The 13th Workshop, the 8th year in orbit

- Galactic astrophysics
- Extragalactic astrophysics
- The industry legacy
- Terrestrial physics
The AGILE gamma-ray sky ($E > 100$ MeV)
The AGILE gamma-ray sky ($E > 100$ MeV)
• **Satellite in nominal spinning mode**
  – Battery, solar panels, OBDH are nominal

• **Instrument**
  – GRID is nominal
  – MCAL is nominal
  – AC is nominal
  – Super-A, only ratemeters
• The instrument confirms its excellent PSF above 100 MeV

• Good sensitivity in spinning mode, several ATELs issued on transient sources (recently, no Crab flares or Cygnus X-3 flares...no 3C 454.3 or 3C 279 flares...)

• Focus on the 50-200 MeV energy range, AGILE can say a lot on emission in this range

• 2nd AGILE source catalogue (pointing mode)
• 3rd AGILE source catalogue (spinning mode)
The inner Galaxy seen by AGILE (E > 100 MeV)
AGILE
100 MeV – 400 MeV

AGILE
400 MeV – 1 GeV

POINTING – binsize = 0.05 deg.
• Very large database and legacy from pointing (2007-2009) & spinning (2010-today) data
• Search for new sources, new transients in the Galaxy and outside
• New projects in star formation studies, role of CRs in star formation, diffuse emission, correlation with Herschel, Planck, HI surveys
developments 2

• continuous monitoring of sources and very rapid alerts
• the “Galactic scan” project
Theoretical investigations on micro-quasars and gamma-ray binaries

Theoretical work on gamma-ray blazars
AGILE and the Earth

• Detection of Terrestrial Gamma-Ray Flashes (TGFs)

• NEW:
  AGILE as a particle monitor
AGILE and the Earth

• much improved detection capability for TGFs (rate > 10 times larger than before)
• detection of repeated TGFs from the same thunderstorm
• meteorology of TGFs
• impacts of TGFs
• now possible to search for “positron events”
• gamma-ray mapping of the Earth
increase in TGF detection rate!
AGILE detection of repeated TGFs from the same thunderstorms: 1

UTC 00:42:40

(thanks to A. Argan, M. Marisaldi, A. Ursi, S. Dietrich and ISAC-CNR)
AGILE detection of repeated TGFs from the same thunderstorms: 1

UTC 00:42:40

1 orbit

UTC 02:27:40

(thanks to A. Argan, M. Marisaldi, A. Ursi, S. Dietrich and ISAC-CNR)
AGILE detection of repeated TGFs from the same thunderstorms: 2

UTC 12:12:40

(Thanks to A. Argan, M. Marisaldi, A. Ursi, S. Dietrich and ISAC-CNR)
AGILE detection of repeated TGFs from the same thunderstorms: 2

UTC 12:12:40

(Thanks to A. Argan, M. Marisaldi, A. Ursi, S. Dietrich and ISAC-CNR)
AGILE detection of repeated TGFs from the same thunderstorms

UTC 12:12:40

1 orbit

UTC 13:57:41

(contact 41190
2015-04-12 12:11:44 UT
TT 355925504.408524

1st TGF

Counts / 0.1 ms

0.1

-0.005

Time-T0 (s)

0.005

0.01

(contact 41190
2015-04-12 12:12:35 UT
TT 355925555.158475

2nd TGF

Counts / 0.1 ms

0.1

-0.005

Time-T0 (s)

0.005

0.01

(contact 41190
2015-04-12 13:50:51 UT
TT 355931451.343620

3rd TGF

Counts / 0.1 ms

0.1

-0.005

Time-T0 (s)

0.005

0.01

(thanks to A. Argan, M. Marisaldi, A. Ursi, S. Dietrich and ISAC-CNR)
AGILE gamma-ray mapping of the Earth
(thanks to A. Argan, A. Trois, G. Piano, A. Ursi)

AGILE scan of the Earth per orbit
AGILE gamma-ray mapping of the Earth

01/07/2014 ÷ 19/03/2015

counts map

exposure map

(thanks to A. Argan, A. Trois, G. Piano, A. Ursi)
AGILE gamma-ray mapping of the Earth

01/07/2014 ÷ 19/03/2015

Counts map

South Atlantic Anomaly

Exposure map

(thanks to A. Argan, A. Trois, G. Piano, A. Ursi)
AGILE gamma-ray mapping of the Earth

01/07/2014 ÷ 19/03/2015

counts map

exposure map

Telemetry gap over Malindi

(thanks to A. Argan, A. Trois, G. Piano, A. Ursi)
AGILE gamma-ray mapping of the Earth

01/07/2014 ÷ 19/03/2015

intensity map

(thanks to A. Argan, A. Trois, G. Piano, A. Ursi)
AGILE gamma-ray mapping of the Earth

01/07/2014 ÷ 19/03/2015

intensity map

enhancement due to the SAA?

(thanks to A. Argan, A. Trois, G. Piano, A. Ursi)
AGILE gamma-ray mapping of the Earth

07/2014 ÷ 09/2014
10/2014 ÷ 12/2015
01/2015 ÷ 03/2015

(thanks to A. Argan, A. Trois, G. Piano, A. Ursi)
AGILE gamma-ray mapping of the Earth

seasonal variation
OR
external (solar) cause?

(thanks to A. Argan, A. Trois, G. Piano, A. Ursi)
• AGILE continues its observations of the Far-Away and the Earth with unique capabilities

• AGILE now in its 9th year in orbit, towards its 10th birthday…!