



SCIENTIFIC ANALYSIS WEB SERVICES FOR ASTRONOMY: THE SSDC SCIENTIFIC TOOLS

F. Verrecchia, F. Lucarelli

ASI Space Science Data Center (SSDC)

INAF - Astr. Obs. of Rome





OUTLINE



- An SSDC description
- The Multi-Mission & MWL environment of the ASI-SSDC and the SSDC online services
- A fast tutorial for SSDC web services (??)
- (The SSDC resident catalogues)
- Summary and outlook
- (VO services)



SSDC OVERVIEW

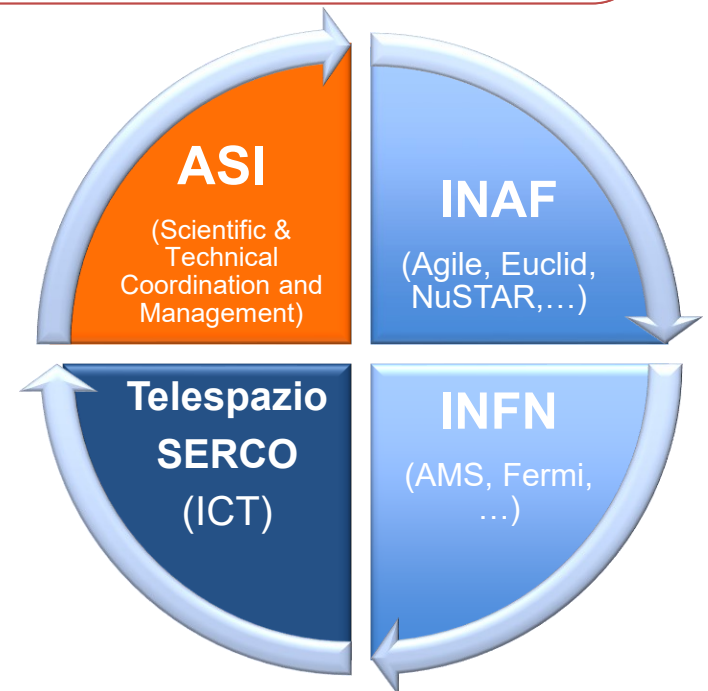


The Space Science Data Center is a Research Infrastructure of the Italian Space Agency

MAIN GOAL

acquire, manage, process and distribute data from (mainly) space based mission adopting the FAIR (Findable, Accessible, Interoperable, Reusable) principles.

- SSDC management and organization involves several Research Institutes:
 - **ASI** – Italian Space Agency
 - **INAF** – National Institute for Astrophysics
 - **INFN** – National Institute for Nuclear Physics
- Industries are involved for Information and Communication Technology supports.





SSDC OVERVIEW



The Space Science Data Center is a Research Infrastructure of the Italian Space Agency

MAIN GOAL

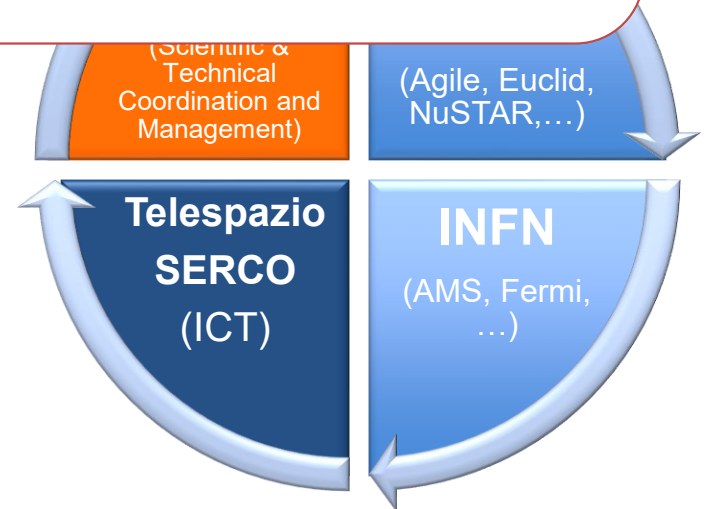
SO

=>Multi-Mission, Multi-Instrument & Multi-frequency
and apart from the hosting of all different archives, also
interoperability of almost all data through specific tools

•
s

- **ASI** – Italian Space Agency
- **INAF** – National Institute for Astrophysics
- **INFN** – National Institute for Nuclear Physics

• Industries are involved for Information and Communication Technology supports.





SSDC OVERVIEW



The Space Science Data Center is a Research Infrastructure of the Italian Space Agency

- SSDC infrastructure: HW (PCs, servers, network infrastructure), specific SW licenses
⇒ **mainly funded by ASI**
- SSDC scientific operations and research:
⇒ mainly **INAF & INFN responsibility** under ASI management and with contribution
- Infrastructure installation and maintenance, industr. SW development:
⇒ mainly **IT Industries responsibility** under ASI management and with contribution

Taking into account FAIR principles, **the SW environment and the specific SW development is mainly based on Open Source packages on Linux OSs, except for the single specific mission Data processing based on Teams official SW. => DP pipeline developed in collaboration, IT & Scientists!**



SSDC DUTIES



The ASI-SSDC activities include various different cases, almost all interoperable through an HW and some SW infrastructures

- SSDC data archives: general storage infrastructure, with clear specific exceptions
- Specific Mission Data processing (DP): each specific mission has its own duties specified in MoUs or other agreements. Different specific data processing are possible, from simple extraction and publication of delivered data results to a real complete DP from raw data with all data level production, as for case of the official unique **AGILE Data Center**
- SW Infrastructure: a DP SW repository including common multi-mission tools and mission official SWs; a web scientific services dedicated SW infrastructure
- **A specific NEW SW infrastructure for Advanced Scientific Tools:** born for the completely revised version (2005) of the historical SED Builder tool and applied to different and more recent tools such as Cosmic Ray DB & MATISSE but ALSO as portal to some data archive (Fermi Data Retrieval)
- **VO activities environment: currently mainly for catalogs!**



THE ASI-SSDC MWL EXPERIENCE



- The ASI-SSDC (former ASDC) on MWL only!
 - wide experience as MWL data center, both for low-level data products (AGILE data center, Fermi-LAT/SWIFT/... data mirror center) and high-level data, data products and catalogs (GAIA, AGILE, FERMI-LAT, ...).
 - Data and data products integrated in a fully MWL environment (MMIA: **Multi-Mission Interactive Archive**).
 - Possibility to perform cross-catalog searches between resident and external catalogs (**DE: Data Explorer tool**).
 - Powerful tools to extract SED of sources and modelization.

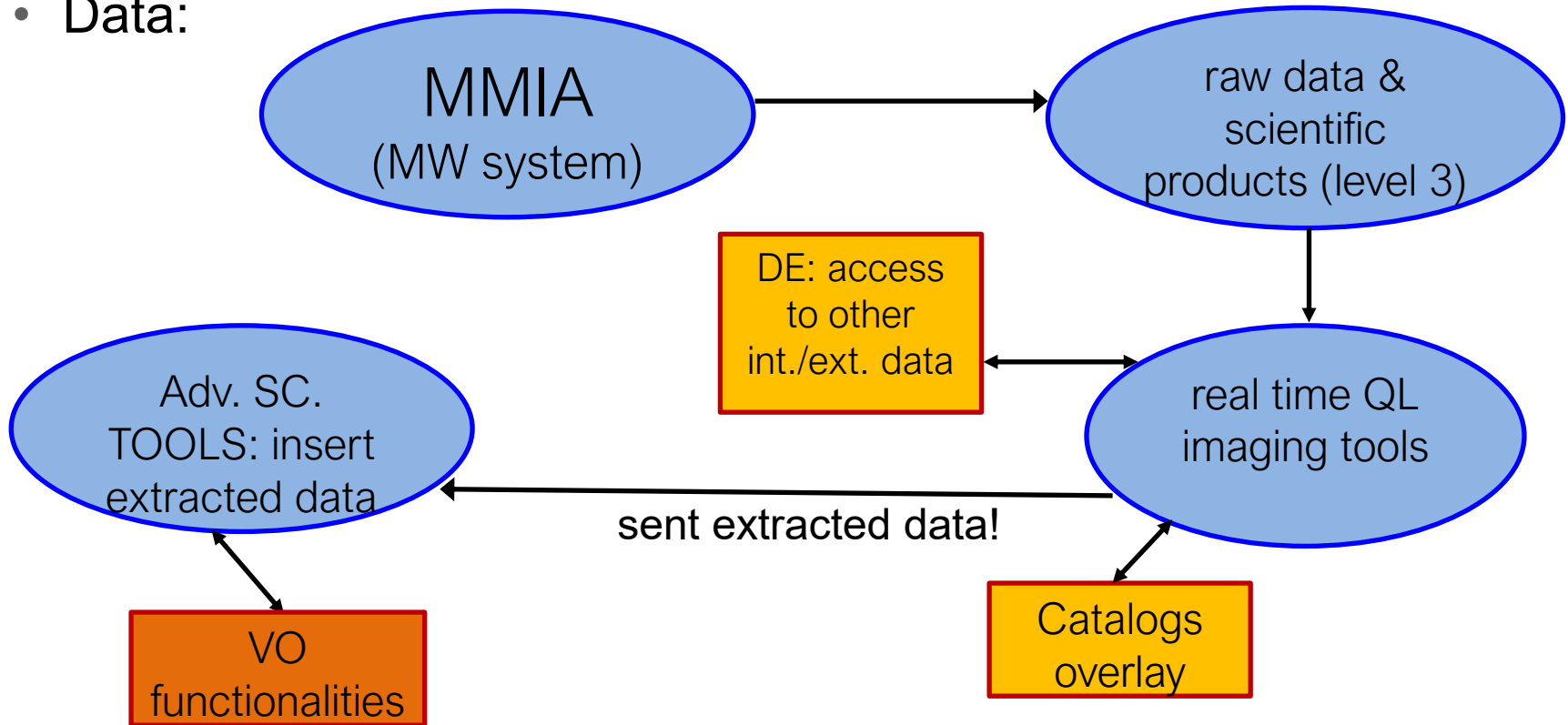


THE ASI-SSDC MWL EXPERIENCE



- The ASI-SSDC (former ASDC) web services main scheme:

- Data:



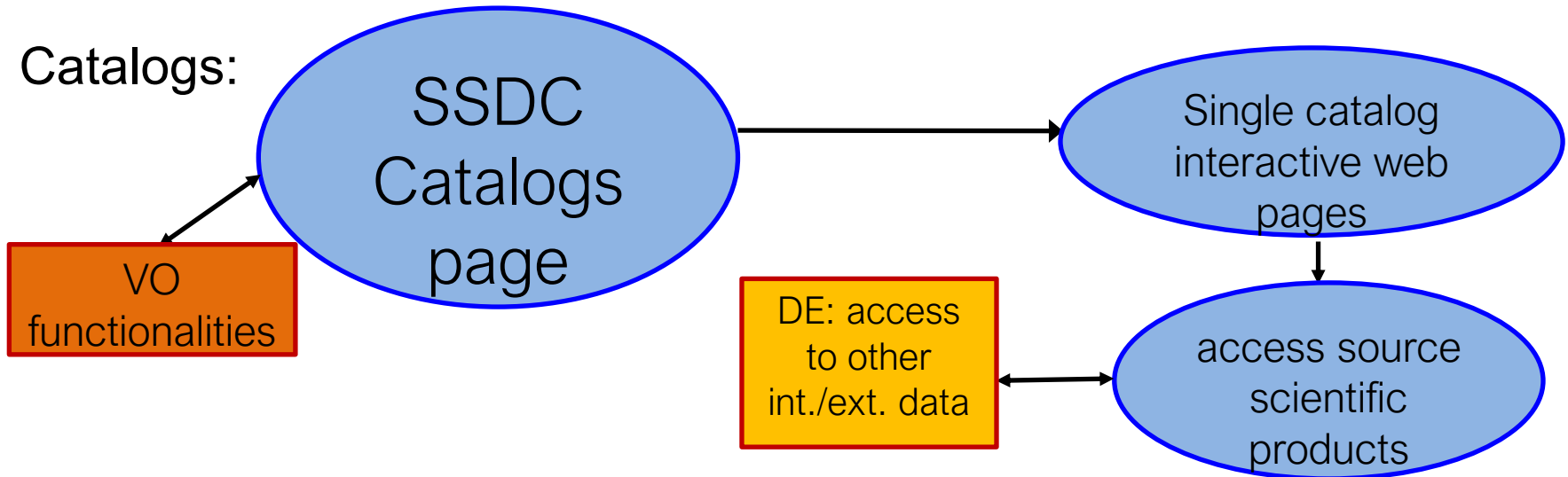


THE ASI-SSDC MWL EXPERIENCE

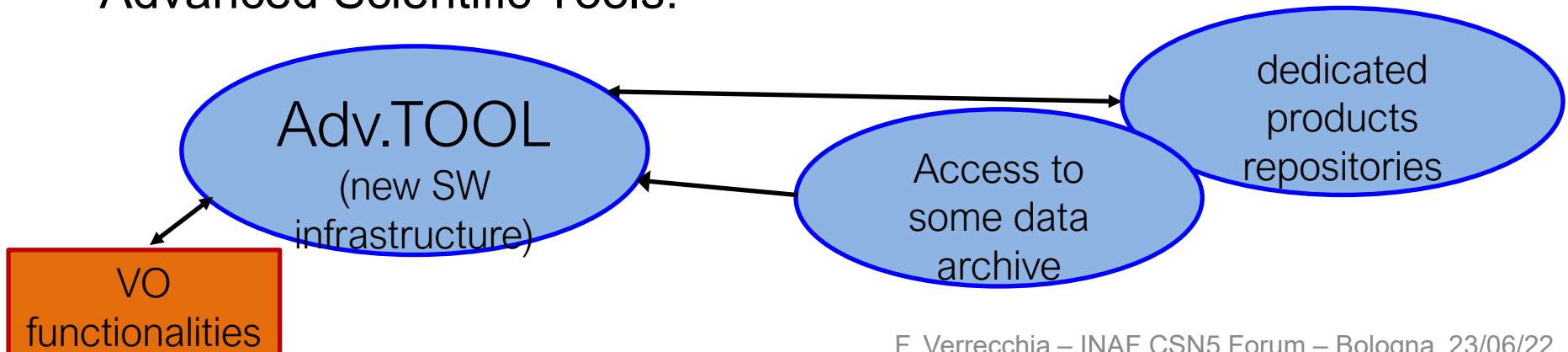


○ The ASI-SSDC (former ASDC) web services main scheme (II):

• Catalogs:



• Advanced Scientific Tools:





THE ASI-SSDC MWL EXPERIENCE



- A web services main SIMPLIFIED scheme:
 - Data: =>single archives, with specific constraints=>inserted in unique **infrastructure (MMIA)**
 - Catalogs: =>published catalogs, with ADDED scientific value AND “per-source” products =>inserted in unique **infrastructure**
 - Advanced Scientific tools: **different, dedicated SW environment (with specific refinements per mission/service)**
 - VO-services: a new TAP service created, under population; other VO-service already present are under revision, further new ones under study



THE ASI-SSDC MWL EXPERIENCE



- An historical/functional SIMPLIFIED scheme: based on open source SW and programming languages
 - **Original web services CORE (from 90's):** based on HEAsoft, IRAF packages, DS9; scientific Browse RDBMS for observations/catalogs repositories; Fortran 77, shell scripting, perl; web programming on HTML, PHP and CGI scripting (shell/perl) ->partly updated to use Python and RDBMS MySQL/PostgreSQL (e.a. AGILE/Fermi/ Herschel data archives); image visualization with JS9;
 - **Advanced TOOLS environment:** updated to use more recent COTS SW versions on more recent OSs, many Python env., Envi SW, vtp (3D), JS9, etc. (*SED Builder, Sky Explorer, MATISSE, Cosmic Ray DB, ExoPlanet*) also dedicated visualization with PHP/Java (SED Builder 3D plots)

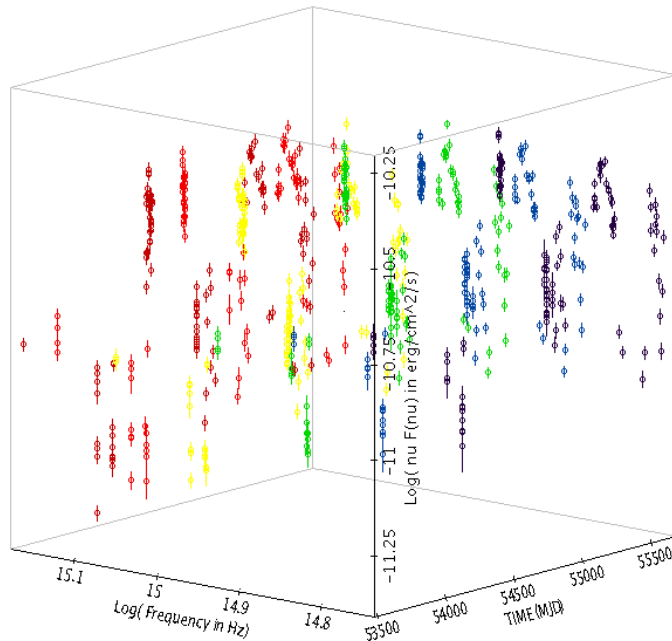


THE ASI-SSDC MWL EXPERIENCE



- An historical/functional SIMPLIFIED scheme: based on open source SW and programming languages

- **Original web services CORE (from 90's):** based on HEASoft, IRAF packages, DS9 scientific Browse RDRMS for observations/catalogs



plots)

- updated to use more recent COTS technologies (Python env., Envi SW, vtp (3D), MATISSE, Cosmic Ray DB, SED Builder 3D with PHP/Java)
- updated to use Python and updated to use more recent COTS technologies (Python env., Envi SW, vtp (3D), MATISSE, Cosmic Ray DB, SED Builder 3D with PHP/Java)



THE ASI-SSDC MWL EXPERIENCE



- **Dedicated mission web servers:** AGILE Services; Fermi Data Retrieval; **Gaia Portal! Solar System** ; CHEOPS mirror

○ Experience: problems & advices (obvious?)

- => **EASY** to develop NEW tools with NEW technologies!!
- => **VERY DIFFICULT** to MANAGE a COMPLETE UPGRADE of an operative Data Center with few decades life! Many interoperabilities between tools & archives
- Better to **DOUBLE the WEB services**: a COMPLETE second independent **DEVELOPMENT** environment should be the best strategy
- Currently strategy has been to proceed case-by-case
- Collaboration among IT & Scientific personnel



SUMMARY AND OUTLOOK



- We presented here a simple SSDC web services scheme and the experience: from Original 90's to 2020's updates => new modern scientific topics (Solar Sys. Exploration, Cosmic Rays, Terrestrial physics, etc.) and advanced old&new tools (*SED Builder*, *Sky Explorer*, *MATISSE*, *Cosmic Ray DB...*).
- **Transition in progress: convert old “Core” env. To new one**
- The MWL SSDC environment provide several unique features that can support a large part of the astronomical community, from HE astrophysics to cosmology, planetology and cosmic ray physics.



SUMMARY AND OUTLOOK



- All services and tools are updated/maintained (web server upgrade, improve graphical layout, add new features, bug-fixes ...) in close synergy with the industrial support.
- Further Space Physics under study by ASI: solar physics, NEO observations



THE SSDC WEB GATEWAY

AND A SIMPLE EXAMPLE
(IF THERE'S TIME)

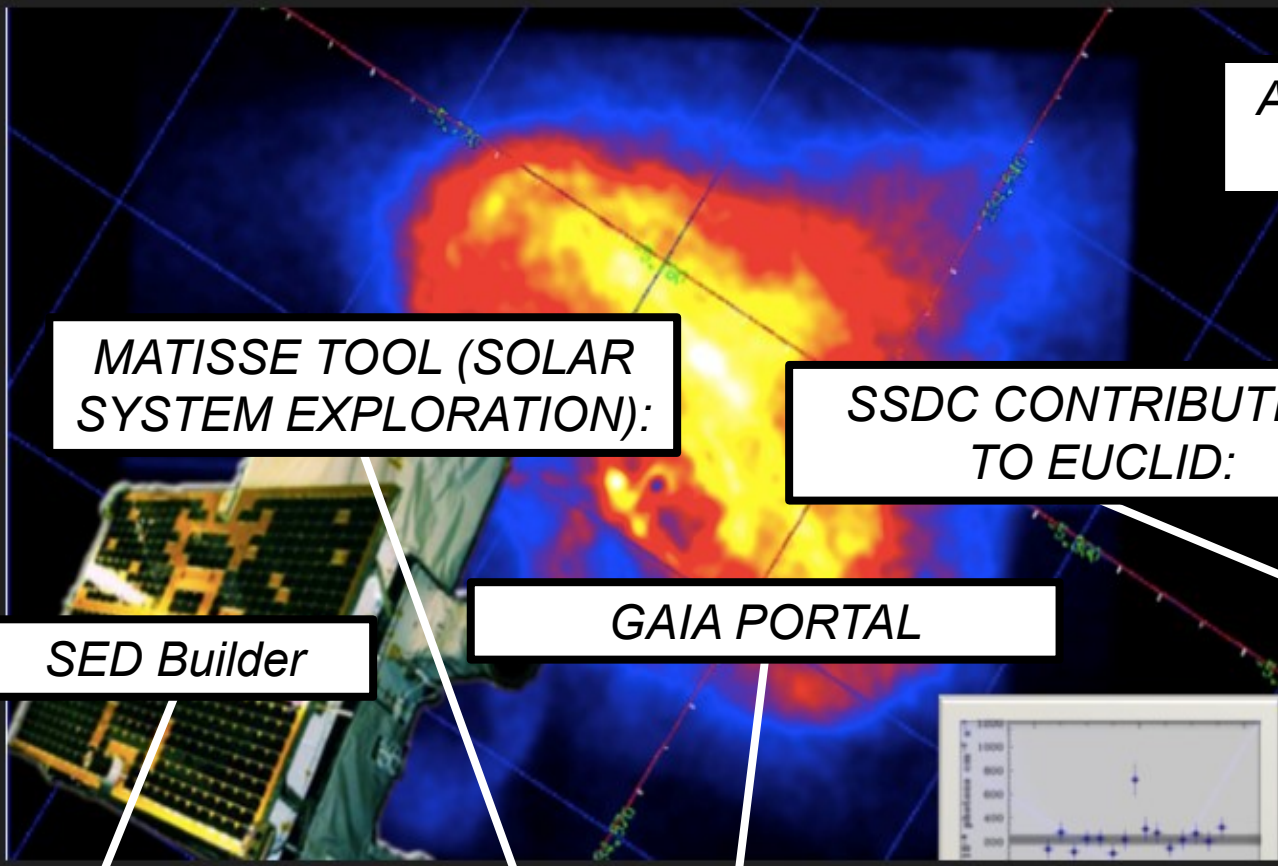


Space Science Data Center



Home About SSDC News and Communication Quick Look Missions Multimission Archive Catalogs Tools Links Bibliographic services

Helpdesk Privacy



MATISSE TOOL (SOLAR SYSTEM EXPLORATION):

SSDC CONTRIBUTION TO EUCLID:

AGILE ONLINE ANALYSIS: SEE PITTORI'S TALK

SED Builder

GAIA PORTAL





THE SSDC RESIDENT CATALOGS



ALL SSDC SOURCE CATALOGS



Space Science Data Center

Home About SSDC News and Communication Quick Look Missions Multimission Archive **Catalogs** Tools Links Bibliographic services

Helpdesk Privacy

SSDC Multi Catalog Search

VHE

- TeV Catalog
- 1WHSP Catalog
- 2WHSP Catalog

Gamma-Ray

- AGILE Catalogs
- Fermi Catalogs
- Third EGRET Catalog

X-ray

- SuperAGILE
- BeppoSAX
- Swift

UV-optical-NIR

- White dwarfs in the SDSS
- The Plotkin Catalog

Radio/Microwave

- Planck
- WMAP3
- WMAP5
- BOOMERanG Blazars
- Multi-frequency
- BZCAT Blazars
- ROXA
- Sedentary survey
- GRBase

ALL CATALOGS

Media

- SED BUILDER
- SKY EXPLORER
- MATISSE
- GAIA PORTAL
- COSMIC RAY DATABASE
- SSDC MULTIMISSI ARCHIVE P SPACE SCIE

TOP NEWS

AGILE-LV3 data analysis

RICERCATORI 18.00-24.00



MULTI-BAND AND MULTI-FREQUENCY CAT.

SSDC catalogs

On-line interactive version of catalogs produced at SSDC or with the contribution of SSDC staff

[Cross-search SSDC catalogs](#)

VHE

Gamma-Ray

X-Ray

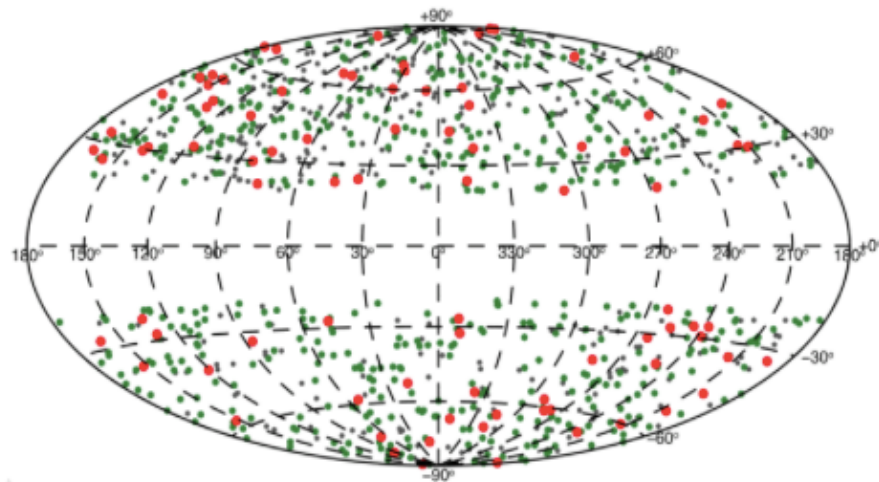
UV-optical-NIR

Radio-Microwave

Multi-frequency

Non Astronomical

All SSDC catalogs



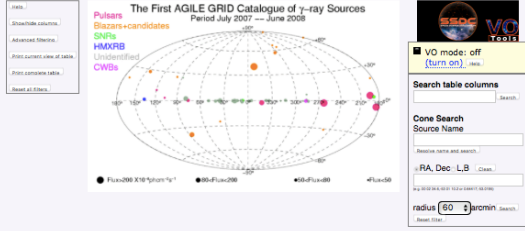
1WHSP

- **TeV** - The TeV Catalogue @ SSDC is a catalogue of VHE sources observed by ground-based Cherenkov telescopes.
- **1WHSP** - 1WHSP: an IR-based sample of ~1000 VHE gamma-ray blazars candidates (Arsioli, Fraga et al. 2015 A&A 579, 34)
- **2WHSP** - The 2WHSP catalog of HSP blazars (Chang, Arsioli et al. 2016. A&A, in press, ArXiv:1609.05808)



ACCESS TO SSDC MISSION CATALOGS

The First AGILE-GRID Catalog of High Confidence Gamma-Ray Sources



C. Pittori, F. Verrecchia, A. Chen, A. Bulgarelli, A. Pellizzoni, A. Giuliani, S. Vercellone, F. Longo, M. Tavani, P. Giommi et al.

AAJ 306, 1563-1574 (2009)

The First AGILE Catalog includes sources detected by using AGILE-GRID data from July 9, 2008. Users can also download the First AGILE Catalog. Refined analysis of complex regions of the Galactic plane yielded a new list of 47 high-confidence sources. Previous preliminary versions were published on this webpage to allow AGILE AO2 guest observations. If the AGILE Catalog data are used in publications, please acknowledge the AGILE Collaboration. We acknowledge the use of the First AGILE Catalog of High Confidence Gamma-ray Sources and on-line version available from the ADC website.

Export Current view of Table in: [Latex format](#) | [FITS format](#) | [Raw text](#) | [CSV text format](#) | [Browse table](#)

Previous Page | Next Page | Page Size (# of lines) 200

This view includes 47 entries

HMC	AGILE Name	RA (J2000) (hh mm ss.s)	Dec (J2000) (dd mm ss.s)	LII (degrees)	BII (degrees)	Position Error 95% (deg)	sqrt(TS)	ES-1
1AGL J0006+7311	1AGL J0006+7311	00 06 34.2	+73 11 06.68	119.65	10.6	0.63	5.1	
1AGL J0242+6111	1AGL J0242+6111	02 42 13.6	+61 11 06.79	135.88	1.13	0.64	5.3	
1AGL J0535+2205	1AGL J0535+2205	05 35 05.99	+22 05 41.71	184.56	-5.63	0.09	47.2	
1AGL J0538-4424	1AGL J0538-4424	05 38 29.69	-44 24 17.89	250.44	-31.2	0.5	5.9	



Possibility to export the table in CSV, LaTeX, ASCII format

The Fermi LAT Third Source Catalog (3FGL)

@ SSDC v16

Help

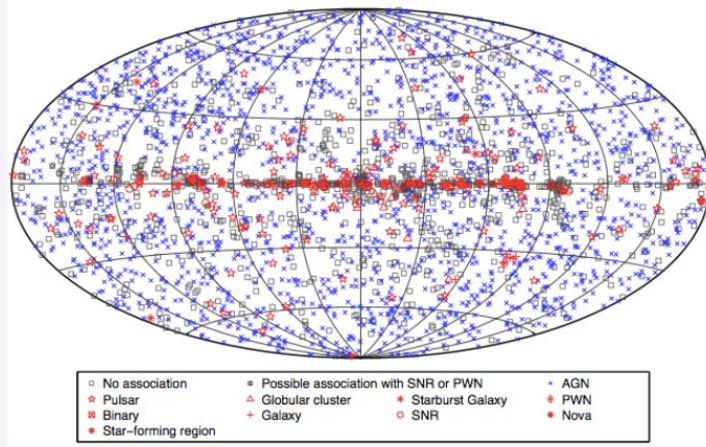
Show/hide columns

Advanced filtering

Print current view of table

Print complete table

Reset all filters



Search table columns

Search

Cone Search

Source Name

Resolve name and search

RA, Dec L,B Clean

radius 5 arcmin Search

Reset filter

This is an interactive version of the Fermi-LAT 4 years Source Catalog extracted from arXiv:1501.02003

The same table is available in a different format (but same content) at the Fermi Science Support Center @ NASA-GSFC

Column descriptions for the LAT 4-year Point Source Catalog are provided in Appendix B of the paper

All | All AGNs | BL Lacs | FSRQs | BCU | Pulsars | Binaries & Novae

SNR, PWN, SFR | GLC | Galaxy & Starburst | NLSY1 | SSRQ/CSS | Unassociated

Export Current view of Table in: [Latex format](#) | [FITS format](#) | [Raw text format](#) | [CSV text format](#) | [Browse table](#)



ACCESS TO SSDC MISSION CATALOGS

The SSDC Multi-frequency Data Explorer: Web and VO data access and tools — Mozilla Firefox (Private ... x)

https://www.ssdc.asi.it/showEntry.php#

Entry 2AGLJ0007-7308 --- PSRJ0007-7303
 R.A. (J2000) = 00 07 04.8 (1.7700 deg) l=119.68
 Dec (J2000) = +73 07 47.99 (73.1300 deg) b=10.54
 Galactic nH = 2.01E+21 (cm⁻²)

AGILE GRID Data Products Error circle EXPLORER Source Details Feedback

Standard Products

Advanced filtering
 Showhide columns
 Print current view of table
 Print complete table
 Reset all filters

Catalog Description

A. Bulgarelli, V. Fioretti, N. Parmiggiani, F. Verrecchia, C. Pittori, F. Lucarelli, M. ABA, 627, A12 (2019)
 Version 2.1 - May, 2022. Download the FITS table here.
 Export Current view of Table in: [Latex format] [FITS format] [Raw text format] [CSV text format]

63 / 456 M

TOPCAT
 File Views Graphics Joins Windows VO Interop Help
 Table List
 Current Table Properties
 Label:
 Location:
 Name:
 Rows:
 Columns:
 Sort Order:
 Row Subset:
 Activation Actions:
 -SAMP
 Messages:
 Clients:

(3FGL)

SSDC VO Tools
 Search table columns
 Search
 Cone Search
 Source Name
 Resolve name and search
 RA, Dec L,B
 (e.g. 00 02 34.6, 53 01 10.2 or 0.64417, 53.0196)
 radius 5 arcmin Search

click on Data Explorer

Access scientific products!

export the table to VO tools!

Dec (J2000) ± 1 m. s.d.	LI (deg)	BL (deg)	95% Position Error (deg)	upT(S)	E > 100 MeV Flux (10 ⁻⁷ ph cm ⁻² s ⁻¹)	E > 100 MeV Flux Error (10 ⁻⁷ ph cm ⁻² s ⁻¹)	Other source name	Spectral Model	Spectral Index	Spectral Index Error	IAGLR/IAGLR Source Name	Classification	3FGL Source Name	3FHL source name	TEVCAT source name	BZCAT
173 07 47.99	119.68	11.1	0.07	26.2	4.160	0.420	LATPSRJ0007-7303	PC	1.29	0.22	IAGLRJ0007-7307	per	3FGLJ0007-7302	3FHLJ0007-7303	TeVJ0006+727	5BZJ030
+05 12 35.99	114.11	-57.34														5BZJ030
+47 53 59.99	130.43	-14.34												6-94-4751		5BZJ001
+01 27 35.99	182.19	-54.74												7-9-0143		5BZJ002
+42 50 24.0	139.86	-17.08	0.5	9.8	1.050	0.190	3C96A	PL	2.2	0.13	IAGLRJ0222-4305	BL	3FGLJ0218-1-4233	3FHLJ0222-6-4302	TeVJ0222+430	5BZJ030
133.17	1.05	0.45	7.6	0.940	0.180			PL	2.33	0.14		gnid	3FGLJ0217-3-4209			

No association
 Pulsar
 Binary
 Star-forming region
 Possible association with SNR or PWN
 Globular cluster
 Galaxy
 AGN
 Starburst Galaxy
 SNR
 PWN
 Nova

This is an interactive version of the Fermi-LAT 4 years Source Catalog extracted from arXiv:1501.02003
 The same table is available in a different format (but same content) at the Fermi Science Support Center @ NASA-GSFC
 Column descriptions for the LAT 4-year Point Source Catalog are provided in Appendix B of the paper

Export Current view of Table in: [Latex format] [FITS format] [Raw text format] [CSV text format] [Browse table]



THE



Entry TeV J1959+6508

R.A.(J2000) = 19 59 59.9 (299.9996 deg) l=98.00
Dec (J2000) = +65 08 54.7 (65.1485 deg) b=17.67
Galactic nH = 1.00E+21 (cm⁻²)

[Source Names](#)

134	<input checked="" type="checkbox"/>	Select	SSDC Data Explorer	Cross-search SSDC
135	<input checked="" type="checkbox"/>	Select	SSDC Data Explorer	Cross-search SSDC
136	<input checked="" type="checkbox"/>	Select	SSDC Data Explorer	Cross-search SSDC
137	<input checked="" type="checkbox"/>	Select	SSDC Data Explorer	Cross-search SSDC
138	<input checked="" type="checkbox"/>	Select	SSDC Data Explorer	Cross-search SSDC
139	<input checked="" type="checkbox"/>	Select	SSDC Data Explorer	Cross-search SSDC
140	<input checked="" type="checkbox"/>	Select	SSDC Data Explorer	Cross-search SSDC
141	<input checked="" type="checkbox"/>	Select	SSDC Data Explorer	Cross-search SSDC
142	<input checked="" type="checkbox"/>	Select	SSDC Data Explorer	Cross-search SSDC

[Feedback](#)

Error circle **EXPLORER** Source Details

arcmin

-50 0 50

[show sources list](#)
[download image in ps format](#)

TUTORIAL HELP

Default catalogs (always selected)

Selectable catalogs:

Default selection [1]

Radio [select]

Infrared [select]

Optical [select]

X-Ray [select]

Gamma [select]

Source Catalogs [select]

[Selected catalog List >>]

size (arcmin)

[Create new image](#)

arcmin

-10 -5 0 5 10

[show sources list](#)
[download image in ps format](#)

Position selected for the analysis: R.A.=19 59 59.9 (299.9996 deg) l=98.00 [SED Builder](#) [Source Names](#)
Dec=+65 08 54.7 (65.1485 deg) b=17.67
[Reset Position](#) Galactic nH= 1.00E+21 (cm⁻²)

Additional Services - ?

SSDC-resident astronomical catalogs ?

Group of Catalogs Selected Catalogs

Radio IR Optical QORG AGN BZCAT
X-ray Gamma ZCAT NGC ZWICKY

Search radius arcmin

Search Other Services ?

VIZIER(X-R-G) VIZIER(O-IR) NED
SIMBAD HEASARC(X-R-G)
GSC2 STSCI MAST 2MASS
SDSS USNO-B1.0 NVO

Search radius arcmin

Bibliography search ?

BZBJ1959+6508 ?

in time range between
 and
[By name via NED](#)
[By coordinates via ADS ?](#)

Access to Public Data Archives -

Data Explorer

AGILE Fermi EGRET

Search radius degrees

- Radio-Micro wave
- IR-Optic-UV
- X ray
- Gamma ray

15/11/17

VN

/MO

/SN

3L

3L

3L

3L

/SN

UNI



ACCESS TO SSCDC MWI TOOLS



Entry TeV J1959+6508
 R.A.(J2000) = 19 59 59.9 (299.9996 deg) l=98.00
 Dec (J2000) = +65 08 54.7 (65.1485 deg) b=17.67
 Galactic nH = 1.00E+21 (cm⁻²) [Source Names](#)

THE ERROR
 CIRCLE
 EXPLORER
 (ECE)



Error circle EXPLORER Source Details Feedback

TUTORIAL HELP

Default catalogs (always selected)

Selectable catalogs:

Default selection

Radio Infrared Optical X-Ray Gamma

Source Catalogs

[Selected catalog List >>]

size (arcmin) 60

Create new image

Position selected for the analysis: R.A.=19 59 59.9 (299.9996 deg) l=98.00
 Dec=+65 08 54.7 (65.1485 deg) b=17.67 [SED Builder](#) [Source Names](#)

[Reset Position](#) Galactic nH= 1.00E+21 (cm⁻²)

Additional Services - ?

DC-resident astronomical catalogs ? Search Other Services ? Bibliography search ?

Group of Catalogs	Selected Catalogs
Radio IR Optical X-ray Gamma	QORG AGN BZCAT ZCAT M33 ZWICKY

Search radius 0.2 arcmin

VIZIER(X-R-G) VIZIER(O-IR) NED SIMBAD HEASARC(X-R-G) STSCI MAST 2MASS SDSS USNO-B1.0 NVO

Search radius 0.2 arcmin

Bibliography search: BZBJ1959+6508 in time range between 1900 and 2018 By name via NED By coordinates via ADS ?

Access to Public Data Archives -

Queries to single data archives ? Multiple queries to SSCDC data archives ?

Gamma Ray Data **AGILE** **Fermi** **EGRET**

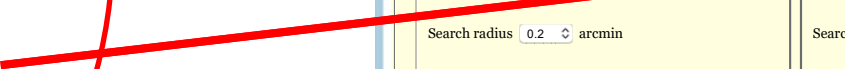
Search radius 50 degrees

Spectral band [all]

Radio-Micro wave IR-Optic-UV X ray Gamma ray

Catalog queries:

- **Internal:** for each energy band
- **External:** to external catalogs DB or data archives





LINK TC



Entry TeV J1959+6508

R.A.(J2000) = 19 59 59.9 (299.9996 deg) l=98.00
Dec (J2000) = +65 08 54.7 (65.1485 deg) b=17.67
Galactic nH = 1.00E+21 (cm⁻²)

[Source Names](#)

[Feedback](#)

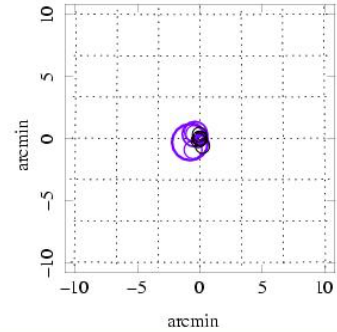
Error circle EXPLORER

Source Details

SEDBuilder

[TUTORIAL](#) [HELP](#)

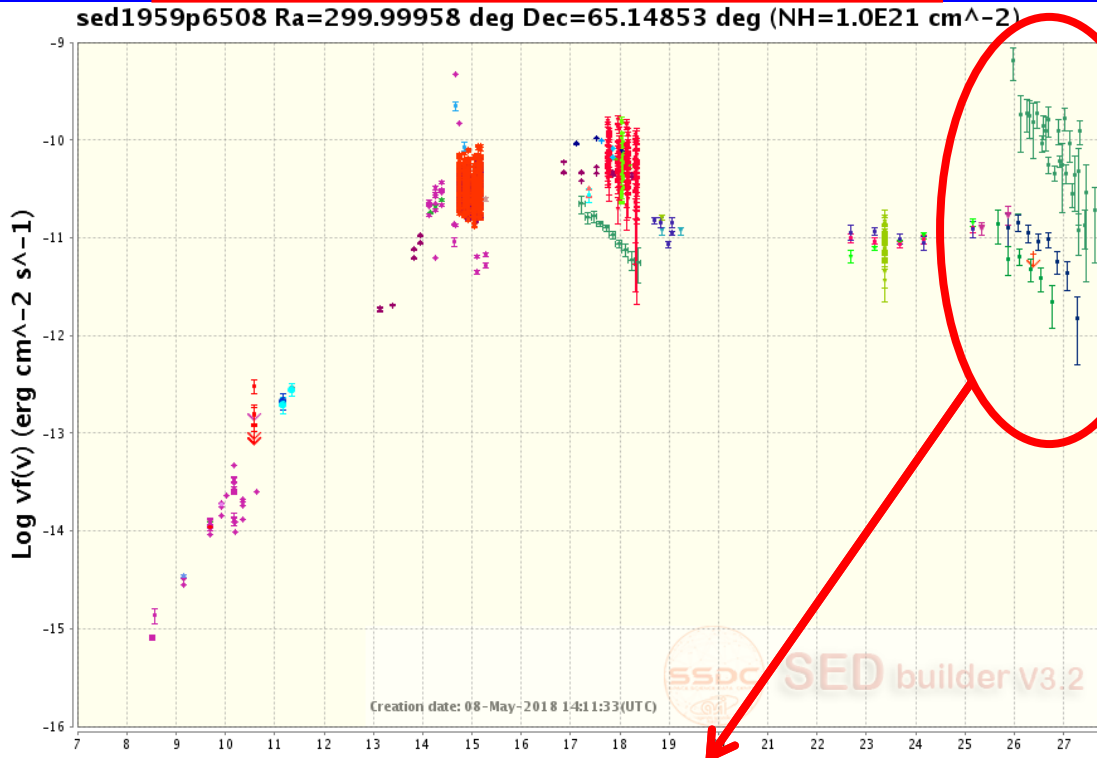
- Default catalogs (always selected)
- Selectable catalogs:
 - Radio [select]
 - Infrared [select]
 - Optical [select]
 - X-ray [select]
 - Gamma [select]
 - Source Catalogs [select]
- [Selected catalog List >>]
- size (arcmin) 60
- Create new image



[show sources list](#)
[download image in ps format](#)

19.9 (299.9996 deg) l=98.00
65.1485 (65.1485 deg) b=17.67
nH = 1.00E+21 (cm⁻²)

[SEDBuilder](#) [Source Names](#)



Archival data from WHIPPLE, HEGRA, MAGIC, VERITAS

142
[Select](#)

[SSDC Data Explorer](#)

[Cross-search](#)

Queries to single data archives

Gamma Ray Data

AGILE Fermi EGRET

Search radius 50 degrees

Multiple queries to SSCD data archives

Spectral band all

- Radio-Micro wave
- IR-Optic-UV
- X ray
- Gamma ray

Bibliography search

BZBJ1959+6508

in time range between
1900 and 2018

[By name via NED](#)

[By coordinates via ADS](#)

15/11/17

PV

SNR

OWN

HI

HI

IE

HI

OWN

OWN

OWN

25



SSDC STAFF



SSDC team involves around 40 people: scientists from ASI, INAF, INFN and SW engineers from Telespazio & SERCO, experts in different fields.

SSDC Management

Gianluca Polenta (ASI)	Director
Valerio D'Elia (ASI)	Universe Observation Manager
Marco Giardino (ASI)	ICT Manager
Matteo Perri (INAF)	INAF Project Scientist
Bruna Bertucci (INFN)	INFN Project Scientist

Secretary and Data Assistant

Cristina Leto (ASI)
Gianluca Perini (INAF) - part time

ICT

Giuseppe Di Persio (INAF) - part time

AGILE Team

Carlotta Pittori (INAF)	Coordinator
Fabrizio Lucarelli (INAF)	
Francesco Verrecchia (INAF)	

AMS

Valeria Di Felice (INFN)	Coordinator
Federico Donnini (INFN)	
Behrouz Khiali (INFN)	

CHEOPS Team

Francesco Verrecchia (INAF)	Coordinator
Giuseppe Di Persio (INAF) - part time	

CTA Team

Fabrizio Lucarelli (INAF)	Coordinator
Ciro Bigongiari (INAF)	
Saverio Lombardi (INAF)	

Euclid Team

Fabiana Faustini (INAF)	Coordinator
Andrea Bonchi (INAF)	
Ronaldo Oliveira da Silva (INAF)	

Fermi Team

Stefano Ciprini (INFN)	Coordinator
Federica Giacchino (INFN)	
Dario Gasparrini (INFN)	

GAIA Team

Paola Maria Marrese (INAF)	Coordinator
Giuseppe Altavilla (INAF)	
Vittorio Francesco Braga (INAF)	
Michele Fabrizio (INAF)	
Silvia Marinoni (INAF)	

Herschel Team

Fabiana Faustini (INAF)	Coordinator
Ronaldo Oliveira da Silva (INAF)	

LIMADOU

Matteo Mergé (INFN)	Coordinator
---------------------	-------------

Multi-frequency and VO Team

Carlotta Pittori (INAF)	Coordinator
Valerio D'Elia (ASI)	
Alessio Giunta (ASI)	
Alessandra Lamastra (INAF) - part time	
Cristina Leto (ASI)	
Alessandro Maselli (INAF)	
Francesco Verrecchia (INAF)	

NuSTAR Team

Matteo Perri (INAF)	Coordinator
Simonetta Puccetti (ASI)	

PAMELA

Valeria Di Felice (INFN)

Planck Team

Gianluca Polenta (ASI)	Coordinator
Gemma Luzzi (ASI)	
Beatriz Ruiz-Granados (INFN)	

Solar System Exploration

Angelo Zinzi (ASI)	Coordinator
Veronica Camplone (INAF)	
Edoardo Rognini (INAF)	

Swift Team

Matteo Perri (INAF)	Coordinator
Valerio D'Elia (ASI)	
Riccardo Middei (INAF)	

Science Communication

Elisa Nichelli (INAF)

Engineering Team

Paolo D'Angeli (TELESPAZIO)	system manager
Fabrizio Fabri (SERCO)	software developer
Giorgio Fanari (SERCO)	software developer
Antonio Guerra (TELESPAZIO)	team leader
Daniele Navarra (SERCO)	web developer
Roberto Primavera (TELESPAZIO)	technical manager
Pier Vincenzo Severo (TELESPAZIO)	team specialist

Senior Scientists

Lucio Angelo Antonelli (INAF-Osservatorio Astronomico di Roma e ASI)	SSDC
Roberto Buonanno (INAF-OA Teramo e Univ. Roma Tor Vergata)	GAIA
Maria Teresa Capria (INAF-IAPS Roma)	ESS (Solar System Explor)
Elisabetta Cavazzuti (ASI)	Fermi
Domenico D'Urso (Univ. Sassari ed INFN-LNS)	AMS/DAMPE
Paolo Giommi (ASI)	Open Universe
Paolo Natoli (INAF-IASF Bologna e Univ. Ferrara)	Planck, Fermi
Ernesto Palomba (INAF-IAPS Roma)	ESS (Solar System Explor)
Elena Pancino (INAF-Osservatorio Astrofisico Arcetri)	GAIA
Piergiorgio Picozza (INFN Roma2)	PAMELA
Antonio Stamerra (INAF-OA Torino)	MWL, CTA, Fermi
Simona Zoffoli (ASI)	LIMADOU

ssdc.asi.it



BACKUP SLIDES



SSDC VO SERVICES



VO ACTIVITIES: CATALOG SAMP CONNECTOR



- SSDC catalog web pages include a VO toolbox to send catalog tables to VO tools, either **TOPCAT** or **Aladin**, using a SAMP connector.

The Second AGILE Catalog of Gamma-Ray sources

SSDC VO Tools

Connect to SAMP

SSDC VO Tools

Connect to SAMP

No hub?

SSDC

Aladin

prop. 12-17 May 2019, Paris,

TOPCAT

TOPCAT(1): Table Browser

name	Ra	Dec	Rflux	Vmag	Redshift	classification	lii	bii	
1	PKS 0252-549	43.3783	-54.6947	1193.	17.7	0.537	FSRQ - WMAP	272.48	-54.62
2	PKS 0257-510	44.6571	-50.8711	452.	23.	0.834	FSRQ	266.21	-56.21
3	PKS 0308-611	47.48167	-60.9743	1103.	18.6		NED: QSO	278.11	-48.95
4	PKS 0310-558	48.02417	-55.69389	501.	18.		Blazar candidate	271.2	-51.89
5	PKS 0317-570	49.73333	-56.84778	257.	17.5		Blazar Candidate	271.9	-50.46
6	PMN J0321-3711	50.3467	-37.1925	5020.			NED: Radio S. Extended - WMAP	240.18	-56.96
7	PKS 0340-372	55.5225	-37.05305	872.	18.1	0.284	QSO	239.34	-52.86
8	PKS 0402-362	60.9712	-36.08	1132.	17.2	1.417	FSRQ	237.73	-48.49
9	PKS 0405-385	61.7446	-38.4397	830.	17.7	1.285	FSRQ - WMAP	241.28	-47.9
10	PKS 0410-519	62.90083	-51.82222	361.	17.5		NED: QSO	260.51	-45.38
11	PMN J0419-3010	64.9512	-30.1686	184.	17.5		Blazar candidate	229.66	-44.58
12	PMN J0422-3844	65.5612	-38.7467	130.	17.	3.11	NED: QSO	241.76	-44.92
13	WGA J0424.6-3849	66.1637	-38.8172	309.	18.5	2.34	FSRQ	241.87	-44.45
14	PKS 0422-380	66.1742	-37.94	1706.	18.1	0.782	FSRQ - WMAP	240.65	-44.41
15	WGA J0428.8-3805	67.2104	-38.0956	51.	16.5	0.15	BL Lac	242.93	-43.6
16	IRXS J043208.7-35065	68.0362	-35.1142	182.	18.		Blazar candidate	236.92	-42.92
17	PKS 0432-606	68.39208	-60.50389	636.	19.		NED: QSO	270.84	-40.16
18	PKS 0435-300	69.4062	-29.9031	691.	17.2	1.328	FSRQ	230.26	-40.74
19	0438-43	70.0738	-43.5489	3933.	18.8	2.852	FSRQ - WMAP	248.4	-41.57

Total: 54 Visible: 54 Selected: 0