

1.1 Range of Requirements

Functional Requirements:

- Be a REST-based service running in a docker container
- Receive dynamic data (available drones, drone capabilities, service points, no-fly zones) from the ILP REST service
- Get the URL for the ILP REST service from an environment variable
- Validate orders against drone capabilities (cooling/heating, capacity, maxCost)
- Assign available drone from service points
- Compute 2D flight paths using longitude and latitude coordinates and an appropriate drone(s)
- Ensure flight paths start and end at the same service point
- Ensure drones only move in 16 directions (0°, 22.5°, 45°, 67.5°, 90°, 112.5°, 135°, 157.5°, 180°, 202.5°, 225°, 247.5°, 270°, 292.5°, 315°, 337.5°) where 0° is East
- Ensure each movement step is 0.00015 degrees
- Ensure drones avoid no fly-zones, including corner cutting
- Support multiple drop-off points per delivery
- Minimise number of drones used, moves and total cost
- Return results as JSON
- Return appropriate HTTP status codes

Measurable Requirements:

- All tasks should complete within 30 seconds
- Destination should be considered reached if the drone is within 0.00015 degrees
- Drone movements should be straight-line of length 0.00015
- Total cost should be calculated as $\text{costInitial} + (\text{moves} \times \text{costPerMove}) + \text{costFinal}$
- Listen on the expected port

Qualitative Requirements:

- Code should be well-structured, readable and understandable by future developers
- Code should be robust and not crash due to invalid input or runtime errors
- Valid HTTP response should always be returned
- Exceptions should be handled gracefully