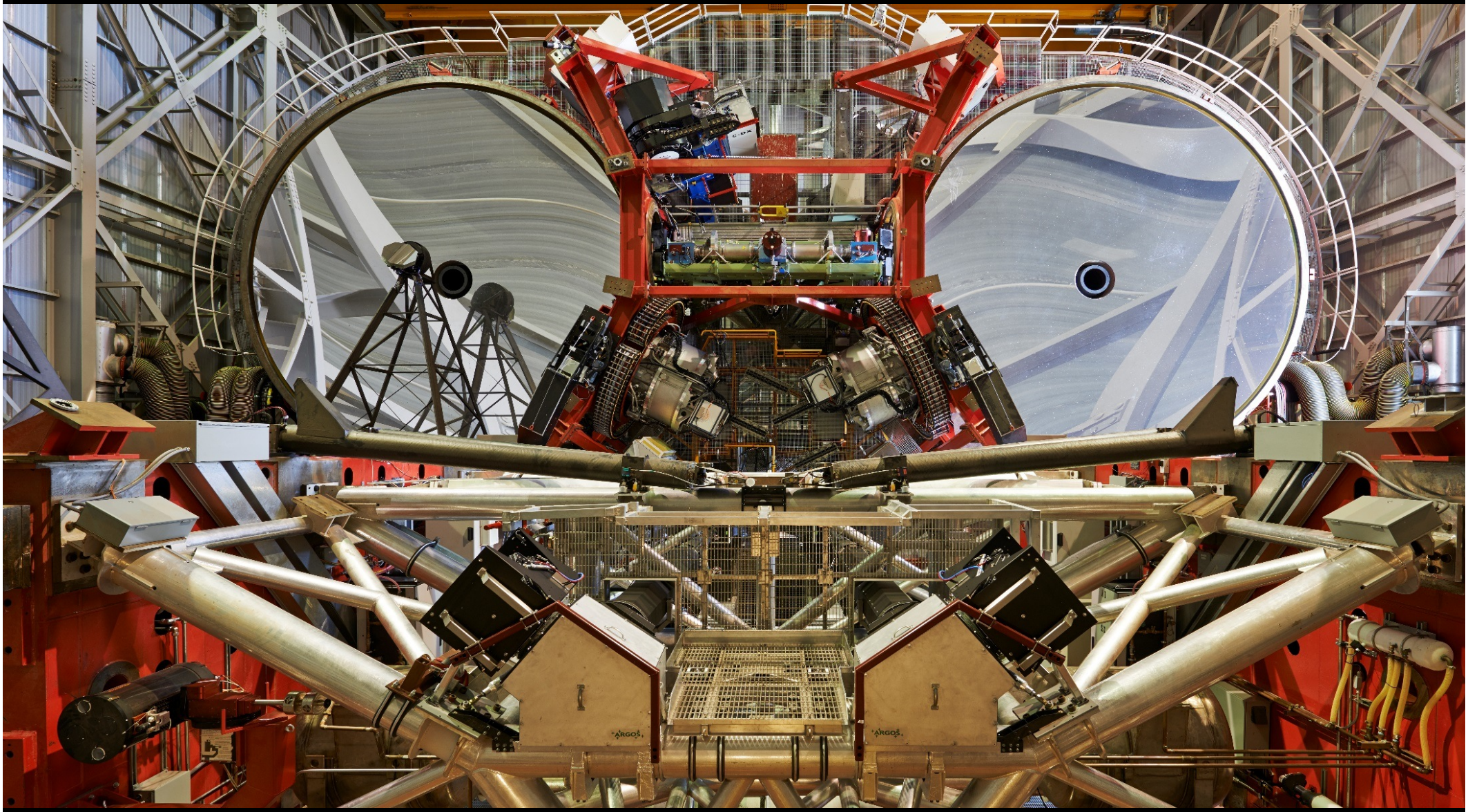
LBT Status

A. Fontana - Ottobre 2014

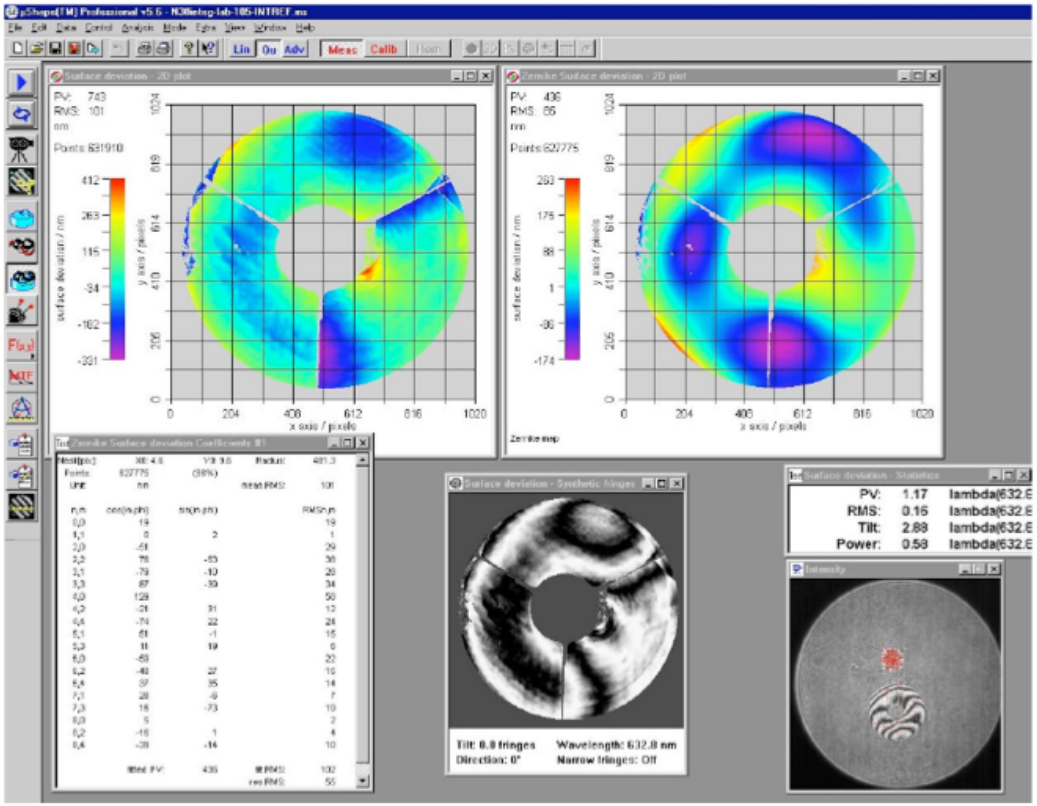


Crucial items

LUCI1-MOS
repeatedly unavailable

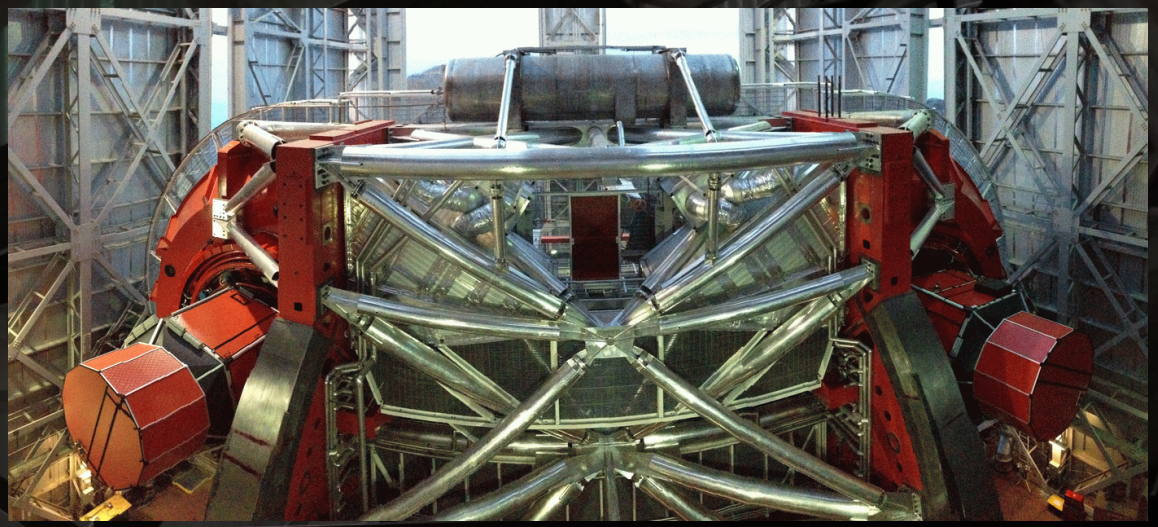
Completely
refurbished during
summer 2014

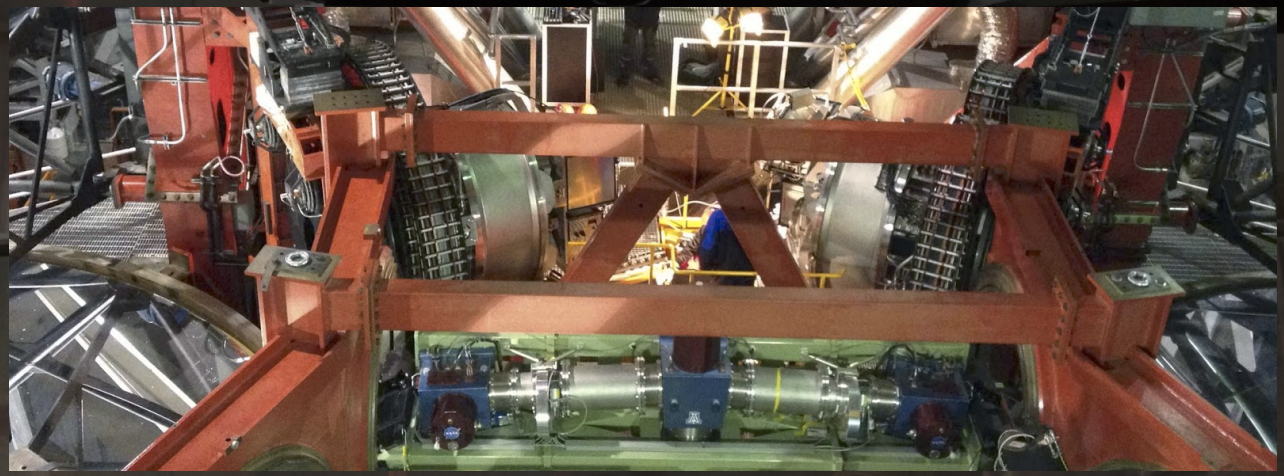
LUCI2-AO
delayed

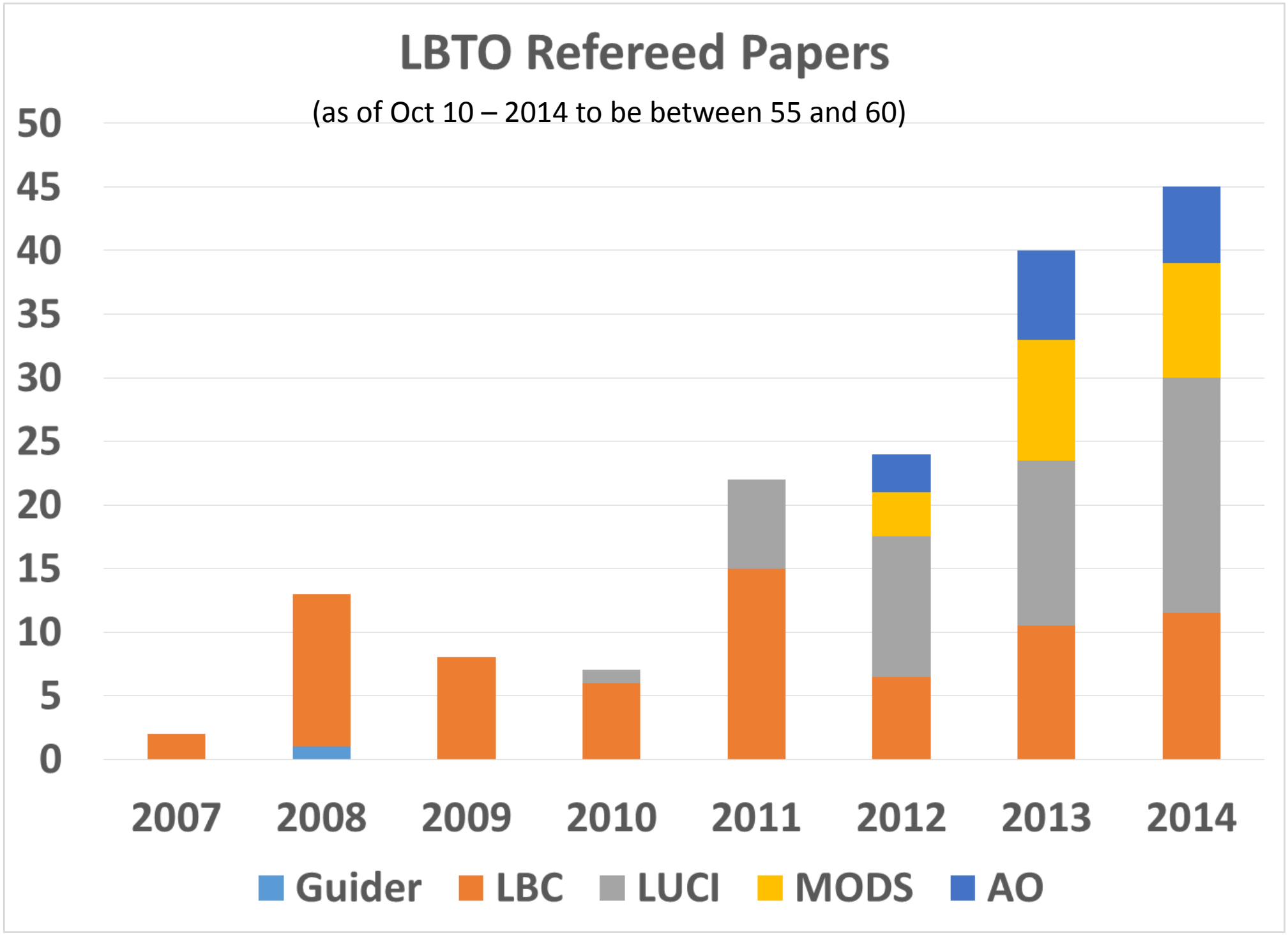


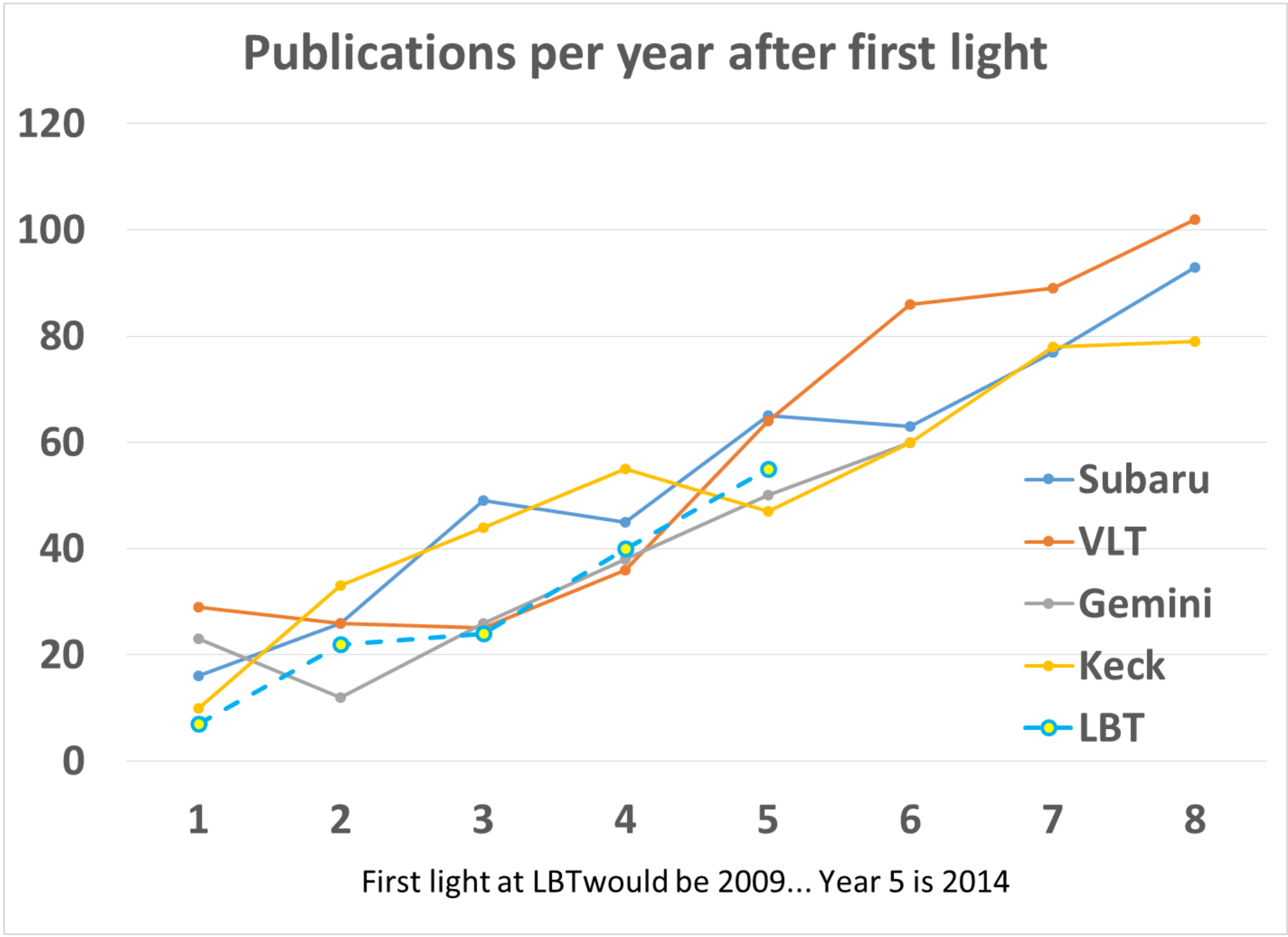
“Commissioning/Development” Activities

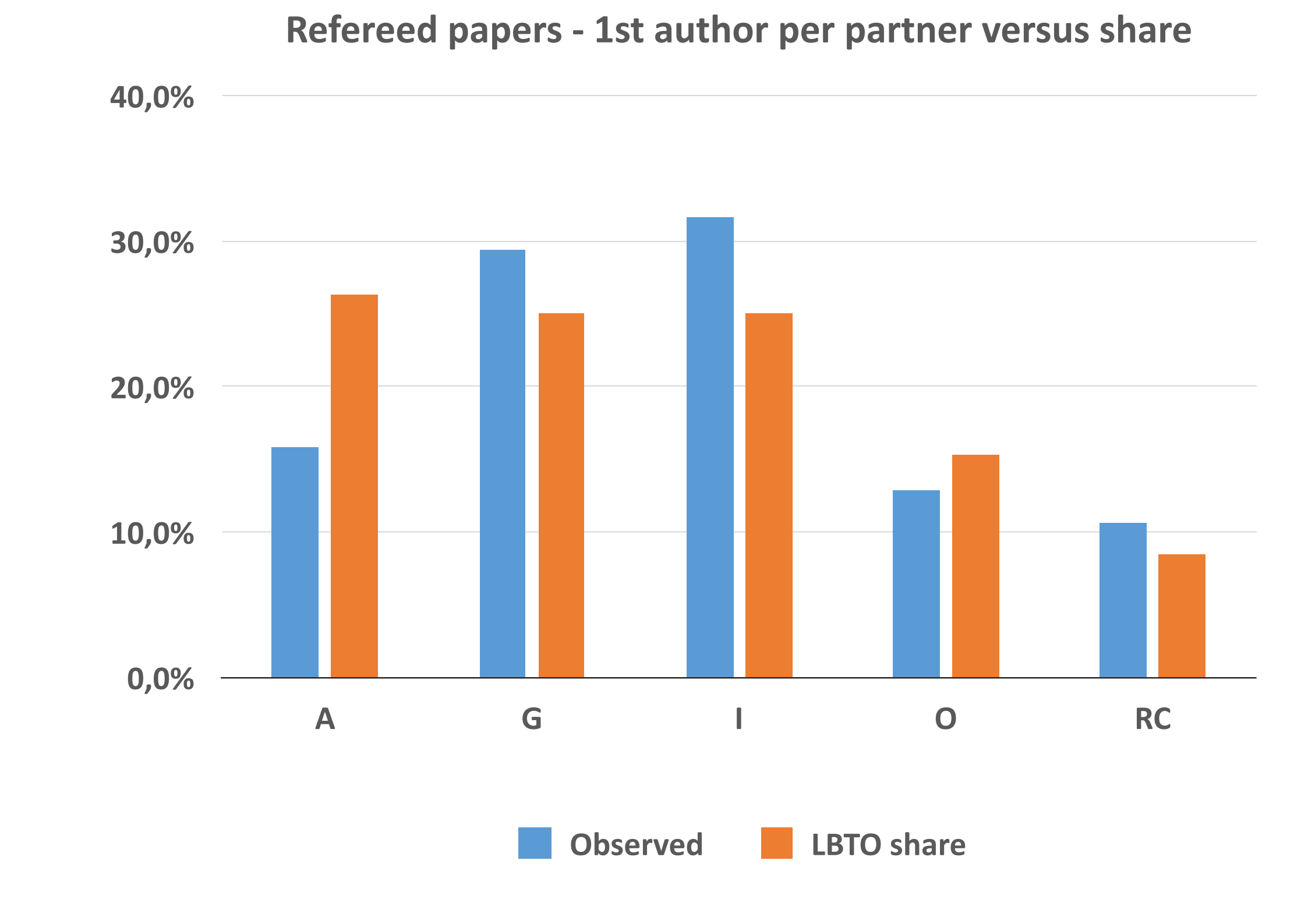
- All instruments (but LN) are on the mountain: LUCI2, MODS2, PEPSI






LBTO Refereed Papers
(as of Oct 10 – 2014 to be between 55 and 60)
50
45
40
35
30
25
20
15
10
5
0
2007
2008
2009
2010
2011
2012
2013
2014
Guider
LBC
LUCI
MODS
AO


Publications per year after first light
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
Subaru
VLT
Gemini
Keck
LBT
First light at LBTwould be 2009... Year 5 is 2014


Refereed papers - 1st author per partner versus share
40,0%
30,0%
20,0%
10,0%
0,0%
A
G
I
O
RC
Observed
LBTO share

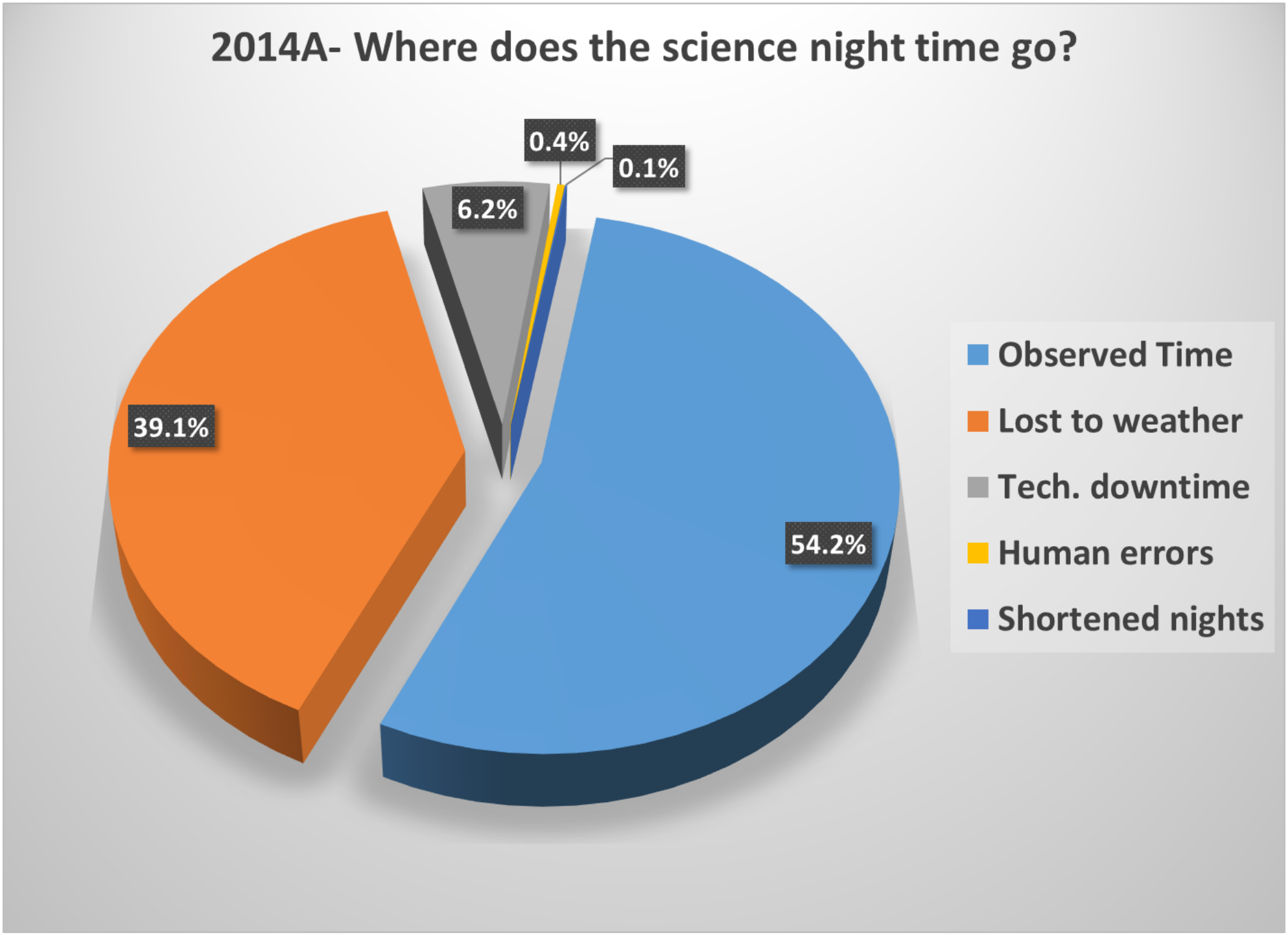
Workshop
Italiano
30 speakers
4 focused
discussions
>100 partecipanti

Tucson User Meeting
50 speakers
70 partecipanti

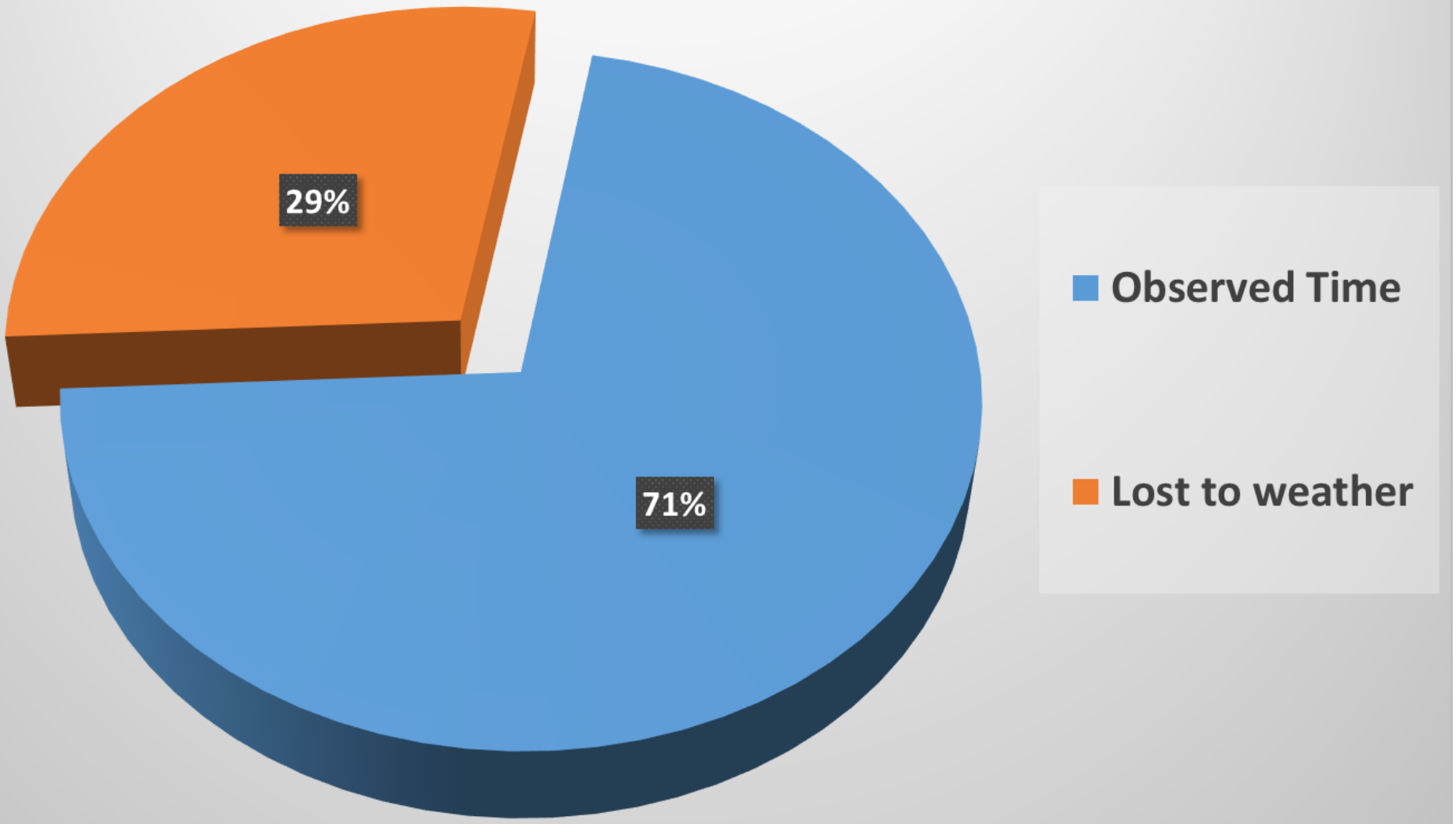
LBTO 2014 Users' Meeting

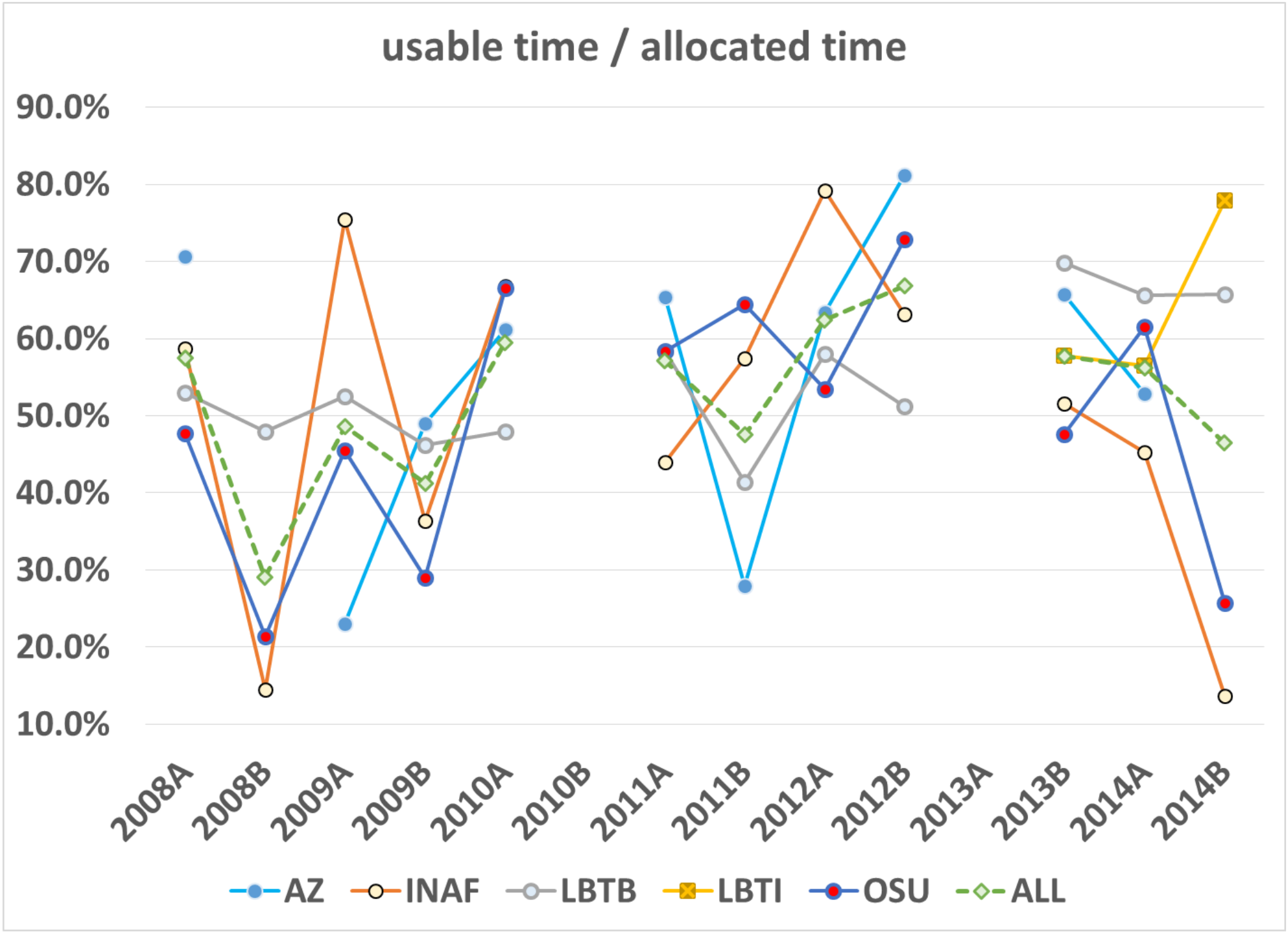
March 22-25, 2014 - Tucson, AZ (USA)

2014A- Where does the science night time go?



2014A - Commissioning/Engineering weather losses




usable time / allocated time
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
2008A
2008B
2009A
2009B
2010A
2010B
2011A
2011B
2012A
2012B
2013A
2013B
2014A
2014B
AZ
INAF
LBTB
LBTI
OSU
ALL

New Projects: Q-mode

An aggressive plan to introduce full queue-mode observing at LBT.

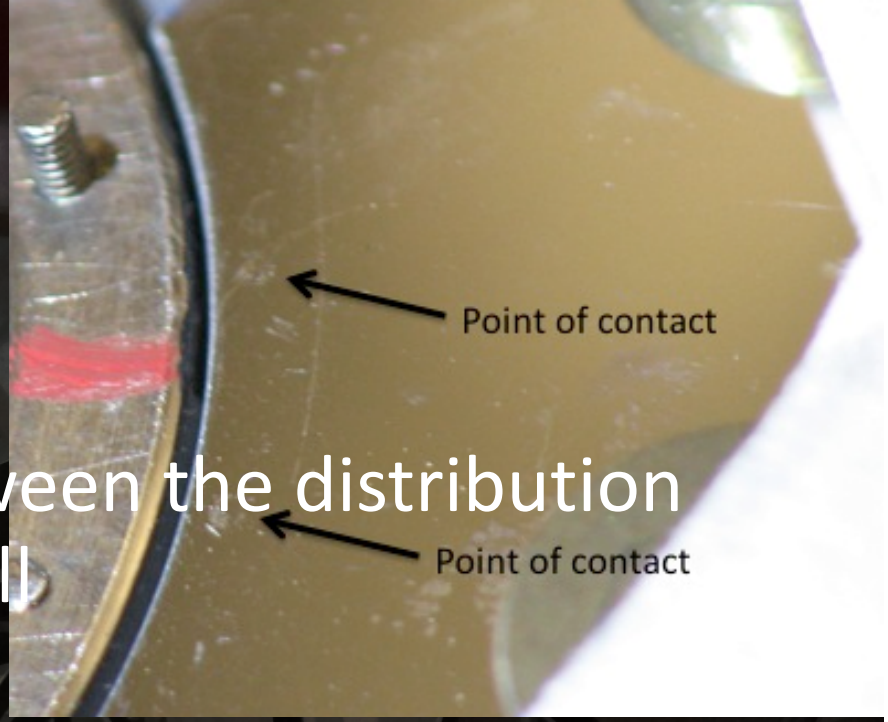
Optimizes science and engineering nights

Managed by LBTO staff, building on partners' experience

Plan presented to 2014 fall Board
Approved pending technical review early 2015

Schedule: test phase 2016A
implemented (LBC LUCI MODS) 2016B

Adaptive Secondaries



- One main issue: contacts between the distribution board and the back of the shell
- Many failures in 14A
- Decision made to install the “ESO” version of the contacts: did not work well during the test phase.
- Finally going back to the previous “spring contacts” but clocking the board to have the contacts on “clean” coating
- Help from JPL…

LUCI1 and AO in tip-tilt mode

- **E+D time allocated in 14A and 14B (progress slowed by weather)**

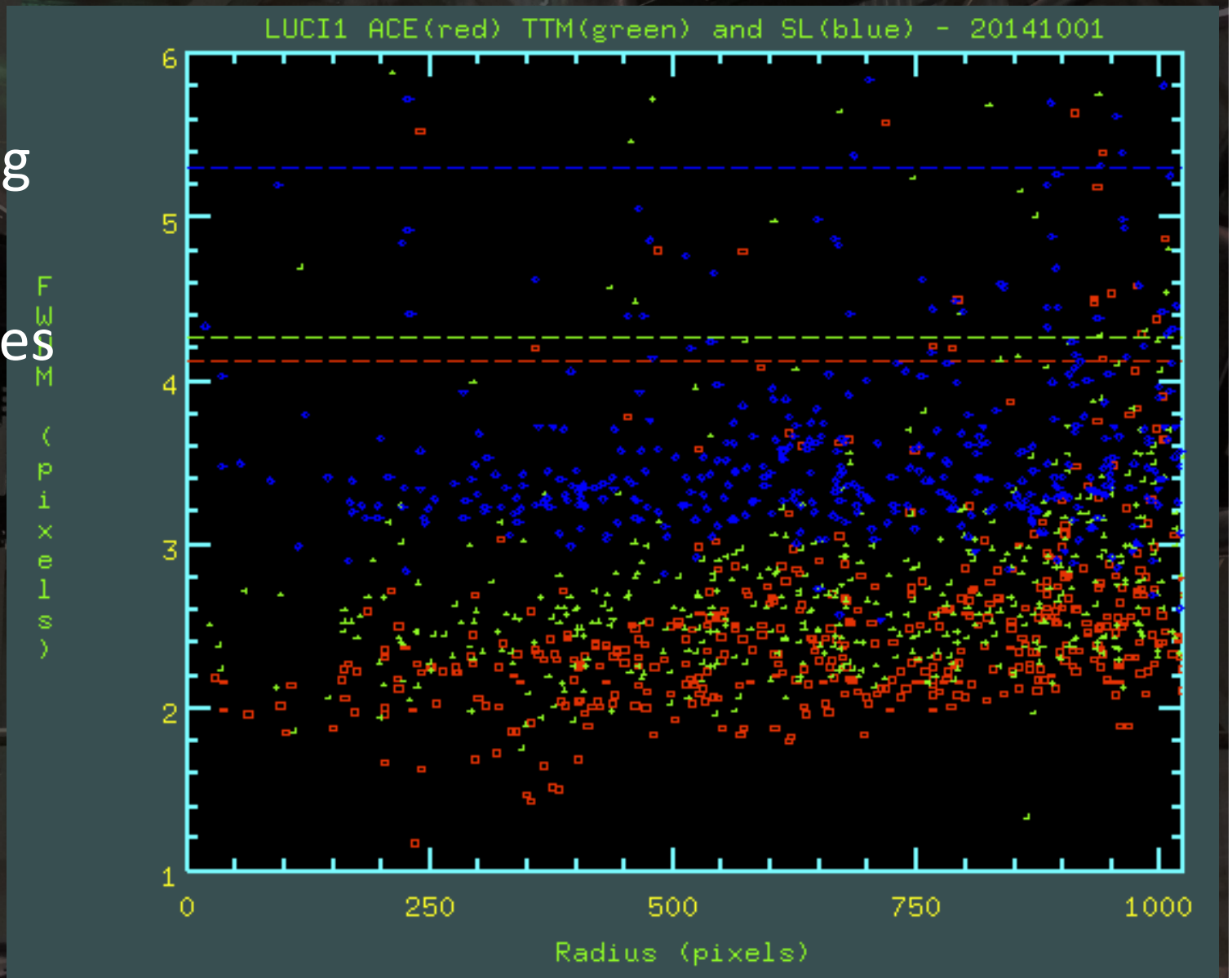
Blue: Natural seeing

Green: AO in TTM

Red: AO - 110 modes

1pixel=0.12”

Seeing in r ~0.65”



LUCI2 AO Camera

Measurement	Rms	Zernike. Rms	Astigmat. rms	Coma rms	Trifoil rms	Spheric. rms
Warm, lab, normal	101 nm	85 nm	38 nm	28 nm	34 nm	56 nm
Warm, lab, reversed	120 nm	114 nm	70 nm	116 nm	30 nm	114 nm
Warm, cyrostat, rev.	119 nm	117 nm	57 nm	47 nm	37 nm	102 nm
Warm, cryostat, p=0	114 nm	112 nm	55 nm	41 nm	36 nm	94 nm
Cold, cyrostat, 100K	100 nm	98 nm	45 nm	42 nm	42 nm	79 nm
Cold, cryostat, 78K	**90 nm**	**88 nm**	**34 nm**	**40 nm**	**31 nm**	**66 nm**

Wavelength Filter band	Strehl %
Z (1.0µm)	72
J	77
H	86
K	92

Table 3: Calculated Strehl ratios of the cold camera

New instruments

Project	Category	Current status (5 Oct 2014)	Short Description	PI
LMIRCam	Upgrade	Proposal ready LBTO funding requested	(1) developing a new IFU mode for LMIRcam, (2) increasing the field-of-view of LMIRcam, and (3) improvingLMIRcam's JHK capabilities	A. Skemer (UA) M. Skrutskie (UVa)
SOUL	Upgrade	Proposal for a Preliminary Design Study to be submitted by Oct 10	The plan is to improve the AO wave-front sensors on the four LBT AO ports (LUCIs and LBTI), installing new detectors (fasters - less readout noise) and more sub-apertures (from the current 30x30 to 40x40)40x40 instead of 30x30lenslet array.	Enrico Pinna (Arcetri - INAF)
SHARK-IR	New Instrument	Proposal for a Preliminary Design Study submitted	An extreme AO near-IR imager (with a coronagraphic mode) designed to benefit from the superb performances of the LBT Adaptive Optics. Will use one of the AO ports of LBTI and will be installed on the LBTI structure.	Jacopo Farinato (Obs. Padova - INAF)
iLocater	New Instrument	Instrument moving forward on external funding - LBTO now following the project (Kickoff: 3 Oct 2014 - PDR: Apr 2015)	A diffraction-limited fiber-fed spectrograph in Y band Y-band (0.95um – 1.13um), providing R=110,000 spectral resolution with radial velocity precision < 1 m/s	Justin Crepp (ND - RC)
SHARK-V	New Instrument	No proposal now - The team is preparing a technical document and feasibility tests (see on the right) before submitting a proposal to SAC and Board at a later date.	Same philosophy as SHARK-IR, but in the visible. Tests still to be made will provide a crucial assessment of the future performances of SHARK VIS in the wavelength range from 600 to 900 nm.	Fernando Pedichini (Obs. Rome - INAF)
LBC Upgrade	Upgrade	No proposal now - The team is assessing the current LBC performances before proposing a possible hardware upgrade.		Enrico Cappellaro (Obs Padova - INAF)

Forthcoming instruments with AO-capabilities

LBTO potential AO performances

JC-CV Oct 2014

	Z	J	H	K	Notes
LUCI N30	72%	77%	86%	92%	camera only
SHARK-NIR		97%	98%	99%	all instrument
LMIRCam					LMIRCam itself designed to have *near perfect Strehl ratios for > 1 micron* . A window and potentialy a diamond-turned optics could be replaced if needed (more information pending)
LN-MCAO		~60%			Uniform on all field, unlike narrow-field high-Strehl NIR/AO

	14B	15A	15B	16A	16B	17A	17B	18A	18B	19A	19B	20A	20B
Infrastructure													
Queue	Development			Test	Stage1		Stage2		Stage3				
AO	Completion												
?? SOUL ??	? Development/Commissioning ?												
?? ARGOS UPGRADE ??					??? Development /Commissioning/Operation ???								
Facility													
LUCI1													
LUCI1 AO			Commissioning	Binocular	Binocular								
LUCI2 AO		Commissioning											
MODS1			Binocular										
MODS2	Commissioning												
LBCB	Binocular			??Upgrade??									
LBCR													
ARGOS	Commissioning				In operation								
New Facility													
?? SHARK-IR ??	??? Development ???							Commissioning	??? In operation ???				
?? SHARK-VIS ??	??? Development ???						Commissioning		??? In operation ???				
Strategic													
LBTI	Commissioning	In operation - with increasing capabilities ??? Facility Status ???											
LMIRCam		?? Upgrades ??		??? Facility Status ??									
?? LIVE ??				??? Development/Commissioning/Operation ???									
Lean-MCAO	Development			Commissioning	In operation ??upgrade to wider field??								
LINC-NIRVANA				??? Development/Commissioning ???				In operation - with increasing capabilities ?? Facility status ??					
PI													
PEPSI	Development	Spectro		Spectro-polarimetry		?? Facility status ??							
?? iLocater ??	?? Development/Commissioning ??						?? In operation - Facility Status ??						

LBTO Long Range Budget Plan (no funding for Gen2 instruments or strategic instrument support)

	2014	2015	2016	2017	2018	2019	2020
Members' contribution	**13,316**	**13,316**	**13,316**	**13,849**	**13,849**	**13,849**	**14,403**
Contribution percentage increase	0.0%	0.0%	0.0%	4.0%	0.0%	0.0%	4.0%
Regular staff	6,044	6,600	6,933	7,036	7,142	7,248	7,357
Other labor costs	250	215	200	200	150	150	150
Operations	1,800	1,695	1,729	1,763	1,799	1,835	1,890
Utilities	1,300	1,300	1,300	1,300	1,326	1,353	1,380
MGIO	896	896	905	914	923	932	942
UA Services	2,050	2,179	2,268	2,300	2,321	2,355	2,392
Corporation	221	215	240	250	250	260	260
Total Operations	**12,561**	**13,100**	**13,335**	**13,514**	**13,661**	**13,873**	**14,110**
staff/total	50%	52%	53%	54%	53%	53%	53%
Transfer to Cont/Res Fund	**755**	**216**	**(19)**	**334**	**188**	**(24)**	**293**

Assumptions		half Queue	full Queue				
Regular positions	60	61	64	64	64	64	64
Regular staff additions	4 2Ast + 1SW + 1mnt	1 Queue (2*1/2)	3 ARGOS+Queue				
Salary raise (mid-year)	2.50%	0.50%	2.50%	0.50%	2.50%	0.50%	2.50%
Labor costs							
Operations increase rate			2%	2%	2%	2%	3%
Utilities increase rate		0%	0%	0%	2%	2%	2%
MGIO increase rate			1%	1%	1%	1%	1%

Transfer to Cont/Res Fund	**755**	**216**	**(19)**	**334**	**188**	**(24)**	**293**
Transfer from Cont/Res to Dev			0	0	0	0	0
Gen 1.1 funding + Gen 1.5 seed	200	400	400				
In-house projects (to Dev. Fund)		240	100	150	100	150	100
Cont/Reserve Fund (end of year)	**1,833**	**1,409**	**890**	**1,074**	**1,162**	**988**	**1,180**
CR Fund / operation budget	***15%***	***11%***	***7%***	***8%***	***9%***	***7%***	***8%***

The LBT Visiting Committee

Visit planned 15-17 Dec 2014

- Brian Schmidt (Chair, Nobel prize)
- Rebecca Bernstein (GMT Project Scientist)
- Nancy Levenson (Gemini Project Scientist)
- Mark Phillips (Magellan Deputy Director)
- Francois Rigaut (ANU - AO specialist)
- Ralph James (LBN - Forme SPIE Optics President)

The final goal of the plan is to make LBTO a major player among ground-based world-class facilities in optical/IR Astronomy.

The main questions to the VC

Will the Observatory with its overall strategy and capabilities be prominently positioned in the global context of the next decade?

Is the combination of telescope and instrument strategy, operational goals, organizational structure, governance and foreseen resources likely to succeed in fulfilling LBT's scientific ambition?

Will the Observatory provide the basis for the substantive production of unique and high-impact science?

LBT has at least a decade to play as a major optical telescope

It is not (only) the last 8m-class, but also the first prototype of 2x-m class telescopes.

Implements and test cutting-edge key technologies for ELTs;
Starts to explore science domains that will be the science focus of ELTs