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Session : Electric Mobility

Harnessing Drone Technology to Transforming India's Future in Mobility

Presented By

DHEERAJ GANGADHARAN

PRESENTATION GUIDELINES

- **Presentation Time**: The total time for presentation is 7 mins. You are requested to be present on-time as per your session slot.
- **Presentation Format**: All the presenting speakers are required to give a presentation as per the PPT Format. (Maximum 7 Slides). Please note that the additional presentation slides cannot be added in the shared PPT format.

INTRODUCTION

What? –

Transforming India's Mobility Landscape with Drones

Why? –

Despite leading a global mobility revolution, India faces critical challenges.

Drones (UAVs) offer innovative solutions to enhance efficiency, accessibility, and sustainability.

How? –

By implementing a strong regulatory framework, fostering private sector participation, and developing the necessary infrastructure.

CONTEXT

Indian drone industry to hit $27M by 2024, growing **at 5.78% CAGR (2024-2029)** due to demand, innovation, and policy support.

India's status of Drone Mobility ecosystem

Drone Rules 2021 and PLI scheme **boost manufacturing**, streamline operations, and drive drone use in agriculture, e-commerce, healthcare, and urban planning.

Indian startups like IdeaForge, Aarav Unmanned, and Skylark **drive innovation**, while global firms DJI, Zipline, and Wing **expand the drone ecosystem**.

Drone market in India to reach 79.6k units by 2029, creating **1-2 lakh jobs** in manufacturing, operation, and maintenance by 2030.

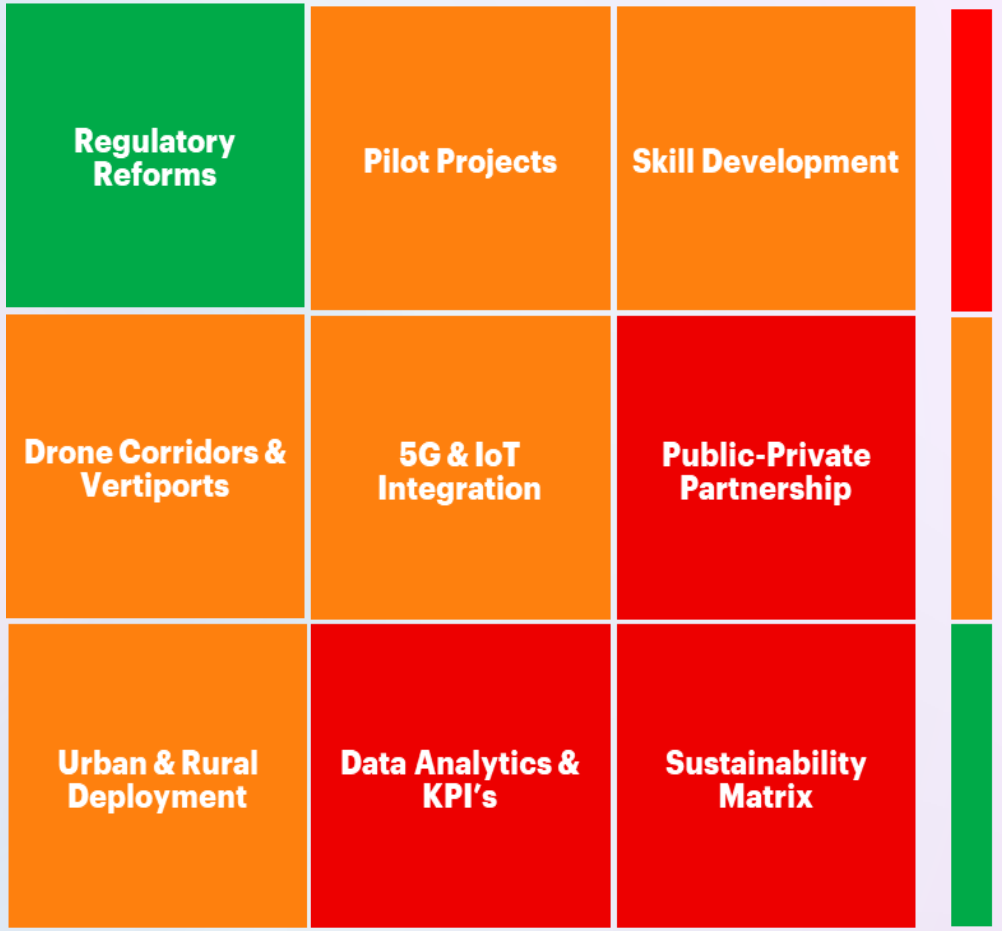

Fig 1: India's status of Drone Mobility ecosystem

RELEVANCE

India's mobility sector by addressing long-standing challenges such as traffic congestion, inadequate infrastructure, and limited accessibility.

Despite its potential, the adoption of drone technology faces several hurdles

1. Regulatory Bottlenecks

- The absence of **standardized regulations** for urban drone operations creates legal uncertainties.
- Gaps in airspace management and data security policies hinder large-scale deployment.

2. Infrastructure Gaps

- The lack of dedicated drone ports and charging hubs limits operational efficiency.
- The absence of **designated air corridors** restricts safe and scalable drone movement.

3. Public Perception

- Safety concerns and potential risks contribute to hesitancy in drone adoption.
- Limited **public awareness** of drone benefits reduces acceptance and support.

4. Technical Barriers

- Short battery life limits flight duration, impacting operational feasibility.
- **Limited payload capacity** reduces commercial and industrial application potential, while advanced navigation and autonomy are essential for precision and safety.

The vast potential (of the drone technology) can be tapped, there by reshaping transport and logistics, agriculture, healthcare, disaster management, and urban planning.

Drone Applications across the Value Chain

Agriculture | Construction & Infrastructure | Energy & Utilities | Logistics & Delivery | Security & Emergency Response | Environmental

Use Cases

Agriculture

Crop Spraying
- Identifying target areas for spraying
- Mapping the field using drones

Soil & Field Analysis
- Identifying target areas for spraying
- Mapping the field using drones

Plant Disease & Pest Detection
- Scanning crops with infrared sensors
- Identifying infected plants

Irrigation System Monitoring
- Assessing soil dryness
- Detecting faulty irrigation lines

Construction & Infrastructure

Aerial Site Surveys
- Capturing real-time topographic data
- Comparing progress with project plans

Worker Safety Monitoring
- Monitoring construction zones
- Identifying unsafe working conditions
- Sending real-time alerts to supervisors

Damage & Weakness Detection
- Infrared scanning for stress points
- Identifying material degradation
- Suggesting reinforcements

Bridge & Structural Inspections
- Detecting cracks and wear
- Reporting maintenance needs

Energy & Utilities

Power Line Inspections
- Capturing thermal images of cables
- Detecting overheating and faults
- Reporting high-risk areas for repair

Wind Turbine Blade Inspections
- Scanning turbine blades for cracks
- Identifying structural weaknesses

Vegetation Management
- Identifying Vegetation Growth Across T&D Line

Solar Farm Maintenance
- Identifying damaged solar panels

Oil & Gas Pipeline Monitoring
- Detecting leaks and corrosion
- Scanning with methane sensors
- Reporting security breaches

Logistics & Delivery

Last-Mile Package Delivery
- Loading package into drone
- Autonomous landing and drop-off

Transportation Route Monitoring
- Capturing real-time traffic data
- Suggesting alternative routes
- Assisting in supply chain optimization

Emergency & Medical Supply Delivery
- Delivering AEDs and emergency kits
- Ensuring contactless deliveries in disasters

Food Delivery
- Delivery of Food at Precision Location

Security & Emergency Response

Law Enforcement Surveillance
- Scanning for suspicious activity
- Tracking criminals
- Relaying real-time footage

Border Patrol & Security
- Monitoring unauthorized crossings
- Using infrared for night surveillance

Firefighting & Thermal Imaging
- Locating fire hotspots
- Mapping escape routes

Disaster Response & Rescue
- Scanning for trapped survivors
- Dropping emergency supplies
- Guiding rescue teams to victims

Crowd Monitoring & Public Safety
- Identifying crowd congestion
- Detecting fights or disturbances
- Assisting in large event security

Environmental

Deforestation & Illegal Logging Tracking
- Identifying tree loss patterns
- Detecting unauthorized logging activity

Wildlife Monitoring & Habitat Protection
- Monitoring endangered species

Pollution & Water Quality Assessment
- Detecting air & water contamination
- Reporting environmental violations

Climate Change Research & Glacier Monitoring
- Measuring temperature variations
- Tracking ice sheet melting
- Monitoring CO_2 emissions

Marine Ecosystem Tracking
- Monitoring illegal fishing
- Analyzing ocean temperature changes

Implementing drone technology across India requires a phased and collaborative approach

Phase 1

FOUNDATION

Laying a firm ground

- Regulatory reforms for a supportive framework.
- Pilot projects will demonstrate viability.
- Skill development initiatives will train a workforce capable of managing advanced drone technologies.

Phase 2

INFRASTRUCTURE DEVELOPMENT

Innovation and investment

- Creating drone corridors and ports will enable efficient operations.
- Integration through 5G and IoT will enable a seamless connectivity.
- Initiatives such as Public-Private Partnership (PPP) will attract investments and enable innovations in this domain/

Phase 3

SCALE-UP AND OPTIMIZATION

Expand and Optimize

- Expanding drone deployment across urban and rural areas will enhance mobility solutions.
- Leveraging data analytics and key performance indicators (KPIs) will optimize operations.
- Sustainability metrics ensure environmentally conscious growth.

North Star

THE OUTCOME

A roadmap for a transformation in mobility

- This transformative roadmap will revolutionize mobility, fostering economic growth and positioning India as a global leader in drone technology, ultimately improving transportation efficiency nationwide

BENEFITS

Efficiency Gains
Drone taxis and cargo drones can reduce travel and delivery times by up to 60%, enhancing productivity.

Cost Reductions
Logistics and operational costs can decrease by 30%, benefiting businesses and consumers.

Environmental Impact
Drones have a significantly lower carbon footprint compared to traditional vehicles, contributing to cleaner air and reduced emissions.

Economic Growth
The sector is expected to create substantial employment opportunities and attract foreign direct investment (FDI).

Enhanced Accessibility
Drones improve connectivity in remote and underserved areas, enabling better access to healthcare, education, and commerce.

Holistic Progress
The integration of drones into India's transportation landscape will drive economic growth, enhance quality of life, and position India as a global leader in drone technology.

Adopting drone technology offers numerous advantages that can transform mobility and other sectors:

60%
Reduce travel and delivery times by up to 60%

30%
Logistics and operational costs can decrease by 30%

KEY TAKEAWAYS / RECOMMENDATIONS

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Key Takeaways

1. Improved Mobility, Economic Growth, attain Global Leadership and meet sustainability goals
2. Drone technology can be used in a variety of sectors in India. Tangible improvements in delivery times, cost efficiency and accessibility
3. Drone technology has the potential to revolutionize India's mobility sector.
4. There are a number of challenges to overcome in order to realize the full potential of drone technology in India.

Recommendations

1. Develop a phased and collaborative approach for implementing drone technology
2. Develop standardized frameworks for urban drone operations, airspace management, and data security.
3. Foster public-private partnerships to drive innovation and investment in drone technology
4. Support research and development to improve battery life, payload capacity, and navigation systems.

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THANK YOU

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Links/References (If any)