

FLYING FROM THE ARCTIC TO AFRICA



Use of unmanned aerial systems for monitoring natural, agro-engineering, and infrastructure facilities

COO OF THE «DRONE SOLUTIONS LLC»

Shchegolkov Artem

# Climate Challenges in the Asia-Pacific Region



Wildfire  
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Drought  
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Flood  
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# Infrastructure under Climate Pressure

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Critical  
infrastructure

# Limitations of Traditional Monitoring

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1. High cost
2. Limited coverage
3. Slow response



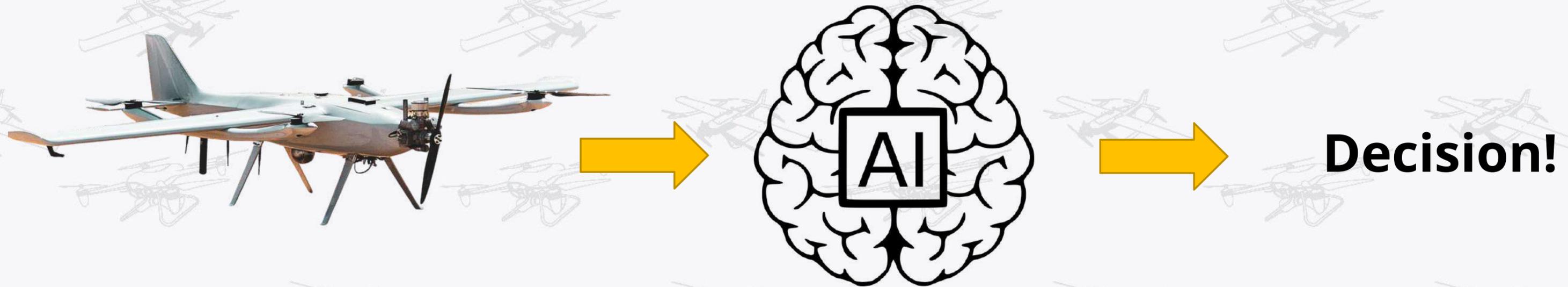
# Why Autonomous UAV Systems



Rapid data collection  
Cost efficiency  
Improved safety

# Role of Artificial Intelligence

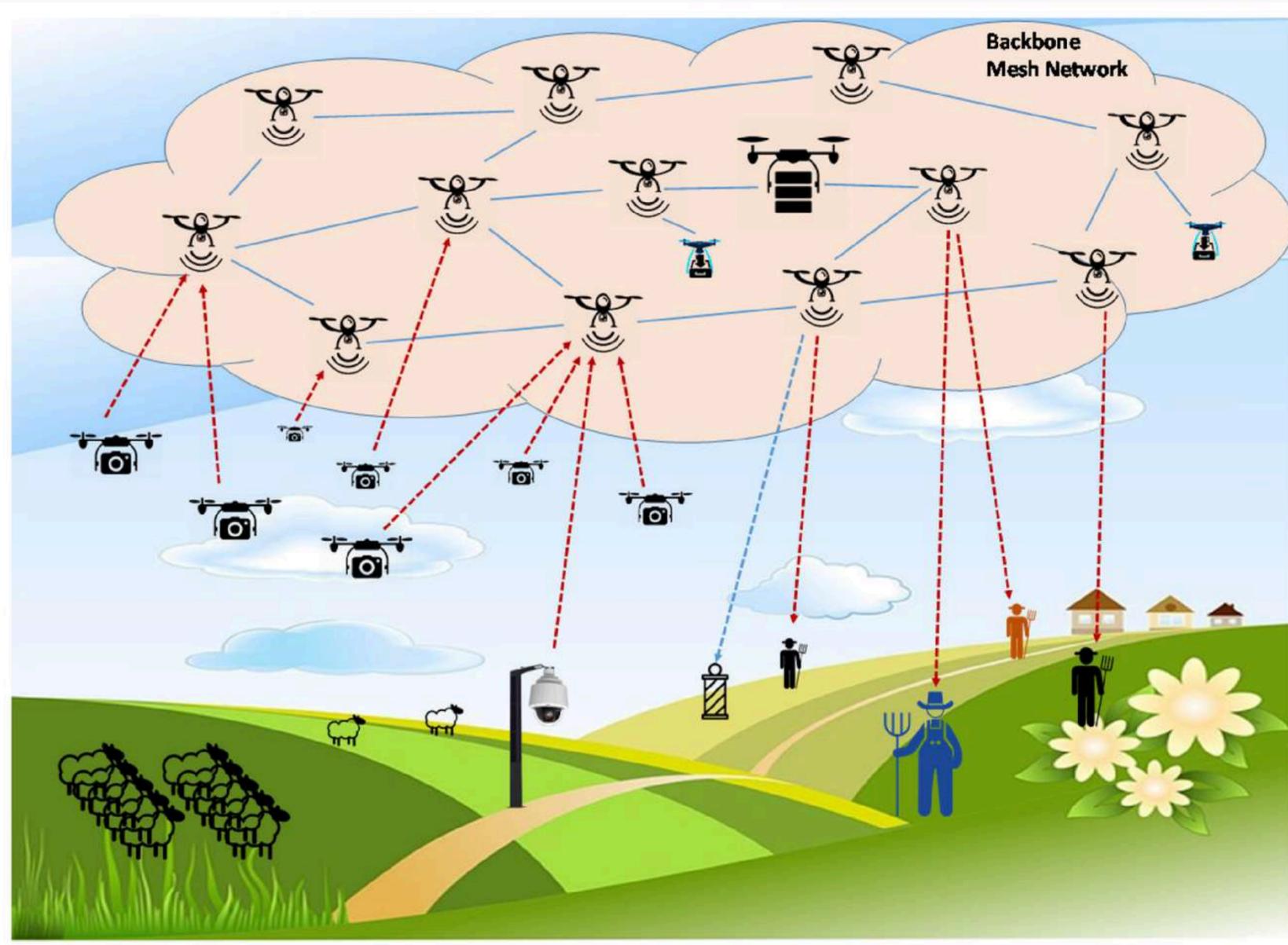
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Levels of AI on UAVs:  
1. Navigation and Flight Control  
2. Data Analytics

# AI Level 1: Navigation and Flight Control

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Features:

1. GNSS-denied operation
2. Visual odometry & SLAM
3. Cooperative flight

# Cooperative UAV Operations



Storkdrone 1



Storkdrone 2

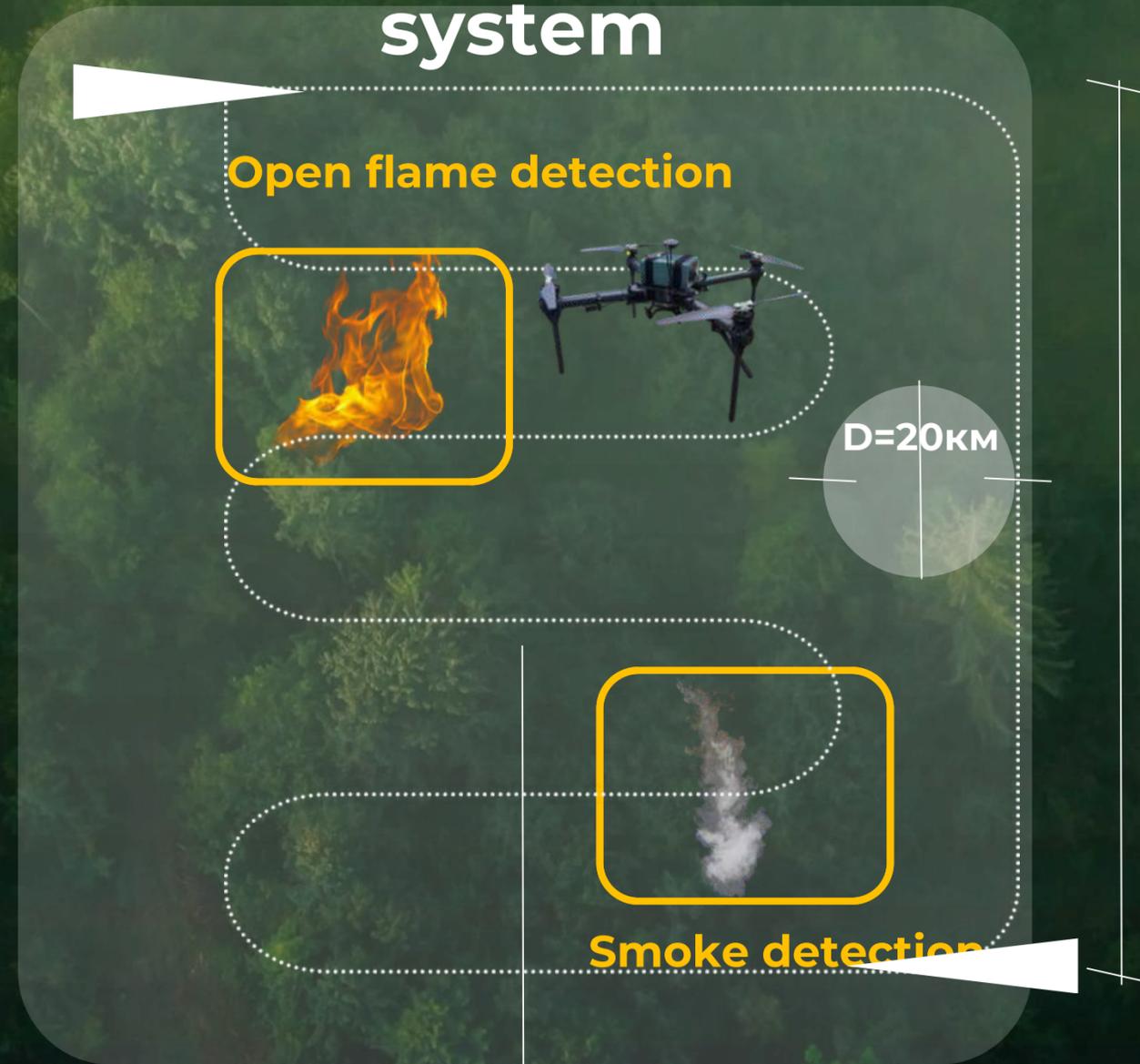


Quazitower

# Example: Wildfire Monitoring



## Automated patrol system



**10 km**

Fire detection range

**100 km**

Real-time video streaming

**10 000 km<sup>2</sup>**

Area coverage during a 5-hour flight

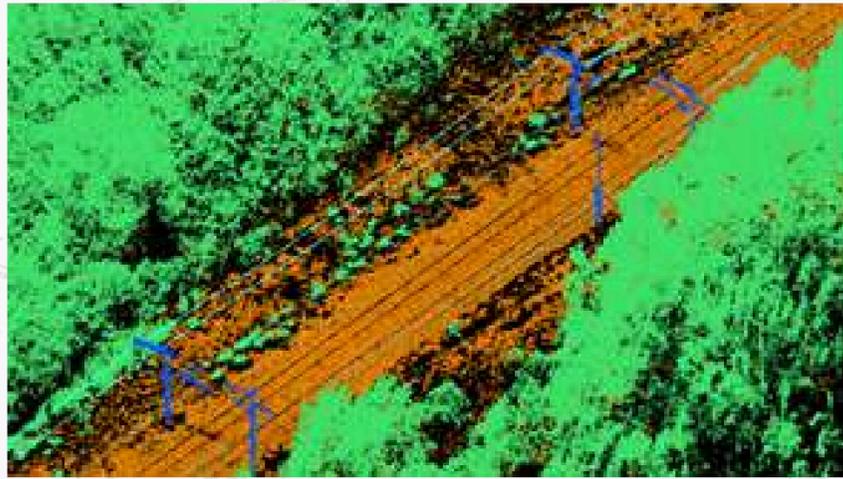
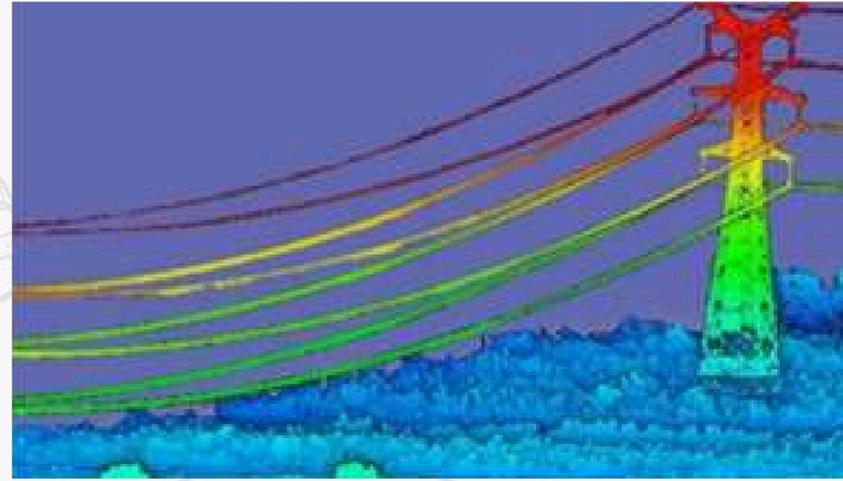
100 km

100 km

**Cooperative use of UAVs significantly increases efficiency**

# AI Level 2: Data Processing and Analytics

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# Infrastructure Monitoring

Unauthorized persons near the facility



Security zone monitoring



Thermal leakage



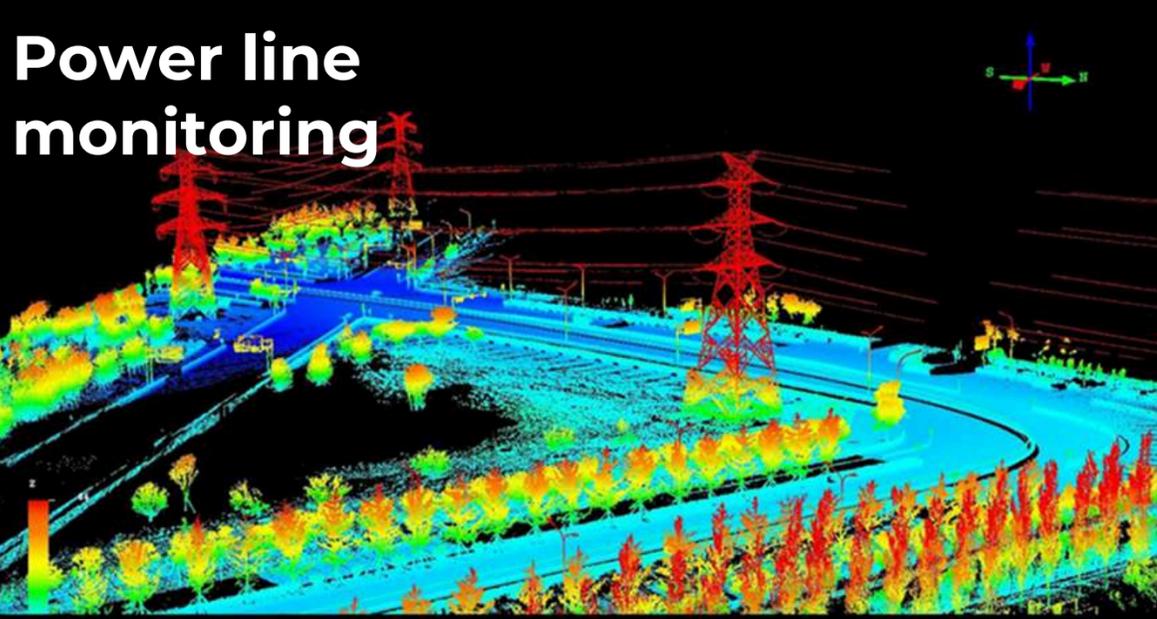
Pipeline routing / pipeline location



Leak detection



Power line monitoring



# Environmental Monitoring

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Ice navigation support



Installation of monitoring buoys on icebergs



Water quality inspection, coastal surveillance



Wildfire response operations



Offshore water sampling and search and rescue



Monitoring migration and population of endangered species

# Emergency Logistics and Communication

1

1 A VTOL is deployed to localize the emergency site

2

2 After identifying the location and the number of casualties, the VTOL deploys a small drone

3

3 The small drone performs a detailed survey of the emergency site

4

4 The small drone lands near the casualty, while the VTOL operates as a communication relay, transmitting video and audio to medical staff and back



Regional medical operations center



Medical supplies can be delivered to emergency sites



# Implementation Methodology

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**Scenario → Requirements → Lifecycle**

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Thank you for your attention!

