

# Tips and Lessons Learned for Conducting Safety Review Board Meetings

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At some point during a safety program's lifecycle, presenting to an Independent Safety Review Board is likely. For the program representatives, including their safety lead, program manager, and supporting representatives (e.g., design engineers, software developers, test directors, etc.), this could be comparable to a full-scale audit on their program — and in some cases, it is! The fear that program representatives have with presenting to Safety Review Boards is the unknown. They may ask themselves:

- What is going to be uncovered, or discovered?
- Will they be able to provide sufficient responses to address questions and concerns and defend our safety assessments?
- Will the Safety Review Board process delay the schedule?
- Are they going to miss a test event milestone?
- Will they make their Critical Design Review (CDR)?
- Will they meet their certification process?
- How much is this going to cost?
- Why do they need to provide all of this Objective Quality Evidence (OQE)?

This paper provides tips and highlights what programs should do, and should not do, based on lessons learned to have successful Safety Review Board meetings. The end goal of any successful Safety Review Board meeting is to ensure the safety program processes and analytical artifacts are adequate and well-established to properly identify and assess safety risks for the personnel, equipment and environment that will be exposed to potential hazards during the system's lifecycle.

## Introduction

Independent Safety Review Boards exist to provide an unbiased, independent assessment of a safety program's processes, reviewing the analytical artifacts generated by a safety program in order to ensure safety risks are adequately identified and assessed. Safety Review Boards are usually required at certain program milestones, prior to a test event, as part of a program's certification process, and prior to fielding. For the U.S. Department of Defense (DoD), mandates and policies have been established that specify the review authority and processes for

Independent Safety Review Boards. Depending on the program type and service — including if the program is considered a Joint Service application — it is imperative that the program understands and follows the mandates, policies, specifications and standards applicable to their system. In addition, instructions and manuals exist to further guide programs through the Safety Review Board processes. Programs should plan for Safety Review Boards well in advance, and should also ensure adequate resources, including both personnel and funding, are available to support the development of Technical Data Packages (TDPs), presentation materials, and travel and labor costs for the personnel who will attend and support the Safety Review Board meetings (assuming in-person review meetings will resume once COVID-19 limitations are lifted).

The goal for a successful Safety Review Board meeting is to ensure the safety program processes and analytical artifacts are adequate and well-established to properly assess safety risks for the personnel, equipment and environment that will be exposed to potential hazards during the system's lifecycle. Everyone involved with the Safety Review Board process, including all program representatives and board members, should agree with this goal to ensure the safety of those exposed to potential hazards and risks.

The paper highlights items that safety professionals should anticipate and predict when presenting to an independent safety review board, and provides tips to ensure the safety program is prepared in order to have a successful Safety Board review.

## Background

Safety Review Boards are composed of subject matter experts across a variety of engineering and technical fields and are well-versed and experienced with system safety processes. Safety Review Boards have authority to provide oversight and guidance to programs in order to ensure the safety program processes are sound to properly identify, document, assess, eliminate, mitigate, manage and accept safety risk throughout the program's lifecycle. Safety Review Boards, while they attempt to meet program requirements and schedules, are unbiased to program demands and, therefore, can provide impartial recommendations to improve the overall safety program.

A Safety Review Board may come into existence based on lessons learned, or as an outcome of a significant incident. For example, Naval Sea Systems Command Instruction (NAVSEAINST) 8020.6 [Ref. 1] provides the background for creation of the Navy's Weapon System Explosives Safety Review Board (WSESRB), which was established in 1967 following two major United States Navy aircraft carrier explosives mishaps. The first major aircraft carrier mishap occurred on October 26, 1966, aboard the aircraft carrier *USS Oriskany* as the result of a MK 24 parachute flare initiation in a magazine. The Navy assigned a Board of Inquiry to determine the cause of the *USS Oriskany* accident and to make recommendations to prevent future similar events. The second major incident occurred on July 29, 1967 aboard the *USS Forrestal* as a result of a series of bomb explosions. Once again, the Navy formed a Board of Inquiry to determine the root cause of the event. Based on the results of these two Boards of Inquiries, and using the Boards' recommendations, the Navy formally established an independent oversight board, the WSESRB. The WSESRB was chartered by the Chief of Naval Operations (CNO) to provide this independent oversight of Department of Navy (DoN) weapon program's safety efforts. From the very outset of the WSESRB, it has been accepted that explosives safety oversight is best accomplished by ensuring maximum compliance with long-standing weapon safety requirements through the life cycle development of each DoN weapon system. In keeping with the organization's original purpose, the ultimate goal of a WSESRB review still stands as the Navy's focal point for the prevention of mishaps involving ammunition, explosives and related systems, thereby eliminating deaths, injuries, lost workdays and property and environmental damage.

### Review Board Process

While it is assumed that each Safety Review Board has its own defined process, this paper will focus on the Navy's WSESRB Safety Review process which is defined in NAVSEAINST 8020.6E [Ref. 1]. Other review processes, such as those for U.S. DoD Joint Service Programs, are defined in Department of Defense Instruction (DoDI) 5000.69, DoD Joint Services Weapon and Laser System Safety Review Processes [Ref. 2]. It should be noted that the safety analytical artifacts are provided in a Technical Data Package (TDP) for WSESRB reviews, and other reviews, such as Joint Service reviews, may refer to this as the Safety Data Package (SDP). Though the SDP may have different names, depending on the Review Board, such as "TDP" for the Navy's Safety Board, the same contents are described in DoD Manual (DoDM), Joint Services Weapon Safety

Review (JSWSR) Process [Ref. 3] and the information contained is very similar from Service to Service.

A typical Safety Review Board process includes the following steps:

- Determine the Safety Review Board meeting's requirement and purpose
- Determine when to have a Safety Review Board meeting
- Develop the TDP
- Develop the presentation
- Conduct the Safety Review Board meeting
- Perform post-meeting activities
- Track current and previous findings
- Maintain Safety Review Board correspondences and dialog

It is imperative that programs understand and comply with the processes defined for the particular Safety Review Board that will review their programs (e.g., NAVSEAINST 8020.6 for WSESRB reviews). It is the responsibility of the program to follow the processes as "requirements" to ensure a successful review. In some cases, programs have submitted their TDP with a NAVSEAINST 8020.6 compliance matrix that highlights the sections or areas of the TDP that meet the requirements provided in the policies and guidance. This traceability shows the Board members that programs understand the requirements, and makes it easy for the Board members to review the TDP for specific content prior to the meeting and should help address potential questions prior to the meeting.

### Determine the Safety Review Board Meeting Requirement and Purpose

The first step of the Safety Review Board process is to determine if the program even *has* a requirement to present to the Safety Review Board based on the purpose of the potential review being pursued. The program can attempt to interpret policies and guidance themselves; however; it is recommended for the program to collaborate early and up front with the Safety Review Board to request guidance prior to initiating the process.

If a Safety Review Board appoints a review board liaison or point of contact for the program, the program should fully utilize this contact as a resource to build a long-term relationship and a "partnership" to navigate through the Safety Review Board processes and to assist with future meetings. It is likely that, if Safety Review Board meetings are required, there will be multiple Review Board meetings throughout the program's lifecycle. Once the program determines if the Safety Review Board



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is required, then the program should move to the next step of the process.

An item to note at this point is some programs may feel that Safety Review Boards are “schedule wickets,” adding additional bureaucracy to an already complex acquisition process and/or are unnecessary and cost the program in schedule, labor and travel. However, if the program has established a sound safety program and approach, generating the necessary safety artifacts to build a sufficient risk assessment should already be performed, in process, or as a minimum, documented as a plan. Programs that have difficulties with Safety Review Boards are those that may not have a well-established safety program, or do not have the resources and/or personnel with the appropriate experience to perform the needed safety tasks. Each program is unique and no single safety program can fit the needs of all programs. The Safety Review Board process will assist programs by ensuring the safety program is properly defined and tailored based on the system complexity, program schedule, and if there are any formal requirements associated with the acquisition process such as if the program is a Rapid Deployment Capability (RDC) or is associated with an Urgent Operational Needs Statement (UONS).

The initial key to a successful Safety Review Board is to have a well-established Safety Program, or if early in the program’s lifecycle, a well-established safety program that is documented in a formal safety plan, such as the System Safety Program Plan (SSPP), and one that has been officially approved. Additionally, depending on the organization of the program and roles of the design agent and their subcontractors, a beneficial document is the System Safety Management Plan (SSMP), which is typically documented by the government safety team and

outlines the roles and responsibilities for all parties involved in the safety program and also provides the safety program hierarchy between the SSMP and SSPP. In some cases, a program may have multiple elements or contributors to the overarching safety program, so multiple SSPPs may be required and the SSMP should describe their interrelationships.

### **Determine When to Have a Review Board Meeting**

Determining the proper time to schedule a Safety Review Board meeting at the appropriate time in the program’s schedule may be difficult. Having a meeting to request concurrence with the safety program one week prior to Critical Design Review (CDR) is too late. Scheduling a meeting to request concurrence with a test event before the test event plan has been drafted is too early to assess and present the safety risk associated with the test event. So, it is important to find the right balance on when to schedule the Safety Review Board meeting, and it is dependent on the purpose of the meeting plus the point of the Program during its acquisition lifecycle.

Typically, the policies and instructions associated with the Safety Review Boards provide direction on when to schedule the Safety Review Board meetings. For example, Reference 1, enclosure (3) provides a sample safety program with various WSESRB review milestones that align with program acquisition milestones. An example safety program schedule with WSESRB reviews is shown in Figure 1.

Safety Review Boards are required before equipment fielding and operational use. To maximize effectiveness of this process, programs may schedule these reviews in conjunction with: Post Milestone A, Prelimi-

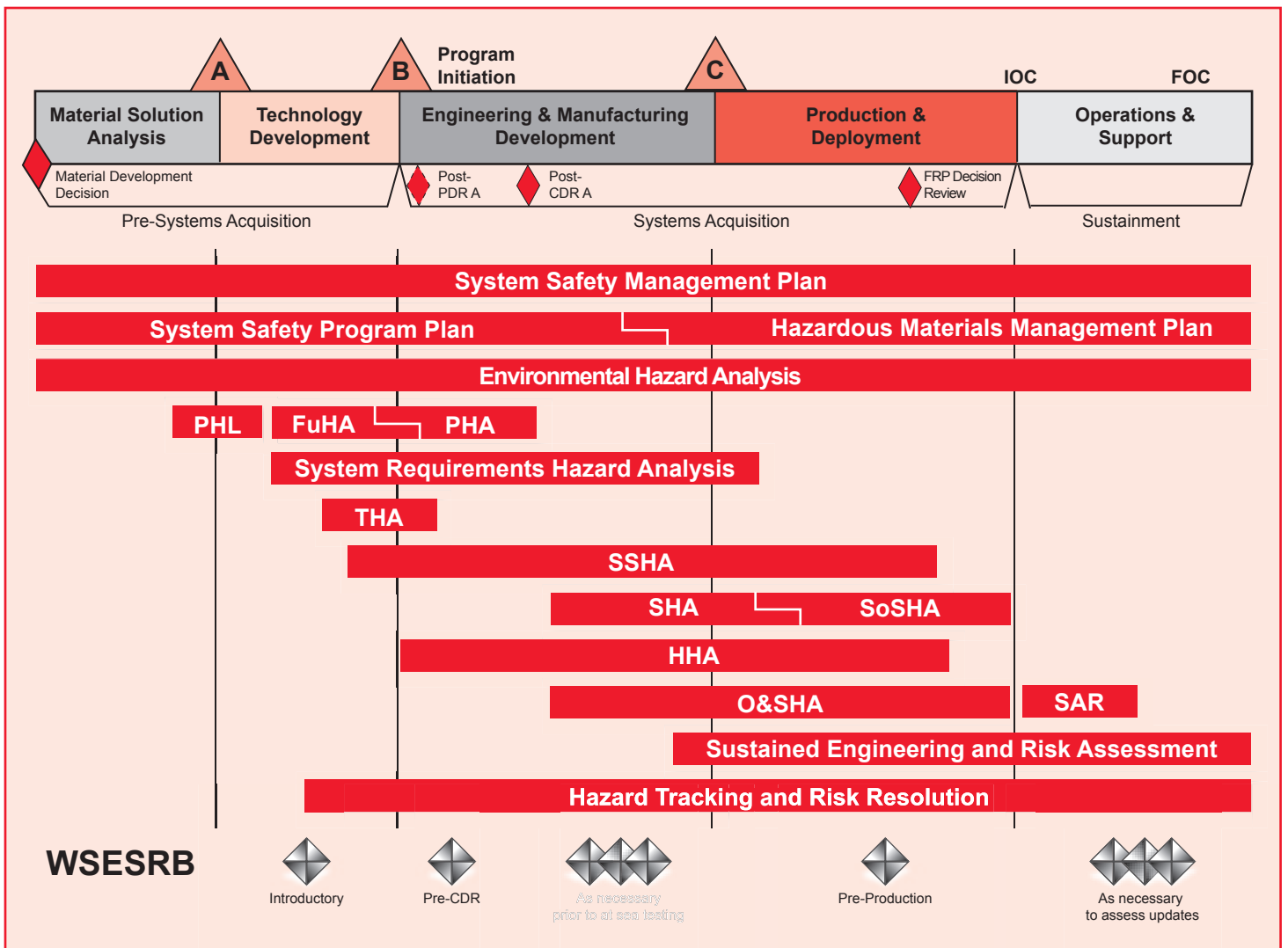


Figure 1 — Sample Weapon System Safety Program and WSESRB Meetings During the Acquisition Process.

nary Design Review (PDR), Milestone B, Critical Design Review (CDR), Milestone C, flight testing, shipboard testing, user testing, including early user assessments or evaluation, and any other event in which the user will be involved, Full Rate Production (FRP) Decision, and product improvements or engineering change proposal implementation that affects the safety of the system. MIL-STD-882E [Ref. 4] tasks can be selectively applied to accommodate a tailored system safety effort.

It is also important to note whether there are sub-panel reviews associated with the Safety Review Board. For example, for the Navy's WSESRB, there are currently two panels, the Software Systems Safety Technical Review Panel (SSSTRP) and the Fuze and Initiation System Technical Review Panel (FISTRP). These panel reviews are typically scheduled before the formal Safety Review Board in order for draft findings associated with the software or fuze and explosive train to be provided to the program prior to the formal Safety Review Board meeting. Otherwise, the Safety Review Board will likely assign a finding to the program to schedule and conduct

panel reviews prior to providing concurrence with the program's request. The panels typically include a smaller panel size and allow a more in-depth focus on the panel's interest area (software and fuze design in this case), and the Safety Review Board relies on the subpanels to provide an in-depth review of the interest areas and these areas are not reviewed in detail at the Safety Review Board meeting. The Panels also tend to be full-day reviews, whereas the Safety Review Board meetings are half-day reviews, unless the program specifically requests a full-day WSESRB review.

### Develop the TDP

The Safety Review Board process requires that the program develop and submit a TDP that includes all of the safety artifacts related to the purpose of the Safety Review meeting. Reference 1 provides detailed guidance for the contents of a TDP for the WSESRB. The TDP needs to be submitted and accepted prior to scheduling a WSESRB and/or SSSTRP review meeting date. This is required to ensure the program has suf-

ficient data and safety analytical artifacts available to allow the WSESRB to render a decision for the meeting's purpose. Note that the term "TDP" may be called differently across Safety Review Boards. For example, the JSWSR refers to this document as the Safety Data Package (SDP) and the U.S. Air Force's Non-nuclear Munitions Safety Board (NNMSB) refers to this document as the Technical Munitions Safety Study (TMSS). Regardless, the TDP submittal should include all of the Objective Quality Evidence (OQE), a common term used to represent all of the safety artifacts and documents within the TDP, which provides the rationale and data to support the main purpose of the review. The TDP should be clear and have a consistent meeting purpose and theme between the Safety Board request letter, TDP, and presentation. The program should include all safety artifacts and documents to support the safety risk assessment. The OQE should provide the data and engineering rationale to show the determination of the safety risk assessment. The Safety Review Board members should be able to follow along with the information provided as OQE and should be able to draw the same conclusions as the safety program with respect to understanding the hazard determination, risk assessment and status of the safety program. As stated earlier, the TDP should also provide traceability to the Safety Review Board process requirements. This quickly shows the Safety Review Board members which TDP sections address which Safety Review Board process requirements, and provides confidence to the Safety Review Board members that the program understands the Safety Review Board process.

If the program is requesting concurrence with the safety program, then the TDP should include the System Safety Program Plan (SSPP). Ideally, the SSPP should integrate with the government's SSPP and should be formally approved and signed by the program manager. If the program is requesting concurrence with a test event, then the TDP should include the Test Event Test Plan and a Safety Assessment Report (SAR) to assess the safety risk associated with the Test Event.

The TDP should not be a "data dump" of numerous safety artifacts poorly organized on a CD-ROM or DoD SAFE file transfer (e.g., random files and file names with no sense of order or flow to the artifacts referenced in the TDP) that may apply to the purpose of the review. The TDP should be a clear consolidation of artifacts that provides a safety case for the meeting's purpose and overall goal. In some cases, the program could include a "read me first" file or TDP roadmap to further describe the TDP organization and purpose of numerous files attached with the TDP. Effective TDPs clearly state the meeting's purpose and provide a sufficient level of detail in the main

body of the TDP with the Safety Program's interpretation of the results, and references the more detailed analytical artifacts, program plans, test plans and reports, etc. as appendices in the TDP.

The TDP should also provide a roll up of the safety hazards, top-level mishaps and safety risks. Effective TDPs also provide the program's recommendations to the Safety Board. This is the opportunity for the program to articulate their anticipated actions or findings from the upcoming Safety Review. The program and safety representative know their own program better than anyone else, including the Safety Review Board members, and the TDP should recommend any remaining actions the Safety Program needs to perform to adequately assess the safety risk.

The TDP should provide a thorough status and summary of previous open findings from past Safety Board reviews. The TDP should also make it easy for Safety Review Board members to understand the Program's Safety Board review history. Consider that the Safety Board members are involved with numerous reviews of various systems and attend numerous meetings besides the current Safety Review Board meeting. The Safety Review Board members will likely require a refresher of the findings that were provided at the previous reviews. Focus on the findings that are currently open, and focus on what impact these open findings have for the purpose of the current review. For example, if the current review is to request concurrence to perform a test, then assess the test risk associated with each finding that is open and provide sufficient rationale for this assessment. Note that some open findings may not be applicable for the test, and if this is the case, simply provide the rationale for this assessment. Safety Boards do not want to assign duplicate findings, so informing the Safety Boards of previous open findings and their relevance to the meeting's purpose is important.

Related to findings, "old" open findings are considered red flags for the Safety Review Board members and may initiate questions and concerns about the efficiencies of the safety program. Open findings that are several years old, or even older — perhaps five years or more — are an indication that the safety program is either unresponsive, is having difficulties establishing a consistent safety program which may include insufficient or sporadic safety program funding or changes to safety staff, or may not be responsive due to management or leadership decisions. Rationale for having old findings in an open status should be clearly articulated, and it is recommended to close "old" findings prior to the TDP submittal, if possible.

The TDP should also maintain consistency with the program name, including software build nomenclature.

Having an inconsistent program name between the TDP and other safety artifacts (and eventually the presentation file) makes it confusing for Safety Review Board members, particularly if the program has presented to the Safety Review Board in the past under a different name. Changing of the program's name may be a necessity, and if this is the case, the program should clearly articulate the reason for the name change and include a history of all of the names and when previous reviews occurred. The program can include a "decoder ring" in the TDP, if necessary, as a quick reference for the names associated with it. Related to software, as programs are becoming more software intensive, build descriptions and nomenclatures due to configuration management are becoming more complex, and in some cases, the build numbers themselves provide information about the software including its functionality and applicability to the program. However, these complexities make it difficult for those outside of the program (Safety Review Board members in this case) to understand and follow. Providing the Safety Review Board members a build nomenclature description in the TDP is useful and allows a quick reference to guide the Board members during the TDP review.

The TDP should not focus on what was fixed, but should focus on what is still open and unresolved. The TDP should assess and document the safety risk associated with the open issues. For example, don't focus the TDP on the Software Trouble Reports (STRs) that have been addressed. These are issues that have been resolved and should no longer pose safety risk to the program. Focus on the open STRs that are safety significant, and assess their safety risk to the program. Document if there are any work-arounds and limitations associated with the open STRs, and also specify how this information is communicated and trained to the end users. In addition, for all reviews (except an introductory type of review) the TDP should focus on the key results of the safety effort to date. This includes, but is not limited to, new hazards, new causal factors, key "safety watch items" and new mitigations recommended and their implementation/verification status. The TDP should summarize safety significant testing, including explosives qualification testing, performed to date and should summarize the results of the testing and if any safety

anomalies occurred. Including this information demonstrates that the Safety Team is managing and executing an effective, influential Safety Program.

During the development of the TDP, collaborate ahead of time. The safety lead (e.g., Principal for Safety (PFS), safety engineer, or safety practitioner, etc.) will likely be responsible for the development and coordination of the TDP. Use the Safety Review Board policies and guidance to develop the TDP outline. Include

board members (in some cases, the program may be assigned a board member point of contact) as part of the program's System Safety Working Group (SSWG) meetings, and dedicate a SSWG meeting agenda to develop the Safety Review Board TDP. Also, the safety lead should ensure that the program manager is part of the TDP development, and the program manager should also be included in the TDP approval process. A formally signed and approved TDP from the program manager is an indication that the safety lead is integrated with the program, and that the information provided in the TDP is approved by the program manager. In addition, the safety lead should ensure other program representa-

tives are part of the TDP development process. The safety lead should coordinate with program subject matter experts (e.g., design engineers, software developers, test directors, etc.) early and often during the TDP development process. It takes a team effort to consolidate all of the necessary safety artifacts to build and document the TDP to ultimately justify the safety case of the program's Safety Review Board purpose and request.

Lastly, consider that the TDP files will be accessible by the Safety Review Board members during the meeting. It is common for the board members to search through the TDP during the review meeting to discuss a safety artifact, risk assessment, test result, etc., so the program should also be prepared in the same manner and should have readily available access to all TDP artifacts during the meeting. The TDP text should be searchable (e.g., using a Ctrl-F "find" function). If the TDP is a scanned image and not searchable, it limits the Safety Board members' ability to navigate through the TDP and search for key items. The TDP text should also be capable of being copied and pasted. This allows the Safety Board to utilize the TDP for development of the draft findings and response letters, and helps ensure accuracy of the

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program name, build nomenclature and/or detailed meeting purposes. The TDP is also an effective document, and potentially a deliverable required by contract, for the program that may be used as a resource, and having text that is searchable and able to be copied is beneficial for the program as well.

In summary, the following are focus areas of the WSESRB TDP:

- Purpose of review — Describe exactly what the program is requesting from this review.
- Previous WSESRBs — Summarize previous WSESRB, FISTRP and SSSTRP history, include any joint reviews, and describe any important open findings from those reviews.
- Program Overview — List lead service, prime contractor and other major players in program; identify current program acquisition lifecycle phase.
- System Description — Describe the function of system; include the intended platform(s) (aircraft type, ship class); describe any other major systems with which the program interacts; and describe major components of item, including any launchers, racks, containers, test sets, other support equipment, etc.
- Summarize any changes to the program since last WSESRB review – Describe any major function changes or platform changes and any changes that involve safety.
- Special WSESRB considerations — Describe anything major the Safety Review Board needs to consider during the review (e.g., known purview limitations such as safety program scope).
- System Safety Program — List safety analyses completed to date, safety analyses planned but not completed and safety analyses that are not planned but may be needed. Note that the WSESRB will assess if there are any concerns regarding safety analyses results and methods utilized to characterize safety risk.
- Describe the status of the risks in a Hazard Risk Index Matrix and summarize the hazard acceptance processes. List any serious/high hazards currently carried by the program and any known plans for mitigation.
- Summarize any major safety areas for Navy systems such as Fuzes and Initiation devices; Software; Insensitive Munitions (IM)/hazard classification; Final Type Qualification; 40-foot drop test/analysis results; Shipboard Shock; Electromagnetic Environmental Effects (E3) (Hazards of Electromagnetic Radiation to Ordnance (HERO)/Electrostatic Discharge (ESD)/Electromagnetic Interference (EMI)); Shipboard Suitability; Human System Integration (HSI); Safe Separation and safe escape; battery qual-

ification/certifications; laser qualification/certifications; Ordnance Assessment plans; Demilitarization and Disposal; Explosive Ordnance Disposal (EOD); container qualifications or other packaging; and training/maintenance procedures/manual updates.

- Include a summary of concerns, summary of the current and projected safety risks, conclusions and provide any recommendations to the Safety Review Board.

### **Develop the Presentation**

Reference 1 also describes the requirements associated with a formal WSESRB review presentation. If a succinct TDP has been documented, the development of the presentation should be straightforward. The materials to be presented should be consistent with the TDP. If there are differences, the program should state why there are differences, what changed the analyses or assessments and what impact occurred, if any, to the safety risk assessment compared to the TDP's original assessment. The TDPs are required to be submitted weeks prior to the meeting in accordance with Reference 1, and it is common for changes or updates to be provided at the meeting that were not included in the TDP. The program should be prepared to disclose these differences and provide the rationale behind these changes. While changes are common, do not submit multiple versions of the presentation or revise the presentation the day of the meeting. The Safety Review Board needs time to review the materials and prepare for the meeting before the occurrence of the meeting. Providing multiple versions of the presentation will frustrate the Board Members and may require discussing the changes during the formal review meeting rather than focusing on the purpose of the review.

Similar to the TDP, the safety lead will likely be assigned as the coordinator of the presentation. Also similar to the TDP, the safety lead should solicit assistance from the program representatives, including the program manager, to provide the necessary data in the presentation. Meeting expectations should also be established prior to the meeting and during the development of the presentation, if not sooner. The safety lead should let the program manager and other representatives know that completing the Safety Board Review with a concurrence and no findings or actions is unlikely.

A consideration during the presentation development is to place the safety section up front in the brief. The reviews are focused on safety, therefore the presentation should not spend a majority of the meeting describing the system description, configuration management process, previous test events, etc., then summarize the safety program and processes, safety hazards and risk assessment at the end of the presentation. These other

“non-safety” items are important and establish a foundation for the safety board’s understanding of the system and processes involved with different aspects of the program; however, the meeting purpose is a Safety Board review, and the board members are most interested in the safety program.

The presentation should provide a thorough status and summary of previous findings and Safety Board reviews. Similar to the TDP, make the presentation easy for Safety Board members to understand the program’s review history. The board members probably will not spend significant time reviewing previous findings during the meeting, but it is useful for the Safety Board members to receive a refresher of the findings that were provided at the previous reviews. Focus the presentation on the findings that are currently open, and focus on what impact these findings have for the purpose of the presentation. The Safety Boards do not want to provide duplicate findings, so informing the Safety Boards of previous open findings is important. Again, similar to the TDP, “old” open findings that are several years old are considered red flags for programs. The program should work diligently to close old findings prior to the review meeting, or have sufficient rationale for having the findings in an open status.

Consistency with the program name, including software build nomenclature, is recommended, in particular having consistency between the TDP and presentation. An inconsistent program name makes it confusing for Safety Board members, particularly if the program changed the name since the TDP submittal, or has presented to the Safety Board in the past under a different name. The program should include a “decoder ring” as handouts during the review meeting, if necessary, as a quick reference for the names associated with the program. This will guide the Board members during the meeting discussion if there have been program name and/or software nomenclature changes.

Like the TDP, the presentation should not focus on what was fixed, but should focus on what is still open or unresolved. Assess the safety risk associated with the open issues and clearly articulate this in the presentation. It is also useful to describe the process used to determine the safety significance of trouble reports or anomalies. The program should have a well-defined process that

uses safety analytical artifacts to justify if a trouble report is safety significant. The program should not state that someone from Safety reviewed a trouble report and it seemed like it was safety related. The process should be more formalized and should trace to a safety artifact that provides the rationale for its safety tagging. Again, like the TDP, for all reviews (except an introductory type of review) the presentation should focus on the key results

of the safety effort, to include safety test results to date. This includes, but is not limited to, new hazards, new causal factors, key “safety watch items,” safety significant test results and new mitigations recommended and their implementation/verification status. Presenting this information demonstrates that the Safety Team is managing and executing an effective, influential safety program.

To allow the board members to easily follow the flow of the presentation, include an agenda slide that summarizes the main sections of the presentation and the time allocation associated with each section.

Schedule five-to-10 minute breaks at appropriate points in

the presentation as a guide for the Safety Review Board Chair, who will usually decide when there is an appropriate transition during the presentation for a break. In addition, have sequential numbering of all slides. If possible, include all slides in a single file, and the slides should be text searchable. This allows the safety board members to quickly search through the presentation file for key items, and also allows the board members to refer to certain content and slide numbers as part of a discussion topic or question. This also allows telecon attendees to follow along by having sequential slide numbers. The Safety Board understands that large presentations may require input from numerous entities, but having numerous presentation files with redundant slide numbers makes referencing confusing during the meeting as well as during the post meeting caucus.

Once the presentation is near a final draft and before the presentation “hits the presses” for finalization and printing (if required), perform a dry-run meeting to simulate the Safety Review Board. The dry run, usually held about one week prior to the review meeting, will determine if the flow of the presentation is sufficient, will provide an idea if the presentation is too lengthy or too short, and will help determine if the safety story is

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effectively portrayed to reflect the program's request. The review is usually a half day, with a nominal briefing time of two hours. Usually, 65 slides are the limit for a two-hour safety review and should be used as a benchmark for slide count. Similar to other steps in Review Board process, collaborate ahead of time. Include board members or a board member point of contact as part of the dry-run presentation. The board member(s) may not be able to fully participate in the dry-run presentation; however, early and upfront collaboration with the Safety Review Board member(s) does provide the program an advantage because both parties should not be "surprised" during a Safety Review Board meeting. Items of concern or elevated safety risk areas should already be known and communicated. During the dry runs, keep track of presenter times and ensure the pace sufficiently meets the two-hour time limit. Be sure to build in time for Board questions during the presentation.

Don't go to a review board without performing a dry-run presentation. Having ill-prepared presenters will make the Safety Review Board meeting unsuccessful and will likely lead to numerous questions and actions/findings. Including a day or two for a dry-run presentation in the overall review schedule plan (typically about one week prior to the actual meeting) will help the presenters further prepare for the Safety Review Board and will also help anticipate the types of questions that may be asked during the formal review. It is important to include a representative audience at the dry-run presentation who can challenge the presenters with questions and comments similar to the actual Safety Review Board. Also, have the program manager attend the dry run so they can be exposed to the content of the presentation and also the types of questions that may be asked. Having a program manager who understands their system safety responsibility, is knowledgeable about the safety processes, and is genuinely concerned about system safety also significantly improves the likelihood of having a successful presentation. Program managers who are the first to answer questions honestly and respectfully show they have a strong understanding of their role in the safety of their system and of their responsibility to integrate safety risk management into the overall systems engineering process for all engineering activities throughout the system's life cycle [Ref. 5].

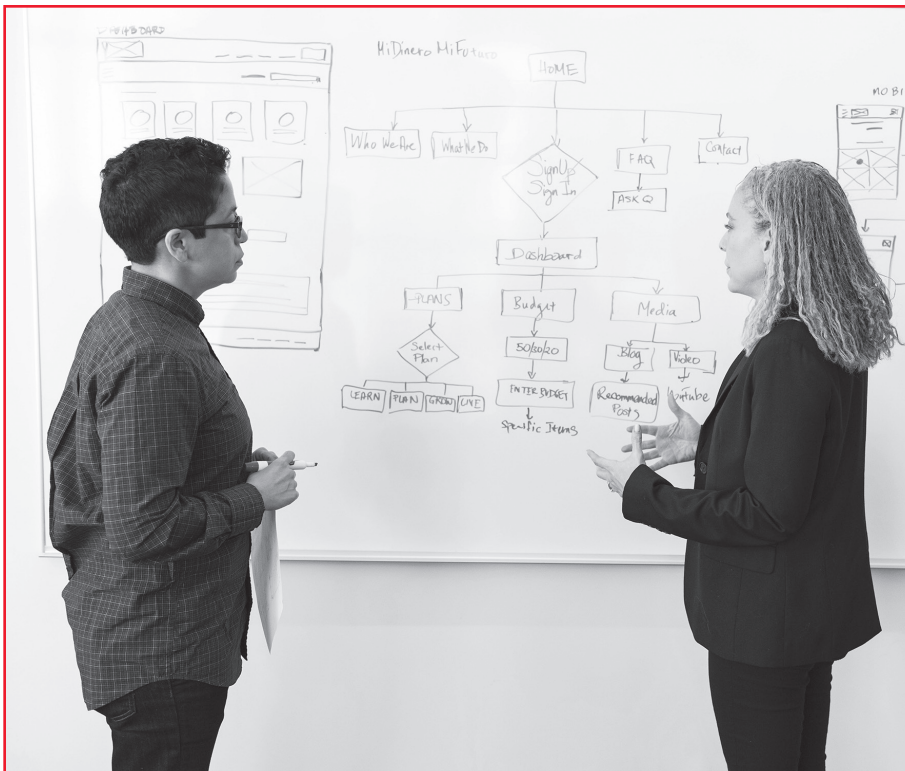
### **Hold the Review Board Meeting**

So, all of this planning, preparation, coordination, collaboration, and hard work has finally led to the day of the formal review presentation. Program representatives should again be reminded of meeting expectations. Attendees should know the basics of what to expect, including the duration of the meeting, what happens during the pre-brief and post meeting caucus, who is presenting and

what topics are they discussing, who is considered the subject matter expert for particular design and program functional areas and are they present to address potential questions, and should understand the timing and triggers associated with when to address questions or take action for findings. In addition, if some program attendees will be attending via telecon (assuming face-to-face WSESRB reviews resume after COVID-19 limitations are lifted) ensure they have the telecon dial-in information and a website link if a webinar-type online meeting (e.g., Defense Collaboration Services (DCS)) will be performed. If the remote attendees are only attending via audio, ensure the telecon attendees are provided the presentation file(s) ahead of time. Scrambling around the morning of the meeting to gather email addresses, obtaining an internet connection and sending files (encrypted in some cases) is not a good use of time prior to the meeting commencing.

The program representatives and safety lead should be very knowledgeable about the system, and should be able to prove this during the Safety Board meeting. For example, a program's PFS briefed the entire program presentation to the WSESRB. This showed that the PFS was intimately familiar with the program. Having this in-depth knowledge of the program indicated that the PFS was deeply involved with the program and had the necessary design knowledge and foundation to perform detailed, in-depth safety assessments to identify and quantify safety risks to the best extent possible. The inverse of this — having a PFS or safety lead appear hesitant at addressing questions related to the system design or appear uncomfortable while presenting the design details — will reduce the Safety Review Board's confidence regarding the competency of the PFS and their ability to fully assess a system that they may not fully understand. In addition, the appropriate subject matter experts (SMEs) from the program should attend the Safety Review Board in the event the presenters are unable to clearly respond to questions from the Board. It is acceptable for the presenter to defer a question to a more knowledgeable program representative that is supporting the meeting; however, it is imperative that the right personnel are supporting the meeting. Otherwise a finding will likely be assigned to provide the appropriate data to address the question.

During the Safety Review Board meeting, questions should be answered openly and honestly. If a question cannot be addressed by either the presenter or participating SMEs, the presenter should simply state that the program will take an action or finding to properly gather the information to address the question. Trying to answer the question without having the appropriate data becomes obvious to the Board members and this may cause a loss of trust between the board and program representatives, and may also lead to more questions and actions or findings.



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The presentation discussion should not focus on what was fixed, but should focus on what is still open or unresolved. Present the processes used and rationale to assess the safety risk associated with the open issues. Focus on the unresolved safety anomalies, such as open trouble reports or STRs that are safety significant, and assess their safety risk to the program.

After the presentation has been provided, assume that the Safety Review Board will caucus for a period of time to develop any draft actions, findings or recommendations. The nominal caucus time for the WSESRB is between 30 to 60 minutes. The Safety Review Board may invite the safety lead and other government program safety representatives to remain with the Safety Review Board during this discussion. This is not an opportunity for the safety lead to argue potential findings, but to allow the safety lead to understand the rationale behind the potential findings, assist the Safety Review Board with any clarifications that may be required, and communicate any of their concerns or requests for formal findings. Once the caucus has concluded and findings have been drafted, the WSESRB will provide the draft findings to the PFS to disseminate to all program attendees. Formal findings are provided after the meeting via a formal correspondence letter between the Safety Review Board and Program Office. The timeframe for this correspondence is dependent on the Safety Review Board policies and guidance.

### Perform Post-Meeting Activities

The safety lead should follow up with the Safety Review Board to receive an indication of when the formal

correspondence letter will be provided to the Program Office. The findings are usually the same or very similar to the draft findings provided at the review, so the safety lead should start the process of assigning program resources to address the findings and provide responses and/or artifacts to address the findings. Depending on how the findings were provided and sectioned in the formal correspondence letter, the program may need to address a set of findings prior to receiving a specific concurrence. Other findings may be provided that should be addressed at the later date, such as prior to system deployment or other major program milestones. Regardless, the program will likely need to document a formal correspondence letter to the Review Board within a certain timeframe since the meeting to summarize the processes or actions taken or planned to address the findings. The program should maintain the momentum of the safety program after the Review Meeting and ensure post-meeting activities are addressed and correspondences with the Safety Boards are maintained within any timeline requirements associated with the Safety Board.

### Track Current and Previous Findings

The program should maintain a findings tracking system to track the current and previous findings assigned at the Safety Review Board Meetings. This could be as simple as a spreadsheet file or a more elaborate database system. As long as the program has a mechanism to track the findings and maintain a correspondence log for each finding (such as when a request for closure was submitted and the response(s) from the Safety Review Board on the clo-

sure requests, to include the formal correspondence letter serial number and issuance date), this should be a sufficient tool to ensure findings are properly resolved and eventually closed. The Safety Review Board maintains their own findings tracking tool, but it is a program responsibility to track their own findings and the program should be able to quickly provide a disposition of their findings if required throughout the program's lifecycle. Again, tracking findings and their formal closure statuses via formal correspondence letter serial numbers and issuance dates is important because these letters provide the formal documentation of the decisions made between the programs and the Safety Review Board.

### **Maintain Review Board Correspondences and Dialog**

After the meeting and findings response letters or formal correspondences, it is still recommended to maintain dialog with the Safety Review Board. This minimizes surprises and ultimately helps reduce safety risk, as well as programmatic risk, by maintaining interaction with the Safety Review Boards. Simple ways to maintain the interaction is to continue to invite the Safety Review Board member to the program's System Safety Working Group (SSWG) meetings, schedule and conduct technical assistance (Tech Assist) meetings which are informal with no findings but Safety Review Board guidance is provided, continue to address findings and request closure of findings until all findings have been closed, and for requests that do not require a formal review meeting, submit Letter Data Packages (LDPs) to request a particular concurrence associated with the Safety Program. Maintaining this dialog will keep the program and Safety Review Board on the same page with respect to program developments, changes, test results, etc. that may impact the safety risk assessments and safety processes presented at previous reviews.

### **Conclusion**

Preparing and presenting to an Independent Safety Review Board is no easy or straightforward task. This paper provides guidance for how to prepare for and conduct a successful safety review and highlights what programs should do, and should *not* do, to have a successful safety review board meeting, with focus based on experiences supporting WSESRB and SSSTRP reviews. The goal for

a successful review board meeting is to ensure the safety program processes and analytical artifacts are adequate and well-established to properly assess safety risks for the personnel, equipment, and environment that will be exposed to potential hazards during the system's lifecycle. Everyone involved with the Safety Review Board process, including all program representatives and board members, should agree with this goal to ensure the safety of those exposed to the potential hazards and risks. All programs are unique in their own ways, and therefore all safety programs are unique too. Safety Review Boards between the U.S. DoD, industries and other agencies or governments are also unique in their own ways. Programs should be aware of the Safety Review Board policies and guidance that apply to their program, and it is imperative that the safety programs are fully aware of these requirements and collaborate early and often with the Safety Review Boards to ensure program success. Programs should not consider the number of actions or findings provided by a Safety Review Board as being directly related to the success of their safety program. Ensuring the safety program is sufficiently structured and safety risk can be or is properly identified and assessed prior to exposing end users, the equipment, and the environment to potential hazards are the underlying purposes for conducting Safety Review Board meetings, and thus leads to a successful safety program.

### **About the Author**

Robert E. Smith, CSP, has 25 years of system safety experience and has supported a wide variety of DoD ordnance and weapon systems. Currently he works in Arlington, VA and supports the Navy Weapon System Explosives Safety Review Board (WSESRB) and Software Systems Safety Technical Review Panel (SSSTRP). While at Booz Allen, Smith has also provided programmatic safety engineering support to a Navy gun system program, underwater countermeasures programs, and fuze projects. In addition, he provided safety policy oversight to the Office of Secretary of Defense (OSD) including coordinating the revision and release of MIL-STD-882E. Prior to Booz Allen, he was the system safety lead for the Marine Corps' Expeditionary Fighting Vehicle and MK 46 Gun Weapon System. He holds a BS in Mechanical Engineering from Virginia Tech and has been a Certified Safety Professional since 2007. ●

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