



UNDER SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

PERSONNEL AND
READINESS

FEB 27 2023

The Honorable Mike D. Rogers
Chairman
Committee on Armed Services
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

The Department's response to section 742 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2020 (Public Law 116-92), "Modification of Requirements for Longitudinal Medical Study on Blast Pressure Exposure of Members of the Armed Forces and Collection of Exposure Information," which requests an annual status report on the longitudinal medical study on blast pressure exposure (section 734 of the NDAA for FY 2018 (Public Law 115-91)), is enclosed.

The Department continues its work on the series of studies being conducted in response to section 734 of the NDAA for FY 2018. The overarching goal of the section 734 studies, also referred to as the Blast Overpressure Study (BOS), is to improve the Department's understanding of the impact of blast pressure exposure from weapon systems on Service members' brain health and better inform policy for risk mitigation, unit readiness, and health care decisions. The section 734/BOS continues to leverage existing work and expertise across the various lines of inquiry. Results from these efforts will inform safety standards and medical policy to protect Service members' health.

Thank you for your continued strong support for the health and well-being of our Service members, veterans, and their families. I am sending a similar letter to the Senate Armed Services Committee.

Sincerely,

A handwritten signature in black ink, appearing to read "Gilbert R. Cisneros, Jr.", is located below the "Sincerely," text.

Gilbert R. Cisneros, Jr.

Enclosure:
As stated

cc:
The Honorable Adam Smith
Ranking Member



PERSONNEL AND
READINESS

UNDER SECRETARY OF DEFENSE
4000 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-4000

FEB 27 2023

The Honorable Jack Reed
Chairman
Committee on Armed Services
United States Senate
Washington, DC 20510

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Thank you for your continued strong support for the health and well-being of our Service members, veterans, and their families. I am sending a similar letter to the House Armed Services Committee.

Sincerely,

Gilbert R. Cisneros, Jr.

Enclosure:
As stated

cc:
The Honorable Roger F. Wicker
Ranking Member

Report to the Congressional Armed Services Committees



Modification of Requirements for Longitudinal Medical Study on Blast Pressure Exposure of Members of the Armed Forces and Collection of Exposure Information

**Annual Status Update
February 2023**

The estimated cost of this report or study for the Department (DoD) of Defense is approximately for Fiscal Year 2021-2022. This includes \$641,000 in expenses and \$25,000 in DoD labor.
Generated on 12 December 2022
RefID: 5-8D9E5CE

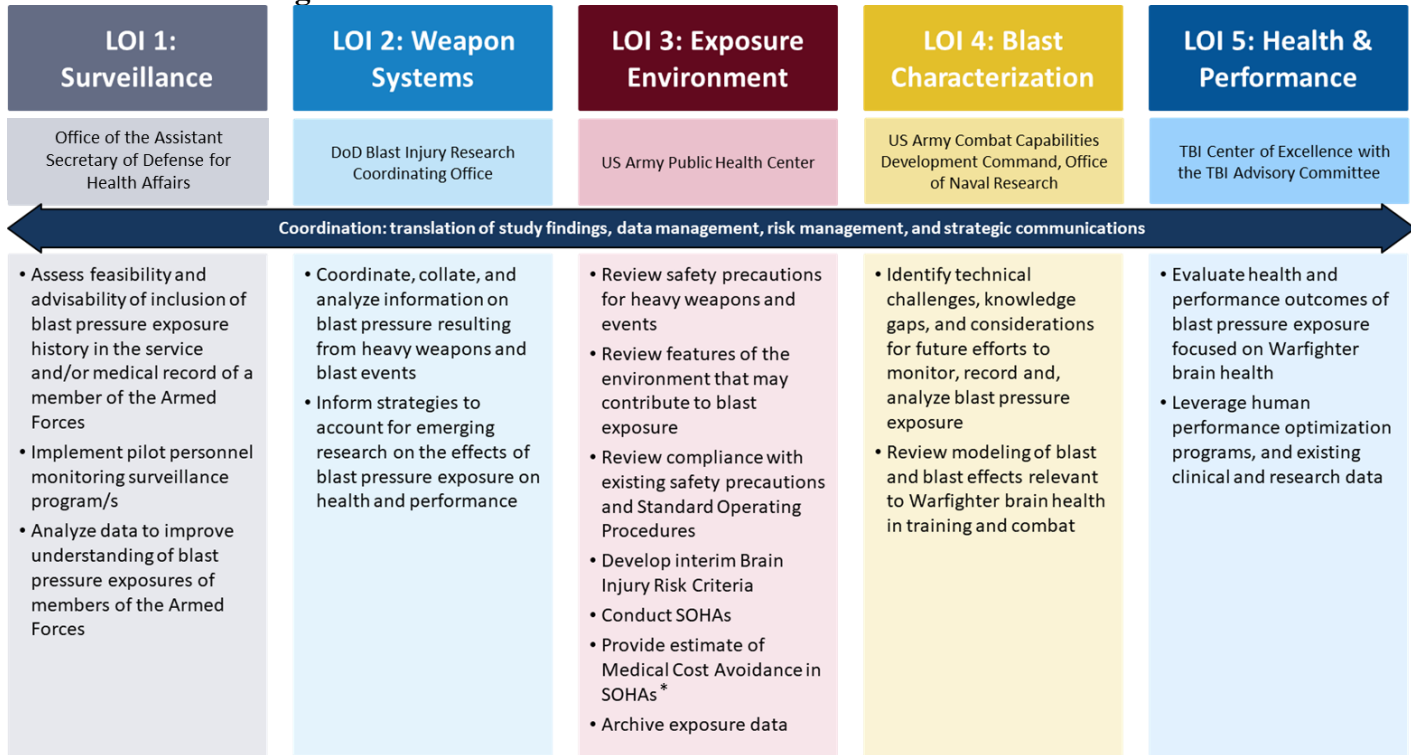
INTRODUCTION

Section 742 of the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2020 (Public Law 116–92), “Modification of Requirements for Longitudinal Medical Study on Blast Pressure Exposure of Members of the Armed Forces and Collection of Exposure Information,” requires an annual status report on the longitudinal medical study on blast pressure exposure (section 734 of the NDAA for FY 2018 (Public Law 115–91)). The most recent annual status update was submitted on December 23, 2021.

The goal of section 734, also referred to as the Blast Overpressure Studies (BOS), is to improve the Department’s understanding of the impact of blast pressure exposure from weapon systems on the brain health of Service members and better inform policy for risk mitigation, unit readiness, and health care decisions. The scope of section 734 includes a series of studies and assessments to achieve the goal rather than a single longitudinal study. The multiple study methodology is used to capture answers to several inter-related research questions that would prove challenging to accomplish with one large and unwieldy study, thereby presenting more opportunities for success.

The section 734/BOS has an established program structure, which includes the following five lines of inquiry (LOIs): Surveillance (LOI 1), Weapons Systems (LOI 2), Exposure Environment (LOI 3), Blast Characterization (LOI 4), and Health and Performance (LOI 5), to address the congressional requirements (Figure 1). An in-process review for section 734/BOS was conducted in October 2022, including updates by each of the LOIs. This in-process review is used to inform the current status of activities across each LOI for the purpose of this annual status update. Additionally, small group reviews of the draft Technical Reports with the LOI leadership and Program Coordinators are ongoing.

Figure 1. Section 734/BOS Lines of Efforts Overview



* Service member Occupational Health Assessments

SECTION 734/BOS LOIs

Surveillance (LOI 1)

The Surveillance LOI (LOI 1) is focused on establishing a capability to monitor and document exposures in high-risk populations and military career fields. Continued progress on the ability to house blast exposure-related data within the Defense Occupational and Environmental Health Readiness System-Industrial Hygiene System (DOEHRS-IH) and later extract relevant data through the Individual Longitudinal Exposure Record (ILER) is being made. A live-fire, Blast Overpressure (BOP) Surveillance Pilot project was implemented to explore and prove that blast exposure data from training with Tier 1 weapons, could be collected and transmitted from Service members in the Army and Marine to DOEHRS-IH. The Surveillance Pilot included three subordinate efforts known as BOS-D(De-Identified), BOS-S(Surveillance) and BOS-L(Longitudinal). The purpose is to help determine feasibility, limitations, and technical requirements of BOP monitoring using the Department's DOTMLPF-P (Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities, and Policy) analysis to inform senior leader and policy decisions regarding future capability development. The high level DOTMLPF implications will also inform the higher-level Comprehensive Warfighter Brain Health program, and implementation of the Doctrine Change Requirements from the approved Joint Requirements Oversight Council memorandum. Additionally, the pilot project will provide the Department with discrete, exposure information to optimize data management within our current systems with linkages to the DOEHRS-IH and ILER systems.

Progress to Date:

LOI 1 accomplished the following:

- Completed a successful movement of BOP exposure data (BOS-D phase).
- Completed a pilot for surveillance (BOS-S phase) at Fort Campbell, KY with 101st Airborne Division (ABD) and collection of BOS-L data from 101st ABD, 1st Battalion, 7th Marines, and range safety officers at the Marine Corps Air Ground Combat Center at Twentynine Palms, CA.
- Generated unit-level reports for the 101st ABD and supporting interpretation document for out brief and leadership input.
- Completed the ability for ILER to extract and present data from BOS-D from DOEHS-IH.

Weapon Systems (LOI 2)

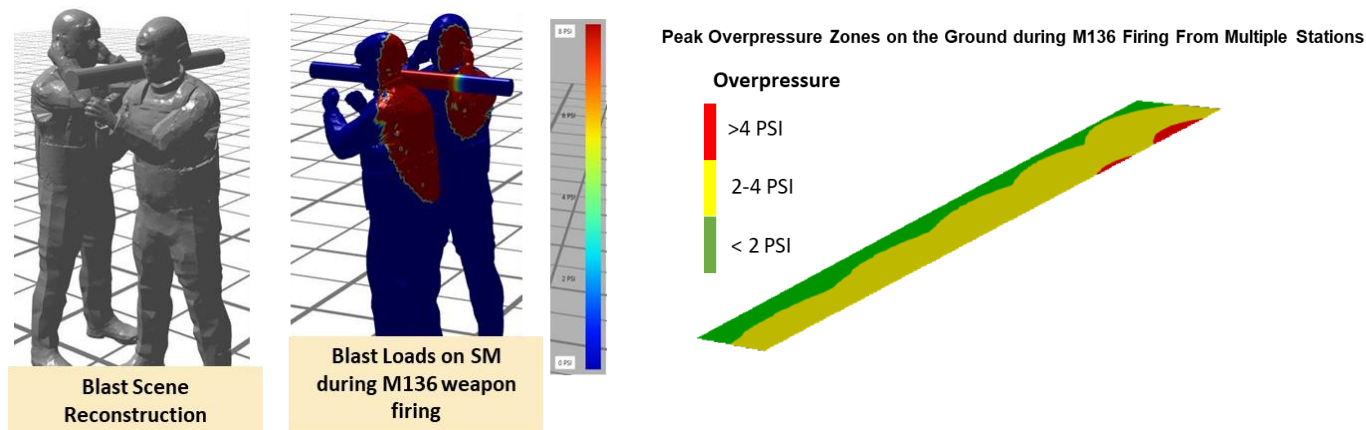
Weapon Systems LOI 2 is focused on developing an improved understanding of the blast exposures that result from firing or detonating various weapon systems, evaluating existing documentation of the weapon systems in development, testing, training and modification scenarios, and analyzing the way these exposure components are described and captured in research, testing, and training communities.

Progress to Date:

LOI 2 accomplished the following:

- Completed Tier 1 weapon Systems executive summaries which include shoulder mounted and 50-Caliber weapons, indirect fire systems (all platforms of mortars and howitzers), and breaching charges.
- Identified gaps and variability in safety guidance across the Services (e.g., weapons use conditions, Allowable Number Of Rounds (ANORs)) and inconsistent terminology for safety concepts, such as ANOR.
- Coordinated with the U.S. Army Training and Doctrine Command for the Army and its Marine Corps counterpart to establish the prototype Range Manager Toolkit (RMTK) BOP Tool Module. The RMTK BOP Tool Module includes visualization of blast loads on Service members (Figure 2) to inform training cadre and unit commanders planning to reduce unnecessary blast exposures in training.

Figure 2. Prototype BOP Tool Module



Exposure Environment (LOI 3)

The Exposure Environment (LOI 3) is focused on determining the contributing factors to how Service members are exposed to BOP. Additionally, LOI 3 is working to identify, assess, control/mitigate, quantify (monetarily), and catalogue post-materiel, fielding-related health hazard exposures (e.g., BOP, impulse pressure, noise exposures) to Service members. The plan is for these actions to evolve with completion of the interim Brain Injury Risk Criteria and relevant Service member Occupational Health Assessments (SOHAs) by the study teams.

Progress to Date:

LOI 3 has accomplished the following:

- Completed the Blast Test Device – gauge validation
- Completed the majority of the Joint SOHA Reports for the Tier 1 Weapon Systems and Breaching Charges – Figure 3.
- Completed the verification, validation, and accreditation of the Medical Cost Avoidance Model. This model can be used to estimate avoidable medical, lost time, disability, fatality, and training replacement costs to present the return on investment for implementing preferred mitigation strategy or controls.
- Held a 2-day Blast Summit in November 2022 to bring together subject matter experts from across DoD to discuss findings and recommendations for blast exposure monitoring.

Figure 3. Tier 1 Weapon Systems & Breaching Charges



Blast Characterization (LOI 4)

The Blast Characterization (LOI 4) focus is on modeling blast and blast effects relevant to warfighter brain health in training and combat, and identifying technical challenges, knowledge gaps, and considerations for future efforts to monitor, record, and analyze blast pressure exposure. LOI 4 focused on three areas in collaboration across LOIs: 1) Repository Development and Toolset Integration; 2) Computational Modeling; and 3) Automation and Analysis.

Progress to Date:

LOI 4 has accomplished the following:

- Leveraged the section 734/BOS efforts for the development of an enduring DoD capability for the longitudinal examination of weapons-based effects (existing and emergent) on Service members' brain health and performance.

- Analyzed capabilities for data repository development, artificial intelligence (unsupervised and supervised learning)
- Continued improvements to an algorithm to provide quality control screening and pre-processing of blast signatures from heavy weapon systems for consumption and derivation into reporting systems.

Health and Performance (LOI 5)

The Health and Performance (LOI 5) continues evaluating the acute, sub-acute, and chronic health and performance outcomes for warfighters exposed to repetitive, low-level, sub-concussive blast pressure with an emphasis on data gleaned from wearable sensors. LOI 5 leveraged existing research efforts throughout the DoD.

Progress to Date:

LOI 5 has accomplished the following:

- Held a research performer working group meeting to present a synthesis of the state of the science, identify health and performance domains and measures, and inform a targeted research strategy to narrow the scope for future research.
- Developed a tri-focused research strategy addressing the brain health effects of low-level blast which includes: 1) acute/training related exposures; 2) chronic/career exposures; and 3) validated assessment and outcome measures, including biological correlates. The low-level blast research efforts will be incorporated into the Warfighter Brain Health Initiative research and development strategy currently under development.
- Led the effort to consolidate and summarize completed and current studies in order to produce a paper advocating for an Assistant Secretary of Defense for Readiness Interim Safety Guidance memorandum. The groundbreaking guidance advocates for commanders to strive to manage BOP exposures below 4psi and that they adopt the “As Low As Reasonably Achievable” approach when planning live-fire training.

BLAST PRESSURE EXPOSURE REQUIREMENTS IN THE NDAA FOR FY 2020

The Under Secretary of Defense for Personnel and Readiness has approved a DoD-wide comprehensive strategy and action plan for warfighter brain health as a Departmental initiative developed to address the health effects, including brain health, from blast pressure exposure from the use of kinetic weapons in training and operations. The strategy also addresses promoting and maintaining brain health in support of maximizing individual Service member combat effectiveness. Leveraging efforts already in progress in response to section 734 of the NDAA for FY 2018, work continues in assessing the feasibility and advisability of uploading personnel exposure data into the existing DOEHRs-IH, as required by section 742 of the NDAA for FY 2020. Section 717 of the NDAA for FY 2020 directs documentation of blast exposures into the medical record with a set of minimum elements for inclusion. A final report has been submitted.

CONCLUSION

The section 734/BOS continues to leverage existing work and expertise across the various LOIs. The LOI efforts are interconnected resulting in close coordination and collaboration between the medical, scientific, technological and operational communities. The results from these efforts will inform safety standards; operational tactics, techniques and procedures; and medical policy to maximize readiness and force health protection. Additionally, this work will address tracking and documenting blast exposure capabilities. All LOIs are working toward the completion of the section 734. A final report is on track to be submitted at the end of calendar year 2023.