Updating the EVN Vision Document

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- Overview
- Activity since the CBD in Shanghai
- Current status
- Input from the discussion at the EVN Symposium
- Future deadlines

IMPLEMENTATION PLAN AND STATUS

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

R. Beswick, T. Bogdanovic, W. Brisken, P.Charlot, M. Lindqvist, A. Lobanov, Z. Paragi, A. Szomoru, L. Testi, T. Venturi

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

✓ DONE

The write up of the document starts

✓ DONE

MEETINGS, CONFERENCES AND DISCUSSIONS IN PREPARATION OF THE DOCUMENT

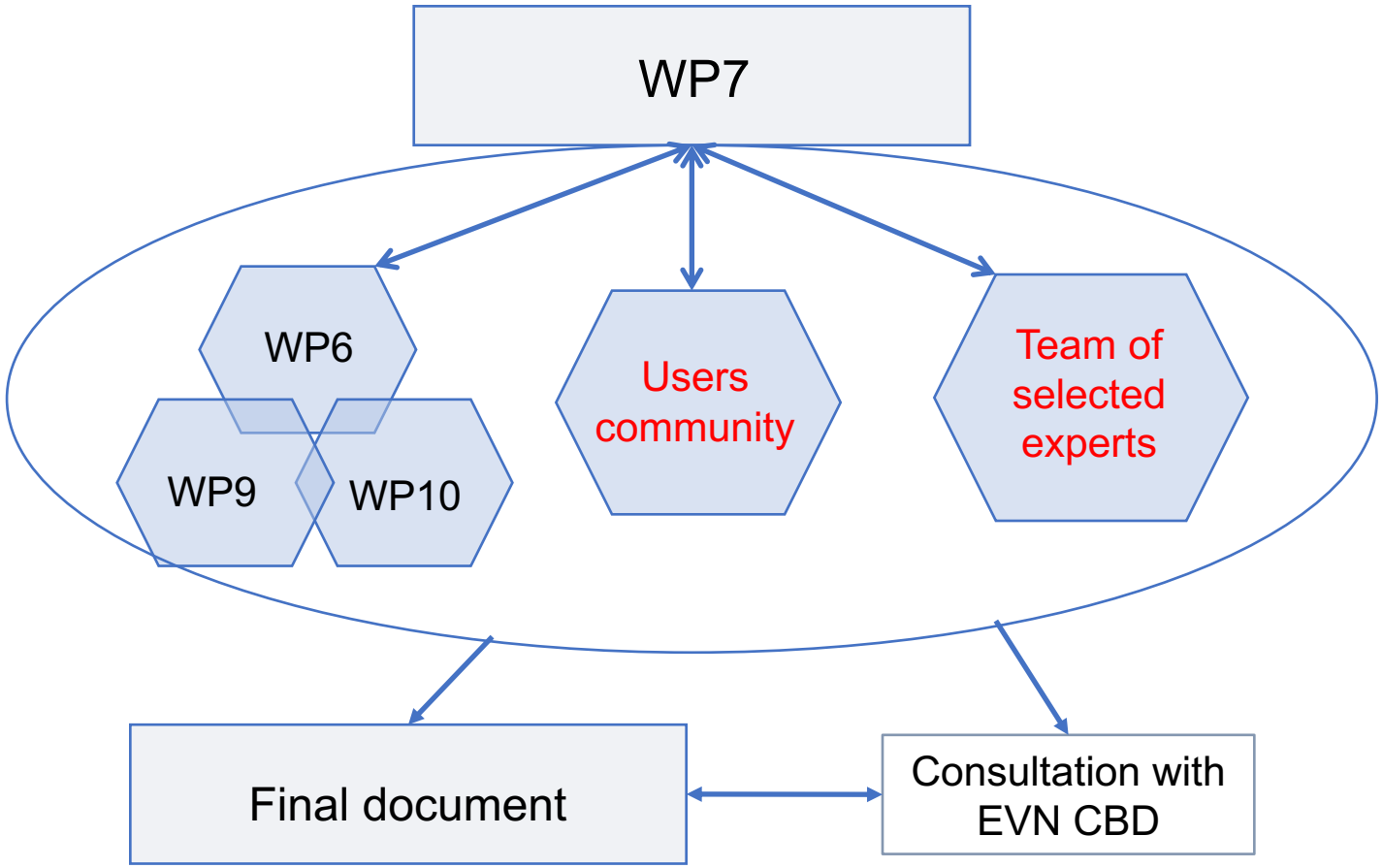
- ✓ VLBI session at the meeting: **eMERLIN and EVN in the SKA era** (Jodrell Bank, 11-12 September 2017)
- ✓ 1.5 days **F2F meeting** (Zaandam, 28 February – 1 March 2018)
- ✓ Special Session SS11 @ EWASS 2018: **Exploring the Universe: a European vision for the future of VLBI** (Liverpool, 4 April 2018)

Status at the CBD in Shanghai

- Preliminary list of topics defined
- Template for the document chosen
- Overall format of the document decided
- Chapter coordinators have selected their «team» of contributors

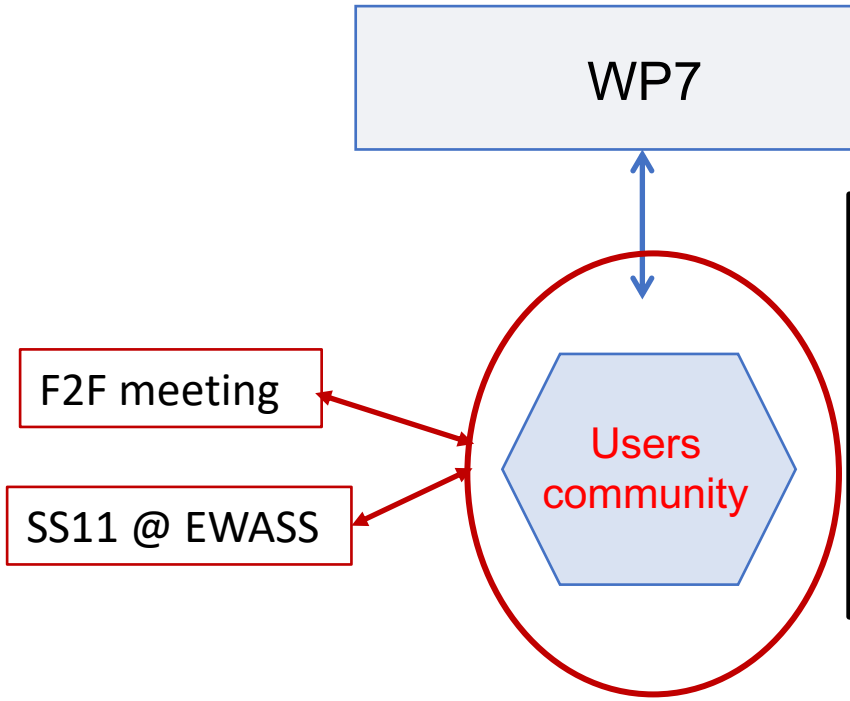
The VLBI Science Vision Document

Input from the Users' Community



The VLBI Science Vision Document

Input from the Users' Community



Discussion at the EVN Symposium

The VLBI Science Vision Document

Suggestions to the chapter coordinators and to the community

The document should not be a wishlist, but rather include:

- ✓ a selection of open questions in astrophysics where VLBI can provide unique answers
- ✓ a selection of science areas which can make considerable progress thanks to VLBI
- ✓ envisaged accessible and feasible developments to address the science

PROGRESS SO FAR

- ✓ A. Szomoru and P. de Vicente delivered a preliminary version of the technology chapter in June
- ✓ A first version of almost all chapters has been delivered in September
- ✓ Further input and feedback was collected during the EVN Vision discussion athe the 14th EVN Symposium & Users' meeting in Granada

STATUS OF THE DOCUMENT

- Preliminary draft of chapters and coordinators

Coordinator W. Brisken

Present and future VLBI arrays and other radio facilities – EVN and JIVE; eMERLIN; CVN; EAVN; JVLA; VLBA; LBA; LOFAR

The multi-messenger landscape – ALMA and E-ELT; CTA

Coordinator J. McKean

Cosmology – Review of current state-of-play; Dark matter: lensing on various scales; Dark energy; Masers: geometric distance and high-z; Lenses: time-delay distances; FRBs: geometric distances

STATUS OF THE DOCUMENT

- Preliminary draft of chapters and coordinators

Coordinators: Muxlow/Morganti

Galaxy Formation and AGN Feedback – Galaxy formation; Faint radio population; AGN vs star formation; faint radio-loud AGN; star formation and accretion in the local Universe; signposts of accretion and feedback; star formation processes; feedback through spectral line VLBI of HI

Coordinator: S. Frey

High-redshift AGNs and SMBH – AGNs in the early Universe; Blazars as tracers of high-z jetted AGNs; High-z observations with VLBI

Coordinator: A. Lobanov

Relativistic jets and innermost regions of AGN – Central regions ofradio-loud AGN; VLBI at microarcesond resolution

STATUS OF THE DOCUMENT

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Coordinators: Perez-Torres & Paragi

Transient Phenomena – Slow transients: BHs and neutron X-ray binary stars, thermonucear runaway supernovae, CCSNs and long GRBs, TDEs, NS and black home mergers, GW; Fast transients: FRBs, NS and pulsars

Coordinators: Bartkiewicz & Rygl

Galactic Masers – Masers in star forming regions; Masers around evolved stars; Maser astrometry

Coordinator: J.C. Guirado

Stellar evolution and planetary systems – VLBI astrometry; Pre-main sequence stars: protoplanetary disks, clusters and star forming regions, calibration of PMS evolutionary; Main sequence stars: Flares/coronal mass ejection, ultracool dwarfs, exoplanets; Evolved stars: mass loss/stellar winds, star spots, colliding winds

STATUS OF THE DOCUMENT

- Preliminary draft of chapters and coordinators

Coordinators: P. Charlot
Astrometry, Earth and Celestrial Reference Frames – A unique capability for positioning; fundamental physics and astronomy; astrophysics of extragalactic nuclei; rotational motions and dynamics of Earth; contribution of the EVN

Coordinator: L. Gurvits
Space Science – Spacecraft as a VLBI target; near-field VLBI

Coordinators: A. Szomoru & P. de Vicente
Technological developments

Coordinator: H. van Langevelde
The future of the EVN archive
VLBI and synergies in the next decade

Input from the discussion at the EVN Symposium

Some missing items were identified:

- Science potentials and impact of very broad band receivers (BRAND) – Denise Gabuzda volunteered to write this part and has joined the team
- Extragalactic spectral line science (beyond HI) – additional chapter
- IMBH – to be added in one of the existing chapters
- Gravitational Waves still missing in the chapter on Transients
- Cosmology applications missing in the astrometry chapter
- Short section on SETI to be added

FURTHER ACTIVITY and ISSUES

- Excellent chapters – Despite the guidelines we provided, however, the chapters are not very homogenous in style – should we live with this?
- Chapter length of the order of 6-10 pages
- A matrix of *requests vs science* is being prepared based on the text given so far
- Some material is still missing
- Selection of topics for the short glossy version of the document in progress

NEXT STEPS AND DEADLINES

- Meeting of the WP leaders scheduled in January – Inspection of the material; matrix of requests vs science; selection of topics for «glossy version» of the vision document
- Meeting among WP leaders and co-writers in 2019, possibly connected with one of the SKA-VLBI science meetings
- Very advanced draft to be delivered in a year from now

The full team (as of today)

An Tao (ShAO) – **C. Reynolds** (CSIRO) – **R. Pizzo** (ASTRON) – **M. Giroletti** (INAF, IRA) – **L. Testi** (ESO) – **A. Deller** (ASTRON) – **A. Possenti** (INAF, OACagliari) – **A. Polatidis** (ASTRON) - **R. Morganti** (ASTRON) - **R. Schultz** (ASTRON) – **R. Deane** (UPretoria) – **A. Merloni** (MPE) – **T. Sbarrato** (Milano Bicocca) – **K. Gabany** - **B. Boccardi** (INAF, OAS) – **R. Laing** (SKAO) - **E. Ros** (MPIfR) – **T. Bogdanovich** (Georgia) – **E. Rossi** (Leiden) – **G. Ghirlanda** (INAF, Brera) – **I. Donnarumma** (INAF, IAPS) - **R. Fender** (ASTRON) – **J. Hessels** (UVA) – **J. Miller-Jones** (Curtin) – **T. O'Brien** (JBO) – **A. van der Horst** (Washington) - **S. van Velzen** (Baltimore) – **R. Williamson** (UChicago) – **J. Chibueze** (SKA-SA) – **F. Colomer** (JIVE) - **S. Etoka** (UMan) – **C. Goddi** (Radboud Uni) – **M. Gray** (UMan) - **L. Moscadelli** (INAF, Arcetri) – **A. Richards** (UMan) – **A. Sanna** (MPIfR) – **G. Surcis** (INAF, OA Cagliari) - **J. van der Walt** (UBerkeley) – **W. Vlemmings** (OSO) - **C. Trigilio** (INAF, Catania) – **J. Greaves** (Cardiff) – **G. Anglada** (London) – **M. Gawonski** (Torun) – **H. Olofsson** (OSO) – **D. Fenech** (UMan) – **G. Bourda** (Ubordeaux) – **G. Cimo'** (JIVE) – **G. Molera** (Finland) – **D. Duev** (Caltech) – **M. Lindqvist** (OSO) - **U. Bach** (MPIfR) – **J. Quick** (HartRAO) – **I. van Bemmel** (JIVE) – **D. Gabuzda** (U. Cork).

Male
Female

THANK YOU

THE INPUT FROM THE CBD IS WELCOME!