Integrated Distribution Management System

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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

- 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

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Major Project Milestones

End of Funded IDMS Project

FY06 Annual Program and Peer Review Meeting
San Ramon, California
May 25-26, 2006
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

United States Department of Energy

Southern Company Services (Prime Contractor)

Alabama Power Company
- Proof of concept
- System wide deployment
- Providing the infrastructure
- Technical and Business expertise

AREVA
- Software development and improvement
- Delivering the complete IDMS package

Miner & Miner
- GIS Extract Tool

Southern Company IT
- Providing interface to existing applications
- Technical and Business expertise
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**
  – 0.1% 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

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