

# MEVA-GF Verification, Validation, Accreditation

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## Outline

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- MEVA Overview
- MEVA History
- Verification, Validation, and Accreditation
- Lessons Learned
- Summary



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## MEVA Capabilities

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- Delivery
- Penetration
  - SAMPLL Regression
  - Curvilinear Penetration
  - PenCurv
- Blast
  - Air Burst
  - Soil Blast
  - Concrete Blast
  - Layered Blast
- Fragmentation
- Structural Collapse
- Mission Evaluation – Structural and Functional Pk



## MEVA History

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- Hardened Buried Target Methodology From EVA-3D Code
  - Curvilinear Penetration
  - Blast Response
- EVA-3D Methodology Developed in Conjunction with Penetration and Blast Tests
- Above-Ground Target Methodology Developed for MEVA
- Layered Blast Methodology Developed in Conjunction with Target and Weapon Specific Tests



## Verification and Validation

- Joint Technical Coordination Group (JTCCG) Accreditation (ASP-1) Guidelines Used
- Some validation performed in part during development of algorithms for particular weapons systems (e.g. Curvilinear Penetration, Layered Blast)
- Independent Subject Matter Expert Verification performed for major methodologies (both code and analyst's manual reviewed) after completion of code
- Verification/Validation often performed using other codes with same or higher fidelity. (i.e. BlastX, PenCurv)
- Detailed "goodness of fit" analysis performed for newly developed cratering code. Accreditation will be coming in near future.



## Lessons Learned

- Accreditation process just started before MEVA V&V so it was a learning process for everyone.
- Lack of Test Data Hindered Validation and Accreditation
  - Validation (Test) Data Often Not Available for Newly Developed Weapons or Damage Mechanisms
  - Many tests are not instrumented sufficiently to get enough data (and the right kinds of data) to develop methodologies or to validate them. Due to:
    - Costs of instrumentation,
    - Difficulties in instrumenting weapons/targets, and
    - Lack of interest/knowledge of people running tests on future validation.
  - This could be improved by better coordination between groups developing weapon systems, running tests, and those developing methodologies.
  - Often no data available except for data used to generate model
- SME and other methodology review should be done as early as possible during methodology development
  - Validation requirements should be defined as early as possible and explicitly as possible



## Summary

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- **MEVA Accreditation**
  - Performed for JTCG/ME using subject matter experts
  - Formal MEVA V&V and Accreditation was performed after development of code.
- **No V&V Databases were available for MEVA V&V**
  - Data is hard to get if it exists at all
  - Data may be classified and therefore not easily accessible
  - Most validation data based on a few tests or comparison to other codes
  - Methodologies developed by different military groups over many years (AFRL, DTRA, WES, JTCG, AAC)
- **Little guidance was provided for V&V requirements**
- **Final V&V Report and Accreditation Report was published by Air Force**

