USING DRONES FOR PIPELINE OPERATIONS

By: David Sanders, Rotor Air Cams LLC

The days are over where the only way to conduct an aerial inspection on a pipeline right-of-way was to hire a pilot to fly a helicopter or fixed wing plane. Thanks to the technology of Unmanned Aerial Vehicles (UAV’s), aka: drones, these highly maneuverable and cost-effective tools are allowing pipeline operators to patrol their infrastructure in real-time without risking people’s safety. Inspections can be completed with live, precise, high-resolution imagery. Many companies are considering integrating remotely-operated aerial camera systems into their regular operations, and this can have a real impact in the oil and gas pipeline industry. Compared to the costs of hiring a pilot and aircraft (as well as the camera system solution) for hours as compared to performing work using a professional UAV provider; the latter would pay for itself quickly. More than that, drones are the future. As a fully digital platform, the integration of new applications that will come to market, their ability to be integrated into other software is the real future of drone technology.

Until recently, methods for surveying, mapping or locating leaks and damaged facilities were costly, time consuming and inefficient. Worker safety was jeopardized by sending workers into dangerous locations, having to climb to high places or to travel through rough terrain. Operations would need to shut down equipment during inspections, losing costly production time.

Specialized drones can be remotely controlled or fly autonomously through software-controlled flight plans working in conjunction with GPS. The drones flown by Rotor are quiet and environmentally friendly, with no pollution or emissions. They can hover and fly at high or low altitudes with special camera sensors creating air 3-D mapping, sending the footage in real-time to the operator to assess the footage. Small drones are able to examine areas where larger aircrafts cannot fly easily, such as densely wooded and remote areas, without putting a pilot at risk.

UAV technology services include aerial visual inspection capability, work progress at a site (change over time), 2D mapping/Survey capability (Orthomosaic), Pre-Visualization, 3D mapping, heat signature recording and more.

Used for preventative monitoring, drones can be equipped with sensors and cameras that transmit data thousands of miles away.

Pipeline operators are required to periodically monitor their systems including checking their right-of-ways to look for signs of a possible leak, including dead or discolored vegetation, pooling of liquid on the ground, dirt or debris blowing up from the ground, or unusual fog or clouding. From a perfect aerial height, UAV’s can ascertain above ground leak indicators, allowing the pipeline operator to take care of potentially critical situations at an early stage. Drones, using special optical devices, provide a safer way to inspect locations that are hard to reach or are dangerous for workers.

There is an association dedicated to advancing the unmanned systems and robotics community called The Association for Unmanned Vehicle Systems International (AUVSI). They split their divisions into three sections; air, ground and maritime, claiming to have the most comprehensive robotics database in the industry. In a recently published report, they estimate that more than 100,000 new jobs will be created by 2025 in the unmanned robotic industry. Agriculture and Public Safety are recognized as their two largest markets. AUVSI’s mission is to advance the unmanned systems and robotics community through education, advocacy and leadership, representing more than 7,000 individual members and 600 corporate members from 60+ allied countries involved in the fields of government, civil and commercial markets.

Pipe Safety

Pipelines are regulated by the Pipeline & Hazardous Materials Safety Administration (PHMSA) and are required to uphold Integrity Management (IM) and Operation and Maintenance Plans (O&M). These plans help the operator properly maintain safe systems including their above ground valves, facilities and right-of-ways. Regular patrolling of these areas are a standard part of pipeline practices to check for leaks or unauthorized encroachment. A timely discovery allows faster response to avoid an emergency situation.

To improve safety and upgrade their programs, pipeline companies are developing drone survey programs as an improved method to inspect their systems. Use of unmanned aerial camera systems is cost-effective, will have added value (digital architecture) and will increase worker safety.

At least one major company uses drones to monitor their Alaskan system. Largely unaffected by the weather, the drone allows the inspection at the convenience of pipeline personnel and eliminates the need to spend thousands of dollars for a piloted helicopter. UAV camera systems can fly pre-programmed flight paths utilizing GPS navigation, which allows for repeatable inspections in the future, enabling comparative change-over-time data along their system. Professional aerial platforms can also compare recorded photography to create a 3D map of your site (‘point cloud’). Manually flown patrols (as opposed to pre-programmed flights) enable the pilot to hover the drone above an area where an anomaly is detected, move closer as needed, share in real time with an inspector or supervisor, as well as take ultra-high resolution pickups to be reviewed later as needed. The early detection of these issues creates a faster response time.

Public Safety

On and offshore drilling rigs, platforms and towers can be monitored with drones both above and below water. Oil slicks show up clearly using infrared to identify leaks. The inspections and complicated tasks once handled by safety inspectors can be accomplished with UAV’s, minimizing the risks to workers. There is less need today to have personnel climb in dangerous places like gas flare stacks or hire a scuba team for underwater inspections.
Using infrared technology and thermal imaging, drones will be detecting heat loss and identify any potential leaks in the pipeline where hot spots might indicate structural weakness. Emergency situations relating to pipelines, such as leaking product or an explosion would be dangerous for people to get too close to. A UAV could monitor the situation while providing a live feed to the operator aiding in the efficiency of working with emergency responders. The thermal imaging cameras could view potential ignition sources before a leaking system explodes and drones can even provide radiation monitoring and measurement.

Having the ability to patrol and monitor pipeline facilities and right-of-ways easily, with high resolution imagery, pipeline companies will benefit in many ways. As adoption of these aerial platforms increases, the efficiencies, applications, and synergy with other systems will also increase. Someday soon, these versatile drones will be a common and integral part of pipeline operations.

Regulating Air Space

All operations conducted in civil airspace must meet minimum safety requirements. As of now, it is against the law to fly a drone for commercial use, unless The Federal Aviation Administration (FAA) has issued you a Certificate of Authorization via the ‘333’ Exemption process, which is the FAA’s current program to enable qualified pilots to utilize UAV’s for commercial operations, before the FAA’s regulations become public. This is approved on a case-by-case basis, and a series of requirements must be met, including having a certified pilot as a principal of the business. If a pipeline operator wants to use a drone for mapping or land surveys, they first need to apply directly to the FAA for the 333 Exemption and receive an FAA Certificate of Authorization (COA). It is important to note that as a business, companies must carry a FAA Certificate of Exemption to operate UAV’s commercially. ROTOR is in full compliance having an FAA COA for commercial drone use for typical visual inspection and survey operations.

For more information, contact David Sanders or Rotor Air Cams, LLC at 800-934-3945

www.ROTOR.nyc  A Veteran-Owned Business

FAA-2015-1230-0001

Aerial Survey Solutions (UAV)

FAA Certified, Fully Insured UAV Services for the Oil & Gas Industry

Work Progress & Survey, Aerial Inspection, 2D Mapping, 3D Mapping