ISTANBUL TECHNICAL UNIVERSITY

SOFTWARE ENGINEERING

ASSIGNMENT 2

PROJECT TITLE	Package Deliverer Drones
TEAM NAME	Team Ratchet
GROUP NUMBER	**6**

TEAM MEMBERS	
NAME	**STUDENT NUMBER**
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PROJECT PLAN

1. INTRODUCTION

1.1 Scope

- Multiple Drones
- GPS Module
- RF Communication Module
- A computer with real-time operating-system that controls the drones.
- Drone Engine Control Module

1.2 Deliverables

1. Drones
2. Source Code
3. Schedule
4. Plan
5. Budget
6. Test Plan
7. Test Reports
8. Project Management Plan
9. Contract
10. Change Request
11. Drone Management Interface
12. Communication Plan
13. Risk Log
14. Project Quality Plan
15. User Guide
16. Design Document
17. Requirements Document

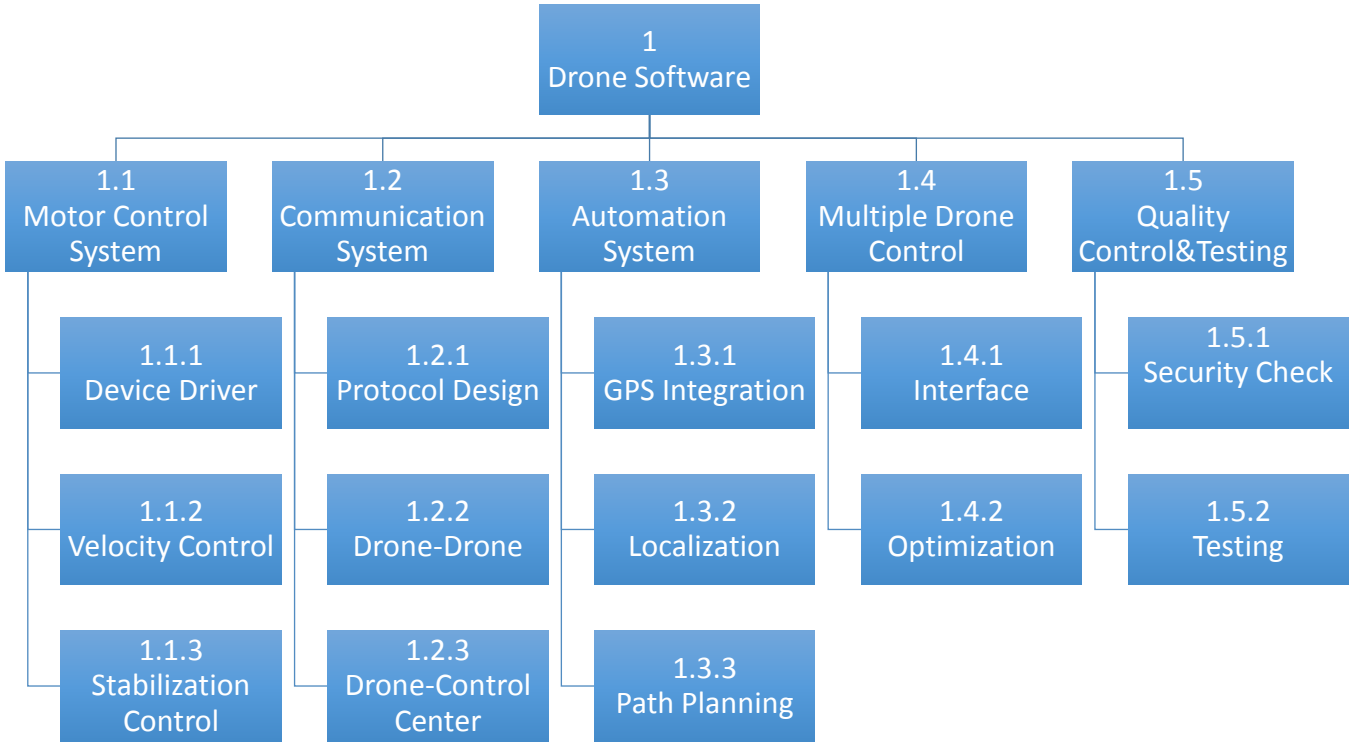
1.3 Epics

Epics	Deliverable No
1.Motor Control System	1
2.Communication System for RF	12
3.Automation System	2
4.Multiple Drone Control	11, 10
5.Quality Control and Testing	6, 7, 13, 14, 15, 16, 17

1.4 Non-Functional Issues

- Security Of Communication
    - End to end encryption between drone and software
    - Security of Communication frequency of drones
- Latency Caused Problem
    - Latency between software and drones
- Connectivity Problems
    - Weather Conditions
- Ease of use for the drone control interface

2. PROJECT PLAN

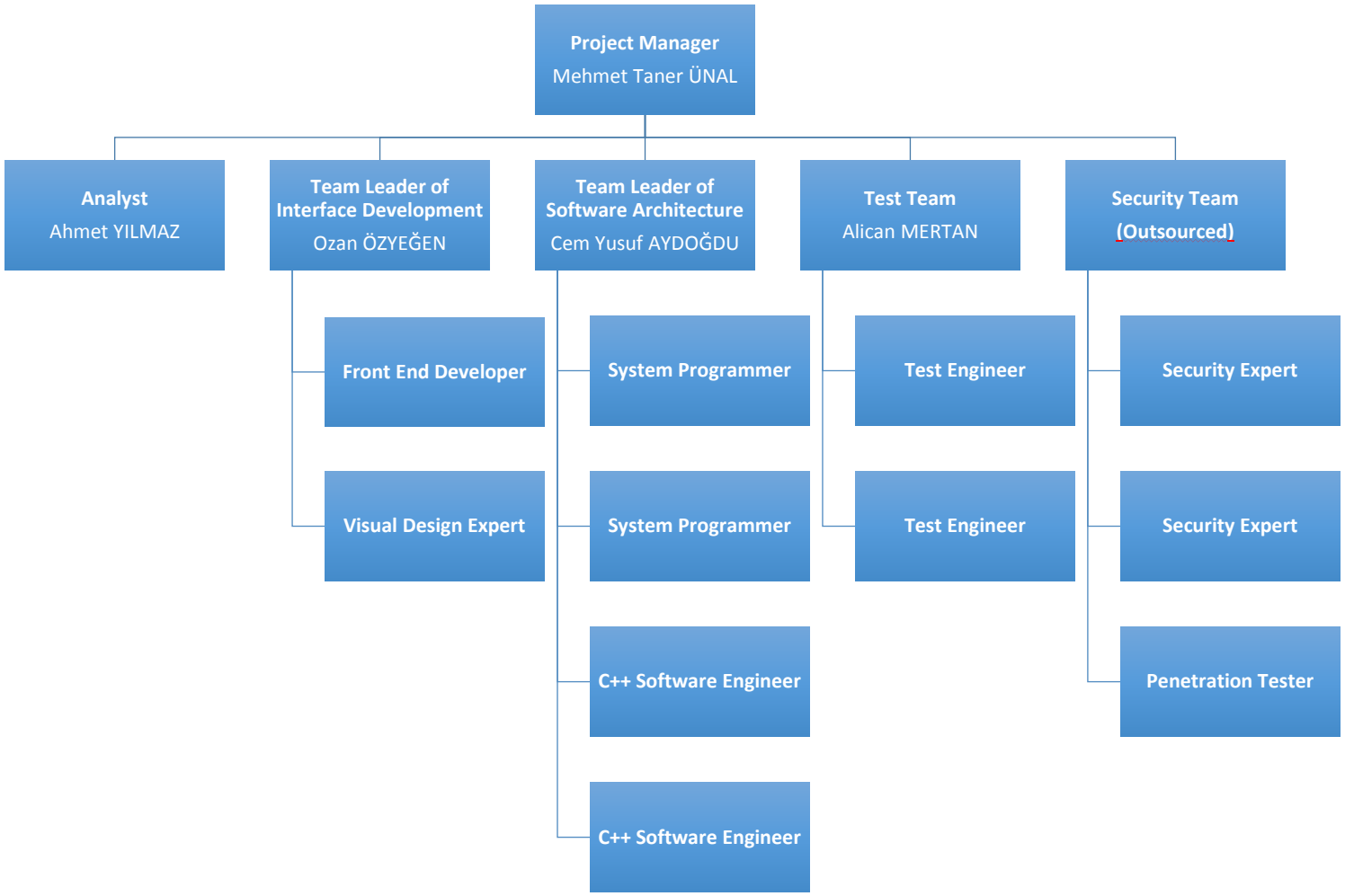


WBS Code	WBS	Definition	Scale (1 to 5)
1	Drone Software	All the work to be done in the project	
1.1	Motor Control System	Software packet to control movements of the drone	
1.1.1	Device Driver	Low level layer of the motor driver hardware (interrupt handling, serial communication)	4
1.1.2	Velocity Control	Software implementations of basic speed control of the drone	2
1.1.3	Stabilization Control	Software about precise complex movements, providing endurance for adverse weather conditions	2
1.2	Communication System	Software package for both close and long range remote communication	
1.2.1	Protocol Design	Communication protocol design for RF module	3
1.2.2	Drone-Drone	Close range drone to drone communication software in order to avoid collisions	2
1.2.3	Drone-Control Centre	General communication system to control and check the drone from the control centre	2
1.3	Automation System	Automation system provides speed parameters to the drone	
1.3.1	GPS Integration	Low level interface for GPS module	2
1.3.2	Localization	Localization software locates the drone on the map using GPS data	4
1.3.3	Path Planning	Path planning system considering possible obstacles in the air (trees, buildings…) in order to avoid crash	4
1.4	Multiple Drone Control	Drone control software to provide real time information about drones, task assignment, failure and goal control	
1.4.1	Interface	User interface to control multiple drones	3
1.4.2	Optimization	Optimization for this software package	2
1.5	Quality Control & Testing	Quality control, test procedures in this work package	
1.5.1	Security Check	Security tests for drone communication system	3
1.5.2	Testing	Test procedures for software and hardware	3

3. ESTIMATES

WBS Code	WBS	Estimated man-week
1	Drone Software	72
1.1	Motor Control System	16
1.1.1	Device Driver	8
1.1.2	Velocity Control	4
1.1.3	Stabilization Control	4
1.2	Communication System	14
1.2.1	Protocol Design	6
1.2.2	Drone-Drone	4
1.2.3	Drone-Control Centre	4
1.3	Automation System	20
1.3.1	GPS Integration	4
1.3.2	Localization	8
1.3.3	Path Planning	8
1.4	Multiple Drone Control	10
1.4.1	Interface	6
1.4.2	Optimization	4
1.5	Quality Control & Testing	12
1.5.1	Security Check	6
1.5.2	Testing	6

4. RESOURCES


Project Manager
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Analyst
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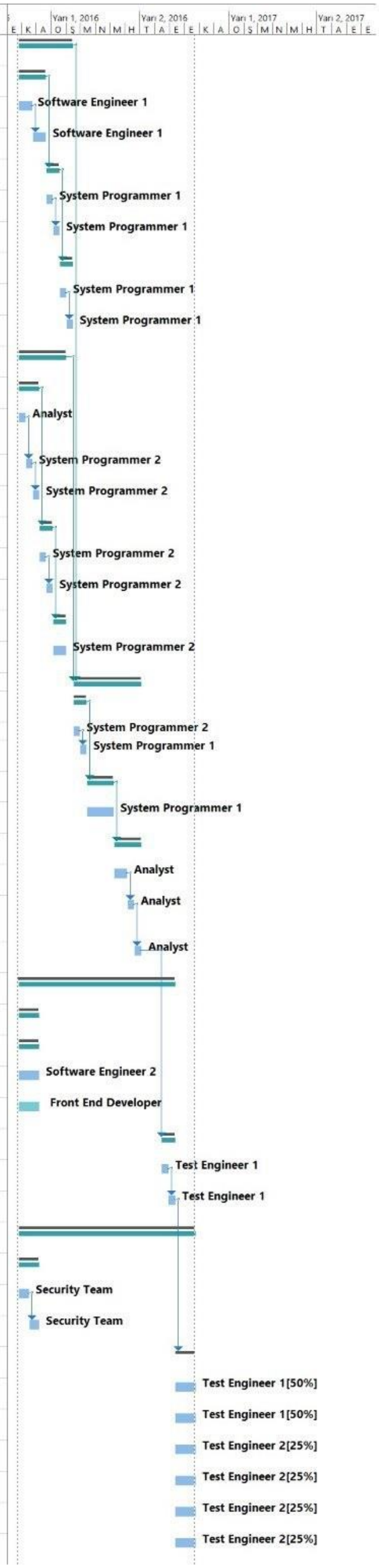
Team Leader of Interface Development
Ozan ÖZYEĞEN
Team Leader of Software Architecture
Cem Yusuf AYDOĞDU
Test Team
Alican MERTAN
Security Team (Outsourced)
Front End Developer
Visual Design Expert
System Programmer
System Programmer
C++ Software Engineer
C++ Software Engineer
Test Engineer
Test Engineer
Security Expert
Security Expert
Penetration Tester

5. SCHEDULE

Kimlik	Görev Modu	Görev Adı Task Name	Süre Time	Başlangıç Start	Bitiş Finish	Önculler
1		**Motor Control Systen**	**16 hf**	**Pzt 26.10.15**	**Cum 12.02.1**	
2		**Device Driver**	**8 hf**	**Pzt 26.10.15**	**Cum 18.12.1**	
3		Driver for Single Motor Control	4 hf	Pzt 26.10.15	Cum 20.11.15	
4		Driver for full Drone Control	4 hf	Pzt 23.11.15	Cum 18.12.15	3
5		**Velocity Control**	**4 hf**	**Pzt 21.12.15**	**Cum 15.01.1**	**2**
6		Stabilization of Velocity	2 hf	Pzt 21.12.15	Cum 1.01.16	
7		Acceleration and	2 hf	Pzt 4.01.16	Cum 15.01.16	6
8		**Stabilization Contr**	**4 hf**	**Pzt 18.01.16**	**Cum 12.02.1**	**5**
9		Manual Control Test	2 hf	Pzt 18.01.16	Cum 29.01.16	
10		Troubleshooting possible errors	2 hf	Pzt 1.02.16	Cum 12.02.16	9
11		**Communication System**	**14 hf**	**Pzt 26.10.15**	**Cum 29.01.16**	
12		**Communication Protocol Design**	**6 hf**	**Pzt 26.10.15**	**Cum 4.12.15**	
13		Designing Communication Protocol	2 hf	Pzt 26.10.15	Cum 6.11.15	
14		Adaptation of transmitter	2 hf	Pzt 9.11.15	Cum 20.11.15	13
15		Adaptation of receiver module	2 hf	Pzt 23.11.15	Cum 4.12.15	14
16		**Drone-Control Cen**	**4 hf**	**Pzt 7.12.15**	**Cum 1.01.16**	**12**
17		Creating Signals	2 hf	Pzt 7.12.15	Cum 18.12.1	
18		Reading Signals	2 hf	Pzt 21.12.15	Cum 1.01.16	17
19		**Drone-Drone Communication**	**4 hf**	**Pzt 4.01.16**	**Cum 29.01.16**	**16**
20		Reaching Second Drone	4 hf	Pzt 4.01.16	Cum 29.01.16	
21		**Automation System**	**20 hf**	**Pzt 15.02.16**	**Cum 1.07.16**	**1;11**
22		**GPS Integration**	**4 hf**	**Pzt 15.02.16**	**Cum 11.03.1**	
23		Adapting module	2 hf	Pzt 15.02.16	Cum 26.02.1	
24		Informing Control Center	2 hf	Pzt 29.02.16	Cum 11.03.16	23
25		**Localization**	**8 hf**	**Pzt 14.03.16**	**Cum 6.05.16**	**22**
26		Stability of Localization	8 hf	Pzt 14.03.16	Cum 6.05.16	
27		**Path Planning**	**8 hf**	**Pzt 9.05.16**	**Cum 1.07.16**	**25**
28		Creating Possible Route	4 hf	Pzt 9.05.16	Cum 3.06.16	
29		Rerouting according to conditions	2 hf	Pzt 6.06.16	Cum 17.06.16	28
30		Simple path test	2 hf	Pzt 20.06.16	Cum 1.07.16	29
31		**Multiple Drone Control**	**231 gün**	**Cmt 24.10.15**	**Cum 9.09.16**	
32		**Interface**	**6 hf**	**Pzt 26.10.15**	**Cum 4.12.15**	
33		**Creating User Interface**	**6 hf**	**Pzt 26.10.15**	**Cum 4.12.15**	
34		Back-End Development	6 hf	Pzt 26.10.15	Cum 4.12.15	
35		Front-End Development	6 hf	Pzt 26.10.15	Cum 4.12.15	
36		**Optimization**	**4 hf**	**Pzt 15.08.16**	**Cum 9.09.16**	**30**
37		Simple paths for multiple drones	2 hf	Pzt 15.08.16	Cum 26.08.16	
38		Troubleshooting possible errors	2 hf	Pzt 29.08.16	Cum 9.09.16	37
39		**Quality Control and Testing**	**52 hf**	**Pzt 26.10.15**	**Cum 21.10.16**	
40		**Security Check**	**6 hf**	**Pzt 26.10.15**	**Cum 4.12.15**	
41		Creating Security	3 hf	Pzt 26.10.15	Cum 13.11.15	
42		Encryption of Communication	3 hf	Pzt 16.11.15	Cum 4.12.15	41
43		**Testing**	**30 gün**	**Pzt 12.09.16**	**Cum 21.10.1**	**38**
44		Drone Health Te:	6 hf	Pzt 12.09.16	Cum 21.10.1	
45		Location Accuracy Test	6 hf	Pzt 12.09.16	Cum 21.10.16	
46		Communication Test	6 hf	Pzt 12.09.16	Cum 21.10.16	
47		Path Test	6 hf	Pzt 12.09.16	Cum 21.10.1	
48		Multiple Drone Control Test	6 hf	Pzt 12.09.16	Cum 21.10.16	
49		Final Test	6 hf	Pzt 12.09.16	Cum 21.10.1	



6. RISKS

Category	Probability	Impact
High complex interface	10%	2
Tech will not meet expectations	10%	2
Staff inexperienced	10%	3
High latency in the system	10%	4
Insufficient funding	15%	4
Security issues	20%	4
Tightened deadline by the customer	30%	3
Change requests	40%	2

	RISK MATRIX	COSTS (DAY)			
		1	2	3	4
PROBABILITY	High complex interface (1)	1	2	3	4
	Tech will not meet expectations (2)	2	4	6	8
	Staff inexperienced (3)	3	6	9	12
	High latency in the system (4)	4	8	12	16
	Insufficient funding (5)	5	10	15	20
	Security issues (6)	6	12	18	24
	Tightened deadline by the customer (7)	7	14	21	28
	Change requests (8)	8	16	24	32
Meaning of the colours in the aspect of risk		Low Degree Risk	Middle Degree Risk	High Degree Risk	