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PETITION FOR EXEMPTION

18 November 2004

U.S. Department of Transportation
Docket Management System
400 7th Street, SW.
Room PL 401
Washington, DC 20591–0001

SUBJECT: PETITION FOR GRANT OF EXEMPTION

Pursuant to Section 11.25 of the Federal Aviation Regulation (FAR), Associated Scientists at Woods Hole (ASWH) hereby petitions the Federal Aviation Administration (FAA) for exemption from FAR Section 21.191(g), to the extent necessary to permit ASWH to utilize a Leza-Lockwood AirCam twin-engine, slow-flight aircraft certificated as Experimental, Amateur-Built, for the purposes of scientific research, including environmental monitoring, wildlife conservation, and photographic documentation.

NATURE AND EXTENT OF RELIEF

The use of an Experimental, Amateur-Built aircraft for scientific research purposes will require exemption to FAR Section 21.191(g).

FAR §21.191(g) states, in pertinent part "Operating an aircraft the major portion of which has been fabricated and assembled by persons who undertook the construction project *solely for their own education or recreation*." (Emphasis added)

This relief is requested in order to operate an AirCam aircraft for other than the stated purposes of education or recreation under which an experimental certificate is issued for an amateur-built aircraft, specifically, to operate an AirCam aircraft for scientific research, as described in this petition.

PUBLIC INTEREST

Granting of this petition for exemption to permit the use of an experimental, amateur-built AirCam aircraft for scientific research purposes is in the public interest for reasons of safety, economics, and the conservation of natural resources, including assisting with the recovery of an endangered species.

As with most aspects of science, conservation, and technology, those pursuing it always seek better and more effective ways of doing the work. ASWH developed the use of both blimps and aerostats (tethered balloons) for aspects of scientific research, principally studies on whales and other marine

species. In addition to the foregoing, we began explorations in 2001 to identify and utilize slow-flight aircraft with good station-keeping ability, good observational and photographic capabilities, relatively quiet and unobtrusive operations, excellent safety characteristics, and reasonable cost. This search has led to the AirCam. This aircraft was originally purpose-built for *National Geographic* research and photography in Africa. In June 2001, we participated in a demonstration flight. Since then, we have continued to evaluate this aircraft, including correspondence with current *National Geographic* researchers/photographers/videographers, who have written, "[for your purposes] it is undoubtedly the ideal plane … ."

Based on the successful match of capabilities to requirements, the use of this aircraft in conservation efforts with right whales and other species will be valuable. Built for slow flight, the aircraft's stall speed is 39 mph and V_{yse} is 60 mph. The 912S Rotax engines are equipped with a reduction-drive gear providing more thrust than direct drive, and allowing a lower rotation speed for the three-bladed prop. This coupled with an exhaust muffler system produces minimal noise from the engines. The slow flight, quiet operation, and excellent photo-platform features will greatly improve our ability to obtain the required photo-images and documentation of the highly endangered Right whale while at the same time minimizing potential disturbance to the whales, particularly, in some cases, sensitive situations of mothers and young calves, and other nearby marine wildlife.

A significant percentage of the work we plan to undertake with the AirCam is publicly funded. Thus, more effective use of these funds is in the public interest. For near-shore, short range, localized surveys and photography, the "all-in" cost of operating this aircraft will be less than other aircraft currently in use or available. We know of no other aircraft that combines the features of safety, capabilities, and cost as does the AirCam.

In addition to right whale surveys, we envision application to other wildlife projects (e.g., dolphins, manatees, etc.), atmospheric sampling, and aerial photography of habitat and land use. At the national level, this program will be linked to the Scientific Committee for Oceanographic Aircraft Research (SCOAR) - a subcommittee of the University National Oceanographic Laboratory System (UNOLS), the Network of Airborne Environmental Research Scientists (NAERS), and the Small Environmental Research Aircraft (SERA) program.

EQUIVALENT LEVEL OF SAFETY

Considering the aircraft characteristics, the requested exemption will provide a level of safety equivalent to and in excess of what is authorized for General Aviation or Restricted category aircraft engaged in similar missions.

Aircraft Characteristics. This twin-engine aircraft was originally designed and built for wildlife surveys in Africa over large areas of forest and habitat where emergency landing options are severely limited and the requirement for a high level of safety and reliability was paramount. The AirCam has built-in redundancy, with separate electrical and fuel systems. At 60 mph, the aircraft has an endurance of 6 hours plus reserve. It has a very high horsepower to weight ratio. In flight, the large vertical stabilizer provides excellent control under single-engine operation should it ever become necessary. Unlike most twin-engine aircraft, the checklist to secure the AirCam for single-engine operation is very short and quickly accomplished. Furthermore, the AirCam is capable of not only maintaining level flight on a single engine, but is rated to climb at 300 fpm at gross weight.

Mission Profile. This 2-seat aircraft will be flown by a single pilot with a scientist/photographer in the second seat. Flight duration will be 2 to 4 hrs, typically at altitudes of 750 to 1500 ft, following a pre-defined survey pattern.

Pilot Experience. The pilot will have a commercial certificate with multi-engine and tail-wheel endorsements.

Crew Training. All pilots will undergo initial qualification/orientation training that includes the typical mission profile, slow flight over whales for photography, and complete emergency procedures. Refresher training and orientation will be conducted routinely (e.g., monthly), and emergency procedures will be included in pre-flight checks.

Crew Safety. For all overwater operations, we will be in compliance with FAR 91.205(b)(12) and all persons will wear Mustang survival/float suits. A flare kit will be onboard the aircraft. For missions with distances greater than 5 miles from shore, an EPIRB/ELT will be onboard the aircraft.

SUMMARY

As required by FAR Section 11.25(d), a summary of the petition is as follows:

Associated Scientists at Woods Hole requests an exemption from FAR Section 21.191(g) to permit the use of an AirCam aircraft (experimental category) for purposes of scientific research, including environmental monitoring, wildlife conservation, and photographic documentation.

Sincerely,

James H. W. Hain
Senior Scientist
Associated Scientists at Woods Hole

The twin-engine Leza-Lockwood Air-Cam was designed as a reliable slow-flight observation and photo-imaging airborne platform. It was originally built for use by *National Geographic* researchers Des & Jen Bartlett in Africa for wildlife studies.

Jim Hain – Senior Scientist

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Jim Hain received his Ph.D. in biological oceanography from the University of Rhode Island in 1975. He has conducted research from Newfoundland to South America, with emphasis on the U.S. outer continental shelf and coastal habitats of endangered marine mammals. One of his areas of expertise is in aerial surveys, with experience in fixed-wing aircraft, helicopters, blimps, and most recently, with aerostats. He routinely uses statistical analyses and geographic information system (GIS) methods. While with Associated Scientists, Jim has been awarded grants or contracts from the U.S. Army Corps of Engineers, Marine Mammal Commission, Minerals Management Service, National Science Foundation, and the Office of Naval Research. He is a member of the Society for Marine Mammalogy, and serves on the editorial board of *Right Whale News*. In October 1997, he received a Coastal America Award for his research relating to the mitigation of ship strikes on right whales on their wintering calving grounds. Jim is a Senior Member of the American Institute of Aeronautics and Astronautics, and a member of the Experimental Aircraft Association (EAA).

Examples of publications and reports

Hain, J.H.W. and L.E. Harris. 2004. Aerostats for oceanographic and atmospheric research. *Sea Technology* 45(2): 75-80.

Hain, J.H.W. 2000. Lighter-than-air Platforms (Blimps and Aerostats) for Oceanographic and Atmospheric Research and Monitoring. Proceedings Oceans2000 MTS/IEEE Conference, 11-14 September 2000, Providence, Rhode Island.

Hain, J.H.W, S.L. Ellis, R.D. Kenney, and C.K. Slay. 1999. Sightability of right whales in coastal waters of the southeastern United States with implications for the aerial monitoring program. Pp. 191-207, *In*, Marine Mammal Survey and Assessment Methods, G.W. Garner, S.C. Amstrup J.L. Laake, B.F.J. Manley, L.L. McDonald, and D.G. Robertson (eds). A.A. Balkema: Rotterdam, Netherlands.

Hain, J.H.W, S. L. Ellis, R. D. Kenney, B. K. Gray, P. J. Clapham, M. T. Weinrich, and I. G. Babb. 1995. Apparent bottom feeding by humpback whales on Stellwagen Bank. *Marine Mammal Science* 11: 464-479.

Hain, J.H.W, M.J. Ratnaswamy, R.D. Kenney, and H.E. Winn. 1992. The fin whale, *Balaenoptera physalus*, in waters of the northeastern United States continental shelf. *Reports of the International Whaling Commission* 42: 653-669.

Hain, J.H.W. 1992. Airships for marine mammal research: Evaluation and recommendations. Publication No. PB92-128271. National Technical Information Service, Springfield, VA. 34 pp.

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Associated Scientists at Woods Hole, Inc. (ASWH) is a non-profit 501(c)(3) organization formed for the purpose of enhancing the development and conduct of scientific studies of all kinds. ASWH, established in 1979, is composed of about 12 members that include engineers and scientists from the Woods Hole community. The organization is steered by a six-member board of directors; Mr. Richard H. Campbell is president. Associated Scientists' has promoted multinational marine research in South American waters in cooperation with Spain and the Organization of American States, and has hosted a number of international workshops and visiting scholars. ASWH has in the past provided a stateside office and administrative facilities for the Bermuda Biological Station. ASWH has provided writing, editorial, and publications production services to the Ocean Drilling Program, Texas A&M University; and to the Minerals Management Service, U.S. Department of the Interior. Some of ASWH's activities are, or have been, oceanographic studies of Spanish coastal waters including the Alboran Sea and the continental shelf; studies of volcanology and sea floor processes in the Mediterranean and the Pacific; analysis of marine mammal feeding requirements on the outer continental shelf; R&D on airborne science technology; and studies of right whales, with emphasis on habitat characterization and mitigation of human impacts, off the coast of northeastern Florida.

Board of Directors: (6) Mr. Richard H. Campbell, Dr. James H. W. Hain, Dr. Philip L. Richardson, Mr. F. William Sargent, Dr. Floyd W. McCoy, and Dr. Llewellya Hillis.

Officers: Mr. Richard H. Campbell, president; Dr. Floyd W. McCoy, vice-president; Dr. James H. W. Hain, clerk/treasurer.

Incorporated as a Section 501(c)(3) non-profit in the Commonwealth of Massachusetts 15 March 1979.

ASWH is tax exempt under Massachusetts Department of Revenue # 042-678-301.

ASWH is listed by Dunn & Bradstreet under DUNS # 13-083-4369