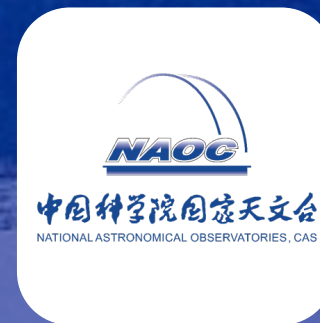
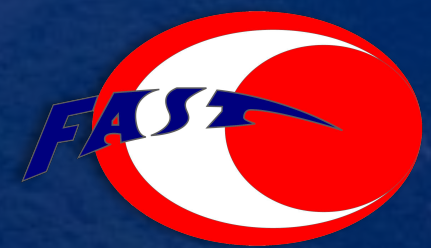




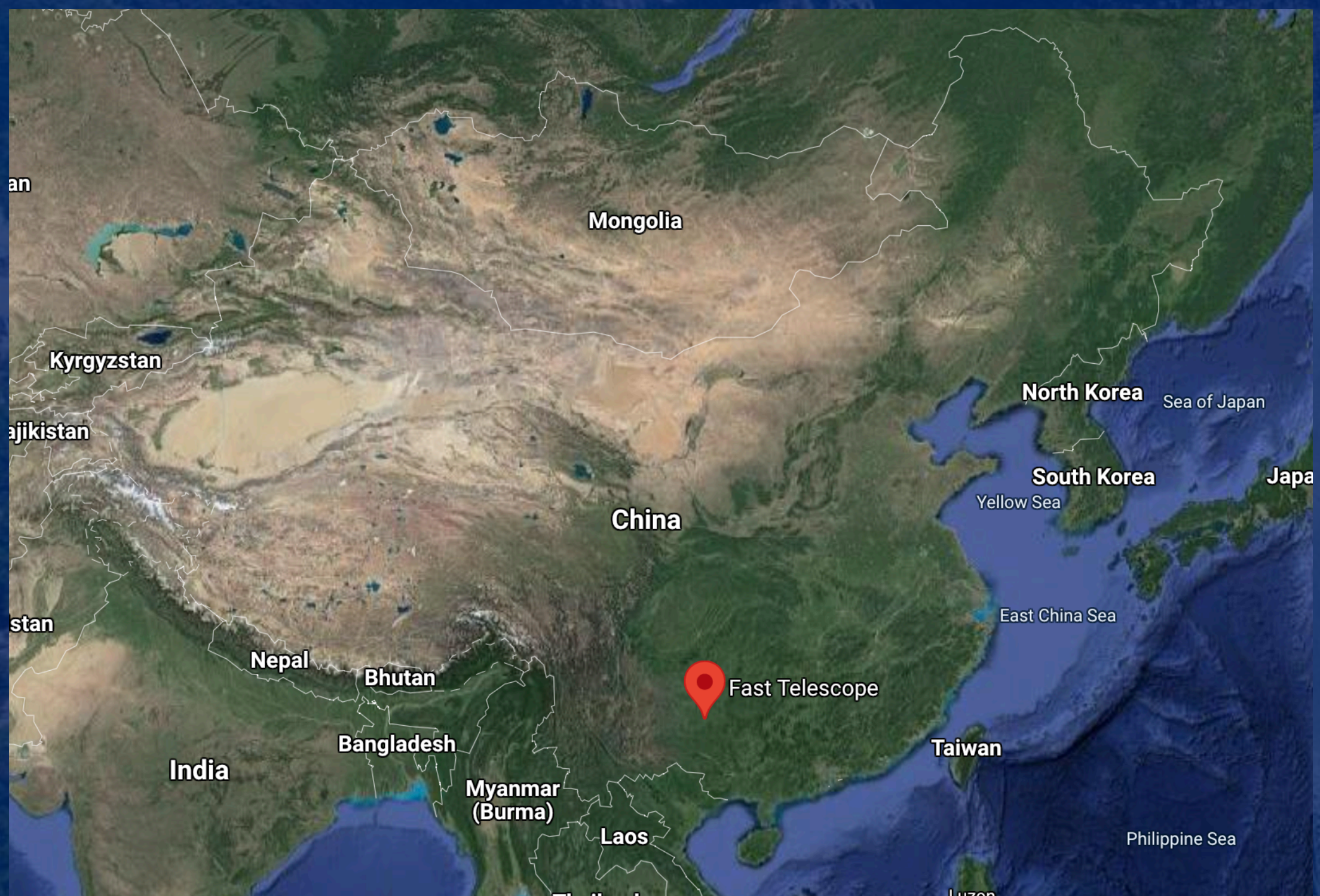
FAST and its VLBI

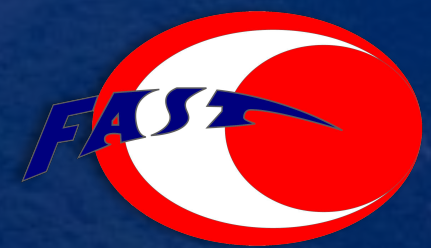
Ru-Rong Chen

EVN TOG Meeting 2022/02/08

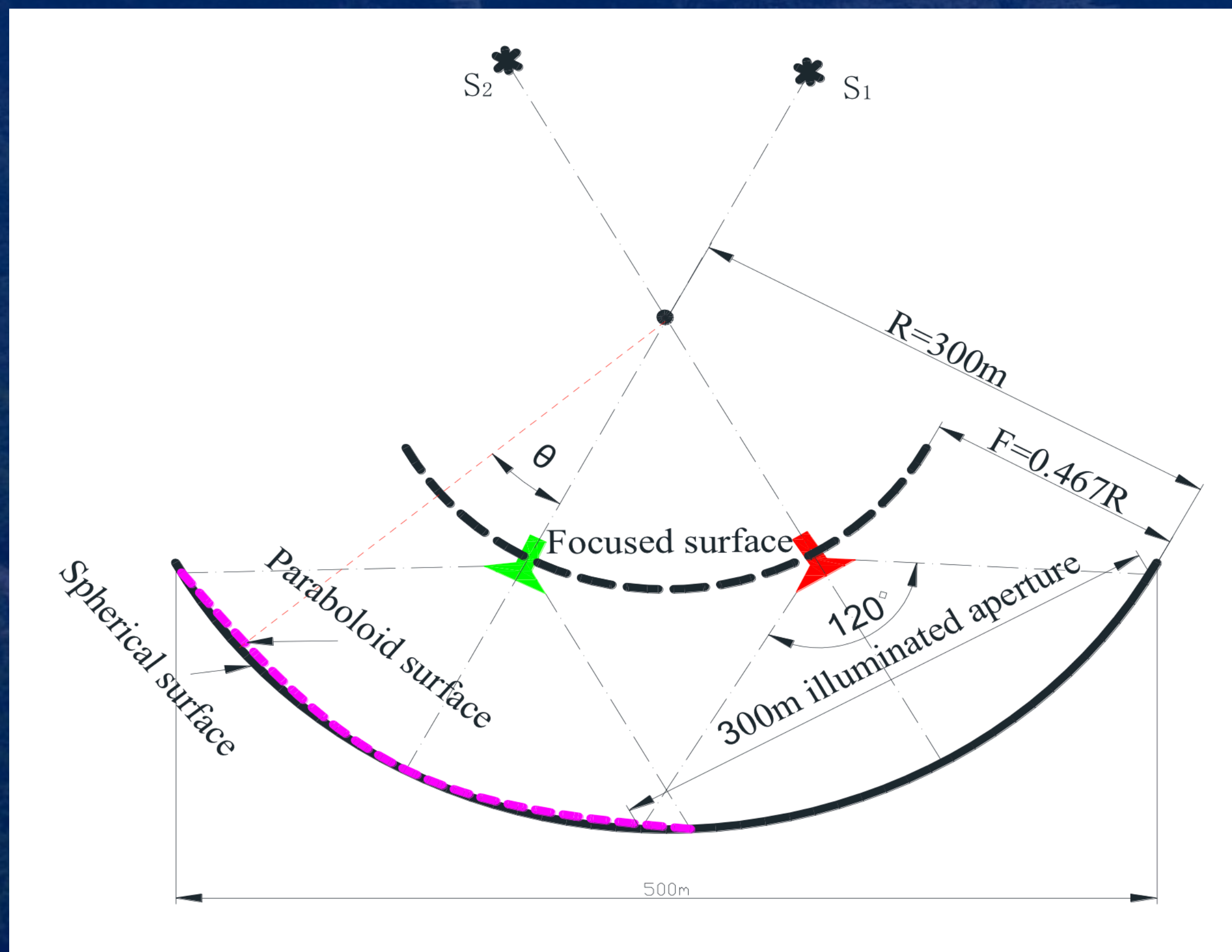


Where





Parameters



Geometric optical principle of the FAST

Illustrated aperture : 300m

Focus ratio : 0.467

Sky coverage : max zenith angle of 40°

frequency : 70MHz - 3GHz

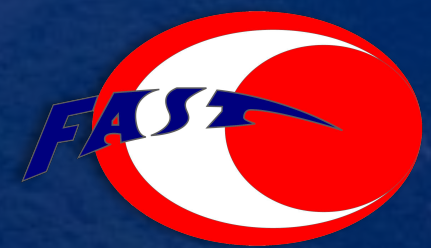
Aeff/Tsys(1.4GHz) : 2000 m²/K

Tsys(1.4GHz): ~20K

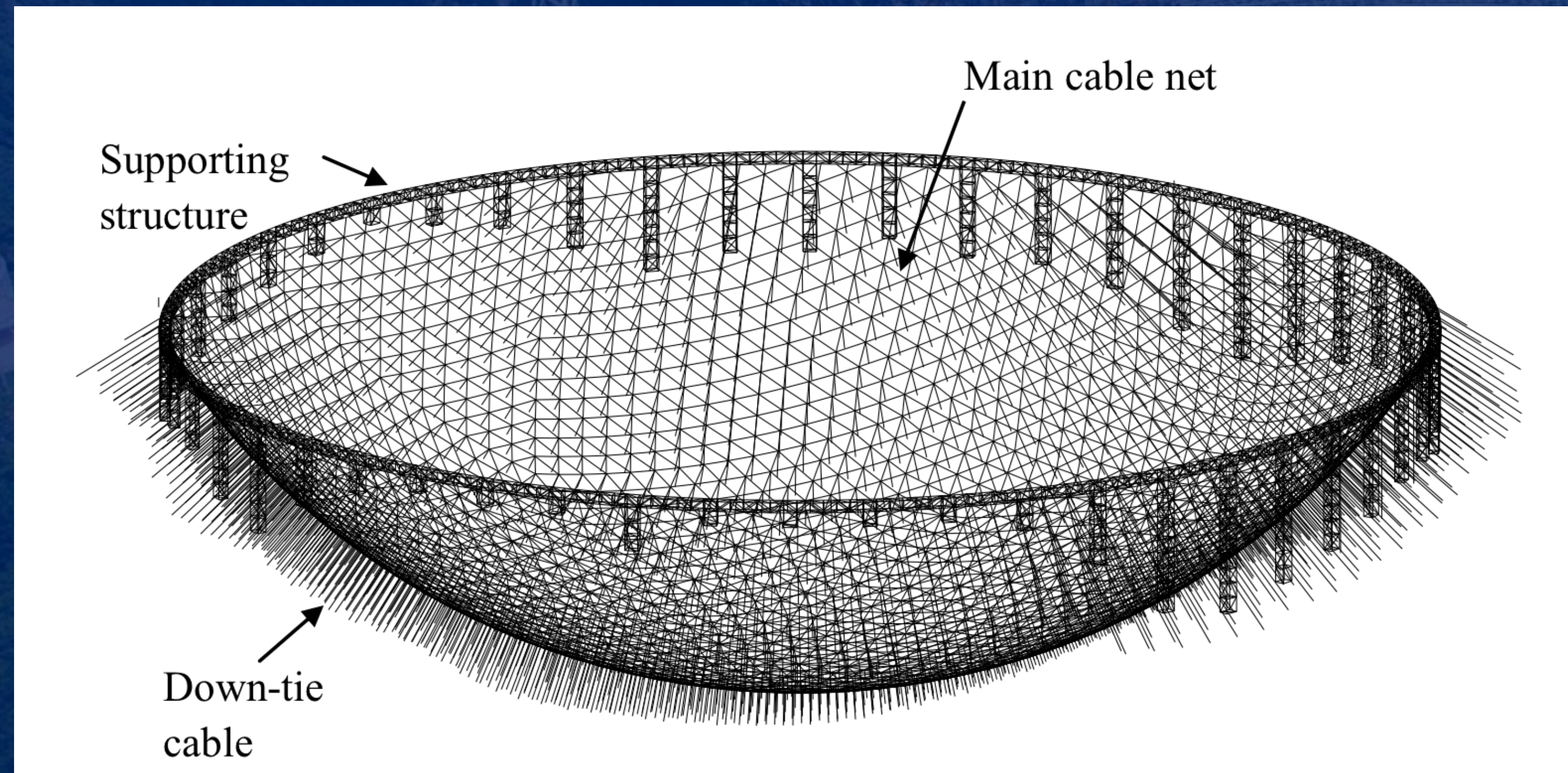
resolution(1.4GHz) : 2.9'

Slew time : < 10 min

Pointing : 8"



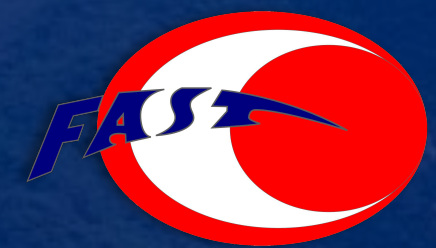
Adaptive reflector system



Main cable net: 4450 alum. panels



cable node and actuator (2,225)



Feed support system



Six towers



Feed cabin: < 30 tons

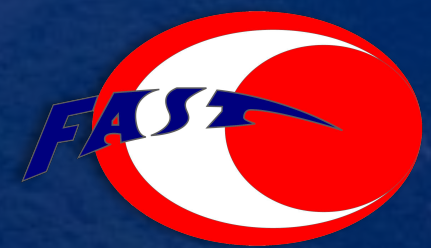


Receivers

19-beam receiver

- Frequency: 1.05-1.45GHz
- Tsys: ~20K



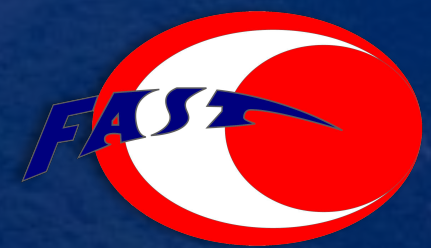


Receivers

0.5-3.3GHz ultra-wide band receiver

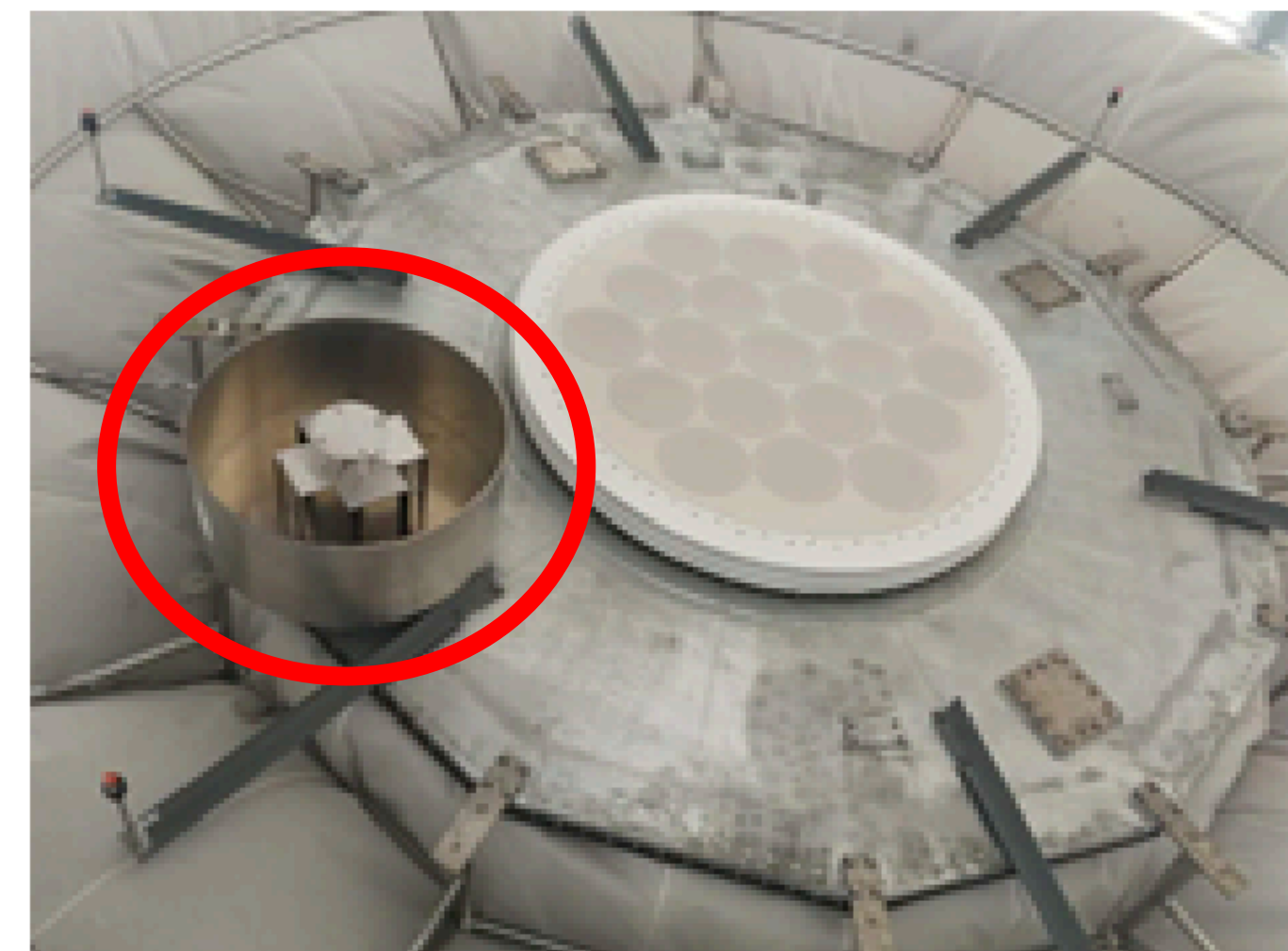
- T_{sys} : $\sim 90\text{K}$ (no cryo.)
- Four sub bands:
0.5-0.95, 0.95-1.75,
1.75-2.55 , 2.55-3.3 GHz

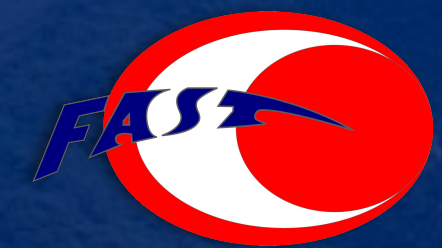




Receivers

- 0.3-0.6GHz receiver
- T_{sys} : 50~60K(no cryo.)

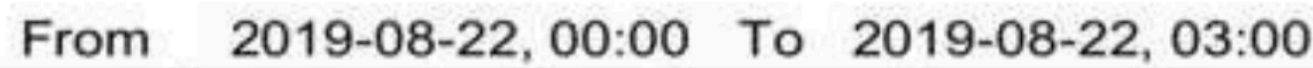


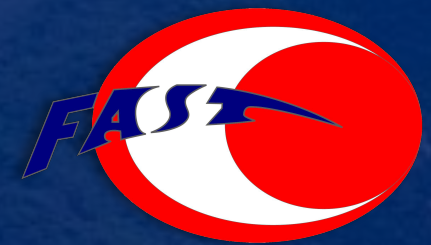


Receivers

- 0.27-1.62GHz wide band receiver
- T_{sys} : 60-70K
- Two sub bands:
0.27-1.024, 1.024-1.62GHz
- 2016-2018



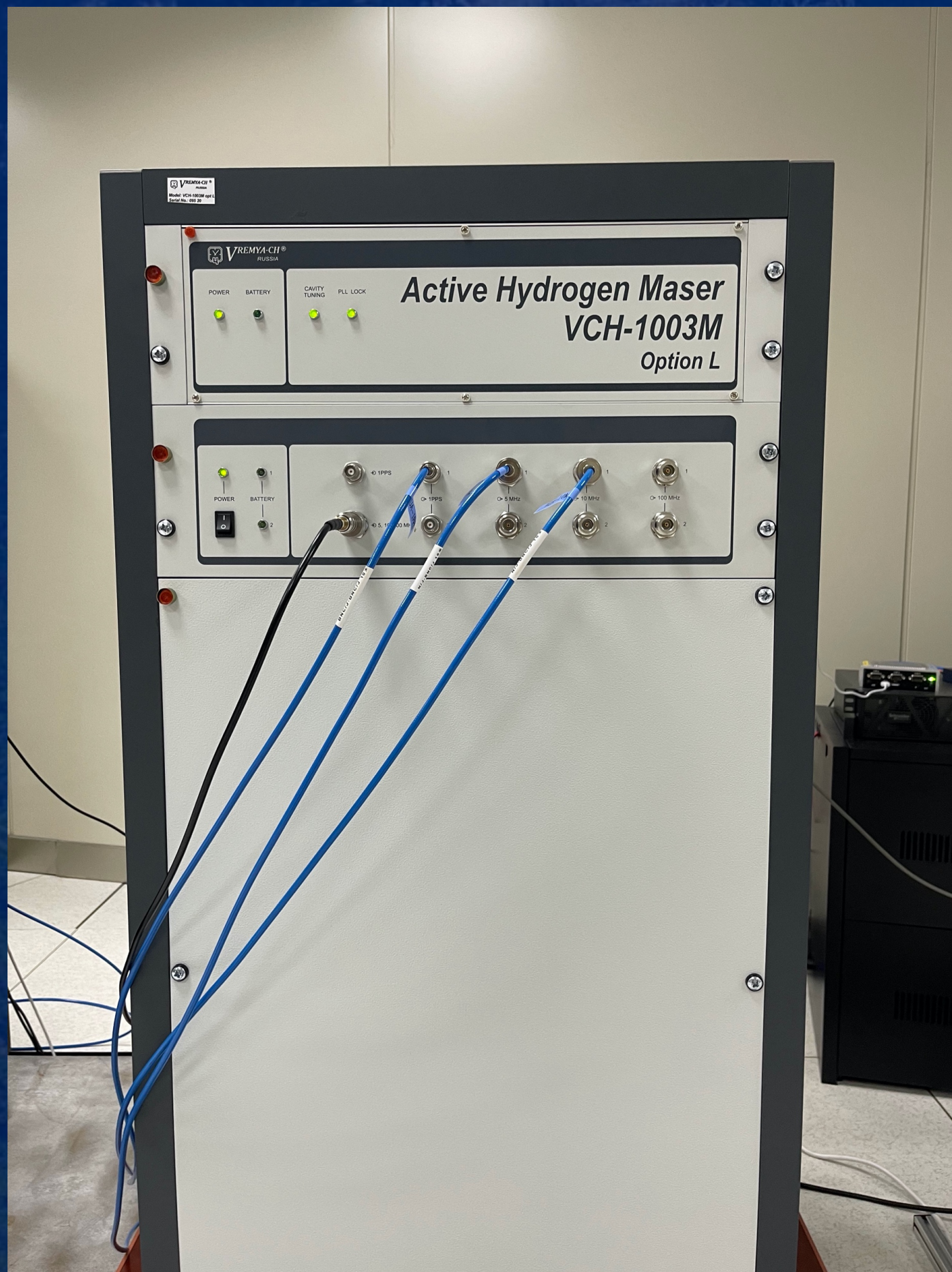




VLBI system



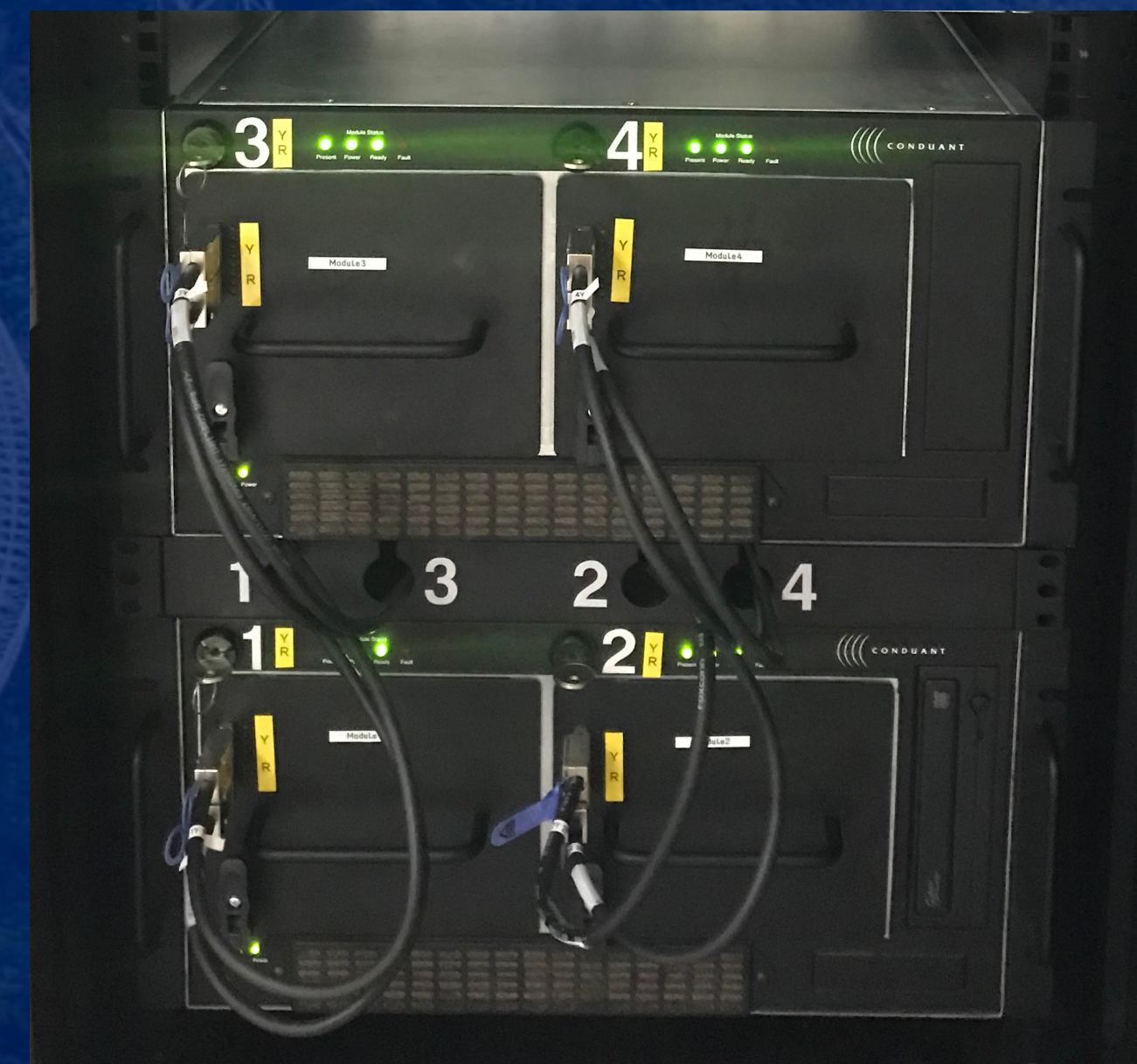
H masers



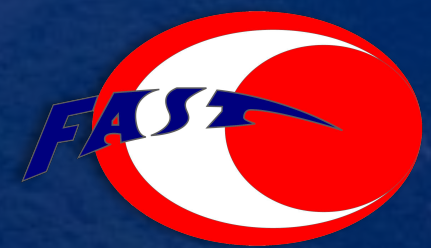
Field system



DBBC2

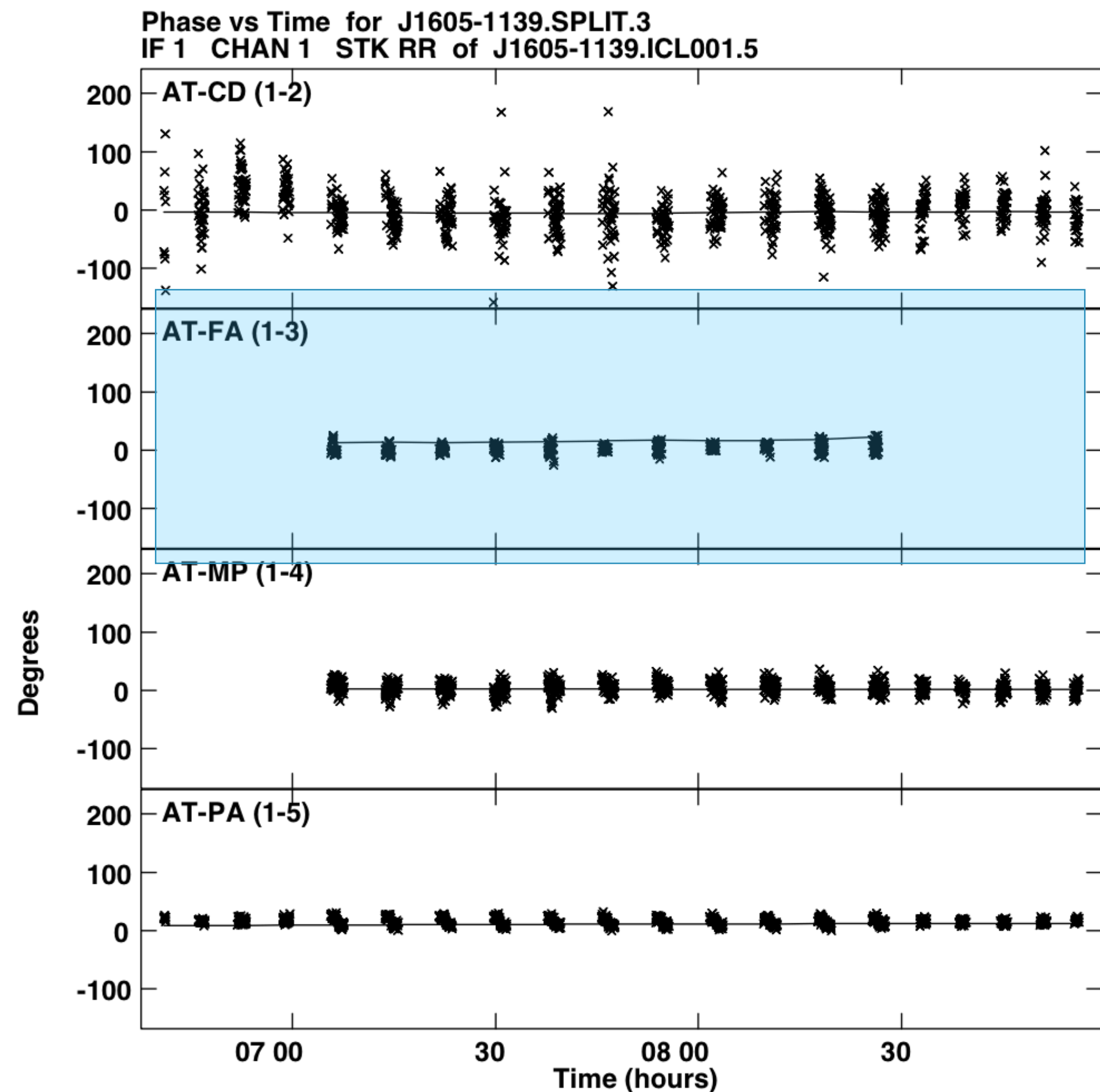


Mark 6



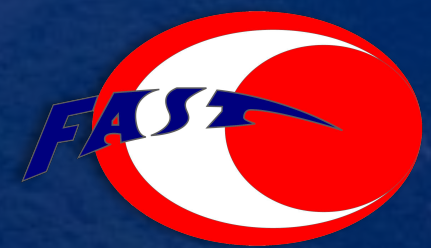
Phase referencing mode

No.	seperation (arcmin)	Switch time (sec)	No.	seperation (arcmin)	Switch time (sec)
1	(0,10]	15	10	(90,100]	130
2	(10,20]	30	11	(100,110]	145
3	(20,30]	40	12	(110,120]	150
4	(30,40]	55	13	(120,130]	160
5	(40,50]	70	14	(130,140]	170
6	(50,60]	80	15	(140,150]	180
7	(60,70]	95	16	(150,160]	190
8	(70,80]	105	17	(160,170]	200
9	(80,90]	120	18	(170,180)	205

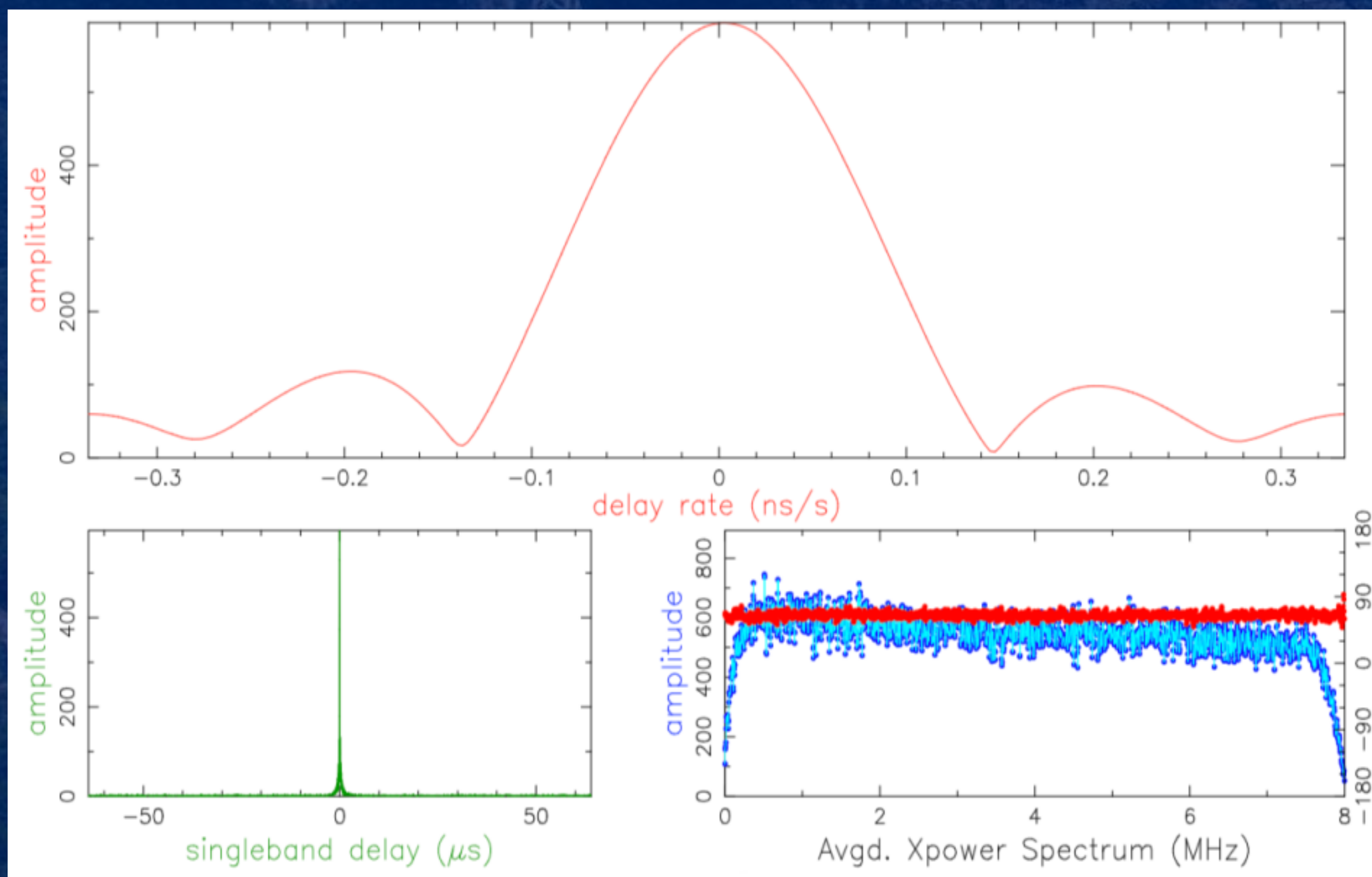


Calibrator: phase vs. time

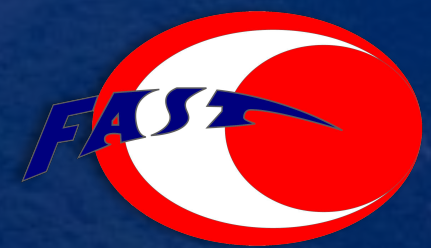
2021.10



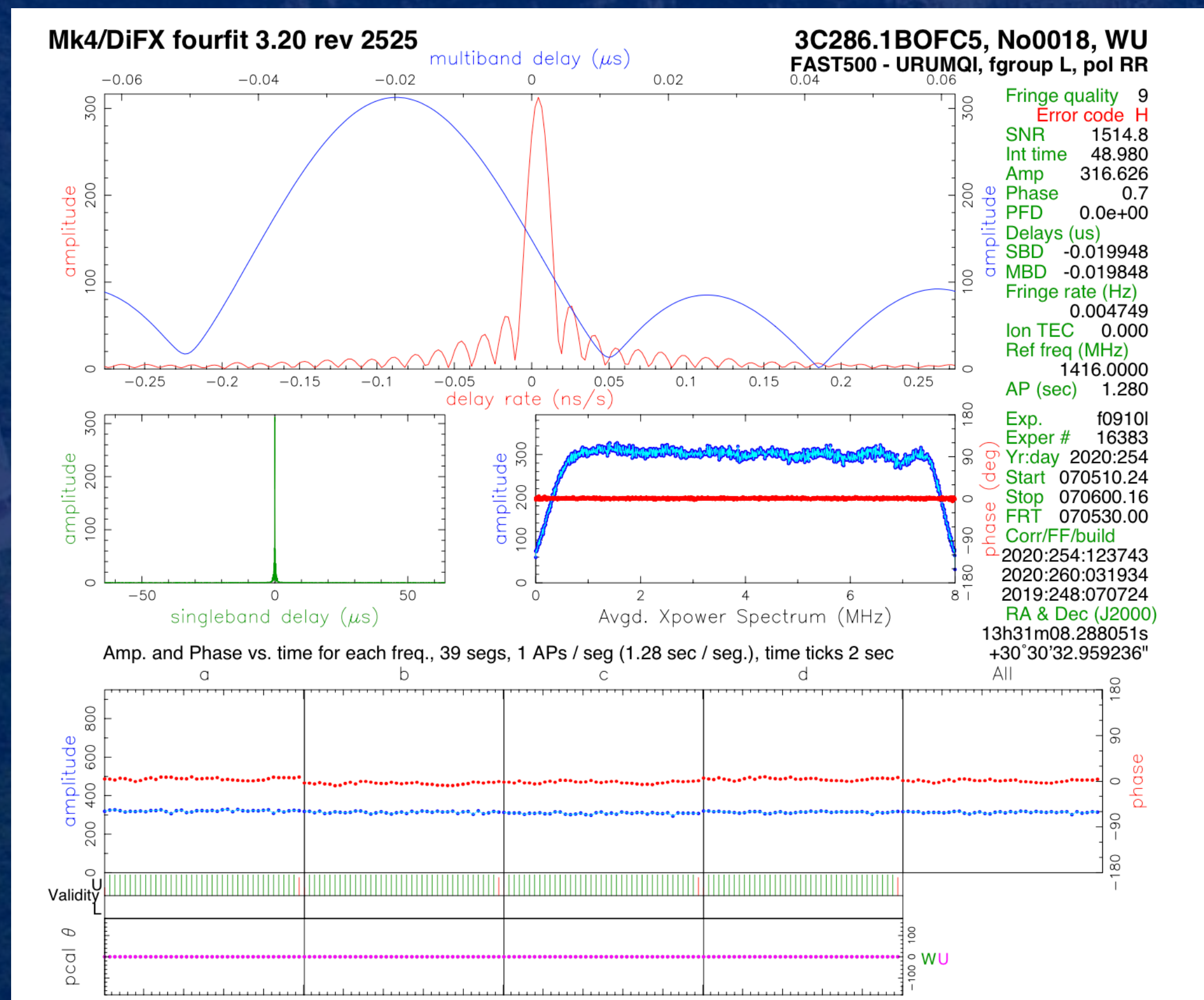
VLBI experiments



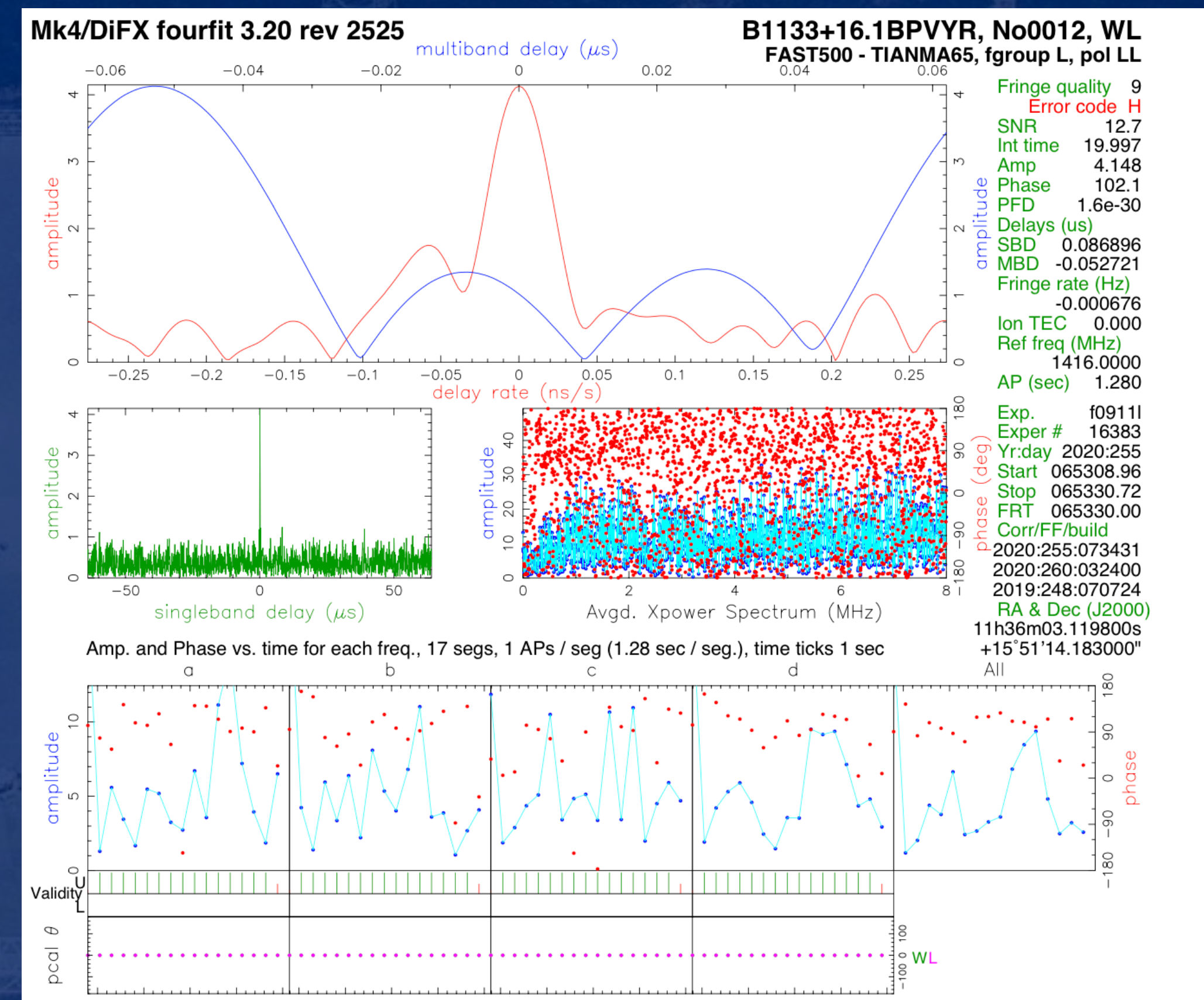
2019.1. FAST-Tianma



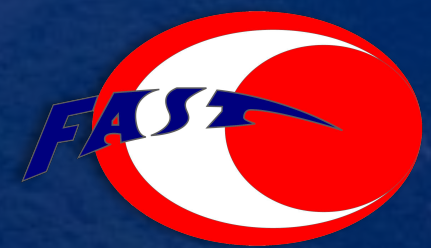
VLBI experiments



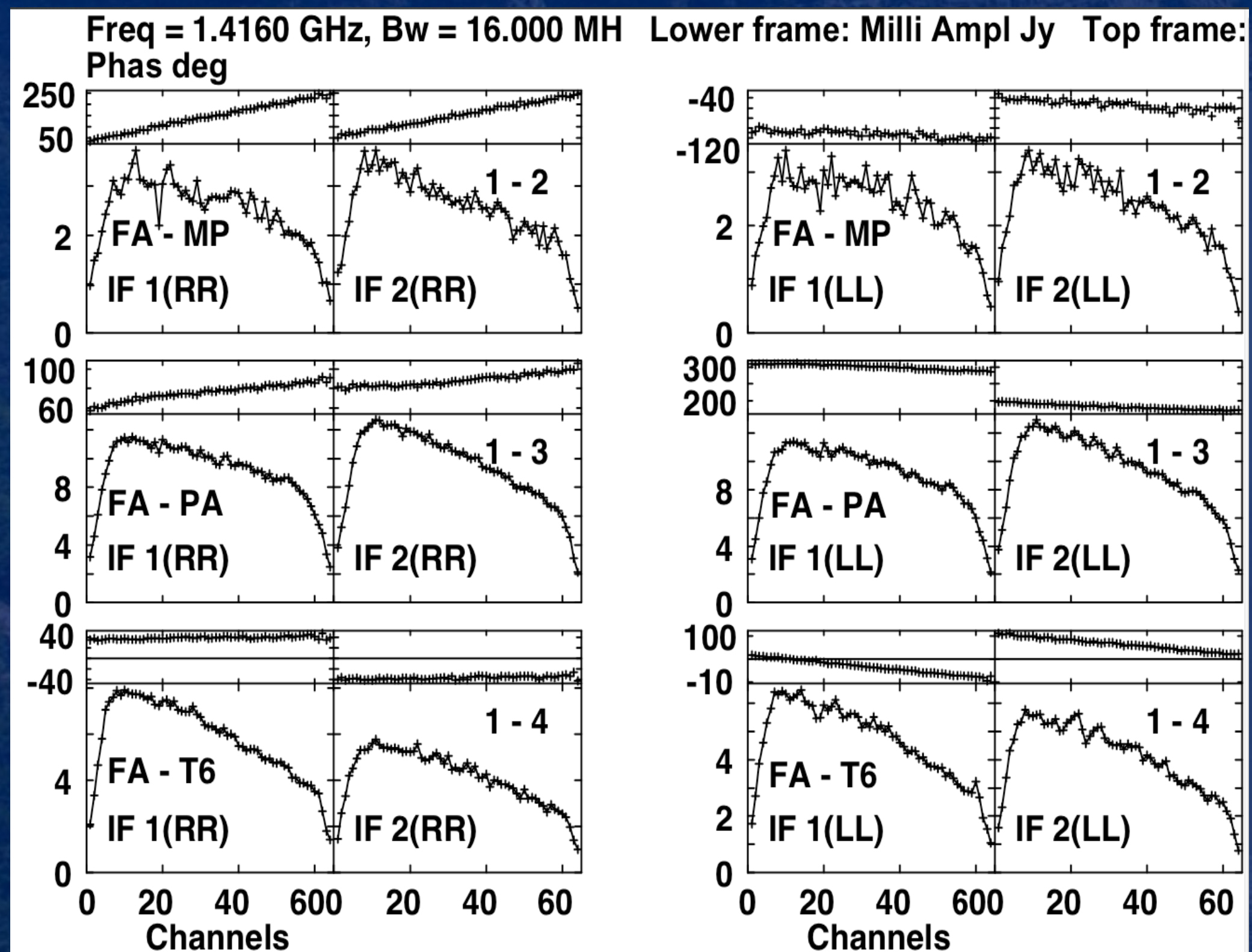
2020.9 FAST-Urumqi
3C286



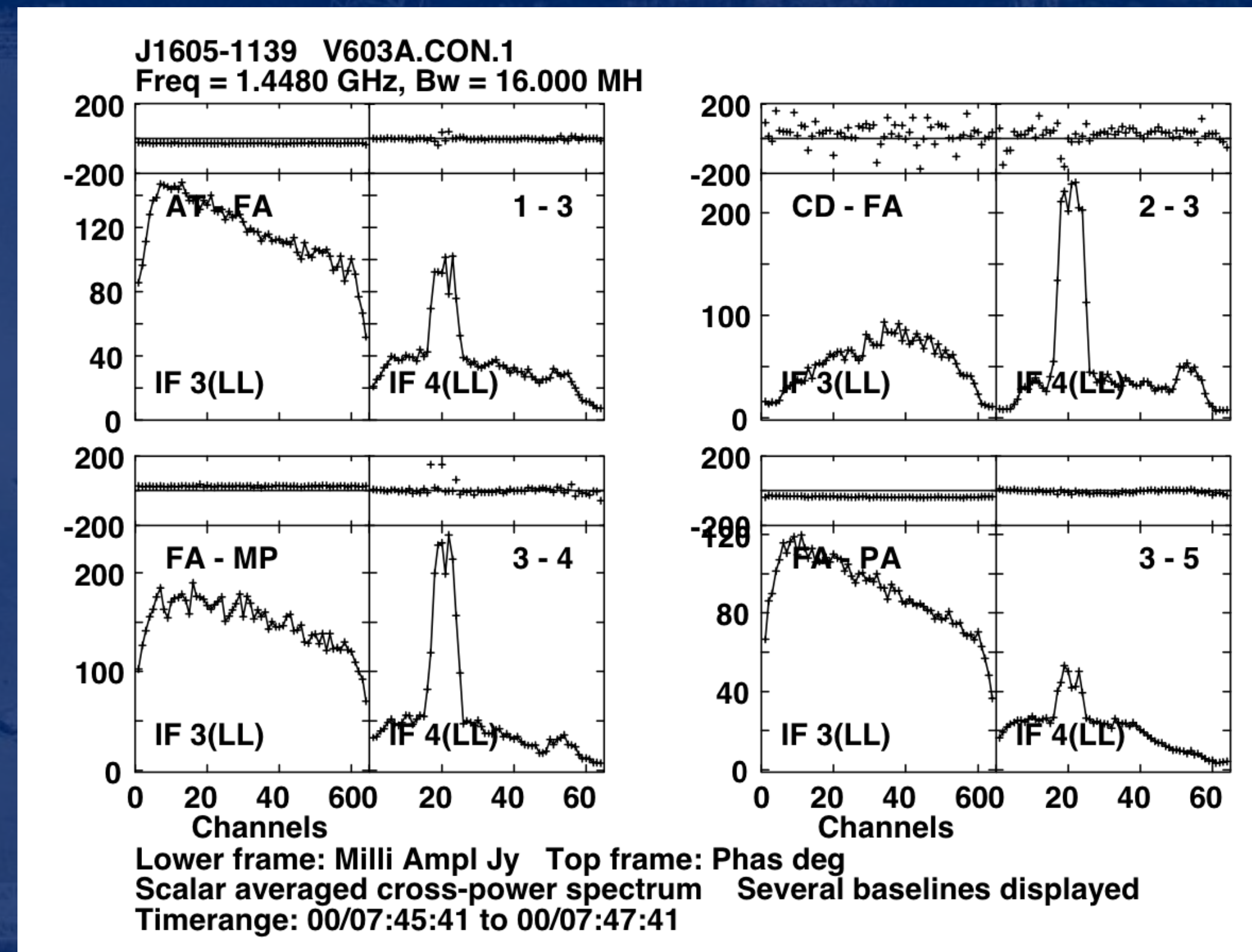
2020.9 FAST-Tianma
Pulsar B1133+16



VLBI experiments



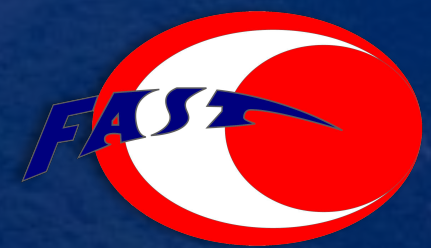
2020.11 FAST+LBA



2021.10 FAST+LBA



3C454.3



Plan for VLBI

Geometric coordinate measurements

Experiments with ultra-wide band receiver

Longer experiments in phase-referencing mode (2-4 hours)



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Thanks