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**VA 1st year External Board Review**

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# Reference period

The reference period for this report, the first in the funding period, is an abbreviated eight months, from March 2020 to October 2020.

# Composition of the review board

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# General Comments

The review board notes that not only is the reporting period abbreviated, but few, if any, deliverables were scheduled for completion within the first eight months of operation. On top of that, restrictions related to the pandemic have seriously impacted work schedules, and made planned activities that involved travel and in-person interaction all but impossible. In these circumstances, the progress that has been made is laudable.

## Objectives

**Has the set of VA activities met the objectives in the relevant period as described in the Description of Action? If not please provide suggestions. If not applicable to the current reporting period, please state it.**

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| In general, the objectives have been met to at least some degree. Very few objectives were scheduled for completion at this early stage of the project. Infrastructure activities (establishing web sites, for example) have had good success, while those that involved face-to-face meetings and workshops were most often cancelled because of restrictions related to the pandemic. Issues or accomplishments related to making up those unavoidable losses are addressed in the individual project sections, where appropriate. |

## Impact

**Has the set of VA activities met the expected impact in the relevant period as described in the Description of Action? If not please provide suggestions. If not applicable to the current reporting period, please state it.**

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| Impact metrics are not defined for any of these projects. Where impact could potentially be measured indirectly, by presentations at conferences, for example, the impact has been somewhat suppressed by cancellations and virtualizations of conferences because of pandemic restrictions. |

## Dissemination

**Has the set of VA activities disseminated and exploited results in the relevant period as described in the Description of Action? If not please provide suggestions. If not applicable to the current reporting period, please state it.**

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| In general, the achievements that might have been expected in dissemination and impact at this early stage have not been as numerous or as far-reaching as planned. The effects of the pandemic restrictions are keenly felt here, where major accomplishments were anticipated from face-to-face conferences and workshops. Some activities have been completed, but at a lower level than would have been expected otherwise; others were cancelled entirely. Each project must adjust its approach to dissemination given the current and ongoing travel restrictions, and how this adjustment is made varies depending on the services being developed and the legacy inherited from the preceding Horizon-2020 program, if any. Each project that has not already done so should be thinking in terms of “making up for lost time” in this area. |

# Specific per-VA Comments

## VESPA

No deliverables and only two milestones for VA activities fell within the reporting period for VESPA: First, setting up the VA review board; and second, organization and follow-up for the first implementation workshop of the period. VESPA has reported a number of achievements in the period but without specific reference to the listed deliverables, which complicates making a more detailed assessment of progress on objectives. Work, however, is clearly ongoing.

### 4.1.1 Highlights

Good progress has been made on enlarging the VO content from beneficiaries (task 6.2 in the VA work package). In addition to updating a number of existing services, 3 new services have been added, bringing the total to 55. Ten additional services are in review, and many existing tools have been updated.

Good progress has also been made on dissemination of VESPA tools and protocols to the larger community (task 6.6) despite conference cancellations. Most notably, the Europlanet representative to the International Planetary Data Alliance is the VESPA coordinator, following a 10-year history of VESPA activities being presented to the IPDA.

Some progress has been made on consolidation of VESPA data services, in the selection of VESPA-cloud for inclusion in the EOSC-hub and in the initial stand-up of VESPA hubs in a GitLab hosted by three VO observatories.

A DOI policy was formulated and released. A brief search of the Astrophysics Data System listed 48 publications (24 refereed) that mentioned (referenced or otherwise acknowledged) VESPA. This is commensurate with the numbers from 2019 (54/28 for the entire year), but the use of DOIs may well have a significant impact on those numbers going forward.

### 4.1.2 Specific issues

There has been no significant progress on enlarging the VO content from the community. This work was directly impacted by pandemic travel restrictions, which caused the cancellation of the annual call and workshop that serve as the primary conduit for bringing new community content onboard. Plans for an online replacement for this calendar year have apparently failed to materialize. There appear to be no plans for making up this deficit and no contingency plans should travel restrictions continue for another 6-10 months. Neither has there been any progress on bringing in content from the amateur community.

Documentation is not keeping pace even with the limited development possible in this review period: the Data Management Plan is now behind schedule; there is no visible tracking in either the website or the wiki of alternate plans or progress on the delayed content additions; and key tutorials needed for bringing new services online seem to be stuck in DRAFT.

### 4.1.3 Specific actions suggested

Prioritize the organization of the 2021 community call and online workshop for bringing in new services from the community. This should include completing the associated tutorials and documentation.

Define a work plan for adding content from the amateur community.

## SPIDER

The SPIDER VA work package has no deliverables within the period, and the report supplied raises some significant questions.

### 4.2.1 Highlights

A SPIDER website has been established, but it is unpopulated.

The AMDA database has been expanded.

### 4.2.2 Specific issues

The starting point for SPIDER is the endpoint of the PSWS portal of the previous funding cycle. The SPIDER report states that the existing PSWS site “provided 12 services”, but then lists only 11 services, of which only 5 appear to be operational on that site. That is a significant deficit that puts this project at a substantial disadvantage for success.

The new website is a framework which currently offers little functionality or guidance for users not already familiar with the acronyms and vernacular of the existing system. The site has a hidden second half for referencing the legacy PSWS project tools. However, the six tools that were listed as available in the SPIDER report but are not operational on the legacy site are missing here as well - leading the user to a “Not available” message or, in the case of TAILCATCHER, to the site for a different tool. A user guessing his way through the site may eventually find a video of the EPSC 2020 presentation, but apart from that there is no information on the site itself about schedules or planned development, or any indication that it is in active development. And while the new home page looks good in a full-sized browser window on a large screen, it does not adapt well to changes in window size.

While it is apparently true that several significant databases have been added to the AMDA database/tool, that tool does not appear to be related to either SPIDER or the prior PSWS in any way. No reference could be found to it by name or link on either the new web site or the legacy PSWS site. Neither is there any reference to either PSWS or SPIDER on the AMDA site.

No mention is made in either the report or the website of the planned Dissemination tasks - specifically special journal issues and dedicated conference sessions. Such things typically require significant time to plan and coordinate, but this task seems to be languishing.

### 4.2.3 Specific actions suggested

Prioritize work on the website. It should quickly become the primary means of communicating with both existing users and new users. For new users in particular it is important to avoid jargon and acronyms in the top-level pages, and to ensure that tools and facilities not yet operational are clearly indicated as such. Pages with no content, non-working links, rendering issues on the home page, and links to services that are discovered (after clicking) to be non-operational all create a negative impression on potential users and will ultimately hinder dissemination. Content from the legacy site should be verified and updated as needed, in particular with respect to tools and capabilities that are still listed on the legacy site as not available. This is particularly important to undertake immediately, because the legacy site is providing the only usable content. “News” and development schedules should be posted and updated regularly to keep users informed and interested in the project.

Develop a plan and milestones for the dissemination tasks.

## GMAP

The GMAP VA work package has no deliverables scheduled before the end of the first year of operation. GMAP has inherited a rich legacy from PLANMAP.

### 4.3.1 Highlights

The framework for web-based GMAP access and support has been initialized. The new GMAP website is established and includes useful placeholder information for users as well as functional links back to the existing PLANMAP site. Notably, the “Documentation” link on the new site takes users to the large and useful *Standard Definition Document*, which is itself the first deliverable of the related JRA work package. The documentation wiki and GitLab repository are also ready to be populated.

PLANMAP-derived maps were presented at the US Planetary Geologic Mappers Virtual Meeting in June 2020.

Non-EU collaborations have been initiated, including engagement with universities and geological institutions in the People’s Republic of China, focusing on the Moon, with data from the Chang’ E missions.

GMAP, via PLANMAP, has continued the practice of using social media as part of their dissemination strategy.

Schedules have been revised to address the impact of the pandemic and the new milestone schedules seem achievable.

### 4.3.2 Specific issues

Although the project continues to use social media for dissemination, that is still being done under the PLANMAP name. The “GMAP” name should be promoted in these venues.

It is difficult to assess progress on most of the tasks in the GMAP VA work package, as most activities would not have even preliminary results to post at this point.

### 4.3.3 Specific actions suggested

Provide more transparency on the review process for geologic maps. Provenance and data quality measures are becoming increasingly important to users as part of the larger scale adoption of FAIR data principles (<https://www.force11.org/group/fairgroup/fairprinciples>). Providing production details, review history, and links to peer-reviewed journal publications containing corroborating information would enhance the FAIR-ness of these products significantly. This, in turn, would further encourage their dissemination.

Consider taking aggressive advantage of opportunities to present GMAP products and development at meetings and conferences, and to sponsor joint planetary geologic mapping sessions with, e.g., USGS at future conferences such as EGU, AGU, LPSC, SA, etc.

## ML

There is no separate work package for ML VA activities. Rather, they are listed as task 10.6 in the JRA package and focus on the creation of web interfaces for tools in development, and integration of ML tools into the websites of VESPA, SPIDER, and GMAP.

### 4.4.1 Highlights

A study on integration of ML tools into the EOSC has been drafted (current version 0.33).

The portal website is online and populated with top-level descriptions of the planned science cases already identified.

Preliminary results for two science cases were presented at conferences.

### 4.4.2 Specific issues

The goal of this project, as expressed in the work package, is to develop ML tools and provide access to the resulting products and documentation. It is not clear, however, what constitutes a “tool” vs. a “product” in the ML case in either the work package description or on the current website. For example, is it the intention of the project to distribute trained models for off-the-shelf use, model code for users to adapt to their own use cases, both, or neither? What does it mean to “integrate ML tools” into the VESPA, GMAP, and SPIDER websites? Defining and describing the goals of the project in plain, non-specialist terms will greatly enhance efforts to raise ML visibility and to encourage new users to consider ML tools for possible solutions.

Apart from setting up the portal website with its introductory text, there is no indication that any work has begun at all on the various deployments and integrations included in the VA task for this project. At this early stage working deployments are not expected, but a schedule and milestones would be, along with an inventory of any significant development that might be needed for deployment in each case. For example, if the intention is to make trained models available through VESPA, would these models be considered a new data product that would require integration into the Virtual Observatory data model?

Issues of support and standardization are not addressed in any of the available documentation. Without these, dissemination of new tools and models would be difficult, if not impossible. If there is no community standard, will this project define its own? Whether the intent is to distribute either models or code, there should be a corresponding Data or Code Management Plan to define requirements and expectations.

The GitLab repository has been established, but it requires registration to access. And while it has been populated, it does not reflect the sort of commit and update activity one would generally expect for an active development site. Consequently, it is not clear whether the GitLab is being employed as a backup, as a distribution site for registered users, or as a development site.

The version number of the European Open Science Cloud (EOSC) integration study would indicate that the document is not complete. There are some significant topics missing, including whether GPUs and sufficient storage resources are available from the EOSC, or what alternatives might be available if the EOSC integration should not prove feasible.

While disseminating information about the concepts and uses of machine learning to the planetary science community is a core part of the work plan, there seems to have been no progress on this to date. The EPSC and ESWS presentations reviewed did not provide any background or educational material describing ML methods.

### 4.4.3 Specific actions suggested

Prioritize development of the website as the primary introduction to ML for new or existing planetary science users. Introductory documentation and plain-language descriptions of planned development and potential applications in planetary science are essential to creating and maintaining interest in the project from both existing and new users.

Set and publicize (on the website, for example) schedules for development and deployment of the planned tools. Including high-level descriptions of how these tools could be applied, with expected outputs or benefits, would further encourage interest in ML development and deployment.

Develop specific work plans (along with schedules) for integration of ML tools into the GMAP, SPIDER, and VESPA portals.

# Any Additional comments and suggestions

Because of pandemic impacts, all projects that have not done so already should review existing plans and milestones for VA deliverables and adjust them as necessary.

Impact metrics would be useful, if not essential, to an objective assessment of the success of dissemination efforts. It would be useful to define and collect appropriate impact metrics for each project to be included in future reports. Given the variety in both discipline and complexity of the projects comprising this program, it would also be appreciated if, in future, reports to the review board were organized by and referenced to the specific VA components and deliverables.

The Board noted in reviewing the various websites that some of the projects have more closely associated themselves with Europlanet than others through the branding elements of their sites (color schemes, layout, links to other Europlanet sites, etc.). The problem of trying to serve very different user communities with the same “look and feel” is a common one that has no easy solution. However, the apparently complete separation of some of these projects from the rest of the Europlanet “team” seems likely to have a negative impact on the success of dissemination efforts, in particular, for projects that isolate themselves. Projects with large, diverse user communities can expose new tools and new approaches to users who are much more likely to be interested than an anonymous user who comes across a link to a website in the midst of a Google return set. If the goal is to grow a small user community, then the first place to turn should be the large, existing Europlanet user community.

Some notes on the review board process:

* Self-organization is not a terribly effective strategy in the first year of a pandemic.
* It would be much more useful for both the board and the projects to schedule live presentations where questions can be asked and answered. For next year, for example, it would be useful to have this sort of meeting after the first-year deliveries have been made.
* Criteria for success can be very hard to define, leaving a tendency to focus on failures, which are all too easy to define. The development of impact metrics will help alleviate this, but input from the teams will be essential in defining meaningful metrics, and for identifying success criteria where there are no objective metrics.

Respectfully submitted 10 December 2020

The Europlanet VA Review Board