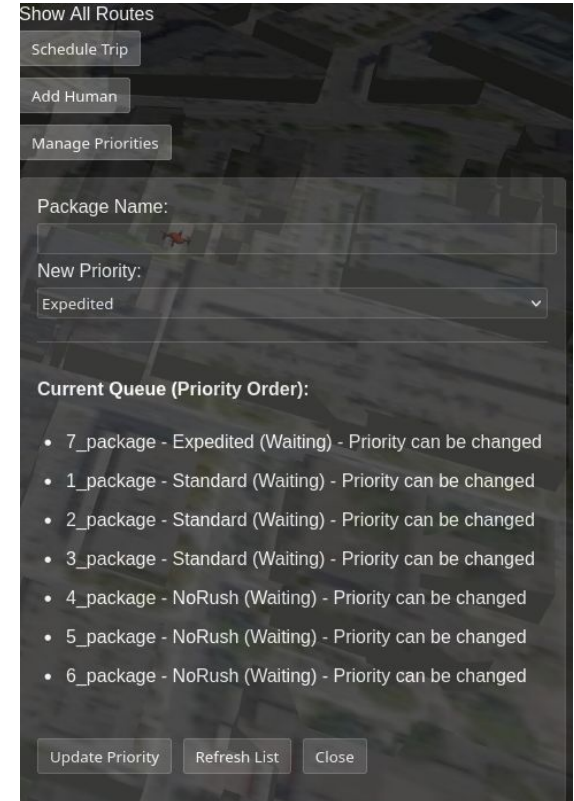


Drone Simulation

Team 001-041

Priority Shipping

- Gives packages different priority states
- Orders them from highest priority to lowest in the delivery queue.
- Can change priority of packages in certain conditions.



The screenshot shows a software interface for managing shipping priorities. At the top, there are four buttons: 'Show All Routes', 'Schedule Trip', 'Add Human', and 'Manage Priorities'. Below these is a form with two input fields: 'Package Name:' and 'New Priority:'. The 'New Priority:' field is a dropdown menu currently showing 'Expedited'. Below the form is a section titled 'Current Queue (Priority Order):' which contains a list of seven items. Each item consists of a package ID, a priority level, a status, and a note that the priority can be changed. At the bottom of the interface are three buttons: 'Update Priority', 'Refresh List', and 'Close'.

Show All Routes

Schedule Trip

Add Human

Manage Priorities

Package Name:

New Priority:

Expedited

Current Queue (Priority Order):

- 7_package - Expedited (Waiting) - Priority can be changed
- 1_package - Standard (Waiting) - Priority can be changed
- 2_package - Standard (Waiting) - Priority can be changed
- 3_package - Standard (Waiting) - Priority can be changed
- 4_package - NoRush (Waiting) - Priority can be changed
- 5_package - NoRush (Waiting) - Priority can be changed
- 6_package - NoRush (Waiting) - Priority can be changed

Update Priority Refresh List Close

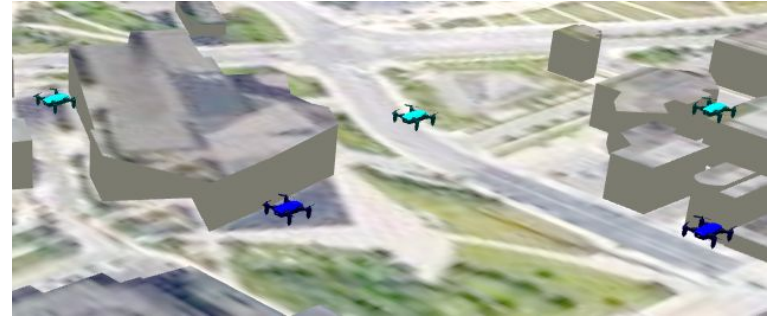
Air Traffic Control

- Singleton: ATC tower
 - Invisible
 - Tracks all flying entities
 - Calls the reroute function of flying entities that are about to collide
- Decorator: Flying Entities
 - All flying entities are wrapped with an ATC decorator which adds the rerouting behavior
- Object: Airplane
 - Created using abstract factory pattern
 - Fly randomly from the edges of the map
 - ATC reroutes them to avoid collision



Multi-Drone Coordination

- Introduces a collaborative drone environment with increased reliability and autonomous fleet behavior.
 - Adds LeaderDrones with Battery (Blue)
 - Adds HelperDrones (Cyan)
 - Adds ChargingStation
- Observer Design Pattern
 - Leader Drones Publishers
 - Helper Drones Observers (Subscribers)



Data Collection Manager

Data Collection Manager Singleton

- Data logging singleton class for centralized collection of IEntity metrics

Why is this new feature important?

- Enables all IEntity types to log metrics
- Supports system debugging and analysis

Design Pattern: Singleton & Observer:

- Ensures a single access point to the DCM
- Helps to manage resources effectively
- Observer pattern integration enables DCM to notify frontend

EntityLog_1746898084

EntityName	EntityID	MetricName	MetricValue
LeaderDrone1	0	collision_unavoidable	964
LeaderDrone1	0	distance_traveled	3.18836E+07
LeaderDrone1	0	handoff_requests	1
LeaderDrone1	0	potential_collisions	1089
LeaderDrone1	0	timesteps_of_entity	13458
LeaderDrone2	3	collision_unavoidable	427
LeaderDrone2	3	distance_traveled	2.72688E+07
LeaderDrone2	3	packages_delivered	1
LeaderDrone2	3	potential_collisions	1037
LeaderDrone2	3	reroute_count	44
LeaderDrone2	3	timesteps_of_entity	14448
LeaderDrone3	6	collision_unavoidable	56
LeaderDrone3	6	distance_traveled	3.16634E+07
LeaderDrone3	6	handoff_requests	1
LeaderDrone3	6	potential_collisions	948
LeaderDrone3	6	reroute_count	111
LeaderDrone3	6	timesteps_of_entity	14180
HelperDrone1	9	distance_traveled	1.09021E+07
HelperDrone1	9	potential_collisions	26
HelperDrone1	9	reroute_count	6
HelperDrone1	9	timesteps_of_entity	16721
HelperDrone2	12	collision_unavoidable	48
HelperDrone2	12	distance_traveled	9.90857E+06
HelperDrone2	12	potential_collisions	53
HelperDrone2	12	reroute_count	3
HelperDrone2	12	timesteps_of_entity	16671
HelperDrone3	15	distance_traveled	2.2315E+07
HelperDrone3	15	handoff_accepts	1
HelperDrone3	15	packages_delivered	1
HelperDrone3	15	potential_collisions	271
HelperDrone3	15	reroute_count	48
HelperDrone3	15	timesteps_of_entity	16171
HelperDrone4	18	distance_traveled	1.94788E+07
HelperDrone4	18	handoff_accepts	1
HelperDrone4	18	packages_delivered	1
HelperDrone4	18	potential_collisions	10
HelperDrone4	18	reroute_count	10
HelperDrone4	18	timesteps_of_entity	16678
Human-OG	21	distance_traveled	4.28835E+07
Human-OG	21	timesteps_of_entity	16784
Human-OG	21	visited_heller	1
Helicopter	22	distance_traveled	1.31843E+07
Helicopter	22	miles_traveled	12
Helicopter	22	timesteps_of_entity	16784
charging_station	24	timesteps_of_entity	16784
Airplane-1	25	distance_traveled	9.37328E+08
Airplane-1	25	potential_collisions	9
Airplane-1	25	reached_dest	33
Airplane-1	25	timesteps_of_entity	15619
Airplane-2	27	distance_traveled	9.94618E+08
Airplane-2	27	potential_collisions	9
Airplane-2	27	reached_dest	31
Airplane-2	27	reroute_count	9
Airplane-2	27	timesteps_of_entity	16784
a_package	29	timesteps_of_entity	9333
a	30	timesteps_of_entity	9333
b_package	31	timesteps_of_entity	8427
b	32	timesteps_of_entity	8427
c_package	33	timesteps_of_entity	7493
c	34	timesteps_of_entity	7493