GULFSTREAM RE-ENGINE PROJECT

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Abstract

This paper will describe the communications of a project. The paper will focus on Communications Planning, Information Distribution, Performance Reporting, and Managing Stakeholders. The project is centered on an aviation-related work scope and takes into consideration the intricacies of working in a highly regulated industry. Wings West, an FAA Repair Station with some engineering capability is the primary company taking on the task of replacing outdated engines on Legacy Gulfstream airframes. An engine manufacturer located in Italy, has an engine that can be used ‘off the shelf’ for this application. This installation will require significant Federal Aviation Administration involvement as well as sound communications.

## Gulfstream Re-Engine Project

## Project Description

Manufactured from the mid 1960’s to the late 1980’s Gulfstream GII and GIII aircraft are robust airframes powered by two Rolls-Royce Spey engines. The Rolls-Royce Spey engine does not meet current noise level requirements at many airports. Wings West Inc. wants to re-engine the Gulfstream GII and GIII aircraft. This will not only bring the aircraft into current and future noise standards, it will also lower emissions and save fuel.

Wings West Inc. has evaluated the number of eligible aircraft in the Gulfstream fleet with the cost associated with the modification and determined the project would generate acceptable profit margins. Most operators will take advantage of the required downtime to accomplished maintenance and perform other modifications and this would benefit Wings West. A launch customer, MakitSo Inc. has been identified as owning a Gulfstream GIII aircraft.

The engine is readily available and carries its own Type Certification. Project length is anticipated at 18 month’s from initiation to closing. This modification has not been accomplished to date and will require Federal Aviation Administration, (FAA) approval via the Supplemental Type Design (STC) process. The STC is a structured process that requires strict control and communications with the FAA.

Supplemental Type Design approval will be sought from the European Aviation Safety Agency, (EASA) which will be coordinated through the FAA. All design standards will meet or exceed Title 14 (Aeronautics and Space) of the Code of Federal Regulations, (14 CFR), and European Aviation Safety Agency rules and regulations. Installation will be in accordance with Title 14 (Aeronautics and Space) of the Code of Federal Regulations.

Since the project will be installed in accordance with the Supplemental Type Certification process, the project will be defined into phases that are consistent with the FAA Advisory Circular No. 21-40A Guide for Obtaining a Supplemental Type Certificate. The phases will be defined as follows with the corresponding project management process groups in parenthesis. Phase One – Conceptual Design Phase, (Initiating Phase), Phase Two – Requirements Definition Phase, Phase Three – Compliance Planning Phase, (Planning Phase), Phase Four – Implementation Phase, (Execution and Monitoring and Controlling) and Phase Five – Post Certification Activities Phase, (Closing).

## Project Stakeholders

Stakeholders will be identified by category and include key stakeholders who are in a decision-making or management role affected by the project outcome. Additional stakeholders are direct stakeholders who directly affect the project by inputs, (drawings, materials, etc.) or outputs, (drawings, materials, fabrication, etc.). Impacted stakeholders have no direct interface to the project but may be impacted either by the process or by the outcome of the project.

Stakeholders will be further classified as to whether they are internal or external. External stakeholders are not privileged to proprietary information developed by the internal stakeholders except as noted. The global exception to this policy is with the FAA. The probable impact or support each stakeholder could cause will be categorized and an approach strategy devised.

In general, the primary stakeholders are 1) Wings West, Inc., 2) MakitSo Inc., the sponsor and launch customer and first article aircraft donor, 3) TrnNburn, Inc., the engine manufacturer, 4) The U.S. government, (primarily the FAA), and 5) the general public. The stakeholder registry is located in appendix A of this document and defines each stakeholder with pertinent contact information.

## Communications Planning (Planning Process Group)

During initial meetings and throughout the project, input will be solicited from all stakeholders to identify additional stakeholders not considered herein. Stakeholder identification will be retained in a Communication Matrix Table maintained by the Project Management group. The Communication Matrix Table will begin at revision N/C, (no change), and will be reflective of stakeholders identified in this document. The Communication Matrix Table will contain the stakeholder name, primary and secondary contact, phone numbers, email address, preferred mode of communication, best time for contact and the frequency of communication.

There will be several distinct stakeholder groups for communication. These are defined to bring structure and organization to the communication paths. One group of stakeholders will be performing stakeholders. These stakeholders have direct input into the final product and include managers, engineers, planners, vendors and workers who build the product. This group needs information because they will be organizing and constructing the final product.

Another group of stakeholders will be evaluating stakeholders. These include the various branches of the FAA, the Environmental Protection Agency, local citizens, and the media. The FAA needs information because they will give the final approval for this project. Subsequent sales are reliant on this approval. The Environmental Protection Agency has a similar role as the FAA. Local citizens and the media need information as it relates to their concerns. For example, will the test runs of the engines disturb local residence, and will this new product be a big hit at the next trade show?

The final group of stakeholders is the sponsor. The sponsor will be apprised of communication with the previous groups because they need the big picture of the project. You do not want your sponsor to find out something from other sources. Cleary defined capabilities need to be understood by all performing stakeholders before commitments are made to either evaluating stakeholders or controlling / financing stakeholders.

The Project Manager (PM) reports directly to the Wings West Chief Executive Officer, (CEO), and will be central to all communications. The Project Manager will organize key stakeholder meetings, establish communication protocols, solicit feedback, and eliminate communication barriers. The PM will identify barriers that affect the communications process and implements solutions making communication effective. All communications will be in the English language.

What needs to be communicated are mostly contractual items (primary contract and work change request), specifications (engineering data, manuals, drawings, etc), planning (critical path and milestone charts), project status (reports, media releases, etc.), and correspondence. Methods of communication will include ‘push’ information in the form of internet-based media, memos and newsletters. The Project Manager for project updates and notifications will distribute periodic ‘push’ emails to the various groups of stakeholders.

Pull information will be available at the Wings West website and includes information about the project specification overview, technical manuals for airframe, engine and components, and engineering specifications. Interested parties can also pull brochures advertising the product. Links will also be available to industry partner sites and regulatory guidance sites. The Wings West Director of Engineering will be responsible for website communications.

Interactive communication is not limited to any one method and includes verbal, telephone, (meetings, teleconference included), email, text messages, etc. All communications are expected to be conducted in a professional manner and follow the protocol established within this document. Meetings will include an agenda and minutes to the meeting in a defined form and manner that will be retained in the project historical records.

The first meeting will be the initiation meeting with the project team, (Wings West and TrnNburn, Inc.), and the Sponsor, (MakitSo, Inc.) and will be conducted by the Wings West CEO. A parallel initiation meeting between project teams at Wings West, TrnNburn, Inc. and the FAA will be conducted. Between the first meeting and development of the project plan conceptual design of the project will be completed. The Project Plan, developed by the project team, will be distributed via email to all key stakeholders. Concurrence of the plan will be required. If adjustments are needed as a result of feedback this step will be repeated as required.

Parallel to the Project Plan is a Certification Plan, developed using FAA Advisory Circular No. 21-40A Guide for Obtaining a Supplemental Type Certificate as a template. This plan along with FAA Form 8110-2, ‘Application for Type Certificate’ will be submitted to the FAA. FAA concurrence of the plan is required and if adjustments are needed because of feedback this step will be repeated as required. Application and certification planning is the responsibility of Wings West Director of Engineering.

After key stakeholder buy into the Project and Certification Plan, a project start-off meeting will be conducted including all stakeholders just prior to beginning the project. The Project Plan, roles, responsibilities, and communication protocol will be discussed. The activity up to this point concludes phases one thru three and brings us up to phase four – Implementation. Throughout the project, status reports will be generated. These reports along with their form and manner will be deliberated in detail in the Performance Reporting section of this document. The Project Manager will report to the sponsor and CEO’s at Wings West and TrnNburn, Inc. once each week. The Wings West Director of Engineering is responsible for periodic project status reporting within the certification organization and the FAA. The timing of these reports will be based on milestone activity.

Type Certificate Board meetings organized by Wings West Director of Engineering will be conducted quarterly with key certification personnel, including Wings West, TrnNburn, Consultant Designated Engineering Representative/Designated Airworthiness Representative, and the FAA. (Designated Engineering Representative / Designated Airworthiness Representative are designated by the FAA and can approve design data / airworthiness respectively). These meetings are to assure compliance with the certification plan and discuss any adjustments required. Meeting minutes will be disseminated via email to participants with copy to the CEO’s and the Project Manager.

Team meetings conducted by the Project Manager will consist of lead personnel from Wings West engineering, planning, material, certification, and operations. These meetings will be conducted once per week and include a representative from TrnNburn, Inc. Review of milestones, action items, issues and assignments will be discussed and recorded. Meeting minutes will be disseminated via email to participants with copy to group managers. During the last month of the project, this group will also conduct daily shipside meeting at the work site. An easel board with sheets of paper will track deliverables and action assignments to the team.

A Key Stakeholder meeting including the Project Manager, CEO’s at Wings West and TrnNburn, Inc., the Wings West Director of Engineering and the FAA Certification Manager will be conducted monthly. Project status, work scope change and risk issues will be discussed and recorded utilizing personal and teleconference mediums. Meeting minutes will be disseminated via email to participants, concurrence with the minutes is assumed unless participants reply otherwise.

During the last month of the project, the Wings West Director of Engineering will conduct a weekly certification group meeting. The group will consist of lead personnel from Wings West engineering, planning, material, certification, flight operations, and the FAA, (Aircraft Certification, Aircraft Evaluation Group, Air Traffic Control, Flight Standards and Flight Test). The Flight Manual Supplement applicable to this project is finalized during these meetings. Flight test planning and project closure procedures will be identified and any issues resolved. Meeting minutes will be distributed via email to participants. The Project Manager will communicate flight test plans to local community groups.

Life-cycle analysis will be ongoing throughout the project by the Wings West and TrnNburn engineering teams. During the Post Certification Activities Phase review, meetings will begin and the life-cycle requirements defined. The Wings West Director of Engineering is responsible for this meeting and the projects Supplemental Type Certificate Instructions for Continued Airworthiness will be the output.

Once the project is complete and the Supplemental Type Certificate issued, Post Project Review meetings will be conducted to identify success stories (to be shared via website), areas needing improvement (to be recorded / incorporated into the product via engineering data – travelers, etc.), and to solidify the plan going forward (marketing the product via website and media). The Project Manager will be responsible for these meetings which will be held as required (minimum of two – three meetings is anticipated), and will distribute the communications as applicable. Project historical records, including records required by regulation, will be retained via a secure digital repository. Paper copies of records required by regulation will be maintained for the period required by title14 of the Code of Federal Regulations.

Wings West Director of Engineering consisting of a FAA representative, a cross section of customers operating the product, and a TrnNburn representative, will establish a maintenance review board. This group will meet quarterly during the first two years of operation and annually thereafter. The group will review operational issues and determine adjustment to any engine limitations or changes to the Instructions for Continued Airworthiness. Meeting minutes will be disseminated via email to participants and any changes to technical publication will be the responsibility of the Director of Engineering at Wings West.

## Information Distribution (Executing Process Group)

Prior sections of this document have identified several means of information distribution and who is responsible for each. In addition, the Stakeholder registry found in Appendix A of this document, records stakeholder preferred method of communication. Additional levels of communication follow and include what is communicated, by who to whom, and how. The first level of communications is formal.

The Primary Contract, (the contract that identifies the complete work scope, specifications, schedules, and financial arrangements), will be in a format specified by Wings West Project Specification Form WII8-1. This can only be executed by the CEO of Wings West, must be reviewed by legal, and must be accepted by the Level One at MakitSo, Inc. Contract acceptance will be notarized. A contract similar to the Primary Contract will be executed between Wings West and TrnNburn, Inc. This can only be executed by the CEO of Wings West, must be reviewed by legal, and must be accepted by the CEO at TrnNburn, Inc. Contract acceptance will be notarized.

Various contracts between Wings West and support vendors will be documented on Wings West form WUU8-1T. These contracts can be executed and approved within the Wings West organization at the Director level. Finalized ‘Top Level’ engineering drawings will be on paper and have acceptance signature by Wings West CEO, TrnNburn, Inc. CEO and MakitSo, Inc. Level One or authorized agent. Authorized agent requires letter on file from the Level One.

All engineering data is generated via electronic media and data for CNC machining will be digital. Distribution of this data is prohibited unless permission is received from a Wing West Director level or higher. Paper copies of engineering data can be generated for the FAA without restriction.

Informal communication can take any form and are generally restricted to the following hierarchy when communication involve internal to external communications. CEO’s communicate with CEO’s, Directors communicate with Directors, and Managers communicate with Managers. The Program Manager will communicate with Impacted Stakeholders. All email distributed by any personnel from the Wings West organization will have the company’s standard statement indicating the message and attachments are for the sole use of the intended recipient and unauthorized distribution is prohibited.

## Performance Reporting (Monitoring & Controlling Process Group)

Performance reporting will formally begin at Phase Two Requirements Definition. Schedule projections will be laid out based on vendor commitments and past experience with similar work scope. Contracts should be finalized by this time and cost allocation can be mapped into an Earned Value baseline.

During Phase Four – Implementation there will be a number of milestones including pylon structure complete, pylon feed through complete, airframe engine mounting structure complete, etc. Each milestone will have a metric to measure against the Earned Value baseline.

Performance reporting will be communicated in several ways. Critical Path, Earn Value Schedule Performance Index, and will be generated into chart form and posted on the Wings West internal website for all employees to review.

The managers at Wings West for their applicable area will generate the above reports plus Status Reports, Progress Reports, Trend Reports Forecasting Report, and Lessons Learned Report. Quality Engineering will collaborate data and bind it into a single report form for Director bi-weekly review. The Project Manager will use the above data to submit weekly reports to MakitSo Inc. and TrnNBurn, Inc. The Director of Engineering at Wings West will use applicable information to update management at the FAA.

## Manage Stakeholders (Monitoring & Controlling Process Group)

Risk Analysis will include those risks to Wings West and consider risk to stakeholders as well. This way potential corrective action can be anticipated and offered before a situation elevates to an unmanageable magnitude. Stakeholder expectations will be solicited and when appropriate a channel of communication will be open to assure the expectation is consistent with the project specification (contract).

Complete and transparent communications are the hallmark at Wings West. This has given them a reputation of trust in the industry. Wings West maintains a full-time telephone service and a person in the management team or above can be contacted at any time.

Work change requests are also accepted at Wings West. A process is in place that incorporates the changes, adjusts schedules, and corrects the baselines. Naturally, should capacity restrict committed resources, alternate schedules must be considered. When issues arise, the Project Manager will use feedback from the stakeholder to assure the concern if fully comprehended. The stakeholder registry in Appendix A contains a matrix of stakeholder basic wants and level of influence. This matrix will serve as a tool for the Project Manager to use with regard to the issue and the stakeholder concern.

A record of issues will be maintained containing the date of occurrence and the date of resolution. Each issue will be categorized and numeric value assigned as to its potential impact on the project and the relativity that the issue will elevate to fruition. The urgency of resources applied to the issue will be based on the numeric values assigned. In conclusion, the project at Wings West will center on the Project Management Team. The exception to this is the fact that the Director of Engineering at Wings West will be responsible for direct interface with the FAA. Based on previous experience at Wings West, this formula will account for another successful project.

# Bibliography

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Pritchard, C. L. (2004). *The project management communications toolkit*. Norwood, MA: Artech House.

Project Management Institute. (2004). *A guide to the project management body of knowledge (PMBOK guide)*. Newtown Square, Pa: Project Management Institute.

Appendix A

Stakeholder Registry

| **Name** | **Title** | **Stakeholder**  **Address** | **Stakeholder**  **Email - Phone** | **Stakeholder**  **Type** | **Stakeholder**  **Role** | **Organization** | **Phase** | **Interest** | **Power** | **Class** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| \*Clifford Roberts | Mngr. Aircraft Certification Office | 1 AirWay  LA, CA. | \*email@com  987.654.4321 | Key | Evaluate | FAA | All | High | High | External |
| \*Francis Ouimet | Mngr. Aircraft Evaluation Group | 1 AirWay  LA, CA. | email@com  \*987.654.4321 | Key | Evaluate | FAA | All | High | High | External |
| \*Lorena Ochoa | Mngr. Mfg. Inspection Office | 1 AirWay  LA, CA. | \*email@com  987.654.4321 | Key | Evaluate | FAA | All | High | High | External |
| Donald Ross | Regional Air Traffic Control | 1 AirWay  LA, CA. | email@com  \*987.654.4321 | Key | Evaluate | FAA | 3 | High | High | External |
| Robert Jones | Primary Customer, Level One | 4 Tune Way, Phoenix, AZ | \*email@com  987.654.4321 | Key | Finance Control | MakitSo Inc. | All | High | High | External |
| William Prescott | Customer Director of Flight Operations | 8 Ito, Phoenix, AZ | \*email@com  987.654.4321 | Key | Finance Control | MakitSo Inc. | All | High | High | External |
| Marc McCune | Wings West Project Manager | 3 Douglas Dr. LongBeach, CA. | email@com  987.654.4321 | Key | Performing | Wings West | All | High | High | Internal |
| Willie Parks | Wings West CEO | 3 Douglas Dr. LongBeach, CA. | \*email@com  987.654.4321 | Key | Performing | Wings West | All | High | High | Internal |
| Louise Suggs | Mngr. FAA Flight Standards District Office | 1 AirWay  LA, CA. | \*email@com  987.654.4321 | Key | Performing | FAA | All | High | Med | External |
| TrnNburn, Inc. | Engine Supplier | 3 Piazza  Liano, Italy | \*email@com  987.654.4321 | Key | Performing | TrnNburn, Inc. | All | High | Med | External |
| Patty Berg | Wings West Chief Flight Test Pilot | 3 Douglas Dr. LongBeach, CA. | \*email@com  987.654.4321 | Key | Performing | Wings West | 3-4 | High | Med | Internal |
| Allan Robertson | Wings West Engineering Director | 3 Douglas Dr. LongBeach, CA. | email@com  987.654.4321 | Key | Performing | Wings West | All | High | Med | Internal |
| Tom Morris | Wings West Quality Manager | 3 Douglas Dr. LongBeach, CA. | \*email@com  987.654.4321 | Key | Performing | Wings West | All | High | Med | Internal |
| Meghan Gockel | Wings West Systems Installation Manager | 3 Douglas Dr. LongBeach, CA. | \*email@com  987.654.4321 | Key | Performing | Wings West | 2-5 | High | Med | Internal |
| Craig Stadler | Wings West Procurement Manager | 3 Douglas Dr. LongBeach, CA. | email@com  \*987.654.4321 | Key | Performing | Wings West | 2-5 | High | Med | Internal |
| Local Citizens | Passive |  |  | Impacted | Passive | Various | 3 | Low | Med | External |
| Vendors | Fabrication / Supply | Various | Various | Direct | Performing | Various | 2-5 | High | Low | External |
| Engineers | Design |  |  | Direct | Performing | Wings West , TrnNburn, and Consultant | All | High | Med | Internal |
| FAA Engineering Designees | Approves data to FAA requirements. |  |  | Direct | Performing | Independent Consultant | 2-4 | Med | Med | External |
| FAA Airworthiness Designees | Conforms parts & assemblies to data requirements. |  |  | Direct | Performing | Independent Consultant | 2-4 | Med | Low | External |
| Expeditors | Procurement |  |  | Direct | Performing | Wings West | 2-4 | Low | Low | Internal |
| EPA | Environmental |  |  | Impacted / Direct | Evaluating | US Government | 1 & 3 | Med | High | External |
| Media | Writers, etc. |  |  | Impacted | Evaluating | Various | 2-5 | Med | High | External |
| Technicians | Installation |  |  | Direct | Performing | Wings West | 2-5 | Med | Med | Internal |

\* Preferred method of contact, (if no \*, either media is ok)