

UNIVERSITY OF HAWAI'I SYSTEM

TESTIMONY

HB 1835: RELATING TO THE DEPARTMENT OF TRANSPORTATION

Testimony Presented Before the
House Committee on Transportation

February 15, 2006

by

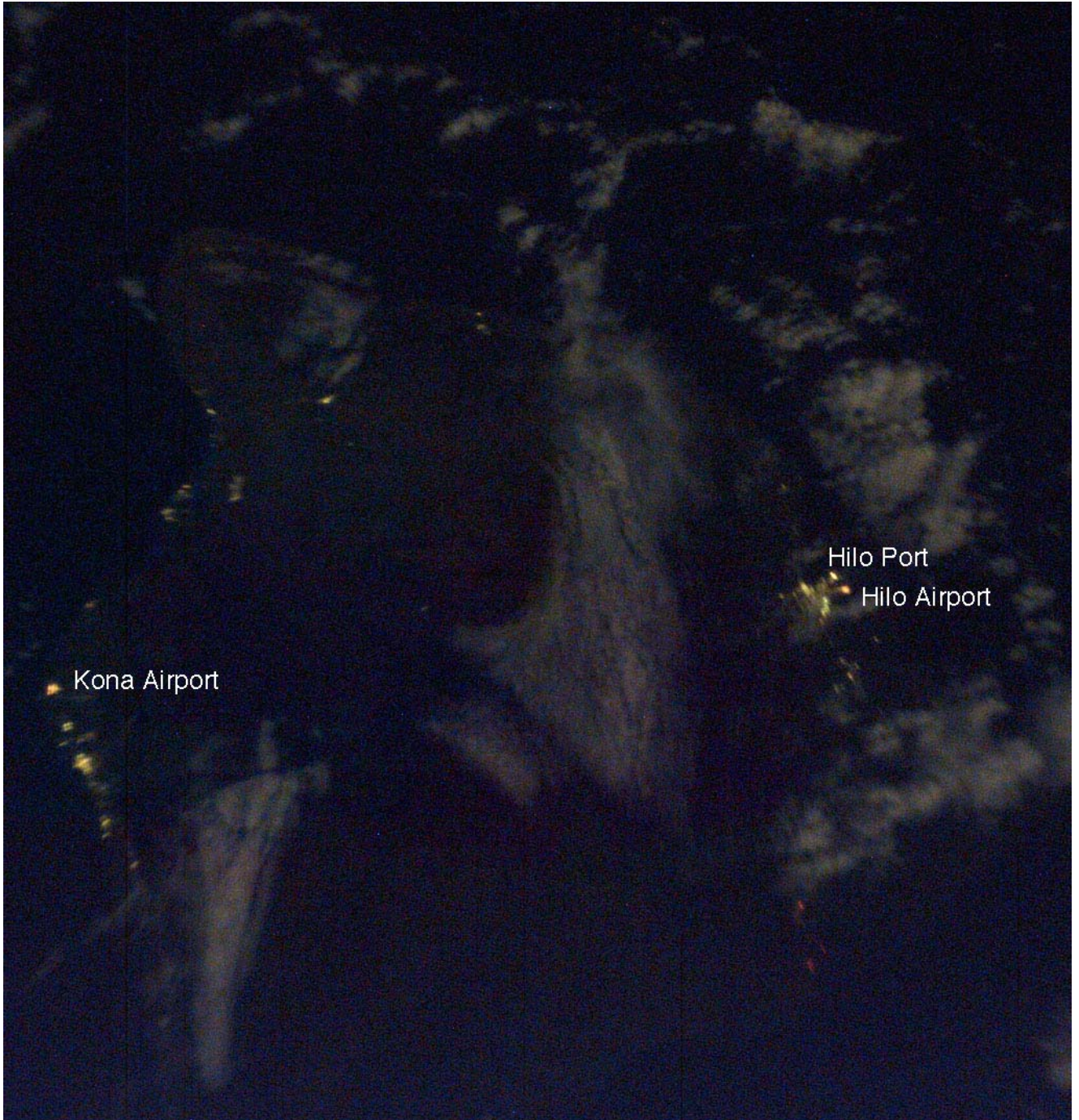
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House Bill 1835
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Chair Souki, Vice Chair Lee, and members of the Committee. My name is Richard Wainscoat and I am here today to submit this testimony in my capacity as the Manager of the University of Hawaii 2.2-meter (88-inch) Telescope, and as an Astronomer at the University of Hawaii Institute for Astronomy.

Over the last decade, artificial lighting on the Island of Hawaii has slowly increased, and is now threatening the ability of the telescopes on Mauna Kea to study faint objects in the night sky. The spectral signatures of high-pressure sodium lamps and mercury lamps are now seen, despite these light sources being regulated by the Hawaii County lighting ordinance. A dark night sky is essential to the continued success of the Mauna Kea observatories. Every 1% of artificial brightening of the night sky results in an effective loss of telescope aperture by 1%.

At the request of the Institute for Astronomy, NASA astronaut Dr. Ed Lu, a former University of Hawaii researcher, obtained two nighttime images of Hawaii from the International Space Station. These images show that some of the major sources of light at night on the islands of Hawaii and Maui are the ports and airports. The nighttime photograph of the Island of Hawaii is shown below, with the airports and Hilo port marked.



Much of the lighting at the airports and ports on the Island of Hawaii does not conform to the county lighting ordinance that was designed to protect the dark night sky over Mauna

Kea. The ramp lighting at Kahului airport points directly at the summit of Haleakala, and is not properly shielded.

The University of Hawaii believes that it is essential that the state department of transportation take immediate steps to improve the lighting at the State's airports and ports. The most important change is to replace all unshielded light fixtures with shielded fixtures that emit no light directly above the horizontal plane. The present unshielded fixtures also represent a hazard to pilots on short final approach to the airports, producing glare which detracts from their ability to see the runway. Unshielded airport lights have been responsible for at least one accident (at LAX airport). Fully shielded lights are in common use at airports throughout the United States. Please note that the University is not requesting any change to navigational lighting (such as runway lights).

The lighting along the approach road to Kona airport, along the roads where the rental car companies are located at Kona airport, and in the Hilo airport parking lot should be changed to low-pressure sodium. Astronomers are better able to filter out light from low-pressure sodium lamps.

Photographs that document some of the lighting problems at the airports are included as an appendix to this testimony.

The University of Hawaii also believes that better road safety, improved visibility, and a darker night sky would result from use of fully shielded light fixtures on all the State's highways. The light fixtures that are presently used (see photo below) emit light directly upwards and sideways. These lights produce a lot of unnecessary glare, which reduces the eye's ability to see the road. Glare is a particular problem for our older people who may have cataracts.



Fully shielded fixtures can be installed without moving poles. With careful selection of fully shielded fixtures, the road can be equally well or better illuminated than with the present unshielded fixtures. Fully shielded fixtures will largely eliminate glare.

Old, decrepit or dirty light fixtures such as that pictured above are commonplace on our highways. Perhaps only 20% of the light emitted from the lamp makes it out of the fixture shown above. The remaining energy is wasted. Many of our highway lights are in urgent need of replacement, and they should be replaced by fully shielded lights.

The city of Calgary has a population similar to Oahu. Calgary has recently replaced 40,000 streetlights with fully shielded lights (using the same poles). Because the fully shielded lights direct the light downwards, where it is needed, they were able to replace all 250-Watt lamps with 200-Watt lamps, and all 150-Watt lamps with 100-Watt lamps. This has produced an energy savings of \$2 million per year. Similar energy savings are also possible in Hawaii. Hawaii presently wastes about \$7 million per year through poor lighting.

Fully shielded lighting is in common use throughout the United States. Texas, Arizona, and California are among the states that use shielded lighting on roadways.

Some of the lighting on the H-3 freeway is fully shielded, and it is possible to see the dramatic reduction in glare that proper shielding produces. The photograph below shows two fully shielded lights alongside two partially shielded lights on the H-3 freeway.



Although the most urgent need for fully shielded lighting is on the islands of Hawaii and Maui, the University believes that it is important to also correct the lighting problems at the airports and ports and on the highways on all islands in the State. The lights from Honolulu already compromise astronomy from Haleakala, and if allowed to grow unchecked, will harm astronomy from Mauna Kea also.

A dark night sky has tremendous value to all citizens—not just astronomers. The residents of Honolulu have lost their ability to see the Milky Way, and only about the 20 brightest stars can be seen in the sky from central Honolulu. From a dark location, you can see 2,000 stars. Poor lighting that is directly lighting the night sky is wasting a tremendous amount of energy and money. Human health problems have recently been linked to light at night. Endangered species such as turtles and birds are confused by lights at night—shielding the lights mitigates this problem. Use of fully shielded lights will help to restore our precious dark sky, and undoubtedly save lives on our highways.

Thank you for your support of our program and for the opportunity to present this testimony.

Appendix — photographs of lighting at the airports on the Island of Hawaii. These photographs are included to demonstrate that the airport lighting on the Island of Hawaii does not conform to the Hawaii county lighting ordinance.



Ramp lighting at Hilo airport. These lights should be fully shielded to conform to the Hawaii county ordinance. They are not properly shielded.



Newly installed parking lot lighting in Hilo airport. These lights are high-pressure sodium lamps. The Hawaii county ordinance requires parking lots to be lit using low-pressure sodium lamps.



Lighting around the control tower at Hilo airport uses high-pressure sodium lamps. The Hawaii county ordinance requires that low-pressure sodium lamps be used on roadways.



Newly installed lighting on the roadway at Kona airport near the car rental lots. These lights are high-pressure sodium. The Hawaii county lighting ordinance requires use of low-pressure sodium lamps for roadways.



High-pressure sodium lamps along the access road to the Kona airport. The Hawaii county lighting ordinance requires use of low-pressure sodium lamps on roadways.