



U.S. NAVY A&EFS PROGRAM OVERVIEW & MAGAZINE STORAGE REQUIREMENTS CALCULATOR (MSRC)

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OVERVIEW

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FCAMS BACKGROUND

- In 2014, the U.S. Navy identified two major issues planners experienced with regard to establishing facility requirements for explosives storage (i.e., how much space is needed):
 - ▶ How to correctly identifying existing magazine facility types
 - ▶ How to properly quantify the required munitions to be stored at an installation (i.e., the load plan)
- The combination of these issues made the creation of repeatable Basic Facility Requirement (BFR) documents difficult and potentially inaccurate
- With limitations on the available details for existing magazines and potential for inaccurate or incomplete load plans, how can planning be done?
- How can the Navy determine if a given load plan (large or small) can be accommodated safely and properly at a given installation (large or small)?
- These questions were the genesis for in the Fleet Concentration Area Magazine Study (FCAMS)

FCAMS BACKGROUND

- The FCAMS project was a NAVFAC Atlantic contract co-sponsored by NOSSA and Naval Munitions Command (NMC Atlantic and NMC CONUS West) October 2014 through March 2017.
- The objective of the FCAMS project was to develop the capability to assess the current available storage capacity of Navy magazine while simultaneously considering explosives limits, spatial constraints including magazine construction type, safe storage practices, and optimal storage techniques.
- FCAMS consisted of three phases:
 - ▶ Phase I baselined six fleet concentration sites to establish NEW limits of storage magazines.
 - ▶ Phase II developed the Magazine Storage and Requirements Calculator (MSRC) to provide a uniform approach for determining storage requirements and generating BFRs.
 - ▶ Phase III utilized the MSRC at each of the six sites to analyze the Global Requirements Based Load Plans (GRBLP), provided by NMC, against the available magazines.

FCAMS BACKGROUND

- The major accomplishments of the project were:
 - ▶ Standardization of the identification and classification of magazine types.
 - ▶ Creation of new streamlined magazine assessment procedures and identification methods.
 - ▶ Adoption of GRBLP and its use in planning.
 - ▶ Updates to UFC 2-000-05N, Series 420.

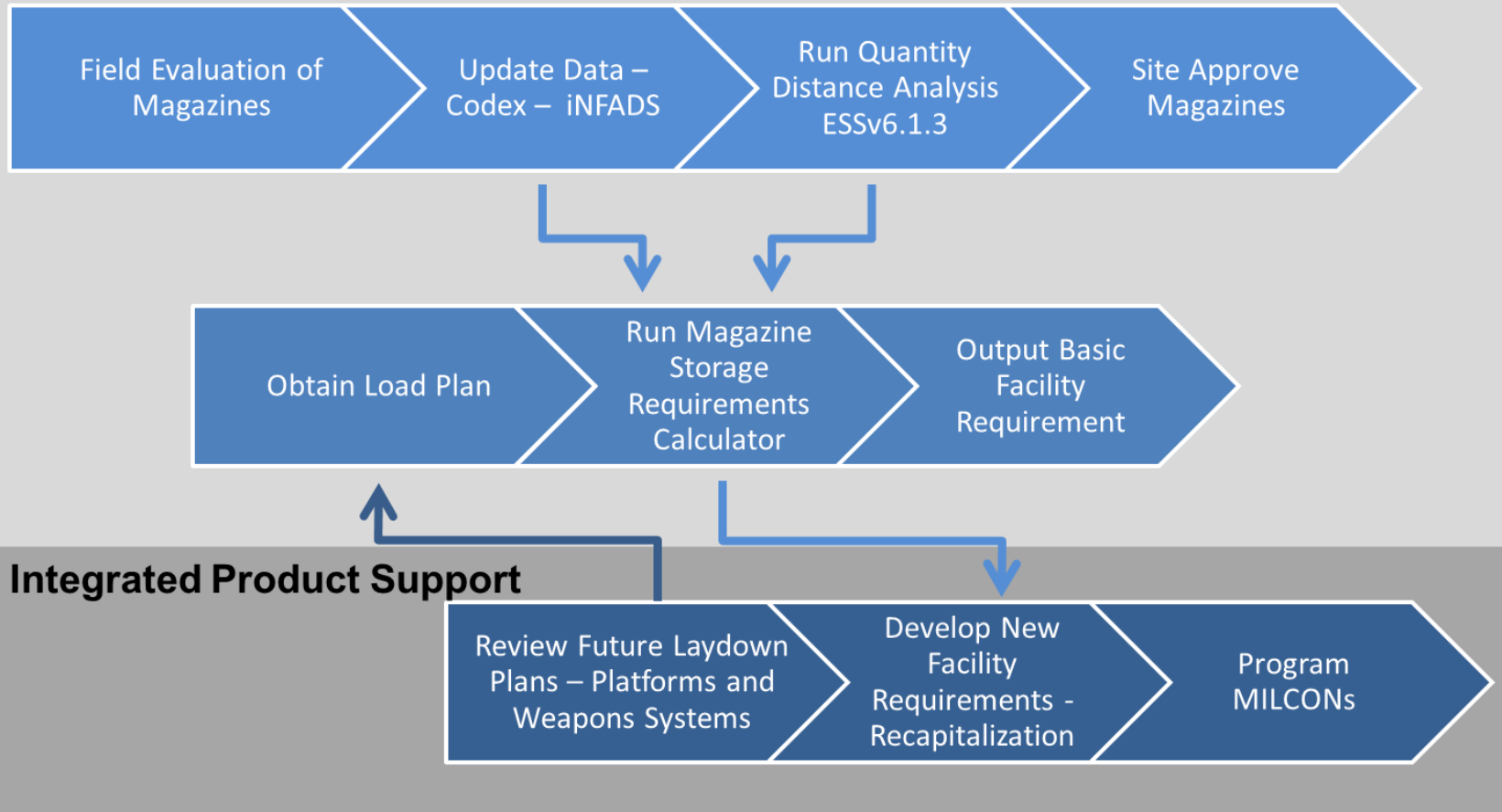


AMMUNITION & EXPLOSIVES FACILITY SUPPORT (A&EFS)

- The success of the FCAMs program at the six fleet concentration sites led the Navy to expand the effort to all Navy installations worldwide.
- Installations with 16 or more storage magazines will be assessed as part of A&EFS.
- Installations with 15 or fewer explosives storage magazines will be self-assessed using the methods developed during FCAMS.
- Upon completion in 2020, the A&EFS program will generate explosives site plans for more than 90% of Navy storage magazines across the world.
- A&EFS is a result of the success of the FCAMS effort and the accuracy and effectiveness of the MSRC.
- A&EFS work has already commenced at Naval Station Rota Spain, Submarine Base New London, and Submarine Base Point Loma.

A&EFS WORKFLOW

Ammunition & Explosives Facility Support (A&EFS)



“BIG PICTURE” FINDINGS

- Big picture: A pound is not a pound and a square foot is not a square foot
- Historically, the Navy has been a low-volume high-density organization (bombs and pallets)
- The modern Navy, in addition to the low-volume high density, is transitioning toward a second ordnance type: high-volume low-density ordnance (containerized missiles)
- These new types of items cannot be stowed in many of the existing magazine spaces throughout the Navy



MSRC OVERVIEW



- The Magazine Storage and Requirements Calculator (MSRC) is an Excel spreadsheet used to analyze and optimize both spatial and Net Explosive Weight (NEW) utilization for explosive magazines and develop a BFR report while meeting all explosive storage requirements.
- Tool allows the user to experiment and test different ways to store munitions. The user can always move things around if they think of a better way to stow munitions. The MSRC is not a data inventory tool.
- How does the MSRC accomplish this?
 - ▶ A “Stowage Matrix” was developed to identify the ideal number of footprints that can be stowed in each of 21 magazine types modeled in the tool.
 - ▶ The principles of NAVSEAINST 8024.2 were adhered to.
 - ▶ NEW limits and mixing rules of HC/D materials are followed.
 - ▶ Storage Compatibility Group (SCG) rules are followed.

MSRC OVERVIEW

- Data Requirements
 - ▶ Load Plan – GRBLP or NALC list
 - ▶ Magazine facility types and security features
 - ▶ Sited NEW – Obtained from the ESS software
- The MSRC is the first planning tool capable of analyzing and optimizing both spatial and NEW utilization while meeting all applicable requirements
- This provides standardization of storage requirements Navy-wide
- The UFC 2-000-05N process can be implemented without the MSRC for small facilities or small load plans

MSRC OVERVIEW

- Consistent, repeatable results across the Navy
- Models requirements based on actual storage layouts/footprints
- Takes into account design type of existing magazine assets
- Space requirements based on actual size/type of article (footprint types) instead of generalized formulas
- Space requirements account for safe storage principles (e.g., stack height maximums) instead of only available area in square feet
- Vastly differing magazine types are properly categorized to store acceptable items (i.e., a square foot isn't just a square foot)
- Faster analyses
- Reduced errors due to human factors
- Defensible method to audit readiness

Sample Analyses

RECAPITALIZATION

- MSRC can be used to efficiently and defensibly determine the required number of new MSMs or box magazines necessary to replace any number of legacy arch or other magazines
- MSRC is first used to determine what quantities of munitions are being stored in current legacy magazines
- This list of munitions is then analyzed to determine the number of new (larger) magazines required to store the same load plan
- Due to inherent limitations of legacy magazines, a single box magazine can often replace several arch magazines
- One example analysis of actual data showed that 51 arch magazines (80' and 50' depths) could be replaced by seven new Box D magazines
 - ▶ Extremely reduced footprint
 - ▶ Fewer facilities to maintain
 - ▶ Modern structures allow increased accessibility and security
 - ▶ Provided greater storage flexibility
- ESS software would be used in conjunction to determine acceptable locations for new magazines

Sample Analyses

MILCON SUPPORT

- Supporting new construction requires justification of the requirement for the new facility
- MSRC can be used to determine whether there is a surplus or deficit of explosives storage space
- The load plan can be analyzed first against the existing magazines
- If a deficit in available space is found (i.e., the load plan won't completely fit within the available magazines), the MSRC can be used to calculate the minimum number magazines (MSM or box mags) that would be required to support the remaining munition items
- This process would use the MSRC in tandem with ESS software to determine allowable NEW limits for new facilities
 - ▶ ESS provides allowable limits based on surrounding exposures and constraints
 - ▶ MSRC helps determine the upper-bound limit needed for varying magazines types (e.g., a magazine may not need an extremely large sited NEW if it will be used to store missiles)

Sample Analyses

BRAC ANALYSIS

- The MSRC can be used to study the relocation or redistribution of munitions from one installation to one or more other installations
- Load plans can be quickly analyzed against available storage facilities at other installations
- The rapid analysis capability of the MSRC, in conjunction with ESS software, allows multiple alternatives at multiple locations to be analyzed and compared
- The consistent, repeatable analysis methodology ensures that each alternative is held to the same criteria, considering physical space and explosives safety criteria

Sample Analyses

PLANNING FOR NEW SITES

- A completely new site can be planned using only a load plan
- ESS software is used first to find the constraints surrounding the available area and estimate the upper bound of available NEW limits
- Upper-bound NEW available limit can be used in the MSRC to determine the number of new “proposed” magazines that would be required to store the provided load plan
- Multiple magazine types can be quickly investigated (e.g., MSM vs. Box Cs or Ds)
- The MSRC will report whether the new magazines are limited by NEW or by physical storage space
- These data can be used to further refine the proposed layout in the ESS software

CONCLUSION

- The A&EFS project exists due to the success of the FCAMS effort and subsequent Navy adoption of methods and tools developed during the FCAMS effort.
- Upon completion of the A&EFS effort, the Navy will have completed:
 - ▶ ESSPs for nearly all magazines across the world
 - ▶ Current BFRs for each installation
 - ▶ Current, accurate facility characterizations for each individual magazine
 - ▶ A global understanding of required MILCON projects

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