This is the pre LATEX write up. A LATEX write up will come when this is all done.

Abastract

Stages

1. Explain Problem
   1. Space debris
      1. Threat to satellites
      2. Kessler syndrome
2. TLE
   1. Go through Two Line element file type
      1. Explain details of Two Line Element file
3. Norad
   1. Explain space-track.org
4. The code
   1. Explain how the code works

Latex Files

At the moment I am using the thesis class, I should look for others

Structure

* TOC/ TOT, TOF
* Acknolwdments
* Abstract
* Introduction
  + Debris (the problem)
  + Cube Sats
  + Talk about Oscar?
* TWO Line elements
  + Desribe how they work and stuff
* SATACT?
* NOARD Space-Track
  + Explain they give SATCAT and TLE
  + Querys
* The Code

Citations

Use ciataiton file on github

Thanks to

Details about NORAD and here

Get\_SATCAT.m is the MATLAB file that gets the satellite catalog numbers of all orbital debris launched after a given year and with the “RCS\_SIZE” value equal to “SMALL”. The Launch Year can be set by the values given by the user in VarStore.m The default launch year is set to 1990. Note that an earlier launch year will provide more data, and thus it will take more time to process. This may cause a time out error. Should this happen the timeOutVal in VarStore.m should be adjusted to be longer.

To do now

Write up / document the code

Mostly do write up today

Explain the problem. Explain TLEs

Email OGE‼‼!

Citing stuff‼

Dan, talk

has snesor, geting 5 measurments

talk about

Citing code

\* Check on web

\* Citing documentation acossicated with code

\* \* Citing webpage or docuemtnationg

\* Contact OGE or grad Ed

So

* Prelim stuff
  + This is written in MATLAB to make it useable for people like me
    - Other languages might be better for web scraping, but this is preferable to the math
* Purpose of project/code
  + We want to get the orbital elements of space debris.
  + We want to get them in a usable form
  + Put in details about Oscar for what we want
* Where do we get these from?
  + NORAD Publishes information about space debris
  + The most common format is a Two Line Element
    - Put detalins about TLE here + explanation
* How do we get them
  + Explain the post script and stuff
    - Explain how this is older and thus we have to do funky things with it. This is why the code is so weird. (But not that exact word)
* How we get them.
  + Summary. The code works in the following steps. 1 Do we already have these values? 2 get the desired norad Ids. (Get satcat) 3 get the TLEs from these IDs and save them in text files. (Get TLE) 4 get the data from the txt files into a matrix (read\_tle\_txt) 5 remove duplicates and ones that have no data. (check TLE).
  + First we see if we already have them and they are in date.
  + First we get the objects that are small, as that is what we want.
    - Walk through what get\_SATCAT does; get\_SATCAT gets them by SATCAT id, and strips them to be usable. Now we know what IDs to get
  + Now we get the TLEs
    - The code then downloads the TLEs from the Ids and saves as txt files. It does this in groups. The groups are so that it does not have to contact the webpage thosdands of times, but also if it fails it does not need to be all repreded.
  + Next we read the txt files
    - The tles are stored in the txt files. They are parsed into a MATLAB array by this function.
  + Finally we removed the duplicated tles from the matrix and store it as a mat file. It is now in a far more usable format, and can be utilized by an space guy w.
* Conc / Future work
  + Start putting in math for this?

Email for meeting with prof Anderson (Thursday morning maybe?) (Do by 1)

Now write up

* Purpose of project/code (abstract) / intro
  + Talk about space debris / cleaning up junk / Oscar?
  + The purpose of this project is to acquire information about earth orbiting debris, turn the information into a usable format, and develop a targeting algorithm for the OSCAR satellite.
    - Step 1 Information accessed
    - Step 2 Code will be written to turn the information about space debris into a format understabadle by someone who has knowlages of spaceflight mechanics.
    - Step 3 With this information an alogritum to target orbital debris will be developed using information provided about an Oscar stilited.
* Prelim stuff ( put in intro)
  + The code is written in MATLAB for accessibility. While other languages might be better for the web interface, they are not often used for [space related] activities and [by space engineers]. As such they will be easier to debug by the average [space engineer]. Additionally MATLAB is preferable for the tools that can be downloaded for [space related activities].
  + The code (like most codes) is designed not to fail. It has built in mechanisms against some of the most common errors that occur, [(more on this in in code section)]. However it also has thorough documentation to help a user should other errors occur.
  + This code assumes the user has at least a basic understanding of spaceflight mechanics. [More here]
* Where do we get these from?
  + Information about objects in space may be found from the website space-track.org.
  + The first task is to find where information about space debris is published
  + Talk about space track here
  + NORAD Publishes information about space debris
  + The most common format is a Two Line Element
    - Put detalins about TLE here + explanation
  + Space-Track allows information to be manually downloaded by the catoluge [cite] or the tle search [cite] (<https://www.space-track.org/#/tle>). Information my also be automatically downloaded by a script. This is the way this projects code will work. (cite using the qyuerys <https://www.space-track.org/#/queryBuilder>)
  + Explain the post script and stuff
    - Explain how this is older and thus we have to do funky things with it. This is why the code is so weird. (But not that exact word)

Change those to data sources and acquisition.

* How we get them. (data acquisition code)
  + Summary. The code works in the following steps. 1 Do we already have these values? 2 get the desired norad Ids. (Get satcat) 3 get the TLEs from these IDs and save them in text files. (Get TLE) 4 get the data from the txt files into a matrix (read\_tle\_txt) 5 remove duplicates and ones that have no data. (check TLE).
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* Conc / Future work
  + Start putting in math for this?

Go to OGE after work, they are open till 6!