FIRE FIGHT CONTROL CENTER

INTERNATIONAL ARMOUR CO ™

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Briefing on a Firefighter Control Center

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FIRE FIGHT CONTROL CENTER

The Heart of Emergency Response

The Firefighting Control Center is a critical hub of coordination and response in emergency services.

This state-of-the-art facility ensures every second counts during a fire emergency, providing firefighters with the tools and information they need to protect lives, property, and the environment effectively.

At the core of modern fire management, the control centre integrates advanced technology, real-time data, and strategic operations, making it an indispensable asset in firefighting efforts.

The Functionality of a Firefighting Control Center

A firefighting control center is a command and control hub where emergency operations are monitored and managed.

It is equipped with sophisticated technology to handle various aspects of fire emergency management:

Real-Time Monitoring: The control center is equipped with multiple large screens displaying live feeds from surveillance cameras, drones, and other monitoring devices. This real-time footage provides a comprehensive view of the situation, allowing for swift decision-making and resource allocation.

Advanced Communication Systems: Effective communication is paramount during emergencies. The control center utilizes high-tech communication equipment, including radios, intercoms, and satellite phones, ensuring seamless communication between firefighters on the ground and command personnel.

Data Integration and Analysis: The center integrates data from various sources, such as weather updates, geographical information systems (GIS), and building layouts. This information is crucial for predicting fire behavior, planning evacuation routes, and deploying resources efficiently.

Coordination and Resource Allocation: The control center plays a pivotal role in coordinating the response efforts of different fire units and other emergency services. It ensures that the right personnel and equipment are dispatched promptly to the right locations.

Incident Management: A digital board in the control center tracks ongoing incidents, resource deployment, and operational status. This helps in maintaining an organized approach to managing multiple emergencies simultaneously.

Real Time Monitoring | Advanced Communication Systems | Data Integration and Analysis | Coordination and Resource Allocation | Incident Management

FIRE FIGHT CONTROL CENTER

The Role of Technology

The integration of cutting-edge technology is a defining feature of modern firefighting control centers.

Drones, equipped with thermal imaging cameras, provide aerial views and help in locating hotspots that are not visible from the ground. Advanced software systems analyze real-time data, offering predictive analytics to foresee the spread of the fire and potential risks.

This technological advantage allows firefighters to stay ahead of the fire, minimizing damage and enhancing safety.

Importance of a Well-Organized Control Center

A well-organized firefighting control center is the backbone of an effective emergency response system.

It ensures that every team member is aware of their role and has access to the necessary information and tools.

The layout of the center is designed to facilitate efficient workflow and quick access to critical data.

Bright lighting, ergonomic furniture, and strategically placed equipment contribute to a focused and alert work environment, essential for managing high-stress situations.

Conclusion

In conclusion, the Firefighting Control Center is an indispensable element in the architecture of fire emergency management.

It embodies the fusion of technology, strategy, and coordination, ensuring that every fire emergency is handled with precision and efficiency. As we continue to face the challenges posed by urbanization and climate change, the importance of these control centers in safeguarding our communities cannot be overstated.

Through continuous innovation and dedication, we strive to enhance our capabilities, providing superior fire protection and emergency response services.

For more information on our firefighting control center and the services we offer, please explore our website or contact us directly. Together, we can build a safer future.

Long Range Cameras

Long Range Drones

Tethered Drones

Communication

Monitoring

Response

FIRE FIGHT CONTROL CENTER

Creating a firefight control center involves several critical components and steps to ensure effective command, control, and coordination during firefighting operations.

Here's a comprehensive guide of what is needed for the fire fighting control center:

1. Infrastructure

Building and Location:

- A secure, accessible building located strategically to provide an optimal vantage point for overseeing operations.
- Reinforced construction to ensure safety and resilience during emergencies.

Facilities:

- Command rooms equipped with advanced communication and monitoring systems.
- Conference rooms for briefings and strategy meetings.
- Secure data and server rooms.

2. Technology and Equipment

Communication Systems:

- Reliable radio communication systems with multiple channels.
- High-speed internet and secure network infrastructure.
- Satellite phones and other emergency communication devices.

Monitoring and Control Systems:

- Advanced software for real-time tracking and management of firefighting resources.
- GIS (Geographic Information System) for mapping and spatial analysis.
- Video walls and large display screens for monitoring live feeds and maps.
- Surveillance cameras, drones, and UAVs for real-time aerial views.

Data Management:

- Robust servers and data storage solutions.
- Backup power systems to ensure continuous operation.
- Cybersecurity measures to protect sensitive data.

3. Personnel

Command and Control Staff:

- Experienced command staff with expertise in firefighting operations.
- Technical support staff for managing communication and IT systems.
- GIS specialists for handling spatial data and mapping.

Operational Staff:

- Dispatchers to manage communication with field teams.
- Analysts to interpret data and provide actionable insights.
- Administrative support for logistics and documentation

4. Procedures and Protocols

Standard Operating Procedures (SOPs):

- Clearly defined SOPs for different types of firefighting scenarios.
- Emergency response protocols for coordination with other agencies.

Training Programs:

- Regular training for all staff on the latest technologies and procedures.
- Simulation exercises to prepare for various emergency situations.

Coordination Mechanisms:

- Established communication lines with local, regional, and national emergency services.
- Integration with other emergency management systems and services.

5. Logistics and Support

Resource Management:

- Inventory management system for tracking firefighting equipment and supplies.
- Fleet management system for vehicles and machinery.

Facilities Support:

- Maintenance teams to ensure all equipment and facilities are in optimal condition.
- Catering and rest areas for staff during prolonged operations.

Health and Safety:

- Medical facilities and first aid stations.
- Safety protocols to protect staff from hazards.

6. Legal and Regulatory Compliance

Licensing and Permits:

- Compliance with local, national, and international regulations.
- Necessary permits for operating communication systems and surveillance equipment.

Insurance:

- Comprehensive insurance coverage for the center, equipment, and personnel.

7. Funding and Budgeting

Financial Planning:

- Detailed budgeting for initial setup and ongoing operations.
- Funding sources, including government grants, private investments, and partnerships

Benefits of UAVs for Fire Surveillance

Early Detection and Response

UAVs equipped with thermal imaging sensors play a crucial role in the early detection of fires.

These sensors can detect abnormal heat patterns and heat sources that may be indicative of a fire starting, even in remote or inaccessible areas.

Upon detecting a potential fire, UAVs can immediately alert command centers, allowing for rapid deployment of firefighting resources.

The ability to detect fires early significantly reduces the spread and potential damage, helping to contain fires more efficiently and preventing them from becoming larger, uncontrollable blazes.

Real-Time Monitoring and Tactical Support

During a fire, UAVs provide invaluable real-time data and visuals to firefighting teams.

By streaming live video feeds, UAVs offer a bird’s-eye view of the fire, revealing its size, spread, and the effectiveness of firefighting efforts.

This aerial perspective helps commanders make informed decisions about where to deploy resources and how to approach containment.

UAVs can also identify hotspots and areas where the fire might spread next, allowing firefighters to preemptively position themselves to contain these potential threats.

Assessment and Damage Control Post-Fire

After a fire has been controlled or extinguished, UAVs continue to be a critical tool for firefighting teams.

They can be deployed to conduct thorough scans of the affected area for any remaining hotspots that could reignite.

UAVs also assist in the damage assessment process by providing detailed images and data of the affected areas, which is essential for evaluating the impact of the fire and planning recovery efforts. This post-fire surveillance ensures that all fire pockets are completely extinguished and helps in documenting the extent of the damage for insurance and investigative purposes.

Safety and Efficiency

The use of UAVs enhances the safety of firefighting personnel by reducing the need to send humans into dangerous, unstable conditions to assess or monitor fire situations.

By utilizing UAVs, firefighting teams can maintain a safe distance, yet have access to detailed, actionable data that would be risky and time-consuming to gather by traditional means.

This not only keeps firefighters safer but also improves the overall efficiency of firefighting operations, allowing teams to focus their efforts where they are most needed without unnecessary risk.

Conclusion

The integration of UAVs into fire surveillance and management systems significantly enhances the capabilities of firefighting teams, from early detection and real-time tactical support to post-fire assessment and recovery planning.

These technologies ensure faster response times, improved decision-making, enhanced firefighter safety, and ultimately, more effective fire management.

By adopting UAV technology, firefighting units can leverage these benefits to improve their operational outcomes and reduce the impact of fires on communities and the environment.

Municipality firefight control center utilizing drones UAVs (Unmanned Aerial Vehicles), and cameras

Municipality firefight control center utilizing drones UAVs (Unmanned Aerial Vehicles), and cameras

Implementing a municipality firefight control center utilizing drones, UAVs (Unmanned Aerial Vehicles), and cameras involves a multi-faceted approach that integrates advanced technology with operational strategies. Here's a comprehensive plan outlining the necessary components and steps for implementation:

1. Needs Assessment and Planning

Objective Definition: Establish the primary goals for the firefight control center, such as rapid response, real-time monitoring, early detection, and efficient resource deployment.

Stakeholder Engagement: Involve local government, fire departments, emergency services, and the community in the planning process to ensure alignment with local needs and regulations.

Feasibility Study: Conduct a feasibility study to evaluate the technological, financial, and logistical aspects of implementing the system.

2. Infrastructure and Technology

<u>**Command Center Setup**</u>

Location: Secure a central location for the firefight control center.

Facilities: Equip the center with workstations, communication systems, large display screens, and secure internet connectivity.

Software: Implement integrated software solutions for real-time data processing, mapping, and analytics.

<u>**Drone and UAV Fleet**</u>

Selection: Choose drones and UAVs suitable for firefighting operations, considering factors like flight endurance, payload capacity, and thermal imaging capabilities.

Procurement: Purchase or lease drones and UAVs, ensuring compliance with local aviation regulations.

Storage and Maintenance: Establish facilities for the storage, charging, and maintenance of the fleet.

Municipality firefight control center utilizing drones UAVs (Unmanned Aerial Vehicles), and cameras

Cameras and Sensors

Fixed Cameras: Install high-resolution cameras in strategic locations for constant monitoring.

Mobile Cameras: Equip drones with high-definition and thermal imaging cameras.

Sensors: Integrate smoke, heat, and gas sensors for early fire detection.

3. Communication and Data Management

Communication Network

Radio Communication: Ensure reliable radio communication channels for coordination among field units.

Data Transmission: Set up robust data transmission networks (4G/5G, satellite, or mesh networks) to support real-time video streaming and data sharing.

Data Management

Storage: Implement secure data storage solutions (cloud-based or on-premises) with sufficient capacity.

Processing: Use advanced data analytics tools to process and analyze incoming data.

Integration: Integrate data from various sources (drones, cameras, sensors) into a unified system for comprehensive situational awareness.

4. Operational Protocols and Training

Standard Operating Procedures (SOPs): Develop SOPs for drone deployment, data management, and emergency response.

Training Programs

Personnel Training: Train firefighting personnel in the operation of drones and UAVs, data interpretation, and new technologies.

Simulation Exercises: Conduct regular simulation exercises to ensure readiness and refine operational protocols.

Municipality firefight control center utilizing drones UAVs (Unmanned Aerial Vehicles), and cameras

Compliance and Safety

Regulatory Compliance: Ensure all operations comply with local, national, and international aviation and data privacy regulations.

Safety Protocols: Establish safety protocols for drone operations, including emergency procedures and risk mitigation strategies.

5. Implementation and Testing

Pilot Project: Start with a pilot project to test the system's effectiveness, identify potential issues, and make necessary adjustments.

Phased Rollout: Implement the system in phases, gradually expanding coverage and capabilities.

Continuous Improvement: Regularly review and update the system based on feedback and technological advancements.

6. Public Awareness and Engagement

Community Outreach: Inform the community about the benefits and operations of the firefight control center.

Feedback Mechanism: Establish channels for public feedback and incorporate it into system improvements.

7. Funding and Budgeting

Budget Planning: Develop a detailed budget covering initial setup, operational costs, maintenance, and training.

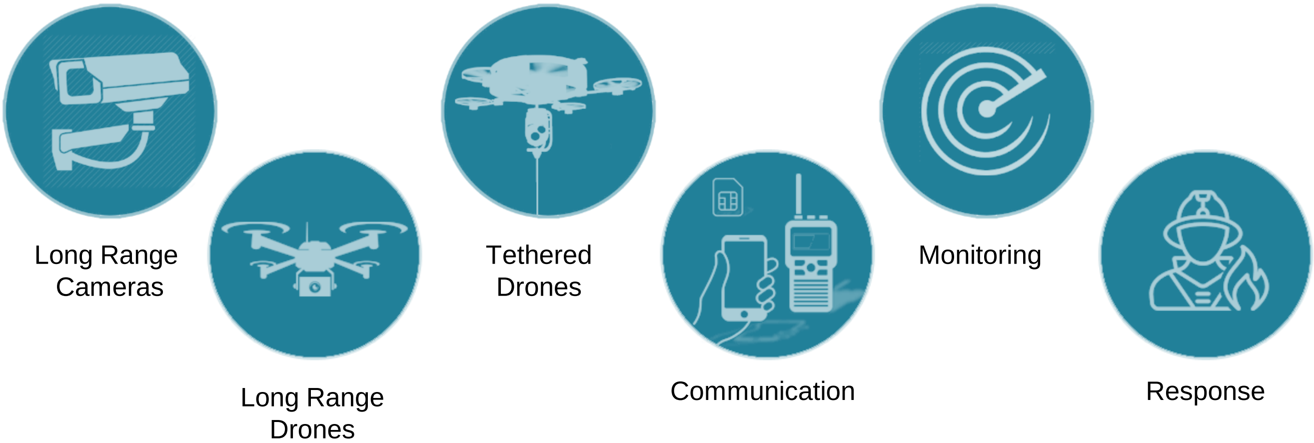
Funding Sources: Identify potential funding sources, including government grants, public-private partnerships, and municipal budgets.

Conclusion

Implementing a municipality firefight control center with drones, UAVs, and cameras requires careful planning, substantial investment, and ongoing commitment to technology and training.

By following these steps, municipalities can enhance their firefighting capabilities, improve response times, and ultimately save lives and property.

We Care & We Can



Standard Operating Procedures (SOP) for Municipality Firefight Control Center

Drones Play an Important Role in
Monitoring and Fighting

Purpose

To outline the standard operating procedures for the Municipality Firefight Control Center (MFCC) in the utilization of Unmanned Aerial Vehicles (UAVs) and cameras for efficient and effective fire management and control.

Scope

SOP applies to all personnel involved in fire detection, response, and management within the municipality.

It covers the deployment of drones and cameras from the initial detection of fire through to the resolution and debriefing stages.

1. Initial Detection and Response

1.1. Detection of Fire Event

Cameras: Continuous monitoring by strategically placed cameras in high-risk zones.

Drones: Periodic patrols by drones equipped with thermal and high-definition cameras.

Manual Reports: Reports from citizens or patrol units.

1.2. Verification of Fire Event

- Upon detection, verify the fire event through multiple sources (camera footage, drone feed, and eyewitness reports).

- Dispatch a verification drone to the reported location for real-time assessment.

2. Alert and Mobilization

2.1. Internal Alert

- Trigger internal alarms within the MFCC.

- Notify the Chief Fire Officer (CFO) and relevant fire response teams.

2.2. Public Alert

- Utilize public alert systems (sirens, social media, and local news) to inform the public of the fire event.

3. Deployment of Drones and Resources

3.1. Drone Deployment

- Deploy drones to the fire location for real-time surveillance.

- Assign specific drones for aerial overview, hotspot identification, and perimeter monitoring.

- Maintain communication between drone operators and the MFCC.

3.2. Resource Mobilization

- Dispatch fire response units to the location.

- Allocate necessary resources (fire trucks, water tenders, and medical units).

4. Coordination and Communication

4.1. Command Center Coordination

- Establish a command center at the MFCC.

- Ensure all incoming data from drones and cameras are displayed on the central monitoring system.

- Designate a communication officer to liaise with field units.

4.2. Field Communication

- Equip field units with communication devices to stay in constant contact with the MFCC.

- Use drone footage to guide field units on the safest and most effective routes.

5. Fire Suppression and Monitoring

5.1. Active Fire Suppression

- Use real-time data from drones to direct fire suppression efforts.

- Prioritize areas with high fire intensity or risk to human life and property.

5.2. Monitoring and Adjustment

- Continuously monitor the fire through drone feeds.

- Adjust firefighting strategies based on evolving fire patterns and drone data.

6. Safety and Evacuation

<u>6.1. Safety Protocols</u>

- Ensure all personnel adhere to safety protocols.

- Use drones to identify and avoid hazardous zones.

<u>6.2. Evacuation Procedures</u>

- Deploy drones to identify and guide evacuation routes.

- Coordinate with local law enforcement for the safe evacuation of affected areas.

7. Post-Fire Operations

<u>7.1. Damage Assessment</u>

- Use drones to assess the extent of the damage post-fire.

- Document all findings with high-resolution imagery and thermal scans.

<u>7.2. Debriefing and Reporting</u>

- Conduct a debriefing session with all involved personnel.

- Compile a comprehensive report detailing the fire event, response actions, and outcomes.

- Analyze drone data to improve future fire response strategies.

<u>7.3. Equipment Maintenance</u>

- Perform maintenance checks on all drones and camera equipment.

- Ensure all devices are operational for future incidents.

8. Continuous Improvement

8.1. Training and Drills

- Conduct regular training sessions for drone operators and fire response teams.

- Perform mock drills to simulate fire scenarios and test response efficiency.

8.2. Review and Update SOPs

- Regularly review and update this SOP based on feedback and technological advancements.

- Incorporate lessons learned from previous fire events to enhance future responses.

Conclusion

Adherence to these Standard Operating Procedures ensures a structured, efficient, and effective response to fire events, leveraging the capabilities of drones and cameras to enhance situational awareness and decision-making.

ANNEXES

ANNEX A' : List of Equipment and Specifications
ANNEX B' : Communication Protocols and Frequencies
ANNEX C' : Emergency Contact List
ANNEX D' : Drone Flight Plans and No-Fly Zones

Drones Play an Important Role in
Monitoring and Fighting

ANNEX A' / List of Equipment and Specifications

1. Drones (UAVs)

1.1. Long-Endurance Surveillance Drones

Model: Hybrid Engine DroneX Pro

Specifications
:
Flight Time: +6 hours
Camera: 4K Ultra HD, Thermal Imaging
Flight Range: +20 km
Weather Resistance: IP45, capable of flying in bad weather conditions
Wind Resistance: Up to 7 Beaufort scale (50-61 km/h or 32-38 mph)
Additional Features: RTK module for precision flying, obstacle avoidance, hybrid engine

1.2. Thermal Imaging Drones

Model: Hybrid Engine HeatSeek

Specifications:

Flight Time: +6 hours
Camera: High-Resolution Thermal Sensor, 20MP Visual Camera
Flight Range: +20 km
Weather Resistance: IP53, capable of flying in bad weather conditions
Wind Resistance: Up to 7 Beaufort scale (50-61 km/h or 32-38 mph)
Additional Features: Obstacle avoidance, hybrid engine

1.3. Rapid Deployment Drones

Model: Hybrid Engine QuickDeploy

Specifications:

Flight Time: +6 hours
Camera: 32x Zoom Camera, 4K HDR, Thermal Imaging
Flight Range: +20 km
Weather Resistance: IP53, capable of flying in bad weather conditions
Wind Resistance: Up to 7 Beaufort scale (50-61 km/h or 32-38 mph)
Additional Features: Lightweight, quick deployment, hybrid engine

2. Ground-Based Cameras

2.1. Fixed Surveillance Cameras

Specifications:

Resolution: 4MP
Lens: 2.8-12mm Motorized Varifocal Lens
Weather Resistance: IP67, IK10
Additional Features: Day/Night/Thermal Imaging, Night Vision, Smart IR, Wide Dynamic Range (120dB)

2.2. PTZ (Pan-Tilt-Zoom) Cameras

Specifications:

Resolution: HDTV 1080p
Zoom: 30x optical zoom
Weather Resistance: IP66, NEMA 4X
Additional Features: Day/Night/Thermal Imaging, IR illumination, Autotracking, Wide Dynamic Range

2.3. Thermal Imaging Cameras

Specifications:

Resolution: 640 x 480 Thermal Sensor
Zoom: Continuous Optical Zoom (14x)
Weather Resistance: IP66
Additional Features: Day/Night/Thermal Imaging, Long-range detection, Network connectivity

3. Communication Equipment

3.1. Two-Way Radios

Model: VHF

Specifications

Frequency Range: VHF (136-174 MHz)
Battery Life: Up to 27 hours
Weather Resistance: IP68
Additional Features: Bluetooth, GPS, Text Messaging

3.2. Mobile Command Unit

Model: Custom-Built Command Center Vehicle

Specifications

Communication: Satellite, 4G/5G connectivity
Equipment: Multiple screens for drone feeds, radio systems, data analysis tools
Power Supply: Backup generators, solar panels
Additional Features: Conference room, workstations, weather monitoring equipment

4. Additional Firefighting Equipment

4.1. Thermal Imaging Cameras (Handheld)

Specifications

Resolution: 320 x 240 Thermal Sensor
Battery Life: +5 hours
Additional Features: In-camera video storage, easy-to-use interface

4.2. Firefighting Drones

Model: EHang 216F Firefighting Drone

Specifications

Payload Capacity: 150 liters of firefighting foam
Flight Time: 20 minutes
Range**: 5 km
Additional Features**: Autonomous flight capabilities, thermal camera

5. Monitoring and Control Systems

5.1. Central Monitoring System

Model: Milestone XProtect Corporate

Specifications

Capacity: Supports an unlimited number of cameras and devices
Features: Advanced video analytics, real-time monitoring, incident management

5.2. Drone Management Software

Model: Drone Deploy Enterprise

Specifications

Features: Flight planning, real-time monitoring, data analysis, 3D mapping

6. Personal Protective Equipment (PPE) for Drone Operators

6.1. Protective Gear

Items: Fire-resistant suits, helmets, gloves, safety goggles

Specifications

Compliance: NFPA 1971 Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting

Features: High visibility, thermal protection

This list ensures that the Municipality Firefight Control Center is equipped with drones featuring hybrid engines capable of extended flight times and greater operational range, meeting the specified requirements for efficient fire detection, monitoring, and suppression.

ANNEX B' / Communication Protocols & Frequencies

1. Primary Communication Protocols

<u>1.1. Radio Communication</u>

Protocol: Digital Mobile Radio (DMR)
Frequency Range: VHF (136-174 MHz)
Usage: Primary communication for fire response teams, drone operators, and command center.

<u>1.2. Satellite Communication</u>

Protocol: L-band Satellite Communication
Frequency Range: 1-2 GHz
Usage: Backup communication for remote areas with poor radio signal coverage.

<u>1.3. Cellular Communication</u>

Protocol: Long-Term Evolution (LTE) / 5G
Frequency Range: 700 MHz to 2.7 GHz (varies by region and carrier)
Usage: Data transmission for drone feeds, real-time video, and command center coordination.

<u>1.4. Wi-Fi Communication</u>

Protocol: IEEE 802.11 (Wi-Fi 6)
Frequency Range: 2.4 GHz and 5 GHz
Usage: Local communication within the command center and for connecting various devices.

2. Drone Communication Protocols

<u>2.1. Control and Telemetry</u>

Protocol: MAVLink (Micro Air Vehicle Link)
Frequency Range: 433 MHz or 915 MHz (depending on regional regulations)
Usage: Control signals and telemetry data exchange between drones and ground control stations.

<u>2.2. Video Transmission</u>

Protocol: Lightbridge or OcuSync
Frequency Range: 2.4 GHz and 5.8 GHz
Usage: High-definition video transmission from drones to the command center.

3. Command Center Communication

3.1. Inter-Department Communication

Protocol: Voice over IP (VoIP)
PTT (POC): Using Global Sim Card under GSM network
Frequency Range: Broadband internet (varies)
Usage: Internal communication within the command center and with other municipal departments.

3.2. Emergency Communication

Protocol: TETRA (Terrestrial Trunked Radio)
Frequency Range: 380-430 MHz
Usage: Secure communication for emergency response coordination.

4. Public Alert Systems

4.1. **Public Broadcast

Protocol: FM/AM Radio Broadcast
Frequency Range: FM (88-108 MHz), AM (530-1700 kHz)
Usage: Public alerts and emergency information dissemination.

4.2. SMS Alerts

Protocol: SMS (Short Message Service) via Cellular Networks
Frequency Range: Cellular bands (varies by carrier)
Usage: Emergency alerts to citizens' mobile phones.

4.3. Social Media and Internet Alerts

Protocol: Internet-based communication (HTTP/HTTPS)
Frequency Range: Broadband internet (varies)
Usage: Dissemination of alerts and updates through social media platforms and municipal websites.

5. Backup Communication Protocols

Protocol: CB Radio (Citizen's Band)
Frequency Range: 27 MHz (26.965-27.405 MHz)
Usage: Additional backup communication for local coordination.

6. Frequency Coordination and Management

6.1. Frequency Management

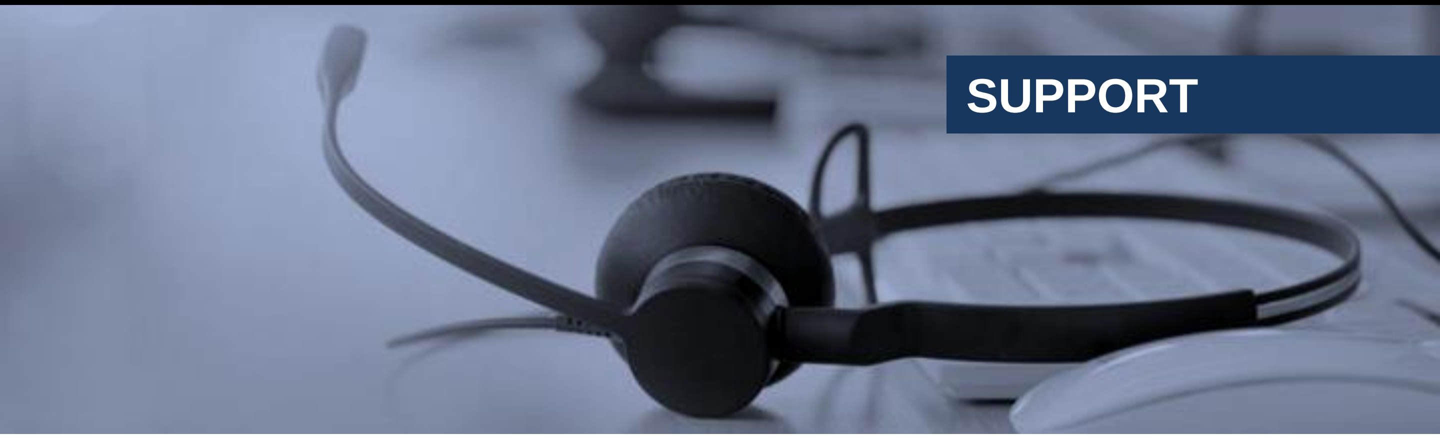
Responsible Entity: Communications Officer
Duties: Ensuring all communication frequencies are properly assigned, avoiding interference, and coordinating with national regulatory bodies.

6.2. Emergency Frequency Channels

Dedicated Emergency Channels:

VHF Emergency Channel: 156.800 MHz (Marine VHF Channel 16)
UHF Emergency Channel: 462.675 MHz (GMRS Channel 20)
Usage: Reserved for emergency communication and coordination.

This list ensures that the Municipality Firefight Control Center is equipped with robust and versatile communication protocols and frequencies, enabling efficient and reliable communication during fire events and other emergencies.



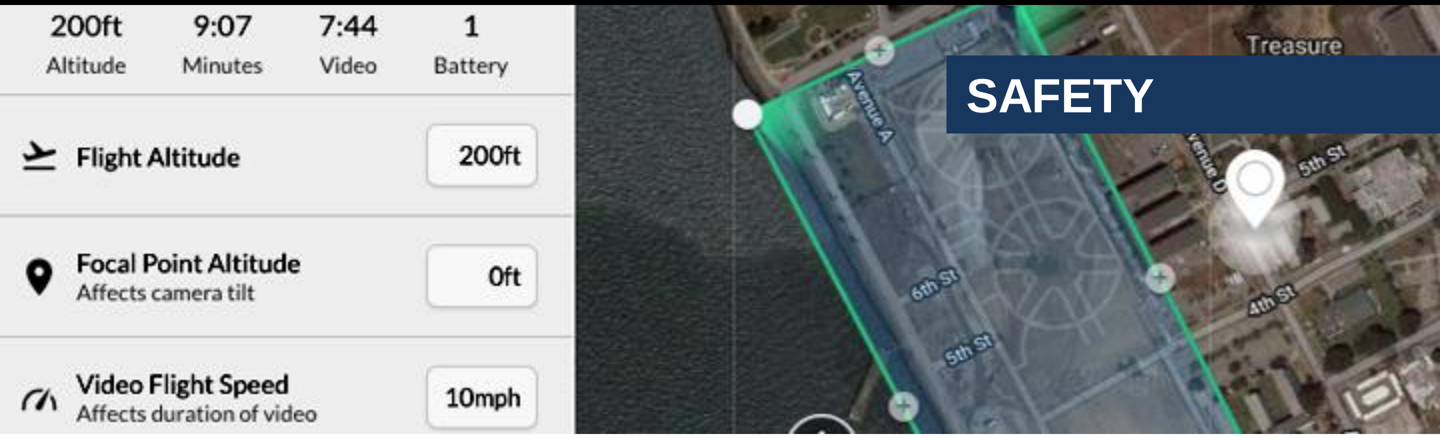
ANNEX C’ / Emergency Contact List

- Municipality Firefight Control Center (MFCC)
- Local Fire Departments (Central Fire Station / Northside Fire Station / Southside Fire Station)
- Local Fire Departments (Northside Fire Station / Southside Fire Station)
- Emergency Medical Services (EMS)
- Law Enforcement (Municipality Police Department)
- Utility Companies (Electricity Provider / Water Supply)
- Environmental Agencies (Environmental Protection Agency (EPA))
- Health Services (Municipal Health Department)
- Red Cross and Other NGOs
- Regional and National Agencies (National Guard)
- Federal Emergency Management Agency (FEMA)
- Local Support and Volunteers Firefighters
- Community Emergency Response Team (CERT)

For all the ABOVE contacts the main details needed are;

- Main Line Number
- Man in Charge
- Mobile phone
- Email

This list provides a comprehensive list of emergency contacts, ensuring that the Municipality Firefight Control Center has immediate access to crucial support and coordination during fire events and other emergencies.



ANNEX D' / Drone Flight Plans and No-Fly Zones

1. Drone Flight Plans

1.1. Pre-Defined Patrol Routes

Route 1: High-Risk Urban Areas

Coverage: Downtown, industrial zones, high-density residential areas
Flight Duration: 2 hours
Patrol Frequency: Every 4 hours
Primary Objectives: Monitoring for fire hazards, real-time incident detection, and public safety surveillance

Route 2: Forest and Wildland Interface

Coverage: Perimeter of forested areas, wildland-urban interfaces
Flight Duration: 3 hours
Patrol Frequency: Twice daily
Primary Objectives: Early detection of wildfires, monitoring of firebreaks, and identification of illegal activities

Route 3: Critical Infrastructure

Coverage: Power plants, water treatment facilities, major transport routes
Flight Duration: 1 hour
Patrol Frequency: Every 6 hours
Primary Objectives: Security surveillance, early detection of infrastructure fires, and assessment of potential hazards

1.2. Incident Response Plans

Immediate Deployment

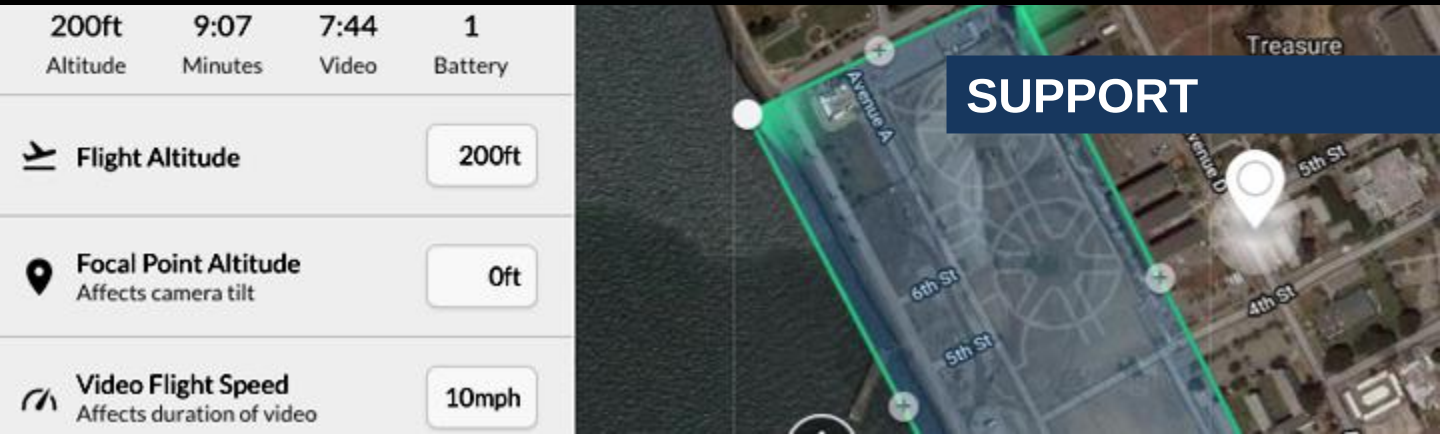
Protocol: Deploy nearest available drone to the incident location within 5 minutes of detection/notification
Flight Path: Direct route from the drone's current position to the incident site
Objectives: Rapid assessment, situational awareness, live-feed to control center

Extended Surveillance

Protocol: Deploy additional drones for extended coverage and detailed assessment
Flight Path: Circular or grid pattern around the incident site
Objectives: Detailed thermal imaging, hotspot identification, and perimeter monitoring

Search and Rescue (SAR) Operations

Protocol: Deploy drones equipped with thermal and night vision capabilities
Flight Path: Systematic search patterns (e.g., grid search) over the designated area
Objectives: Locate missing persons, assess the extent of damage, and guide rescue teamssurveillance and response capabilities.



3. Flight Authorization and Coordination

3.1. Flight Authorization Procedures

Pre-Approved Routes and Missions

Procedure: Submit detailed flight plans to the Municipal Aviation Authority for approval
Documentation: Include route maps, objectives, and safety measures

Emergency Deployments

Procedure: Obtain rapid clearance from the Incident Commander or designated authority
Documentation: Provide real-time updates and post-mission reports

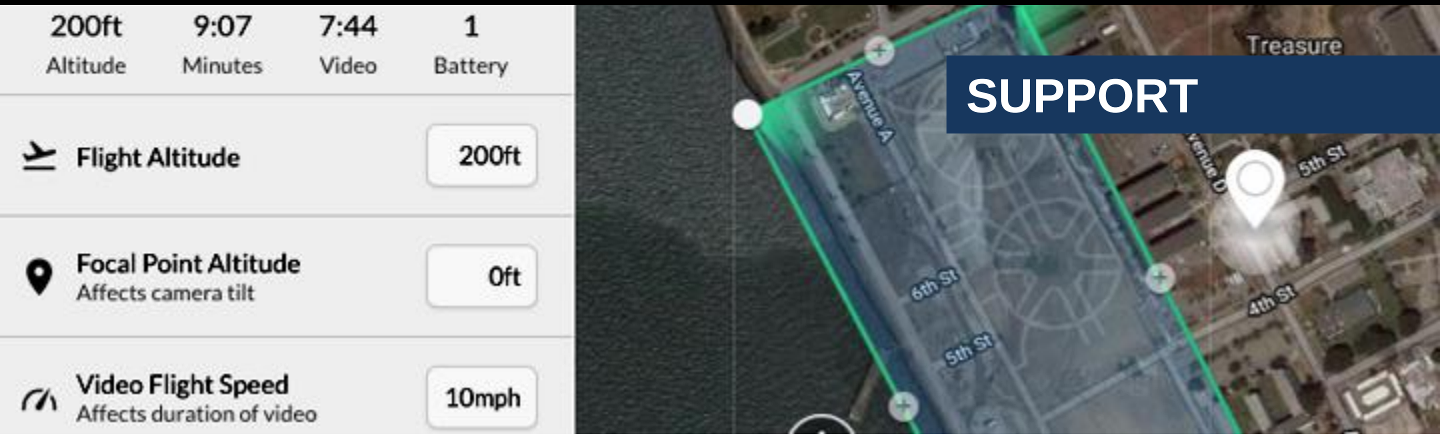
3.2. Coordination with Air Traffic Control (ATC)

Communication Protocol

Procedure: Establish direct communication lines with local ATC for coordination during flights
Frequency: Real-time updates and coordination during take-off, flight, and landing phases

Integration with Manned Aircraft Operations

Procedure: Ensure all drone operations are coordinated to avoid conflicts with manned aircraft, especially during large-scale incidents
Safety Measures: Implement geofencing and collision-avoidance systems



4. Monitoring and Compliance

4.1. Real-Time Monitoring

Central Monitoring System

Capabilities: Live tracking of all drones, real-time video feeds, and telemetry data
Responsibilities: Continuous monitoring by designated personnel within the MFCC

4.2. Post-Flight Analysis

Data Review

Procedure: Conduct a thorough review of all flight data, including video footage and telemetry
Reporting: Compile and submit reports on mission outcomes, issues encountered, and compliance with flight plans

Maintenance and Calibration

Procedure: Regular maintenance and calibration of drones and communication equipment
Schedule: Pre-defined maintenance schedules and after every significant deployment

This list ensures that all drone operations are meticulously planned, authorized, and coordinated, with specific routes and protocols in place to enhance the efficiency and safety of the Municipality Firefight Control Center's aerial surveillance and response capabilities.