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MARCH | VOL 2 | ISSUE 7

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TECH TALK

THE DRONES ARE COMING TO THE OILFIELD

BY GARY BEERS • FOR ENERGY PIPELINE



"ON THE ROAD AGAIN" may be Willie Nelson's opening song, but it is the story of a roustabout's workday in a rural oilfield.

In one week recently, he logged 70 hours and over 1,000 miles to spend less than 20 minutes at each of 50 well and tank battery sites to do visual inspections, measure free-board at eight pits, and download data from sensors at four wells. Adding to this routine, emergency trips were needed to check out four landowner complaints about open gates and hotshot several small pieces of equipment to fellow roustabouts working on repairs at well sites. And, to top off the week, the need to take infra-red photographs of flares at three well sites was postponed due to wet weather and landowner's request to stay off his range roads to prevent road damage. Instead of a truck, the roustabout dreamed about doing the assignments with an ultralight aircraft - obviously, this was impractical due to cost.

Another version of the roustabout's dream may come true in the coming year as one outcome of the booming business of commercial drones that is now sweeping the country.

Off-the-shelf drone helicopters for commercial businesses are outfitted with basic instruments for GPS navigation and color photography. Custom abilities can be added, such as methane and other gas sensors, cargo bay for small items (less than 10 pounds), armature for transferring cargo or movement of small items, and ability to download electronic data from fixed, monitoring equipment.

While commercial use of drones in oilfields is an emerging business with start-up services centered on pipeline inspections in Alaska, there are numerous ventures in the agricultural sector that are developing drone capabilities and practices that can easily transfer

to uses in the oil and gas sector. For example, drones fly a selected route and hover at designated locations to take photographs of soil and crop conditions from several elevations. In other industrial applications, onboard gas sensors provide the drone's ability to measure and record atmospheric concentrations near smoke stacks or flares. An advancement on cargo handling capability is demonstrated by a drone that can fly a location having a spare battery and arrive at the location and use the armature to change the drone's battery.

I discussed the various assignments carried out by the above roustabout with a developer/manufacturer of commercial drones located near Denver. The outcome was a variety of commercial drones (especially robotic helicopters) can be outfitted to perform these activities with a significant savings in the roustabout's travel time and costs.

- The roustabout's skills would be more effectively used in guiding the drone (minutes) than in the driving a truck (hours) to a site in a rural oilfield.
- With the assistance of the drone, the roustabout's less than 30 minutes of onsite work effort can be easily leveraged to photograph, from various angles and elevations, site and equipment conditions for a permanent record.

Also, the availability of this drone capability in the remote settings of oilfields would provide local standby public services to aid in search/rescue and help locate/monitor wildfires.

The Federal Aviation Authority has three levels of regulations for approving of unmanned aircraft operations in the national airspace:



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TECH TALK

- Public Operations (Governmental). Certificate of Authorization of Waiver (COA).

Approval for public agencies and organizations to operate a particular unmanned aircraft for a particular purpose in a particular area. Common uses today include law enforcement, firefighting, border patrol, disaster relief, search and rescue, military training, and other governmental missions.

- Civil Operations (Non-governmental). Special Airworthiness Certificate: Experimental Category.

Approval for civil, non-governmental operations that have demonstrated their unmanned aircraft can operate safely within an assigned flight test area and cause no harm to the public. The local FAA Manufacturing Inspection District Office will issue the certificate with operating limitations.

- Commercial Operations. Section 333 Exemption (under FFA Modernization and Reform Act of 2012).

Until regulations are specifically developed for safely integrating commercial operations of small unmanned aircraft systems into routine National Airspace Systems, the FFA is leveraging the authority under Section 333. The needed Small Unmanned Aircraft Systems Rule (sUAS Rule) is expected to be released for public comment later this year.

Approval for unmanned aircraft system if the specified operating conditions do not create a hazard to users of the national airspace or to the public - or pose a threat to national security. Approval may require COA and/or airworthiness certificate.

Examples of exemptions granted under Section 333 since December 2014 are:

- Motion picture and television filming within closed sets (7)
- Aerial photography for feature films (1)
- Precision aerial surveys and inspection (4)
- Precision aerial surveys for real estate characterization (1)
- Monitoring and ensure safety at construction sites (1)
- Flare stack inspections of oil platforms located in Gulf of Mexico (1)
- Photogrammetry and crop screening to perform precise agriculture (1)

Colorado and other states in the western oilfields are considering legislation regulating the use of drones;



however, these efforts are focused on privacy issues and public safety.

Within the above regulatory framework, there are opportunities to obtain approval for the use of commercial drones in rural oilfields under certain conditions.

Here are some activities are underway in North Dakota and Colorado to increase information and field data in support of the "boom" in commercial drone use.

NORTH DAKOTA

- In 2013, FFA selected North Dakota to host one of the six unmanned aircraft test sites in U.S. research ways to safely fly drones in the national airspace. The state is contributing \$4 million to start operations which are expected to provide at least 240 new high-skilled jobs.
- University of North Dakota offers the first unmanned aircraft college degree in the nation and is home to the Unmanned Aircraft Center for Excellence.

COLORADO

- In 2014, University of Colorado at Denver started offering a course, "Drone 101."
- In June, Denver will host the 2015 International Conference on Unmanned Aircraft Systems. The conference theme is "Integrating UAS into the national airspace."

When the FFA regulations and policies are clarified in the coming year, the industry for the commercial application of drones will explode and create hundreds of high-tech jobs.

Certainly, there is strong opportunity in the Niobrara Field (Colorado and Wyoming) for a new venture that is the national center for development of environmental monitoring and "roustabout" drones for commercial uses in oilfield operations. ♦

A variety of commercial drones, especially robotic helicopters, like this one, can be outfitted with cameras to help take pictures in the field, rather than taking the time to drive to site.