

Fowado Technology Group - sUAS-EOTACS Payloads Capability Assessment Event:
White Paper Submission

Company Name: Fowado Technology Group (FTG)

Capability Tile: FTG UMS

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Problem Statement Tile: UMS Broadcast

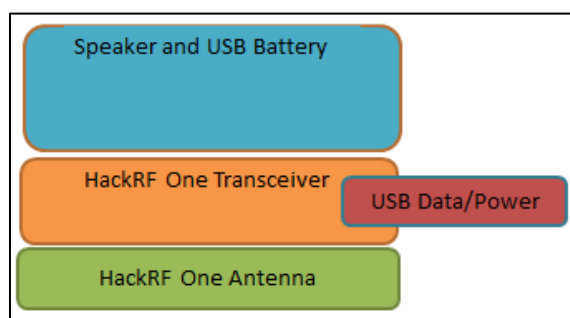
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EXECUTIVE SUMMARY

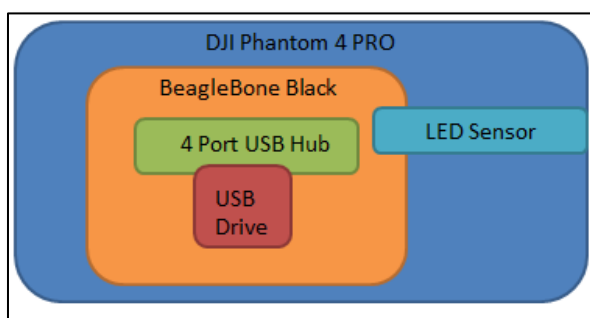
Fowado Technology Group (FTG) proposes FTG UMS as an enhancement of our SOFWERX AirSpew Challenge top three finisher to address MISO's gap in the ability to intercept, jam, modify and transmit/broadcast FM/Television/Cellular across sUAS platforms during short duration operations and to conduct sUAS MISO messaging. Our solution will combine edge platform compute capabilities with a software define radio and necessary amplification to meet MISO's missions. The compute component of the payload facilitates the command and control of the software defined radio while the broadcast amplification component achieves the targeted ranges.

TECHNOLOGY CONCEPT

Our technology concept is based on our successful submission to SOFWERX's OpenWERX AirSpew Challenge conducted September 2017. In our AirSpew submission one of three interchangeable payloads integrated a software defined radio module with a DJI Phantom 4 quadcopter. The diagram below shows an overview of the components that were part of the AirSpew Radio Module:



The payload also included compute capabilities that provided the processing behind the radio functionality and which were shared with two additional interchangeable modules, outlined below:



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The radio transmission was remotely controlled using the platform's trigger button and the broadcast message was sourced from a USB memory stick on the UAS. The payload was attached to the platform without structural modifications (as outlined in the AirSpew challenge). Overall, FTG's submission to the challenge placed 3rd.

For a short video of the AirSpew Radio Module visit <https://youtu.be/qCI9H9dysWo>

In order to meet MISO's requirements FTG UMS would enhance the original AirSpew Radio Module in the following areas:

- All-weather condition proofing compute, software defined radio, and amplification components
- Enhance self-supporting power to support desired transmission ranges
- Develop remote operator messaging interface
- Enhance FM broadcast to 25nm range
- Develop TV broadcast with 15nm range
- Develop Cellular broadcast with 8 nm range
- Integration with MISO sUAS target platform (if different than DJI Phantom 4)

The system would carry forward the following existing features to help meet MISO requirements:

- Payload weight at or under 4 lbs.
- FM broadcast capability
- Integration with DJI Phantom 4

In terms of technology readiness, we believe that the foundation AirSpew Radio Module sits around TRL6 having flown the platform with the module in operation. Additionally, SOFWERX independently operated the module in order to evaluate it for the challenge. On the manufacturing side we consider the AirSpew Radio Module to be about MRL 5 where we have demonstrated the capabilities on a prototype but have not optimized for production. FTG Radio modifications are lower in the TRL/MRL scale since they are in the technology assessment and proving phase.

AirSpew Radio Module was developed under a compressed schedule while developing two additional modules and using only FTG resources and time. We learned valuable lessons that if selected will directly apply to the development of the FTG UMS to meet MISO's need for FM/TV/Cellular transmission from an aerial platform.

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COMPANY VIABILITY

Fowado Technology Group (FTG) is a small, minority, veteran owned business based out of Tampa, Florida. While selling some of the most sophisticated drone equipment available to civilians FTG also offers custom UAS solutions that include engineering and manufacturing of both hardware and software components and systems. Additionally, we pilot drones for a variety customer needs; these competencies give us the unique perspective of the entire UAS lifecycle: sale, service, modification, and operation.

Our team includes a mix of former military members that understand being mission focused combined with technical and engineering expertise that cover hardware and software fields. Our company's strength is to provide customers with innovative solutions that stretch the art of the possible.

ROM COST/SCHEDULE

Current System – AirSpew Radio Module

Assumptions and Variables:

- Assumes assembling new AirSpew Radio Module
- Assumes availability of same/similar components as original design, unavailability of components is a variable
- Assumes same AirSpew platform (DJI Phantom 4) if MISO using different sUAS platform that integration will be part of End State System work
- **Cost: \$500 / Schedule: 30 days**

End State System - FTG UMS

Assumptions and Variables:

- Encompasses the enhancements outlined in the Technology Concept section
- Assumes one prototype system delivered
- Assumes one transmission type (FM/TV/Cellular) per mission/flight
- Assumes the current system (AirSpew Radio Module) is available as starting point (cost/schedule for that not included, see above)
- Assumes level of effort for sUAS platform integration (mechanical and logical) is similar to DJI Phantom 4
- Assumes we are provided (GFE) the sUAS target platform for integration
- **Cost: \$25,000 / Schedule: 120 days**
 - Most of the cost is the estimated non-recurring engineering work to address the shortfalls of the current system against MISO's use case