Going on-air at Blue Ribbon - round the lake Balaton boat race with Silvus MESH radio network in Hungary

Have you ever felt like walking in heaven after going through hell? Because that is precisely what happened to us during our last POC at the biggest lake in Central Europe, called Balaton.

It is something you should see to believe it, and I can promise you will never forget it. Neither will we.

We were asked to prepare a POC, which shows the capabilities of a MESH network providing internet connection to wireless cameras at boat races. These cameras are installed on boats, helicopters and different places ashore.

Competitive broadcast-quality wireless transmission technologies are not enough to cover such distances, so internet bonding devices are used at events like this. Several manufacturers are dealing with such technology on the market.

But even the best available solutions used by the biggest broadcasters like the national broadcaster in Hungary have a weak point: they depend on the infrastructure of an existing mobile network (3G/4G/5G).

Speaking from experience, you may all know what happens in places like stadiums, concerts, events or gatherings crowded with people. Not to mention forests, mountains, lakes or borders where mobile network coverage is barely enough to send a text message. That is why we started our preparations to provide additional network support to those bonding units for wireless cameras.

Good planning starts with good engineering. Silvus tools like link-budget calculator are our Swiss knife for preparation. We use it to calculate the proper frequency, bandwidth, spatial streams and the

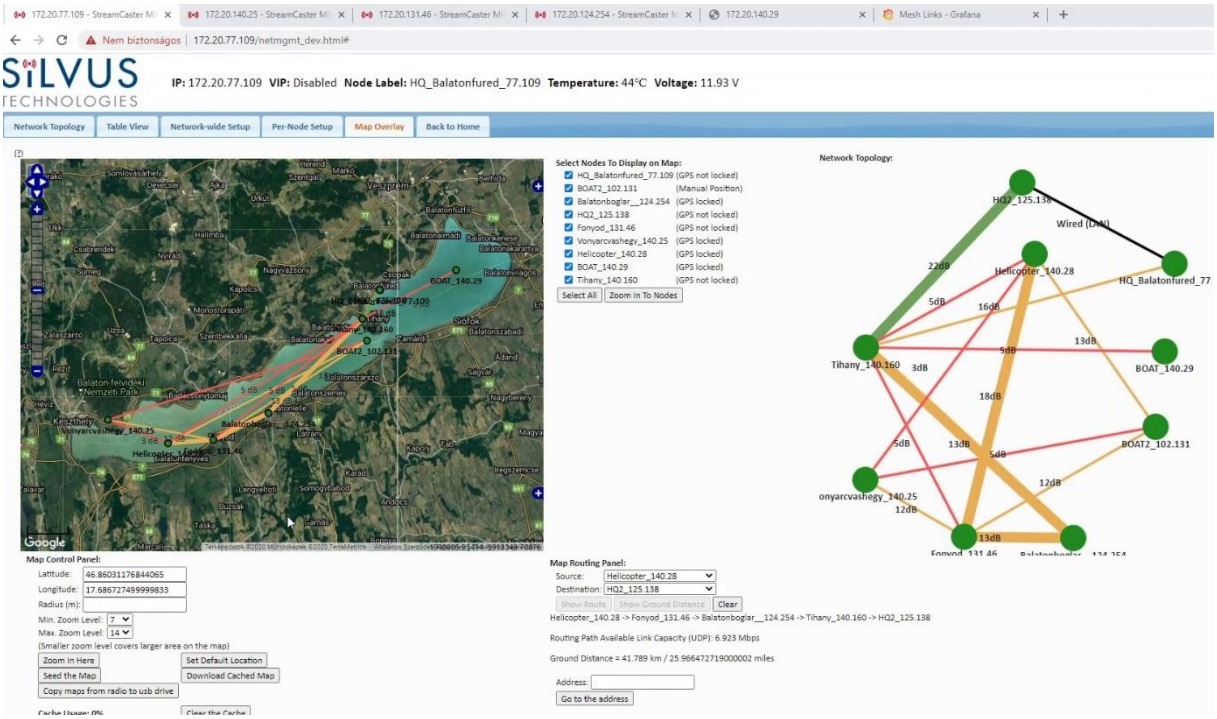
theoretically achievable maximum distances. Combining it with the Google Maps Measure Distance tool, they make an unbeatable combo.

Another inevitable tool you should remember to use when you plan such long distances is an Earth curvature calculator.

After planning everything in our pristine office, we began the field tests. It was the time when we realized that even if we have Line of Sight (LOS) between our units, most of the radio waves are absorbed in the water. It is obvious you may say but not completely. Even close to the water on a pier, we were able to send traffic between radio nodes kilometres away from each other. We wanted to achieve better connections, which meant we had to find better spots. Luckily, this beautiful lake is surrounded by gentle hills with adorable watchtowers. We aimed at these places, though they were further from the lake. And we succeeded.

According to Silvus routing panel, we reached more than 43kms with a UDP link capacity of 5Mbps using just 4bBi omni antennas on Streamcaster 4200 radios, from Alsóörs lookout-tower to Fonyód belvedere spot. Actually, it is almost the maximum theoretical distance that can be achieved based on the Silvus link budget calculator tool.

Although we were not able to pre-test the helicopter and the race boats, we were calm knowing that we were as much prepared as possible. Our main goal with the POC was to demonstrate that we could cover the whole lake with Silvus MESH network using six radios ashore, two on boats and 1 unit on a helicopter. We were pleased and proud because we were able to demonstrate that our planning and pre-engineering provided by our Broadcast Solutions GovCom Team were correct and we were able to see that our Proof of Concept was working. But this is not the end of the story yet.



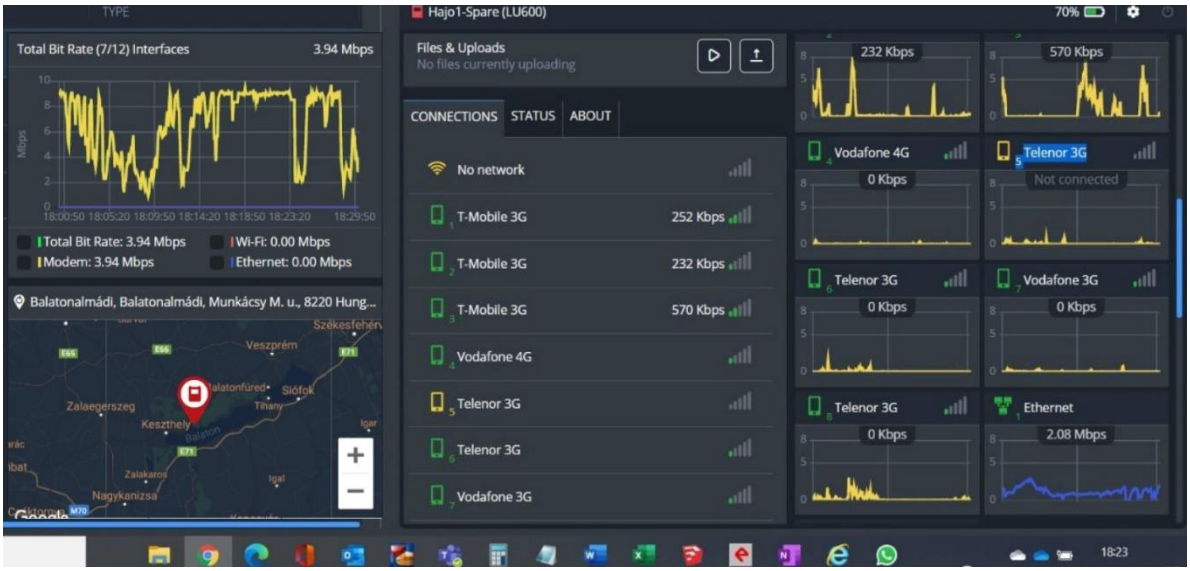
On race day, everything happened according to our planning. The race started, mobile networks went down, and there was no sufficient cellular connection not even with 8 SIM card bonding units. Because there was no live feed from the wireless cameras of the boats, spectators were watching the talking heads from the studio on the shore while a fantastic boat race was going on in the meantime. It was not the fault of the bonding units: it was the fault of the network they relied on.

That was the point when we had to decide if we were ready to raise the bar. We were already happy and satisfied with our results. Linking our POC to the Hungarian national broadcasters' M4 live stream

and going on-air could have ruined all our effort we had invested in this demo, not to mention our reputation. On the other hand, if we succeed, we will get our license to enter the gates of Broadcast Engineering Heaven if there is such a thing at all.

Guess what our choice was.

Some fine-tuning on the parameters, installing two additional sector antennas, one more radio, and finally injecting the internet to the network and Silvus' MESH network came alive.



Across the lake every bonding cellular unit combined with a Silvus radio got internet connection regardless their weak cellular network connection.

That is the story.

Everything went well, the show was saved, and everybody was happy and satisfied. All bonding units attached to a Silvus radio were able to broadcast live picture no matter they were up in the air or on the lake.

However, at the end of the day having our ice-cold beer we discussed our experience and experiences. We learnt some lessons that I think are worth to share:

- Do not save your time on preparation. That is engineering. Think, plan, work hard before you act. Then you just have to push the right button at the right time, which is like harvesting the fruit of your work. Really pleasing moment.
- After our experience we proved our concept about the boundaries of bonding cellular connections. We also found the solution to break these boundaries with Silvus radios, which are not necessarily the replacements of the widespread bonding cellular units but rather the excellent tool to extend the boundaries and capabilities of those technologies.
- These technologies are unbeatable together but separately they do what they are aimed to do. Silvus radios work as a layer2 wireless network switch and it is up to you what you use them for.

Our job is to find out and provide the best broadcast solutions for any situations not just in Hungary but all over the world. That is engineering, that is our mission and our passion, too.

Botond Horvath, Broadcast Solutions Hungary