The capstone project presented by, **"High Flyers,"** explores hydrogen-powered drones for extended-range aerial sensing for environmental, geospatial, and other wide area uses. It emphasizes their applications in industries such as oil & gas, energy, and logistics. The broader drone market, valued at $30 billion in 2023, is expected to grow significantly due to increasing demand for long-flight and high-payload drones.

The current reliance on battery-powered drones is limited by their short flight times (typically under an hour) and operational constraints. Hydrogen fuel cell drones are proposed as a solution, offering longer flight durations (around 4 – 9 hours and depending on the amount of hydrogen and payload), significantly less down time for refueling and reduced emissions and noise.. Technical considerations prioritize Proton Electrolyte Membrane (PEM) fuel cells for their balance of weight, cost, and operational performance. PEMs require hydrogen and oxygen as ingredients; oxygen comes from the air and PEMs, unlike other fuel cells, are tolerant to CO2 that comes with the air resulting in higher reliability.

The business model for High Flyers takes inspiration from a one-stop shop model wherein our strategic differentiators would be subject matter knowledge of the use-cases, energy and process industry, technology development (of hydrogen powered drones), regulatory landscape especially in the area of FAA licenses and potential post processing of drone surveillance outputs using AI. Our initial focus is the surveillance and inspection of pipeline, petrochemical / process plants, and electrical infrastructure in the Gulf Coast and then expanding globally. Newer use-cases such as ocean surveillance for oil sheens, plastic debris, geologic surveys and natural disasters damage surveillance will be added as the business grows.

The proposed roadmap includes:

1. **Year 0-1:** Pilot testing hydrogen-powered drones, refining the business model, and securing Beyond Visual Line of Sight (BVLOS) permits.
2. **Year 2:** Scaling operations with a 12-drone fleet featuring advanced navigation systems.

The diverse team experienced in oil and gas, regulatory, engineering, and technology commercialization is committed to move this capstone project into a real business. The team requests $2 million in funding over two years to validate use cases, establish partnerships, and navigate regulatory challenges. The initiative seeks to position High Flyers as a cost-effective, technology-forward vendor for extended-range drone applications in energy and related sectors.

Team:

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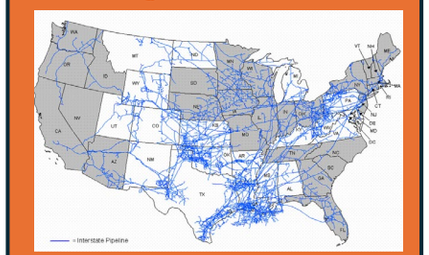
Highflyers

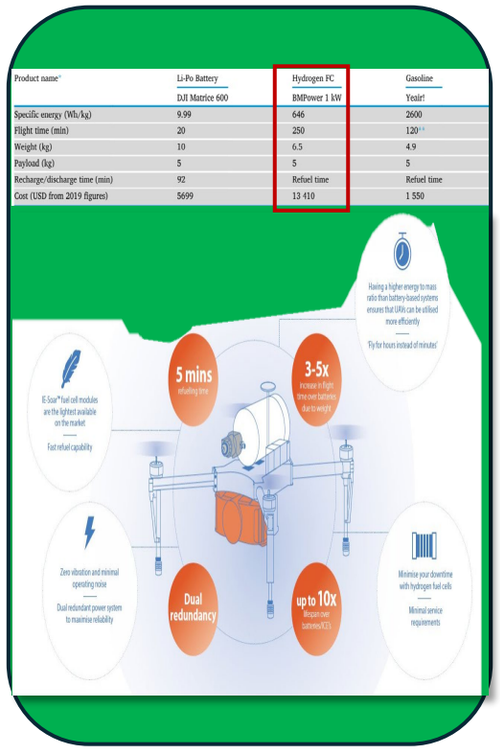
Extended Range Aerial Sensing with H_2-Powered Drones

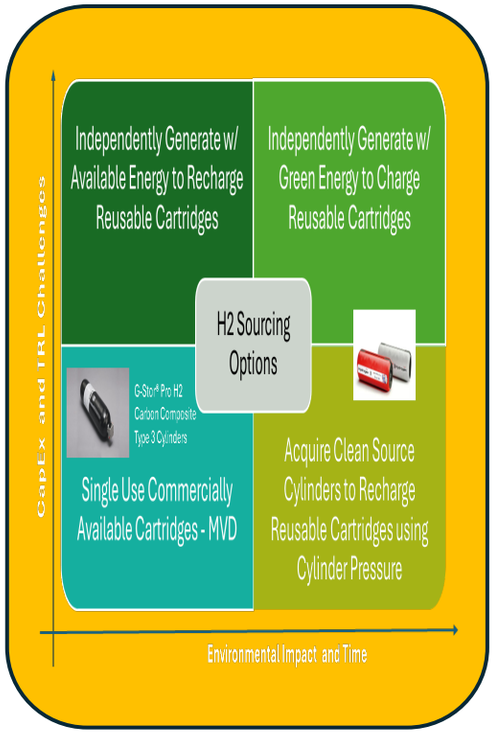
Business Opportunity → Technical Options → Source of H_2 & Market → Business Model → Timeline & Plan

Pipeline Integrity Management Market



CAGR of **5.16%** (2024-2032)





- Highflyers will provide aerial sensing, monitoring, and exploration services to renewable, oil and gas production activities required to explore, develop, and service resources and assets.
- The company will begin in the Gulf Coast region and eventually will have extensive geographical coverage, conducting business in approximately 80 countries.