

## Case Study: Teal Drones

### Dojo Five Embedded Firmware Development



## Background

Teal Drones designs and manufactures drones and ground control stations for use in military operations, public safety monitoring, police and fire response, and search and rescue missions. Not only is the drone technology used for reconnaissance activities, it is also deployed for situational awareness, construction management, and for land mapping as well. The company employs approximately 50 people including 20 engineers, and 8 software and firmware developers. Software updates for Teal Drones products are released multiple times per year but not on a set cadence. The company uses a variety of boards, chips, and processors to develop their products including Nordic, STMicroelectronics, and Qualcomm.

Teal Drones had a specific project with well defined input and output, and identified the Nordic chip as a good choice for the solution. However, the Teal Drones team was already completely consumed and didn't have any Nordic experts available for the project. They sought to use a previous contractor but the attempt to utilize this resource was unsuccessful (rigid workflows and processes, lack of experience with the chosen technology solution, and gaps in a project leader's capabilities can often impact the start and delivery date of a project). The decision was made at the onset of the initiative to use contractors to develop the solution, but Teal needed an experienced embedded firmware resource. Using a simple Google search ("contractors with experience with Nordic") they discovered and contracted Dojo Five EmbedDev services.

## Requirements and Milestones

During the project, Teal Drones identified key milestones and requirements, however it became clear that they were unrealistic and adjustments were needed to match reality as the project went on. Dojo Five offered the following to realign expectations around the project:

- 1. Systems Engineering.** Dojo Five was able to provide additional system engineering to help clarify how the new BLE module would interact with the rest of the drone ecosystem. Dojo Five identified the design choices for Teal which enabled them to pick the best options to match their desired top-level use cases.
- 2. Requirements and Testability.** Since the BLE module would eventually have to be certified, Dojo Five ensured this process would be set up for success by clearly defining requirements and structuring the embedded software in a manner that facilitated easy testing of all underlying requirements and specifications.
- 3. Flexibility.** Once it was clear the original key milestone dates given by the customer were not feasible, Dojo Five helped set a realistic timeline and was able to increase resourcing at the customer's request to ensure Teal Drones would be successful.

### *"Dojo Five hit the ground running and didn't stop!"*

*We do most of our engineering in-house, but they are now 'top of the list' next time we run into a situation where we may need external resources for whatever reason. We just plowed through the development and it got done—with almost no back and forth due to miscommunications or bugs. Very impressive. Everything went really well and we're about to go to certification with the solution. Dojo Five was great immediately and throughout the project. Interpersonal communications were great, working through the technical issues were great, and the solution is working well at the end. Honestly, I'm not able to think of any cons or negatives."*

**Colby Whitney**

Director of Software Engineering  
Teal Drones

# Done Right from the Beginning

By breaking down high-level use cases into system requirements and low-level requirements during the systems engineering process, Dojo Five was able to save Teal Drones time and additional expense in the certification process. In addition, Dojo Five's technical expertise with BLE and the nRF52 chipset, allowed them to quickly stand up a base application to assist with derisking the system in general. Dojo Five also provided input around various design decisions, listing the pros and cons for each to help ensure rework would not be needed down the road.

## Summary

Teal Drones set out to use a contractor for this project and terminated a previously hired contractor before hiring Dojo Five. After finding Dojo Five via an internet search, they were available to get to work immediately on Systems Engineering—using various diagrams, documentation, and requirements that would all be used in the certification report. They also provided embedded firmware and embedded Linux development, Docker containers for repeatable/automated builds, as well as Python test scripts used for embedded software verification plans.



Visit [DojoFive.com](https://DojoFive.com) to learn more about what Dojo Five can do for your embedded project. Or contact us for a **complimentary demo** of EmbedOps and our embedded services offerings at [hello@dojofive.com](mailto:hello@dojofive.com)