

# Congress of the United States

## House of Representatives

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

2321 RAYBURN HOUSE OFFICE BUILDING

WASHINGTON, DC 20515-6301

(202) 225-6371

[www.science.house.gov](http://www.science.house.gov)

November 29, 2016

The Honorable Charles F. Bolden  
Administrator  
National Aeronautics and  
Space Administration (NASA)  
300 E Street., SW  
Washington, DC 20546

Dear Administrator Bolden:

NASA recently issued a press release titled “Report Confirms Scientific Benefits of NASA’s Asteroid Redirect Mission.”<sup>1</sup> This press release highlighted a recent report titled “SBAG Special Action Team Report: ARM Connections to Priority Small Body Science and Exploration Goals.”<sup>2</sup> The report states that on June 28, 2016, NASA requested that the SBAG form the Special Action Team to identify connections between the Asteroid Redirect Mission (ARM) and the most recent planetary science decadal report and any small body Strategic Knowledge Gaps (SKGs) that could be addressed by ARM. This press release is particularly peculiar, as it implies that the ARM has gained acceptance by advisory bodies. NASA plans to issue contracts for ARM in a few short months. As the incoming Administration evaluates ARM, it would benefit from clear guidance from both NASA and its advisory bodies. Similarly, it should be unencumbered by decisions made in the twilight of this Administration’s term.

Contrary to the assertions made in the press release, numerous advisory bodies have questioned the merits of President’s ARM mission. The NASA Advisory Council (NAC), the Small Bodies Assessment Group (SBAG), and the National Research Council have all raised concerns with the mission since its proposal by the Administration.

### NASA Advisory Council

In July of 2014, the NAC issued a recommendation calling for independent cost and technical assessment prior to the selection of a specific mission concept. The recommendation stated:

---

<sup>1</sup> <https://www.nasa.gov/feature/report-confirms-scientific-benefits-of-nasa-s-asteroid-redirect-mission>

<sup>2</sup> <http://www.lpi.usra.edu/sbag/documents/ARM-SAT-2016-09-26.pdf>

"The Council recommends that NASA should conduct an independent cost and technical assessment of the Asteroid Redirect Mission (ARM). NASA should state clearly in advance what the cost and technical criteria are for implementing the mission. These criteria should include affordability within currently projected budgets. The independent assessment should be performed before the downselect between Options A and B. The possible outcomes of this process are: fly Option A, fly Option B, or (if the projected cost is unacceptable) fly neither."<sup>3</sup>

That recommendation went unheeded. NASA argued in responses to the recommendation that contractor studies were sufficient to inform their deliberations.<sup>4</sup> NASA eventually conducted an internal cost estimate as part of the selection, but that does not appear to satisfy the intent of the NAC recommendation.<sup>5</sup>

On January of 2015, the NAC stated that,

"[t]he specific ARM objective of capturing part or all of a small asteroid contributes little to the longterm goal of H2M [Humans to Mars], contributes only peripherally to planetary defense, and may add a great deal of cost, resulting in exceeding the suggested \$1 .25B budget cap."<sup>6</sup>

In April of 2015, the NASA Advisory Council (NAC) issued the following finding on the ARM:

"Instead of relocating a boulder from an asteroid, we suggest that a more important and exciting first use of this new SEP stage would be a round trip mission to Mars, flying it to Mars orbit and then back to the Earth-Moon system and into a distant retrograde lunar orbit."<sup>7</sup>

### National Research Council

In December 2014, the National Research Council issued a report titled *NASA's Strategic Direction and the Need for a National Consensus*, which stated:

"[t]he committee has seen little evidence that a current stated goal for NASA's human spaceflight program—namely, to visit an asteroid by 2025—has been widely accepted as a compelling destination by NASA's own workforce, by the nation as a whole, or by the international community."<sup>8</sup>

In a separate report, *Pathways to Exploration*, the NRC identified 11 mission elements for a manned Mars surface mission. The report made the case that the technologies

---

<sup>3</sup> [https://www.nasa.gov/sites/default/files/files/NAC\\_Minutes-LaRC\\_Meeting\\_July\\_2014-FINAL\\_Tagged.pdf](https://www.nasa.gov/sites/default/files/files/NAC_Minutes-LaRC_Meeting_July_2014-FINAL_Tagged.pdf)

<sup>4</sup> [https://www.nasa.gov/sites/default/files/atoms/files/jul2014\\_nasa\\_responses\\_package\\_2\\_tagged02.pdf](https://www.nasa.gov/sites/default/files/atoms/files/jul2014_nasa_responses_package_2_tagged02.pdf)

<sup>5</sup> Jeff Foust, "NASA Selects Boulder Option for Asteroid Redirect Mission," SpaceNews, March 25, 2015. Accessed at <http://spacenews.com/nasa-selects-boulder-option-for-asteroid-redirect-mission/>

<sup>6</sup> [https://www.nasa.gov/sites/default/files/atoms/files/jan2015\\_arm\\_signed\\_nasa\\_response.pdf](https://www.nasa.gov/sites/default/files/atoms/files/jan2015_arm_signed_nasa_response.pdf)

<sup>7</sup> [www.nasa.gov/sites/default/files/atoms/files/april9-10\\_finalrecom-tagged.pdf](http://www.nasa.gov/sites/default/files/atoms/files/april9-10_finalrecom-tagged.pdf)

<sup>8</sup> <https://www.nap.edu/catalog/18248/nasas-strategic-direction-and-the-need-for-a-national-consensus>

developed under ARM would not provide many of the technologies necessary for such a Mars mission. The report stated,

“[b]ecause of the assumption of an NTP-based advanced propulsion system for the Mars Surface mission, **the ARM robotic asteroid-redirect vehicle is considered a dead-end mission element**, inasmuch as its advanced SEP capabilities are not leveraged in future missions as currently envisioned” [emphasis added].<sup>9</sup>

#### Small Bodies Assessment Group

In their findings about the idea published on March 20, 2013, SBAG said of the mission:

While the participants found it to be very interesting and entertaining, **it was not considered to be a serious proposal** because of obvious challenges, including the practical difficulty of identifying a target in an appropriate orbit with the necessary physical characteristics within the required lead time using existing or near- to long-term ground-based or space-based survey assets. When it came to our attention that this project was being seriously considered by the agency, SBAG – representing broad expertise in asteroid science and mission planning – offered to provide an independent technical review of this proposal..... failure of the HEOMD and SMD to utilize SBAG in this situation seems a peculiar decision and raises the serious question of the extent to which HEOMD and SMD wish to make decisions based on restricted input promoting specific outcomes. [emphasis added]<sup>10</sup>

In response to this SBAG finding, the NASA revealed that they had little-to-no input into the politically derived mission.

“The ARM was brought forward by the Administration as a Presidential Budget initiative. As such, to a certain point, information about it was embargoed by the Administration until the President’s budget was announced – two months later this year. It was therefore not possible for HEOMD and SMD to use the community forums for input during this period. **In fact, only a handful of individuals within both the Directorates knew of the budget initiative**” [emphasis added].<sup>11</sup>

SBAG has consistently cast doubt on ARM’s usefulness, particularly as a planetary defense mission. In its July 2013 meeting, the group found that,

“[g]iven the size of the ARRM target (< 10m), **ARRM has limited relevance to planetary defense**. Retrieving a NEO this small only tangentially benefits planetary defense, as the stated target body may not be representative of the larger, hazardous bodies” [emphasis added].<sup>12</sup>

<sup>9</sup> <https://www.nap.edu/catalog/18801/pathways-to-exploration-rationales-and-approaches-for-a-us-program>

<sup>10</sup> [http://www.lpi.usra.edu/sbag/meetings/jul2013/presentations/Final\\_Response\\_findings\\_SBAG\\_8.pdf](http://www.lpi.usra.edu/sbag/meetings/jul2013/presentations/Final_Response_findings_SBAG_8.pdf)

<sup>11</sup> *Ibid*

<sup>12</sup> <http://www.lpi.usra.edu/sbag/findings/index.shtml#sbag9>

Until a recent media event held by NASA and the White House Science Advisor (where no media questions were taken<sup>13</sup>) in September,<sup>14</sup> planetary defense was refuted by NASA as a rationale for the mission. After NASA announced ARM, you told the NASA Advisory Council (NAC) that planetary defense-related objectives would not play a primary role in ARM. You are quoted as stating, “I don’t like saying we’re going to save the planet. At some point, that may be done, but that’s not—we’re not in a position that we should be saying, ‘Fund the asteroid initiative and we’re going to save the planet.’”<sup>15</sup>

The NAC minutes from that meeting indicate that you saw “saving the planet” not as part of ARM but, rather, as part of the White House’s Asteroid Grand Challenge initiative. The Asteroid Grand Challenge initiative seeks to promote planetary defense by finding all asteroids that could pose threats to humans, a requirement derived from Sec. 321 of *the NASA Authorization Act of 2005* titled *the George E. Brown, Jr. Near Earth Observation Survey*. According to the minutes, you stated that ARM could contribute to this initiative, but maintained that the two efforts were separate, indicating that “[w]e need to get that confusion out of it. ARM’s primary goal is not saving the planet.”<sup>16</sup> Press reports indicated that you referred to the ARM’s contribution to planetary science as “peanuts.”<sup>17</sup>

In January 2015, SBAG reiterated concerns from a July 2014 meeting in which the committee found that,

“[t]he portion of the ARM concept that involves a robotic mission to capture and redirect an asteroid sample to cis-lunar space is not designed as an asteroid science mission and **its benefits for advancing the knowledge of asteroids and furthering planetary defense strategies are limited and not compelling**” [emphasis added].<sup>18</sup>

While NASA’s press release states that the SBAG SAT report “confirms scientific benefits of NASA’s [ARM] mission,” the press release fails to note that the actual report states that “[t]his report should not be seen as contradicting or superseding findings by SBAG in 2013-1016 or at a later date.” This would seem to reinforce previous criticisms of ARM, not negate them.

Furthermore, the report was scoped by NASA in such a way as to arrive at predetermined outcomes. For instance, NASA charged the SBAG SAT to “identify **any connections** between the science objectives for small bodies as identified in the planetary decadal survey report ‘Visions and Voyages for Planetary Science in the Decade 2013-2022’ and those stated ARM objectives” [emphasis added]. By charging the SBAG SAT to look

---

<sup>13</sup> <http://nasawatch.com/archives/2016/09/nasa-boulder-re.html>

<sup>14</sup> <https://www.nasa.gov/press-release/white-house-nasa-to-discuss-asteroid-redirect-mission-s-importance-for-journey-to-mars>

<sup>15</sup> Foust, Jeff. “Bolden: asteroid redirect mission not going to ‘save the planet.’” *Space Politics*. August 10, 2013. <http://www.spacepolitics.com/2013/08/10/bolden-asteroid-redirect-mission-not-going-to-save-the-planet/>

<sup>16</sup> *Ibid*

<sup>17</sup> See *Supra* 17

<sup>18</sup> *Ibid*.

broadly at “any connections” between ARM and the decadal survey, NASA set a bizarrely low bar for the mission to satisfy. For instance, NASA did not ask the SBAG SAT to evaluate the optimal missions to accomplish the scientific objectives contained in the recent decadal, or how ARM would be prioritized against those alternatives.

Similarly, NASA charged the SBAG SAT to also “...[i]dentify any small body Strategic Knowledge Gaps (SKGs) that **could be addressed**, in whole or in part, by activities conducted during the ARM” [emphasis added]. By broadening the review to evaluate how SKGs “could be addressed” by ARM, NASA once again set such a low bar for review that one could conceivably rationalize any mission under those terms. Such a review does not require a critical assessment of the merits of the mission, or whether it would actually close those SKGs – just that the mission in some way (even tangentially) could be related to them. The review, as scoped, did not direct a cost-benefit analysis for the mission, or whether the SKGs could be better addressed by other missions such as competitively awarded Discovery and New Horizons missions, ground based observations, or existing and past missions such as Dawn, OSIRIS-Rex, Hayabusa, or Hayabusa 2.

Finally, the review is devoid of any relation to a larger strategic exploration strategy, such as a human exploration roadmap, or a scientific prioritization process. The mission was thrust upon NASA by the current Administration with little-to-no consultation with Congress or the experts at NASA.<sup>19</sup> The next Administration will have an opportunity to review the merits of the mission going forward. The program recently exceeded its \$1.25 billion cost cap and is now estimated at \$1.4 billion without launch vehicle costs.<sup>20</sup> It was also announced that the program would be delayed one year.<sup>21</sup> The next Administration may find merit in some, if not all, of the components of ARM, and continue the program; however, that decision should be made after a full and fair review based on the merits of the program and in the context of a larger exploration and scientific strategy. The Administration should also be presented with honest assessments from its advisory groups, not farcical studies scoped to produce a predetermined outcome. Unfortunately, this press release and report does little to advance those causes.

In order to better understand the genesis and intent of both the SBAG SAT report and the aforementioned press release, please provide the Committee with all documents (as defined by attachment A) associated with the consideration, development, formulation, drafting, production, and dissemination of both the report and the press release. Please deliver these records by Tuesday, December 13, 2016. If you have any questions associated with this request, please contact Mr. Tom Hammond, Staff Director, Subcommittee on Space, at (202) 225-6371.

---

<sup>19</sup> See *supra* 10

<sup>20</sup> <https://www.nasa.gov/feature/nasas-asteroid-redirect-mission-completes-robotic-design-milestone>

<sup>21</sup> *Ibid*

Sincerely,



Lamar Smith  
Chairman



Brian Babin  
Chairman  
Space Subcommittee

### **Attachment A: Responding to Committee Document Requests**

1. In complying with this request, you are required to produce all responsive documents, in unredacted form, that are in your possession, custody, or control, whether held by you or your past or present agents, employees, and representatives acting on your behalf. You should also produce documents that you have a legal right to obtain, that you have a right to copy or to which you have access, as well as documents that you have placed in the temporary possession, custody, or control of any third party. Requested records, documents, data or information should not be destroyed, modified, removed, transferred or otherwise made inaccessible to the House Science Committees.
2. In the event that any entity, organization or individual denoted in this request has been, or is also known by any other name than that herein denoted, the request shall be read also to include that alternative identification.
3. The Committees' preference is to receive documents in electronic form (i.e., CD, memory stick, or thumb drive) in lieu of paper productions.
4. Documents produced in electronic format should also be organized, identified, and indexed electronically.
5. Electronic document productions should be prepared according to the following standards:
  - (a) The production should consist of single page Tagged Image File ("TIF"), or PDF files.
  - (b) Document numbers in the load file should match document Bates numbers and TIF or PDF file names.
  - (c) If the production is completed through a series of multiple partial productions, field names and file order in all load files should match.
6. Documents produced to the Committees should include an index describing the contents of the production. To the extent more than one CD, hard drive, memory stick, thumb drive, box or folder is produced, each CD, hard drive, memory stick, thumb drive, box or folder should contain an index describing its contents.
7. Documents produced in response to this request shall be produced together with copies of file labels, dividers or identifying markers with which they were associated when the request was served.
8. When you produce documents, you should identify the paragraph in the Committees' schedule to which the documents respond.
9. It shall not be a basis for refusal to produce documents that any other person or entity also possesses non-identical or identical copies of the same documents.
10. If any of the requested information is only reasonably available in machine-readable form (such as on a computer server, hard drive, or computer backup tape), you should consult

with the Committee staff to determine the appropriate format in which to produce the information.

11. If compliance with the request cannot be made in full by the specified return date, compliance shall be made to the extent possible by that date. An explanation of why full compliance is not possible shall be provided along with any partial production.
12. In the event that a document is withheld on the basis of privilege, provide a privilege log containing the following information concerning any such document: (a) the privilege asserted; (b) the type of document; (c) the general subject matter; (d) the date, author and addressee; and (e) the relationship of the author and addressee to each other.
13. In complying with this request, be apprised that the U.S. House of Representatives, the U.S. Senate, and the Committee do not recognize: any of the purported non-disclosure privileges associated with the common law including, but not limited to, the deliberative process privilege, the attorney-client privilege, and attorney work product protections; any purported privileges or protections from disclosure under the Freedom of Information Act; or any purported contractual privileges, such as non-disclosure agreements.
14. If any document responsive to this request was, but no longer is, in your possession, custody, or control, identify the document (stating its date, author, subject and recipients) and explain the circumstances under which the document ceased to be in your possession, custody, or control.
15. If a date or other descriptive detail set forth in this request referring to a document is inaccurate, but the actual date or other descriptive detail is known to you or is otherwise apparent from the context of the request, you are required to produce all documents which would be responsive as if the date or other descriptive detail were correct.
16. Unless otherwise specified, the time period covered by this request is from July 1, 2015 to the present.
17. This request is continuing in nature and applies to any newly-discovered information. Any record, document, compilation of data or information, not produced because it has not been located or discovered by the return date, shall be produced immediately upon subsequent location or discovery.
18. All documents shall be Bates-stamped sequentially and produced sequentially.
19. Two sets of documents shall be delivered, one set to the Majority Staff and one set to the Minority Staff. When documents are produced to the Committee on Science, Space, and Technology, production sets shall be delivered to the Majority Staff in Room 4220 of the O'Neill House Office Building and the Minority Staff in Room 324 of the Ford House Office Building.
20. Upon completion of the document production, you should submit a written certification, signed by you or your counsel, stating that: (1) a diligent search has been completed of all documents in your possession, custody, or control which reasonably could contain



responsive documents; and (2) all documents located during the search that are responsive have been produced to the Committees.

### **Schedule Definitions**

1. The term "document" means any written, recorded, or graphic matter of any nature whatsoever, regardless of how recorded, and whether original or copy, including, but not limited to, the following: memoranda, reports, expense reports, books, manuals, instructions, financial reports, working papers, records, notes, letters, notices, confirmations, telegrams, receipts, appraisals, pamphlets, magazines, newspapers, prospectuses, inter-office and intra-office communications, electronic mail (e-mail), contracts, cables, notations of any type of conversation, telephone call, meeting or other communication, bulletins, printed matter, computer printouts, teletypes, invoices, transcripts, diaries, analyses, returns, summaries, minutes, bills, accounts, estimates, projections, comparisons, messages, correspondence, press releases, circulars, financial statements, reviews, opinions, offers, studies and investigations, questionnaires and surveys, and work sheets (and all drafts, preliminary versions, alterations, modifications, revisions, changes, and amendments of any of the foregoing, as well as any attachments or appendices thereto), and graphic or oral records or representations of any kind (including without limitation, photographs, charts, graphs, microfiche, microfilm, videotape, recordings and motion pictures), and electronic, mechanical, and electric records or representations of any kind (including, without limitation, tapes, cassettes, disks, and recordings) and other written, printed, typed, or other graphic or recorded matter of any kind or nature, however produced or reproduced, and whether preserved in writing, film, tape, disk, videotape or otherwise. A document bearing any notation not a part of the original text is to be considered a separate document. A draft or non-identical copy is a separate document within the meaning of this term.
2. The term "communication" means each manner or means of disclosure or exchange of information, regardless of means utilized, whether oral, electronic, by document or otherwise, and whether in a meeting, by telephone, facsimile, email (desktop or mobile device), text message, instant message, MMS or SMS message, regular mail, telexes, releases, or otherwise.
3. The terms "and" and "or" shall be construed broadly and either conjunctively or disjunctively to bring within the scope of this request any information which might otherwise be construed to be outside its scope. The singular includes plural number, and vice versa. The masculine includes the feminine and neuter genders.
4. The terms "person" or "persons" mean natural persons, firms, partnerships, associations, corporations, subsidiaries, divisions, departments, joint ventures, proprietorships, syndicates, or other legal, business or government entities, and all subsidiaries, affiliates, divisions, departments, branches, or other units thereof.
5. The term "identify," when used in a question about individuals, means to provide the following information: (a) the individual's complete name and title; and (b) the individual's business address and phone number.

6. The term "referring or relating," with respect to any given subject, means anything that constitutes, contains, embodies, reflects, identifies, states, refers to, deals with or is pertinent to that subject in any manner whatsoever.