# Truth Pods: Radar Validation Tool of Counter-Unmanned Aircraft Systems

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## Summary

This project addresses the need for affordable, secure, and reliable radar validation tools for Counter-Unmanned Aircraft Systems (C-UAS) testing. Existing options are costly, prone to destruction, and production often relies on foreign companies. The proposed "truth pod" offers a low-cost, scalable, and secure solution. It provides real-time UAV location data, enabling precise radar validation for military, defense, and commercial applications.
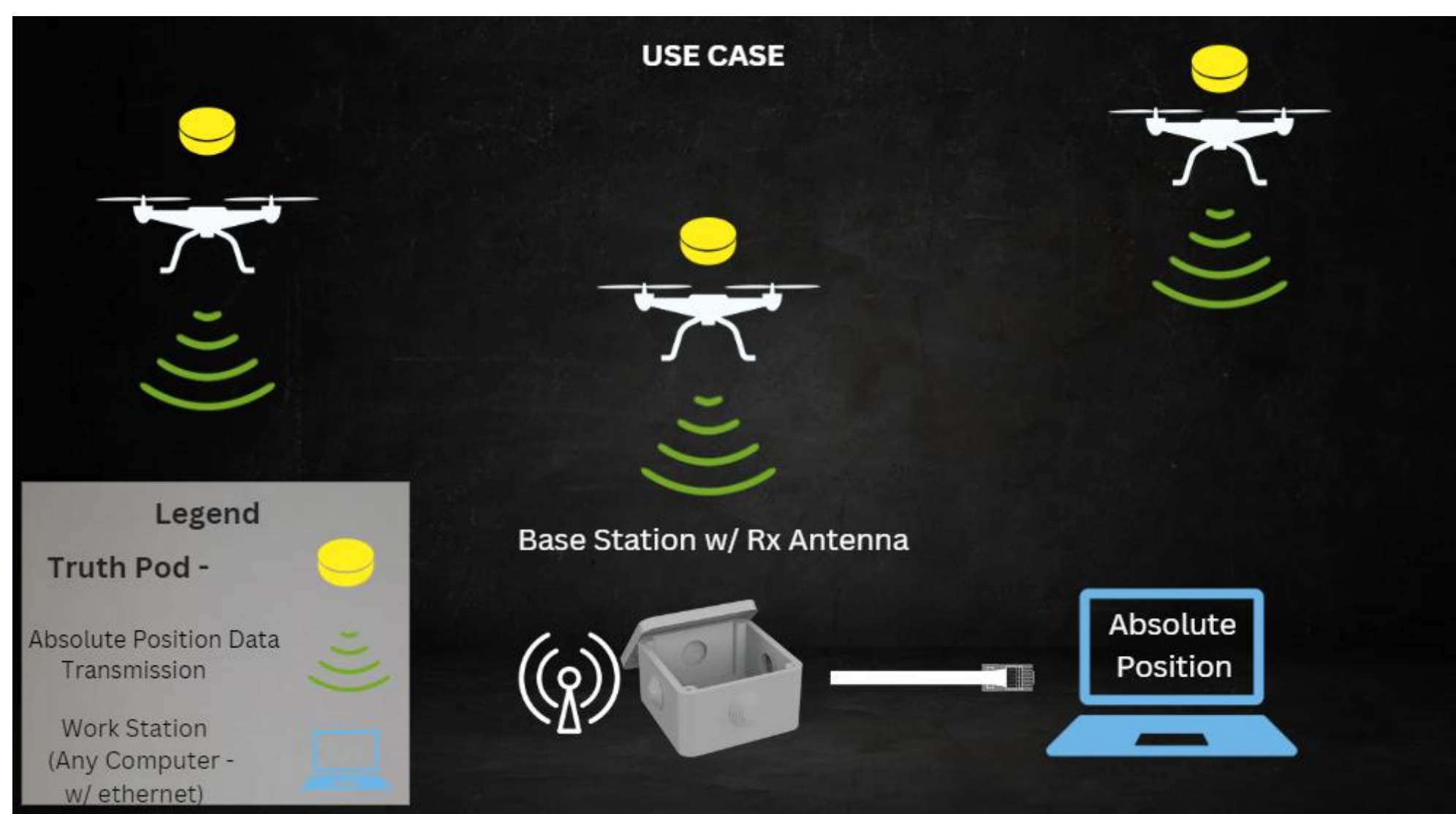
## System Design

Multiple Truth Pods are capable of transmitting GPS location data to a base station at the same time using TDMA; powered by a rechargeable battery, it provides more than 12 hours of operation, sufficient for the duration of a drone test. The Truth Pod is designed for line-of-sight communication, as the base station receives GPS data transmitted via LoRa radio and forwards it via serial connection to a computer. The system maintains a packet loss rate below 20% within the 1-mile line-of-sight range.



## Key Requirements

- Must provide location data of test UAVs for the purposes of verifying performance of radars.
- Base station must be able to connect to at least 2 pods at the same time.
- Must be able to log locally for 2 hours.
- The packet loss for each pod must be less than 20% within 1 mile.
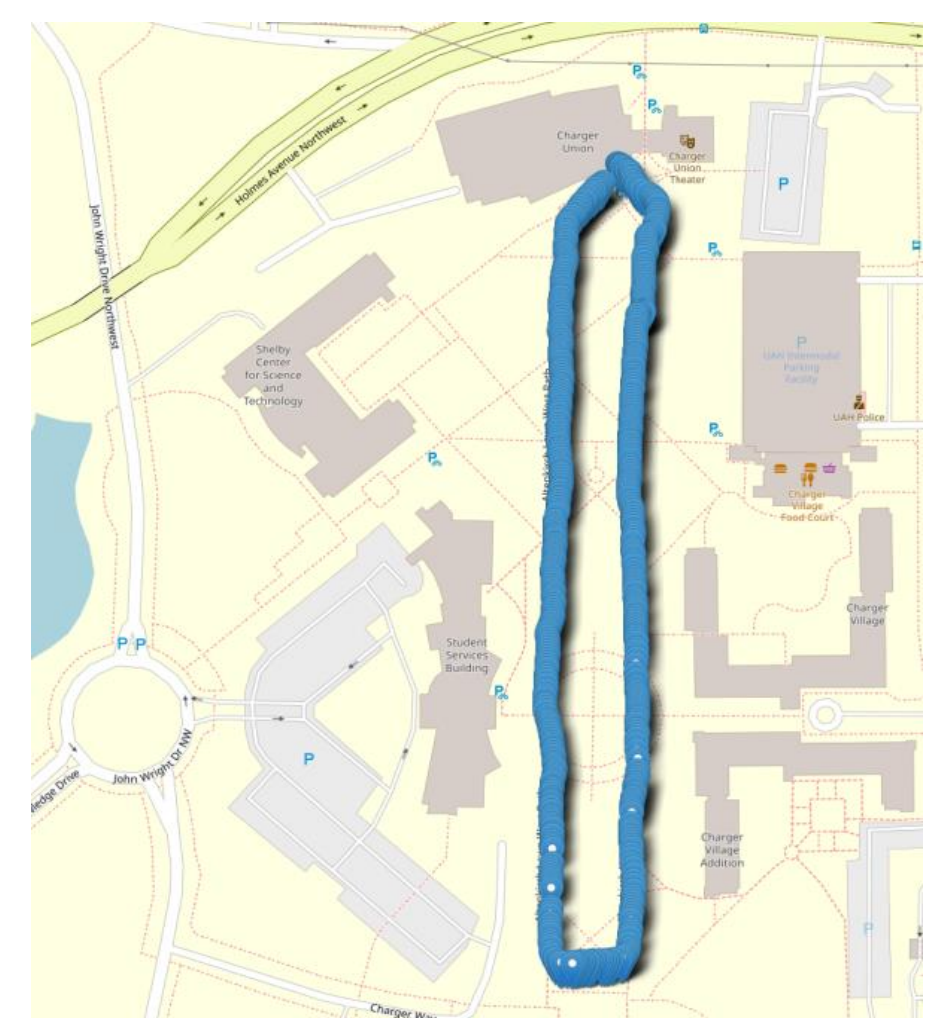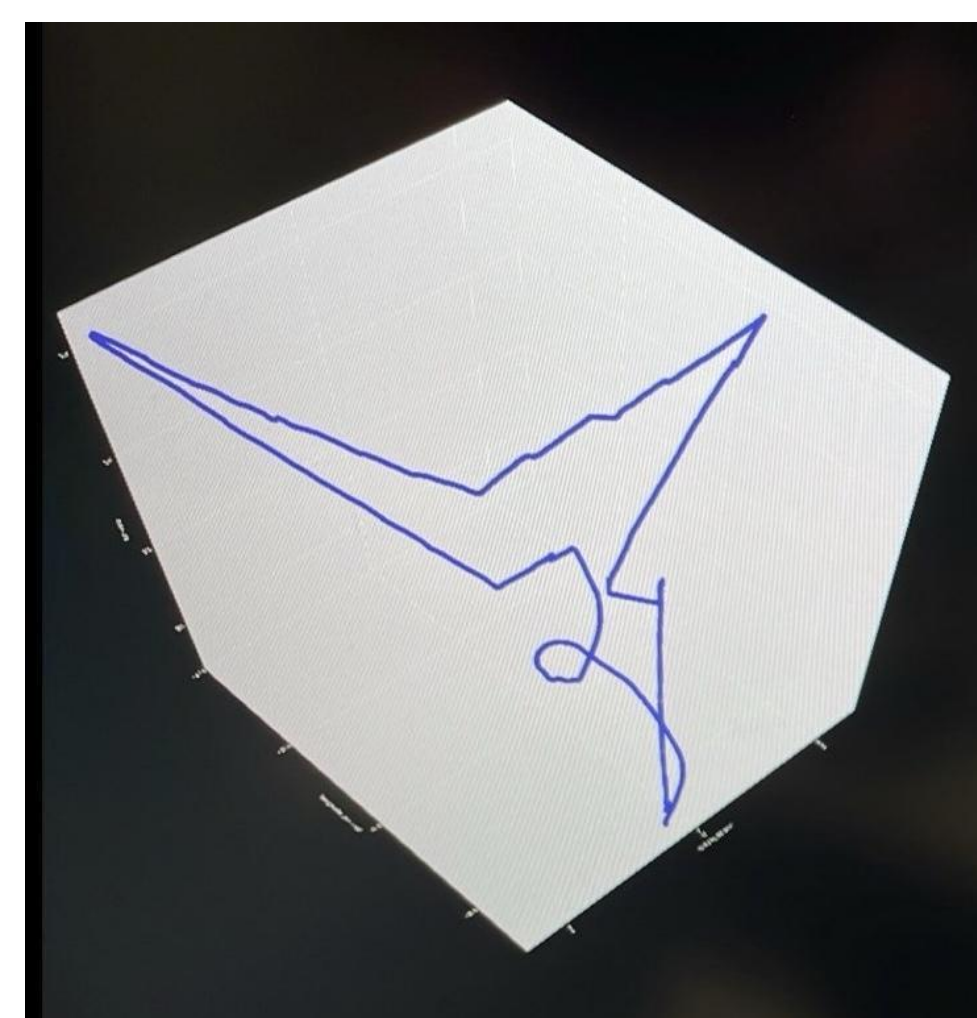


## Conclusion

We were able to complete a working "truth pod" prototype that was able to be used as a radar validation tool by SAIC at a government test. Some of our major accomplishments were that our project was able to help the radar validation process by providing a ground reference of "truth" with an interactive 3D graph (above), was housed in a custom 3D enclosure (left), locally logged data on pod while sending it via LoRa to the base station, published data from the base station to other systems on the network, and is capable of doing all of the above while costing less than $100.

## Acknowledgements