Department of Defense Explosives Safety Board (DDESB)

Explosives Safety and Munitions Risk Management (ESMRM) Assessment Process

August 2018

Training Session Objectives

- Educate symposium on DDESB roles, functions, resident expertise, and support capabilities
- Provide insight into current DoD Explosives Safety Munitions Risk Management (ESMRM) policy
- Educate participants on the ESMRM Assessment process
- Gain forum participants perspective on explosives safety and risk management
- Serve as exchange venue for explosives safety best practices; trends; procedures; and lessons learned for applicability within and across forum participants

Training Session Agenda

- Intro Brief
- ESMRM Policy
- Technical Paper 23 Overview
- **ESMRM Assessment Process**
- ESMRM Assessment Examples
- ESS risk based capabilities in ESS 6.1.4

ESMRM Assessment Process Agenda

- ESMRM Assessment Purpose
- ESMRM Assessment Triggers
- Deviating from Explosives Safety Standards
- Application of ESMRM Principles
- 9-Step ESMRM Assessment Process Overview
  1. Initiation
  2. Scope
  3. Coordination & Info Gathering
  4. Pre-Assessment Analysis
  5. On-Site Assessment
  6. Draft Report Generation
  7. Report Coordination & 8. Finalization
  9. Lessons Learned & Info Management
- CCDR Risk Decision
- Risk Tracking and Validation

ESMRM Assessment Purpose

- To identify, analyze, and reduce munitions-related risks in support of DoD explosives safety policy tenets:
  - To protect personnel and property from the potentially-damaging effects of DoD military munitions
  - To expose the minimum number of people for the minimum time to the minimum amount of DoD military munitions required to safely and effectively execute the mission
- Explosives safety is a critical function where the Combatant Commander (CCDR) can influence decisions relating to identifying and reducing munitions-related risks
- Planning for risks and potential consequences from the unintended initiation of DoD military munitions, procedures, and processes provides commanders the necessary information needed to make informed risk decisions based on ESMRM principles and contributes to mission success

The foundational premise of ESMRM involves upfront identification and clear communication, to the appropriate level of command, of the risks and consequences to and from DoD military munitions during all phases of military planning, training, and operations

ESMRM Assessment Triggers

- When explosives safety requirements cannot be met and a deviation from standards is required
- In support of the non-conforming portion of a Hybrid Safety Submission
- In support of munitions operations at locations where DoD military munitions will be, or are forecasted to be, in support of operational requirements such as:
  - Main Operating Bases (MOBs)
  - Forward Operating Sites (FOSs)
  - Cooperative Security Locations (CSLs)
  - Exercise operating locations
  - Contingency operating locations
  - Sea and Aerial Ports of Embarkation/Debarkation (SPODs/APODs)
  - En route infrastructure support facilities

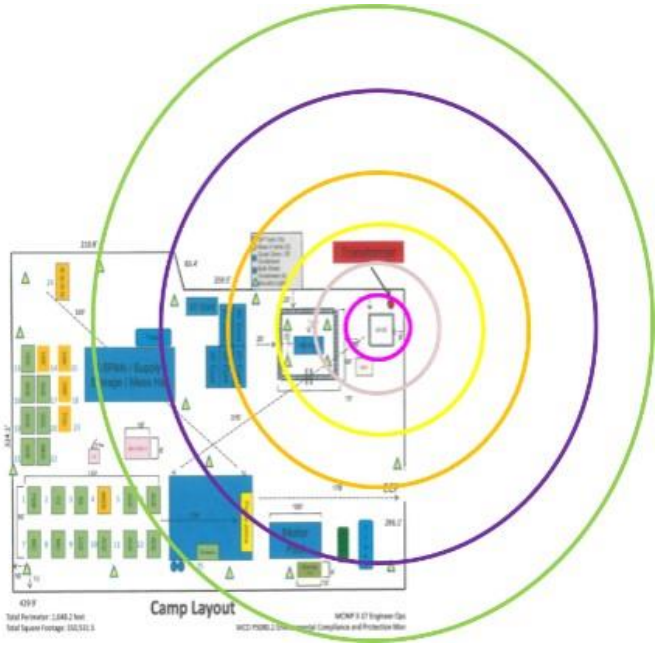
Deviating from Explosives Safety Standards

- When ESMRM requirements cannot be met, DoD Components may accept risk greater than afforded by the minimum explosives safety standards when:
  - Required by strategic or compelling operational necessity
  - Acceptance is supported by a written risk assessment
  - An informed risk decision is made at the appropriate level within the chain of command
- Such deviations from standards should include:
  - A statement of operational necessity
  - Identification of potential risks to personnel and property
  - An analysis of the potential consequences to personnel and property – Including: **potential number of fatalities**, **injuries**, and **infrastructure damage estimates**
  - A corrective action plan to reduce identified risks
  - A risk decision supported by documented analysis of the potential consequences that acknowledges and accepts the risk to personnel, property, and mission

The goal of ESMRM is to increase, from an explosives safety perspective, DoD knowledge of munitions-related risks to aid in the decision-making process.

Application of ESMRM Principles

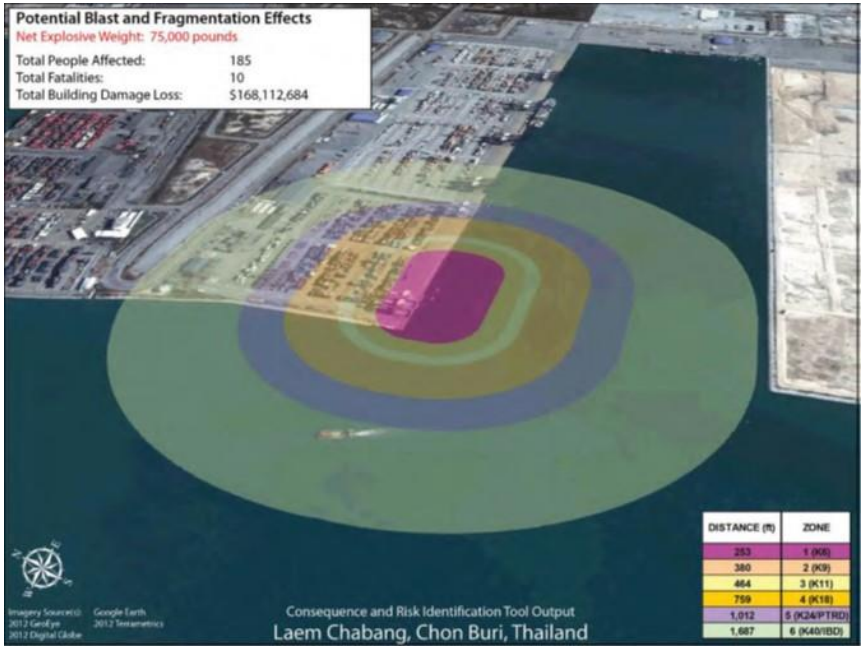
- Planning. The greatest opportunity to identify and reduce risks from munitions is during the planning process.
  - All operational, contingency, and training plans that involving munitions should include an ESMRM assessment early in the planning process to identify risks and develop courses of action (COA) to reduce risks and minimize the introduction of unnecessary munitions related risks
  - CCDRs or their delegates **may** need to make a risk decision if residual risks remain after developing risk reducing COAs



Map of an operating location with explosives arcs encumbering on-base facilities and personnel

Application of ESMRM Principles

- Logistics Nodes. Implementing munitions-related risk reduction actions at logistic nodes, particularly at commercial facilities, poses unique challenges to mission planners
  - Munitions-related risks are often difficult to reduce at:
    - ✓ APODs
    - ✓ SPODs
    - ✓ Railheads
  - ESMRM assessments are required to quantify potential consequences to personnel and property
  - CCDRs or their delegates **will** need to make a risk decision for munitions-related risks



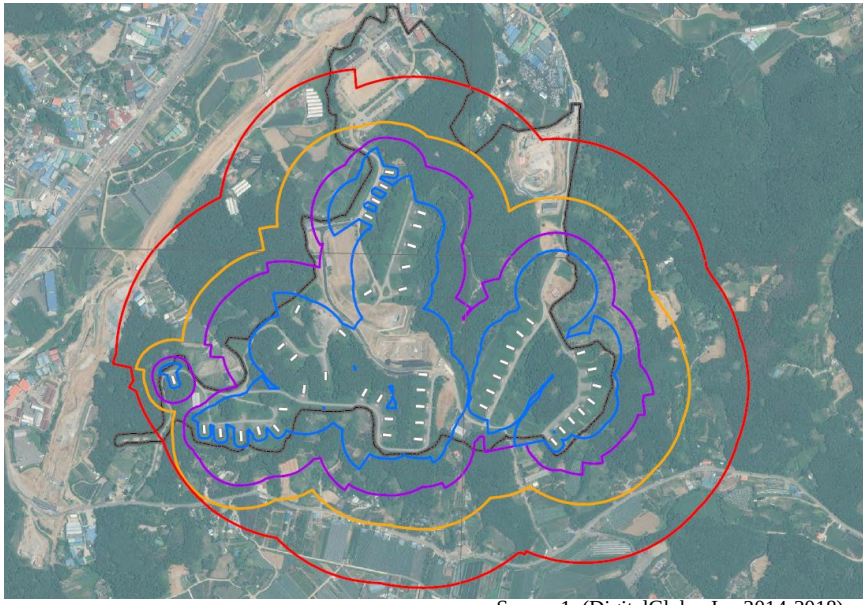
Source 1. (DigitalGlobe, Inc 2014-2018)

Aerial photograph of a SPOD with overlay of explosives arcs from ship carrying military munitions encumbering port infrastructure and civilians

1. Source: DigitalGlobe, Inc. National Geospatial-Intelligence Agency EnhancedView Web Hosting Service. 2014-2018. https://evwhs.digitalglobe.com/myDigitalGlobe (accessed 2017-2018). – Modified by DDESB

Application of ESMRM Principles

- Established munitions operating locations. The ESMRM process supports the identification and analysis munitions related risks:
  - Non-conforming portions of Hybrid Site Plans
  - Temporary munitions operating locations
  - Joint/Multi-national operations
- Depending on the amount of time before the operation, munitions-related risks should be identified and reduced during planning to the extent possible
  - CCDR or their delegate **will likely** have to make a risk decision for residual risks that cannot be eliminated

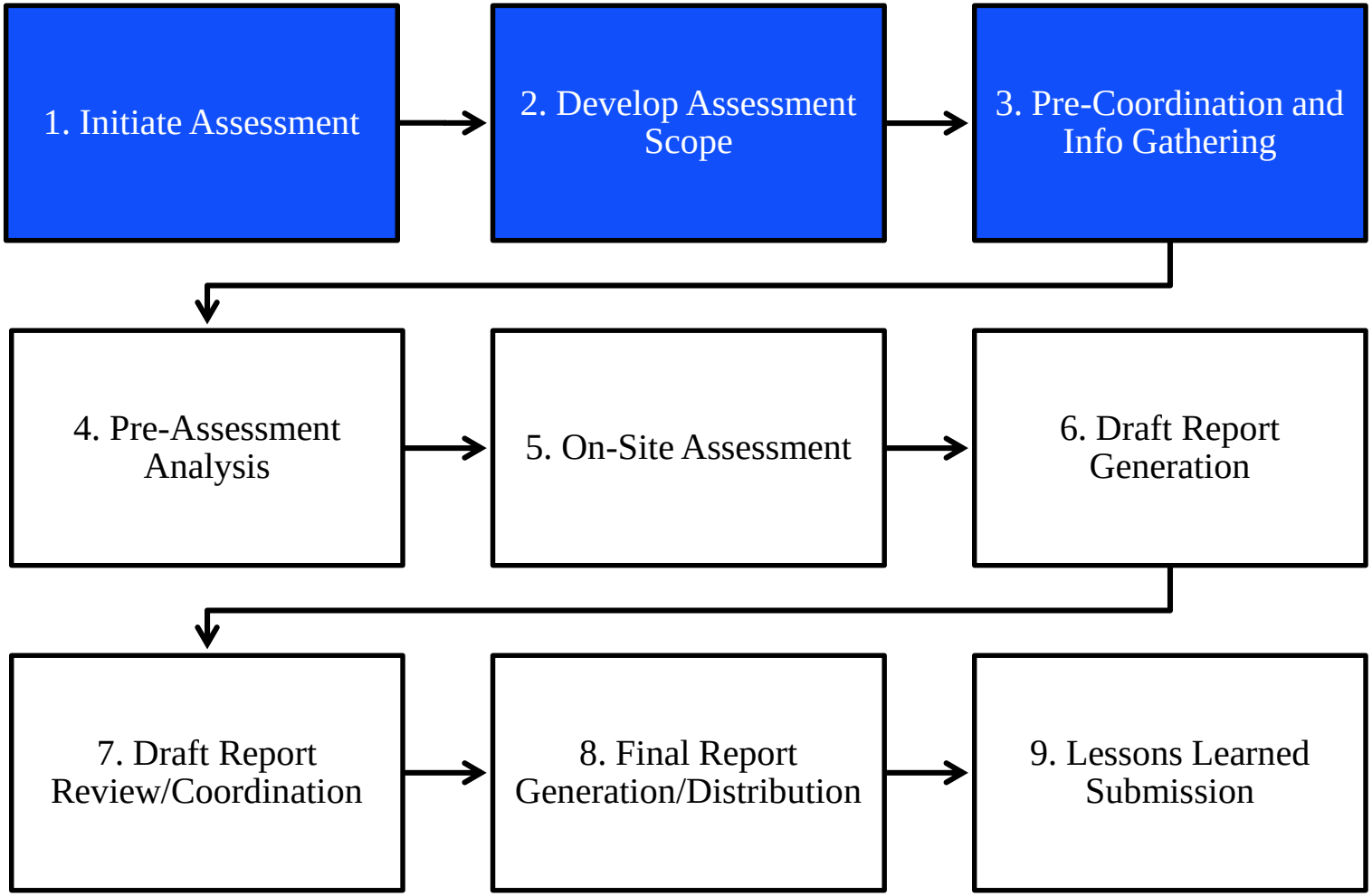


Source 1. (DigitalGlobe, Inc 2014-2018)

Aerial photograph of an operating location with overlay of explosives arcs from military munitions encumbering off-base infrastructure and civilians

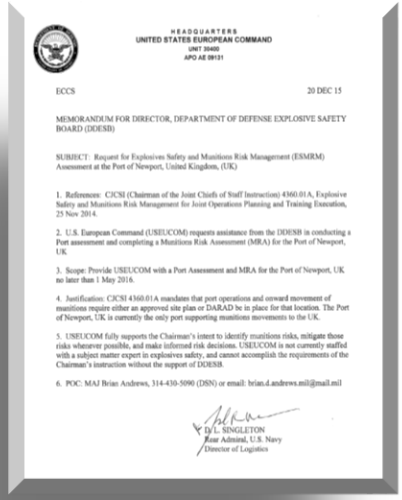
1. Source: DigitalGlobe, Inc. National Geospatial-Intelligence Agency EnhancedView Web Hosting Service. 2014-2018. https://evwhs.digitalglobe.com/myDigitalGlobe (accessed 2017-2018). – Modified by DDESB

ESMRM Assessment 9-Step Process Overview



1. Initiation

- Requesting organization will initiate a request for an ESMRM Assessment through Service component with the lead equity in the operation or location
- GCCs, FCCs, Component Commanders, or subordinate commanders can initiate requests for ESMRM Assessments at non-DoD controlled facilities or locations not assigned a lead Service
- DoD Components can conduct ESMRM Assessments organically



HEADQUARTERS
UNITED STATES EUROPEAN COMMAND
UNIT 30400
APO AE 09131

ECCS 20 DEC 15

MEMORANDUM FOR DIRECTOR, DEPARTMENT OF DEFENSE EXPLOSIVE SAFETY BOARD (DDESB)

SUBJECT: Request for Explosives Safety and Munitions Risk Management (ESMRM) Assessment at the Port of Newport, United Kingdom, (UK)

1. References: CJCSI (Chairman of the Joint Chiefs of Staff Instruction) 4360.01A, Explosive Safety and Munitions Risk Management for Joint Operations Planning and Training Execution, 25 Nov 2014.

2. U.S. European Command (USEUCOM) requests assistance from the DDESB in conducting a Port assessment and completing a Munitions Risk Assessment (MRA) for the Port of Newport, UK.

3. Scope: Provide USEUCOM with a Port Assessment and MRA for the Port of Newport, UK no later than 1 May 2016.

4. Justification: CJCSI 4360.01A mandates that port operations and onward movement of munitions require either an approved site plan or DARAD be in place for that location. The Port of Newport, UK is currently the only port supporting munitions movements to the UK.

5. USEUCOM fully supports the Chairman's intent to identify munitions risks, mitigate those risks whenever possible, and make informed risk decisions. USEUCOM is not currently staffed with a subject matter expert in explosives safety, and cannot accomplish the requirements of the Chairman's instruction without the support of DDESB.

6. POC: MAJ Brian Andrews, 314-430-5090 (DSN) or email: brian.d.andrews.mil@mail.mil

D L. SINGLETON
Rear Admiral, U.S. Navy
Director of Logistics

2. Scope

- The proposed scope of an ESMRM Assessment should be developed and agreed to in writing by the requestor and assessment team lead and at a minimum include:
  - Assessment location and associated Lines of Communications (LOC)
  - Assessment approach and methodology
  - Assessment team composition
  - Timelines (i.e., assessment execution and deliverable expectations)
  - Deliverables and their distribution (report and briefs)
  - Any required follow-on actions
- Scope Changes or Modifications
  - All modifications will be documented and integrated into report
  - Requestor and assessment team lead shall agree to modifications
    - ✓ Either party can initiate a modification

2. Scope (*continued*)

- Base assessment team composition on scope and location; members may include, but are not limited to…

DDESB	Service Explosives Safety Center
Lead Service Representative(s)	Safety, Logistics, Planners, Ammo reps
Supporting Engineering Commands	Service Expeditionary Support Team
Applicable GCC/FCC Representative(s)	Requesting Service Component
Surface Deployment & Distribution Command	Air Mobility Command
U.S. Defense Attaché Office	Military Sealift Command
Host Nation Representative(s)	Location Support Organizations (at site)

3. Coordination & Info Gathering

- Assessment team logistics:
  - Pre-site survey travel to the assessment location (if required)
  - Country clearance requirements (passports/visas)
    - ✓ Location specific training (e.g., country brief, antiterrorism/force protection)
    - ✓ Force protection plans
    - ✓ Medical (e.g., vaccinations, certificates)
    - ✓ Visit requests (as required)
  - Logistics requirements
    - ✓ Transportation and billeting
    - ✓ Personal protective equipment
    - ✓ Equipment critical to assessment execution
    - ✓ Host nation / requesting unit support requirements
    - ✓ Work spaces
    - ✓ Information technology requirements
  - Coordination with requesting unit, higher headquarters, DoS, and host nation (as required)

3. Coordination & Info Gathering (*continued*)

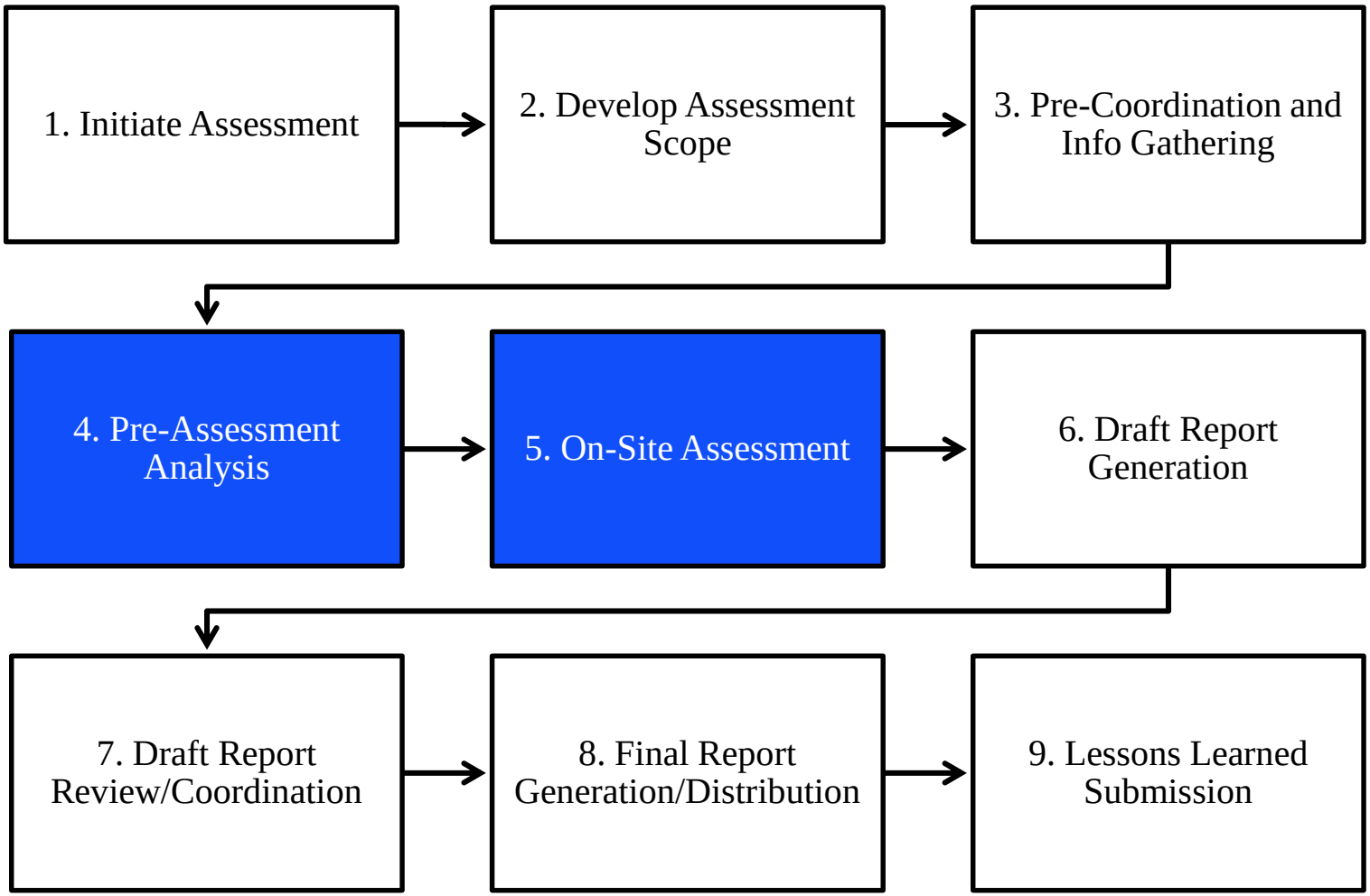
- Site specific information requirements:
  - ➢ Planned facility use
    - ✓ Operational details and supporting info
  - ➢ Potential Explosion Site (PES)
    - ✓ Location, type & operations
  - ➢ Exposed Sites (ESs)
    - ✓ Types of facilities, census data
    - ✓ Hazardous materials/operations
  - ➢ Historic facility/location data
    - ✓ site plans, deviations, prior assessments
  - ➢ Maps/overhead imagery
  - ➢ Host nation specific regulations

Source 1. (DigitalGlobe, Inc 2014-2018)

ESMRM Assessment to analyze SPOD to support munitions off-load operations involving 30,000 lbs NEW HD 1.2.1

1. Source: DigitalGlobe, Inc. National Geospatial-Intelligence Agency EnhancedView Web Hosting Service. 2014-2018. https://evwhs.digitalglobe.com/myDigitalGlobe (accessed 2017-2018). – Modified by DDESB

ESMRM Assessment 9-Step Process Overview



4. Pre-Assessment Analysis

- Accomplish initial analysis of data and materials compiled in Step 3
- Steps 1 - 4 of the assessment process are iterative. The pre-assessment analysis of information collected in steps three often helps to clarify the assessments overall scope
  - ➢ Assess potential munitions-related risks
    - ✓ Use maps/imagery data to identify Potential Explosion Site(s) (PES)
    - ✓ Based on PES location and Net Explosives Weight (NEW) limits determine Explosives Safety Quantity Distance (ESQD) arcs to identify Exposed Sites (ES) encumbered by the arcs
  - ➢ Identify information gaps that require resolution prior to or during on-site assessment
  - ➢ Based on pre-assessment analysis, as appropriate:
    - ✓ Adjust scope of assessment
    - ✓ Finalize support requirements
      - Assessment team composition
      - Logistics requirements etc…

4. Pre-Assessment Analysis

- In this example, the pre-assessment analysis identified:
  - The ESQD arcs extended 1,260 from the PES
  - Only 20 facilities were encumbered by the ESQD arcs
  - Hazardous materials were present within the ESQD arcs
- Based on the findings a desk-top assessment of the port was completed:
  - Infrastructure data was estimated using imagery
  - The Defense Attaché office collected the personnel exposure data

Source 1. (DigitalGlobe, Inc 2014-2018)

Image reflecting ESQD zones and encumbered Exposed Sites (ES)

1. Source: DigitalGlobe, Inc. National Geospatial-Intelligence Agency EnhancedView Web Hosting Service. 2014-2018. https://evwhs.digitalglobe.com/myDigitalGlobe (accessed 2017-2018). – Modified by DDESB

A detailed and thorough pre-assessment analysis is a critical first step towards producing a decision-worthy product for senior leaders

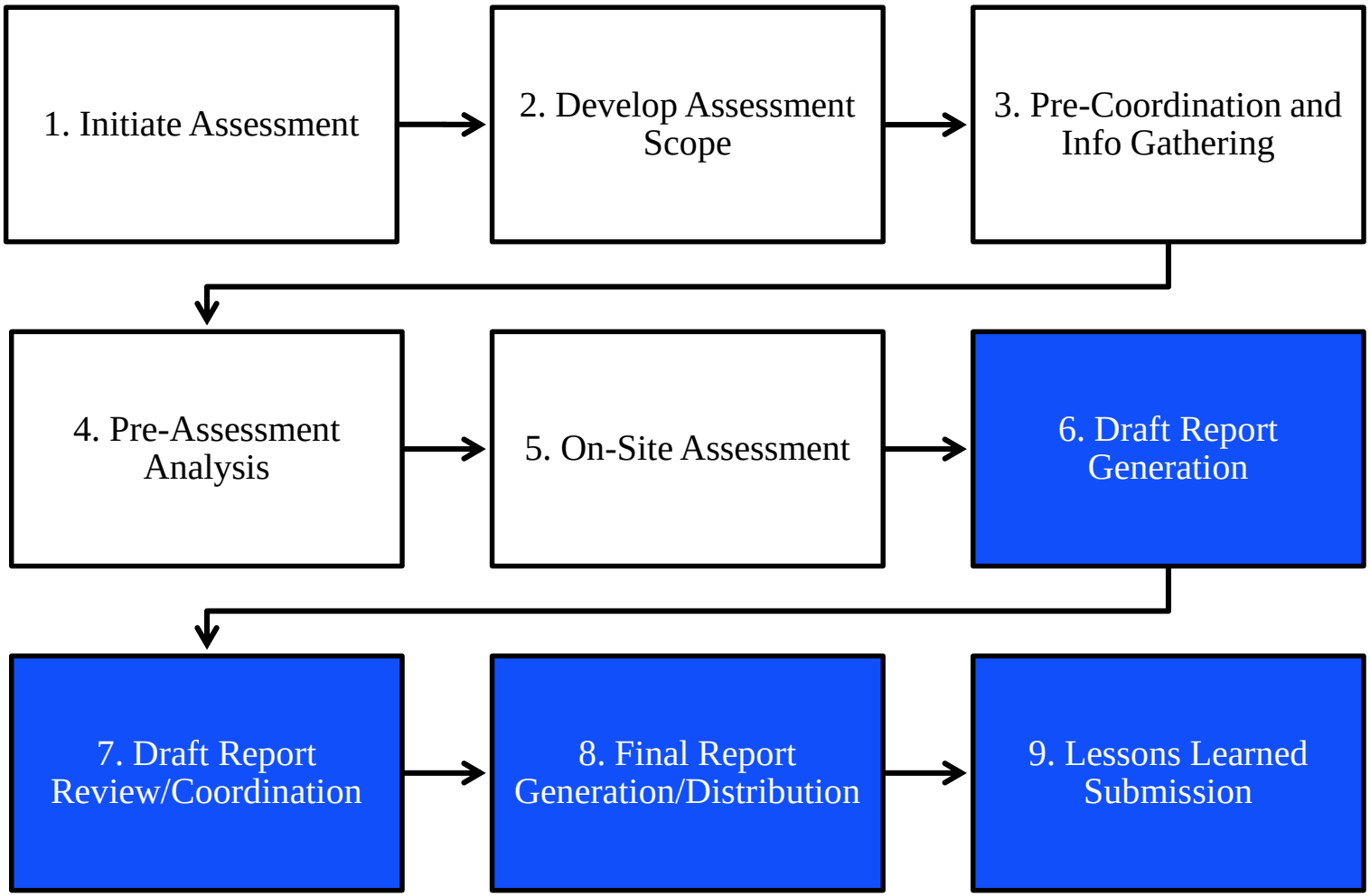
5. On-Site Assessment

- Assess storage, operating locations, LOCs, and supporting infrastructure to identify the consequences and risks ***to and from*** the munitions operation and their related processes
- Validate Pre-assessment assumptions to include imagery
- Develop risk management measures to mitigate or eliminate identified risks for risk decision authority consideration
  - Controls may include protective construction, alternative locations, and limitations on personnel exposures and/or operating timeframes
  - Effective measures address who, what, where, when, why, and how the control will impact the risk and associated operation
  - Residual risk should be reevaluated to ensure no new hazards are introduced

5. On-Site Assessment (*continued*)

- Considerations during on-site assessment:
  - Reception, staging, onward movement, and integration (RSO&I)
  - Clear zones around unloading and loading points
  - Containerized munitions on/off-load support equipment
  - Potential hazards to and from munitions operations
  - Emergency response capabilities, equipment, and timelines
  - Location and information on potential Exposed Sites (ES), such as shopping centers, hospitals, schools, apartment complexes, and houses
  - Location of hazardous materials producers and storage (e.g., liquefied natural gas or bulk fuels facilities)
  - Utilities location (e.g., gas pipes, power stations, electrical lines, critical communication nodes)
  - Lightning protection systems

ESMRM Assessment 9-Step Process Overview



6. Draft Report Generation

- Draft report includes:
  - Executive summary
  - Assessment purpose and scope
  - Assessment methodology
  - Explosives safety technical information (e.g., site plans, deviations)
  - Identification and explanation of munitions operations and their related processes
  - Infrastructure analysis based on risk to and from explosives/munitions
  - Overall risks to and from explosives/munitions and related processes
  - Recommendations for mitigating or eliminating explosives safety risks
  - Proposed organizations/units responsible for implementing and/or supporting risk-reduction actions and timeline for implementation
  - Process for executing oversight of risk reduction implementation measures

7. Report Coordination & 8. Finalization

- Draft report coordination
  - ➢ Assessment team lead is responsible for coordination & report accuracy
    - ✓ Utilize Comment Resolution Matrix, or similar tool, to capture inputs and proposed edits
    - ✓ Critical inputs require successful adjudication with input source
- Timeline for review is dependent on number of locations and exposures captured in assessment
  - ➢ Report finalization generally takes 1-3 months
- Final report brief and publishing
  - ➢ Team lead and team members will out-brief report
  - ➢ Requesting organization will distribute report according to the agreed in assessment scope

9. Lessons Learned & Info Management

- Lessons Learned
  - Assessment team lead is responsible for capturing lessons learned
  - Any team member, support element, or on-site personnel may input lessons learned
    - ✓ Inputs should focus on improving the assessment process
    - ✓ Administrative, logistical, scoping, tasking clarity, information management, etc…
- Reference CJCS Instruction 3150.25F, "*Joint Lessons Learned Program*" for more detailed information

CCDR Risk Decisions

- ESMRM Assessment reports are designed to provide information necessary to support informed risk decisions
  - ➢ The derived quantitative measure used to identify the hazard severity will be forwarded up the chain of command as a single package to ensure that the potential consequences and mitigating strategies are effectively communicated through out the chain of command
- Risk decision authorities should formally document risk decisions and provide specific guidance on the implementation of risk control measures

Risk Tracking and Validation

- Risk Decision authorities should specify risk tracking reporting requirements, as necessary to monitor compliance with site-specify guidance
  - As part of the risk decision process, risk decision authorities will assign risk reduction mitigating strategy responsibilities to specific organizations as necessary to alleviate potential gaps in implementations of these measures
- ESMRM Assessment maintenance and update frequency:
  - Should be maintained and updated to reflect changes in the operating environment and mission scope
  - Validate ESMRM Assessments during the review and exercise of operations plans (OPLANs) and concept plans (CONPLANs)
  - Changes of command – CCDRs and subordinate commander will be informed of existing munitions-related risk decisions effecting their areas of responsibilities upon assuming Command
  - In most situations, can remain valid for up to 24 months providing conditions on the ground have not significantly changed

Questions / Comments / Discussion

Camp Doha, Combat Loaded Vehicle Explosion, 11 July 1991. The US 11th Armored Cavalry Regiment (ACR) at Camp Doha, suffered a horrendous loss. Due to the threat of renewed hostilities the 11th ACR kept its combat vehicles "combat loaded" with ammunition to reduce their response time. At approximately 10:20 A.M, a defective heater in an M992 ammunition carrier loaded with 155mm artillery shells caught on fire. This set off an hours-long series of explosions and fires that damaged or destroyed 102 vehicles, including 4 M1A1 tanks and injured 49 US soldiers. Estimated $15 million in damages.

Source: Gulflink.health. n.d. https://gulflink.health.mil/du_ii/du_ii_tabi.htm (accessed July 5, 2018).