Semi-autonomous UAV for Long Range Asset Monitoring & Logistics
Problem

● Frequent monitoring of oil & gas pipelines is essential to prevent catastrophe
● Current monitoring processes have the following limitations
  ○ Foot/vehicle patrol is a time consuming process
  ○ Helicopter based monitoring is cost intensive
  ○ Satellite monitoring is costly, can be performed only when the satellite pass the particular area and possibility of atmospheric noise disrupting the data

Opportunity

● Aerial monitoring with Unmanned Aerial Vehicle (UAV)/ drones is the cost effective method
● UAVs can fly low & slow capturing detailed images without atmospheric noise
● Multicopters have limited range (upto 10km) which requires it to be recovered, recharged and relaunched in short intervals resulting in high operating cost for long range pipeline monitoring
● Fixed wing drones can cover large range but needs a runway or a take-off and landing assist system resulting in higher operating cost.

Solution

● A fixed wing-multicopter hybrid drone which can take-off & land vertically and can travel long distance
Pipeline Inspection

GROUND VEHICLE & FOOT-PATROL
Limited Access
Time Consuming

QUADCOPTERS
Low Range and Endurance
Fly Low

FeatherDyn UAV
Economic & Safe
Fly Low & slow
Least atmospheric distortion
Optional Solar Panel

HELICOPTER
Costly
Atmospheric noise
Global expenditure for pipeline monitoring $37 Billion per annum
courtesy: Frost & Sullivan

Petroleum Product Pipelines Network in India
Operational: 14623 km
Under Construction: 1993 km

Natural Gas Pipelines Network in India
Operational: 16240 km
Under Construction: 10258 km

Source: www.pngrb.gov.in

According PNGRB norms, its mandatory to conduct inspection of entire pipelines atleast once every month
Maritime Support (secondary application)

**PROBLEM**
- HELICOPTER
  - Costly
  - High maintenance
  - Slow turnaround

**SOLUTIONS**
- FeatherDyn UAV
  - Quick Response
  - Economic
  - Safe
  - Eco-friendly

- BOAT
  - Slow
  - Time=Cost
  - Human risk

- INSPECTION & LOGISTICS
- DISASTER RELIEF/RESCUE
Maritime Logistics

- Wilhelmsen estimates (maritime logistics company)
  - 90% cost reduction by use of UAVs
  - Global annual saving of 675 million USD

Global UAV market

- 18 billion USD in 2018
- 58 billion USD by 2025
  (Courtesy: MarketsandMarkets Research Pvt. Ltd.)

Gulf cooperation council region (2022)

- 1.5 billion USD drone commercial market
  - 633 million USD oil and gas
  - 20 million USD drone based logistics
  (Courtesy: safety4sea.com, source:Strategy & PwC analysis)
Product Development (Asset monitoring UAV)

Proof of concept

Prototype1

Quadcopter test bed

PoC under testing

Test flight Prototype1
● **Vertical take-off & landing** - operate from anywhere. No runway, catapult, landing net.

● **Unique electric propulsion system** - wind & gust resistance, redundant and efficient.

● **Three lifting surface** - ease of CG balance

● **Semi autonomous flight** - waypoint navigation (least piloting skills required).

● **Autonomous image aided landing** - take-off & land on moving ships.

● **Corrosion Shielding & Thermal management.**

● **Buoyancy chamber and Water tight Payload & Avionics Bay**
Benefits

- **Cost reduction**
  - Wilhelmsen estimates 90% cost saving by use of UAV. Maersk pilot test drone delivery to ships.
  - Frequency of inspection could be increased to enhance safety.

- **Electric Propulsion**
  - Least maintenance, long life & high reliability.
  - Health monitoring of propulsion can be performed to avoid failure

- **Least human involvement**
  - No risk to life
Applications

• Logistics support and aerial monitoring for upstream/ downstream Oil & Gas industries
• Logistics support for Shipping industry
• Inspection and logistics support for offshore wind farms
• Defence & paramilitary forces
• Disaster management agencies
• Logistics support (medical) for remote locations
Competitors (primary application)

SKYX, Canada

DELAIR, France

INDIA

Skylark
GarudaUAV
Pigeon
Detect

Competitive Advantages

- Unique electric propulsion system (to be patented) which is efficient in hover, vertical and cruise flights than existing configurations.
- The propulsion system is configured to resist strong wind and is redundant.
Competitors (logistics application)

- DHL Parcelscopter (Germany)
- ALTI UAS (South Africa)
- Jouav (China)
- AeroLift Express (USA)

In land logistics
Oil rig logistics support
FeatherDyn Team

Founders

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Recognitions

★ Startup fund of a major Oil & Gas company
March 2019

★ Won the pitch fest at FORGE STARTegies camp, Coimbatore
Dec 2018

★ Idea Grant of Kerala Startup Mission
August 2018

★ Maker Village seed fund
May 2018
Thank You

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