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IEEE Test Plan

PRJ 381

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PLANT SPECIES PROJECT

TEST PLAN OUTLINE

TEST PLAN IDENTIFIER

Master Test Plan: PRJ381_Module_TP_1.0

INTRODUCTION

This report will explain all objectives, scope, and goals related with the Tello-drone project, which will aid in the identification of alien plant species by photographing plants in a given region and scanning them to determine whether or not they are foreign to the area. Because the system discussed in this project plan was built with limited access to the actual drone and no budget, the majority of the testing is based on the drone's software, implying that compatibility with the product (Tello-drone) will be imperfect, but the system will be rigorously tested in accordance with the system's goals, objectives, and requirements.

TEST ITEMS (FUNCTIONS)

- Within the scope, the aim is to test and find which solutions will work the best with the project.
- It is important to test and apply machine-learning to the project as this will be used to identify plants.
- It is also important to connect to a drone (IP based camera) as this will be used to capture footage of plants.
- The UI should be easy to navigate and use.
- A user should also be able to import pictures of plants they have previously captured.

Function	Comment/Description
CRUD	Can Be Created, Updated, and Searched
Connect()	Will link the drone to the program
Execute()	Will read user-provided custom drone instructions and carry them out.
StartStatic()	Start the static camera
StopStatic()	Stop the static camera
StartIP()	Start the IP camera
StopIP()	Stop the IP camera
Scan()	Execute the code to scan a captured image for (foreign) flora

Note: Functions subject to change

SOFTWARE RISK ISSUES

The most significant challenge we will and have experienced is scope creep, which indicates that the scope of our project has altered considerably since our development plan report. We had planned to build a Xamarin-based system, but because to technological limits, we had to change the design to a normal Windows Form C# system. This caused an issue in the system since the foundation was designed for one reason but mutated into another; the system has been changed for the new function.

FEATURES TO BE TESTED

This is a representation of all of the system's functional features that will be evaluated during the final development phase.

Objective	Comment/Description/Reference
Recoding capabilities	Testing to see if the recording capability functions
Scanning	Testing to see if the system can scan a plant accurately
Media	Testing if the program can import captured footage

FEATURES NOT TO BE TESTED

This is a representation of all the functional components of the system that will not be reviewed during the final phase of development.

Objective	Comment/Description/Reference
The drone can scan plants	Determine if the plant is an alien species, via the usage of a drone camera

APPROACH (STRATEGY)

A Tello drone, which will fly over the premises supplying information to the system and carrying out commands. The drone and system will require a quick training session to understand the controls and how the software works.

We'll be using a Tello Drone and the accompanying camera equipment. To obtain commands such as motions and fly orders, we will use C# and Tello libraries in C#.

We will use Test Case Prioritization and Regression Test Selection for regression testing. Sort the test cases by business importance, criticality, and frequency of use.

If test cases are prioritized, the regression test suite will be drastically reduced. Regression Test Selection is a technique that entails running selected test cases from a test suite to check if the updated code affects the software application.

We will manage regression issues quickly by doing thorough code reviews, monitoring metrics, integrating shift-left testing with continuous testing, and automating whenever possible.

ITEM PASS/FAIL CRITERIA

Responsibilities

- **Main functionality** - This is the most crucial criteria. The format of this proof must be agreed upon. It might be prior agreement on the system's major features and the proof, including testing records, that must be supplied to verify that they work.

- **Important faults** - Severe or high flaws that affect essential elements of the system and have no workarounds must be cleared before going on to the next step of testing. Meaningful testing in the succeeding step will be difficult, if not impossible, with this degree of defect.

- **Other faults** should ideally be rectified, but if they haven't, they must be documented, along with the impact on the system and an estimated date for when they will be resolved.

- **Updated documentation** - Any documentation that will be required for the next testing cycle must be updated.

- **Produce Test Summary Report**

Evaluation Process

- **Summarize Testing Results** - On a Requirements Traceability Matrix, all incidents be traced back to the requirements – regardless if they are open or closed.

- **Evaluate Business Scenarios** - Every open incident is linked to a set of Business Scenarios, after which its technical effect and appropriateness for providing the business with the required functionality are evaluated.

- **Estimate Business Impact** - The impact on the organization of each open incident is then assessed. Evaluation and documentation are done for the effect, the frequency of the business impact, and the countermeasures (such as schedule fixes and workarounds).

- **Acceptance Decision** - The analyses are then assessed for acceptability. Any of the following might apply:

    - **Acceptance** - All aspects of the system will be authorized. Instances that aren't addressed will be dealt with.

    - **Limited System Acceptance** - Unresolved issues are the root of too many issues. Subject to a schedule of repairs, staff training on workarounds, and other comparable procedures, the system is approved.

    - **System Rejection** - When the system does not support the business scenarios of the organization, this happens.

Requirements Traceability Matrix

- Demands in connection with Business Scenarios to guarantee that every piece of functionality needed to fulfil business scenarios has been specified.
- Business vs Acceptance Criteria Scenarios to make certain that each business scenario has been taken into account.
- Test Case Acceptance Criteria to make sure that every Acceptance Criteria are included in at least one Test Case.
- Test Cases Against Incidents: for keeping track of test outcomes.
- Incident requirements to be able to evaluate the system's performance.

SUSPENSION CRITERIA AND RESUMPTION REQUIREMENTS

- When the drone's connectivity is repeatedly lost.
- If Tello library commands are not working, stop looking for errors and check the library.
- Problems connecting the drone camera

TEST DELIVERABLES

What is to be delivered as part of this plan?

- Test Plan—In this document, everything that has to be done for UAT is listed.
- Designs that meet the UAT Acceptance Criteria
- Test cases: The input values and anticipated outcomes of tests.
- Reports of Developers' Handover for Transmittal of Test Items
- The outcomes of the tests that have been performed are contained in test logs.
- Incident Reports: Surprising outcomes seen.
- Logs for Incident Reports - Incident Report Summary
- Testing summary report - A testing summary.
- Test outcomes.

REMAINING TEST TASKS

- Connect the IP camera and the drone
- Test the movement controller while the drone is attached.

The process of developing the application involves several stages. Our application will be made available in stages. We'll begin the release and testing process once we've completed all of the first features and services, we set out to create.

Everyone in the group will assist in testing all of our application's features and functionalities as soon as version 1 (our initial version) is released. Then, we'll determine whether any steps don't go as planned or whether there's something we can do better.

When we come across a feature we wish to enhance or add, we'll then implement the modifications and release the new version, in this example version 2, and we'll keep doing this until all the initial criteria are completed.

Task	Status
Create Test Plan	In Progress
Create System Test Plan	In Progress
Verify Prototype	In Progress
Testing functionality	In Progress
Debugging	In Progress

ENVIRONMENTAL NEEDS

- Drone fitted with IP camera
- Connection to drone

Before doing the first test, there won't be any initial data. After the initial test, if everything goes as expected, we will get our first collection of sample data.

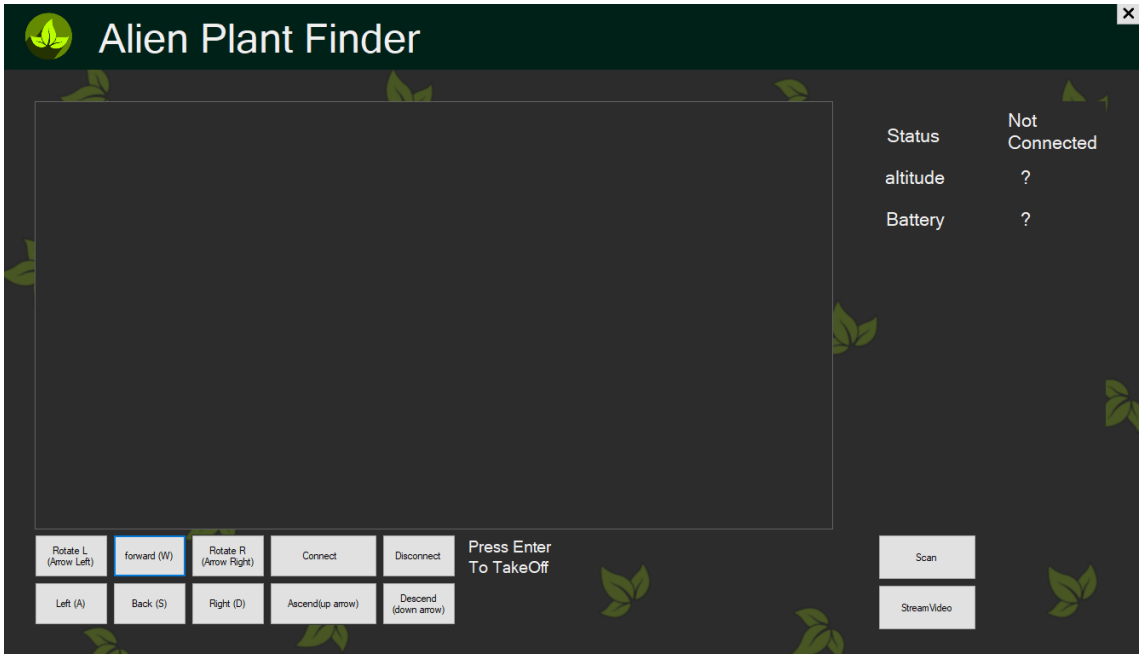
Each of the three features of the multi-part feature application—moving the drone with a smartphone and scanning the plants—will be put through multiple tests.

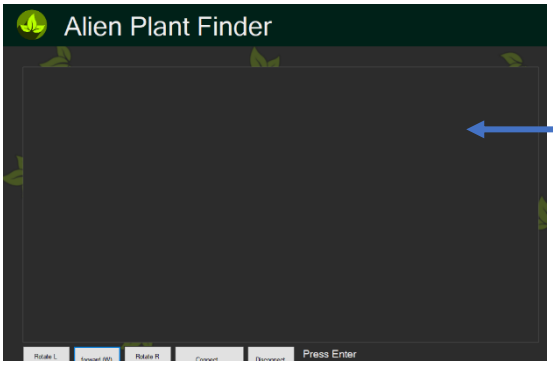
There won't be any unique electricity needs. However, both the drone and the smartphone that will control the drone need to be charged.

STAFFING AND TRAINING NEEDS

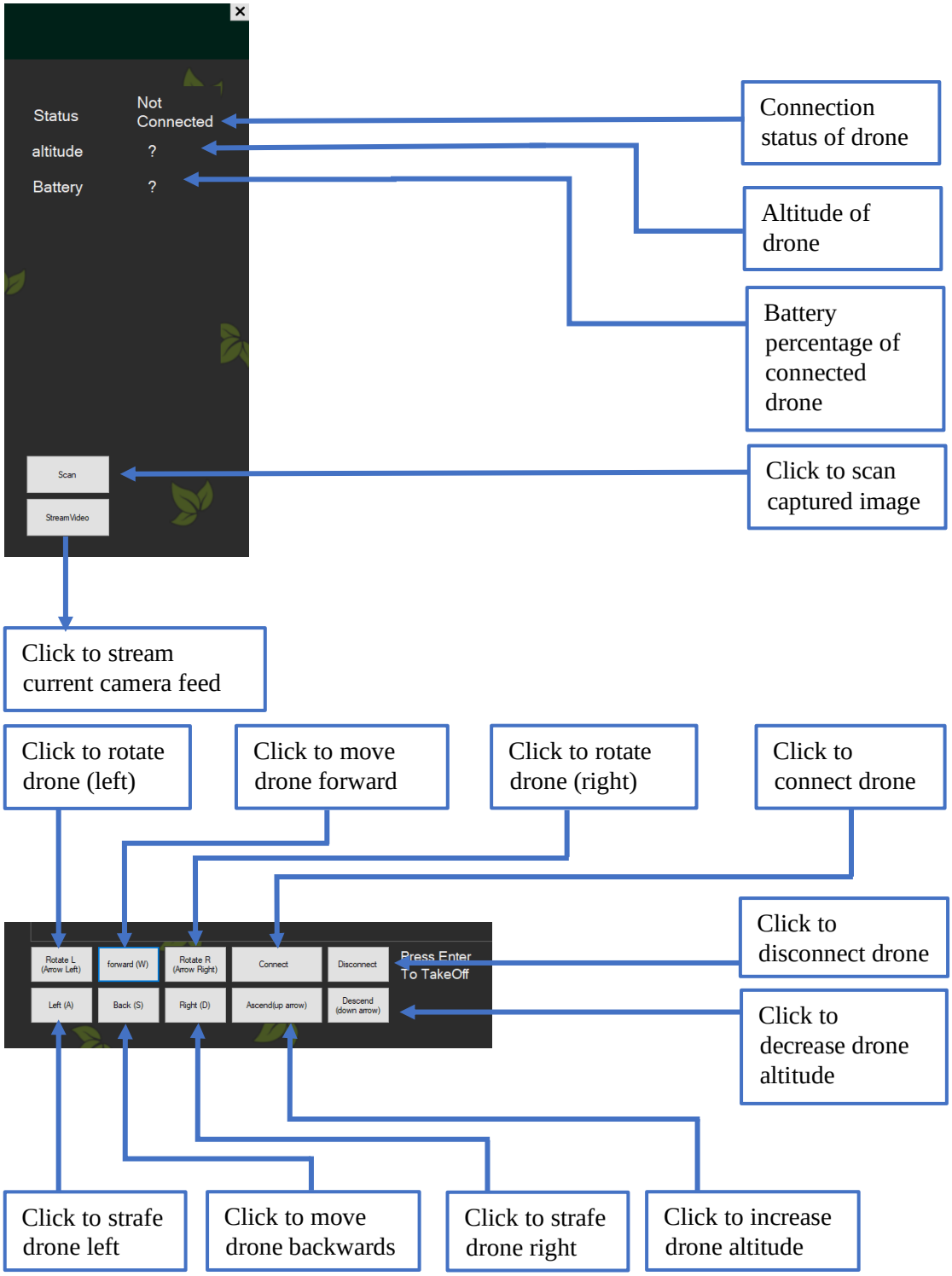
Upon start-up, the user will be greeted by a 5 second splash screen.

Once the splash screen disappears, the main form/application will appear.





In this window, the user will receive graphical feedback on the connected drone's camera. In other words, the camera feed will be shown here


Status
Not Connected
altitude
?
Battery
?
Scan
StreamVideo
Connection status of drone
Altitude of drone
Battery percentage of connected drone
Click to scan captured image
Click to stream current camera feed
Click to rotate drone (left)
Click to move drone forward
Click to rotate drone (right)
Click to connect drone
Rotate L (Arrow Left)
forward (W)
Rotate R (Arrow Right)
Connect
Disconnect
Press Enter To TakeOff
Left (A)
Back (S)
Right (D)
Ascend(up arrow)
Descend (down arrow)
Click to disconnect drone
Click to decrease drone altitude
Click to strafe drone left
Click to move drone backwards
Click to strafe drone right
Click to increase drone altitude

RESPONSIBILITIES

	TM	PM	Dev Team	Test Team	Client
Acceptance Test (Documentation)	x	x		x	x
Acceptance Test	x	x		x	x
Unit Test (Documentation)	x		x	x	
Unit Test	x		x	x	
System Integration Test (Documentation)	x		x	x	
System Integration Test	x		x	x	
System Design Reviews	x	x	x	x	x
Prototype Reviews			x	x	x
Test Procedures	x	x	x	x	
Change Control and Regression Testing	x	x	x	x	x

SCHEDULE

The project plan lists all the future testing activities' dates, timings, and responsible parties. The personnel required for each testing task will be coordinated by the project manager in collaboration with the development and test team leaders.

PLANNING RISKS AND CONTINGENCIES

Inability to obtain necessary tools, data, or software

One of our main issues with the project is that none of us have a drone, and since we are spread out throughout the nation, it has proven to be difficult to borrow one from university.

Nevertheless, we were given approval to utilize one of their drones for the project by Belgium Campus in Pretoria. However, the majority of us live in other places, thus it will be quite difficult for us to get to campus and test the drone as a group – if not borderline impossible.

Insufficient personnel resources when testing is about to start

It was difficult since there wasn't a large variety of plants, including a mix of foreign and native flora. In order to test if our drone program will be able to scan all of the plants and be able to recognize an alien plant specimen, we need the aforementioned statement to function properly.

APPROVALS

- Developer Team
- Test Team
- Team Manager
- Project Manager

GLOSSARY

Tello Drone: Tello Drone is a part of Tello Edu, a cutting-edge and programmable drone perfect for use in education. It's easy to learn programming languages like Swift, Python, and Scratch. Thanks to an improved SDK 2.0, Tello EDU now has more complex commands and bigger data interfaces.

Prototypes: An early version of a product created to test a hypothesis or process is known as a prototype. It is a term that is used in a variety of industries, including software development, electronics, design, and semantics. Prototypes are frequently used by system analysts and users to evaluate new designs that attempt to improve accuracy.

Multi-part feature application: Multipart features are made up of several physical components that each only correspond to one set of attributes.

Traceability Matrix: Usually presented as a table, a traceability matrix is a document used in software creation for many-to-many comparison of any two baselined documents a relationship's completeness by examining its ties to other people

Development Manager/Teams: In many major firms, a development manager is a vital position. They operate as the customer's, higher management's, and customers' primary point of contact. They carry out the duties necessary to successfully execute the company's ambitions by planning and assigning assignments.

Test Manager/Teams: Various test activities must be planned, coordinated, and controlled by test managers.

Team Manager/Teams: The task of monitoring the work of their team falls to the team managers. In order to ensure that everyone is on the same page with regard to the aims and objectives of the organization, they frequently serve as a liaison between their team and senior management.

Project Manager/Teams: In any effort with a specified scope, defined start, and defined completion, project managers are responsible for planning, procuring, and carrying out the project.