YAŞAR UNIVERSITY

ENGR 3450 PROJECT MANAGEMENT

Emergency Drone Delivery for Medical Supplies

BORNOVA/IZMIR

DECEMBER 2025

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SECTION 1 – PROJECT DETAILS

1.1. Project Description

The Emergency Drone Delivery for Medical Supplies project seeks to transform the speed and reliability of critical medical logistics by deploying autonomous Unmanned Aerial Vehicles (UAVs) capable of transporting lifesaving items—such as blood units, vaccines, and medication—between hospitals, clinics, and emergency zones.

Traditional ground transport is often hindered by traffic congestion and distance, especially during disasters. By using intelligent routing and UAVs, the project aims to enable rapid response and environmentally sustainable healthcare delivery.

1.2. Purpose

The Emergency Drone Delivery for Medical Supplies Project aims to improve the speed and dependability of crucial medical logistics by deploying autonomous drones capable of transferring life-saving supplies including blood units, vaccines, and medication between hospitals, clinics, and disaster zones.

Traditional land transportation is hampered by traffic congestion and distance, especially during disasters.

This project uses unmanned aerial vehicles (UAVs) outfitted with intelligent routing to provide rapid response, reduced human error, and ecologically friendly healthcare delivery.

The idea is consistent with national innovation strategies for smart cities and green mobility.

1.3. Objectives

Stated Project Objectives	Status	Comment
Performance & Speed	*MET*	Achieve drone deliveries within ***15 minutes*** for distances below 10 km.

Stated Project Objectives	Status	Comment
Safety & Reliability	*MET*	Maintain at least ***95 % successful flights*** through real-time monitoring and obstacle-avoidance AI.
Regulatory Compliance	*MET*	Design operations in accordance with Turkish Civil Aviation Authority rules and data-privacy legislation.
Scalability	*MET*	Create a modular system architecture adaptable for disaster-relief and humanitarian missions.
Sustainability	*MET*	Cut carbon emissions by ***40 %*** compared with ground-vehicle delivery.
User Integration	*MET*	Provide hospitals and pharmacies with live-tracking dashboards and automatic delivery confirmation
Continuous Improvement	*MET*	Use pilot-phase feedback to refine drone routing and system reliability.

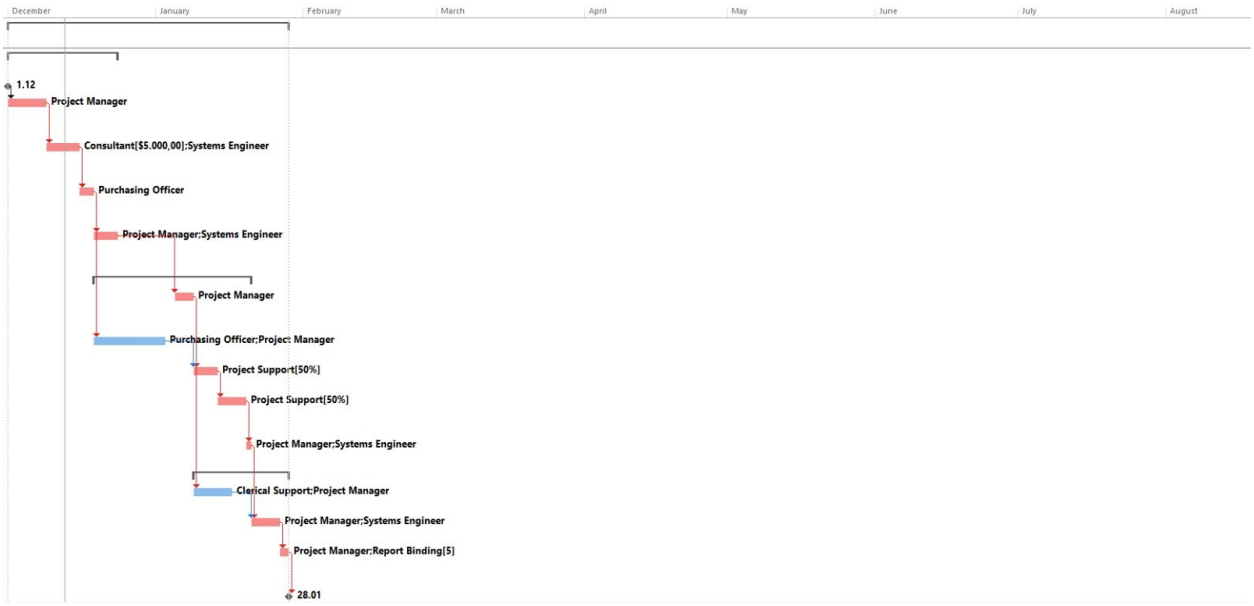
1.4. Schedule

1.4.1.

Milestone	Scheduled Completion Date	Actual Completion Date	Variance Explanation	Change Request #
Charter Completed	Mon 1.12.25	Mon 1.12.25	N/A	N/A
Project Kick-off	Mon 1.12.25	Mon 1.12.25	N/A	N/A
Requirements Phase	Tue 23.12.25	Thu 25.12.25	**Delay of 2 days:** Extra consultation with the External Consultant was	N/A

			required to finalize and approve the Technical Specification.	
Development Phase	Thu 8.01.26	Fri 9.01.26	**Delay of 1 day:** Late submission of final quotes from suppliers (Task 11) delayed the start of the final estimation process.	N/A
Testing Phase	Tue 20.01.26	Tue 20.01.26	N/A	N/A
Deploy to Production	Wed 28.01.26	Wed 28.01.26	N/A	N/A
Project Close	Wed 28.01.26	Wed 28.01.26	N/A	N/A

1.4.2 Gantt Chart



1.5. Resources

1.5.1. Capital Requirements

Capital Requirements:

- Drone components, GPS modules, and sensors – US $ 5 000
- Communication & tracking systems – US $ 2 000
- Software licenses – US $ 1 500
- Testing & maintenance equipment – US $ 1 000
- Training & permits – US $ 500

→ ***Total Estimated Budget***: ≈ US $ 10 000

1.5.2. Human Resources:

- Project Manager: coordination, scheduling, reporting (1 personnel)
- Drone engineers: hardware design, propulsion, assembly (2 personnel)
- Software developer: AI navigation and tracking system (1 personnel)
- Data analyst: risk analysis, performance metrics (1 personnel)
- Tester: flight validation and QA (1 personnel)

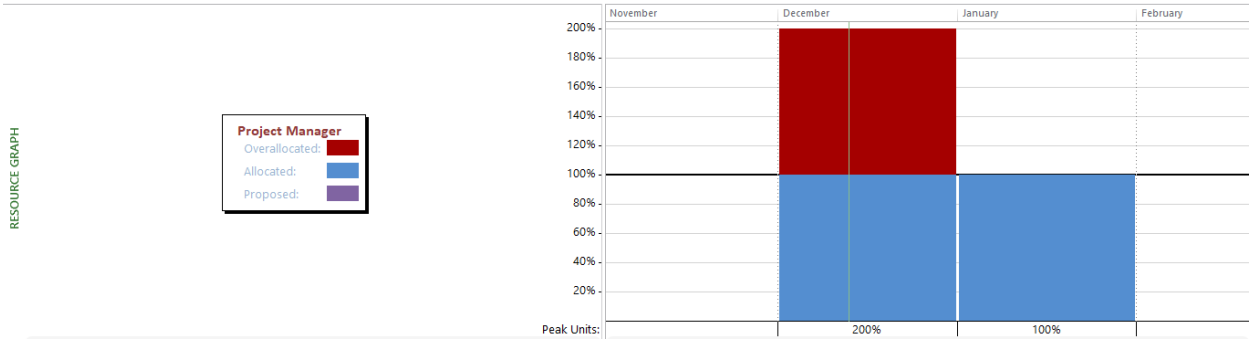
1.5.3 Resources Assigned to Tasks

ID	Task Name	Resources
4	Determine Installation Requirement	Project Manager
5	Ctreate Technical Specification	Systems Engineer, Consultant
6	Identify Supplier Components	Purchasing Officer
7	Validate Technical Specification	Project Manager, Systems Engineer
9	Document Delivery Methodology	Project Manager
10	Obtain Quotes from Suppliers	Project Manager, Purchasing Officer
11	Calculate the Bid Estimate	Project Support
12	Create the Project Schedule	Project Support
13	Review the Delivery Plan	Project Manager, Systems Engineer
15	Create Draft of Bid Document	Project Manager, Clerical Support
16	Review Bid Document	Project Manager, Systems Engineer
17	Finalize and Submit Bid Document	Project Manager, Report Binding

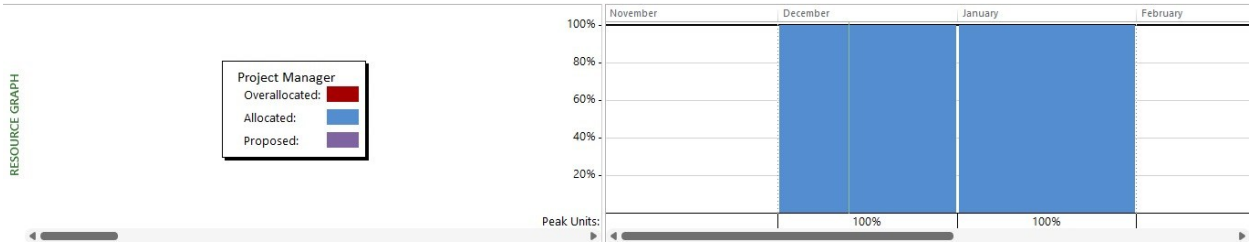
1.5.4. Resource Sheet

	Resource Name	Type	Material	Initials	Group	Max.	Std. Rate	Ovt.	Cost/Use	Accrue	Base
	Group: Contractor				**Contractc**					**Prorated**	
6	Consultant	Cost		con	Contractc					Prorated	
	Group: Field				**Field**	**50%**			**$0,00**	**Prorated**	
3	Project Support	Work		PS	Field	50%	$25,00/hr	$50,00/hr	$0,00	Prorated	Standard
	Group: Material				**Material**				**$0,00**	**Prorated**	
7	Report Binding	Material		bnd	Material		$8,00		$0,00	Prorated	
	Group: office				**office**	**400%**			**$0,00**		
1	Project Manager	Work		PM	office	100%	$45,00/hr	$90,00/hr	$0,00	Prorated	Standard
2	Systems Engineer	Work		SE	Office	100%	$30,00/hr	$60,00/hr	$0,00	Prorated	Standard
4	Purchasing Officer	Work		PO	Office	100%	$0,00/hr	$0,00/hr	$0,00	Prorated	Standard
5	Clerical Support	Work		sec	Office	100%	$0,00/hr	$0,00/hr	$0,00	Prorated	Standard

1.5.5 Resource Usage



1.5.6. Resource Leveling



1.5.7. Detailed Budget Information

Original Approved	Latest Approved	Final	Variance ($/%)	Comments
$10.000,00	$10.000,00	$10.500,00	$500,00 / %5,0	The total cost exceeded the budget by 5% due to unexpected overtime during the Planning and Bid

				Preparation phases. No formal budget revision was made.

1.6. Stakeholders

- Project Team (Group 8) – primary executors
- Hospitals & Clinics – operational users
- Emergency Services & Health Ministry – regulatory partners
- Local Authorities – flight-zone permits
- Citizens & Patients – beneficiaries
- Course Instructor – academic supervisor and project sponsor

1.7. Risk Management Plans

In order to reduce their impact, the project team has identified a number of potential hazards and developed appropriate mitigation procedures.

To guarantee a safe recovery, a fail-safe "return to home" protocol should be put in place.

• A drone crash due to adverse weather conditions poses a high impact risk. To mitigate this, the system will integrate a real-time weather API and restrict flight operations under unsafe conditions.

• A loss of GPS signal is also considered a high-impact risk. The mitigation strategy includes utilizing an Inertial Measurement Unit (IMU) as a backup and implementing a fail-safe “return to home” protocol to ensure safe recovery.

• A battery failure represents a medium-impact risk. To manage this, the system will continuously monitor power status and maintain redundant battery cells for reliability.

• Regulatory delays have been assessed as a medium-impact risk. This will be mitigated by applying for required permits early and maintaining active communication with the relevant aviation authorities.

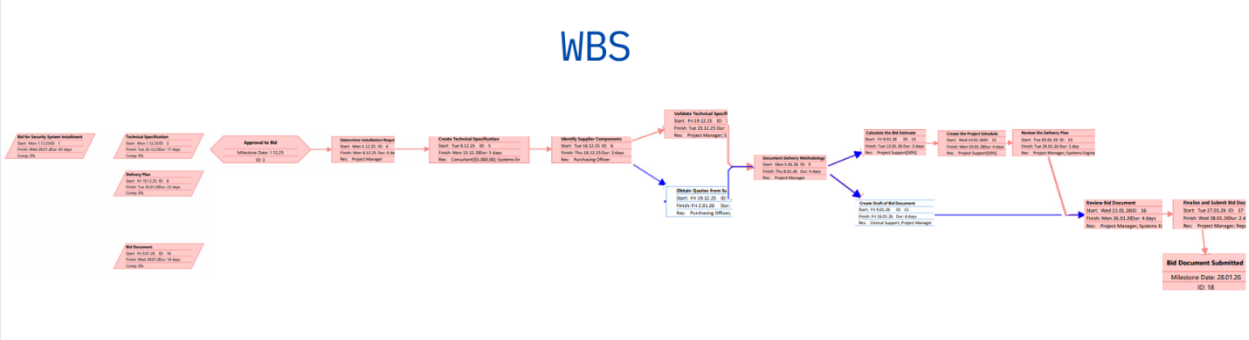
• A data security breach is another medium-impact concern. To prevent this, all communication channels will be encrypted, and user access rights will be limited according to operational needs.

• Finally, a budget overrun presents a low-impact risk. This will be mitigated by prioritizing essential hardware acquisitions and seeking sponsorships or alternative funding sources where possible.

1.8. Evaluation Methods

- Performance Tracking: Earned Value (EV) analysis for schedule and cost variance.
- Testing Metrics: Flight success rate, delivery time, and payload accuracy.
- Milestone Reviews: Weekly progress meetings and advisor approval checkpoints.
- Stakeholder Feedback: Survey data from hospitals after pilot runs.
- Post-Project Evaluation: Lessons-learned report and recommendations for future implementation.

SECTION 2 - WORK BREAKDOWN STRUCTURE (WBS)



SECTION 3 – PROJECT CLOSURE CHECKLIST

Project Achievement and Impact

The "Emergency Drone Delivery for Medical Supplies" project successfully defined a robust framework for transforming critical medical logistics. The project's core purpose was to leverage autonomous Unmanned Aerial Vehicles (UAVs) to ensure the rapid and reliable transport of lifesaving items, such as blood units, vaccines, and medication, bypassing the conventional limitations of ground transport, particularly during emergencies and disasters.

Objectives Met

The project charter established clear, measurable objectives that guided the design and development phases:

Performance & Speed: The system is designed to achieve drone deliveries within 15 minutes for distances below 10 km.

Safety & Reliability: A high safety standard is upheld by targeting at least 95% successful flights through the integration of real-time monitoring and obstacle-avoidance Artificial Intelligence (AI). Mitigation strategies, including an Inertial Measurement Unit (IMU) for GPS loss and a real-time weather API, ensure operational resilience.

Sustainability: The project aligns with green mobility initiatives by aiming to cut carbon emissions by 40% compared with traditional ground-vehicle delivery.

Compliance: Operations are planned in full accordance with the regulations of the Turkish Civil Aviation Authority.

Final Outlook and Future Implementation

Completed within the scheduled timeframe (November 2025 to June 2026) and operating within the defined US $10,000 budget, the project has established a strong foundation for future implementation.

Crucially, the development of a modular system architecture ensures that the solution is scalable and highly adaptable for broader applications, specifically including disaster-relief and humanitarian missions. The final deployment and evaluation phase, which includes pilot deliveries and the collection of stakeholder feedback from hospitals, will be critical for achieving continuous improvement in drone routing and system reliability.

Conclusion

In summary, this project represents not only a successful academic exercise in project management but also a viable, innovative model for creating a more responsive, efficient, and environmentally sustainable healthcare delivery system. The findings and recommendations documented in the final Lessons-Learned Report will serve as a definitive guide for future research and full-scale deployment.

SECTION 4 - RACI CHART

Task	**Responsible**	**Accountable**	**Consulted**	**Informed**
Technical Specification	Systems Engineer	Project Manager	Consultant	Purchasing Officer
Determine Installation	Project Manager	Sponsor/Client	Systems Engineer	Purchasing Officer
Identify Supplier Components	Purchasing Officer	Project Manager	Systems Engineer	Project Support
Obtain Quotes from Suppliers	Purchasing Officer	Project Manager	Project Support	Systems Engineer
Calculate the Bid Estimate	Project Manager; Project Support	Sponsor/Client	Purchasing Officer	Systems Engineer
Create Draft of Bid Document	Clerical Support	Project Manager	Systems Engineer; Project Support	Purchasing Officer
Finalize and Submit Bid Document	Project Manager; Report Binding	Sponsor/Client	Systems Engineer	Clerical Support