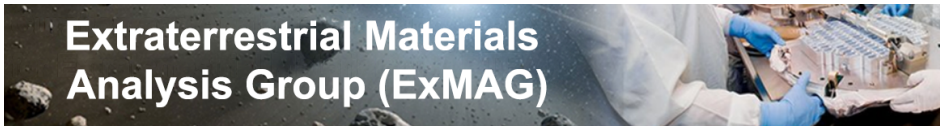

Extraterrestrial Materials Analysis Group Response to draft Cooperative Agreement Notice (CAN) entitled "Support for Planetary Sample Science (SPSS)"

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This response represents input from current members of the Extraterrestrial Materials Analysis Group (ExMAG).

Background: The National Aeronautics and Space Administration (NASA) Science Mission Directorate (SMD) has released a draft Cooperative Agreement Notice (CAN) entitled "Support for Planetary Sample Science (SPSS)" for public comment. The final SPSS CAN will invite the submission of proposals to provide support for members of the planetary science community carrying out science activities that make use of extraterrestrial samples. Scientific studies of such samples have proven valuable for informing our understanding of the solar system. NASA's Planetary Science Division (PSD) has long provided support for community research with these samples. With this opportunity, NASA seeks to continue to provide this support to enable community research.

The collection, curation, and analysis of astromaterials are core elements of NASA's Planetary Science program. NASA-funded efforts include human and robotic sample collection and return missions (*e.g.,* Apollo, Stardust, Genesis, OSIRIS-REx, ANSMET), curation of these samples and other collections (*e.g.,* meteorite, interplanetary dust particles, micrometeorites, microparticle impacts), and research efforts for sample analysis, including laboratory facilities. The data generated from these diverse efforts result in a broad range of raw data files, as well as calibrated and higher-level data products. The Extraterrestrial Materials Analysis Group (ExMAG) is a NASA-chartered, community-based, interdisciplinary group providing a forum for discussion and analysis of matters concerning the collection, curation, and analysis of extraterrestrial samples. ExMAG is providing our comments on the SPSS CAN as it pertains to planetary science sample collection, curation, and analysis efforts.

ExMAG recommendations and analysis:

1. ExMAG supports NASA facilitating community members' access to the NASA collections housed at JSC and the unique opportunities associated with the JSC curatorial facilities. However, the current SPSS CAN does not consider support for analysts to use advanced analytical capabilities and facilities available outside of JSC and as such, is not in line with other ongoing facilities support efforts by NASA such as the PSEF.

NASA JSC is the designated repository for extraterrestrial materials returned by missions and terrestrial collection activities. As such, there are aspects to working with collections that require unique collaboration with JSC – for example, research on fragile samples, exploratory work looking at multiple samples/sub-samples to choose some for further research, and bringing instruments into clean rooms and curation infrastructure to accomplish unique objectives. Fully utilizing these

collections can require close in person collaboration between researchers and curation staff, so ExMAG encourages NASA to continue to support this access via vehicles like this CAN.

ExMAG recognizes that multiple analysis techniques are housed within the ARES portion of JSC, including several labs that recently won PSEF support. However, working with samples at these facilities is not a unique opportunity compared with other US and international facilities, many initiated and supported by NASA programs. ExMAG recommends that NASA consider how researchers are supported accessing the full range of analysis facilities across NASA's portfolio, not just those housed within the JSC research division.

2. ExMAG supports the CAN inclusion for training activities to make best use of the NASA collections.

Hands-on training for skills relevant to the handling, preparation, and analysis of small particles are vital to our community. Under the current CAN, the LPI has facilitated five successful training sessions, each training 4-6 scientists in hands-on activities in how best to utilize NASA collections. These training sessions have also included how to prepare a successful sample request, accessing sample information and sample security training. These workshops have been very successful in broadening access to the sample collections to new scientists, building skills in the handling of the materials and allowing new scientists to assess how the techniques to handle the samples may apply to their own research. These trainings have been held in collaboration with scientists at JSC and at other universities and laboratories and ExMAG appreciates the role LPI plays in facilitating these opportunities. ExMAG further recommends that training in software skills for sample analysis be considered as well.

3. ExMAG recommends that the SPSS CAN also include training for investigators on current, NASA-compliant data repositories available to archive planetary sample analysis data with the expectation that data generated from work done via the CAN be appropriately archived.

The information produced as part of NASA’s scientific research activities represents a significant public investment. Results of federally funded research and development need to be shared openly to enable transformational open science through the continuous evolution of science data and computing systems for NASA’s Science Mission Directorate (SMD). ExMAG previously provided recommendations for sample analysis data in the Request for Information (RFI) on proposed additions to SPD-41a. However, the draft CAN does not address expectations, training, and support for ensuring that data generated by the activities in the CAN NASA-compliant archives for data resulting from the analysis of samples to ensure compliance with FAIR Guiding Principles.

The Astromaterials Data System (AstroMat) is NASA's only supported data infrastructure to store, curate, and provide access to laboratory data acquired on samples curated in the Astromaterials Collections at the Johnson Space Center. ExMAG strongly recommends that the SPSS CAN require that all data generated via CAN activities be reposited in AstroMat. Because the current

policy does not require AstroMat as a repository, many researchers choose instead to submit supplemental data with publications. This cycle has prevented AstroMat from becoming the robust and accessible database the community needs and deserves. Requiring that CAN data be reposited in AstroMat would be a straightforward way to strengthen the content and useability of AstroMat for the whole community.

Furthermore, the CAN should request that the implementing institution provide appropriate training for investigators on how to archive their data to meet FAIR principles and use the NASA compliant data repository (AstroMat). Such training would also be of enormous utility to the whole community, in the same way the microsample handling training has been.

4. ExMAG stands ready to work with NASA in the future to help understand how the community uses these CAN functions, how often they are needed, what unique access they provide, and how support for sample collection access, analysis facilities, and data archives might evolve to better support our community.