CHENIERE ENERGY, INC.

Cheniere sUAS (Drone) Program

September 2018

Mission

To safely gather, process, and deliver aerial data to add business and operational value to Cheniere and its partners.

Cheniere's sUAS Program

- Operating for 2 years
- 600 miles of logged flight distance
- Currently 6 Certified Commercial Pilots
- Fleet of 5 Aircraft
- Variety of Payloads
  - Visible Spectrum Cameras
  - Optical Zoom Cameras
  - Radiometric Thermography

Application of sUAS Technology

- Primary Business Units Currently Utilizing Drone Program
  - Pipeline
  - Branding & Marketing
  - Communications
  - Land Management
  - CC Operations
  - Executive Leadership
  - SP Engineering and Construction
  - Marine

- Integration Horizon
  - Fugitive Emissions Detection
  - Environmental (Dredge Outflow, Wetland Development)
  - Land Management (Surveys, LIDar)
  - Corporate Security (Perimeter Mapping)
  - Health & Safety (Emergency Response Planning)
  - Technical Services (Flare Tip Inspections, Thermal Tank Inspections)

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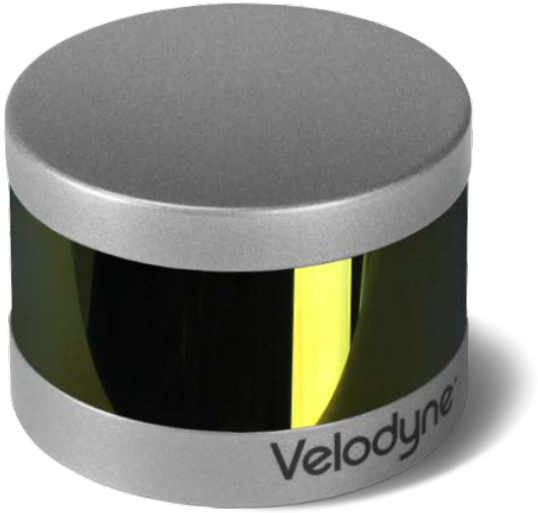
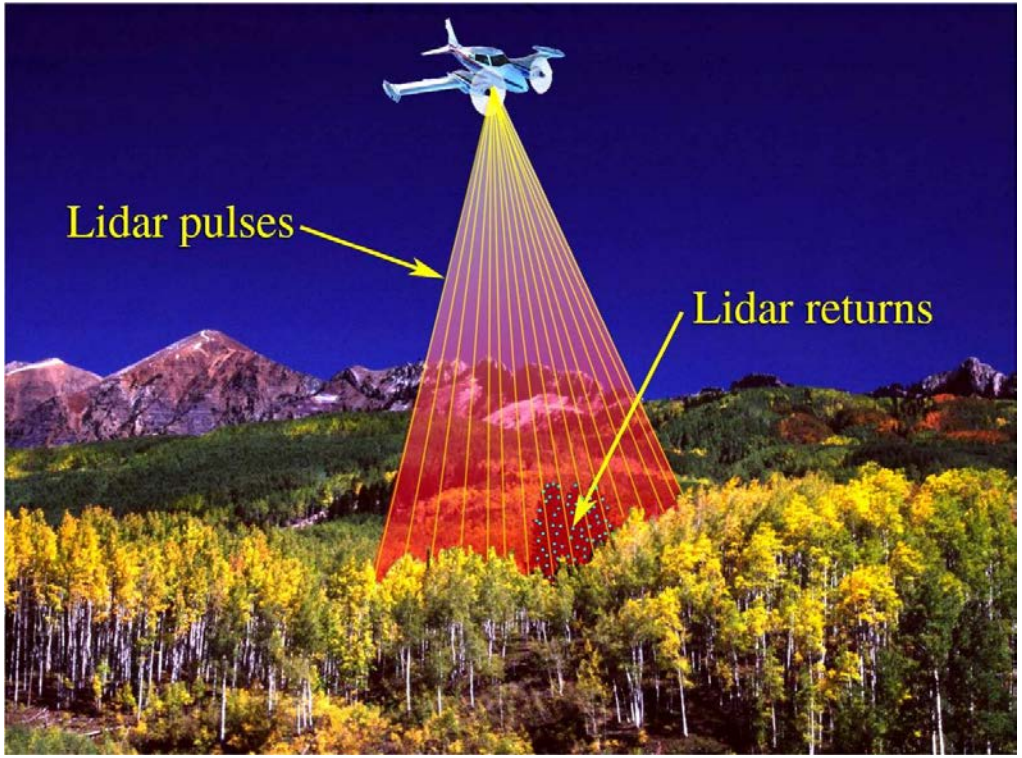
Missions

Land Management - LiDaR





Missions

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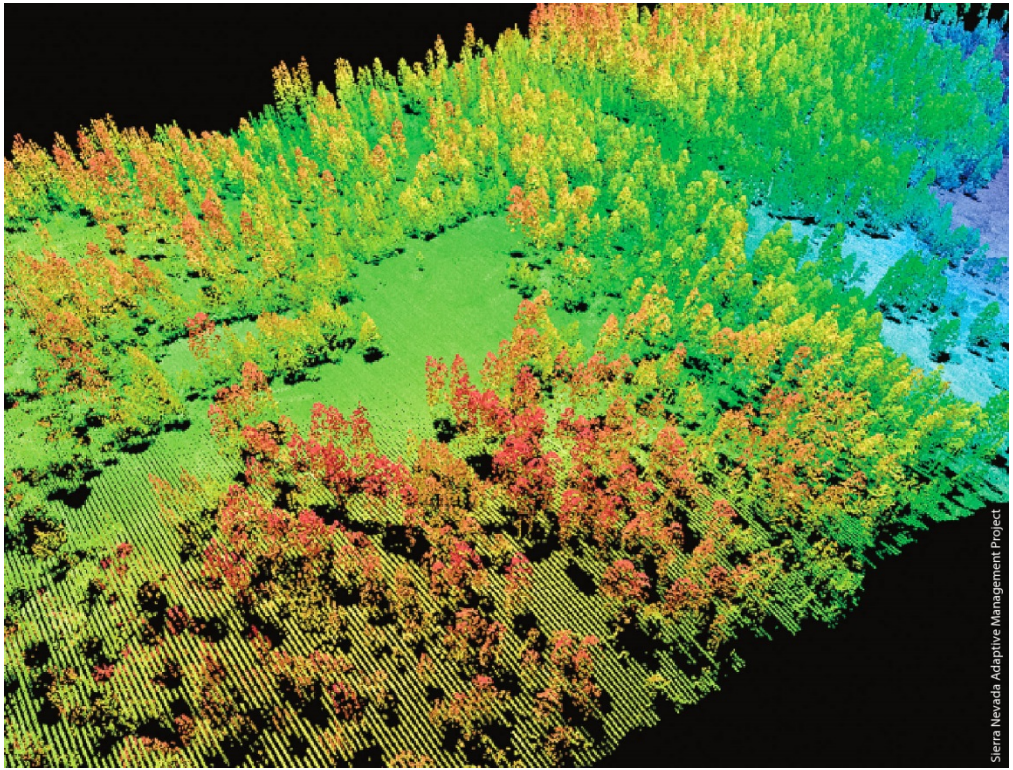


Missions

Land Management

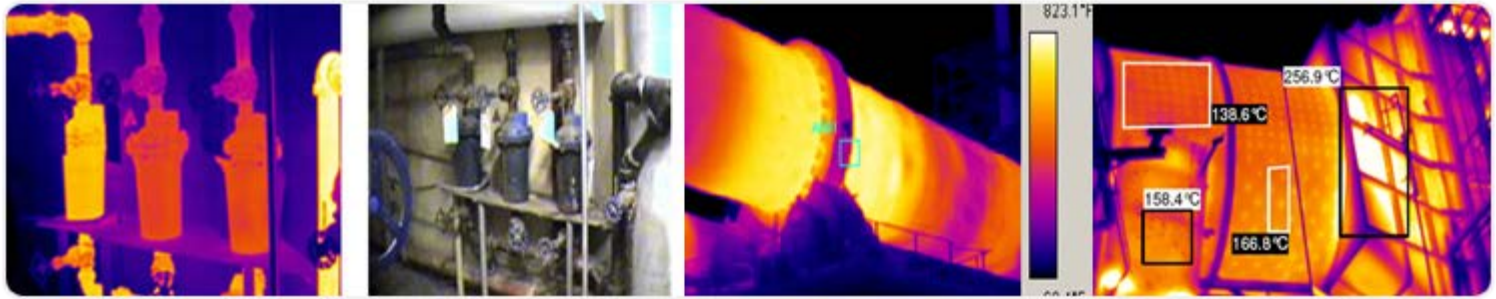
- Lidar
  - **Li**ght **D**etection **a**nd **R**anging
- Orthomosaic
- 3d Modeling

Missions

Pipeline – Fugitive Emissions Detection

Missions

Pipeline – Radiometric Thermography

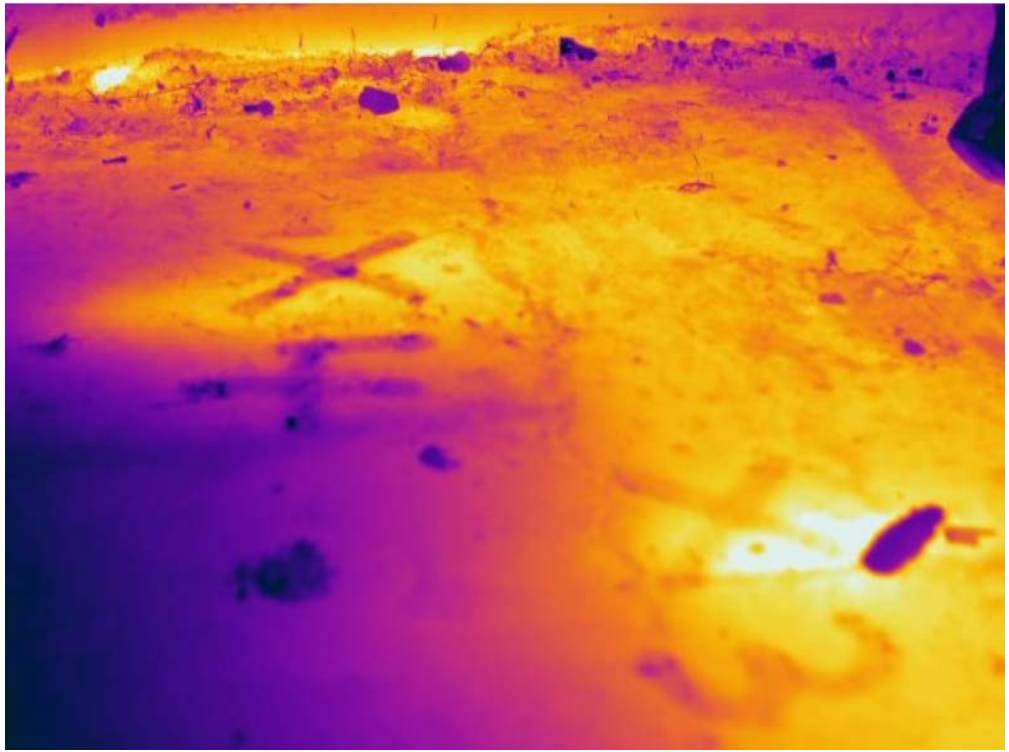


Missions

Pipeline

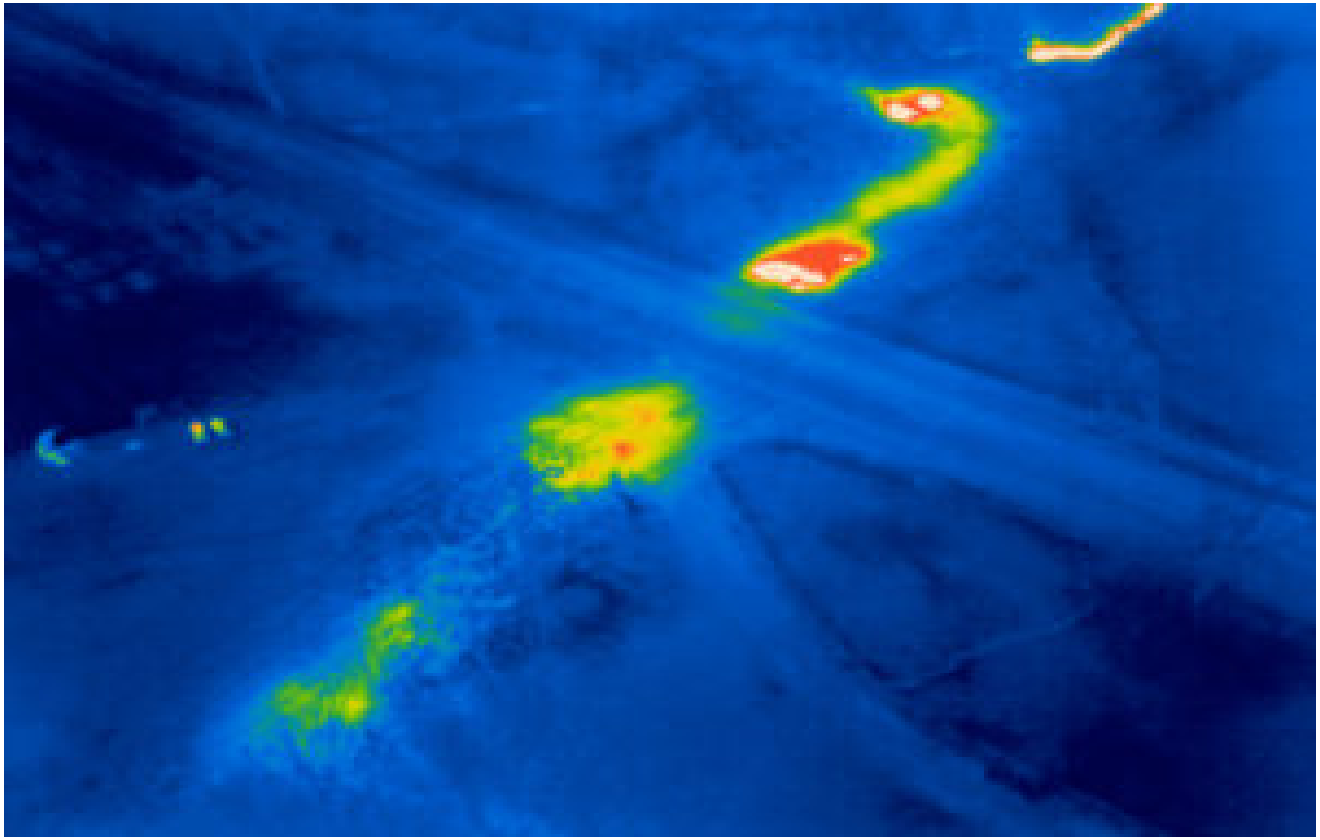
Missions

Pipeline



Missions

Pipeline



Missions

Marine – Corpus Christi Channel Flight

- The problem:
  - Need real-world video data for a simulation program.
  - Need persepctive on AtoNs in CC Channel

- The solution:
  - Utilize the quad copter to fly the entire approach from Corpus Christi bay to the Cheniere Corpus Christi marine terminal at helm height to virtualize an LNG tanker's approach.
  - Video and data will be used in the ship navigation simulator to ensure accuracy.
  - Navigational ranges will be assessed to ensure adequacy for LNG tanker operations
  - Currently the Marine team assess that 6 ranges will need to be modified.
    - Total cost of range modification is estimated at ~$6million
    - This mission could potentially reduce that price to ~$3million or less
  - Video with telemetry will be issued to LNG ship pilots to aid in their navigation.

Missions

Marine – Corpus Christi Channel Flight

- Outcome: Mission was a huge success, the video was used as expected and Cheniere was able to engage the Coast Guard personnel with objective evidence of the ATON positions.

Legislative Landscape for sUAS

- Current Rules
  - 14 CFR Part 107
    - General (Subpart A)
    - Operation of Aircraft (Subpart B)
    - Certification of Pilots (Subpart C)
    - Operational Waivers (Subpart D)

- New Rules
  - FAA Reauthorization
    - H.R. 4
    - S. 1405

Legislative Landscape for sUAS

H.R. 4 Subtitle B – Unmanned Aircraft Systems

- Section 332
  - 45502 – Integration of civil UAS into NAS
  - 45503 – Risk-based permitting of UAS
  - 45507 – Special rules for UTM and CNS
  - 45510 – Carriage of property for compensation or hire

- Sections 341, 342
  - CUAS Technologies

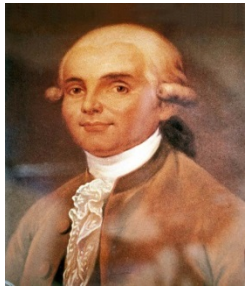
- Beyond Visual Line of Sight (BVLOS)

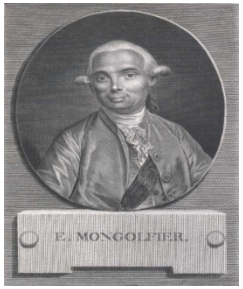
- CNS – Communication, Navigation and Surveillance
- UTM – Unmanned Traffic Management

Brief History of sUAS Technology

First use of sUAS

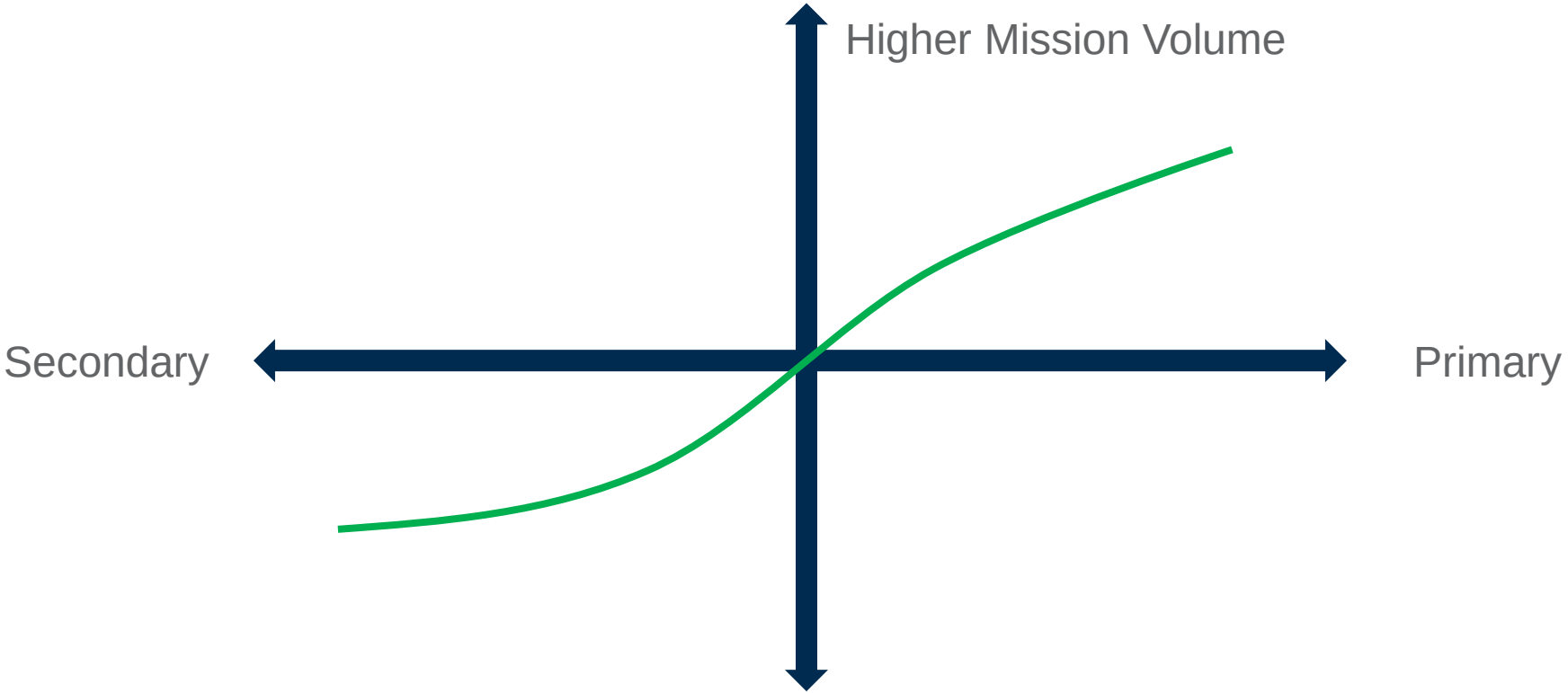
- France 1782
- Montgolfier brothers





- Distance flown: 1.2mi
- Was destroyed after landing by the “indiscretion” of passers by.

Shift from Secondary to Primary Role



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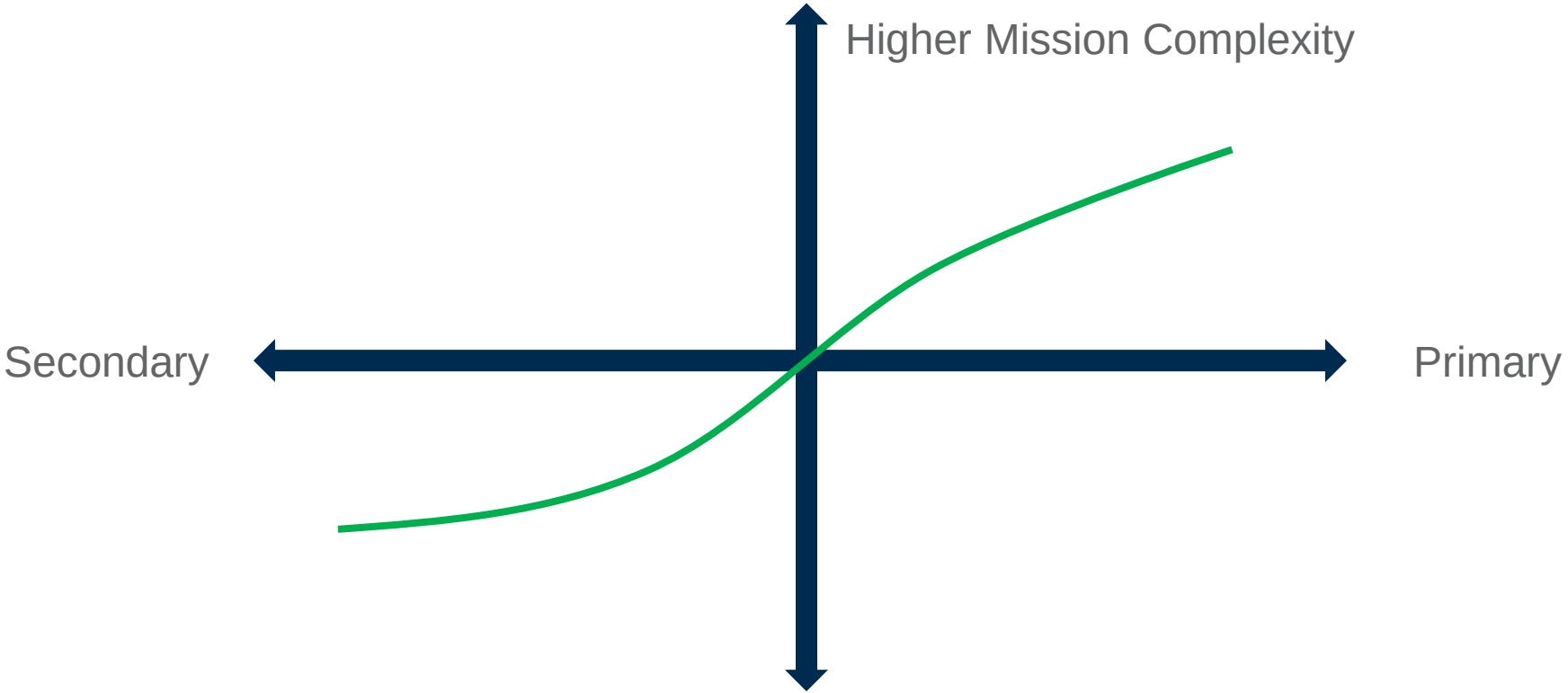

Thank You

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