

# UNIVERSITY OF HAWAI'I SYSTEM

## TESTIMONY

### SCR 46 / SR 27

REQUESTING THE DEPARTMENT OF TRANSPORTATION TO COMPLY WITH COUNTY ORDINANCES AND STANDARDS RELATING TO OUTSIDE LIGHTING AT AIRPORTS AND HARBORS, AND TO PROVIDE CUT-OFF OR FULLY SHIELDED LENS FIXTURES TO DIRECT ARTIFICIAL LIGHTING DOWNWARD TO PREVENT DIFFUSION OF THE LIGHT INTO THE ATMOSPHERE, ON THE ISLAND OF HAWAI'I AND THE ISLAND OF MAUI

Testimony Presented Before the  
SENATE COMMITTEE ON  
TRANSPORTATION AND GOVERNMENT OPERATIONS

March 29, 2006

by  
Michael T. Maberry  
Assistant Director for External Relations, UH Institute for Astronomy  
Institute for Astronomy  
University of Hawai'i

**Testimony Related to  
Senate Concurrent Resolution 46**

**and**

**Senate Resolution 27**

**RELATING TO THE DEPARTMENT OF TRANSPORTATION**

**Presented before the**

**Senate Committee on Transportation and Government Operations**

**The Twenty-Third Legislature**

**Wednesday March 29, 2006**

**by**

**Michael T. Maberry**

**Assistant Director for External Relations, UH Institute for Astronomy**

**Institute for Astronomy**

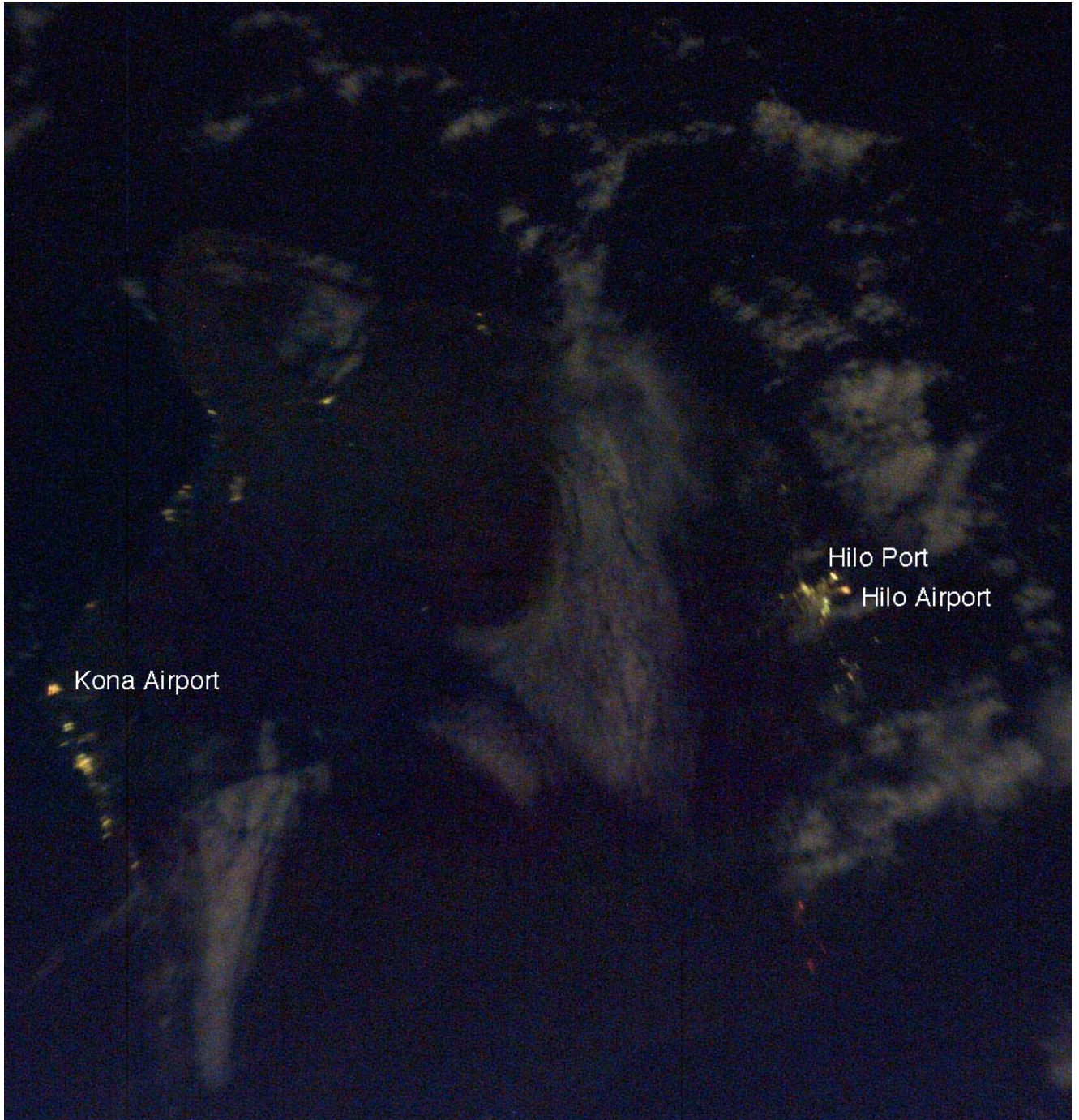
**University of Hawaii**

Chair Inouye, Vice Chair Espero, and members of the Committee. My name is Michael T. Maberry and I am here today to submit this testimony in my capacity as the Assistant Director for External Relations, University of Hawaii Institute for Astronomy, for Dr. Richard J. Wainscoat, Manager of the University of Hawaii 2.2-meter (88-inch) Telescope, and an Astronomer at the University of Hawaii Institute for Astronomy. Dr. Wainscoat is off-island and unable to deliver this testimony personally. The University of Hawaii strongly supports these resolutions.

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%.

**Testimony Related to Senate Concurrent Resolution 46 and Senate Resolution 27**  
**Senate Committee on Transportation and Government Operations**  
**March 29, 2006**

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 harbors and airports. The nighttime photograph of the Island of Hawaii is shown below, with the airports and Hilo harbor marked.



**Testimony Related to Senate Concurrent Resolution 46 and Senate Resolution 27  
Senate Committee on Transportation and Government Operations  
March 29, 2006**

Much of the lighting at the airports and some of the lighting at the harbors 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 airports and harbors on the islands of Hawaii and Maui. 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 can 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.

Astronomers recognize the need for use of broad-spectrum light sources (such as high-pressure sodium) in the ramp areas of the airports. However, these high-pressure sodium lamps are currently unshielded and are some of the most damaging light sources for astronomy on the Island of Hawaii and Maui. They emit light directly upwards as well as horizontally — this light is most easily scattered into the telescopes. We understand that some of these lights may have been installed prior to 1988, when the Hawaii county ordinance was last revised. In the 18 years since 1988, larger telescopes (e.g., the Keck telescopes) have come into operation, and the detectors and instruments on the telescopes have become much more sensitive. The telescopes on Mauna Kea are up to 30 times more sensitive than in 1988, and are therefore much more vulnerable to interference from the airport lights.

We are not requesting any change to the light source, but do request that the light fixtures be replaced by fully shielded fixtures. Fully shielded fixtures eliminate propagation of light directly upwards, and will significantly reduce the amount of light from the airports that enters the telescopes.

We further request that at both harbors and airports, the lighting be reduced to the minimum level consistent with safety and security when there is no ongoing activity. This will save energy as well as help preserve the dark sky.

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

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**March 29, 2006**

A dark night sky has tremendous value to all citizens—not just astronomers. The residents of the Big Island and Maui, particularly Hilo and Kahului, will also benefit from these changes, because their ability to see the night sky will be improved by these efforts.

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

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March 29, 2006**

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.

**Testimony Related to Senate Concurrent Resolution 46 and Senate Resolution 27  
Senate Committee on Transportation and Government Operations  
March 29, 2006**



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.

**Testimony Related to Senate Concurrent Resolution 46 and Senate Resolution 27**  
**Senate Committee on Transportation and Government Operations**  
**March 29, 2006**



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.



**Testimony Related to Senate Concurrent Resolution 46 and Senate Resolution 27**  
**Senate Committee on Transportation and Government Operations**  
**March 29, 2006**



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.

**Testimony Related to Senate Concurrent Resolution 46 and Senate Resolution 27**  
**Senate Committee on Transportation and Government Operations**  
**March 29, 2006**



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.