

National Aeronautics and Space Administration  
**Headquarters**  
Washington, DC 20546-0001



Reply to Attn of: Space Technology Mission Directorate

**National Environmental Policy Act;  
Low Density Supersonic Decelerator Technology Demonstration Mission**

**AGENCY:** National Aeronautics and Space Administration (NASA), Space Technology Mission Directorate

**ACTION:** Finding of No Significant Impact

**SUMMARY:** Pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321 et seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), and NASA policy and regulations (14 CFR Part 1216 Subpart 1216.3), NASA has made a Finding of No Significant Impact (FONSI) with respect to the proposed additional splashdown area which is needed in support of the Low Density Supersonic Decelerator (LDSD) Technology Demonstration Mission (TDM). Based on information gleaned from the first test conducted at the U.S. Navy Pacific Missile Range Facility (PMRF), Hawaii, NASA prepared a Supplemental Environmental Assessment (SEA) to evaluate the potential environmental consequences (environmental impacts) of changes planned for future tests campaigns to be conducted at PMRF. The SEA analyzes potential environmental consequences from three alternatives.

**DATE:** April 2015

**AVAILABILITY:** The SEA and FONSI prepared for the LDSD TDM mission are available at:

- Hawaii State Library  
Hawaii and Pacific Section Document Unit  
478 South King Street  
Honolulu, Oahu, HI 96813-2994
- Lihue Public Library  
4344 Hardy Street  
Lihue, Kauai, HI 96766
- Waimea Public Library  
9750 Kaunualii Highway  
Waimea, Kauai, HI 96796

Electronic copies of the SEA and FONSI are available at:

- [http://sites.wff.nasa.gov/code250/NASA\\_LDSD\\_FSEA.html](http://sites.wff.nasa.gov/code250/NASA_LDSD_FSEA.html)
- [http://www.nasa.gov/mission\\_pages/tdm/ldsd/](http://www.nasa.gov/mission_pages/tdm/ldsd/)

**COOPERATING AGENCIES:**

The National Oceanic and Atmospheric Administration (NOAA) and the U.S. Fish and Wildlife Service (USFWS) served as Cooperating Agencies in preparing this SEA as each have regulatory authority regarding the Proposed Action.

**FOR FURTHER INFORMATION CONTACT:**

Mr. Steven W. Slaten  
NASA Management Office Environment and Facilities Manager  
Jet Propulsion Laboratory  
4800 Oak Grove Drive  
MS 180-801  
Pasadena, CA 91109  
(818) 393-6683

**SUPPLEMENTAL INFORMATION:**

NASA has determined that the document entitled *National Aeronautics and Space Administration Low Density Supersonic Decelerator Technology Demonstration Mission Pacific Missile Range Facility Supplemental Environmental Assessment* (hereinafter the "LDSD SEA") adequately and accurately analyzes the potential environmental effects of the Proposed Action. The LDSD SEA and its underlying documents are hereby incorporated by reference in this FONSI.

**BACKGROUND:**

In May 2013, NASA completed the *Low Density Supersonic Decelerator Technology Demonstration Mission (TDM) Pacific Missile Range Facility (PMRF) Final Environmental Assessment* (LDSD Final EA) and issued its FONSI on 10 May 2013. The National Aeronautics and Space Act of 1958, as amended (42 U.S.C. 2451(d)(1)(5)) establishes a mandate to conduct activities in space that contribute substantially to "[t]he expansion of human knowledge of the Earth and of phenomena in the atmosphere and space," and "[t]he preservation of the role of the United States as a leader in aeronautical and space science and technology and in the application thereof to the conduct of peaceful activities within and outside the atmosphere." In response to this mandate, NASA, in coordination with the National Academy of Sciences (NAS), has developed a prioritized set of science objectives to be met through a long-range program of spacecraft missions. As part of the U.S. Space and Earth exploration effort, these missions are designed to be conducted in a specific sequence based on technological readiness, launch opportunities, timely data return, and a balanced representation of scientific disciplines. Section 1.1 of the 2013 LDSD Final EA provides a detailed background for NASA's LDSD mission directive, and Chapter 4 of the 2013 LDSD Final EA analyzes the environmental consequences to PMRF, Niihau, and the Open Ocean Area. The 2013 LDSD Final EA can be found at: [http://www.sites.wff.nasa.gov/Code250/LDSD\\_Final\\_EA\\_May2013.pdf](http://www.sites.wff.nasa.gov/Code250/LDSD_Final_EA_May2013.pdf).

Subsequent to issuing the FONSI for the LDSD Final EA on 10 May 2013, NASA continued its mission planning and ultimately conducted the first LDSD flight in June 2014. Lessons learned from this initial LDSD flight indicated that changes to the Proposed Action as described in the 2013 LDSD Final EA could be warranted. Under NEPA, Federal agencies have a continuing duty to evaluate the environmental consequences of their actions. Under certain circumstances, agencies must supplement their existing environmental analyses should they

propose changes to those actions that could have a bearing on environmental consequences. Accordingly, NASA has prepared a Supplemental EA to the 2013 LDSD Final EA to evaluate the environmental consequences of operational changes it proposes for the future LDSD test flights scheduled to begin in the summer of 2015.

As discussed below, the SEA provides (1) a summary of the June 2014 LDSD test flight; (2) the lessons learned which prompted NASA to consider modifying its Proposed Action; and (3) the Federal authorization needed to undertake the proposed changes.

### **Lessons Learned from 2014 LDSD Supersonic Flight Dynamics Test (SFDT):**

A significant accomplishment of the LDSD project's 2014 campaign was demonstrating the ability to accurately predict the balloon's climb out trajectory and to recover the balloon carcass and Test Vehicle. The hard lesson learned was that there is the possibility of going weeks without acceptable conditions for launch. Another lesson learned is that the northern trajectories represent significant risk of early termination unless mitigated.

Based on the results of the 28 June 2014 test flight, the LDSD project investigated the possibility of dropping and recovering expended flight hardware, with the exception of the balloon flight train, in the eastern part of Papahānaumokuākea Marine National Monument (PMNM) during future demonstration missions. This flight option would be conducted within the boundary of PMNM, but outside of the 5.6-km (3-nm) Special Management Area surrounding Nihoa Island. Section 1.1.3 of the LDSD SEA summarizes the request for authorization to splashdown within PMNM.

### **DESCRIPTION OF THE PROPOSED ACTION:**

**NO-ACTION ALTERNATIVE:** Under the No-action Alternative, NASA would conduct the Proposed Action as detailed in the 2013 LDSD Final EA with the clarification that some recovery aids discussed in the EA may or may not be employed. This proposed test campaign would consist of launch, operation, and recovery of up to four missions from a designated location on PMRF. The SFDT campaign would consist of up to four flights from approximately June to July 2014 and June to August 2015. One flight was conducted in 2014, and up to three flights could be conducted in 2015. Under the No-action Alternative, Sections 2.2.2.1 (Operational Facilities) and 2.4.2 (Launch Operation) of the SEA would apply.

**ALTERNATIVE 1—PROPOSED ACTION (PREFERRED ALTERNATIVE):** The Proposed Action (Alternative 1—Preferred Alternative) incorporates all activities described in the No-action Alternative and provides for additional splashdown area and test opportunities for the SFDT. This would require approved entry into the easternmost part of the Open Ocean Area of PMNM; therefore, NASA has requested authorization for entry into PMNM through a Conservation and Management permit. This entry would consist of the splashdown and recovery of expended flight hardware, with the exception of the balloon flight train, and potential fly-over of Nihoa Island and its surrounding Special Management Area from scheduled SFDTs beginning in 2015. NASA could have up to two technology testing launches each year for the next 5 years (June through August, 2015 to 2019).

This additional splashdown area excludes the 70 hectares (170 acres) of Nihoa Island and the approximately 128.5 km<sup>2</sup> (37.5 nm<sup>2</sup>) Special Management Area within 5.5 km (3 nm) surrounding Nihoa Island. To ensure the excluded area waters and/or island will not be entered, one of two scenarios would occur: (1) the LDSD Program would initiate the SFDT in

such a manner that expended flight hardware would be recovered before drifting into the excluded area; or (2) the flight system would overfly the excluded area, and the Test Vehicle would be dropped outside 5.5 km (3 nm) from Nihoa Island. Therefore, expended flight hardware would not be deposited on Nihoa Island or within the Special Management Area surrounding the island.

**ALTERNATIVE 2—ADDITIONAL LAUNCH YEARS:** Under Alternative 2, NASA would conduct the No-action Alternative as described in the SEA, which is the Proposed Action as detailed in the 2013 LDSD Final EA with clarification that some recovery aids discussed in the 2013 LDSD Final EA may or may not be employed. Under Alternative 2, NASA would conduct the launch, operation, and recovery of up to two missions per year over the next 5 years (June through August, 2015 to 2019) from a designated location on PMRF using the flight trajectory outlined in the 2013 LDSD Final EA. Under Alternative 2, Sections 2.1.1.1.2.1 (Operational Facilities) and 2.1.1.3 (Launch Operation) of the SEA would apply.

#### **ENVIRONMENTAL EFFECTS:**

Fourteen areas of environmental consideration were initially evaluated for the Open Ocean Area and Nihoa Island to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing the severity of potential environmental effects. These areas included air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, visual aesthetics, and water resources. Ultimately 3 of the 14 areas of environmental consideration were addressed (Air Quality; Biological; and Cultural), and 2 of the 14 areas were addressed for Nihoa Island (Biological and Cultural). The remaining resource areas did not warrant analysis in such a manner.

**Air Quality:** The ballast of the balloon system provides stability and control of the balloon during ascent. The LDSD balloon system carries approximately 110 kilograms (250 pounds) of ballast consisting of very fine steel shot (grain size 0.3 to 0.5 millimeter [mm] [0.01 to 0.02 inch]), which would be released to adjust the float altitude of the balloon system. Under National Ambient Air Quality Standards as promulgated in the Clean Air Act, the U.S. Environmental Protection Agency (EPA) regulates particulate matter of size 2.5 and 10 microns (1 micron is equal to 0.001 mm), as these sizes can be easily breathed into the lungs of humans or animals. However, as the particle size of the ballast exceeds 10 microns, the ballast material is not regulated by EPA. The released ballast would travel in the upper atmospheric winds and be dispersed over hundreds of kilometers. Therefore, under the Proposed Action, the emissions from SFDT would have no significant adverse effects on existing air quality within PMNM.

**Biological Resources:** In accordance with Section 7 of the Endangered Species Act, NASA initiated informal consultation with the National Marine Fisheries Service (NMFS) on 9 January 2015 and with USFWS on 6 March 2015. Based on the analysis in both Biological Evaluations, NASA and its Cooperating Agencies determined that the Proposed Action is likely to produce stressors to which listed individuals would respond if exposed. However, the likelihood of such exposure has been determined to be extremely remote. As such, NASA concluded that the proposed action “may affect, not likely to adversely affect,” all listed species and designed critical habitat in the action area. In a letter dated 10 March 2015, NMFS concurred with this determination. In a letter dated 6 April 2015, USFWS also concurred with this determination.

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act, NASA initiated Essential Fish Habitat (EFH) consultation with NMFS. On 27 March 2015, NMFS stated in an electronic communication that potential impacts to EFH would not change significantly enough from the 2013 LDSD Final EA determination of no impacts to EFH to warrant additional review.

Previously, on 7 January 2013, NASA in coordination with the Navy (PMRF) determined that the LDSD Test program at PMRF is covered by the Navy Coastal Zone Management Act (CZMA) De Minimis List, which was approved by the Hawaii CZM Program on 9 July 2009. On 10 March 2015, the Navy affirmed the continued applicability of their CZMA De Minimis List for the LDSD Test program.

**Cultural Resources:** NASA would conduct up to two SFDT test flights per year over the next 5 years (2015–2019). If expended flight hardware should splashdown or drift into PMNM, NASA would recover all floating hardware as quickly as possible, thereby avoiding adverse impacts to cultural resources. As PMNM is considered in Hawaiian traditions as a sacred place from which life springs and to which spirits return, unavoidable cultural impacts may occur, if either of the up to 10 balloon flight trains (up to two per year, over 5 years) should sink to the PMNM sea floor. However, given the unlikely probability of splashdown occurring in PMNM and that the balloon flight train is most likely to sink outside PMNM, the risk of impact is small. All identified cultural properties on Nihoa Island are situated some distance from the planned (nominal) trajectory of the Proposed Action. NASA estimates that the balloon has approximately a 0.4 percent chance of reaching float altitude within PMNM and a 20 percent chance of entering PMNM after reaching float altitude. These probabilities are further reduced when NASA and the U.S. Navy apply the project's established Go/No Go criteria.

Additionally, to further mitigate (reduce) the potential for environmental impact, Nihoa Island and the Special Management Area would be excluded and one of two scenarios would occur: (1) the LDSD Program would initiate the SFDT in such a manner that expended flight hardware would be recovered before drifting into the excluded area; or (2) the flight system would overfly the excluded area, and the Test Vehicle would be dropped outside 5.5 km (3 nm) from Nihoa Island. In letters to the State Historic Preservation Division (SHPD) and the Office of Hawaiian Affairs (OHA), NASA determined that there will be no archaeological/traditional Native Hawaiian sites or historic properties affected by the proposed activities. These letters stated, in accordance with the regulations that implement Section 106 of the National Historic Preservation Act, that if NASA had not received further comment from these offices within 30 days, the LDSD project would assume concurrence with the determination. No responses were received; therefore, NASA assumes that SHPD and OHA concur with this determination.

#### **PUBLIC INVOLVEMENT:**

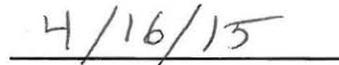
NASA notified the public of the availability of the Draft SEA through a combination of mailed correspondence and published notices in local newspapers. The Draft SEA was also available for public review on the Internet and at local libraries. NASA provided a 30-day public comment period on the Draft SEA. Minor comments were received from NOAA's Office of National Marine Sanctuaries and have been incorporated into the Final LDSD SEA.

**CONCLUSION:**

On the basis of the LDSD SEA and underlying reference documents, NASA has determined that the environmental impacts associated with this Proposed Action will not individually or cumulatively have a significant impact on the quality of the human environment. Accordingly, the requirements of NEPA and CEQ and NASA implementing regulations are fulfilled, and an environmental impact statement is not required.



Stephen Jurczyk  
Associated Administrator  
Space Technology Mission Directorate



Date