

# Applications of GIS in Government

## Course Description

This course teaches the use of Geographic Information Systems (GIS) focusing on how the software technology, the data configuration, user skills and professional knowledge work together to create successful projects. Applications of GIS will focus on Government uses that are common throughout Florida and pertinent to Professional Surveyors and Mappers. This course will include examples and walk-through exercises using GIS software.

Tom Tibbitts, PSM GISP  
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# Course Objectives

- ▶ To develop a foundation of GIS knowledge and a hands on approach to GIS software.
- ▶ To address and discuss the relationship between GIS technology and the Surveying Practice and Profession.
- ▶ To illustrate the uses of GIS by reviewing GIS applications within Government focusing on data, software, skills and processes.
- ▶ To address GIS clients and how GIS is used within client projects. This will address government projects including GIS components and contracting methods.
- ▶ To address GIS projects for Surveyors, detailing data, maintenance and spatial analysis as a process for providing efficient Surveying and Mapping services.
- ▶ To build an understanding of GIS technology and a foundation of GIS skills through in-class exercises and use of GIS software.

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# Instructor Profile

Tom Tibbitts is a Florida Professional Surveyor and Mapper (PSM #6565) and a certified GIS Professional (GISP) with over 17 years of experience. Mr. Tibbitts is a graduate of the University of Florida with a Bachelor of Science in Geomatics. Mr. Tibbitts is the Assistant GIS Manager with St. Johns County and has 14 years experience within county government developing Geographic Information Systems projects including Parcel Mapping, Asset Maintenance, LiDAR, Orthophotography, Geodatabase Administration, Application Development and GIS Education. Mr. Tibbitts has presented at the ESRI International User Conference, the ESRI Surveying Summit, the FSMS Education Conference and the ESRI Southeast Regional Users Conference. Mr. Tibbitts is an active member of the Florida Surveying and Mapping Society, the Northeast Florida GIS Steering Committee and other Surveying and GIS organizations.

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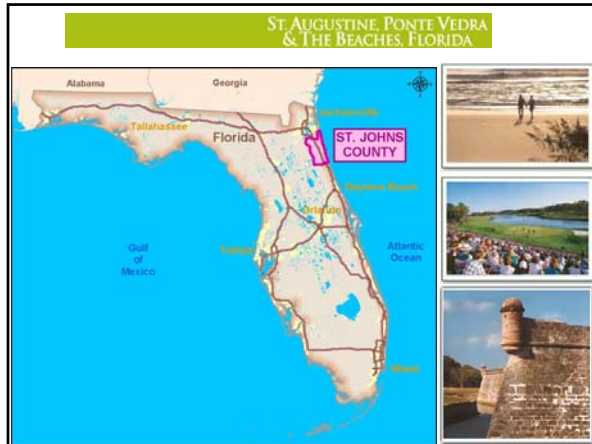
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## Course Topics

- ▶ GIS Technology and the Surveying Profession.
- ▶ Components of GIS Including Software, Data, People and Processes.
- ▶ Government Applications of GIS.
- ▶ GIS Applications and Data for Clients.
- ▶ GIS Applications and Data for Surveyors.

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## Resources Introducing GIS

- ▶ What is GIS Clip:
  - <http://gis.esri.com/esriclips/clip.cfm?ClipID=60>
- ▶ Introduction to GIS Site:
  - [www.gis.com](http://www.gis.com)
- ▶ GIS Everyday Clip:
  - [http://www.esri.com/company/gis\\_touches/everyday.html](http://www.esri.com/company/gis_touches/everyday.html)
- ▶ Geography Matters Brochure
  - <http://www.gis.com/whatisgis/geographymatters.pdf>
- ▶ GIS for Surveying
  - [www.esri.com/industries/surveying](http://www.esri.com/industries/surveying)

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## GIS and Surveying

- ▶ Experiences using GIS software, data, people or processes.
- ▶ Attendees professional background, PLS/PSM, GISP, public/private, other

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## What is GIS?

## What is Surveying and Mapping?

*What Defines the boundaries and intersections of these technologies and professional services?*

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## What is the Gap?

## What is the Bridge?

*Surveyors and Mappers Need to Become Involved*

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- ▶ GIS Technology and the Surveying Profession.
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## Components of GIS

- ▶ GIS Software & Hardware
- ▶ People and Professions within GIS
- ▶ Process and Purpose
- ▶ GIS Data Structure

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## Components of GIS

- ▶ GIS Software
  - ArcGIS Desktop
  - ArcGIS Server
  - ArcGIS Explorer
  - AutoCAD Map
  - Google Earth
- ▶ Hardware
  - Desktop, Mobile, Data Collector

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## Components of GIS

- ▶ People within GIS
  - Rolls, responsibilities and contributions
  - Data maintainers
  - Analysts
  - Developers
  - Cartographers
- ▶ Professions



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## Components of GIS

- ▶ Defining The Purpose
- ▶ Planning The Process



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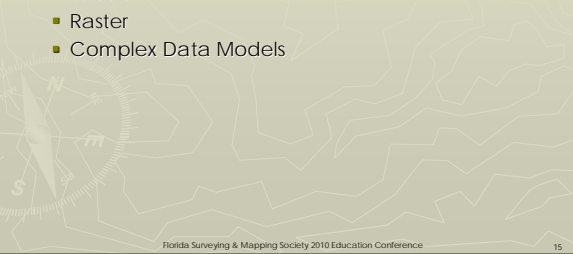
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## Components of GIS

- ▶ GIS Data Structure
  - Spatial
  - Tabular
  - Raster
  - Complex Data Models



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## GIS Data Modeling

- ▶ Types of GIS Data
- ▶ Topology
- ▶ Relationships
- ▶ Attributes
- ▶ Complex Data – Networks, Survey model, Terrains, 3D,

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## GIS in Government

- ▶ Local
  - County, City, special service ...
- ▶ Regional
  - Regional Planning Council, Water Management District ...
- ▶ State
  - FDEP, FDOT, FDEM, FDOR ...
- ▶ Federal

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## St. Johns County GIS Applications

- ▶ Foundation Projects
  - Enterprise GIS Data Library
  - Imagery, Parcels and Foundation Layers
- ▶ Application Projects
  - Land Development Services
  - Asset Management & Maintenance
  - Storm Water Model Project
  - ArcIMS and ArcGIS Server

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## GIS Development in St. Johns County

- ▶ Success Creates Interest
  - Project requests
  - Data Development
  - Users Appear
  - Data Requests
  - Technical support
  - Wider audience of users – ArcIMS
  - Wider use of data – ArcSDE

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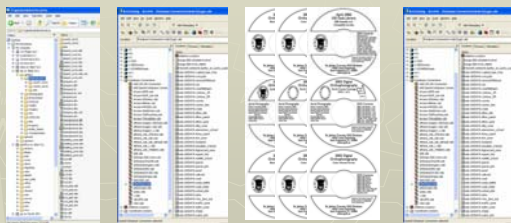
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## Enterprise GIS Data Library

*Data is the foundation for GIS Applications and should ensure consistency, accuracy, timeliness and reliability.*

*Data Maintenance procedures are the key to long term data quality.*



Sun and Intel  
Fileservers  
1995

Published in  
ArcSDE  
2003

GIS Data Library  
CD - 1998

Editing in  
ArcSDE  
2007

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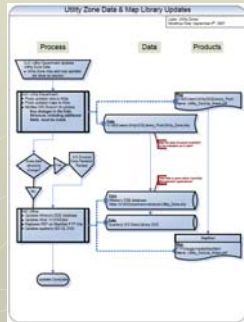
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## Enterprise GIS Data Library

### Extended Users

- ▶ User Maintained Data and Maps Can Be Published
- ▶ Handles Critical Requirements
- ▶ Documented Process



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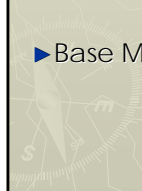
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## Parcel Layer

- ▶ Property Appraisal Mapping
- ▶ Plat Review
- ▶ Base Map Uses



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## Parcel Layer

- ▶ Plat submittals are reviewed by the County Surveyor for compliance with Florida Statute.
- ▶ Plat submittals are reviewed by GIS for closure and accuracy and shared with the Property Appraiser.



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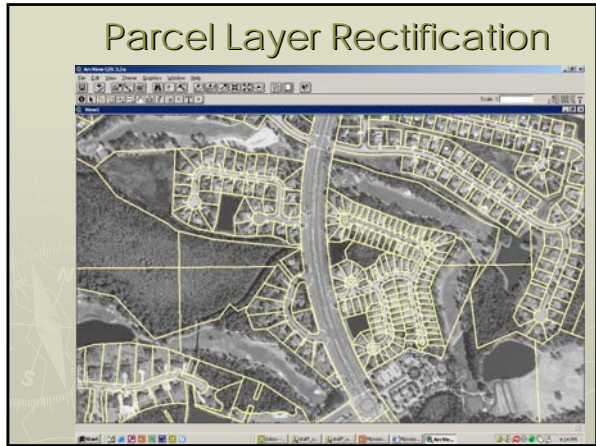
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## Parcel Layer

- ▶ Purpose
- ▶ Process
- ▶ Results
- ▶ Uses

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## Imagery and LiDAR Projects

- ▶ 1995 (DOQQ)
- ▶ 1997 (LSat)
- ▶ 1999 (SJC)
- ▶ 1999 (DOQQ)
- ▶ 2002 (SJC)
- ▶ 2003 (SJC)
- ▶ 2004 (DOQQ)
- ▶ 2005 (FDOR)
- ▶ 2008 (FDOR)
- ▶ 2008 (SJC)
- ▶ 2009 (SJRWMD)
- ▶ 2009 (SJCPA)

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## Imagery and LiDAR Data

- ▶ Purpose
- ▶ Process
- ▶ Results
- ▶ Uses

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## Public Works Asset Management

- ▶ Inventory of county transportation and storm water infrastructure, and maintenance activities.
- ▶ Comply with GASB 34
- ▶ Solution to manage assets
  - Development of a work plan
  - Maintenance and Repair
  - Reporting
  - Analysis
- ▶ From Reactive To Preventive Mode
- ▶ Paperless Environment
- ▶ Integrate with existing systems and Performance Based Budgeting standards

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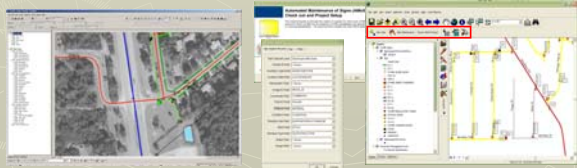
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## Asset Inventory Data Collection

- ▶ Orthophotography data extraction
- ▶ GPS Field data collection
- ▶ Windshield pavement surveys
- ▶ Video van data collection



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## Maintenance Process



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## Project Results...

- ▶ Informed staff and expectations met.
- ▶ Public Works adds technology to it's tool belt, opening up solutions in Debris Removal, advanced response and notices...
- ▶ SJC Utilities Asset Management
- ▶ Storm water modeling becomes more practical using the Asset geodatabase

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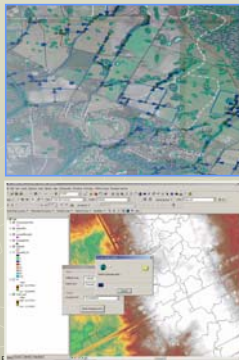
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## Countywide Storm Water Model

- ▶ Create watershed models to support initial storm water utility improvements.
- ▶ Public Works Department's storm water Utility
- ▶ Jones Edmunds and Associates manage the Project Team.



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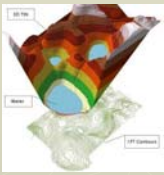
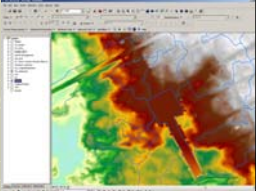
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## Countywide Storm Water Model

- ▶ Digital Topographic Information
  - Identify topographic changes
  - Prepare project Digital Terrain Model
  - Document for Technical Support Data Notebook
  - Quality Assurance

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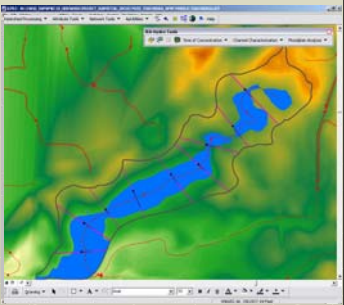
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## Countywide Storm Water Model

### Watershed Management Plan

- Run model and check results
- Preliminary floodplain delineation
- Calibration & verification
- Problem area visits
- Independent QA/QC



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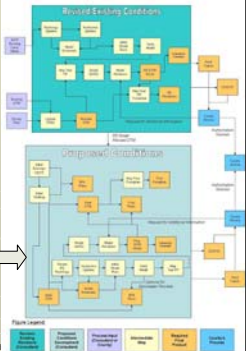
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## Countywide Storm Water Model

### Model/GIS Maintenance

- Archival
- Ongoing Modifications
  - ▶ Improvements
  - ▶ Permitting
  - ▶ Concurrency
  - ▶ Analysis
  - ▶ Change Testing

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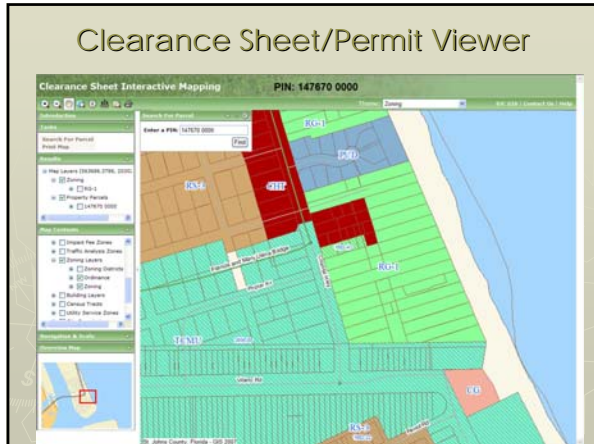
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# Clearance Sheet/Permit Viewer



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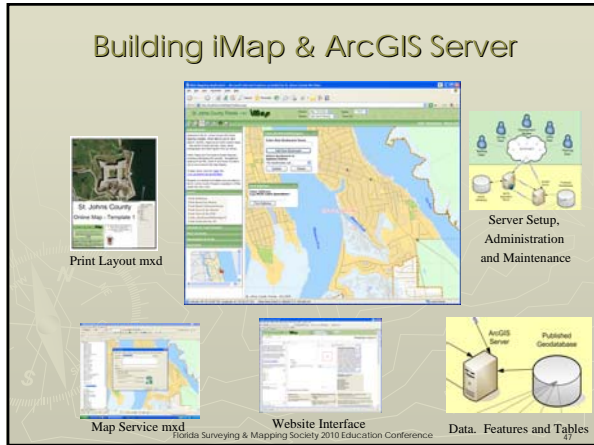
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# Building iMap & ArcGIS Server



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# E911 Dispatch and GIS



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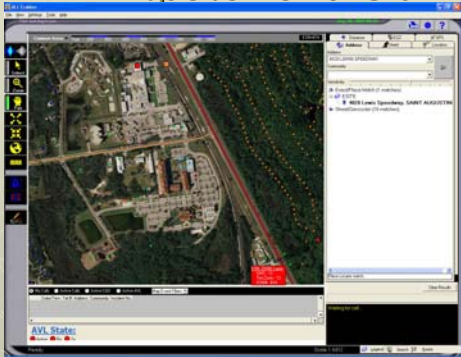
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## E911 Dispatch and GIS



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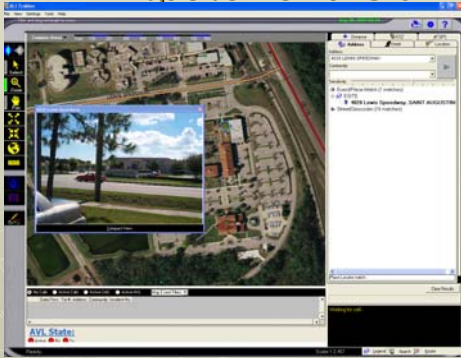
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## E911 Dispatch and GIS



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## GIS Projects and Data for Clients

- ▶ Client GIS Projects and Data
- ▶ GIS Consultant and sub-consultant services
- ▶ Government Request for Proposals Process
  - Sample RFP process and results

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## GIS Applications and Data for Surveyors

- ▶ Use of GIS for Surveying Operations
- ▶ Available GIS data to support Surveying and Mapping services
- ▶ Internal GIS applications
  - Survey Control
  - Survey Project Manager
- ▶ GIS data and spatial analysis exercise

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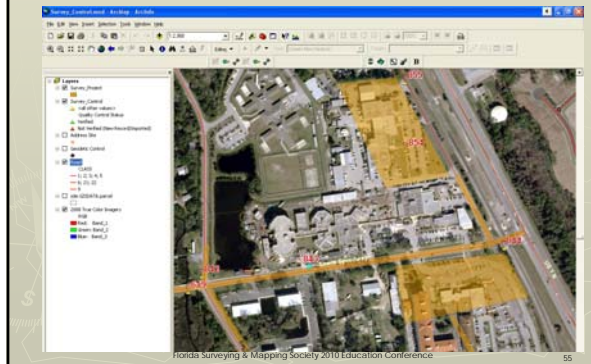
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## Survey Control/Project Manager




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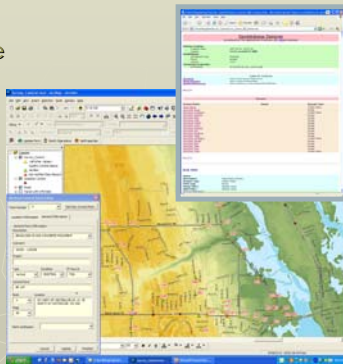
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## Survey Control Manager

- ▶ Geodatabase Design
- ▶ Customized Application for editing
- ▶ Management and Analysis




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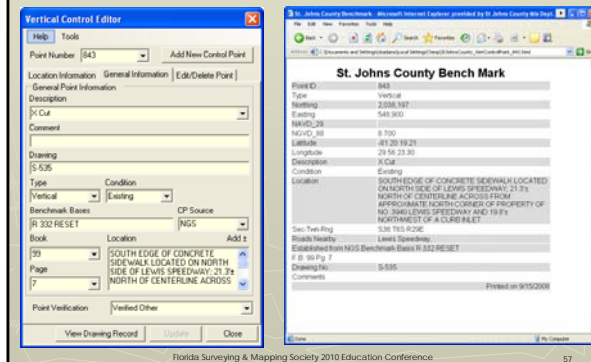
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## Survey Control Manager




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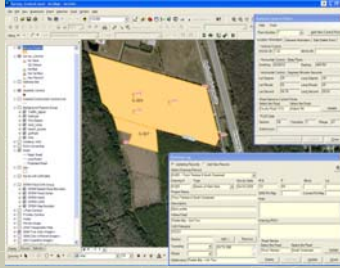
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## Survey Project Manager

- ▶ Geodatabase Design
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## Survey Project Manager

A screenshot of the 'Drawing Log' window in the Survey Project Manager software. The window has a title bar and a close button. It contains a table with columns for Drawing #, Type, Survey Date, M.B., P, Block, and Lot. The first row shows drawing S-535, a Topographic Survey, dated 02/08/2007. Below the table are fields for Project Name, Description, Where Filed, CAD Filename, Section, Township, Range, and Subdivision. There are also buttons for 'Add New Record', 'Add', 'Remove', 'Delete', 'Add Row', 'Update', and 'Close'.

Drawing #	Type	Survey Date	M.B.	P	Block	Lot
S-535	Topographic Survey	02/08/2007				

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- ▶ GIS Applications and Data for Clients.
- ▶ GIS Applications and Data for Surveyors.
- ▶ **Summary and Questions**

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