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Session MT15

MATISSE

The ASDC tool to access and visualize Solar
System exploration data



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ASI Science Data Center



1995

BeppoSax
Science Data
Center
founded



2000

ASDC major
partner for the
ASI missions of
observation of
Universe
(Swift, AGILE,
Fermi,
NuSTAR, AMS,
...)



2012

Solar System
Exploration
group starts
developing
MATISSE

MATISSE fundamentals

Multi-purposed **A**dvanced **T**ool for the
Instruments of the **S**olar **S**ystem **E**xploration

- Be multi-platform (mainly web-based tool)
- Give the community a tool to access, visualize and analyse data
- Provide the capability to merge data from different instruments so as to improve scientific results
- Maintain the data access policy
 - Public data accessible to everyone
 - Proprietary data accessible only to selected groups

Why MATISSE?

- The astrophysics community regularly uses public tools to access and analyse data
- This approach is not frequently applied within the planetological community
 - Everyone needs to build its own tool/algorithm to make science
 - Data from instruments not well known cannot be used!
 - Not spherical objects are difficult to map
- At present data volumes are so large that this approach is no longer affordable

MATISSE milestones

Oct '12 - Solar System @ASDC

Jan '13 - First version of MATISSE

Feb '14 - MySQL db added

Jun '14 - Hands-on tutorial

Aug '14 - Comet data

Looking for
data

Video is
online now!

The present-day MATISSE

Data access

- 3D shape model
- 2D maps
- Data download
- DB searchable with geographic/geometric metadata

Data fusion

- Mosaics
- Ratio

User privileges

- Data access based on the policy of the data

The present-day MATISSE

- ESA Rosetta
- NASA Dawn

2 missions

- 21 Lutetia
- 67P Churyumov-Gerasimenko
- 4 Vesta

3 targets

- OSIRIS (public observations of Lutetia)
- VIRTIS-M
- GIADA
- VIR

4 instruments

The desired future MATISSE

Many targets

Many missions

Surface & Atmosphere

Accessing MATISSE

The screenshot shows the ASI Science Data Center homepage. At the top, there are three browser tabs: 'CO Meeting Organizer EPS...', 'CO Meeting Organizer EPS...', and 'ASDC - ASI Science Data C...'. The main header features the 'asdc' logo, the text 'ASI Science Data Center', and the 'asi' logo. Below the header is a navigation menu with links: Home, About ASDC, Public Outreach, Quick Look, Missions, Multimission Archive, Catalogs, Tools, Links, Bibliographic services, and Helpdesk. The main content area displays a 3D visualization of a celestial body with a purple crystalline structure and a yellow/orange thermal map overlay. To the right is a grid of mission logos. A large orange callout box contains the URL 'www.asdc.asi.it'. A red arrow points from this callout to the 'MATISSE' logo in the bottom navigation bar, which is circled in red.

www.asdc.asi.it

MATISSE

ASDC - ASI Science Data Center

AGILE SWIFT FERMI

HUSTAR AMS-02 PLANCK

SOLAR SYSTEM PAMELA GATA

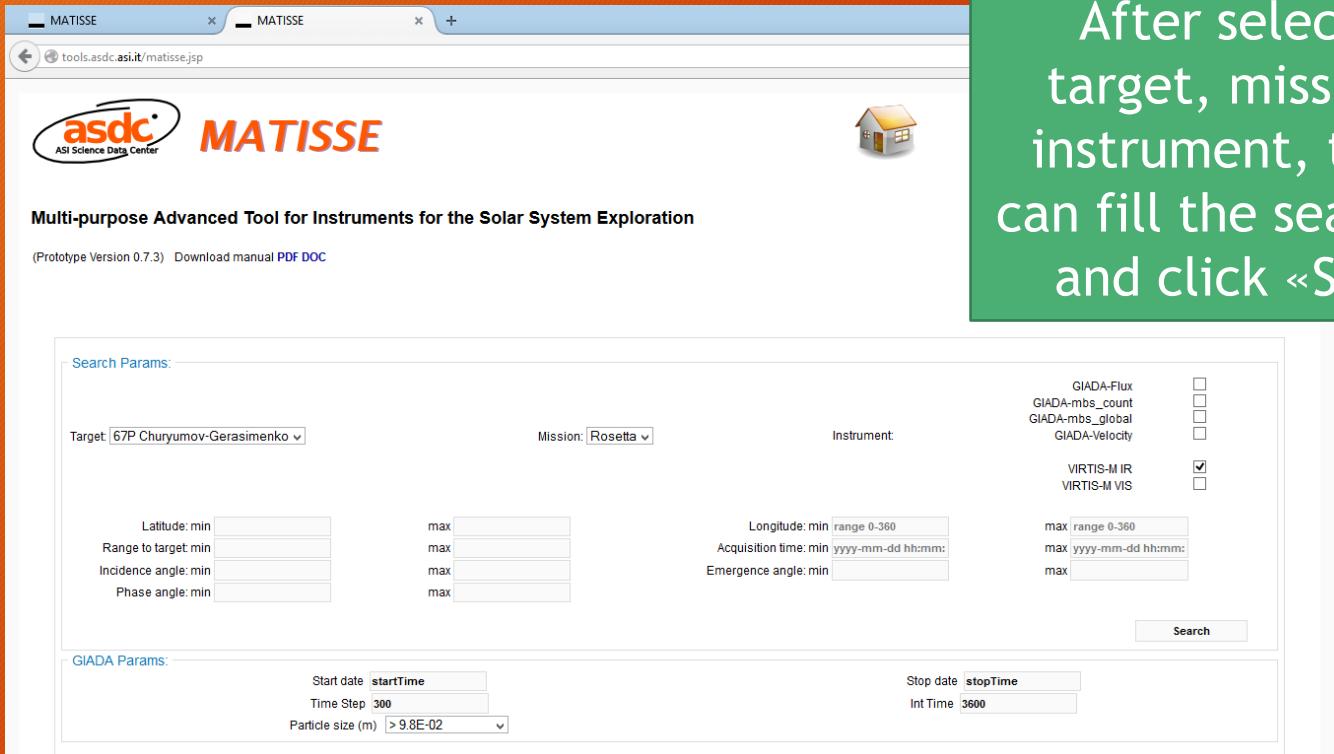
HERSCHEL BEPPO SAX SIMBOL X

CHEOPS EUCLID PLATO

SED^m BUILDER V3.0 SKY EXPLORER MEDIA COSMIC-RAY DATABASE ASDC MULTIMISSION ARCHIVE CATALOGS ASDC BIBLIOGRAPHY TOOL NEWSLETTER TOP NEWS EVENTS

MATISSE homepage

<http://tools.asdc.asi.it/matisse.jsp>



The screenshot shows the MATISSE search interface. At the top, there are logos for ASDC and MATISSE, and a house icon. Below the header, the text reads: "Multi-purpose Advanced Tool for Instruments for the Solar System Exploration" and "(Prototype Version 0.7.3) Download manual PDF DOC". The search form includes fields for Target (67P Churyumov-Gerasimenko), Mission (Rosetta), and Instrument (checkboxes for GIADA-Flux, GIADA-mbs_count, GIADA-mbs_global, GIADA-Velocity, VIRTIS-M IR, and VIRTIS-M VIS). There are also fields for Latitude, Range to target, Incidence angle, Phase angle, Longitude, Acquisition time, and Emergence angle. A "Search" button is at the bottom right. A green callout box on the right side states: "After selecting a target, mission and instrument, the user can fill the search form and click «Search»".

Search results

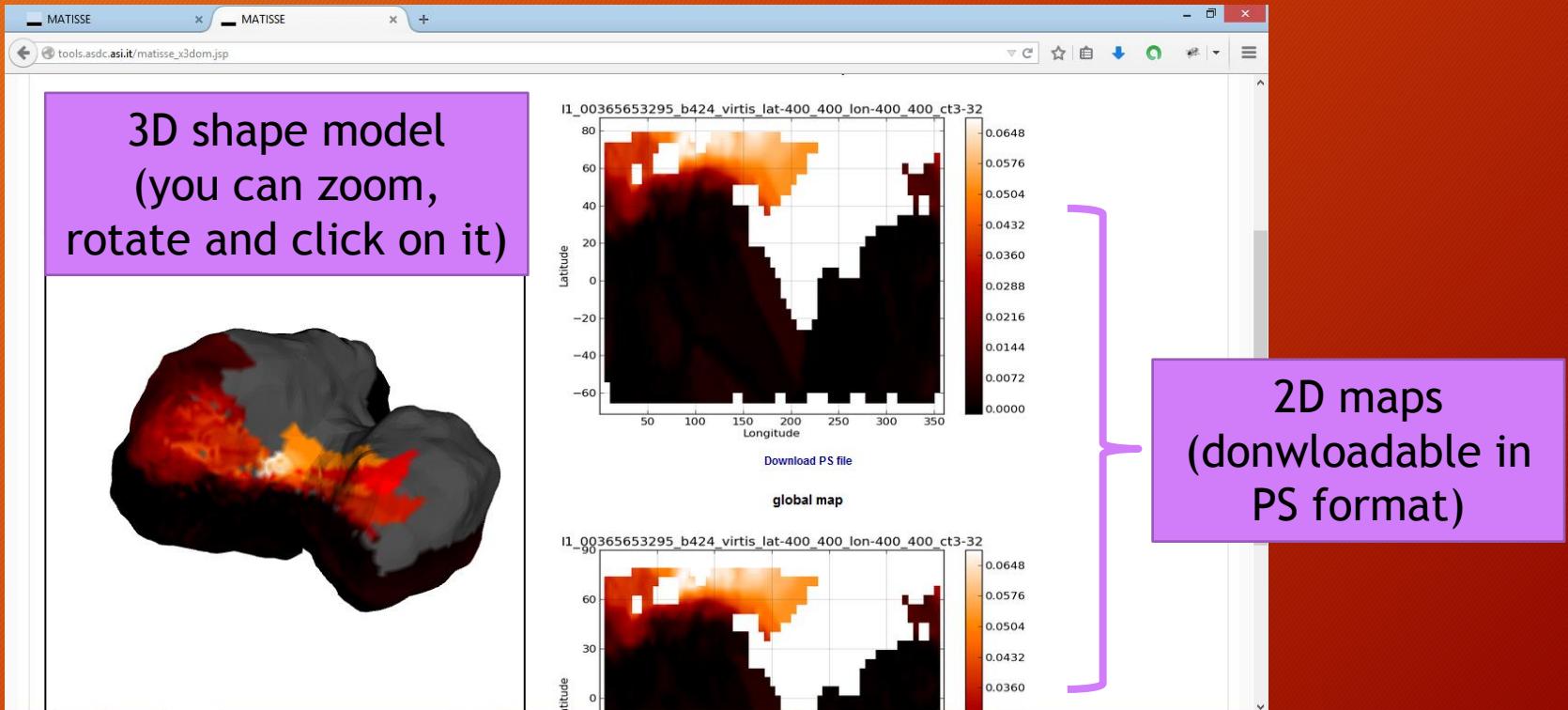
| MATISSE | | | | | |
|-------------|-----------------------|-----------------------|----------|---------|---------|
| | 2014-08-18 16:19:43.0 | 2014-08-18 16:54:56.0 | -52.0892 | 70.0651 | 0.0111 |
| VIRTIS-M IR | 2014-08-18 17:19:43.0 | 2014-08-18 17:54:56.0 | -50.2887 | 65.9354 | 0.0302 |
| VIRTIS-M IR | 2014-08-18 18:19:43.0 | 2014-08-18 18:54:56.0 | -36.8927 | 59.0504 | 0.0427 |
| VIRTIS-M IR | 2014-08-18 19:19:43.0 | 2014-08-18 19:54:56.0 | -15.9119 | 49.232 | 0.0074 |
| VIRTIS-M IR | 2014-08-18 20:19:43.0 | 2014-08-18 20:54:56.0 | -28.5043 | 45.741 | 0.0213 |
| VIRTIS-M IR | 2014-08-18 23:19:42.0 | 2014-08-18 23:54:55.0 | 20.8581 | 69.9438 | 162.603 |
| VIRTIS-M IR | 2014-08-19 00:19:43.0 | 2014-08-19 00:54:56.0 | -6.9917 | 73.5434 | 134.93 |
| VIRTIS-M IR | 2014-08-19 01:19:43.0 | 2014-08-19 01:54:56.0 | -52.485 | 74.3802 | 107.738 |
| VIRTIS-M IR | 2014-08-19 02:19:43.0 | 2014-08-19 02:54:56.0 | -45.1162 | 74.2919 | 80.9247 |
| VIRTIS-M IR | 2014-08-19 03:19:43.0 | 2014-08-19 03:54:56.0 | 4.9865 | 73.4197 | 53.028 |
| VIRTIS-M IR | 2014-08-19 04:19:43.0 | 2014-08-19 04:54:56.0 | -7.7825 | 72.167 | 25.3646 |
| VIRTIS-M IR | 2014-08-19 05:19:43.0 | 2014-08-19 05:54:56.0 | 5.5715 | 70.6551 | 0.9498 |
| VIRTIS-M IR | 2014-08-19 06:19:43.0 | 2014-08-19 06:54:56.0 | 10.6316 | 69.3258 | 0.0047 |
| VIRTIS-M IR | 2014-08-19 07:19:43.0 | 2014-08-19 07:54:56.0 | 9.029 | 68.1724 | 0.045 |
| VIRTIS-M IR | 2014-08-19 08:19:43.0 | 2014-08-19 08:54:56.0 | -36.6699 | 72.275 | 0.1601 |
| VIRTIS-M IR | 2014-08-19 09:19:43.0 | 2014-08-19 09:59:56.0 | -20.1714 | 78.1357 | 1.1672 |
| VIRTIS-M IR | 2014-08-19 13:19:44.0 | 2014-08-19 13:54:54.0 | -50.1181 | 89.1506 | 0.0504 |
| VIRTIS-M IR | 2014-08-19 17:19:44.0 | 2014-08-19 17:54:54.0 | -20.5402 | 89.184 | 0.0017 |
| VIRTIS-M IR | 2014-08-19 18:19:44.0 | 2014-08-19 18:54:54.0 | -27.2807 | 89.0774 | 0.0066 |
| VIRTIS-M IR | 2014-08-19 20:19:44.0 | 2014-08-19 20:54:54.0 | -44.1255 | 89.514 | 0.0226 |
| VIRTIS-M IR | 2014-08-20 00:19:43.0 | 2014-08-20 00:54:54.0 | -38.2693 | 89.3085 | 0.0202 |
| VIRTIS-M IR | 2014-08-20 03:19:44.0 | 2014-08-20 03:54:54.0 | -21.3356 | 89.1478 | 0.0584 |
| VIRTIS-M IR | 2014-08-20 04:20:26.0 | 2014-08-20 04:52:04.0 | -9.1258 | 18.0388 | 125.395 |
| VIRTIS-M IR | 2014-08-20 12:20:26.0 | 2014-08-20 12:52:04.0 | -1.304 | 30.1482 | 0.1567 |
| VIRTIS-M IR | 2014-08-20 13:20:26.0 | 2014-08-20 13:54:24.0 | -8.8976 | 23.6497 | 231.163 |

Showing 1 to 483 of 483 entries

The user can order
results on the basis of
their metadata.

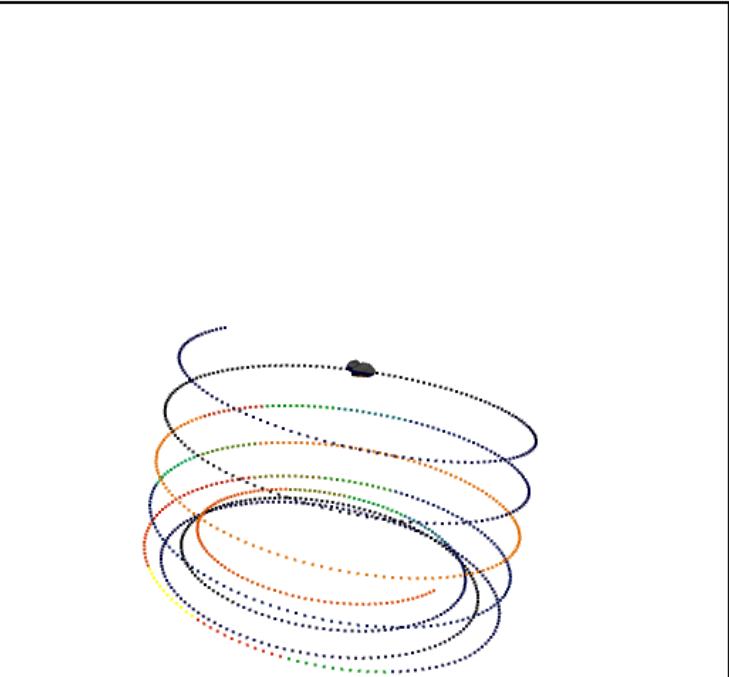
Then select 1 or more
observations to proceed

VIRTIS-M on 67P C-G



GIADA on 67P C-G

Source: 67P Churyumov-Gerasimenko



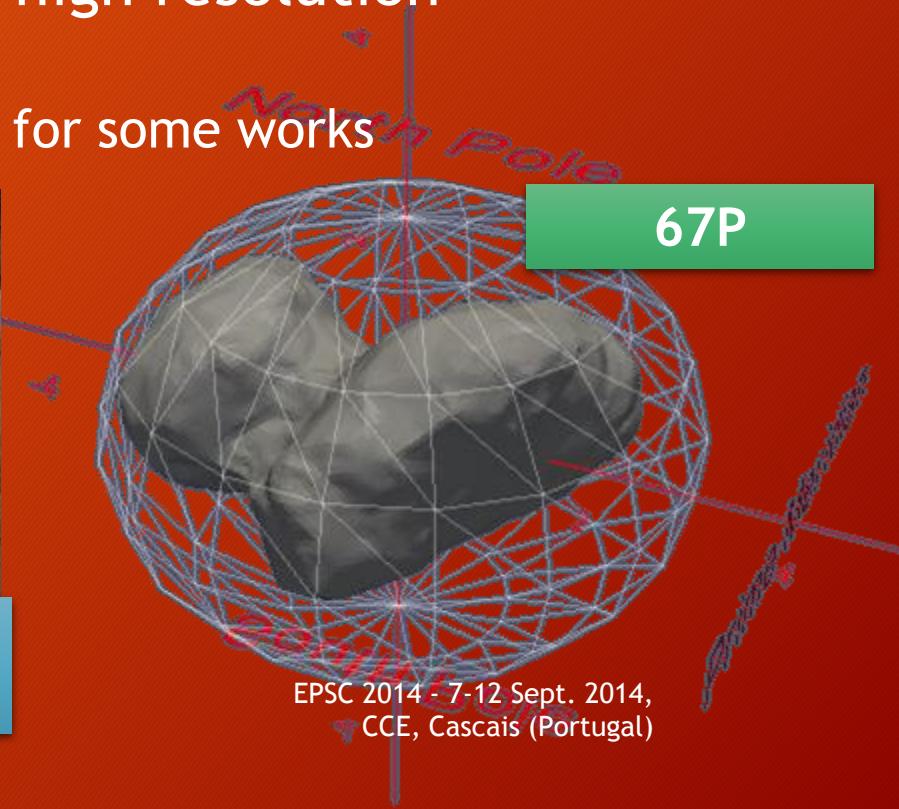
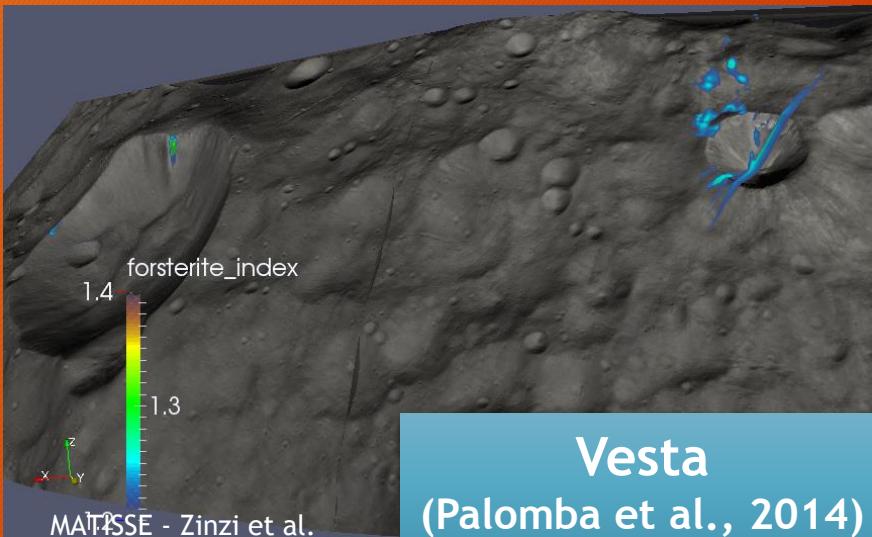
[Download data \(compressed archive\)](#)

[Back](#)

Click to download data in IDL format

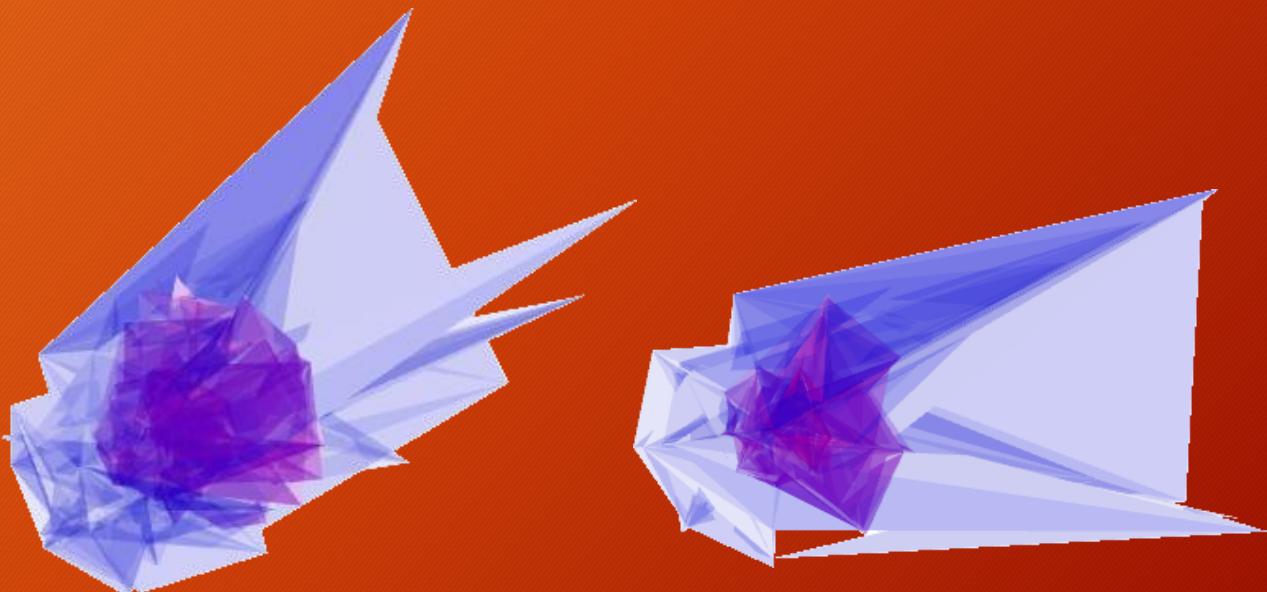
Future developments (1)

- Integration with desktop softwares (e.g. Paraview) to visualize very high resolution outputs
 - This solution is already used for some works



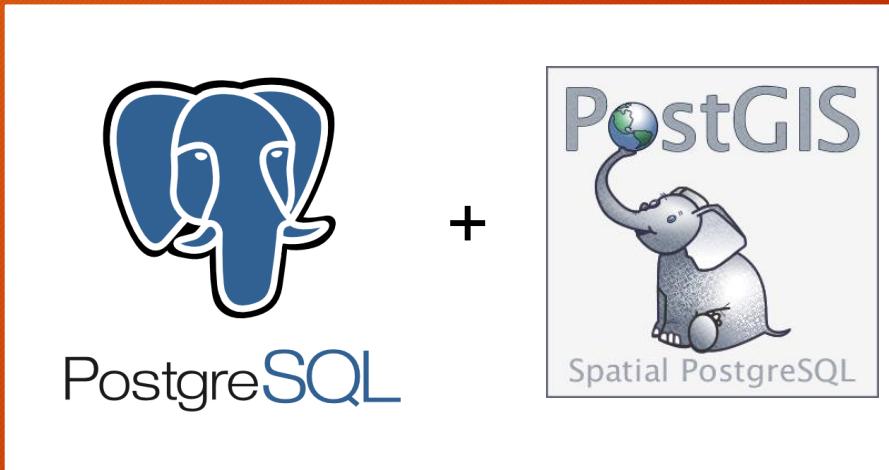
Future developments (2)

- Create scientifically useful visualization of the coma



Future developments (3)

- Use a db best tailored for geographical queries (e.g. PostgreSQL + PostGIS)



Conclusions

- MATISSE is online since January 2013 and is fully operative for the 67P C-G phase of the Rosetta mission
- Strong collaboration with science teams helps us to develop useful tasks

**Data fusion in planetary exploration
is near to become reality**

Acknowledgments

I would like to thank all the people
in VIRTIS-M, VIR and GIADA teams
that helped us to create MATISSE for
Rosetta and Dawn

Thank you!

Contact me at
angelo.zinzi@asdc.asi.it

Useful links:

<http://www.asdc.asi.it/>

<http://solarsystem.asdc.asi.it/>

<https://tools.asdc.asi.it/matisse.jsp>