserves the right to seek clarification on submissions.

4.2. This RFI is interested in information that informs alternatives development. Alternatives are comprised of materiel and non-materiel solutions, and combinations thereof, across the DOTMLPFI spectrum that contribute to NexGen M&S CRs described in Annex A. These include but are not limited to:

4.2.1. Systems, products, services, applications (and their functionality), interfaces, data, and dependencies on hardware, facilities, and infrastructure

4.2.2. Processes, personnel, and organizational nodes required to operate the capability.

4.2.3. Technologies and technical standards (open, proprietary)

4.2.4. This RFI will herein refer to one or many potential combinations of these as "your capabilities." This information will inform alternatives and will be described using the NATO Architecture Framework (NAF) v4.

4.2.5. This RFI is also interested in information that informs alternatives analysis from various perspectives. HQ SACT is interested in how National capabilities relate to the functional and non-functional CRs described in Annex A. CRs have not been prioritized and the number of capability requirements related by a common theme does not indicate priority (i.e. a single CR may be categorized as critical in the future). HQ SACT is also interested in how National capabilities realise the desired effects and expected benefits described in Section 3.2 across a range of scenarios. NEXGEN MS' scenarios include recurring collective training and exercises, strategic studies, computer-assisted wargames, and experimentation. HQ SACT will derive measures from desired effects and expected benefits during stage 3a of CPP development.

4.2.6. Lastly, this RFI is interested in information that informs capability programme planning. This includes the availability, readiness, and feasibility of National capabilities. NEXGEN MS will decompose the programme into outlined projects, addressing all DOTMLPFI aspects, and provide a high-level programmatic schedule.

4.2.7. Some of this information was already requested and received by previous RFIs (RFI #1 and #2). Please feel free to simply indicate that some information was already provided. However, HQ SACT appreciates any additional information you

feel may benefit alternatives development considering the newly developed CRs described in Annex A.

4.2.8. Questions for Nations:

4.2.8.1. Information to assist alternatives definition

- 4.2.8.1.1. What capabilities does your Nation currently employ that you feel would fulfil all or part of the CRs in Annex A? Please provide any technical information such as those listed in Section 3.
- 4.2.8.1.2. Please describe the operational context of how your capability is used (e.g. employment scenarios, workflows, use cases, vignettes, or procedures).
- 4.2.8.1.3. Please describe the types of users, personnel, and organisational framework required to operate the capability. Please also describe any required skills and training.
- 4.2.8.1.4. Please describe your capabilities' major relationships, dependencies, and interfaces with other relevant systems and data.

4.2.8.2. Information to assist alternatives analysis (capability requirements)

Please describe how your capabilities relate to the CRs. Please use the table provided in Annex A to describe the level of support your capabilities could provide (e.g., Full, Partial or None).

4.2.8.3. Information to assist alternatives analysis (scenarios)

- 4.2.8.3.1. Please describe how your capabilities support the following scenarios. These are relevant operational scenarios with conditions under which capabilities may be applied. If possible, please also describe how your capabilities positively affect these processes, considering the previously-stated desired effects and expected benefits.
- 4.2.8.3.2. Please describe how your capabilities could support NATO military planning/decision making activities.
 - Mission analysis
 - Course of action development
 - Course of action analysis
 - Operational plan testing
 - Operations assessment
- 4.2.8.3.3. Please describe how your capabilities could support operational analysis and studies in support of military operations analysis and strategic planning.

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4.2.8.3.4. Please describe how your capabilities could support computer-assisted wargaming.

- Allow analysts to conduct pre-wargame simulation to provide insights, limitations, outcomes, and/or identify areas for further scrutiny such as inputs to a wargame.
- Support simulation being run in parallel with a wargame event.
- Support turn-based game-play and interruptions to interact with simulation activities and events.
- Enable post-wargame simulation to explore alternative decisions and outcomes.

4.2.8.3.5. Please describe how your capabilities could support the ability for users to conduct iterative simulation according to an experimental design faster than real time.

4.2.8.3.6. Please describe how your capabilities support collective training & exercises as outlined in the Bi-SC Collective Training and Exercise Directive (CT&E) 075-003.

4.2.8.4. Programming

4.2.8.4.1. Please describe any legal and commercial considerations (e.g. Intellectual Property Rights (IPR) availability, licensing restrictions, export controls or National regulations) preventing its use by NATO.

4.2.8.4.2. Please provide information on when your proposed solutions could be available. What would you estimate the timeframe (in terms of months or years) for implementation and sustainment of your capabilities for NATO (assuming full implementation)? Please take into account technology refresh cycles for the expected lifespan of this capability. Range estimates are acceptable. If possible, please describe the decomposition and phased development and delivery of your proposed capabilities.

4.2.8.4.3. Please describe information regarding the maturity and technical readiness level of your capabilities.

4.2.8.4.4. Please describe the integration of your capabilities with the NATO enterprise. If possible, please describe how long the integration would take.

4.2.8.5. Cost

4.2.8.5.1. If possible, please provide a Rough Order of Magnitude (ROM) for the cost associated with the implementation and sustainment, to include licensing costs, of your capabilities (assuming full implementation). Please take into account technology refresh cycles for

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the expected lifespan of this capability. Range estimates are acceptable.

4.2.8.5.2. Please describe how much the capabilities would cost per annum.

4.2.8.5.3. Please describe what training would be included in the provided costs. Would training occur annually or one-time?

4.2.8.5.4. Please provide information to inform operational and maintenance cost estimates.

4.2.8.5.5. Please describe hardware and materiel cost requirements for your capabilities.

4.2.8.6. Host Nation. Would your Nation be able and willing to take the responsibility of a Host Nation on behalf of NATO and provide your capabilities as a turnkey solution for NATO, delivered, managed and maintained by yourselves? HQ SACT understands this information may have already been provided during RFI #1 and/or RFI #2.

4.3. Eligibility to Respond:

Only NATO Nations are eligible to respond to this RFI.

4.4. Response Template.

4.4.1. Provide name, mailing address, overnight delivery address (if different from mailing address), designated point of contact (phone number, e-mail).

4.4.2. Response should include at a minimum a technical description and technical architecture diagram of the proposed implementation. Responses are not required to follow any format, but the following is proposed:

- a) Introduction
- b) Assumptions
- c) Technical / System Requirements
- d) Description of Network Implementation & Architecture Views
- e) Recommendations

4.4.4. Identify current services your company offers, which most closely match the capabilities, specified in this RFI (or portions of).

4.4.5. Available product brochures, specification sheets, photographs, illustration and technical descriptions that describe services are welcome. Respondents are encouraged not to include marketing informational materials that do not relate to the services described in this RFI as it will be discarded; however, responses may include URL links to technical documentation materials (i.e., technical data sheets for products) are welcome.

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4.4.6. Response limited to a single main document and enclosures for a total not-to-exceed 10 page (material provided as per paragraph above not included).

4.4.7. The document should be single-spaced, have one-inch margins, assume US letter-size (8 1/2 by 11 inches) page, use 12-point font, and be formatted for compatibility with Microsoft Word or Adobe Acrobat Reader (current versions).

4.4.8. Submissions should be named according to the following convention: <Respondent company name; maximum of 12 characters>_NEXGENM&S RFI_<date in YYYYMMDD format>.<filename extension of 3 or 4 characters>.

4.4.9. Responses shall not be classified above NATO UNCLASSIFIED.

4.4.10. The information may be considered in developing any future potential Statement of Work requirements. HQ SACT will consider selected information for developmental contracts and experimentation candidates.

4.5. Price Estimates

HQ SACT seeks non-binding Rough Order Magnitude (ROM) price estimates for the sole purpose of estimating programmatic costs and planning funding for future programme proposals/bids. Provision of data, or lack of, will not prejudice any respondent in the event that there is a competitive bidding process later as part of NATO Common Funded Capability Development.

4.6. Response Due Date

Responses to this RFI must be received by **5:00 pm EDT 22 April 2024**. The responses shall not contain any classified information. HQ SACT reserves the right to seek clarification on submissions.

5. CLARIFICATIONS AND QUESTIONS

Inquiries of a technical nature about this RFI shall be submitted by e-mail solely to the aforementioned POCs by **5:00 pm EDT 29 March, 2024**. Accordingly, questions in an e-mail shall not contain proprietary and/or classified information. Answers will be posted as soon as possible on the HQ SACT P&C website at: <https://act.nato.int/contracting>.

All questions should be submitted by **29 March 2024** to allow for appropriate response time prior to the **22 April 2024** response due date.

6. ADDITIONAL INFORMATION

6.1. Non-disclosure Principles and/or Non-disclosure Agreement (NDA) with Third Party Company.

6.1.1. Please be informed that HQ SACT may contract a company to conduct the Analysis of Alternatives investigation in support of this project. HQ SACT will follow nondisclosure principles and possibly conclude an NDA with that company to protect submitted information from further disclosure. As the third party beneficiary of this

nondisclosure, this RFI serves to inform you how HQ SACT plans to proceed and HQ SACT's intent to protect information from unauthorized disclosure. This requires the third party company to protect the disclosed information using the highest degree of care that the company utilizes to protect its own Proprietary Information of a similar nature, and no less than reasonable care.

6.1.2. The third party company receiving the information shall not, without explicit, written consent of HQ SACT:

- a) Discuss, disclose, publish or disseminate any Proprietary Information received or accessed under nondisclosure principles and subject to an NDA, if an NDA is concluded;
- b) Use disclosed Proprietary Information in any way except for the purpose for which it was disclosed in furtherance of the goals of the instant project, collaboration, activity or contract; or
- c) Mention the other Party or disclose the relationship including, without limitation, in marketing materials, presentations, press releases or interview.

6.2. Organizational Conflicts of Interest.

As Procurement/Contracting involves the expenditure of funds allocated by the member nations, we must always strive to maintain trust in and preserve the integrity of the procurement procedures. It is essential that our procedures facilitate transparent and robust competition from industry.

Contractor and subcontractor personnel performing work under an HQ SACT contract may receive, have access to, or participate in the development of sensitive information relating to source selection methodology, cost or pricing information, budget information, and future specifications, requirements or Statements of Work or perform evaluation services that may create a current or subsequent Organizational Conflict of Interests (OCI). Similarly, companies responding to an HQ SACT RFI may create a subsequent OCI determination when pursuing future NATO contracts generated from that RFI.

Each individual contracting situation will of course be examined on the basis of its particular facts and the nature of any proposed contract. The exercise of common sense, good judgment, and sound discretion is required in both the decision on whether a significant potential conflict exists and, if it does, the development of an appropriate means for resolving it.

In anticipation of a future OCI determination, any company either awarded an HQ SACT contract or responding to an HQ SACT RFI while also anticipating bidding on future NATO contracts relating to this work, should consider having a mitigation plan in place to address or mitigate any OCI concerns now or in the future.

6.3. Handling of Proprietary Information

Proprietary information, if any, should be minimized and clearly marked as such. HQ SACT will treat proprietary information with the same due care as the command treats its own proprietary information. HQ SACT will exercise due care to prevent its unauthorized disclosure. Please be advised that all submissions become HQ SACT property and will not be returned.

6.4. Exceptions to Obligations. The third party company receiving the information may disclose, publish, disseminate, and use Proprietary Information:

a) To its employees, officers, directors, contractors, and affiliates of the recipient who have a need to know and who have an organizational code of conduct or written agreement with the recipient requiring them to treat the disclosed Proprietary Information in accordance with nondisclosure principles and the NDA (if executed);

b) To the extent required by law; however, the company receiving the information will give HQ SACT prompt notice to allow HQ SACT a reasonable opportunity to obtain a protective order or otherwise protect the disclosed information through legal process that is:

- Demonstrated in written record to have been developed independently, or
- Already in the possession of the company receiving the information without obligation of confidentiality, prior to the date of receipt from HQ SACT, or
- Disclosed or used with prior written approval from HQ SACT, or
- Obtained from a source other than HQ SACT without obligation of confidentiality; or publicly available when received.

6.5. Any response to this RFI is considered to establish consent to this process. A copy of the NDA, if or when concluded, can be provided on request.

7. SUMMARY

This is a RFI only. The purpose of this RFI is to involve nations through collaboration, for their input to NATO's requirement for NATO Next Generation Modelling & Simulation. HQ SACT has not made a commitment to procure any of the items described herein, and release of this RFI shall not be construed as such a commitment, nor as authorization to incur cost for which reimbursement will be required or sought. **It is emphasised that this is a RFI, and not a RFP of any kind.**

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Annex A: Functional and Non-functional Capability Requirements (CR)

A.1. The table below includes level 1 CRs and level 2 CRs that provide additional detail. Please provide any additional or amplifying information you feel is relevant or will contribute to our analysis (e.g., explanation of any partial fulfilment, clarification as to whether or not your capabilities can fulfil the CRs now or could be modified to do so, etc.). Please use the table to describe the level of support your capabilities could provide. In the Fulfilment column, please use codes (3 = Full, 2 = Partial, 1 = None).

A.2. In requirement statements, the word “shall” indicates it is required to satisfy stakeholders’ needs. The word “should” indicates that a requirement is recommended.

Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
CR 1.0		Computer-Assisted Exercises	NexGen M&S shall provide capabilities to support simulation-related development and execution activities ¹ for computer-assisted exercises		
			1 - Aligned with current processes performed in JWC and JFTC and described in documentation such as the Bi-Sc CT&E Directive 075-003, JWC SOP 800 Exercise Planning		
	CR 1.1	Continuity of operations	NexGen M&S shall maintain current simulation functionality that is required to deliver recurring operational level exercises on time per DR 1.0		
	CR 1.2	Performance scalability	NexGen M&S simulation shall be capable of scaling computer resources horizontally per NFR 2.0		
	CR 1.3	Efficient Order of Battle (ORBAT) development	NexGen M&S applications shall enable users to complete ORBAT development activities with an expected level of resources (e.g. time, procedural steps)		
	CR 1.4	Collaborative Order of Battle (ORBAT) development	NexGen M&S shall provide capabilities that allow staff to work on ORBAT from different locations		
	CR 1.5	Common unit repository	NexGen M&S shall support standardised force data. This may leverage capabilities from GSR 6.5.3		
	CR 1.6	Efficient simulation database development	NexGen M&S applications shall enable regular users to complete their simulation database development activities with an expected level of resources (e.g. time, procedural steps)		
	CR 1.7	Settings data	NexGen M&S shall support the reuse of data used to develop settings ² for exercises		
			2 - Reusable geo data, country books, peacetime ORBATs, to create the political context/world where the exercise occurs		

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
	CR 1.8	EXCON situational awareness	NexGen M&S shall provide capabilities to filter and control the flow of information to improve EXCON situational awareness		
	CR 1.9	EXCON ground truth	NexGen M&S shall provide ground truth pictures for exercise control activities		
	CR 1.10	Geo, time referencing	NexGen M&S should support geo-referenced and time-referenced analysis and reporting during execution and analysis. This may leverage capabilities from GSR 4.0		
	CR 1.11	Open AAR data storage	NexGen M&S should enable data storage in non-proprietary formats for after action reporting. This may leverage capabilities from GSR 4.0		
	CR 1.12	AAR data access	NexGen M&S shall make after action reporting data accessible to commercial tools. This may leverage capabilities from GSR 3.0 and GSR 6.0		
	CR 1.13	C2 / Simulation interoperability standards	NexGen M&S capabilities shall be compliant with the standards ³ to stimulate C2 systems 3 - Specified by JWC and JFTC (e.g. OTH Gold, Link 16, ADatP-3, etc.), STANAGS, STANRECS, C2SIM		
	CR 1.14	C2 / Simulation interoperability	NexGen M&S capabilities shall be interoperable with NATO-approved C2 and FAS services, including NATO-approved national systems		
	CR 1.15	C2 databases	NexGen M&S shall improve the ability to import required C2 databases ⁴ to simulations, and vice-versa. 4 - As directed by JWC, JFTC		
	CR 1.16	INTEL-FS interoperability	NexGen M&S should enable simulation outputs to be communicated to the Intel community via INTEL-FS		
	CR 1.17	LOGFAS/ESS programme interoperability	NexGen M&S should enable API-style interaction ⁵ between simulations and logistics systems ⁶ 5 - Improved system-to-system interface versus a data dump and import type procedure 6 - LOGFAS as part of the Enablement Support Services (ESS) capability programme.		
	CR 1.18	Load orders	NexGen M&S shall maintain the ability to ingest and execute orders ⁷ 7 - ATOs, ACOs, as well as orders from other domains (e.g. Land) as directed by JWC, JFTC		

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
CR 2.0		Operational Planning	NexGen M&S shall provide simulation capabilities to support operational planning		
	CR 2.1	Simulation capability for operational planning	NexGen M&S shall provide a simulation capability (per GSR 6.0) to support NATO military planning/decision making activities:		
	CR 2.2	Simulation within time constraints	NexGen M&S simulation capabilities should support operational planning and assessment processes within operational timelines per NFR 5.0		
	CR 2.3	Rapidly configurable	NexGen M&S capabilities should allow users to configure a simulation with varying courses of action within operational timescales per NFR 5.0		
	CR 2.4	Low overhead	NexGen M&S shall enable planners to complete their simulation tasks without significant interruptions such as supervision or workarounds per NFR 1.0		
	CR 2.5	Visualizations	NexGen M&S shall provide visualisation at the operational and strategic level such as military conflict, crises, and operational plans being simulated		
	CR 2.6	C2 to model data exchange	NexGen M&S simulations should use real world data ¹ as simulation input parameters per GSR 6.0		
			1 - From Command and Control (C2) systems, Functional Area Services (FAS) systems, or national data providers		
	CR 2.7	TOPFAS suite interoperability	NexGen M&S should enable connections ² with the TOPFAS suite to allow simulations to receive, use, and digest planning objects, system elements, diagrams etc. from TOPFAS tools, and vice versa		
			2 - Improved system-to-system interface versus a data dump and import type procedure		
CR 3.0		Operational Analysis and Strategic Studies	NexGen M&S shall provide capabilities to support operational analysis and strategic studies		
	CR 3.1	Simulation capability for operational analysis and strategic studies	NexGen M&S simulations (per GSR 6.0) shall be capable of fulfilling simulation requirements of strategic studies		
	CR 3.2	Data retention	NexGen M&S shall retain results and simulation data of interest to analysts		
	CR 3.3	Search previous event packages	NexGen M&S should allow analysts to search event packages ¹ previously archived by other analysts.		
			1 - Event packages includes the artefacts, assets, data, and results associated with a simulation-supported event		

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
	CR 3.4	Search models	NexGen M&S should allow analysts to search for models to conduct analysis. This may leverage capabilities from NFR 8.0		
	CR 3.5	Assess models	NexGen M&S should allow analysts to assess metadata descriptions of models		
	CR 3.6	Assess suitability	NexGen M&S should provide information to assess the suitability, and intended usage of models		
	CR 3.7	Assess data requirements	NexGen M&S should provide information to assess the data requirements of models		
	CR 3.8	Assess execution details	NexGen M&S should provide information to assess technical details for deploying, integrating, and/or executing the models		
	CR 3.9	Assess dependencies	NexGen M&S should provide information to assess the system or software dependencies needed to use the models		
	CR 3.10	Assess time	NexGen M&S should provide information to assess the time required to prepare and use the models		
	CR 3.11	Assess business details	NexGen M&S should provide information to assess the model's availability, procurement options, and financial requirements		
	CR 3.12	Efficient data curation	NexGen M&S applications shall enable analysts to curate data with an expected level of resources (e.g. time, procedural steps)		
	CR 3.13	Conduct analysis	NexGen M&S shall provide tools and libraries for analysts to conduct analysis and visualize data		
	CR 3.14	Visual representations	NexGen M&S applications shall provide tools for analysts to present information in an effective manner to decision-makers		
CR 4.0		Computer-assisted Wargames	NexGen M&S shall provide capabilities to support wargame activities¹ and computer-assisted wargames		
			1 - Aligned with wargaming process defined by Experimentation and Wargaming Branch at HQ SACT and modelled by the NexGen M&S architecture		
	CR 4.1	Simulation capability for wargaming	NexGen M&S shall provide a multi-domain simulation capability (per GSR 6.0) to support computer-assisted wargames		
	CR 4.2	Planning support	NexGen M&S shall provide capabilities to allow planners to routinely wargame and test concepts, plans, and courses of action		
	CR 4.3	Mid-game simulation	NexGen M&S simulations shall adjust and adapt throughout the execution phase of the wargame.		
	CR 4.4	Force-on-force adjudication	NexGen M&S shall provide capabilities to perform and report force-on-force calculations in support of wargame adjudication		
	CR 4.5	Wargame decisions adjudication	NexGen M&S shall provide capabilities to adjudicate wargaming decisions at the operational and strategic level for analytical and training wargames		

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
	CR 4.6	Post-game simulation	NexGen M&S shall capture and provide information to enable post-wargame simulation to explore alternative decisions and outcomes		
	CR 4.7	Post-game analysis	NexGen M&S shall provide capabilities that enable wargamers to successfully complete post-game analysis tasks		
	CR 4.8	Visualization	NexGen M&S shall provide visualizations to support wargame adjudication		
	CR 4.9	Low overhead	NexGen M&S shall enable wargamers to complete their simulation-related tasks without significant interruptions, such as supervision or workarounds, per NFR 1.0		
GSR 1.0		Integrated Planning and Execution	NexGen M&S shall enable integrated planning and simulation capability		
	GSR 1.1	Integrated simulation capability	NexGen M&S shall integrate the activities and functionality of simulation planning and execution phases		
	GSR 1.2	Integrated operational processes	NexGen M&S shall integrate with workflows and operational processes described in GSR 2.7		
	GSR 1.3	Simulation Planning	NexGen M&S shall enable distributed and collaborative simulation planning		
GSR 2.0		Simulation preparation	NexGen M&S shall provide capabilities for users to conduct tasks to prepare simulations		
	GSR 2.1	Efficient Order of Battle (ORBAT) development	NexGen M&S applications shall enable users to develop datasets for simulations with an expected level of resources (e.g. time, procedural steps)		
	GSR 2.2	Initialize simulation	NexGen M&S shall allow users to initialize simulations		
	GSR 2.3	Edit parameters	NexGen M&S applications shall allow regular users ¹ to conduct simulation tasks, e.g. to create, inspect, edit, duplicate simulation parameters, without significant supervision.		
			1 - Non-specialists. No requirement for special skillsets (e.g. database engineers, geo)		
	GSR 2.4	Access Scenario Data	NexGen M&S shall provide access to data sources needed to develop simulation parameters		
	GSR 2.5	Set collection parameters	NexGen M&S applications shall allow regular users ² to set data collection parameters		
			2- Non-specialists. No requirement for special skillsets (e.g. database engineers, geo)		
	GSR 2.6	Workflow	NexGen M&S should guide users using workflows aligned with stakeholder's recurring operational processes ⁴⁵⁶		
			3- Non-specialists. No requirement for special skillsets (e.g. database engineers, geo)		

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
			<p>4 - Recurring processes performed in JWC and JFTC and described in documentation such as the Bi-SC CT&E Directive 075-003, JWC SOP 800 Exercise Planning</p> <p>5 - Aligned with wargaming process defined by Experimentation and Wargaming Branch at HQ SACT and modelled by the NexGen M&S architecture</p> <p>6 - Aligned with processes for strategic studies, operational analysis, and operational planning</p>		
	GSR 2.7	M&S Enabling Services	<p>NexGen M&S should provide or enable the inclusion of M&S Enabling Services⁷ as described in the MSaaS Technical Reference Architecture to assist users in preparing simulation</p> <p>7 - e.g. Simulation Scenario Services, M&S Repository Services, M&S Composition Services, M&S Registry Services</p>		
GSR 3.0		Simulation execution	NexGen M&S shall provide capabilities for users to control and execute simulation		
	GSR 3.1	Execute	<p>NexGen M&S shall allow regular users¹ to control simulation execution</p> <p>1 - Non-specialists. No requirement for special skillsets (e.g. database engineers, geo)</p>		
	GSR 3.2	Iterative experimentation	NexGen M&S shall provide capabilities that allow analysts to conduct iterative simulation to support their operations. Operations may include experimentation, trade-space exploration, or data farming.		
	GSR 3.3	Execution rates	<p>NexGen M&S simulation capabilities shall execute at rates² faster than real time as required for the event</p> <p>2 - Minimum speed of 6x; Typical speed of 100x - 200x; Desired speed at fastest possible rate for experimentation</p>		
	GSR 3.4	M&S Enabling Services	<p>NexGen M&S should provide or enable the inclusion of M&S Enabling Services³ as described in the MSaaS Technical Reference Architecture to assist users in executing simulation</p> <p>3 - e.g. Simulation Control Services</p>		
GSR 4.0		Process simulation outputs	NexGen M&S shall provide capabilities to collect, process, and visualize simulation outputs during and after execution		
	GSR 4.1	Data collection	NexGen M&S shall record simulation data of interest to enable after action review and analysis		

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
	GSR 4.2	Audio, video data	NexGen M&S shall record audio and video as directed		
	GSR 4.3	Standards format	NexGen M&S should store data using non-proprietary formats		
	GSR 4.4	Persist	NexGen M&S shall store data as directed to appropriate external data store(s)		
	GSR 4.5	Capture Decisions	NexGen M&S should capture decisions and subjective data associated with execution		
	GSR 4.6	Monitor simulation	NexGen M&S shall provide the ability to remotely monitor simulation execution		
	GSR 4.7	Enable post analysis	NexGen M&S shall provide analysis of collected data		
	GSR 4.8	User-defined visualisations	NexGen M&S should allow user-defined visualisations		
	GSR 4.9	Visualize analysis results	NexGen M&S shall provide visualisation capabilities		
	GSR 4.10	Results interrogation	NexGen M&S shall enable users to explore and perform queries on simulation outputs		
	GSR 4.11	Third-party analysis	NexGen M&S shall enable data analysis by third-party capabilities		
	GSR 4.12	Reporting and presentation	NexGen M&S shall provide information to support after action reporting activities		
	GSR 4.13	Replay	NexGen M&S shall support scenario replay from specified times		
	GSR 4.14	Save analyses outputs	NexGen M&S shall save simulation-related results and in accordance with applicable Archivist policies.		
	GSR 4.15	Archive exercise package, lessons learned	NexGen M&S should enable users to compile and archive packages of relevant information regarding the planning, execution, and analyses of a simulation-supported event. This must also be done in accordance with applicable Archivist policies.		
	GSR 4.16	Observations, assumptions, and anecdotal data	NexGen M&S shall allow users to associate anecdotal information with archived event packages		
GSR 5.0		Simulation Capability	NexGen M&S shall provide simulation capability(ies) that can support several application areas¹		
			1 - strategic studies, wargaming, operational analysis, operational planning		
	GSR 5.1	Mission Level Model	NexGen M&S shall provide mission-level modelling as commonly understood by the military model hierarchy		
	GSR 5.2	Campaign Level Model	NexGen M&S shall provide campaign-level modelling as commonly understood by the military model hierarchy		
	GSR 5.3	Defence-enterprise level model	NexGen M&S should provide defence-enterprise level models ²		
			2 - Gallagher, Caswell, Hanlon, Hill. "Rethinking the Hierarchy of Analytic Models and Simulations for Conflicts". (2014)		

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
	GSR 5.4	Operational domains	NexGen M&S shall simulate multiple operational domains ³		
			3 - Air, Land, Maritime, Cyberspace, Space		
	GSR 5.5	Logistics	NexGen M&S shall simulate logistics operations		
	GSR 5.6	Civil	NexGen M&S shall support modelling resilience, civil preparedness, and assessing strategic shock to the civil environment		
	GSR 5.7	J9 Resilience	NexGen M&S shall interoperate with resilience models developed at SHAPE J9		
	GSR 5.8	CIMIC	NexGen M&S should represent the human environment in simulation in order to understand the impact of NATO and military operations on the human environment		
	GSR 5.9	PMESII	NexGen M&S should enable the inclusion of capabilities that can represent Political, Military, Economic, Societal, Information and Infrastructure (PMESII) state changes caused by the effects of actions		
	GSR 5.10	Represent Effects of DIMEFIL actions	NexGen M&S should represent the effects of Diplomatic, Information, Military, Economic, Financial, Intelligence, Law Enforcement (DIMEFIL) actions		
	GSR 5.11	Inclusion	NexGen M&S shall enable the inclusion of new models as needed to represent the operational environment per NFR 3.0		
	GSR 5.12	Artificial intelligence	NexGen M&S should be capable of using artificial intelligence		
	GSR 5.13	Games engines	NexGen M&S should support rendering by independent game engines		
	GSR 5.14	M&S Services	NexGen M&S should enable M&S Services ⁴ as described in the MSaaS Technical Reference Architecture.		
			4 - e.g. Simulation Services		
GSR 6.0		Data	NexGen M&S shall enable the ability to import, process, and make data available for simulation and analysis		
	GSR 6.1	Identify data source	NexGen M&S should allow users to identify data sources (e.g. NATO, open sources, national)		
	GSR 6.2	Data ingest and persist	NexGen M&S should provide the ability to ingest data		

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
	GSR 6.3	Catalogue interoperability	NexGen M&S should interoperate data catalogues		
	GSR 6.4	Real world data	NexGen M&S should provide access to real data for use in models		
	GSR 6.5	Data sharing	NexGen M&S should enable sharing and accessing data from Nations and across the NATO Command Structure using agreed processes and procedures		
	GSR 6.6	Curate data	NexGen M&S shall provide tools to query, manipulate, organize, and curate data into desired formats		
	GSR 6.7	Automated data pipelines	NexGen M&S should enable automated processes for ingesting, processing, and archiving data		
	GSR 6.8	Develop models	Analysts shall have the ability to develop parametric models		
	GSR 6.9	Produce metadata	NexGen M&S should allow users to associate descriptive information with datasets		
	GSR 6.10	Catalogue data	NexGen M&S should allow users to publish a dataset's descriptive information		
	GSR 6.11	Assess metadata	NexGen M&S should provide descriptive information for other users to assess the suitability (e.g. availability, releasability, suitability, pedigree, technical details) of shared assets		
	GSR 6.12	Data lake	NexGen M&S should provide the ability to store un-curated data		
	GSR 6.13	Data warehouse	NexGen M&S should provide the ability to store curated data		
	GSR 6.14	Tagging	NexGen M&S should distinguish between real and simulation data		
	GSR 6.15	Search data	NexGen M&S should provide a common access point for users to search and analyse available data		
	GSR 6.16	Controlled data access	NexGen M&S shall allow access to data by authorized users		
	GSR 6.17	Common baseline of data	NexGen M&S shall provide common and agreed-upon datasets (e.g. ORBAT, terrain)		
	GSR 6.18	Releasability	NexGen M&S should tag and control the release of data, in all or in part, according to releasability		
	GSR 6.19	Data classification	NexGen M&S shall provide data at multiple classifications ¹		
			1 - NU, NS, and MS		
PIR 1.0		Programme interoperability	NexGen M&S capabilities shall be interoperable with other related NATO capability programmes		
	PIR 1.1	ETEE-FS	NexGen M&S capabilities shall be interoperable with capabilities from the ETEE-FS capability programme		
	PIR 1.2	Enablement Support Services (ESS)	NexGen M&S capabilities shall be interoperable with applications and data from the ESS capability programme		

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
	PIR 1.3	Political, Military Assisted Decision-Making (PM-ADM)	NexGen M&S capabilities shall be interoperable with capabilities from the PM-ADM capability programme		
	PIR 1.4	Data Exploitation	NexGen M&S capabilities shall be interoperable with capabilities from the Data Exploitation effort		
	PIR 1.5	IT Modernisation (ITM)	NexGen M&S capabilities shall be interoperable with capabilities from the ITM programme		
	PIR 1.6	CORE COMMS	NexGen M&S capabilities shall be interoperable with capabilities from the CORE COMMS programme		
NFR 1.0		Usability			
	NFR 1.1	User-friendly	NexGen M&S applications shall enable regular users to complete their simulation-related activities without significant interruptions such as supervision or workarounds.		
	NFR 1.2	User satisfaction	Regular users do not experience a significant number of issues while using NexGen M&S applications that would result in negative user satisfaction.		
	NFR 1.3	User interfaces	NexGen M&S applications shall have similar styling and look-and-feel		
NFR 2.0		Scalability			
	NFR 2.1	Scalability	NexGen M&S shall enable increasing and decreasing infrastructure as needed to meet changing demand		
	NFR 2.2	Cloud infrastructure	NexGen M&S should allow simulation environments to be deployable agnostic of the host environment		
NFR 3.0		Modularity			
	NFR 3.1	Modular Open Architecture	NexGen M&S should enable severable functionality and system components to be developed added, removed, or replaced separately and independently via a modular architecture		
	NFR 3.2	Inclusion of new capabilities	NexGen M&S shall enable the rapid inclusion of new components, user applications and technical services with an expected level of resources (e.g. time, procedural steps)		
	NFR 3.3	Open modelling standards	NexGen M&S shall define open modelling standards for modelling simulation entities		
	NFR 3.4	Extensibility	NexGen M&S should enable independent development of compatible and pluggable content, functionality, and models		
	NFR 3.5	APIs and interfaces	NexGen M&S should enable the coupling of applications and services via standardized interfaces		
	NFR 3.6	Modelling and Simulation as a Service (MSaaS)	NexGen M&S should follow the concepts described in the Modelling and Simulation as a Service (MSaaS) Technical Reference Architecture and MSG-195.		
NFR 4.0		Security			

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Tier 1	Tier 2	Requirements Statement		Fulfilment	Comments
	NFR 4.1	Network classifications	NexGen M&S should be deployable on NU, NS, and MS networks		
	NFR 4.2	Scenario roles and permissions	NexGen M&S shall control access to users application based on roles and permissions		
NFR 5.0		Accessibility			
	NFR 5.1	Web-enabled	NexGen M&S applications shall be mainly web-enabled and remotely accessible from any NATO computer		
	NFR 5.2	Availability	NexGen M&S capabilities should be available within operational time constraints		
NFR 6.0		Compliance			
	NFR 6.1	Regulatory requirements	NexGen M&S shall be compliant with relevant NATO regulatory requirements		
	NFR 6.2	Federated Mission Networking	NexGen M&S should be compliant with relevant Federated Mission Networking (FMN) specifications		
	NFR 6.3	STANAGs, STANRECs	NexGen M&S should be compliant with relevant modelling and simulation STANAGs and STANRECs		
NFR 7.0		Efficiency			
	NFR 7.1	Efficient operations	NexGen M&S applications shall enable regular users to complete their simulation-related activities with an expected level of resources (e.g. time, procedural steps)		
NFR 8.0		Model Reuse			
	NFR 8.1	Describe resources	NexGen M&S should allow users to a develop descriptive information about models		
	NFR 8.2	Publish resource information	NexGen M&S should enable providers to publish descriptive information models to a location widely accessible to simulation users		
	NFR 8.3	Search models	NexGen M&S should provide the ability to search for models that have been published		
NFR 9.0		Interoperability			
	NFR 9.1	Interoperability with NCS systems	NexGen M&S shall be interoperable with required NATO Command Structure systems		
	NFR 9.2	C2 stimulation	NexGen M&S shall be interoperable with C2 systems (NATO Inventory) used by NATO bodies		
NFR 10.0		Maintainability and Supportability			
	NFR 10.1	Support	NexGen M&S service management, maintenance and support should be conducted by an authority (e.g. Host Nation, NCI Agency) in accordance with Service Level Agreements		