TRACKING OF SPACE DEBRIS FROM PUBLICLY AVAILABLE DATA
THINK OF A BETTER TITLE

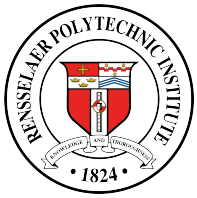
Philip Hoddinott

Submitted in Partial Fulfillment of the Requirements

for the Degree of

MASTER OF SCIENCE

Approved by: People



Department of Mechanical, Aerospace, and Nuclear Engineering

Rensselaer Polytechnic Institute

Troy, New York

August 2018

July 31, 2018

Contents

List of Tables

List of Figures

0.1 Acknowledgments

Thank lots of people here

0.2 Abstract

Talk about Goals of project

0.3 Introduction

Talk more about project. one or two paragraph here

0.3.1 Space Debris

Space Debris is bad

0.3.2 CubeSats

talk about cube sats here

0.3.3 OSCAR

Unsure if talking about oscar? Yes not

0.3.4 NORAD /Space Track

0.4 Data Types

0.4.1 Two Line Element

A Two Line Element (TLE) is a data format that encodes a list of orbital elements for an Earth-orbiting object for a given point in time [Re do this]

Stuff about it

An example is given below. The line under the dashes is the reference number line.

```
ISS (ZARYA)
1 25544U 98067A   04236.56031392  .00020137  00000-0  16538-3 0  9993
2 25544  51.6335 344.7760 0007976 126.2523 325.9359 15.70406856328906
------------------------------------------------------------------------
12345678901234567890123456789012345678901234567890123456789012345678901234567890
1         2         3         4         5         6         7
```

Table 1[1] describes the example TLE.

0.4.2 SatCat?

0.5 NORAD Space-Track

0.5.1 Space-Track Query

0.5.2 matlab code?

0.6 Conclusion

Table 1: Description of TLE

Line 0		
Columns	**Example**	**Description**
1-24	ISS (ZARYA)	The common name for the object based on information from the Satellite Catalog.
Line 1		
Columns	**Example**	**Description**
1	1	Line Number
3-7	25544	Satellite Catalog Number
8	U	Elset Classification
10-11	98	International Designator (Last two digits of launch year)
12-14	067	International Designator (Launch number of the year)
15-17	A	International Designator (Piece of the launch)
19-32	04	Epoch Year (last two digits of year)
21-32	236.56031392	Epoch (day of the year and fractional portion of the day)
34-43	.00020137	1st Derivative of the Mean Motion with respect to Time
45-52	00000-0	2nd Derivative of the Mean Motion with respect to Time (decimal point assumed)
54-61	16538-3	B* Drag Term
63	0	Element Set Type
65-68	999	Element Number
69	3	Checksum
Line 2		
Columns	**Example**	**Description**
1	2	Line Number
3-7	25544	Satellite Catalog Number
9-16	51.6335	Orbit Inclination (degrees)
18-25	344.7760	Right Ascension of Ascending Node (degrees)
27-33	0007976	Eccentricity (decimal point assumed)
35-42	126.2523	Argument of Perigee (degrees)
44-51	325.9359	Mean Anomaly (degrees)
53-63	15.70406856	Mean Motion (revolutions/day)
64-68	32890	Revolution Number at Epoch
69	6	Checksum

Bibliography

[1] Space Track. Basic description of the two line element (tle) format, 2013.

Bibliography

[1] Hold for now before I used the bib file

Appendix 1 - MATLAB code

Thanks for Paul McKee who started this template. It seems to have good matlab code viwing