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Deliverable D18.3

Providing access of 60,9 (NOEMA) and 213,8 (PV) hours to the IRAM infrastructure

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Deliverable Leading Partner: Institut de Radioastronomie Millimétrique INSTITUT DE RADIOASTRONOMIE MILLIMETRIQUE INSTITUT DE RADIO ASTRONOMIE MILLIMETRIQUE SOCIETE CIVILE I.R.A.M., France

1 Document information

Document name:	Providing access of 146,5 (NOEMA) and 485,0 (PV) hours to the infrastructure TNA IRAM in the period 01/07/2014 – 30/10/2015
Type	Other
WP	18 (IRAM)
Authors	Roberto Neri & Nicolas Billot, Catherine Berjaud (IRAM),

1.1 Dissemination Level

Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

1.2 Content

2 Description of the TNA-IRAM deliverable D18.3

2.1 Information about the TNA – IRAM-NOEMA

The NOEMA Interferometer (former Plateau de Bure Interferometer, PdBI) started astronomical operation in 1990. It is located in the French Alps, near Gap, at an altitude of 2550m. The interferometer currently consists of seven antennas, each 15 meters in diameter. All 7 telescopes are equipped with low-noise heterodyne receivers for the 3mm, 2mm, 1mm and 0.8mm atmospheric windows. The SSB receivers provide a contiguous bandwidth of 4 GHz in each polarization. There is at present no other interferometer on the northern hemisphere that offers the same sensitivity at these wavelengths. With baselines up to 768 meters (in the East-West direction), it allows sensitive imaging at sub-arcsecond resolution (0.2-0.3 arcseconds at 1.2mm wavelength). The signals from the 7 antennas are processed by two IRAM-developed digital correlators, which allow a large variety of observing modes and the possibility to phase up all 6 antennas for VLBI experiments. Global VLBI experiments at 3mm wavelength together with the American VLBA and a number of European telescopes are performed twice a year. VLBI observations at 1.3mm were performed with the IRAM 30m telescope, APEX and CARMA (2014), and in the longer term experiments are planned that also use the ALMA antennas in Chile.

A major upgrade is currently underway. It will transform the interferometer into a new qualitatively different and much more powerful instrument. NOEMA will double the number of antennas of its predecessor, the Plateau de Bure Interferometer. The first of the six new NOEMA antennas was inaugurated end of September 2014. During the next years, construction of the array will continue and five other antennas will follow, up to 12 antennas in 2019, increasing the total IF of the receivers from 8 to 32GHz, and extending the East-West baseline from 0.8 to 1.6 km. Together with the IRAM 30m telescope, the proposed enhancement will provide the scientific community with full access to all of the millimeter windows, from about 72 to 373 GHz, in the northern hemisphere, with a unique combination of two complementary facilities.

2.1.1 Information about the provided access to IRAM-NOEMA (01/07/2014 – 30/10/2015)

For the period 01/07/2014-30/10/2015, a total of 249 proposals were received for the NOEMA Interferometer with a considerable weight on extragalactic science. On the basis of scientific merit 113 proposals were recommended by the Program Committee for observations with the NOEMA Interferometer. From these proposals, the Program Committee recommended 17 eligible projects that can be supported under the RadioNet3 TNA program to be scheduled at the NOEMA Interferometer during the Summer-2014, Winter-2014/2015 and Summer-2015 semesters. The total observing time allocated to eligible proposals during the current reporting period corresponds to 146,5 hours. In total, 43 users from TNA-eligible institutes, distributed over 11 projects, benefited from this telescope time.

The list of recommended eligible projects for which time was allocated and the associated number of observing hours are given in a table below. The detailed information about the committee providing access, projects and selection will be given in the TNA database of the 3rd periodic report.

Project acronym	Name (institute) of the TNA user group leader	Number of the TNA users	Provided access [hours]
Provided access to the IRAM – NOEMA:			
X0C6	IVISON Rob (ESO, IO)	6 over 12	14
X--3	DESSAUGES-ZAVADSKY Miroslova (Geneva Observatory, CH)	7 over 13	8
D14AC	EDGE Alastair (Durham University, UK)	3 over 6	1
S14AW	FENECH Danielle (Univ. College London, UK)	5 over 5	5,5
W14AA	FONTANI Francesco (INAF, Arcetri, IT)	4 over 7	56
W14DG	EDGE Alastair (Durham University, UK)	3 over 6	8
W14FG	BLAIN Andrew (Univ. Leicester, UK)	2 over 3	2
S14AE	WAMPFLER Suzanne (NBI, DK)	4 over 4	13
S14BS	STANWAY Elizabeth (Univ. Warwick, UK)	2 over 2	6,5
S14BT	SWINBANK Mark (Durham University, UK)	5 over 6	14
S14BV	GEACH James (Univ. Hertfordshire, UK)	4 over 6	18,5
PROJECTS: 11		USERS: 43 TNA users over 70	ACCESS: 146,5 hrs

2.1.2 Information about the financial EC contribution to the travel to IRAM-NOEMA

The table below provides the list of eligible users whose travel costs have been supported by RadioNet3 in the reporting period July 01, 2014 to October 30, 2015.

Project acronym	Person name (institute)
S14AE	Suzanne Wampfler (DK)
S14BS	Elizabeth Stanway (UK)
W14AA	Francesco Fontani (IT)

2.2 Information about the TNA IRAM-PV

The 30-m telescope, located at an altitude of nearly 3000m on the Pico Veleta in the Spanish Sierra Nevada, has been designed with a surface accuracy and a pointing capability for observations in the atmospheric windows at 3, 2 and 1 mm. Occasionally the telescope is even used at 0.8 mm during particularly favourable atmospheric conditions.

The IRAM 30m telescope is by far the most sensitive millimetre-wave single-dish for observations in the abovementioned atmospheric windows. It provides sensitive imaging down to 8" resolution and offers unique observing capabilities with several low-noise wide-band heterodyne receivers (EMIR) and a dual polarization 9-channel heterodyne array (HERA). These heterodyne receivers can be connected to a variety of analogue and digital backends that allow spectroscopic studies at resolutions between 3.3 KHz and 4 MHz. One of the backends (XPOL) is capable of making cross correlations, a feature which is used for polarization observations. In the current reporting period, two continuum cameras were also used at the 30m telescope: GISMO, a 2mm bolometer camera consisting of 128 closed-packed pixels using Transition-Edge Sensors (TES), and NIKA, a prototype camera equipped with two focal plane arrays observing simultaneously in the 1mm and 2mm atmospheric windows. These arrays are based on a new type of detectors, namely Kinetic Inductance Detectors, or KIDs, that until NIKA had never been used in astronomy before. The full instrument, called NIKA2, has just been installed at the 30m telescope and the commissioning is underway. NIKA2 will be offered to the community in 2016.

The telescope is also equipped with modern wide-bandwidth VLBI backends and recorders, and VLBI experiments at 3, 2 and 1.3mm wavelengths have successfully been carried out in recent years. The 30m telescope is also heavily used for complementing interferometer maps with short-spacing information, mostly for NOEMA, but also for completing data for the CARMA and ALMA interferometers.

2.2.1 Information about the provided access to IRAM-PV (01/07/2014-30/10/2015)

For the current reporting period, a total of 188 proposals were received for the 30m telescope with a well-balanced distribution between extragalactic and galactic science. On the basis of scientific merit, the Program Committee recommended 154 proposals for observations with the 30m telescope. From these proposals, the Program Committee recommended 19 RadioNet3 eligible projects for scheduling at the 30m during the Summer-2014, Winter-2014/2015 and Summer-2015 semesters. The total observing time allocated to eligible proposals during the current reporting period corresponds to 485,0 hours. In total 72 users from TNA-eligible institutes, distributed over 19 projects, benefited from this telescope time.

The list of recommended eligible projects for which time was allocated and the associated number of observing hours are given in a table below. The detailed information about the committee providing access, projects and selection will be given in the TNA database of the periodic reports.

Project acronym	Name (institute) of the TNA user group leader	Number of the TNA users	Provided access [hours]
Provided access to the IRAM-PV			
006-14	BELRAN Maria Teresa (INAF, IT)	6 over 8	16,5
026-14	HENSHAW Jonathan (University of Leeds, UK)	4 over 7	42
082-14	PUSCHNIG Johannes (Stockholm Observatory, SE)	6 over 8	23,5
085-14	ALLAERT Flor (University of Gent, UK)	3 over 3	18
091-14	OONK Raymond (ASTRON, NL)	2 over 3	19
118-14	WAMPFLER Susanne (STARPLAN, DK)	4 over 4	28,5
154-14	WANG Ke (ESO, IO)	6 over 12	9,5
162-14	CESARONI Riccardo (INAF, IT)	4 over 5	57,5
171-14	MOOR Attila (Konkoly Observatory, HU)	4 over 5	3
196-14	SARGENT Mark (University of Sussex, UK)	5 over 6	52
198-14	MICHALOWSKI Michal (University of Edinburgh, UK)	3 over 5	3
208-14	ALADRO Rebeca (ESO, IO)	3 over 6	16
210-14	OONK Raymond (ASTRON)	2 over 3	27
220-14	BLAIN Andrew (University of Leicester, UK)	2 over 3	14
013-15	SCHMIDT Miroslaw (UMK, PL)	2 over 2	46
022-15	LESCHINSKI Kieran (University of Wien, AT)	5 over 5	20
043-15	TAQUET Vianney (Leiden Observatory, NL)	4 over 5	44,5
054-15	KAMINSKI Tomasz (ESO, IO)	1 over 2	5
064-15	PUSCHNIG Johannes (Stockholm Observatory, SE)	6 over 7	40
PROJECTS: 19		USERS: 72 TNA users over 99	ACCESS: 485

2.2.2 Information about the financial EC contribution to the travel to IRAM-PV

The table below provides the list of 12 TNA-eligible projects, which have claimed the reimbursement for travel costs incurred in the reporting period 01/07/2014 – 30/10/2015 by users eligible for RadioNet3 support.

Project acronym	Person name (institute)
006-14	BELTRAN Maria Teresa (INAF)
026-14	HENSHAW Jonathan (University of Leeds)
082-14	PUSCHNIG Johannes (Stockholm Observatory)
091-14	OONK Raymond (ASTRON)
118-14	WAMPFLER Susanne (STARPLAN)
154-14	WANG Ke (ESO)
162-14	CESARONI Riccardo (INAF)
022-15	LESCHINSKI Kieran (University of Wien)
054-15	GARCIA BURILLO Santiago (OAN)
059-15	HUNT Leslie (INAF)
064-15	PUSCHNIG Johannes (Stockholm Observatory)
080-15	DANNERBAUER Helmut (University of Wien)

Appendix

The table below provides the list of members of the IRAM Program Committee whose travel costs have been supported by RadioNet3 in the reporting period 01/07/2014 – 30/10/2015.

Date and Location	Person name (institute)
October 20-21, 2014	Henrik Beuther (MPIA, Heidelberg, Germany)
	Valentin Bujarrabal (OAN, Madrid, Spain)
	Romeel Dave (University of the Western Cape, South Africa)
April 14-16, 2015	Beelen Alexandre (IAS, Orsay, France)
	Romeel Dave (University of the Western Cape, South Africa)
October 21-22, 2015	Kohno Kotaro (University of Tokyo, Japan)

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