Lick Observatory

Strategic Planning Committee
Inaugural Meeting
September 13, 2007

Lick Strategic Planning Group

Background: Burt Jones

UCO MISSION STATEMENT

Operate, maintain, and advance the optical/infrared astronomy facilities of the Lick Observatory on Mt. Hamilton.

•Provide a scientific and administrative interface to the Keck Observatory on Mauna Kea, Hawaii.

•Operate facilities to design and construct advanced instrumentation for the Lick and Keck Telescopes, including major optics, instruments, detectors, and software systems

•Conduct forefront research in astronomy.

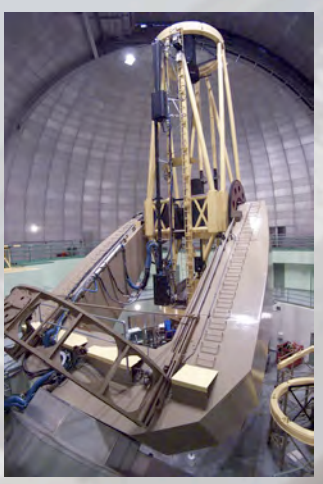
•Provide an organization which can unite and coordinate astronomy groups throughout the UC system in support of the Lick and Keck Observatories.

•Support through its facilities graduate and undergraduate student teaching and the training of astronomy Ph.D.s throughout the UC system.

Research Telescopes

* Shane
* Nickel
* Crossley
* CAT
* KAIT
* 36-inch
* APF

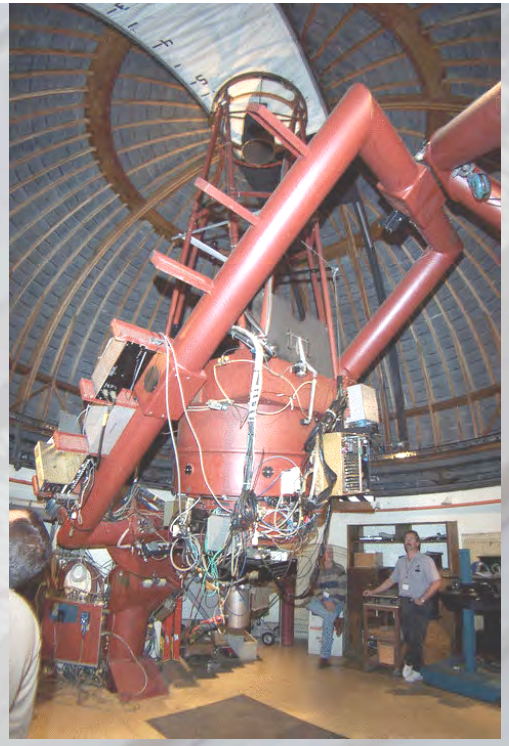
Shane



- Kast (1993-Cassegrain spectrograph)
- Hamilton (1986-Coude high-resolution spectrograph)
- PFCam (1997-Prime focus imager)
- AO-IRCAL (1995-Cassegrain Adaptive Optics
- Gemini (1995, facility instrument 1997-Cassegrain near to mid-IR imager/spectrograph)
- User (e.g., Flitecam, Puetter IR)

Nickel

CCD Cassegrain Imager
Cassegrain Spectrograph
User (OSETI, Welsh camera, Bloom/Butler camera)



CAT

Hamilton (High-resolution spectrograph)

Crossley

User (Marchis, Doyle)

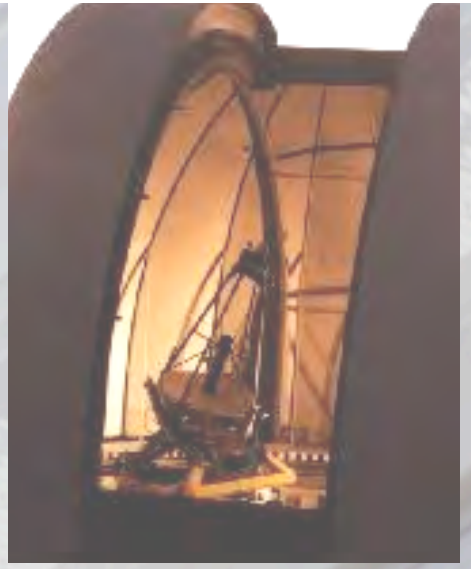
KAIT

CCD Cassegrain imager

APF (Automatic Planet Finder)

(Naysmith High Resolution Spectrograph)

36-Inch Refractor (?)



Mountain Scientific Support Staff

Reporting to the Director

*3 Support Scientists (Misch, E. Gates, Grigsby)

Reporting to UCO Computer and Programming Head (Deich)

*1 Programmer (J. Gates)

Reporting to Telescope Operations Supervisor (Severinsen)

*4 Telescope Operators/Technicians (Baker, Earthman, Walp, Miller)

*2 Laser Techs/Technicians (Chloros, Morey)

*1 Telescope Maintenance (Owens)

Campus support:

*40% time Jones

*40% V. Wallace

*McLean, as needed

*Business staff

*Software Group

*Labs

Mt. Hamilton Work Orders

Summary View- All Projects Year 2000-2007 and 2008 Proposed Projects

2000-2007	Mt. Hamilton Work Orders			
Full Code	Project Description	Current Status	Total $$ Original Budget Estimate	Total Expended or Committed thru 8/30/07
KW0002	Upgrade to MH Leach Controller	Completed	$ -	$ 1,687
KW0003	Upgrade to 40" CAT Encoder	Completed	$ 6,000	$ 27
KNCOXX	Upgrade to 120" Encoder	Completed	$ -	$ 78,943
KTILTM	Tiltmeter	Completed		$ 12,791
KW0106	Upgrade to MH Spectrograph	Completed	$ -	$ 1,563
KW0108	Upgrade CAT drive	Completed	$ 15,000	$ -
KW0109	New Guide System for Coude TV	Completed	$ 15,296	$ 17,407
KW0110	Replace 120" Telescope Control	Completed	$ 26,064	$ 3,387
KW0111	Jones/Stover mini-project	Completed	$ -	$ 323,442
KW0214	Upgrades to MH AO System	Completed	$ -	$ 867
KW0317	Upgrade to PFCAM	Completed	$ 17,200	$ 37,380
KW0322	Upgrade to AO system encoders	Completed	$ 40,707	$ 210,039
KW042A	PF CAM Shroud	Completed	$ 6,252	$ 5,113
KW043E	Kast-Red CCD Controller (2 controllers were actually installed into the Nickel)	Completed	$ 33,114	$ 37,339
KW052A	POCO 120"	Completed	$ 169,880	$ 48,291
KW052B	120" Launch Telescope	Completed	$ -	$ 575
KW052C	Nickel Guider Optics Replacement	Completed	$ 2,269	$ 336
KW052D	Kast Red Camera drift	Completed	$ 7,316	$ 1,892
KW052E	PFCAM upgrade	Completed	$ 60,025	$ 64,159
KW052F	PFCam & ADC Servicing	Completed	$ 15,736	$ 5,463
KW062A	Dewar Farm		$ 28,612	$ 75,015
KW062B	KTL sevices over the Web	Completed	$ 3,016	$ 2,895
KW062C	UCAM controller for Nickel	Completed	$ 23,130	$ 8,454
KW072A	UCAM Power Modifications	Completed	$ 1,500	$ 2,834
KW072B	MH 120" Dome Wheel Axles		$ 17,145	$ 53,048
KW072C	MH 40" Shutter Repair		$ 27,888	$ 1,166
KW072D	MH 40" focus Repair		$ 24,576	$ 5,996
KW072E	MH 12" Telescope Refurbishment		$ -	$ 2,897
KW072G	KAST Motor Controller Upgrade 05/07		$ 183,334	$ 9,939
KW082A	KAST Optics Coating		$ 9,098	$ -
	Total without APF		**733,157**	**1,012,943**
3 KFD,KFT,KFS	APF Dome, Telescope & Spectograph (total expended =total commitments of all funds)		$ 8,200,000	$ 10,150,198
	Grand Total Including APF		**$ 8,933,157**	**$ 11,163,141**

Notes:

1 Budget showing 0 indicates either no estimate was done, or was estimated to be 0 cost.
2 Labor expended is from the data set 7/1/03 through 7/31/07 and is unaudited.
3 APF Project is shown as original submitted budget and total committed funds through 8/30/07

Proposed	Mt. Hamilton Work Orders			
Full Code	Project Description		Total $$ Budget	Total Expended or Committed thru 8/30/07
pending (1)	Hamilton Upgrade	In Proposal	$ 246,590	$ -
pending (2)	KAST UCAM CCD Controller Upgrade	In Proposal	$ 217,660	$ -
KW082B-pending	3m Renishaw encoder measurements	Pending WO	$ 9,745	$ -
	Total		**473,995**	**-**

Notes:

1 Based on Hamilton Upgrade Proposal January, 2007. ROM estimates will need to be fully costed for Proposal approval. These shown costs are without contingency.
Upgrade proposal includes the following:
-Modernization of the motor control electronics and software
-Mechanical improvements (Guide TV rotation, Guide TV filter wheel, Stages for I2Cell and CAT mirror 5)
-New Hamilton Dewar

2 Based on incomplete KAST Red CCD Proposal estimate in progress, Option 2 Parts, Option 1b Labor.

Still to be added: UPS/cabling costs, Dewar modifications & engineering study & Contingency
Upgrade proposal includes the following:
Red side SNAP CCD
-Construction of new KAST Red side Dewar
-UCAM CCD Controller
-CCD Testing and Parameterization
-Integration of CCD, Dewar and UCAM controllers
-Dewar electronics box
-UCAM Controller mounting brackets
-Computer and Ancillary Systems & software (SPG)

3 Projects will need to be formally costed. Estimates represented above are at composite Federal rates, or P.I. estimated rates (based on June07).

Shane
Instrument Usage by Request

	05A	05B	06A	06B	07A	07B
Kast	87	88	97	88	94	115
Ham	37	39	26	41	53	41
PFCam	11	6	19	20	20	1
AO	44	30	28	28	27	35
Gemini	2	4	9	7	17	14
Own	12	12	12	12	6	6
Total	189	179	191	196	217	220

Shane

Campus Usage by Request

	05A	05B	06A	06B	07A	07B
UCB	46	50	55	61	68	68
UCSC	46	36	38	31	36	23
UCD	4	18	16	12	4	1
UCSD	26	21	29	33	39	39
UCLA	37	27	35	31	32	28
SFSU	18	18	18	18	20	20
Other	12	9	0	10	22	15
LLBL	-	-	-	-	-	26
Total	189	179	191	196	217	220

Shane

Position Usage by Request

	05A	05B	06A	06B	07A	07B
Faculty	102	88	101	108	112	101
Grad St	22	31	27	32	20	13
Post-Doc	19	27	21	29	43	51
Research	46	33	42	27	42	53
Total	189	179	191	196	217	220

Shane

Science Areas by Request

	05A	05B	06A	06B	07A	07B
Solar Sys	10	9	16	7	11	16
Plan. Det.	28	28	26	39	37	36
Galactic	45	54	40	49	65	55
X Galactic	94	75	100	96	98	105
Eng.	12	13	9	5	6	8
Total	189	179	191	196	217	220

Trends?

In last semester, 4 proposals accounted for 88 of requested 220 nights.

Nickel - Cat Usage

Quarter	05-1	05-2	05-3	05-4	06-1	06-2
Nickel	18	36	43	28	38	38
CAT	48	66	66	47	27	48

Quarter	06-3	06-4	07-1	07-2	07-3
Nickel	56	28	30	46	82
CAT	48	36	55	35	36

Public Outreach

Main Building, 36-inch tours, Gift Shop, Exhibits

(open 363 days a year, around 25,000 visitors a year)

Shane Visitor's Gallery

Summer Visitor's Program

6 nights of public viewing, with lectures (~1,300 per year)

Music of the Spheres

6 concerts in the main building, followed by lectures and viewing (~900 per year)

Tours

college classes, professional groups (~24 per year)

HamCam

Funding Events

1997
Lick Observatory in the Keck ERA

*Continued forefront, competitive research, change in emphasis

*Continued and expanded Keck support

*Test bed for instrumental development

*Synoptic, long term, and specialized programs

*Continued and increased graduate student training

*Continued and increased public education and outreach

1997 Action Plan

*Technical support

New support astronomer position, programmer, laser tech

*New instrumentation

Near IR spectrograph did not happen, still have Gemini
New Coude feed telescope, have instead APF coming online

*Better communication

On line documentation, web site
Mt Hamilton Instrument Group

1997Action Plan

*Improved seeing

minor actions

*Remote observing

only now taking place

*Telescope upgrades

Pointing, tracking, guiding, only now taking place

Current Projects

*Kast Upgrade (underway)

- New control boards
- New red CCD
- New dichroics (?)
- New coatings
- Overhaul

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Current Projects

*Nickel Focus Mechanism

*Replace Dome Axles

*Pointing Improvements

Future Projects

*Seeing Improvements (vent air through light tunnel)

(costed, not yet approved)

*Cooling guide cameras

(being costed)

Future Projects

*Hamilton Upgrade (will start when KAST is done)

-New control boards
-remote iodine cell operation
-remote image rotator operation
-New guide TV filter wheel

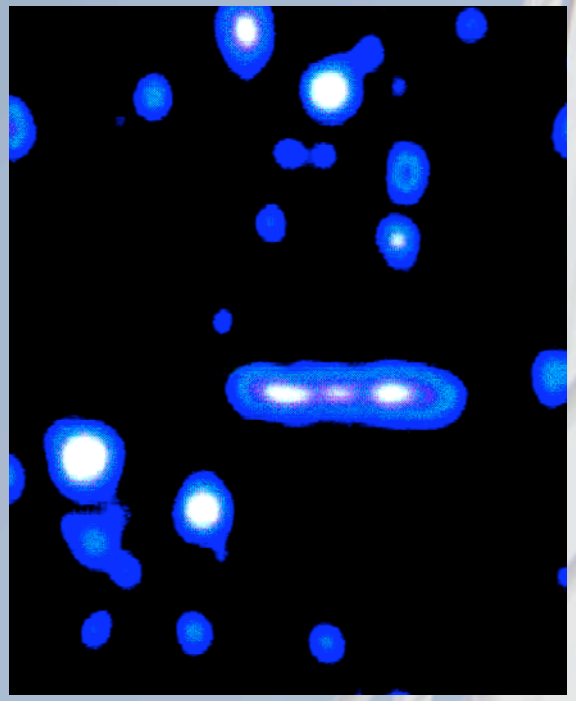
Upcoming Challenges
San Jose Lighting

1980 San Jose switched from Mercury vapor to low pressure sodium for most of its street lighting (helped by input from Lick Observatory) for energy savings

Today,

50,700 LPS lights

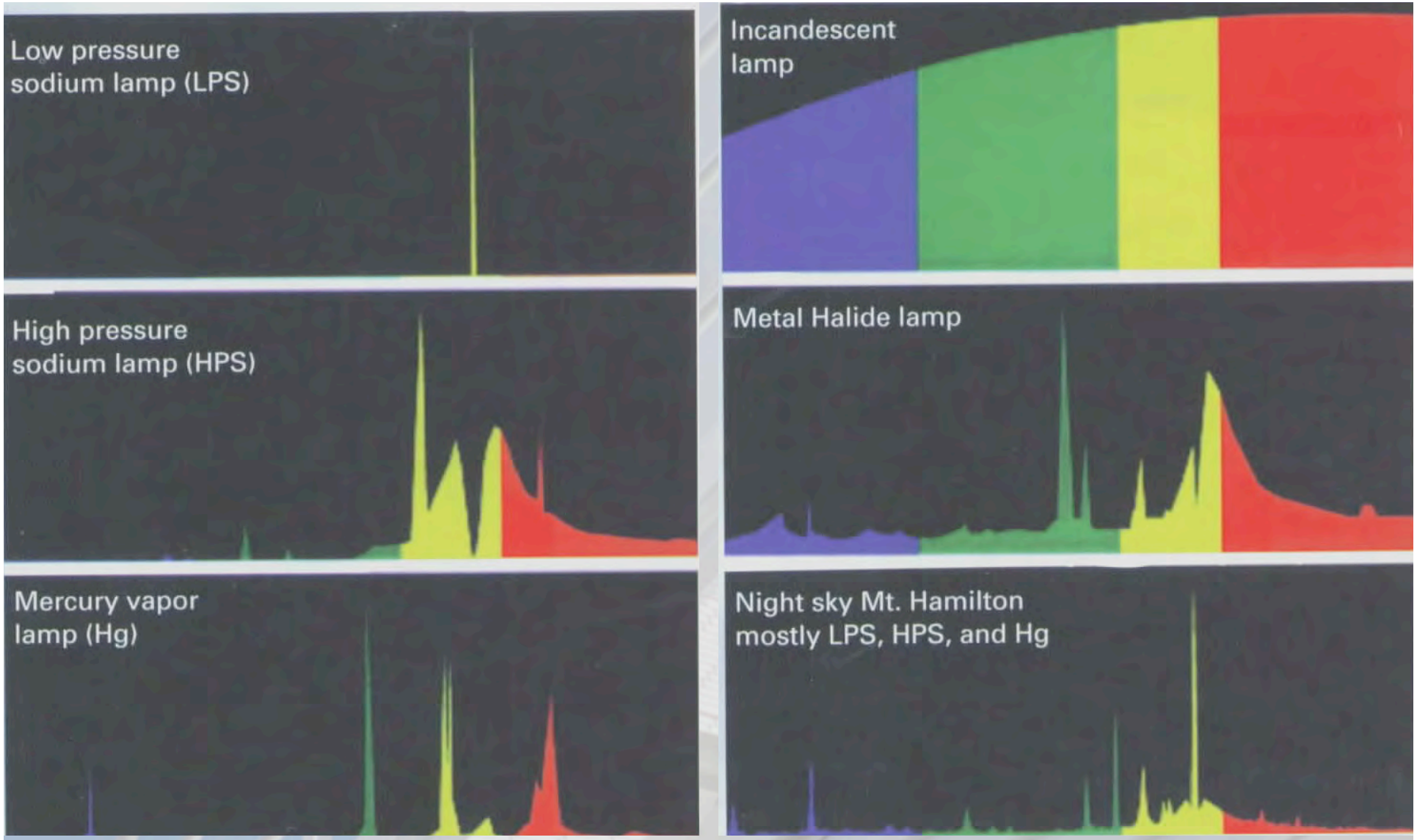
7,130 HPS lights



Asteroid San Jose

San Jose has:

*Mandated LPS for nearly all street lighting
*Mandated LPS for all private development
*Fully shielded lights for all sources more than 4,050 lumens
*Partial shielding for all light sources
*Outdoor lighting turned off within one hour of close of business



But:

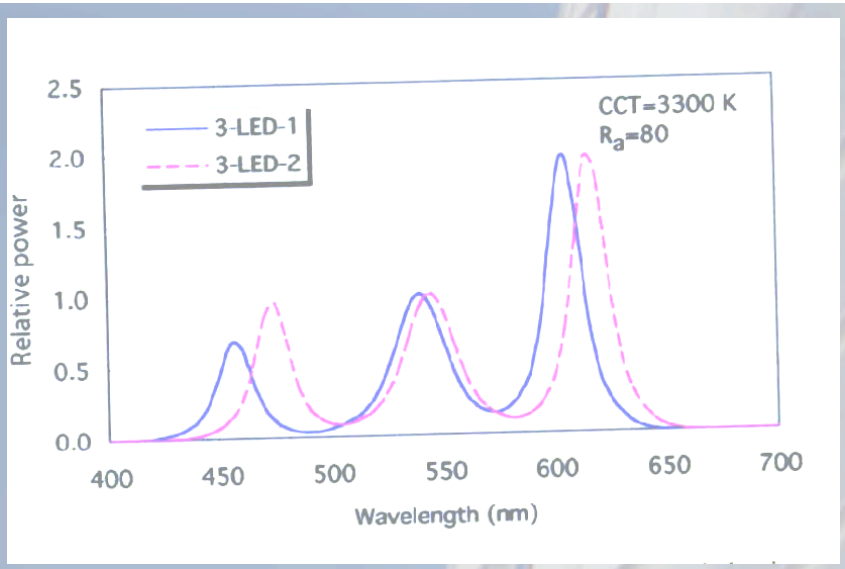
The future is bright (literally), but not good

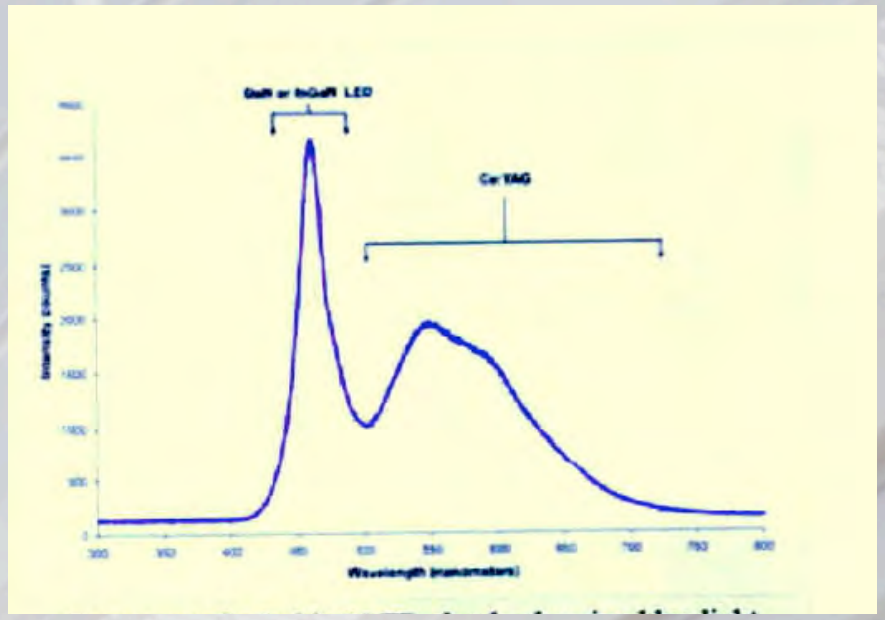
But not entirely black

San Jose Lighting Task Force

*UCO involved
*Looking at replacing current LPS-HPS street lights.
* Most likely candidate: LED
-Energy efficient
-Long lasting (50,000 hours)
-White Light

UCO/Lick is working with San Jose to mitigate going to a white light source





Current ways of producing white light from LED

Possible mitigations

Go to amber (6 nm fwhm) late at night

White by 3 color LED

Personal Feelings:

1) Lick can continue to be a significant contributor to front line research.

2) Our future research will need to move more to high resolution spectroscopy, AO, and near and mid IR spectroscopy and imaging, and we need new instrumentation in these areas.

3) We need to shift our emphasis to long term programs and graduate research.