



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

INCIDENTAL HARASSMENT AUTHORIZATION

Space Exploration Technology Corporation (SpaceX) is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(D)) to harass marine mammals incidental to recovery of Falcon 9 rockets at Vandenberg Air Force Base in California, and at contingency landing locations in the Pacific Ocean, when adhering to the following terms and conditions.

1. This Incidental Harassment Authorization (IHA) is valid from December 1, 2017 through November 30, 2018.
2. This IHA is valid only for Falcon 9 First Stage recovery activities at Vandenberg Air Force Base (VAFB), California, and at auxiliary landing sites offshore.
3. General Conditions
 - (a) A copy of this IHA must be in the possession of SpaceX, its designees, and work crew personnel operating under the authority of this IHA.
 - (b) The species authorized for taking are listed in Table 1. The taking, by Level B harassment only, is limited to the species and numbers listed in Table 1. Any taking exceeding the authorized amounts listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this IHA.
 - (c) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in Table 1, or any taking of any species of marine mammal other than those listed in Table 1, is prohibited and may result in the modification, suspension, or revocation of this IHA.
4. Mitigation Requirements

The holder of this Authorization must implement the following mitigation measures:

 - (a) Unless constrained by other factors including human safety or national security concerns, launches must be scheduled to avoid boost-backs and landings during the harbor seal pupping season of March through June when practicable.
5. Monitoring

The holder of this Authorization must conduct marine mammal and acoustic monitoring as described below.

 - (a) To conduct monitoring of Falcon 9 First Stage recovery activities, SpaceX must designate qualified, on-site individuals approved in advance by NMFS;



- (b) If sonic boom model results indicate that a peak overpressure of 1.0 pounds per square foot (psf) or greater is likely to impact VAFB, then acoustic and biological monitoring at VAFB must be implemented;
- (c) If sonic boom model results indicate that a peak overpressure of 1.0 psf or greater is predicted to impact the Channel Islands between March 1 and June 30, greater than 1.5 psf between July 1 and September 30, and greater than 2.0 psf between October 1 and February 28, monitoring of pinniped haulout sites on the Channel Islands must be implemented;
- (d) Monitoring must be conducted at the haulout site closest to the area predicted to experience the greatest sonic boom intensity, when practicable;
- (e) If Falcon 9 First Stage recovery activities are scheduled during daylight, time-lapse photography or video recording must be used to document the behavior of marine mammals during Falcon 9 First Stage recovery activities;
- (f) If Falcon 9 First Stage recovery activities are scheduled during nighttime, night vision devices must be used by monitors to observe pinniped behavior;
- (g) Monitors must conduct hourly pinniped counts for 6 hours per day on the day of the Falcon 9 launch. Hourly pinniped counts shall be centered around the launch time when events occur during daylight hours. For nighttime events, hourly pinniped counts shall be conducted from daybreak to 6 hours after daybreak;
- (h) Monitors must remain at the monitoring location until pinniped behavior is observed to return to normal, when practicable;
- (i) Monitoring must be conducted for at least 72 hours prior to any planned Falcon 9 First Stage recovery and continue until at least 48 hours after the event;
- (j) Monitoring must include multiple surveys each day that record the species, number of animals, general behavior, presence of pups, age class, gender and reaction to noise associated with Falcon 9 First Stage recovery, sonic booms or other natural or human caused disturbances, in addition to recording environmental conditions such as tide, wind speed, air temperature, and swell;
- (k) Monitors must document marine mammal responses to noise associated with Falcon 9 First Stage recovery activities using the categories shown in Table 2.
- (l) For Falcon 9 First Stage recovery activities that occur from March through June, follow-up surveys of harbor seal haulouts on VAFB will be conducted within two weeks of the Falcon 9 First Stage recovery;
- (m) If sonic boom model results indicate a peak overpressure of 1.0 psf or greater is likely to impact VAFB during January or February, then acoustic and biological monitoring must be implemented at northern elephant seal rookeries at VAFB, when practicable;
- (n) Acoustic measurements of the sonic boom created during boost-back at the monitoring location must be recorded to determine the overpressure level.

6. Reporting

The holder of this Authorization is required to:

- (a) Submit a report to the Office of Protected Resources, NMFS, and the West Coast Regional Administrator, NMFS, within 60 days after each Falcon 9 First Stage recovery action. This report must contain the following information:
- (1) Date(s) and time(s) of the Falcon 9 First Stage recovery action;
 - (2) Design of the monitoring program; and
 - (3) Results of the monitoring program, including, but not necessarily limited to:
 - (i) Numbers of pinnipeds present on the haulout prior to the Falcon 9 First Stage recovery;
 - (ii) Numbers of pinnipeds that may have been harassed as a result of Falcon 9 First Stage recovery activities;
 - (iii) For pinnipeds estimated to have been harassed as a result of Falcon 9 First Stage recovery noise, the length of time pinnipeds remained off the haulout or rookery;
 - (iv) Any other observed behavioral modifications by pinnipeds that were likely the result of Falcon 9 First Stage recovery activities, including sonic boom; and
 - (v) Results of acoustic monitoring including comparisons of modeled sonic booms with actual acoustic recordings of sonic booms.
- (b) Submit an annual report on all monitoring conducted under the IHA. A draft of the annual report must be submitted within 90 calendar days of the expiration of this IHA, or, within 45 calendar days of the requested renewal of the IHA (if applicable). A final annual report must be prepared and submitted within 30 days following resolution of comments on the draft report from NMFS. The annual report will summarize the information from the 60-day post-activity reports, including but not necessarily limited to:
- (1) Date(s) and time(s) of the Falcon 9 First Stage recovery action;
 - (2) Design of the monitoring program; and
 - (3) Results of the monitoring program, including, but not necessarily limited to:
 - (i) Numbers of pinnipeds present on the haulout prior to the Falcon 9 First Stage recovery;
 - (ii) Numbers of pinnipeds estimated to have been harassed as a result of Falcon 9 First Stage recovery activities at the monitoring location;
 - (iii) For pinnipeds estimated to have been harassed as a result of Falcon 9 First Stage recovery noise, the length of time pinnipeds remained off the haulout or rookery;
 - (iv) Any other observed behavioral modifications by pinnipeds that were likely the result of Falcon 9 First Stage recovery activities, including sonic boom;
 - (v) Any cumulative impacts on marine mammals as a result of the activities, such as long term reductions in the number of pinnipeds at haulouts as a result of the activities; and
 - (vi) Results of acoustic monitoring including comparisons of modeled sonic booms with actual acoustic recordings of sonic booms.

(c) Reporting injured or dead marine mammals:

- (1) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA (as determined by the lead marine mammal observer), such as an injury (Level A harassment), serious injury, or mortality, SpaceX will immediately cease the specified activities and report the incident to the NMFS Office of Protected Resources ((301) 427-8401) and the NMFS West Coast Region Stranding Coordinator ((562) 980-3230). The report must include the following information:
 - (i) Time and date of the incident;
 - (ii) Description of the incident;
 - (iii) Status of all Falcon 9 First Stage recovery activities in the 48 hours preceding the incident;
 - (iv) Description of all marine mammal observations in the 48 hours preceding the incident;
 - (v) Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, and visibility);
 - (vi) Species identification or description of the animal(s) involved;
 - (vii) Fate of the animal(s); and
 - (viii) Photographs or video footage of the animal(s).

Activities will not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with SpaceX to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. SpaceX may not resume their activities until notified by NMFS via letter, email, or telephone.

- (2) In the event that SpaceX discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.*, in less than a moderate state of decomposition), SpaceX will immediately report the incident to the NMFS Office of Protected Resources ((301) 427-8401) and the NMFS West Coast Region Stranding Coordinator ((562) 980-3230). The report must include the same information identified in 6(c)(1) of this IHA. Activities may continue while NMFS reviews the circumstances of the incident and makes a final determination on the cause of the reported injury or death. NMFS will work with SpaceX to determine whether additional mitigation measures or modifications to the activities are appropriate.
- (3) In the event that SpaceX discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, scavenger damage), SpaceX will report the incident to the NMFS Office of Protected Resources ((301) 427-8401) and the NMFS West Coast Region Stranding Coordinator ((562) 980-3230), within 24 hours of the discovery. SpaceX will provide photographs or video

footage or other documentation of the stranded animal sighting to NMFS. The cause of injury or death may be subject to review and a final determination by NMFS.

7. Modification and suspension

- (a) This IHA may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein, or if NMFS determines that the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.



Donna S. Wieting,
Director,
Office of Protected Resources,
National Marine Fisheries Service.

NOV 30 2017

Date

Table 1. Numbers of Incidental Take of Marine Mammals Authorized

Species	Number of Takes by Level B Harassment Authorized
Pacific Harbor Seal	16,608
California Sea Lion	45,000
Northern Elephant Seal	2,724
Steller Sea Lion	240
Northern Fur Seal	3,000
Guadalupe Fur Seal	12

Table 2. Classifications of Levels of Pinniped Behavioral Disturbance on Land

Level	Type of response	Definition	Classified as behavioral harassment by NMFS
1	Alert	Head orientation or brief movement in response to disturbance, which may include turning head towards the disturbance, craning head and neck while holding the body rigid in a u-shaped position, changing from a lying to a sitting position, or brief movement of less than twice the animal's body length.	No
2	Movement	Movements in response to the source of disturbance, ranging from short withdrawals at least twice the animal's body length to longer retreats over the beach, or if already moving a change of direction of greater than 90 degrees.	Yes
3	Flush	All retreats (flushes) to the water.	Yes