

AccessionIndex: TCD-SCSS-T.20250103.001

Accession Date: 3-Jan-2025

Accession By: Dr.Brian Coghlan

Object name: First Birr I-LOFAR radiotelescope on-site data acquisition computer

Vintage: 201x

Synopsis: Isilon RAID server. S/N: G081790013L.

Description:

As of 2025, LOFAR is a complex of 52 radiotelescope sites in Europe, stretching over 2000km from Birr in Ireland to Poland, with a central clustering in The Netherlands. Each site is based on the same physical and abstract interferometric template and operates in one of two mutually exclusive modes: *Remote* or *Local*. During *Remote* mode each site acquires observation data between 10 and 240 MHz, combines it in custom on-site signal processing hardware, and feeds the live result data to a central computing complex in Groningen that can combine the data from a multiplicity of sites, yielding a resolution that is a function of the maximum distance between those sites. Users can apply for *Remote* mode observation time, which is scheduled centrally, typically during weekdays, with sites centrally switched to *Local* mode during weekends, although such scheduling is not fixed in stone. During *Local* mode the site is controlled by the local users.

LOFAR was conceived within ASTRON (the Netherlands Institute for Radio Astronomy) in the 1990s, designed and tested in the 2000s, and officially opened in 2010. LOFAR is a pathfinder for the Square Kilometre Array (SKA). A major upgrade to LOFAR-2.0 is in progress, designed to deliver high-quality and innovative science throughout the present decade and beyond.

I-LOFAR is the Irish station. Funding was granted to a consortium of Irish universities led by Trinity College Dublin (TCD), with partners from University College Dublin (UCD), Dublin City University, Athlone Institute of Technology (AIT), the National University of Ireland Galway (NUIG), University College Cork (UCC), the Dublin Institute for Advanced Studies (DIAS) and Armagh Observatory, with principal investigator Professor Peter Gallagher (then of TCD, now of DIAS). It allows Irish astrophysical research to be integrated into one of the most sophisticated telescopes on the planet. University contributions and the help of private donors and Science Foundation Ireland (SFI) plus the commitment of the 7th Earl of Rosse and also a team of undergraduate physics students enabled I-LOFAR to be installed by 2017 at the *Rosse Observatory* on the grounds of Birr Castle, which has a long and rich heritage in science and engineering.

This specific machine was the first Birr I-LOFAR on-site data acquisition computer. It acquired data over a 10Gbps fibre link directly from the Astron receiving container, and stored the data in internal terabyte-scale (>4TB) storage configured as RAID-5. The data was then shared with other elements of the system over 10Gbps Infiniband.

Thankyou to Dr.Brian Coghlan for donating this item.

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Some of the items below may be more properly part of other categories of this catalog,
but are listed here for convenience.

Accession Index	Object with Identification
TCD-SCSS-T.20250103.001	First Birr I-LOFAR radiotelescope on-site data acquisition computer. Isilon RAID server. S/N: G081790013L, 201x.

References:

1. Wikipedia, *Low-Frequency Array*, see:
https://en.wikipedia.org/wiki/Low-Frequency_Array
Last browsed to on 5-Jan-2025.



Figure 1: First Birr I-LOFAR radiotelescope on-site data acquisition computer, front three-quarter view



*Figure 2: First Birr I-LOFAR radiotelescope on-site data acquisition computer, front view.
There are twelve removeable terabyte-scale SATA RAID drives behind the removable front panel.*



Figure 3: First Birr I-LOFAR radiotelescope on-site data acquisition computer, rear view

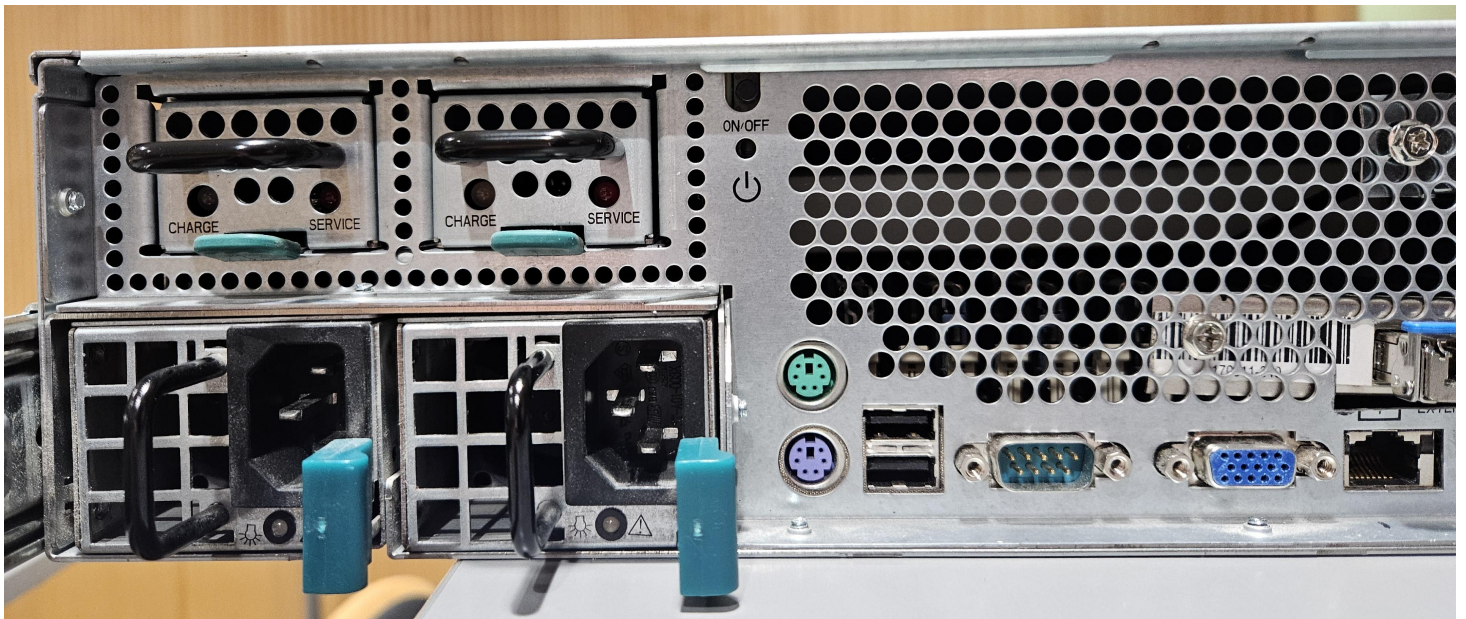


Figure 4: First Birr I-LOFAR radiotelescope on-site data acquisition computer, rear left closeup, showing dual-redundant power supplies and power ON/OFF button.

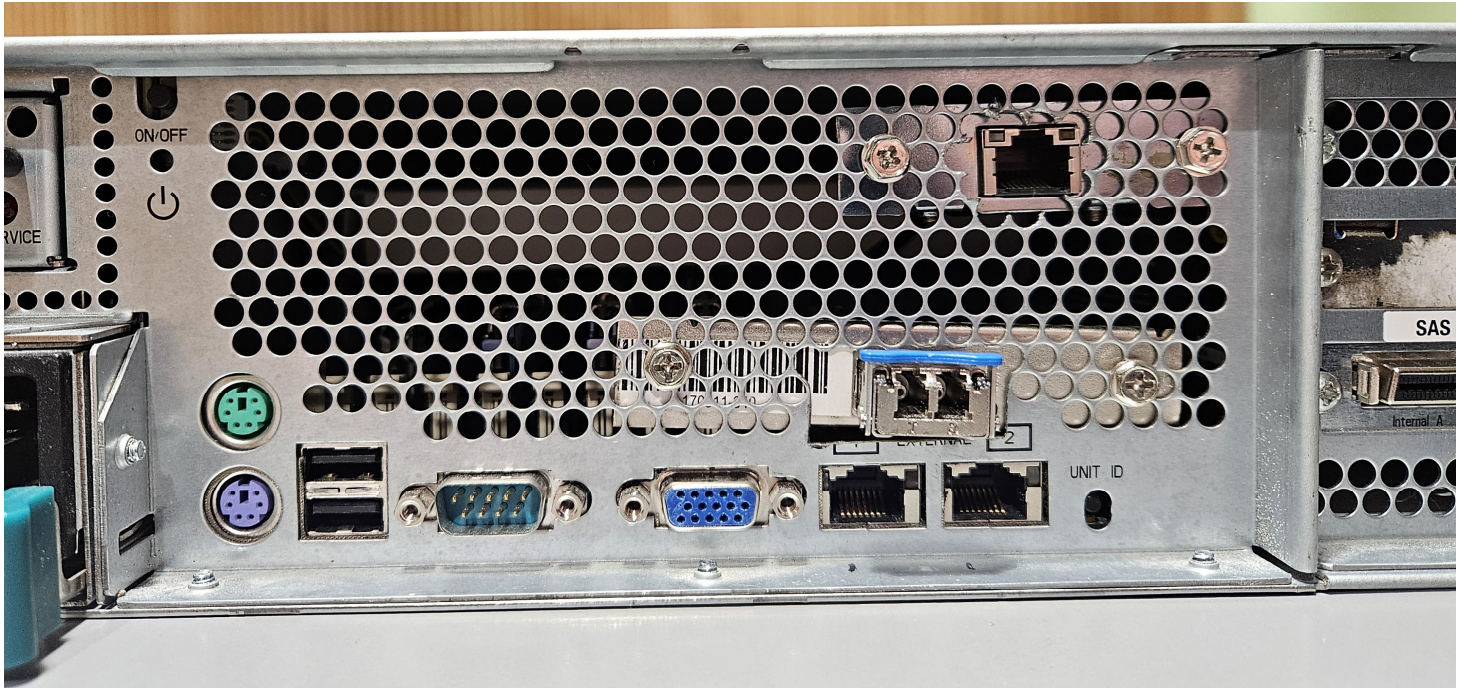


Figure 5: First Birr I-LOFAR radiotelescope on-site data acquisition computer, rear middle closeup, showing standard PC interfaces plus IMPI remote management and 10Gbps fibre interfaces.



Figure 6: First Birr I-LOFAR radiotelescope on-site data acquisition computer, rear right closeup, showing internal RAID controller and 10Gbps Infiniband interface.