

Capturx Improves NASA's Facility Utilization Optimization

Capturx for ArcGIS Field Data Red-lining Solution

NASA Langley Research Center (LaRC) is a technology and innovation leader in both aeronautics and space research, and in space utilization. In addition to looking upwards into the vastness of space, NASA LaRC also manages a great deal of space at its Langley campus. The GIS team at NASA LaRC was an early adopter of ArcGIS and has created an optimization program to help manage and ensure that they get the most out of their facilities. Staying on top of facilities management requires mobile workers collecting data on maps around campus. With the introduction of Capturx for ArcGIS, NASA LaRC has been able to streamline their facilities data collection significantly by automatically integrating handwritten map markups into ArcGIS.

Summary

Customer: NASA Langley Research Center, leader in aeronautics and space research and in space utilization.

Situation: Complex infrastructure requires better facility usage to reduce cost.

Challenge: Costly and slow facility management due to paper data re-entry.

Solution: Capturx for ArcGIS automates data integration into ArcGIS.

Benefits: Cut survey time by 1/2, errors by 80%, reduced overall survey costs by 1/3.

Situation:

Technical disciplines at NASA require the work of specialized personnel that form numerous teams using state of the art facilities and resources. NASA's vast Langley Research Center encompasses 800 acres including over 300 buildings which contain over 6000 rooms, totaling more than 3 million square feet of space. The facility, built to accommodate roughly 4000 employees 50 to 60 years ago, supports many disciplines including Structures and Materials, Flight Electronics and Atmospheric Sciences. These diverse disciplines require massive and complex infrastructure to support NASA's mission. Space utilization tools address the need for optimizing facility usage to minimize operational costs while maximizing synergy between employees, groups, organizations and technical functions. To facilitate decision making and record keeping, the GIS team from NASA LaRC started managing building interior details using ArcGIS more than 10 years ago.

Challenges: Time-consuming data collection

A basic task in managing facilities is the room survey, which has always been completed using pen and paper. Subsequently, the paper notes were re-keyed manually into the GIS system to ensure up-to-date tracking and analysis. Transcribing and re-entering paper survey and inspection data took time, cost money and allowed for human error – which made decision making around space utilization difficult. The ArcGIS database was often many months out-of-date.

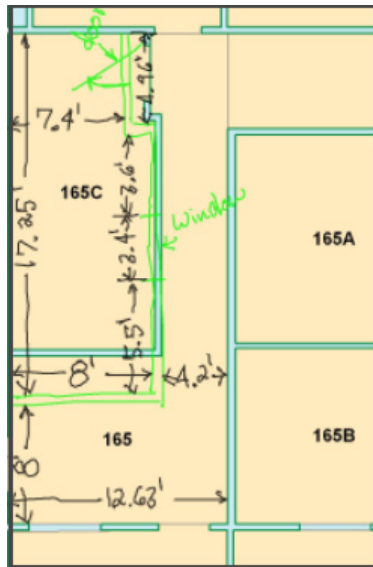
The cumbersome data collection process and reliance on out-of-date data hampered decision making, especially during periods of reorganization, remodeling, and downsizing. In recent years, NASA LaRC was asked to cut costs, while also undergoing a major change in their mission requirements, from focusing on aeronautics to focusing on space exploration. The Center began an effort to reduce their land use, buildings and personnel by 25%. The result was a great deal of change in how space was allocated and optimized – and the need for processing a large number of documents.

Solution: Capturx for ArcGIS

To automate information flow of the facility data collected by staff on paper, NASA LaRC deployed Capturx for ArcGIS. With Capturx, the data collectors continued their surveys and inspections using paper forms, maps and a clipboard for easy note-taking. Data was digitized instantly and stored as it was written using the digital pen. When staff returned to the main office from their rounds, the data was immediately and automatically integrated into ArcGIS. Teams didn't have to re-enter data, wait for transcription, or suffer from transcription errors.

"This process has been broken for years and we've tried to get this done and get it done efficiently." William Ball, GIS Team Leader, NASA Langley Research Center.

With Capturx, maps of floor plans are printed from ArcGIS, the same way that the team prepares and prints maps today. The maps are printed on normal paper and digitally enabled with a unique background pattern, which the digital pen senses as the pen writes. Each stroke of the pen on the paper map creates a new feature or a red-line annotation which is geospatially referenced and added to the geodatabase. Once the pen is docked into its USB port on a PC or laptop, the data automatically appears in ArcGIS. There is no new technology to learn or data to re-enter.



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GIS Team Leader
NASA Langley Research Center

Benefits

Faster and better decision-making

Capturx integrates seamlessly with ArcGIS, making data uploads and data management very easy. Since the basic workflow and tools – pen and paper – don't change, the data collection can be performed by nearly anyone. Once collected with Capturx, the data can be uploaded and shared with all members of the team. By eliminating transcription errors and decreasing the time gap between data collection and data upload, the GIS team was able to quickly update the GIS database and make better decisions with up-to-date information.

"With Capturx, it's easy for the person collecting the data and there's no guesswork for our GIS tech as to what he's trying to tell us. The information goes straight in and we can archive it without making a scanned copy." William Ball, GIS Team Leader, NASA Langley Research Center.

Works the way they work

With the natural pen interface and direct integration into ArcGIS, virtually any team member can begin using Capturx right away. Additionally, Capturx has the added benefit of creating a hard copy backup of everything that is collected. Unlike mobile computers, if the digital pen is lost, teams always have a back-up copy on paper. If a mobile computer is lost, apart from the expense of replacing the hardware – the data is also lost, requiring the reacquisition of data by an additional field survey, a costly alternative. Loss of paper map and you will still have the data stored digitally on the pen.

Immediate ROI

Apart from the time required to manually re-enter data into ArcGIS, data errors introduced during transcription or from faulty memory created headaches for the facilities teams. Projects would be planned based on mistaken information – which would cause delays and require the time and expense of additional surveys. After implementing Capturx with ArcGIS, the building surveyor teams could easily write all

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their notes once – knowing that the information would be integrated accurately into ArcGIS without another data re-entry step. NASA LaRC GIS, estimates that they have cut the survey time in half, cut errors by 80%, and reduced overall survey costs by one third.

Future Plans

Roof Surveys

The GIS team at NASA LaRC is already considering new ways to utilize the Capturx technology. One such example may be how roof inspections are conducted by Operations and Maintenance. The Operations and Maintenance department conducts frequent roof top inspections for which they will use Capturx for ArcGIS to document condition, HVAC, and other equipment.

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Storm Surveys

Another possible application is storm damage assessment. At NASA’s Johnson Space Center, emergency crews must assess building problems (blown-out windows, roof damage, etc.) during the storm. However, during and immediately after a storm, complex electronics and awkward heavy mobile computers are cumbersome for data collection. The teams could collect data using Capturx plans printed on Rite-in-the-Rain 11 x 17 paper which resists tearing and smudging. The LaRC GIS Team plans to invest in additional systems to prototype this and other capabilities.

Circuit Breaker Documentation

Additionally, NASA needs to comply with National Fire Protection Association requirements for documenting and analyzing electrical disconnects, which has been a multi-year process, currently being done with 5 expensive laptops. Synchronizing the laptops with the master database has been problematic and the team would like to get better use out of the laptops as they work through budget issues. A simple map and form, created and digitally enabled with Capturx Forms for Excel, could provide an alternative to the laptops, reduce training expenses and easily integrate with the existing database.