The AGILE Data Center: data archive and processing, GOP and AO3

Carlotta Pittori, on behalf of the ADC

8th Agile Meeting - The Third Birthday Bologna, April 28, 2010 AGILE on PSLV-C8 Sriharikota, India April 2007

The AGILE Payload: the most compact instrument for high-energy astrophysics:

only ~100 kg ~ 60 × 60 cm Payload

ASI Mission with INFN, IASF-CNR e CIFS participation γ-ray astrophysics: 30 MeV - 30 GeV energy range and simultaneous X-ray capability between 18 - 60 keV



April 23, 2007: Launch! **April 23, 2010: happy third birday!**

Equatorial orbit: 550 Km, < 3° inclination angle

AGILE orbital parameters

Baseline equatorial orbit: 550 Km, 3° inclination

Semi-major axis: 6922.5 km (± 0.1 km) Requirement: 6928.0 ± 10 km

Inclination angle: 2.48° (±0.04°) Requirement: < 3°

Eccentricity: 0.002 (±0.0015) Requirement: < 0.1°





TPZ orbital decay estimate: Height < 500Km **08 Agosto 2014**

(Jan 13, 2010 **updated estimate**, using recent solar flux "Schatten" forecasts + 2σ)



leight of Perigee (km)

Eccentricity



Telespazio data (from last ASI contractual milestone PM1) Acquired passages from May 12, 2009 to December 12, 2009: 97,5% efficiency

Percentages of passages from 12/05/09 (Pre-OVR4/RF) to 31/12/09 (PM1) (Total predicted 3295) ■ Passages Acquired (3212)

Passages Planned as Not Acquired (77)

Passages Partially Lost (4)

□ Passages Totally Lost (2)



AGILE GS Architecture



The AGILE Data Center at ASDC – ESRIN

• The ADC, based at ASDC-ESRIN, is in charge of all the scientific oriented activities related to the analysis and archiving of AGILE data:

From scientific telemetry (TM) Level–0:

- ✓ Preprocessing → Level-1 data
- ✓ Quick-Look Analysis (transient detection)
- ✓ Standard analysis → Level-2 data (photon list)
- Scientific analysis (source detection, diffuse gamma-ray background)
- Archiving and distributing all scientific AGILE data



AGILE: "very fast" Ground Segment (with contained costs)



Record for a gamma-ray mission!

AGILE Science Alert System

• The system is distributed among the ADC @ ASDC and the AGILE Team Institutes (Trifoglio, Bulgarelli, Gianotti et al.)

• Automatic Alerts to the AGILE Team are generated within $T_0 + 45 \text{ min} (SA) \text{ and } T_0 + 100 \text{ min} (GRID)$

• GRID Alerts are sent via email (and sms) both on a contact-by-contact basis and on a daily timescale

• Refined manual analysis on most interesting alerts performed every day (daily monitoring)

# Date Fro <u>m</u>	▼ Thread [Subject]	Si <u>z</u> e
8327(10:08:54 AM Fuschino Fabio	Re: [Grid] [AGILE] [Mcal] SuperAGILE detection of GRB 100	6 KB
8327110:26:30 AM Ettore Del Monte	[Grid] [AGILE] SuperAGILE detection of GRB 100331B	6 KB
8327(09:44:04 AM Hiromitsu Takahashi	[GRBS] GRB100401297	5 KB
8327:09:34:13 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.23 (121.3, 29.5, 317.332) - 13 - FM3.11	9 KB
8327-09:34:12 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.18 (343.9, -2.8, 170.919) - 4U_1705-44	9 KB
8327:09:34:12 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.17 (20.2, -10.9, 182.049) - 31 - FM3.11	^{экв} Маіlbox
8326(07:53:08 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 5.11 (65.0, 30.0, 238.079) - 11 - FM3.119_1	11 KB
8326(07:29:05 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.45 (20.2, -10.9, 176.214) - 31 - FM3.11	9 KB
8326;07:23:05 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.35 (121.3, 29.5, 305.147) - 13 - FM3.11	9 KB
8326(06:54:02 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.57 (195.2, 3.4, 410.441) - 1AGL_J0634	11 KB
8326(06:25:00 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.41 (43.8, 32.9, 209.845) - 13 - FM3.119	9 KB
8326406:25:00 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 5.11 (65.0, 30.0, 250.057) - 11 - FM3.115	9 KB
8326:06:20:00 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.29 (121.3, 29.5, 319.167) - 13 - FM3.11	9 KB
8326:06:15:00 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.21 (20.3, -10.9, 183.684) - 31 - FM3.11	9 KB
8326'05:48:53 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.43 (195.2, 3.4, 434.909) - 1AGL_J0634	11 KB
8325:04:26:52 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 5.11 (65.0, 30.0, 238.949) - 11 - FM3.119	10 KB
8325(04:26:52 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 4.41 (43.8. 32.9. 201.619) - 12 - FM3.119	10 KB
8325704:11:47 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL	
8325(03:36:46 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL	
8325:03:09:45 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL	D. X 👌 🖘 😏 . 😡 .
8325403:09:45 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL a la la catient	lag Delete Junk Print Back Forward
8325:03:01:45 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL	64 5 9.725) - 21 - FM3.119 2.5POT5 400 0154 • U
8325:02:30:43 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL [gridalert] ALERT LEVEL 4.01 (198.8, -16.5,	126.963) - BZBJ0527+0331 - FM3.119_2.SP 🔹 U
8325'01:33:46 AM GCN Circulars	INTEGRAL trigger 5994 ([gridalert] ALERT LEVEL 5.26 (195.0, 4.4, 17	5.686) - 1AGL_0634+1748 - FM3.119_2.S • U
8324701:12:41 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL [gridalert] ALERT LEVEL 4.03 (66.5, -29.8, 1	64.691) - 31 - FM3.119_2.SPOT5_100_015 • U
8324(01:12:41 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL [gridalert] ALERT LEVEL 4.14 (274.1, 29.4, 9 [gridalert] ALERT LEVEL [gridalert] ALERT LEVEL 4.6 (94.7, 33.8, 742	0.0812) - BZBJ1057-2754 - FM3.119_2.SPO • U 098) - BZOU1723+6547 - FM3.119_2.SPOT
8324(01:12:41 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL [gridalert] ALERT LEVEL 4.3 (94.7, 33.7, 704	.121) - BZQJ1723+6547 - FM3.119_2.MON • U
8324:12:48:41 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL [gridalert] ALERT LEVEL 6.68 (195.2, 4.3, 47	1.069) - 1AGL_J0634+1748 - FM3.119_2.M • U 22.825) - 31 - FM3.119.2 MON2.015499.0
8324:12:19:40 AM Utente GRID1 BUILD17	[gridalert] ALERT LEVEL 0 [gridalert] AGILE Daily Report 27/04/2010 (o	k)
	[gridalert] ALERT LEVEL 4.25 (42.4, -9.5, 22)	2.534) - 21 - FM3.119_2.SPOT5_400_0154 • U
	gridalert] ALERT LEVEL 4.15 (55.2, -4.1, 24	4.236) - 26 - FM3.119_2.SPOT5_400_0154 • U
	[gridalert] ALERT LEVEL 4.28 (274.1, 29.4, 9	2.6225) - BZBJ1057-2754 - FM3.119_2.SPO • U
	[gridalert] ALERT LEVEL 6.92 (195.0, 4.4, 10 [gridalert] ALERT LEVEL 4.12 (198.8, -16.5,	2.286) - IAGL_J0634+1748 - FM3.119_2.5P • U 132.098) - BZBJ0527+0331 - FM3.119_2.SP • U
	gridalert] ALERT LEVEL 4.5 (94.7, 33.8, 756	.381) - BZQJ1723+6547 - FM3.119_2.SPOT • U
	[gridalert] ALERT LEVEL 4.26 (94.7, 33.7, 71 [gridalert] ALERT LEVEL 4.03 (224.2, -63.1,	6.855) - BZQJ1723+6547 - FM3.119_2.MO • U 330.386) - 31 - FM3.119 2.MON2 015497 • U
	[gridalert] ALERT LEVEL 6.9 (195.2, 4.3, 488	.708) - 1AGL_J0634+1748 - FM3.119_2.MO 🔹 U
	gridalert] ALERT LEVEL 4.14 (140.3, -6.1, 1 [gridalert] ALERT LEVEL 4.23 (42.4, -9.5, 21	83.383) - 21 - FM3.119_2.MON2_015497.0 • U 5.879) - 21 - FM3.119 2.SPOT5 400 0154 • U
	[gridalert] ALERT LEVEL 4.28 (274.1, 29.4, 8	9.9745) - BZBJ1057-2754 - FM3.119_2.SPO • U
	 [gridalert] ALERT LEVEL 4.13 (198.8, -16.5, [gridalert] ALERT LEVEL 7.01 (195.0.4.4.13) 	126.469) - BZBJ0527+0331 - FM3.119_2.SP • U
	[gridalet] ALERT LEVEL 4.19 (94.7, 33.8, 73	4.69) - BZQJ1723+6547 - FM3.119_2.SPOT • U
	[gridalert] ALERT LEVEL 4.19 (94.7, 33.8, 71	1.981) - BZQJ1723+6547 - FM3.119_2.SPO • U
	[gridalert] ALERT LEVEL 4.25 (94.7, 53.7, 69	316.146) - 31 - FM3.119_2.MON2_015497 • U
	[gridalert] ALERT LEVEL 6.98 (195.2, 4.3, 47	2.405) - 1AGL_J0634+1748 - FM3.119_2.M • U

x snapshots

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• :	[gridalert] ALERT LEVEL 4.01 (198.8, -16.5, 126.963) - BZBJ0527+0)331 - FM3.119_2.SP 🍳 Utente GRID1 BUILD17	 11:23 AM
÷.	[gridalert] ALERT LEVEL 5.26 (195.0, 4.4, 175.686) - 1AGL_J0634+1	1748 - FM3.119_2.S 🔹 Utente GRID1 BUILD17	 11:22 AM
+	[gridalert] ALERT LEVEL 4.15 (37.0, 1.6, 163.378) - 21 - FM3.119_1	2.SPOT5_100_0154 🔹 Utente GRID1 BUILD17	 11:19 AM
	[gridalert] ALERT LEVEL 4.03 (66.5, -29.8, 164.691) - 31 - FM3.11	9_2.SPOT5_100_015 • Utente GRID1 BUILD17	 11:19 AM
+	[gridalert] ALERT LEVEL 4.14 (274.1, 29.4, 90.0812) - BZBJ1057-27	54 - FM3.119_2.SPO Utente GRID1 BUILD17	 11:12 AM
	[gridalert] ALERT LEVEL 4.6 (94.7, 33.8, 742.098) - BZQJ1723+6547	7 - FM3.119_2.SPOT 🔹 Utente GRID1 BUILD17	- 11:04 AM
+	[gridalert] ALERT LEVEL 4.3 (94.7, 33.7, 704.121) - BZQJ1723+654	7 - FM3.119_2.MON 🔹 Utente GRID1 BUILD17	 10:52 AM
	[gridalert] ALERT LEVEL 6.68 (195.2, 4.3, 471.069) - 1AGL_0634+1	1748 - FM3.119_2.M 🔹 Utente GRID1 BUILD17	+ 10:51 AM
+	[gridalert] ALERT LEVEL 4.2 (224.2, -63.1, 322.825) - 31 - FM3.119)_2.MON2_015499.0 🔹 Utente GRID1 BUILD17	 10:50 AM
0 .	[gridalert] AGILE Daily Report 27/04/2010 (ok)	no_reply@asdc.asi.it	 10:11 AM
	[gridalert] ALERT LEVEL 4.25 (42.4, -9.5, 222.534) - 21 - FM3.119_	2.SPOT5_400_0154 🔹 Utente GRID1 BUILD17	 10:02 AM
	[gridalert] ALERT LEVEL 4.15 (55.2, -4.1, 244.256) - 26 - FM3.119	2.SPOT5_400_0154 • Utente GRID1 BUILD17	+ 10:02 AM
+	[gridalert] ALERT LEVEL 4.01 (37.1, 1.7, 170.796) - 21 - FM3.119_2	2.SPOT5_100_0154 🔹 Utente GRID1 BUILD17	 09:50 AM
	[gridalert] ALERT LEVEL 4.28 (274.1, 29.4, 92.6225) - BZBJ1057-275	54 - FM3.119_2.SPO 🔹 Utente GRID1 BUILD17	 09:48 AM
+	[gridalert] ALERT LEVEL 6.92 (195.0, 4.4, 182.286) - 1AGL_J0634+1	1748 - FM3.119_2.SP 🔹 Utente GRID1 BUILD17	• 09:43 AM
	[gridalert] ALERT LEVEL 4.12 (198.8, -16.5, 132.098) - BZBJ0527+0	331 - FM3.119_2.SP 🔹 Utente GRID1 BUILD17	· 09:43 AM
	[gridalert] ALERT LEVEL 4.5 (94.7, 33.8, 756.381) - BZQJ1723+654	7 - FM3.119_2.SPOT 🔹 Utente GRID1 BUILD17	• 09:24 AM
*	[gridalert] ALERT LEVEL 4.26 (94.7, 33.7, 716.855) - BZQJ1723+654	47 - FM3.119_2.MO 🔹 Utente GRID1 BUILD17	· 09:08 AM
+	[gridalert] ALERT LEVEL 4.03 (224.2, -63.1, 330.386) - 31 - FM3.1	19_2.MON2_015497 • Utente GRID1 BUILD17	• 09:07 AM
	[gridalert] ALERT LEVEL 6.9 (195.2, 4.3, 488.708) - 1AGL_0634+17	/48 - FM3.119_2.MO 🔹 Utente GRID1 BUILD17	+ 09:07 AM
+	[gridalert] ALERT LEVEL 4.14 (140.3, -6.1, 183.383) - 21 - FM3.11	9_2.MON2_015497.0 🔹 Utente GRID1 BUILD17	 09:07 AM
	[gridalert] ALERT LEVEL 4.23 (42.4, -9.5, 216.879) - 21 - FM3.119_	2.SPOT5_400_0154 • Utente GRID1 BUILD17	· 08:15 AM
+	[gridalert] ALERT LEVEL 4.28 (274.1, 29.4, 89.9745) - BZBJ1057-275	54 - FM3.119_2.SPO 🔹 Utente GRID1 BUILD17	• 08:06 AM
	[gridalert] ALERT LEVEL 4.13 (198.8, -16.5, 126.469) - BZBJ0527+0)331 - FM3.119_2.SP 🔹 Utente GRID1 BUILD17	 08:00 AM
*	[gridalert] ALERT LEVEL 7.01 (195.0, 4.4, 176.217) - 1AGL_0634+1	1748 - FM3.119_2.S 🔹 Utente GRID1 BUILD17	• 07:59 AM
*	[gridalert] ALERT LEVEL 4.19 (94.7, 33.8, 734.69) - BZQJ1723+6547	7 - FM3.119_2.SPOT 🔹 Utente GRID1 BUILD17	· 07:43 AM
+	[gridalert] ALERT LEVEL 4.19 (94.7, 33.8, 711.981) - BZQJ1723+654	47 - FM3.119_2.SPO 🔹 Utente GRID1 BUILD17	• 07:43 AM
	[gridalert] ALERT LEVEL 4.25 (94.7, 33.7, 696.409) - BZQJ1723+654	47 - FM3.119_2.MO 🔹 Utente GRID1 BUILD17	• 07:27 AM
*	[gridalert] ALERT LEVEL 4.04 (224.2, -63.1, 316.146) - 31 - FM3.1	19_2.MON2_015497 🗕 Utente GRID1 BUILD17	• 07:27 AM
÷.	[gridalert] ALERT LEVEL 6.98 (195.2, 4.3, 472.405) - 1AGL_0634+1	1748 - FM3.119_2.M 🔹 Utente GRID1 BUILD17	• 07:27 AM
+	[gridalert] ALERT LEVEL 4.12 (198.8, -16.5, 126.599) - BZBJ0527+0	331 - FM3.119_2.SP 🔹 Utente GRID1 BUILD17	• 06:26 AM
	[gridalert] ALERT LEVEL 7.03 (195.0, 4.4, 176.21) - 1AGL J0634+17	748 - FM3.119 2.SP 🔹 Utente GRID1 BUILD17	• 06:26 AM

A recent example: AGILE-GRID quicklook, April 13, 2010



0.0002 0.0004 0.0006 0.0008 0.001 0.0012

Two AGILE Atels published on April 13, 2010:

AGILE detects enhanced gamma-ray emission from the blazar PKS 2142-758

ATel #2551; F. Verrecchia (ASDC), E. Striani (Univ. Roma Tor Vergata), C. Pittori, F. Lucarelli (ASDC), S. Vercellone (INAF/IASF-Pa), M. Tavani (INAF/IASF-Rm), A. Bulgarelli (INAF/IASF-Bo), F. D'Ammando (INAF/IASF-Pa), I. Donnarumma (INAF/IASF-Rm), V. Vittorini, E. Del Monte, Y. Evangelista, M. Feroci, F. Lazzarotto, L. Pacciani, P. Soffitta, E. Costa, I. Lapshov, M. Rapisarda, A. Argan, G. Piano, G. Pucella, S. Sabatini, A. Trois (INAF/IASF-Rm), F. Fuschino, M. Galli, F. Gianotti, C. Labanti, M. Marisaldi, M. Trifoglio, G. Di Cocco (INAF/IASF-Bo), A. Chen, A. Giuliani, S. Mereghetti, P. Caraveo, F. Perotti (INAF/IASF-Mi), A. Pellizzoni, M. Pilia (INAF/OA-Cagliari), G. Barbiellini, F. Longo, E. Moretti, E. Vallazza (INFN Trieste), A. Morselli, P. Picozza (INFN and Univ. Roma Tor Vergata), M. Prest (Universita` dell'Insubria), P. Lipari, D. Zanello (INFN and Univ. Roma Sapienza), P.W. Cattaneo, A. Rappoldi (INFN Pavia), P. Santolamazza, S. Colafrancesco, P. Giommi (ASDC), L. Salotti (ASI) on 13 Apr 2010: 14:50 UT

AGILE detection of the new unidentified gamma-ray source AGL J0906-1241

ATel #2552; C. Pittori, F. Verrecchia (ASDC), E. Striani (Univ. Roma Tor Vergata and INFN Roma), M. Tavani (INAF/IASF-Rm), S. Vercellone (INAF/IASF-Pa), S. Sabatini (INAF/IASF-Rm), A. Bulgarelli, F. Gianotti, M. Trifoglio (INAF/IASF-Bo), and Univ. Tor Vergata), A. Chen, A. Giuliani, S. Mereghetti, P. Caraveo, F. Perotti (INAF/IASF-Mi), I. Donnarumma (INAF/IASF-Rm), F. D'Ammando (Univ. Roma Tor Vergata and INAF/IASF-Rm), E. Del Monte, Y. Evangelista, M. Feroci, F. Lazzarotto, L. Pacciani, P. Soffitta, E. Costa, I. Lapshov, M. Rapisarda, A. Argan, G. Piano, G. Pucella, A. Trois, V. Vittorini (INAF/IASF-Rm), F. Fuschino, M. Galli, C. Labanti, M. Marisaldi, G. Di Cocco (INAF/IASF-Bo), A. Pellizzoni, M. Pilia (INAF/OA-Cagliari), G. Barbiellini, F. Longo, E. Moretti, E. Vallazza (INFN Trieste), A. Morselli, P. Picozza (INFN and Univ. Roma Tor Vergata), M. Prest (Universita` dell'Insubria), P. Lipari, D. Zanello (INFN and Univ. Roma Sapienza), P.W. Cattaneo, A. Rappoldi (INFN Pavia), F. Lucarelli, P. Santolamazza, S. Colafrancesco, P. Giommi (ASDC), L. Salotti (ASI) on 13 Apr 2010; 15:14 UT

Summary of ASDC activities for AGILE: (from Agile Science Management Plan)

- Running the Quick Look Analysis
- Running the standard data reduction Analysis
- Performing, when necessary, the Interactive data Analysis
- Managing Announcement of Opportunities
- Contributing to the management of the AGILE Pointing Program
- Archiving all the data (raw, cleaned and calibrated, scientific)
- **Distributing** the data to the scientific community
- Providing scientific support to the users community
- Officially interface the project for both data and proposals via dedicated web pages
- Providing the standard software support for the data analysis

First AGILE GRID light ADC 24/5/2007

Commissioning Phase: AGILE Vela PSR Count Map

(~ 20000 s)



AGILE: 3 years in orbit

- AGILE demonstrates for the first time the covering of ~ 1/5 of the entire gamma-ray sky (FoV ~ 2.5 sr) with excellent angular resolution and competitive sensitivity.
- AGILE shows for the first time an optimal performance of its gamma-ray and hard X-ray imagers.
- > 15530 orbits, April 27, 2010
- Pointing observation mode up to October 18, 2009 (~ 94% Fine Pointings)
- > 2700 orbits in **spinning observation mode** since October
- Very good scientific performance, especially at ~ 100 MeV
- Guest Observer Program open to the scientific community: Cycle-1 completed, Dec. 1, 2007 – Nov. 30, 2008
 Cycle-2: completed, Dec. 1, 2008 – Nov 30, 2009
 Cycle-3: on-going, Dec. 1, 2009 – Nov 30, 2010

On November 4, 2009, toward the end of Cycle-2, AGILE scientific operations were reconfigured following a malfunction of the reaction wheel. The satellite is currently operating in a **spinning observing mode** and it is now surveying a large fraction of the sky every day. AGILE current spinning sky view:



On December 3-4, 2009 the AGILE satellite detected the strongest γ -ray flare ever observed (E > 100 MeV). The flaring γ -ray source is in the active galaxy 3C454.3 (z=0.859, $F_{\gamma} > 2 \times 10^{-5}$ ph cm⁻² s⁻¹, $L_{iso} = 6 \times 10^{49}$ erg s⁻¹)

the Vela pulsar

the black hole "Crazy Diamond" in the galaxy 3C 454.3

AGILE in pointing mode: 24-month intensity map (E > 100 MeV) (July 2007 – August 2009)



Cygnus Region

Galactic Center

AGILE in spinning: 5-month intensity map (E > 100 MeV) (Nov. 2009 – Mar. 2010)



First AGILE Catalog of High Confidence Gamma-Ray Sources

• **First year of scientific operations:** observations from July 9, 2007 to June 30, 2008. **Conservative analysis,** with a high-quality gamma event filter.

47 high confidence sources E> 100 MeV:

- 21 confirmed and candidate Pulsars,
- 13 Blazars (7FSRQ, 4BL Lacs, 2 unknown type),
- 2 possible HMXRBs,
- 2 possible SNRs,
- 1 Colliding-wind Binary System (Eta-Car)
- 8 Unidentified sources.

Interactive on-line version of the the First AGILE-GRID Catalog from ADC web page http://agile.asdc.asi.it/



C. Pittori et al., A&A 506, 2009 - arXiv:0902.2959

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The X-ray imager SuperAGILE: public source list from interactive pages at ADC: http://agile.asdc.asi.it/

					SuperA	Webpage updated twice a c	Catalog				
nilable parameters ame Tra Edec Edat n Eexposure Forbi GO	: eobs_flux_err_flux_ t	e				NOTE for the proper user	of the data contained on	this Webpage			Reset IX
Entry number		Light Curve	Target Name	RA (J2000)	Dec (J2000) dd mm ss.d 👻	Latest Observation Time	Flux (cts cm^-2 s^-1)	Flux error (cts cm^-2 s^-1)	Detection Significance	Exposure (sec)	Orbit number
Subset selection mode: inclusive								* * 5321	1 · · · · · · · · · · · · · · · · · · ·	• • 801	1
10000	ASSOC Data Explorer	Show	4U 1700-377	17 03 56.8	-37 50 38.4	2009-09-27T16:38:25	0.03	0.0069	4.68	3541	012539
2	Asoc Data Explorer	Show	Ginga 1826-24	18 29 28.0	-23 47 49.2	2009-09-27T16:38:25	0.017	0.0042	4.17	3429	012539
3 ^{Select}	ASOC Data Replorer	Show	Sco X-1	16 19 54.9	-15 38 24.0	2009-09-27T16:38:25	0.444	0.0378	34.19	3429	012539
4	Aso: Data Explorer	Show	HETE J1900.1-2455	19 00 08.6	-24 55 12.0	2009-09-27T14:56:15	0.018	0.0042	4.46	3601	012538
5	Alloc Data Explorer	Show	GX 17+2	18 16 01.4	-14 02 09.5	2009-09-27T14:56:15	0.014	0.0033	4.31	3569	012538
6	ASSC Data Explorer	Show	GX 9+1	18 01 32.3	-20 31 44.3	2009-09-27T11:32:14	0.02	0.0045	4.66	3883	012536
7	ASOC Data Explorer	Show	GRS 1758-258	18 01 12.2	-25 44 34.7	2009-09-27T09:50:19	0.02	0.0042	5.26	3997	012535
8	See Data Explorer	Show	SWIFT J1753.5-0127	17 53 28.3	-01 27 07.1	2009-09-27T06:26:13	0.026	0.0062	4.42	3917	012533
95000	Asse: Data Explorer	Show	4U 1820-303	18 23 40.5	-30 21 39.6	2009-09-26T13:26:14	0.014	0.0036	4.02	3769	012523
10	ASOC Data Explorer	Show	GX 5-1	18 01 08 1	-25 04 44 4	2009-09-25T05:07:47	0.022	0.0033	7.61	3627	012504

Completato

46 X-ray (18-60 keV) validated sources, up to October 2009

Mc & Fan Citadada

SuperAGILE public light curves (pointing mode data)



Completato

Update: all SuperAGILE detected sources in 3 years including spinning mode data



SOME AGILE HIGHLIGHTS



AGILE first-year blazar studies summary:

• AGILE (as EGRET and now Fermi) detected only few objects with flux greater than 100×10^{-8} ph cm⁻² s⁻¹. Selection effects or there is a subclass of blazar with peculiar characteristics?

• AGILE observations has brought to light a more complex behaviour of blazars with respect to the standard models:

- the presence of two emission components in any BL Lacs
- the possible contributions of an hot corona as source of seed photons for the EC in FSRQs

• The study of multi-wavelength correlations is the key to understanding the structure of the inner jet and the origin of the seed photons for the IC process

Gamma-ray Pulsars by AGILE



Slide adapted from: Alberto Pellizzoni - The Bright Gamma Ray Sky, ASI-ESRIN '09

AGILE Pulsar main results:

(from AGILE Pulsar working group)

Among the newcomers from timing analysis:

- the remarkable PSR B1509-58 with very high rotational energy losses, with a magnetic field in excess of 10¹³ Gauss
- PSR J2229+6114 providing a reliable identification for the previously unidentified EGRET source 3EG 2227+6122.
- Moreover, the powerful **millisecond** pulsar B1821-24, in the globular cluster M28, is detected
- Structured **energy-dependent peaks** (more than two) are evident in pulsar light curves.
- Full exploitation of <100 MeV band in progress (exposure competitive with Fermi)

Galactic gamma-ray sources

 Carina region: γ-ray detection of the colliding wind massive binary system n-Car with AGILE

Tavani et al. 2009 ApJ, 698, L142, 2009 (arXiv:0904.2736)

- Cygnus region microquasars:
- AGILE detects several gamma-ray flares from Cygnus X-3, and also weak persistent emission above 100 MeV Tavani et al. 2009, Nature 462, 620, 2009 (arXiv:0910.5344)
- AGILE observations of Cygnus X-1, one detected gamma-ray flare

Sabatini et al. 2009, ApJ 2010, Del Monte et al., A&A 2010

• Detection of Gamma-Ray Emission from the Vela Pulsar Wind Nebula with AGILE

Pellizzoni et al. 2009, Science 327, 2010

Impulsive events: GRBs and TGFs

 SuperAGILE has detected several GRBs in its energy band (18-60 keV) at a rate of about 1 per month while the AGILE
 Minicalorimeter (MCAL) observes about 1 GRB per week in the energy range 0.7-1.4 MeV on several time scales (Marisaldi et al.). GRID energies: only three confirmed GRBs up to now with HE component E > 50 MeV.

-The AGILE Minicalorimeter also detects **Terrestrial gammaray flashes**, very interesting events up to 40 MeV on timescales < 5 ms (Marisaldi et al., JGR 115, A00E13, 2010, available online **from ADC webpage**)

 \Rightarrow See afternoon special session





Welcome to the AGILE Data Center Home Page at ASDC

These pages provide updated information and services in support to the general scientific community for the mission AGILE, which is a small Scientific Mission of the Italian Space Agency (ASI) with participation of INFN, IASF/INAF and CIFS.

AGILE is devoted to gamma-ray astrophysics and it is a first and unique combination of a gamma-ray and an hard X-ray imager. It will simultaneously detect and image photons in the 30 MeV - 50 GeV and in the 18 - 60 keV energy ranges.

The AGILE Mission Board (AMB) has executive power overseeing all the scientific matters of the AGILE Mission and is composed of:

- AGILE Principal Investigator: Marco Tavani, INAF/IASF Rome (Chair)
- 1 ASI representative: Paolo Giommi, ASDC
- ASI Mission Director: Luca Salotti, ASI
- AGILE Co-Principal Investigator: Guido Barbiellini, INFN Trieste
- Project Scientist: Sergio Colafrancesco, ASDC

As specified in the Announcement of Opportunity Cycle-2, it is not possible to propose for ToO observations in response to AGILE Announcement of Opportunity.

However, observers can propose a ToO at any time during the mission by contacting directly the PI or one of the AMB members.

y and approval will be taken by the full AMB. GILE Team or other scientists for advice or

http://agile.asdc.asi.it

il belong jointly to the proponent and to the

AGILE current spinning sky view



Click here to access to AGILE Spinning FOV plotter

(Click here for previous pointing details)



Latest AGILE News

- (April 14, 2010) AGILE detection of the new unidentified gamma-ray source AGL J0906-1241
- (April 14, 2010) AGII E detects enhanced



AGILE AO1: completed Submitted proposals: 29 Approved/P. Approved: 24 Requested Targets: 122 Approved Targets: 100 Pulsars: 39 **AGN: 31 3EG sources: 30**

Cycle-1 GOP Schedule

• SW build GO 1.0 + test dataset: released on May 22, 2008

- Cycle-1 data distribution:
- first delivery (17 OBs) on June 5, 2008
- second delivery (3 OB) on July 17, 2008
- last complete data release on Dec 23, 2008



AGILE AO2:

Submitted/Approved proposals: 15

14 PI, 74 co-PI

Requested/Approved Targets: 93

Pulsars: 21

AGN: 62

3EG sources: 10

AGILE SW & AO2 Data Distribution Schedule

• First public SW build + test dataset: delivered on May 22, 2009

- New SW release (4.0): delivered on October 6, 2009
- AO2 (+ AO1 reprocessed) GO data packets ready: delivered on October 6, 2009

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pproved Targets Show as	PDF in a new wi	ndow								
Target Name	RA (J2000)	Dec (J2000)	RA (J2000)	Dec (J2000)		b P	PI Name	Proposal ID	TargetClass	Title
3EG J0010+7309	0h 9m 36.72s	73 10' 58.80"	2.403	73.183	119.870	10.560	Diego Torres	57	3EG Sources	AGILE GRID observations of Unidenti ed EGRET sources likely related to supernova
JVAS J0010+1724	0h 10m 34.7s	17 24' 18.00"	2.642	17.405	109.233	-44.377	Stefano Vercellone	49	Active Galactic Nuclei	Study of the gamma-ray properties of a sample of high-energy blazar candidates
J0030+0451	0h 30m 27.35s	4 51' 39.59"	7.614	4.861	113.141	-57.611	Andrea Possenti	52	Pulsars	Investigating the gamma-ray properties of a sample of northern radio pulsars
GC 0109+224	1h 12m 5.76s	22 44' 38.39"	18.024	22.744	129.142	-39.879	Alessandro Paggi	55	Active Galactic Nuclei	SSC: the end of the tether?
J0205+6449	2h 5m 37.92s	64 49' 44,39"	31.408	64.829	130.719	3.085	Andrea Possenti	52	Pulsars	Investigating the gamma-ray properties of a sample of northern radio pulsars
PKS 0208-512	2h 10m 46.31s	-51 1' 1.20"	32.693	-51.017	276.101	-61.778	Elena Pian	45	Active Galactic Nuclei	Multiwavelength Variability of Gamma-Ray-Loud Blazars
HB89 0212+735	2h 17m 30.72s	73 49' 33.59"	34.378	73.826	128.927	11.964	Filippo D'Ammando	56	Active Galactic Nuclei	AGILE observation of 4 high-redshift MeV blazars
J0218+4232	2h 18m 6.24s	42 32' 16.79"	34.526	42.538	139.508	-17.527	Andrea Possenti	52	Pulsars	Investigating the gamma-ray properties of a sample of northern radio pulsars
3C 66A	2h 22m 40.8s	43 2" 9.60"	35.667	43.036	140.144	-16.766	Elena Pian	45	Active Galactic Nuclei	Multiwavelength Variability of Gamma-Ray-Loud Blazars
RBS 0315	2h 25m 4.55s	18 46' 48.00"	36.269	18.780	151.786	-38.789	Filippo D'Ammando	56	Active Galactic Nuclei	AGILE observation of 4 high-redshift MeV blazars
1ES 0229+200	2h 32m 48.72s	20 17' 16.80"	38.203	20.288	152.942	-36.607	Alessandro Paggi	55	Active Galactic Nuclei	SSC: the end of the tether?
AO 0235+164	2h 38m 38.87s	16 36' 57.59"	39.662	16.616	156.771	-39.110	Alessandro Paggi	55	Active Galactic Nuclei	SSC: the end of the tether?
NGC 1358	3h 33m 38.39s	-5 5' 23.99"	53.410	-5.090	190.589	-45.564	Francesco Longo	54	Active Galactic Nuclei	Search for gamma-ray emission from UHECR candidate sources
3EG J0348+3510 (Per OB2)	3h 48m 0.0s	35 12' 0.00"	57.000	35.200	159.031	-15.014	Elena Orlando	58	3EG Sources	Search for gamma-ray emission from star-forming regions
PSR J0358+5413	3h 58m 53.75s	54 13' 11.99"	59.724	54.220	148.190	0.811	Teresa Mineo	48	Pulsars	AGILE-GRID observation of Radio Pulsars
WMAP3 J0403-3604	4h 3m 52.79s	-36 4' 47.99"	60.970	-36.080	237.737	-48.486	Carlotta Pittori	59	Active Galactic Nuclei	Blazar duty cycle from the microwave to gamma-ray slope
WMAP3 J0423-0120	4h 23m 14.40s	-1 20' 24.00"	65.810	-1.340	195.284	-33.144	Carlotta Pittori	59	Active Galactic Nuclei	Blazar duty cycle from the microwave to gamma-ray slope
PKS 0422+004	4h 24m 46.79s	0 36' 7.19"	66.195	0.602	193.586	-31.777	Alessandro Paggi	55	Active Galactic Nuclei	SSC: the end of the tether?
PKS 0521-365	5h 22m 58.8s	-36 27' 32.40"	80.742	-36.459	240.608	-32.716	Elena Pian	45	Active Galactic Nuclei	Multiwavelength Variability of Gamma-Ray-Loud Blazars
J0538+2817	5h 38m 24.95s	28 17' 9.60"	84.604	28.286	179.718	-1.686	Andrea Possenti	52	Pulsars	Investigating the gamma-ray properties of a sample of northern radio pulsars
PKS 0537-441	5h 38m 49.91s	-44 5' 9.59"	84.708	-44.086	250.083	-31.091	Elena Pian	45	Active Galactic Nuclei	Multiwavelength Variability of Gamma-Ray-Loud Blazars
PKS 0537-286	5h 39m 54.23s	-28 39' 57.60"	84.976	-28.666	232.940	-27.293	Filippo D'Ammando	56	Active Galactic Nuclei	AGILE observation of 4 high-redshift MeV blazars
3EG J0542+2610	5h 42m 0.0s	26 0' 0.00"	85.500	26.000	182.081	-2.222	Diego Torres	57	3EG Sources	AGILE GRID observations of Unidenti ed EGRET sources likely related to supernova
PKS 0548-322	5h 50m 40.80s	-32 16' 19.19"	87.670	-32.272	237.566	-26.144	Alessandro Paggi	55	Active Galactic Nuclei	SSC: the end of the tether?
PSR J0614+2229	6h 14m 17.28s	22 30' 36.00"	93.572	22.510	188.786	2.400	Teresa Mineo	48	Pulsars	AGILE-GRID observation of Radio Pulsars
3EG.10631+0642	6h 31m 39 36s	6 41' 42 00"	97 914	6 695	204 720	-1 320	Diego Torres	57	3EG Sources	AGILF GRID observations of Unidenti ed EGRET sources likely related to supernova

AGILE AO3 now open!!!

Proposals can be submitted up to April 30, 2010

AGILE in spinning is now surveying a large fraction of the sky every day and during Cycle-3 it will not follow a predefined Baseline Pointing Plan as in previous observing Cycles.

Guest Observers can apply for data rights of AGILE Cycle-3 observations, from December 1, 2009 to November 30, 2010.

AO3 key dates:

- Release of AO3: March 30, 2010
- Due date for proposals: April 30, 2010
- AO3 Observing Period (Cycle-3): December 1, 2009 November 30, 2010

The complete documentation for this AO3 can be found on-line at the AGILE-ASDC web pages http://agile.asdc.asi.it/ao3.html

AGILE Public Data Distribution from the ASDC MMIA

- First public delivery (17 OBs): June 5, 2009
- Second public delivery (3 OBs): July 17, 2009
- Publication of a reprocessed Cycle-1 (20 OB) dataset: October, 2009
- Complete Cycle-1 public data release: Dec 23, 2009



Conclusions

• AGILE is operating nominally producing data in spinning with quality similar to that obtained when operating in pointing mode (15 ATels and 1 GCN since November 2009)

- All ADC functionalities and data processing promptly adapted to the new spinning configuration
- In progress: new optimized attitude reconstruction, improvement both for spinning and pointing data

 Complete reprocessing of AGILE data will be done during the next few months. New reprocessed archive and new source catalog will be available from ADC webpages

AGILE Data Center



AGILE data flow and Ground Segment organization (from Agile Science Management Plan)



Gamma-ray Imaging Detector (GRID)		
Energy Range	30 MeV – 50 GeV	9. S
Field of view	$\sim 3 \ {\rm sr}$	
Sensitivity at 100 MeV (ph cm ⁻² s ⁻¹ MeV ⁻¹)	6×10 ⁻⁹	(5σ in 10 ⁶ s)
Sensitivity at 1 GeV (ph cm ⁻² s ⁻¹ MeV ⁻¹)	4×10-11	(5σ in 10 ⁶ s)
Angular Resolution at 1 GeV	36 arcmin	(68% cont. radius)
Source Location Accuracy	~5-20 arcmin	S/N~10
Energy Resolution	$\Delta E/E \sim 1$	at 300 MeV
Absolute Time Resolution	$\sim 1 \mu s$	
Deadtime	$\sim 200 \mu s$	
Hard X-ray Imaging Detector (Super-AGI	LE)	
Energy Range	10 - 40 keV	
Field of view	107°×68°	FW at Zero Sens.
Sensitivity (at 15 keV)	$\sim 5 \text{ mCrab}$	(5σ in 1 day)
Angular Resolution (pixel size)	$\sim 6 \text{ arcmin}$	10.004.0004.000
Source Location Accuracy	~2-3 arcmin	S/N~10
Energy Resolution	$\Delta E < 4 \text{ keV}$	10000000000000
Absolute Time Resolution	$\sim 4 \mu s$	
Deadtime (for each of the 16 readout units)	$\sim 4 \mu s$	
Mini-Calorimeter		
Energy Range	0.3 – 200 MeV	40 - 9.58583997
Energy Resolution	$\sim 1 \text{ MeV}$	above 1 MeV
Absolute Time Resolution	~ 3 µs	
Deadtime (for each of the 30 CsI bars)	$\sim 20 \mu s$	

AGILE 1 year COUNT MAP (July 2007- June 2008)

