The Radar Engineer's Report

The 16 SuperDARN antennas are about 25 meters high and have to be climbed for inspection in case anything is broken or needing to be replaced.

At the end of February 2020, Travis Duck arrived back in Cape Town on the *SA Agulhas II*, having departed on the ship in December 2018 for SANAE IV, South Africa's Antarctic base. Travis was contracted by SANSA to oversee the SuperDARN installation during the 2018/2019 'takeover'. He wrote an article for the SANAE IV newsletter halfway through his stint, explaining what this entailed.

"The radar operates 24 hours per day and is only shut down during excessive winds of at least 60 knots (around 120 km/h) or when maintenance is needed to be carried out on the system," he wrote. "This takeover we replaced the cables and cable trays leading to the 16 antennas. This required measuring and cutting each cable to exactly the same length of 146 meters. We needed to be accurate to a millimetre, so it was a rather intensive task."

He explained that this level of accuracy was important because of the propagation delay between the antennas, and ensured that the radar will give correct readings on the location of detections.

"The radar operates inside a hut near the antennas. Inside the hut are the 16 transceiver boxes, timing box and two servers (one for backup). The system sends its data to the servers at UKZN each night, and from there it is uploaded to the international SuperDARN server."

Travis noted that the current installation is the second version of the radar. "The first one was a TV style antenna (log-periodic) array, and could not handle the high wind speeds and rough weather here. One poor radar engineer, years ago, had the terrible experience of going outside and finding that one antenna had fallen over and hit another one, like a domino effect. This is my worst fear as I have no idea what I would do to fix that!"

"The current antenna design is a twin-terminated folded dipole, and has a much smaller surface area for the wind to catch. This upgrade was done during the 2008/2009 take-over. The radar was further upgraded from an analogue system to a digital system in the takeover of 2013/2014. The current digital radar was designed and built in-house at SANSA in collaboration with the Australians."

"I have had to climb the antennas a few times during the year and found that it is a rather exhilarating experience. We never climb in wind speed above 10 knots, and even at 10 knots it's unforgiving. I try for around five knots as the wind chills you to the bone and makes simple tasks like tying knots extremely difficult."

"The radar is working brilliantly and has only given me a few curve balls to figure out during the year. So far, it has been a fun and interesting experience."

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