Commercial Operation of Drones, Regulations, Challenges & Outlook

Sanjeev Gadhia: Chief Executive Officer
In AFRICA

INNOVATION IS

NOT A CHOICE

IT IS A

NECESSITY.....
IATA Air Cargo Innovation Award Winner 2017 – UTM Concept for Africa
# Astral Aerial Solutions

## Who we are
- Astral Aerial Solutions (AES) is a drone operator and service provider based in Kenya.
- Licensed by the Kenya CAA to test Commercial Drones within Kenya.
- Subsidiary of Astral Aviation Ltd, which is a well established cargo airline in East Africa.

## What we do

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<tbody>
<tr>
<td>3. Oil, Gas and Mining Services.</td>
<td>7. Agricultural services.</td>
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<td>4. Infrastructural inspections.</td>
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## Astral’s Vision
To be a World Class Drone Operator and Service provider.
Astral Aerial Solutions - Mantra

ACCESS

THE INACCESSIBLE.

CONNECT

THE DISCONNECTED.

REACH

THE UNREACHABLE.
Strategic Plan

RPAS Operating Certificate (ROC)
I. Commercial drone operator
II. Commercial drone services and solutions

RPAS Training Academy in Kenya.
I. RPAS Pilot Licensing.
II. Specialized industry training
   I. Agriculture
   II. Mining
   III. Oil and Gas
   IV. Surveying
   V. Utility Inspection
   VI. BVLOS

Astral DronePort

Commercial Drone Consultancy
Commercial Applications

- Cargo Deliveries
- Industrial Inspection
- Agriculture

RPAS Operating Certificate (ROC)
CARGO DELIVERY
A Case for Cargo Drones in Africa

**Humanitarian, Medical & Relief**
- Relief Cargo Deliveries
- Medical and Vaccine Deliveries
- Emergency Food Delivery
- Blood Deliveries

**Commercial Services**
- Oil and Gas
- Mining
- Agriculture
- Energy and Utilities

**Postal & Ecommerce**
- Small Parcel Deliveries
- Mail and Courier
- E-commerce Products
- DronePort
Advantages of Large Cargo Drones for Air transport over Manned Aircrafts.

- Cost effective.
- Flexibility in flight scheduling.
- Ability to land on unpaved runways and water.
- Fewer crew requirements.
- Minimal Stop-overs and More Direct flights.
The FlyOx Cargo Drone

- 4,000 kg Maximum Weight
- 1850 kg payload
- 1200km Range
- 31 hours Endurance on empty payload
- Can land on water and unpaved airstrips
FlyOx Update

Pilot Project Quick Facts

- 3 successful test flights conducted at NATO Andoya Air Base, Norway in Sep / Oct 2018
- Autonomous Take-off and landing both day and night
- Take off distances < 500m
- Distance traveled per flight = 260km
- 0 technical issues
- Operational capable in 1 hour
Market Comparison: Cargo Configuration

Singular Aircraft has two segment competitors: Manned (Conventional Aviation) and Unmanned, following their applications.

Actually, our real competitors are manned aircrafts. See chart comparison (Manned)

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>payload</th>
<th>Endurance</th>
<th>range</th>
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<tbody>
<tr>
<td>FLYOX I</td>
<td>1850 kg</td>
<td>&gt;35 h</td>
<td>2.515 NM</td>
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<table>
<thead>
<tr>
<th>MANNED</th>
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<tbody>
<tr>
<td>Cessna Caravan</td>
</tr>
<tr>
<td>payload: 1.400 kg</td>
</tr>
<tr>
<td>range: 1.070 NM</td>
</tr>
<tr>
<td>Twin Otter</td>
</tr>
<tr>
<td>payload: 2.500 kg</td>
</tr>
<tr>
<td>range: 775 NM (no PL)</td>
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<tr>
<td>Dornier 228</td>
</tr>
<tr>
<td>payload: 2.000 kg</td>
</tr>
<tr>
<td>range: 250 NM</td>
</tr>
<tr>
<td>Beechcraft 1900</td>
</tr>
<tr>
<td>payload: 3.000 kg</td>
</tr>
<tr>
<td>range: 400 NM</td>
</tr>
<tr>
<td>Metroliner fairchild</td>
</tr>
<tr>
<td>payload: 2.000 kg</td>
</tr>
<tr>
<td>range: 500 NM</td>
</tr>
</tbody>
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Irrigation Management
Crop Spraying
Crop Inspection
Solar
Wind Turbines
Oil, Gas and Mining
Power Lines
Real Estate
14 African Countries have published UAV Regulations.

**Case of Kenya**

- The Civil Aviation RPAS Regulations 2017 were gazette on 6-Oct 2017 under Legal Notice 259.
- In June 2018, Parliamentary Committee on Delegated Legislation put on hold the RPAS Regulations
  - Charged very high fines; which is against the Kenyan constitution.
  - Did not have public participation or involvement during preparations.
  - Did not adequately address some safety and security concerns they had.
- Drones continue to fly in Kenya for recreation and commercial by unlicensed individuals or operators, which is a high risk due to the lack of insurance or legislation.
- Astral Aerial requests the GoK / Kenya CAA to address the 3 concerns and publish new set of regulations asap !!!
Drones for Africa – Selected Cases

• UNICEF Malawi Humanitarian Drone Testing Corridor.
• Lake Victoria Challenge
• ZIPLINE Blood Deliveries in Rwanda
• Tanzania – Dar Flood Mapping / Zanzibar Mapping Initiative
• UAS Farmers Project in Mozambique
• Surveying Port Facilities in Morocco
• Wildlife Monitoring in South Africa, Namibia, Tanzania.
• Fighting desertification in Sudan by planting Acacia seeds by drones
Drones overall will be more impactful than I think people recognize, in positive ways to help society.

– Bill Gates