AWB Time Help

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1 Introduction

One of the first things to do when starting an observational session is to ensure that your setup reflects the correct date and time. This may mean entering your local date and time, time zone and daylight saving via a telescope controller hand set or just checking that your laptop/PC clock is correct if you are using software (e.g. EQASCOM) to control your scope.

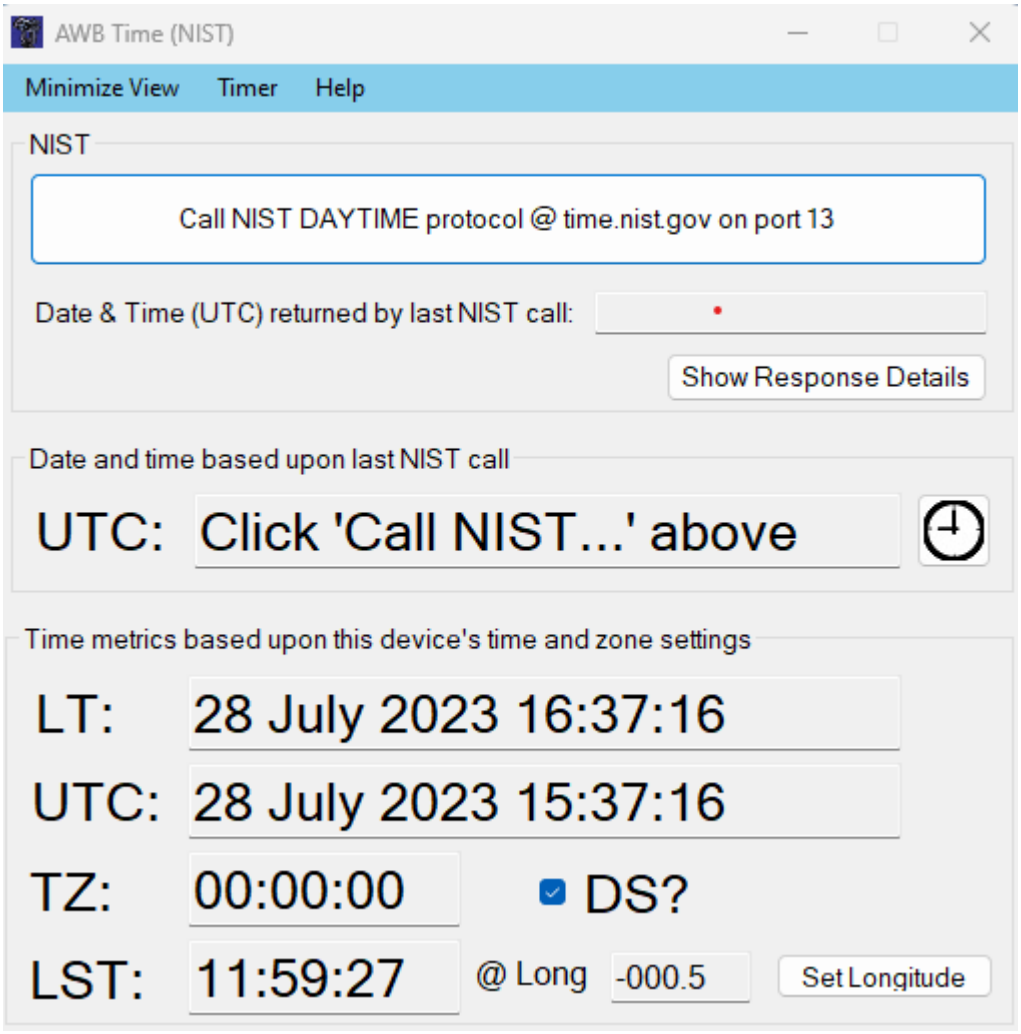
I created this application to show all of these date and time metrics from your device along with your LST (Local Sidereal Time) and a facility to call the NIST (National Institute of Standards and Technology) time service to check that your device's time is correct.

Note:

- Even though the NIST servers normally maintain a very accurate time (see section 3.2 for details) there will always be a latency between your device and the NIST server. The NIST service returns an estimate of the network latency which is used to adjust the time returned, however you should not assume that the time displayed from the NIST call is ultra-accurate due to possible latency errors.
- This application calls the NIST service using their DAYTIME protocol on the address *time.nist.gov* and on port 13. Your infrastructure / firewalls etc may block this port and/or site and if so it will always fail.
- Do not repeatedly click on the 'Call NIST…' button as NIST reserve the right to block any IP that makes frequent repeated calls to their service (primarily to prevent DOS attacks). If a call fails then give it a few seconds before trying again.

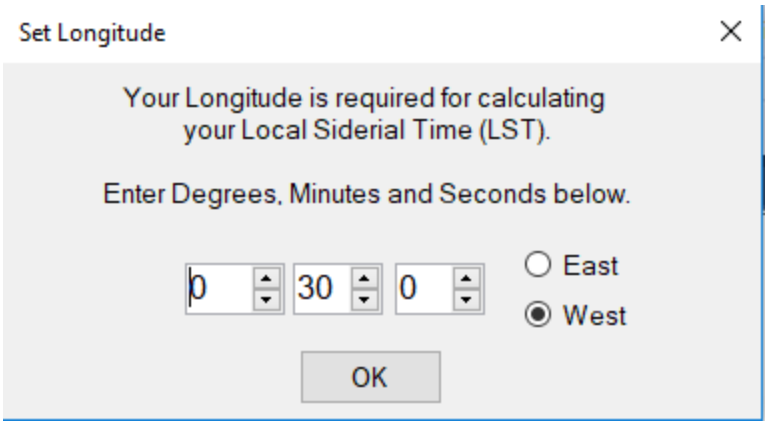
2 Startup

Upon starting the *AWB Time* application, the following screen will be presented:



The LT (Local Time), UTC (Coordinated Universal Time), TZ (Time Zone) and DS (Daylight Saving), will all be populated based upon your device time and zone settings.

For the application to calculate your correct LST (Local Sidereal Time) it has to know your longitude. To set your Longitude click on the *Set Longitude* button and the following screen will appear:

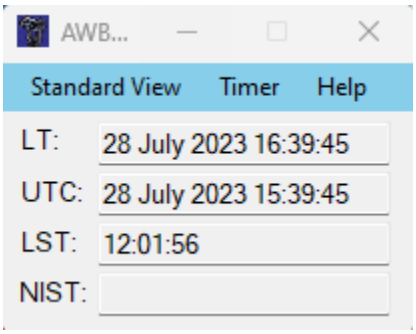


Change the values to your longitude and click OK.

The main screen will now show your LST. A West longitude is displayed as a negative figure on the main screen.

2.1 Toggle display size

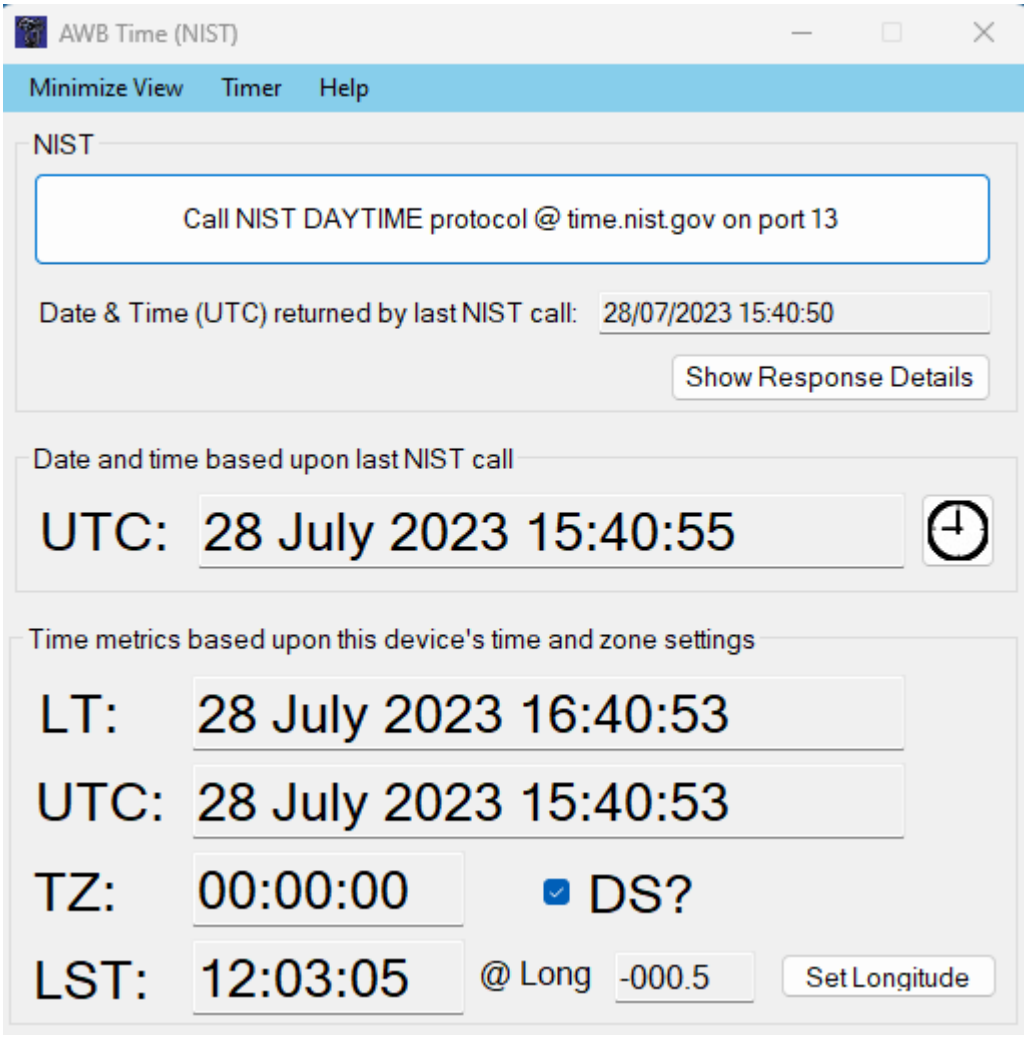
Click on the Minimize View menu option to toggle the display view to a small representation.



3 Calling NIST

Do not repeatedly click on the 'Call NIST…' button as NIST reserve the right to block any IP that makes frequent repeated calls to their service (primarily to prevent DOS attacks). If a call fails then give it a few seconds before trying again.

A successful call to the NIST service will populate the UTC field in the middle of the screen as in the example below:

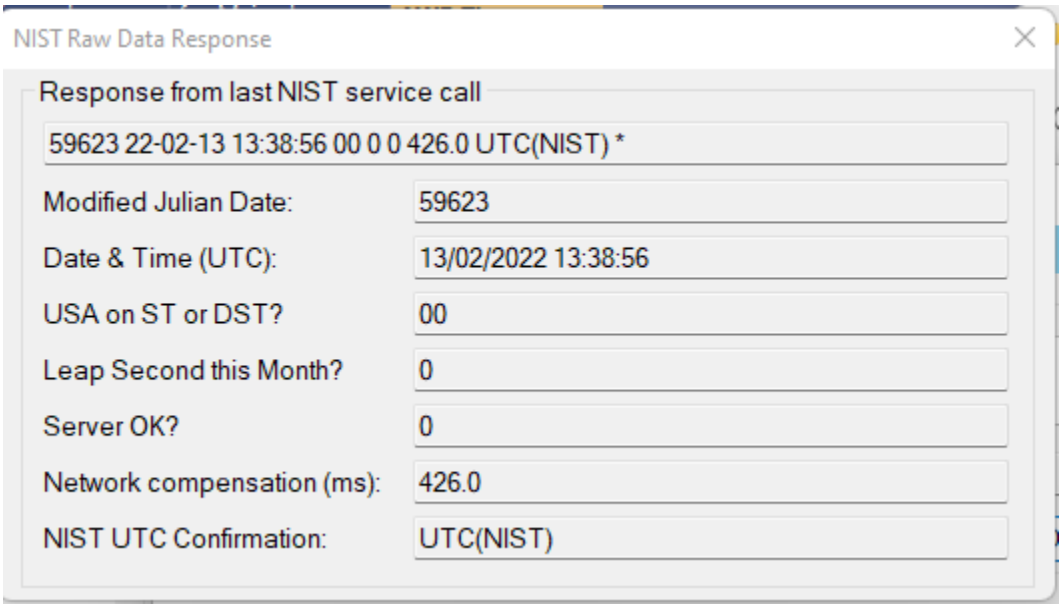


3.1 Re-Sync your device time

If your device time varies by more than few seconds it may be worth re-syncing your device using the Windows *Adjust date and time* feature or by using the button on the application. Note that you must be running the application with Administrator privileges for this to succeed.

3.2 NIST Response

Clicking on the *Show Response Details* button will present a screen as follows which contains the raw service response data from NIST.



The NIST service response format is:

JJJJJ YR-MO-DA HH:MM:SS TT L H msADV UTC(NIST) OTM

Where:

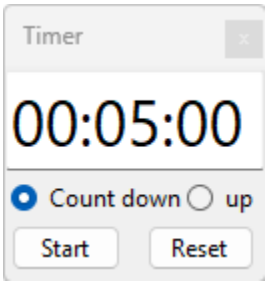
- JJJJJ Is the Modified Julian Date (MJD). The MJD has a starting point of midnight on November 17, 1858;
- YR-MO-DA Is the date. It shows the last two digits of the year, the month, And the current day of month;
- HH:MM:SS Is the time in hours, minutes, And seconds. The time Is always sent as Coordinated Universal Time (UTC);
- TT Is a two digit code (00 to 99) that indicates whether the United States Is on Standard Time (ST) Or Daylight Saving Time (DST). It also indicates When ST or DST Is approaching. This code Is Set To 00 When ST Is In effect, Or To 50 When DST Is In effect. During the month In which the time change actually occurs, this number will decrement every day until the change occurs. From 50 To the actual number of days until the time change. It will decrement by 1 every day until the change occurs at 2 a.m. local time When the value Is 1. Likewise, the spring change Is at 2 a.m. local time When the value reaches 51;
- L Is a one-digit code that indicates whether a leap second will be added or subtracted at midnight on the last day of the current month. If the code Is 0, no leap second will occur this month. If the code Is 1, a positive leap second will be added at the End Of the month;
- H Is a health digit that indicates the health of the server. If H = 0, the server Is healthy. If H = 1 then the server Is operating properly but its time may be in error by up to 5 seconds. This state should change to fully healthy within 10 minutes. If H = 2, Then the server Is operating properly but its time Is known to be wrong by more than 5 seconds. If H = 3, Then a hardware Or

software failure has occurred And the amount Of the time Error Is unknown. If H = 4 the system Is operating In a special maintenance mode And both its accuracy And its response time may be degraded. This value Is Not used for production servers except In special circumstances. The transmitted time will still be correct to within ±1 second In this mode;

- msADV displays the number Of milliseconds that NIST advances the time code To partially compensate For network delays;
- The label UTC(NIST) Is contained In every time code. It indicates that you are receiving Coordinated Universal Time (UTC) ;
- OTM (on-time marker) Is an asterisk (*). The time values sent by the time code refer to the arrival time of the OTM.

4 Timer

A simple timer facility is included that is accessed via the '*Timer'* main menu item. This displays the following screen:



Enter any time up to 24 hours in the format HH:MM:SS with padded zeros. For example the screen above shows 5 minutes.

You may count up or down from the entered time via the radio group selection and then click the '*Start'* button which then toggles to a '*Stop'* button.

The *Reset* button will set the time to 00:00:00 if the radio group is set to '*up'*, or to the last entered time if the radio group is set to '*Count down'*.

5 Further Information

Please visit my website www.astroworkbench.co.uk for further applications, documents and articles.

Thanks.

Keith.