

C-Nav[®]

C-NavX1 RINEX Procedure

Revision 1

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C-Nav[®] Positioning Solutions
oceanengineering.com/positioning-solutions



Release Notice

This is the January 2023 release of the **Oceaneering[®] C-NavX1** GNSS receiver RINEX procedure.

Revision History

1	01/XX/2023	Release
0	01/18/2023	Initial document creation
Revision	Date	Description

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Table of Contents

C-NavX1 RINEX Procedure	1
Trademarks	3
Disclaimer of Warranty	3
Limitation of Liability	3
Table of Contents	4
Manual Organization.....	5
Manual Conventions	6
Section 1 - Overview	7
Introduction.....	7
Section 2 – Obtaining the C-NavX1 IP Address	8
The C-NavX1 IP Address	8
Section 3 – Extracting Data from the C-NavX1	9
FTP File Transfer.....	9
Section 4 – Unzipping the extracted data.....	11
Section 5 – Combining .tps Files	12
Section 6 – Creating a RINEX file	14

Manual Organization

This is a short tutorial explaining the steps necessary to extract raw .tps files from the C-NavX1's internal memory and convert to RINEX.

[Section 1 - Overview](#) (Page 7) gives a brief overview of the purpose of this document.

[Section 2 – Obtaining the C-NavX1 IP Address](#) (Page 8) outlines the procedure for obtaining a working IP address. If the receiver's IP is known it can be skipped, as the IP address is a requirement for accessing the receiver's internal file storage location.

[Section 3 – Extracting data from the C-NavX1](#) (Page 9) lists the procedure to transfer the raw GNSS files from the C-NavX1's internal file storage location.

[Section 4 – Unzipping the extracted data](#) (Page 11) lists the procedure to unzip the .bzip2 files.

[Section 5 – Combining .tps files](#) (Page 12) lists the procedure to combine the .tps files into a single file.

[Section 5 – Creating a RINEX file](#) (Page 14) lists the procedure to create a RINEX observables file.

Related Documents

[CNAV-MAN-061.01 \(C-NavX1 GNSS Receiver User Guide\)](#)

Provides specifications and information about the C-NavX1 GNSS receiver.

[CNAV-MAN-062.1 \(C-NavX1 Firmware Update Installation Procedure\)](#)

Provides instructions for updating C-NavX1 GNSS receiver firmware using C-NavX1 Firmware Updater Software Application.

[CNAV-PRI-014.2 \(C-NavX1 Firmware Release Notice\)](#)

Provides details of the latest C-NavX1 GNSS receiver firmware release.

Manual Conventions

Arial font is used for plain text in this document.

Arial italic font is used for settings names.

'Arial quoted' font is used for settings values.

Arial Bold font is used for button names.

Arial Bold Italic font is used for menu items.

[Arial Blue](#) font is used for cross-references.

[Arial Blue Underline](#) font is used for hyperlinks.

Arial red italic is used for typed commands.

Arial Bold font size 10 is used for captions.

ARIAL BLACK ALL-CAPS font is used for port connection names.



This symbol means Reader Be Careful. It indicates a caution, care, and/or safety situation. The user might do something that could result in equipment damage or loss of data.



This symbol means Danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical and RF circuitry and be familiar with standard practices for preventing accidents.

Important notes are displayed in shaded text boxes.

Please note:

Such note boxes display important information that should not be ignored.

Simple file content is displayed in Courier New Black font in a text box.

```
#Sample File  
Version 0.1
```

Section 1 - Overview

Introduction

This C-NavX1 GNSS receiver has an internal memory which records zipped .tps files of 5 minute duration. These files can be extracted from the receiver and converted to RINEX format for subsequent offline processing where required.

The C-NavX1 should have a known IP address which will be used to access the required logging directories.

Warning:

Use only the latest version of C-NavX1 firmware to perform the outlined procedure(s). The latest firmware is available for download from the [C-Nav Customer Support Webpage](#).

The following software will be required to perform this procedure.

TPS2RIN is a Topcon utility that converts GNSS .tps binary files to the industry-standard RINEX format. This is supplied as a zip file which includes a README with instructions and examples of use. This is available for download from the [C-Nav Customer Support Webpage](#).

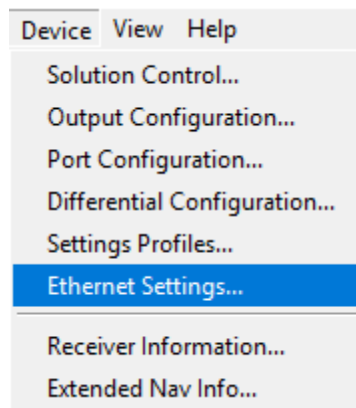
FTP transfer tool e.g. FileZilla which is freely available on the internet and facilitates anonymous FTP transfer of data from the C-NavX1.

7-Zip is a freeware utility that can be used to uncompress bzip2 files which is the format logged by the C-NavX1.

Section 2 – Obtaining the C-NavX1 IP Address

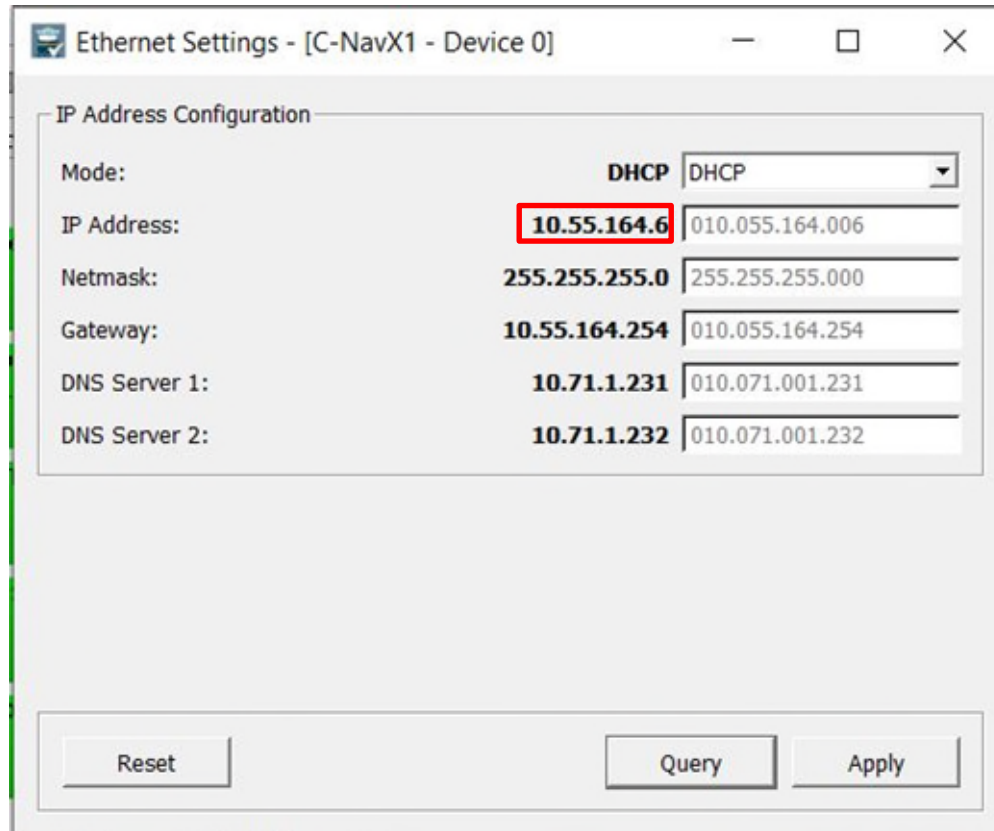
The C-NavX1 IP Address

1. Connect the receiver and the PC or laptop being used to the same network switch with DHCP capabilities.
2. Using C-Setup / C-Monitor[®] QA/QC software / C-Scape connect to the C-NavX1 using one of the receiver's Serial or USB port.
3. Once the C-Nav[®] control software establishes communication with the receiver, access the **Ethernet Settings** page from the **Device** menu.



4. If there is no IP address, set the **mode** to 'DHCP', if it was 'Manual' before after changing to 'DHCP' make sure to press **Apply**.
5. Use the **Query** button to update the items on the menu window, if an IP address isn't shown, give it some time and press **Query** again, else check the network hardware and cabling.

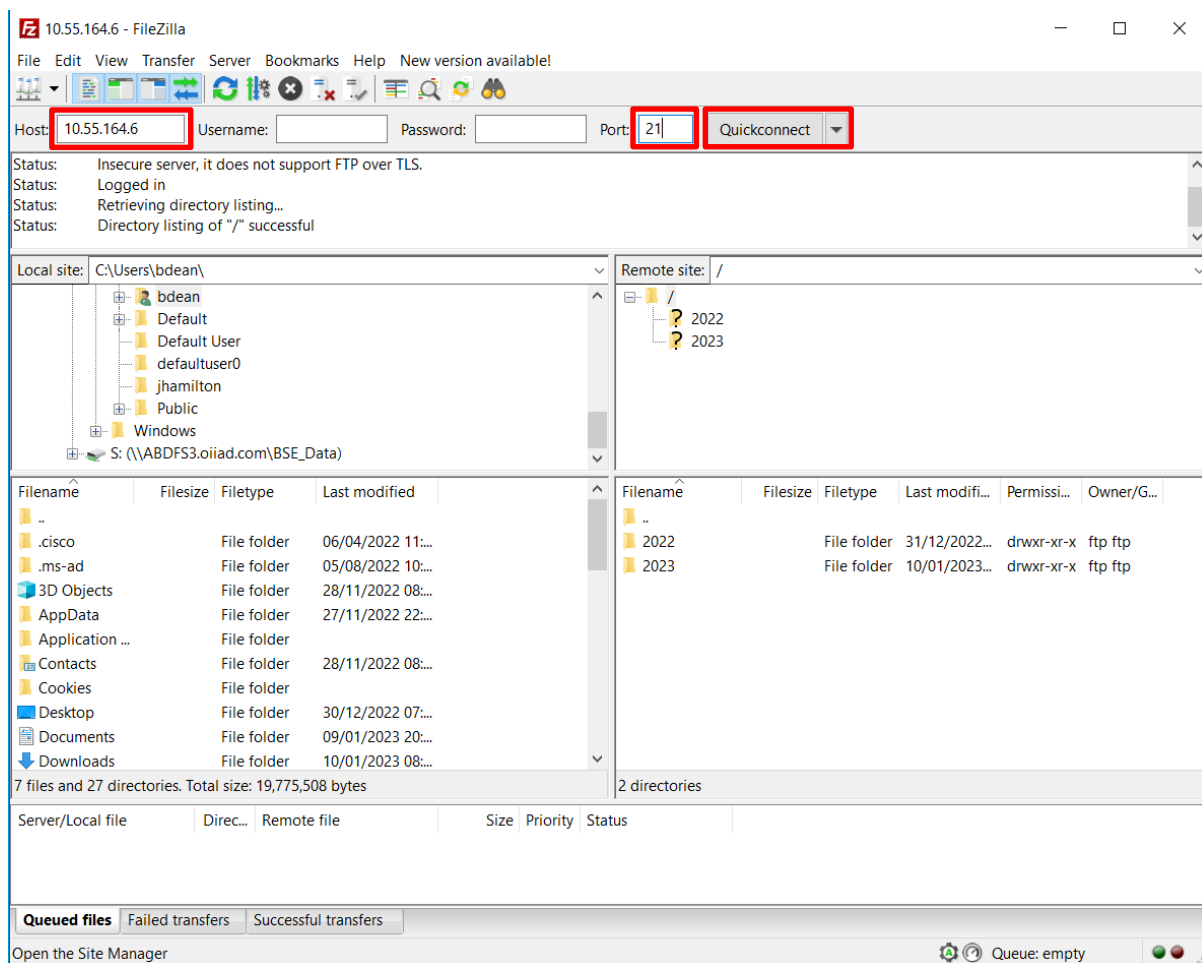
6. Take note of the *IP address* shown for the receiver, this will be the IP address used to access the logging directories.



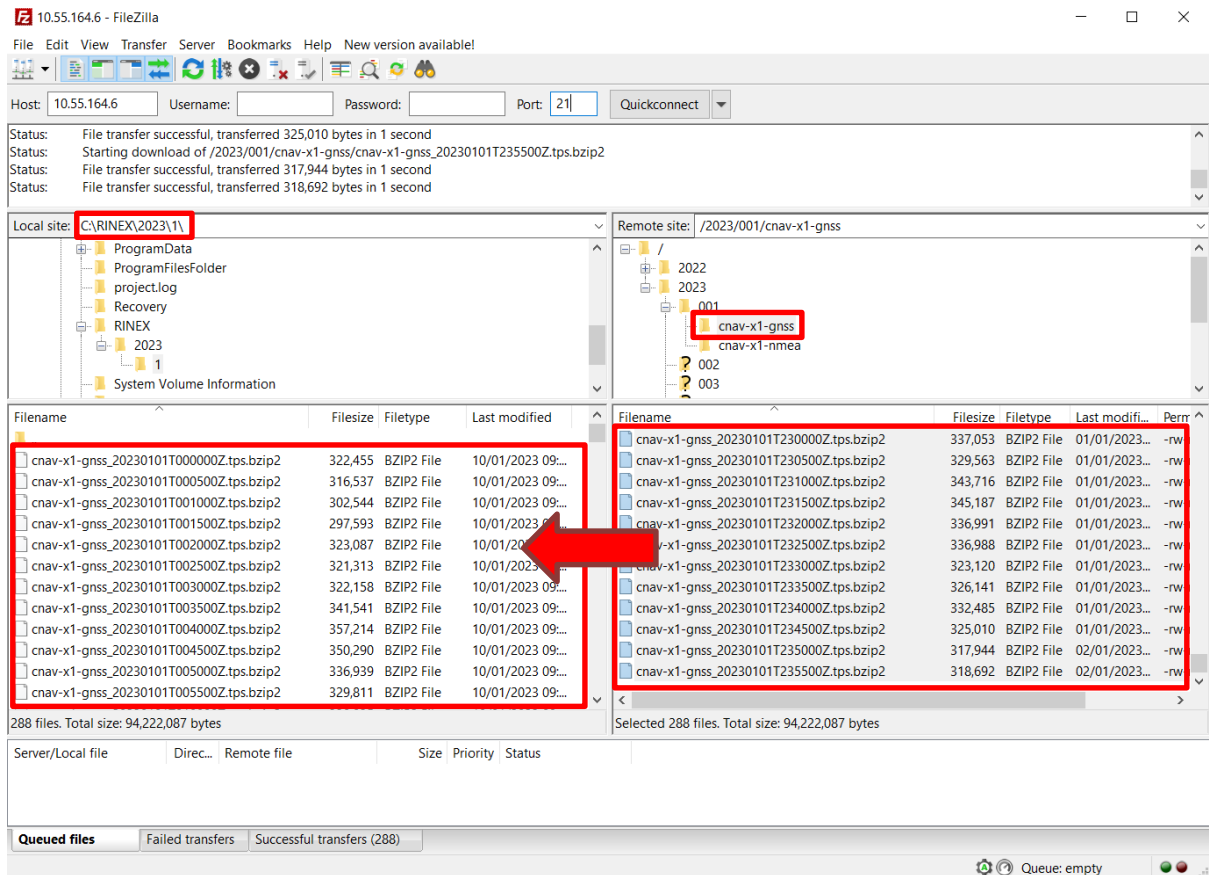
Section 3 – Extracting Data from the C-NavX1

FTP File Transfer

1. Run your preferred FTP software tool. In this example we will use the FileZilla application.
2. Enter the receivers IP address as determined in the previous step port 21 and establish the connection.

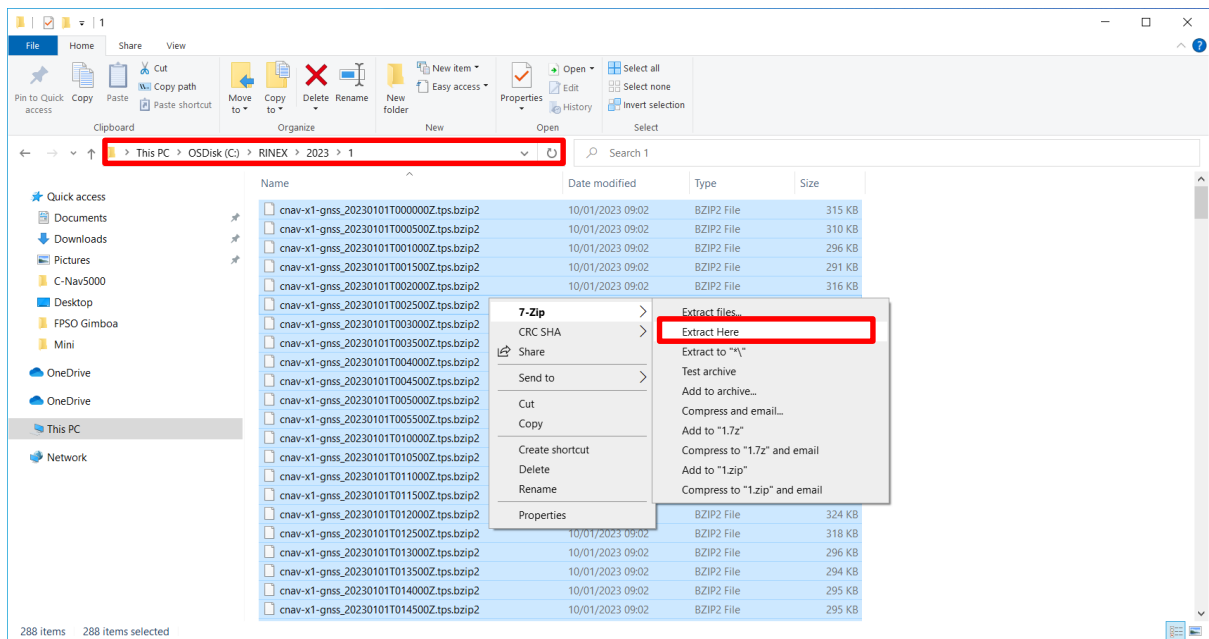


3. You will be presented with the root log folder on the C-NavX1 containing top level year directories. Clicking on the year directory will present you with folders identified by the day count within the year.
4. Each day folder contains both NMEA and GNSS data folder which contains compressed bzip2 files of 5 minute duration. To retrieve binary files for RINEX processing, enter the GNSS folder, select the files for the time interval of interest and drag-and-drop them across to the chosen local folder location on your local machine.



Section 4 – Unzipping the extracted data

1. Using Windows Explorer, navigate to the location of the files previously transferred from the C-NavX1's internal memory.
2. Ensure you have the 7-Zip application installed on the local machine.
3. Select all of the .bzip2 files that you want to extract, right click and select Extract Here, which will extract all of the .tps files to the same folder directory.



Section 5 – Combining .tps Files

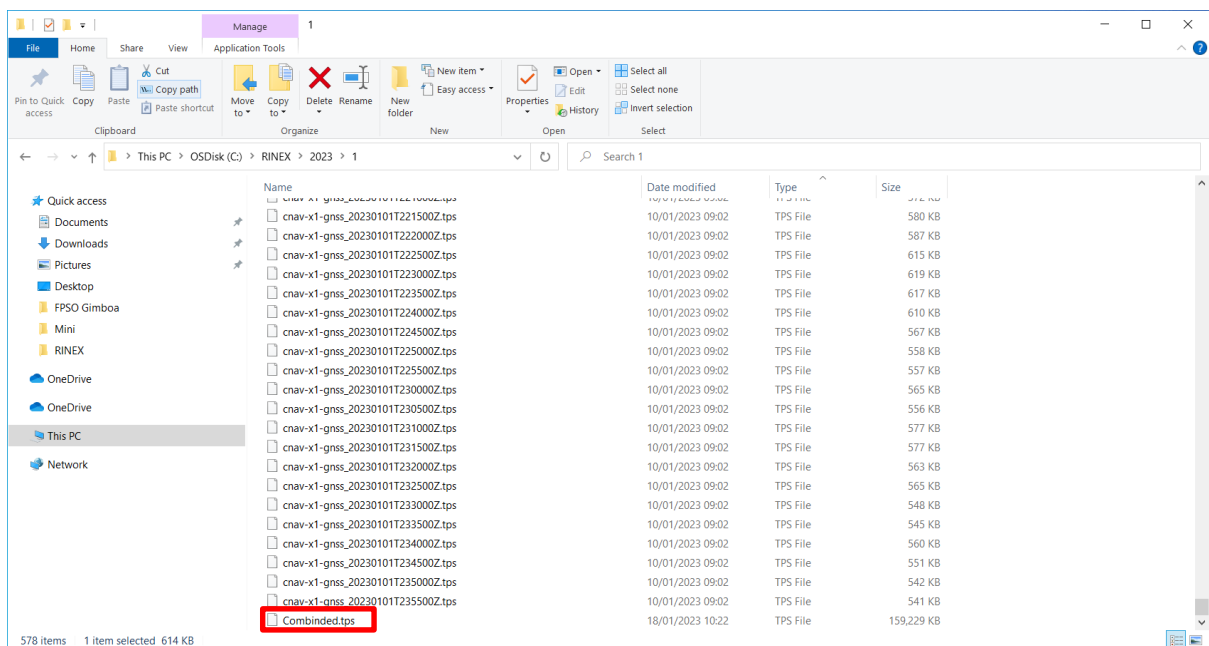
1. Data is extracted from the receiver in 5 minute durations. In most circumstances, users will want to combine these in to a single 24 hour data set for example.
2. This can be done from a terminal program on the local machine e.g. Command Prompt.
3. Use the `cd` command to change the directory to the location of the extracted .tps files.
4. Use the command `Copy /b *.tps Combined.tps` to combine all of the 5 minute files in to a single file named Combined.tps

```

Command Prompt
Microsoft Windows [Version 10.0.19044.2364]
(c) Microsoft Corporation. All rights reserved.

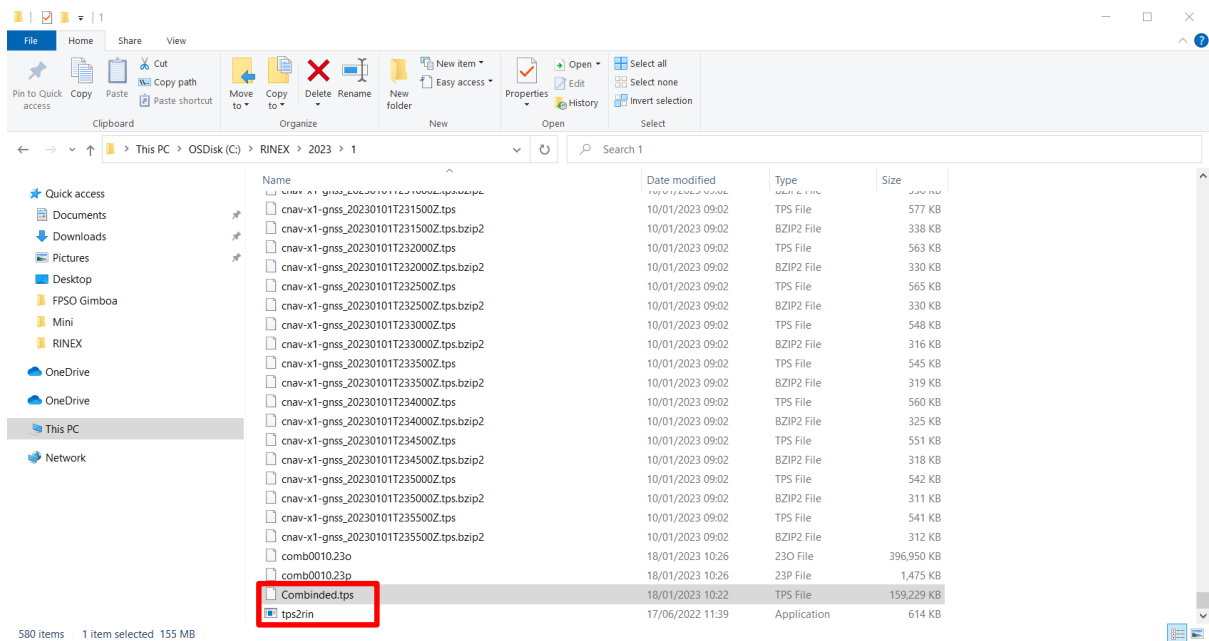
C:\Users\bdean>cd C:\RINEX\2023\1

C:\RINEX\2023\1>Copy /b *.tps Combinded.tps
cnav-x1-gnss_20230101T000000Z.tps
cnav-x1-gnss_20230101T000500Z.tps
cnav-x1-gnss_20230101T001000Z.tps
cnav-x1-gnss_20230101T001500Z.tps
cnav-x1-gnss_20230101T002000Z.tps
cnav-x1-gnss_20230101T002500Z.tps
cnav-x1-gnss_20230101T003000Z.tps
cnav-x1-gnss_20230101T003500Z.tps
cnav-x1-gnss_20230101T004000Z.tps
cnav-x1-gnss_20230101T004500Z.tps
cnav-x1-gnss_20230101T005000Z.tps
cnav-x1-gnss_20230101T005500Z.tps
cnav-x1-gnss_20230101T010000Z.tps
cnav-x1-gnss_20230101T010500Z.tps
cnav-x1-gnss_20230101T011000Z.tps
cnav-x1-gnss_20230101T011500Z.tps
cnav-x1-gnss_20230101T012000Z.tps
cnav-x1-gnss_20230101T012500Z.tps
cnav-x1-gnss_20230101T013000Z.tps
cnav-x1-gnss_20230101T013500Z.tps
cnav-x1-gnss_20230101T014000Z.tps
cnav-x1-gnss_20230101T014500Z.tps
cnav-x1-gnss_20230101T015000Z.tps
cnav-x1-gnss_20230101T015500Z.tps
  
```



Section 6 – Creating a RINEX file

1. **TPS2RIN** is a Topcon utility that converts GNSS .tps binary files to the industry-standard RINEX format. This is supplied as a zip file which includes a README with instructions and examples of use. This is available for download from the C-Nav Customer Support Webpage.
2. The tps2rin application will need to be extracted from the zip file. In this instance it was extracted to the same location as the Combined.tps file created in the previous step.



3. Drag and drop the Combined.tps file on to the tps2rin application. This will automatically run the application and create the required RINEX observables file.

C-NavX1[®] RINEX Procedure

