

### **Summary of project**

NASA's Earth Data department is a subsection of NASA with a goal of enabling data discovery through public access of archives which hold collections of Earth observation data (NASA Earth Science Exhibit). As the program expands on its projects, the amount of data collected increases on the scale of hundreds of terabytes every day. Several new projects are currently in the process of development to improve the quality of data collection. One of these missions, NISAR, will be able to collect data in a manner sophisticated enough to detect differences in the Earth's environment to the scale of a centimeter. This project alone is expected to deliver around 80 terabytes of new data per day. In 2021, the NASA database held close to 40 petabytes (40 million gigabytes) of data with a projected collection of 245 petabytes (245 million gigabytes) of data by 2025.

The Cyber Crusaders will look at a small subset of data which includes surface temperature and wind velocity data. Our goal is to present this data for the state of New York in a presentable and easy to understand fashion so that educators who do not have experience with data analysis can create discussions with students. Data should be presented in such a way that users can draw their conclusions from the set of data such as where the best location to place renewable energy sources would be or what type of renewable energy should be used in a given area.

The website will be titled "Velocity of Air and Surface Temperature" or "V.A.S.T." for short. Our slogan is "Crusading Towards a more Renewable Future" as a way to match our Cyber Crusaders team name.

### **Users and stakeholders**

The primary users for V.A.S.T. are K-16 educators. Educators may or may not have experience with viewing data, therefore it is essential that our website be easy to navigate through the data presented. Typical use for the website by an educator may include downloading or displaying the data to targeted students. The data should be presented in a way that allows educators and their students to discuss the results of the data.

In addition to the primary user, several stakeholders will benefit in the implementation of V.A.S.T.. Students will have the ability to access the data through their educators as previously mentioned. Additionally, students may use the data for projects to explore the wind velocity and surface temperature as well as make an analysis on an extension of the topic. For example, a student may overlay different sets of data of a certain local area to compare the weather patterns in different years. The group plans to allow data to be downloaded as multiple data file types for increased ease of use.

Similarly, data interested civilians will also have the ability to make an analysis of the data shown. If the stakeholder is a data analyst who is more experienced with data, an example use of the website is using the data provided to make an informed suggestion to inexperienced users on energy decision making. This example can be extended to data analysts working with engineers to determine the type and scale of a power system when designing a new energy system.

The final major stakeholder for V.A.S.T. is NASA. The refined focus of the provided data to exclusively display wind velocity and surface temperature data for New York. NASA employees can draw conclusions about this specific area with greater ease. Additionally, if NASA runs education programs in the state of New York, NASA will have the same benefit as educators in New York in the sense of an increased ability to present topics on the provided data.

The Cyber Crusaders

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### **Summary of Technologies**

We will be using HTML and CSS for our front-end development. We will use Bootstrap for responsive designing and unique styling. We may also try to use React in replacement, or in parallel to Bootstrap in order to create a very well designed and visually appealing interface for the users. Our backend will consist of Node/Express to build and be the framework of our web apps and mobile apps. We will use JavaScript for our backend, we may add JavaScript frameworks in order to create a more appealing and advanced application. Our application's database will be built using MongoDB. MongoDB is very fast, reliable and scalable for a project like this. GitHub will be used as a method of version control. Discord will be used for communication among the group members. We will use a Microsoft Azure VM in order to host and make our application.

### **Functional vs Non Functional Requirements**

The first of our functional requirements is that our system must display temperature and wind speed data for New York. This data must be tailored such that various constraints can be applied, such as time or more specific location. Furthermore, the displayed data must be in a format that users can use to effectively make conclusions. Finally, in order to sustain continued growth of our application, users with different needs must have a way to submit feedback or ask questions.

As for our non-functional requirements, In order to continue supporting new data as it is collected, our site must have a way to pull data from Nasa's websites. A functioning API is also needed for users to effectively grab our data and make conclusions with it. Finally, we intend to extensively test our platform to ensure our application is safe and secure.

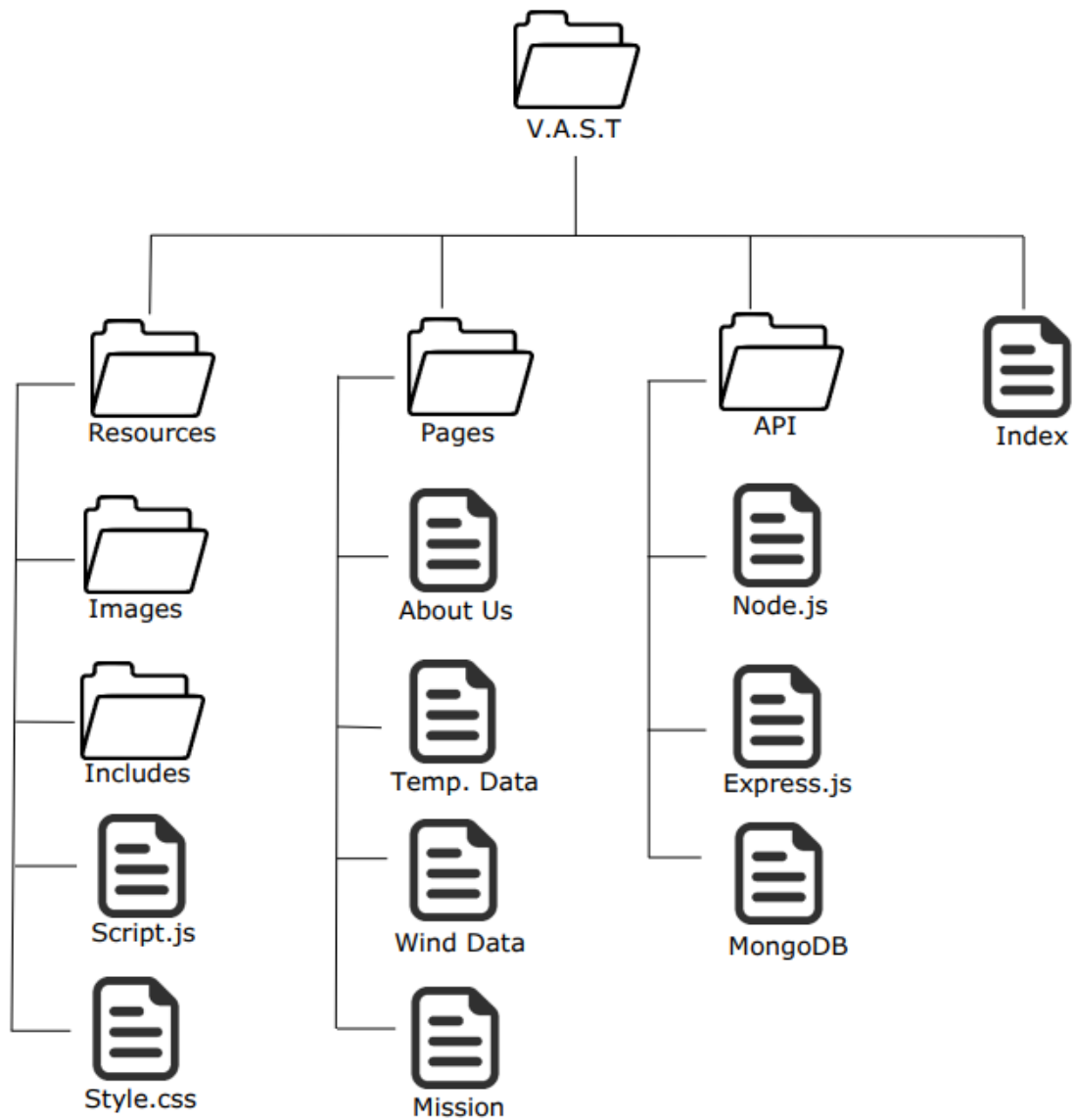
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### **Estimated project schedule (timeline / chart)**

We will begin with a front-end design based on the wireframe. We will begin with the HTML and CSS, and follow the wireframe. We expect to change the initial design of the application in order to better serve our users, this will be done through feedback we receive. We expect to be fully completed with our front-end by February 24. We expect to have our database system fully completed by March 17. Our API will be our next challenge, we expect to be completed with the API on March 31. We expect to have fully integrated our front-end with our backend (JavaScript and API) by April 14. Finally, we present our application to the stakeholders and users on April 25.

## Sitemap



## Wireframe Pages

