



METHANE EMISSIONS DETECTION, GEO-LOCATION AND QUANTIFICATION



John Crane is an active participant in the effort to reduce methane emissions



Engagement with Key Stakeholders



OIL AND GAS CLIMATE INITIATIVE



UNEP



International Association of Oil & Gas Producers



European Sealing Association e.V.



What is Driving Energy Companies to Act?



Carbon footprint reduction
and Environmental impact
(Paris Agreement)



Transform emissions into
profitability; more energy
availability for the market



Safety



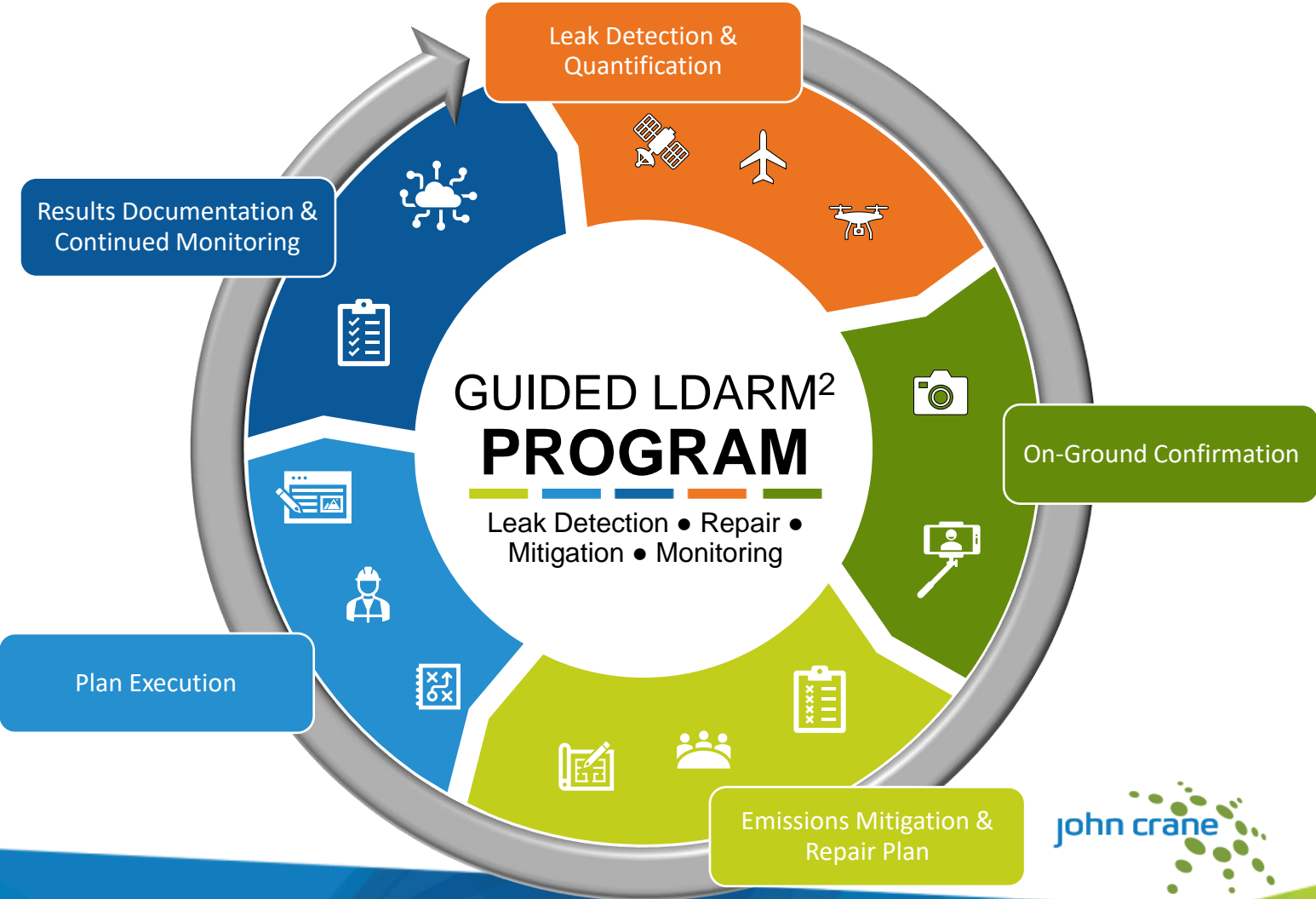
Government regulations

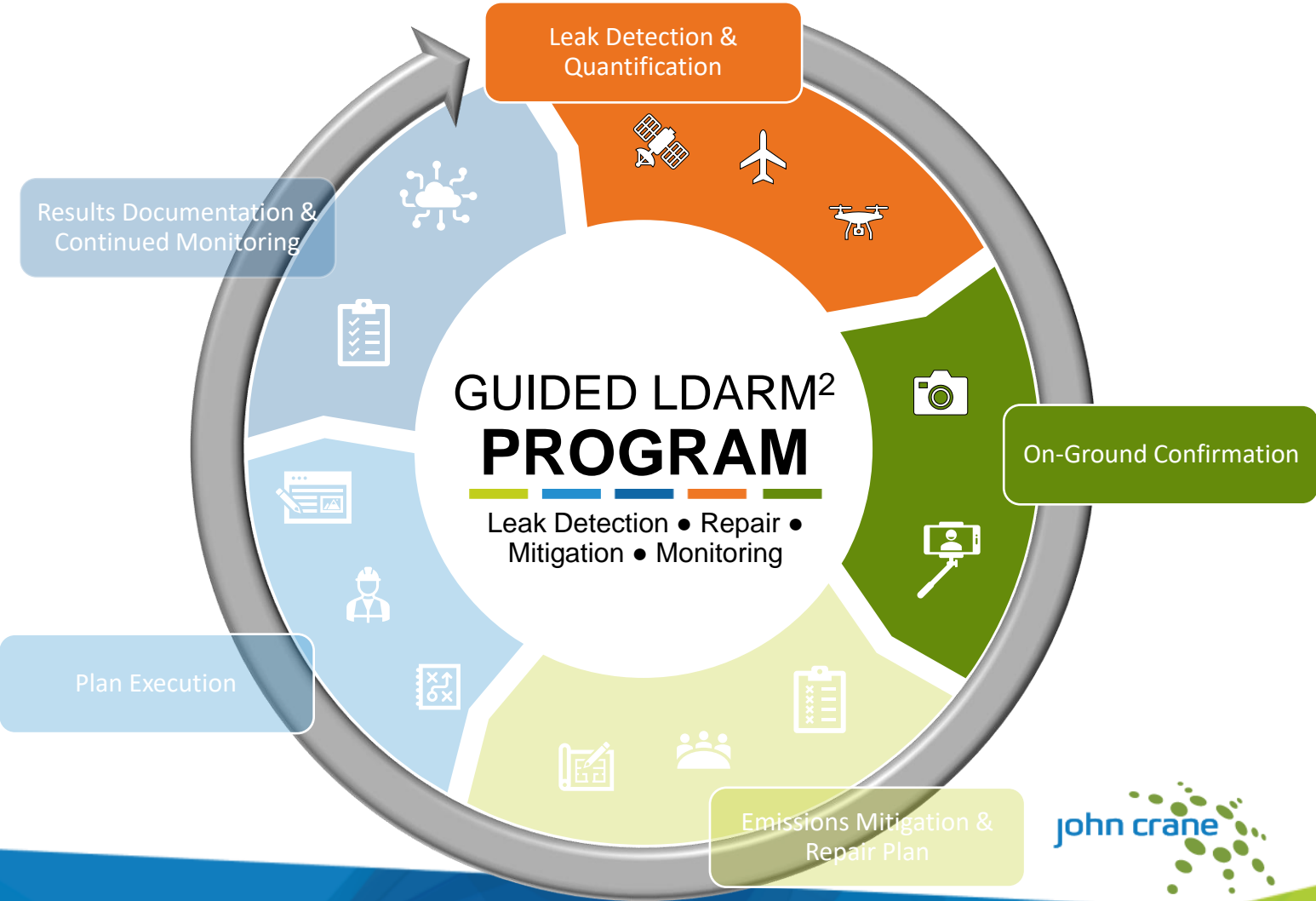


Pressure from Investors



Pressure from Activists





SATELLITES



AIRPLANES



UNMANNED AERIAL VEHICLES (UAVs)



GROUND EQUIPMENT

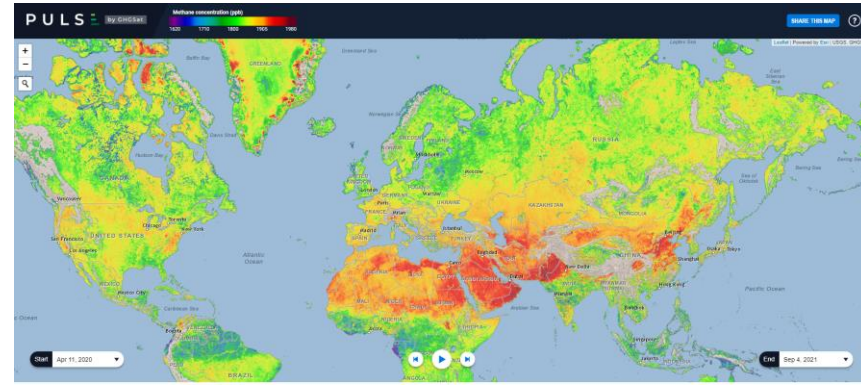
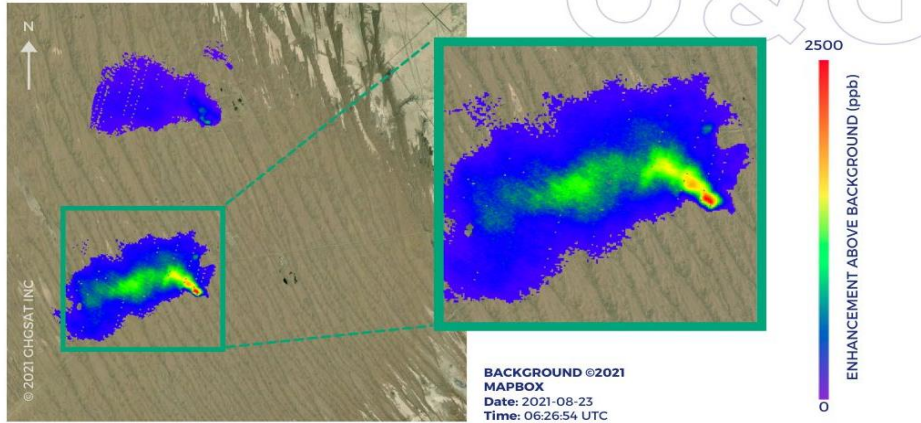


Flight Altitude	Single-Day Coverage	Detection Limit (kg/hr)	Resolution	Sensitivity	Offshore Capability
520 km	15 earth orbits	≥ 205	25m/pixel	18 ppb	No
1 km	Up to 100 mi ²	≥ 32	10 ft/pixel	N/A	No
0-5 km	4-100 mi ²	≥ 0.1	N/A	10 ppb	Yes
N/A	0.5 mi ²	≥ 0.0004	N/A	TBD	Yes

Satellite Methane Detection

Satellite CH₄ Measurement

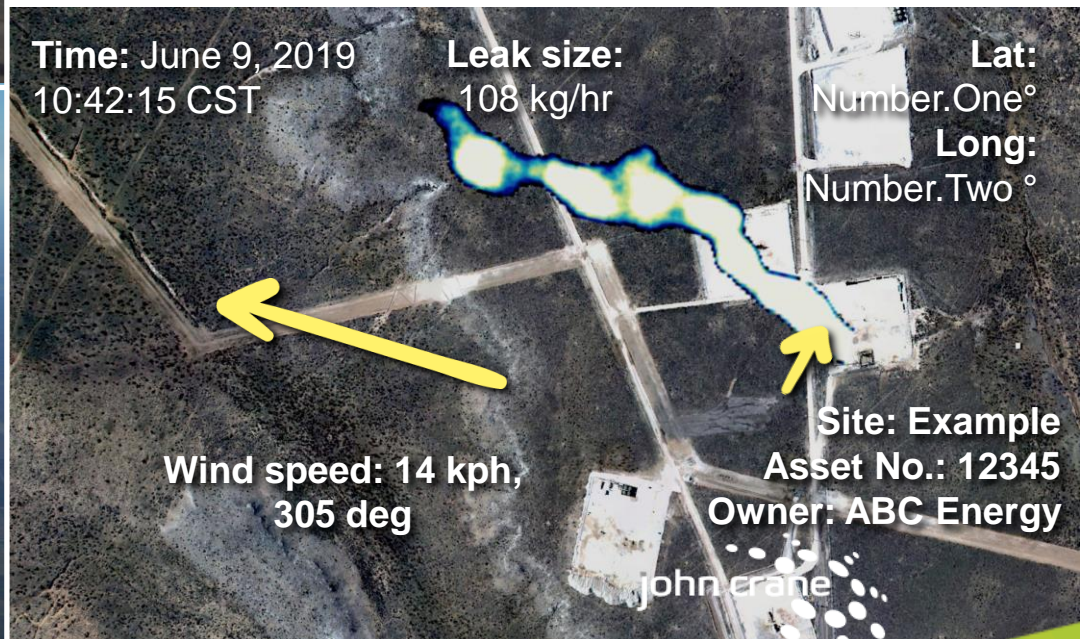
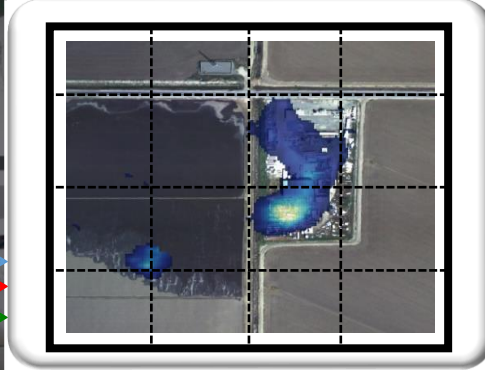
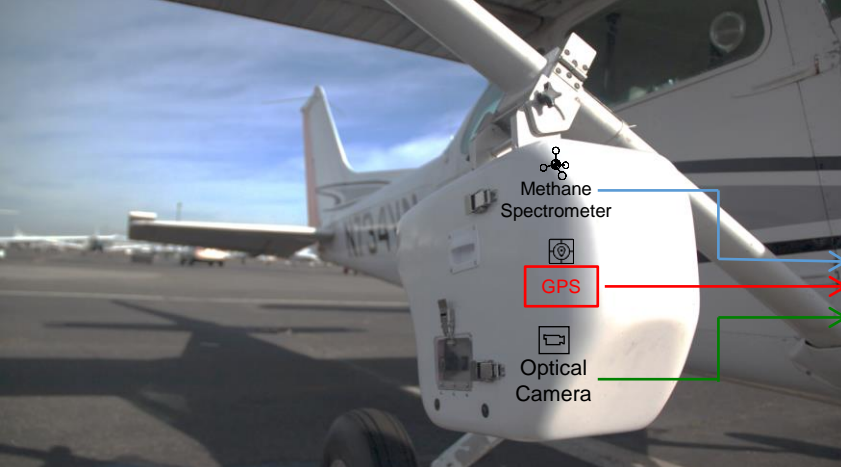
Oil & Gas - Turkmenistan, Central Asia



- Largest aerial coverage option
- Results provided in ppb methane
- Identify super-emitters for further investigation
- Not dependent on local licenses, permits, or regional stability



john crane



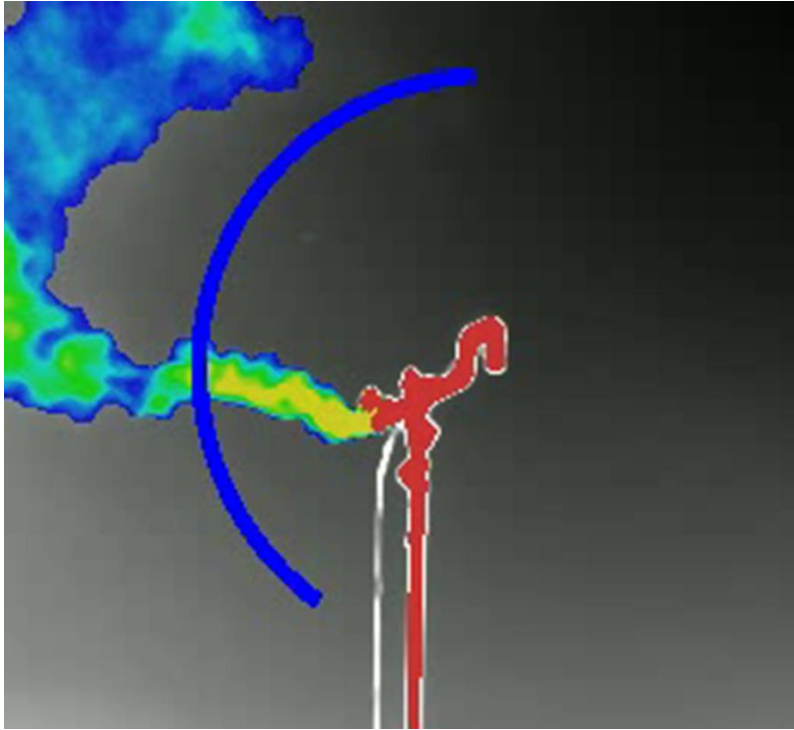
UAV Methane Detection & Quantification



- Visual Line of Sight (VLOS) options and BVLOS (Beyond Visual Line of Sight) options
- Onshore and offshore applications
- Quantifiable, actionable reporting with repeatable workflows
- Future state: meet or exceed regulatory reporting requirements



On-Ground Confirmation



- Trained operators pinpoint and quantify leaks identified by satellite or airplane
- Meet or exceed regulatory reporting requirements
- Quantifiable, actionable reporting

Way Forward



- Best-in-class methane detection and quantification technologies
- Global footprint
- Data for each plume gets loaded into your spatial data and repair management systems
- John Crane work with your teams to create and implement repair, mitigation, and monitoring plans
- Partnering with customers to achieve energy transition goals



Questions and Answers

