Italian VLBI status

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Eating VLBI 2017 - Jeju Island - November 1st, 2017

History - before VLBI

1964, Northern Cross in Medicina, 408 MHz

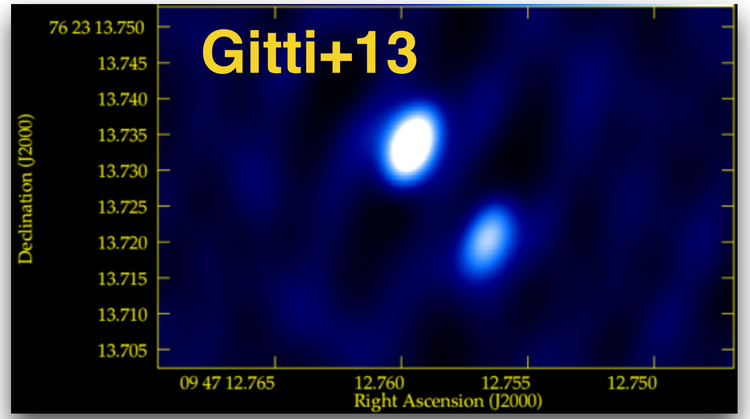
1972, 1980, (2017) Bologna YERAC

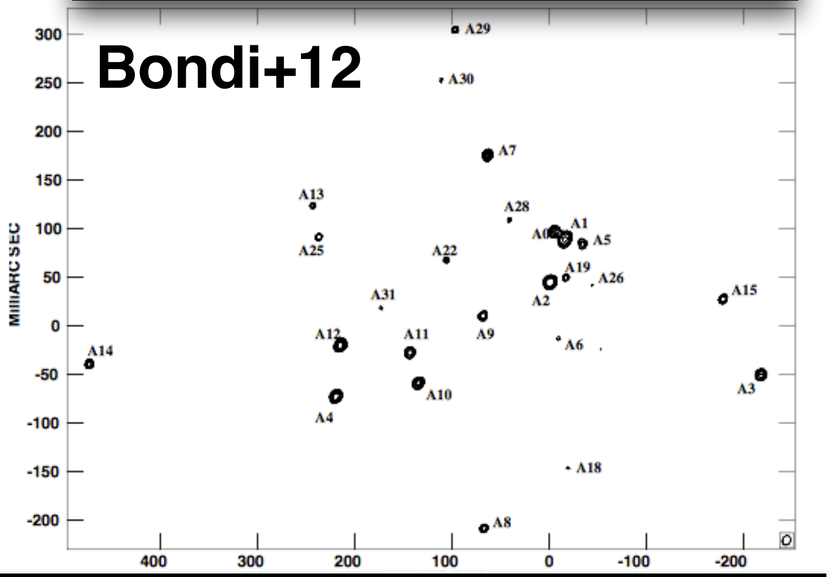
History - VLBI in Bologna

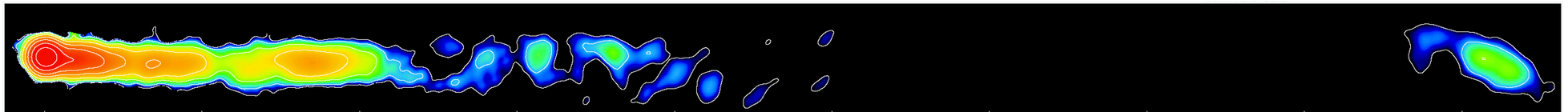
- 1980 one of five EVN founders
- 1983 Medicina VLBI dish
- 1988, 2001 Castel S. Pietro Terme schools
- 2008 EVN symposium
- 2012, 2014: Eating VLBI workshops

History - science in Bologna

- AGNs - VLBI resolution fundamental for resolving compact regions and study kinematics in “rapidly” evolving systems
- blazars: relativistic jets, e.g. superluminal motion studies & connection to high energy satellites
- “young” radio sources, evolution of radio galaxies: CSS, GPS sources
- and also: Seyfert galaxies, starburst galaxies, supernovae, gravitational lenses, binary BH, transients (novae, GRBs, FRBs, …)



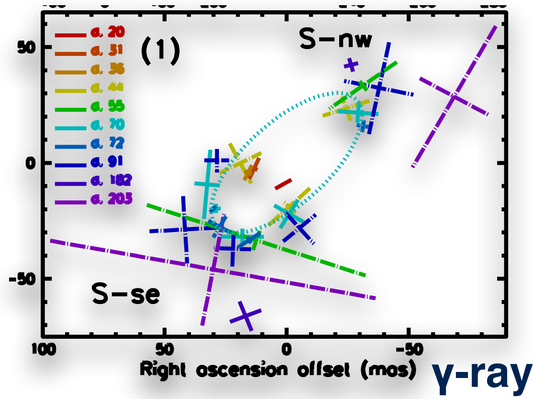




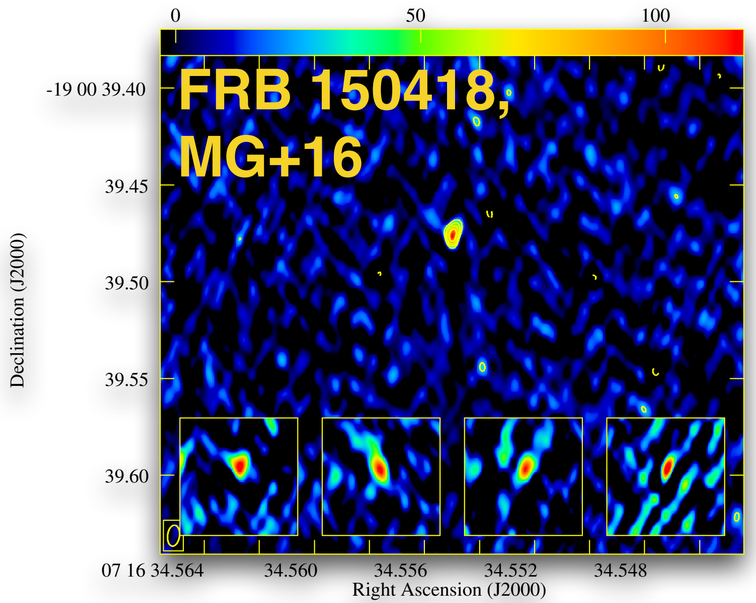
Beyond Bologna…

- 1988 opening of VLBI dish in **Noto**
- 2013 first VLBI tests in **Sardinia**
- other VLBI groups in Italy: Cagliari (star formation, binaries), Arcetri (star formation), Milan (blazars, NLS1, compact objects), Rome (Seyfert galaxies, gamma-ray sources)

Science - Bologna and beyond



EVN
γ-ray nova V407Cyg

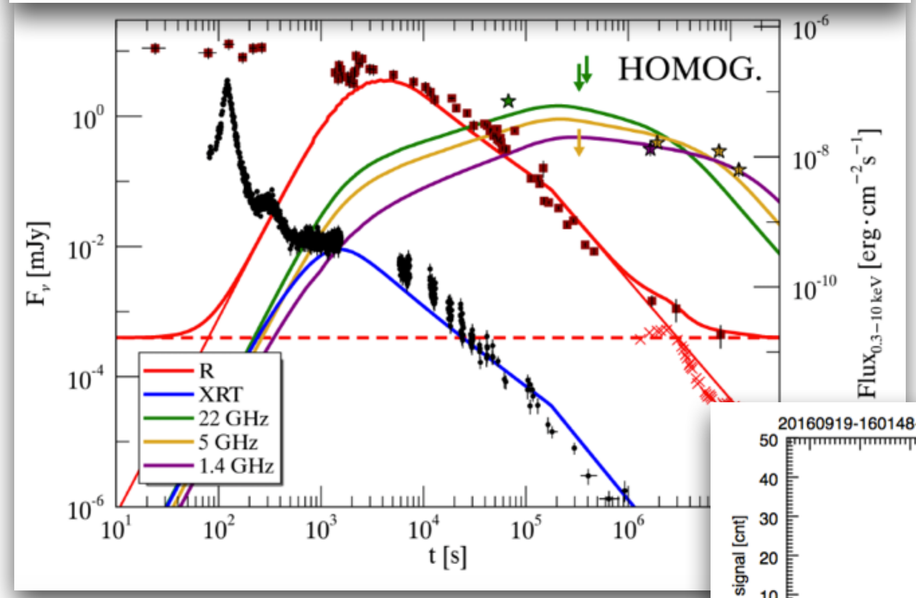


Astronomy & Astrophysics manuscript no. paper_151027A_v1
April 29, 2016

The 999th *Swift* Gamma–Ray Burst: some like it thermal

A multiwavelength study of GRB 151027A

F. Nappo[1,2,⋆], A. Pescalli[1,2], G. Oganesyan[3], G. Ghirlanda[2], M. Giroletti[4], A. Melandri[2], S. Campana[2], G. Ghisellini[2], O. S. Salafia[5,2], P. D'Avanzo[2], M. G. Bernardini[6], S. Covino[2], E. Carretti[7], A. Celotti[3], V. D'Elia[8,9], L. Nava[10], E. Palazzi[11], S. Poppi[7], I. Prandoni[4], S. Righini[4], A. Rossi[11], R. Salvaterra[12], G. Tagliaferri[2], V. Testa[7], T. Venturi[4], S. D. Vergani[13]



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24 Oct 2016; 21:41 UT

[Previous | Next | ADS]

Monitoring of Cyg X-3 giant flare with Medicina and the Sardinia Radio Telescope

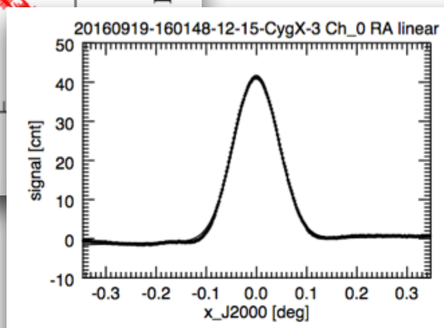
ATel #9508; *E. Egron, A. Pellizzoni (INAF-OAC), M. Giroletti, S. Righini, A. Orlati (INAF-IRA), M. N. Iacolina, A. Navarrini, M. Buttu, C. Migoni, A. Melis, R. Concu, G. P. Vargiu, M. Bachetti, M. Pilia, A. Trois, S. Loru, M. Marongiu (INAF-OAC)*
on 19 Sep 2016; 23:27 UT
Credential Certification: Elise Egron (egron@oa-cagliari.inaf.it)

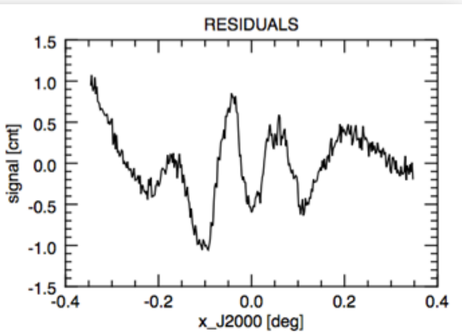
Subjects: Radio, Binary, Black Hole, Neutron Star

transients

single dish

blazar monitoring





Current situation

	Medicina (Mc)	Noto (Nt)	Sardinia (Sr)
diameter	32m	32m	64m
active surface	N	Y	Y
L	Y	Y/N (not operational)	Y
S/X	Y	Y	N
C	Y	Y	N/Y (designed)
C - high	Y (not cooled)	Y (not cooled)	Y
K	**Y (2-beam)**	**Y**	**Y (7-beam)**
Q	N	Y	N/Y (designed)
W	N	N (being considered)	N (being considered)
e-VLBI	Y	Y	almost!

	Mc	Nt	Sr	KVN-Ta
Mc		893*	592	8401
Nt	13.5		580	8639
Sr	5.5	6		8783
KVN-Ta	17	18	7.5	

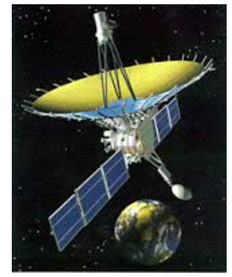
baseline length (km)

* same as T6-Ky!

K-band 5σ sensitivity (mJy) [5min @1Gbps]

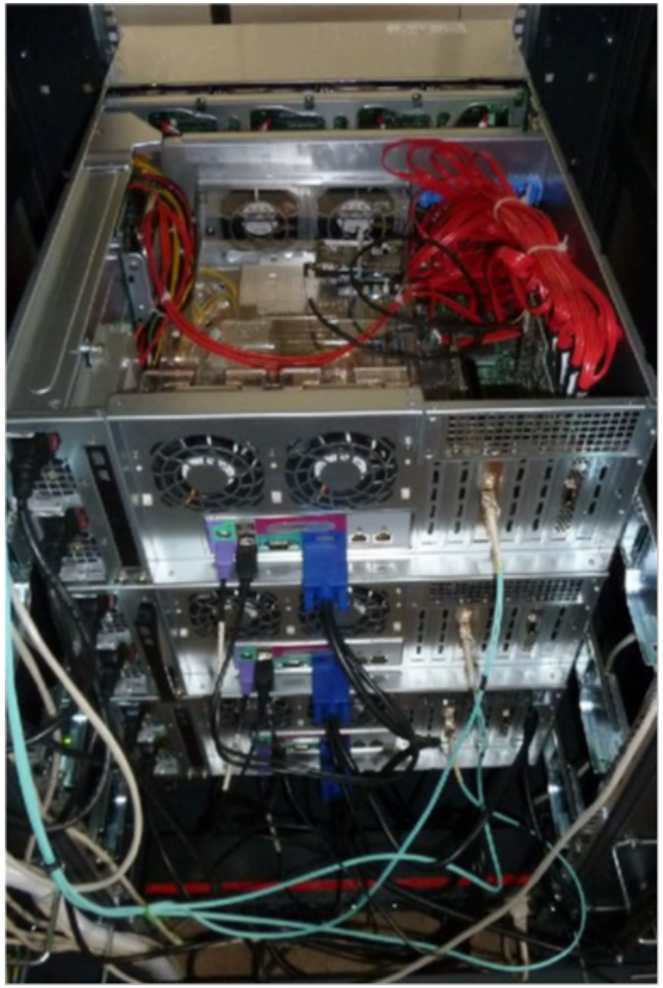
Activities

- EVN/Global VLBI
  - 3 disk-recorded sessions per year, each ~3 weeks long
  - 10 e-VLBI days per year, some ToOs
  - correlated at JIVE
- Radioastron
  - several short (~few hours) slots per month
  - correlated in Moscow
- IVS (geodesy)
- Single dish



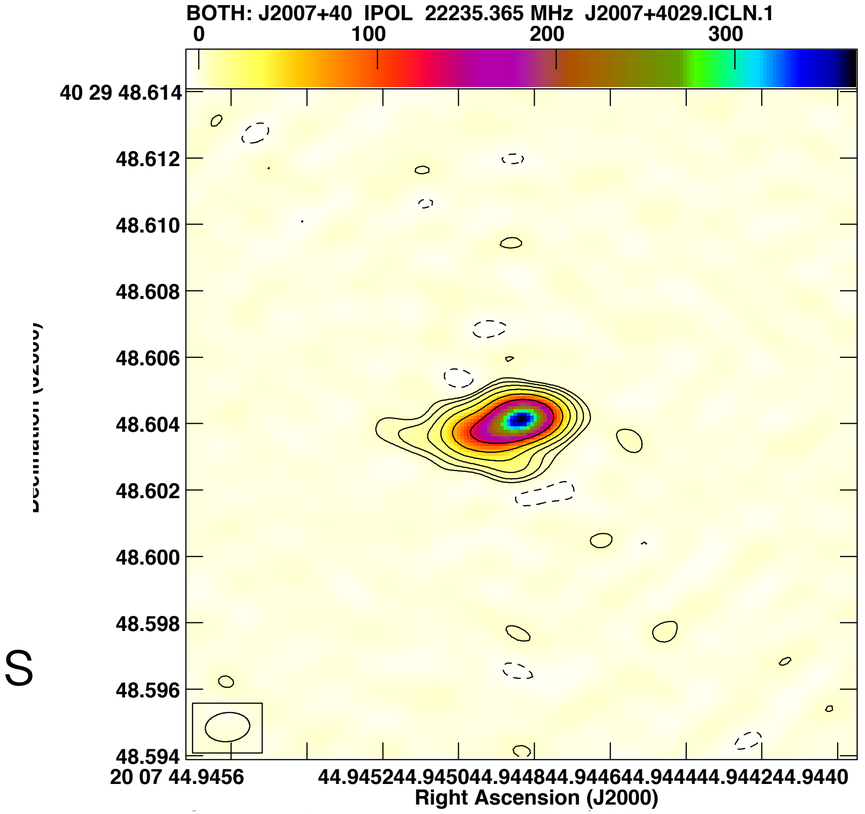
The DiFX correlator

- Infiniband 40Gbit connection
- 10 Gbit network, 16 cores each, 24 disks bay
- Now 150 TB available
  (20 TB SATA + 30 TB SAS each + 44 TB new node)
- Mc, Nt can record directly to Bologna, or e-transfer
- This has open entirely new possibilities, including Italian VLBI, Eating VLBI, and more



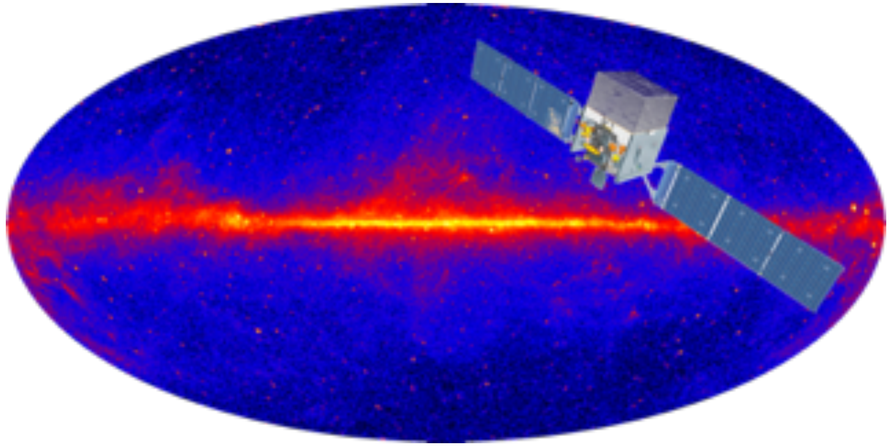
Italian VLBI science

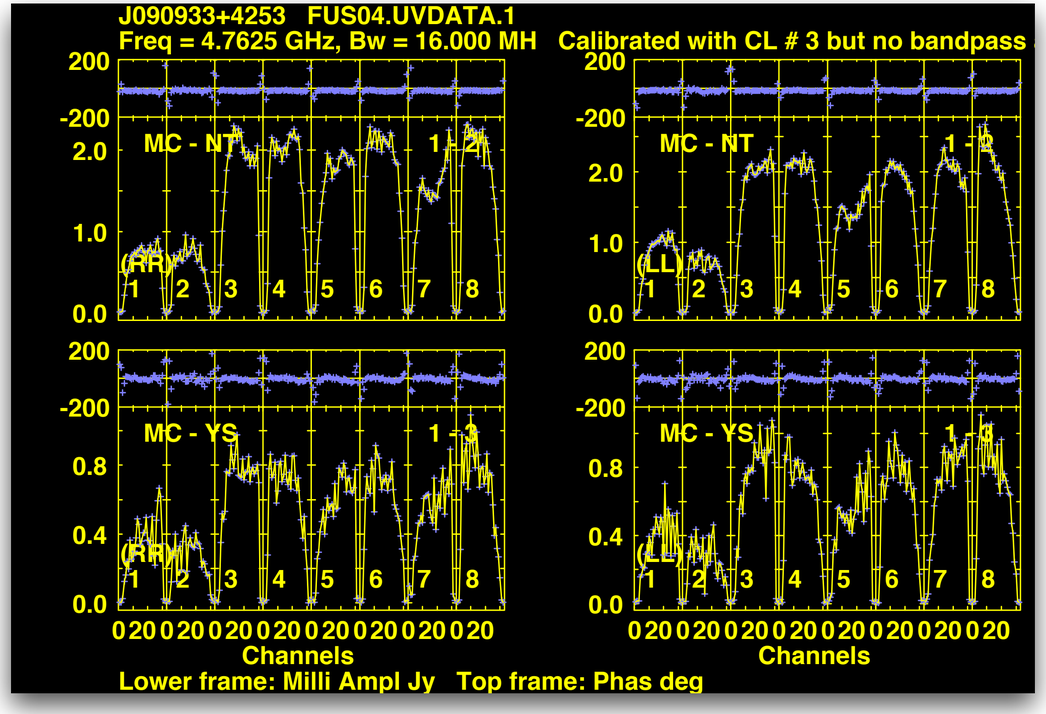
- Ideal for transients - see Elise's talk, and more
  - in general, filter out RFI, diffuse contaminating emission, probe compact scales
- Good for projects not requiring detailed imaging
  - star formation?
  - search for compact features on massive scales
  - geodesy (Matera replacing Sardinia)
- Generally possible to obtain support from other "small" European dishes



I-VLBI and beyond: EOFUS

- European Observations of *Fermi* Unidentified Sources (with Schinzel, Petrov, et al.)
- search for VLBI sources in the field of gamma-ray unidentified sources
- on massive scale!
- 7yr Fermi catalogue, ~10^3 sources north of -20deg, 5 GHz, baseline sensitivity of 10 mJy, 3-5 mas astrometry
- stations: Mc, Nt, Ys, Tr, Ir





Outlook

- **Mc, Nt** regularly offered also for Italian/international (extra-EVN) VLBI every year on **Oct/Apr 1st**
- **Best-effort basis** support for correlation
  - generally, it is wise to seek coordination with IRA personnel (eg myself)
- For **Eating VLBI**, two proposals submitted at last deadline
  - 2018 EHT activity support
  - 3C 84, TXS 0506+056 (the “neutrino” blazar), and more
  - coordinated KVN/KaVA/EAVN proposals to be submitted
- *Probably, still early for regular coordinated Eating VLBI activities - but food for thought*

more food for thought

- Kazuhiro showed
  - Oct ’12, 1st Eating VLBI workshop: spring ’13, 1st Ita-Jap fringe tests
  - Oct ’14, 2nd workshop: spring ’15, 1st Ita-Jap successful fringes
  - March ’17, Ita-Kor kick-off: Apr ’17, M87 Eating VLBI success
- Meeting bring really good fruits, keep on this way
- Also complement science and technology with outreach activities (this afternoon)

IAUS342 - “Perseus in Sicily”
From black hole (PerA = 3C 84!!!) to cluster outskirts

- 14-18 May 2018 (stay tuned for 1st announcement soon!)
- Topics: SMBHs: mass and spin, magnetosphere & sphere of gravitational influence; hot vs cold accretion; MHD processes in disks and jets; jet production, collimation, and acceleration mechanisms; HE emission: site and mechanisms, leptonic vs hadronic processes; particle acceleration; jet-medium interaction on galactic and cluster scales; gas heating and cooling; BH-galaxy coevolution and radio source evolution
- SOC: Asada, Blandford, Bower, de Guveia, Doeleman, Fabian, Grandi, Giroletti, Jones, Ma, Nagai, Nemmen, Rudnick, Siemiginowska, Stawarz, Yuan