Suspension of the Closing Date of the Comment Period

The terrorist attacks of September 11, 2001 on the World Trade Center and the Pentagon caused the FAA to temporarily cease all non-military flights in the United States and required airports and airlines to adopt certain security measures prior to the resumption of commercial service. In response to the new security requirements and lowered passenger demand, several, airlines have reduced the number of aircraft operations below previously planned levels throughout the national airport system, including LGA. These factors, at least in the short-run, have contributed to a significant decrease in airport congestion at LGA. In addition, the FAA has received a joint request (dated September 28, 2001) by the Air Transport Association, Regional Airline Association, National Air Carrier Association, American Association of Airport Executives, and the Cargo Airline Association for the FAA to suspend indefinitely its consideration of alternative demand management policy options or at a minimum extend the comment period by 180 days. In a letter dated October 8, 2001, the Air Carrier Association of America disagrees that all issues addressed in the June 12, 2001, **Federal Register** notice be delayed for any time period.

In these circumstances, the FAA has determined that it would be reasonable and in the public interest to suspend until further notice the closing date of the comment period for the notice 65 FR 31731, June 12, 2001. At the appropriate time, FAA will publish an advance notice giving the new closing date and an indication whether the scope or nature of the demand management options under consideration have changed.

Issued on October 9, 2001 in Washington, DC.

John M. Rodgers,

Director of the Office of Aviation Policy and Plans.

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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Record of Decision

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Record of decision: Programmatic Environmental Impact Statement for Licensing Launches.

SUMMARY: The FAA prepared a Final Programmatic Environmental Impact Statement for Licensing Launches (PEIS), to evaluate the potential environmental consequences of licensing launches. After reviewing and analyzing currently available data and information on existing conditions, potential environmental impacts, and alternative measures to mitigate those impacts, the FAA Associate Administrator for Commercial Space Transportation (AST) finds that the proposed action of licensing launches, as described in the PEIS, is not a major Federal action that would significantly affect the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969. The information in this PEIS is not intended to address all site-specific launch issues including localized effects. This PEIS is intended to serve as a tiering document to assist commercial launch operators in preparing site-specific documentation. Any additionally required site-specific environmental documentation will be developed as needed prior to FAA approval of proposed licensing activities. Localized effects and any cumulative impacts at individual launch sites are appropriately analyzed in the environmental review of a launch site operator.

This PEIS assesses the potential environmental effects of licensing launches from ignition, liftoff, and ascent through the atmosphere to orbit, the disposition of launch vehicle (LV) components down range, and controlled reentry of reusable launch vehicles. Additional launch activities (including vehicle assembly, payload preparation prior to liftoff, payload functioning during useful life, and payload reentry whether controlled or uncontrolled) were determined to be outside the scope of the PEIS.

FOR FURTHER INFORMATION CONTACT: Ms. Michon Washington, Office of the Associate Administrator for Commercial Space Transportation, Space System Development Division, Suite 331/AST–100, 800 Independence Ave., SW., Washington, DC 20591; phone (202) 267–9305, or refer to the following Internet address: *http://ast.faa.gov*

Introduction

This Record of Decision (ROD) provides final FAA approval for a program to issue launch licenses to United States (U.S.) citizens or for licensed launches within the United States. The FAA has concluded that there are no significant short-term or long-term effects to the human environment resulting from this licensing program. The proposed Federal action is consistent with the purpose of national environmental policies and objectives as set forth in NEPA and will not significantly affect the quality of the human environment.

Background

The Commercial Space Launch Act of 1984 (the Act) (49 U.S.C. 70101–70121), authorizes the Department of Transportation, and through delegations, the FAA, to oversee, license, and regulate launch and reentry activities and the operation of launch and reentry sites as carried out by U.S. citizens or within the United States. 49 U.S.C. 70104, 70105. The Act directs the FAA to exercise the responsibility consistent with public health and safety, safety of property, and the national security and foreign policy interests of the United States. 49 U.S.C. 70105. The FAA is also responsible for encouraging, facilitating, and promoting launches by the private sector. 49 U.S.C. 70103. The FAA first licensed a launch in 1989.

In the past three decades, space has become increasingly important in a broad range of areas including scientific research, communications, and navigation. Human advancements in technologies such as telecommunications and microgravity crystal growth are leading to increased demand for access to space because of its unique environment and are being developed for direct commercial application. These new technologies and industry's desire to market them, have created the need for increased access to space. Based on the FAA's proprietary model used to project launch manifests, the demand for access to space cannot be met by the current or foreseeable U.S. government procured launch vehicles (LVs) (*see* Section 2.1 of the PEIS). Therefore, the commercial launch program is critical to ensure that the U.S. remains in the forefront of commercial space development. Current U.S. space policy requires that the U.S. government encourage private sector and state and local government investment and participation in the development and improvement of U.S. launch systems and infrastructure.

Along with the technological advancements which increase the demand for space access, the private sector has expressed heightened interest in conducting launches. These types of launches have previously been conducted only by the Federal government. However, now the commercial launch industry is attempting to promote convenient, affordable access to space, while

satisfying the payload lift requirements of the space industry, and promoting the commercial development of space.

Under the authority of 49 U.S.C. Subtitle IX, ch. 701, the FAA determines whether to issue a launch license. Issuing a launch license is considered a major federal action and is therefore subject to NEPA review. In order to meet the need for commercial access to space and comply with the requirements of 49 U.S.C. Subtitle IX, ch. 701, the FAA regulation 14 CFR 415.101, Environmental Review, and NEPA, the FAA prepared a PEIS for Licensing Launches. This type of document is permitted by the Council on Environmental Quality (CEQ) in the Implementation of Procedural Provisions of NEPA (Preamble to Final Regulations) 43 FR 55978 (November 29, 1978.) (*See also* CEQ regulations at 40 CFR 1500.4, 1502.4, 1502.20, and 1508.28 and FAA Order 1050.1D, paragraph 88.) ''Material common to many actions may be covered in a broad EIS, and then through tiering may be summarized and incorporated in each subsequent EIS.''

In February 1986, the FAA published a Programmatic Environmental Assessment for Commercial Expendable Launch Vehicle Programs. The document provided information on the impacts of expendable launch vehicles based on the known effects in existing documentation for U.S. government expendable launch vehicle programs. This document did not address site-specific aspects of launches.

The PEIS will update and replace the 1986 programmatic environmental assessment. A Notice of Intent was published in the **Federal Register** on November 27, 1995 announcing the preparation of a PEIS addressing the potential effects of licensing expendable launches. The notice stated that FAA would conduct a public scoping meeting if sufficient interest was expressed. Although no one expressed an interest in FAA conducting public scoping meetings, written comments were received. These comments have been summarized in the PEIS. In addition to the announcement of the written comment period on the Draft EIS, the FAA requested comments directly from Federal agencies, industry, and individuals who expressed an interest in being included on the distribution list. The second volume of the Final PEIS summarizes the comments received and set forth the FAA's responses.

The Final PEIS considers, at the programmatic level, the environmental impacts of licensing launches. The Final PEIS also analyzes in detail the potential environmental impacts of the estimated 261 U.S. licensed launches that will result from the proposed licensing program between 2000 and 2010. Included in the analysis are potential environmental impacts resulting from ignition and lift-off to payload separation, the deposition of LV components downrange and controlled reentry of reusable launch vehicles. Site-specific, localized environmental effects will be subject to project specific environmental reviews as part of the licensing process.

Proposed Agency Action

The preferred alternative for the PEIS is the Launch Licensing Alternative. The PEIS analyzes impacts by examining the following characteristics of LVs and LV launch profiles:

- Payload capacity (the mass an LV can lift into a particular orbit),
- Types of propulsion systems (the mechanisms that change the mass and velocity of the vehicle), and
- Launch platforms—ground, air, or sea-based.

Environmental Impacts of the Proposed Action and Alternatives

Launch licenses are needed to provide a mechanism for ensuring protection of public health and safety. U.S. laws and policy and international treaties recognize the technological and economic importance of developing space transportation. The FAA's launch review and licensing procedures are necessary to ensure that launch applicants meet conditions designed to protect the public health and safety, safety of property, and national security and foreign policy interests. These conditions include:

- Adhering to launch safety regulations and procedures,
- Complying with requirements concerning pre-launch record keeping and notifications, including those pertaining to federal airspace restrictions and military tracking operations,
- Complying with federal inspection, verification, and enforcement requirements, and
- Securing the minimum amount of third-party liability insurance specified by the DOT.

Five alternatives were considered in the PEIS in addition to the preferred alternative. Three of these alternatives were considered but not retained for detailed study in the PEIS because they were determined not to be feasible. These alternatives include the Non-Solid Propellant Alternative, More Environmentally-Friendly Vehicles Alternative, and Composite Vehicle Construction Alternative. The Non-Solid Propellant Alternative would require the FAA to preferentially license only those vehicles that use liquid or hybrid fuels. Implementing this alternative would eliminate the majority of licensed launches by existing launch service providers. The More Environmentally-Friendly Vehicles Alternative would require the FAA to stop licensing launches until such time that a new launch vehicle is designed that causes no adverse impacts to the environment. At this time, the development of such technology is not reasonably foreseeable or sufficiently practicable. Also, this alternative would put additional pressure on foreign markets to keep up with the increased demand while prohibiting the FAA from fulfilling its mandated responsibility for encouraging, facilitating, and promoting launches by the private sector. Finally, the Composite Vehicle Construction Alternative would require the FAA to preferentially license those launches using vehicles that are constructed entirely of composite materials which would make the vehicle lighter and therefore, not require as much fuel to reach orbit. However, again these vehicles do not currently exist and there are no realistic plans to develop them.

Based on a systematic evaluation of the full range of potential alternatives, three alternatives were carried forward for detailed assessment of environmental impacts. They include, the Preferred Alternative, the More Environmentally-Friendly Propellant Combinations Alternative, and the No Action Alternative.

Preferred Alternative; Under this alternative, the FAA would license launches. The licensing process would follow specifications as set forth in the Act and its implementing regulations. This alternative would allow U.S. licensed launch providers to meet the needs of U.S. companies that want to launch satellites; thus, decreasing the need for U.S. companies to look to foreign launch providers to launch U.S. satellites.

More Environmentally-Friendly Propellant Combination Alternative; Under this alternative, the FAA would preferentially license those launches that produce less harmful tropospheric and stratospheric air emissions of hydrogen chloride (HCl) and aluminum oxide (Al_2O_3) which are associated with solid rocket motor (SRM) propellants. Therefore, the FAA would preferentially license launches of LVs with no SRMs or with combinations of SRMs and liquids. Preferentially licensing those launches with LVs that are not solely propelled by SRMs would reduce the

total number of licensed launches projected through 2010. The number of launches using liquid, liquid/solid, or hybrid propellant systems was assumed to remain unchanged under this alternative. Thus, the total number of FAA-licensed launches in the U.S. or by U.S. citizens (i.e., programmatic launches) would decrease substantially under this alternative. It is assumed that the decrease in U.S. licensed launches using only solid propellants would be compensated for by the increase in these launches elsewhere in the world, because the same number of payloads would still be produced and need to be launched (see Section 2.4.1 of the PEIS) and it is likely that a similar size and type of launch vehicle would be employed.

No Action Alternative; Under this alternative, the FAA would not issue licenses for launches. Because 49 U.S.C. Subtitle IX, ch. 701 requires launches within the United States or conducted by U.S. citizens to be licensed, the U.S. launch industry would be unable to provide licensed launches, regardless of launch location. In addition, it is possible that worldwide demand for licensed launches would decline if the U.S. were no longer in the commercial space launch market. However, it is more likely that companies in need of launch services would procure these services from another country. This alternative would prohibit the FAA from overseeing, licensing, and regulating launch and reentry sites as carried out by U.S. citizens or within the United States. In addition, the FAA could not fulfill its mandated responsibility for encouraging facilitating and promoting launches by the private sector.

There are three major categories of environmental impacts examined for the preferred alternative, more environmentally-friendly propellants alternative, and no action alternative; they include: Atmospheric, noise, and other environmental impacts. The atmospheric category analyzes impacts to air quality, and includes an analysis of acid rain, ozone depletion, and global warming. The noise category includes an analysis of launch, in-flight, and reentry noise on various human and animal receptors. The final category, other environmental effects includes analyses of impacts to water, land, and biota, as well as analyses of socioeconomic, historical, cultural and archaeological impacts. Cumulative impacts are discussed in a separate section of this document. The environmental impacts of each alternative are summarized in detail below.

Preferred Alternative

The launch licensing alternative is the preferred alternative under which the FAA would license launches. Licenses would be issued in accordance with the specifications set out in 49 U.S.C. Subtitle IX, ch. 701 and supporting regulations. Under this alternative, some site-specific NEPA and other environmental review would still be required, prior to issuing launch licenses.

Atmospheric Impacts

The atmospheric impacts of the preferred alternative are addressed for all levels of the atmosphere. The primary impacts to the troposphere may result from the ground cloud, the cluster of emissions formed from the ignition of rocket motors and the resulting launch of the LV. Other potential impacts to the troposphere could result from accidents on the launch pad or during initial LV flight. In the stratosphere, LV emissions could potentially affect global warming (the greenhouse gas effect) and the depletion of the stratospheric ozone layer. The potential LV emissions that may affect global warming include water vapor and CO_2. The estimated water vapor and CO_2 emissions from LVs constitute a very small fraction of emissions of these substances from other sources. Consequently, as discussed in Section 5.1.2 of the PEIS, the impacts of LV emissions on global warming are expected to be insignificant. In this analysis, no impacts are predicted to the mesosphere during normal launches because air emissions are not an issue in this region of the atmosphere. Some exhaust products from LVs generated during launch and vehicle flight have been found to have a temporary effect on electron concentrations in the F layer of the ionosphere. However, as discussed in Section 5.1.5, these effects have been found to dissipate quickly (within minutes) and are therefore found to be insignificant.

Noise Impacts

The noise impacts of the preferred alternative were also considered, particularly the impact of sonic booms. A sonic boom is the noise created by a shock wave when an aircraft or LV is traveling overhead faster than the speed of sound. As discussed in Section 5.2.1 of the PEIS, there was no indication of possible health impacts from the preferred alternative. While annoyance data have not been validated, people may be more sensitive to sonic booms than previously thought. The type of interference and the activities that people were engaged in prior to the interference affect annoyance levels, and a wide range exists in estimating the percent of people annoyed. However, preliminary data indicate that people perceive sonic booms as more intrusive than aircraft noise at comparable levels. Structural damage to facilities may occur as a result of overpressure. Overpressure is a transient pressure, that occurs as a result of an explosion, that exerts a force that exceeds the standard atmospheric pressure. Approximately one in 10,000 panes of glass may be broken at an overpressure of four pounds per square foot. LVs can possibly produce an overpressure in the two to three pounds per square foot range and would only affect structures under the flight path. Flight paths could be altered to avoid overflight of sensitive structures and therefore launches of LVs would have insignificant impacts from noise.

Land and Water

Impacts to soil may include temporary increases in available metals and temporary decreases in pH. Impacts to surface water may include temporary increases in available metals and temporary decreases in pH. For each of the six environment types evaluated in the PEIS, the buffering capacity of the soil and water were found to be sufficient to prevent significant impacts from launches (see Sections 5.3.2 and 5.3.3 of the PEIS).

Biological Resources

Chronic impacts could result from subtle changes in habitat and the potential for bioaccumulation (a progressive increase of the bodily content of a toxic compound) of pollutants that may be released into the environment from launch-related activities. Impacts to biological resources from repeated LV emissions close to the source can include fish kills and/or mortality of terrestrial fauna. Flora in the vicinity of the launch site may be affected by the launch exhaust products or from combustion products associated with catastrophic events. However, a study of the impact of ten years of Space Shuttle launches on the local biota, soil, and water has not found significant impacts on these resources.

Launches also present a potential for acute impacts to fish and wildlife in the vicinity of the launch pad resulting from noise, blast debris, heat, and toxic chemicals. The possibility of acute noise impacts depends on the size and type of LVs being launched or reentering. In general, the potential for impacts to biological resources from LV heat

exhaust is mitigated by the use of berms or shields. In addition, environmental monitoring following launch failures has not indicated discernable impacts on sensitive receptors.

There is a remote possibility that jettisoned motors, stages, or fairings from an expendable launch vehicle could strike a marine animal when impacting the ocean during normal flight operations. According to the marine animal strike probability analysis conducted for the PEIS, fewer than 0.5 animal strikes are expected annually, even when all launch activity is summed and a summation is done across all species over both the Atlantic and Pacific Oceans (see Appendix B of the PEIS). For the purpose of this PEIS, a ''strike'' refers to harassment, injury, or death of a marine animal. The strike probability estimate does not indicate potential for a significant impact from launches.

Socioeconomic Impacts

Development and growth of a commercial launch industry would have a beneficial economic impact. Jobs associated with the commercial launch industry tend to be technology-based and require highly skilled workers with specialized training and education.

Environmental Justice Impacts

The PEIS considered environmental justice impacts in a general, non-site specific manner. Thus, environmental justice effects within the scope of this analysis are related to socioeconomic effects. The PEIS did not identify any significant environmental impacts from the preferred alternative. Therefore, no disproportionately high and adverse environmental impacts on any low-income or minority populations are expected as a result of the preferred alternative. Impacts to individuals and communities would be considered in site-specific environmental documentation. This analysis assumes that the preferred alternative would result in positive socioeconomic effects, including maintaining or increasing current employment levels in the U.S. launch industry, it is assumed that these positive effects would at a minimum not produce disproportionate negative impacts on minority or low-income populations (see Section 5.5 of the PEIS).

More Environmentally-Friendly Propellant Combination Alternative

Atmospheric Impacts

Potential impacts to the atmosphere from the more environmentally-friendly propellant combination alternative were examined for each atmospheric layer. The impacts from this alternative to the mesosphere and ionosphere are expected to be the same as the impacts from the preferred alternative, because this alternative does not affect emissions in those regions of the atmosphere. Potential impacts to the troposphere and stratosphere from this alternative are discussed below. It is important to note that conclusive data and analyses regarding the specific impacts of emissions from multiple combination propellant propulsion systems (e.g., liquid and solid combinations) currently do not exist. Because the environmental impacts from multi-propellant or hybrid propulsion systems have not been adequately characterized at this time, this analysis relies on existing, available data on emissions from conventional propellant systems. Ongoing U.S. Air Force and industry research in this area may alter the future understanding of the cumulative atmospheric impacts of multi-propellant propulsion systems and the relative atmospheric impacts of these different systems.

The expected emission load of HCl in the stratosphere for all projected U.S. licensed launches from 2000 through 2010 (a period of 11 years) is approximately 1,787 tons, and additional free Chlorine (Cl) load is 24 tons. This averages to approximately 165 tons of HCl and Cl load to the stratosphere from U.S. licensed launches per year. In comparison, under the preferred alternative, the emission load of HCl in the stratosphere for all projected U.S. licensed launches from 2000 through 2010 is approximately 2,292 tons, and additional free Cl load is 31 tons. This averages to approximately 211 tons of HCl and Cl load to the stratosphere from U.S. licensed launches per year. In general, emissions of concern resulting from potential accidents on the launch pad and from activation of flight termination systems would also be reduced under this more environmentally-friendly propellant combinations alternative, because LVs using only solid propellant systems would no longer be licensed by the FAA (*see* Section 6.1 of the PEIS).

Noise Impacts

As discussed in Section 6.2 of the PEIS, due to the expected decrease in the number of U.S. licensed launches, this alternative is anticipated to have fewer noise impacts than those associated with the preferred alternative.

Land and Water

The more environmentally-friendly propellant combinations alternative would reduce the impacts of licensed launches on soils in the vicinity of launch pads (*see* Section 6.3 of the PEIS). Space Shuttle and other government launches using solids would still have an impact on soil pH, but the cumulative effects from these launches, as a result of fewer licensed launches involving only solid propellants, would not be as great. The additional impact to local water resources near a launch site from FAA licensed launches would also be reduced (see Section 6.4 of the PEIS). Additionally, coastal waters that could be affected in the event of an accident would experience reduced impacts due to the lack of use of solely SRM propelled vehicles.

Biological Resources

Vegetation changes due to acid deposition from the ground cloud at launch, as well as wildlife impacts from launch activities, would be reduced. However, the demand for launches could lead to construction of launch sites outside the U.S. As discussed in Section 6.5 of the PEIS, these launch sites could potentially have a significant impact on biodiversity if they are sited on or near endangered or biologically fragile ecosystems (*i.e.,* rain forests or habitats of endangered species). The probability of jettisoned expendable LV sections (e.g., payload fairings or stages) striking a marine animal would remain remote under this alternative.

Socioeconomic Impacts

Development and growth of the commercial launch industry would have a beneficial economic impact; limiting this development and growth by preferentially licensing a subset of launches of LVs would reduce the magnitude of this beneficial impact relative to the preferred alternative (*see* Section 6.6 of the PEIS).

Environmental Justice Impacts

This PEIS considered environmental justice impacts in a general non site-specific manner. Thus, environmental justice effects within the scope of this analysis are related to the socioeconomic effects. Because this analysis has shown no significant environmental effects from this alternative and further assumes that this alternative would result in positive socioeconomic effects (although less positive relative to the preferred alternative), including maintaining or increasing current employment levels in the U.S. launch industry, it is assumed that these positive effects would, at a minimum, not produce disproportionate negative impacts on minority racial,

ethnic, or economically-disadvantaged populations (*see* Section 6.7 of the PEIS).

No Action Alternative

Because 49 U.S.C. Subtitle IX, ch. 701—Commercial Space Launch Activities, formerly the Commercial Space Launch Act (CSLA) requires launches by U.S. entities to be licensed, the U.S. launch industry would be unable to continue LV launch operations regardless of their location, under the no action alternative. Chapter 701 requires FAA to license a launch if the applicant complies and will continue to comply with chapter 701 and implementing regulations. 49 U.S.C. 70105. One of the purposes of chapter 701 is to provide that the Secretary of Transportation, and therefore the FAA, pursuant to delegations, oversees and coordinates the conduct of launch and reentry, and issues and transfers licenses authorizing those activities. 49 U.S.C. 70104 (b)(3). The agency has the authority to prevent a launch if it decides that the launch would jeopardize public health and safety, safety of property, or national security or a foreign policy interest of the United States. 49 U.S.C. 70104 (c). Not licensing any U.S. launches would not be consistent with chapter 701 in this context. Additionally, the no action alternative could negatively impact the national security and foreign policy interests of the United States. Some U.S. government payloads have been launched by the U.S. commercial launch industry. Therefore, if launches were not licensed, the overall reduction in available payload capacity could, in a worst case scenario, impact the U.S. government's ability to launch needed payloads and negatively affect programs that rely on access to space. Additionally, parties that had planned to launch from U.S. launch sites would be forced to find alternatives potentially exposing sensitive technologies to countries with competing economic and security interests.

Under the no action alternative it was assumed that the same number of worldwide commercial launches would take place. However, because the FAA would cease issuing licenses for launches by U.S. companies, the launches would take place using foreign launch providers and locations. In the absence of access to licensed launches in the United States, it is likely that other countries with existing launch programs (*e.g.*, France, Russia, China, and Canada) would significantly expand their programs to accommodate the demand. In addition, it is possible that countries without existing launch programs would initiate commercial launches to meet this worldwide demand.

Atmospheric Impacts

It is possible that if no licensed launches could take place from the U.S., then fewer LVs would be launched overall worldwide unless existing foreign launch programs could expand rapidly to accommodate increased launch requirements. As discussed in Section 7.1 of the PEIS, this would result in an overall decrease globally in launch emissions that potentially affect the atmosphere. However, based on the comparison of capacity and propulsion systems, the transfer of launches from U.S. LVs to foreign LVs (*e.g.*, Zenit (Russia), Proton (Russia), Ariane IV and V (France), Long March (China), H2 (Japan), GSLV (India), PSLV (India), and M–V (Japan)) could cause an increase in atmospheric emissions overall. Any specific effects that might be associated with launches such as the potential for acid rain, and highly transient and localized stratospheric ozone depletion, would occur outside the U.S. However, the potential for global warming and stratospheric ozone depletion would remain essentially the same based on the assumption that an equal number of launches would occur in either case.

Noise Impacts

The prospect of noise and sonic booms near U.S. launch sites from licensed launches would be eliminated (see Section 7.2 of the PEIS).

Land and Water

If no licensed launches occurred, there would be no impact on the soils in the vicinity of launch pads at U.S. launch sites. Space Shuttle and other government launches would still have an impact on soil pH, but the cumulative effects from these launches, absent licensed launches, would not be as great (see Section 7.3 of the PEIS). Similarly, the prospect of local water impacts near U.S. licensed launch sites would be eliminated, and coastal waters that could be affected in the event of an accident would no longer be impacted (see Section 7.4 of the PEIS).

Biological Resources

Vegetation changes from the launch ground cloud would be eliminated, as well as impacts to wildlife from launch activities. However, the increased demand for launches could lead to construction of launch sites outside the U.S. As discussed in Section 7.5 of the PEIS, these launch sites could potentially have a significant impact on worldwide biodiversity if they were sited on or near endangered or biologically fragile ecosystems (i.e., rainforest or habitats of endangered species). The probability of jettisoned expendable launch vehicle sections (*e.g.*, spent SRMs, payload fairings, or stages) striking a marine animal would remain remote.

Socioeconomic Impacts

The no action alternative could have negative socioeconomic impacts by forcing all payloads currently planned for licensed launches in the U.S. to use foreign launch vehicles (see Section 7.6 of the PEIS). As a result, U.S. jobs would be lost to foreign entities to support their launch activities and programs. It is also possible that U.S. telecommunication companies and other U.S. space users would be given lower priority for launching satellites, creating a potential for scheduling problems and loss of competitiveness in the global technology market.

Environmental Justice Impacts

The no action alternative would create no significant environmental effects and thus would not disproportionately affect minority or disadvantaged populations. However, because the no action alternative would have negative socioeconomic impacts that may result in a loss of U.S. jobs to foreign entities, it is possible that minority or low-income populations could suffer some disproportionate effects of these job losses (see Section 7.7 of the PEIS).

Potential Cumulative Impacts of Launches

This section considers the potential cumulative impacts of launch events. Cumulative impacts are defined as impacts to the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7). Only the cumulative atmospheric impacts of licensed launches combined with all other launches worldwide were analyzed. Other cumulative impacts, including most cumulative noise and local environmental impacts, would be site-specific and are beyond the scope of this PEIS. Other cumulative impacts would be considered in site-specific documentation.

Cumulative Atmospheric Impacts

The cumulative impact of all tropospheric emissions loadings from launches is relatively insignificant

compared with industrial and natural emissions loadings to the troposphere (see Section 8.1.1 of the PEIS).

As discussed in Section 8.1.2 of the PEIS, the cumulative impacts of launches on global warming and depletion of the stratospheric ozone layer are insignificant compared to other global industrial sources. The cumulative impact on stratospheric ozone depletion from launches is far below and indistinguishable from the effects from other natural and man-made sources.

The PEIS does not predict any cumulative impacts to the mesosphere or ionosphere (see Sections 8.1.3 and 8.1.4 of the PEIS). The greater the number of vehicles that are launched, the greater the potential for creating ''holes'' in the ionosphere; however, based on available data indicating that this effect is temporary, the cumulative impacts to the ionosphere are assumed to be extremely small.

When an accident occurs near the launch pad or a launch anomaly forces the use of in-flight termination capabilities (if equipped), there is a cumulative effect on air quality, potential global warming, and stratospheric ozone depletion (see Section 8.1.5 of the PEIS). For accidents that occur in the stratosphere, HCl and nitrogen oxides emissions could potentially contribute to stratospheric ozone depletion, while carbon dioxide emissions could potentially contribute to global warming. Although on a cumulative basis the likelihood of accidents occurring increases as the number of launches increases, accidents involving launch vehicles are relatively uncommon events primarily because launches of these vehicles are infrequent events especially as compared to other traditional modes of transportation.

Cumulative Noise Impacts

In general, the potential cumulative impacts of noise from LV launches are expected to be local effects that are expected to impact the area around the launch pad (see Section 8.2 of the PEIS). However, an important possible cumulative noise impact might include changes in the migrating route and habitat selection of certain marine animals exposed to repeated occurrences of sonic booms caused by the flight and reentry of LVs.

Irreversible and Irretrievable Commitment of Resources

The launch of LVs requires the commitment of natural resources, including the consumption of mineral resources. No additional cultural resources, whether human or land resources, are expected to be committed to the launching of LVs beyond those that have been or will be addressed in site-specific environmental documentation. Basic commitments of natural and cultural resources for licensed launches are not different from those necessary for many other research and development programs; they are similar to the activities that have been carried out in previous space program activities (see Section 11 of the PEIS).

Mitigation Measures

A variety of mitigation measures are presented in the PEIS and selected measures could be implemented for those projects for which site-specific environmental analyses show the potential for significant impacts. The PEIS specifically presented mitigation measures for noise, water quality, air quality, solid and hazardous waste, cultural and historical resources, biological resources, and orbital debris (for detailed discussion see Sections 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, and 9.7, respectively, of the PEIS). Monitoring may be appropriate at individual launch sites, such as water sampling and analyses, archeological surveys of areas with historic artifacts, and biological species surveys by specialists to monitor the health and numbers of biological species of concern.

Examples of mitigation measures are described below.

Noise. Research and guidelines regarding noise harassment and injury to threatened or endangered species are evolving. Launch personnel responsible for environmental health and safety should keep abreast of advances in this area, and take active measures to avoid levels established as inducing behavior modification or injury (*e.g.,* certain sea state conditions may be associated with less noise impacts, as well as certain slower speeds). Possible actions to mitigate the effects of noise at launch sites include:

- Orientating the flame bucket away from sensitive receptor areas.
- Using a deflector sheet on the flame bucket.
- Using a deluge system to suppress engine ignition noise.
- Constructing blast fences around the launch site perimeter.
- Restricting launches to optimal seasons (*e.g.*, launching only during non-nesting or non-migratory seasons, depending on the species of concern).
- Restricting launches to optimal times during the day (*e.g.,* preferably mid-day).
- Planting tall and fast-growing trees around the perimeter of the launch site (*e.g.*, poplar trees).
- Constructing berms along roadways.
- Using lower engine power levels at liftoff, as appropriate.
- Coordinating with U.S. Fish and Wildlife and National Marine Fisheries Service (NMFS) personnel regarding appropriate local activities and monitoring of sensitive species.

Water Quality. Possible actions to mitigate the effects on water quality at launch sites include:

- If surface or ground water is to be withdrawn for fire protection, personnel deluge purposes, noise mitigation, or for potable water, studies may be undertaken to ensure the reservoir has an adequate capacity.
- Preparing spill contingency plans that are updated as frequently as needed.
- Containment structures can be constructed around storage facilities to prevent a leak from impacting surface or ground water.
- Contoured land or catchment basins can be put in place to collect excess water from flame suppression or noise suppression activities to prevent runoff into bodies of water.
- Recycle or reuse water generated and used on site.
- Marine pollution abatement measures may include: Deployment of booms, use of dispersion chemicals, collection of debris, and implementation of a monitoring program.

Air Quality. Possible actions to mitigate the effects on air quality at launch sites include:

- Using environmentally-friendly propellants, as feasible.
- Launching in optimal weather and wind conditions to maximize the rate of dissipation of the ground cloud while minimizing the potential impacts to sensitive receptors.
- Participating in emissions banking/trading programs.

Research is continuing in several areas vital to mitigating the potential air impacts of launches. As additional information becomes available regarding currently unresolved research questions, this information should be used to implement appropriate air quality mitigation measures. Examples of current unresolved research questions include: (1) The influence of local stratospheric meteorology in ozone depletion related to LV emissions; (2) size distributions and relative influence of alumina versus soot emissions; (3) U.S. LO_x/kerosene propellant systems ozone loss mechanism; (4) emissions and potential ozone-depleting

differences between U.S. and Russian LO_x/kerosene motors; and (5) impacts from emissions from pure (no SRM) LO_x/kerosene LV propellant systems.[i]

Solid and Hazardous Waste. Possible actions to mitigate the effects of solid and hazardous wastes at launch sites include:

- Taking advantage of all pollution prevention opportunities, and implementing an active pollution prevention plan and reward system.
- Implementing a proactive recycling program for solid and some hazardous wastes to minimize the amounts generated.
- Purchasing environmentally-friendly products whenever possible.
- Maintaining appropriate site-specific clean-up materials in accordance with spill prevention and preparedness procedures (*e.g.*, pH neutralizers).
- Developing a comprehensive Environmental Management System consistent with ISO 14000 guidelines.

Cultural and Historical Resources. The most important mitigation action to protect cultural and historical resources is to restrict activities and disturbances at launch sites, as much as is feasible, to limited areas in order to maintain near-natural conditions on as much of the site as possible. In addition, consultation with appropriate state historic preservation offices, tribal historic preservation offices, local communities, and impacted populations should be conducted to identify and further mitigate possible effects on cultural and historical resources. Specific mitigation actions should include the following:

- Whenever possible, avoid launching in culturally or historically sensitive areas.
- Relocate resources, if possible and approved by stakeholders and public authorities.
- Protect resources from launch impacts with blast fences, enclosures, and other physical control measures.
- Coordinate with the state historic preservation office, tribal historic preservation offices, and other local authorities, as appropriate and meet proactively with members of the public.

Biological Resources. The most important mitigation action to protect biological resources is to restrict activities and disturbances at launch sites, as much as is feasible, to limited areas in order to maintain near-natural conditions on as much of the site as possible. Generic mitigation measures should also include proper containment of all chemicals and an adequate spill preparedness program, including effective emergency and disaster plans to minimize the effects of accidents. Specific mitigation measures to protect biological resources at launch sites might also include the following:

- Relocating endangered or threatened animals.
- Banking wetlands.
- Using barriers (*e.g.*, fencing) to minimize animal intrusion in the area or to keep species in place and away from the launch location.
- Building new habitat (habitat substitution) or improving existing habitat.
- Implementing an effective lighting policy for management of exterior lights, emphasizing the use of low-pressure sodium lights as opposed to lights that emit ultraviolet, violet-blue, and blue-green wavelengths.
- Active monitoring (and implementing appropriate action plans using the results of monitoring) to offset any unanticipated effects.
- Optimally directing the launch pad flame duct so as to minimize impacts to vegetation from scorching.
- Coordinating early in the proposed project with U.S. Fish and Wildlife, NMFS, and/or state wildlife officials regarding any concerns including: Local activities and monitoring of sensitive species (*e.g.*, conducting operations to avoid sensitive breeding, spawning, or weaning seasons).

Orbital Debris. Although orbital debris is in outer space, it is possible that it could reenter Earth's atmosphere. Likely impacts would be insignificant but the FAA does require applicants to demonstrate certain safety measures in order to receive license approval. While these launch plan features are not required for environmental purposes and the orbital debris outside the Earth's atmosphere are not an impact category, the requirements can have a beneficial mitigating effect. The more orbital debris, the greater the likelihood debris could reenter Earth's atmosphere; and therefore efforts to minimize the amount of debris have an added benefit beyond safety as mitigating detrimental impacts. To obtain safety approval, an applicant must demonstrate for any proposed launch that for all launch vehicle stages or components that reach Earth orbit—(a) There will be no unplanned physical contact between the vehicle or its components and the payload after payload separation; (b) Debris generation will not result from the conversion of energy sources into energy that fragments the vehicle or its components. Energy sources include chemical, pressure, and kinetic energy; and (c) Stored energy will be removed by depleting residual fuel and leaving all fuel line valves open, venting any pressurized system, leaving all batteries in a permanent discharge state, and removing any remaining source of stored energy. Other equivalent procedures may be approved in the course of the licensing process. Additional mitigation measures may be employed to shield against debris particles up to 1 cm in diameter. For debris of larger sizes, current shielding concepts may become impractical.[ii] Advanced shielding concepts may make shielding against particles up to 2 cm diameter reasonable, but it is possible that the only useful alternative strategy for large particles will be avoidance, which is feasible for average size spacecraft, but for very large spacecraft collision probabilities are sufficiently high that an alternate means of protection may be required.[iii]

Launch planning may help to protect launch vehicles and payloads from potential damage. Although there are no measures to significantly modify the current debris environment, there are options available to control, limit, or reduce the growth of orbital debris in the future including:

- Obtaining a conjunction on launch assessment from U.S. Space Command (See 14 CFR 417.233).
- Booster and payload design to minimize release of debris.
- Preventing spontaneous explosions of launch vehicle bodies and spacecraft.
- Use of particle-free propellants.
- Disposal or de-orbiting of spent upper stages or spacecraft.
- Careful mission design to actively remove debris.
- Launch vehicles and spacecraft can be designed so that they are litter-free (i.e., they dispose of separations devices, payload shrouds, and other expendable hardware at a low enough altitude and velocity that they do not become orbital).
- Stage-to-stage separation devices and spacecraft protective devices such as lens covers and other potential debris can be kept captive to the stage or spacecraft with lanyards or other provisions to minimize debris.
- When stages and spacecraft do not have the capability to de-orbit, they can be made as inert as feasible by expelling all propellants and pressurants and

[i] Ross, Martin. The Aerospace Corporation. *Rocket Impacts on Stratospheric Ozone: Program Review.* March 25, 1998 Briefing.

[ii] National Science and Technology Council. *Interagency Report on Orbital Debris.* November 1995.

[iii] National Science and Technology Council. *Interagency Report on Orbital Debris.* November 1995.

assuring that batteries are protected from spontaneous explosion.

• No unplanned physical contact between the vehicle or its components and the payload after payload separation.

• When the mission requires delivery of a spacecraft which itself has a maneuver capability, two alternatives are possible.

1. Leave the upper stage attached for delivery of the spacecraft to orbit to maximize its maneuver capability.

2. Separate the spacecraft at suborbital velocity so that the stage decays naturally and the spacecraft uses its onboard propulsion to establish its orbit.

All launch sites would comply with any permit conditions imposed by regulatory authorities.

Prepared by Michon Washington. Dated: October 5, 2001.

Recommended by Herb Bachner. Dated: October 5, 2001.

Decision and Order

The more environmentally-friendly propellant combinations alternative is defined as preferentially licensing those vehicles that are not solely propelled by SRMs. The number of launches using liquid, liquid/solid, or hybrid propellant systems was assumed to remain unchanged under this alternative. Thus, the total number of FAA-licensed launches in the U.S. would decrease substantially under this alternative. It was assumed that the decrease in U.S. licensed launches that use only solid propellants would be compensated for by an increase in these types of launches elsewhere in the world.

Because 49 U.S.C. Subtitle IX, ch. 701—Commercial Space Launch Activities, formerly the Commercial Space Launch Act (CSLA) requires launches by U.S. entities to be licensed, the U.S. launch industry would be unable to continue LV launch operations regardless of their location under the no action alternative. Not licensing any U.S. launches would not be consistent with chapter 701 in this context. Under the no action alternative it was assumed that the same number of worldwide commercial launches would take place. However, because the FAA would cease issuing licenses for U.S. launches, the launches would take place using foreign launch providers and locations.

Neither the more environmentally-friendly propellant combinations alternative nor the no action alternative would enable the FAA to fully meet projected demand for increased access to commercial space transportation. The preferred alternative does fulfill the purpose and need for commercial access to space. In addition, although some environmental effects may be greater under the preferred alternative as compared to the no action or more environmentally-friendly propellant combinations alternative, the impacts are still expected to be less than significant. For the reasons summarized earlier in this Record of Decision and supported by detailed discussion in the PEIS, the FAA has selected the preferred alternative.

The information in this PEIS is not intended to address all site-specific launch issues. Appropriate site-specific environmental documentation would be developed in conjunction with the licensing process. The PEIS is intended to serve as a tiering document to assist launch operators in preparing site-specific documentation.

I have carefully considered the FAA's goals and objectives in relation to the programmatic launch actions discussed in the PEIS, including the purpose and need to be served, the alternative means of achieving them, the environmental impacts of these alternatives at a broad, programmatic level, and the mitigation measures available to preserve and enhance the environment as needed on a site-specific basis. Based upon the record of this proposed Federal action, and under the authority delegated to me by the Administrator of the FAA, I find that the action in this Record of Decision is reasonably supported.

Issued in Washington, DC on: October 5, 2001.

Patricia G. Smith,

Associate Administrator for Commercial Space Transportation.

[FR Doc. 01–25754 Filed 10–11–01; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Aviation Rulemaking Advisory Committee Meeting on Air Carrier Operations

AGENCY: Federal Aviation Administration (FAA) DOT.

ACTION: Notice of meeting.

SUMMARY: The FAA is issuing this notice to advise the public of a meeting of the Federal Aviation Administration Aviation Rulemaking Advisory Committee to discuss air carrier operations issues.

DATES: The meeting will be held on October 25, 2001, at 10 a.m.

ADDRESSES: The meeting will be held in Conference Room 833, Federal Office Building 10A (the ''FAA Building''), 800 Independence Ave., SW., Washington, DC 20591.

FOR FURTHER INFORMATION CONTACT: Linda Williams, Office of Rulemaking, 800 Independence Avenue, SW, Washington, DC 20591, telephone (202) 267–9685.

SUPPLEMENTARY INFORMATION: Pursuant to section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92–463, 5 U.S.C. App II), notice is hereby given of a meeting of the Aviation Rulemaking Advisory Committee on Air Carrier Operations to be held on October 25, 2001.

The agenda will include:

- Airplane Performance Working Group final report.
- Extended Range Operations with Two-Engine Aircraft (ETOPS) Working (ETOPS) Working Group status report.

Attendance is open to the interested public but may be limited by the space available. Members of the public must make arrangements in advance to present oral statements at the meeting or may present written statements to the committee at any time. Arrangements may be made by contacting the person listed under the heading **FOR FURTHER INFORMATION CONTACT.**

Sign and oral interpretation can be made available at the meeting, as well as an assistive listening device, if requested 10 calendar days before the meeting.

If you are in need of assistance or repair a reasonable accommodation for this event, please contact the person listed under **FOR FURTHER INFORMATION CONTACT.**

Issued in Washington, DC, on October 5, 2001.

Louis C. Cusimano,

Assistant Executive Director for Air Carrier Operations, Aviation Rulemaking Advisory Committee.

[FR Doc. 01–25756 Filed 10–11–01; 8:45 am]

BILLING CODE 4910–13–M

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Research, Engineering and Development (R, E&D) Advisory Committee

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of meeting.

Pursuant to section 10(A)(2) of the Federal Advisory Committee Act (Pub. L. 92–463; 5 U.S.C. App. 2), notice is hereby given of a meeting of the FAA