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**Providing access of 257 hours to the**  
**e-MERLIN infrastructure**

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## 1 Document information

Document name: Providing access of 318 hours to the TNA e-MERLIN in the period 20/05/2014 – 30/11/2015

Type Other

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### 1.1 Dissemination Level

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

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## 2 TNA e-MERLIN deliverable

### 2.1 Information about the TNA e-MERLIN

e-MERLIN is an array of seven radio telescopes across the UK, connected to a central correlator at Jodrell Bank Observatory (JBO) and operated as a dedicated radio interferometer to produce high-resolution images. With a maximum baseline length of 220 km, MERLIN provides a unique capability for radio imaging at 0.01-0.15-arcsec resolution at frequencies of 1.5, 5 and 22 GHz (L, C and K bands). The e-MERLIN project has resulted from a major upgrade involving the installation of new receivers, analogue and digital electronics, optical-fibre links to each telescope and a new correlator at JBO. This upgrade has increased the useable bandwidth by more than two orders of magnitude, and hence the continuum sensitivity by more than 10 times. In addition, the increase in bandwidth will dramatically improve aperture coverage for continuum observations resulting in enhanced image fidelity together with simultaneous spectral-index imaging. First fringes between nearby telescopes using a prototype correlator were achieved in April 2009, fringes from all remote telescopes were obtained in autumn 2010, and the full network with the complete correlator has been available to international users from 2012 onwards.

### 2.2 Information about the provided access in the period 20/05/2014 – 30/11/2015

All e-MERLIN observing time is competitively allocated on the basis of scientific merit and proposals are reviewed by an independent Time Allocation Group. Throughout the reporting period e-MERLIN observations have been split into three categories:

- a) ongoing instrumental verification and commissioning work related to the upgrade of e-MERLIN,
- b) e-MERLIN observations as part of the e-MERLIN legacy programme,
- c) PATT (Panel Allocation of Telescope Time) proposals.

Observing time in this reporting period (*23<sup>rd</sup> Sept 2013 – 30th Nov 2015*) has been split equally between these three principle areas. In addition to formal TAG approved programmes e-MERLIN is open to Director's Time observations which can be triggered for exceptional events that are unpredictable at the time of open proposal deadlines – such request are open to all and are rapidly scrutinised on scientific merit.

Nature of programmes and selection procedures:

- 1) e-MERLIN legacy programme observations comprise of large consortia backed projects which have been allocated significant observing time to be spread over a number of years. These allocations have been competitively reviewed and allocated by an internationally appointed team of external expert scientists following an open round for proposals. In total, 12 e-MERLIN legacy projects have been allocated; of which 2 of these projects meet the requirements of TNA eligibility.
- 2) Proposals for PATT allocated programmes are accepted at regular (approximately biannually) proposals deadlines that are widely advertised amongst the international astronomical community. All proposals are assessed by an independently appointed Time Allocation Group and all proposals are externally reviewed by experts drawn from the astronomical community. Time is allocated on scientific merit alone.

During this reporting period observations have been made for proposals made for Cycle-0 (deadline 26<sup>th</sup> January 2012), Cycle-1 observing (deadline 17<sup>th</sup> July 2013), Cycle-2 (deadline 15<sup>th</sup> April 2014) and Cycle-3 (deadline 30<sup>th</sup> April 2015). Assessment, allocation and observations of Cycle-3 proposals occurred on 17<sup>th</sup> August 2015. A list of potential TNA projects from this period are included below. Each of these cycles have received a large number individual projects from a wide range nations.

There are 17 identified eligible user groups and associated e-MERLIN projects which have been approved through open time applications. They are a mixture of TAG allocated approved programmes, observations within existing e-MERLIN Legacy Programmes, and separate e-MERLIN observations associated with successful VLBI proposals. Observations made for instrumental commissioning (some of which have been made on behalf of TNA eligible groups) are not included. All classes of observations are ongoing in this period and projects identified with no current eligible hours remain available for dynamical scheduling during later observing periods, and additional observations may be made for any project dependent on the scientific completeness of observations made to date.

e-MERLIN TNA eligible science programmes comprise (20/5/2014-30/11/2015 inclusive):

Project acronym	Name of the TNA user group leader	Number of the TNA users	Provided access [hours]
CY2001*	Perez-Torres (IAA, ES)	4 (7)	-
CY2003	Marti-Vidal (OSO, SE)	4(4)	49.6
CY2205	Frey (FOMI, HU)	4 (5)	63
CY2216	Kuegler (Heidelberg, DE)	4 (4)	16
CY2218	Laing (ESO)	1(1)	65.5
CY2221	Engels (Hamburg, DE)	3 (4)	84.71
CY2222	O’Gorman (Trinity, Ireland)	6 (12)	31.0
CY2225	Chemin (Bordeaux, FR)	6 (6)	31
CY3002**	Perez-Torres (IAA, ES)	4(7)	-
CY3201**	Koenig (IRAM, FR)	4(7)	-
LIRGI	Conway (OSO, SE) & Perez-Torres (IAA, ES)	12(20)	97.5
EP087	Perez-Torres (IAA, ES)	8 (8)	44
EL051	Liuzzo (INAF, IT)	5 (5)	20.5
EH031	Hada (INAF, IT)	4 (7)	24.5
EH032	Heald (ASTRON, NL)	3 (3)	18
EM106	Mezcua (IAC, ES)	2(4)	32
EV019	Varenus (OSO, SE)	9 (10)	19.75
Total projects 17		Total users 83 (114)	Total access 517 hrs

*\* Project CY2001 was allocated override time of transient events to be triggered by the PI. No trigger was requested in this period so no deliverable hours were requested.*

*\*\* CY3002 and CY3201 are cycle 3 proposals and pending observations in Q4 2015/Q1 2016. These observations have not been made at the time of reporting.*

In total 517 hours of telescope access hour have been delivered in this period, for 17 projects, including a total of 114 investigators. Of these many TNA users are involved in multiple projects, a total of 83 TNA-enabled investigators against projects. The total number of users and delivered hours, includes all telescope time dedicated to TNA projects (this is inclusive of observations with sub-set of antennas as well as additional calibration and hence time may exceed hours requested in individual proposals) significantly exceeds the agreed deliverable (318hrs). It has to be mentioned that several projects, including the large legacy projects, have continuing programmes with further associated observations extending into future deliverable periods; only hours provided in this reporting period are listed.

The eligible user groups contain both established workers in the field and young researchers. In recent years a significant effort has been made to advertise and attract new research groups from Europe and the UK. RadioNet3 activity has undoubtedly helped in this regard. Future proposals for e-MERLIN post commissioning and present proposals for VLBI are handled by the NorthStar web-based proposal tool, which is common to a number of European telescopes. This tool was developed under the RadioNet (FP6) Networking Activity – Synergy.

## 2.3 Information about the EC financial contribution to the travel

All eligible user groups were identified and sent targeted emails inviting them to consider sending personnel to Jodrell Bank Centre for Astrophysics for observational analysis, indicating that travel and subsistence funding was available for such visits.

Several TNA supported groups have travelled to Manchester for data reduction support in this time frame (including groups with observations made in prior delivery periods) these included:

- Mezcur (IAA, Spain visit 21/04/2014-25/04/2014),
- Gabanyi (FOMI, Hungary, 16/05/2014-02/05/2014,
- Leal-Ferreira (Leiden, The Netherlands, 20/08/2015-25/08/2015, and 30/11/2015-4/12/2015).

Additionally some groups have also been assisted during face-to-face visits (but used their own travel funds), and numerous other groups have benefited from remote assistance through all stages of their projects provided by e-MERLIN support staff.

The RadioNet3 TNA travel budget is allocated by the RadioNet3 beneficiary No. 5 (JIVE) and therefore, the exact costs will be presented by JIVE.

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