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ARINC 838 Project Roadmap

Team Information Overload V2

Mike Deats, Scott Griffin, Ryan Neal, Brandon Sutherlin, and Liron Yahdav

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**Fall**

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# Executive Summary

The ARINC 838 specification attempts to standardize and validate the format of software to be loaded on avionics hardware. The Customer has expressed fears that the specification is incomplete and/or ambiguous. This project is to evaluate the specification for efficacy and completeness. The evaluation should drive the simplification of the loadable software installation process. Team Information Overload v2 (IO2) will provide the customer the following deliverables per the *Success* *Criteria* section of the Boeing-cmu\_proposal\_arinc\_838 document:

* Prototype implementation of build and verification tools
* Prototype implementation of the target loader
* Gap analysis via revision information/comments on ARINC 838
* Draft guidelines for loading target hardware[[1]](#footnote-1)

It is noteworthy that the customer has approved this road map.

# Project Domain & Project Goals

The goals of the ARINC 838 per the Boeing-cmu\_proposal\_arinc\_838 document are as follows:

* Mature the standards or the ARINC 838 Specification
  + Identify shortcomings in the draft standard
* Simplify the loadable software installation process
  + Demonstrate that relatively simple target loader code can reliably identify, verify and install loadable software to the LRU
* Evaluate whether this project, and subsequently other projects in the aerospace industry, can be completed using Agile methodologies[[2]](#footnote-2)

# Tools & Methodology

Team IO2 has diverse knowledge and professional experience in the discipline of Software Engineering. Additionally, the team has worked together successfully on previous projects and is able to make well-informed decisions quickly. One of the most important qualities of this high-performing team is its ability to identify and rapidly adapt to changes. IO2 leveraged these attributes to identify that the following criteria make the ARINC 838 project an ideal candidate for Agile Development:

* Small team
* Short project
* Requirements subject to change[[3]](#footnote-3)
* Product is not mission critical[[4]](#footnote-4)
* Team has experience with Agile and traditional methodologies
* Customer expressed a desire to evaluate the efficacy of Agile
* Customer has committed to necessary Level of Effort (LOE)
* Customer has technical knowledge and experience with Agile development

Henceforth, IO2 plans to use Agile development to successfully achieve the goals of the ARINC 838 project as identified in in the Project Goals section. IO2 is intimately familiar with Extreme Programming (XP) and each member has varying levels of experience with other Agile approaches including but not limited to Scrum, the Highsmith model, Kanban, and Crystal Clear. The customer is also intimately familiar with XP. Team IO2 will use XP based on familiarity with its benefits and successful use on previous projects.

Per the Customer’s request for the use of a statically typed language, IO2 will use Java (JRE 1.6.x) and Eclipse for an IDE. In addition, the following tools will be used to support XP practices[[5]](#footnote-5) and manage the project in general.

|  |  |
| --- | --- |
| Agile Practice | Tool |
| Velocity | Pivotal Tracker |
| Story Estimation | Planning Poker |
| Pair Programming | Adobe Connect, Mikogo, Google Hangouts |
| TDD | JUnit, also evaluate TestNG as suggested by the Customer |
| Continuous Integration | TeamCity |
| Open Workspace | GitHub & Pivotal Tracker |

The list of tools provided is not intended to be comprehensive. Additional tools may be necessary as the project progresses. If additional tools are necessary then IO2 will seek customer approval prior to employing the new tools.

# Resource Allocation

IO2 will harness its talents and diversity through practices like Pair Programming[[6]](#footnote-6) and Open Workspace to provide a quality product that meets or exceeds the Customer’s expectations. The team plans to spend on average 15 – 20 hours a week on the project. The table below provides the total investment for the ARINC 838 project.

|  |  |
| --- | --- |
| Average Hours Per Week | 17.5 |
| Team size | 5 |
| Number of Weeks | 14 |
| Total Labor Investment in Hours | 1225 |

IO2 will employ iterative development. The iterations will be short (one to two weeks). The iterations will be consistent with an Agile approach to include reflection and customer demonstration.

# Conclusion

Team IO2 will create an API that implements the ARINC 838 specification. IO2 will provide test cases and gap analysis to evaluate the efficacy and comprehensiveness of the ARINC 838 specification. IO2 will provide a prototype implementation of the target loader. Finally IO2 will provide draft guidelines for loading target hardware as time permits. These artifacts meet the success criteria as defined by the Customer in the proposal.

1. Optional deliverable as time permits [↑](#footnote-ref-1)
2. This desire was verbally expressed by the Customer and is not otherwise explicit within the proposal [↑](#footnote-ref-2)
3. The requirements are well-defined however the change is anticipated related to gap analysis and other activities identified as time-permitting activities [↑](#footnote-ref-3)
4. Loading avionics software is mission-critical, however this code is proof of concept and not intended for use in production [↑](#footnote-ref-4)
5. Not all of the Agile practices require a tool to implement [↑](#footnote-ref-5)
6. The team does not intend to use Pair Programming for rote or boilerplate tasks [↑](#footnote-ref-6)