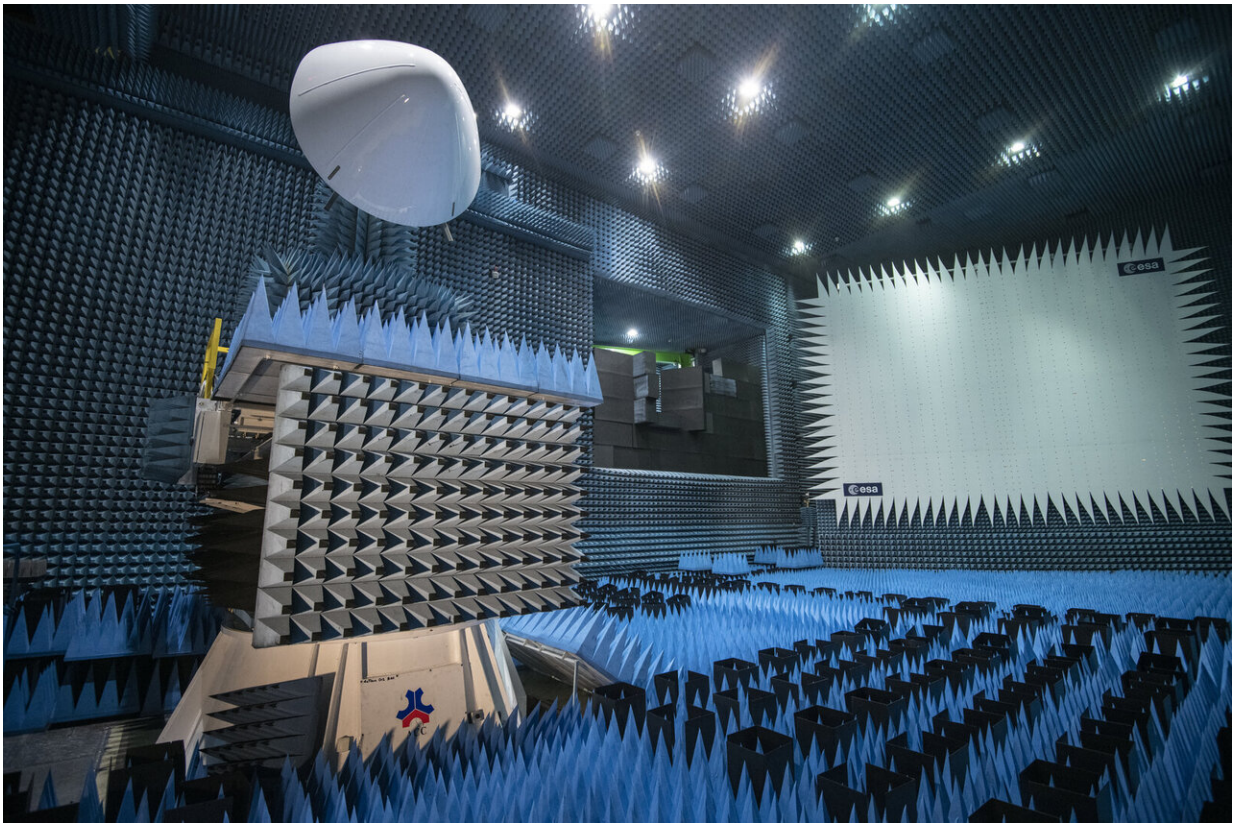


Image: Aircraft nose dome assessed in ESA Hertz chamber

November 13 2019



Credit: ESA-P. de Maagt

ESA test facilities can test more than just space hardware: here, the 2.0m-diameter nose of an Airbus A340 aircraft is seen in ESA's Hertz chamber, undergoing radio-frequency testing.

"We had a rare gap in our test schedule and were able to accommodate a commercial customer," explains ESA antenna engineer Eric Van Der Houwen.

"SPECTO Aerospace works on repairing damaged structural [aircraft](#) parts like radomes—radar domes—found on the noses of aircraft, which protect forward-looking weather radar and other equipment. But before any repaired radome can be returned to flight it needs radio frequency testing to confirm the repair has been a success and the structure is performing acceptably."

A radome can be damaged in various ways, including lightning strikes, bird strikes or due to hail erosion. The repair process needs to return the radome—an aramid fiber honeycomb composite sandwich structure—to be high mechanically stiff and aerodynamically smooth—while also ensuring its desired [radio-frequency](#) (RF) performance remains intact.

"Sometimes a repaired radome can look good but might not perform so well in RF terms," adds Eric. "It might be that the radome structure is absorbing too much RF energy, or triggering signal reflections or interactions that alter the shape of what should be a forward-looking signal. In this particular case, this radome requires a 'side lobe level test' – checking its sideways emissions.

"So we first of all measure the antenna pattern and energy level without the radome and then with the radome to see how much these values change. Finally we again test the antenna without the radome, to make sure our results match on a reliable basis."

Part of ESA's technical heart in the Netherlands, the metal-walled "Hybrid European Radio Frequency and Antenna Test Zone" chamber is shut off from all external influences. Its internal walls are studded with radio-absorbing 'anechoic' foam pyramids, allowing radio-frequency

testing without any distorting reflections.

The Hertz chamber carried out a rapid test campaign for the company, with the nose cone—which fits onto both Airbus A330 and A340 aircraft—into and out of ESA's ESTEC technical center in Noordwijk, the Netherlands in a single day.

"ESA is one of our reliable partners for specific aircraft parts testing," remarks Jeroen Mast, managing director of SPECTO. "Our in-house test facility is able to perform the standard transmission efficiency tests for aircraft radomes, with ESA's anechoic [test](#) facilities offering a valuable add-on to our services."

Provided by European Space Agency

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