

What if UAVs Make Land Surveyors (Almost) Surplus to Requirements?



Three years ago, Ruud Knoops and his three business partners never dreamed that they would develop an unmanned aerial vehicle (UAV or 'drone') that could make the land surveyor surplus to requirements. Working faster, more accurately and fully automatically, Atmos UAV's Marlyn drone can complete two weeks' worth of land surveying work in 24 hours. Just try doing that using traditional

methods!

By Remko Ebbers, editor of 'Forum', the newsmagazine of VNO-NCW (The Confederation of Netherlands Industry and Employers)

When you see the black Marlyn drone from [Atmos UAV](#) taking off vertically and then tilting sideways a couple of seconds later, you might think for a minute that it's heading for a crash landing. But rather than witnessing a technical problem, what you're actually seeing is a controlled in-flight manoeuvre. Its inventors, [Ruud Knoops](#), [Dirk Dokter](#), [Sander Hulsman](#) and [Joost Bouman](#) developed Marlyn while studying aerospace engineering at TU Delft in The Netherlands. "There are two basic drone models: a traditional fixed-wing aircraft and the helicopter type," explains Knoops. "The downside of a fixed wing is that you need a runway space for take-off and landing, but the benefit is that it can fly faster and further. Helicopter-type drones don't need a runway, but they are inefficient. Our drone combines the best of both worlds without their disadvantages."

Land surveying is key market for Atmos UAV

Marlyn was a case of first designing a solution, and then seeking the problem it solves. The team ultimately found that problem in land surveying. "Modern-day [photogrammetry](#), the method for conducting land measurements from the air, has been around since 1950, but was very expensive until recently," says Knoops. "It entailed hiring an aircraft plus pilot and costly imaging apparatus. Now that sensors have become smaller and the technology more affordable, the technique is within reach of smaller companies too." This means that it is not only possible to map an area using photogrammetry, but also that it can be feasible to conduct drone flights every couple of months, such as to monitor the rate of land subsidence.



Atmos UAV's Marlyn drone

The Marlyn drone: accurate and easy to use

To find out precisely what professionals expected from land surveying drones, the company took a tried-and-tested approach: looking at what competitors were doing and visiting drone users and potential customers. After all, no one knows the pros and cons of each type better than the users themselves. One of their requirements was accuracy. "Our patented hardware – in other words, our Marlyn drone – can be deployed in winds of up to force 6 (*a strong wind in which it is difficult to hold on to your umbrella, Ed.*). That outrivals all of our competitors right now. And accuracy is extremely important; being out by just a half a degree at 100 metres up in the air equates to several metres on the ground, which is no good if you're building a road or measuring subsidence." Another requirement was ease of use, which is why Marlyn can be fully programmed to do everything automatically, from take-off right through to landing. Knoops: "We can teach everyone how it works in the space of a day."

Data for construction work, infrastructure projects and dike monitoring

Atmos UAV's customers are actually not primarily interested in the innovative drone itself. "For them, it's more about the data they can obtain with it," says Knoops. "We're still focused on how well it flies, but for our customers the work doesn't start until after the drone has landed. Our drone can do two weeks' worth of work for traditional land surveyors in just 24 hours, and instead of delivering 500 to 1,000 points, we provide millions. Construction companies and water authorities can use them to produce a 3D model which reveals all kinds of data about heights and distances with just a couple of mouse clicks."

Growing to 1,000 drones a year

Currently, the drones are still built manually in the YES!Delft workshop, but the company has plans to grow. Atmos UAV is already exploring companies that can make Marlyn's parts so that Atmos itself only has to do the assembly. "We intend to grow to over a thousand drones a year. That's not unrealistic; our biggest competitors produce 1,500 a year. Plus the market is clearly growing. Whenever we publish an article online, [such as the article about a remote island in the Indian Ocean](#), it immediately generates business for us."

Land surveying is an international industry

The company is looking forward to next year, when the European drone rules will be updated. "The regulators' biggest fear is that a drone will be involved in a crash with a commercial aircraft. But professional drone pilots pay close attention to the rules – their livelihoods depend on it. They also have the necessary permits and licences. The problem is with the amateurs who think they can simply launch a drone from a nearby field." The next step will be to work on uniform international regulations. "It's not ideal if the drone is subject to different rules in different countries."

The [original version](#) of this article appeared in Forum (in Dutch), the newsmagazine of VNO-NCW (The Confederation of Netherlands Industry and Employers)



[Mapping Silhouette National Park](#) from [ATMOS UAV](#) on [Vimeo](#).