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# *Development of the Advanced Unified EM Design Code*

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**M&S Workshop**

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# Report Documentation Page

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# *Overview*

- Background information
- Advanced development objectives
- Technical improvements
  - Functionality
  - Maintenance
- Verification and Validation plans
- Users' Meeting
- Conclusion

# *Background*

- **JCS memo on combined battlefield environmental effects initiative, c. 1994**
- **Combined Battlefield Environmental Effects Initiative, 1995 - 1998**
  - Unified Protection Concept
  - Allocation Methodology
  - Evaluated Military and Commercial Standards
  - Prototype Unified EM Design Tool
- **Unified EM Design & Test Protocols Program, 1999 – 2004, Version 1.6**
- **Advanced Unified EM Design Program, 2005-2007**



# *What is Unified EM Design?*

- Explorer style user's interface
- Detailed information on
  - environments,
  - immunities,
  - margins, and
  - transfer functions
- On-line help including protection methodology
- Develops barrier performance requirements
  - Based on specified environments and immunities
  - Unified requirement across all environments
- Web page at [www.uemdesign.com](http://www.uemdesign.com)



# *Program Objectives*

- Add to the existing functionality of the UEM Design software package with advanced algorithms and user capabilities.
- Maintain and expand the information in the UEM Design software's data base and upgrade the software as necessary for use on current and future computer systems.
- Demonstrate the validity of the UEM Design methodology.

# *Enhanced Functionality*

- Internal coupling
  - Topology issue
  - Internal fields
  - Re-radiation
- System design process
  - Develop additional example system models
  - Investigate methods for improving system model development

# *Maintenance*

- Information
  - Additional environments and immunities
    - Additional versions of MIL-STD-461
    - Unclassified high power EM environments from IEC standard and IEEE EMC special issue
  - Data base entries as opposed to software modifications
- Software
  - Review program trouble reports
  - Prioritize and correct as needed to ensure operation of the software
  - Verify software on new operating systems

# *Verification and Validation*

- Documented V&V to support application during a system development program
- DTRA has made V&V a critical activity for the advanced software development effort
- Strawman validation effort includes design, implementation, and testing of simple system with multiple EM environments

# *Users' Meeting Overview*

- Wednesday, April 6, 2005
- Attendance limited to current and potential UEM Design users
  - US Citizen, and
  - Government agency or Government contractor
- Activities
  - Overview of planned updates
  - Hands-on demonstrations
  - Polling of user community to determine interest in future modifications
  - Basic training for new users
- Sign-up for software for qualified users

# *Summary*

- Unified EM Design tool provides users with:
  - detailed environment and immunity descriptions
  - system level analysis to determine barrier performance requirements
- Version 1.6 released in March 2003
- Advanced development underway
  - Enhanced Functionality
  - Maintenance
  - Verification and Validation

# *Users' Meeting Activities*

- Overview of planned updates
- Hands-on demonstrations
- Polling of user community to determine interest in future modifications
- Basic training for new users
  - Unified EM Protection Methodology
  - Quick tour
  - EM Quantities
  - System design example