



Newsletter June 2015

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RadioNet3 Newsletter

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Meet RadioNet3 at the EWASS 2015

As the RadioNet booth and the meet & greet on the EWASS2014 were a great success, meet & greet will be repeated at the EWASS 2015.

Join us for a meet & greet at the RadioNet3 booth in the morning of June 25, 2015. You will have the opportunity to talk with the RadioNet3 coordinator, management and partners about the possibilities that RadioNet3 offers, but also about radio astronomy in general - the present situation, its future, and its meaning in society.

HILADO software development applicable in a wider scientific computing community

The Joint Research Activity HILADO of the RadioNet3 project is concerned with "bringing it to the users"; the users in this case being scientists involved in data processing. Astronomical data processing is often interactive. Processing scripts are rerun after adjusting parameters. Only values downstream from the changed steps need to be recalculated, but identifying redundancies manually is tricky and error-prone. As processing becomes more and more time consuming, generating terabytes of data, redundant computation should be automated where possible.

Tools were developed to do this. With these tools, radio astronomers should be able to concentrate on the specification and outcome of data processing experiments. Finding out what needs to be recalculated in a modified experiment should be left to the tools.

Any scientific field where the time consumed by data processing is an important consideration will benefit from this work. Eliminating redundancies speeds up processing. HILADO tools derive a new, data processing recipe that executes exactly only those steps that differ from the original experiment. In doing so, the tools can make clever use of modern file systems which are able to minimise and track storage requirements of data sets with only small differences.

The need for this tooling is already present for existing modern radio telescopes such as LOFAR,

where the ratio between processing time and observing time is approximately 5:1 for 'routine' observations and up to 20:1 for experimental processing. The SKA radio telescope currently being designed will generate at least an order of magnitude more data. HILADO methods reduce processing time significantly and will contribute to the goal of bringing data to the user faster.

DIVA

A dramatic increase in sensitivity for VLBI observations is happening now! DIVA, a RadioNet3 Joint Research Activity, with a team of European scientists and engineers from INAF, MPIfR and OSO, has been developing a VLBI digitiser and formatting unit, a so-called VLBI "backend" with the name Digital Base-Band Converter Vers. 3 (DBBC3). Two prototypes have been built and tested in the labs, and the first field test at the 25-m antenna in OSO (SE) and the 32-m antenna in Noto (Sicily) is planned for June 22, 2015. More tests with three antennas are planned for the 2nd half of 2015.



The history of the digital hardware for VLBI observing was dominated by the US for nearly 40 years. Since the European VLBI Network (EVN) accepted the project to develop a European VLBI backend in 2005, Europe has caught up and slightly surpassed the US finally with the introduction of the DBBC2 in the EVN in 2012 to 2014. The EU-supported DBBC3 expands the capabilities of the VLBI backends by a factor of nearly 10 in data-rate. The modular system can be extended beyond the planned data-rate for DIVA of 32 Gb/s up to 128 Gb/s, which cannot be rivalled by any other VLBI backend world-wide.

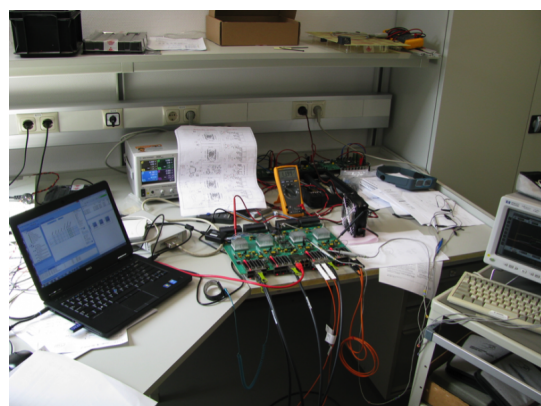
The DBBC3 will enable 'first class' VLBI from cm to mm and sub-mm wavelengths. In particular at the shortest wavelengths it will help to observe and eventually image the event horizon of the super-massive central Black Hole in our galaxy, as well as other nearby radio galaxies. For geodesy it will help enabling intercontinental measurements of positions of antennas with up to a precision of 1mm and 0.1mm/y.

UniBoard2: First (LED) Light

Recently, the UniBoard2 project reached an eagerly awaited milestone: a blinking LED! In May 2015, the finished UniBoard2 was delivered in Dwingeloo.

UniBoard2 set out in July 2012 to create an FPGA-based, extremely high-performance computing platform, geared towards the large astronomical facilities currently under development. This board employs cutting-edge technology; while the prototype board has been equipped with the latest 20nm Altera Arria10 FPGAs, it is in fact pin-compatible with the even more powerful 14nm Stratix10 FPGAs, which will only become available at the end of this year.

The powering up of the board went extremely well, and only very few of the 20000 connections had to be modified. Following this, all solder joints were checked through boundary scans. After the I/O to the FPGAs had checked out successfully, the board was ready to be loaded with its first



firmware personality, resulting in a blinking LED.

Further tests are now ongoing, of the 24 40GbE optical interfaces (1Tb/s front side I/O), the 192 10GbE interfaces to the backplane (2Tbps board-to-board interconnectivity) and of the DDR4 interfaces. In addition, it has to be verified that all 12144 multipliers can run at 400MHz (yielding almost 5TMAC/s).

The UniBoard2 project partners are the Universities of Bordeaux, Manchester and Orléans, INAF, MPG Bonn, ASTRON and JIVE. ASTRON is in charge of the hardware design; the other partners have or are in the process of developing firmware personalities for the board, while JIVE is leading the project. Achieving this success was made possible through the close collaboration and interaction between the partners and the Altera, EBV, Neways and QPI companies.

Transnational Access: 9000 hours provided by RadioNet3

Since the project start beginning of 2012, RadioNet3 provided scientists of European institutes with 9000 hours of access to the most excellent European radio telescopes and arrays, making possible 375 projects.

IAU XXIX Assembly

The RadioNet3 coordinator will represent RadioNet3 on the IAU Symposium in Hawaii from August 4 to 8, 2015. He will exchange ideas with the non-European colleagues and stand for the RadioNet brand.

RadioNet3 encourages visitors of the IAU to visit the RadioNet3 booth (number #129) and the RadioNet3 corner in the student pavilion.

45th anniversary of the YERAC

On August 19-21, 2015, the Young European Radio Astronomers Conference (YERAC) will take place for the 45th time. RadioNet3 as a main sponsor is thus especially pleased that this jubilee coincides with the first time, the YERAC will be held in Latvia, in the Ventspils International Radio Astronomy Centre (VIRAC). RadioNet3 welcomes this young institute to host the well-established YERAC.

Radio astronomy master and doctoral students, and early stage postdocs are invited to participate in one of the oldest international radio astronomy meetings. More information: <http://yerac2015.venta.lv/>

Limited financial support for participants is possible. For the details please visit the meeting webpage.



ERIS 2015

The 6th European Interferometry School will take place on September 6-10, 2015 in Garching/Germany. RadioNet3 is proud of supporting since 2005 a week of lectures and tutorials handling the basic principles of radio interferometry techniques and data analysis, and the scientific difficulties and ways of achieving solid scientific results from radio interferometry.

The ERIS2015 will focus on the generation of new and greatly enhanced interferometers, which have recently become available to European astronomers.

Graduate students, beginning postdoctoral fellows, and more senior researchers interested in learning about the techniques of radio interferometry are welcome to attend the ERIS2015.

More information: <http://www.eso.org/sci/meetings/2015/eris2015.html>

A limited financial support for participants is possible. For the details please visit the meeting webpage.

CESRA solar radio summer school

The RadioNet3 supported CESRA solar radio summer school is hosted by the Glasgow University, August 24-28, 2015.

The school is open to solar radio physicists, including PhD students and early career researchers. It will cover the essential elements of theory, modelling and data analysis and will feature lectures and tutorials. The participants will have the opportunity to meet and discuss research topics with their peers together in an informal atmosphere.

More information: <http://www.astro.gla.ac.uk/cesra2015>

Limited financial support for participants is possible. For the details please visit the meeting webpage.

IRAM 30m summer school 2015

The RadioNet3 funded IRAM 30m summer school on September 11-18, 2015 in Pradollano, Spain, will combine lectures on millimetre astronomy with observations using the 30m telescope.

In addition to lectures by experienced scientists and 30m observers, the students, lecturers and technical assistants will form small groups, to work on specific topics, preparing science cases. They will conduct the observations with the 30m telescope, reduce the data, and present their first results on the last day of the summer school.

The school is meant particularly for young scientists with little previous experience in mm-astronomy. It is limited to approximately 40 students, selected on the basis of their interests, experience, and references.

More information: <http://www.iram-institute.org/EN/content-page-308-7-67-308-0-0.html>

Limited financial support for participants is possible. For the details please visit the meeting webpage.

All RadioNet3 events can be viewed here: <http://www.radionet-eu.org/>

Berlin

The meeting RadioNet3 – present & future opportunities, August 25-26, 2015 in Berlin, RadioNet3 offers the whole European radio astronomy community a platform for discussing the achievements of RadioNet3 and ideas for the future. The EC call for the RadioNet follow-up project is expected in October 2015; a successful proposal has then to be written by end of March 2016. This means that Prof. Anton Zensus, the current and future project coordinator, has to receive the short proposals of the applicants for the follow-up project on September 3, 2015 at the latest. This meeting is intended for all radio astronomers - institutes and individuals - planning to write a short proposal for the follow up project, and exchanging ideas with colleagues of the European community.

More information: <https://indico.mpifr-bonn.mpg.de/indico/conferenceDisplay.py?confId=104>

CONTACT: Management – Dr. Izabela Rottmann - rn3@mpifr.de