MATISSE 2.0: new ideas to support planetary sciences. A. Zinzi[1,2], A. Longobardo[3], M. Giardino[1], S. Ivanovski[3], M.T. Capria[3], E. Palomba[3], [1]SSDC-ASI (angelo.zinzi@ssdc.asi.it – Via del Politecnico, snc – 00133 – Rome, Italy), [2]INAF-OAR, [3]INAF-IAPS.

Introduction: Five years after the beginning of the project, MATISSE (Multi-purpose Advanced Tool for Instruments for the Solar System Exploration – https://tools.asdc.asi.it/matisse.jsp, [1]) now ingests observations in different formats and from different space missions and targets.

Its main aim was to provide the community with a tool able to make easier and enhance the scientific production of a single instrument: this goal has been pursued by making the data searchable with a metadata driven database, introducing the possibility of computing high-order products (i.e., mosaics and ratios) and visualize them in advanced forms.

The tool presently allows to search, analyze and visualize data regarding comet 67P Churyumov-Gerasimenko, asteroid 4 Vesta, dwarf panet 1 Ceres, the Moon and the planets Mercury, Venus and Mars.

In particular for these three latter objects new approaches have been developed, allowing the data not to be physically located at ASI Space Science Data Center (SSDC), but to be queried over remote servers (e.g., [2]).

The expansion of MATISSE to objects larger than asteroids and comets, for which the tool had been specifically designed at the beginning, now requires a robust update, so that valuable online visualizations can be displayed for all the targets.

Present-day MATISSE: MATISSE currently uses a series of programming languages in order to start the pipeline, read the observation files, perform computations and generate the output objects.

These are composed by two static PNG maps, a 3D online visualization (only for smaller targets), and downloadable files, such as 2D projections in ENVI, GeoTIFF and FITS file and a 3D projection as a VTP file.

This architecture fullfils the original requirements of searching for observations inside a local or remote database, obtaining mosaics and ratios merging together single observations and displaying the results in both 2D and 3D format for online and desktop usage.

However it also introduce several limitations that, with the time, need to be overcome.

MATISSE 2.0: The next version of MATISSE will be a brand-new one, so that, without wiping out the succesfull modular structure of the current version, a number of newly introduced solution can allow to overcome existing limitations.

In particular, the pipeline will be completely written in Python, except where software readers are available only in different languages (e.g. LecturePDS, written in IDL/GDL [3]).

Hence it will be possible to adopt solutions able to speed up the computations, for example by avoiding to write intermediate files to be exchanged between scripts in different languages, or by using parallelization for saving machine-time when possibile.

Another main difference will be in the output page, where the 3D visualization will be performed using the same X3DOM javascript presently used, but adopting binary files instead of ASCII ones. This will add the possibility of displaying inside the browser also high-resolution versions of large planetary Digital Elevation Models.

Furthermore, the static maps will be replaced by FITS projected images visualized by means of the JS9 suite. In this way it will be possible for the user to change zoom, palettes and scales in order to fit the output requirements.

By also changing the graphic interface, making it possible to improve responsivity, user support and usability of the tool, will be one of the target of the newly designed version of the tool.

Conclusions: The totally new version of ASI SSDC MATISSE tool, planned to be completed for the end of 2018, will add a number of valuable features to the tool.

The new version will allow planetary sciences community a better usage of the tool, that could be used for enhanced scientific purposes, without the limitations arssen at the completion of its first version.

References:

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[2] http://openplanetary.co/blog/tool/matisse2ps.html

[3] Erard S. et al. (2013), http://vopariseuroplanet.obspm.fr/utilities/Virtispds_3.1a.pdf