



RFID Technology From HID and InfraMarker Takes Paleontological Discoveries From Dig to Display® With 99% Accuracy

The process of tracking a fossil from excavation to analysis often encounters challenges with data loss and inconsistencies. However, a groundbreaking method for fossil tracking is revolutionizing the process, courtesy of a collaborative effort between pioneers in asset management and two committed organizations.

Leveraging cutting-edge technology from InfraMarker by Berntsen and Esri, alongside RFID tags from HID, the Earth Sciences Foundation Inc. (ESF), — a non-profit with excavation and fossil preservation expertise — and the Standing Rock Sioux Tribe — whose ancestral land holds the paleontological site — have come together for a historic achievement.

CHALLENGE

Traditionally, field notebooks serve as the primary repository of information, capturing location coordinates, sketches, and field numbers — a complex code encompassing site details, discovery dates, and taxonomic clues. However, upon leaving the excavation site, these notebooks often become separated from their corresponding specimens, resulting in a significant disconnect between crucial context and the physical fossil itself.

At the storage facility, the reliance on paper spreadsheets for fossil tracking creates additional inefficiencies. Manual data entry is susceptible to human error, leading to inconsistencies and inaccurate location information. Thus, retrieving a specific fossil can become a separate time-consuming treasure hunt within itself, hindering research workflows.

The process of preparing fossils for additional study presents yet another hurdle. Removing the protective jackets, a necessary step for analysis, severs the physical link between the specimen and its field number. This disassociation further complicates the ability to connect the fossil back to its crucial contextual information documented in the field notebook, potentially delaying accurate classification and interpretation of the data.

The need for a fossil-tracking solution that would promote data accuracy, accessibility, and ultimately, a deeper understanding of our evolutionary history, was clear.

CASE STUDY

"This project is the proof that any organization that needs to track and manage assets across space and time will benefit from incorporating RFID with their GIS."

Mike Klonsinski, President of Berntsen

SOLUTIONS

- RFID tags
- TSL readers



SOLUTION

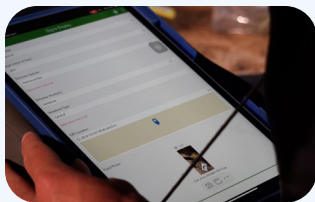
Leveraging InfraMarker's RFID marking products, Esri's field mapping software and HID's RFID tags, the solution encompasses a three-step process to track and manage dinosaur remains at the Standing Rock Sioux Tribe lands in South Dakota. The process ran as follows:



Step 1 — Tagging and Data Capture

Upon identifying a fossil for removal, the field technician uses ArcGIS Survey123 software to capture vital information such as precise location, species, anatomical part, as well as photos, field notes, schematics and metadata.

A unique RFID bone identifier is then assigned to the fossil using a TSL RFID scanner from HID. This tag stores basic data such as: asset owner, asset description, original asset coordinates, unique identification number



Step 2 — Consolidated Information

The InfraMarker functionality integrated with the ArcGIS Survey123 mobile app, facilitates writing the basic fossil data from the tag to the GIS asset record. So, when the field technician captures additional information such as field notes and photos through the ArcGIS Survey123

data collection form, all relevant data is associated with the fossil's record in ArcGIS Survey123, completing the field process.



Step 3 — Secure Transport and Ongoing Tracking

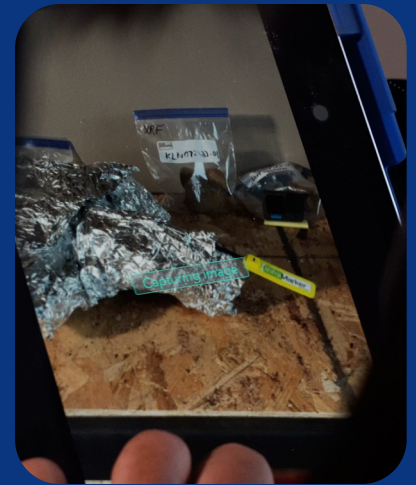
Once data capture is complete, the RFID asset identifier is securely attached to the bone (zip-tied) or sealed within the foil package, ensuring the physical ID remains with the fossil throughout its journey.

RFID readers and the ArcGIS Survey123 mobile application with InfraMarker to track the fossil's movement through various workflow zones (storage, prep, study, display). Each scan with the RFID reader generates a date/time stamp, creating an auditable record and providing the last known location of the fossil.

With ArcGIS online, ESF can view a map of bones (original and current location), a complete record of each bone, and a dashboard of daily/weekly/monthly actions. As an added bonus, third-party organizations can be granted access to this information. In the case of Standing Rock — the bone owners — they were able to accompany the bone assets' journey without having to be on-site.

Results

The solution proved to be a resounding success. Within just five days, the excavation team had seamlessly catalogued 347 fossils, demonstrating the rapid adoption and efficiency gains offered by this innovative approach.



"Using RFID technology, GIS mapping, and geospatial curation, as well as creating a whole fossil tracking system, we are able to see the life of this fossil from the time we found it in the ground, to the time we put it in the repository or storage building, to the time we prep it, clean it, restore it, and display it in the museum. This allows people to follow the adventure of this bone from beginning to end, as well as allows us and other scientists to do better research, collaborate easier, and exchange ideas faster,"

Tom Hebert
Founder and Director of Earth Sciences Foundation, Inc.

There was an 80% improvement in workflows, as the solution reduced the burden of manual data entry and administrative tasks. This freed up valuable time for the field technicians to focus on core activities like research and fossil conservation. To that end, because data capture is standardized, consistent information is collected for every fossil, facilitating a more comprehensive analysis.



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scientists to do better research, collaborate easier, and exchange ideas faster,” stated Tom Hebert, Founder and Director of Earth Sciences Foundation, Inc.

More importantly, the combined power of InfraMarker’s RFID system and HID tags delivered near-perfect accuracy in tracking fossil movement and location throughout the entire preservation process. Throughout the process, all RFID interrogation data was collected in the cloud, providing near real-time visibility of bone status by auditors hundreds of miles from the dig site.

“I know where everything is—right now,” Hebert stated while tagging a bone during excavation. “I can’t speak glowingly enough about how well this works for us out here. We are in the middle of nowhere; there’s no wi-fi connectivity here, and it still works!”

[Learn more](#) about HID’s custom tag designs.

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