

C&S Companies Leverages GIS for Accurate Airfield Inspections and Future-Ready Asset Management Data

BACKGROUND

“Out on the airfield, with countless underground utilities, airspace limitations, and safety zones to consider, capturing highly accurate data within inches is vital.”

POSH SUPUPRAMAI
AVIATION DIGITAL DELIVERY LEAD

When it comes to airfield inspections, the team at C&S Companies recognizes the value of accurate and precise digital as-built data. It's a way to improve active project management and reporting while providing a strong foundation for their aviation clients' asset management databases. With the goals of accuracy, collaboration, and future-ready data in mind, C&S Companies started testing a GIS-powered inspection solution.

RESULTS

C&S Companies' use of the Appia x ArcGIS integration has resulted in the following benefits:

High-accuracy geo-located inspection data for aviation work

Improved inspection efficiency by eliminating the PDF-based process

The ability to review and respond to daily construction activities in real-time

A comprehensive, information-rich deliverable to aviation clients that supports future asset management efforts

SOLUTION

An integration between Appia, a cloud-based construction administration and inspection platform, and Esri ArcGIS Field Maps, an industry-leading application for real-time geospatial data collection. Appia acts as the authoritative source of truth for all construction activities, while Field Maps streamlines the capture of precise, geo-located field data.

This solution is powered by GeoBridge, a data bridge developed by Seiler Geospatial to connect the data in Appia and Field Maps through a notebook configuration.

Meet Posh, C&S Companies GIS Champion

Posh Supupramai is the Aviation Digital Delivery Lead at C&S Companies. As a civil engineer with a decade-plus of experience on airport projects, Posh is driven by an interest in the vast potential of the data captured throughout the construction process. He joined C&S to tap into the capabilities of GIS in their airfield work.



“I always wanted to explore what more I can do to leverage data that we design and build. That’s how I happened into the GIS world. By [leveraging] BIM and CAD into GIS, I’m able to do more with the data like asset management, different dashboards, maps – different ways to digitize the data,” he said.

Acknowledging the potential of GIS to improve the accuracy of inspections today while offering an enhanced, future-focused deliverable to C&S Companies’ aviation clients, Posh began leading a team to test the use of GIS for inspection work.

Two Test Projects Come Into Focus

“We want to make sure the inspectors are comfortable – this is something new to them so we wanted to play it safe.”

Posh and his team took a sensible approach to introducing GIS into their inspection process. Armed with a Trimble DA2 receiver and the Field Maps application, the inspections would capture one line item on two test projects:



Taxiway reconstruction at the Rhode Island T.F. Green International Airport in Warwick, Rhode Island, capturing light cans



Pavement repairs at the Gerald R. Ford International Airport in Grand Rapids, Michigan, capturing pavement demolitions

The Challenges of a PDF-Based Process

The alternative to the GIS process is to physically markup PDF plan sets to note item locations. This process is useful for getting a general sense of item installation but doesn't offer the same precision or data flexibility that GIS can provide. The data is simply not as reliable when capturing as-built conditions.

“If you're marking up a PDF and I bring that PDF in and overlay it with CAD, the scaling will be off and pose inaccuracy issues.”

Posh and his team aren't trying to capture data for data's sake. They want to be able to provide that data to their aviation clients in a useful format - for project progress reporting, design comparisons, and future use in asset management. With GIS, the value of project data vastly increases.



The Benefits of GIS-powered Inspection

“Airports are increasingly building comprehensive GIS databases. By using Field Maps to capture data in the field, we can accurately document the location of constructed features. This approach is a big step forward from the old methods that lacked GPS capabilities.”

The new, GIS-driven inspection process that Posh and his team are testing and advocating for comes with a variety of short-term and long-term benefits.

And as airports continue to build out their own GIS databases, it's only a matter of time before what C&S Companies can offer becomes the expectation for all airfield inspection work.

The new process is a simple one:

- + Start a project in Field Maps, where you can edit the base map and view all of the items related to the project
- + Search for the item you need to measure, display all the details relevant to the item, and then conduct the inspection/measurement in Field Maps
- + Attach photos, location details, and remarks, as well as stationing/offset information
- + Seamlessly sync GIS data with the daily report in Appia via the GeoBridge connector
- + Open the draft reports in Appia to see all the collected field items, in addition to attachments, comments, and an audit log
- + Leverage dashboards in Esri to share a comprehensive visual overview of project progress and dollars spent by pulling in Appia report data

This process allows Appia to act as the source of truth while inspectors use Field Maps to capture accurate, real-time field data down to the inch.



“What’s great about this integration is that whatever we do in Field Maps isn’t the authoritative source of truth, that’s Appia. So, we can capture something in Field Maps and then we can modify the quantity in Appia. All the construction admin tracking stays in Appia. What this process helps us do is – if I want to know more about this information, [if] I want to query more about this object that was installed in the field – how do I get more information about that? Let’s go back to the most current source, which would be Appia.”

Benefits of this new process include ↓

Improved inspection accuracy and efficiency

First and foremost, the combined use of a Trimble unit with ArcGIS Field Maps provides the inspection team with accurate as-built data and eliminates the redundant PDF process. It’s also a more efficient way to conduct inspections – to quote Posh, “activate the token and we’re within inches.”

Enhanced project management and risk mitigation with real-time insights

The ability to apply filters to a map in ArcGIS means that project managers can get a quick overview of installations that took place on a certain date and open Appia if they need more information. Per Posh, this data accessibility leads to “better project insight and better tracking of where things are installed.”

The C&S team can look at various elements on a web map to see what

was captured each day, then dive into the daily report in Appia to review construction activities. This process allows for a real-time response to potential issues.

As an example of how access to a GIS database can help improve project outcomes, Posh spoke to the restrictions on equipment placement on a typical airfield job site:

“When you’re working on an airfield, there are restrictions on where you can be and install and place equipment. We have what’s called a runway safety area, a runway object-free area, and for taxiways as well, so we want to make sure no equipment is sitting in those areas. So by adding an offset line from the center line of the runway, I have a line of the object-free area and I add that to Field Maps.

If you’re the field personnel, you open up that map and you’re making sure none of the construction activities are occurring in the object-free area, and no equipment is within there without

calling tower... having that on the map and having the Trimble beacon will help with that awareness out in the field.”

Collaborative information-sharing with project stakeholders

Posh and his team are still testing their use of the integrated Appia x ArcGIS Field Maps solution, but they already have plans on how they’ll share data back to their airport clients. By creating custom dashboards in ArcGIS, they can share a relevant, easily digestible project overview with clients – one that can be filtered by dates, item types, etc. – and visualize the data for a high-level audience.

Comprehensive foundation-building for asset management data

Posh and his team’s vision goes beyond the day-to-day efficiencies this integration can provide on the job site. Their goal is to meet the needs of airport clients – not just the ones that



already have GIS databases, but the ones that will be calling for that data in the future.

“An airport is like a mini-city. You have roads, buildings, and there’s usually a GIS database, whether it’s maintained by them, the city, or the county.”

The issue? Sometimes a project’s as-built information (BIM or CAD data) will sit on a shelf and won’t make it into the GIS database until months, or even years down the road. C&S Companies is looking at ways to provide that data upfront so that it’s a matter of “plug and play” when clients get the project deliverable. From there, it can feed the asset management lifecycle.

And while many airports want GIS data to support asset management – tracking things like pavement lifecycle,

airfield light replacement etc., some airports don’t have the budget for a full-time GIS manager to maintain and organize the database. Since GIS data is easier to access than, say, BIM or CAD data, C&S Companies can find valuable information that supports asset management without a dedicated staffer.

Simplified regulatory compliance and reporting

The Federal Aviation Administration has two programs that are relevant to C&S Companies GIS operation: The Airport Data and Information Portal (ADIP) and the Airports Geographic Information Systems (AGIS) Survey Program. Being able to capture their own GIS data on airfield work will simplify reporting to the FAA for Posh and his team when the time comes.

A Long-Term Vision for GIS Data

“We are moving into a more data-rich industry... If you can get your data into GIS, I think in the next 10 years, you will be able to connect that data with any other solution that you would need. I think the unrealized gain is what more you can do with that data.”

Posh and his team may be starting small to perfect the process of capturing and sharing GIS data, but their long-term vision is expansive. The goal isn’t just to capture the data, but to make it more usable, more insightful, and more accessible for their clients in the aviation industry.

The evolution and adoption of GIS technology have been compared to the slow and steady growth of BIM over the past couple of decades. It may have started with one in-house champion, as Posh is championing GIS for C&S Companies, then a team, then a department, to the point where getting BIM files is the expectation for any organization embracing digital project delivery. Posh and his team are ensuring that the data is there when their clients need it.

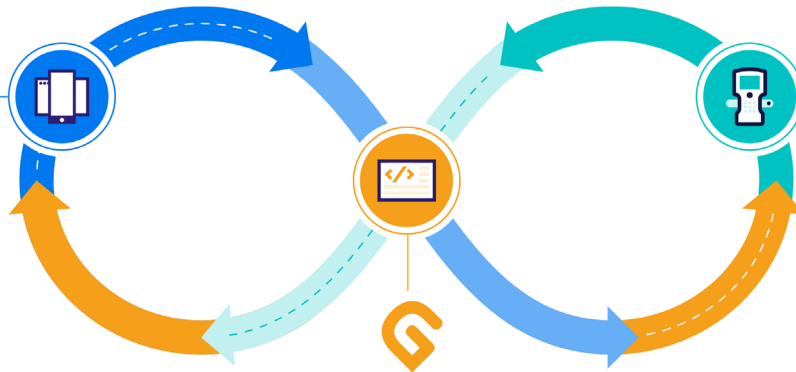
“You don’t want to be trying to find that data in 10 years. You want it now.”

With Appia x ArcGIS Field Maps, data is infinitely connected.

Appia®

Manage your construction contract data.

- Document daily work
- Make payments + track funding
- Issue change orders
- Verify items and materials



ArcGIS® Field Maps

Collect your construction contract data.

- Validate and measure item quantities via GPS
- Record auditable digital as-built project items
- Establish shapes + quantities

GeoBridge®

Connect your field data.

- Connect project items to GIS features
- Support project reporting for field measured project items
- Link GIS features to project digital as-built objectives
- Associate change orders to field workflows

Explore how your organization can capture GIS data and create a streamlined workflow for data visualization by visiting:

solutions.infotechinc.com/appia-x-arcgis-field-maps