

# A VLBI antenna at the island of Madeira

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## ABSTRACT

It is now 12 years since we started our project of placing a VLBI antenna at Madeira, ideally linked to the EVN (currently with 18 antennas). The EVN is now growing to become e-EVN with all antennas linked via fibre cable in order to do real time data acquisition and processing. On our side, we have completed all measurements required to inspect in detail the best sites in Madeira: weather, RFI and horizon profiling. We keep two excellent sites in Porto Moniz on hold for a final decision.

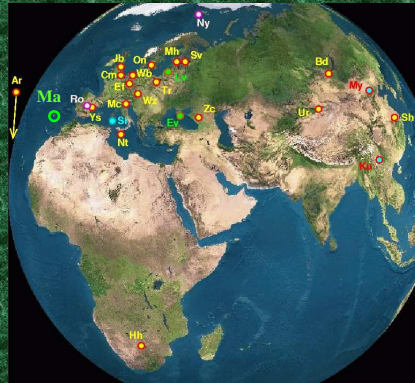
## THE CASE FOR A NEW ANTENNA AT MADEIRA

A radio telescope in the Atlantic has been an old ambition of radio astronomy, since this would reduce the infamous 'mid-atlantic gap' seen in the u-v plane coverage of global Very Long Baseline Interferometry (VLBI) observations. In particular, the European VLBI Network (EVN) now includes an antenna in the other side of the Atlantic (Arecibo - Ar) and, thus, a VLBI dish at Madeira (Ma) is very relevant to help increase the sensitivity of the instrument (related to u-v coverage). The argument only gets stronger when considering the South African antenna at Hartebeesthoek (Hh), also part of the EVN: as a whole on the planet, the EVN has an east-west configuration, so the more we "approach the southern hemisphere" the better sensitivity we will get to observe sources where all the action will take place in the next decades (ALMA, SKA, E-ELT).

## RESULTS

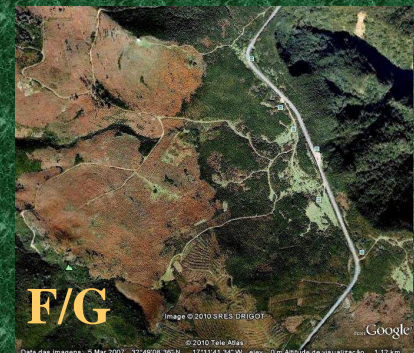
Wind is not a problem for any of the two sites. We are still assessing column water vapour information from satellite data.

As regards RFI, both sites are excellent. In fact, at peak interference, both are better than the IAU recommendations by a factor of over 20! And by a much higher factor at the mean RFI level.



## THE TWO SITES

The ideal site to build a radio telescope is not necessarily a high mountain site but rather a shallow valley protected from city/man made interference. It should not be exposed to frequent gusty/very strong winds. Seven sites (A-G) were initially selected for on-site inspection, of which only two (D and F/G) are now left. The first is at an altitude of 1300 m while the second varies from 1000-1100 m (gentle westlooking slope). See maps below.



## MORE ISLANDS

The Expres network was a great experience to test fibre optic cable performance and real time radio interferometry. The current move south of the largest astronomical instruments skyrockets all Atlantic islands as particularly relevant places for VLBI radio antennas.

## ACKNOWLEDGEMENTS

our very serious Site Surveying Committee

