Enhancing the IRAM30m telescope for the next 15 years

Carlos A. Durán[1*], Miguel Sanchez[1], Manuel Castillo[1], Salvador Sanchez[1], Joaquín Santiago[1] and Antonio J. Vázquez [1]

***Abstract*—The IRAM30m millimeter-wave radio telescope started its operations in 1985. Since then, it has undergone multiple upgrades, including those related to instrumentation, thermal control, as well as telescope hardware and software. To ensure the radio telescope remains competitive over the coming 15 years, it requires more substantial renovations and updates. The first major step in that direction involved replacing the entire servo control system of the radio telescope. This affects both the main axes (AZ/EL) and the sureflector hexapod, as well as the subreflector wobbling system. This modernization is currently undergoing and being funded by Regional European Funds. Another significant improvement involves enhancing the main reflector surface by restoring the characteristic 30m white paint to maximize the radio telescope optimal performance across the entire elevation range. Along with these refurbishment taks, essential pieces of software for the telescoope control and science operations are being updated or replaced. After this upgrade is completed, science operations will resume. Meanwhile discusssions about further improvements that would include new instruments, surface degradation tracking and external spourious signal tracking and monitoring are taking place.**

***Keywords*— Instrumentation, IRAM, Telescope, upgrade.**

I. Introduction

IRAM 30m telescope, built in 1981, has been successfully operating since 1985. The contribution of the IRAM30m to science during these almost 40 years is undeniable. Moreover, the 30m has been source of inspiration and reference for many other telescopes/observatories [1] around the globe, not only from the purely scientific point of view, but also for the technical (hardware, software, techniques, etc.) and operational aspects.

The telescope has reached the point where more substantial and disruptive changes are required to keep it at the forefront. These changes include the upgrade of critical hardware like the servo system (see Fig 1.) and interface software as first steps. Still in this long-term view of 15 years, the telescope -observatory- would require also major upgrades on instrumentation, control system software, data reduction software and critical KPI monitoring tools. This talk presents the extent of some of the most relevant tasks carried out so far, and provides an overview of what we are aiming for the future of the 30m.

Fig. 1. IRAM30m telescope during the hexapod replacement, as part of the servo control system upgrade. July 2023.

References

[1] R. Guesten et al, "*The Atacama Pathfinder EXperiment (APEX) – a new submillimeter facility for southern skies*–" A&A 454 (2) L13-L16 (2006) [Online]. Available. https://doi.org/10.1051/0004-6361:20065420 [Accessed: Jan. 26, 2023].

[1]Instituto de Radioastronomía Milimétrica IRAM, Granada, 18012, Spain.
[*]Carlos A. Durán / cduran@iram.es

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