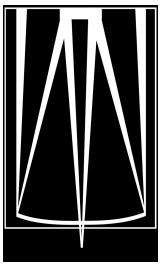
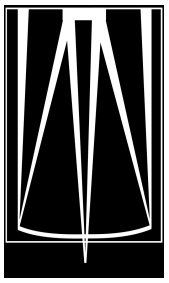


Gemini Observatory
Southern Operations



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GUIDELINES FOR VISITING OBSERVERS AND INSTRUMENT TEAMS

By
Safety Operations

GS Administrative Operations

GS Science Operations

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Gemini Observatory - Cerro Pachón, Chile
Phone: 011-5651-205-600

Colina El Pino s/n
La Serena, Chile

Observers and Instrument Teams' *Guide to Gemini South Telescope*

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Introduction

This guide contains important nformation about the Gemini South Telescope that will be of interest to observers and instrument teams visiting Gemini South and perhaps Chile for the first time. You are strongly urged to read this document in detail. Please direct any comments about this document to Helena Vincke (hvincke@gemini.edu)

Facilities

The Gemini South Telescope is located on Cerro Pachón, Chile, 97 km east of La Serena and just to the south of Cerro Tololo, the site of Cerro Tololo Inter-American Observatory (CTIO). The altitude at the summit of Pachón is about 2714 meters (8,900 feet). The driving time to the Pachón summit is about 1hr 45min from La Serena and 35 minutes from Tololo.

The Pachón facility includes a large instrument lab with a crane, vacuum pumps, manifolds for the compressed helium system and the coolant system, and other basic equipment needed to prepare instruments. Electrical power is 110 V and 220 V, 50 Hz. US-style 3-prong plugs are typical at AURA facilities in Chile. However standard Chilean power is 220V, 50 Hz using narrow 2 or 3-prong round plugs. We have large storage dewars, smaller transfer dewars, and other equipment needed for handling liquid nitrogen, but minimal equipment for liquid helium. Liquid nitrogen is readily available, but liquid helium must be special ordered well in advance. There is a small machine shop with a mill, lathe, drill press, etc., and machinists who can easily handle many jobs, but major machining projects may require facilities on Tololo or in La Serena. Finally, we have a good selection of tools and test equipment, but we do not have a large inventory of specialized equipment that some instruments may require; please inquire about any special needs.

Lodging and meals for Gemini observers are provided at the CTIO facilities on Tololo. There are no lodging facilities at the Pachón summit. There is a facility known as the "20 Units" a few km from the summit where lunch and dinner are served. Therefore, depending on one's schedule, meals can be obtained either on Tololo or at 20 units.

Gemini maintains two offices in the Tololo Round Office Building (ROB) for staff and visitor use. The offices contain a few computers, internet connections for laptops, a printer/fax, and a video link to Pachón and La Serena. Laptops can get IP numbers automatically using DHCP.

The Gemini Southern Base Facility (SBF) is located on the AURA recinto (compound), in La Serena. The current office building (R on map below) is set back in the trees across the street from the AURA maintenenance shop. It includes administrative, scientific, and engineering offices and a conference room. The La Serena control room is currently located near the CTIO library. Dormitory rooms are available on the recinto for personnel staying in La Serena (Q on map below). At present there are no Gemini facilities in La Serena for laboratory or instrument work; if such facilities are required special arrangements must be made with CTIO. A new building for Gemini offices and laboratories is under construction (G below).

Contacts

Local arrangements for visitors are handled by staff at the SBF in La Serena. Chile's international telephone access code is 56 and the La Serena city code is 51.

You can find our Staff directory by entering to the Gemini web page : http://www.gemini.edu/ and go to the staff directory link under Operations Support.

Preparing for your Visit

Driving: An International Driver's Permit or a Chilean Driver's License is required to drive rental or AURA/Gemini vehicles in Chile. (Note that this policy differs from the policy for driving AURA vehicles elsewhere, e.g. in Tucson. A GSA license is not valid in Chile.)

Environmental conditions: Cerro Pachón's altitude of 2714 m (8,900 feet) is not high enough to cause significant health problems for most visitors, although slight shortness of breath and perhaps headaches can occur especially on the first day of a visit. The altitude is high enough that visitors with certain medical conditions may wish to seek medical advice in advance and exercise caution while they are at the summit.

The nighttime temperature on Pachón can vary from a mild 10-20 C during the summer months to below 0 C in the winter. In winter there can be snow, high winds, and very low wind chill temperatures. Gemini does not currently have a supply of winter clothing for visitors, so please bring appropriate clothing and a flashlight of your own.

Safety shoes: Steel-toed shoes are required for those working with instrumentation and other heavy equipment Additional protective equipment and clothing will be worn as specific work assignments require.

Ground Transportation

There are several options for transportation in and around La Serena, and between La Serena, Tololo, and Pachón. In general ground transportation arrangements are handled by Helena Vincke (56-51-205 627), hvincke@gemini.edu). Helena should be informed of all travel requirements well in advance so that vehicles can be scheduled properly, especially if there are special circumstances (such as inability to drive or to operate a manual transmission).

Normally visitors are met at the airport and taken either to the AURA compound or to the CTIO dormitory. If for some reason you are not met and have to take a taxi to the La Serena office, it will be easiest if you ask for "el recinto de AURA" or "la oficina de Tololo" since not all taxi drivers may have heard of Gemini yet.

Because the lodging for observers and other long-term visitors to Pachón is on Tololo, and there is no regularly scheduled shuttle service between Tololo and Pachón, most long-term visitors should anticipate that they will drive themselves between the two locations. One alternative for nighttime observers is to travel with the Gemini staff members on night duty, but obviously there will be schedule limitations.

Gemini and Rental Vehicles: Visitors are usually assigned a 4-wheel drive vehicle either from Gemini's own fleet or from a local rental company for travel to Tololo and Pachón. Most vehicles have manual transmissions. Gemini may also rent smaller cars for use in La Serena; these are generally not suitable for travel to Tololo or Pachón.

Gemini Bus: Visitors wishing to work on Pachón during the day and spend the night in La Serena can ride the bus that transports Gemini daytime workers. The bus leaves the recinto at 6:30 AM and the Pachón summit at 4:30 pm on weekdays only.

Carryall: CTIO provides a "Carryall" service which leaves La Serena for Tololo at 11:00 am and departs Tololo at 2:00 on weekdays and 4:30 pm on Saturdays. (Sunday service may be available by special request, but it is expensive.) Sign up for the carryall at the CTIO front desk in La Serena or in entryway to the Tololo dining hall. Note that the carryall travels between La Serena and Tololo only; there is no service to Pachón.

CTIO Vehicles: On Tololo, CTIO provides small cars to visitors for travel around the summit. These are generally not made available to Gemini staff or visitors, but may be upon special request. Under no circumstances are these vehicles to be driven off the Tololo summit paved roads (e.g. to Pachón).

Vehicle Service: *Vehicle services on Cerro Pachón are very limited, and problems like running out of gasoline or a flat tire on the Pachón road can place personnel in danger.* Please be aware of vehicle servicing requirements and the available facilities on the Recinto and on Tololo, and take advantage of them *before* problems develop.

Gemini vehicles should be serviced in the Recinto garage before leaving La Serena. Gasoline is available here during normal working hours on weekdays. It is likely that the vehicles will be fully serviced upon pickup, but do not take this for granted.

Services such as gasoline, tire changes, and compressed air are also available on the Tololo summit, in the garage near the beginning of the dirt road down the mountain. The garage is normally staffed only on weekdays, but the Tololo paramedic can pump gasoline and provide other assistance after hours or on weekends.

In an emergency, there is a small amount of gasoline stored at the Telescope on Pachón. Gemini staff should be consulted if this gasoline is needed.

Smoking in Vehicles: Smoking is not permitted in any AURA/Gemini vehicle.

Travelling to Tololo and Pachón

Driving on Mountain Roads: The roads to Cerro Tololo and Cerro Pachón are unpaved and mountainous. Please note the following warnings issued by AURA.

ROAD WARNINGS

1. Roads leading to the summit can be very dangerous and present a hazard to those driving or riding as a passenger.
2. Drivers must be extremely cautious of the winding, unpaved road, steep slopes and drop-offs.
3. Many sections of the road do not have guard rails. This requires extreme caution.
4. Drivers and passengers must wear their safety belts at all times.
5. Drivers must be alert to on-coming traffic and blind curves.
6. When visibility is poor, drivers must proceed with caution. Foglights can help tremendously in conditions of fog or blowing snow.
7. The road may be rough or washed out (washboard effect) causing the vehicle to slide. Proceed with extreme caution.
8. Obey all speed limits and traffic signs. The speed limit is 50 km/hr in daylight, under good driving conditions. Drivers must obey all traffic signs and reduce speed accordingly to match current road and weather conditions. Excessive speed has been found to be a major factor in most of the accidents that have occurred on AURA's roads.
9. Before entering AURA property, drivers must have already checked tires, including the spare, checked for sufficient gasoline, and ensured the vehicle is in good operating condition. All visitors must wait at the gate to enter AURA property.
10. Winter conditions may cause particularly hazardous conditions on the road to Cerro Pachón. Drivers must proceed with extreme caution. Access to the summit will be forbidden if conditions warrant.
11. Winter roads can be hazardous. Be prepared with chains and drive slowly at all times.

From the highway, the road is fairly flat and straight for 10 km, then it becomes steeper and more winding. At the 5 km mark (measured from the Tololo summit) is the "Quisco Junction" where the road forks to Tololo and Pachón (14 km). After the junction, both roads become much steeper and narrower, with frequent sharp, blind curves and drop-offs of several hundred meters on either side. Please exercise extreme caution on these roads! Observe the speed limit, stay as far away from the edge as possible, and be on the lookout for approaching traffic on blind curves. Wild animals, goats, and horses are also frequently seen on the road.

Radio use while travelling: When driving onto AURA property from the main road, the gatekeeper will take your name and make the radio call to the summit. Visitors travelling between Tololo and Pachón in Gemini vehicles must use their vehicle radios to inform the Tololo or Pachón paramedics of their departures and arrivals between 07:00 and 23:00. Visitors in rental vehicles will be provided with a hand-held radio. Be sure to give your name, vehicle number or description, and destination. Between 23:00 and 7:00, the guards at the La Serena recinto gate must be

contacted at **205 282**. Be sure to notify the appropriate contact at your destination when you arrive, especially when returning to Tololo in the morning (see Appendix B).

Road emergency radios: There are emergency radios at the 27, 22, 18, 12, 9 km markers (measured from the Tololo summit) and at el Quisco Junction by which the Tololo and CP paramedics can be contacted.

From el Quisco Junction to the Pachón summit there are emergency radios at the 8 and 5 km markers (measured from the summit). Keep in mind that the nearest emergency radio may be behind you rather than in front of you.

Arrival: Upon arriving at Tololo or Pachón, call the Tololo or Pachón paramedic on the radio to inform him that you completed the trip safely.

At Pachón, notify the duty officer of your presence. Write your initials on the white board inside the main entrance, and hang Gemini vehicle keys on the appropriate hook.

New visitors to Pachón should meet briefly with Alejandra Pinto, the summit administrative assistant, so she will be familiar with all personnel in the facility in the event of an emergency.

Summit Driving Rules:

1. On Pachón, observe the 30 km/hr speed limit on the dirt road between the last hairpin turn and the Telescope. Slowing down reduces airborne dust and helps keep our optics clean.
2. When driving on Tololo at night, turn off vehicle headlights and turn on parking lights or flashing hazard lights upon reaching the paved summit road. Avoid driving to the actual summit where the domes are – many observations are highly sensitive to vehicle lights.
3. When driving on Pachón at night, turn off headlights and turn on parking or hazard lights before entering the parking lot.

Tololo Lodging

Lodging for Cerro Pachón visitors is provided at CTIO on Tololo. Rooms are likely to be located in one of four 2-bedroom houses, but depending on availability may also be in the main dormitory with the dining hall. House or room keys may be picked up in the Round Office Building (ROB), either in the main office during the day or in the key rack in the Gemini office after hours.

Lodging for Gemini visitors on Tololo is arranged by Helena Vinke (56-51-205 627, hvinke@gemini.edu).

Meals for Gemini visitors are provided in the Tololo dining hall. Lunch is served from 12:30 pm to 2:00 pm. Gemini has arranged for dinner to start at 4:30 pm, so Gemini observers can leave for Pachón at about 5:00 pm. Gemini visitors should use the Gemini log sheet located in a black folder on a round table near the service area. Night lunches are also available using the signup sheets in the dining hall. These forms should be turned in by 3:00 pm and the lunches can be picked up after dinner.

Gemini Telescope Safety

Like all observatories, Gemini South has a number of hazards of which visitors need to be aware. Cerro Pachón is a remote site, nearly two hours from major medical services, so even minor accidents can place personnel in serious danger. Please note the following procedures and precautions that will help make your visit a safe one.

Emergency Contacts: Paramedics are stationed on both Pachón and Tololo. They should be first contacts in any emergency. They will notify other Chilean authorities if additional aid is deemed necessary.

The Pachón paramedic can be contacted in the following ways:

1. Use the Gemini Internal Frequency hand-held radios, channel 1.
2. Use the Tololo Repeater Frequency hand-held or vehicles radios, channel 1.
3. Use the Tololo Repeater Frequency emergency radios located on the road.
4. Call the Paramedic clinic on Pachón, dialing **205 722**.

The Tololo paramedic can be contacted in the following ways:

1. Use the Tololo Repeater Frequency hand-held or vehicles radios, channel 1.
2. Use the Tololo Repeater Frequency emergency radios located on the road.
3. Call the Paramedic clinic on Tololo, dialing **205 440**.

Closing/opening limits and nighttime evacuations: During nighttime operations the Systems Support Associate (SSA) is the duty officer and so has responsibility for the safety of both telescope and personnel. *Therefore, the SSA has the authority to close the dome if they feel that conditions are unsafe for the telescope and to evacuate the Telescope if conditions are unsafe for people.* In general, the closing guidelines are as follows.

(See chart on next page.)

Status	**Wind speed**
Loose snow/dust, extreme caution	8 m/s
Loose snow/dust, close	12 m/s
Work out of wind	10-15 m/s
Close	17-20 m/s

Status	**Humidity**
High caution	80%
Extreme caution	85%
Close	90%

Status	**Pressure**
Caution	<730 mb
Extreme caution	<725 mb

The SSA can modify these guidelines if they feel it is appropriate, for example if there is a lot of wind-born dust. After closing the dome cannot be opened again until the humidity has remained below 80% and the wind speed below 15 m/s for 30 minutes.

14-hour rule: Gemini has adopted a "14-hour rule." This states that no worker shall be present on the summit more than 14 hours per 24-hour period. The duty officer has the authority to ask people to leave the telescope if they have been on the summit for more than 14 hours.

Safety Tour: First-time visitors must receive a safety tour of the facility from an authorized Gemini employee. The contents of this tour are described in the appendix to this document. Because our lodging facilities are on Tololo, a 35-40 minute drive from Pachón on a dangerous road presents a hazard. Visitors should be well-rested and alert before undertaking a drive on such a road.

Clothing: As a minimum, sturdy leather closed-toed shoes or boots, full length pants, and shirts with minimum four inch sleeves will be worn. Steel-toed shoes are required for those working with instrumentation and other heavy equipment Additional protective equipment and clothing will be worn as specific work assignments require. Hard hats may be required when working in the dome area. Gemini staff will advise if other personal protective equipment is necessary.

See appendices A & B following.

Appendix A: Gemini South Safety Tour

First-time visitors to the Gemini South Telescope must receive a safety tour of the facility from a designated Gemini employee. The tour guide will brief the visitor on the following topics.

Flashlight and Radio: Always carry a flashlight and a hand-held radio when you are inside the building. This is particularly important when you are going to the 4th level, using the stairs or the elevator.

Accessible areas:

- Visitors are generally permitted anywhere on level 1 (ground level) and level 4 (the observing floor) after they have received a safety orientation from an authorized Gemini employee.
- Off-limits areas may be declared by Gemini personnel in the event of hazardous operations such as mirror recoating.
- Visitors are permitted on the telescope structure and the center section (the part that moves in elevation), but approval to enter these areas must be granted by an authorized Gemini employee prior to to entry each time to ensure safety.
- Levels 2 and 3 are more hazardous and visitors must not enter them without a Gemini escort.
- The mirror cell is strictly off-limits to anyone but Gemini employees.

Emergency Exits: Emergency exits are located on the east side of the dome area on level 1, and in a special cubicle on level 4 (the observing level), roughly opposite the main entrance. The level 4 emergency exit leads down a separate stairwell and directly out of the dome. Caution must be taken on this stairwell as the steps are narrow and steep.

Signs posted inside the building indicate the emergency exits; however, they are not lighted.

Safety equipment: Note the locations of the following safety equipment, especially on level 4:

- Telephones
- Placards listing emergency phone numbers
- Fire extinguishers
- First-aid kits and other equipment
- Smoke hoods
- Eye wash stations

Platform lift: A large section of the floor on level 4 consists of a moveable platform lift. When the lift is lowered to level 1, there is a 3-story drop from level 4 down to it, with only bolted-down railings to protect against a fall. Note the position of the lift whenever you are on level 4, and exercise extreme caution if the lift happens to be down, especially in the dark.

Power bars: The bars that distribute high-voltage electrical power to the rotating dome are at shoulder level around the outer perimeter of level 4. The bars are fairly well shielded with orange plastic covers, but the protection is not

complete. Always maintain a discrete distance from the power bars, especially when carrying tools, ladders, or other metal equipment.

Oil on floor: The mirror cell and moving platforms in the dome can leak oil and coolant fluid, especially onto the azimuth platform under the center section. Walk carefully in this area and be alert for oil slicks.

Telescope motion: The telescope makes absolutely no sound when it slews in azimuth or elevation. Be alert for sudden, unannounced telescope motions when on level 4, especially at night when observations are in progress. All parts of the telescope that can move are painted blue.

Pinch points: Railings and other equipment around the telescope can act as pinch points when the telescope moves in azimuth. One especially dangerous area is just in front of the emergency exit cubicle. Be aware of these areas and avoid them if there is any possibility the telescope may move.

Access to center section catwalk: No access to the center section catwalk is permitted unless the elevation locking pins are engaged and prior permission is given by a Gemini employee. Learn how to check that the locking pins are engaged.

Smoking: Smoking is not permitted inside the dome and/or the attached structures.

See appendix following.

Appendix B: Summary of Useful Information

Telephone numbers: international callers add 56 51

Person/Location	Number	Person/Location	Number
Pachón Paramedic	205 722	Tololo Paramedic	205 440
Pachón control room (SSA)	205 701	La Serena gate	205 282
Pachón control room (Ast.)	205 730	ROB offices	205 459/463
Pachón control room FAX	205 710	La Serena control room	205 614
Pachón reception	205 700	La Serena reception	205 600
Pachón observing floor	205 724/5	La Serena FAX	205 650

Travelling to/from Pachón and Tololo

- Leaving Tololo: notify the ROB office either in person or by radio that you are leaving, give name, vehicle number or id, and destination.
- Leaving Pachón
  - 07:00 - 23:00: radio the CTIO office with your name, vehicle, and destination.
  - 23:00 - 07:00: notify the La Serena gate of your name, vehicle, and destination
- Arriving at Tololo from Pachón
  - 07:00 - 23:00: radio the CTIO office that you have arrived.
  - 23:00 - 07:00: notify the La Serena gate (205 282) that you have arrived
- Arriving at Pachón
  - Write name on white board next to vehicle number/id and leave Gemini keys
  - Take a radio
  - Inform duty officer and paramedic of your arrival
- CTIO carryall: leaves La Serena reception at 11:00am and the CTIO dining hall at 2:00pm

Meals

Location	Lunch	Dinner	Night lunch
CTIO	12:30 pm – 2:00 pm	4:30 pm	Forms in by 3:00 pm
20 units	12:30 pm – 2:00 pm	5:30 pm – 7:30 pm	By request

Telescope Safety

- The duty officer (SSA at night) is responsible for safety and has authority for opening/closing the telescope and evacuating the Telescope.
- On the observing floor anything that is blue can move. Beware of telescope motion and pinch points.
- Be wary if walking around the summit, especially at night. There are shear, long drops within meters of Telescope exits.
- Always carry a flashlight and radio.
- Plan your work to comply with the 14-hour maximum stay rule.
- Always be mindful of the safety of yourself and others.