

The Rosetta Science Archive: Status and Plans for Completing and Enhancing the Archive Content

D. Fraga (1), M. Aberasturi, M. Barthelemy (1), E. Grotheer (1), D. J. Heather (1), L. O'Rourke (1), M. Taylor (2)

¹ ESA/ESAC Rosetta Science Ground Segment, ESAC, ESA; ² ESA/ESTEC



1 - Introduction

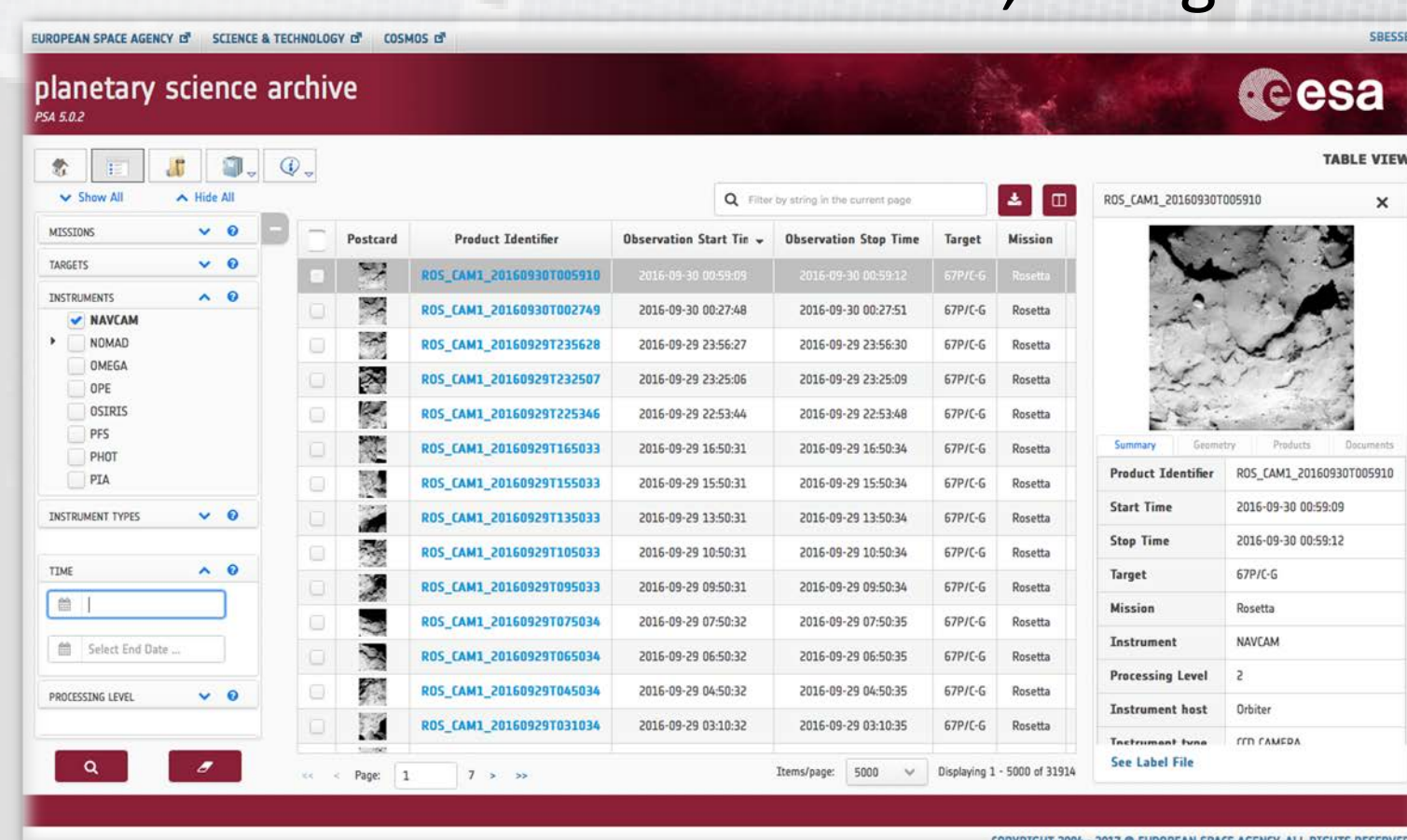
On **30 September 2016**, Rosetta completed its incredible mission by landing on the surface of **Comet 67P/Churyumov-Gerasimenko**. Although this marked an end to the spacecraft's active operations, intensive work is still ongoing with instrument teams preparing their final science data increments for delivery and ingestion into **ESA's Planetary Science Archive (PSA)** [1].

In addition to this, ESA is working with a number of instrument teams to **enhance and improve** their data and documentation in an effort to provide the **best long-term archive** possible for the **Rosetta mission**.

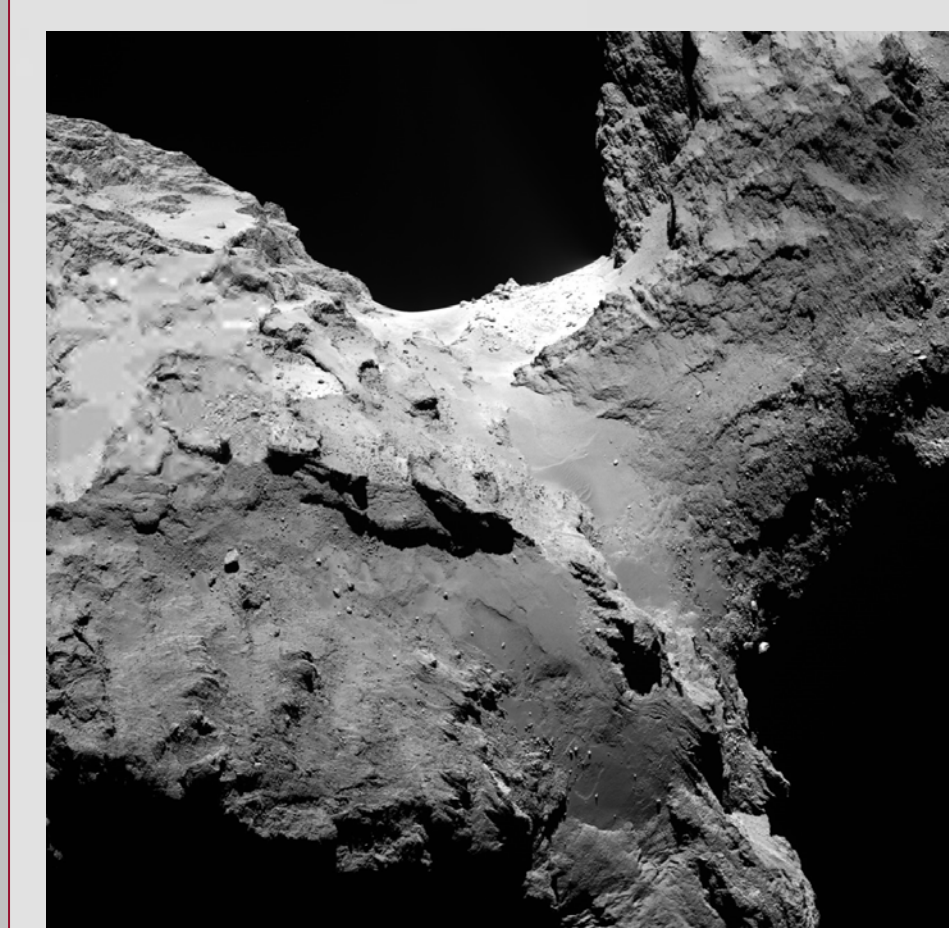
2 - Rosetta Data: Status in the PSA

All science data from the Rosetta mission are hosted both by the **Planetary Science Archive (PSA)** at ESA (<http://psa.esa.int>) [1], and by NASA's **PDS Small Bodies Node (SBN)**. The long duration of the Rosetta mission, along with its diverse suite of instrumentation and the range of targets observed throughout its lifetime combine to make this an extremely challenging mission to archive [2].

A number of **independent data reviews** have taken place over the course of the mission in an attempt to track the evolution of the data pipelines from each instrument and ensure that the **science data** are documented and formatted in the **best possible way** to allow end-users to exploit them.



PSA new interface at <http://psa.esa.int>



The last of these reviews was held in spring 2016, based on the first science data received from the comet phase. Many issues were raised by the reviewers, and the instrument teams have been working very hard to implement the fixes requested. In some cases this work is ongoing, and for all instruments, the review process has understandably resulted in a slow down of the standard delivery schedule.

Apart from these external scientific reviews, ESA and PDS Archive Scientists review all datasets from a more technical perspective before being released publicly. The main focus of this review is to ensure compliance to the PDS3 standard and ensure homogeneity across all instruments of Rosetta.

Currently, the majority of teams have delivered all of their data from the entire mission including the Extension phase.

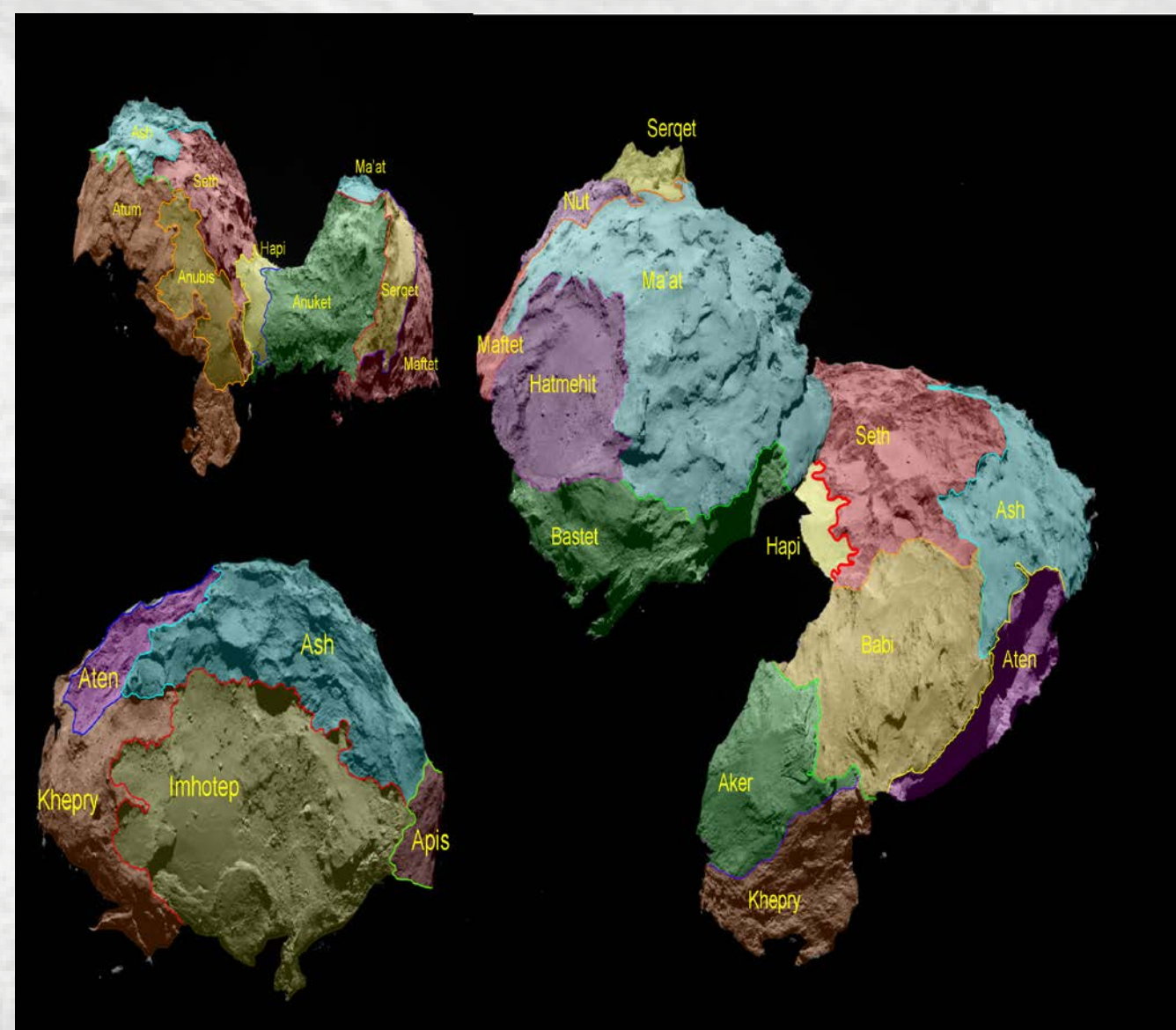
3 - Rosetta Enhanced Archiving

The nominal archive deliveries from the Rosetta mission are of **excellent quality**, and will be of **immense interest** and use for **many decades** to come thanks to the efforts of all involved in their production, assessment, storage and dissemination. However, there is, as always, much more to do!

ESA is working with the Rosetta instrument teams to allow them to provide enhancements to their archive content. Updates are focused on key aspects of an instrument's **calibration** or the production of **higher level data** / information, and are therefore very specific to each instrument's needs.

These activities will run for various lengths depending upon the tasks to be undertaken. The full **'archive enhancement'** process will run **until end of September 2019**, when the post operations activities for Rosetta will come to a close.

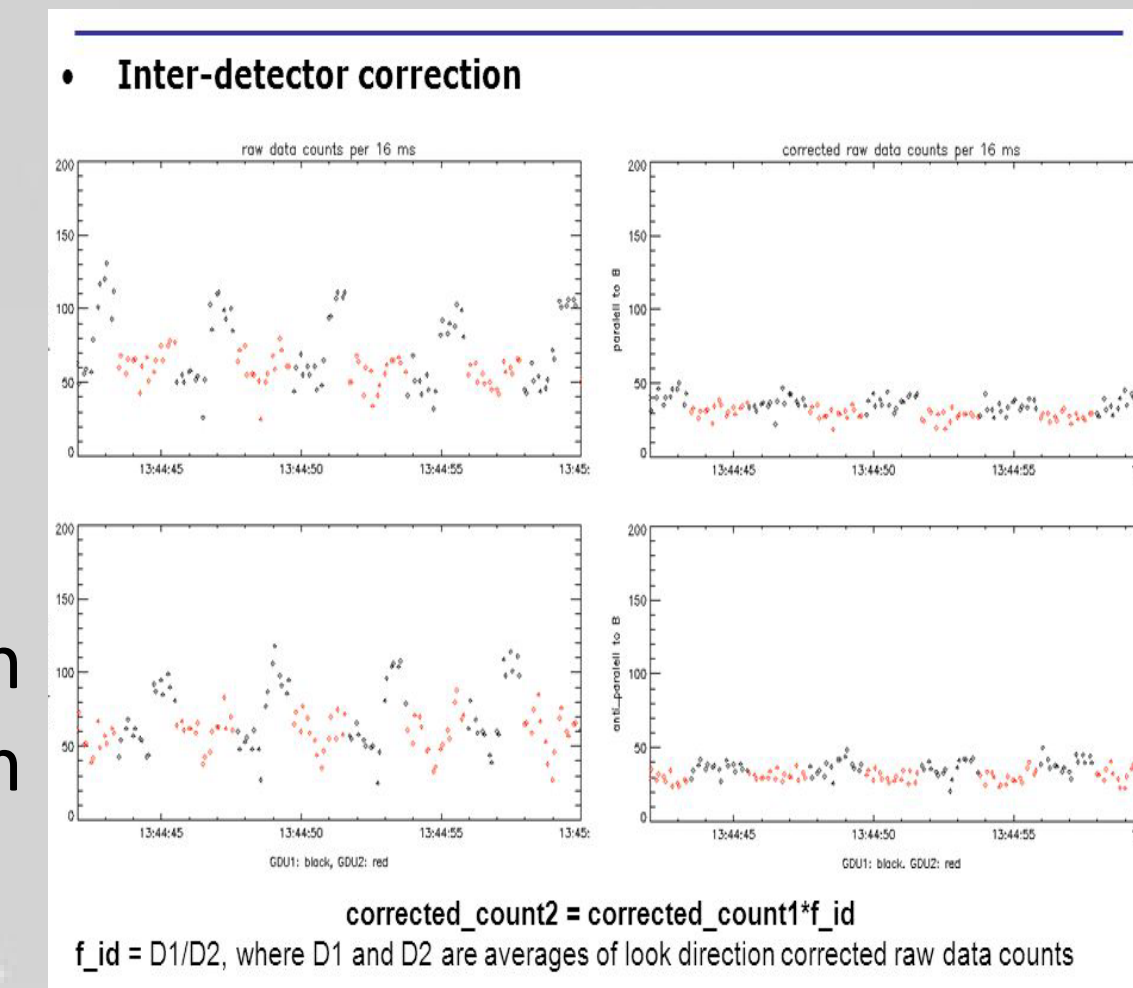
In the following section, we highlight **just a few** of the activities taking place within the archive enhancement activities to give a **flavour of the updates** that can be expected.



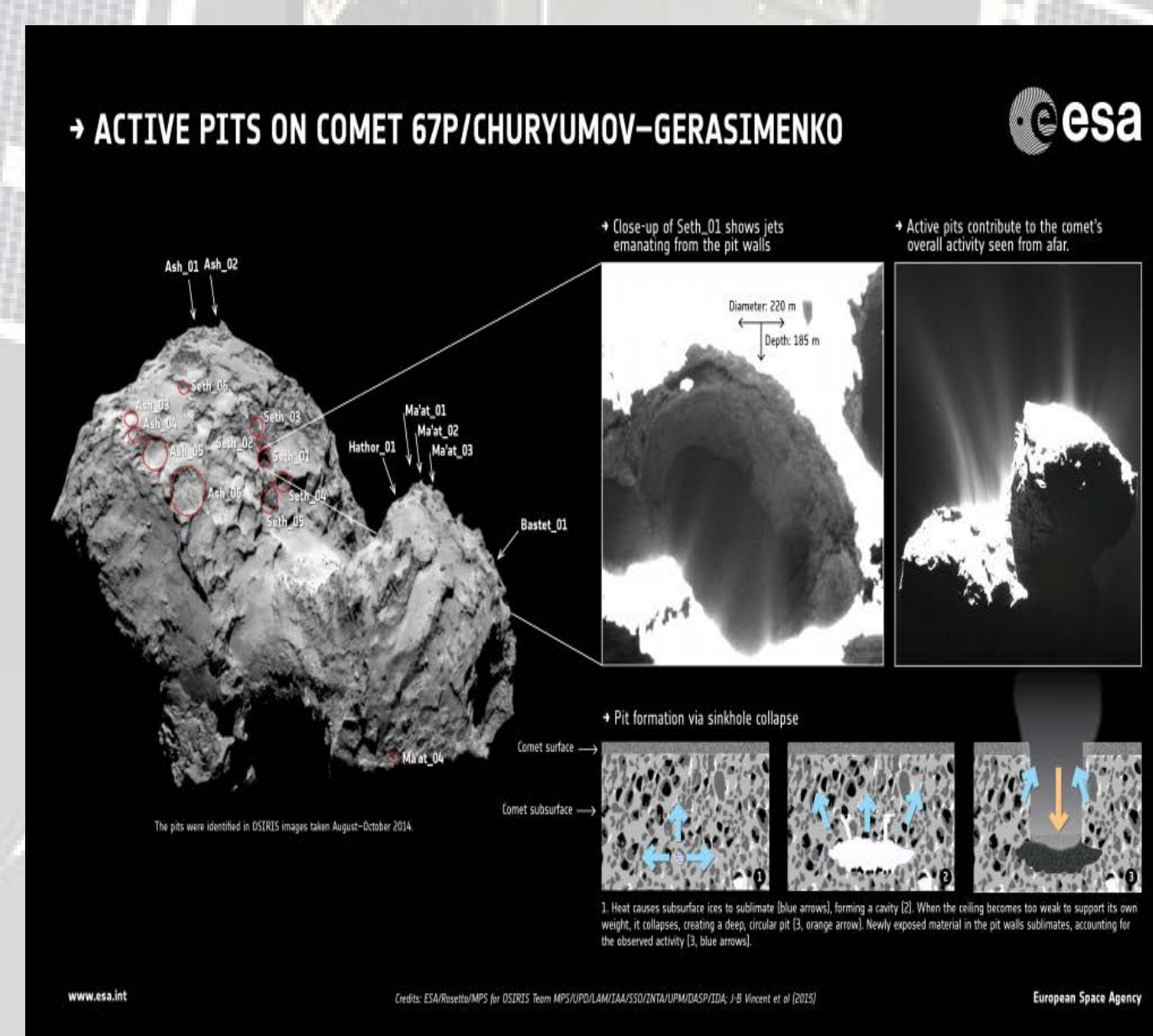
4 - Enhancing the Archive Content

Most instrument teams will work on providing a **Science User Guide** for their data, as well as **updating calibrations**. Several teams will also be generating and delivering **higher level** processed data and **derived products**. For example, the **VIRTIS** team will be working to update both their **spectral and geometrical calibrations**, and will aim to deliver **mapping products** to the final archive. Similarly, the **OSIRIS** team will be improving their **calibrations** and delivering data additionally in **FITS** format.

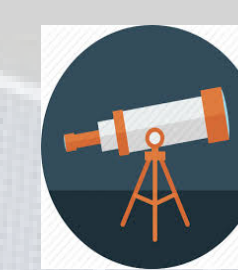
The **Rosetta Plasma Consortium (RPC)** instrument suite will be working on **cross-calibrations** that will greatly improve the final data to be delivered from each experiment, as well as a number of activities individual to each instrument (e.g. **removal of spacecraft noise from MAG**).



The **MIDAS** team will similarly be working on instrument **cross-calibrations**, the production of a **dust particle catalog** from the comet coma and the deconvolution of the tip shape.

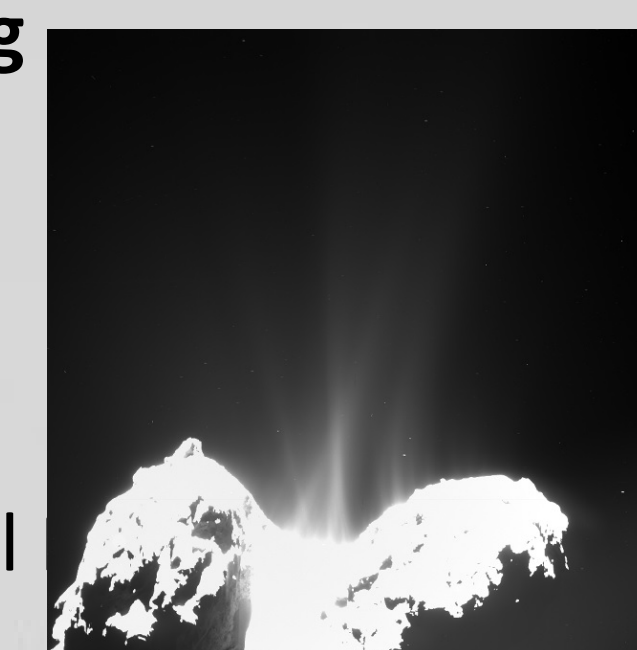


The **GIADA** team will be producing higher level products in the form of **dust environment maps**.



Dataset(s) containing supporting **ground-based observations** from amateur astronomers will also be produced. These data were taken simultaneously with Rosetta operations and could provide some important **contextual** information.

Rosetta ESA archiving team will be producing **calibrated** data sets for the **NAVCAM** instrument, and will be working to include the latest **shape models** from the comet into the final



The Rosetta ESA archiving team is also working on providing a **centralized solution** to the problem of **geometry on the comet** for implementation within the final Rosetta data holdings.

5 - Final Archive Reviews



An **End of Mission Comet Data Peer Review** to be held in October this year will assess the comet phase data holdings from the Rosetta mission.

Finally an **Enhanced Archiving and Closeout Peer Review** is expected in 2018 for the US instruments and for 2019 for the European instruments. This review will cover the entire mission (including the Cruise, asteroids flybys, Comet and Extension phases). The goal will be to assess the deliverables from the **archive enhancement phase**, the completeness and correctness of the full mission archive and ensure that the final Rosetta archive within the PSA is as good as it can be to allow for scientists to **fully exploit** the data holdings for decades to come.

6 - Conclusion

This Rosetta science archive in ESA's PSA and in NASA's PDS, is in good shape. With the support of the instrument teams and the completion of the **archive enhancement in 2019**, the **Rosetta archive** can become an **immensely valuable resource** for scientists in years to come, and the **full scientific potential** of the mission can be realized.

References

- [1] Besse, S. et al., (2017) Planetary and Space Science
- [2] Barthelemy, M. et al., (2017) Planetary and Space Science Planetary Science Archive (PSA) : <http://psa.esa.int>

Contact Info

Diego Fraga Agudo
dfraga@sciops.esa.int
+34 91 81 31 578