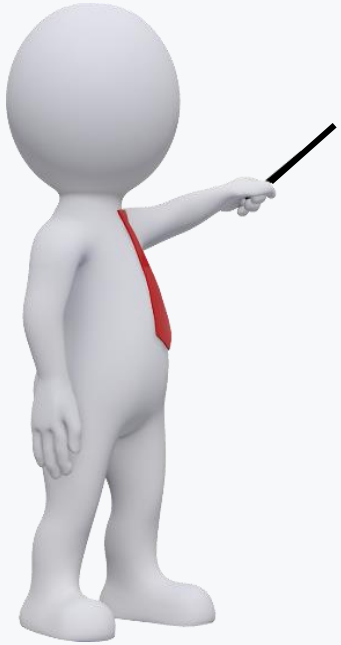
DRONE OPERATION COURSE FOR CARGO AND PEOPLE TRANSPORT

PRACTICAL PLANNING EXERCISE

MISSION REVIEW

SCENARIO

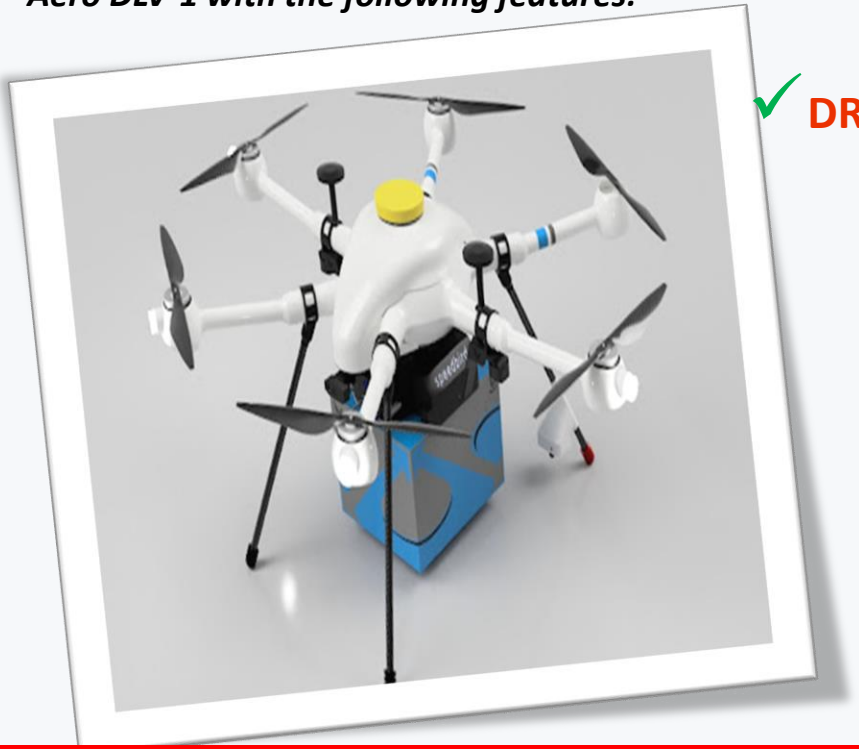
You are the head of operations of "DRONES TRANSPORTE VIP", a company specialized in urgent deliveries using cargo drones in Buenos Aires. You have been tasked with planning a critical delivery mission using the SpeedBird Aero DLV-1 with the following features:



- ✓ **MISSION:** Urgent delivery of medical supplies.
- ✓ **ORIGIN:** Distribution center in Puerto Madero – Juana Manso 1151, Autonomous City of Buenos Aires – (Coordinates: 34°36'51.52"S - 58°21'47.54"W).
- ✓ **DESTINY:** Fundación Favaloro Buenos Aires – Avenida Belgrano 1746, Ciudad Autónoma de Buenos Aires - (Coordinates: 34°36'50.57"S, 58°23'27.58"W).
- ✓ **APPROXIMATE LINEAR DISTANCE:** 2.6 km
- ✓ **MISSION TIME:** 10:00 a.m. (local time)
- ✓ **WEATHER CONDITIONS:** Clear skies, easterly winds at 12 kts (22.2 km/h), occasional gusts of 18 kts (33.3 km/h), temperature of 24°C

SCENARIO

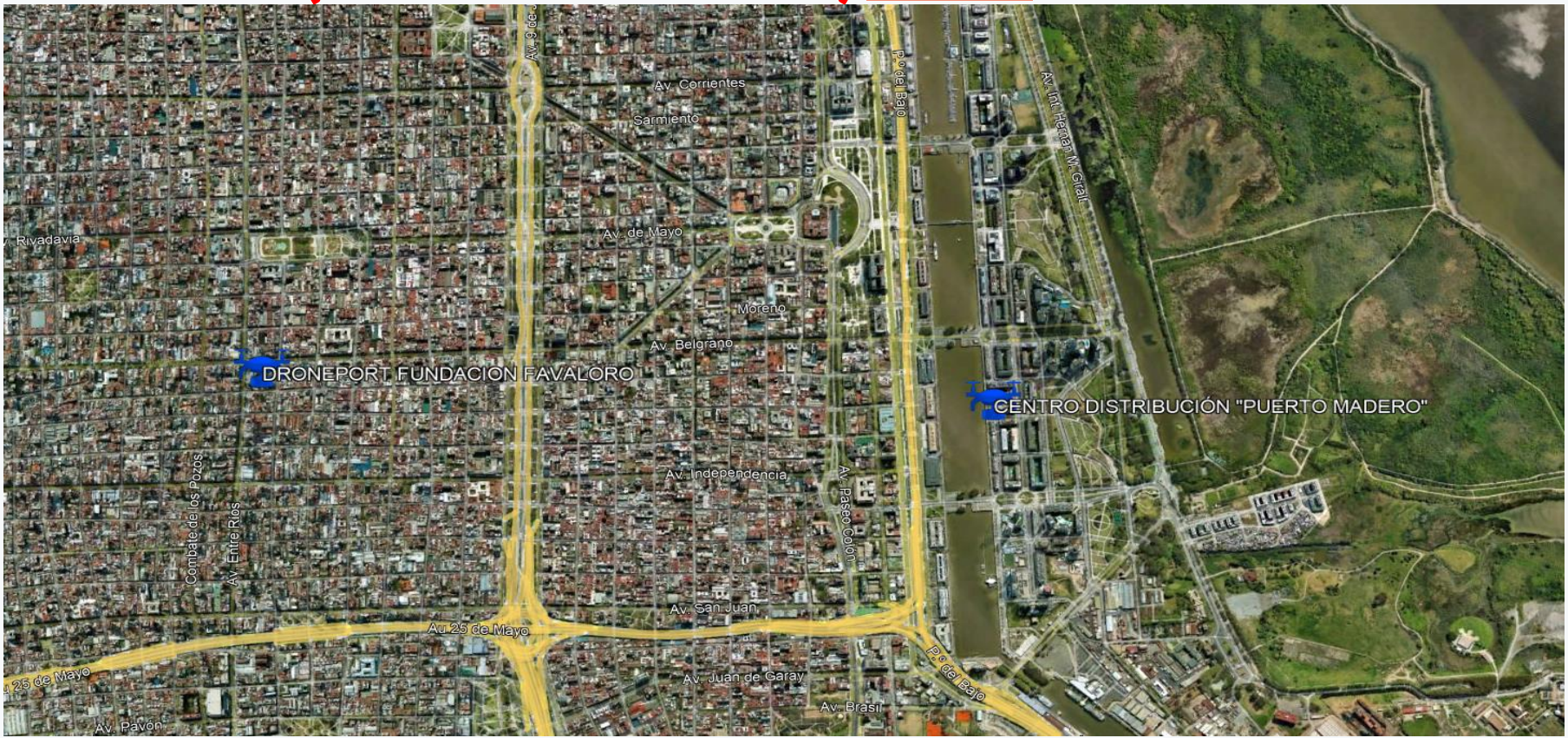
You are the head of operations of "DRONES TRANSPORTE VIP", a company specialized in urgent deliveries using cargo drones in Buenos Aires. You have been tasked with planning a critical delivery mission using the SpeedBird Aero DLV-1 with the following features:



DRON: SPEEDBIRD AERO DLV-1

- Maximum wind for operation: 16 kts (29.6 km/h)
- Gust limit: 25 kts (46.3 km/h)
- Maximum take-off weight: 13.25 kg
- Empty weight: 10.75 kg
- Maximum Loading Weight: 2.5 kg
- Cruising speed: 50 km/h
- Maximum range: 8 km in one direction, 4 km in two directions

MISSION (ZENITHAL VIEW)



EXERCISE

Using the information provided and the "CHECKLIST GUIDE FOR PLANNING AND EXECUTION OF TRANSPORT DRONE MISSIONS", develop a detailed flight plan that addresses the following aspects:

1. Initial assessment and risk analysis
2. Route planning, considering airspace and obstacles in Buenos Aires
3. Population density analysis and necessary route adjustments
4. Communications and redundancy plan
5. Specific considerations of the urban environment of Buenos Aires
6. Emergency Procedures
7. Regulatory compliance and documentation.

Present your plan in the form of a report, justifying each decision based on the information provided in the reference documents and the specific characteristics of Buenos Aires and the SpeedBird Aero DLV-1.

RESOLUTION OF THE EXERCISE

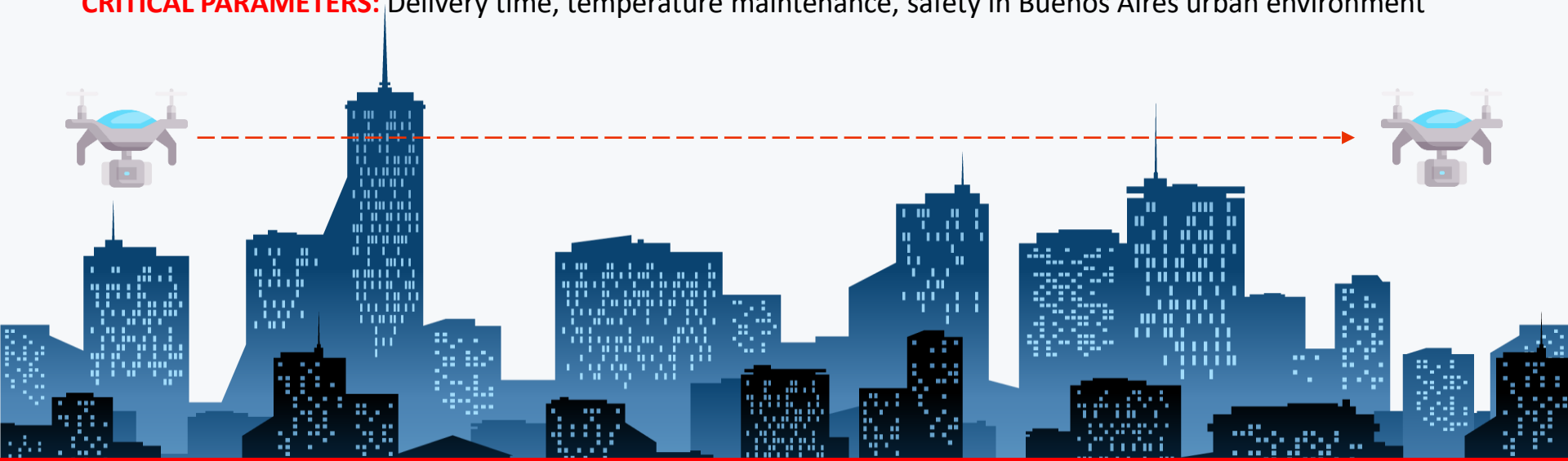
1. INITIAL EVALUATION AND RISK ANALYSIS

MISSION DEFINITION:

TYPE: Urgent delivery of medical supplies in Buenos Aires

OBJECTIVE: Transport 2 kg of temperature-sensitive medical supplies from Puerto Madero to the Favaloro Foundation.

CRITICAL PARAMETERS: Delivery time, temperature maintenance, safety in Buenos Aires urban environment



1. INITIAL EVALUATION AND RISK ANALYSIS

PRELIMINARY RISK ANALYSIS:

FLIGHT IN URBAN ENVIRONMENT: Densely populated Microcentro of the Autonomous City of Buenos Aires

LOAD: Temperature sensitive

WIND CONDITIONS: within the operational limits of DLV-1, but with significant bursts

POSSIBLE INTERFERENCE: in communications due to the urban environment and tall buildings

RISK OF COLLISION: with obstacles (skyscrapers, antennas, other aircraft)

AREA FLYBY with high pedestrian and vehicular activity

1. INITIAL EVALUATION AND RISK ANALYSIS

RISK MITIGATION MATRIX:

URBAN ENVIRONMENT: Plan optimal route avoiding more densely populated areas and considering city parks

SENSITIVE CARGO: Use lightweight insulated container to maintain temperature without exceeding the load limit

WIND: Continuous monitoring and possible route adjustment if gusts intensify

INTERFERENCE: Implement redundant communication systems considering the infrastructure of Buenos Aires

COLLISIONS: Use DLV-1 collision avoidance system and plan route with vertical safety margin

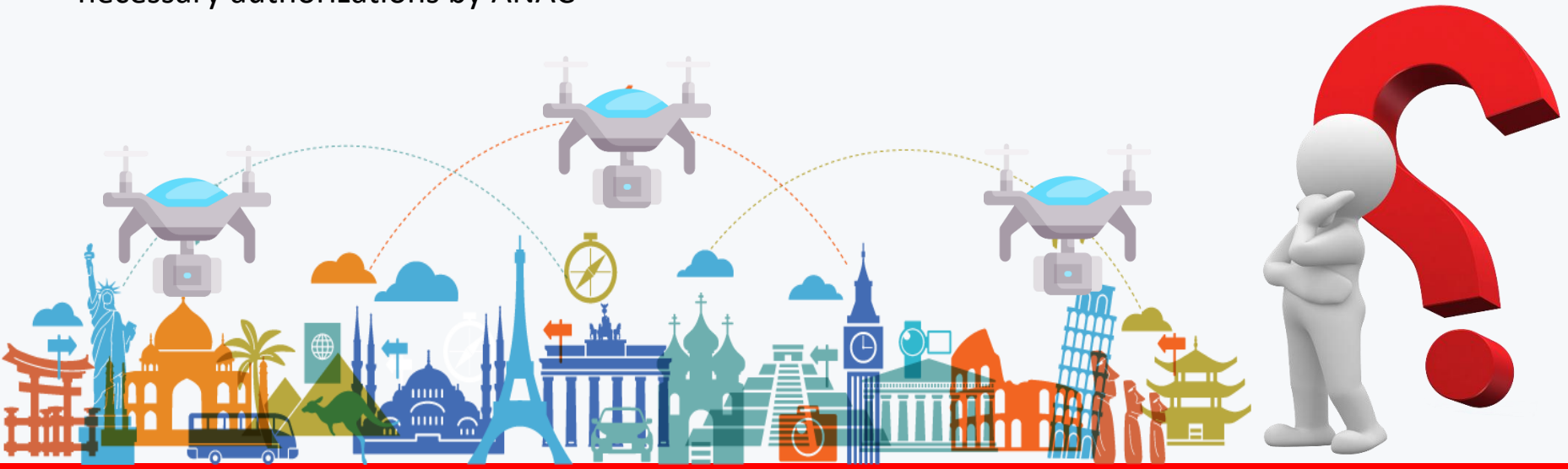
TRAFFIC: Schedule your flight outside of rush hour ground traffic

1. INITIAL EVALUATION AND RISK ANALYSIS

GO/NO-GO EVALUATION:

GO: Weather conditions within operational limits of the DLV-1, systems working correctly, route planned and approved by aviation authorities

NO-GO: Worsening weather conditions (especially wind), failure of critical drone systems, denial of necessary authorizations by ANAC



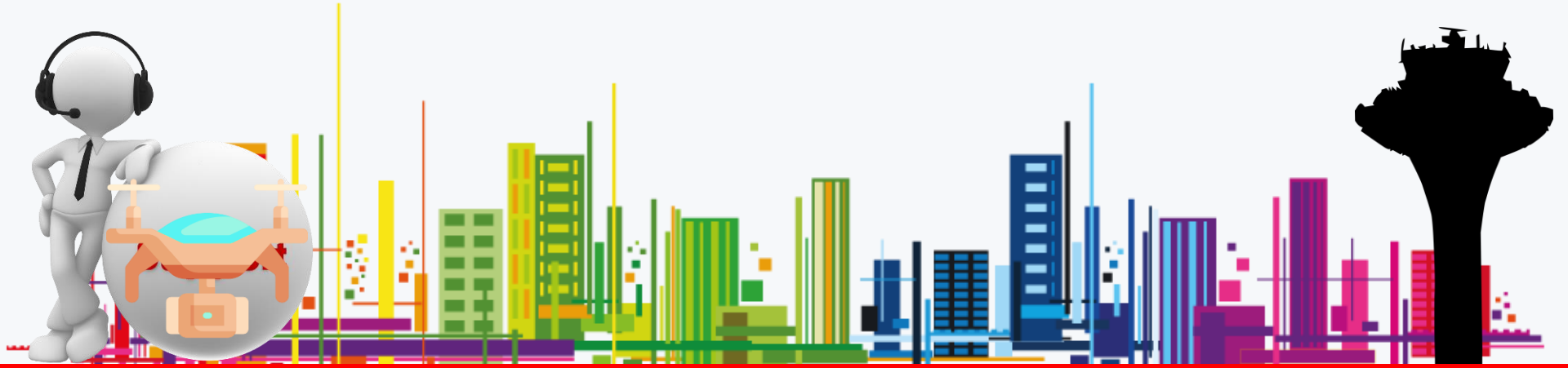
2. ROUTE PLANNING

ANALYSIS OF THE AIRSPACE:

VERIFY NOTAMS: for the area of operation in Buenos Aires, especially near the Jorge Newbery Airport

COORDINATE WITH CONTROL TOWER: of Aeroparque Jorge Newbery for route approval

IDENTIFY RESTRICTED AREAS: such as the Casa Rosada and government buildings along the way



2. ROUTE PLANNING

ROUTE PLANNING:

PRIMARY ROUTE: From the "Puerto Madero" Distribution Center, continue north on Juana Manso Avenue to Azucena Villaflor Boulevard and turn west continuing along Belgrano Avenue to the Favaloro Foundation.

ALTERNATIVE ROUTE: From the "Puerto Madero" Distribution Center, continue south along Juana Manso Avenue to Rosario Vera Peñalosa Street. Then Paseo del Bajo, Av Independencia to Av Entre Rios

DECISION POINTS: Establish points at main intersections (e.g. Av. 9 de Julio) to evaluate continuation or activation of alternative route

2. ROUTE PLANNING

PRIMARY ROUTE SECONDARY ROUTE DECISION POINTS

2. ROUTE PLANNING

OBSTACLE ANALYSIS:

USE DATA: of the City of Buenos Aires to identify tall buildings in Puerto Madero, Microcentro and Balvanera

PLAN FLIGHT HEIGHT: considering the skyscrapers of Puerto Madero and microcentro buildings + the safety margin

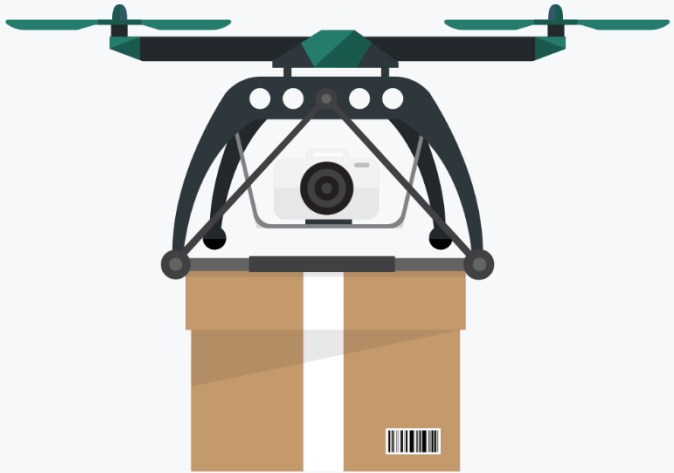
2. ROUTE PLANNING

ENERGY MANAGEMENT PLAN:

CALCULATE ESTIMATED CONSUMPTION: 3.6 km one way + 3.6 km return = 7.2 km total

POWER RESERVE: 5% of total capacity (0.4 km additional) = 7.6 km

TOTAL REQUIRED: 7.6 km, below the maximum range of the DLV-1 in one direction (8 km)



2. ROUTE PLANNING

WEATHER ANALYSIS:

CURRENT CONDITIONS: Collect data from nearby weather stations

PROGNOSIS: Check trends for the next 3 hours

URBAN CANYONS: Identify areas of potential turbulence between buildings

3. OPERATIONAL SAFETY MANAGEMENT

EMERGENCY RESPONSE PLAN:

ENGINE FAILURE: Establish specific procedures for each phase of the flight.

LOSS OF COMMUNICATION: Define times and actions for each scenario.

MEDICAL EMERGENCIES: Coordinate with emergency ground services.

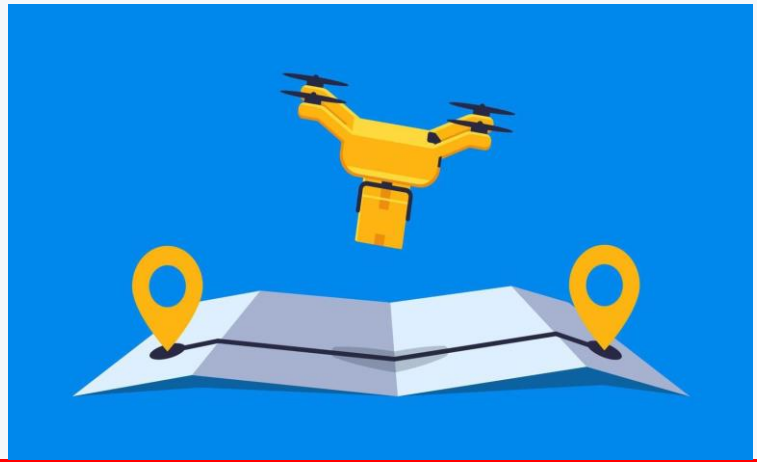
3. OPERATIONAL SAFETY MANAGEMENT

IDENTIFICATION OF SAFE ZONES

ZONE MAPPING: Create list of landing points with exact coordinates.

ACCESS ASSESSMENT: Verify access routes for emergency teams.

NEARBY OBSTACLES: Document obstacles and restrictions for each zone.



3. OPERATIONAL SAFETY MANAGEMENT

OPERATOR FATIGUE ANALYSIS

CURRENT STATUS: Check rest hours and pilot status

WORKING CONDITIONS: Evaluate Control Center Environment

REPLACEMENT PLAN: Establish respite schedules and procedures if necessary

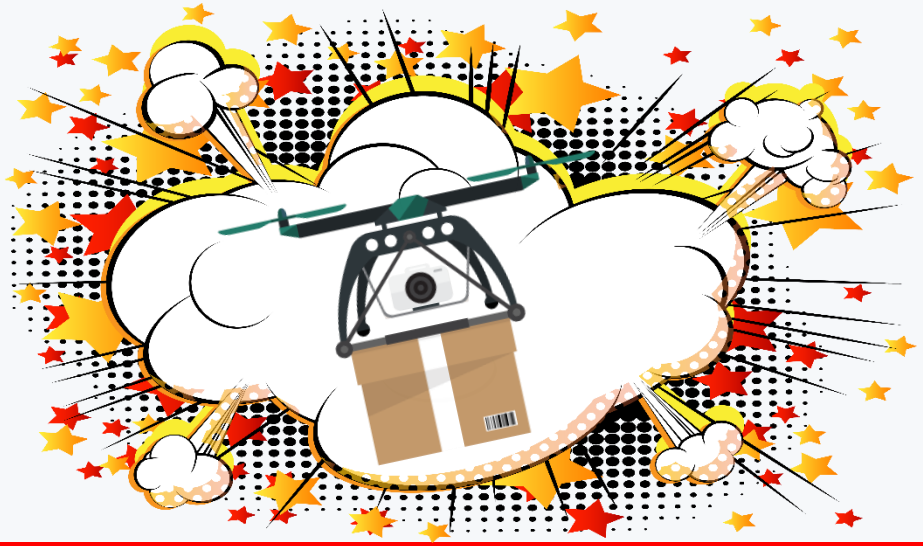
3. OPERATIONAL SAFETY MANAGEMENT

REVIEW OF PREVIOUS INCIDENTS:

HISTORICAL ANALYSIS: Review similar trades in the last 3 months

LESSONS LEARNED: Document adaptations based on previous experience

IMPLEMENTED IMPROVEMENTS: Verify the effectiveness of previous corrective measures



4. POPULATION DENSITY ANALYSIS

DENSITY MAPPING

USE DATA: of the Government of the City of Buenos Aires to identify areas of high, medium and low density on the route

CONSIDER HIGH DENSITY in Puerto Madero, Microcentro and surroundings of the Favaloro Foundation

4. POPULATION DENSITY ANALYSIS

ROUTE ADJUSTMENT

PRIORITIZE FLIGHT: on wide avenues such as Av Independencia and Av Belgrano.

AVOID OVERFLIGHT: direct from Plazas and other areas of high pedestrian concentration

SPECIAL EVENT ANALYSIS:

VERIFY THE EXISTENCE OF SCHEDULED EVENTS (MARCHES, RALLIES, PROTESTS, ROADBLOCKS): especially in Plaza de Mayo, Obelisk or areas near the route.

4. POPULATION DENSITY ANALYSIS

DENSITY HAZARD MITIGATION PLAN

SET SPECIFIC HEIGHT LEVELS: seeking to increase the height in the densest areas.

IMPLEMENT SPEED ADJUSTMENTS: Reducción en áreas críticas.

MAINTAIN SAFETY DISTANCES: horizontal of buildings and vertical in denser areas.

ENABLE BYPASS PROTOCOLS: Predefined alternative routes in case of unforeseen concentrations

COORDINATE WITH AUTHORITIES: Direct communication with traffic control and local security.

5. COMMUNICATIONS PLAN

COVERAGE MAP

IDENTIFY 4G/5G COVERAGE ZONES: along the route, considering possible interference from tall buildings

MAPPING POINTS of possible electromagnetic interference, especially in the microcenter area.

5. COMMUNICATIONS PLAN

LINK LOSS PROTOCOL:

ACTIVATION OF RTH (RETURN TO HOME) MODE if the loss persists for longer than the time established in the operations manual.

AUTO-LANDING: at the nearest safe point if the loss persists for longer than stated in the operations manual.

5. COMMUNICATIONS PLAN

CYBERSECURITY PLAN

IMPLEMENT ENCRYPTION PROTOCOLS: for control and telemetry links

SET UP TWO-FACTOR AUTHENTICATION: For access to the mission planning and control system

KEEP FIREWALLS ACTIVE: Configure specific rules for DLV-1 communications

RUN INTRUSION MONITORING: for interference detection or unauthorized access attempts

6. CONSIDERATIONS OF THE URBAN ENVIRONMENT OF BUENOS AIRES

PLAN ROUTE: considering the effect of urban canyons on avenues such as Belgrano Avenue, Independencia and 9 de Julio

IDENTIFY ZONES: of possible turbulence due to the configuration of tall buildings in Puerto Madero and Microcentro

ESTABLISH SPECIFIC PROCEDURES: for takeoff in Puerto Madero and landing in the area of the Favaloro Foundation

7. EMERGENCY PROCEDURES

IDENTIFY AND MAP SAFE ZONES: for emergency landing, including parks or green spaces not used by people.

ESTABLISH COMMUNICATION PROTOCOL: with Buenos Aires emergency services in the event of an incident

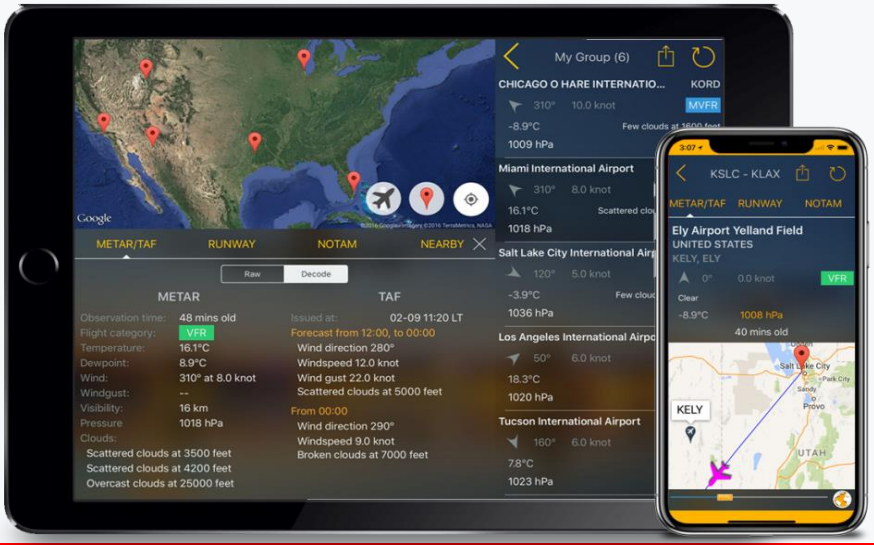
DEFINE PROCEDURES FOR DIFFERENT SCENARIOS: engine failure, loss of GPS signal, winds exceeding operating limits

8. REGULATORY COMPLIANCE AND DOCUMENTATION

VERIFY AND ENSURE COMPLIANCE WITH REGULATIONS: of the Aeronautical Authority for drone flight, especially in sensitive urban areas

OBTAIN NECESSARY AUTHORIZATIONS: for flights in controlled airspace of Buenos Aires, considering the proximity to Aeroparque

PREPARE AND REVIEW ALL REQUIRED DOCUMENTATION: UAV pilot licenses, insurance, SpeedBird Aero DLV-1 certifications



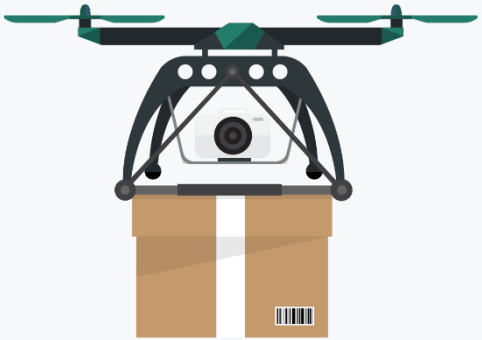
9. TECHNICAL PREPARATION OF THE DRONE

PRE-FLIGHT INSPECTION: Perform exhaustive check of the drone and systems according to checklist

SOFTWARE UPDATE: Verify and update firmware and databases

SYSTEM CONFIGURATION: Adjust drone parameters according to requirements

PAYLOAD VERIFICATION: Ensure proper installation and payload operation



10. BRIEFING AND MISSION EXECUTION

EQUIPMENT BRIEFING: Conduct a full briefing with all staff

FINAL GO/NO-GO CHECK: Confirm compliance with all mission criteria

REAL-TIME MONITORING: Establish ongoing monitoring procedures

CHANGE MANAGEMENT: Define protocols to adapt to changes during the mission

11. POST-MISSION PROCEDURE

DEBRIEFING: Perform post-flight analysis with the entire team

INCIDENT REPORTING: Document and analyze any abnormal events

RECORD UPDATE: Complete flight and maintenance logs

MISSION ASSESSMENT: Analyze compliance with objectives and lessons learned

DRONESVIP

QUESTION TIME!