

1 **ExMAG Spring Meeting 2021 Findings – DRAFT 5/21/21**

2 Please send comments/feedback by May 28, 2021 to ExMAG.community@gmail.com

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5 **New Frontiers 5**

6 The Advance Notice Regarding New Frontiers 5 (NF5) Announcement of Opportunity includes a
7 Lunar South Pole - Aitken Basin sample return mission, as recommended by the Decadal Survey.
8 However, in the Advance Notice, this mission is listed with the parenthetical (pending Artemis
9 landing site selection(s) and science objectives). The Artemis III Science Definition Team
10 Report is now available and ExMAG was briefed on it. ExMAG concurs with LEAG that the
11 scientific goals of a South Pole-Aitken Basin sample return mission are unlikely to be addressed
12 at the planned Artemis landing locations at the lunar south pole. **ExMAG recommends that**
13 **NF5 proposals for such a mission should not be dependent upon Artemis program**
14 **planning.**

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16 Increasingly complex sample-return missions, such as cryogenic comet sample return, will
17 require investment in curation infrastructure and community laboratory facilities. For sample-
18 return missions, the actual costs for all aspects of curation, from planning through distribution
19 and storage, including all required laboratory construction or modification, are required to be
20 borne by the mission from inception to 2 years following sample return. Whereas missions with
21 long cruise phases may be able to defer the costs of operation and scientific analysis to Phase E,
22 this situation potentially penalizes sample-return missions that have to include early planning and
23 construction/renovation of curation facilities and laboratories in Phases B-D. Therefore, the
24 Midterm Review of the Decadal Survey recommended that NASA consider the budget for
25 curation by sample return missions as a Phase E cost to ensure that sample return missions are on
26 equal footing with other mission proposals and discourage unrealistically low budgets for sample
27 curation. **ExMAG endorses the Midterm Review finding and recommends that the Curation**
28 **Costs for sample return missions be considered outside the PI cost cap in the NF5 call.**

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31 **Terrestrial Sample Collection activities**

32 For over four decades, the U.S. has annually performed meteorite recovery through ANSMET
33 (the Antarctic Search for Meteorites Program). The meteorites recovered by ANSMET are
34 vitally important for planetary research, providing scientists from around the world with samples
35 of planetary bodies not easily obtainable by other means. These meteorites recovered by
36 ANSMET thus far include the first meteorites recognized as lunar and martian, hundreds from 4
37 Vesta, primitive remnants from the earliest stages of our solar system's history, and new
38 meteorites that have challenged our understanding of solar system formation and evolution,
39 including that of our own planet. The meteorites recovered in Antarctica motivate and inform
40 preparations for, analyses during, and context following missions to small bodies, moons, and

41 planets, maximizing science return from these missions. Due to the ongoing COVID-19
42 pandemic, the 2020-21 and 2021-22 ANSMET field seasons were canceled. **ExMAG strongly**
43 **recommends that NASA and NSF ensure the continuity of terrestrial sample collection**
44 **efforts by resuming stratospheric flights and a robust ANSMET field season as soon as**
45 **practical.**

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48 **Chang'E-5 Sample Availability for US Researchers**

49 The successful Chang'e 5 mission has returned the first new lunar sample return in decade. The
50 samples' source is a unique location, a young mare basalt far from previous collection sites,
51 holding the potential to dramatically change our understanding of solar system volcanic and
52 impact history. NASA-funded researchers have a strong interest in working with these samples
53 but understand that their collaboration with the People's Republic of China (PRC) is constrained
54 by the Wolf Amendment, a Congressional limitation prohibiting bilateral exchanges between
55 NASA-funded scientists and scientists and institutions in the PRC.

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57 Science is an international effort that is hindered when individuals face barriers to fully
58 participating in science because of national policies. While recognizing that the US State
59 Department has flagged human rights issues in the PRC as an area of concern, a scientific
60 exchange similar to that conducted by the US and Soviet Union on Luna and Apollo samples in
61 the 1970s could encourage scientific knowledge exchange to foster openness and diplomacy.
62 Under current policy, Chinese national scientists are disallowed from receiving Apollo sample
63 loans from the US collection. **ExMAG encourages NASA to explore a path to permit sample**
64 **exchange and reciprocal sample loans between NASA and CNSA for the Chang'E-5 and**
65 **Apollo samples** specifically, and potentially to broaden such a program to encompass the
66 substantial Antarctic meteorite collections of both nations and future sample-return missions.

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68 Such an exchange would substantially alleviate individual researchers' concerns about working
69 with Chang'E samples using NASA funding, which could constitute a violation of the Wolf
70 Amendment. However, in the absence of a formal sample exchange with NASA, **ExMAG**
71 **requests that NASA clarify guidelines regarding whether and how NASA-funded scientists**
72 **may request and analyze Chang'E-5 samples.** For example:

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- 74 • NASA-funded researcher requesting directly from CNSA website
- 75 • NASA-funded team of researchers of different nationalities requesting directly from
76 CNSA website
- 77 • NASA-funded researcher working with a US colleague who is not NASA funded and
78 who received a sample
- 79 • NASA-funded researcher working with an international colleague who is not NASA
funded and who received a sample