ASTR1001 “Astrophysics” Assignment 2.

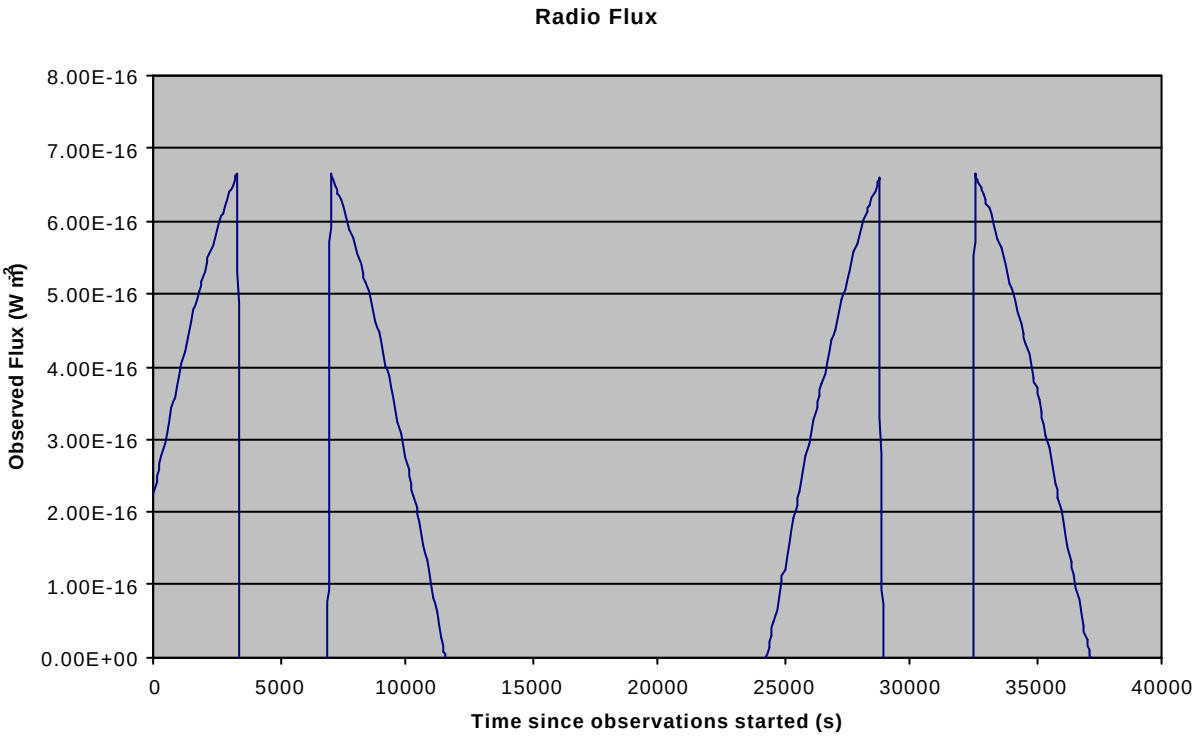
The Story So Far

After several days of observations, you are still hiding in the comet cloud, half a light year from HD666123. Captain Chubb does not plan on moving until she’s exhausted all the things that can be learned from out here.

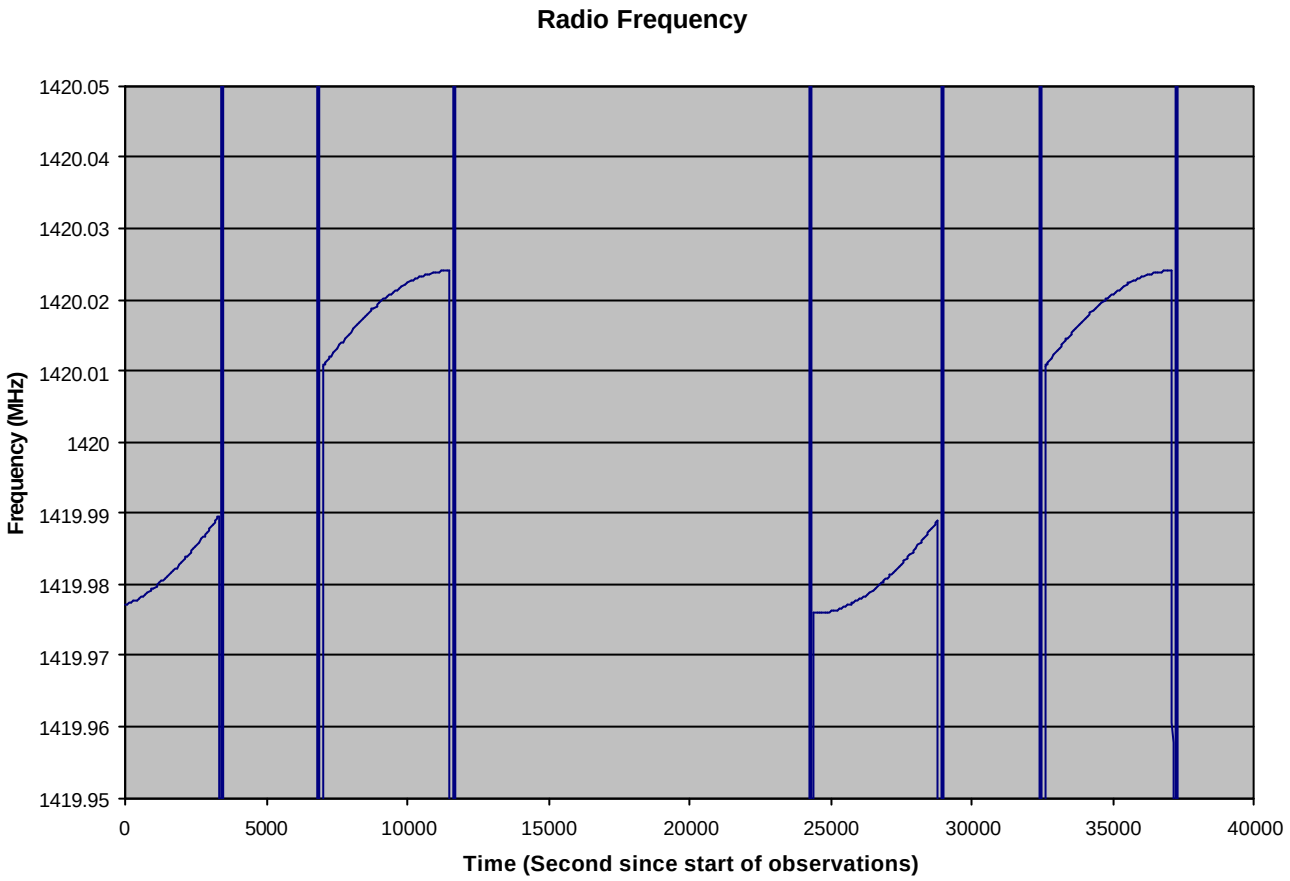
What’s New?

The new data comes from the telemetry division, who have now been monitoring the radio signals from the “dot” since you arrived. They have some startling results.

- The radio signal is entirely emitted in a narrow frequency range, near 1420 MHz. This is the same frequency that was seen from Earth.
- The signal seems to be neither amplitude nor frequency modulated – it is a pure sine wave.
- The intensity of the signal does, however, change slowly with time. This was not observed from the Earth. The graph of intensity against time shows a curious pattern.



- The frequency of the emission, while always close to 1420 MHz, does slowly change, again with an interesting pattern.



That's all the telemetry division have been able to work out so far. They will continue to monitor the signals. A table containing the data will be put in the ship's library.
The captain has passed these data on to you, the science team, for your analysis.

The Assignment.

This is the second of three assignments based on the "mystery planet". For this assignment, you should deduce as much as possible, using the data that I've provided here, plus the data from the first assignment.. Over the next few weeks I'll release more data, and that will be the subject matter for the next two assignments. As before, you can work as individuals or teams.
This assignment is worth 5% of the marks for ASTR1001.
If you wish, you may once again work in teams. If you do so, you need only submit one write-up for the whole team, and you will all be given the same mark. Team submissions will be marked in exactly the same way as individual submissions.
Deadline: Monday 8th March, 11am. Assignments should be submitted electronically via WebCT. A special link will be provided.
Your write-up should once again be at most 300 words long, summarising what you have deduced about the mystery planet. It should be written in the style of an 'Executive Briefing' for Captain Chubb. You should concentrate on facts that might be important to this mission, and on the physical reasoning that led you to these conclusions.