



PROBLEM STATEMENT:

Small-scale ranchers in Guadalupe County struggle with solo labor and manual data entry. **Cowboy Connect** provides hands-free AI to ensure these local operations remain sustainable.



MEET ANTON CHICO MIDDLE SCHOOL TEAM NEW MEXICO

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MEET OUR USERS:

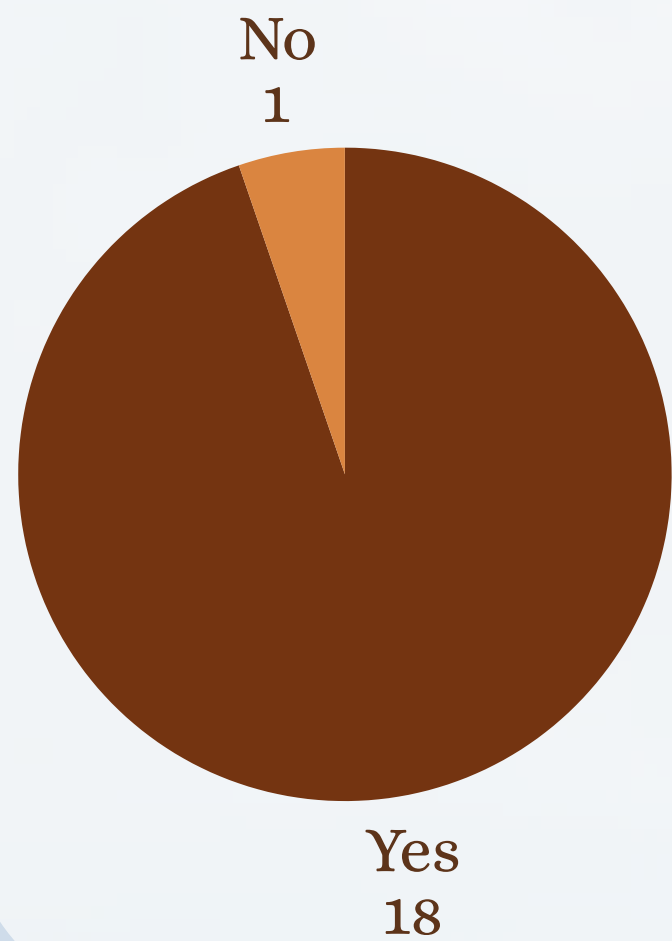
Transito Sanchez
Elliot Bachicha
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Kiko Padilla



VISUAL DATA 1

Would you be interested in adopting new technology solutions in to your cattle ranching operation?

Yes No



VISUAL DATA 1: The pie chart shows that 94.7% of cattle ranchers are interested in adopting new technology.

APP DEMO



ENGINEERING DESIGN PROCESS

DEFINE

Our team explored the agricultural sector of our community, specifically focusing on farming and ranching. Ranching is a huge part of the Anton Chico Community with a large number of ranchers having their own family run operation.

IMPROVE

To improve our product, we plan to make the module small enough to fit on a cattle tag so it can be tested in the field. We also aim to develop a fully functional app so both components can be used simultaneously.

ASK

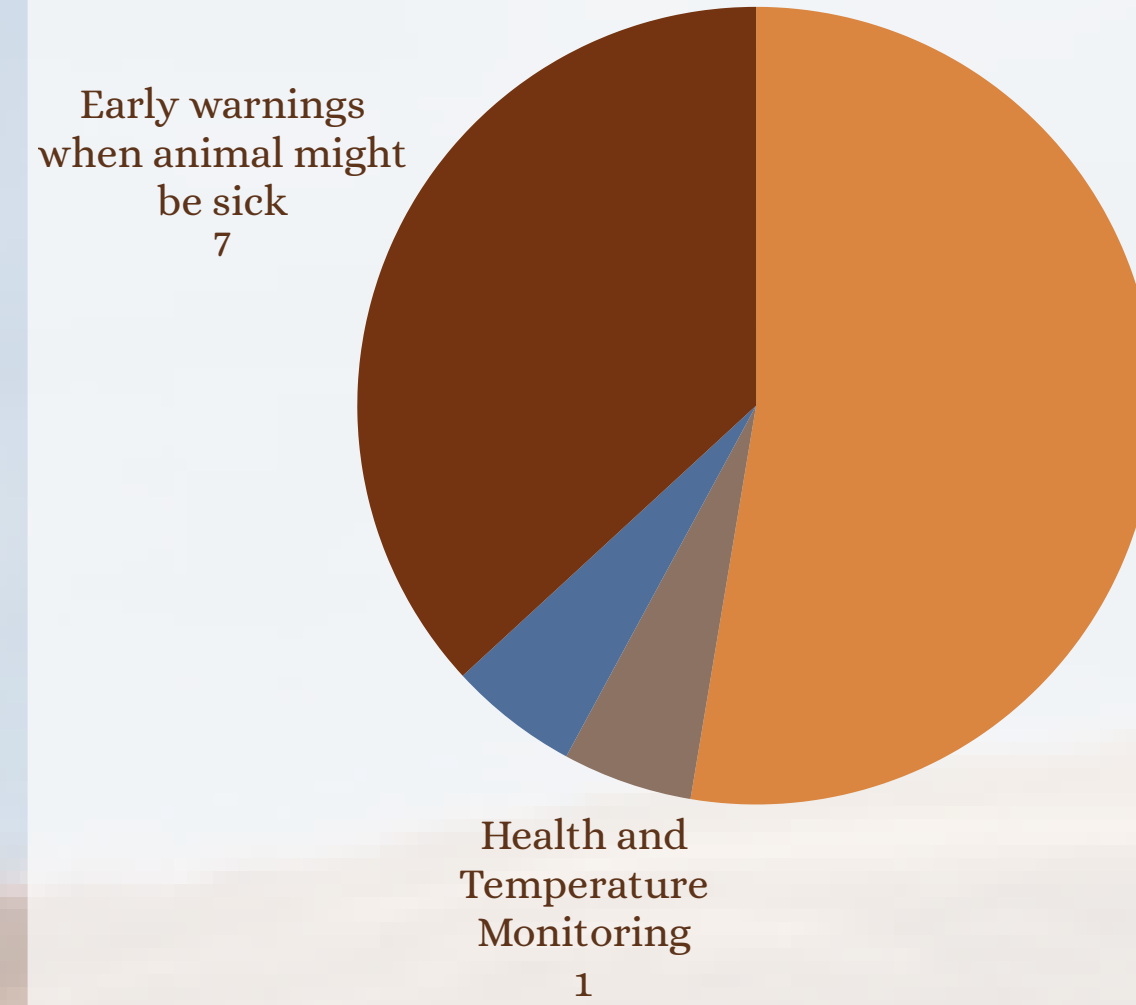
We created a survey for those in the agriculture field to see what kind of product we could develop that would be helpful. By analyzing the data we identified the specific need that our product would address.

User Survey



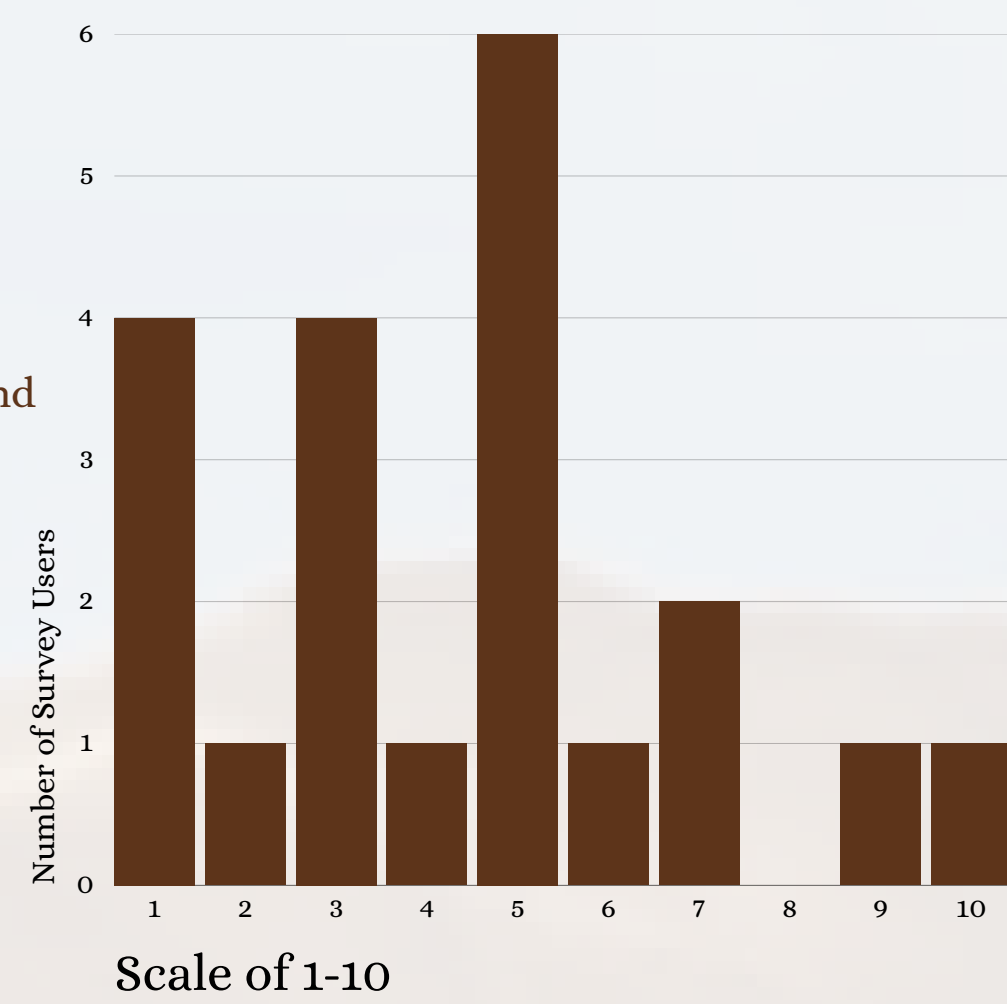
VISUAL DATA 2

Which feature of Cowboy Connect sounds most helpful to you?



Visual Data 2: The pie chart highlights the most valuable features of Cowboy Connect, with over 50% of users selecting GPS tracking and digital fencing as the most helpful

On a scale of 1-10, how happy are you with how you currently track animal health and location?

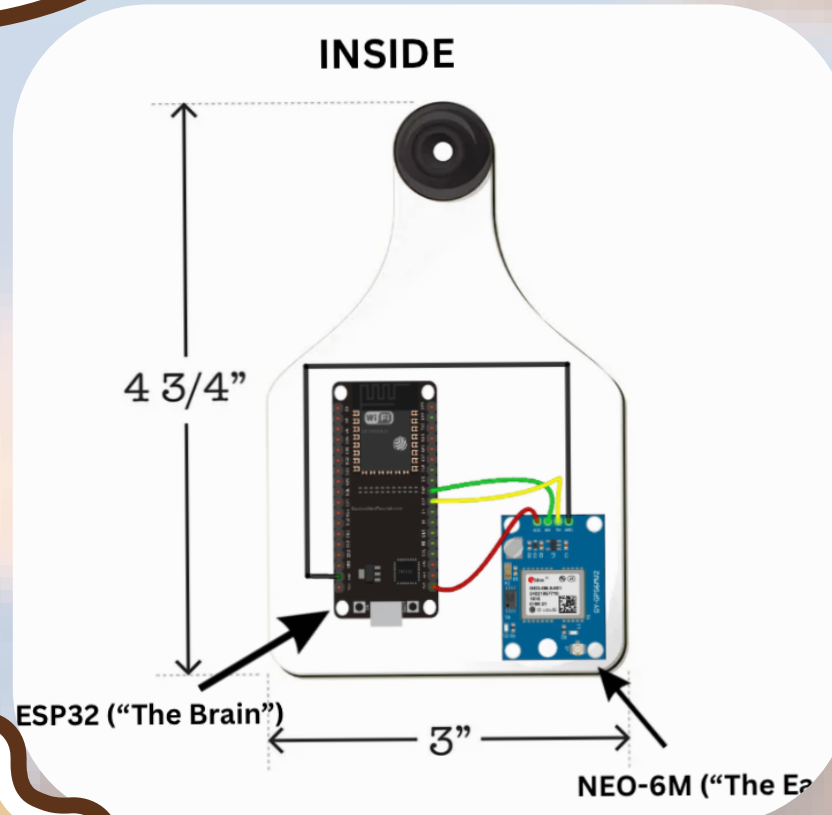


Visual Data 2: The bar graph illustrates current user satisfaction with tracking livestock health and location, with the majority of respondents rating their satisfaction at 5 or below

OBJECTIVES

Primary	Secondary
Accelerate Data Entry: Make livestock record-keeping at least 50% faster for ranchers.	Enhance Animal Health: Facilitate better record-keeping for vaccinations and treatments to help ranchers spot health problems early.
Enable Hands-Free Management: Provide a voice-controlled system that allows ranchers to log data while performing physical labor like branding or vaccinating.	Mitigate Labor Shortages: Act as a "digital ranch hand," allowing solo ranchers to manage a herd more efficiently without needing to hire extra workers.
Improve Herd Tracking: Utilize GPS ear tags to monitor cattle locations in real-time and reduce the time spent searching for lost livestock.	Reduce User Stress: Lower the mental and physical burden on solo ranchers by ensuring data is not forgotten or lost during busy seasons.

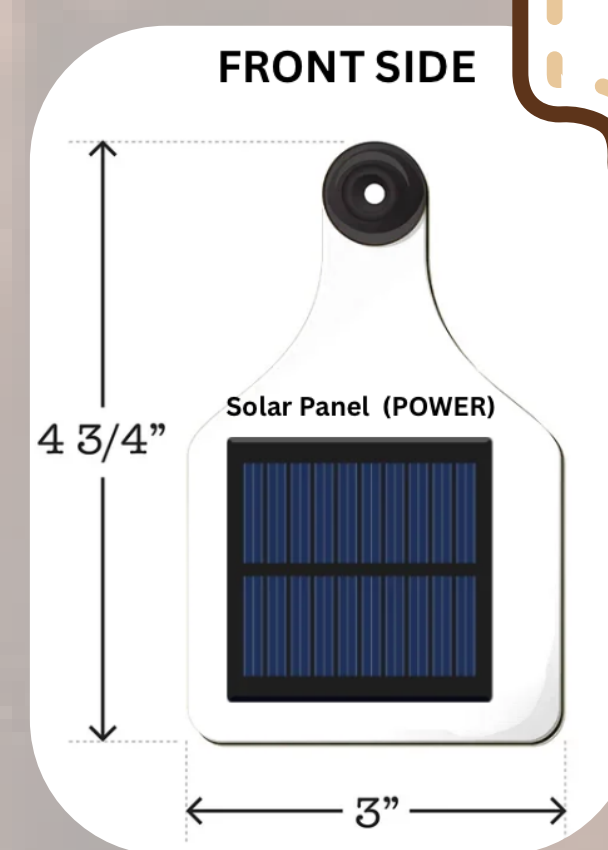
PROTOTYPE GRAPHICS



THE TAG

PROTOTYPE DETAILS

The top two images shows the tag component of our prototype. It uses an Arduino Nano board, a GPS module, and a solar panel to provide the coordinates of where your cattle are located on a map. (Dimensions 4 3/4" x 3")



THE APP

PROTOTYPE DETAILS

The bottom image shows the app component of our prototype. It includes a map feature that displays the real-time location of all cattle in the pasture. The app also features an AI voice assistant that allows users to quickly log notes while branding or vaccinating cattle.

IMAGINE

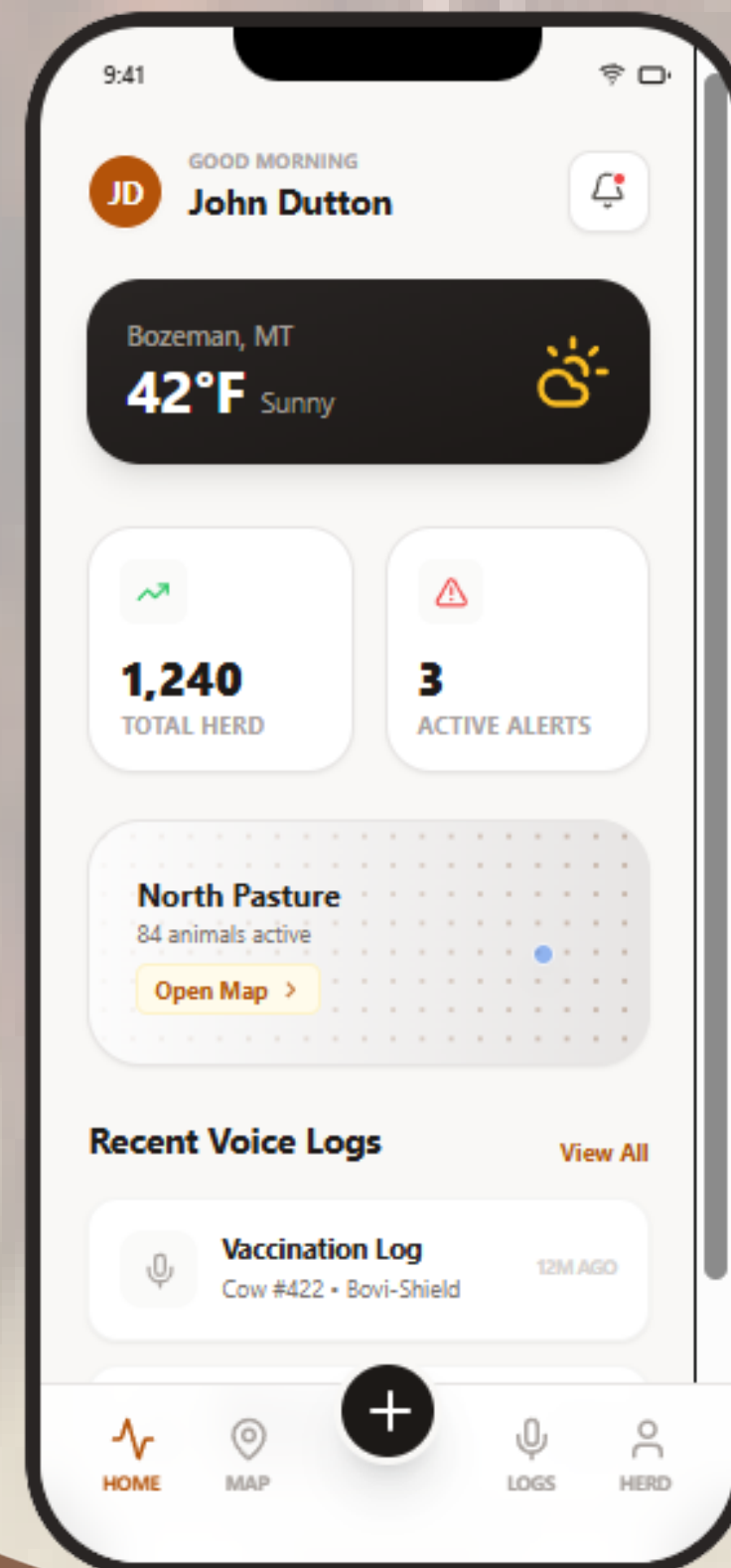
We determined that our users were all interested in adopting new technology and many struggled with finding reliable help. Once the need was clear, our team defined exactly what Cowboy Connect would be and listed the "must-have" features that would directly solve the issues found in our research.

PLAN

We decided to create a GPS ear tag for cattle that would connect to an app that would help with herd management. This would meet our users survey responses of including new technology and would help with the labor shortage by allowing one person to do more in less time.

PROTOTYPE

We designed a cattle tag that has a GPS module that allows the tracking of your animal. We also developed an app that would connect to the cattle tag to give realtime location of your cattle. The app has AI features that help to keep record keeping for managing cattle in order.



TAG DESIGN ITERATIONS



Image 1 shows a preliminary test of the approximate size of the tag.



Image 2 is a freehand sketch of the cattle tag, outlining our initial design concept.

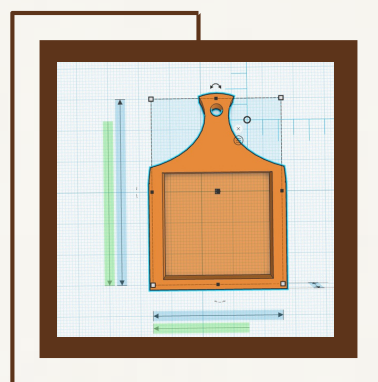
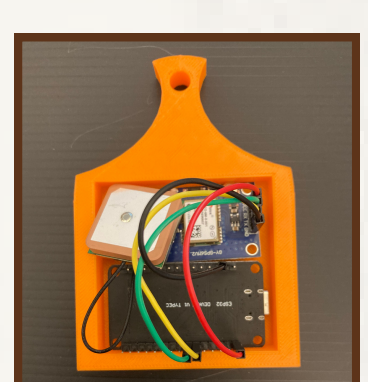


Image 3 shows the TinkerCAD model we created, including the identations designed to hold the sensors.

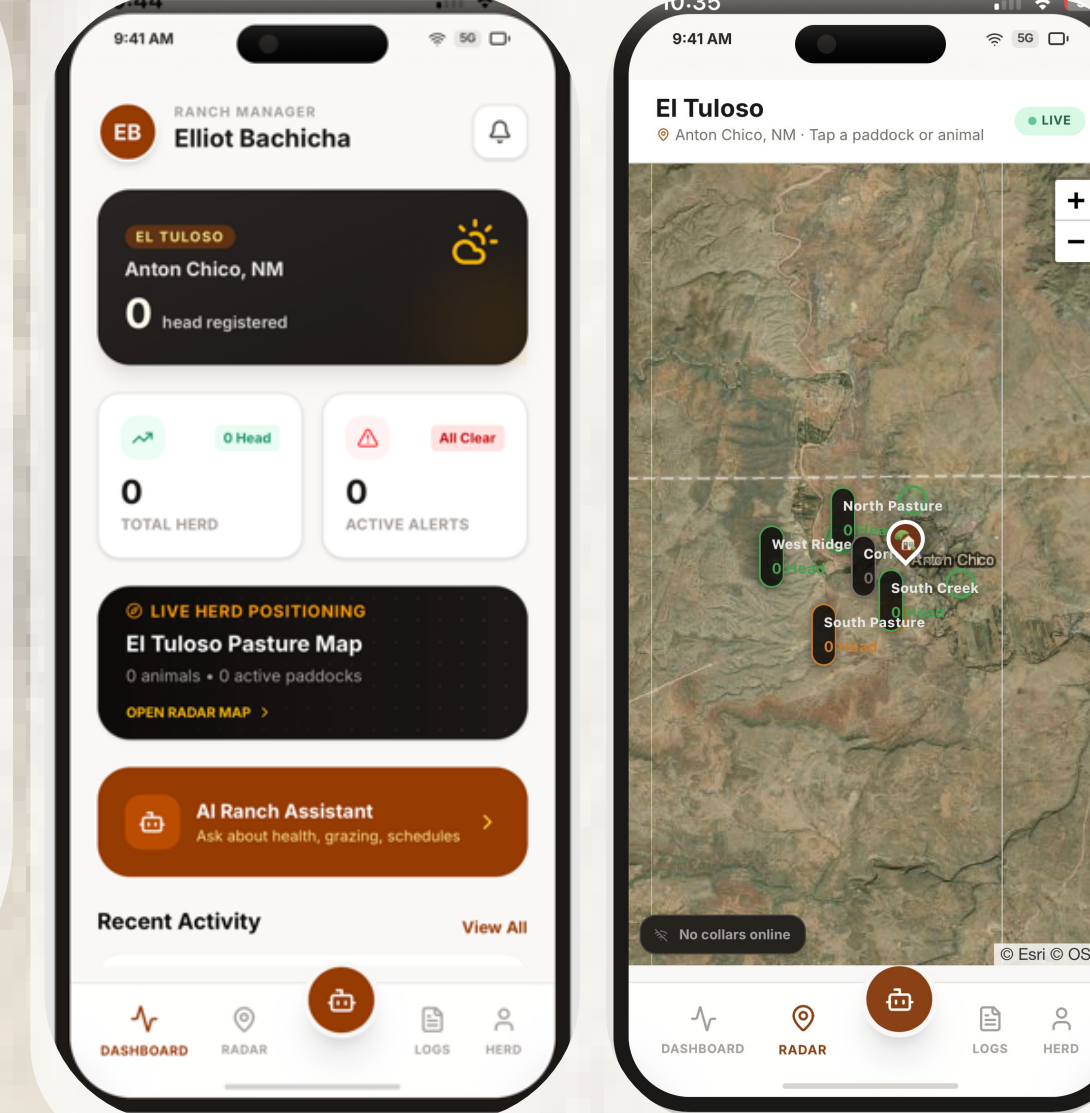


Image 4 is a photo of the actual 3D-printed prototype based on our TinkerCAD design.



The final image represents our planned design for the prototype.

APP ITERATIONS



The App Iteration shows our fully functional User Dashboard. The image on the Left is the Home Screen and the image on the right is the Map View of El Tuloso Ranch.

RESULTS

- The team demonstrates how the prototype is designed to promote equity for users
- A working app was developed to model system functionality and user interaction
- A physical prototype was created using an Arduino Nano and GPS module to display real-time coordinates
- The system shows how ranchers can track livestock location efficiently
- While the prototype is still being refined, core features have been successfully demonstrated
- Results indicate strong potential to improve accessibility, reduce workload, and support independent ranchers

CONCLUSIONS

- Cowboy Connect meets key user requirements by making ranching more efficient, safe, and accessible
- Prototype and App demonstrate that voice-controlled data entry and GPS tracking can reduce workload by approximately 50%
- System functions as a "digital ranch hand," supporting ranchers working independently
- Promotes equity by reducing physical and mental strain, especially for elderly ranchers
- Eliminates the need for additional labor to maintain records and locate livestock

IMPROVEMENTS

If we continue this project, we would focus on these four areas:

- Work Without Signal: We will add a "save for later" mode so the app works even in areas with no cell service.
- Stronger Tags: We will design tougher ear tags that won't fall off or break in rough weather.
- Predicting Sickness: We will improve the AI to warn ranchers before an animal even looks sick.
- Better Privacy: We will add more security so ranchers have total control over who sees their private herd data.

Overall, Cowboy Connect shows that modern technology can make traditional ranching safer and more successful for everyone.

CITATIONS

Ages & Farm Size: New Mexico Department of Agriculture, 2021-2024 Annual Statistics Bulletins.
Cattle Count: USDA National Agricultural Statistics Service, 2022 Census of Agriculture.
Cowboy Connect Survey [Data set]. (2026). Unpublished raw data.