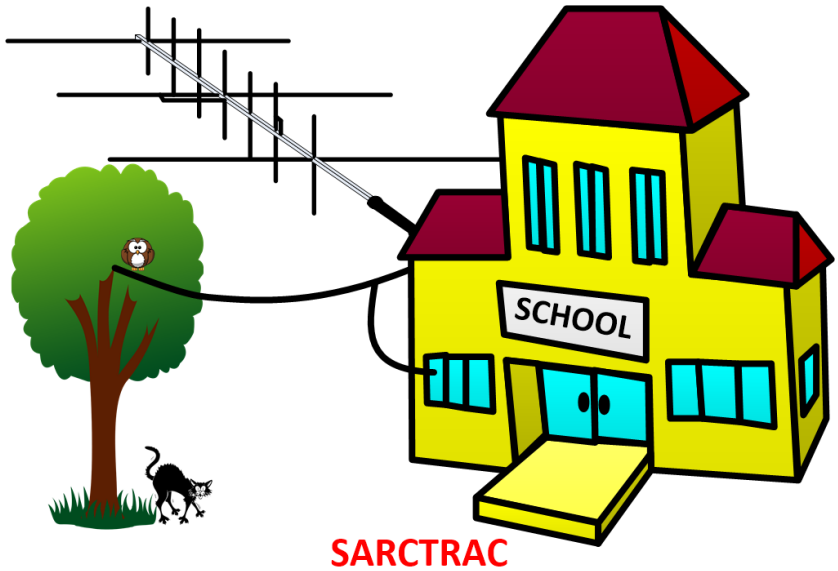
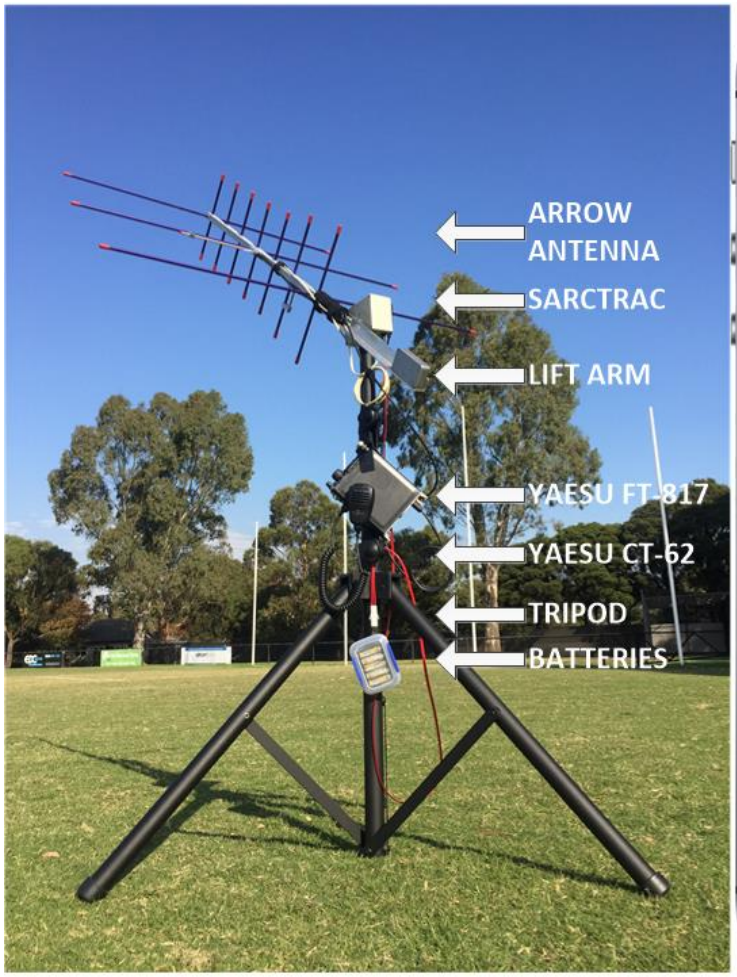
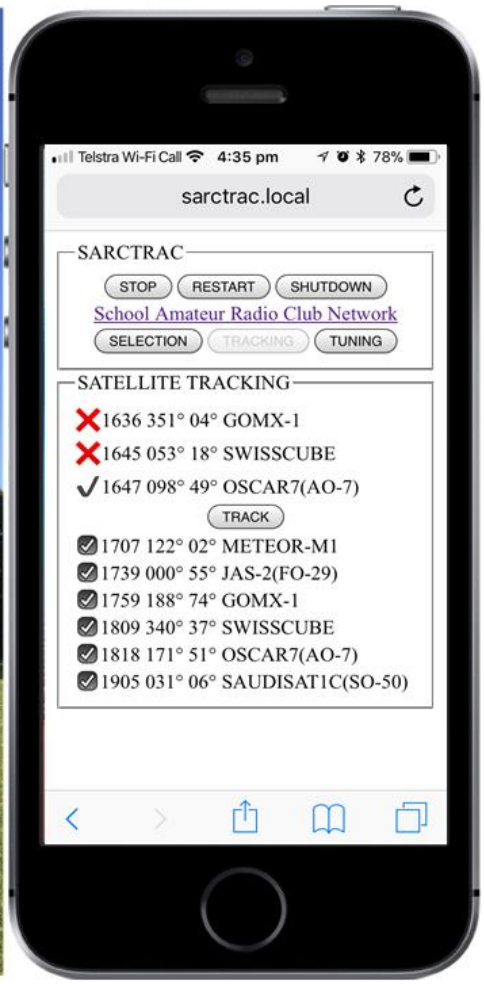


SARCTRAC
Satellite Antenna Rotator Controller & TRACker
SCHOOL AMATEUR RADIO CLUB NETWORK
www.sarcnet.org

SARCTRAC Update Procedure





Document Version 1.0 for Hardware Version 2 and Software Version 1.03

Contents

Introduction

This procedure allows the SARCTRAC application software and its configuration files to be updated by users in the field. It covers the history of different SARCTRAC versions and instructions of how to download, edit and install the latest version.

SARCTRAC Versions

The different versions of the SARCTRAC application software and configuration files are shown in Table 1. It is recommended to always download, install and use the latest version.

Table 1 - SARCTRAC Versions

Version	Description
1.0	Original Version.
1.01	Motors stopped at start-up for safety.
1.02	Changes to allow the SARCTRAC Updater to run super-user scripts, as may be necessary to update the operating system.
1.03	Changes to allow the SARCTRAC Updater to expose the settings.txt file in backups and to update it from the SARCTRAC USB Disk. Explanation: Changes to the control parameters in the settings.txt file were required to stabilize the operation of 1.2 RPM motors. SARCTRAC was originally designed for 0.6 RPM motors. Supply shortages of these motors resulted in 1.2 RPM motors being shipped instead. The 1.2 RPM motors are slightly noisier, but work better on high-elevation satellite passes. However, some builders reported undesirable azimuth oscillations. This version permits the settings.txt file to be edited in order to make changes to the SARCTRAC Proportional, Integral and Differential (PID) control parameters as well as the 3D Sensor Low Pass Filter alpha value. The settings.txt file shipped with this version has also been changed to suit the 1.2 RPM motors. Users with the original 0.6 RPM motors can substitute this file with a backup of their original settings.txt file. Note: A rigid tripod and solid antenna lift-arm mounting, the correct use of the supplied O-rings to minimise motor backlash and good 3D Sensor calibration are all far more critical to minimising such oscillations. Increased stability comes at the price of additional overshoot and settling time for large changes in the setpoint azimuth or elevation angles. SARCTRAC is a finely-tuned, real-time, feedback control system, such that these control parameters and the physical characteristics of the system can greatly affect its dynamic response.

SARCTRAC Application Software and Configuration Files

The SARCTRAC application software and configuration files, used in this update procedure and as found on the SARCTRAC USB Disk, are described briefly in Table 2.

Table 2 - SARCTRAC application software and configuration files

Item	Description
BackupNN	This is a SARCTRAC backup folder, automatically created by the SARCTRAC Updater at boot-up, in response to finding any new update items in the root folder of the SARCTRAC USB Disk. It will contain all of the following items, exactly as they were just prior to performing the update.

sarctrac	This file is an archive of SARCTRAC application files and, optionally, configuration files and user data. There are three types of sarctrac file: A Master sarctrac file, an Update sarctrac file and a Backup sarctrac file, as follows: • A Master sarctrac file contains the SARCTRAC application software including the following factory default configuration: ○ WiFi Network Access Credentials ○ Satellite Orbital Element Library URL List ○ Satellite Orbital Element Libraries ○ Satellite Frequency/Mode Database ○ Home Location Address and Time Zone ○ Satellite Selected, Rejected and Tracked Lists ○ 3D Sensor Calibration and Filter Parameters ○ Rotator Position Controller Dynamics It is downloaded from the SARCNET website at https://www.sarcnet.org/sarctrac/versionX.XX/master • An Update sarctrac file contains only the new SARCTRAC application software and no factory default configuration. It is downloaded from the SARCNET website at https://www.sarcnet.org/sarctrac/versionX.XX/update • A Backup sarctrac file is created automatically prior to any update and is stored in a SARCTRAC BackupNN folder on the SARCTRAC USB Disk. This file is a complete archive of all SARCTRAC application software and configuration. Note that the SARCTRAC BackupNN folder also contains an editable copy of the following configuration folders and files. The SARCTRAC update process will first restore the sarctrac archive file and then any separate configuration files found in the root folder of the SARCTRAC USB Disk.
tle (folder)	This folder contains Orbital Element Library (txt) files, each one containing the orbital parameters of multiple satellites in NORAD Two Line Element (TLE) format. See the SARCTRAC Manual for details.
network.txt	This file contains the WiFi Router SSID and password. See the SARCTRAC Manual for details.
freqmode.txt	This is the SARCTRAC Satellite Frequency/Mode database. See the SARCTRAC Manual for details.
rotorcal.txt	This is the SARCTRAC 3D Sensor calibration file. Do not edit this file.
settings.txt	This file contains SARCTRAC settings. The parameters in the settings.txt file are currently not well documented and should not be changed unless we provide you with specific directions to do so. For more information, please contact us at info@sarcnet.org.

SARCTRAC Download Procedure

1. Use a browser on your PC to select the latest version of the SARCTRAC application software and configuration files at https://www.sarcnet.org/sarctrac. Note: It will be in a folder called versionX.XX, where X.XX is the latest version number. In that folder there will be subfolders for the master and update files.
2. Download the versionX.XX folder to your PC Desktop.

SARCTRAC USB Disk Preparation

1. Insert the SARCTRAC USB Disk into the USB port of your PC. Note: The SARCTRAC USB Disk must have its volume label set to SARCTRAC. Update the volume label if it does not.
2. Now would be a good time to backup the contents of the SARCTRAC USB Disk to the Desktop of your PC. Simply select all items and copy them to a folder on your PC.
3. Keep a copy of these backup folders as they may contain SARCTRAC user data. You can copy items from a backup folder to the root folder of the SARCTRAC USB Disk in order to restore previous items using this update procedure.

SARCTRAC Update Procedure

1. First determine the type of SARCTRAC update required and the target file(s) of interest, as shown in Table 3.

Table 3 – SARCTRAC Update Types and Target Files

Reason for Update	**Target File(s)**
Starting SARCTRAC for the first time. This only requires editing and installing your network.txt file.	network.txt file
Installing a new version of SARCTRAC software with factory default configuration. Note that the 3D sensor calibration, frequency/mode database, orbital element libraries, home location, time zone, settings and network configuration will all be reset to factory defaults.	Master sarctrac file network.txt
Installing a new version of SARCTRAC software with previous user configuration. Note that the 3D sensor calibration, frequency/mode database, home location, time zone, orbital element libraries, settings and network configuration will not be changed.	Update sarctrac file
Restoring a previous version of SARCTRAC software and user configuration if the new version doesn't work or the current version stops working. Note that the 3D sensor calibration, frequency/mode database, home location, time zone, settings and network configuration will be restored.	Backup sarctrac file
Changing the WiFi Router SSID and Password.	Backup network.txt file
Changing the Satellite Frequency/Mode database	Backup freqmode.txt file
Restoring a previous 3D Sensor calibration data	Backup rotorcal.txt file
Changing SARCTRAC settings in accordance with specific advice from SARCNET	Backup settings.txt file
Creating user-defined Orbital Element Library Files	Backup tle folder with txt files

2. Next copy the target folder(s) and file(s), as required, to the root folder of the SARCTRAC USB Disk. For example, as shown in Figure 1.

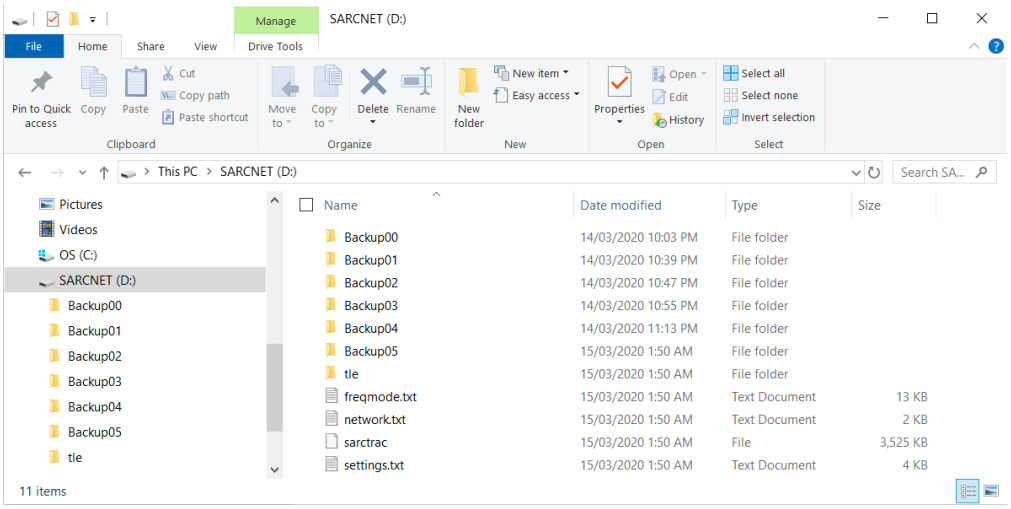


Figure 1 - Example SARCTRAC USB Disk directory listing

3. Then edit the target txt file(s), if required, to change the user data therein. Always use a basic text editor like Notepad, but not Word. Check for the correct name and extension of each file. WARNING: Any formatting errors in these files will stop SARCTRAC from functioning, but not upgrading. In this case you will have to fix the error in the txt file, or restore a backup txt file, using this update procedure.
4. Delete any items from the root folder of the SARCTRAC USB Disk which are not required. Note: Existing backup folders should remain as they are ignored in the update process. New backup folders will be created and numbered sequentially.
5. Make a backup copy of the SARCTRAC USB Disk on the PC.
6. Eject the SARCTRAC USB Disk on the PC.
7. Power Down SARCTRAC.
8. Insert the SARCTRAC USB Disk into a USB Port on SARCTRAC.
9. Power Up SARCTRAC with a clear view of the sky for GPS access.
10. Wait up to four minutes for SARCTRAC to boot, beep, backup, install, reboot, and beep again.
11. Log in to the SARCTRAC SELECTION Page using your web browser.
12. Refresh the SARCTRAC SELECTION Page while waiting for a GPS Error less than 5m.
13. Check the following settings are all in accordance with the SARCTRAC Manual:
    a. SARCTRAC ID and Version number
    b. Your Name and Call Sign
    c. Your Street Address
    d. The Date and Time
    e. The Online status
    f. The status of the TRer and GPS Ports
    g. The GPS time sync
    h. The Selected and Rejected Satellites
    i. The Orbital Element Library TLE list
    j. The Time Zone
    k. The System Start-up Log