New Technologies

Virginia Pilot Project Phases I, II, and III


One Call Technology Pilot Project
VUPS

Over-notification with Current System

Over-notification with Current System

Over-notification with Current System

Members:

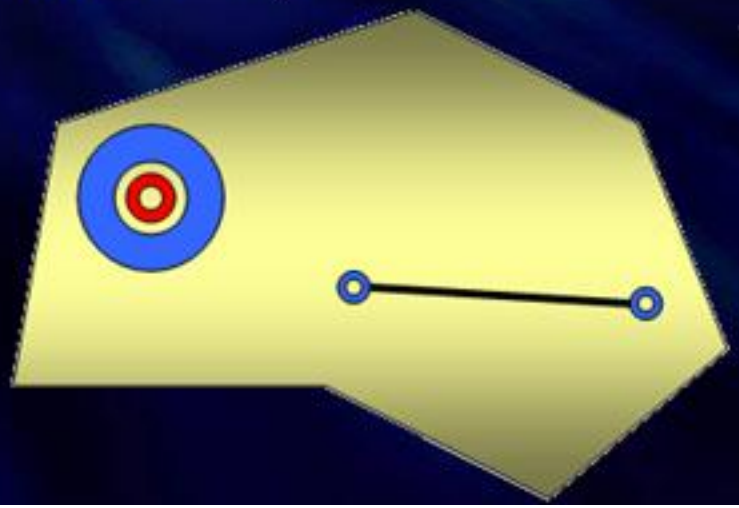
CGCH10 = COLUMBIA GAS/UTILIQUEST	CHC009 = CHESTERFIELD CO. WATER
CMC906 = COMCAST COMMUNICATIONS	DOM100 = DOMINION VIRGINIA POWER
QWES05 = QWEST COMMUNICATIONS	VZN283 = VERIZON COMM.

Members

Code	Name	Type
CHC009	CHESTERFIELD COUNTY	BG
DOM100	DOMINION VIRGINIA POWER	R
VZN283	VERIZON COMM. - RICHMOND	O

Virginia One Call Technology Pilot Project

- Phase I: Electronic white lining
  - Excavator using hand-held device gathered GPS coordinate data at proposed excavation site and transmitted electronic locate request ticket to VUPS
  - Excavation areas were: Single point (bulls eye); line; or polygon area
  - Automated map selection by VUPS upon locate request ticket entry based on GPS coordinates



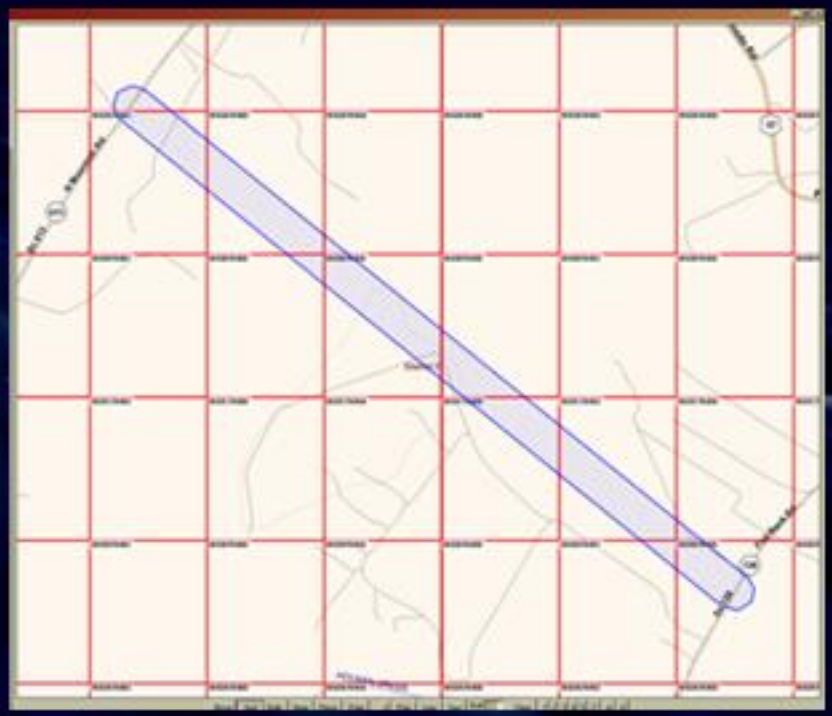
Results From Phase I

Type	Control Area	Percentage of Area Total	Test Area	Percentage of Area Total	Relative Reduction
Total Requests	88,187		2,005		
3Hour Notices	4,274	4.85%	42	2.10%	56.78%
Cancellations	554	0.63%	8	0.40%	36.51%
Code 60	23,184	26.29%	178	8.88%	66.22%
Code 91	4,439	5.03%	68	3.39%	32.60%
Code 93	36	0.04%	0	0.00%	100%
Code 94	535	0.61%	1	0.05%	91.80%

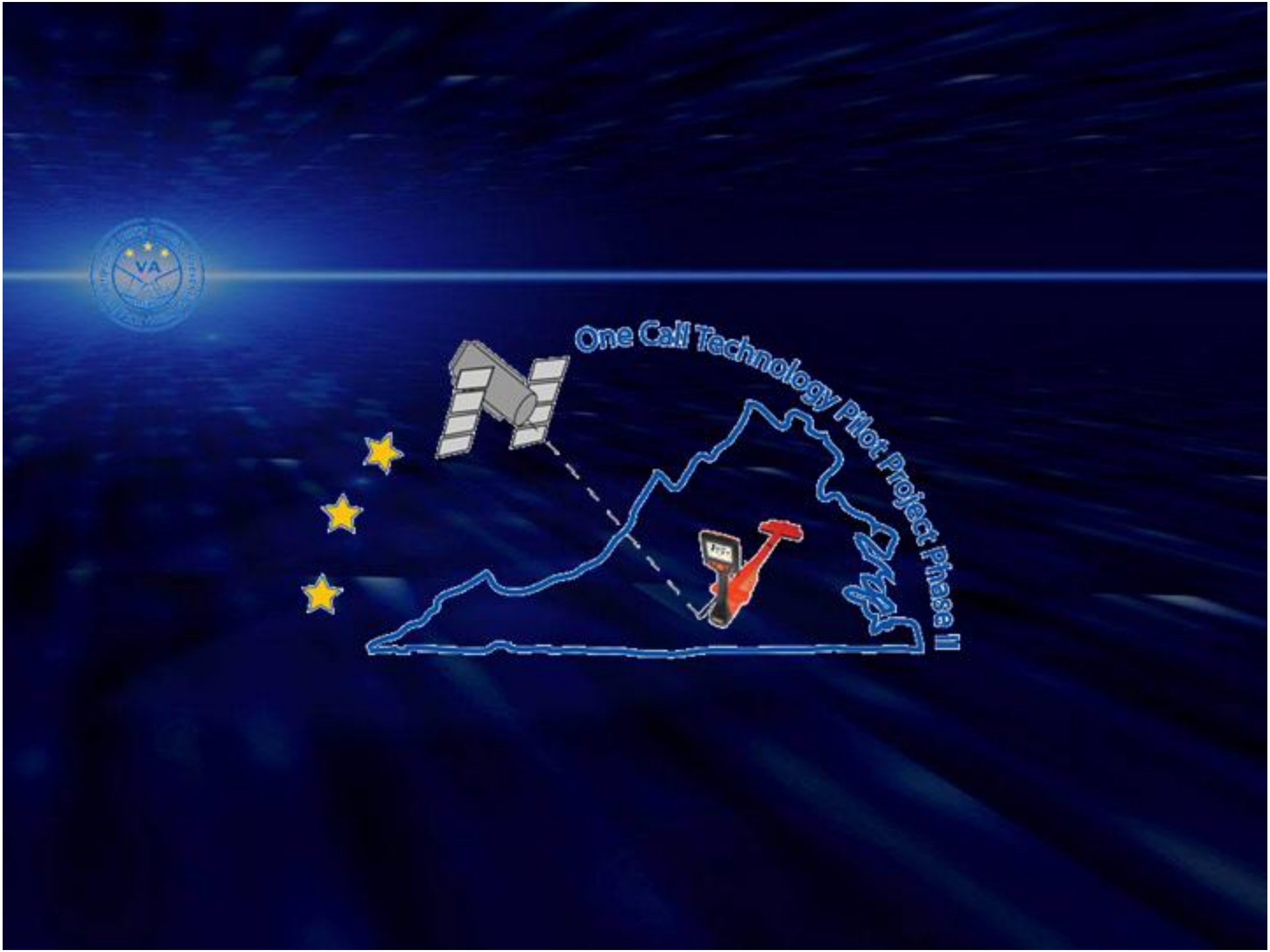
Results from Phase I

Over-notification was reduced by more than 8%

Results from Phase I



Pilot Projects tickets were 89% smaller in size


One Call Technology Pilot Project Phase II

Virginia One Call Technology Pilot Project Phase II

- Locate Facilities and collect GPS data to create electronic manifest
- Provide manifest to excavators with Positive Response System ("PRS") data
- Provide data to operators for verification of maps and plans

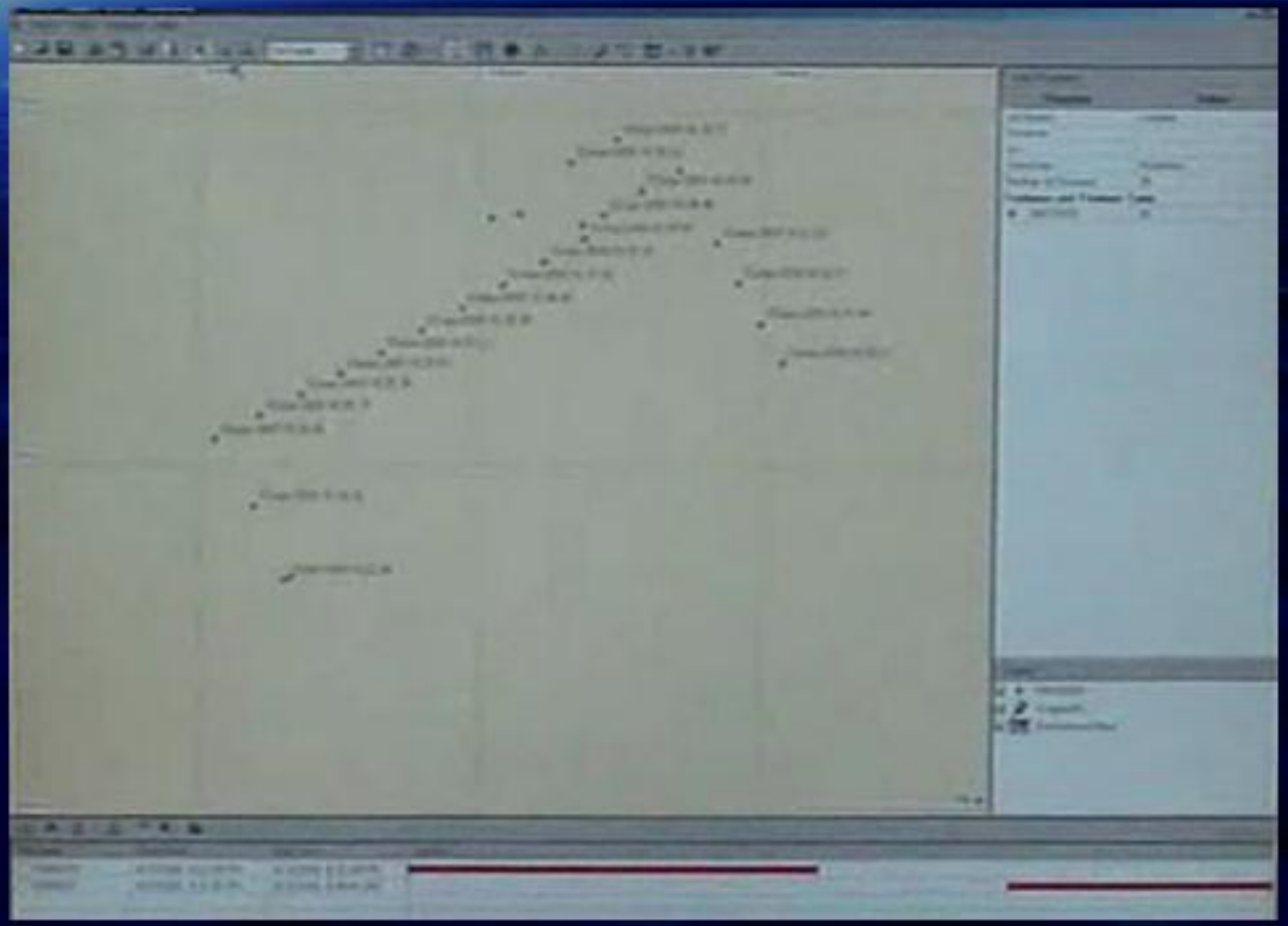
Why Accurate Locate Manifests are Needed

- To Properly document marking of facilities
- To provide an accurate depiction of marks to excavators as a check against marks in the field
- To document compliance with state laws and Part 192 and 195
- To provide accurate information for investigation of incidents
- Etc…

Phase II

Phase II

Phase II



Phase II

Phase III

- Phase III: Electronic Excavation – Utilize GPS with excavation equipment to prevent facility hits
  - Operator's view

GPR Advancements

the Energy to Lead

GTI Research Related to Damage Prevention

> Alicia Farag

Virginia Damage Prevention Conference

April 22nd 2009

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Gas Technology Institute

Solving Important Energy Challenges via:

- > Contract Research
- > Program Management
- > Technical Services
- > Education and Training

> Over 1,000 patents
> Nearly 500 products commercialized

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GTI Alignment with Industry Value Chain

SUPPLY	DELIVERY	END USE
		
Needs		
Provide a secure, stable, competitive domestic energy supply	Address strategic concerns of domestic energy T&D infrastructure	Maintain industrial competitiveness and improve affordability and applicability of gas
Focus		
> Unconventional Natural Gas Resources > Gasification of Coal and Biomass > Carbon Capture and Sequestration	> Safety > Pipeline Integrity > Cost Reduction > Efficiency	> Efficiency and environmental > Product development and commercialization > Competitive industry

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Industry Solutions Under Development

- Inaccurate locates or mark-outs
  - Plastic pipe locators
  - Multi-sensor locators
  - Improved mapping – GPS, GIS, inertial
  - Smart tagging
- Excavators that do not utilize the one-call center
  - Pipe-based sensors to detect impact (vibration, acoustic)
  - Satellite and aerial monitoring
- Excavators that dig carelessly
  - Pipe-based sensors to detect impact (vibration, acoustic)
  - Active marker technology

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GTI's Damage Prevention Program

- >Locating and avoidance tools
- >Mapping and data collection
- >Active marking
- >Training, procedures, program development

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Locating and Avoidance Tools

- Acoustic locator
- HDD pipe detection tool
- Advanced locating technology evaluations
- GPS-based excavation encroachment notification (Phase 3)

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GPS as a Potential Solution

- Phase 1 – GPS-enabled cell phones for calling in One-Call Tickets
- Phase 2 – GPS-enabled locators for capturing asset location information
- Phase 3 – GPS-enabled excavation equipment for encroachment monitoring

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Phase 3

> Objective

- Develop and demonstrate a GPS-based excavation monitoring system
- Phase 3A - Protect against excavators that do not utilize the one-call center or accidently leave the valid ticket area
- Phase 3B - Protect against excavator encroachment

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Phase 3A

- Trimble Asset Management System
  - Low cost, low accuracy
  - Commercially available
  - Additional benefits
- Portal
  - Data repository
  - Monitoring software to detect excavation activity that is occurring outside of a valid one-call ticket

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Phase 3A

- Digging Trigger
  - How does the system know when digging is occurring?
  - Retrofit Sensors
    - Motion or pressure sensors
    - Diagnostics
  - Next Generation Equipment

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Phase 3A

- Pilot Project
  - Summer 2009
  - Soliciting participation from excavators

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Phase 3B

- GPS Grade control system
  - High accuracy, high cost
  - Commercially available
  - Additional benefits
- Real-Time Portal
  - Monitoring software to warn excavator of imminent encroachment
  - Low and high cost options
- GPS-Enabled Locator
  - High accuracy GPS

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Phase 3B

- Equipment Manufacturers
  - Next Generation Equipment
- Pilot Project
  - Summer 2010

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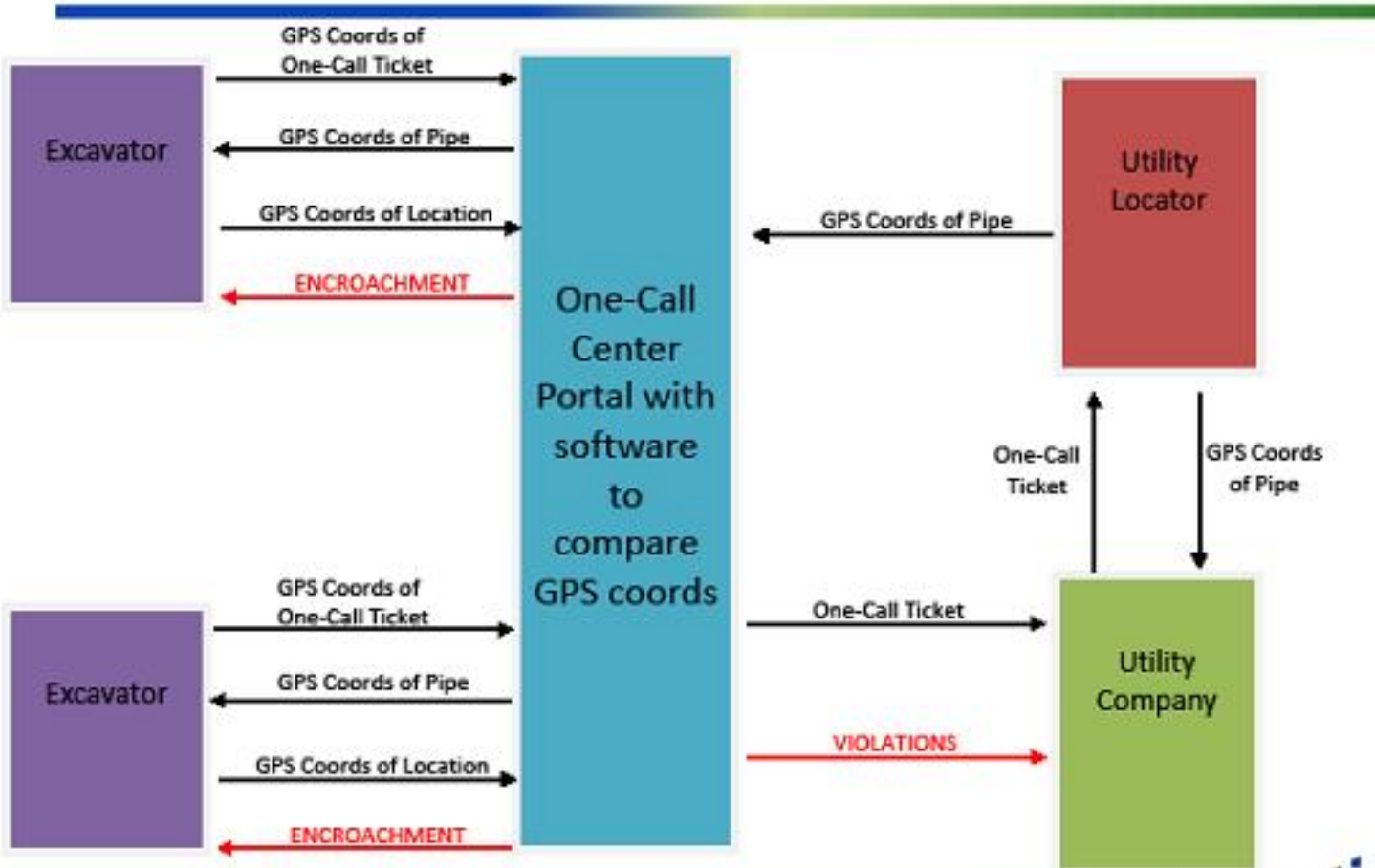
Process Flow



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Current Status

- Developing portal to collect information
- Developing retrofit trigger mechanisms
- Working with equipment manufacturers for next generation equipment
- Soliciting potential pilot participants for Phase 3A

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Looking Beyond Phase 3 . . .

> How can the technologies being developed in Phase I, II and III be further exploited to reduce excavation damages and reduce costs?

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Looking Beyond Phase 3 . . .

- Large public improvement projects
  - Open, web-based GIS to submit and share utility location information
    - GPS whiteline of project area
    - GPS-enabled locators for existing lines and utility relocates
    - RFID tags
  - Expansion of Phase 2 to extend the benefits to other organizations

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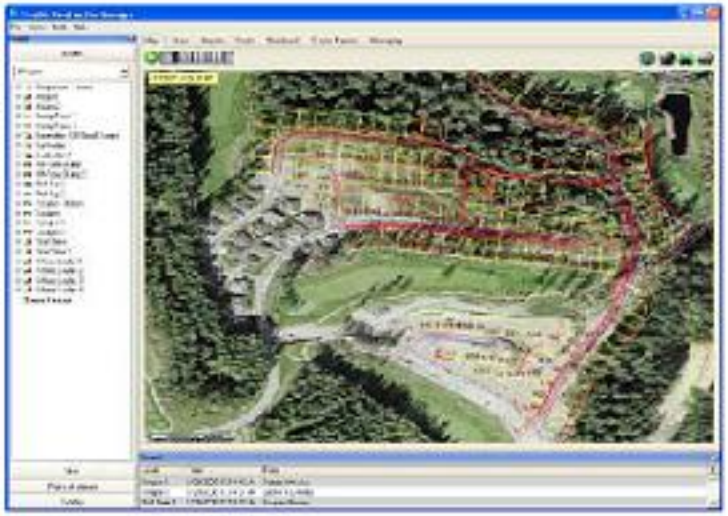
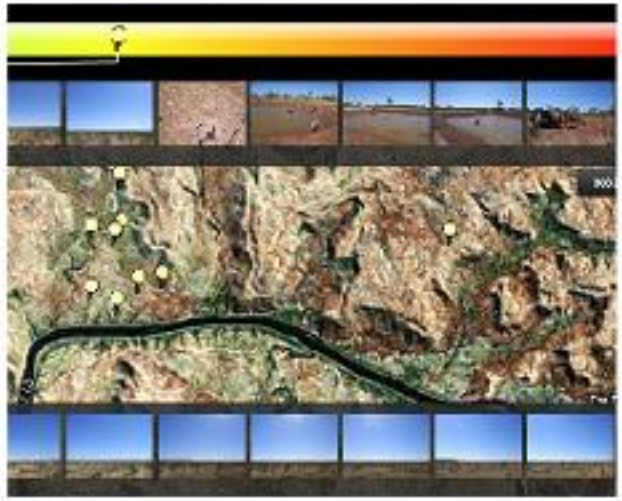
Mapping and Data Collection

- GPS for as-builts
- GPS data collection through routine operations
- GPS, GIS and RFID for project planning





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Training, Procedures, Program Development

- Training
- New technology implementation
- Damage prevention program development

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Questions???