Tuning in the Low Frequency Transient Radio Sky with AARTFAAC

Yvette Cendes, Peeyush Prasad, Folkert Huizinga, and the AARTFAAC Team

Science at Low Frequencies II

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Introducing AARTFAAC

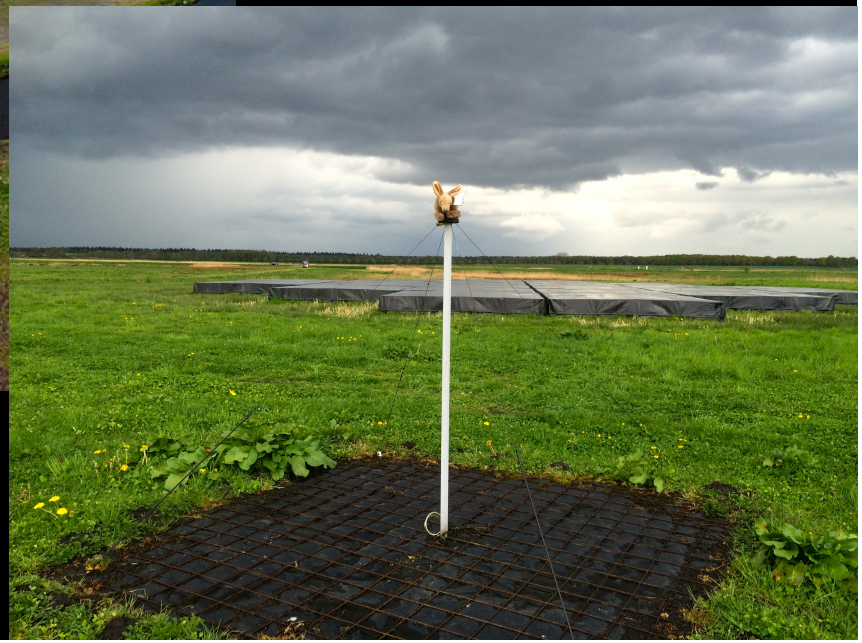
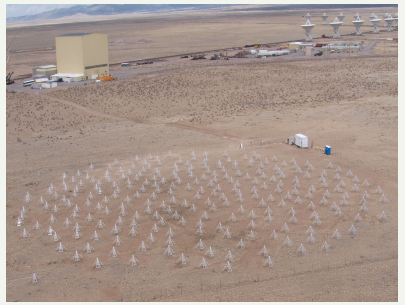


Image credit: LOFAR

Comparing the Instruments

	AARTFAAC	MWA	LWA1
			
Array Elements	288 inverted V antennas	128 tiles	256 wiregrid bowties
Freq. Range (MHz)	30-80	80-300	10-88
Field of View (sr)	π	0.06π	π
Angular Resolution (arcmin)	60	3	120
Spectral Res. (kHz)	15	40	75
Temporal Res. (s)	1	4	5
Sensitivity (Jy)	40	8.7	~80

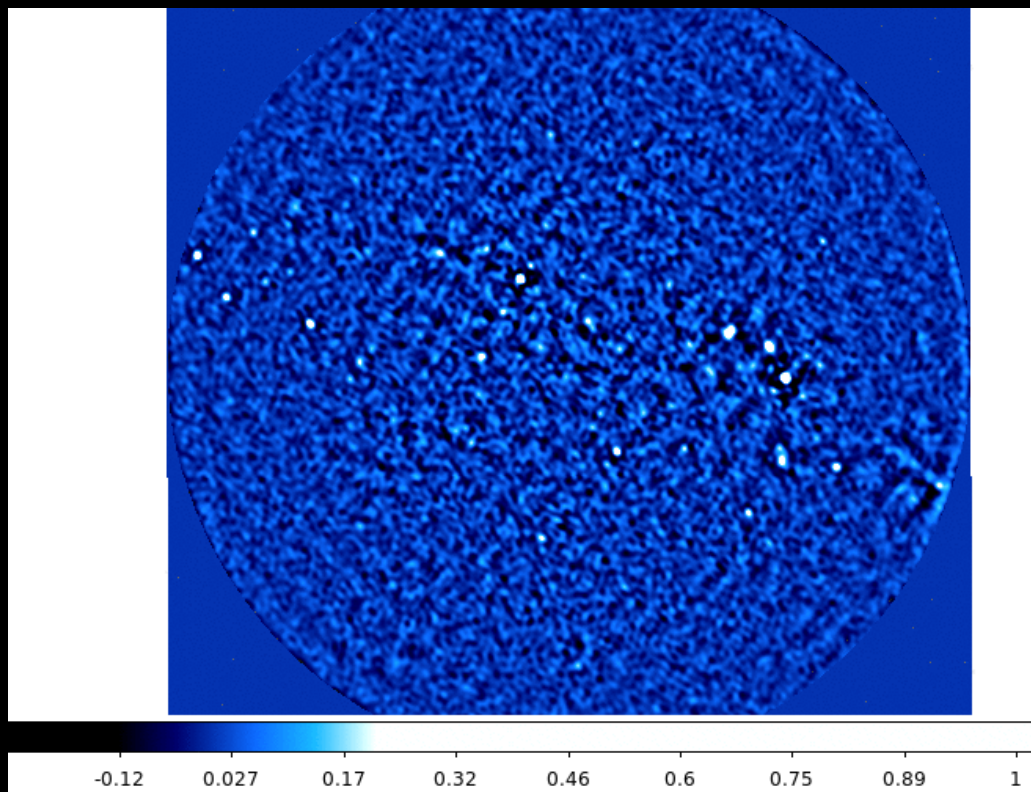
Sources: Prasad et al 2014, Tingay et al 2015, Obenberger et al 2015

AARTFAAC: The Movie

- https://youtu.be/b_Xx7haB9f0?t=5m16s

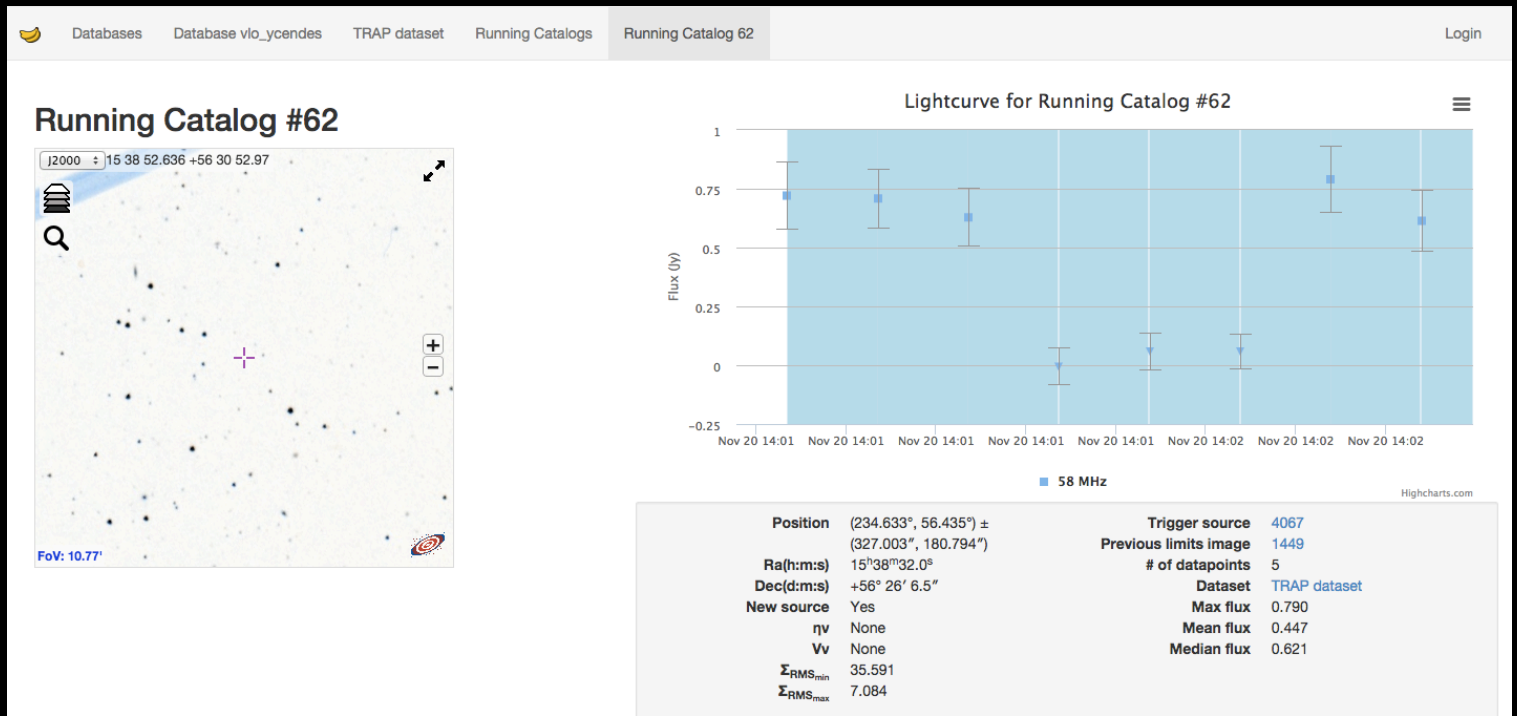
The First AARTFAAC Data Set

- Two subbands of a RFI-free 4.5 hour data stretch @57MHz, 6 MHz bandwidth, 1 second integration on images which are calibrated
- Beam model and a crude flux scale (based on Scaife & Heald, 2012) Is implemented

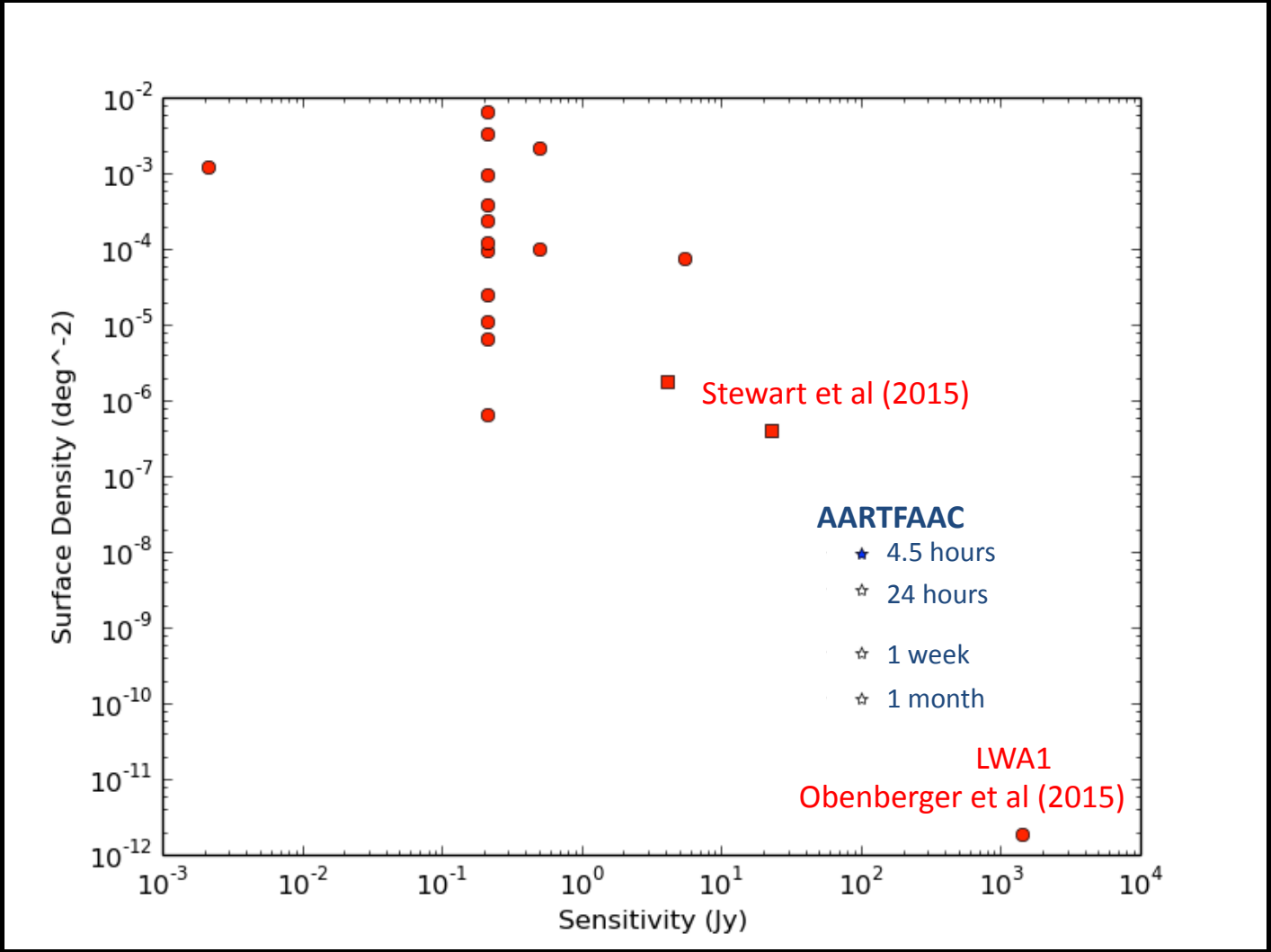


The TraP

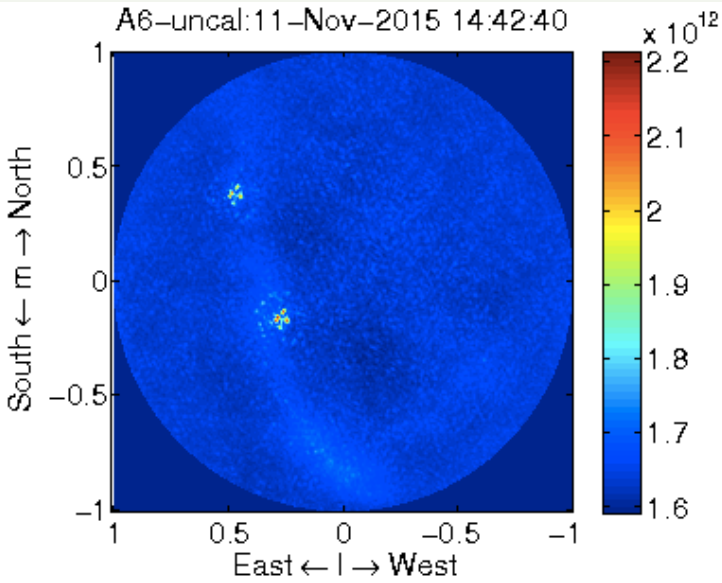
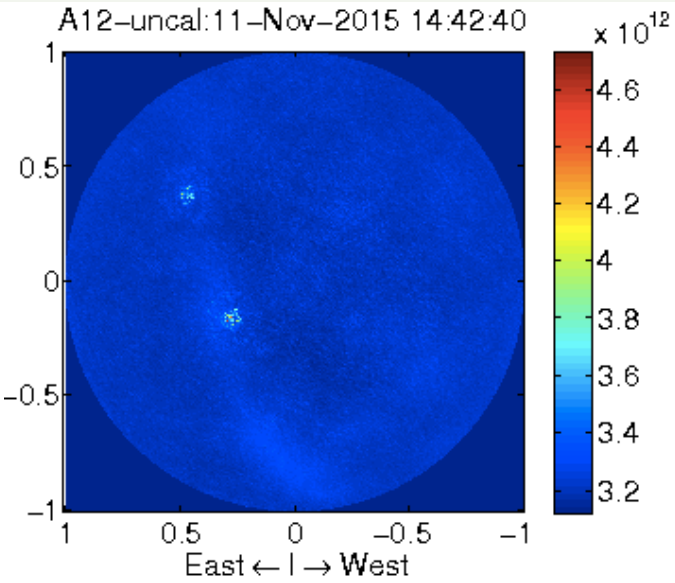
- An automatic transient detection pipeline developed by the LOFAR Transients KSP (see Swinbank et al., 2015)
- Can be used by several telescopes for transient searches, such as VLITE, MWA (Rowlinson et al., submitted) and LOFAR (Stewart et al., 2015)



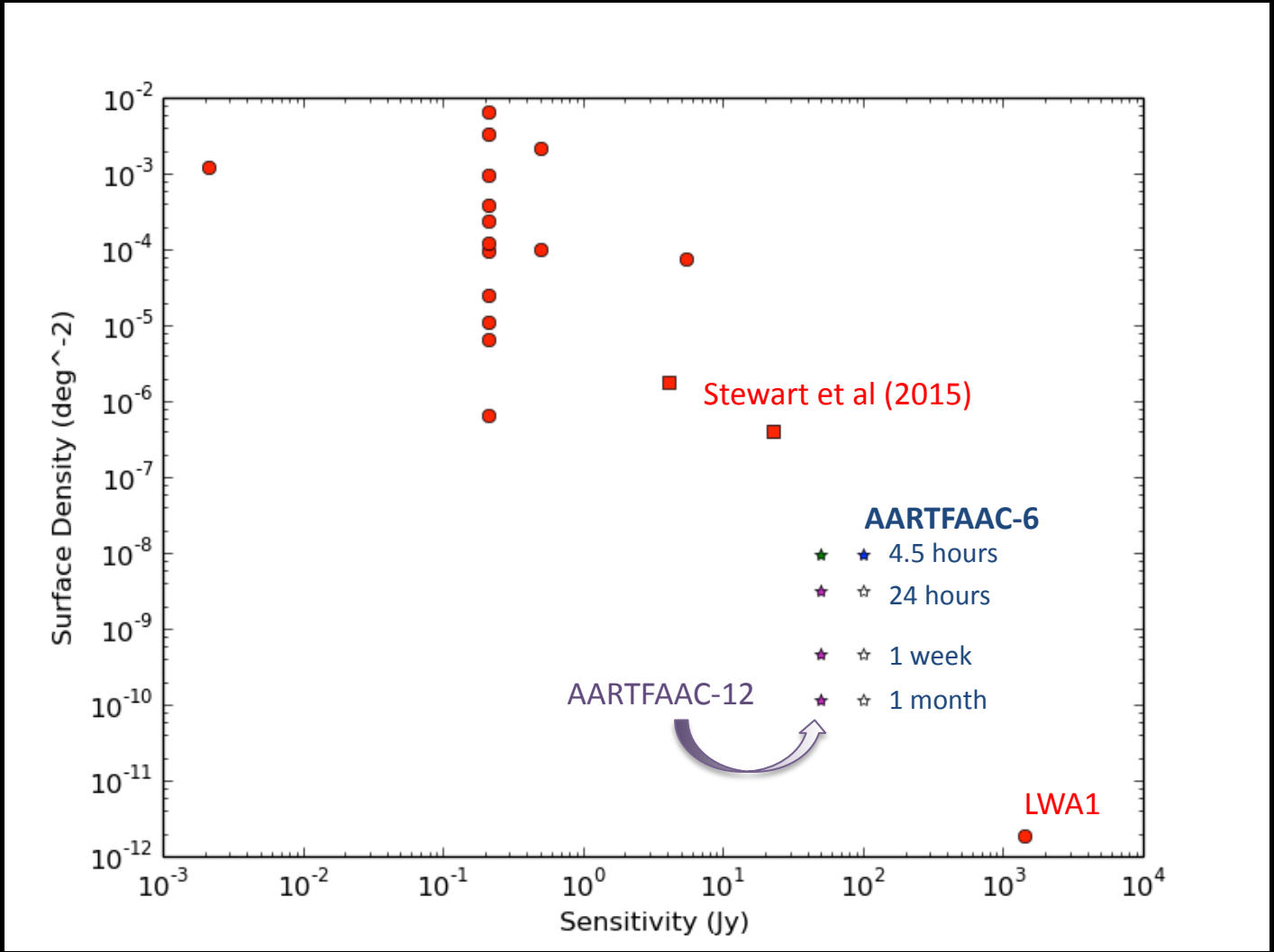
Transient Surface Density



The Next Generation

	AARTFAAC-6	AARTFAAC-12
		
Array Elements	288 inverted V antennas	576 inverted V antennas
Maximum Baseline (m)	300	1000
Angular Res. (arcmin)	60	20
Spectral Res. (kHz)	3	12
Temporal Res. (s)	1	1
Sensitivity (Jy)	40	20

AA-12 Transient Predictions



Conclusions

- The AARTFAAC project is open for business, and we are analyzing our first data for transients!
- AARTFAAC-6 will soon be replaced by AARTFAAC-12, which will double our sensitivity and resolution
- We will also begin integrating images over longer time scales to probe different time domains for transients