
How Graphic Representations of Outages at Alabama Power Are Made Simple

Presentation Overview

- ✘ This presentation will discuss the steps we took at Alabama Power using GIS to create a couple of different maps of outages reported in our Outage Management System.
- ✘ Reasons Outage Maps Developed
 - ✘ Executive Dashboard
 - ✘ Update Media

Presentation Agenda

- ✘ Alabama Power—Who are we?
- ✘ How Our Outage Management System (OMS) Functions
- ✘ Maps
 - Real Time Outage Map
 - Historic Outage Map
- ✘ The Future
 - AMI (Advanced Metering Infrastructure)
 - IDMS** (Integrated Distribution Management System)

Alabama Power Company

- ✘ Affiliate of The Southern Company
- ✘ Headquartered in Birmingham, Alabama

Employees

Employees.....6,980

Customers

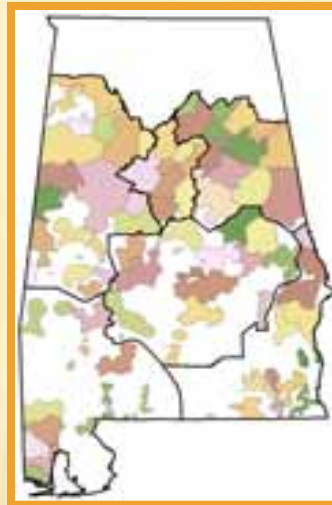
Total.....1,431,334
Residential.....1,207,883
Commercial.....216,830
Others*6,621

Miles of Line

Total.....89,648

Transmission
Total.....10,218

Distribution
Total.....79,430



Service Territory

Square Miles.....44,500

Divisions.....6

Operation Centers....82

Transmission and Distribution

Total poles and towers.....1,516,602

Distribution
poles.....1,396,297

Hurricane

Hurricane Katrina

Date: August 2005

Type of storm: Hurricane

Peak customers out: 636,891

Days to restore service: 9



Ice Storms



Ice Storm of 1982

Date: January 12, 1982

Type of storm: Ice

Peak customers out: 250,000

Days to restore service: 9

Ice and Snow



The Blizzard of 1993

Date: March 13, 1993

Type of storm: Snow

Peak customers out: 404,206

Days to restore service: 8

Tornadoes



Straight Line Winds



Afternoon Thunderstorms



Outage Management System

Used to identify the source of outages in the electrical distribution system based on customer calls via an interface to the Customer Accounting System



CUSTOMER ACCOUNT



Outage Management System

Data OMS

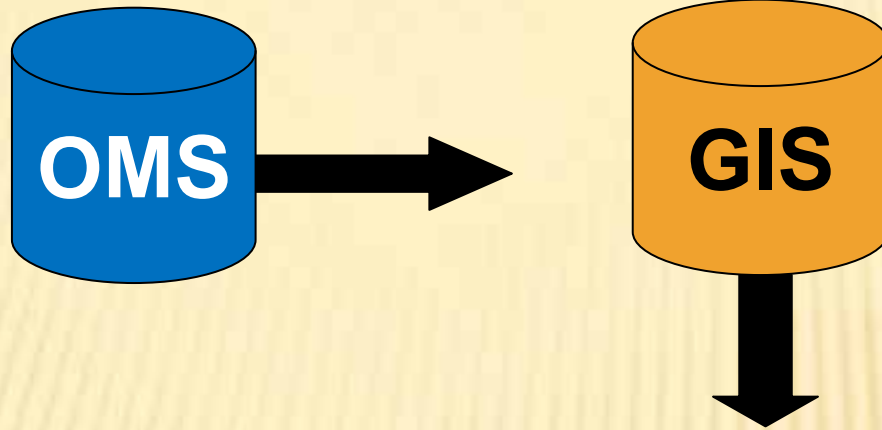
DATA RECEIVED FROM OUTAGE MANAGEMENT SYSTEM TABLE

- OPERATION CENTER
- DEVICE
- # OF CUSTOMERS
- COMMENTS
- TIME (OUTAGE AND RESTORATION)

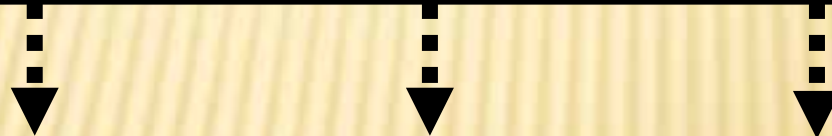
Outage ID	In Use	Operating Center	Feeder Name	Grade	Assigned To	Remarks	First Call	Est. Restore Date/Time	Cust. Calls	Outage Count	Estimated Cust. Out
		CARBON HILL	SAWDOCK RD-NR14542	X	14320 THOMPSON, JEFF		08/12 06:28	08/12 18:00	1	1	1
		CENTREVILLE	SR 1861-3889-A5H-5410	X	14611 DIAL, DONNE		08/12 12:49	08/12 16:30	1	1	1
		DEMOPOLIS	S DEMOP 220H-32730-5488	X	NLC	PRN & NEUT DOWN	08/12 09:58	08/12 16:15	1	1	1
		FAYETTE	FAY 02 40 116-3028-5484	X	14674 MCCOLLUM, BENNY		08/12 13:13	08/12 16:45	1	1	1
		TUSCALOOSA	AIRPORT #1-1136-5410	X	STYRING-BAUGHMAN	tree d g	08/12 10:11	08/12 18:00	1	1	1
		TUSCALOOSA	FAY HWY-3935-183-5411	X	14810 HEWITT, KELVIN		08/12 12:12	08/12 14:30	1	1	1
		TUSCALOOSA	HARDING HWY-34784-H02-5410	X			08/12 13:06		1	1	1
		TUSCALOOSA	SAUL RD-34864-WEST-5410	X			08/12 13:08		1	1	1
		WETFIELD	WVN TD-4892-5487	X	14656 CROSS, BILLY		08/12 11:58	08/12 16:15	1	1	1

OP CENTER	SWITCH	# OF CUST	COMMENTS	OUTAGE REPORT	SERVICE RESTORE
TUS	T101	30	BROKEN POLE	08/12 6:30	08/12 12:00
TUS	T103	45		08/12 6:45	08/12 15:00
TUS	T105	200	TREE DOWN BROKEN POLE	08/12 7:00	08/12 19:00
BHAM	B201	10		08/13 9:00	08/13 13:00
BHAM	B203	60		08/13 7:15	08/13 12:30
BHAM	B206	300	WIRE DOWN	08/13 10:00	08/13 17:30

Data Structure



REAL TIME OUTAGE GRAPHIC

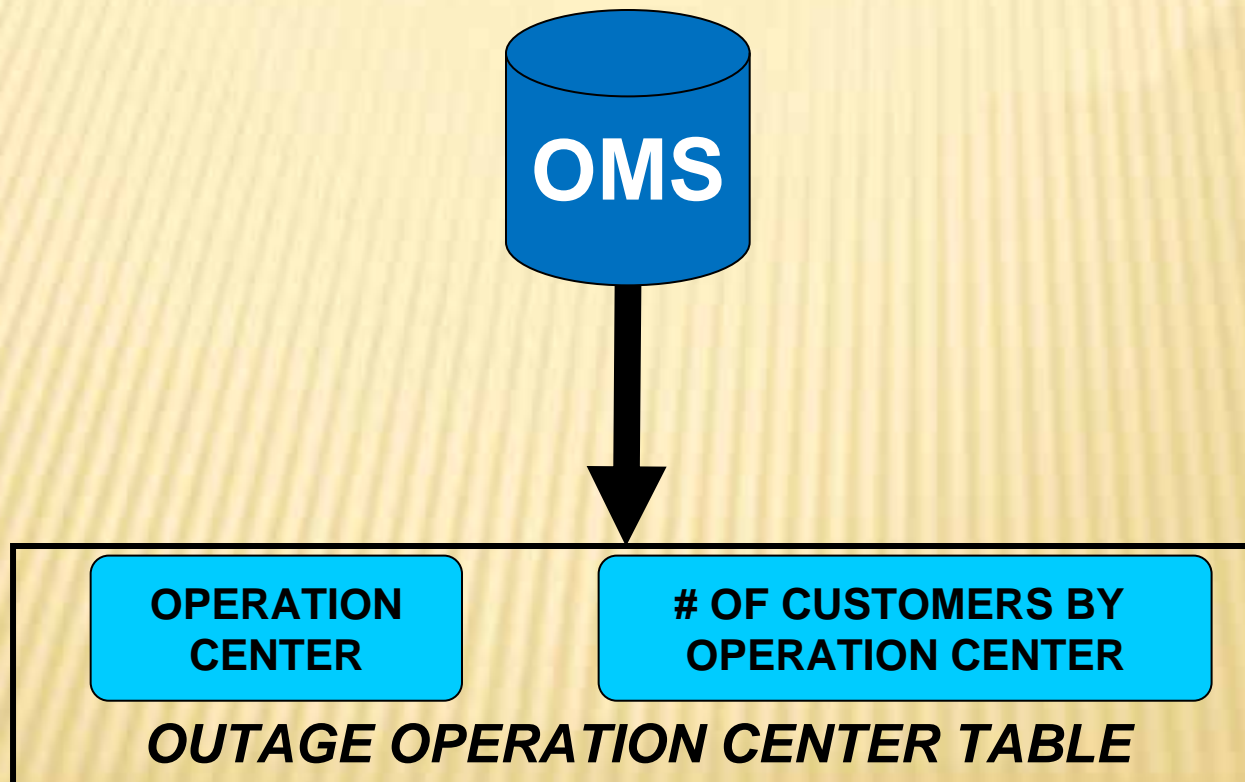


**HISTORIC OUTAGE
ANALYSIS**

Data Structure

◎ OPERATION CENTER TABLE

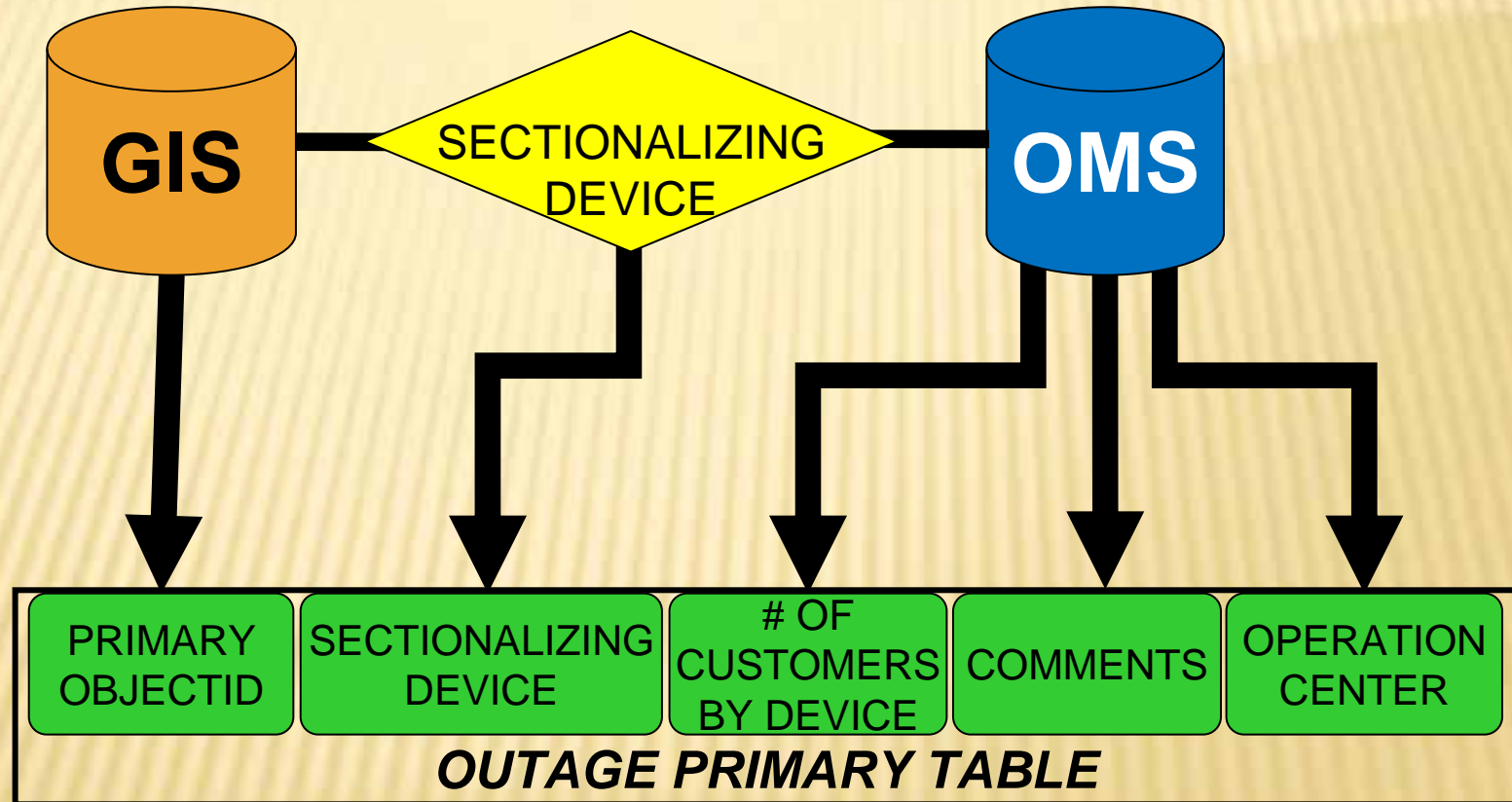
Contains Operation Center and Number of Customers Out by Operation Center Directly from OMS



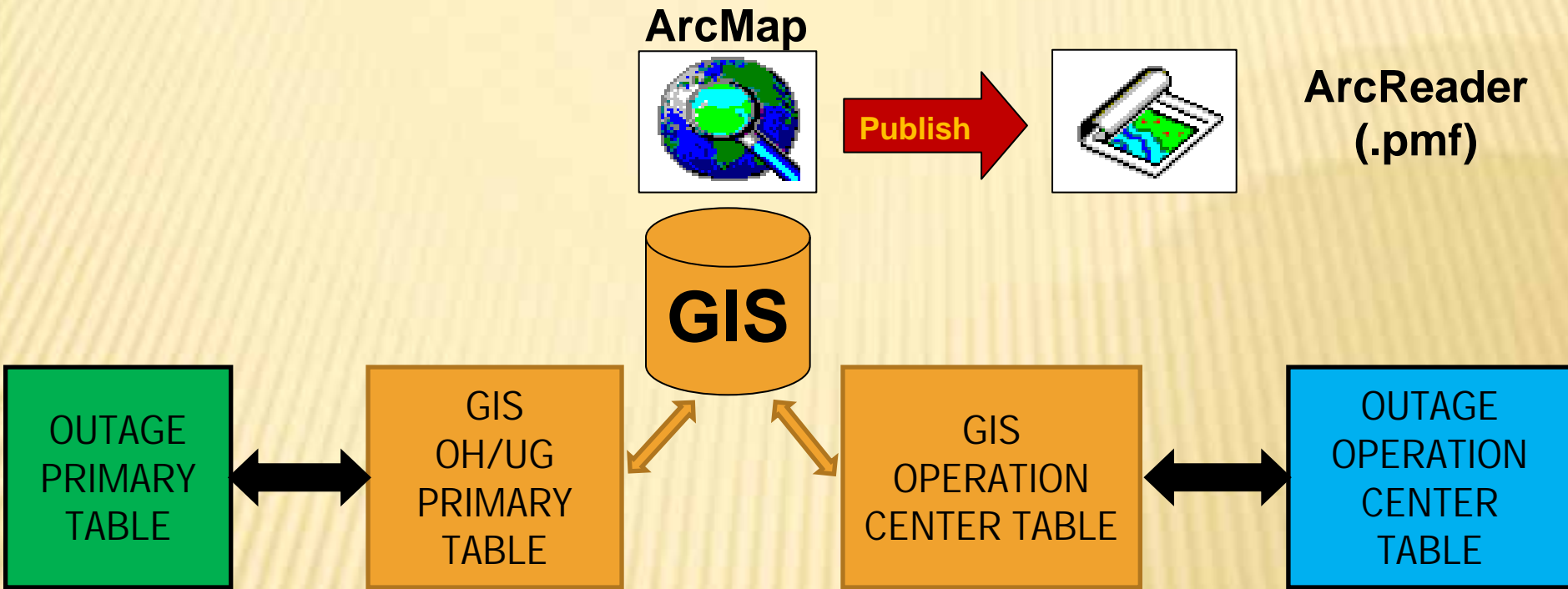
Data Structure

PRIMARY TABLE

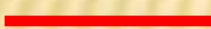

Created by Joining Primary Table with OMS Table Based on Sectionalizing Device





Data Structure



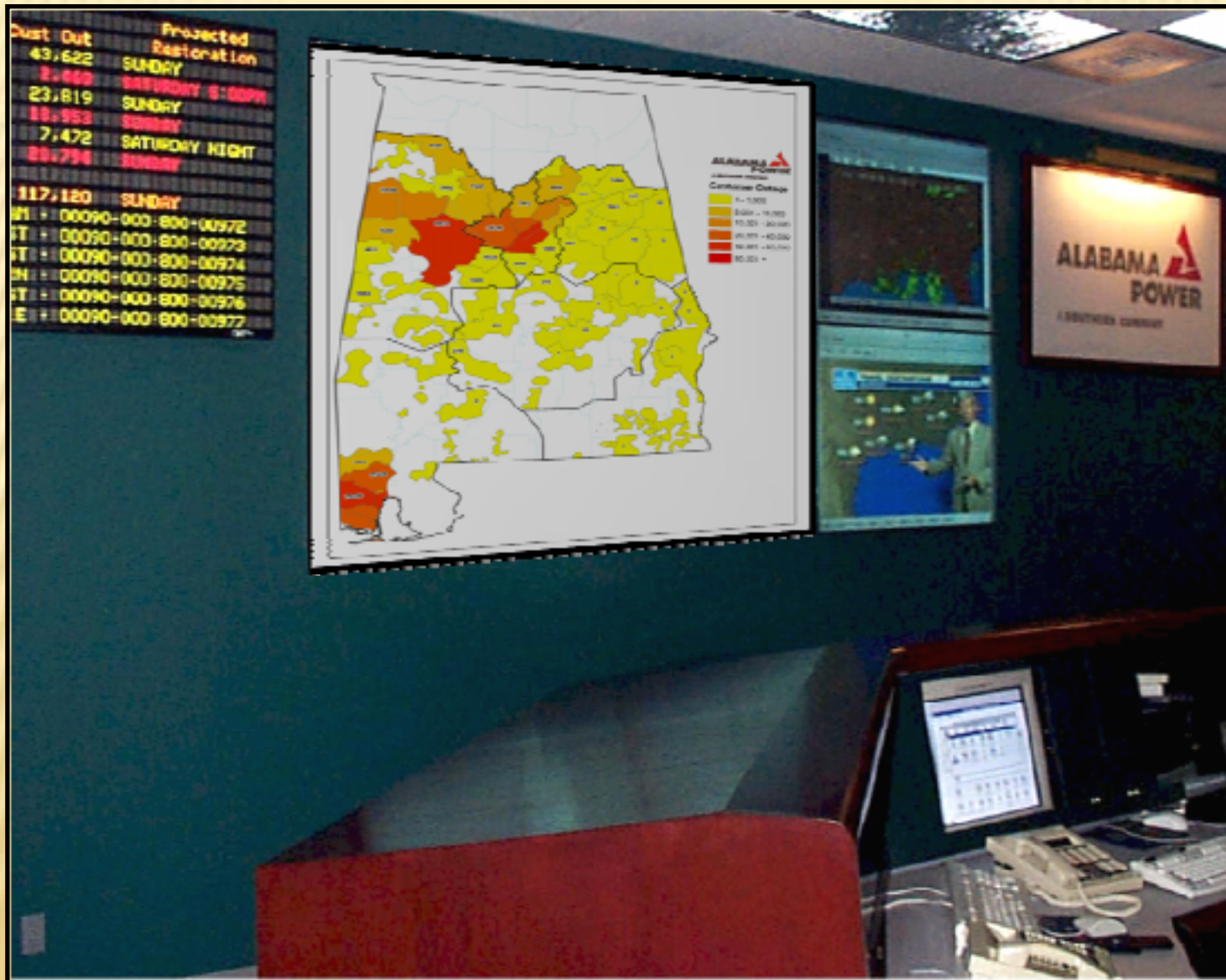
PRIMARY SYMBOLOGY

-  Energized
-  De-Energized

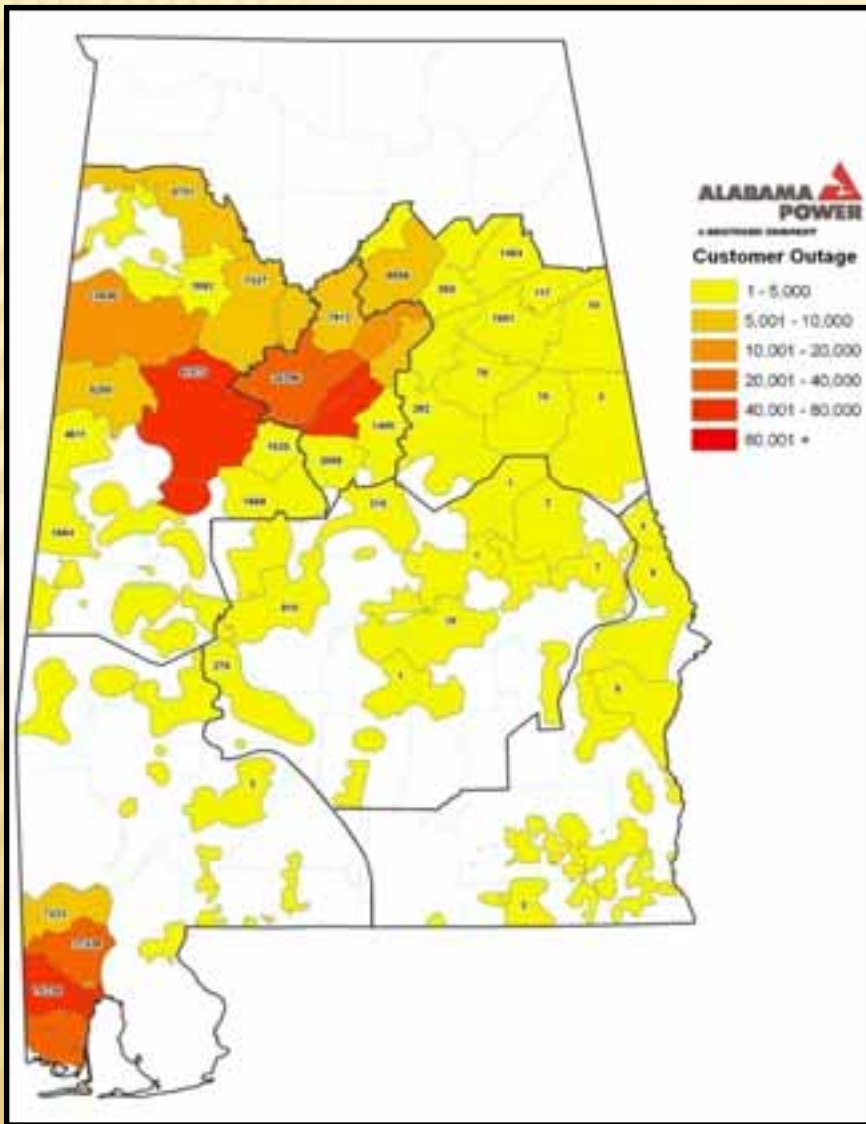
OP CENTER SYMBOLOGY

-  1 - 5,000
-  5,001 - 10,000
-  10,001 - 20,000
-  20,001 - 40,000
-  40,001 - 80,000
-  80,001 +

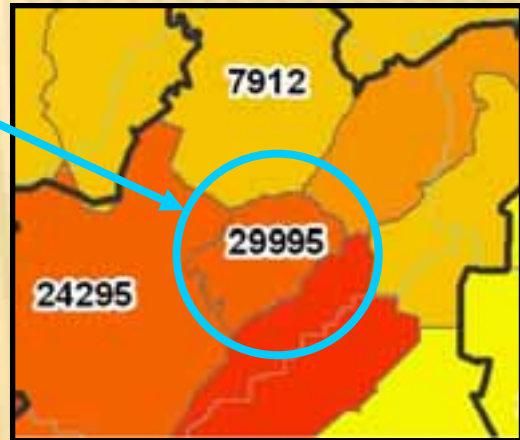
Real Time Outage Map



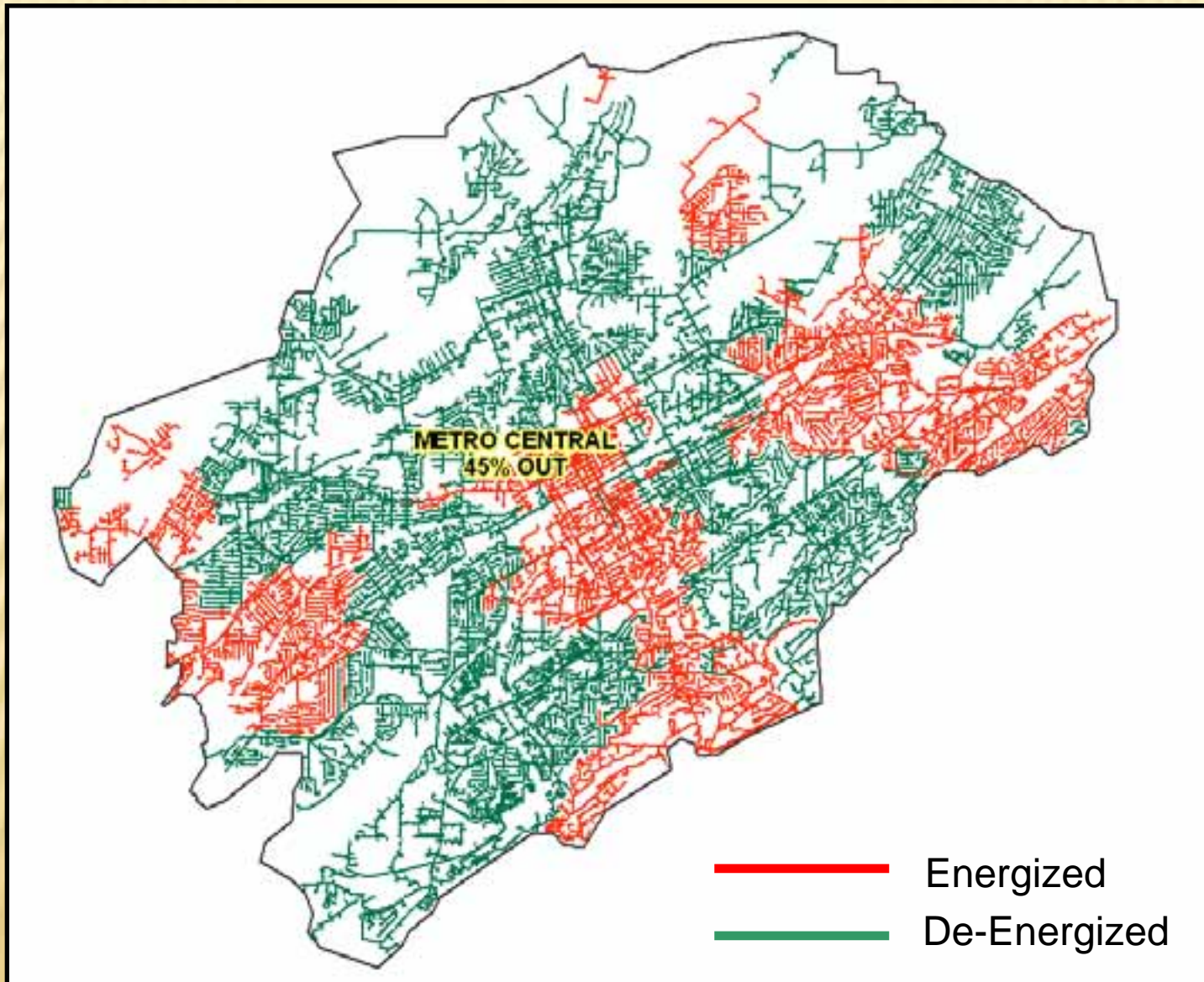
Outage Map at State Level



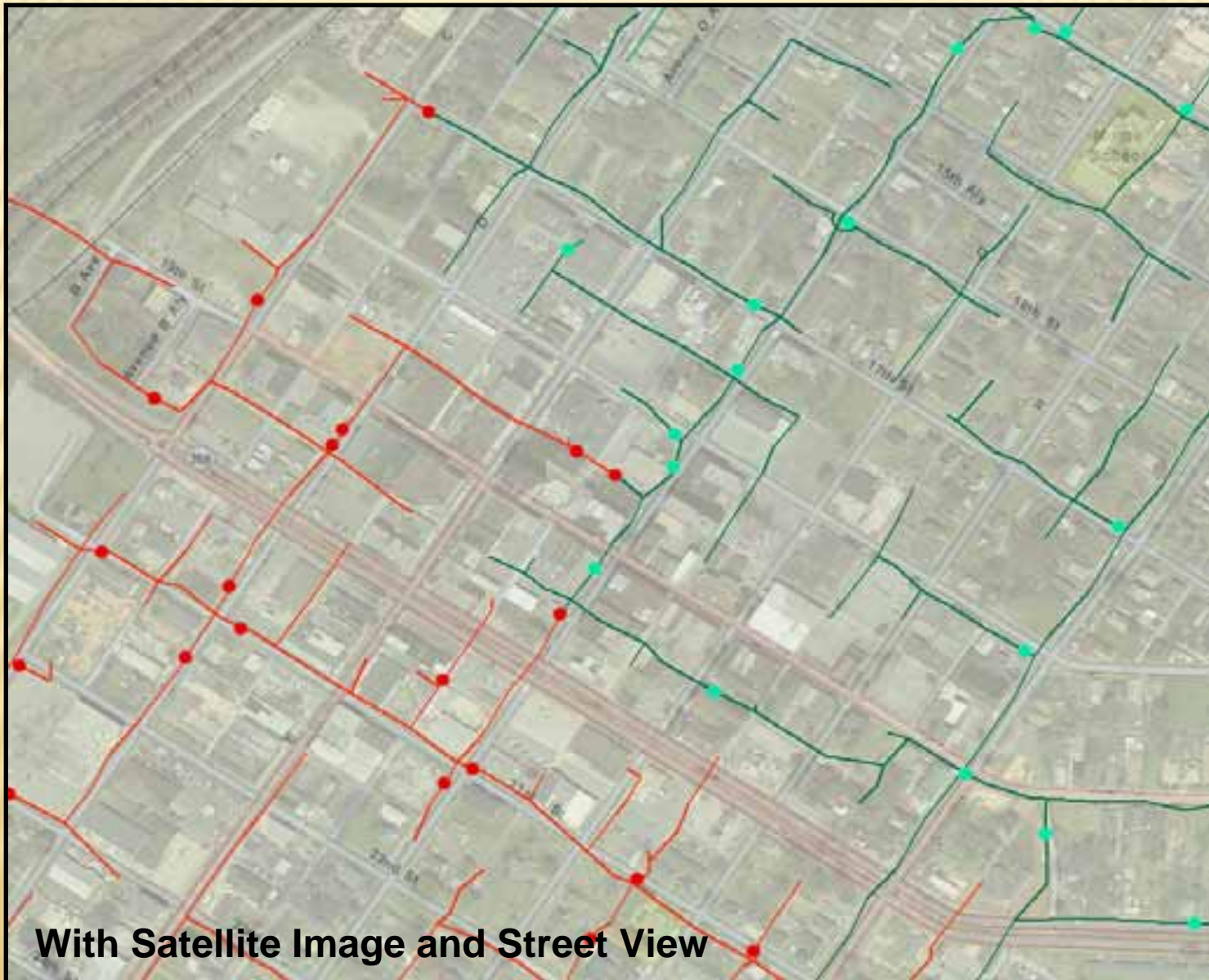
- + APCO
- Birmingham
 - Substations
 - BIRMINGHAM DIVISION
 - + ALL BIRMINGHAM
 - + MetroCentral
 - + EastJefferson
 - + WestJefferson
 - + Leeds
 - + Columbiana
 - + MetroSouth
 - + Gardendale
 - + ESRI_StreetMap_World_2D
 - + ESRI_Imagery_World_2D
- + Southeast
- + Mobile
- + Eastern
- + Western
- + Southern
- + Map Legend



Outage Map at Operation Center Level

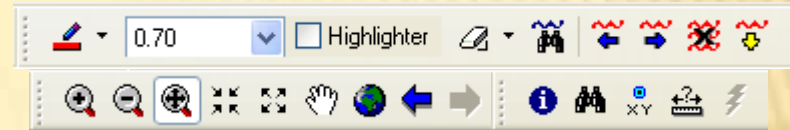
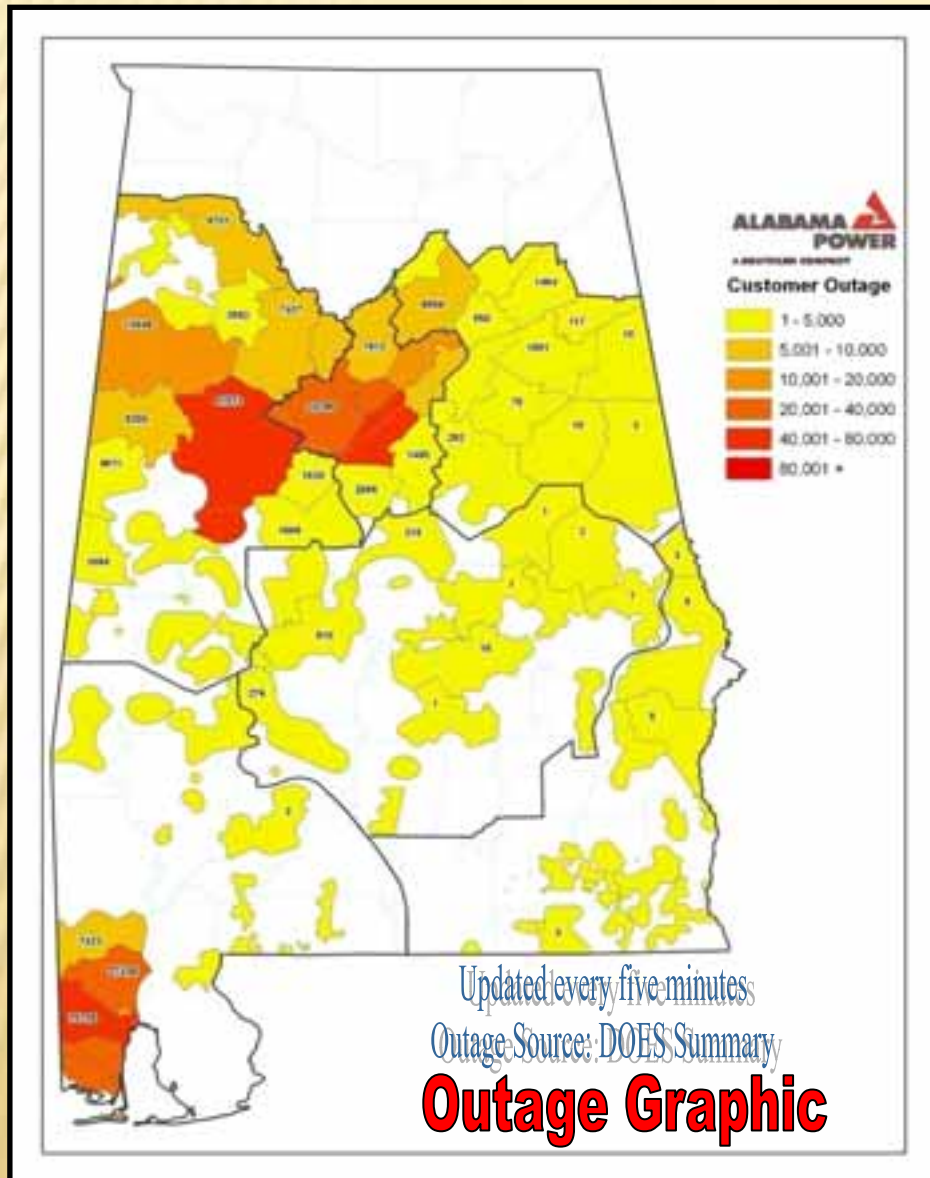


Outage Map at Primary Level



With Satellite Image and Street View

Outage Map in ArcReader



✘ TOOLS

- + Zoom in/out
- + Pan
- + Go to previous/next extent
- + View spatial bookmarks
- + Searching by address or feature
- + Identify features
- + Hyperlink tool
- + Measure features
- + Mark-up capabilities



Historic Outage Map



- ✘ Post Storm Restoration
- ✘ Shows Storm Impact and Restoration Efforts
- ✘ Helps Analyze Past Storm Operation in Preparation for Future Events
- ✘ Tracking Analyst Tool (ESRI)

Historic Outage Maps

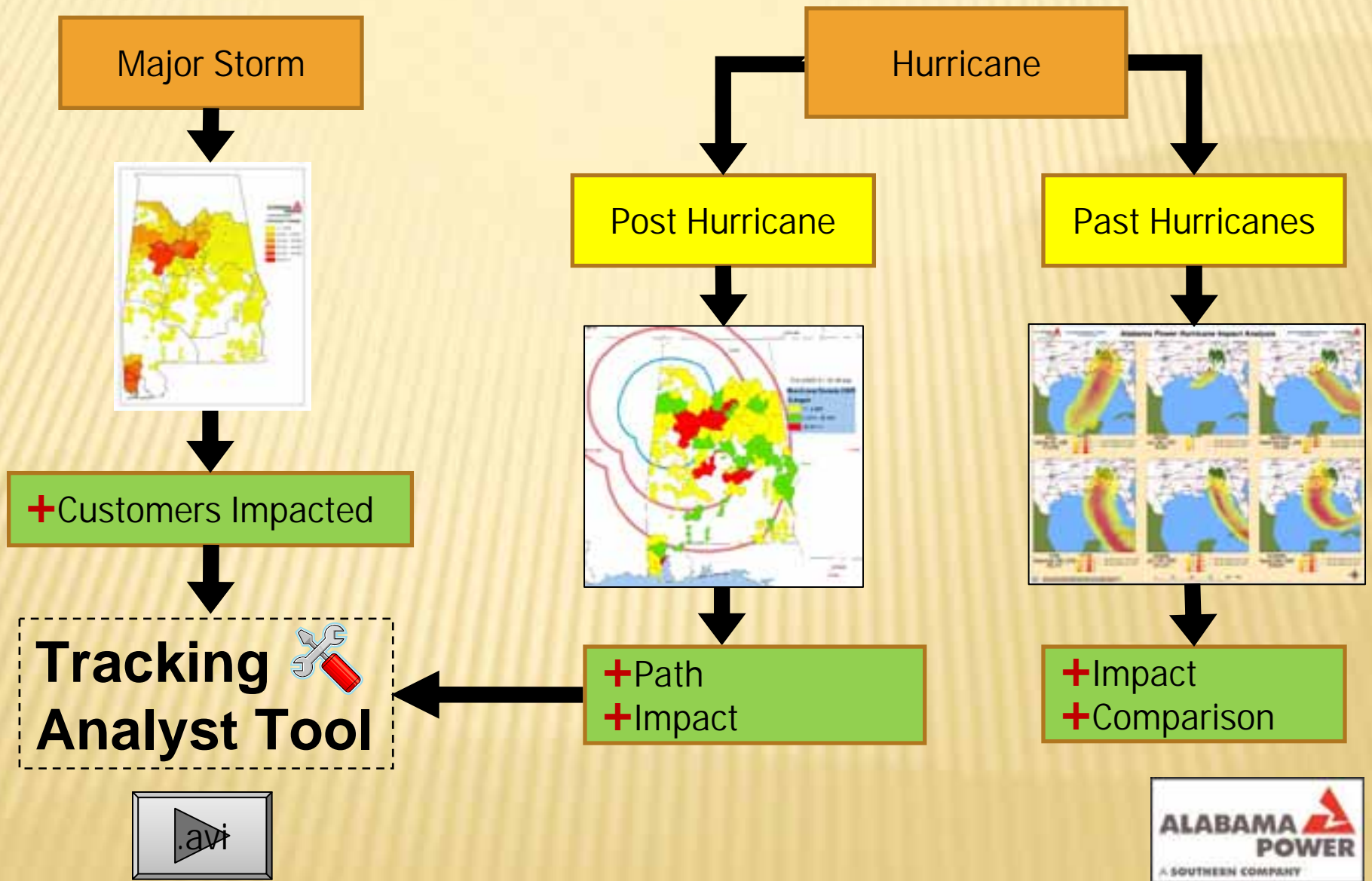
✘ Data Sources

- + OMS
- + Wind Band Shapefile
- + APCO GIS Database
- + ESRI Resource Center

(Imagery, Weather Radar, and Street Maps)



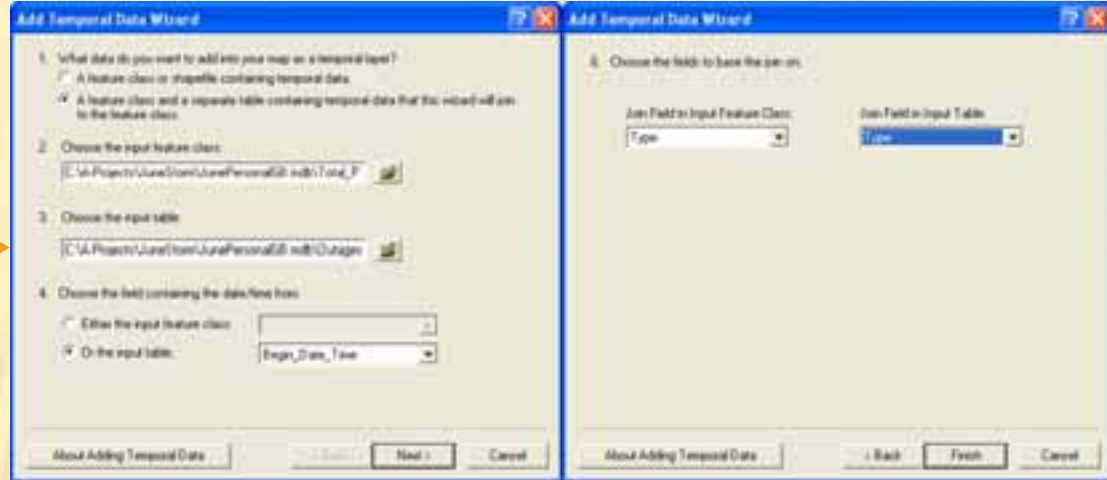
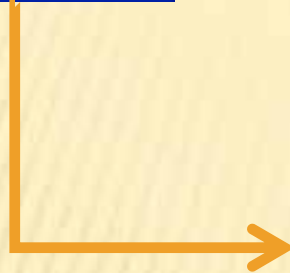
Historic Outage Maps



Tracking Analyst (ESRI Extension)



How to
Add
Temporal
Data



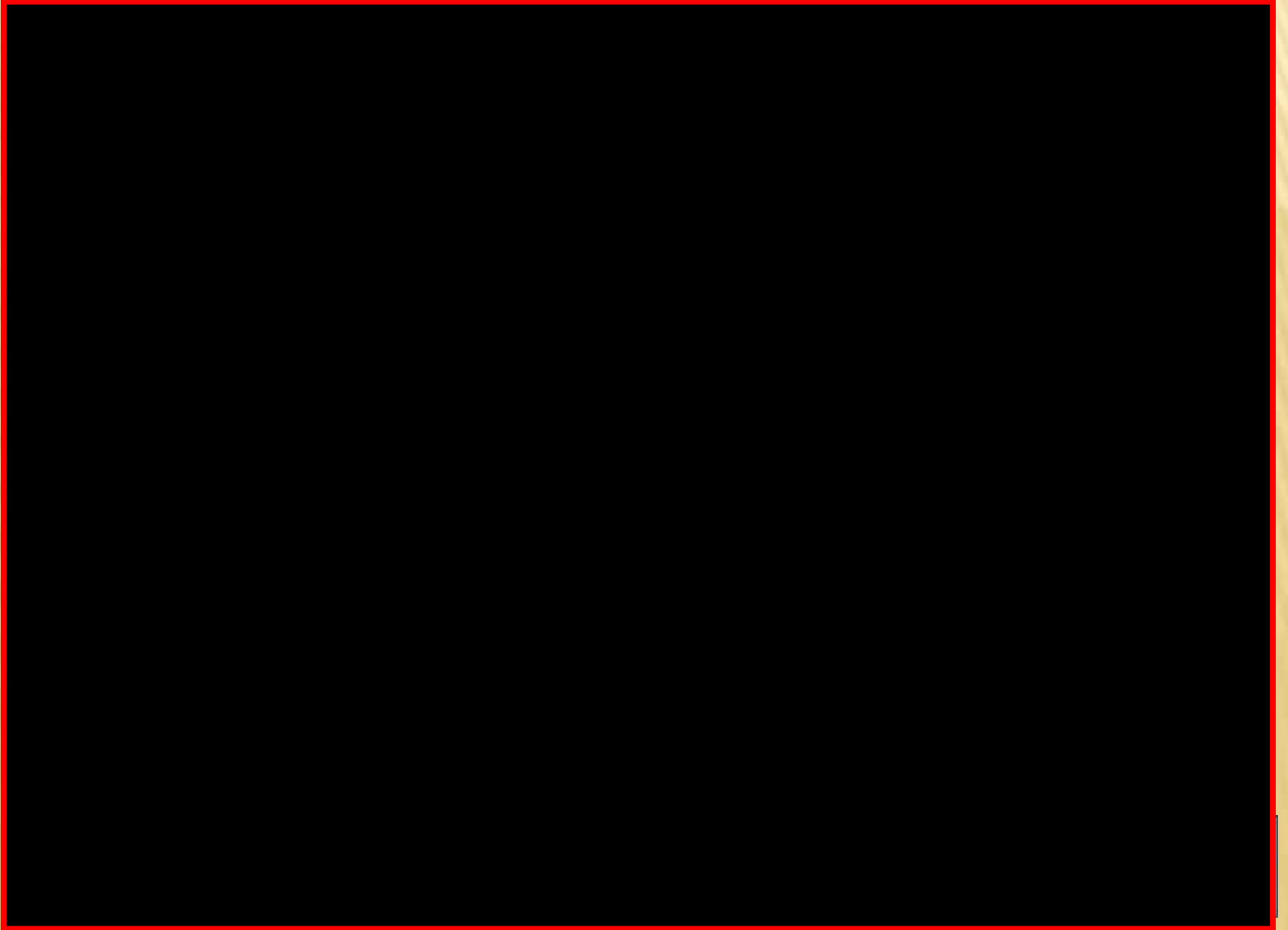
How to Customize Layer



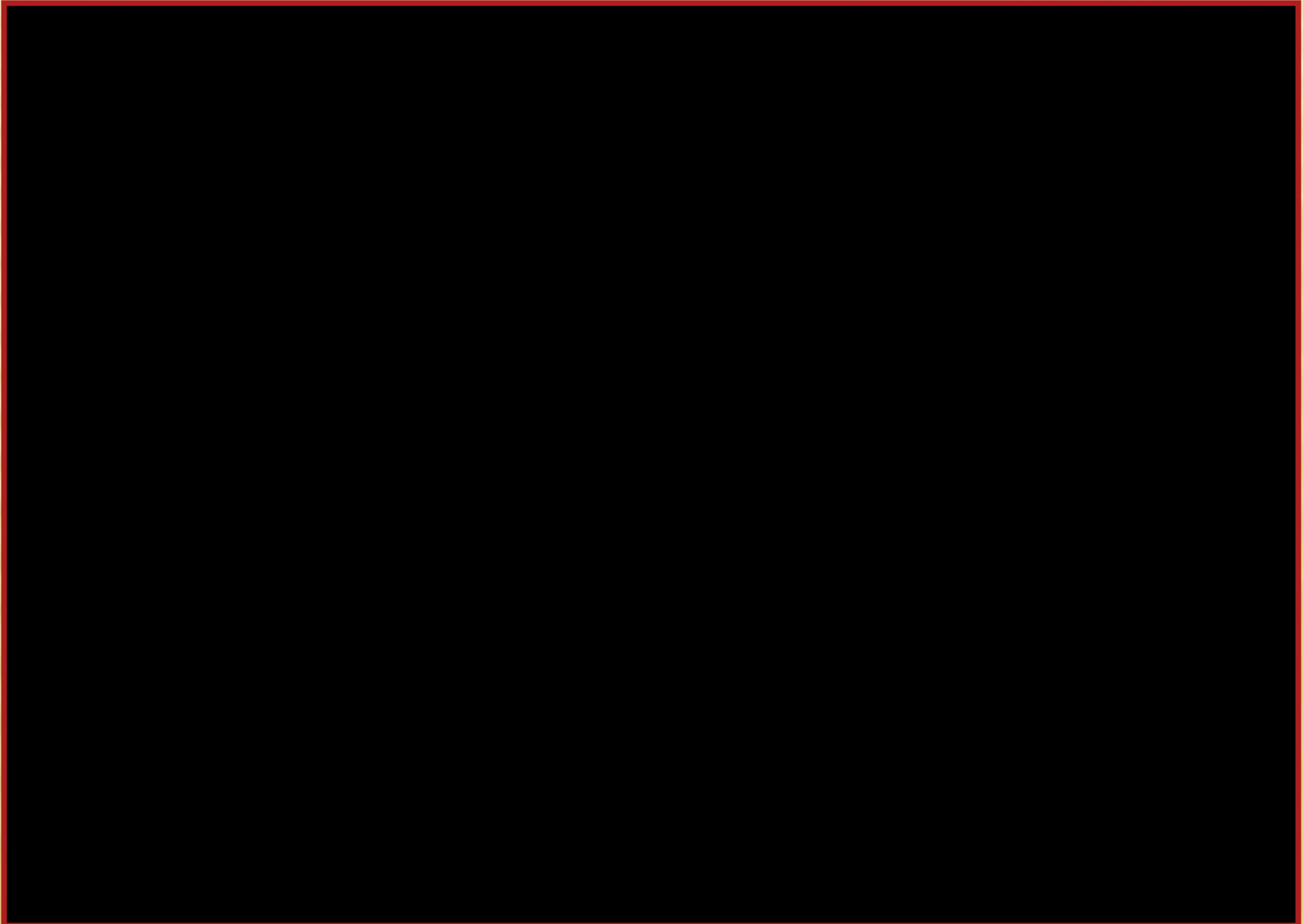
How to Play Back Data



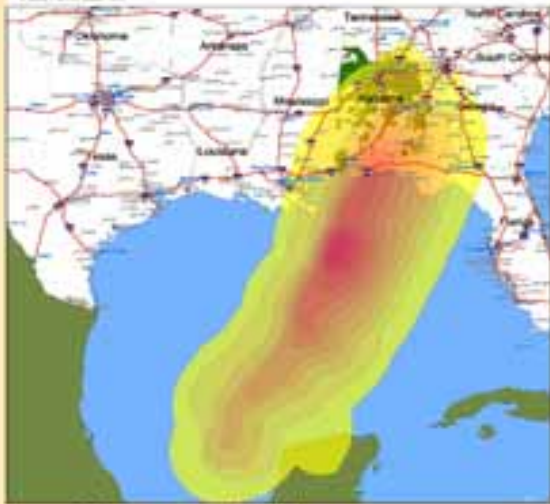
Historic Storm Video (June 2009)



Historic Storm Video (Hurricane Dennis 2005)



Alabama Power Hurricane Impact Analysis



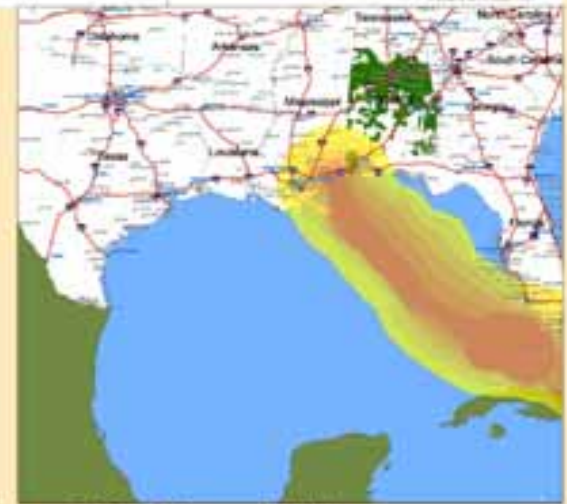
OPAL
October 4th, 1995
475,869

Speed, MPH	City with Population under 100,000	City with Population over 100,000
40	1	1
50	1	1
60	1	1
70	1	1
80	1	1
90	1	1
100	1	1
110	1	1
120	1	1
130	1	1
140	1	1
150	1	1



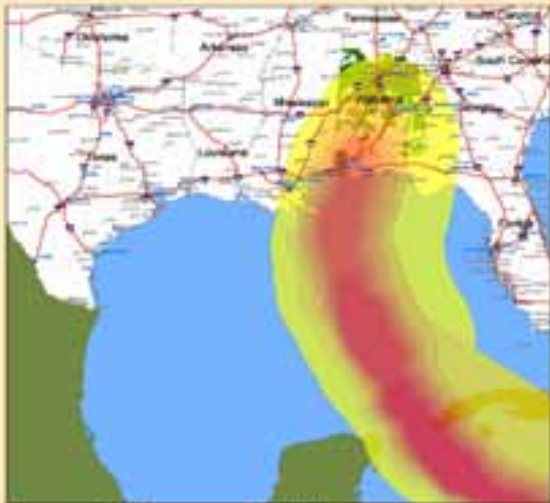
DANNY
July 19th, 1997
36,605

Speed, MPH	City with Population under 100,000	City with Population over 100,000
40	1	1
50	1	1
60	1	1
70	1	1
80	1	1
90	1	1
100	1	1
110	1	1
120	1	1
130	1	1
140	1	1
150	1	1



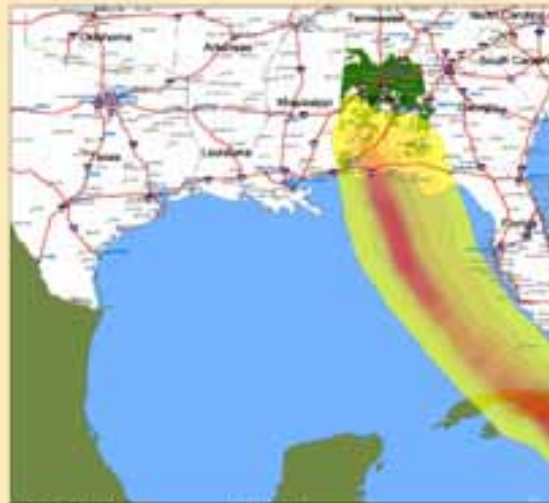
GEORGES
September 27th, 1998
148,596

Speed, MPH	City with Population under 100,000	City with Population over 100,000
40	1	1
50	1	1
60	1	1
70	1	1
80	1	1
90	1	1
100	1	1
110	1	1
120	1	1
130	1	1
140	1	1
150	1	1



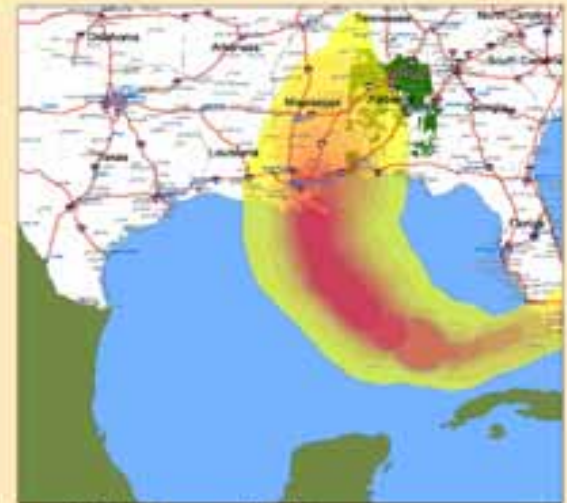
IVAN
September 16th, 2004
825,701

Speed, MPH	City with Population under 100,000	City with Population over 100,000
40	1	1
50	1	1
60	1	1
70	1	1
80	1	1
90	1	1
100	1	1
110	1	1
120	1	1
130	1	1
140	1	1
150	1	1



DENNIS
July 11th, 2005
241,214

Speed, MPH	City with Population under 100,000	City with Population over 100,000
40	1	1
50	1	1
60	1	1
70	1	1
80	1	1
90	1	1
100	1	1
110	1	1
120	1	1
130	1	1
140	1	1
150	1	1



KATRINA
August 29th, 2005
636,891

Speed, MPH	City with Population under 100,000	City with Population over 100,000
40	1	1
50	1	1
60	1	1
70	1	1
80	1	1
90	1	1
100	1	1
110	1	1
120	1	1
130	1	1
140	1	1
150	1	1

Future Outage Management

- ✘ Advanced Metering Infrastructure (AMI)
- ✘ Integrated Distribution Management System (IDMS)



Future Outage Management

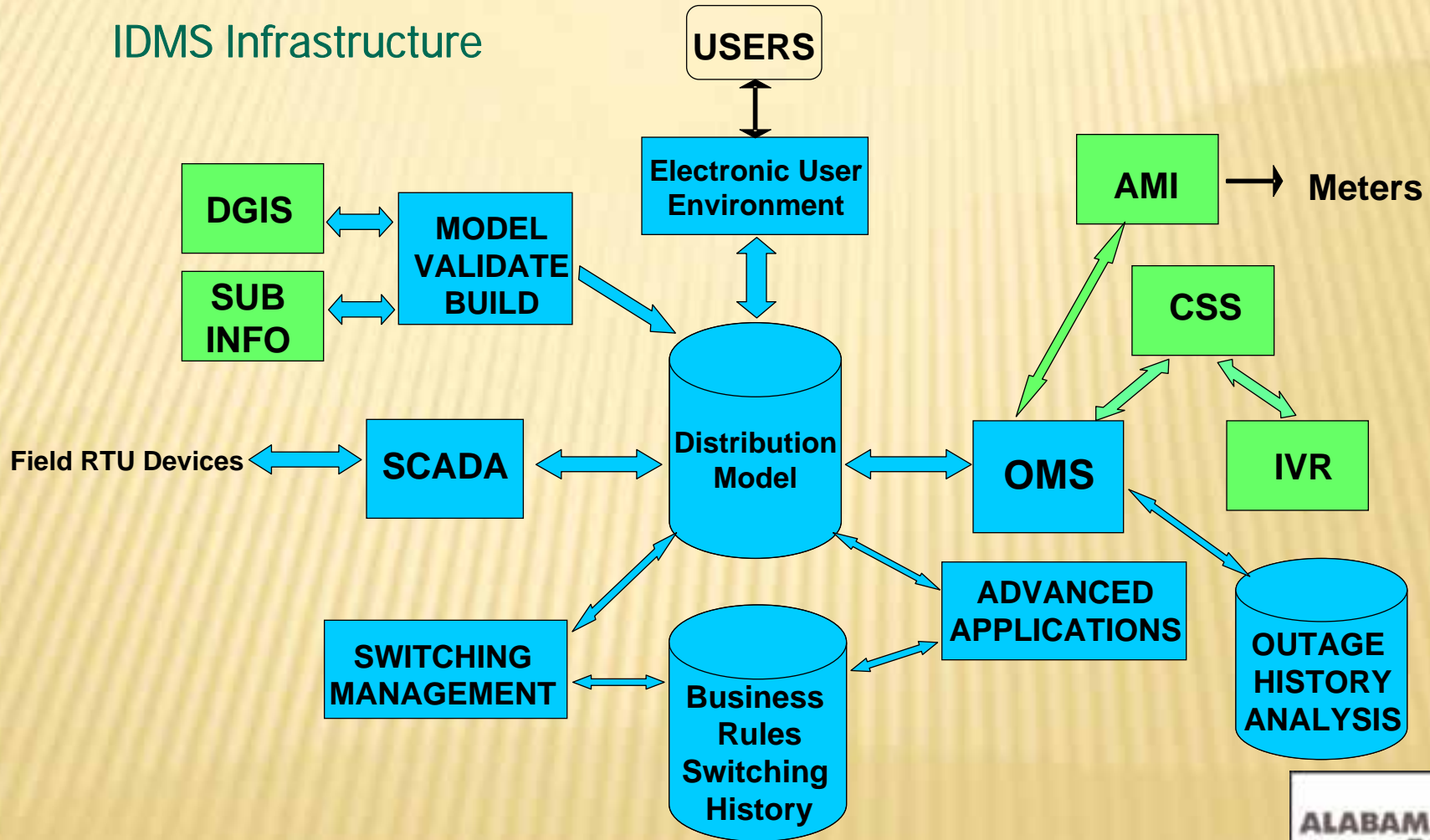
- ✘ Advanced Metering Infrastructure
 - + Read Any Meter Anytime
 - + Voltage Information
 - + Active Power Outage, Power Restoration, and Tamper Detection

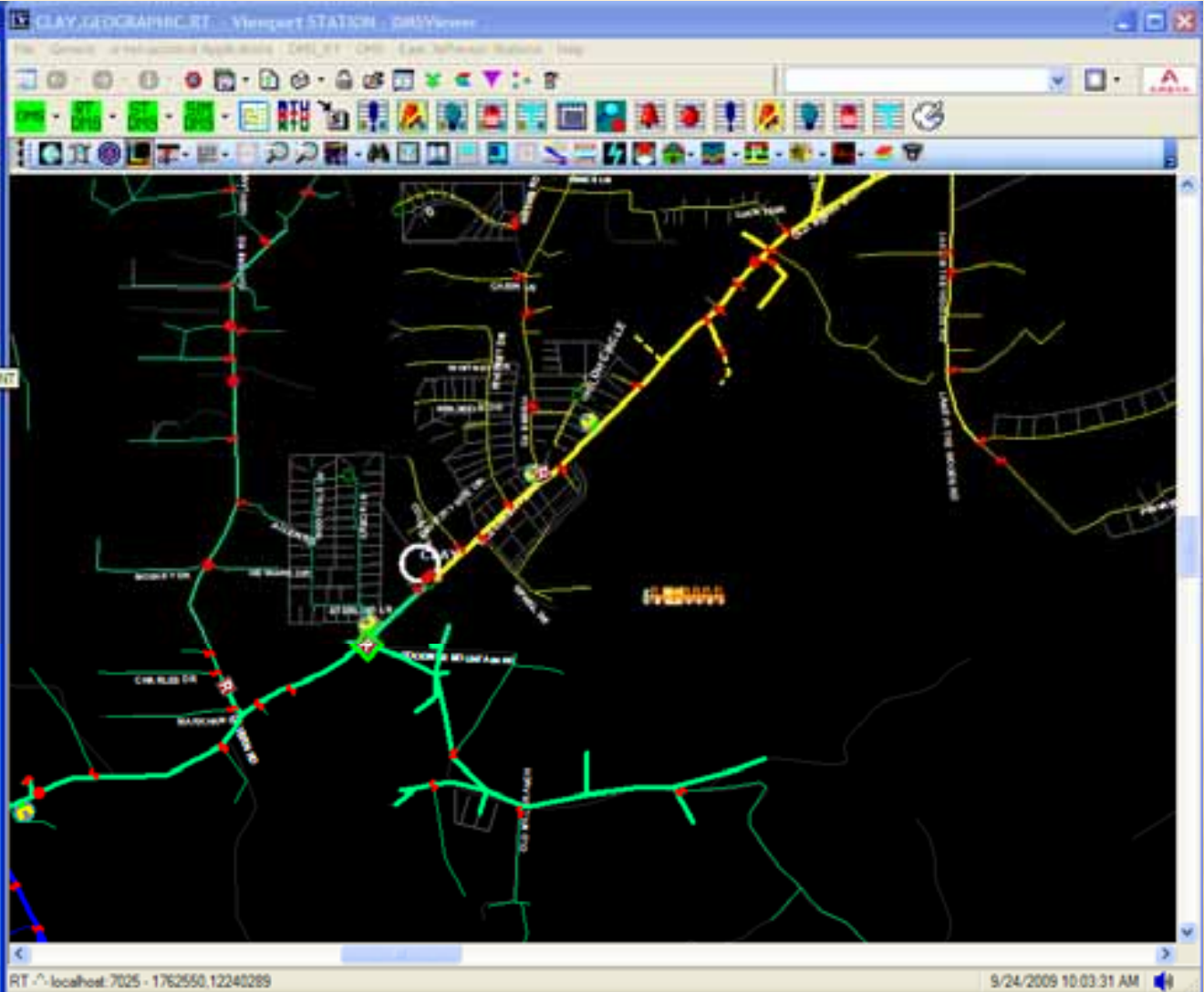


Future Outage Management

✘ Integrated Distribution Management System

IDMS Infrastructure





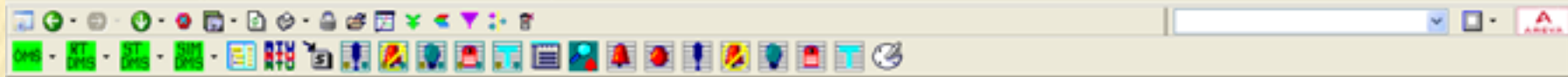
All Events - Viewport ALARM_BANNER - DMSViewer

File Generic e-terracontrol Applications DMS_RT DMS East Jefferson Stations Help

Time	Name	Value	User	Device Time
▲ 24-Sep-2009 09:41:05	PAWNEE 39551 POSN	Closed		24-Sep-2009 09:41:05
▲ 24-Sep-2009 09:41:05	PAWNEE 39539 POSN	Closed		24-Sep-2009 09:41:05
▲ 24-Sep-2009 09:41:05	Data Source MR	Online		24-Sep-2009 09:41:05
▲ 24-Sep-2009 09:41:05	Data Source NS	Online		24-Sep-2009 09:41:05
▲ 24-Sep-2009 09:40:26	MOV&fromShellHeart"atr	Failed		24-Sep-2009 09:40:26

▲ JMSWINDA@LOCALHOST | Not Connected

9/24/2009 10:03:31 AM



Feeder



Feeder

Outage Summary

Feeder	Outage Time	#Cnfm	#Prctd	#Cust	ConfOl	PrdOut	Momnt	cnfm	l
CLAY 03916	9/24/2009 9:43:49 AM	1007	0	1815	3	0	0	808	
ARGO 48768	9/24/2009 9:41:19 AM	0	0	1535	1	0	0	1535	
CHALKVILLE 03656	9/24/2009 9:41:19 AM	0	2228	2228	0	1	0	0	

Incident Crew

Incident Detail

Order#	Device	Start Time	ETR	Aft	Called	AMI
267001758	CLAY V4618	9/24/2009 9...	9/24/2009 1...	595	0	0
264000092	N ROEBUCK 05415	9/24/2009 9...	9/21/2009 2...	1297	0	0
264000091	ARGO XT0072	9/24/2009 9...	9/21/2009 2...	10	0	0
264000090	TRUSSVILLE A9691	9/24/2009 9...	9/21/2009 2...	3	0	0
264000089	ARGO XT0072	9/24/2009 9...	9/21/2009 2...	133	0	0
264000088	N ROEBUCK 05437	9/24/2009 9...	9/21/2009 2...	2206	0	0
267001772	CLAY V4620	9/24/2009 9...	9/24/2009 1...	396	0	0
267001763	CLAY V3153	9/24/2009 9...	9/24/2009 1...	16	0	0
264000132	CHALKVILLE 03656	9/24/2009 9...	9/21/2009 4...	2228	1475	0

THANKS FOR YOUR TIME!

QUESTIONS?

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