



U.S. Department of Energy
Office of Electricity Delivery & Energy Reliability

Electric Distribution



FY06 Annual Program and Peer Review Meeting

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Integrated Distribution Management System

Joe Schatz
Southern Company
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IDMS

Problems & Needs

- Utilities must expand distribution operation capability to acquire and act on analytical information such as:
 - system loading
 - predicting and analyzing incipient faults
 - ensuring power quality
 - meeting specialized customer requirements
 - dealing with the pressing concerns of national security

Less of this



RAW DATA

More of this



INFORMATION

- Utilities today must function within narrow operating margins while retaining or improving service reliability
- Applications are needed to analyze contingencies based upon the present state and predicted operating conditions
- Tenured workforce: Technology is needed to train new employees

Industry Challenges:

Many Field Devices Today, Very Little Integration



IDMS will integrate DA devices with disparate systems such as DA, GIS and OMS.

Background

- Southern identified and surveyed companies offering a Distribution Management System
 - none of the companies currently offer a fully integrated system that meets all of Southern's requirements including the following:
 - Integration of several applications with a common user interface
 - Fault location
 - Protection coverage/coordination validation
 - Dynamic de-rating of equipment due to harmonic current flow
 - A full function Distribution Operator Training Simulator
 - Many other needs of future distribution systems
- Must begin implementation for future systems

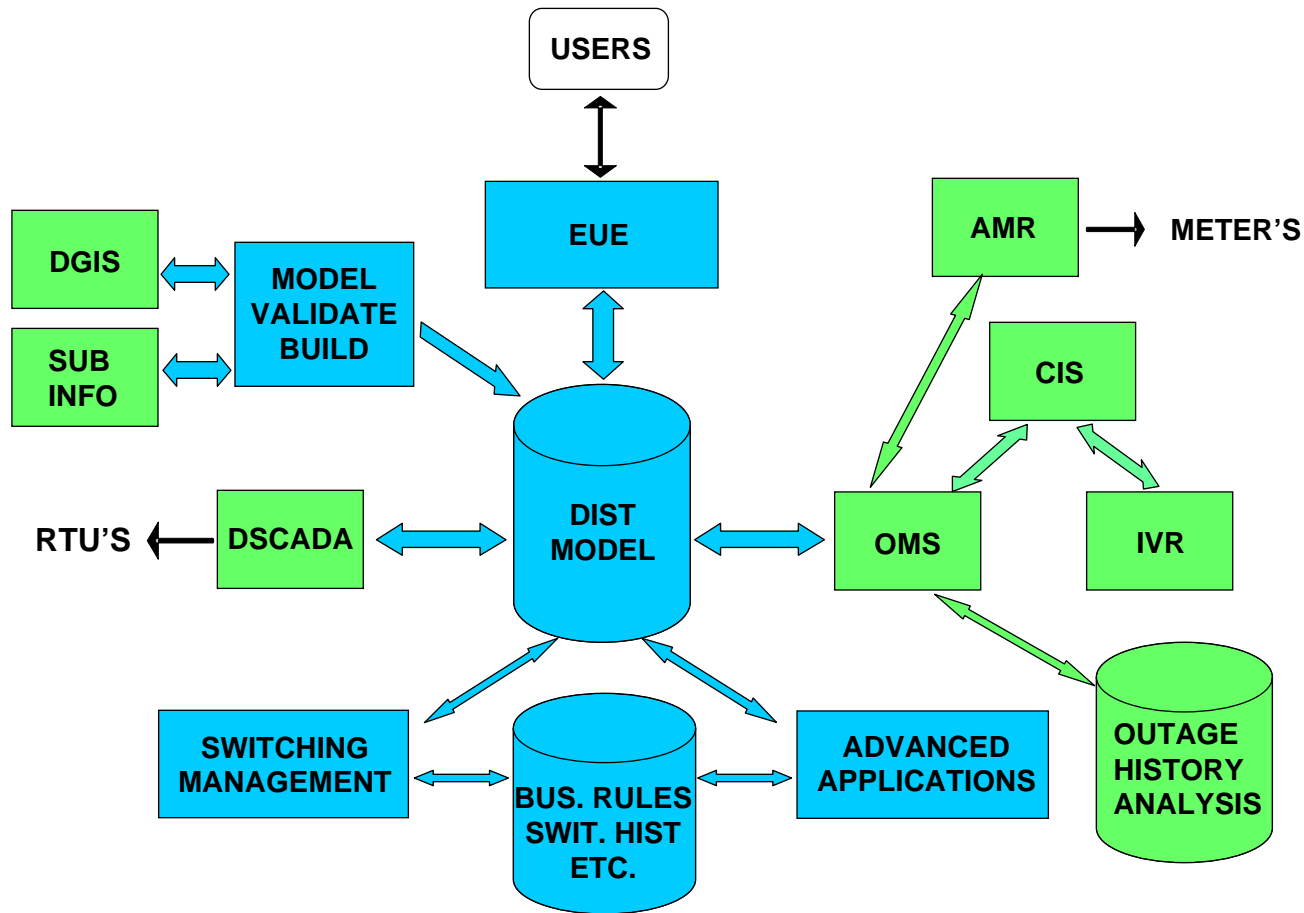
IDMS Objective

- Develop an Integrated Distribution Management System (IDMS) that will define and demonstrate a framework for the future distribution systems within the US electric utility industry.
- Alabama Power, a subsidiary of Southern Company, will host the IDMS pilot

Technical Approach - What is IDMS?

- A seamlessly integrated set of applications to raise electric system operating intelligence by augmenting DSCADA with other applications and system operations
- IDMS is a method of conveying information, instead of raw data, to Distribution Operations personnel

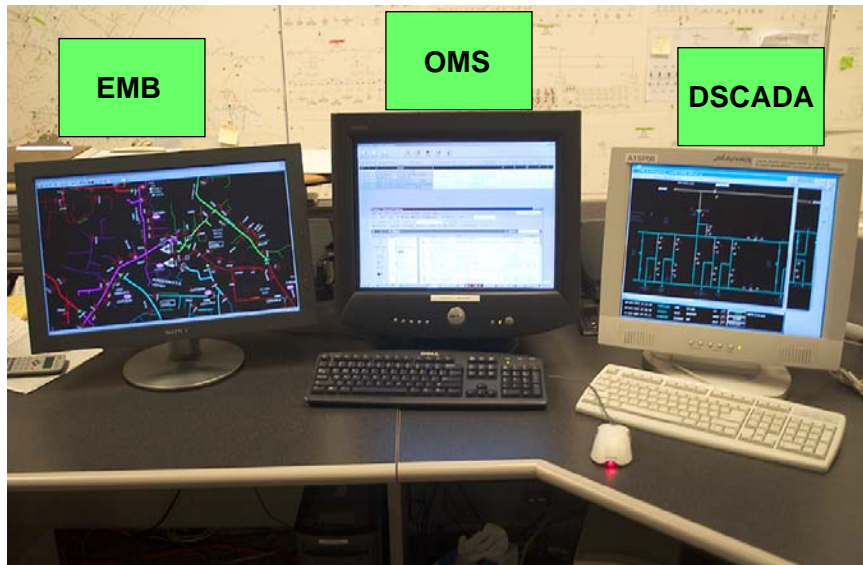
What is IDMS?



— Components included in an IDMS

— Existing or proposed systems

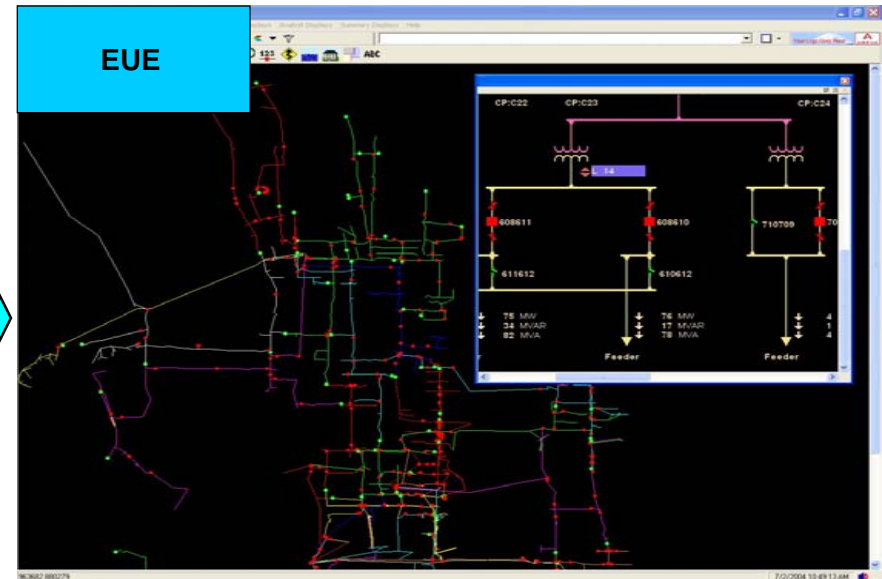
Electronic User Environment



EMB – Electronic Map Board

OMS – Outage Management System

DSCADA – Distribution Supervisory Control
And Data Acquisition



EUE provides a common form of information visualization and interaction to the user for the various components of the IDMS.

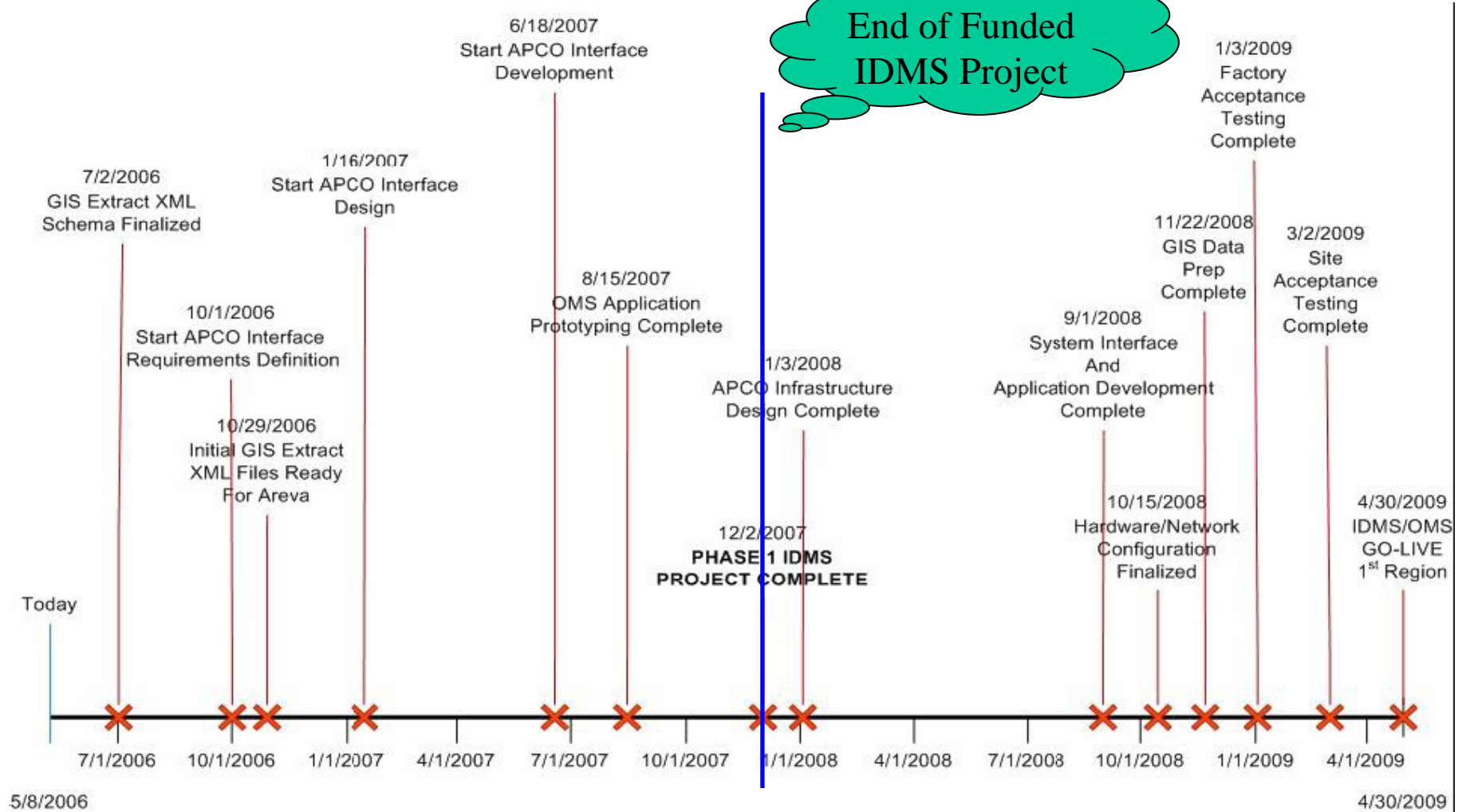
Cost Detail



End of Funded
IDMS Project

	2006	2007	2008-9	Total
Overall Project Budget	\$3,923K	\$2,473K	\$8,300K	\$14,696K
DOE Budget	\$1,533K	\$ 967K		\$2,500K
Future Collaborations			\$3,000K	\$3,000K
Southern Company Funding	\$2,390K	\$1,506K	\$5,300K	\$9,196K

Major Project Milestones



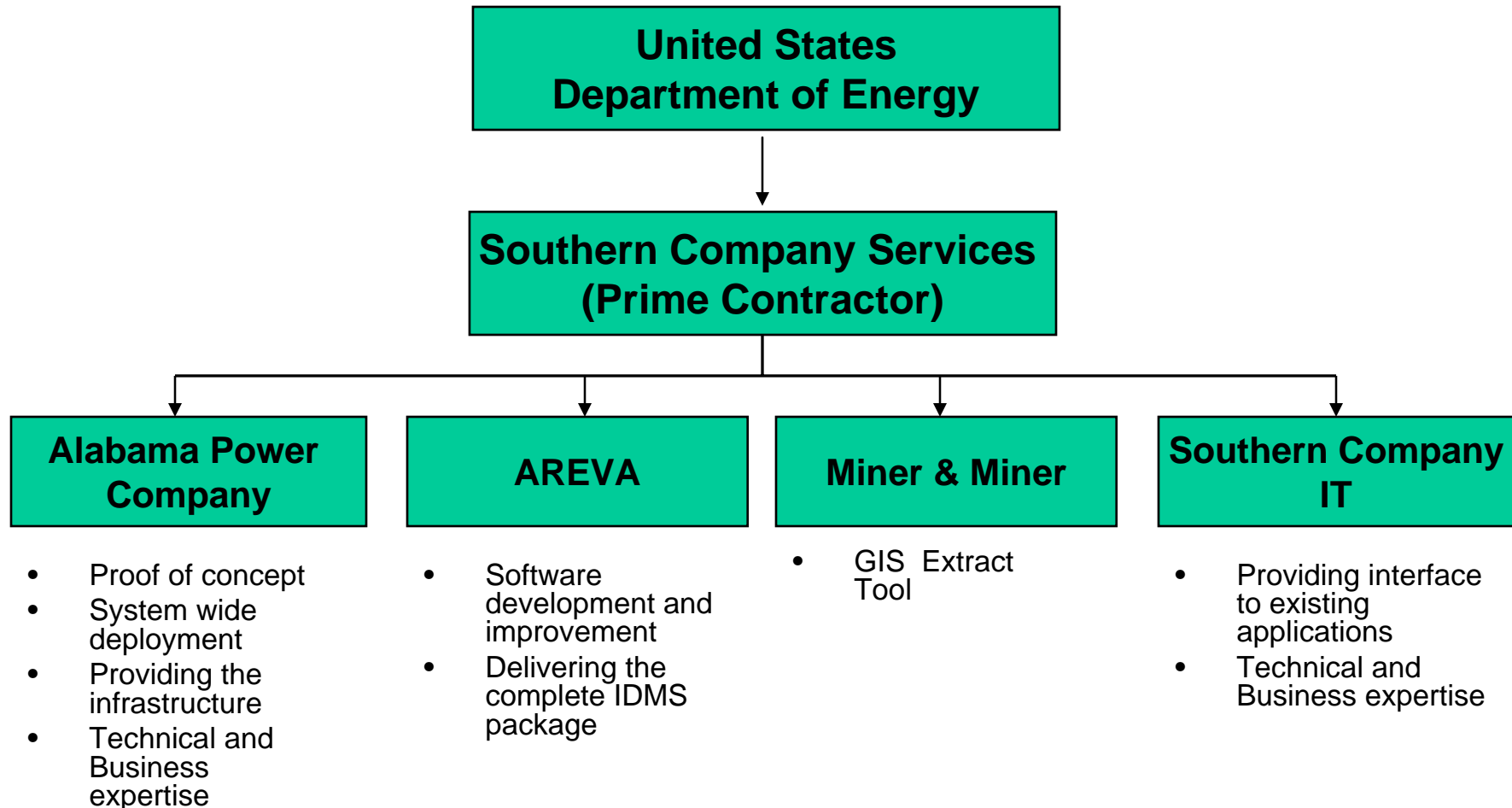
FY 2006 Plans

- Continue specifications and requirements of IDMS
- Complete GIS Data Extract tools
- Begin enhancements to EMB systems
- Begin Network View of IDMS including electrical component display and other GIS info
- Prototypes of Switching Operations
- Prototypes of Network Analysis Functions
 - Reconfiguration w/ Advanced Power Flows and Short Circuit Analysis
 - Other advanced applications

FY 2007 Plans

- Continue Application Integration and Appropriate Development
- Start and complete all interface design
- Complete prototyping
- Complete System Integration procedures
- Factory Acceptance Tests
- Site Acceptance Tests
- Define future IDMS activities

Project Organization and Participants



Technical and Economic Benefits

- **Power flow analysis with Volt/Var/Loss Optimization:**
 - Industry reports estimate the recoverable losses range from .5% to as high as 4.1% of the kW hour's sold at a typical utility
 - Alabama Power sold 33 billion kW hours in 2003
- **IDMS Assumptions**
 - .1% recoverable losses @ .06/kWh equates to **\$2,000,000** in annual savings
 - A 5% decrease in losses would equate to a **\$10,000,000** annual savings

Benefits

- **Utilizing FISR within the IDMS system will reduce SAIDI to our customers**
 - Average APC customer experienced an outage of 132 minutes/year in 2003
 - A 33% reduction in outage duration would equate to a gain in revenues of over \$160,000 at APC alone
 - Customer productivity would improve in a like manner

Additional Benefits, Barriers & Impact

- **Additional Benefits:** Single user interface with complete functionality, “Modernized Grid”, Distribution Operator Training Simulator
- **Barriers:** Limited funds, Intellectual Property protection, industry adaptation of “Advanced Distribution Systems”
- **Impact:** IDMS will provide a common method of information presentation and interaction, something not available today but needed for operating an Advanced Distribution System. If fully implemented, IDMS should allow even the smallest of distribution system operators to function in an optimal configuration and recoup millions of dollars through reliability and loss avoidance alone.

Summary

- **As Distribution Systems become more complex, and capable, IDMS will be allow operation at optimized configurations and parameters**
- **Benefits come from all areas:**
 - Faster and more accurate operator decisions
 - System operating efficiencies increased
 - Intelligent systems allow analysis before implementing any operations
- **Common Electronic User Environment ties all distribution system functions into one integrated package**
- **Loss avoidance alone can justify IDMS functionality**

IDMS Project Contact Information

Joe Schatz

Southern Company
600 North 18th Street
Birmingham, AL 35291
(205) 257-5047
jeschatz@southernco.com