Secure Tomorrow Series

Alternate Futures: Advanced Manufacturing Controller Guide

WELCOME AND INTRODUCTIONS

[The instructions in this guide are built around a virtual execution of the workshop, using a virtual meeting platform.]

Hello. My name is [name], and for the next three hours I will be your game controller for Alternative Futures: Advanced Manufacturing. My role is to guide you through the game.

Before we get started, let's do a quick round of introductions. [Ask players for their name and a quick summary of their background.]

The Cybersecurity and Infrastructure Security Agency (CISA) National Risk Management Center (NRMC) has developed this game to assist stakeholders across the critical infrastructure community to self-facilitate and conduct foresight activities that will enable them to derive actionable insights about the future, identify emerging risks, and proactively develop corresponding risk management strategies to implement now. One goal of the Secure Tomorrow Series is to develop a repeatable and defensible process that (1) identifies emerging and evolving risks to critical infrastructure systems, and (2) identifies and analyzes the key indicators, trends, accelerators, and derailers associated with those risks to help critical infrastructure stakeholders direct their risk management activities.

As such, today you will be playing as yourselves, bringing your knowledge, experience, and perspectives to debate strategies that will shape critical infrastructure resilience and security in light of potential advancements in the advanced manufacturing ecosystem. Hopefully, the game will be a fun and interactive way for you to think broadly about future threats and opportunities, learn from your peers, and identify strategies to inform preparedness activities.

The game consists of three rounds, each of which will present you with a scenario that could plausibly occur within the next three to seven years. During each round, you will play one of three unique roles. [Display placemat document on camera and point to the appropriate column header for each role as you name them.] *The three roles are the Innovator, the Devil's Advocate, and the Judge.* [Assign which player has what role for Round One. If there are more than three players participating, assign them to be additional Innovators.] *We will rotate roles after each round.*

What do these roles entail?

- **The Innovator(s):** *Your job is to propose initiatives that will help critical infrastructure owners increase the security and resilience of their systems in preparation of future issues that could arise from progress with advanced manufacturing processes or technologies. Initiatives could be policies, programs, investments, public-private partnerships, research and development, or other actions that, if successfully put into motion today, you believe will better position and prepare one or more critical infrastructure sectors for the future. You will have 15 minutes to think of and present up to three initiatives and up to three supporting arguments per initiative. When proposing an initiative, please consider both its potential effects and the feasibility of implementation.* [Note: If there is more than one Innovator per round, each Innovator will introduce at least one of the three initiatives. All Innovators will develop these initiatives collaboratively, attempting to bolster the supporting arguments. Please be flexible on the 15-minute time limit, especially in cases in which there are multiple Innovators and during the first round.]

- **The Devil's Advocate:** *Your job is to "stress test" the ideas of the Innovator(s). After the Innovator(s) finish(es) presenting the initiatives and supporting arguments, you will identify counterarguments as to why these initiatives may not be successful. In total, you will have*

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10 minutes to present up to three counterarguments for each of the proposed initiatives. Your counterarguments can target one or more of the supporting arguments or can underscore a new concern that may cause the initiative to fail. You can choose to debate the effects the ideas will have or highlight challenges with implementation. Please note that the Innovator who proposed the initiative gets one last chance to rebut your counterarguments once you are finished.

As you've probably guessed by now, these two roles are competing against each other through your arguments and counterarguments. Depending on your role, you can score points for either successfully implementing your initiatives or denying your opponent's initiatives. Meanwhile, each successful initiative increases resilience to possible social, technological, economic, environmental, or political (STEEP) disruptions. [Display the STEEP Disruptors & Odds Poster on camera.]

- ▪ ***The Judge:*** *Your job is to weigh the arguments versus counterarguments for each initiative and determine whether it has a high, medium, or low chance of success.* [Display placemat document on camera and point to a row in the Judge's column that lists "Chance of Success."] *To be clear, "success" means the initiative can be implemented and, if implemented, will substantially increase security or resilience against possible threats arising from the described scenario. As the Judge, you may interject at any time for clarification, but please be careful not to influence or aid the other players' arguments or counterarguments.*

The Judge will determine the success of each initiative by rolling this virtual 20-sided die: https://rolladie.net/roll-a-d20-die. *The die simulates the unpredictability of the supporting environment for initiatives and the game's inability to account for all positive and negative factors that might influence success.* [Display the STEEP Disruptors & Odds Poster on camera.]

- ▪ *An initiative with a **high** likelihood of success will be successful with a roll of 6 or higher (75 percent chance).*
- ▪ *An initiative with a **medium** likelihood of success will be successful with a roll of 11 or higher (50 percent chance).*
- ▪ *An initiative with a **low** likelihood of success will be successful with a roll of 16 or higher (25 percent chance).*

Are there any questions so far?

*As a final note about these roles, please understand that this game **does** encourage you to compete with one another, but the **purpose** of this game is to generate discussions that develop well-conceived and thought-provoking initiatives. Regardless of the outcomes of each round, it is your collective insights that matter.*

Please use the placemat document you received to take notes and sketch out your arguments or counterarguments for each initiative.

PRACTICE ROUND

To familiarize yourself with the three roles, let's walk through a practice round with one initiative using a completely unrelated topic. As the topic, let's use "reducing the number of car accidents in the United States."

[Motion to Player One.] *What is one initiative that you think might help reduce the number of car accidents occurring nationwide each year? Now, provide a supporting argument why you think that*

this initiative would be successful, considering both how the initiative would affect the number of car accidents and how it could be implemented feasibly.

Normally, you would provide two more supporting arguments for this initiative, as supported by your fellow Innovators. You would then repeat this for up to two more initiatives. For this practice round, I'm going to move on to the Devil's Advocate.

[Motion to Player Two.] *As the Devil's Advocate, what is one reason why Player One's initiative might fail?*

Normally, you would identify up to three counterarguments for each initiative. After you come up with your counterarguments, we would go back to the Innovator(s) for a rebuttal.

[Motion to Player One.] *Do you have a quick rebuttal?*

[Motion to Player Three.] *Now, Judge, do you think this initiative has a high, medium, or low likelihood of success? Why? Finally, let's roll the die to see whether the initiative is ultimately a success or failure.*

[Determine whether successful.]

Now that we've done a practice round, are there any final questions? Does everyone understand the flow of the game? How about the odds? [Answer any questions.]

If there are no more questions, let's move on to the actual game.

PRESENT STATE

Advanced manufacturing describes the use of innovative technologies and processes—such as artificial intelligence, automation, robotics, 3D printing, sensors, and big data analytics—to make existing products and create new ones. Advanced manufacturing technologies have already led to increased efficiency, safety, productivity, and other benefits in various industries, including the aerospace, automotive, chemical, and electronics industries. Some examples include the following:

- *A manufacturer of high-precision parts for the aerospace industry implemented a manufacturing execution system to help automate assembly and ensure quality control. Sensors on the factory floor capture processes down to the number of times a screw has been turned; a software system then uses this data to adjust assembly functions.*
- *A medical-device manufacturer uses 3D printing to create components that are recyclable, replacing plastic parts with organic materials that break down upon disposal. The company also employs sensors and automation to monitor and track production in real time, allowing for more efficient energy and water usage.*

Current drivers affecting future developments in advanced manufacturing include the following:

- *Rapid prototyping methods that combine 3D printing, printed electronics, and fabrication capabilities will enable products that are tailored to individual needs and shorten design-to-production lifecycles.*
- *Digitalization of production (e.g., use of digital representations) will allow manufacturers to capture data throughout the product lifecycle, allowing for digital traceability.*
- *Advances in algorithms for smart machines will increase use of autonomous systems and will necessitate new approaches for human-machine interactions.*
- *Growing emphasis on supply chain innovation will facilitate sustainable sourcing of raw materials and product recycling.*

Select a STEEP Disruptor

[Point to the STEEP Disruptors & Odds Poster.] *As I mentioned before, this poster outlines a popular framework for scanning the future. It covers five dimensions—social, technological, economic, environmental, and political—which make the acronym* STEEP*.*

Each disruptor will force players to explore strategies to mitigate risks to critical infrastructure during a plausible future scenario that could arise pertaining to the advanced manufacturing ecosystem. These scenarios may limit player actions, reflect new capabilities achieved because of implementing advanced manufacturing processes or technologies, or require players to consider the implications of an event. [Identify the first player to log on by name.] *As the first player to log on, you can choose which STEEP category you would like to explore for Round One.* [See Appendices I–V. Please note that each disruptor ends with a question that should be announced to the group after reading through the disruptor narrative, to clarify the issue that players will be addressing for the disruptor. Additional discussion questions are included in each appendix to serve as prompts or as questions for open discussion periods.]

LET'S PLAY

Round 1

As a reminder, for Round One you are considering initiatives that, if successfully begun today, you believe will help prepare critical infrastructure owners for potential risks arising in these future scenarios.

[Turn to the Innovator(s).] *I am going to begin your turn by giving you five minutes to gather your thoughts about potential initiatives. After that point, I will encourage you to share your thoughts aloud so that the other players can get a sense of what you're thinking. I'll be engaging you in a dialogue to help you flesh out your initiatives and develop the supporting arguments.* [If there are multiple Innovators, you may want to encourage the Innovator team members to begin sharing their ideas with each other after two minutes, before asking them to announce their first initiative after five minutes has elapsed.]

As a recommendation, try to stay away from sweeping generalizations. With such statements, I will push you to provide an example of what you are alluding to or ask you to give an anecdote to explain or demonstrate your idea. Innovator(s), your turn starts now.

[Start the timer from 15 minutes. After five minutes, prompt an Innovator to begin verbalizing their first initiative.]

Try to have the Innovator(s) frame arguments by explaining:

- How their idea addresses security and resiliency
- How the idea can be implemented
- What will change if the idea is implemented

Some questions to help the Innovator(s) develop supporting arguments include the following:

- Is there a precedent for the type of activity you are proposing?
- Are there major risks that need to be addressed in your supporting arguments?
- Are multiple steps necessary for implementation? What do you think might realistically be achieved in the next three to seven years?

- Who are the stakeholders necessary for implementation to be successful (i.e., whose support do you need)?
- What conditions exist today that make you believe this initiative will succeed (as opposed to in the past)?

Throughout the Innovator(s) round, or after 15 minutes, recap the Innovator(s) initiatives and supporting arguments and look to each Innovator to validate.

[Reset the timer to 10 minutes.] Ask the Devil's Advocate to begin thinking aloud and presenting their counterarguments. Start the timer.

Throughout the Devil's Advocate's round or after 10 minutes, recap the points made by the Devil's Advocate and look to the Devil's Advocate to validate.

[Reset the timer to five minutes.] Ask the Innovator(s) to begin their rebuttal and start the timer.

After the rebuttal period, ask the Judge to select the likelihood of success for each initiative and to present their rationale. Afterwards, direct the Judge to roll the die once for each initiative.

Declare the winner for Round One. [If there was a good discussion among participants during the round, you may want to include a short open discussion period (less than 10 minutes) following judgment to continue this discussion. This is also an opportunity to discuss how the initiatives could be strengthened.]

[Gesture to the Round One winner.] *As the winner of Round One, you get to choose the STEEP disruptor category for Round Two.*

Subsequent rounds

Assign new roles.

Present the new scenario based on the STEEP disruptor chosen (see Appendices I–V). [Please keep in mind that depending on what players present in the prior round, you may want to preclude them from selecting certain STEEP categories, since the discussion may become repetitive. Use your best judgment.]

Follow the instructions listed under Round One.

Declare the winner for Rounds Two and Three based on the results.

Direct the winning player or team to select a STEEP disruptor (Round Two only).

[You can adjust the number of disruptors explored as desired, but you will need to consider the corresponding increase or decrease in time commitment and modify the gameboard, as necessary.]

WRAPPING UP AND FINAL DISCUSSION

[After rolling the die for the final round of the game:] *Before we conclude with some wrap-up questions, I would like to thank you all for participating today. I know some parts of this game can be frustrating, especially when…* [Controller chooses whichever phrase is the most appropriate.]

- *…a well-conceived initiative fails due to the roll of a die,* OR
- *…a poorly conceived initiative succeeds due to the roll of a die.*

[Controller chooses to say this or not, based on all Devil's Advocate performances.] *Additionally, we recognize that the Innovator's position is a little more challenging. The Devil's Advocate has more*

time to think through what to say, and it's easier to point out the flaws in the Innovator's ideas. We purposely designed the game to encourage this type of interaction because it pushes players not only to identify potential ideas for preparing for the future, but also to think critically about how these ideas can be executed and in what timeframes they can be achieved, and to begin to address major risks.

Although we've set up the game to encourage competition among players, it's important to stress that we are playing this game to generate ideas that will lead to more resilient and secure critical infrastructure systems in the future. I want to reiterate that it's your collective insights and subject matter expertise that matter. So, let's walk through what happened during each round today.

Walk through the outcomes of each round, and then move the game-board marker to its new position as follows:

- If all three initiatives pass in a round, move the marker up two positions.
- If two initiatives pass in a round, move the marker up one position.
- If one or no initiatives pass in a round, move the marker down one position.

Declare whether critical infrastructure systems have become more resilient as a result of the players' initiatives.

Some questions to ask during the open discussion include the following:

- What were your key takeaways?
- What was the most surprising or unexpected initiative presented?
- What was the most enjoyable part about playing the game? The least? Are there any improvements you would suggest?
- What would your organization do differently, given what was discussed during the game?

APPENDIX I: SOCIAL DISRUPTOR

MACHINE-HUMAN INTERACTIONS

March 3, 2030. One person is killed, and six others injured when an autonomous forklift veers off course at a Dutton & Co. facility. The incident is the latest in a series of near-misses and accidents plaguing the company's new, state-of-the-art metal fabrication facility, which has experts debating whether the company paid sufficient attention to occupational safety when updating the facility.

A Dutton & Co. spokesperson attributes Thursday's incident to a failure in systems software. To deliver parts throughout the facility, the company uses several autonomous material-handling vehicles that are guided by sensors using guidance beacons that map the production floor. The spokesperson acknowledges previous incidents in which vehicles veered off course and struck warehouse racks. In the wake of the latest incident, however, the company places further use of these autonomous vehicles on hold.

Although this incident seems at first blush to be one of robotic error, plant employees have expressed broader concerns about inadequate training and confusing operational interfaces that they had repeatedly asked management to change—to no avail. A new stamping press in one production line, for example, was connected to sensors to help synchronize the placement of raw metal into the press. Three key devices involved in the production line were each made by different manufacturers, and the safety software and devices were not fully understood by the system integrator, who unknowingly made the system less safe when designing the central control panel. As a result, workers who believed the machinery to be fully deenergized were struck by a robotic arm that activated suddenly. One advanced manufacturing expert notes that the use of autonomous systems does not absolve companies of the responsibility of addressing new machine-human interactions that occur in the workplace.

What initiatives can help ensure workforce readiness and safety?

Additional discussion questions

[These questions can be used to prompt the Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor these questions or ask new ones to meet the matrix game sponsor's specific needs.]

- *What are the potential challenges in applying advanced manufacturing technologies, including automation, in the workplace?*
- *What are the difficulties associated with attracting and retaining skilled workers?*
- *What are some initiatives or partnerships that may enable a smooth workforce transition within industries that use advanced manufacturing techniques?*

- *How can manufacturers better balance the investments required to implement advanced manufacturing technologies and processes with workforce training and safety?*

APPENDIX II: TECHNOLOGICAL DISRUPTOR

ADVANCED MANUFACTURING INTRODUCED NEW CYBER VULNERABILITIES

On March 1, 2030, defense officials order an indefinite halt to a $750 million dollar small satellite project. The stoppage is announced following reports that Zacrexus Satellite Enterprises, the prominent U.S. satellite manufacturer, was the target of a devastating cyberattack several months back. An investigation of the company's headquarters facility reveals numerous exploitable vulnerabilities, including compromised smart sensor devices, hidden public-facing networks, and upstream supply chain cybersecurity issues.

According to the investigation report, the cybercriminals likely sought lucrative intellectual property. Sensitive proprietary digital threads of Zacrexus' satellite blueprints and prototypes have recently been traced to friendly and adversarial countries, raising concerns about illegal component manufacturing of the patented satellite technologies. The availability of this technical data represents a blow to U.S. leadership in satellite manufacturing.

In the decision to halt the satellite project, a defense spokesperson cites concerns about potential sabotage associated with the cyberattack. Investigators, alongside Zacrexus engineers, are still working to confirm that the criminal hackers did not alter the digital design files of several satellite components. Moreover, the criminal hackers appear to have gained access to Zacrexus' operational technology systems and may have covertly compromised or even controlled SCADA devices that support Zacrexus' manufacturing processes.

What initiatives could ensure that cybersecurity protocols and assessments are implemented within manufacturing facilities? What initiatives could help in the post-event recovery from a cyberattack?

Additional discussion questions

[These questions can be used to prompt the Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor these questions or ask new ones to meet the matrix game sponsor's specific needs.]

- *How can the connectedness of devices (i.e., the industrial internet of things), which is vital for advanced manufacturing, be leveraged to reduce technological risks for industries?*
- *What are some ways that cyber-mitigation strategies may be applicable within the manufacturing sector? Are there any unique considerations for cybersecurity as advanced manufacturing techniques are implemented in this sector?*

APPENDIX III: ECONOMIC DISRUPTOR

FOREIGN MARKET DOMINANCE IN 3D PRINTING FOR AVIATION

By 2027, steady advances in aviation 3D-printing technology have resulted in foreign 3D- printing companies becoming the major supplier for Eurocoach Air, Europe's largest aircraft manufacturer. These companies are able to produce 3D-printed parts for aviation at scale, including critical components such as wing control surfaces and landing gear parts. By leveraging 3D-printed parts, the airline industry is able to save approximately 50 percent on the cost of new aircraft and parts replacements and save on fuel costs because of performance improvements that reduce aircraft weight.

U.S. aircraft manufacturer XYZ —which is prohibited by U.S. regulations from contracting with certain foreign 3D-printing suppliers—faces a degraded market position relative to Eurocoach Air. By 2030, XYZ is suffering steep losses in revenue. In addition, U.S. 3D-printing companies, which are restricted in their suppliers for machinery, feedstocks, and designs, are facing higher production costs and losing market share outside the United States. As a result, by the end of 2030, several of XYZ's parts suppliers go out of business, and major air carriers begin reporting concerns about future parts shortages. Concurrently, U.S. officials implement additional restrictions on the purchase of Eurocoach Air aircraft that contain 3D-printed parts made with designs, equipment, or feedstocks from certain countries, citing concerns over reliability and the risk of sabotage.

What initiatives can you think of to address the economic and security impacts to the United States of foreign-market dominance of 3D printing for aviation?

Additional discussion questions

[These questions can be used to prompt the Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor these questions or ask new ones to meet the matrix game sponsor's specific needs.]

- *What actions could federal agencies take over the next seven years to mitigate any anticipated impacts on U.S. airlines of certain nations gaining a market-leading position in 3D printing for aviation?*
- *If the United States chooses to allow some types of 3D-printed parts made with foreign inputs to be used in the manufacture of U.S. commercial aircraft, how could federal agencies and industry partners mitigate scenarios in which supply chain disruptions occur, including possible deliberate trade blockages?*

APPENDIX IV: ENVIRONMENTAL DISRUPTOR

NEW OPPORTUNITIES FOR SUSTAINABLE ENERGY

Throughout 2030, senior energy officials embark on a "Net-Zero Heroes" roadshow, holding a series of press conferences nationwide to highlight transformative advancements in energy-sector capabilities. Policymakers, industry leaders, and researchers alike agree that a revolution is underway in America's energy sector, led by the U.S. advanced manufacturing industry.

Press conferences tout the following examples of how advanced manufacturing is accelerating progress in solar, geothermal, and wind technologies:

- *Atomic-layer printing techniques have led to new solar technologies, such as more efficient eco-friendly semiconductors and the mass production of transparent panels for windows. Solar usage has tripled nationwide, and 10 states have attributed decarbonization gains to solar manufacturing advancements.*
- *Gulf Coast states are leading the country in wind-turbine technologies as they race toward renewable electricity commitments. New coastal hubs for wind energy now have onsite 3D-printing capabilities for blades, turbines, and other structural parts.*
- *3D-printing capabilities have also helped the United States exceed federal wind power development goals, as 22–25 GW wind turbines have progressed from an aspiration to the standard.*
- *In the Midwest, geothermal advancements have played a central role in several state decarbonization initiatives. Advanced automation technologies now allow for remote drilling operations in harsh environments without endangering field crews. In addition, digital twin technologies have led to zero waste in the production of geothermal equipment.*

Some scholars and leaders, however, are challenging advanced manufacturing's sustainability within traditional energy providers, noting that past advanced manufacturing efforts within petrochemical and oil and gas industries have faltered.

What are other ways in which advanced manufacturing can contribute to advancements in the energy sector? What actions can federal and state governments take to ensure that advanced manufacturing's potential is realized in energy transition efforts?

Additional discussion questions

[These questions can be used to prompt Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor these questions or ask new ones to meet the matrix game sponsor's specific needs.]

- *What are some initiatives that could help ensure accountability of environmental sustainability within industries?*
- *How does the implementation of advanced manufacturing technologies affect workforce needs in the energy sector?*

APPENDIX V: POLITICAL DISRUPTOR

REGULATORY OVERSIGHT FOR ADVANCED MANUFACTURING TECHNOLOGIES

May 31, 2030. Graryx Industries, a growing parts supplier for the aerospace industry, is under fire for the 2029 crash of Patriot Airways Flight 121. The lead federal investigator for the crash, Theodore Lawson, confirms that key components that failed prior to the crash were designed and produced using advanced manufacturing processes. Unconfirmed reports link these components to Graryx Industries, with investigators citing a rushed prototyping process as one contributing factor, noting that the company deliberately ignored structural concerns voiced during multiple inspections. They also note the variability among domestic and foreign sources for the company's raw feedstocks; Graryx Industries mixed these sources.

A congressional investigation is imminent as legislators lambaste the lack of regulatory oversight for advanced manufacturing technologies. U.S. House Speaker Paula Thornberry vows to hold hearings soon, demanding to know why Graryx's much-heralded quality and safety measures, such as real-time tracking and artificial intelligence–powered preventive maintenance, failed. She calls for urgency in issuing new federal legislation, noting the absence of binding standards, oversight, or regulatory frameworks for these technologies in numerous states.

What initiatives can help ensure the formation of appropriate domestic and/or international advanced manufacturing standards and regulations within critical industries like aerospace?

Additional discussion questions

[These questions can be used to prompt the Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor these questions or ask new ones to meet the matrix game sponsor's specific needs.]

- *How do the societal implications of advanced manufacturing technologies affect standards or regulations?*
- *How might legislation be crafted that balances the need for oversight while avoiding the excessive burden on manufacturing enterprises vital to the aerospace economy?*
- *What are the pros and cons of nonbinding regulations within advanced manufacturing industries? Could binding regulations put small manufacturing enterprises at a competitive disadvantage compared to larger companies?*
- *What concerns might exist about the United States adhering to international advanced manufacturing standards and regulations?*

APPENDIX VI: GAME SCHEDULE

Table 1: Schedule for conducting the Matrix Game

	MATRIX GAME STAGES (~3 HOURS)		
Introduction	- Welcome participants and discuss game purpose (Controller) - Explain game rules (Controller) - Practice round - Introduce current state and potential implications (Controller)	3 Min 5 Min 7 Min 3 Min	18 Min Total
Round 1	- Introduce future scenario based on STEEP disruption (Controller) - Craft initiatives and present arguments (Innovator(s)) - Present counterarguments (Devil's Advocate) - Rebuttal (Innovator(s)) - Adjudicate arguments and roll die (Judge) - (Optional) Open discussion period - Select STEEP disruptor	5 Min 15 Min 10 Min 5 Min 5 Min < 10 Min 1 Min	41–51 Min Total
Round 2	- Introduce future scenario based on STEEP disruption (Controller) - Craft initiatives and present arguments (Innovator(s)) - Present counterarguments (Devil's Advocate) - Rebuttal (Innovator(s)) - Adjudicate arguments and roll die (Judge) - (Optional) Open discussion period - Select STEEP disruptor	5 Min 15 Min 10 Min 5 Min 5 Min < 10 Min 1 Min	41–51 Min Total
Round 3	- Introduce future scenario based on STEEP disruption (Controller) - Craft initiatives and present arguments (Innovator(s)) - Present counterarguments (Devil's Advocate) - Rebuttal (Innovator(s)) - Adjudicate arguments and roll die (Judge) - (Optional) Open discussion period	5 Min 15 Min 10 Min 5 Min 5 Min < 10 Min	40–50 Min Total
Wrap Up	- Determine final game status of critical infrastructure security and resilience (Controller) - Open discussion period (Players)	5 Min 15 Min	20 Min Total