RadioNet support for **organisers** of technical events

Application form

EVENT INFORMATION	
EVENT TITLE	Frontiers in Radio astronomy with Innovative Engineering 2019
EVENT PLACE	Kamena Vourla – Greece
ORGANISER'S INSTITUTE	Institute: University of Thessaly Contact person: Dr. Giorgos Veldes, Assistant Professor e-mail@uth.gr Physicist -Radioengineer, Co-PI of the project of the first Hellenic radio telescope (*Note:* The Hellenic Open University is a co-organizer Institute, as Dr. Nectaria Gizani, is the Co-PI radio astronomer of the project, assistant professor of the University. However the proposed event is technical, and hence mostly related to the radio-engineer's Institute. Please see text)
EVENT DATE	11/12/2019 – 13/12/2019
NO. OF PARTICIPANTS	Max 60 participants
TOTAL EVENT COST	20.000 euros
OTHER SOURCES OF FUNDING	No

REQUEST *(max. 2,5 pages)*	
Requested contribution [EURO]	20.000 euros. We note that there is no conference fee for the participants
Use of the RadioNet contribution	This event is mainly for engineers (however radio astronomers are welcome as their input is needed), who are involved in projects of development of radio telescopes around the world. The suggested duration is up to three (3) days, with starting date the 11th of December and ending date the 13th of December, 2019. The event venue will be at the Octagon, the conference room of the Centre for Satellite Communications (CSC) "Thermopylae". CSC is owned by OTE, the biggest Hellenic Telecommunications Company. OTE granted to the consortium of the University of Thessaly and the Hellenic Open University, the infrastructure of the most modern, and best maintained 32m redundant telecomm antenna, to be converted to the first Hellenic Radio telescope (called THERMO*p*Y*lae*), at the premises of the CSC. The centre is about 10 km away from Kamena Vourla, which is a small town about 170 km in the north of Athens. Kamena Vourla is a popular touristic place, especially in the summer, and offers excellent accommodation choices for participants. Octagon is a beautifully decorated and recently renovated conference room, offering all essential facilities and equipment for a smooth conduct of a conference. Taking into account the above the Radionet funding will support the following activities. **1. Hospitality costs** **(a)** Accommodation and travel expenses for some participants, not exceeding five persons (**b)** The transport of the participants (*by bus*) from Athens airport El. Venizelos to Kamena Vourla and vice versa (**c**) The daily transport of participants from Kamena Vourla to CSC and vice versa (**d)** The catering services for coffee breaks and lunch breaks

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	2. Publication costs. **(a)** Design of the webpage for the technical event, **(b)** Program and abstract brochure **(c)** Conference newsletter **3. Expendable supplies** for the folders of the participants upon registration and necessary stationery as well as material for the posters that will be presented at the premises of the Octagon during the conference (eg. envelope staplers, markers, pens, pencils, thumbtacks, tapes, etc.). All the expendable supplies will be printed with the logos of Radionet and EU. **4 Publicity and disseminations.** Press releases in the local, national newspapers, magazines and media (TV, radio, internet, etc.) for the announcement of the technical event as well as for the national dissemination of the important role of the Radionet on Radio astronomy. ***Note:*** The logos of Radionet and EU will be inserted in all event advertisement media.
Topic	The technical event planned is a natural continuation of the conversion of the 32m telecomm antenna to the first radio telescope in Greece, at the southernmost end of Europe. As already mentioned, the THERMO*pYlae* conversion project falls into the research collaboration between the University of Thessaly (P.I., Dr. Giorgos Veldes, physicist-radio engineer with an internationally awarded expertise on metamaterials) and the Hellenic Open University (P.I., Dr. Nectaria Gizani, the only active Greek radio astronomer *in Greece*). The aims of the technical event are: **1.** Knowledge and expertise exchange between engineers working in the development and maintenance of radio telescopes and front-ends and engineers with broader expertise, who participate in the conversion projects of parabolic telecommunications antennas to radio telescopes, all over the world. **2.** The inclusion of the innovative metamaterials technology in the RF engineering and its applications in the astronomical microwave equipment. Based on the above, the main topics, which will be addressed in the technical event are: **1.** *Antenna and control systems technology for radio telescopes.* In this topic we seek interaction of expertise on new antenna designs for radio astronomy, on all aspects of dish conversion and related issues and on control systems technology. Mechanical and electrical engineers will interact and discuss challenges and solutions of the problems they face. **2.** *The new design of RF equipment*. The aim of this topic is the exchange of expertise within the community of the RF engineers about new technologies used in the design and construction of the radio astronomical equipment front-ends. **3.** *The digital backends technology*. The hardware and software computer engineers will exchange expertise on the new requirements of the data processing and the challenges faced in the design and operation of the backend devices as well as in the networking of the radio telescopes. **4**. *Metamaterial technology in the astronomical equipment.* A whole session will be devoted in the metamaterial technology and its innovative applications in traditional radio engineering. Metamaterials are artificial materials which resent unique properties. In the microwave regime the main advantages are the intrinsic properties of the frequency selection and the subwavelength operation. Thus, the metamaterials are used in the construction of microwave devices as filters, couplers and so on. *We note that we will present how we intent to use the metamaterial properties in the construction of an astronomical receiver operating as dual band radiotelescope in the THERMopYlae*.
Relevance for RadioNet	The proposed technical event's outcomes fit well within the scope and focus of RadioNet. It aspires to attract engineers of all areas of expertise working in projects of radio telescopes' development all over the world. In this way, the knowledge, about new methods, technologies and techniques used, will be directly exchanged, new collaborations will be formed where further ideas will be nourished, achieving the aims of the Radionet about the dissemination of technical achievements. The topic about the metamaterials is expected to significantly advance our

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	knowledge well beyond the current state-of-the-art in radio astronomy equipment. In fact, in this context, combination of studies of metamaterials composed by the radio astronomical microwave equipment does not exist yet. To our knowledge the topic of metamaterials has never been addressed in this context in conferences before. Consequently, the proposed event will be the cause for both the development of new experimental methods and techniques and the interest of the industry for the construction of new radio astronomical equipment. The cross-pollination between these aspects will be a key element towards the success of the proposed event.
Impact	The University of Thessaly has Engineering Schools that are able to support the event. The proposed technical event claims relevance with the field of RF and microwave engineering, on one hand, and with radio astronomy on the other. The Hellenic Open University – School of Science and Technology supports the radio astronomy relevance of the event (Dr. Nectaria Gizani is the Co-PI, radio astronomer of the Hellenic radio telescope project). The discussion about new innovative technologies (e.g. metamaterials) in the design of astronomical equipment can attract strong interest among companies of the technological sector for these innovative applications in the field of radio astronomy (e.g. dedicated microwave devices like couplers, filters, etc.) In this direction the role of Radionet as the European node could be catalytic. The collaborative interactions with other research radio nodes from abroad (e.g. USA, Mexico, Africa, Australia and New Zealand), will enforce, further expand and strengthen the international research collaborations with the European radio astronomy engineers, enabling further production of higher caliber academic output. The mutual interaction will be a significant scientific and cultural benefit for potential PhD researchers and young scientists and engineers from Europe, as it will open a gateway through which they will also be involved in an interdisciplinary and multifaceted collaboration in the near future, with leading institutes and internationally acknowledged scientists both in Europe and in the rest of the world.
Ethics	The Co-PI of the project of the Hellenic radio telescope is a female radio astronomer, with first-hand awareness of the sensitive matter of the gender imbalance in her scientific field of expertise, and other scientific and technological fields. From her role in the scientific organizing committee, female engineers and scientists will be invited and encouraged to participate, especially from radio astronomy developing countries. We will have female engineers-invited speakers. More than 50% of the funding asked for the financial support of participants from poorer countries and smaller universities and research institutes will be intended for (young) female engineers and scientists wanting to attend the event. Needless to say that we will also encourage the participation of female PhD students, independently of age.

Privacy Policy: *With signing this template and applying for RadioNet funding, I accept the Privacy Policy of RadioNet, which is based on the EU General Data Protection Regulation (GDPR).*

Place & Date:

Lamia - 01/07/2019

Signature of the applicant:

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