**Project Name:** *<Project Number??>*Multi-Level Oil Indicator (aka MLOI)

**Goal:** Produce an automatic LabVIEW based Acceptance Test Procedure (ATP) for the Pratt & Whittney (PWC) Elevate Oil Level Sensor (OLS).

**Objectives** *(What are we hoping to achieve as a result of this project? Use the acronym SMART as a guide.)*

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| --- | --- | --- |
| ***Must Haves (5)*** | ***Highly Desired (3)*** | ***Nice to Haves (1)*** |
| * Test Procedure approved by PWC | * Test multiple product lines on same test apparatus. | * On-line documentation |
| * Test a single Elevate DUT to ATP 8005571.05 rev E. | * Test parameters configurable/tunable per the AAP Engineering manager. | * MLOI apparatus can be applied to other OLS product lines beyond Elevate. |
| * Hand-free operation once the DUT(s)   is/are loaded.   * to self-certify | * Graphic display of test progress for the operator. | * One button test operation. |
| * Produce record of ATP test result | * Option for manual tank level control | * Live button “tool-tips” |
| * Pass Gage R&R study per AAP Quality Manager. | * Automated/guided Calibration procedure for Level and the Resistance measure | * Continuing Life Cycle and Configuration Management (Living issues list). |
| * Compliance with AAP AS9100 QAM document & records control. | * Collect and plot AEPS test type data, time (50ms) ChA & B ohms and Level | * Test multiple DUT in a single test cycle |
|  | * Analyze AEPS data for transition level, double actuation and slow Switch time. |  |

**Product Requirements (***What are specific testable product requirements?)*

See Technical Requirements for Multi-Level Oil Indicator #250129

**Deliverables** *(What specific products and/or services will this project create? These should be in noun format.)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ***Deliverable(s)\**** | ***Owner*** | ***Customer(s)*** | ***Supplier(s)*** | ***Risks*** |
| Test Hardware including Tank, Level sensor, pump, power supplies, Interface connections. | Engineering | Production Test | Various, duplicate existing ATP Test Bench | 1. Hardware not a capable of meeting specified Gage R&R. |
| Test PC, LabVIEW licenses and network/server connectivity. | IT | Production Test | PC Vendor, National Instruments | 1. Licensing issue, IT type bugs |
| Instrumentation including:   1. Level Sensor (Keyance Lazer) 2. Motor Control (Pololu 18V7) 3. Analog Input Data Acquisition 4. Reference current sources and sensor connection to DAS. | Engineering/  R. Ales Consulting | Production Test | 1. Keyance LK-G507) 2. Pololu (18V7-USB) 3. DataQ (DI-2108) 4. Divelbiss (Custom PCB) | 1. Product/part availability 2. Not Gage R&R capable 3. Difficult to maintain/calibrate/zero 4. Availability of design/development resources |
| LabVIEW Application Software | IT | Production Test | R. Ales Consulting. | 1. Lead time 2. Custom product, singled sourced 3. In adequate maintenance documentation. |
| Interface Units   1. Breadboard (1) 2. PCB (4) | Engineering | Production Test | Design and breadboard prototypes are internal.  PCB is Divelbiss | 1. Breadboard reliability 2. PCB Lead Time, multiple spins 3. PCB NRE and unit cost 4. PCB not COTS |
| Qualification Test Plan | Quality | PWC | R. Ales Consulting. | 1. Test apparatus not capable of test to spec. 2. Design DUT not capable of passing |
| Apparatus deployment | Engineering | Production Test | Project Team | 1. Not placed in service. |
| Doc Control compliance | Quality | Production Test | Project Team | 1. Data is disorganized or lost 2. Not secure. |

**Stakeholders** *(Individuals and/or organizations who will be actively involved in, or who will exert influence on, the project and its deliverables.)*

**Customer(s):** Wayne Forester, Production Test, Allen Aircraft Products, [waynef@allenaircraft.com](mailto:waynef@allenaircraft.com)

**Sponsor:** Rob Hyde, Allen Aircraft Products, [robh@allenaircraft.com](mailto:robh@allenaircraft.com)

**Support Team** *(Individuals and/or organizations who will be actively involved in, or who will exert influence on, the project and its deliverables.)*

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**Milestones** *(best guess)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Responsibility** | **Planned Delivery Date** | **Completed Date** |
| Q01 Evaluation Apparatus Release | R. Ales Consulting | 12/31/24 | 2/1/25 |
| ATP specification update | Engineering | 3/17/25 |  |
| Assess Stage Gate Review (requirements validation) | R. Ales Consulting | 3/21/25 |  |
| Update Design Spec | R. Ales Consulting | 3/27/25 |  |
| Develop Stage Gate Review (Design Review) | R. Ales Consulting | 3/28/25 |  |
| Draft Qualification Test Plan (QTP including gage R&R) | R. Ales Consulting/Quality | 4/3/25 |  |
| Q02 Evaluation Apparatus Release | R. Ales Consulting | 4/7/25 |  |
| Execute QTP on Q02 with breadboard interface | Production Test | 4/11/25 |  |
| Is MLOI put into production services with breadboard IF??  *Per 3/6/25 meeting YES breadboard Interface board may be used in production.* |  |  |  |
| Finalize Interface PCB design | Engineering | 4/21/25 | ) |
| Build Interface PCB (purchase four (4 ) completed PCB) | DivelBiss | 6 weeks after receipt of P.O. |  |
| Release to A01, Put into Production Service. | Quality |  |  |

**Triple Constraint Ranking** *(Rank from driver to weakest constraint.)*

|  |  |  |
| --- | --- | --- |
| 1. Function (Scope) | 1. Delivery Date (Time) | 1. Cost |

**Cost Expectations (***What is the expected budget – is it a target or an absolute?)*

**Development Costs**

|  |  |
| --- | --- |
| NRE – Project Management | $15K |
| NRE – LabVIEW Development | $15k |
| NRE – PCB Development | $6K |
| Other Agency Certifications (not required) | ~~-~~ |
| **Total** | **$30K-$45K** |

**Prototype & Production Units Pricing**

|  |  |  |  |
| --- | --- | --- | --- |
| **Item Number** | **Beta Units** | **First Article Units** | **Productions units** |
| Interface PCB | - | - | $500.00 |

**Constraints** *(List the things that will be considered restrictions or limitations on the project.)*

1. PWC needs MLOI to be **DONE 100% complete** released in compliance with AS9100 and PWC requirements by <DATE??>

**Assumptions** *(List the things that will be taken as granted or true when developing the project's list of activities, budget and schedule.)*

1. Turns from a hobby into a real project with assigned PM and resources, follow the PMI and AAP development SOP.
2. OLS design is capable of meeting the test requirements.
3. Instrument tolerance requirements are not greater than 0.1% of full scale.

**Change Control** *(Who will be signing off on project changes?)*

Any changes to the scope of the project initiated by PWC must be in written form and may cause a change to NRE and/or product costs. The changes are effective once mutually agreed and accepted in writing by PWC and Allen Aircraft products.

**Stakeholder Signatures** *(The Initiation Phase is not complete until every stakeholder identified above has reviewed and signed off on the Project Charter.)*