

MICHIGAN STATE

U N I V E R S I T Y

Project Plan Presentation

Automated Process for Airworthiness Release

The Capstone Experience

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*From Students...
...to Professionals*

Project Sponsor Overview

- Third largest airline in the world
- 4,500 flights a day reaching over 300 cities
- One of the founders of United Airlines is William Boeing



Project Functional Specifications

- United Airlines needs to store all information for an AWR form in one place
- Our solution is a website that provides automated record checks, progress tracking and notifications, and record updates for technicians and supervisors
- Digital signatures are utilized to authenticate and monitor technician progress

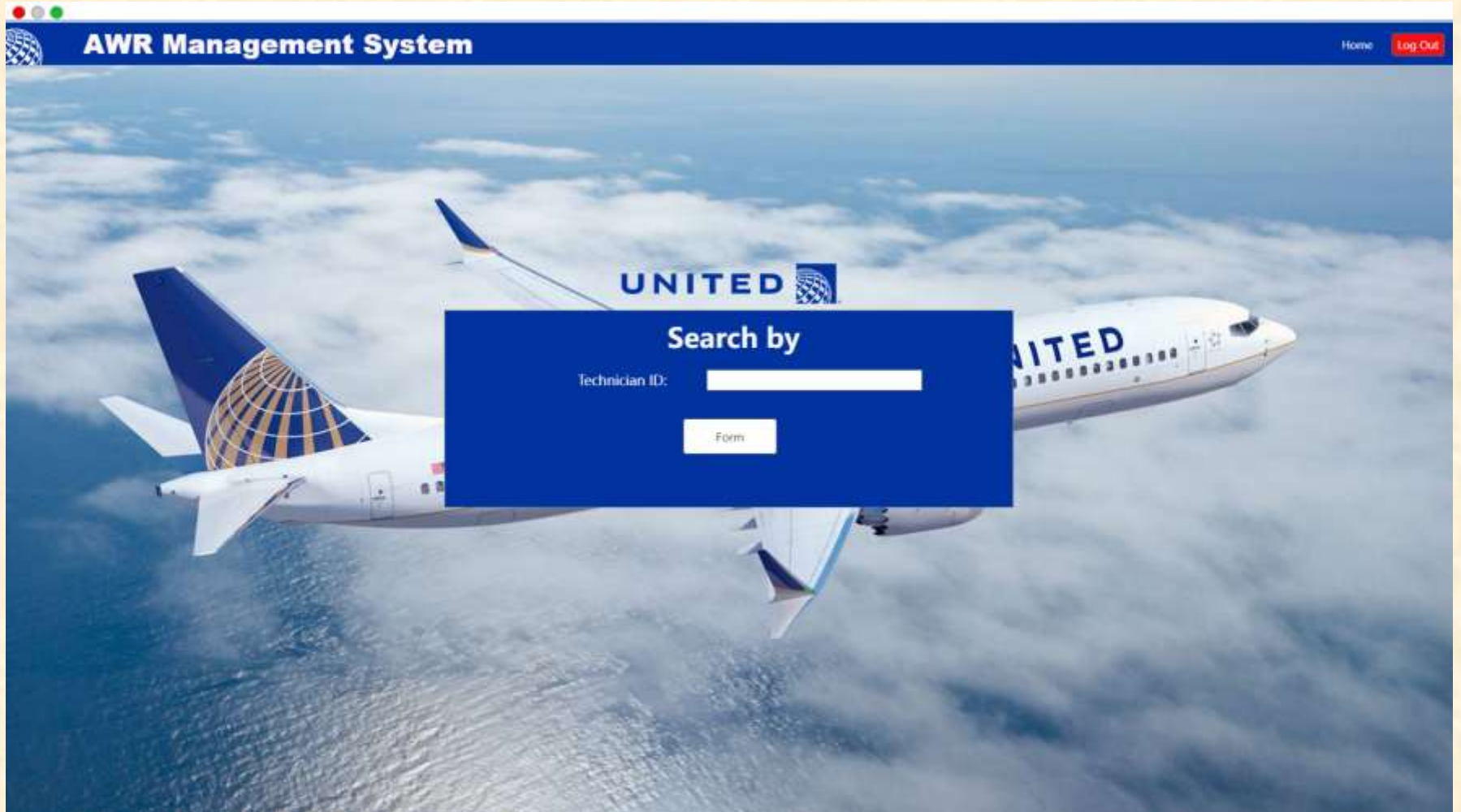


Project Design Specifications

- Make it easy for completing and viewing AWR forms
- Users have ability to digitally sign off forms
- Ability to track progress of an individual technician
- Capability to filter search results if the user is a supervisor



Screen Mockup: Main Page



Screen Mockup: Search Forms

AWR Management System

Home [Log Out](#)

Enter keyword to search

#	Fleet	Plane	Date
1	Mark	Otto	@mdo
2	Jacob	Thornton	@fat
3	Larry	the Bird	@twitter
4	Mark	Otto	@mdo
5	Mark	Otto	@mdo
6	Jacob	Thornton	@fat
7	Larry	the Bird	@twitter
8	Mark	Otto	@mdo
9	Mark	Otto	@mdo
10	Jacob	Thornton	@fat
11	Larry	the Bird	@twitter



Screen Mockup: Create Form

AWR Management System Home [Log Out](#)

Step 1 - Applicant Information:

Name:

Emp. No:

Station:

A&P No:

Repairman Certificate (if applicable):

Step 2 - Fleet Type Requested:

Fleet:

Form: 31-0002
REV: 20-0702-3-0033
Gen: 06/15/2021

UNITED

AIRWORTHINESS RELEASE AUTHORIZATION REQUEST

Step 1 - Applicant Information

Name: _____ Emp. No: _____ Station: _____

A&P No: _____ Repairman Certificate: _____
(if available)

Step 2 - Fleet Type Requested

A319X20 A321N 737NG 737MAX 787 787 777 787 OTHER _____

Step 3 - Applicant Acknowledgments (Initial each item and sign)

1. My Training Record contains the following in MTIBs:

- _____ Completion of Paperwork Policies and Procedures Training (SMM or equivalent for suppliers)
- _____ CAT Awareness
- _____ ETCPS Awareness
- _____ RI / IDT Awareness
- _____ RSMS Awareness

2. I affirm I have met the requirements of 14 CFR 65.83 and have 6 months aircraft maintenance experience within the last 24 months at United Airlines, or I have met the equivalent requirements as per [General Maintenance Manual \(GMM\) 19-25-00](#).

3. I have read the following GMM sections (plus other related materials) and have signed the Maintenance of Understanding on the reverse side of this form:

- _____ 19-25-03 [Airworthiness Release](#)
- _____ 19-25-10 [Aircraft Maintenance Logbook](#)
- _____ 19-25-25 [Delayed Maintenance Policy and Procedures](#)
- _____ 19-25-88 [Required Inspection Items \(RII\)](#)
- _____ 19-13-05 [Inspection Delegation Tasks](#)

_____ MIL, CCL, and NEP, including the Presentable section of the requested fleet type

4. _____ I understand that I am not to exercise my Airworthiness Release until the authorization appears in my MTIBs training record.

5. _____ I understand that if my Airman or Repair Certificate has limitations (i.e. Aeronics ONLY or IFE), I am only authorized to sign off for work within the scope of my certificate limitations.

Applicant Signature: _____ Employee Number: _____ Date: _____

Page 1 of 2



Screen Mockup: Digital Signature

AWR Management System Home [Log Out](#)

Step 3 & 4 - Applicant Acknowledgments & Airworthiness Release Authority:

UNITED

AIRWORTHINESS RELEASE AUTHORIZATION REQUEST

Step 1 - Applicant Information

Name: Julian Smith Emp. No: 12378 Station: Station 1

APP No: 123 Repairman Certificate: 12345678

Step 2 - Fleet Type Requested

ADIRADA ADIRB T218A T218B 737 737 777 777 787 787 747 747

Step 3 - Applicant Acknowledgments (Initial each item and sign)

1. My Training Record contains the following in MTLE:

- Completion of Paperwork Policies and Procedures Training (CPPT) or equivalent (see supplier)
- CAT Assessment
- ETDPL Assessment
- 66.137 Assessment
- ESM Assessment

2. I affirm I have met the requirements of 14 CFR 65.81 and have 6 months of recent maintenance experience within the last 24 months of direct AirWing job duty and the dependent requirements as per [Current Maintenance Manual \(CMM\) 10-28-05](#).

3. I have read the following QRTR sections plus other related materials and have signed the Blockwork of Understanding on the reverse side of this form:

- 10-28-05 - Airworthiness Release
- 10-28-05 - Aircraft Maintenance Logbook
- 10-28-05 - Current Maintenance Policy and Procedures
- 10-28-05 - Inspection Procedures Items (IPI)
- 10-28-05 - Inspection Checklist Table
- MEL, OOI, and NEI, including the Phraseology section of the requested fleet type

4. I understand that I am not to exercise my Airworthiness Release until the authorization appears in my MTLE training record.

5. I understand that if my Release or Repair Certificate has limitations (i.e. Airframe OROF or PFI), I am only authorized to sign off for work within the scope of my certificate limitations.

Sign

Applicant Signature Employee Number Date

Page 1 of 1

Go BackComplete



Screen Mockup: Individual Progress

AWR Management System Home [Log Out](#)

John Smith AWR Progress

- Step 0 - Pre-Requisites Completed
- Step 1 & 2 - Applicant Information & Fleet Type
- Step 3 & 4 - Applicant Applicant Acknowledgments & Airworthiness Release Authority
- Step 5 - Supervisor Endorsements

[Back](#) [Next Step](#)

Form: 71-000
Rev: 04/15/2013
Rev: 04/15/2013

UNITED

AIRWORTHINESS RELEASE AUTHORIZATION REQUEST

Step 1 - Applicant Information

Name: John Smith Emp. No: 12378 Status: Student 1

AWR No: 12 Applicant License: 9 years

Step 2 - Fleet Type Requested

aircraft: ADP 1910 1910A 191 191F 191D 191E 191H

Step 3 - Applicant Acknowledgments (initial each item and sign)

- My Training Plan contains the following in PDF:
 - Completion of Paperwork Policies and Procedures Training (SM/In applicant for supply)
 - CAT Assessment
 - ETOPS Assessment
 - E1/E2 Assessment
 - RWYM Assessment
- I affirm I have met the requirements of 14 CFR 61.83 and have 6 months aircraft maintenance experience prior to the last 24 months of initial AWR or I have met the applicant requirements as per [United Maintenance Manual \(UMM\) 04.02.02](#)
- I have read the following UMM sections plus other related materials and have signed the Memorandum of Understanding on the reverse side of this form:
 - 04.02.01 - Airworthiness Release
 - 04.02.03 - Aircraft Maintenance Logbook
 - 04.02.04 - Initial Maintenance Policy and Procedures
 - 04.02.05 - Recurrent Inspection (RSI, RI)
 - 04.02.06 - Inspection/Inspected Tasks
 - MEL, ECL, and MEL, including the Phraseology section of the requested fleet type
- I understand that I am not to exercise my Airworthiness Release until the authorized signature on my PDF training record.
- I understand that if my Airman or Repair Certificate has limitations (i.e. Airman ONS or PPL), I am only authorized to sign off for work within the scope of my certificate limitations.

Applicant Signature: _____ Employee Number: _____ Date: _____

Page 1 of 2

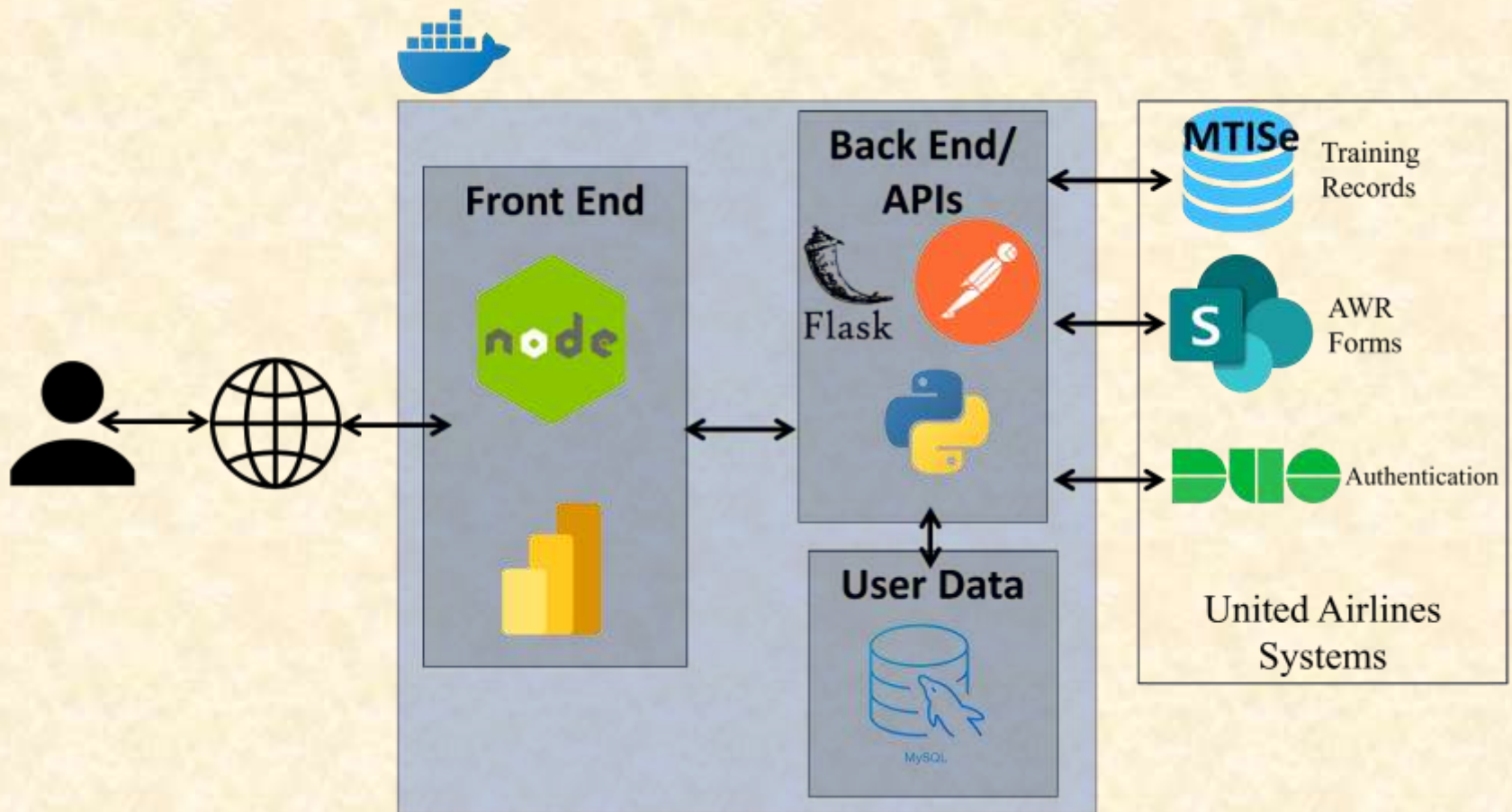


Project Technical Specifications

- The front end will be built using Node.js, and Power BI will be used to create progress bars to track AWR form completion.
- In the back end, Flask will be used to receive various HTTP requests.
- Postman will be used to manage APIs to various databases.
- Python will be used to create algorithms for digital signatures and pdf manipulation.
- MySQL will be used to store user data.
- SharePoint will be used to store AWR forms, and MTISe is the database where technician training records are stored.
- Duo Security will be used to implement a multi-authentication system to our application.
- Docker is used to containerize our application for deployment.



Project System Architecture



Project System Components

- Software Platforms / Technologies
 - SharePoint is a document storage system developed by Microsoft.
 - MTISE is a proprietary database that stores United Airlines' technicians' training records.
 - Postman is an API development and management tool.
 - Flask is a micro web framework
 - Node.js is a JavaScript web framework
 - Power BI is a data visualization tool developed by Microsoft.
 - MySQL is a relational database system.
 - Duo Security is a platform that offers various security tools.
 - Python is a high-level programming language.
 - Docker is a containerization tool.



Project Risks

- Security and Human Error Mitigation
 - Need to protect critical data and mitigate risk of unexpected human behavior
 - Meeting with security engineer, walking through mockups to understand behavior
- Implementing Digital Signature
 - Need digital signatures in system to complete forms
 - Meeting with United legal department, working through tutorials for cryptography
- Interacting with United Airline's Databases
 - Need to access proprietary database system MTISE
 - Setting up dummy sharepoint, read internal documentation
- Using Internal Authentication Systems
 - Need to set up system that matches United's internal system
 - Meeting with security engineer and getting vendor numbers to interact with system



Questions?

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