Secure Tomorrow Series

Cross-Impacts Session Facilitator Guide

CROSS-IMPACTS SESSION FACILITATOR GUIDE

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Non-federal facilitators: The Cybersecurity and Infrastructure Security Agency (CISA) has provided this toolkit as a starting point for your organization to address these critical issues. Please feel free to expand upon or adapt these exercises and tools to your needs. In several places throughout the document, we have provided guidance for federal facilitators regarding participants, process, and information protections. This guidance is based upon federal requirements, which may differ from state and local considerations. Please consult with your organization to consider what language or actions you will need to take in hosting a session.

GOAL

This activity allows participants to explore, in a structured way, emerging and evolving risks and risk mitigation strategies pertaining to the topics of brain-computer interfaces (BCIs), quantum technologies (communications, computing, sensors), and synthetic biology. Participants will focus their attention on six intersections of drivers of change and National Critical Functions (NCFs).[1]

Participants will come away with a better understanding of the ramifications of these drivers of change for different NCFs.

KEY OUTPUTS

- A list of plausible risks, organized around NCFs, pertaining to BCIs, quantum technologies, or synthetic biology.
- A corresponding set of risk mitigation strategies that would increase security and resilience of critical infrastructure and critical systems supporting these NCFs.

RECOMMENDED PARTICIPANTS

[*Please note: This activity requires between 8 and 12 participants. Invitations to participate should focus on individuals at the mid- to senior career level who are interested in exploring longer-term risks to critical infrastructure (CI) to enable effective risk management. To provoke new lines of thinking about risks to CI and systems (either directly or through cascading impacts), we recommend that you seek broad representation from regional CISA personnel; state, local, tribal, and territorial planners; fusion center and intelligence community representatives; and other private-sector, non-*

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[1] NCFs are those functions of government and the private sector so vital to the U.S. that their disruption, corruption, or dysfunction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.

profit, think tank, and academic stakeholders. In particular, individuals with interest and expertise in BCIs, quantum technologies, or synthetic biology, and individuals who are already familiar with strategic foresight, are encouraged to participate. Please review the read-ahead for your topic of interest to better understand the associated drivers of change and NCFs that the session will potentially cover and use this knowledge to choose participants.]

[Once known, this section of the guide would list the participants, their titles, and the agencies/organizations they represent.]

FORMAT

This activity is designed for a period of 4 hours. The remainder of this facilitation guide is built around a virtual execution of the activity.[2]

SUPPORT STAFF

- Facilitator
- Documentation lead

SUPPORT MATERIALS

- Read-aheads outlining the drivers of change and NCFs for each of the cross-impacts session topics are available
- Virtual meeting platform
- Web-based platform that provides a virtual whiteboard (to construct the matrix of drivers of change and NCFs) and allows for real-time voting of intersection points

PREPARATION

The facilitator should become familiar with the specific topic (of the three) that is being explored and should also review the facilitation talking points included in this guide. The facilitator should also review the list of participants and familiarize themselves with the background and affiliation of each participant. Depending on the participants and topic, the facilitator and session sponsor should also determine whether developing a short summary about the topic as an additional read-ahead is necessary. Participants should receive the read-ahead(s) at least one week before the session.

For virtual executions, the facilitator should be comfortable using the virtual platforms involved. Matrix displays (see the appendices) should be generated ahead of time, and the associated website link to access the display should be included with each participant's invitation.

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[2] Please note: This activity can easily be converted for an in-person event. Participants would simply conduct the activities outlined in this guide on a white board or large wall, using sticky notes to display their ideas. For more details, please contact SecureTomorrowSeries@cisa.dhs.gov.

AGENDA (SAMPLE)

1–1:15 p.m.	Introductory remarks (welcome, participant introductions, objectives, and agenda)
1:15–1:30 p.m.	Choose intersection points for discussion*
1:30–3 p.m.	Discuss intersection points 1–3 (emerging risks, evolving risks, and risk mitigation strategies)
3–3:15 p.m.	Break
3:15–4:45 p.m.	Discuss intersection points 4–6 (emerging risks, evolving risks, and risk mitigation strategies)
4:45–5 p.m.	Final thoughts and wrap-up

* Depending on the topic and participants, the facilitator may want to precede this activity with an overview discussion about the topic, leveraging the topic subject matter experts who are participating. Facilitators should adjust the agenda accordingly.

GENERAL INSTRUCTIONS

- **Foster and maintain a collaborative, respectful atmosphere.** Encourage different observations, opinions, and perspectives. The discussions will explore a variety of policies, actions, and issues, and participants will likely display different degrees of expertise on a particular discussion topic. These discussions are a no-fault, not-for-attribution exercise that focuses on the identification, analysis, and generation of possible threats, uncertainties, and risk-management strategies for upcoming issues of concern.

- **Encourage participants to speak from their perspective.** Particular stakeholder groups may have prominent strategic needs. We can use a participant's unique perspective as a starting point for broadening the discussion to how it might apply to other stakeholder groups. If a participant is speaking from the perspective of a particular stakeholder group, remember to ask other stakeholder groups how this might also apply to their group.

- **Focus on CI security and resilience**. Focus participants on linking whatever needs/issues are being discussed to a risk for CI security and resilience. They can be indirectly connected and can certainly prompt a discussion about any complexities and tradeoffs involved, but we always want to come back to CI security and resilience. In other words, as the group is identifying emerging or evolving threats, also have them elaborate on the connection to CI, if it is not obvious.

ACTIVITY SESSIONS

I. **INTRODUCTORY REMARKS** (1–1:15 p.m.): After welcoming participants and facilitating participant introductions, the facilitator will introduce the topic and objectives, as well as outline the agenda.

Breakdown	1. Welcome 2. Participant introductions 3. Review of objectives, topic of interest, and desired outputs 4. Agenda
Facilitator Talking Points	▪ Suggest that participants keep their cameras on to make it easier to engage and have more free-flowing discussions. ▪ Determine ahead of time with the session sponsor whether participants will receive a copy of the notes from the session. If so, inform participants so they can focus on the discussion (versus taking notes). ▪ Provide background information on the specific topic of interest (see appendices for topic descriptions). Depending on the topic and participants, the facilitator may want to have a more expansive discussion about the topic (key concepts, current trends), leveraging the topic's subject matter experts who are participating.

II. **CHOOSING INTERSECTION POINTS** (1:15–1:30 p.m.): The facilitator will display the topic matrix for the topic of discussion (Appendix A, B, C, or D) and give a brief tutorial on how to use the virtual platform to vote on priority intersection points in the matrix, which will serve as the main discussion points for the session. It is recommended that this take the form of virtual "dot" voting, assigning a set of five dots of the same color to each participant, which are used to indicate preferred intersection points on the virtual whiteboard. Participants will have up to 3 minutes to vote for the five intersection points they would like to discuss. The facilitator should work with the session sponsor ahead of time to determine the criterion for voting. Suggested options for the criterion include the following:

- ▪ Intersection points with the greatest impact;

- ▪ Intersection points that are the least understood; and

- ▪ Intersection points that represent areas of which participants have the most knowledge.

The facilitator will then review the virtual whiteboard and choose the six most popular intersection points for discussion in the next session.[3] Given the potential for overlapping concerns across multiple NCFs and/or drivers of change, the facilitator should use their discretion to determine whether to combine two or more intersection points to discuss at the same time.

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[3] Alternatively, if the sponsor desires, the facilitator can arrange the selection process such that each selected intersection point addresses a different driver of change. To accomplish this, the facilitator may need to limit each participant to vote for no more than one intersection point in each row of the matrix.

Breakdown	1. Define drivers of change and NCFs. 2. Relay instructions for choosing intersection points. 3. Review matrix with participants' selections. 4. Choose six intersection points for further discussion.
Facilitator Talking Points	▪ The facilitator should be prepared to help participants come to a common understanding of each of the drivers and NCFs listed in the matrix rows and columns. ▪ The facilitator should have some latitude in steering the group's selection of the six intersection points for discussion (e.g., helping break ties, encouraging broad coverage of multiple NCFs or drivers of change).

III. **DISCUSSION OF EMERGING AND EVOLVING RISKS AND MITIGATION STRATEGIES** (1:30–4:45 p.m., with a 15-minute break at 3 p.m.): The facilitator will facilitate a group discussion around each of the six chosen intersection points focused on emerging risks, evolving risks, and risk mitigation strategies.

Breakdown	For each intersection point, facilitate discussion to expound upon risks and risk mitigation strategies (roughly 30 minutes for each intersection point). A discussion of uncertainties and ramifications related to the intersection point may help drive that discussion. During the discussion, the facilitator should visually display or highlight the current intersection point to help keep participants on topic. For example, the facilitator can draw a red rectangle around the current intersection point on the virtual whiteboard.

Facilitator Talking Points	▪ The goal for the facilitator is to keep the discussion as free-flowing as possible in order to identify a variety of potential risks and mitigation strategies.
	   o It is okay for participants to disagree.
	   o Generating new and different ideas is more important than building consensus.
	
	▪ As an example, let us assume that a majority of participants chose the intersection point 2B for the topic Quantum Technologies (the intersection of the column "Protect sensitive information" and the row "Advances in quantum computing"; see Appendix B).
	   o Start with the person(s) who voted for the intersection point to identify a risk that could arise from development of a sufficiently advanced quantum computer that could affect current means of protecting sensitive information (e.g., public key encryption).
	   o Ask that person and others to expand on the risk. Why is it relevant? Why is it important? What are the implications/consequences if the risk is unchecked?
	   o Finally, have participants identify plausible mitigation strategies to counter this risk.
	   o Then solicit participants to identify another risk.

	o Continue in this fashion for 30 minutes and then move on to the next intersection point.
	▪ Here are some general questions for each risk identified: o Are there specific implications at the local, state, regional, or federal level? o Are there specific implications for one or more CI sectors? o Are there specific implications for CISA? o Are there specific implications for the public? o Are there current activities being undertaken to address this risk? o Are there best practices to build on? o How do you view/understand [insert driver of change]? How might this driver affect other drivers or trends on the matrix? What cascading impacts might occur that would link back to concerns for CI security and resilience? o Is there a precedent for or example of the risk mitigation strategy you are proposing? o Is the risk changing over time? How has the risk evolved?
	▪ Encourage participants to use the platform's chat function as a means for them to ask follow-up questions to each other, expand on statements made, and provide links to additional information. The chat can also serve as a parking lot for ideas. Facilitators should scan through the chat comments and, as appropriate, introduce comments into the discussion.

IV.   **FINAL THOUGHTS AND WRAP-UP** (4:45–5 p.m.): The facilitator will ask participants to highlight their key takeaways from the risks and risk mitigation strategies that they identified. Additionally, the facilitator will briefly inquire about any NCFs or drivers of change that were not addressed by any of the six intersection points selected.

Breakdown	1. Ask participants for key takeaways. 2. Identify and discuss any NCFs or drivers of change not covered. 3. Make note of participant interest in pursuing follow-up activities (e.g., sharing results and attendee contact information, building out top priority areas from the discussion, obtaining input and assistance on unaddressed portions of the matrix chart).
Facilitator Talking Points	▪ Some wrap-up questions for participants include the following: o What were your key takeaways? o What was the most surprising or unexpected risk or risk mitigation strategy identified? o What was the most enjoyable part of this workshop? The least? Are there any improvements you would suggest? ▪ Look for any driver of change or NCF not chosen by any participant. Is there any reason why this driver or NCF wasn't selected?

APPENDIX A: BRAIN-COMPUTER INTERFACES (BCIs)

Topic description: BCIs have long been confined to medical laboratory settings, where they have demonstrated enormous promise for helping patients regain motor function or communicate. In recent years, major technology companies have begun investing in BCIs, bringing an infusion of resources that will likely accelerate breakthroughs in BCI capabilities, more commercial applications, and their entry into numerous sectors. However, these advances will bring a host of potential privacy, security, equity, and individual welfare concerns. Furthermore, other countries are investing in developing BCI technology, which may expose the United States to risks from economic and military competition, as well as ethical, legal, and security concerns.

Drivers of Change	National Critical Functions					
	1. Educate and Train	2. Preserve Constitutional Rights	3. Protect Sensitive Information	4. Provide Medical Care	5. Provide Wireless Access Network Services	6. Support Community Health
A. Advances in "reading" data from the brain						
B. Advances in "writing" data to the brain						
C. Commercial influences						
D. Ethical and accountability concerns						
E. Harmful effects						
F. Inequities in access						
G. International competition						
H. Performance augmentation						

APPENDIX B: QUANTUM TECHNOLOGIES

Topic description: The rapid development of quantum technologies—specifically, quantum computers and new algorithms that can break public key encryption—raises the specter of a potentially catastrophic future threat to all applications that depend on information and communications technologies. The risks are multilayered and entwined, and certain critical infrastructure systems are particularly vulnerable because of their reliance on internet-connected industrial control systems and internet-enabled distributed operations.

Drivers of Change	National Critical Functions					
	1. Conduct Elections	2. Protect Sensitive Information	3. Provide Identity Management and Associated Trust Support Services	4. Provide Information Technology Products and Services	5. Provide Internet-based Content, Information, and Communication Services	6. Research and Development
A. Advances in quantum communications						
B. Advances in quantum computing						
C. Advances in quantum sensors						
D. Data harvesting						
E. Reliance on digital signatures						
F. Synergies and virtuous cycles						
G. Timeline uncertainty						

APPENDIX C: SYNTHETIC BIOLOGY

Topic description: Synthetic biology is the redesigning and harnessing of biological organisms to impart new or improved abilities and produce products. In the next 10 to 15 years, synthetic biology will likely contribute to significant advances in food and agriculture, healthcare, sensors and diagnostics, manufacturing, and more. However, synthetic biology poses dual-use risks; the rapid progress in this field that is contributing to beneficial advances can also facilitate nefarious applications, such as making relatively benign bacteria and viruses more pathogenic. Manipulation of systems using synthetic biology could result in unintended or accidental negative impacts.

Drivers of Change	National Critical Functions						
	1. Manage Hazardous Materials	2. Manage Wastewater	3. Produce and Provide Agricultural Products and Services	4. Produce and Provide Human and Animal Food Products and Services	5. Produce Chemicals	6. Provide Medical Care	7. Supply Water
A. International competition							
B. Public acceptance							
C. Shift to biomanufacturing							
D. Technological advancements							
E. Technology democratization							
F. Translating research into practice							
G. Workforce shortages							