

Work package number ⁹	WP3	Lead beneficiary ¹⁰	6 - UMAN
Work package title	Training		
Start month	1	End month	48

Objectives

The Training activity is devoted to equipping radio astronomers and engineers with the skills which are essential to take full advantage of the present and future radio astronomical infrastructures by:

- offering a focussed set of schools and forums, where specialist observatory personnel discuss engineering developments and exchange best practises, where users present cutting-edge results from RadioNet infrastructures, and where experienced astronomers train the next generation in the basics and finer points of using radio astronomy infrastructures,
- providing a dedicated support programme for visitors to the European ALMA Regional Centre nodes in order to strengthen and enlarge the user base,
- encouraging mobility so that the contacts between the different groups: astronomers, engineers and industry will be reinforced.

Description of work and role of partners

WP3 - Training [Months: 1-48]
 UMAN, MPG, IRAM, OBSPARIS, ESO, UTU, UNIGLAS, DST
 WP3.1 Astronomical/Engineering Schools [UMAN, IRAM, OBSPARIS, UTU, all partners]

This activity will foster the skills needed for exploitation of European radio astronomy facilities by researchers worldwide. It will enable radio astronomers to take advantage of global best practices and research opportunities and help newcomers to radio astronomy to learn current state-of-the-art techniques, and encourage them to stay in the field. The events are aimed at astronomers and engineers in order to communicate, and indeed develop techniques needed to plan observations, reduce and interpret data from present and next-generation facilities. This ensures that there will be sufficient experts in the market to support their communities in making use of new opportunities (ALMA, EHT and SKA, and the other rapidly-evolving RadioNet facilities). Each year a range of events catering to the whole community from beginners to experts will be offered addressing:

- Radio Interferometry – ERIS provides hands-on teaching of planning, calibration and imaging for data from RadioNet arrays and ALMA. There is a need for advanced workshops aimed at astronomers and software engineers with significant experience in order to share and develop techniques such as in mm VLBI (e.g. VLBI with ALMA) or wide-field, wide-band imaging at longer wavelengths to make use of the dramatic increases in sensitivity and survey opportunities afforded by SKA pathfinders.
- Single dish hands-on observing – the IRAM 30-m schools will continue biannually, additionally new cm-wave observatories to host single-dish training will be sought.
- Solar radio astronomy – events will be linked where appropriate to Community of European Solar Radio Astronomers (CESRA) and European Solar Physic Meetings. Two will be linked to new observing opportunities: Solar observing with ALMA and launching of Solar Orbiter (ESA) and Solar Probe (NASA) in 2018. A workshop on radio and space weather forecasting will strengthen co-operation between research infrastructure, scientific communities, modellers and observers, and the MetOffice UK.
- Radio interference – speakers on spectrum management issues will attend the training events of this NA, additionally an international Spectrum Management school will be organised in 2018, requiring the participation of experts from around the world.
- Complementary topics – such as geodesy schools, CASA software training at the ARC nodes, science-themed schools and multi-wavelength workshops offering a radio session.

WP3.2 Mobility for ALMA Regional Centre Users – MARCUs [ESO]

The goal of this task is encouraging mobility of the community across Europe what will disseminate knowledge and enable innovative research partnerships by supporting visits of European ALMA users to the European ARC nodes.

The European ALMA Regional Centre (ARC) is a unique structure of user support in (sub-) millimetre astronomy. The ARC consists of a network of nodes and centres of expertise spread across Europe, plus the central coordinating node at the ESO headquarters in Garching/DE. The ARCs network forms the interface between the ALMA observatory and the European astronomical community. ARC nodes provide face-to-face support at the proposal preparation stage in case of complicated observing programmes and/or novice users. They also provide support for data reduction and for archival research in order to ensure that the ALMA archive and ALMA itself is exploited to its full potential. Some of the individual nodes offer beside the overall ALMA support additional expertise, such as solar observations, very high frequencies, polarization, mosaicing, high-dynamic-range imaging. MARCUs will strengthen and enlarge the user base.

This activity will support users from all European countries to take full advantage of the scientific and technical expertise from the most appropriate ARC node. In the past RadioNet3 has supported at least half of the requested visits to the ARCs. Some ARC nodes have limited funding available for visiting scientists, but this funding is by far not enough to cover all the requested visits in Europe. A large fraction of the astronomers who travel to the ARC nodes for face-to-face support are early career scientist (postdocs, students) who often do not have access to funding to support their trip. Now, when ALMA is in the full operational mode, it is crucial that new European ALMA users will receive any needed assistance – the mission of this activity.

WP3.3 Short Training Missions – STM [MPG, UMAN, all RadioNet partners]

In an additional aspect of the training programme, we will support mobility in order to reinforce the contacts between the different groups: astronomers, engineers and industry. This will allow early career researchers to establish international, diverse collaboration. On the long perspective it will lay a foundation for the sustainability of the present and future infrastructures. The exchange programme will be open not only to the project partners but also to institutes elsewhere, especially those based in African countries will be encouraged. However, the visit must take place at the RadioNet beneficiaries. The call for applicants will be released every 8 months and a selection committee, whose members will be appointed by the RadioNet Board, will review the applications. The applicants will be expected to send a motivation letter, a CV, a brief summary of the proposed work, and the invitation of the host institution. The EC funding will support travel and accommodation costs. Typical duration of the visit will be one week. Each visit will be documented in an assessment report, clearly specifying the added value for the RadioNet community.

Potential hosts for training events will be invited to submit proposals for financial support, which will be evaluated by a WP3 selection committee appointed by the Board. The WP3 coordinators will ensure that major events such as ERIS occur at the appropriate intervals and receive guaranteed support. The calls of opportunity will be widely publicised. The financial support will subsidise travel costs for selected participants: e.g. early career, from less well-funded institutes or invited lecturers and tutors. Organisers will be encouraged to ensure the gender balance and diversity of attendees, both among participants and tutors. RadioNet will assist event hosts in publicising announcements, contacting experts and ensuring that lecture and tutorial material is maintained in open-access repositories. To assure the sustainability of the regular events, a manual for event organisers based on past experience and feedback from participants will be created. These will provide a checklist and ensure that lessons learned are communicated, whilst being accessible for updating.

Participation per Partner

Partner number and short name	WP3 effort
1 - MPG	0.01
3 - IRAM	0.01
6 - UMAN	0.01
10 - OBSPARIS	0.01
13 - ESO	0.01
24 - UTU	1.00
27 - UNIGLAS	0.20
28 - DST	0.17
Total	1.42

List of deliverables

Deliverable Number¹⁴	Deliverable Title	Lead beneficiary	Type¹⁵	Dissemination level¹⁶	Due Date (in months)¹⁷
D3.1	Specialised training event 1	6 - UMAN	Report	Public	16
D3.2	Spectrum management school	10 - OBSPARIS	Report	Public	24
D3.3	Update No 1 of the 'Guide to the European ARC network'	13 - ESO	Report	Public	24
D3.4	Specialised training event 2	6 - UMAN	Report	Public	32
D3.5	Report on Lessons from Short Training Missions	1 - MPG	Report	Public	48
D3.6	Specialised training event 3	6 - UMAN	Report	Public	48
D3.7	Update No 2 of the 'Guide to the European ARC network'	13 - ESO	Report	Public	48

Description of deliverables

Reports from specialised training event, e.g. ERIS, single-dish, CESRA, Spectrum Management school and Short Training Missions; update of the 'Guide to the European ARC network'.

D3.1 : Specialised training event 1 [16]

Specialised training event, e.g. ERIS, single-dish, CESRA

D3.2 : Spectrum management school [24]

Spectrum management school

D3.3 : Update No 1 of the 'Guide to the European ARC network' [24]

Update of the 'Guide to the European ARC network'

D3.4 : Specialised training event 2 [32]

Specialised training event, e.g. ERIS, single-dish, CESRA

D3.5 : Report on Lessons from Short Training Missions [48]

Report on Lessons from Short Training Missions

D3.6 : Specialised training event 3 [48]

Specialised training event, e.g. ERIS, single-dish, CESRA

D3.7 : Update No 2 of the 'Guide to the European ARC network' [48]

Update of the 'Guide to the European ARC network'

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS11	Training event 1	6 - UMAN	10	Web pages published

Schedule of relevant Milestones

Milestone number¹⁸	Milestone title	Lead beneficiary	Due Date (in months)	Means of verification
MS12	ARC Guide update 1 /STM reports	13 - ESO	20	Guide/report published
MS13	Spectrum Management school	10 - OBSPARIS	20	Organisation of the event
MS14	Training event 2	6 - UMAN	26	Web pages published
MS15	Training event 3	6 - UMAN	43	Web pages published
MS16	ARC Guide update 2 /STM reports	13 - ESO	43	Guide/report published