Project Deliverable 12

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Chosen Area: Space Industry

**Section 1 - Introduction and Current Problems**

Chosen Area

I am choosing the Space Industry. I do not work in this industry, but it is an area I have always been interested in. Specifically, I would like to build a database that assists with object and entity tacking of the objects in space. There is a real danger as we launch more into space that we may cause collisions with other objects and cause a chain reaction that causes us to lose access to space all together.

Data Management Problems

There are a few potential data management problems that affect this area. One big problem is having multiple data sources, especially from different companies with different regulating bodies over their space industries. This means verifying the quality and integrity of the data is very important. Another problem I see is keeping as close to live data as possible. This problem can be increased because of the first problem. If the data source is not meeting the standards and speed is desired, then bad data can happen.

Motivation

Having many sources of data can cause many redundant and incomplete databases. It can be difficult to gain a complete understanding of data when it is limited to begin with. Having one central database that has already vetted its sources and verified the data integrity are some of the leading motivations.

Potential Benefits

We would need to have a standard for verifying the data integrity and not having repeated redundant data in our central database. If we could do this, live and even predict the path of objects as they travel would be a main benefit in this. People would be able to trust our database. Over all the others.

Potential Users

The benefits lead right to the possible users. Other space agencies would be some of the main users. They could use it to make sure a predicted trajectory of a launch is safe and free of debris. Also, satellite operators could use it to assist in collision avoidance systems. As long as our data is free of redundancies, is accurate, and is trusted we could assist is almost every area of the space industry.

**Section 2 - Business Rules**

1. Objects
   1. Each Object needs to track details about it such as the name, type, mass, width, height, depth.
   2. An object has one and only one type, Original Launch, Orbit, Projected Reentry, and Launch Sites.
   3. An Object can be docked to none or many other objects.
2. Object Type
   1. This is meant to track many types of objects like rocket body, payload, launch vehicle, station part, or fragment.
   2. Each Object Type can belong to one or many objects.
3. Original Launch
   1. This is the original launch information, location, date, time, failure status.
   2. Each Launch can have one or many objects.
   3. Each Launch has one and only one launch site.
4. Orbit
   1. This is the current orbit of the object. This should track the Inclination, Periapsis, Apoapsis
   2. Each orbit belongs to only one object.
5. Launch Sites
   1. These are the ground-based locations for launches. It should track the name, latitude, longitude, altitude.
   2. Each launch site can have many Launches.
6. Projected Reentry
   1. This is the projected re-entry of an object. All objects obit decay and this is tracking that. This should track the Inclination, Periapsis, Apoapsis, date, time, projected latitude, projected longitude.
   2. Each entry has only one object
7. Docked Objects
   1. This is to track things like stations that are made of many objects with unique launch information. It needs to track all objects docked together
   2. A Docked object can have by definition 2 or many objects.

**Section 3 - Entity Relation Diagram**

A screenshot of a computer screen

Description automatically generated