



**Simulation Interoperability  
Standards Organization**

*"Simulation Interoperability & Reuse through Standards"*

# **SISO-TOR-033-2020**

## **Terms of Reference for the XR (eXperiential Reality) Interoperability Standards Study Group**

**Version 1.0**

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## Revision History

Version	Section	Date (MM/DD/YYYY)	Description
1.0	All	11 Apr 2020	

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# Simulation Interoperability Standards Organization

## Terms of Reference for the XR (eXperiential Reality) Interoperability Standards Study Group

### 1 Proponent Name(s) and Contact Information

This section identifies the key proponents and individuals who have agreed to participate as members of the XR (Experiential Reality) Interoperability Standards Guidance Study Group.

Primary proponent(s):

#	Name	Organization
1.	William A. Oates	AFAMS
2.	Paul Gustavson	SimVentions
3.	Peggy Gravitz	HII-MDIS

Additional members:

#	Name	Organization
1.	Jonathan Harris	Navy
2.	David Wells	UCF/IST
3.	Chuck Sanders	DMSCO
4.	Brad Friedman	STE CFT
5.	Chris McGroarty	U.S. Army
6.	Dan Davis	USC-ICT
7.	Bob Lutz	JHU/APL
8.	Thomas Holland	GTRI
9.	Chris Metevier	STTC
10.	Wesley Clark	SRC Inc
11.	Lionel K. Himeche	DGA
12.	Crash Konwin	Booz Allen
13.	Bharatkumar Patel	DSTL, UK MOD
14.	Marc Gimbel	Raven Solutions
15.	Jean-Louis Gougeat	SOGITOC
16.	Wim Huiskamp	TNO
17.	Jon Diemunech	AFRL
18.	Curtis Blais	NPS
19.	David Drake	JHU/APL

#	Name	Organization
20.	Wink Bennett	AFRL
21.	Christopher Stapleton	Simiosys
22.	Kevin Gupton	ARL/UT
23.	Roy Scudder	ARL/UT
24.	Mike Haimson	Carousel Tech
25.	Damon Curry	Pitch Technologies
26.	David Ronnfeldt	Australian Department of Defence

## 2 SISO Committee with Oversight

The SISO Committee with oversight of this group shall be:

- X   SISO Standards Activity Committee
- SISO Executive Committee
- SISO Conference Committee

## 3 Rationale

The challenges and issues faced by what is typically known as AR/VR (Augmented Reality / Virtual Reality) technology covers a broad range of technical, operational, interoperability and social problems that must be addressed in order for society and the M&S community to benefit from the potential of AR/VR solutions.

For the purposes of this Study Group the term “XR Interoperability” will be applied to represent and reflect a holistic approach centered on the collaborative exchange of information necessary to convey realistic experiences, which is needed to fully realize the power and potential of an “XR World”. With this study group the concept behind the term XR has been defined to pertain, derive and focus on an individual’s real-world experience.

With an assertive and accelerated schedule, this Study Group will investigate six critical capabilities for XR Interoperability that includes: Operational Support, Tele-Operational Support, Educational Support, Analytical Support, Technical Support and Projectional Support. These are described further in section 4.2.

An agile approach will be applied to provide incremental products with an end state within 12 months that will demonstrate an XR Interoperability concept.

In addition, it is recognized that there are several ongoing standards-related efforts with regard to AR/VR technology in the areas of AR, VR, and Mixed Reality (MR), including Artificial Intelligence (AI), and Human System Integration (HSI). Therefore, the tasks will include the canvassing of existing standards efforts with a cross reference to the challenges and issues being addressed as well as the XR capability area supported.

## 4 Tasks

### 4.1 Administrative Tasks

The group shall execute the following administrative tasks:

1. Operate in accordance with all applicable SISO administrative products.

2. A Group Lead shall be appointed by the SISO Committee establishing the Study Group. The Group Lead shall be a SISO member. If the Group Lead changes over the course of the study period, then group members shall identify a new Group Lead, make a recommendation to the SISO Committee with oversight to appoint the new Group Lead, and that SISO Committee shall appoint the new Group Lead.
3. Work directly with the SISO Committee providing oversight to ask questions, clarify process, coordinate products and supporting documentation, and to communicate.
4. Update and maintain information on the group webpage.
5. Maintain a group folder in SISO's Digital Library in which all historical files relevant to the group and relevant to the study-related products developed by the group are archived.
6. As much as possible, conduct discussions and business utilizing the group Discussion Forum and teleconferencing to minimize requirements for meeting space at Simulation Innovation Workshops.
7. Announce all formal meetings using the group Discussion Forum, document minutes of all formal meetings, and archive minutes, as well as all other materials presented at meetings, in the group folder in SISO's Digital Library. Formal meetings are meetings where official business is conducted (e.g., voting, decisions are made).
8. Announce all informal discussions using the group Discussion Forum. Following an informal discussion, summarize and post salient points using the group Discussion Forum.
9. Take advantage of alternate meeting opportunities at SISO affiliate- and sponsoring-organizations' venues in which group members also participate.
10. Become and remain cognizant of other organized efforts (both internal and external to SISO) that are addressing related/relevant standards and practices. Maintain liaison with those organizations for the purpose of expressing interest in their efforts and findings, potential collaborations, and in sharing the group's work.
11. Produce a Final Report and deliver to the SISO Committee with oversight.

## 4.2 Group-Specific Tasks

Based on the need discussed in the rationale section, the group shall execute these group-specific tasks.

1. Investigate the six potential areas for XR Interoperability application, which includes: Operational, Tele-Operational, Educational, Analytical, Technical and Projectional. Describe and articulate the key elements of each area and the potential benefit provided to the consumer.
  - Operational Support includes the ability for an operator to remotely manage a distributed asset, such as semi-autonomous vehicle.
  - Tele-Operational Support includes the ability for an embedded asset (e.g., soldier or first responder) to receive cognitive support from a remote subject matter expert located at another location.
  - Educational Support includes the ability to train an individual or team in a synthetic / augmented environment
  - Analytical Support includes the ability to evaluate data and data models in a unique way within the confines of the XR space.
  - Technical Support includes the ability to engineer and evaluate mechanical and physical assets
  - Projectional Support includes the ability to present and configure new environments for the purpose of mimicking or demonstrating a desired capability, whether real or conceptual.

2. Conduct a literature review of SISO papers and other related literature on XR Interoperability to include related AR, VR, MR, AI, haptic feedback devices, hand-tracking technology and other efforts. The focus is on human and machine interoperability exchange related to social interaction, which includes physiological responses and behavior (i.e., gestures). This review is intended to include a curation of tools, technologies and systems that capture, represent, and reflect human intent, insight and interaction useful in measuring things like social learning, group collaboration, and team dynamics.
3. Catalog, describe, and analyze standards-related efforts with regard to XR based technology by canvassing existing standards efforts, applying a cross reference to the challenges and issues, and identifying the specific XR capability area supported including the advantages and disadvantages of each standard. For the XR capability, the focus is on capturing, reflecting and sharing human experience in a simulation rich environment, whether virtual or augmented, with the goal to foster the cognitive exchange of ideas, insights, and intent, which meet or exceed real-world interaction. This is sometimes referred to as cognitive interoperability.
4. Provide guidance based on the curation of data collected above that might assist organizations in choosing an XR Interoperability approach for creating simulation-based environments to support operational, teleoperation, educational, analytical, technical and/or projectional capabilities. Guidance could also include use cases if applicable.
5. Apply an agile approach to curate content for the development of the Study Group report and invite demonstrations to illustrate XR interoperability experience capability.
6. Provide recommendations for potential SISO developed standard, guidance and/or reference product based on study group findings.

## 5 Products

The Study Group shall produce the following products:

1. Formal meeting minutes and other meeting materials.
2. Final Report (using the approved template).
3. Detailed description with key elements of the six critical capability areas as described under group-specific task number 1 above.
4. Results of literature review as described under group-specific task number 2 above.
5. Listing of standards-related efforts with cross-referenced analysis as described under group-specific task number 3 above.
6. Guidance and support for navigating XR technology as described under group-specific task number 4 above. Guidance could also include use cases if applicable.
7. As possible, invited demonstrations of an XR Interoperability experience as described under group-specific task number 5 above.
8. Recommendations for standards, guidance and reference product development based on study group findings.

## 6 Performance Period

The performance period shall commence with approval of the Terms of Reference and continue until the Final Report is delivered and a way ahead decided.



Event / Deliverable	Date
Working Group Meeting	Feb 2020 @ SIW
Study Group Kickoff Meeting – Agile-based Planning Meeting	April 2020
Periodic Study Group Meetings – Agile-based Review Meetings	Monthly
Working Draft Version #1 of Report– XR Interoperability Capability	June 2020
Working Draft Version #2 of Report– XR Interoperability Capability	Sept 2020
Working Draft Version #3 of Report– XR Interoperability Capability	Dec 2020
Study Group Meeting – Lessons Learned and Summary of Findings (includes presentation of Final Report)	Feb 2021 (SIW)

The group shall update this schedule periodically and report slippages to the SISO Committee with oversight. The SISO Committee with oversight will consider inability to meet scheduled milestones as a reason to dissolve the group.