

A PROBLEM OF TIME AND TELESCOPES

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The Problem

Imagine you are a researcher who studies Jupiter.

Last week you used AEOS (Advanced Electro-Optical System) telescope on Haleakala and saw Jupiter perfectly

Yesterday, you went back to AEOS, but you couldn't see Jupiter, even when you adjusted the telescope.

However, your friend used a nearby telescope and was able to see Jupiter clearly.

You tried again today and saw Jupiter. You think something's wrong with the telescope and how it finds Jupiter.

In order to figure out what's wrong you need to replicate the error by making the telescope think it's the same time the error occurred.

Existing Setup

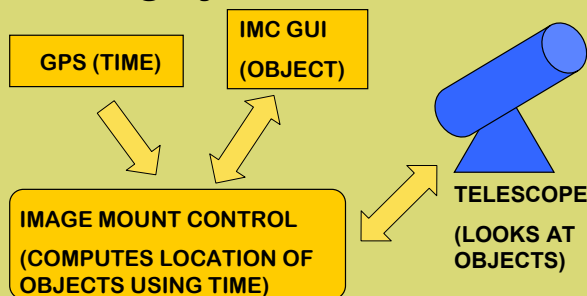
❖ The telescope gets the location in the sky to point at from the Image Mount Control (IMC).

❖ The IMC will get the current time from GPS and is told what object to look at from a graphical user interface (GUI).

❖ The IMC uses those two parameters to calculate where the telescope should look and sends the proper commands to the telescope.

BUT, the IMC can only calculate the position using the current time. There is no way to manually change the time read by the IMC.

Existing System Flowchart



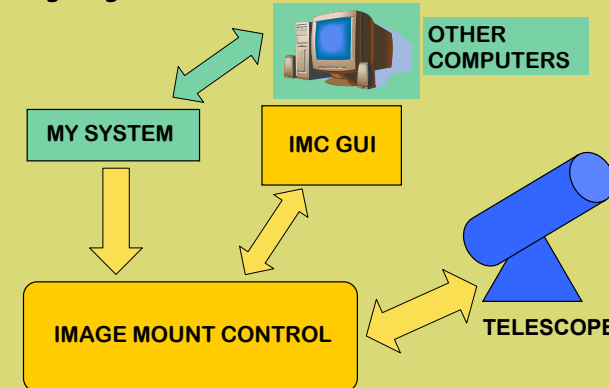
My Project

❖ Design a system to input any time into the Image Mount Control. (essentially replacing the GPS input)

❖ Make the system compatible with any telescope that uses an IMC with an input of time from GPS.

My system allows researchers to troubleshoot problems and investigate how the telescope behaves at any time and date they want.

My System Flowchart



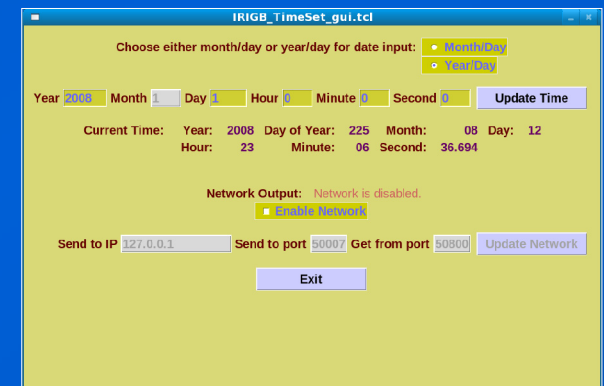
Time Setting System

The system is comprised of a Linux PC, a timer card, a C program, and GUI, and a networking feature.

The GUI is the only thing the user sees.

It is capable of setting and displaying the time on the card as well as enabling or disabling and setting up the network.

The System GUI



How it Works

❖ To set/change the time:

- Choose the format to enter the time in
- Enter the time in the proper fields
- Press the Update Time button

❖ To set/change network settings:

- Check the Enable Network button
- Enter the right information
- Click the Update Network button

Results

❖ C program communicates with GUI and timer card to send the new time and date to the IMC

❖ The user can change the time via the GUI

❖ System is able to send and receive information from another computer

The Solution

So now you are able to replicate the problem you had by entering the time you tried to look at Jupiter yesterday. This will allow you to troubleshoot and hopefully fix the problem.

You can also input future dates (such as important missions) to see if the telescope will operate in a desirable way.

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