STABILITY IS FUZZY

SKY TRONIC – START UP COMPANY AT WROCŁAW TECHNOLOGY PARK

Let's face it. Technology is amazing. Very often, before we even realise it, something that was once unimaginable or radical has become commonplace. Some might even say technology creeps up on us. Do you remember what life was like before the internet? Can you imagine life without it now? How about the jet engine? What about cars? Chairs? The wheel? In fact, anything and everything that has ever been discovered or invented that we now rely on and take for granted? It's all technology. And that's pretty cool.

Sky Tronic, a new Polish company, have taken a pretty cool idea called fuzzy logic and applied it in an incredibly cool way. This definitely falls into the category of, "so good, you'll not know how you lived without it," tech. But first, a quick, fuzzy history lesson.

About 100 years ago, we were looking for ways to help steer ships in a straight line. Anyone who's ever tried will know how impossible this is: you steer one way, you overcorrect, you steer the other way… and you effectively zigzag through the water. Even the best helmsmen of the day would have to constantly correct by +/- 2° to keep on course. In the hunt for a system that could both automate and improve upon this, the snappily named, "proportional–integral–derivative controller," (PID for short) was invented and this reduced the margin of error down to +/-0.5°.

Great news! But while this was very good for slow moving and reactive situations, like steering a boat, it wasn't as good in faster situations when we didn't so much need an accurate measurement as a good guess.

In case you're confused, imagine this: you are in a car travelling at speed towards a tree. Is it more important to know the precise distance between you and the tree and then apply a small correction to the steering before measuring the distance once again to see if you're still going to hit the tree? Or is it better to apply the brakes?

This type of computation requires more than just on/off logic; it needs to know as much as possible about all the not-so-obvious bits in between 'on' and 'off' too… and it became known as fuzzy logic.

Fast forward to the 80s and fuzzy logic took the camcorder world by storm. These small, hand-held devices had previously been prone to shaky-hand syndrome, so whenever you looked at the video you had filmed, it appeared as if you'd been standing in the middle of an earthquake. Enter fuzzy logic. Hand-held camera-wobble was obliterated, turning everyone almost overnight into Stephen Spielberg. Fabulous - but fuzzy logic didn't stop there!

Nowadays, it's all around us. Air conditioners, televisions, microwave ovens, automatic-transmission in cars; in fact, anywhere that requires intelligent control of a device to react quicker by correctly 'guessing' what it should do next. Try it on your smartphone. If you have a stabilisation option in the camera settings, that's fuzzy logic. It's normally switched on by default, so you may not even know it was there or that you were already using it…

Sky Tronic have taken fuzzy logic and applied it to an Unmanned Aerial Vehicle, or UAV. Not just any UAV though; a search-and-rescue (SAR) helicopter drone. They're currently working with the Mountain Volunteer Search and Rescue Group based in the Karkonosze Mountains on the Polish/Czech border. Their drone will be equipped with all the usual sensors to determine altitude, air speed and position, which will also be supplemented by ultrasonic and optical detectors, including IR thermal imaging.

What's really unique about these SAR UAVs, however, is not what data they'll be able to collect, but how they'll use it.

If you're flying, mountain rescue scenarios are not typically very healthy environments to be in. While you're busy looking for casualties, bad weather and poor visibility are often trying to chuck you at the nearest rocky outcrop. Our conventional PID controller might do an excellent job in calculating how close your UAV is to the rocks as the wind tries to crash the two together. Conversely, our fuzzy controller would tell the drone to steer the other way, quickly.

The sorts of applications that are being jointly explored by Sky Tronic and the Karkonosze SAR team include hunting for survivors after an avalanche, using IR to find anyone buried in the snow. Swift deployment of a UAV capable of wide-area searches in conditions unsuitable for larger, manned aircraft could make this application of technology revolutionary. If that wasn't enough, having found a survivor, the UAV might even be able to hover whilst lowering a first-aid kit to an SAR team on the ground. These types of manoeuvres have always been considered incredibly risky, but with fuzzy logic, Sky Tronic intends to reduce this risk and save lives.

The joint project, for which Sky Tronic has applied for EU funding, is expected to take about three years. Once complete, the company foresees rolling out the technology not only for SAR, but also to other life protection and rescue services. These might include the police, fire and rescue, coastguard and any other organisation that requires relatively inexpensive monitoring and search functionality from a stable, aerial platform.

And what about when the technology has been proven in UAVs? It probably goes without saying that the potential for fuzzy logic in larger, manned craft could be enormous and Sky Tronic have their eyes on this too. But not only. Given the multitude of data fuzzy logic can interpret, including from optical and ultrasonic detectors, they're also leading the field of non-GPS controlled positioning. This could be used to safely navigate when GPS is unavailable, for example, indoors.

With technology this exciting, it's hardly surprising that Wrocław Technology Park has welcomed Sky Tronic into its business incubator programme. This is where new and courageous start up companies, like Sky Tronic, can enjoy highly discounted office space, laboratories and other park facilities. These cost saving benefits really help young companies when they're starting out. To help even more, regular networking meetings are held, where members of the incubator meet other park residents to share ideas, gain valuable feedback and maybe even discuss future possibilities.

The sort of technology being pioneered by Sky Tronic today is only really limited by our imaginations. As time progresses and the technology matures, previously hazardous situations will become much less so, perhaps even normal. Users of the technology probably won't even realise they have it. And this has to be one of the best measures of successful technology – when it blends so seamlessly into our worlds that we simply couldn't imagine living without it.

Wrocław Technology Park is very proud to be able to support Sky Tronic in its early business life. Once again, the park is sponsoring technology that will really make a difference.