GeoGIS 2018 Transition and Support
930-982

Prepared for the

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Research Project 930-982, GeoGIS 2018 Transition and Support

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16. Abstract

GeoGIS is a web-based geotechnical database management system developed for the Alabama Department of Transportation (ALDOT). The purpose of GeoGIS is to facilitate the efficient storage and retrieval of geotechnical documents. The website utilizes a web-based map to search for documents based on the location of the project to which the document is associated. Project 930-982, GeoGIS Transition and Support has three primary tasks. Task 1 was to integrate GeoGIS with eDocs and transfer the application to ALDOT. This task has been completed. Task 2 was to continue to add functionality based on user feedback. In this period of performance, based on user feedback, GeoGIS was adapted to accept and process DIGGS documents for Atterberg Limits and Cone Penetration Tests. GeoGIS was also adapted to accept landslide events and associated documents and metadata. Additionally, GeoGIS has been populated with bridge points and bridge cards. Task 3 was to continue to populate projects with their associated documents. During the period of performance of this project an additional 396 projects were initialized, and an additional 1,527 documents were added.

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EXECUTIVE SUMMARY

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Final Report

GeoGIS 2018 Transition and Support
930-982

1. Introduction

GeoGIS is an internet-based application providing the Alabama Department of Transportation (ALDOT) web browser access to a Geographical Information System (GIS) containing various technical documents. GeoGIS provides an interface to search, view, and upload various document types. The complete functionality of GeoGIS has been summarized in previous reports.[1] Figure 1 displays the map-based User Interface screen.[2]
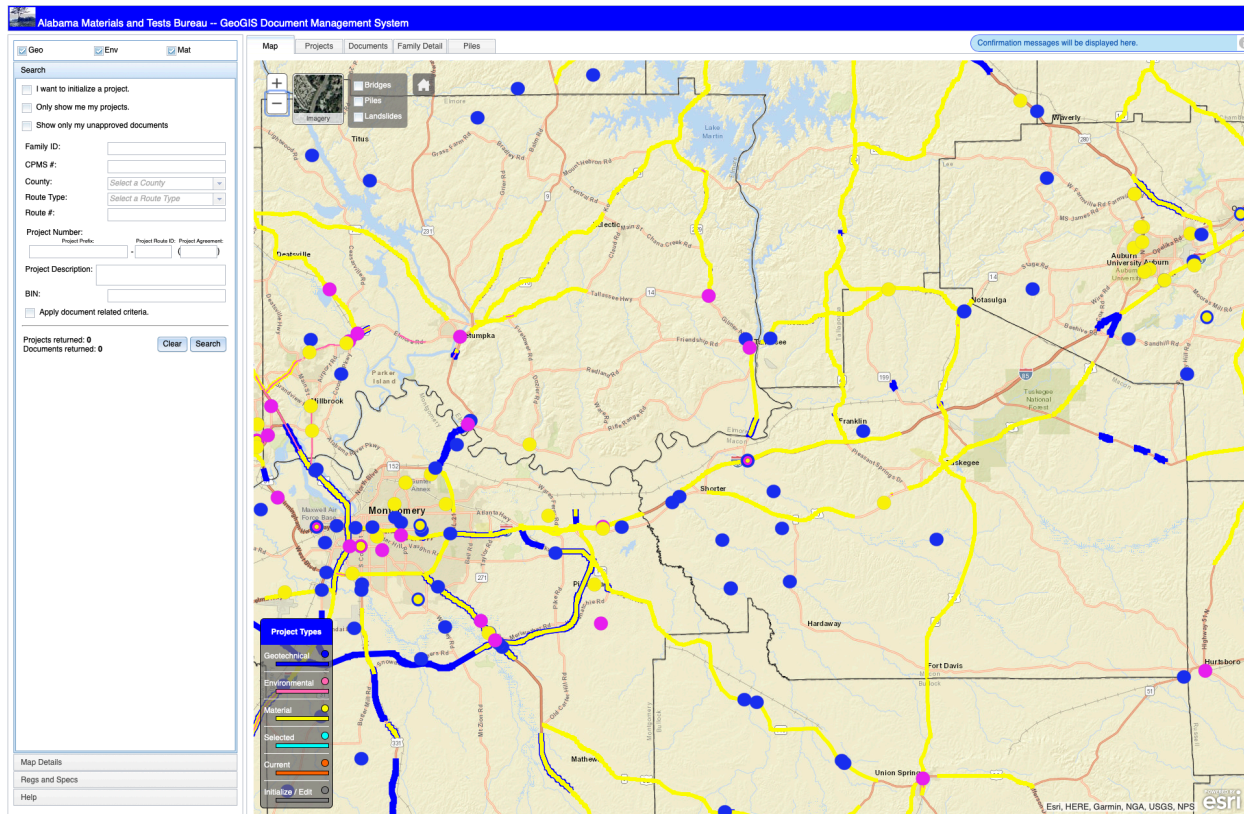
Figure 1. GeoGIS Mapped-Based User Interface.

GeoGIS is populated with thousands of spatially-located geotechnical, environmental, and materials projects and their associated documents. The number of projects and documents continues to rise as new and historic information is entered into the system.

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[1] Final Report, Research Project 930-919, GeoGIS 2016 Development and Support

[2] https://aldotgis.dot.state.al.us/geogis

As of February 2021, GeoGIS document inventory contains the following:

GeoGIS Inventory	
Initialized Projects	3,918
• Geotechnical	1,689
• Material	1,692
• Environmental	654
• Bridge Cards	982
Approved Documents	14,852

Table 1. GeoGIS Document Inventory.

GeoGIS supports 138 ALDOT personnel and 93 contractors.

Project 930-982 GeoGIS Transition and Support had an original period of performance of 1 January 2019 to 31 December 2019. Several No Cost Extensions were granted extending the end date until 30 September 2020. Monthly meetings and general support continue on the project.

This final report will summarize the progress on the specific tasks related to project 930-982 GeoGIS Transition and Support.

2. Progress on Tasks

Research Project 930-982 had three primary tasks:

- **Task 1:** *Integrate eDocs into GeoGIS and transfer the site*.
- **Task 2:** C*ontinue development of site functionality based on user feedback*.
- **Task 3:** *Continue to populate GeoGIS with past projects and documents*.

Significant progress was made on all three tasks. These are summarized below.

2.1 Integrate eDocs into GeoGIS and transfer the site.

GeoGIS has achieved considerable success moving from a research project, to a production environment hosted at The University of Alabama, to a deployed application at ALDOT. After passing the required security penetration test, the UA team and ALDOT team have successfully deployed the GeoGIS website and database to ALDOT servers. (See footnote 2.) Figure 2 below provides an overview of GeoGIS and the interactions with various services.
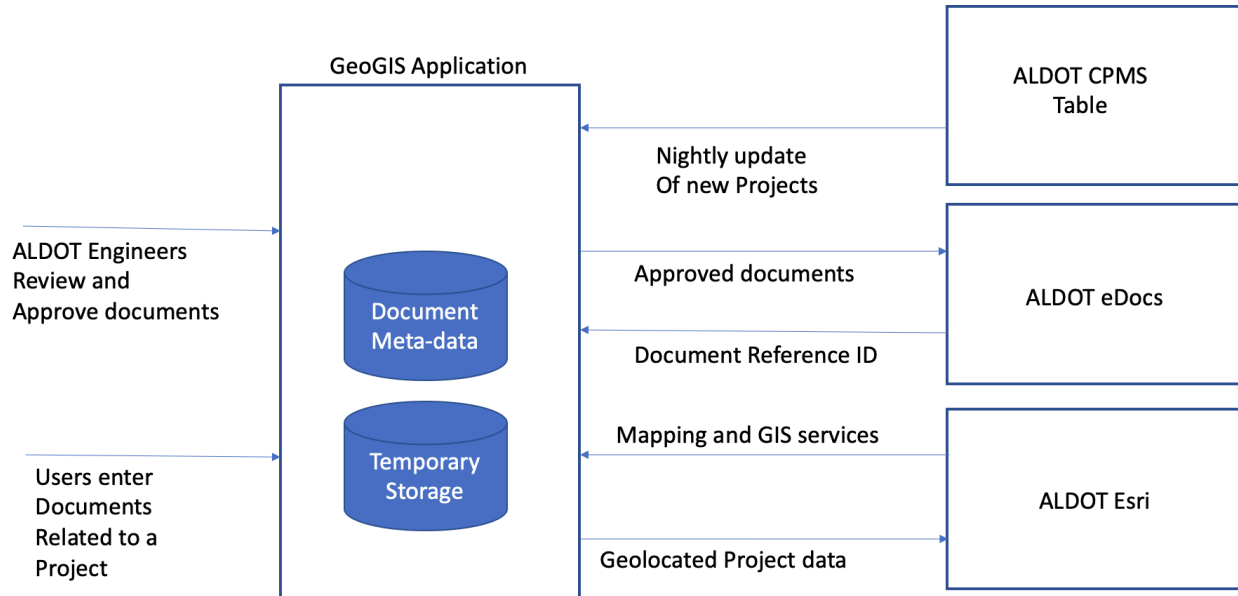
Figure 2. Overview of GeoGIS interactions.

The GeoGIS application receives an update of ALDOT project data nightly from CPMS. A user, generally a consultant, can locate their project and upload documents to the project. The documents are held in temporary storage until they are reviewed and approved by an ALDOT Engineer. When the document is approved, it is forwarded to eDocs with a document reference returned to GeoGIS. GeoGIS stores that reference with the document meta-data. GeoGIS uses the Esri services to provide mapping and GIS functionality through the user interface.

In terms of documents, the GeoGIS application is directly connected to the ALDOT eDocs server using eDocs to store and retrieve documents. Approximately 97% of documents originally stored GeoGIS have been transferred to eDocs. The remaining documents were deemed to large transfer to eDocs automatically and are being uploaded manually.

2.2 Continue development of site functionality based on user feedback.

The GeoGIS development team meets monthly with ALDOT Geotech and Environmental group leaders. Based on these monthly meetings, additional event and document types were added to GeoGIS during this project period. These include landslides and bridge data. For bridge data, GeoGIS students geo-located bridge points and associated those with the electronic bridge cards. As reported in Table 1, 982 bridge cards have been populated into GeoGIS.

One area of particular interest to ALDOT Geotech users is to assist in the development and implementation of the Data Interchange for Geotechnical and Geo-environmental Specialists

(DIGGS) exchange format. The DIGGS specification is an XML (eXtensible Markup Language) format and supports documents including Atterberg Limits and Cone Penetration Tests.

The GeoGIS development team modified and enhanced the application to support Atterberg Limit and Cone Penetration tests. GeoGIS is one of only a few geotechnical data tools embracing this new national standard. Table 2 below shows a GeoGIS derived one-page view of an Atterberg Limit test. The Table 2 below is derived from DIGGS compatible file uploaded to GeoGIS.

Liquid Limit
Liquid Limit Data

Liquid Limit		
Trial No	Blow Count	Water Content
1	30	53
2	27	62
3	20	77.7
Liquid Limit	25	65.8575
Plastic Limit		
Trial No		Water Content
1		20
2		21
Plastic Limit		20.5

Table 2. Atterberg Limit Test One Page View generated in GeoGIS.

Figure 3 below provides a GeoGIS generated visualization of a Cone Penetration Test. The visualization was generated by GeoGIS from a DIGGS compatible file.
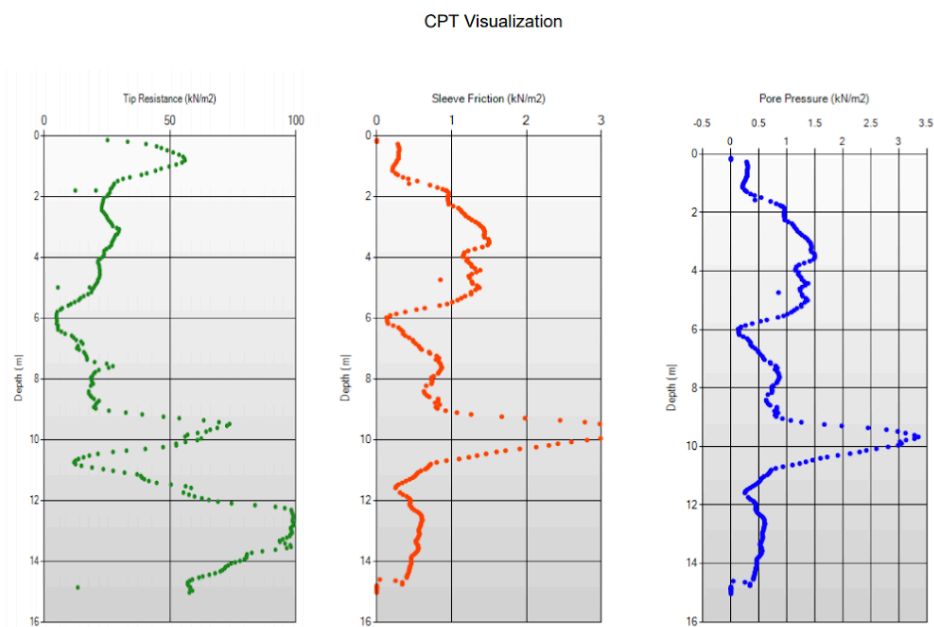
Figure 3. Cone Penetration Test Visualization generated in GeoGIS.

2.3 Continue to populate GeoGIS with past projects and documents.

Table 3 below shows the progress on scanning and entering documents and projects into GeoGIS. During the period of performance for this project an additional 396 projects were initialized, and an additional 1,527 documents were added.

GeoGIS Inventory			
	February 2021	September 2020	January 2019
Initialized Projects	3,918	3,353	2,957
• Geotechnical	1,689	1,684	1,630
• Material	1,692	1,622	1,341
• Environmental	654	637	496
• Bridge Cards	982	982	0
Approved Documents	14,852	14,689	13,162

Table 3. Progress on Projects and Documents.[3]

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[3] The rate of project and document entry has slowed due to the impact of COVID on student access at the University.