

# COS Sites Historical descriptive:

## (AFOps) Tucson Facilities

1. 950 N Cherry Avenue (AFO Base)

Tucson facilities consist of six buildings located on non-contiguous sites that encompass approximately 4.2 acres (185,000 s.f).



1. **950 N Cherry Avenue**- Constructed in 1960, several additions were added over the years. The additions were built in 1962, 1964, 1965 and 1967. The basement is 40,000 square feet and the 1<sup>st</sup> floor is 67,000, with a combined total of 107,000. The building has 264 rooms. A 5,175 sf modular trailer was placed on top of the east side roof in 1993 for temporary offices. The original HVAC system in building 950 is old and obsolete. It is not energy efficient and is on the verge of failure. The original plumbing has been patched beyond allowable code requirement allows. I has also caused severe flooding damage in the past. Below the carpet are asbestos base floor tiles, above the ceiling tiles are asbestos insulated beams and columns. The first floor has no water sprinkler system and the door knobs are non ADA/NFPA compliant. Sixty percent of the windows are still its original single pane glass. Fifty percent of the exterior walls are non'insulated metal sheets that conduct heat in the summer and cold in the winter. Most of the glass fronts are original with single pane glass.

Near building 950 at the corner of the lot is the Arizona Facility Operations building (AFO), built in 1960 with 12 rooms; a total of 6,369 sf. Outside of minor office renovations, no major upgrades have been done.

2. **1715 E 1<sup>st</sup> St.** - La Quinta office was a series of six small adobe houses built in the 1950's. In 1970, walls and floors were built in between all the houses to form hallways and additional offices. All the houses were joined together in a U shape with 7,444 sf. La Quinta has 39 rooms.

3. **1002 N. Warren St.** - AURA building built in 1970 totaling 3,042 SF. Aura building has 23 rooms.

4. **1730 E. 1<sup>st</sup> St** - Shipping and Receiving logistics warehouse built in 1980 is a 1,700 sf Pre Engineered Building. The building is divided in two sections, the logistics warehouse and the carpentry shop. A 900 sf modular trailer was placed beside it in 2003. The Laboratory is a Pre-Engineered Building built in 2000, 1400 sf located in the vicinity.

## (AFOps) Kitt Peak



Kitt Peak began building in 1958 and many of the original buildings still stand with much of the original equipment. The most recent building was built in 1992, the WIYN telescope. Many of the telescope electronics have been replaced and are custom designed and produced. The facility infrastructure was installed in 1958 and has since been kept working with patching as needed. This continues to function in part due to the excellent design, craftsmanship, materials used during construction, and the ingenuity of the people keeping it running. The mountains electrical system and plumbing system are in dire need of replacement due to deterioration and age.

1. Fire & First aid Station- built in 1985. 1,500sf.
2. Dorm 1- Built in 1960 and an addition in 1966 has had no major improvement. 2,144 sf./1,845 sf.
3. Dorm 2 –built in 1963- 4,400sf.
4. Dorm 3 – built in 1964 and remodeled in 1994 3,760 sf.
5. Dorm 4- built in 1975 and renovated in 2011- 2,800 sf.
6. House 1 - Built in 1960 the building has had interior renovations. 1,594 sf.
7. House 2- Built in 1961 the building has had interior renovations. 1,400 sf.
8. House 3- Built in 1961 the building has had interior renovations. 1,400 sf.
9. House 4- Built in 1963 1,400sf.

10. House 5- Built in 1963 1,400sf.
11. House 6- Built in 1963 1,800sf.
12. Calypso- (unknown)
13. Admin building – Built in 1960 the building has had no major improvements. 3,200 sf.
14. Dining facility – Built in 1960 the building has had no major improvements. 3,115 sf.
15. WIYN .9 M observatory- Built in 2014 it is 9,270 sf.
16. WIYN 3.5 M observatory- Built in 1992- 6,910sf.
17. 4M Mayall observatory- Built in 1972 – 41,727.
18. Visitor Center- built in 1964 - 3,424 sf.
19. Technical Shops – Built 1965 – 3,800 sf.
20. Fabrication Shop- Built in 1969 – 1,357sf.
21. Mechanic Shop- Built in 1960- 1,540 sf.
22. Flocculation House – Built in 1969- 969 sf.
23. Pump house- Built in 1960, refurbished in 2013. - 560sf.
24. UST and fuel pumps- (unknown)
25. Solar office lab (EM shop)- Built in 1963 is 2,214 sf.



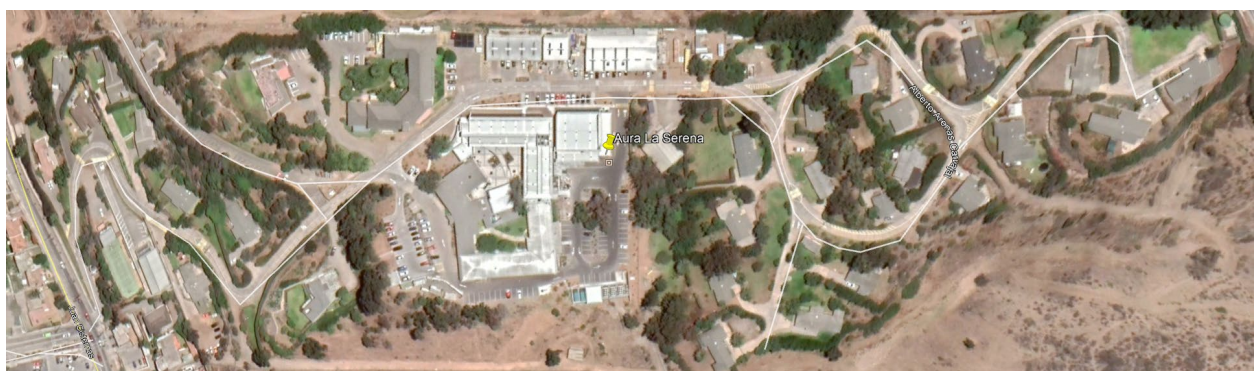
## Chile Facilities

### 1. La Serena, CFO Base (Gemini South)

The Gemini South base facility was constructed in 2002 and commissioned in March 2003. It contains offices, several meeting rooms, a lecture hall, laboratory, control room, computer room, 2 UPS Systems, a service yard with a backup generator, 2 kitchens, restrooms, and a beautiful garden. The total building space is 1,642 square meters (17,674 square feet).



## La Serena Facility



The land for the central portion of the main southern headquarters facility was purchased by AURA in October of 1963. This property was acquired for the construction of laboratories, employee housing and administration buildings to support the astronomical telescope facilities being built on Cerro Tololo.

**First Purchase: Central part of the La Serena compound**

Area: 5.57 hectares (13.76 acres)

Purchase date: 8 October 1963

**Second Purchase: Land adjacent to J. Cisternas Street**

Area: 10,450 Square Mt. (2.58 acres)

Purchase date: 15 July 1966

**Third Purchase (last): Eastern Sector**

Area: 6.69 hectares (16.55 acres)

Purchase date: 9 May 1968

**LA SERENA HISTORICAL HIGHLIGHTS**

1. AURA bought the mid-section (administrative section) of the La Serena Compound - 1963
2. Construction houses # 8-9-10-11-12 and 13 - 1970
3. Construction houses # 18 and 19 - 1973
4. Construction houses # 20 – 21 and 22 - 1974
5. Completed laboratories in basement of ETS extension; project completed - 1984
6. Completed installation of hilltop water tank and fire-station system in La Serena campus - 1984
7. Completed construction of House # 26 - 1984
8. Completed construction of House #27 - 1985
9. Completed construction of U-MASS Bldg & Enclosure - 1997
10. Completed construction of Gemini Base facilities at La Serena Campus - 2002
11. La Serena Base Facility construction ends, and building is delivered for occupancy - 2021

ITEM	No	USAGE	ENCLOSED AREA	
			SQFT	SQMT
		<b>LA SERENA</b>		
a)		DEDICATED PROGRAMS OR ORGANIZATION		
	1)	GEMINI OFFICES <sup>2</sup>	19,828.00	1,842.08
	2)	SOAR OFFICES <sup>1</sup>	1,500.00	139.35
	3)	New Offices Building	19,376	1,800.00
	4)	Data Center building	7,535	700.00
		Subtotal	26,911.00	4,481.43
		ENGINEERING AND TECHNICAL SERVICES		
b)	1)	INSTRUMENT <sup>1</sup>	5,086.40	472.54
	2)	INSTRUMENT SHOP <sup>1</sup>	6,610.00	614.09
	3)	LABS <sup>1</sup>	1,578.00	146.60
	4)	OFFICES AND CONFERENCE ROOMS <sup>1</sup>	5,827.70	541.41
		Subtotal	19,102.10	1,774.64
c)		NOAO-S AND CTIO		
	1)	COMPUTERS <sup>1</sup>	1,308.70	121.58
	2)	INSTRUMENT <sup>1</sup>	46.60	4.33
	3)	LABS <sup>1</sup>	139.40	12.95
		Subtotal	1,494.70	138.86
d)		OBSERVATORY SUPPORT SERVICES		
	1)	GARAGE <sup>1</sup>	3,226.00	299.71

	2)	KITCHEN <sup>1</sup>	1,118.30	103.89
	3)	LAUNDRY <sup>1</sup>	390.00	36.23
	4)	MAINTENANCE SHOPS <sup>1</sup>	1,300.00	120.77
	5)	OFFICES AND CONFERENCE ROOMS <sup>1</sup>	3,836.07	356.38
	6)	WAREHOUSE <sup>1,4</sup>	1,600	148.65
		Subtotal	13,070.37	1,214.28
e)		RESIDENTIAL AND OTHER USAGE		
	1)	DORMS <sup>1,3</sup>	1,431.60	133.00
	2)	HOUSES <sup>1</sup>	50,859.00	4725.04
	3)	Lobby Reception <sup>1</sup>	365.00	33.91
	4)	RECREATIONAL <sup>3</sup>	3,590.00	333.52
	5)	Staff Services <sup>1</sup>	818.52	76.04
	6)	TELEPHONE <sup>1,6</sup>	113.30	10.53
		Subtotal	57,179.32	5312.04
f)		SCIENTIFIC STAFF		
	1)	Library <sup>1</sup>	1,045.00	97.08
	2)	OFFICES AND CONFERENCE ROOMS <sup>1,6</sup>	7,670.00	712.57
		Subtotal	8,715.00	809.65
		<b>TOTAL LA SERENA</b>	<b>119,315.40</b>	<b>13,592.25</b>

## 2. Gemini South, Mountain, Cerro Pachon

The Gemini South 8.1-meter diameter optical/infrared telescopes saw first light in 2000 and is located on a mountain in the Chilean Andes called Cerro Pachón at a height of 2,725 metres [8,940 feet]) where very dry air and negligible cloud cover make this a prime telescope location.



## Cerro Tololo and Cerro Pachón Facilities



The land encompassing the primary mountain-top astronomical sites, as well as the necessary access to them and the surrounding areas required to protect them from potential encroaching development, was purchased by AURA in January 1963. This property was acquired to establish a site for building astronomical telescope facilities in the southern hemisphere. From 1991 through 1999 additional land was acquired to expand the original site to accommodate new telescope location requirements and the suitable protection of them.

### **Cerro Tololo & Pachón: *Estancia El Totoral***

Area: **33,729 Hectares approx. (83,351.77 acres approx.)**

Purchase Date: 19 January 1963

### **HISTORICAL HIGHLIGHTS**

1. AURA bought the Tololo Compound, “El Totoral”, 33,729 hectares (83,345.84 acres) with Cerro Tololo near its center - 1963
2. “Temporary” powerhouse, warehouse and maintenance shops completed; contrary to master plan, permanent structures have yet to be built - 1963
3. First 50,000-gallon water storage tank installed on Tololo. 1965

4. Five houses were completed on Tololo. 1966
5. The administrative/scientific office building was completed on Tololo. 1967
6. Astronomers' Dormitory and Dining Hall first occupied. 1967
7. Tololo instrument shop completed; it subsequently became the electronic shop, and the visitors' center. 1967
8. San Carlos water system initiated to replace the Los Placeres system; two more 50,000-gallon storage tanks installed on Tololo. 1975
9. Completed offices on ground floor of extension to ETS wing. 1984
10. Completed construction of NASA Crustal Survey installation on Tololo. 1984
11. Completed construction of the new Tololo laundry wing on Technicians' Dorm, Tololo. 1984
12. Completed first phase of Pachon Dormitory at cerro Pachón consisting in Total seven Dormitories, Hall & utilities (365M<sup>2</sup>). 2008
13. Completed construction of second phase of Pachon Dormitory at cerro Pachon consisting in five dormitories & walkway totalizing 199.2 M<sup>2</sup>. 2009
14. Completed construction 3rd. Phase of the Pachon Hotel and Kitchen Facility, consisting of a kitchen, dining hall and open section and terrazzo, SqMt 5,152. 2012
15. Vera Rubin: Ends civil works and delivery of the finished enclosure in Pachon. 2019

### **Cerro Tololo Buildings**

The Cerro Tololo site provides space for the telescopes and related support facilities of MSO programs and affiliated organizations. The area described for each building is the total of all enclosed space including: scientific space, laboratory areas, offices, dorms, restrooms, circulation, and all other habitable support space. Covered or defined areas not included in the listed figures are: tunnels, crawl spaces, tanks, exterior slabs, docks, porches, utility vaults, and other unenclosed equipment spaces.

	<b>CERRO TOLOLO FACILITIES</b>	<b>SQ.FT.</b>	<b>SQ.MT.</b>
1	Round Office Building <sup>1</sup>	3,390.35	314.97
2	TELOPS Building ( <i>las Tacas</i> ) <sup>1</sup>	2,035.70	189.12
3	Dining Facility/Kitchen <sup>1</sup>	4,042.00	375.51
4	Visitor Dormitory <sup>1</sup>	8,259.00	767.29
5	Worker Dormitory #1 <sup>1</sup>	4,859.00	451.42
6	Worker Dormitory #2 <sup>1</sup>	4,150.00	385.55
7	Recreation Hall <sup>1</sup>	1,524.00	141.58
8	Laundry <sup>1</sup>	777.00	72.19
9	Houses (5 at 1291 sq.ft. each) <sup>1</sup>	6,455.00	599.69
10	4 Meter Telescope (Blanco) <sup>2</sup>	40,473.00	3,760.06
11	1.5 Meter Telescope <sup>1</sup>	7,928.00	736.54
12	1.3 Meter Telescope <sup>3</sup>	563.00	52.30
13	1.0 Meter Telescope (ex YALO) <sup>4</sup>	3,001.00	278.80
14	0.91 Meter Telescope <sup>1</sup>	2,351.00	218.42
15	24" Schmidt Telescope <sup>4</sup>	1,788.00	166.11
16	24" SARA Telescope <sup>4</sup>	275.00	25.55
17	#1 16" Telescope <sup>1</sup>	581.00	53.98
18	#2 16" Telescope <sup>1</sup>	581.00	53.98
19	Prompt Telescopes (8) <sup>4</sup>	2,538.37	235.96
20	Airglow Telescope <sup>4</sup>	220.45	20.48
21	WHAM Telescope Facility <sup>4</sup>	385.00	35.77
22	Las Cumbres Observatory <sup>4</sup>	1298.00	120.6
23	Korean Microlensing Telescope <sup>4</sup>	1258.00	117.0
24	MEARTH Facility Building <sup>4</sup>	971.00	90.3
25	T80-South Telescope <sup>4</sup>	910	84.6
24	GONG Facility Bldg. <sup>5</sup>	369.42	34.32
25	Warehouses, incl. at gate area <sup>1</sup>	15,813.00	1,469.08
26	Guard House <sup>1</sup>	1,000.00	92.90
27	Garage <sup>1</sup>	3,039.00	282.33
28	Power House <sup>1</sup>	2,379.20	221.03
29	Maintenance Shop <sup>1</sup>	7,587.70	704.92
30	Electronics Shop Facility <sup>1</sup>	1,856.60	172.48
	<b>TOTAL</b>	<b>132,658.79</b>	<b>12,324.83</b>

### Cerro Pachón Buildings

The Cerro Pachón site provides space for the telescopes and related support facilities of Gemini, SOAR and other programs. The area described for each building is the total of all enclosed space including: scientific space, laboratory areas, offices, dorms, restrooms, circulation, and all other habitable support space. Covered or defined areas not included in the listed figures are: tunnels, crawl spaces, tanks, exterior slabs, docks, porches, utility vaults, and other unenclosed equipment spaces

	<b>CERRO PACHÓN</b>	<b>SQFT</b>	<b>SQMT</b>
1	20-Unit <u>Dormitory</u> <sup>1</sup>	3,747.00	348.11
2	12-Unit Dormitory (new hotel) <sup>2</sup>	6101.00	567.15
4	Kitchen and Dining Facility <sup>1</sup>	5,152.03	478.64
5	Poly Clinic <sup>1</sup>	1,748.00	162.39
6	LSST 8.4M Telescope <sup>3</sup>	35,900.00	3,337.00
7	LSST 1.2M Calibration Telescope <sup>3</sup>	710.00	66.00
8	Gemini 8.1M Telescope <sup>4</sup>	18,190.00	1,689.91
10	SOAR Telescope <sup>5</sup>	4928.00	458.00
12	ALO - Andes Lidar Observatory <sup>5</sup>	970.69	90.18
13	Utility Shack <sup>1</sup>	547.88	50.90
14	Communications Facility PACHÓN <sup>1</sup>	107.64	10.00
	<b>TOTAL</b>	<b>78,102.24</b>	<b>7,258.28</b>

## Hawaii Facilities

1. Gemini North, 670 N. Aohoku Place, HFO Base, Hilo Hawaii



The Gemini North Hilo Base Facility (HBF) consists of two buildings constructed in two phases. The first building is a 17,000 sq ft single-story office building with lab space initially occupied on or around 1999. The second building is a 13,000 sq ft two-story office building initially occupied on or around 2003. Both buildings are served by direct expansion air conditioning systems. The lab of the single-story building includes an air compressor that operates only periodically depending on the needs of the lab.



## 2. Maunakea Summit, Hawaii



The Gemini North telescope saw first light in February 1999. Most systems like chilled water, compressed air, fans, pumps, and lighting were already functional and in service in 1998, 23 years ago. The facility has replaced most of the chilled water equipment and all the fluorescent lights in 2019, with additional air compressors added over time for redundancy. The only HVAC conditioned space is for the data center, which has redundant chilled water and heat pump systems. Currently, everything is functional in nominal fashion, with no noteworthy issues.