

ECE 6390 Radiolocation Scavenger Hunt 1

SARSAT Rescue!

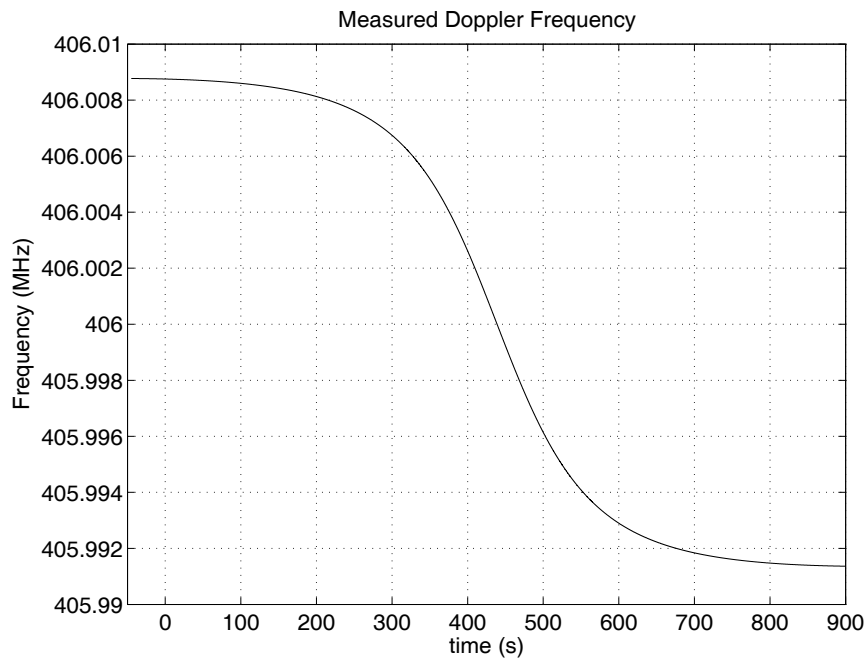
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1 Introduction

According to radio transmissions intercepted by other trans-Atlantic pilots, a large commercial jet has made a crash-landing somewhere in the Atlantic ocean. Its last known bearing and location are relatively sketchy; the only trace of the plane is an EPIRB that has been activated and received by a SARSAT satellite riding down the -76.0° longitude line. Based on the satellite's received waveform, your engineering team must provide a "best estimate" of where the jet crashed so that the Coast Guard can be dispatched.

2 Technical Data

The figure below is a snapshot of the SARSAT's measured carrier frequency as a function of time. This particular satellite is making an upwards orbital swing (from south to north) and is precisely riding the -76.000° longitude line during this recorded period. The time $t = 0$ s corresponds to the moment that the satellite has crossed the equator. The raw data (time in seconds and frequency in Hz) are tabulated in an ASCII file that has been posted on the project website.



3 Deliverables

You must prepare a web-based report or presentation that documents your solution to this problem. Other search-and-rescue workers will hopefully use your documented solution to operate more efficiently in the future. Keep in mind that there are other independent teams of engineers working on this problem (who you do not believe are as competent or as ethical as your team), so the web report must look good and “sell” your solution in addition to being technically correct. The web report should be in html-format with all files submitted in-class on a CD or through e-mail¹. Your report will be graded completeness, **technical writing**, technical correctness, professional content, and creative use of web presentation. I will likely post a couple unique solutions and high-quality projects to the web.

Some interesting questions to address in your final web report/presentation:

- Are there any ambiguities in your technique? How might these be addressed?
- Can you place a confidence interval on your position estimate?
- How might a receiver measure carrier frequency?

4 Final Clue

The actual longitude/latitude of the EPIRB is very close to an island in the Atlantic. The name of the island will help you in your next RLSH assignment.

¹e-mail submissions must be ZIPped and are only recommended for files less than 2 MB total