



The VLBI Future

A roadmap for the next decade

T. Venturi (INAF), M. Lindqvist (OSO), Z. Paragi (JIVE)

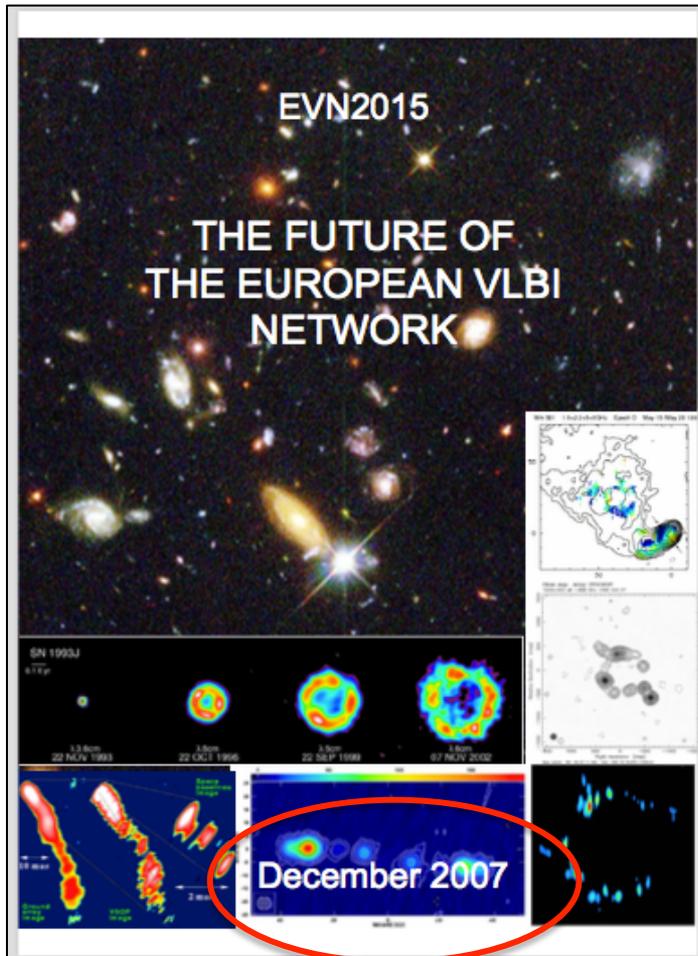


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- ✓ Background and “actors”
- ✓ The WP and the implementation plan
- ✓ Purpose of this F2F meeting
- ✓ Progress so far
- ✓ Next steps and milestones



BACKGROUND AND “ACTORS”

**As highlighted by the EVN CBD in 2016:
it is time to revise the VLBI Science
case for several reasons**

- Role and potentials of VLBI in the new astrophysical challenges
- Role, potentials and added value of VLBI in the SKA era
- Define key science areas and observational needs to have a roadmap for the technological development
- White book in support of funding requests to national agencies and ministries



BACKGROUND AND “ACTORS”

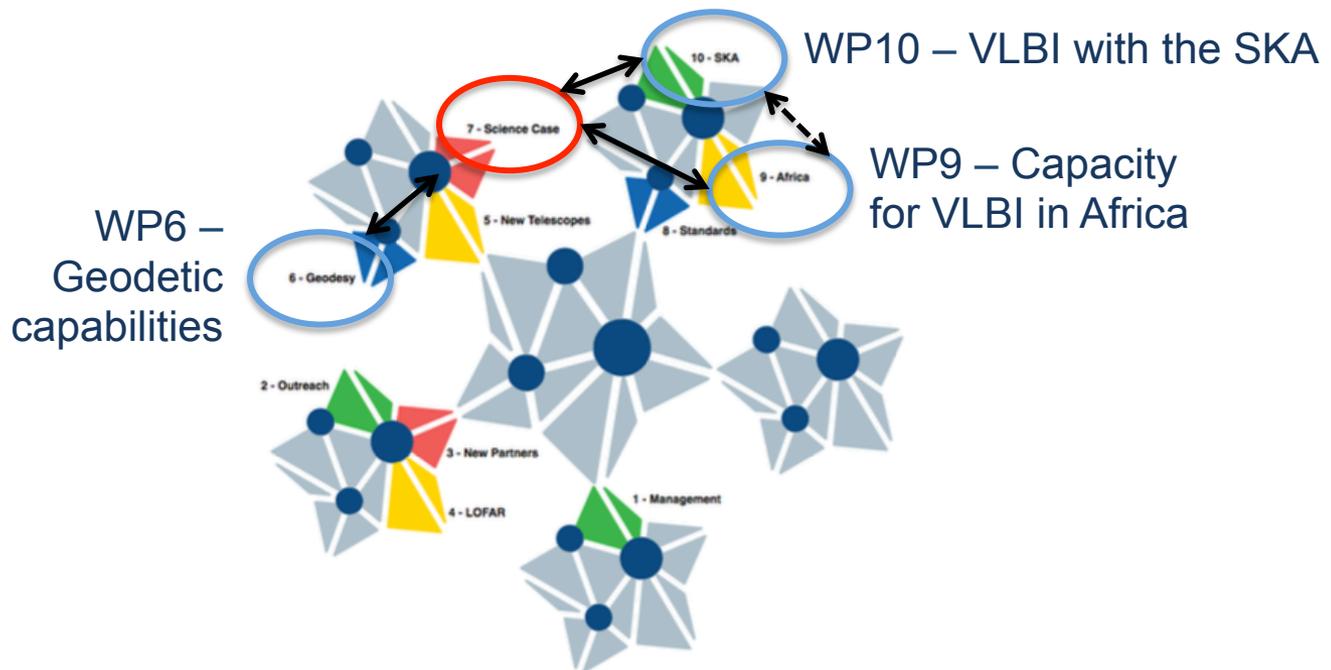
Objectives for WP7 as in the JUMPING JIVE proposal

Because of the progress in the field of astrophysics and the changes in the radio astronomy landscape it is timely to revisit the EVN science case. **In consultation with the user community and global partners** we will define the most important science areas for future VLBI array.

- One task: *VLBI Science case*
- One main deliverable: a white paper setting the future priorities of VLBI science capabilities

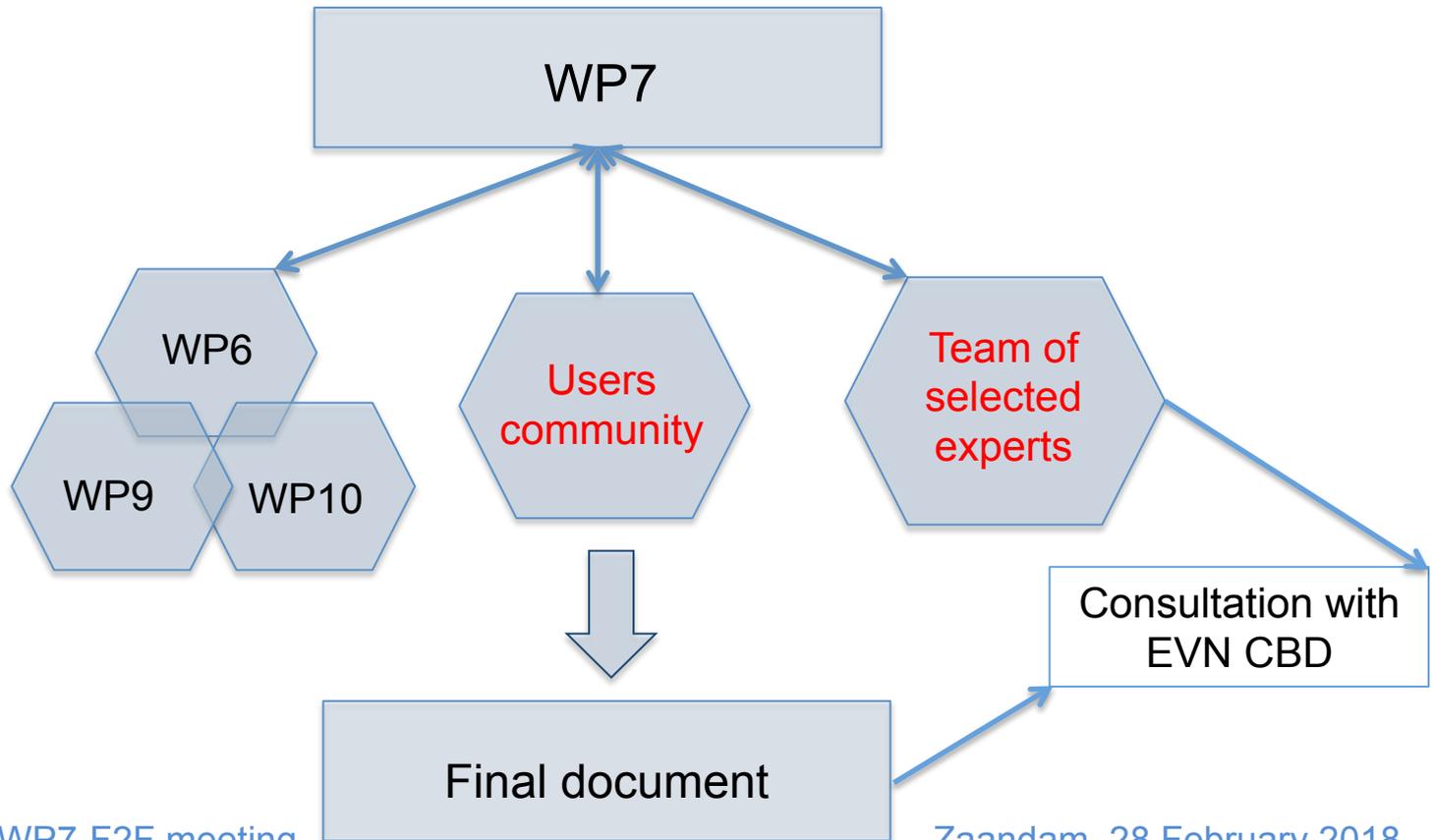


Relations to other WPs in the project Capacity for doing science





WP7 and feedback from the other JJ-WPs, the community at large and the EVN CBD





IMPLEMENTATION PLAN AND PURPOSES OF THIS F2F MEETING

Core team of max 10 experts identifies key science areas and **experts** for the various sections/ chapters



Core team and **experts** meet in a 1-2 day brainstorming meeting:

- to identify key science areas and technological developments;
- to discuss how to involve the community at large



The write up of the document starts

↓
R. Beswick, T. Bogdanovic,
W. Brisken, P.Charlot, M.
Lindqvist, A. Lobanov, Z.
Paragi, A. Szomoru, L. Testi,
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PROGRESS AND ACTIONS SO FAR

First presentation of the project to the community at the meeting: eMERLIN and EVN in the SKA era (Jodrell Bank, 11-12 September 2017)

Meeting part 2 : The future of VLBI

(Organisers: Tiziana Venturi (INAF) /Michael Lindqvist (Onsala) /Zsolt Paragi (JIVE)

12:00 - [Introduction, welcome and overall vision](#) - Tiziana Venturi (INAF, Italy)

12:15 - [EVN present status and future direction](#) - Michael Lindqvist (Onsala Space Observatory, Sweden)

12:30 - [VLBA technical roadmap : 2020-2035](#) - Walter Brisken(LBO, USA)

12:45 - [Wide-Band single pixel feeds and EVN technical upgrades](#) - John Conway (Onsala Space Observatory, Sweden)

13:00 - Lunch

14:15 - [VLBI and the SKA \(an update from the SKA-VLBI SWG\)](#) - Zsolt Paragi (JIVE)

14:15 - [Investigating radio quiet quasars using e-MERLIN and EVN observations of strong gravitational lensing](#) - Philippa Hartley (JBCA)

14:15 - [Probing circumstellar structures through masers with the EVN and e-MERLIN](#) - Sandra Etoka (JBCA)

14:30 onwards - Discussion and Wrap-up



PROGRESS AND ACTIONS SO FAR



LIVERPOOL 3-6 APRIL 2018

European Week of Astronomy and Space Science
EWASS 2018
RAS NAM 2018

EWASS 2018

- Welcome & News
- About EWASS
- Organisers
- Dates
- Venue
- Programme
- Plenary Lectures
- Abstract Submission
- Registration
- Travel Information
- Accommodation

Special Session SS11

4 April 2018

3 – 6 April 2018 (TBD)

Exploring the Universe: a European vision for the future of VLBI

Aims and scope

The aim of this special session is to discuss and position the role of very long baseline interferometry (VLBI) at radio wavelengths in the context of the challenges and open questions of astrophysics as we approach the next decade. VLBI arrays are the only instruments capable of reaching milliarcsecond scale resolution and below, and in this special session we aim at addressing those astrophysical key areas where VLBI will prove to be crucial for a major improvement of our knowledge. This special session is part of an ongoing effort to shape the VLBI roadmap for the next decade, and will be an excellent good chance to gather many experts within and outside the VLBI community, to discuss the most fundamental astrophysical questions VLBI will be able to address, complementing the other main forthcoming astronomical facilities. The speakers have been selected, but we still accept and encourage poster submission.

Programme

- Topic 1
OBSERVATIONAL COSMOLOGY: Cosmology and Gravity; Galaxy and AGN co-evolution
- Topic 2
EXTREME PHYSICS: Towards the horizon of events; Transient events
- Topic 3
THE LOCAL UNIVERSE: Masers, stars and planetary systems
- Topic 4
THE FUTURE OF HIGH RESOLUTION RADIO ASTRONOMY IN EUROPE

Invited speakers

- Guillem Anglada-Escude Queen Mary University of London, UK
- Andreas Brunthaler MPIfR, Bonn, Germany
- John Conway Onsala Space Observatory/Chalmers University, Sweden
- Heino Falcke Radboud University, The Netherlands
- Jason Hessels ASTRON, The Netherlands
- Andrea Merloni MPE, Garching, Germany
- Tom Muxlow University of Manchester/Jodrell Bank Observatory, UK
- Samaya Nisanke Radboud University, The Netherlands
- Hans Olofsson Chalmers University, Sweden
- Miguel Perez-Torres IAA, Spain
- Cristiana Spingola Kapteyn Astronomical Institute, The Netherlands
- Tullia Sbarrato University Milano Bicocca, Italy

Scientific organisers

Tiziana Venturi (tventuri@ira.inaf.it), Istituto di Radioastronomia, INAF

Zsolt Paragi (zparagi@jive.eu) Joint Institute for VLBI ERIC (JIVE)

Michael Lindqvist (Michael.Lindqvist@chalmers.se) Onsala Space Observatory





PROGRESS AND ACTIONS SO FAR

Starting from the programme originally proposed for the Symposium at EWASS 2018, we drafted an first version of the index of the Vision Document, which broadly consists of three main sections:

Section I - The landscape of the present and future observing facilities

- Present and future VLBI arrays and radio facilities
- Present and future space and ground observatories at other wavelengths

Section II - The scientific roadmap for the next decade

- Cosmology
- Galaxy formation/AGN feedback
- Towards the horizon/jets and their formation
- Explosive/transient phenomena
- Stars, stellar evolution and formation of planetary systems
- Earth and celestial reference frames (astrometry and geodesy)
- New developments in VLBI





PROGRESS AND ACTIONS SO FAR

Section III – A new vision for the European Very Long Baseline Interferometry

- A science-driven technological roadmap for the next decade
- VLBI and synergies in the next decade
- Summary and conclusions

This very preliminary chapter list has been the starting point for this f2f meeting



HORI

Agenda

28/02/2018

Start at 13:30

SESSION I	Insights from the EVN Bodies	Chair P. de Vicente
13:30 - 13:40	Welcome and Introduction of all participants	G. Cimo
13:40 - 14:00	Presentation of the task, deliverables and timeline	T. Venturi
14:00 - 14:20	Lessons from EVN2015	H. van Langevelde
14:20 - 14:50	Prospects and ambitions of the EVN for the next decade	J. Conway
14:50 - 15:15	Technological prospects for the EVN for the next decade	A. Szomoru
15:15 - 15:45	Discussion	Chair P. de Vicente
15:45 - 16:00	Coffee break	

SESSION II	Scientific achievements, open questions and future prospects for VLBI	Chair: T. Muxlow
16:00 - 16:25	Cosmology	J. McKean
16:25 - 16:50	Galaxy formation and AGN feedback	R. Beswick
16:50 - 17:15	Close to the AGN cores: mmVLBI and jet formation	A. Lobanov
17:15 - 17:40	Stars: formation and evolutionary stages	A. Bartkiewicz
17:40 - 18:05	Astrometry and geodesy	P. Charlot

Dinner



HORIZON 2020



INAF
ISTITUTO NAZIONALE
DI ASTROFISICA
NATIONAL INSTITUTE
FOR ASTROPHYSICS



01/03/2018

SESSION II	Continued	Chair: T. Muxlow
08:15 - 08:40	Transient phenomena	M. Perez-Torres

SESSION III	Thinking Global	Chair: F. Colomer
08:40 - 09:00	Prospects for Global VLBI	W. Briskin
09:00 - 09:20	Prospects for e-MERLIN-EVN	T. Muxlow

SESSION IV	General discussion	Chair: M. Garrett
09:20 - 10:40	What are we still missing? Suggestions/insights	Chair & All
10:40 - 11:00	Coffee break	
11:00 - 12:45	Chapter coordinators and writing teams	Short parallel sessions
12:45 - 13:30	Wrap up and future steps	M. Lindqvist, Z. Paragi, T. Venturi
13:30	Lunch	
15:00	Meeting ends	



PURPOSES OF THIS F2F MEETING

- ✓ Start sketching the big picture of VLBI over the next decade;
- ✓ Identify the astrophysical areas where VLBI will play a key role over the next decade –
WARNING: transformational science should be highlighted, rather than a wishlist;
- ✓ Highlight the potential technological developments;



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- ✓ Start sketching the big picture of VLBI over the next decade;
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- ✓ Highlight the potential technological developments;
- ✓ A preliminary time schedule is defined.

From the short parallel sessions we expect that:

- the coordinator of each chapter/area is identified;
- a list of further experts to be involved in each area is drafted.



NEXT STEPS AND MILESTONES

- ✧ SS11 at EWASS 2018 will take place on April 4th, 2018 in Liverpool – Its main goal is to collect the input of experts outside the VLBI community
- ✧ Very first draft of the Vision Document should be made available by the end of September 2018
- ✧ A special session will be organized at the 14th EVN Symposium in Granada to share the document and collect further input from the VLBI community

We need to deliver an **advanced draft for minor revision and overall final reading **by Q3-2019**, as requested by the EVN Board of Directors**



THANK YOU!

None of this will be possible without your help and the engagement of the whole community