2019 GIS-T
A unique approach to extracting features from raster images

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Agenda

- Georeferenced Images
- Information collected
- Raster to Centerline Event Collector (RCEC)
- RCEC Demonstration
To many Acronyms

- MDOT – Maryland Department of Transportation
- SHA – State Highway Administration
- OHD – Office of Highway Development
- PSD – Plats and Surveys Division
- OPPE – Office of Planning and Preliminary Engineering
- ORE – Office of Real Estate
Statistics of Maryland

- Maryland has approximately 70,792 miles of roadway.
- MDOT SHA has approximately 65,000 Right-Of-Way plats.
- From those 65,000 only 35,300 have been georeferenced within a five-foot accuracy.
Georeferenced Images

Following the mandated inclusion of corner coordinates on all newly issued Right-Of-Way (ROW) plats, MDOT SHA’s Office of Highway Development (OHD) Plats & Surveys Division (PSD) introduced a more advanced initiative in 2015 to geo-reference the Office of Real Estate’s (ORE) ROW plat collection and preserve the digitized information as a statewide dataset.

The geo-referenced plat images are exported as GeoTIFF files, which contain the geographic coordinates as metadata to be extracted.
Georeferenced Images

Corner Coordinates

X=1447086
Y=630074
Georeferenced Images
Although the future uses of the dataset may vary, the initiative currently has two broad foreseen goals:

- **Plat Research Automation**: Streamlining the plat research process through the internal MDOT SHA GIS platform, by spatially referencing the dimensions of each property plat to its geographic location.
- **Plat Feature Extraction**: Transforming plat survey information—including Maryland State ROW boundaries—into publicly available vectorized planning datasets.
Georeferenced Images: Methodology

- **Phase I: Corner Coordination:** Efforts begin with expanding the ORE directive to manually collect the corner coordinates of PSD issued ROW plats, by exporting *GeoTIFF* image files of the newest 5,000 plats based on each plat’s PSD-issued corner coordinates, coordinated on the *MD StatePlane* datum.

- **Phase II: Control Point Coordination:** Corner coordinates and *GeoTIFFs* are generated for plats issued with *MD StatePlane NAD 83/91* datum coordinates located on baseline of ROW control points. Older plats with *MD StatePlane NAD 27* datum control point coordinates are geo-referenced by using *CorpsCon6* conversions of the point coordinates.
Georeferenced Images: Methodology

Phase III: Part-Of-Plat Coordination: Older plats without established coordinates are geo-referenced using their provided association with newer coordinated plats that have already been geo-referenced, by matching baseline of ROW station numbering and identifying similar land features.

Phase IV: Baseline Coordination: Historical plats are grouped by each plat’s associated Project ID provided by the ORE Management System database (OREMS), and the baselines of ROW for each project grouping are accurately plotted in Bentley MicroStation using advanced geometry tools.
Baselines

- Using historical Plats the only computational information that it contains is a baseline. This baseline can be a baseline of construction or a baseline of right of way.
- Typically we use the baseline of right of way to compute coordinates.
Information Collected

- Plat Number
- Item Number - Primary
- Liber Number
- Folio Number
- Secretary Number
What are we collecting?

- Item Number – historical number used to determine transactions of parcels between the State of Maryland and private owners when the State makes and acquisition of land.
Raster to Centerline Event Collector (RCEC) Requirements

Key Requirements

♦ Provide interface to facilitate the creation of parcel frontage linear event on Maryland DOT’s linear referencing system (LRS) road network.

♦ Utilize georeferenced plat images (GeoTiff’s) to create a parcel frontage linear event.

♦ Supports a streamlined and simple workflow that requires little to no past business or ArcGIS experience.

♦ Creation of parcel linear event schema and forms to enter event attribute data.
Custom Application over Event Editor Considerations

- Streamlined and simplified event creation workflow
  - Simple population of Side of Road value through single click
  - Auto population of Begin and End MP values through two clicks
  - Custom Application has far fewer menus and search forms and options that clutter the interface.

- High level of selectability and with GeoTIFF’s within an Image Service
  - The ability to directly select and zoom to a specific plat image lead toward publishing the plat images as an image service over a base map.

- Custom application data entry forms avoids using complicated attribute sets of Event Editor; the need to set them up, set up the fields that need editing, managing and maintaining
Raster to Centerline Event Collector Development (RCEC)

Technology Stack

- HTML5
- Angular 5
- TypeScript
- Sass
- Leaflet
- Material Design
- Turf.js
Demo - Standard Workflow
## Demo - Standard Workflow

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Questions?
Thank You!

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Abstract: "To address a need for spatially relating historical property transactions to current state land assets, the Maryland Department of Transportation (MDOT) State Highway Administration (SHA) set out to develop a spatial dataset that represents these transactions. Georeferenced plat images containing property parcel transaction data are utilized as the primary source from which the data is captured and extracted into a linear referencing system (LRS). The HTML5, web-based Raster-to-Centerline Event Collector application (RCEC) is a user-friendly solution alternative to an out-of-the-box Event Editor. The tool integrates GIS and LRS technology with traditional survey data, allowing MDOT SHA to easily find, identify and report existing land ownership changes using an intuitive route-based approach. By facilitating the identification and sale of “extra lands” that the State of Maryland otherwise would not have known to be in its possession, this tool better prepares MDOT SHA to engage with customers in an efficient and informed manner. This presentation will focus on the technical design, operation and use of the MDOT SHA Raster-to-Centerline Event Collector application as well as outlining the anticipated benefits of better managing one of Maryland’s most valuable assets: land."