

# ESA's Science Programme – How to Get Involved?

Arvind Parmar  
Head, Science Support Office  
ESA Directorate of Science

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How can I get involved in and benefit from ESA's Science Programme?

1. Propose observations with one of ESA's observatories
2. Exploit archival data from ESAC
3. Participate in an instrument consortium
4. Membership of a User Group, TAC, science team etc
5. Membership of a ESA Science Advisory Structure committee
6. Join ESA as a Research Fellow

# Announcement of Observing Opportunities



Many ESA Science Missions have annual calls for observing proposals:

- INTEGRAL's 15<sup>th</sup> AO closed on 31 March 2017. 65 proposals were received with an oversubscription in time of 4.2. Next AO in 1 year.
- XMM-Newton's 17<sup>th</sup> AO will open on 22 August 2017 with a deadline of 6 October 2017. AO-16 had 442 proposals and an oversubscription of 6.3.
- CHEOPS 1<sup>st</sup> AO is expected 6 months before launch (so mid-2018). An Open Time Workshop to help potential proposers will be held on 26-27 July in Austria.
- JWST first GO call in November 2017 following GTO and DD-ERS calls

However, the competition will be very strong.....



# Exploiting ESA's Data Archives



- The ESA archives at ESAC contain a treasure trove of information. They include all the public data from nearly all ESA's science missions
- You can download science-ready products such as calibrated images, lightcurves and spectra, as well as documentation and analysis software. Go to: <https://www.cosmos.esa.int/web/esdc>
- The archives are organised into three themes:
  - Astronomy
  - Heliophysics
  - Planetary

And data from "new" missions such as Solar Orbiter, BepiColombo etc will be added as they become available.



# ESA Space Science Open Data Policy



Proprietary period for all science data (~1 year)

To instrument teams when data is being produced by instrument teams

To observer for observatory missions

Data then enter the public domain

Freely accessible worldwide

Being sometimes replicated in non ESA site (European / US data centres)



Data is made available to the scientific community through Internet

Through a standard web browser and through scriptable APIs

Search, preview, select and download



## Astronomy Science Archives



**esasky**



**exosat**



**gaia**



**herschel**



**hubble  
space  
telescope**



**iso**



**lisa  
pathfinder**



**planck**



**xmm-  
newton**

## Heliophysics Science Archives



**cluster**



**double star**



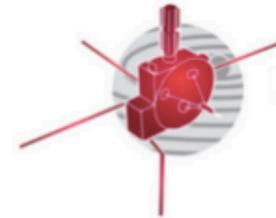
**ISS-SolACES\***



**proba-2**



**soho**



**ulysses**

## The Planetary Science Archive



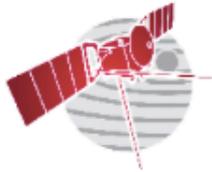
**cassini  
huygens**



**exomars**



**giotto**



**mars  
express**



**rosetta**



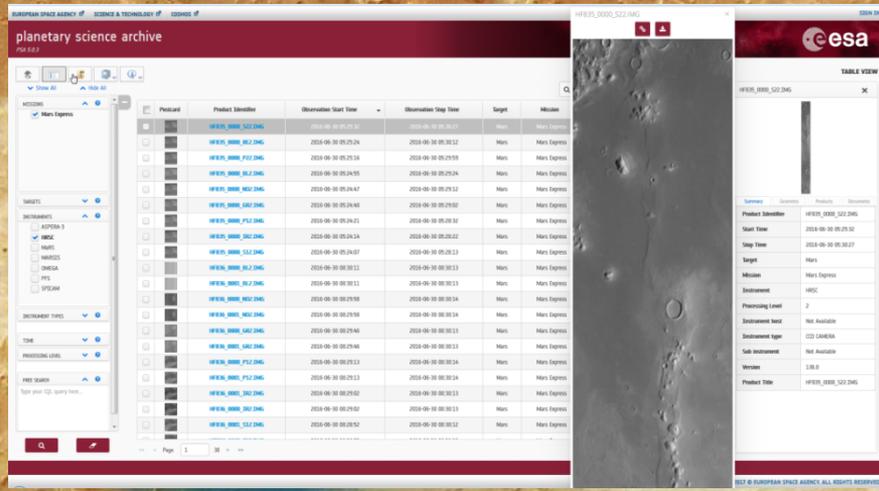
**smart-1**



**venus  
express**



Planetary Science Archive



**planetary science archive**  
PSA 0.0.1

TABLE VIEW

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HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:33.6	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:35.5	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:37.4	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:39.3	2010-06-00 00:29:59.9	Mars	Mars Express
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HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:45.0	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:46.9	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:48.8	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:50.7	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:52.6	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:54.5	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:56.4	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:25:58.3	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:26:00.2	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:26:02.1	2010-06-00 00:29:59.9	Mars	Mars Express
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HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:27:29.5	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:27:31.4	2010-06-00 00:29:59.9	Mars	Mars Express
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HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:27:39.0	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:27:40.9	2010-06-00 00:29:59.9	Mars	Mars Express
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HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:27:52.3	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:27:54.2	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:27:56.1	2010-06-00 00:29:59.9	Mars	Mars Express
HEX01_0006_S22_0MG	HEX01_0006_S22_0MG	2010-06-00 00:27:58.0	2010-06-00 00:29:59.9	Mars	Mars Express
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HEX01\_0006\_S22\_0MG

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 Mission: Mars Express  
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 Processing Level: 2  
 End-to-end level: Not Available  
 End-to-end type: COC CANVAS  
 Sub-instrument: Not Available  
 Version: 1.06.0  
 Product Title: HEX01\_0006\_S22\_0MG

## ONE ARCHIVE, MANY MISSIONS

**What is the PSA?**

The European Space Agency's (ESA) Planetary Science Archive, or PSA, is the central repository for all scientific and engineering data returned by the agency's space science missions that have been exploring planets, moons, and small bodies in the Solar System.

The interface is designed for scientists who use observations from ESA's planetary missions for their research, but should be reasonably intuitive also for non-experts.

**What can you find in the archive?**

The PSA contains science-ready data that have been calibrated by the instrument teams and peer reviewed by independent experts in the scientific community. The observations are compliant with the Planetary Data System (PDS) standards to ensure the long-term preservation of the dataset.

The archive encompasses over three decades of ESA's exploration of the Solar System, including data from missions that are currently operating, in the post-operations phase, or completed, as well as ground-based observations of comets. These data – about 10 million individual observations so far, amounting to almost 50 terabytes in volume – are now available to the scientific community from one single interface.

The PSA team is also preparing for ESA missions that are currently in the implementation phase, such as BepiColombo, Solar Orbiter, and JUICE, so that when observations are available in the future, they can be readily incorporated in the archive infrastructure.

**Missions included in the PSA:**

- EnaMars 2016
- Giotto
- Huygens
- Mars Express
- Rosetta
- SMART-1
- Venus Express

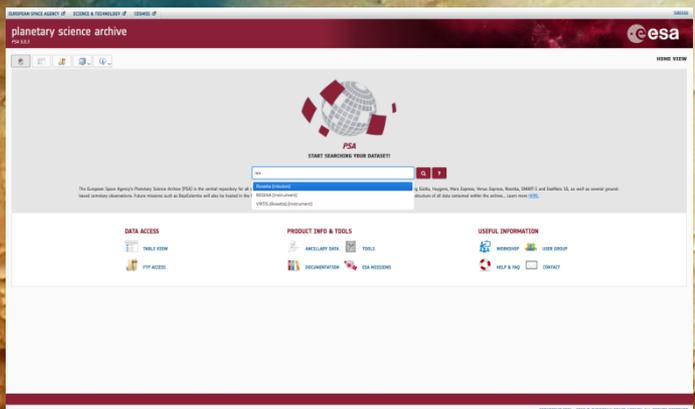
**Main targets:**

- Mars
- Comet 1P/Halley
- Titan
- Mars: Phobos; Deimos
- Comet 67P/Churyumov-Gerasimenko; Asteroids 21 Lutetia and 2867 Steins
- Moon
- Venus

Visit the archive at: <http://psa.esa.int>

The PSA team welcomes feedback and suggestions for ways to improve the archive so that as many people as possible can make use of this extraordinary database. To contact the team, fill out the form at: <http://www.cosmos.esa.int/web/psa/contact-us>

Visit the other ESA archives at: <http://archives.esa.int>



**planetary science archive**  
PSA 0.0.1

START SHARING YOUR DATASET

The European Space Agency's Planetary Science Archive (PSA) is the central repository for all scientific and engineering data returned by the agency's space science missions that have been exploring planets, moons, and small bodies in the Solar System. It also contains ground-based observations. Future missions such as BepiColombo will also be hosted in the PSA.

**DATA ACCESS**

- TABLE VIEW
- PPR ACCESS

**PRODUCT INFO & TOOLS**

- ANALYTICAL DATA
- TOOLS
- DOCUMENTATION
- ESA MISSIONS

**USEFUL INFORMATION**

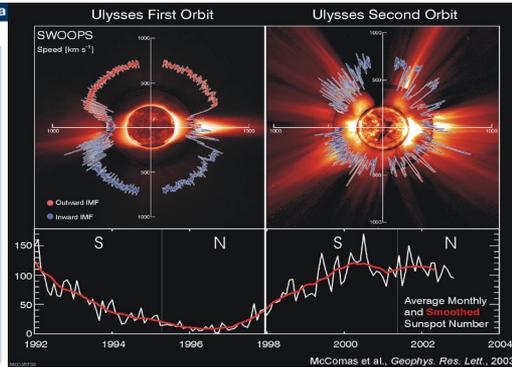
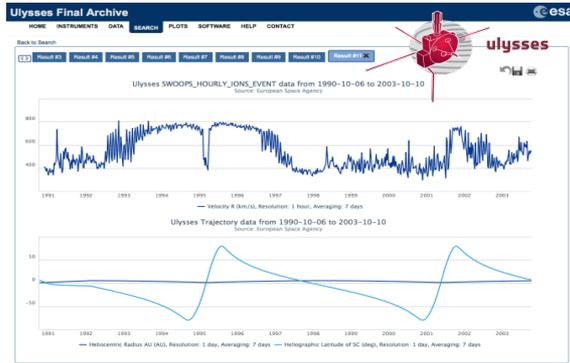
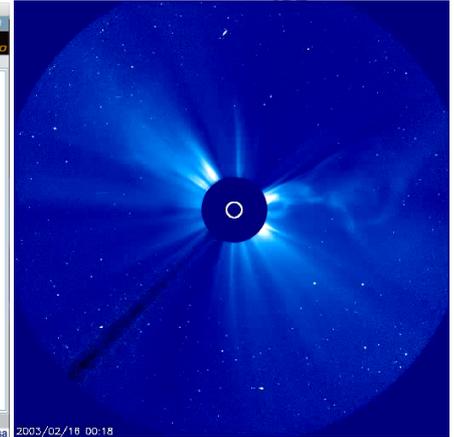
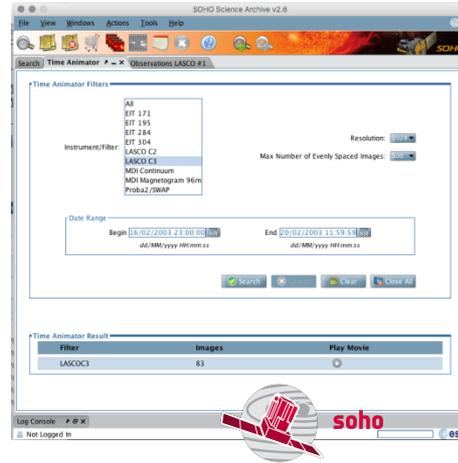
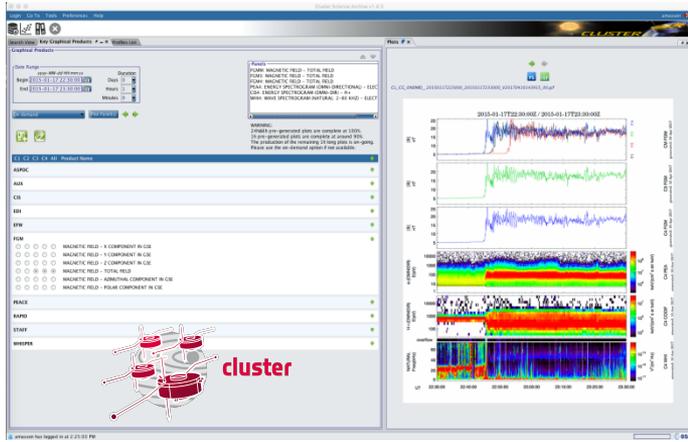
- MEMBERSHIP
- USER GROUP
- HELP & TAG
- CONTACT

Index of <http://psa.esa.int/pub/mirror/>

Up to higher level directory

Name	Size	Last Modified
CASSINI-HUYGENS		18/10/07 00:00:00
EARTH		11/09/09 00:00:00
ExoMars2016		09/11/16 18:42:00
GIOTTO		17/10/06 00:00:00
HST		17/10/06 00:00:00
INTERNATIONAL-ROSETTA-MISSION		14/10/16 03:00:00
MARS-EXPRESS		19/05/09 00:00:00
PSA		23/03/17 13:55:00
SMALL-MISSIONS-FOR-ADVANCED-RESEARCH-AND-TECHNOLOGY		20/08/10 00:00:00
VENUS-EXPRESS		15/09/10 00:00:00

# ESA Heliophysics Archives



- ESA Sky (<https://sky.esa.int>) is the multi-mission interface to the astronomy mission archives for ALL users.
- You don't need to be an expert to use ESA Sky!
- Provides a multi-wavelength view of the sky through accessing the data from individual archives
- Exploration!
- Similar "overarching" approaches are being developed for the planetary and heliospheric archives

# ESASky Concept: Explore, compare, select, download



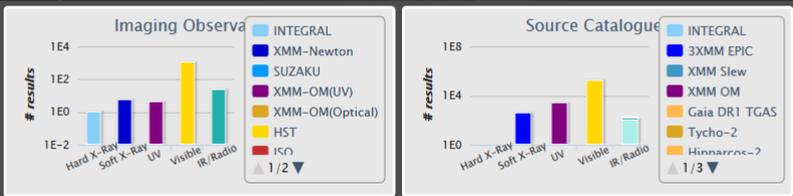
J2000 13 29 52.409 +47 10 4.24

Sky DSS2 color

m51



Data Panel



Click on histograms bars to start retrieving metadata.  
Click on legend labels to disable collections.

Close data panel

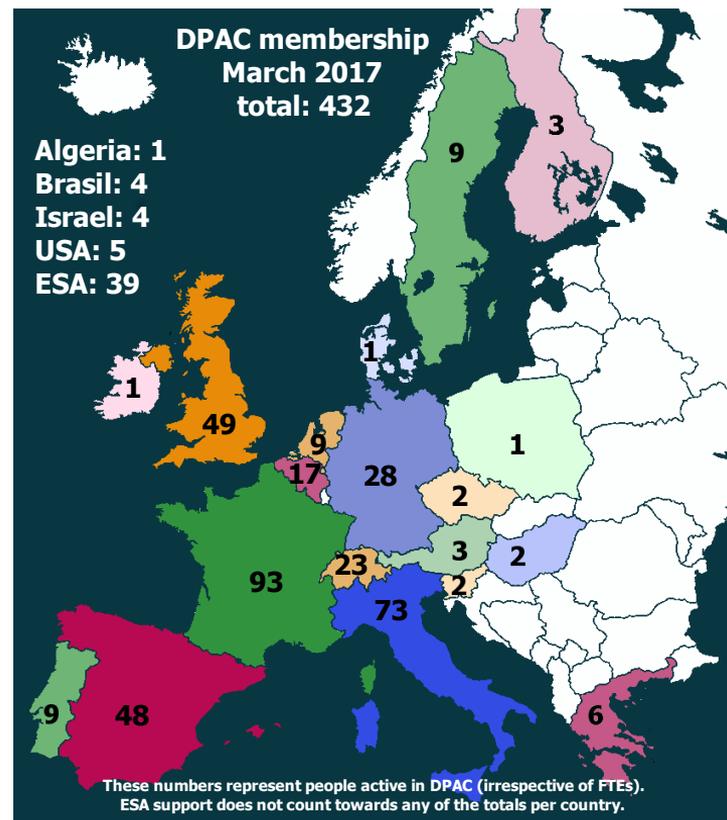
ESASky is a new open-science data portal for astronomical data from ESA's science missions. You are invited to use it and provide feedback to improve it!

<http://sky.esa.int>

# Instrument Consortia

An example:

- The Gaia DPAC is the consortium responsible for the (very complex) data processing for the mission
- Over 400 members. Euclid is even bigger!
- The chart to the right, shows the DPAC membership distribution
- Bring expertise to consortia.



# ESA Announcements of Opportunity



Go to <https://www.cosmos.esa.int> and then click on Announcements



## SCIENCE ANNOUNCEMENT OF OPPORTUNITIES

Announcement of Opportunity	Status
<a href="#">3rd Call for Science Planners in the NASA-led IRIS Mission</a>	<b>Closed</b> on 5 May 2017
<a href="#">Call for mission concepts for the large-size "L3" mission opportunity in ESA's Science Programme</a>	<b>Closed</b> on 16 January 2017
<a href="#">Announcement of Opportunity for the operations and scientific exploitation of the SPICE instrument on board the Solar Orbiter mission</a>	<b>Closed</b> on 26 September 2016
<a href="#">Call for a Medium-size mission opportunity in ESA's Science Programme (M5)</a>	<b>Closed</b> on 5 October 2016
<a href="#">New Science Ideas</a>	<b>Closed</b> on 14 September 2016
<a href="#">2nd Call for Science Planners in the NASA-led IRIS Mission</a>	<b>Closed</b> on 4 May 2016
<a href="#">European Scientist Participation in the WFIRST FSWG</a>	<b>Closed</b> on 8 April 2016
<a href="#">Interdisciplinary Scientists and Guest Investigators in the ExoMars 2016 Mission</a>	<b>Closed</b> on 30 March 2016



# ESA Needs Help!



ESA often needs the advice of external expert bodies:

- Time Allocation Committees (TACs) for observatory missions. In the last XMM-Newton AO, there were 5 East European TAC members (from HU, CZ, EE, PL, RO) out of 70.
- User Groups or Science Working Teams for individual missions
- Conference Organising Committees. Scientists from PL and CZ are on the organising committee of the last XMM-Newton workshop

Members are selected from active users of the data



# ESA Needs Scientific Advice!



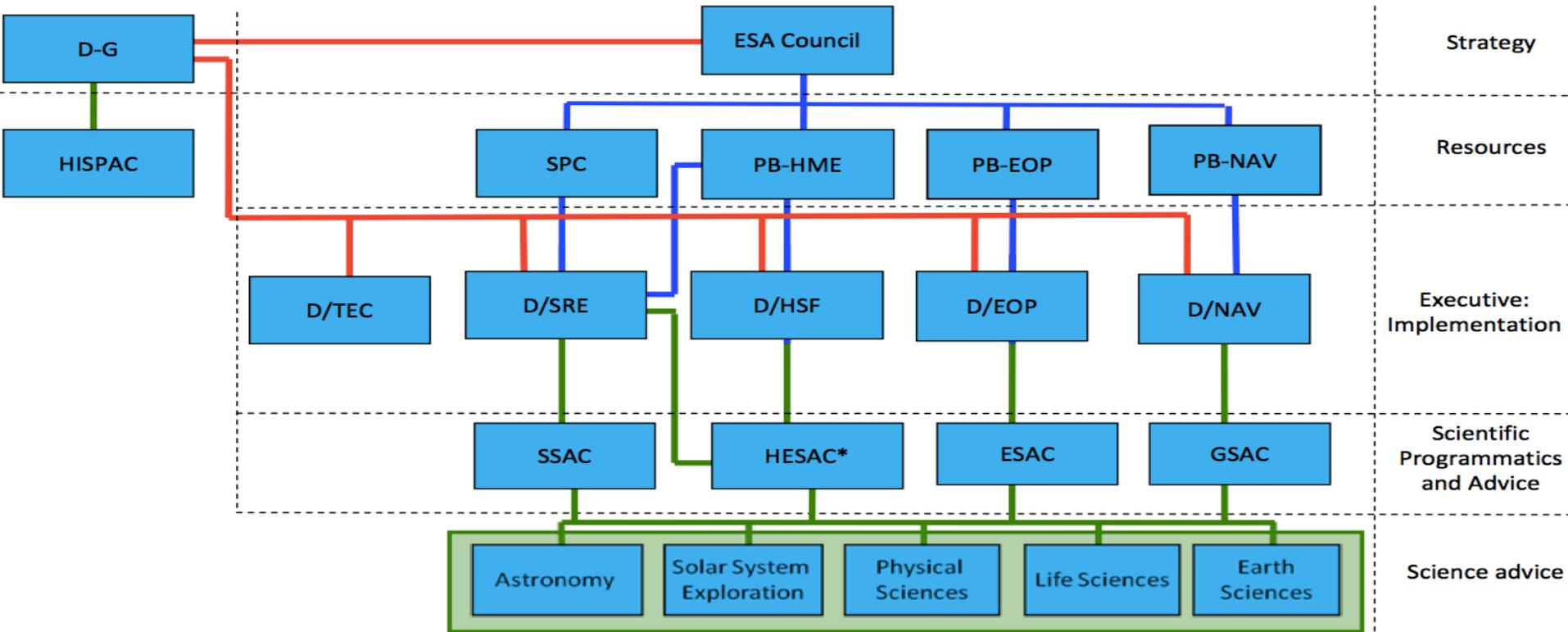
## ESA's Science Advisory Structure:

- The Working Groups who are experts in Astronomy (AWG) Solar System and Exploration (SSEWG) and the Physical Sciences (PSWG) first provide science evaluations.
- The Space Science Advisory Committee (SSAC) which is the senior advisory committee.

Members serve for 3 years. We are always looking for leading astronomers and space scientists who are willing to serve.



# ESA'S Advisory Structure



# ESA Research Fellow Programme



- This is ESA's "Post Doctoral Research Programme". See: <https://www.cosmos.esa.int/web/science-faculty/research-fellowship>
- Research Fellows (RFs) are young scientists staying for two (or possibly three) years at ESAC or ESTEC.
- A major advantage is that RFs do not have functional duties, so can spend the vast majority of their time doing science
- The next annual recruitment round closes on **2 October 2017**. We normally recruit around 8 new RFs each year.
- A similar programme exists for Master degree graduates (The Young Graduate Trainee programme).

