

Updating the EVN Vision Document

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Zsolt Pargi (JIVE)

- Overview
- Activity since the CBD in Bologna
- Current status
- Input from the Directors
- Future deadlines

Last slide of the report in Bologna

NEXT STEPS

1. Participation in the *Radio/Millimetre astrophysical frontiers in the next decade*, Charlottesville, 25-27 June 2019 (poster presentation accepted)
2. Second very advanced version of the document to be delivered to the CBD at the meeting in November 2019
3. First version of the glossy document to be delivered to the CBD at the meeting in November 2019
4. The SKA-VLBI meeting in October will be another chance for at least part of the people involved to have a further discussion on the document
5. Possible final meeting with the community in 2020

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1. Participation in the *Radio/Millimetre astrophysical frontiers in the next decade*, Charlottesville, 25-27 June 2019 (poster presentation accepted) - **DONE**
2. Second very advanced version of the document to be delivered to the CBD at the meeting in November 2019 - **DONE**
3. First version of the glossy document to be delivered to the CBD at the meeting in November 2019 - **TBD**
4. The SKA-VLBI meeting in October will be another chance for at least part of the people involved to have a further discussion on the document - **DONE**
5. Possible final meeting with the community in 2020 – **IN PROGRESS**

OVERVIEW OF THE ACTIVITY IN PREPARATION OF THE DOCUMENT

- ✓ VLBI session at the meeting: **eMERLIN and EVN in the SKA era** (Jodrell Bank, 11-12 September 2017)
 - ✓ 1.5 days **F2F meeting** (Zaandam, 28 February – 1 March 2018)
 - ✓ Special Session SS11 @ EWASS 2018: **Exploring the Universe: a European vision for the future of VLBI** (Liverpool, 4 April 2018)
 - ✓ **Open discussion** on the EVN Vision Document at the **14th EVN Symposium** in Granada (8-11 October 2018)
 - ✓ **Meeting of the WP leaders** to assemble the first version of the document (Bologna, 21-23 January 2019)
 - ✓ **EVN Closed Session** at the **SKA-VLBI Key Science Projects and Operations Workshop** (SKAO, 14-17 October 2019)
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- First deadline to chapter coordinators to deliver their part: 3 September 2018
 - Second deadline for revision after the EVN Symposium: end of December
 - Third version for revision after reading the full document: 28 February 2019
 - First delivery to the CBD: 3 April 2019
 - Second delivery to the CBD: 21 October 2019

VLBI20-30: a scientific roadmap for the next decade

The future of the European VLBI Network

Editors: Tiziana Venturi, Zsolt Paragi & Michael Lindqvist



Image by Paul Boven (boven@jive.eu). Satellite image: Blue Marble Next Generation, courtesy of Nasa Visible Earth (visibleearth.nasa.gov).

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1. Participation in the *Radio/Millimetre astrophysical frontiers in the next decade*

T. Venturi and M. Lindqvist attended
Poster presented: *A scientific roadmap for VLBI in the next decade.*

- ✓ Very fruitful meeting and fruitful discussions
- ✓ First version of executive summary drafted after the meeting (TV)
- ✓ First version of Chapter 8 drafted after the meeting: 8.1.1 *Technological requirements and operation modes* (TV); 8.1.2 *The EVN in the SKA Era* (ZP)
- ✓ Executive summary and Chapter 8 sent to M. Garrett, H. van Langevelde, P. Colomer, J. Conway and R. Bachiller for comments and input

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10 Key Science Questions/Goals in the executive summary

Topics identified:

- Dark Matter and Dark Energy
- Galaxy Evolution
- Physics of black holes and jet formation
- GW and multi-messenger astrophysics
- Fast transients
- SETI
- Distance scale
- The Milky Way
- Space missions and Solar System
- Stellar evolution

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2. Second very advanced version of the document to be delivered to the CBD at the meeting in November 2019

Current version, including the main comments received by the CBD at the meeting in Bologna:

- ✓ Feedback to all EVN representatives solicited (China, Russia, Korea, South Africa) – none received
- ✓ Full list of CBD directors included

distributed for the final set of comments to the CBD on October 21st, 2019

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4. EVN closed session at the SKA-VLBI meeting at SKAO (16 October 2019).

Invited people:

- ✓ Chapter leaders, and CBD members and contributors attending the meeting
- ✓ R. Schilizzi and P. Wilkinson who had read and provided feedback to the document
- ✓ M. Rioja and R. Dodson as experts

Outcome:

- Very helpful discussion
- Feedback on the Executive summary, key science questions and Chapter 8 (RTS,PNW, RL)
- Missing items noted (EHT, Extragalactic OH, Global VLBI alliance)

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New urgent actions:

- Minor updates of the scientific part (numbers, references)
- **Need to freeze the document to some date**

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The document sent to the CBD on October 21st was accompanied by a list of actions as emerged from the closed session

GENERAL CONSIDERATIONS

- Only two remaining missing topics (little text is required)
- Still not fully homogenous – Help has been offered by ASTRON to harmonize the language and the style throughout the document
- Inclined NOT to derive a matrix of required developments for the EVN. Instead, the technological requirements in Section 8.1.1 will be linked to the science part
- Glossy version still in progress – Zsolt Paragi will lead this effort, in coordination with WP2 in JUMPING JIVE. The deadline for the JUMPING JIVE deliverable has the priority for the moment

FEEDBACK REQUEST TO THE CBD

- Any comments on the scientific part?
- Any comments on the executive summary?
- Any comments on the 10 key questions (i.e. selected topics, format)?
- Suggestions for the glossy version?
- Any comments on the technological priorities?
- What's next at the CBD level?

Technological priorities for the next decade

The European VLBI Network, as a consortium of individual observatories plus JIVE (contributing central correlator and central support functions) operates by dedicating observing time, consumables and expertise to the common goals of the network. The MoU establishing the EVN consortium commits its members to maintain common inter-operable observing capabilities. In developing the array for this future this requirement requires a common technical development roadmap to be developed. A science vision for the EVN is the inventory of possible applications compiled by the user community, constrained by expected future technical capabilities. The scientific priorities should define a technological roadmap by which the EVN, headed by its Consortium Board of Directors, prioritize their efforts. The changes and upgrades selected and endorsed by the Consortium Board of Directors are as follows:

- Develop broad-band EVN antenna/receiver systems that are compatible with SKA1-MID on the short term, and can be further upgraded to larger bandwidths and higher frequencies in the long term.
- Develop an EVN correlator platform that is capable of handling $N > 30$ telescopes, some of which supply multiple beams, and that has modes optimized for processing a) wide fields of view, b) short transients and c) high spectral resolution modes (for masers, SETI and Spacecraft applications).
- Develop a large field of view archive that provides advanced access to VLBI and other radio



astronomy data products in support of the science goals of other instruments such as SKA and LOFAR in the radio and survey data at other wavebands.

- Consider the elements developed in the SKA context, such as VLBI antennas distributed in the African Continent as an attractive option to enhance the European distributed radio astronomy facilities with more optimal frequency and uv-coverage.

NEXT STEPS

- ❑ F2F meeting of the WP leaders to finalize the document (late 2019 or very early 2020)
- ❑ Document ready by the next EVN Symposium in Cork – Final meeting and discussion with the community
- ❑ Document ready for submission to the EC in Summer 2020
- ❑ Preliminary glossy document by the Spring CBD (2020)

- ❖ A special session on VLBI has been accepted for the EAS 2020 (Leiden), *Registering the Universe with the Highest Spatial Accuracy* (Chair van Bemmelen, co-chair Venturi)
- ❖ A joint session on VLBI will be held at the URSI GASS 2020 (Rome), *J04* (Chair Colomer)

THANK YOU
FOR YOUR ATTENTION