



## EVN VISION Discussion

### The VLBI Future A roadmap for the next decade

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## OUTLINE

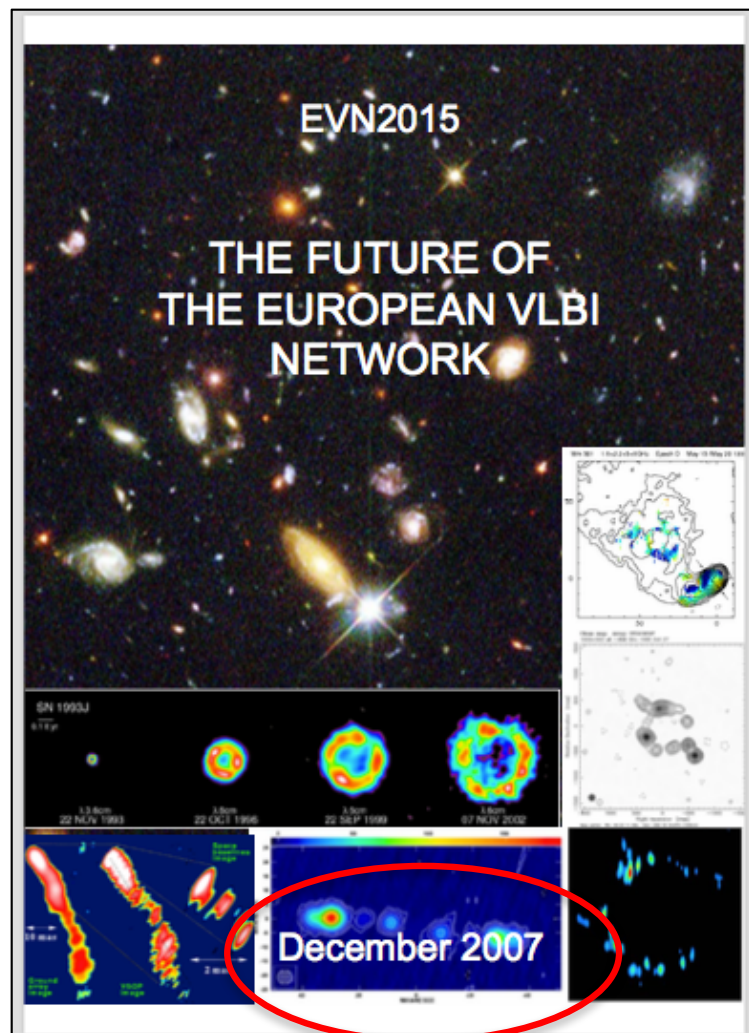
- ✓ Background and “actors”
- ✓ The task and the implementation plan
- ✓ Current Stage
- ✓ Purpose of this discussion



## 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”

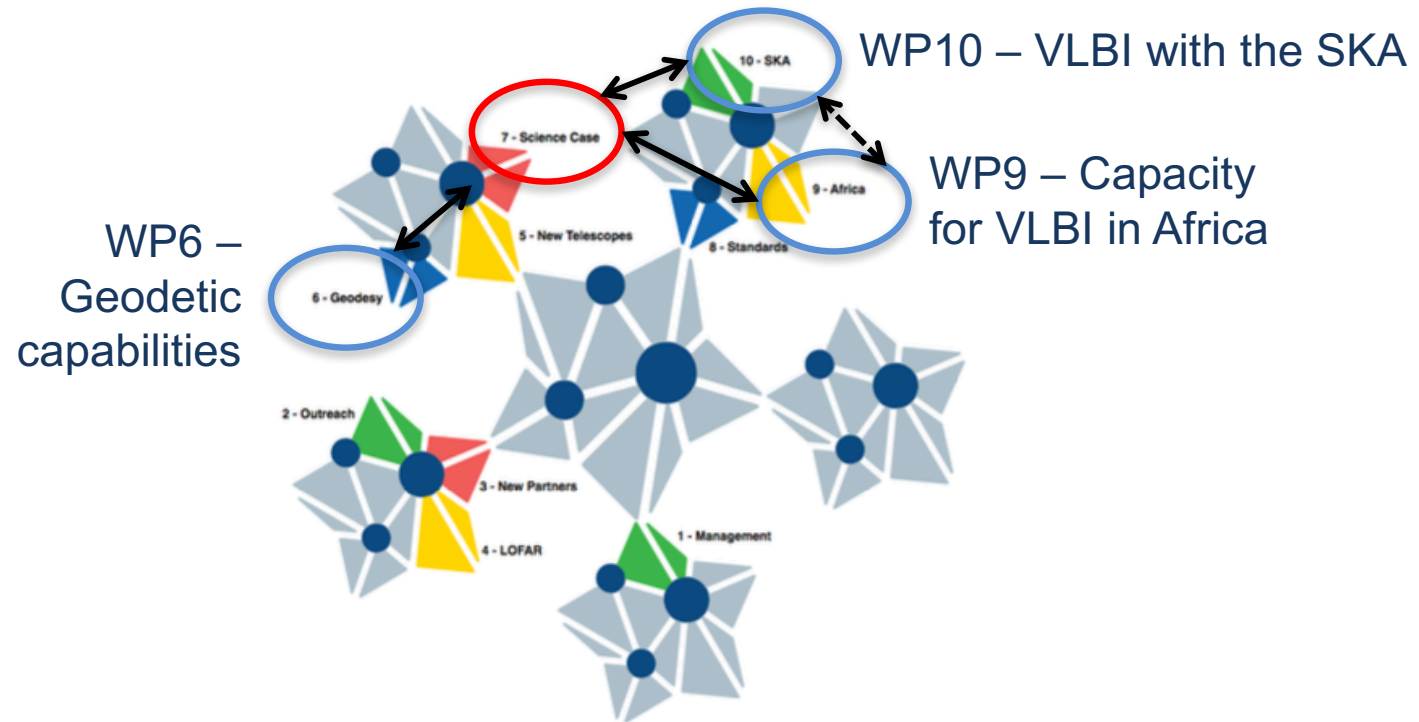
### Objectives for WP7 as in the JUMPING JIVE proposal

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

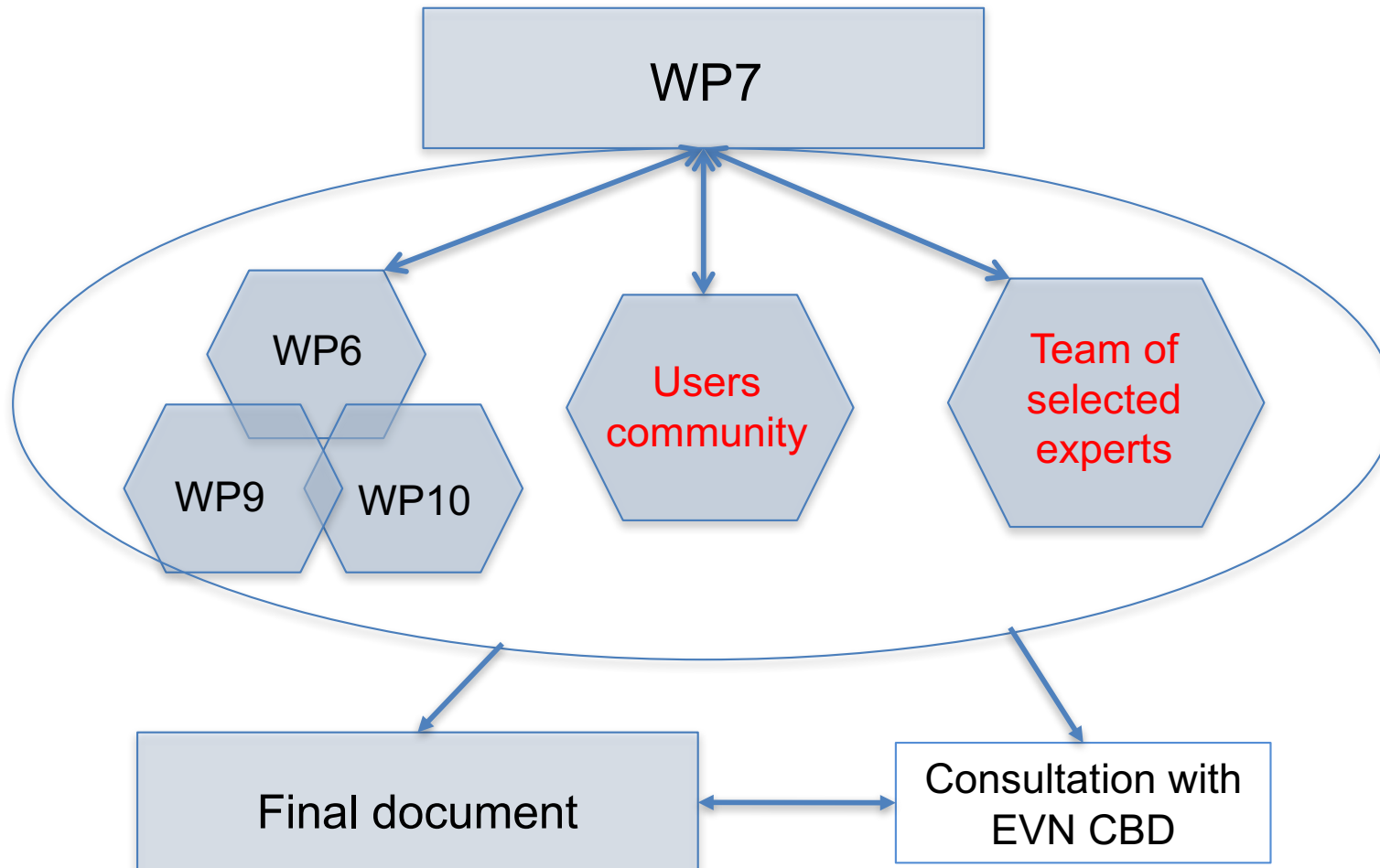


## Relations to other WPs in the project Capacity for doing science



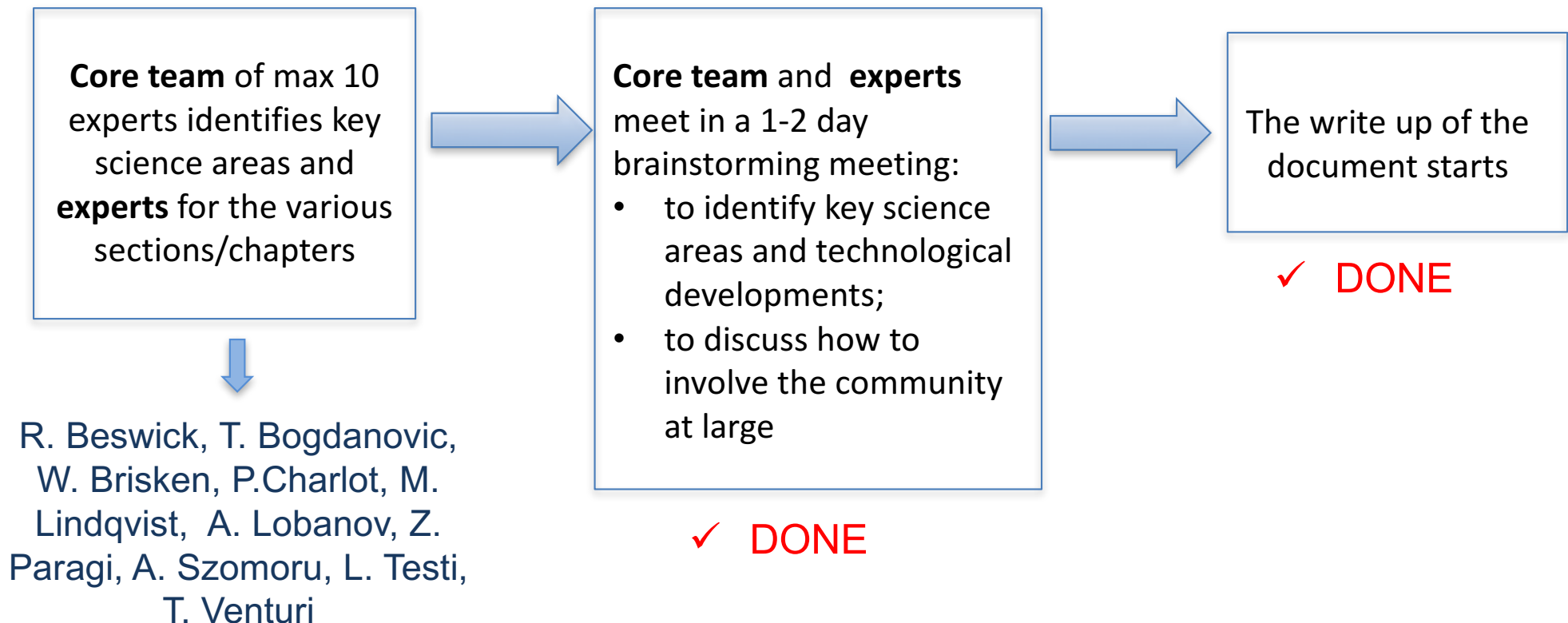


## THE PROCESS





## IMPLEMENTATION PLAN AND STATUS





## The F2F Meeting Zaandam (NL), 28/2-1/3/18



- 1.5 day meeting
- Scientific presentations on:  
cosmology, galaxy formation & AGN  
feedback, AGN and inner jets, stellar  
evolution, astrometry and geodesy,  
transient science
- 34 participants (four connected  
remotely)
- Lively and productive discussion
- Chapter coordinators identified





Chair: Tiziana Venturi **SS11 @EWASS – A European Vision for the future of VLBI**

09:00	Gravitational waves: potential contribution of VLBI	Andrew Williamson	PDF
09:30	Gravitational Lensing with the next generation of VLBI arrays	Cristina Spingola	PDF
09:45	Coevolution of Supermassive Black Holes and their host galaxies: open questions and prospects for VLBI	Andrea Merloni	PDF
10:15	The impact of VLBI Observations on our Understanding of Star-formation Activity and Low-Luminosity AGN Systems	Tom Muxlow	PDF
10:30	COFFEE BREAK		
11:00	MERAC Prize in Theoretical Astrophysics	Sandrine Codis	
11:30	MERAC Prize in Observational Astrophysics	Renske Smit	
12:00	MERAC Prize in New Technologies	Martin Pertenais	
12:30	Cosmological hydrodynamical simulations	Joop Schaye	
13:00	LUNCH		
14:30	Imaging black holes with mm-VLBI: past, present and future	Heino Falcke	PDF
15:00	Big and young SMBHs in the early Universe: how can we observe jetted AGN?	Tullia Sbarrato	PDF
15:15	Zooming in on fast radio bursts	Jason Hessels	PDF
15:45	Extragalactic Synchrotron Transients with VLBI: from Supernovae to TDEs	Migues Perez-Torres	PDF
16:00	COFFEE BREAK		
16:30	Stellar masers and the structure of the Galaxy	Andreas Brunthaler	PDF
17:00	VLBI and the life-cycles of stars	Hans Olofsson	PDF
17:15	The future of VLBI	John Conway	PDF
17:45	Summary and concluding remarks	Tiziana Venturi	
18:00	Close		



[http://www.jive.eu/jumpingjive/doku.php?id=vlbi\\_future:meetings:ewass18](http://www.jive.eu/jumpingjive/doku.php?id=vlbi_future:meetings:ewass18)

14<sup>th</sup> EVN Symposium – Granada, 9 October 2018



## The VLBI Science Vision Document

Approach - **The document is not a wishlist, but rather includes:**

- ✓ 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



## Current stage

- 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



## Current stage

- 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

The inner core regions and mm-VLBI



## Current stage

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### Coordinators: Perez-Torres & Paragi

**Transient Phenomena** – Slow transients: BHs and neutron X-ray binary stars, thermonuclear runaway supernovae, CCSNs and long GRBs, TDEs, NS and black hole 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



## Current stage

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**Coordinators: P. Charlot**

Astrometry, Earth and Celestial Reference Frames

**Coordinator: L. Gurvits**

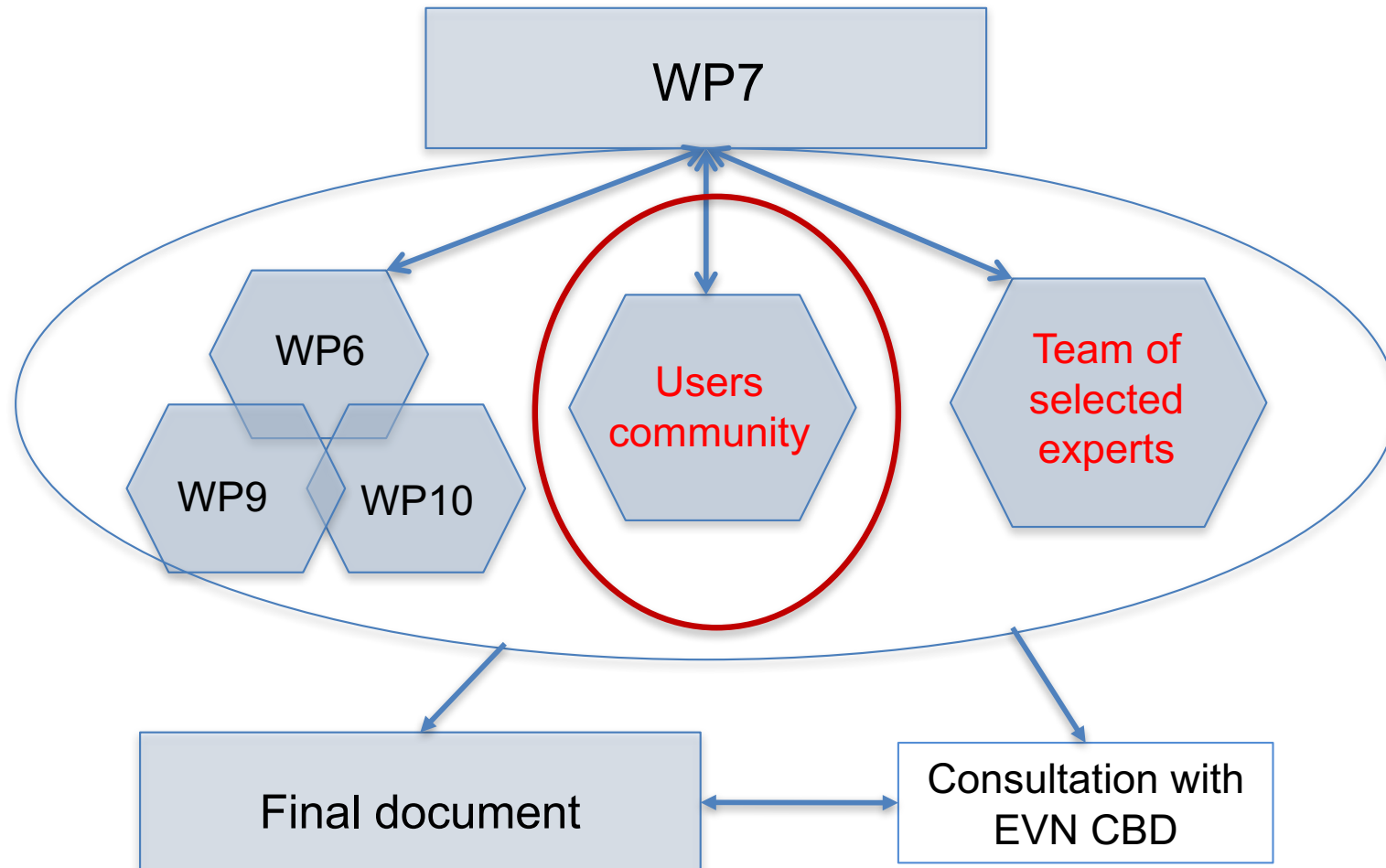
Space Science– Spacecraft as a VLBI target; near-field VLBI

**Coordinators: A. Szomoru & P. de Vicente**

Technological developments

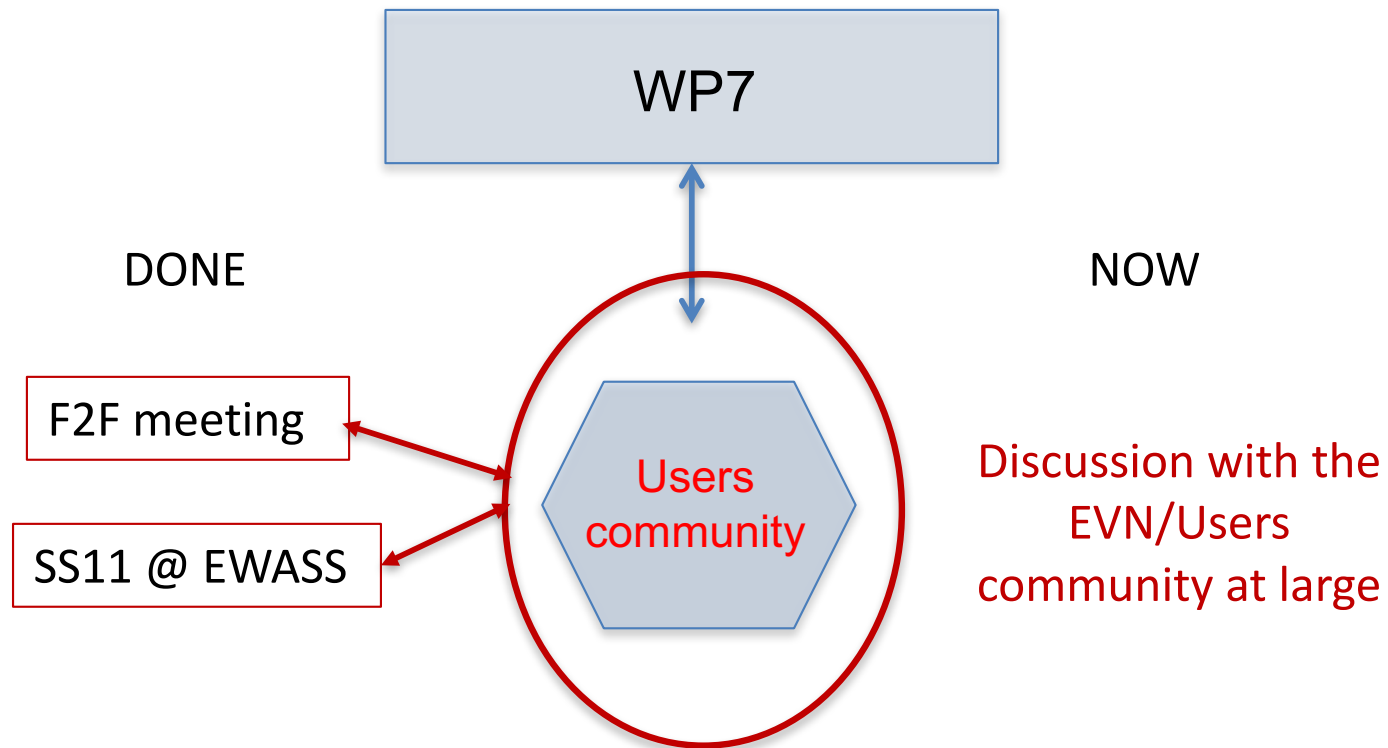


## PURPOSE OF THIS DISCUSSION





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- Comments/suggestions?
- Is there anything major missing from the broad list of topics we have selected?
  
- The process is still open and contributions are welcome
- Get in touch with the chapter coordinator of the topic you may wish to contribute to



THANK YOU FOR YOUR  
ATTENTION