

The Parkes Telescope

Procedures for remote operations

Version 2.3

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Overview

Astronomical observations made with the Parkes Telescope are normally made from a location remote from the Observatory. The observer accesses the telescope's observing systems through computer interfaces and internet links to the observatory computers. All telescope hardware needed for observing can be controlled and monitored by computer.

Observations are normally conducted in schedule mode: a description of the observation is prepared in advance in the form of a "schedule file". This file is used by TCS to configure the telescope and execute the observation. For most observing, this is preferred compared to setting up the TCS GUI manually: it is less prone to human error and the schedule file becomes a record that allows observations to be repeated in exactly the same manner.

The observer can monitor the progress of the observation and the condition of the telescope and collected data through a variety of interfaces. During the observation, this monitoring is the observers' primary responsibility.

The state of the telescope is also monitored by its automated protection system, the TPS (Telescope Protection System). The TPS monitors the critical telescope systems, and acts in favour of the safety of the telescope if adverse conditions are detected. Its actions include stowing the telescope or disabling its motion, switching between alternate power sources for the telescope and initiating observatory staff intervention. Monitoring displays used for observing will inform the observer of any action taken by the TPS.

With remote operations of the telescope it is also essential to define procedures to handover the telescope between operators located in different places, whether observers or staff. During Maintenance or system configuration staff can be working on the telescope structure and it is essential to define and follow clear handover procedures as well as isolate the telescope from remote access during local operations.

The observer has a number of sources of advice and assistance:

- This procedural manual
- The Parkes Telescope Users Guide (PTUG)
- The designated supporter allocated to the specific project (Project Expert)
- A member of the Science Operations team (business hours only)
- For emergencies, a member of the Parkes Rapid Response Team.

The remainder of this manual describes the procedures to be followed for all stages of observing with the Parkes Telescope. Details of configuring and controlling the data acquisitions are described in the separate PTUG.

Section 1 gives the requirements for remote access to the Parkes telescope observing systems. Section 2 describes the levels of observer support available and gives references for finding information. Section 3 and 4 describe the main procedures to be followed in observing remotely and handing over the telescope. Sections 5, 6, and 7 outline the roles of the three layers of support: Project Expert, Science Operations and the Emergency Parkes Rapid Response team.

1. Requirements for remote observations on Parkes

The remote observer will need the following:

1. An active CSIRO login account .To establish an account, follow the instructions at http://www.atnf.csiro.au/cgi-bin/atnfres/ident_request.pl
Allow 5 working days for the account to be established.
2. To book as remote observer for the scheduled observations at the web page <https://parkes-ops.atnf.csiro.au/PORTAL/> (tab “Register”). A confirmation will be sent by email. The confirmation email will contain information and resources on remote observing at Parkes (e.g., web page link)
3. To complete the online observer training if instructed to do so in the confirmation email.
4. To complete a full Remote Observing Training if not trained for remote observing in the last **12 months**. Otherwise, especially if first-time remote observers, you will need to conduct an observing session at the SOC in Sydney under the supervision of a trainer before being qualified as Remote Observer.
5. To have a project requiring a standard configuration (see PTUG for the definition).
6. If the observation is non-standard, the observer is required to come to the SOC or Parkes at least for the first run of the project to support the non-standard setup (if required) and/or be trained in the use of the special observing setup the project requires.
7. A computer with the following:
 - 7.1. access to the internet;
 - 7.2. a recent version of a commonly used operating system (Linux, Unix, Mac OSX, Windows);
 - 7.3. a version of VNC. TightVNC (Linux and Windows) or Chicken of the VNC (Mac) are options we have tested to work with our system;
 - 7.4. a web browser that supports HTML-5 and is javascript enabled; browsers that are known to support remote Parkes operations are:
 - Safari v6+ (OS X)
 - Firefox v16+ (OS X, Linux, Windows)
 - Chrome v23+ (OS X, Linux, Windows)
 - 7.5. a screen of size at least 2500 x 1600 is recommended; two screens or a multiple-page desktop is a great convenience.

2. Parkes Observing support

In addition to the procedures described in this manual, the following are sources of assistance for the observer, and are accessible through the Parkes Observing Portal page at the link <https://parkes-ops.atnf.csiro.au/PORTAL/>

This is a resource page for remote observing providing:

- Chat Utility.
- Link to the PTUG (tab “Documentation”).
- Link to the Observing Schedule Generator (tab “Documentation”).
- Link to correlator documentation, which includes troubleshooting tips if experiencing problems with MBCORR, DFB3 or DFB4 (tab “Documentation”).
- Link to this document including a description of the mechanism to effect the handover (tab “Documentation”).
- A table showing the telescope schedule (tab “Schedule”). Clicking on each time slot it shows:
 - date, time, project ID, observer.
- SO support contact (tab “Schedule”, click the desired project slot).
- The roster of the Emergency Contact Person (tab “Emergency Contact”).
- A link to instructions and details for the VNC connection (tab “Documentation”).
- The VNC password is communicated at the SOC or at Parkes during training only (or by telephone if changed after your last training).
- A wiki reporting current known issues and reports from the previous observers and staff (tab “Alert”).
- A link with the description of how the TPS reacts in case of an Emergency situation is detected by the TPS itself (tab “Documentation”).
- Observing booking system (tab “Register”).
- Register as Observer in Charge (tab “Observer in Charge”).

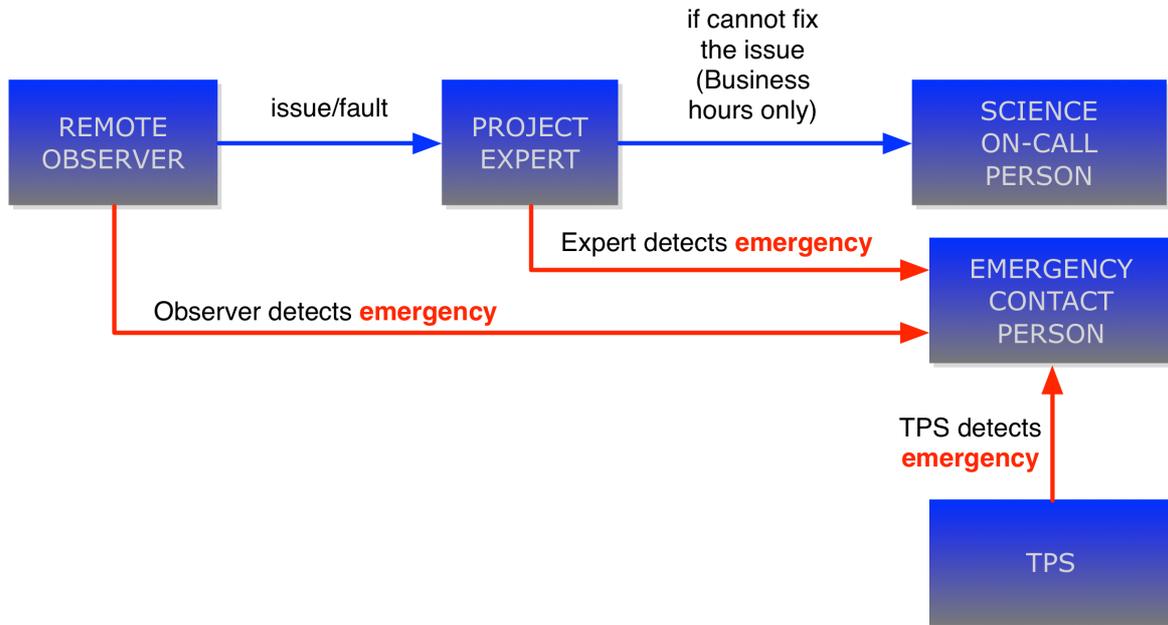
This page needs access control via CASS unix account login.

The observer in need of assistance should, in general, consult these in the order given below.

- 1) The Parkes Telescope Users Guide (http://www.parkes.atnf.csiro.au/observing/documentation/user_guide/pks_ug.html)
- 2) The designated supporter allocated to the specific project (Project Expert). This is equivalent to the DA role at Narrabri, but specific to the project. This is usually a **member of the observing team** expert observer of the Parkes Telescope.
- 3) During business hours only, a rostered member of the Parkes SO team can be

- contacted if the issue is beyond the Project Expert knowledge.
- 4) For emergencies, an Emergency Contact Person rostered member of the Parkes Rapid Response Team.

The diagram below shows the flow of support to the Remote Observer.



In case of fault compromising the quality of the data (but not the safety of the Telescope) the Observer is supposed to contact the Project Expert, who will try to fix the issue (see Section 5).

If not able, during business hours only, the Expert can contact a rostered On-Call person of the Parkes SO team, who will attend the issue (see Section 5, 6, and 7).

After hours, either the Observer in Charge or the Project Expert is required to **submit a Fault Report** through the Parkes Telescope web page to alert staff who will attend the issue as soon as practical (in Business Hours).

In case the Observer notices an emergency condition before the TPS does, the Observer is encouraged to contact the Emergency Contact Person directly (Section 3.7).

The project PIs are required to nominate the Project Expert among the project team members when submitting the proposal. In the absence of expertise the nominated Project Expert is at least required to come to the SOC to be trained as Parkes Observer on time for the project to start.

Regarding remote operations, procedures for the Safety of the Observers are out of scope of this document. If the observer is located in CSIRO premises (e.g., the Parkes

Observatory or the SOC) please refer to the local safety procedures to observe or work in CSIRO (whatever more appropriate). CSIRO is not responsible for safety of remote observers when they operate the telescope from outside CSIRO premises and it is recommended to refer to the local safety procedures.

3. Procedures

3.1 Establishing contact with the Parkes observing systems

Follow the instructions on the Parkes Observing Portal pages to

- 1) open the Parkes Observing Portal web page <https://parkes-ops.atnf.csiro.au/PORTAL/> for essential support pages, like:
 - a. the Chat Utility.
 - b. Register as Observer in Charge.
 - c. Execute the handover procedure.
- 2) Open FROG, that is essential to hear TCS sounds. In fact, VNC sessions are not able to play sounds and FROG (web browser based) is essential to allow the observer to hear all alert and warning sounds. This is essential to correctly operate the telescope and be alerted about telescope system faults and issues that can affect the data quality.
- 3) open the observation VNC sessions for, e.g.:
 - a. either:
 - i. TCS (single dish observations)
 - ii. atsnap (VLBI observations)
 - b. PKMC
 - c. MoniCA
 - d. loboss
 - e. logui
 - f. operfcc
 - g. Backend control GUIs or terminals

3.2 Take control of the observing systems

Using the web browser based facilities, the VNC sessions, and the handover procedures of this manual (Section 4.5):

- 1) check that the Telescope State is set to “Observing” (on the Chat Utility);
- 2) establish a dialogue with the current operator/observer via the Chat Utility;
- 3) register as Observer in Charge;
- 4) follow the appropriate handover procedure.

3.3 Configuring the telescope systems for observations

See PTUG

3.4 Creating an observing schedule

See PTUG

3.5 Monitoring the state of the observation and assessing data quality

See PTUG

3.6 TPS intervention, and recovery

All actions initiated by the TPS are logged and visible to the observer through the view of the log available in FROG. If TPS takes action making the telescope unavailable (e.g. stowing it) the observer is alerted through FROG.

Communications on the next course of action will be given to the observers through the Chat Utility of the Parkes Observing Portal. The observer contact details provided might also be used.

In particular, the Emergency Contact Person is expected to acknowledge the TPS alert within 10 min and react. Once the condition of the telescope has been assessed, the Emergency Contact Person will advise the observer whether the observations can be resumed or halted until the next business day as the issue will be addressed by staff (See Section 7).

3.7 Telescope safety

Observers may themselves recognise conditions that are potentially dangerous to the telescope, but may in some circumstances be missed by the TPS. In such cases the observer should contact the Emergency Contact Person and alert of the situation (contact details are on the Parkes Observing Portal, tab “Emergency Contact”).

4. Handover procedures.

4.1 Introduction

With remote operation of the Parkes 64m telescope it is essential to define procedures to handover the telescope between operators located in different places, whether observers or staff.

For some time now, the ATCA and Mopra telescopes have operated under a remote model, where observers can either observe at the site or from anywhere in the world.

Whether on-site or not, control is provided via secure VNC sessions. This setup is also adopted for the Parkes telescope.

One of the distinctions between observing with Mopra/ATCA and Parkes is the Master Control Panel. This allows Parkes local staff to take control of the telescope for maintenance and receiver changes and therefore “lock-out” remote access via key switches. A remote observer would not have visual access to the MCP or adjacent whiteboard to ascertain if anyone is on the telescope structure or what Caution/Danger tags are present on the MCP itself.

To mitigate the possibility of a remote observer taking control of the telescope while the telescope is under maintenance or undergoing a receiver change, there is a need to isolate the telescope from remote access.

This is realized by disabling the access to the VNC sessions by killing all the VNC clients and changing the password.

4.2 Site-Remote Observer communications

Communications between handover operators usually occur by the Chat Utility (see Sections 4.4 and 4.5).

Email shall NOT be used during a handover.

In cases where there is a changeover between observing projects at the SOC, the observer-observer interaction can take place face-to-face at the SOC.

4.3 Telescope State

There are two possible States of the Telescope:

- 1) Maintenance
- 2) Observing

When set to Maintenance the telescope can be operated for local activity only (by local staff), such as maintenance or reconfiguration.

When set to Observing the telescope can be operated remotely.

Remote Observers can operate the Telescope only when the current State is Observing.

In Maintenance State the Telescope can be operated only by local staff.

If the current mode is Maintenance, the VNC session must be isolated from outside access and the observers shall assume “hands-off” and await contact from Parkes local staff.

The actual Telescope State is displayed on the Chat Utility.

Setting the Telescope State shall be allowed only to local staff, who can check the local conditions and evaluate whether it is safe to set the telescope ready for remote access.

Setting the Telescope State is performed on the Parkes Observing Portal via a function that only staff can access.

4.4 Chat Utility

The Chat Utility has the following features:

- Is available on the Parkes Observing Portal.
- Displays the current state of operation:
 - Maintenance
 - Observing
- Alerts observers to start/end of project times UTC.
- Displays details of the current observer(s); at a minimum name and project ID. This is obtained from data entered when a remote-observing registration is done.
- Has a relational-database backend to allow for chat and mode change history to be viewed via a web-browser (staff only).
- Logs the activity on file (conversations, changes of Telescope State, results of VNC session connection/disconnection).
- Does not contain alarms. Alarms are part of FROG.
- Is written in a platform-independent language such as Python or HTML.

An example of the Chat Utility is shown below. It shows an example of a handover dialog between two observers.

4.5 Handover procedures

The handover procedures described here are for observers. Refer to the appropriate SWI for the handover procedures to be executed by local staff in case of Maintenance.

This section provides detailed checklists of the handover procedures for the different types of situations that can be met:

- Staff-to-Observer
- Observer-to-Staff
- Observer-to-Observer
- No Operator-to-Observer (start with Telescope stowed)
- Observer-to-No Operator (end with Telescope stowed)
- No Operator-to-Staff
- Staff-to-No Operator

An example of “No Operator” is when the telescope is taken in hand after a Green Time period.

Staff-to-Observer

- Staff safely sets MCP to “Remote”;

- Staff sets the Telescope State to “Observing”;
- This makes the VNC sessions accessible from outside changing back the password to that known by the Users;
- Staff and Observer communicate via Chat and agree on handing over the telescope;
- The Observer takes control of the telescope;
- Observer sets up the observations (e.g. TCS, backends, ... see PTUG for details);
- Observer conducts the observations.

Observer-to-Staff

- Staff contacts the current Observer via Chat Utility;
- Staff and Observer agree on handing over the telescope;
- Staff takes control of the telescope;
- Staff sets the Telescope State to “Maintenance”. This kills all the VNC clients and the password to one unknown to Users;
- Staff operates the telescope for local activity (either Maintenance or Reconfiguration) following the appropriate SWIs;

Observer-to-Observer

- The new Observer contacts the current Observer;
- The two Observers agree on handing over the telescope (time, how to leave the telescope, et cet.);
- N.B.: if the current observer is not contactable, the new Observer can take control of the telescope at the start of the project scheduled time;
- The new Observer takes control of the telescope;
- Observer sets up the observations (e.g. TCS, backends, ... see PTUG for details);
- Observer conducts the observations.

No Operator-to-Observer

- The new Observer checks that:
 - o no one is in charge of the telescope (no details on the Chat Utility and no one is replying on the Chat Utility).
 - o MCP is set to “remote” (FROG displays the MCP state).
 - o the Telescope State is set to “Observing”;
 - o the telescope is either stowed or stationary.
- The Observer takes control of the telescope;
- Observer sets up the observations (e.g., TCS, backends, ... see PTUG for details);
- Observer conducts the observations.

Observer-to-No Operator

- The Observer ends the observations;
- The Observer checks not to have been contacted on the Chat Utility;
- The Observer stows the telescope (e.g., via TCS, see PTUG);
- The Observer quits TCS and the Backend GUIs used;
- The Observer clears the contact details in the Chat Utility;
- The Observer quits the VNC client used.

No Operator-to-Staff

- Staff checks that:
 - o no one is in charge of the telescope (no details on the Chat Utility and no one is replying on the Chat Utility);
 - o MCP is set to "remote";
 - o the Telescope State is set to "Observing";
 - o the telescope is either stowed or stationary;
- Staff takes control of the telescope;
- Staff sets the Telescope State to "Maintenance". This kills all the VNC clients and the password to one unknown to Users;
- Staff operates the telescope for local activity (either Maintenance or Reconfiguration) following the appropriate SWIs.

Staff-to-No Operator

- Staff safely sets MCP to "Remote";
- Staff sets the Telescope State to "Observing";
- This makes the VNC sessions accessible from outside changing back the password to that known by the Users;
- Staff stows the telescope, leaves it under remote control, and leaves a message on the Chat Utility that the telescope is ready for remote observing;
- Staff clears the contact details in the Chat Utility.
- Staff quits the VNC client used.

5. Roles of Project Expert

Each team is required to nominate the Project Expert at the time of the proposal submission. This is a member of the project team expert observer of the Parkes Telescope for that specific observing mode.

Tasks of the Expert are:

- 1) To train the Observer of his/her project team to the setup specific for their observations:
 - a) Setting up schedules
 - b) Setting up the observations
 - c) Startup observations
 - d) Assessing the data quality
- 2) Support the team in case of needs with the observations. The Expert will set the time range he/she can be contacted.
- 3) To contact the rostered team member of the Science Operation support in case of need (business hours only, 8:00-16:00 weekdays only).
- 4) Submit a Fault Report in case of observing issues. This is essential, especially for after hour issues, to alert staff who can then address the problem the next working day.
- 5) Call the on-call Emergency Contact Person for any perceived threats to telescope

safety at any time.

- 6) Please note that the on-call person is not supposed to be called after hours for observing issues, but only in case of perceived threats to telescope safety (see item #4).

6. Roles of Science Operations

- 1) Construct and publish the Parkes observing schedule.
- 2) Maintain the Parkes Observing Portal keeping the information up to date.
- 3) Maintain the PTUG up to date.
- 4) Manually override the handover mechanism when needed.
- 5) Participate on the roster of SO On Call to give support to the Project Experts (business hours only, 08:00-16:00 weekdays).
- 6) Train Project Experts.
- 7) Train observers if not trained in the last 12 months.
- 8) Be part of the Emergency Contact team.
- 9) As member of the Parkes Observatory staff, call the Emergency Contact Person of the Parkes Rapid Response Team for any perceived threats to telescope safety at any time.

7. Roles of the Emergency Contact Person of the Parkes Rapid Response Team

The Emergency Contact Person is part of the Parkes Rapid Response Team which comprises members of the Parkes staff equipped to solve or assist in solving telescope safety issues.

At all times one member of the team will be on duty, that is on call - they will be contactable by the TPS, by staff in EO or SO, and by the observer.

The role of the Emergency Contact Person is to assess any emergency situation brought to his/her attention (primarily by the TPS), react as appropriate to ensure the telescope is in a safe condition, and if necessary call for assistance from other members of the team or from emergency services (e.g., local fire brigade).

The Emergency Contact Person is expected to acknowledge the alert, assess the telescope conditions and react appropriately.

Once the assessment is completed, the Emergency Contact Person will contact the observer in charge to communicate the status of the telescope and whether the observations can be resumed. If not, the issue will be addressed the next business day once the telescope has been secured in a safe condition.

Refer to the Emergency Contact Person support document for a comprehensive description of the role and the expectations of the Emergency Contact Person.

APPENDICES

Appendix 1: Glossary

EO:	Engineering Operations
FROG:	Fantastic Remote Observing GUI
GUI:	Graphic User Interface
MoniCA:	Monitoring CASS Antennas
PKMC:	Parkes Monitor & Control
PRO:	Procedures for Remote Observing
PTUG:	Parkes Telescope User Guide
SO:	Science Operations
SWI:	Safety Work Instructions
TCS:	Telescope Control Software
TPS:	Telescope Protection System