

# CTIO and AURA-O

– Some highlights & anecdotes, 1993-2007

A brief, personal account

Malcolm G. Smith

# Patrick McCray

## “Giant Telescopes”

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- “Astronomical Ambition and the Promise of Technology”.
- Harvard University Press, 2004. 376 pages.
- AURA’s role, especially that of Goetz Oertel, is clearly spelled out.
- MGS interview was held in 2002 -> 138 pages.
- Gemini was essential to CTIO’s survival.

## Official Inauguration of Tololo. Trip up was on horseback

Photos thanks to Jorge Hernán Carrasco Contreras.



Elqui Governor, Hernán Carrasco  
Peralta + Capt. Carabineros, Sr, Muñoz

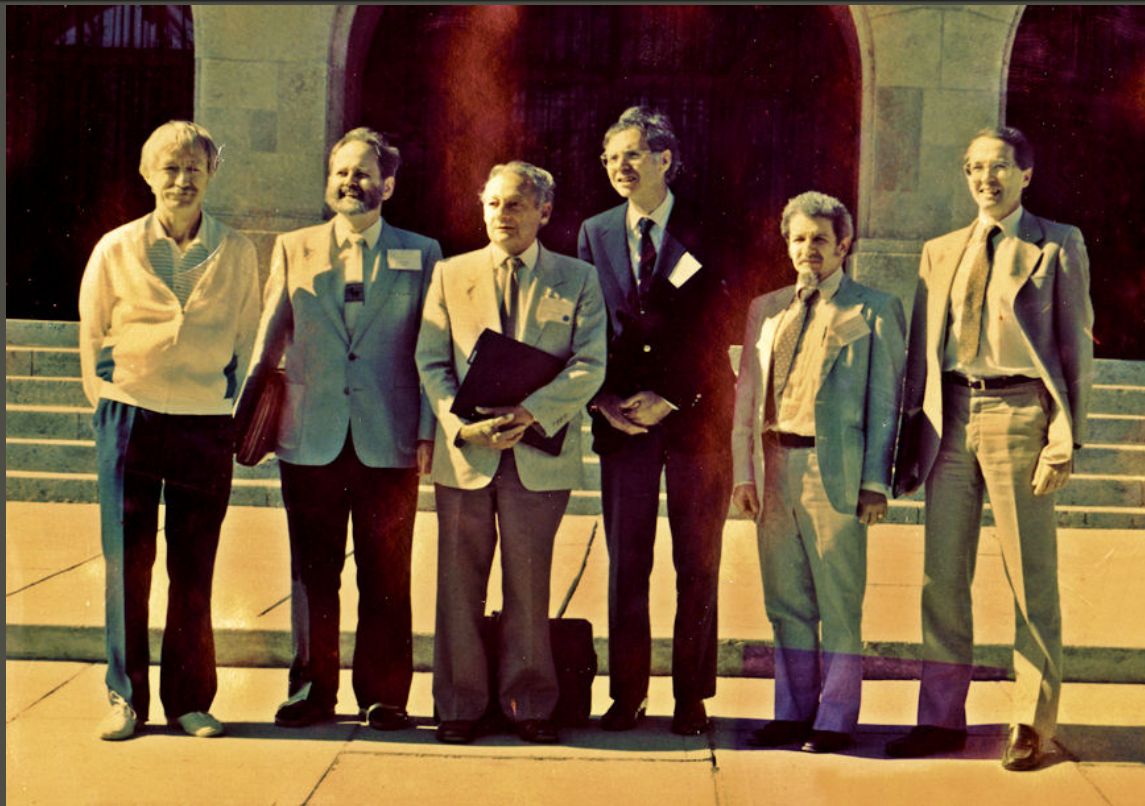


Sr. Muñoz + Rep. Ministry of  
Education, Sr. Sergio Catalán

1966. Secondary-school students from the Colegio Seminario Conciliar de La Serena (later to host “El Tololito” and Cerro Mayú public observatories, led by Padre Picetti)



# Victor Blanco and early staff at 25th anniversary celebration.



Bill Kunkel, Jim Hesser, Victor Blanco, John Graham, Barry Lasker, Pat Osmer  
ASP Conference Series, Proceedings, La Serena, January 20-22, 1988  
(+ MGS, invited speaker Australian Inst. of Physics Symposium)



Compare con la  
próxima imagen.

ZODIACAL LIGHT

Cortesía Roger  
Smith/CTIO



CERRO TOLOLO

# November, 1993

- Senator Edgardo Boeninger – “Ministro Secretario General de la Presidencia” (for
- Aylwin) advises us
- that Chile is about to
- set up a Chilean
- equivalent of the US
- Environmental
- Protection Agency.



# Environmental protection and dark skies in Chile - CONAMA

- He also recommended (in response to our request for guidance in late 1993) that we put CTIO's interest in protection against light pollution on the lawmakers' early agenda as the model for early legislation to cover "secondary pollution".



## Difficult days for SOAR but the rescue from Brazil begins (1993).

- Columbia University pulls out of the SOAR collaboration at end of 1993 as a 30% partner.
- CTIO recommends to a review committee in Brazil that they add a 34% share in SOAR to the 5% share already held in the Gemini telescopes.



# Need for change at CTIO.

## NOAO Newsletter, March, 1994

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- Driving factors included:
- (1) the impact of internal and external reviews of NOAO,
- (2) the forthcoming integration with operations of Gemini,
- (3) *the budget for activities at CTIO (e.g. recent increases in value of peso-→\$300k p.a.)*
- (4) the success of new initiatives to bring new telescopes to CTIO. SOAR-→Pachón.

# 1994/1995 - 4-m

## Image Quality Improvements

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- Led by Jack Baldwin.
- Started with:-
  - (a) active primary support – median image quality improved from  $\sim 1.3''$  to  $0.96''$  by October 1994,
  - (b) use of image analyzer to check collimation of f/8 secondary (especially after top-end flips) and
  - (c) autoguiding.

# November 1994.

## Hawaii, sister cities and Gemini

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- Mayor of La Serena Adriana Peñafiel speaks of a new relationship between Chile and Hawaii with the Gemini Telescope program.



- AURA President Goetz Oertel invites the Governor of Hawaii, John Waihee, to visit CTIO.

# March 1995. People & Pesos. NOAO budget crisis (1)

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- Severe cuts to CTIO staff.
- RIF = Reduction In Force = 13 positions plus voluntary resignations and a dismissal.
- Funds from KPNO->CTIO allowed Ron Probst to join the CTIO staff for 3 years.
- ‘The net \$416k p.a. reduction represents about a third of the problem we face in attempting to avoid any further staff cuts over the next 3 or 4 years’.

## Budget crisis (2)

- US\$400k found for CTIO in rest of FY'94 by transfer from NOAO's Northern operations during that period.
- Severe cuts to CTIO in FY1995.
- Level-effort staffing for at least the 3-year period starting March 16th 1996.
- Impact of any further NOAO budget cuts over that 3-year period were to be absorbed by NOAO operations in the Northern Hemisphere.

# Budget crisis (3)

- Cover inflation and exchange-rate differentials – thus maintaining at least 25% of the CTIO budget for non-payroll expenditure.
- Add 2 astronomers plus 0.5FTE instrument scientist for SOAR (or to be found from SOAR partners).
- Worst experience of my administrative career – but the employees' Union was helpful in finding the best solutions we could.

# Recovery for CTIO – looking forward via Cerro Pachón

- Joao Steiner's crucial roles in handling Brazil's participation in both Gemini (1993) and SOAR (1995).
- Joao goes missing...for a signature.
- MGS participation, via a Brazilian review committee (Joao Steiner, Kepler, Luiz Bevilaqua) in its national astronomy program.





# AURA in Chile

Cerro Tololo

Cerro Pachon



Progress and Action Plan for  
Implementing IAU2009 Resolution B5



Tololo - 50th Anniversary 5/7/13

# Selection of a site for the LSST - the impact of 2MASS .

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- The LSST was going to southern Arizona.
- A question was asked (by MGS) at a 2MASS meeting about the statistics of useful nights at the 2MASS sites in Arizona and Chile.
- Preference for the LSST site was changed from southern Arizona to Mexico!

# January 1995 - REU students and later impact on the selection of the site for the LSST

- January 1995 – Research Experience for Undergraduates program comes to CTIO.
- Led by Eileen Friel.
- PIA program added to include students from Chile.  
Mexico favored for LSST over Chile.  
Fulbright fellowship to CalTech...

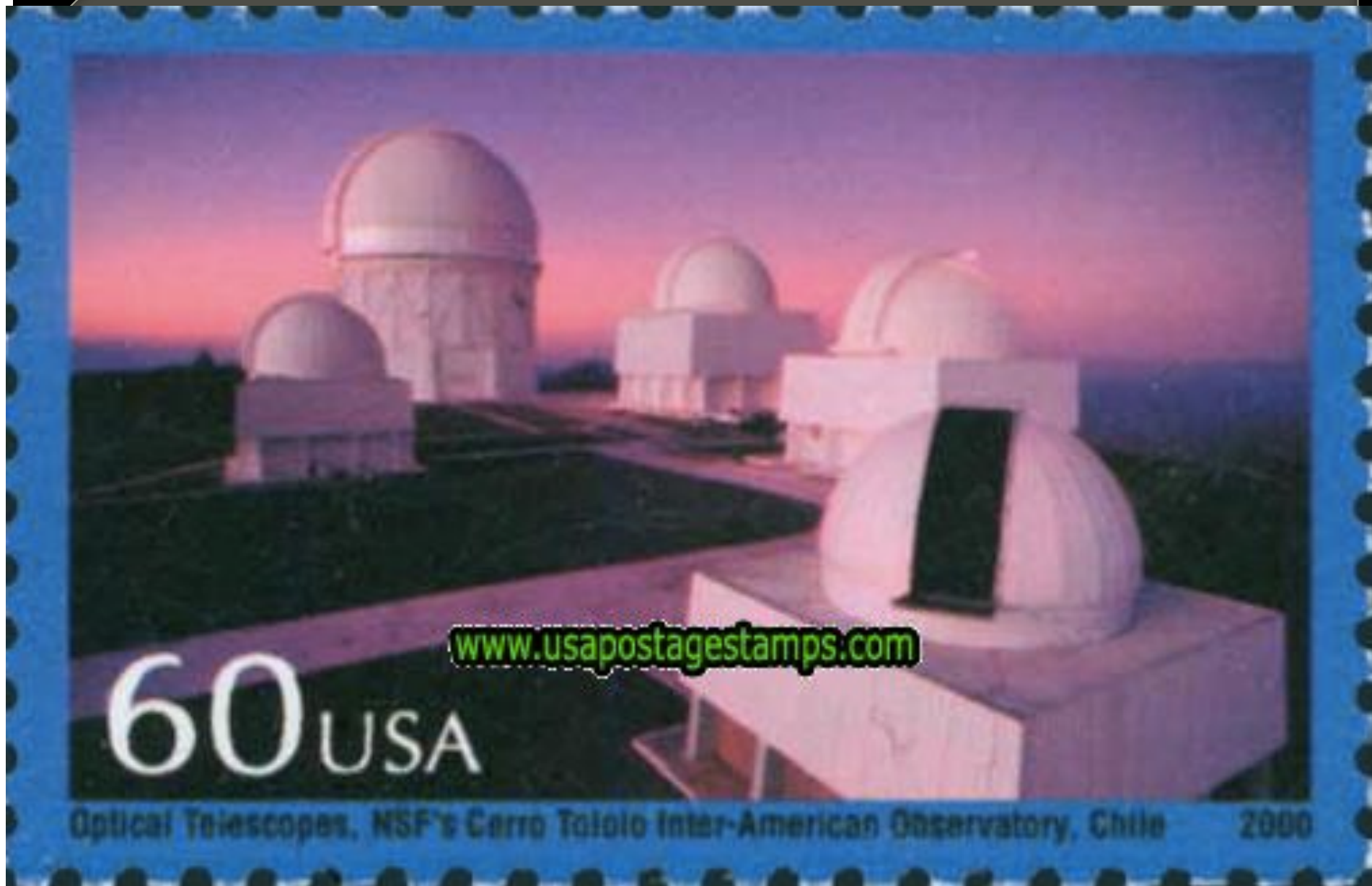


Laura Perez  
REU/PIA 2005

MS, Probing The Vastness of Space, World Expo 2000

# PROBING THE VASTNESS OF SPACE





# Distinguished Visitors



Visitors after this period included Prince Harry, Presidents Lagos (who has his own personal telescope) and Aylwin, Governor-General Adrienne Clarkson of Canada...



Informar a las autoridades de los planes de investigación, divulgación e inversión



# The Turn of the Millenium. Gemini & SOAR on Cerro Pachón



Tololo - 50th Anniversary 5/7/13

# Final Site Selection - LSST

- April 2006



San Pedro Mártir



Las Campanas



CTIO/Cerro Pachón



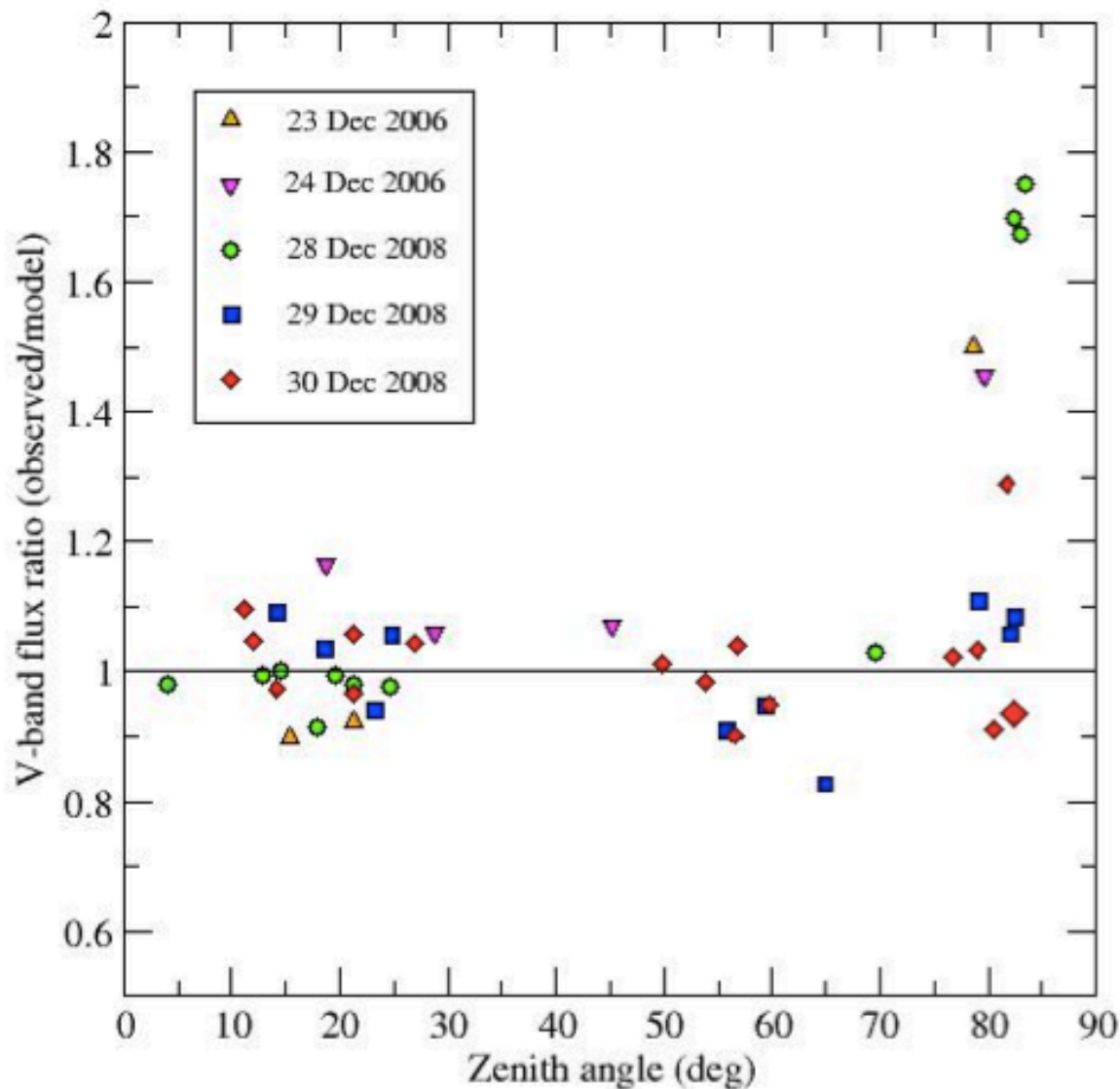
# The LSST – Arizona/2MASS; Mexico and two REU students

## Cerro Pachón – Future site of the LSST





**La Serena, Coquimbo (about 50km distant): 15-minute exposure from Cerro Tololo. (Photo – Malcolm Smith. 28<sup>th</sup> December 2008. Small telescope V-band measures from 7 deg up to zenith were taken on this and successive nights by Kevin Krisciunas).**



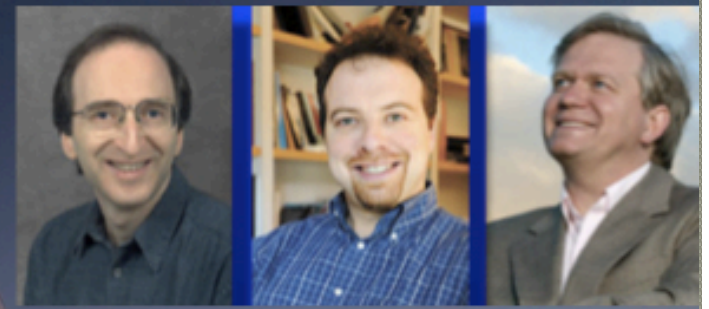
V-band Sky  
Brightness  
ratio over La  
Serena -  
compared with  
zenith values.  
Ratio = 1 for  
Garstang  
model for  
unpolluted  
night sky.

V-band  
measurements  
made by Kevin  
Kriscuinas

# Nobel Physics Prize, 2011

**Awarded to: S. Perlmutter, A. Riess, & B. Schmidt**

**NOAO/CTIO Blanco 4-m (Chile)**



Used to search for distant supernova candidates.

NOAO staff astronomers formed part of one group:

- M. Phillips, R. Schommer, C. Smith, N. Suntzeff
- Matheson (UCB, now at NOAO)

•NOAO Infrastructure played a critical role in establishing the cosmic distance scale and in calibrating the luminosity-distance relation for Type Ia supernovae.

# New “Norma Lumínica” (1)

- A 50th-birthday present from the Chilean
- Government?

Cerro Tololo



(Credit: Arturo Gómez & José Velásquez/CTIO)

Cerro Pachón



Foto: M.G.Smith, 2009.



- And as we are celebrating our 50 years, we will invite you later to blow out 50 little candles, but in one puff, so as to avoid any light pollution.

Light Pollution Legislation and  
Protecting Observatory Sites E9/T3

'Tololo - 50th Anniversary 5/7/13



Santiago apagó sus luces por La Hora del Planeta

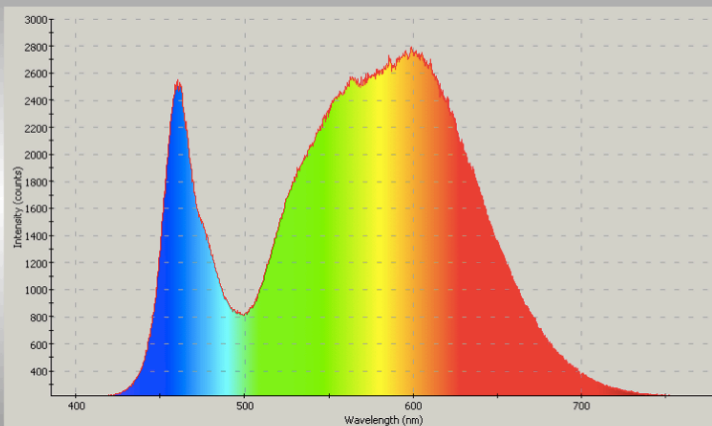
# New “Norma Lumínica” (2)

- ◉ Main restrictions (Pedro Sanhueza):-
- ◉ Full cutoff. ( $<0.49 \text{cd/Klumen}$  at  $90^\circ$ )
- ◉ Over illumination  $< 20\%$  above Chilean standard for minimum levels in public lighting.
- ◉ Laser beams or searchlights must not be oriented near horizontal (limit  $z_d < 70^\circ$ )

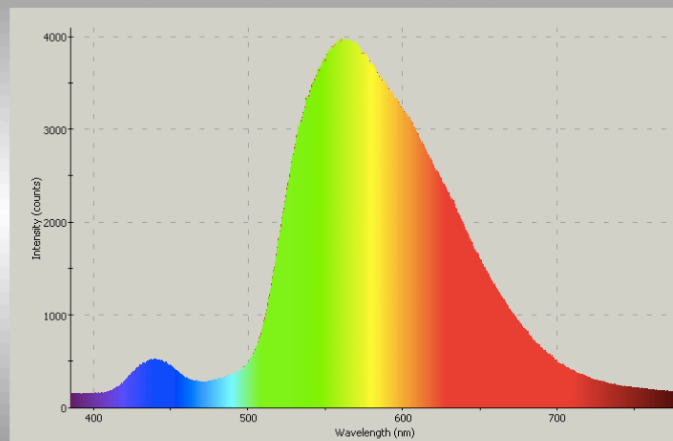
# New “Norma Lumínica” (3)

- Spectral restrictions.
- 300 to 380nm < 15% of total (380/780nm)
- 380 to 499nm < 15% of total
- 781nm to 1 micron < 50% of 380/780 nm)

Espectro LED 7.000K

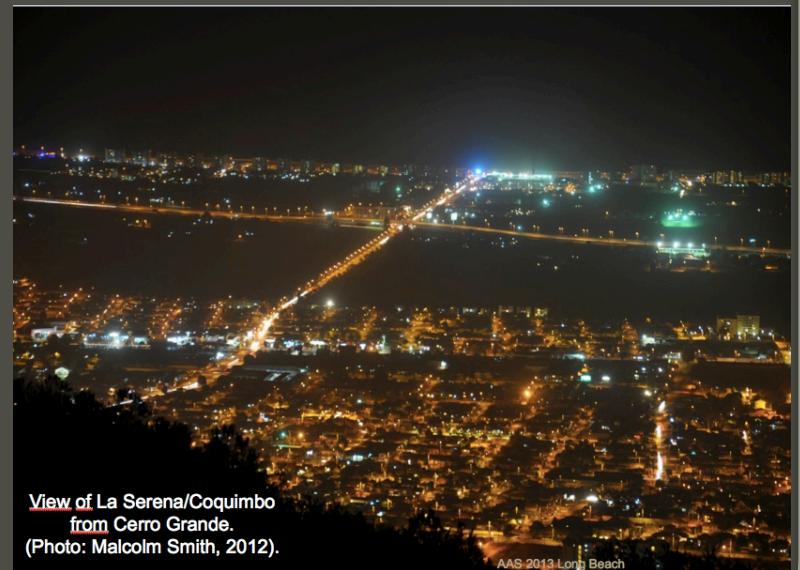


Espectro LED 3.200K



# Billboards

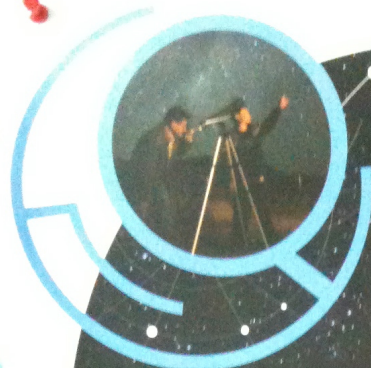
- Billboards with inner sources of illumination (LED or plasma big screens) must emit no more than  $50\text{cd/m}^2$  at night.
- Lighting for externally-illuminated billboards must be full cut off and be installed horizontally



View of La Serena/Coquimbo  
from Cerro Grande.  
(Photo: Malcolm Smith, 2012).

AAS 2013 Long Beach

E C



**Este espectáculo**  
se da en un solo lugar  
**en el**  
**mundo.**  
**En la Región de**  
**Coquimbo**

¿Porqué dejar de contemplar las estrellas?  
Usemos la inteligencia, organicémonos,  
cuida que tu casa, avenida, calle o pasaje  
se ilumine sólo donde se necesita.

**Ilumine el SUELO y no el CIELO**  
**NO destruyamos**  
**NUESTRO PATRIMONIO**



# FIN

Billboard on Avda. del Mar



View of La Serena/Coquimbo  
from Cerro Grande.  
(Photo: Malcolm Smith, 2012).



(Credit: Arturo Gómez & José Velásquez/CTIO)



**Vista desde el sitio del  
LSST.**

← Río  
Hurtado

←  
Ovalle

Foto: M.G.Smith, 2009.