



*The November 2019*  
DEFENSE THREAT REDUCTION ADVISORY COMMITTEE (TRAC)  
*Report on*  
***Scenario-Based Planning to Maintain the Credibility  
Of the U.S. Nuclear Deterrent Against Emerging Threats***

A Presentation to the USSTRATCOM Academic Alliance  
by  
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and  
The Honorable Ronald F. Lehman, Ph.D.

30 June 2020

Outline of the Presentation on the  
**TRAC Report on Nuclear Scenario-based Planning**

- **Intro to TRAC and FACA**
  - Ron Lehman, Task Force Co-Chair
- **Tasking, Research Context, and Findings**
  - MG Bill Chambers, Task Force Co-Chair
- **Challenges in War Gaming and Metrics**
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- **Recommendations**
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- **Questions from Audience**
  - Bill Chambers and Ron Lehman

# INTRODUCTION TO THE TRAC AND FACA

***“This is a report of the Threat Reduction Advisory Committee, a Federal Advisory Committee established to provide the Department of Defense and the Secretary of Defense, through the Under Secretary of Defense for Acquisition and Sustainment, independent advice and recommendations on:***

- a. Reducing the threat to the United States, its military forces, and its allies and partners posed by nuclear, biological, chemical, conventional, and special weapons;***
- b. Combating weapons of mass destruction to include non-proliferation, counterproliferation, and consequence management;***
- c. Nuclear deterrence transformation, nuclear material lockdown, and accountability;***
- d. Nuclear weapons effects;***
- e. The nexus of counterproliferation and counter weapons of mass destruction terrorism, and***
- f. Other Acquisition and Sustainment Office and Defense Threat Reduction Agency mission-related matters, as requested by the Under Secretary of Defense for Acquisition and Sustainment.***

***The views expressed herein do not represent official positions or policies of the United States Government.”***  
***[p.iii]***

The TRAC operates under the Federal Advisory Committees Act (FACA), which requires that:

- Membership be vetted for expertise and for avoidance of conflict of interest.
- Findings and Recommendations must be by consensus of the full TRAC membership.
- Meetings must be reported in the Federal Registrar, and
- Unclassified Reports must be made public.

The TRAC consulted closely with DOD officials to understand the challenges they face, but the TRAC also interfaces with a wider community of experts in technology, policy, and operations.

The November 2019 TRAC Nuclear Report investigation was done by a Task Force of the TRAC.

Follow on work will be conducted by the Defense Science Board (DSB), also a FACA.

# Tasking

## **PURPOSE OF THE STUDY**

- ***“The 4 September 2018 Terms of Reference (TOR) from the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) directs the TRAC Task Force on Scenario Based Planning to Maintain the Credibility of the U.S. Nuclear Deterrent Against Emerging Threats to “...evaluate available methodologies...as well as realistic scenarios” “...for ensuring the credibility of the United States (US) nuclear deterrent over the next 10-25 years.” In particular, the Task Force was asked to “...consider analytic and data-driven frameworks” and to “...identify options on how to more rapidly integrate a data-driven approach.” [p.5]***

## Research Context (page 1)

- ***“Deterrence analysis, assessment, planning, and training continue to become more complicated with the rise of multiple near-peer threats and multiple nuclear actors. Moreover, new technologies involving cyber, space, air or missile defense, hypersonics, anti-submarine warfare, autonomous delivery systems, advanced sensor capabilities, and artificial intelligence/machine learning add to the complexity of the strategic setting.” [p.5]***
- ***“Useful tools to cope with the growing complexity are available in industry, and advanced capabilities have been demonstrated in the Department of Defense (DoD) and in national security-related communities, academia, and laboratories. Possibilities for much more capable, vivid, and realistic tools, however, are exploding, including the next wave of machine learning and artificial intelligence.” [p.5]***

## Research Context (page 2)

- ***“ . . . a set of initiatives is provided to address integration and acquisition of DoD-wide modeling, simulation, and gaming tools. These points were added to be responsive in a timely manner to issues of immediate interest to the Office of the Secretary of Defense.” [p.3]***
- ***“an expansion of the central sections of the Report, included as Annex A, can serve as a Primer on issues related to nuclear deterrence. This Primer also provides a foundation for analysis, modeling, simulation, and war gaming related to nuclear deterrence.” [p.3]***

# Findings

1. ***“Current analytic tools are insufficient to provide senior leaders the necessary, high-quality data to support the evidence-based decision making needed to successfully tackle the complex nuclear deterrence challenges they face during the next 25 years.” [p.9]***
2. ***“Improved use of advanced analytic tools including simulations and war gaming to gain both experience and exploitable data would support necessary evidence-based decision making.” [p.9]***
3. ***“If modern tools for deterrence analysis were put in place now for use during the next decade, DoD could meaningfully aid decision makers to overcome the challenges surrounding the bloc modernization of nuclear deterrence forces as they transition from legacy systems to replacement systems, with a particular emphasis on examining the FY29-FY39 time period.” [p.10]***

## Some Further Findings

- ***“Planning for effective deterrence including its nuclear dimensions is proving to be more complex as challenging scenarios multiply and technologies advance.”*** [p.11]
- ***“As China diversifies and expands its nuclear capabilities and as Russian public rhetoric, military doctrine, exercise behavior, capabilities development, and focus invoke the prospect of nuclear use in regional conflicts and other scenarios that the West had not seen as likely to involve nuclear threats, the ability to model, simulate, and game must focus on the most strategically significant, plausible scenarios while taking into account that more actors, more capabilities, and more scenarios may cross the threshold of high risk.”*** [p.11]



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## Challenges to War Gaming

### SPECIAL COMMENTS ON WAR GAMES

- *“In addition to modeling efforts, validation using data from past exercises and system acquisitions coupled with more traditional analytical studies continues to be valuable and should be expanded. Often, advanced and traditional approaches can be integrated. For example, war gaming can be employed in an iterative way to inform ongoing analytical efforts as well as to educate senior leaders in the Department about risks and their mitigation.*
- *“Learning by doing” is highly constrained in the operational nuclear arena, but war games are an inexpensive (and sometimes the only) way to learn by doing.*
- *Current war gaming efforts yield anecdotes more than exploitable data and often anecdotes don’t test the efficacy of our strategic capabilities.*
- *Because games are routinely concluded when the first nuclear weapon is employed, experience and data on the impact of nuclear use in the midst of high-intensity conventional warfare is seldom gained.*
- *DoD needs to explore ways in which games can provide insight into the pace of escalation.*
- *War games should explore the impact of alternative force structures on escalation dynamics.*
- *War games need to play scenarios all the way from pre-conflict through initiation of hostilities and first nuclear use to war termination to provide insights regarding optimal strategies for all stages of conflict, including the need to establish intra-conflict deterrence.*
- *Given the nuclear postures of potential adversaries, simulations and gaming can help the US and its Allies understand better the dynamics of limited nuclear use.*
- *Different factors influence different players (adversary, allies, US), and understanding these asymmetries is important because differences in culture, organizations, and other human factors may impact deterrence significantly. These factors, which have become highly noticeable in on-line gaming, can be identified and assessed in realistic deterrence gaming as well.*
- *Gaming can improve presidential decision support, particularly in understanding nuclear effects on infrastructure and populations.*
- *Concerns over the implications of cyber or space war on C4ISR and especially NC2 may be better understood by the effective use of new tools for analysis, modeling, simulation, and war gaming. Scenarios used for war gaming must go beyond immediate operational planning needs to address “What if?” possibilities such as are mentioned above.”*

# Deterrence Metrics

- ***“A single, composite measure of merit for deterrence is unlikely to be reliable. Analysis of multiple measures of merit is necessary to account for the diverse views of the US, its allies, and its adversaries.***
- ***Data from modeling, simulations, and gaming should be generated that can give greater insights into tipping points and margins of confidence in deterrence under different stresses.***
- ***Deterrence metrics are valuable for gauging deterrence and identifying trends, but “surrogation” – the confusion of the metric with what it is supposed to measure – must be avoided. For example, the adequacy of a deterrent force is impacted by the numbers, yields, and types of nuclear weapons it can deliver, but these metrics are not themselves direct measures of deterrence.***
- ***Advances in modern psychology and economics – from improvements in classical utility theory through the maturation of prospect theory with its emphasis on loss-aversion and relative rather than absolute gains – suggest new opportunities to apply modern behavioral science to deterrence analysis.***
- ***Scenario-based planning may not always be precisely predictive, but sound simulation and gaming can enhance readiness to respond to real contingencies and the inevitability of surprise.***
- ***DoD needs to understand what it can gain from the exploitation of these advance analytical, modeling, simulation, and gaming capabilities and what it risks if adversaries exploit these advances and the US does not.” [pp.11-12]***

# Recommendations

## ***RECOMMENDATION – BUILD A ROADMAP***

***“Create a Roadmap for modeling, simulation, and gaming of the nuclear deterrence challenge that:***

- Integrates analytic tools to generate high-quality, statistically significant data to support strategic-level decision making to optimize the deterrent,***
- Drives cost-effective acquisition of modeling and simulation,***
- Includes both nuclear and conventional forces, Nuclear Command, Control and Communications (NC3)/C4ISR, across all domains, at every phase of confrontation and hostilities with nuclear-armed competitors, and***
- Cuts across organizational boundaries and breaks down research and development (R&D), operational, and intelligence “stovepipes.” [p.10]***

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# QUESTIONS FROM THE AUDIENCE?

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# TRAC NUCLEAR TASK FORCE MEMBERS

## ANNEX C: MEMBERS AND ADVISORS

- Major General William A. Chambers, USAF (Ret) (Co Chair)\*
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- Joseph V. Braddock, Ph.D.\* \*\*
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- Charles F. McMillan, Ph.D.\*
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- Ms. Joan B. Rohlfing\*
- Mr. Elbridge A. Colby, J.D.
- John R. Harvey, Ph.D.
- The Honorable W. Bruce Weinrod, J.D.
- *Executive Director: Drew Walter, Senior Advisor DUSD(A&S)*

\*Member of TRAC

\*\* Stepped down from TRAC May 27, 2019

# FULL TRAC MEMBERSHIP DURING STUDY

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- Dr. George Whitesides

\* Stepped down from TRAC May 27, 2019