WildTracker
Project Management Plan

Prepared by	Delenn Palmer, WT18G4 - PM	Date	28/10/2018
Checked by	Christian Neilsen, WT18G4 - OD	Date	28/10/2018
Approved by	Delenn Palmer, WT18G4 - PM	Date	28/10/2018
Authorised for use by	Felipe Gonzalez, Supervisor	Date	28/10/2018

Queensland University of Technology
Gardens Point Campus
Brisbane, Australia, 4001.

Revision Record

Document Issue/Revision Status	Description of Change	Date	Approved
1.0	Initial Issue	07.08.2018	Delenn Palmer
2.0	Updated Intro, Project Aims & Approach, System Architecture	21.08.2018	Delenn Palmer
3.0	Updated Data Budget, Project Timeline and Version History	07.09.2018	Delenn Palmer
4.0	Final Revision	28.10.2018	Delenn Palmer

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Definitions

UAV	Unmanned Aerial Vehicle
QUT	Queensland University of Technology
CONOPS	Concept of Operations
PMP	Project Management Plan
HLO	High Level Objectives
ASL	Airborne Systems Lab
WT	WildTracker
GUI	Graphical User Interface
SUP	Supervisor

1 Introduction

The 'Systems Engineering' methodology is crucial to the successful completion of any complex engineering projects. The 'Systems Engineering' approach simplifies a large scale project by breaking down larger systems to smaller manageable subsystems which can be completed methodically to ensure that all project goals that were developed are met successfully. The Project Management Plan (PMP) outlines the implementations of a 'Systems Engineering' approach by applying it to the given systems design for this project. The PMP will be updated continuously throughout the life of the project to keep track of revised schedules/due dates, and new goals and targets set for each team member. It is designed to show the client the progress made on the project. In addition to being an important document for the client, it can also be used by team members as a reference document throughout the project.

1.1 Scope

This document is to serve as a guideline and timeline for the completion of work segments delegated to responsible personnel within this team. This document is also considered to be a projected timeline or schedule to be ready for testing and validation by the end of this projects completion date. A Concept of Operations (ConOps) and System Architecture diagram, which provides a high-level overview of subsystem components and overview of the mission is also contained within this document. It does not however contain the technical specifications for each subsystem and their components, which will be provided in separate technical documents.

1.2 Background

QUT ASL is a world leading research centre based in Brisbane, Australia. They conduct research into autonomous technologies which support the development of autonomous aircraft or drones for remote sensing with on-board sensor systems for a wide range of commercial applications.

The QUT Airborne Systems Lab (ASL) has commissioned students of EGH455 in collaboration with WWF and Wildlife Australia to design and build an autonomous detection and tracking tool for wildlife. Group 4 has been tasked with designing an Unmanned Aerial System (UAS) application that must have the ability to identify and report the number of, the size of and volume of wildlife present in footage retrieved by drones. In addition, the data acquired and processed must be accessible both in the real-time use of the application and after the video has been exported. More information can be found further on throughout this Project Management Plan.

2 Reference Documents

2.1 QUT Documents

RD/1	WT18G4-SUP-Customer Needs	WildTracker Project: Customer Needs Document 2018
RD/2	WT18G4-SR-02	WildTracker Project: System Requirements Document 2018
RD/3	EGH455 Lecture Slides	EGH455 Lecture Notes – provided by Felipe Gonzalez
RD/4	WT18G4-FD-01	WildTracker Project: Final System Design 2018
RD/5	WT18G4-GUI-TR-01	WildTracker Project: Graphical User Interface (GUI) Testing Report 2018
RD/6	WT18G4-OD-TR-01	WildTracker Project: Object Detection Testing Report 2018
RD/7	WT18G4-ICD-01	WildTracker Project: Interface Control Document 2018
RD/8	WT18G4-VV-01	WildTracker Project: Verification & Validation Matrix 2018

3 Project Aims and Approach

The aim of this project is to design, develop and test a system capable of autonomously detecting and tracking wildlife via a software application. The wildlife data is comprised of video captures provided by the QUT ASL and Unit Co-ordinators. The system will identify specific animals, chosen by each team by running image processing software created.

The system requirements were derived from the High-Level Objectives (HLOs) outlined in the customer needs document RD/1. By analysing and discussing the HLOs with all team members from the project, an in-depth list of system requirements was created.

The project is approached with a systems engineering methodology, specifically following the Systems Engineering 'V' Model, as shown in the figure below. Due to the constraints and the complexity of the project, it was expected that the system be split into various subsystems, each of which would adhere to the Systems Engineering 'V' model. Each group member was delegated a subsystem based on their strongest area of expertise. Each group member is responsible for researching, designing, building and testing their assigned subsystems. Following the testing of their individual subsystems, the end goal is to integrate all subsystems and deliver a working system that meets the requirements and HLOs based on the customer's specifications.

A Gantt Chart (schedule) was created to ensure that all milestones and tasks were reached within a specified timeframe to ensure the successful completion of this project. As the project manager, it is within my duty to maintain project documents, ensure that all group members are producing work to the highest of standards and meeting the scheduled deadlines. This will allow for the subsystems to devote more of their time and resources to their relevant fields in order to complete this project.

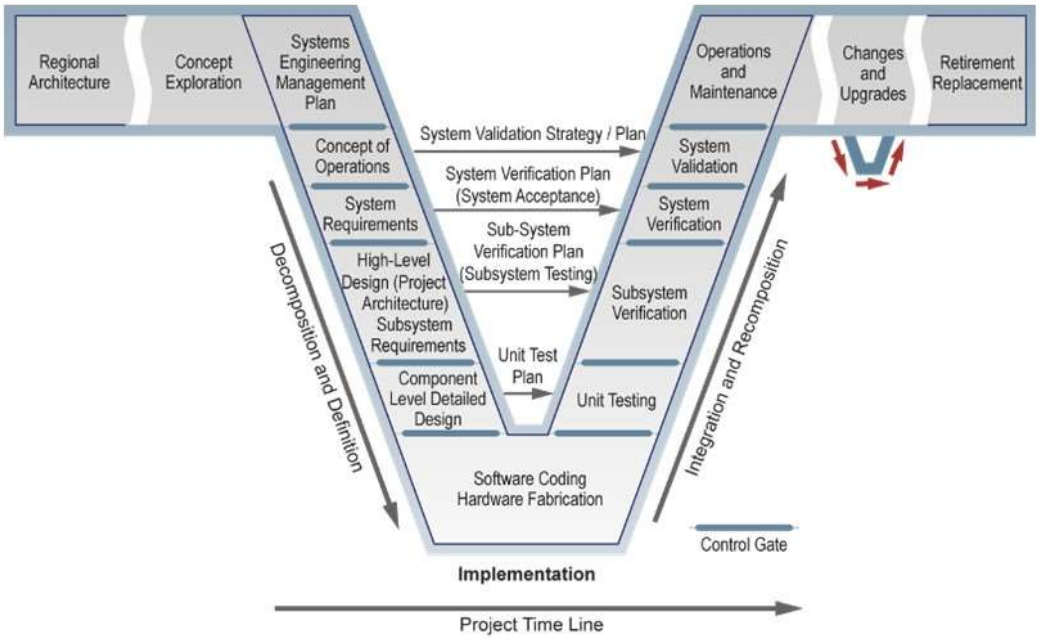

Figure 1: The Systems Engineering V Model (RD/3)

4 Project Organisation

4.1 Subsystem Roles and Responsibilities

The WildTracker team consists of 4 members all currently undertaking a Bachelor of Engineering with Honours at QUT. In compliance with the Systems Engineering Approach, each team member has been assigned and delegated a subsystem within the project of which they are responsible for the specification, development and integration with other subsystems, in order to create the final product. The Project Manager is the responsible person that ensures that all team members are progressing the development of their subsystem and are complying with the scheduled project timeline outlined in this document. The table below outlines the assigned subsystems and responsibilities of each team member which will ensure a balanced workload for the completion of the project.

Team Member	Subsystem	Code	Responsibilities
Delenn Palmer	Project Manager	PM	▪ Project breakdown and allocation ▪ Subsystem allocation ▪ Project schedule management ▪ Client and supervisor briefings ▪ Project documentation ▪ Allocate and maintain budget ▪ Validation of subsystems integration and testing
Timothy Vu	GUI & Reporting	GR	▪ Research suitable visualisation and interface methods for project task ▪ Design and develop visualisation and interface system for project task ▪ Test visualisation and interface to ensure subsystem complies with the rest of the project task ▪ Integration of visualisation and interface with other subsystems ▪ Create generate reports for subsystem tests
Christian Neilsen	Deep Learning	DL	▪ Research suitable Deep Net methods for the project task ▪ Design and develop Deep Net system for project task ▪ Test Deep Net program to ensure subsystem complies with the rest of the project task ▪ Integration of Deep Net program with other subsystems
Alexander Santander	Machine Learning	ML	▪ Research suitable Machine Learning methods for the project task ▪ Design and develop Machine Learning system for project task ▪ Test Machine Learning program to ensure subsystem complies with the rest of the project task ▪ Integration of Machine Learning program with other subsystems

Table 1: Team Members and Subsystem Allocation

4.1.1 Organisational Chart

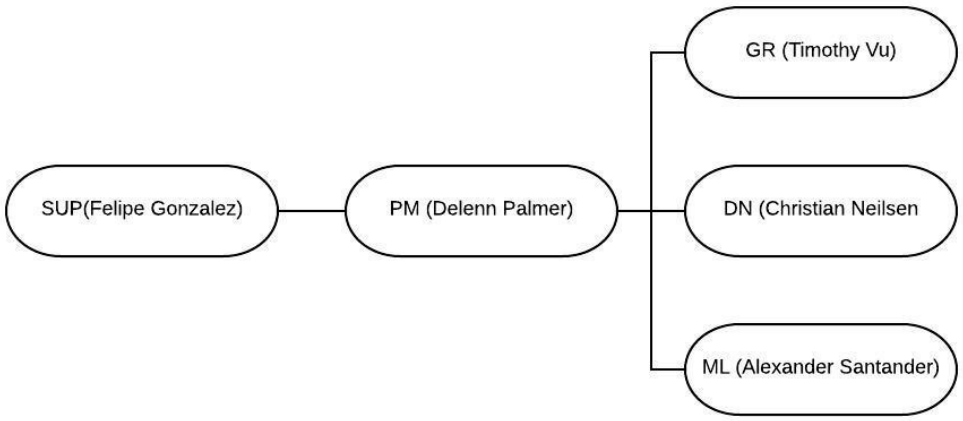

Figure 2: Organisational Chart Diagram

4.2 Document Management

Complex system engineering projects require the development of multiple supporting documents. It is essential to have certain procedures set out to manage and store documentation in an easily identifiable manner. Therefore, certain document management procedures have been implemented to ensure that structured availability of all documents associated with the project is readily available.

4.2.1 Document File Naming

To easily identify and access documents, a standard naming convention was put in place that all authors of the documents would need to use. The file name of documents will include the project name, year, group number, document name and the version of the document.

For instance, this document, named as WT18G4-PMP-01 is interpreted as: WildTracker Project 2018 – Group 4 – Project Management Plan – Version 1 (1st Release).

4.2.2 Revisions of Documents

During the develop of each system within this project, constant testing and validation will result in multiple changes throughout the lifetime of the project. As a result, all documents will constantly need to be revised and updated as the project progresses. These revisions will be kept track in accordance with a simple numbering system. This revision record will be kept within the document title and a revision record in the form of a table that can be found in the beginning of the document.

4.2.3 Document and Media Storage

A reliable storage solution is required for projects of this scale. Therefore, in the initial team meetings, it was decided that a shared cloud storage platform would be the best solution to manage all documentation and media. The cloud storage platform, DropBox was chosen to ensure that all documents and resources are constantly up to date and could be easily accessed as a shared folder for all team members.

5 Resource Management

There is a large range of resources available to our team to help with the successful completion of the WT18G4 Project. These resources include intellectual, human and financial resources. All team members of the WT18G4 Project team will make use of all available resources to achieve the project goals successfully and within the specified budget.

5.1 Human Resource

The most crucial resource to the successful completion of this project is the human resources. All team members of this project are considered valuable assets as they will aide in the completion of the UAV System. Each team member has been assigned responsibilities which have been broken down into work packets through the Systems Engineering Approach. The role of the Project Manager is to ensure that all team members have a balanced workload and complete their assigned responsibilities in order to have a successful completion of the project.

The Project Manager is the first port of call when it comes to the notification of an issue. An enquiry would then be made to the Project Supervisor, Felipe Gonzalez. This will ensure that all questions can be answered properly. The team also has the opportunity to meet the Project Supervisor at least once a week during the Lecture/Tutorial sessions to bring up any concerns regarding the projects activities.

Other human resources that are available for support and guidance include QUT Staff members Juan Sandino and Olga Moskvyak. All team members are encouraged to seek guidance and consult with individuals who are experts in their related subsystems.

5.2 Intellectual Resource

The team will have access to intellectual resources provided in the form of lectures, tutorials and practical sessions to aid the completion of the project.

5.3 Project Budgets

5.3.1 Mass Budget

The mass budget is not applicable to this design project.

5.3.2 Power Budget

The power budget is not applicable to this design project.

5.3.3 Data Budget

To determine the data budget for this project, different software systems for the implementation of the wildlife detection subsystem needed to be evaluated. The following options are the programs to be considered. OpenCV, MATLAB and TensorFlow. The following tables were trade studies provided to the EGH455 students to help with the consideration of software programs.

Criteria	*Weight*	*Score*					*Weighted score*
		5	*4*	*3*	*2*	*1*	
Cost	3	Free	Perpetual license (< $100)	Perpetual license (> $100)	Temporal license (< $50 / year)	Temporal license (> $50 / year)	0.50
Availability	5	Online (unmetered connections)	Offline via QUT computer labs	Online (metered connections)	Offline via QUT IT support	Physical IT staff assistance	0.83
Portability	3	Multiple (Mobile, Desktop, IoT, Tablet)	Multiple (Mobile, Desktop)		Limited (Only desktop, multiple O.S.)	Poor (Only desktop, single O.S.)	0.50
Documentation	5	Rich	Appropiate	Moderate	Regular	Poor	0.33
Support	4	Official support (free)	Community support	Official support (paid)	Limited support	No support	0.53
Platforms (O.S)	3	cross-platform				single-platform	0.50
Learning Curve (difficulty)	2	Smooth		Moderate		Steep	0.20
Licensing	3	Any usage (commercial and eduational)		Educational purposes only		Request license	0.50
Copyright	2	No restrictions		Limited restrictions (e.g. commercial usage)		Organisation restrictions (e.g. QUT software)	0.33
						TOTAL:	**4.23**

Table 2: OpenCV Trade Study (RD/3)

Criteria	*Weight*	*Score*					*Weighted score*
		5	*4*	*3*	*2*	*1*	
Cost	3	Free	Perpetual license (< $100)	Perpetual license (> $100)	Temporal license (< $50 / year)	Temporal license (> $50 / year)	0.30
Availability	5	Online (unmetered connections)	Offline via QUT computer labs	Online (metered connections)	Offline via QUT IT support	Physical IT staff assistance	0.67
Portability	3	Multiple (Mobile, Desktop, IoT, Tablet)	Multiple (Mobile, Desktop)		Limited (Only desktop, multiple O.S.)	Poor (Only desktop, single O.S.)	0.20
Documentation	5	Rich	Appropiate	Moderate	Regular	Poor	0.67
Support	4	Official support (free)	Community support	Official support (paid)	Limited support	No support	0.40
Platforms (O.S)	3	cross-platform				single-platform	0.10
Learning Curve (difficulty)	2	Smooth		Moderate		Steep	0.33
Licensing	3	Any usage (commercial and eduational)		Educational purposes only		Request license	0.30
Copyright	2	No restrictions		Limited restrictions (e.g. commercial usage)		Organisation restrictions (e.g. QUT software)	0.33
						TOTAL:	**3.30**

Table 3: MATLAB Trade Study (RD/3)

Criteria	Weight	Score					Weighted score
		5	4	3	2	1	
Cost	3	Free	Perpetual license (< $100)	Perpetual license (> $100)	Temporal license (< $50 / year)	Temporal license (> $50 / year)	0.50
Availability	5	Online (unmetered connections)	Offline via QUT computer labs	Online (metered connections)	Offline via QUT IT support	Physical IT staff assistance	0.50
Portability	3	Multiple (Mobile, Desktop, IoT, Tablet)	Multiple (Mobile, Desktop)		Limited (Only desktop, multiple O.S.)	Poor (Only desktop, single O.S.)	0.50
Documentation	5	Rich	Appropiate	Moderate	Regular	Poor	0.50
Support	4	Official support (free)	Community support	Official support (paid)	Limited support	No support	0.53
Platforms (O.S)	3	cross-platform				single-platform	0.50
Learning Curve (difficulty)	2	Smooth		Moderate		Steep	0.20
Licensing	3	Any usage (commercial and eduational)		Educational purposes only		Request license	0.50
Copyright	2	No restrictions		Limited restrictions (e.g. commercial usage)		Organisation restrictions (e.g. QUT software)	0.33
						TOTAL:	4.07

Table 4: TensorFlow Trade Study (RD/3)

When comparing trade studies, the options that have the highest weighted scores are those that are considered best for the project application. In this instance, OpenCV (with a score of 4.23) is considered to be the best software program to create the wildlife detection subsystem.

From further research, TensorFlow (with a score of 4.23) in conjunction with the Darkflow Deep Learning Neural Network will be used for the machine learning aspect of the wildlife detection subsystem.

After completion of the project, the Object Detection team was able to test how fast the processing of a video would be. The table below represents the speed in which it took to process a ~30 second video.

Data Processing Rate (FPS)		
	GTX 1070 (GPU)	**Standard CPU**
YOLO V2	25 FPS	0.5 FPS
TINY YOLO V2	70 FPS	2 FPS

Table 5: Data Transmission

5.3.4 Financial Budget

There is a fixed budget for the project of $50 per student, per team; however, it has been identified that no purchase requirements are to be expected.

6 Concept of Operations

The Concept of Operations (ConOps) were created with reference to the System Requirements and High-Level Objectives (HLO's) set by the client. The ConOps breaks down the overall system into easily visualised segments and shows the key connections between these segments. The main objective was to describe the systems intended use from the user's point of view without containing any low level functions or technical requirements that may change the system design life cycle.

The ConOps diagram can be broken down into four easily identifiable sections:

1. Video and Data acquisition
2. Graphical User Interface - Input
3. Graphical User Interface – Output
4. Object Recognition Systems

The above-mentioned systems are described in greater depth in the table below:

ConOps Diagram Number	Description
CONOPS-1 – Video and Data Acquisition	Video footage containing training and testing data will be taken from multiple sources. Footage is to be recorded via drone and must contain at minimum 2 different types of animals in frame at once. Footage should be taken at direct overhead and oblique angles.
CONOPS-2 – Graphical User Interface (Input)	The user will choose what video footage will be uploaded into the system. They will interact with the application to load the input data and after image processing has been completed, they will be able to retrieve the final video file with bounding boxes and animal identification.
CONOPS-3 Graphical User Interface (Output)	The interface allows the user to manage video files for processing and will also let the user choose processed video names and locations. The user will also be able to view the identification as it plays through the application interface, with live statistics shown to the side, such as; number of animals, animal type etc.
CONOPS-4 – Object Recognition Systems	The Object Recognition Systems contain all the AI, ML and DL algorithms that are used to process video files and detect how many animals are in each frame, what species each detected animal is and some basic characteristics of each animal such as size.

Table 6: ConOps Diagram Description

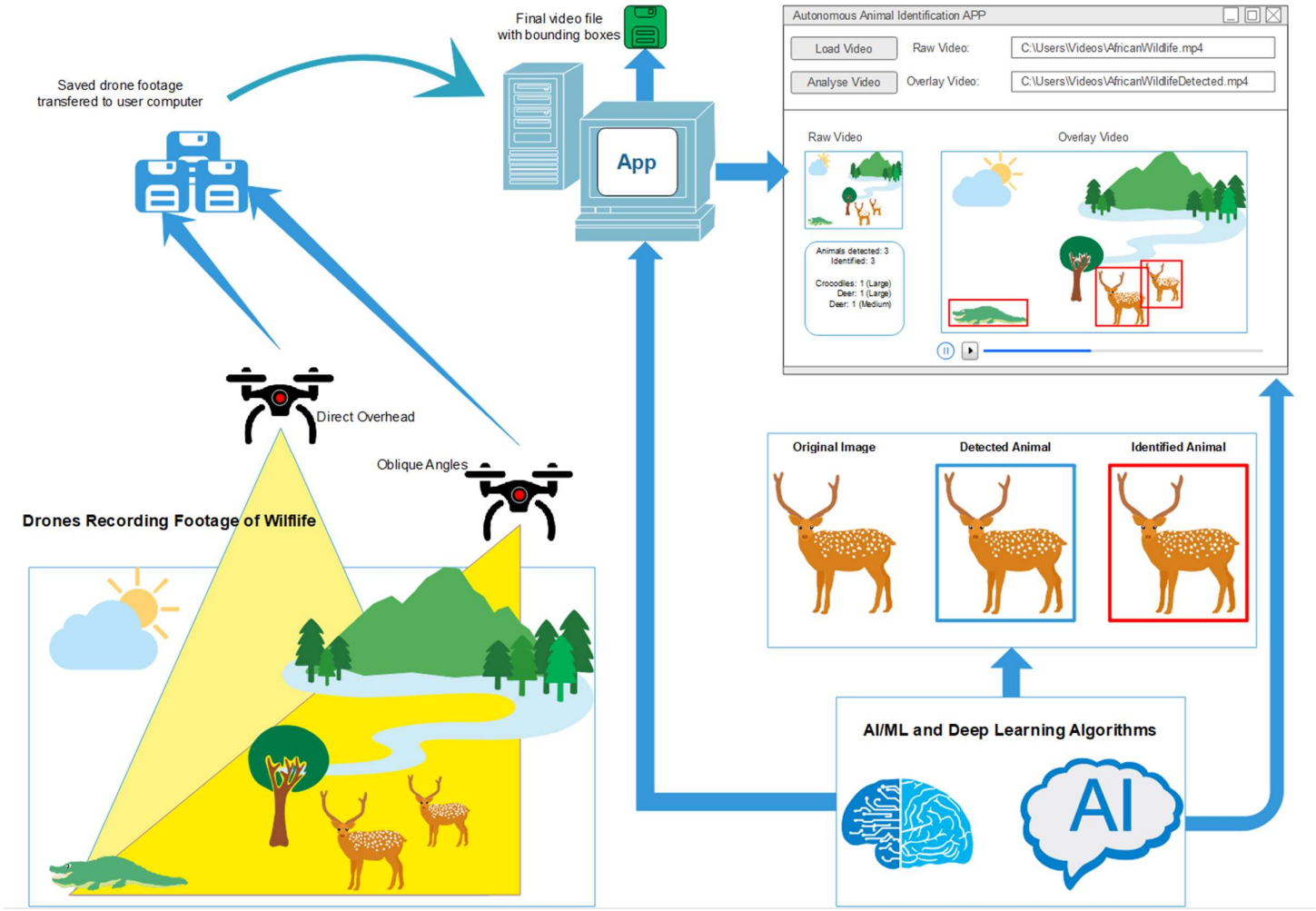

Figure 3: ConOps Diagram

7 System Architecture

The system architecture is a visual representation of the system interfaces broken down by subsystem components. The system architecture for the WildTracker project can be found in the figure below.

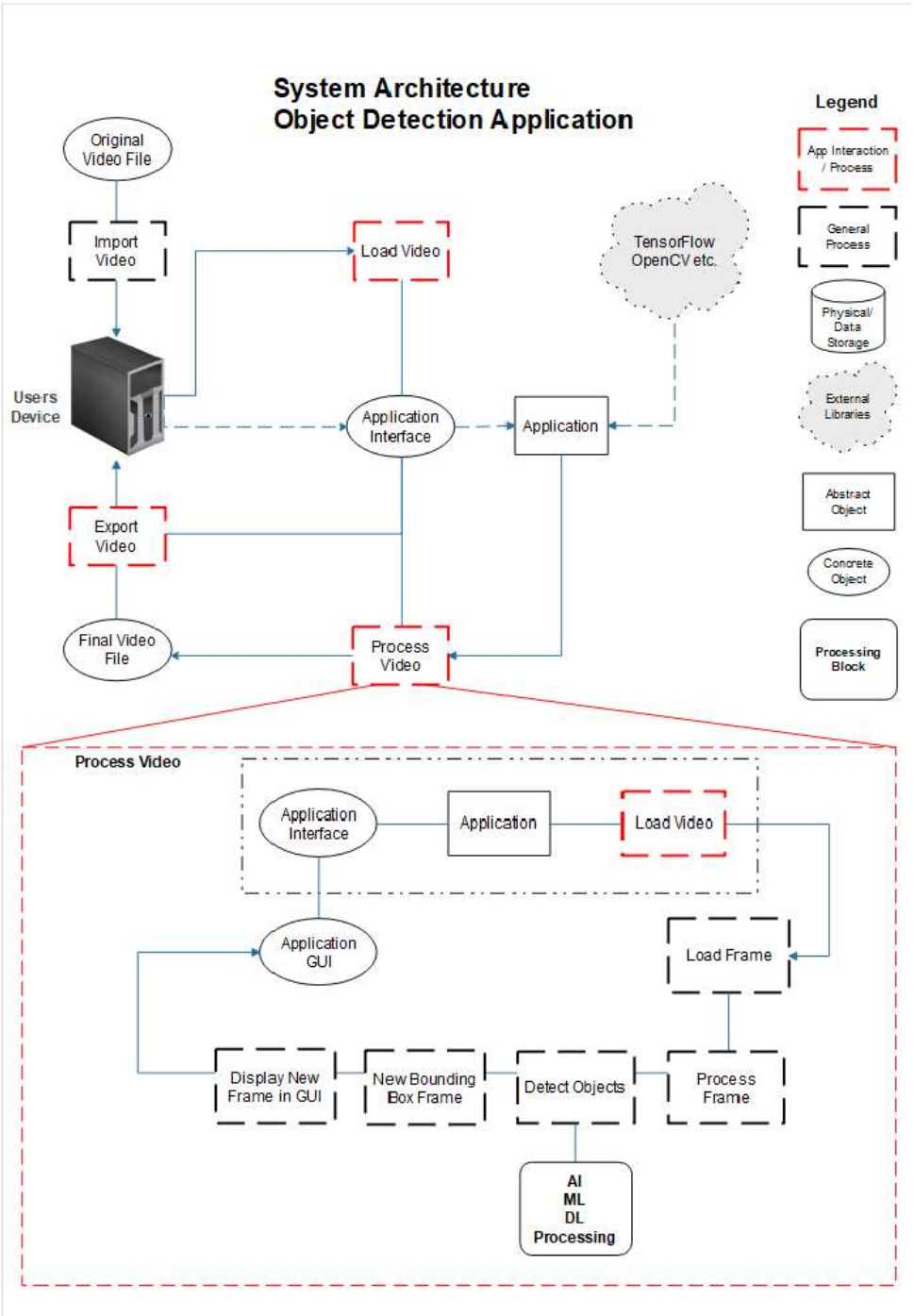

Figure 4: System Architecture Diagram

7.1 Description of Subsystem Interfaces

The WildTracker project is a collection of self-regulating subsystems which when combined, produces a complete functioning system. Each subsystem plays a role of equal significance and is designed to perform specific tasks.

The system architecture uses a block diagram format to visualise all subsystems and their connectivity within the system. The diagram uses colour coded and dotted arrows and lines to indicate the type of connection between each component and sub-components. The system comprises of two main sections, the data retrieval and output system (Graphical User Interface – GUI) as well as the processing video system (Machine & Deep Learning).

This particular system architecture focuses solely on the software systems rather than the hardware systems. This is because the only hardware needed is a modern computer running on either the Linux or Windows Operating Systems.

The system architecture breakdown goes as follows:

- At first the original file is imported to storage on the user's device
- It is then loaded into the WildTracker application at the press of a button on the interface
- After the press of the button, it will begin to start processing the video which involves a continuous loop of –
    1. Loading the frame
    2. Processing the frame
    3. Detecting objects within the frame
    4. Adding appropriate bounding box(es) to the frame
    5. Outputting to the GUI
- After all frames have been outputted, it can then be viewed by the user in real time within the GUI. Once this has been completed, the processed video will be exported to the storage of the user's device.

8 Test Plan

Throughout the development process, each subsystem was tested and verified with the project manager before integration with other subsystems. After testing all corresponding subsystems, necessary changes were made before the validation of the final integrated system. This was to ensure that there was error free compatibility with all subsystems and the operation of the program went smoothly. Each stage was vigorously tested to ensure that the system functioned correctly and matched the specification. As demonstrated to the client during a demonstration session, the system performed superbly and was successful in matching all system requirements. The individual test reports is detailed in the following documentation RD/5 and RD/6.

The verification matrix below summarises the requirements used to validate the system.

Table 7: Verification Matrix (sourced from RD/8)

REQUIREMENTS	VERIFICATION	TRACEABILITY							SUBSYSTEM			
		HLO-M-1	HLO-M-2	HLO-M-3	HLO-M-4	HLO-M-5	HLO-M-6	CLIENTS BRIEF	PM	GUI	ML	DL
FUNCTIONAL REQUIREMENTS												
REQ-M-01	Demonstation / Simulation / Testing	X						X	X	X	X	X
REQ-M-02	Demonstation / Simulation / Testing	X						X	X	X	X	X
PERFORMANCE REQUIREMENTS												
REQ-M-03	Demonstation / Simulation / Testing		X								X	X
REQ-M-04	Demonstation / Simulation / Testing		X								X	X
USER REQUIREMENTS												
REQ-M-05	Demonstation / Simulation / Testing		X	X						X	X	X
REQ-M-06	Demonstation / Simulation / Testing		X	X						X	X	X
REQ-M-07	Demonstration			X						X	X	X
REQ-M-08	Demonstration				X					X	X	X
DELIVERY REQUIREMENTS												
REQ-M-09	Deliverable / Submission					X			X			
REQ-M-10	Deliverable / Submission						X		X			

9 Work Breakdown Structure

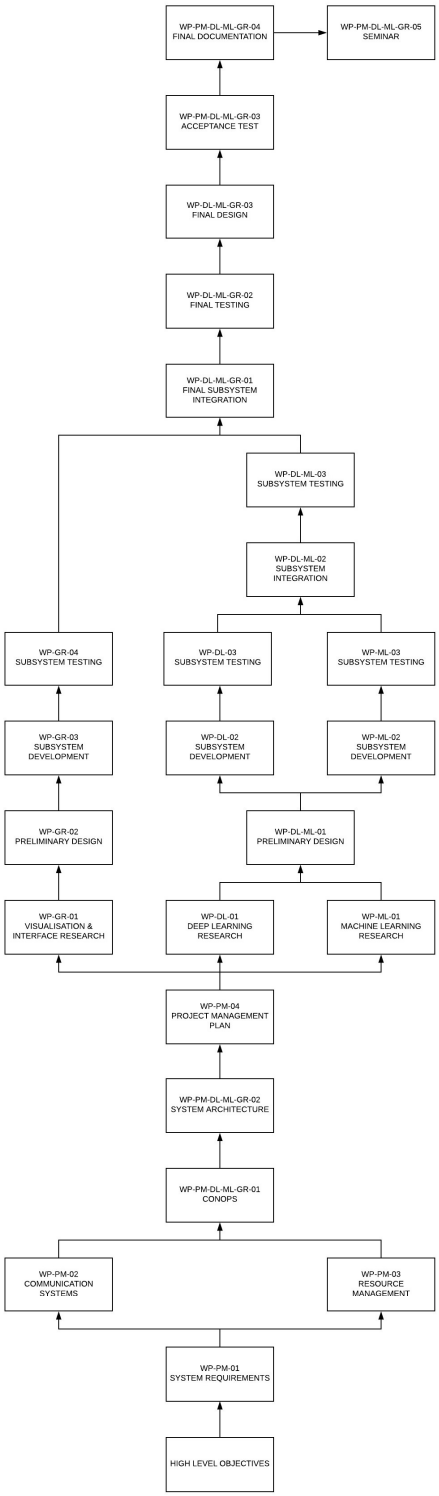

Figure 5: Work Breakdown Structure Diagram (WBS)

10 Gantt Chart

The WildTracker Project Timeline was determined based on the time restrictions given from the customer requirements. As such, this project needed to be completed within a 13-week timeframe. The first figure below, represents all tasks with the intended start state, intended completion date.

Task Name	Start	End	Duration (days)
Derive Project System Requirements [WP-PM-01]	27/07/2018	1/08/2018	5
Set up Communication System [WP-PM-02]	2/08/2018	3/08/2018	1
Set up Resource Management System [WP-PM-03]	2/08/2018	3/08/2018	1
ConOps [WP-PM-DL-ML-GR-01]	6/08/2018	12/08/2018	6
System Architecture [WP-PM-DL-ML-GR-02]	6/08/2018	12/08/2018	6
Deep Learning Research [WP-DL-01]	13/08/2018	20/08/2018	7
Machine Learning Research [WP-ML-01]	13/08/2018	20/08/2018	7
Visualisation & Interface Research [WP-GR-01]	13/08/2018	20/08/2018	7
DL & ML Preliminary Design [WP-DL-ML-01]	21/08/2018	30/08/2018	9
VI Preliminary Design [WP-GR-02]	21/08/2018	30/08/2018	9
Deliverable: PMP & Subsystem Prelim. Designs [WP-PM-04]	31/08/2018	1/09/2018	1
DL Subsystem Development [WP-DL-02]	31/08/2018	14/09/2018	14
ML Subsystem Development [WP-ML-02]	31/08/2018	14/09/2018	14
VI Subsystem Development [WP-GR-03]	31/08/2018	14/09/2018	14
DL Subsystem Testing [WP-DL-03]	15/09/2018	16/09/2018	1
ML Subsystem Testing [WP-ML-03]	15/09/2018	16/09/2018	1
VI Subsystem Testing [WP-GR-04]	15/09/2018	16/09/2018	1
DL & ML Subsystem Integration [WP-DL-ML-02]	17/09/2018	19/09/2018	2
DL & ML Subsystem Testing [WP-DL-ML-03]	20/09/2018	22/09/2018	2
DL, ML & VI Final Subsystem Integration [WP-DL-ML-GR-01]	25/09/2018	9/10/2018	14
DL, ML & VI Final Testing [WP-DL-ML-GR-02]	10/10/2018	14/10/2018	4
Final Designs [WP-DL-ML-GR-03]	15/10/2018	21/10/2018	6
Acceptance Tests [WP-PM-DL-ML-GR-03]	22/10/2018	24/10/2018	2
Final Documentation [WP-PM-DL-ML-GR-04]	24/10/2018	26/10/2018	2
Deliverable: Project Documenation	26/10/2018	27/10/2018	1
Seminar [WP-PM-DL-ML-GR-05]	26/10/2018	27/10/2018	1

Figure 6: Project Timeline Task Description

The second figure is the legend for the project timeline.

LEGEND	
	Delenn Palmer
	Christian Neilsen
	Alexander Santander
	Timothy Vu
	Delenn Palmer, Christian Neilsen, Alexander Santander, Timothy Vu
	Christian Neilsen, Alexander Santander, Timothy Vu
	Christian Neilsen, Alexander Santander

Figure 7: Project Timeline Legend

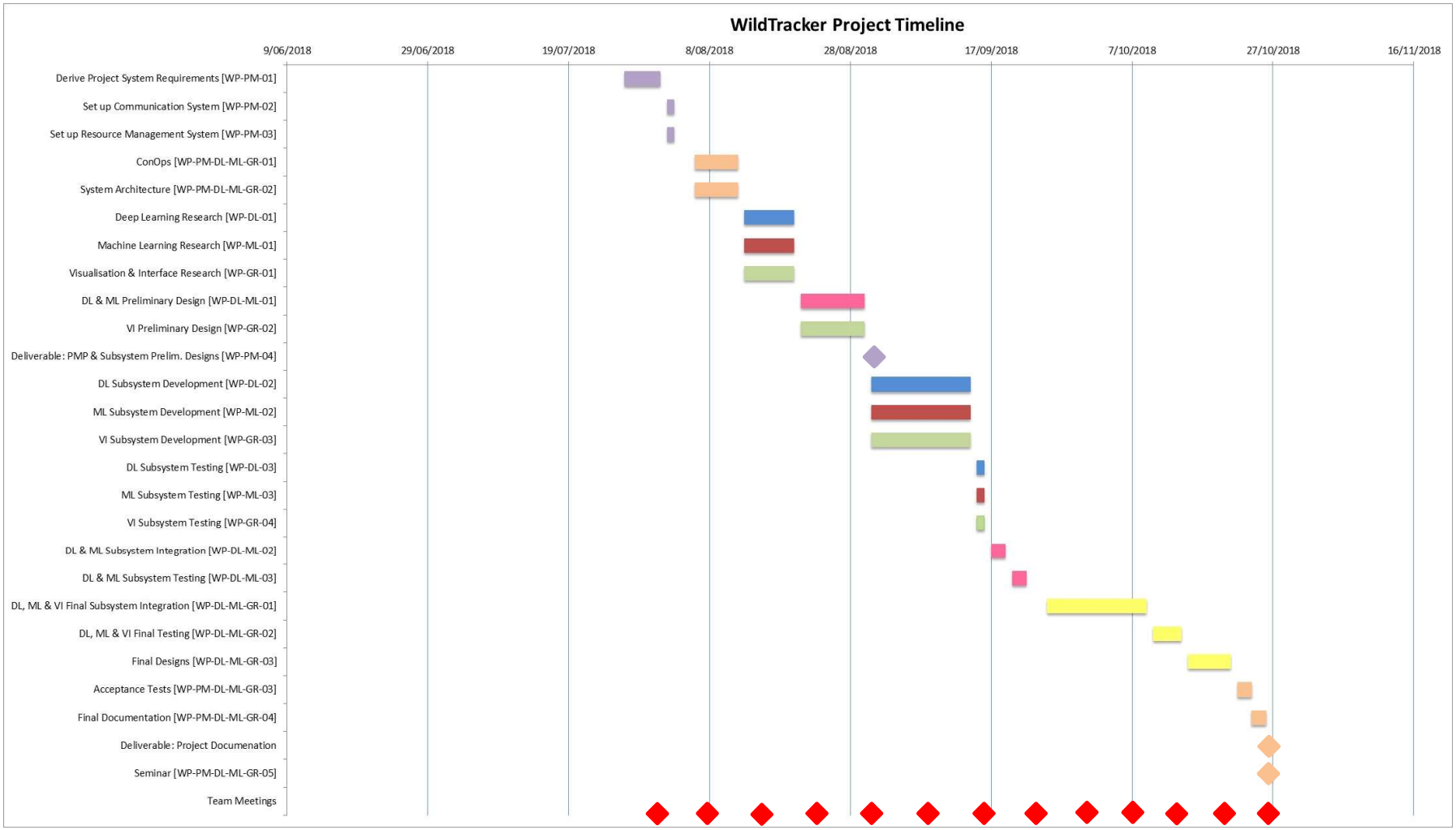

Figure 8: WildTracker Group 4 Project Timeline

11 Work Packets

WP-PM-01	**System Requirements**
Description:	Establish System Requirements with reference to the Customer Needs document. These system requirements will be referred to throughout the entire project as they are the criteria that needs to be met in order to consider the project a complete success
Team Member Responsible:	Delenn Palmer
Work Package Duration:	6 Days
Date of Commencement:	27/07/2018
Date of Completion:	01/08/2018
Requirements:	RD/1 – Customer Needs Document
Deliverables:	System Requirements Document – WT18G4-SR-01

WP-PM-02	**Communication Systems**
Description:	A platform for the sharing of ideas, links and other relevant information as well as delegation of documentation and communication outside of class hours were established.
Team Member Responsible:	Delenn Palmer
Work Package Duration:	15 minutes
Date of Commencement:	02/08/2018
Date of Completion:	03/08/2018
Requirements:	Nil.
Deliverables:	Private Facebook chat was created (EGH455 Group 4). Contact numbers were also delegated. In order to keep all information relevant, team meetings were set on every Thursday at 12.30pm.

WP-PM-03	**Resource Management**
Description:	As this is considered a substantial group project, documents would need to constantly be created, revised and managed. As a result a storage method was determined so all team members would have access to these documents.
Team Member Responsible:	Delenn Palmer
Work Package Duration:	15 minutes
Date of Commencement:	02/08/2018
Date of Completion:	03/08/2018
Requirements:	Nil.
Deliverables:	Created a Shared DropBox folder named “WildTracker Project”

WP-PM-DL-ML-GR-01	**ConOps**
Description:	ConOps needed to be established to determine the functionality of the entire system. This was required based on the HLO's given
Team Member Responsible:	All Team Members – Created by Christian Neilsen
Work Package Duration:	1 Week
Date of Commencement:	06/08/2018
Date of Completion:	12/08/2018
Requirements:	WP-PM-01
Deliverables:	ConOps included in WT18G4-PMP-01

WP-PM-DL-ML-GR-02	**System Architecture**
Description:	A detailed flow diagram containing the technical specifications of the system. It will contain the components of all subsystems as well as their integration method.
Team Member Responsible:	All Team Members
Work Package Duration:	1 Week
Date of Commencement:	06/08/2018
Date of Completion:	12/08/2018
Requirements:	Subsystem Architecture from Subsystem Managers
Deliverables:	System Architecture included in WT18G4-PMP-01

WP-PM-04	**Project Management Plan**
Description:	A detailed formal, approved document that defines how the project will be executed, monitored and controlled. It includes system requirements, subsystem management plans, and other planning documents.
Team Member Responsible:	All Team Members
Work Package Duration:	6 Week
Date of Commencement:	23/07/2018
Date of Completion:	31/08/2018
Requirements:	WP-PM-01, WP-PM-02, WP-PM-03, WP-PM-DL-ML-GR-01, WP-PM-DL-ML-GR-02
Deliverables:	WT18G4-PMP-01

WP-GR-01	**Visualisation & Interface Research**
Description:	Conduct research specific to the Visualisation and Interface Subsystem of the WildTracker System to be created.
Team Member Responsible:	Timothy Vu
Work Package Duration:	8 Days
Date of Commencement:	13/08/2018
Date of Completion:	20/08/2018
Requirements:	WP-PM-01

Deliverables:

WP-DL-01	**Deep Learning Research**
Description:	Conduct research specific to the Deep Learning Subsystem of the WildTracker System to be created.
Team Member Responsible:	Christian Neilsen
Work Package Duration:	8 Days
Date of Commencement:	13/08/2018
Date of Completion:	20/08/2018
Requirements:	WP-PM-01

Deliverables:

WP-ML-01	**Machine Learning Research**
Description:	Conduct specific research to the Machine Learning Subsystem of the WildTracker System to be created.
Team Member Responsible:	Alexander Santander
Work Package Duration:	8 Days
Date of Commencement:	13/08/2018
Date of Completion:	20/08/2018
Requirements:	WP-PM-01

Deliverables:

WP-GR-02	**Preliminary Design**
Description:	Create the Preliminary Design for the subsystem using the most suitable software components for the project.
Team Member Responsible:	Timothy Vu
Work Package Duration:	9 Days
Date of Commencement:	21/08/2018
Date of Completion:	30/08/2018
Requirements:	WP-GR-01, WP-PM-01
Deliverables:	Production of Preliminary Design Document for Subsystem – WT18G4-PD-GR-01

WP-DL-ML-01	**Preliminary Design**
Description:	Create the Preliminary Design for the subsystem using the most suitable software components for the project.
Team Member Responsible:	Christian Neilsen & Alexander Santander
Work Package Duration:	9 Days
Date of Commencement:	21/08/2018
Date of Completion:	30/08/2018
Requirements:	WP-DL-01, WP-ML-01, WP-PM-01
Deliverables:	Production of Preliminary Design Document for Subsystem – WT18G4-PD-DLML-01

WP-GR-03	**Subsystem Development**
Description:	Develop the subsystem based on the previous research acquired and preliminary designs that were created.
Team Member Responsible:	Timothy Vu
Work Package Duration:	2 Weeks
Date of Commencement:	31/08/2018
Date of Completion:	14/09/2018
Requirements:	WP-PM-01, WP-GR-01, WP-GR-02

Deliverables:

WP-DL-02	**Subsystem Development**
Description:	Develop the subsystem based on the previous research acquired and preliminary designs that were created.
Team Member Responsible:	Christian Neilsen
Work Package Duration:	2 Weeks
Date of Commencement:	31/08/2018
Date of Completion:	14/09/2018
Requirements:	WP-PM-01, WP-DL-01, WP-DL-ML-01

Deliverables:

WP-ML-02	**Subsystem Development**
Description:	Develop the subsystem based on the previous research acquired and preliminary designs that were created.
Team Member Responsible:	Alexander Santander
Work Package Duration:	2 Weeks
Date of Commencement:	31/08/2018
Date of Completion:	14/09/2018
Requirements:	WP-PM-01, WP-ML-01, WP-DL-ML-01

Deliverables:

WP-GR-04	**Subsystem Testing**
Description:	Test subsystem to prepare for system integration
Team Member Responsible:	Timothy Vu
Work Package Duration:	5 Days
Date of Commencement:	15/09/2018
Date of Completion:	19/09/2018
Requirements:	WP-GR-02
Deliverables:	Subsystem Testing Report – WT18G4-TR-GR-01

WP-DL-03	**Subsystem Testing**
Description:	Test subsystem to prepare for subsystem integration
Team Member Responsible:	Christian Neilsen
Work Package Duration:	5 Days
Date of Commencement:	15/09/2018
Date of Completion:	16/09/2018
Requirements:	WP-DL-ML-01
Deliverables:	Subsystem Testing Report – WT18G4-TR-DL-01

WP-ML-03	**Subsystem Testing**
Description:	Test subsystem to prepare for subsystem integration
Team Member Responsible:	Alexander Santander
Work Package Duration:	5 Days
Date of Commencement:	15/09/2018
Date of Completion:	16/09/2018
Requirements:	WP-DL-ML-01
Deliverables:	Subsystem Testing Report – WT18G4-TR-ML-01

WP-DL-ML-02	**Subsystem Integration**
Description:	Integrate DL individual subsystem to ML individual subsystem to continue system development for UAV project
Team Member Responsible:	Christian Neilsen & Alexander Santander
Work Package Duration:	3 Days
Date of Commencement:	17/09/2018
Date of Completion:	19/09/2018
Requirements:	WP-DN-ML-01, WP-DL-02, WP-ML-02, WP-DL-03, WP-ML-03
Deliverables:	Complete DL & ML Subsystem Integration

WP-DL-ML-03	**Subsystem Testing**
Description:	Test subsystem to prepare for subsystem integration
Team Member Responsible:	Christian Neilsen & Alexander Santander
Work Package Duration:	3 Days
Date of Commencement:	20/09/2018
Date of Completion:	22/09/2018
Requirements:	WP-DL-ML-01, WP-DL-ML-02

Deliverables:

WP-DL-ML-GR-01	**Final Subsystem Integration**
Description:	Integrate all subsystems to continue and finalise system development for UAV project
Team Member Responsible:	Christian Neilsen, Alexander Santander & Timothy Vu
Work Package Duration:	2 Weeks
Date of Commencement:	25/09/2018
Date of Completion:	09/10/2018
Requirements:	WP-GR-02, WP-DL-ML-01
Deliverables:	WildTracker System

WP-DL-ML-GR-02	**Final Testing**
Description:	Test the systems performance to make sure they have met all criterion based on the System Requirements Document
Team Member Responsible:	Christian Neilsen, Alexander Santander & Timothy Vu
Work Package Duration:	5 Days
Date of Commencement:	10/10/2018
Date of Completion:	14/10/2018
Requirements:	WP-PM-01, WP-GR-05, WP-DL-ML-04
Deliverables:	Testing Report Documentation – WT18G4-TR-FD-01

WP-DL-ML-GR-03	**Final Design**
Description:	Make changes from the Preliminary Design of all subsystems based on any revisions determined and made through subsystem development and testing.
Team Member Responsible:	Christian Neilsen, Alexander Santander & Timothy Vu
Work Package Duration:	1 Week
Date of Commencement:	15/10/2018
Date of Completion:	21/10/2018
Requirements:	WP-GR-02, WP-DL-ML-01, WP-DL-ML-GR-02

Deliverables:

WP-PM-DL-ML-GR-03	**Acceptance Tests**
Description:	Complete acceptance tests to see if the final product meets the all system requirements
Team Member Responsible:	All Team Members
Work Package Duration:	N/A
Date of Commencement:	22/10/2018
Date of Completion:	24/10/2018
Requirements:	Completed WT18G4 Project
Deliverables:	Physical Demonstration

WP-PM-DL-ML-GR-04	**Final Documentation**
Description:	Final project submission including all documents
Team Member Responsible:	All Team Members
Work Package Duration:	N/A
Date of Commencement:	17/10/2018
Date of Completion:	26/10/2018
Requirements:	All documents and demonstration results
Deliverables:	All documents and demonstration results

WP-PM-DL-ML-GR-05	**Seminar**
Description:	Presentation to client panel
Team Member Responsible:	All Team Members
Work Package Duration:	N/A
Date of Commencement:	26/10/2018
Date of Completion:	26/10/2018
Requirements:	All documents and demonstration results
Deliverables:	All documents and project presentation