



INTERINSTITUTIONAL AGREEMENT FOR SCIENTIFIC COOPERATION
between
UNIVERSITY OF TURIN - DEPARTMENT OF PHYSICS (DP-UNITO)
and
ITALIAN NATIONAL INSTITUTE FOR ASTROPHYSICS (INAF)

The University of Turin - Department of Physics (hereinafter DP-UnitO), represented by the Rector Prof. G. Ajani and its Director, Prof. S. Massaglia

AND

The Italian National Institute of Astrophysics (hereinafter INAF), represented by the President Prof. Nicolò d'Amico.

sign this interinstitutional agreement to establish and maintain scientific cooperation and relationships between the two institutions related to participation to the International Low Frequency ARray (LOFAR) Telescope (hereinafter ILT) activities.

PREAMBLE

INAF is the Italian national Research Organisation for Astronomy and Astrophysics controlled by MIUR, the Italian Ministry for Education, University and Research. Organised in 16 institutes distributed in the Country, INAF counts on about 1400 employees of which about 1000 staff and 400 on temporary contracts. INAF counts also on about 400 associated researchers, i.e. employees of Universities or other research organisation that are formally admitted to participate to INAF research programmes.

On March 23, 2018 the Council of INAF approved participation of INAF to the ILT and the programmatic roadmap for LOFAR proposed by the Scientific Director of INAF.

The ILT requires a coordination of activities at National levels in the form of a Consortium that gives a chance of aggregation between different research institutions and groups interested in the exploitation of LOFAR. National Consortia should have a legal representative that acts as contact with ILT for legal and financial issues. The specific form and rules of the National LOFAR Consortia depend on the current laws and administrative boundary conditions in each Country.



Consequently, INAF is willing to act as aggregator of the national Italian interest in ILT by promoting the program and stipulating bilateral or multilateral memoranda of understanding and interinstitutional agreements with other interested parties, with particular reference to Universities. This national aggregation is aimed to form what has been preliminarily named LOFAR-IT Board.

In 2018 INAF started negotiations with the ILT Director and Netherlands Institute for Radio Astronomy. ASTRON and AstroTec Holding representatives defining a roadmap to become ILT member. Negotiations that allowed INAF to immediately join the ILT immediately having a status of full member is based on the following three items.

- A one-time entry fee in-kind contribution valued at about 400 kEuro to contribute to the technical development of LOFAR 2.0 stations.
- An agreement with AstroTec to purchase a LOFAR 2.0 station in 2021-22.
- An annual participation defined by the ILT Board.

After the formal approval by the INAF Council, INAF has signed the following three agreements with three different partners (see attached documentation).

- (i) The first agreement with ASTRON on the development of LOFAR 2.0 stations;
- (ii) The second agreement with AstroTec Holding to purchase one LOFAR 2.0 station as soon as it becomes available.
- (iii) The third agreement with ILT to complete statutory requirements so to allow INAF admission to the ILT Board as full member. This implied the sharing of the ILT observing resources even before having an operational LOFAR 2.0 station.

To coordinate LOFAR actions in Italy, including the aggregation of external institutions, INAF made the following actions.

- Creating the Italian LOFAR Board that actually includes: Dr. F.Govoni, Coordinator of the National Radio Astronomy Unit (UTG2), Dr. G.Brunetti, Member of the Advisory Committee of the UTG2 and three members nominated by the UTG2, aiming to extend it to representatives of external institutions and universities.
- Appointing Dr. G. Brunetti as Italian LOFAR delegate in the ILT Board.
- Signing the ILT Certificate of Entry on April 16, 2018.



The Department of Physics of the University of Torino (DP-UniTO), recently awarded by the Italian Government (Ministry of Education, Universities and Research) as being one of Department of Excellence, aims at making significant investments in the field of radio astronomy.

From September 2017 INAF and DP-UniTO representatives have carried out negotiations for collaborating on the creation of the Italian LOFAR Board and LOFAR related activities. A programmatic letter of intent to certify scientific interests has been already signed and approved by the DP-UniTO (see attached documentation). This letter highlights the intention of DP-UniTO to join the Italian LOFAR Board in agreement with INAF regulations as described and finalized in the present agreement of cooperation signed by the two parties.

DP-UniTO hosts the High Performance Infrastructure: OCCAM managed by the C3S Interdepartmental Centre for Scientific Computing (<http://c3s.unito.it>), considered a strategic resource by the Italian LOFAR Board.

NOW THEREFORE, the Parties agree to the following:

Article 1 - Preamble

The Preamble is considered to be an integral and substantial part of this Agreement.

Article 2 – Purpose and subject of the agreement

INAF and DP-UniTO wishes to partner in a scientific and technological collaboration to exploit all aspects and synergies arising from the ILT in the area of astronomy and astrophysics, also including technological assets, meteorology and ionosphere studies, geophysics and high precision farming.

This implies the sharing of the LOFAR rights, observational resources, computing infrastructures and reserved observing time that satisfies requests and necessities from the two parties in agreement with the decisions of Italian LOFAR Board.

- DP-UniTO agrees with the INAF roadmap consolidated through the agreements previously described and already signed by INAF.
- DP-UniTO acknowledges the INAF contribution to LOFAR as described in the scientific and technological roadmap proposed by the UTG2 and Scientific Director and accepted by the INAF Council.



- DP-UniTO recognizes the role of INAF as the coordinator and representative of Italian LOFAR Board as point of contact with the ILT for legal and financial issues.
- DP-UniTO contributes to the Italian LOFAR with infrastructures and in-kind due as described in the present agreement of cooperation. The minimum contribution to guarantee full membership of DP-UniTO in the Italian LOFAR Board is described in the article 4 of the present document.
- DP-UniTO wishes to provide additional contribution if funds and resources will become available. DP-UniTO expresses the interest to install and operate a LOFAR 2.0 station in Italy whereas resources will become available.
- DP-UniTO will delegate a representative voting member in the Italian LOFAR Board.

Article 3 – MINIMUM CONTRIBUTION TO JOIN THE ITALIAN LOFAR BOARD

INAF and DP-UniTO agree on a minimum level of contribution from DP-UniTO to become a full member of the Italian LOFAR board.

Here we described in detail the minimum level of contribution that should be provided by DP-UniTO in the first eighteen (18) months of partnership. After these initial eighteen months the two parties agree that DP-UniTO will provide a minimum contribution of equivalent value for the remaining duration of the agreement and then this will be discussed in the Italian LOFAR Board.

Thanks to the funds provided to the DP-UniTO by the Italian Consortium Inter-University for Space Physics (CIFS), within the framework of the Department of Excellence, DP-UniTO reserved computing resources for eighteen (18) months out of those available from the C3S in agreement with all its committees. In addition CIFS will collaborate providing in-kind contributions under a specific agreement signed with the DP-UniTO. These reserved computing resources of the OCCAM infrastructure will be made available to the Italian astronomical community according to decisions made by the Italian LOFAR Board and according to the guidelines described below.

The computing allowance for the first eighteen (18) months are agreed to be the following.

- For the first six (6) months up to two (2) FAT nodes of OCCAM will be reserved for LOFAR-IT users to carry out data reduction of LOFAR observations in priority mode. This implies that users must request one or two nodes at least ten (10) working days before providing the data. The two (2) FAT nodes cannot be used for more than a total of four (4) months period over the six (6) months dedicated time. During these first six (6) months 50 TB of data storage will be also available to the Physics Department.



- For the following twelve (12) months up to three (3) FAT nodes will be reserved in priority mode for the Italian LOFAR board. The three (3) FAT nodes cannot be used for more than a total of eight (8) months period over the twelve (12) months dedicated time. During this second period of twelve (12) months, for the first six (6) months up to additional 50 TB, for a total of 100 TB, will be provided for data storage. During the second six (6) months up to additional 50 TB, for a total of 150 TB, will be provided for data storage. Data storage will be guaranteed for a maximum period of 12 months (i.e. the DP-UniTO reserves the right to delete data older than 12 months if necessary).

DP-UniTO will also guarantee the necessary FTE support and the appropriate operation and optimization of the C3S resources. The appropriate operation of the computing infrastructure will be monitored by the Italian LOFAR Board that will include a representative from DP-UniTO.

Article 4 – ADDITIONAL CONTRIBUTION TO JOIN THE ITALIAN LOFAR BOARD

The INAF agreement with ASTRON foresees the possible extension of the collaboration between the Italian LOFAR Board and the ILT on the study and the development of the low band antennae. IF this development will be approved by the ILT, DP-UniTO will be involved in this research line providing an in-kind contribution valued at 1 FTE equivalent and whose details will be defined by the Italian LOFAR Board.

As a programmatic line DP-UniTO wishes to carry out appropriate efforts to contribute to the Italian LOFAR Board by funding Ph.D. programs and post-doctoral fellowships on strategic research areas connected with LOFAR.

Article 5 – DURATION AND VAILIDITY OF THE AGREEMENT

This agreement shall in the first instance remain in force for a period of three (3) years and can be renewed upon expiry by an exchange of letters between the Parties. A written declaration of withdrawal must be made no later than six months before the termination of a given three-year program.

The agreement can be terminated in writing by either party. In that case, the period of notice must be at least 3 months.

The Italian LOFAR Board, in conformity with the aforementioned ILT policies will decide on any effects of such termination by INAF on ILT participation, and any consequences that impact Italian-LOFAR Board.



In the case that, due to circumstances beyond the control of INAF any or both agreements INAF-AstroTec (on future station purchase) and INAF-ASTRON (on development collaboration) mentioned in the preamble are terminated before completion, this agreement will be terminated. In this case DP-UniTO will participate to a new negotiation with ILT together with the Italian LOFAR Board.

Article 6 – LIABILITY

No Party shall be liable to any other Party for any indirect or consequential loss or similar damage such as, but not limited to, loss of profit, loss of revenue or loss of contracts. The Parties shall be liable to each other, indemnify and keep each other harmless against all other claims, actions, demands, suits, damages, costs and direct losses arising in connection with any intentional or negligent act, omission or wilful misconduct of the party, its employees or other persons working under its responsibility in the performance of this agreement. The parties will inform each other of their insurance (or self-insurance) provisions for third party liability.

Article 7 – DATA PROCESSING

The Parties are responsible for the processing, dissemination, and communication of personal data concerning this agreement within the scope of the pursuit of its institutional purposes and as provided in its regulations in implementation of legislative decree no. 196 of 30 June 2003, on the processing of personal data.

Article 8– APPLICABLE LAW AND DISPUTES

This Agreement is regulated by Italian law. For anything that is not specifically indicated, the provisions included in the current regulations on the subject, remain in force as far as they are compatible. The Parties, in fulfilling their respective obligations arising from this agreement, must observe and respect the provisions of the Code of Ethics.

Any disputes concerning the interpretation or execution of this contract will be settled amicably between the parties.

Where it is not possible to reach an agreement in accordance with the previous paragraph, the court with exclusive jurisdiction to settle any dispute relating to the validity, interpretation, execution or the termination of the contract, is the Court of Turin.

Article 9– REGISTRATION AND EXPENSIS

This agreement is drawn up in 2 copies in English, one of each will be kept by each Party.

This Agreement is subject to registration in case of use and a fixed tax, pursuant to articles 5 and 39 of Presidential Decree no.131 of April 26, 1986, to be paid by the party requesting registration.

The cost of the stamp duty for this Agreement shall be borne by the Parties in equal measure.



This agreement shall be lodged at the Research and International Relations Division of the University of Turin and at the INAF offices.

Signature :

Date:

Prof. Nicolò d'Amico
INAF President

A handwritten signature in black ink, appearing to read "N. d'Amico".

Signature :

Date:

Prof. Gianmaria Ajani
Rector of the University of Turin

Signature :

Date:

Prof. Silvano Massaglia
Director of the Physics Department
of the University of Turin

A handwritten signature in black ink, appearing to read "S. Massaglia".