

Commercial Operation of Drones, Regulations, Challenges & Outlook



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Chief Executive Officer



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

1. Air Transport of cargo
2. E-commerce deliveries
3. Oil, Gas and Mining Services.
4. Infrastructural inspections.
5. Environmental and Wildlife Conservation.
6. Emergency response and Public service.
7. Agricultural services.

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

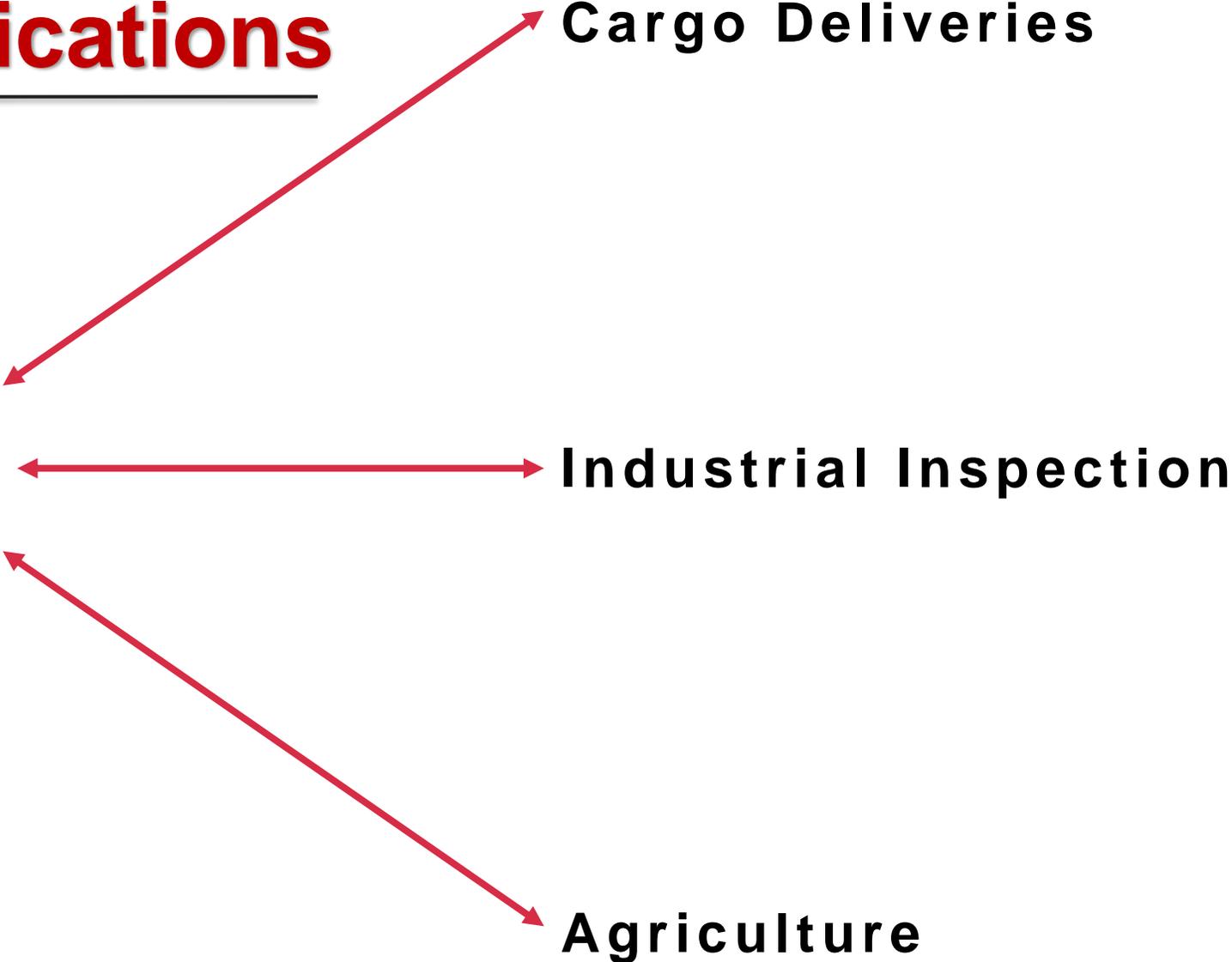
Astral DronePort

Commercial Drone Consultancy

Commercial Applications



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 Fly0x Cargo Drone



A 4,000 kg Maximum Weight

B 1850 kg payload

C 1200km Range

D 31 hours Endurance on empty payload

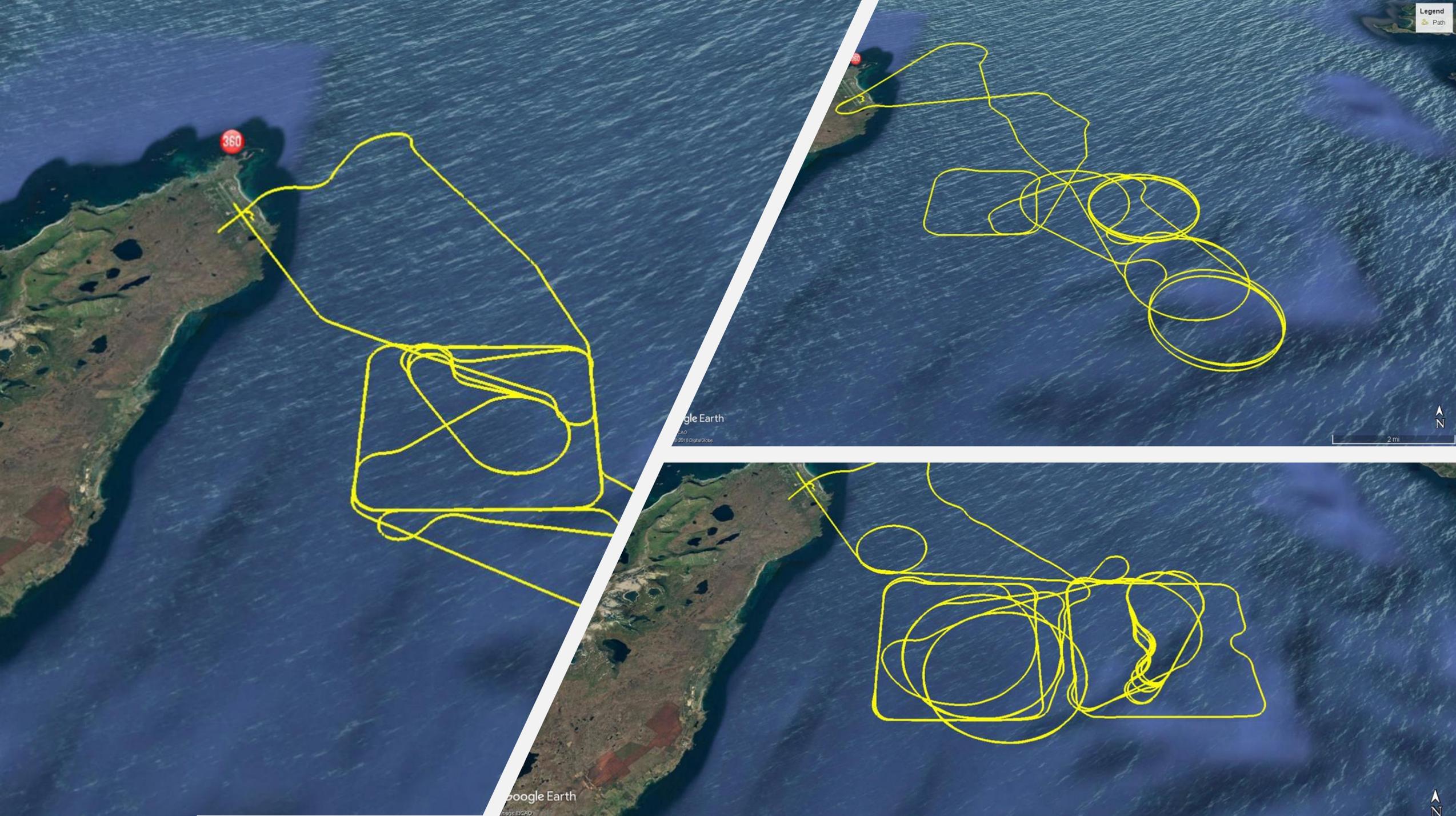
E Can land on water and unpaved airstrips

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**



360

Google Earth
© 2010 DigitalGlobe

Legend
Path

2 mi

Google Earth
© 2010 DigitalGlobe

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)

Aircraft	payload	Endurance	range
FLYOX I	1850 kg	>35 h	2.515 NM
MANNED			
Cessna Caravan	1.400 kg	-	1.070 NM
Twin Otter	2.500 kg	-	775 NM (no PL)
Dornier 228	2.000 kg	-	250 NM
Beechcraft 1900	3.000 kg	-	400 NM
Metroliner fairchild	2.000 kg	-	500 NM



Irrigation
Management



Crop Spraying



Crop
Inspection



Solar

Wind Turbines

Oil, Gas and
Mining

Power Lines

Real Estate

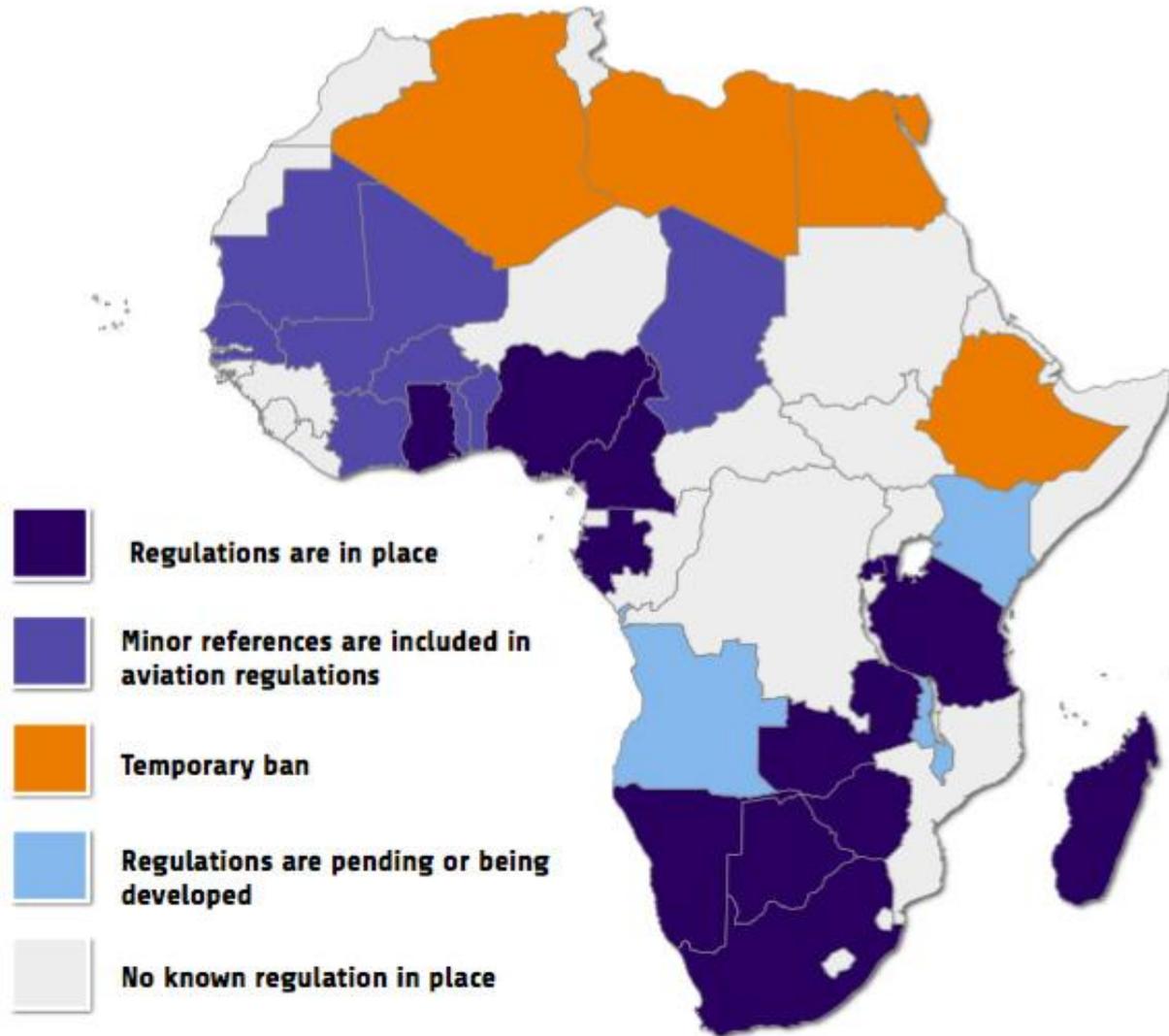


Status on Drone Regulations in Africa & Kenya !!!

- ✓ 14 African Countries have published UAV Regulations.

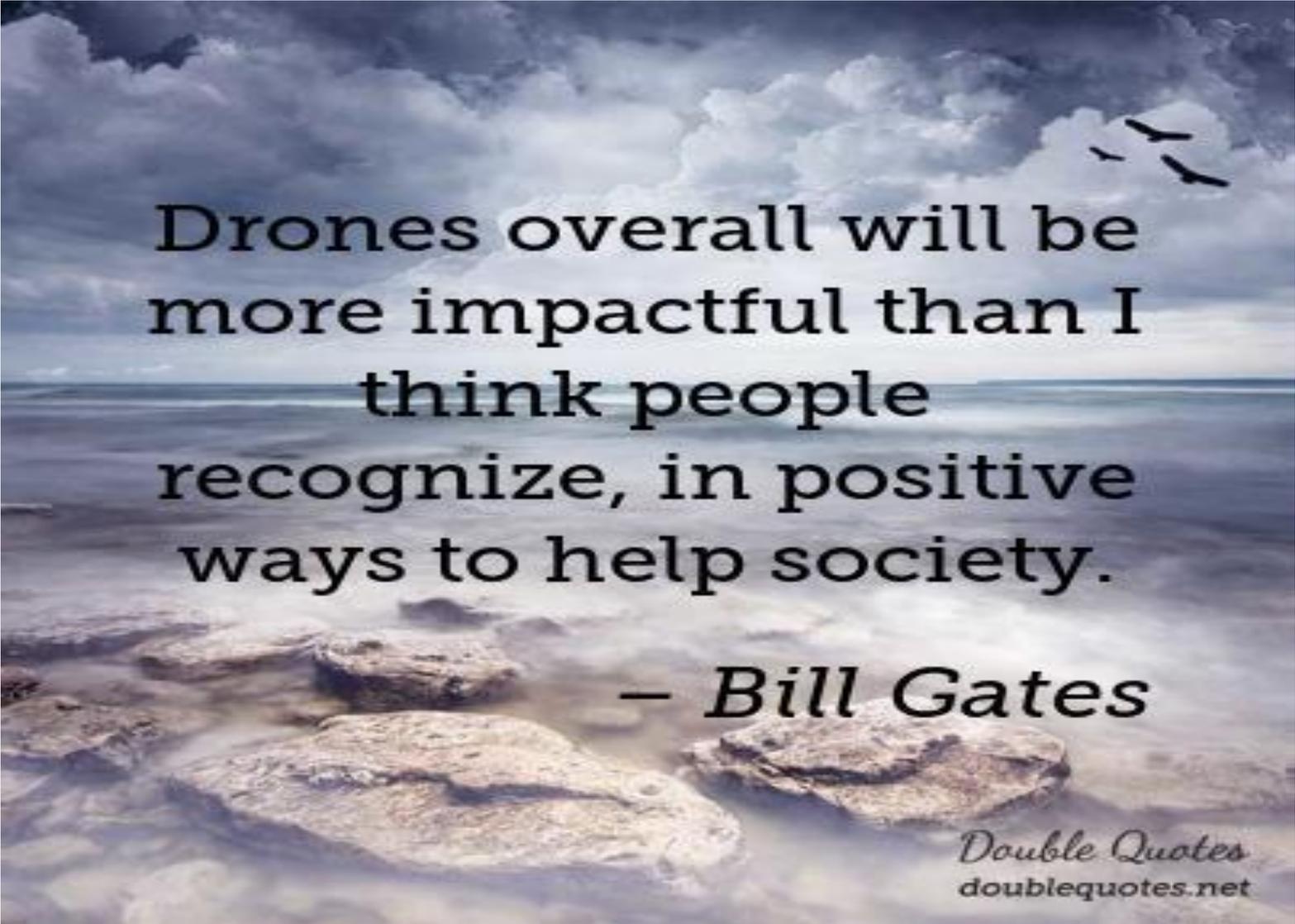
Case of Kenya

- ✓ 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

The background image shows a coastal scene with large, flat rocks in the foreground, a calm sea, and a cloudy sky. A single bird is seen in flight in the upper right quadrant of the sky.

Drones overall will be
more impactful than I
think people
recognize, in positive
ways to help society.

– *Bill Gates*