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Report on Lessons from Short Training Missions

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Authors (Institutes) Caroline Jaillot (ESO), Reinhard Keller (MPG), Robert Beswick (UIMAN), Alessandro Navarini (INAF), Anita Richards (UNIMAN),

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Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
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1 Introduction

In an aspect of the training programme, RadioNet has encouraged mobility (staff exchange) by supporting travel and accommodation costs of Short Term Missions (STM) in order to reinforce the contacts between the different groups: astronomers, engineers, and industry. The main goal was to spread the available technical expertise across the community, addressing not only the RadioNet partners but reaching beyond, even beyond Europe. The STM has allowed gaining missing technical expertise at the home institutes through a visit to the expert host institute. Moreover, STM allowed to establish international diverse collaboration and lay the foundation for the sustainability of present and future infrastructures. For this purpose, STM focused not on the individual careers, but on the long-term planning of astronomical/industry partners.

This document presents the lessons learned in the organization of the Short Training Missions program.

2 STM Overview

Seven STM calls titled “RadioNet support for Short Term Missions” were released between January 2017 and January 2020, one every six months at the beginning of the months of January and July. Each of the calls was released at least four weeks before the submission deadlines. Applications were sent in by email to RadioNet@mpifr.de. The decision on the applications was given to the supported applicants two weeks after the proposal deadlines, six weeks after call release. The recipients of the RadioNet financial support had to assure the visibility of the support by including in any advertisement media the project’s and EU logos, and the acknowledgment sentence “*This event has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 730562 [RadioNet]*”.

34 applications were received and reviewed by a selection committee, who approved the support of 23 STM. The following table shows the number of approved applications for each of the calls:

STM call application deadline	Number of supported applicants
February 1 st , 2017	4
July 1 st , 2017	4
February 1 st , 2018	6
July 1 st , 2018	3
February 1 st , 2019	3
July 1 st , 2019	1
February 1 st , 2020	2

This section reviews and comments the adopted process for the STM.

1. Review and update of call text

Before each call, the text was updated and improved considering the comments sent to previous applicants, who had submitted non-eligible or not fully supported applications.

2. Call advertisement

The first call was made available on the RadioNet website and also advertised through emails to some of the Directors of the main Radio Astronomy Institutions in Europe, with the request for the announcement to be widely disseminated. Next calls were additionally distributed through the RadioNet Newsletter, which has at present more than 1000 subscribers. Due to the progressive decrease of the number of applications, it was decided for the last call (Jan 2020) to directly inform via email a number of people who could circulate further the information. The applications selection committee selected and sent an email to more than 50 people (of about 15 institutes) but this had no benefit. Other ways of communication should be explored.

3. Review applications eligibility

Eligibility was the first evaluation criterion of the applications and non-eligible applications were not further evaluated. The main reasons of non-eligibility were the following:

- Mission between non-RadioNet institutes;
- Mission not focussing on technical/operational aspects.

4. Selection Panel

A selection panel was appointed by RadioNet Board to evaluate the applications. The panel was composed of:

- Dr Reinhard Keller (up to March 2019 as a leader of the WP3.3. STM, Group Leader of Electronics, Systems Operation Group at Max Planck Institute for Radio Astronomy;
- Dr Rob Beswick, Head of Science Operations and User Support for the e-MERLIN/VLBI National Facility at the University of Manchester;
- Dr Alessandro Navarrini, First Technologist and Front-End Engineer at INAF-Astronomical Observatory of Cagliari, Italy;
- Caroline Jaillot (from March 2019, as a leader of the WP3.3 STM), Electronic Engineer at ESO, supporting the maintenance of the ALMA Radio Telescope.

5. Applications evaluation

The members of the selection committee reviewed each eligible application and evaluated (score between 0 and 5 – the best):

- the Topic of the STM;
- the Proposed work;
- the Cross-disciplinary aspect of the STM (transfer of knowledge);
- the expected Impact;
- the CV of the applicant.

6. Decision

Following the applications evaluation, a meeting was organized to allow the Selection committee to agree on the support to be allocated to each STM. With the help of the summary of the evaluations done by each member of the Selection committee, the decision was usually easy to obtain. The committee made efforts to ensure gender balance. It is noted that three women were beneficiary of the STM support. All applicants were informed of the meeting decision about their application shortly after the meeting. In case of non-eligible or not fully supported STM, reasons were explained and the call of the text improved to avoid repetition of such cases. In case of full or partial support, it was reminded to the applicants its rights and obligations to be actually supported by RadioNet (mention of RadioNet in publications, STM report, claim deadline).

7. Review of STM report

After a verification of content and format, the STM reports were uploaded on the wikipage of the WP3.3 of RadioNet (<https://radiowiki.mpifr-bonn.mpg.de/doku.php?id=na:training:stm>).

8. Payment

Payment was made by MPG (beneficiary No.1) upon reception of the STM report and claim. There were 5 accepted STMs of which cost was not claimed due to cancellation or no provision of claiming documents.

3 Impact

The 19 STMs, which took place between March 2017 and September 2019 have offered the possibility to 17 persons of 11 institutes in 9 countries to work with colleagues of 9 RadioNet institutes, creating important synergies and transfer of knowledge on very diverse aspects of the radio-astronomy (telescopes, operation, data correlation and interpretation).

3.1 Institutes

The detailed lists of home and host institutes are given below.

Home Institutes:

- INAF-IAPS (Istituto Nazionale di Astrofisica- Istituto di Astrofisica e Planetologia Spaziali), Italy

- INAF-OAA (Istituto Nazionale di Astrofisica - Osservatorio Astronomica di Arcetri), Italy
- Ivano-Frankivsk National Technical University of Oil and Gas, Ukraine
- Kenyatta University, Kenya
- Onsala Space Observatory (OSO), Sweden
- SKA, South Africa
- Stanford University, USA
- Trinity College, Ireland
- Ventspils International Radio astronomy Center (VIRAC), Latvia
- West Virginia University, USA
- Yebes Observatory (IGN), Spain

Host institutes:

- ASTRON (Netherlands Radio Astronomy Centre), Netherlands
- INAF-IRA (Istituto Nazionale di Astrofisica - Istituto di Radioastronomia), Italy
- INAF-OAB (Istituto Nazionale di Astrofisica - L'Osservatorio Astronomico di Brera), Italy
- IRAM (Institut de Radioastronomie Millimétrique), France
- JIV ERIC, Netherlands
- MPIE (Max-Planck-Institut für extraterrestrische Physik), Germany
- MPIfR (Max-Planck-Institut für Radioastronomie), Germany
- Yebes Observatory, Spain
- Onsala Space Observatory (OSO), Sweden

3.2 STM topics

The STM have covered a wide range of topics, which may be classified in 4 categories:

- Development and improvement of radio-telescopes
- Operation
- Software tools
- Scientific studies

The list below tries to summarize the main STM topics (according to these categories) and highlights specific outcomes. More detailed examples of STM are given in section 3.3.

1. Development and improvement of radio-telescopes
 - Receiver development
 - RFI mitigation
 - o Assembly and characterization of HTS filter
 - Vapour Radiometer development
 - Holography
 - Metrology
 - Optical telescope for improving radio telescope pointing and tracking system capabilities
2. Operation
 - Development of operations structure for the AVN (African Very Long Baseline Interferometry Network)
3. Software tools development
 - Stand-alone software tool improving accessibility of archived LOFAR data
 - Code to work with large area mosaics
4. Scientific studies
 - Data Interpretation
 - o Joint study of objects in the radio and soft gamma-ray bands
 - o Comparison of the low and high energy polarization signatures of blazar jets
 - Astrochemistry
 - o C-fractionation study

All STM reports are available on the WP3.3 wikipage of RadioNet:

<https://radiowiki.mpifr-bonn.mpg.de/doku.php?id=na:training:stm>

3.3 STM Examples

Example 1: Mutual work of Yebes Observatory and OSO in feed development

Both institutes participate in RadioNet BRAND EVN activities and are developing broad band receiver. Working on the same project and same fields create possible mutual areas of work.

A 12 days STM of a member of IGN to OSO has been focused on the study of a common approach for data analysis, data formats for exchange of design data and use of the same models for estimating the noise contribution from various sources.

By joining the knowledge of both institutes for the feed design and low noise techniques, the result of this STM could be use by the whole radio astronomical community.

Example 2: Participation of a SKA member to the Sardinia Radio Telescope (SRT) holography campaign

The main objective of the holography campaign performed during the STM was to improve alignment of the SRT surface panels in prevision of higher frequency receivers (under construction). The actions of this 10 days STM were first directly focused on the SRT campaign while the remaining time was spent on understanding post-processing tools and interpretation of previous results.

The direct consequences of this STM are:

- a contribution to the SRT holography campaign, which directly feeds into scientific results for the SRT;
- a transfer of specific holography knowledge to the on-going African VLBI Network (AVN) project.

Example 3: Transfer of knowledge of ASTRON to VIRAC and development by a VIRAC member of a tool for improving accessibility to LOFAR archived data

Through three STMs of one of his members, VIRAC has gained a lot of ASTRON experience regarding calibration and data processing and offered to the community a tool improving accessibility to LOFAR archived data.

The first STM (about 2 weeks) was focused on learning how to use Jive SFXC Correlator, including calibration, fringe fitting for SFXC, and using SFXC with VDIF data format, the second (about one week) on LOFAR data processing. During the second STM, automated scripts were started to be developed for improving data retrieval and creating environment for data processing. The third STM (4 days) was dedicated to the finalization of the tool.

Example 4: International collaboration in understanding the nature of the magnetic fields of blazar jets

A one-week STM of a scientist of Stanford University at Max-Planck Institute for Radio Astronomy has allowed to initiate a strong collaboration in understanding the nature of the magnetic fields of blazar jets.

By a joined work, the home institute has gained knowledge about the Turbulent Extreme Multi-Zone (TEMZ) model of blazar emission and the relativistic magnetohydrodynamic code PLUTO and the host institute about the Bayesian block analysis. And this exchange of expertise undoubtedly forms a strong basis for future collaboration.

4 RadioNet financial support

The total cost of RadioNet financial support for the STM is 16671kEUR.

8226,07 EUR have been spent during the first 18 months (PR1), supporting the travel and accommodation costs of 8 missions, 8445,36 EUR during the next 18 months (PR2), supporting 10 missions. No missions were performed in 2020 due to pandemic.

RadioNet partially supported travel and accommodation costs of each STM (for a visit of 1 week a maximum of 900 € of eligible cost were reimbursed, for a longer mission up to 1500 €). Each visit was documented in an

assessment report following a report template that clearly specified the added value for the RadioNet community.

5 Acronyms

AVN	African Very Long Baseline Interferometry Network
HTS	High-Temperature Superconducting
ERIC	European Research Infrastructure Consortium
INAF	Istituto Nazionale di Astrofisica
IRAM	Institut de Radioastronomie Millimétrique
LOFAR	Low-Frequency Array
MPIE	Max-Planck-Institut für extraterrestrische Physik
MPIfR	Max-Planck-Institut für Radioastronomie
OSO	Onsala Space Observatory
STM	Short Term Mission
VIRAC	Ventspils International Radio astronomy Center
VLBI	Very-Long-Baseline Interferometry

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