The background of the slide features a composite image. In the center is a large, glowing globe of the Earth. Superimposed on the globe is a dark, multi-story building with several windows that are illuminated from within, creating a grid-like pattern of light. The overall scene is set against a dark, possibly interior, background with some faint architectural lines.

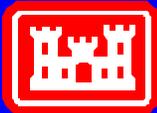
# **USAERDC**

**Dr. James R. Houston**  
**Director**

**COL James S. Weller**  
**Commander**

# Development of New Civil Works R&D Program

## Innovative Technologies for Flood Damage Reduction

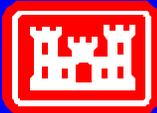


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# Workshop Goals and Objectives (4-5 April 2000)

- Validate problem areas and summarize District needs
- Summarize lessons learned
- Identify technologies that have high potential for application
- Identify future operational capabilities and research needs

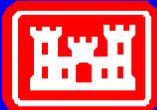


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# Background and Objectives

- Dr. Tony Liu, CERD
- Mr. Art Walz, Mr. Al Branch, CECW-EG
- Mr. Edward Hecker, Mr. Rob Grubbs, CECW-OE

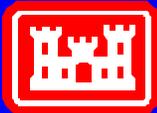


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# Background and Objectives

- Develop inter-disciplinary R&D program for flood damage reduction
- Forum for exchange of ideas and experiences among field personnel from various disciplines of research, engineering, and emergency operations
- Foster integration of Federal and state programs

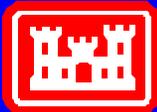


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# Workshop Participants

- 60 Participants
- Headquarters
- 6 Corps Divisions
- 12 Corps Districts
- 5 Laboratories (CEERD)
- 1 State Agency (CA)
- 1 Local Sponsor



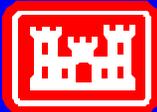
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# Workshop Agenda



- Define Workshop Goals and Objectives for an End Product
- 27 Workshop Presentations
- Participants Networking
- Focus Groups Define Needs
- Groups Prioritize Short-Term and Long-Term Needs



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# Workshop Objectives



- Lessons Learned
- Field Offices' Actions
- Field Offices' Needs
- Past Research Efforts
- On-going Research
- Research Needs
- Prioritize Research Needs

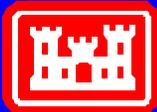


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# Workshop Presentations

- Chronic Problem Areas
- Innovative Levee Evaluations
- Innovative Flood Fighting
- Emergency Flood Control



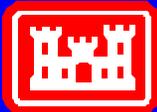
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# Chronic Problem Areas



- Material Piping Failures
- Cumulative Effects of Underseepage
- Aging Infrastructure
- Poor Communication During Flood Fights
- Limited Resources to Collect Field Data During Floods

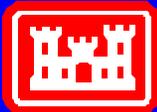


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# Innovative Flood Fighting

- Flood Warning Systems
- Water Control Data System Modernization
- Integrated GIS and Modeling
- GPS-located Digital Photos
- Laptop Mapping and Databases Transmitted Via Cellular Phone
- Aerial Digital Imagery

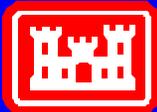


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# Innovative Levee Evaluations

- Integrated GIS Mapping of Critical and Problem Areas
- Soil Moisture Measurements with Passive Microwave Radiometry
- Mapping with LIDAR
- Mapping with IFSAR
- Real Time Hydraulic Surveys with Side Scan Sonar

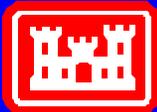


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# Emergency Flood Control

- Emergency Levee Construction in the Red River Valley
- Expedient Levee Raising Structures
- Centrifuge Modeling of Alternate Flood Control Barriers
- Emergency Construction of Sheet Piling to Serve as a Flood Wall
- Emergency Repairs to Flood Walls



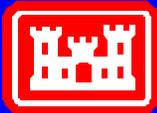
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# Prioritized Short-Term Needs



- Quick Aerial Digital Photography
- Access to Real Time Mapping
- Field Laptops w/ GIS Mapping and Capability to Query Databases
- Field Laptops Linked to Command Centers Via Cellular Phones
- Non-intrusive Measurements of Phreatic Surfaces in Levees
- Small Flood Fight Manual
- Accurate Flood Level Forecasting



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# Prioritized Long-Term Needs



- Determine Piping Mechanics from Seepage and Cumulative Effects
- Need Capability to Locate and Delineate Piping Voids
- Need Capability to Remotely Read Levee Performance Instrumentation
- Develop Integrated GIS Mapping to Support Engineering Modeling
- Clearing House of Recommended Products (Tested & Evaluated)

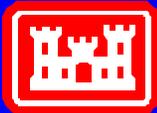


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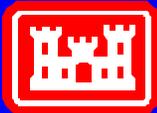
# Future Operating Capabilities

- Capability to conduct real-time condition surveys and improved condition assessment
  - Quick aerial digital photography
  - Field laptops with GIS mapping and capability to query databases
  - Non-intrusive measurements of phreatic surfaces in levees
  - Determine piping mechanics from seepage and cumulative effects
  - Real-time hydraulic surveys



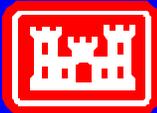
# Future Operating Capabilities

- Capability to perform real-and near-real time modeling, simulation and mapping
  - Integrated GIS modeling
  - Physical modeling of alternate flood protection barriers
  - Mapping with LIDAR, IFSAR, GEOSAR



# Future Operating Capabilities

- Capability to provide improved forecasting methods and flood warning systems
  - Accurate flood stage prediction
  - Integrated decision-making tools (inundation maps, breaches)



# Future Operating Capabilities

- Capability to perform expedient and cost effective flood fighting and other emergency operations
  - Expedient levee-raising structures
  - Innovative seepage control methods
  - Improved installation and maintenance of relief wells

