21037D

The design process in NASA's Aerospace engineering program

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Background on me and my team:

We are a team of 3: Me: Addison, Julia, and Noah. We are all in 7th grade and are doing VEX IQ for the first time this year. At CMS we are all in the STEM program and all have a love for science, engineering, programming, and challenges. This makes our approach to the design process a little different

On the Next few slides I will show you their design process in relation to ours.

The first step: Stakeholders Expectations and 2nd Step: Technical Requirements

"A "stakeholder" is a group or individual that is affected by or has a stake in the product or project. The key players for a project/product are called the key stakeholders. At the topmost level, the customer may be the person or organization that is purchasing the product. the customer may be the leader of the team that takes the element and integrates it into a larger assembly" Nasa makes sure to keep its Stakeholders in mind so that they know what needs to be done in order to continue on to actually start sketching out what materials might be needed, crews they might have to call in etc.

After consulting with the stakeholders NASA will rewrite the stakeholders wants and turn it into a definition of the problem. When the know the problem, the can start looking at what they might, any time constraints, communication, and different teams that will work one the project.

How our first steps relate to theirs

Our Teams VEX design process for these steps look very similar, in our team we looked at what our challenge overview and what needs to happen. In Vex, the "stakeholder" is the challenge and while we build we constantly check in with the challenge and make sure what we are doing matches that. Our step 2 also involves actually defining the problem and doing almost a brain dump where we start thinking of what motions our robot might do or what parts we might need, and we get all of that down on paper.

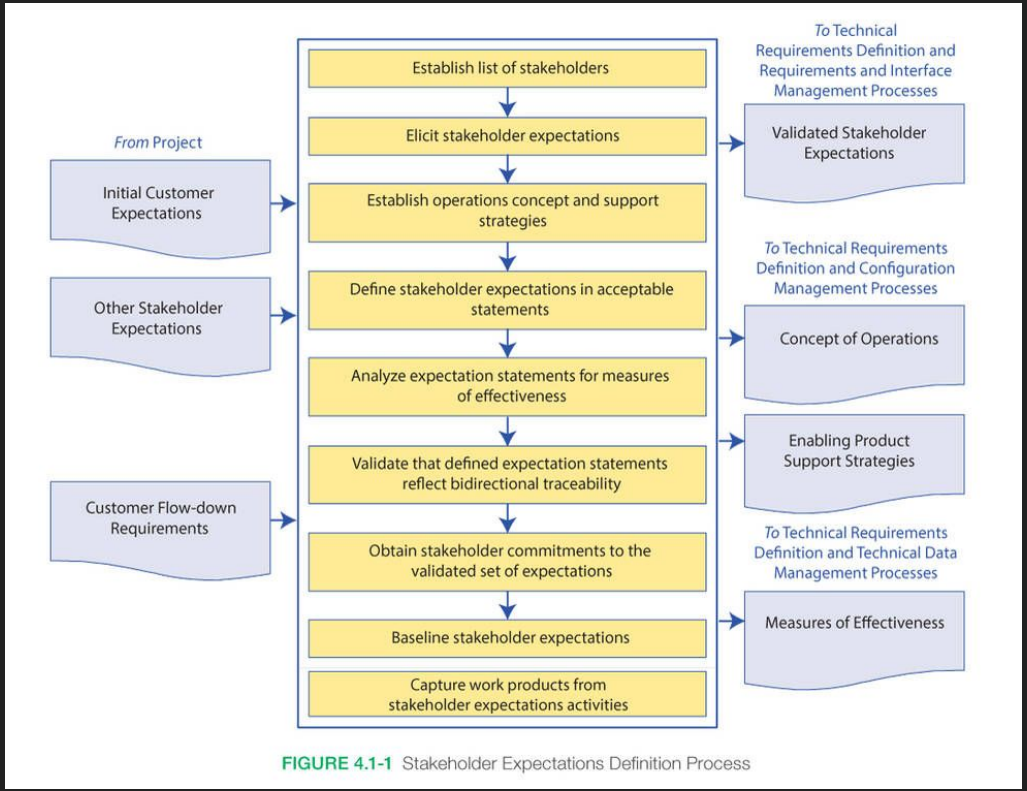

FIGURE 4.1-1 Stakeholder Expectations Definition Process

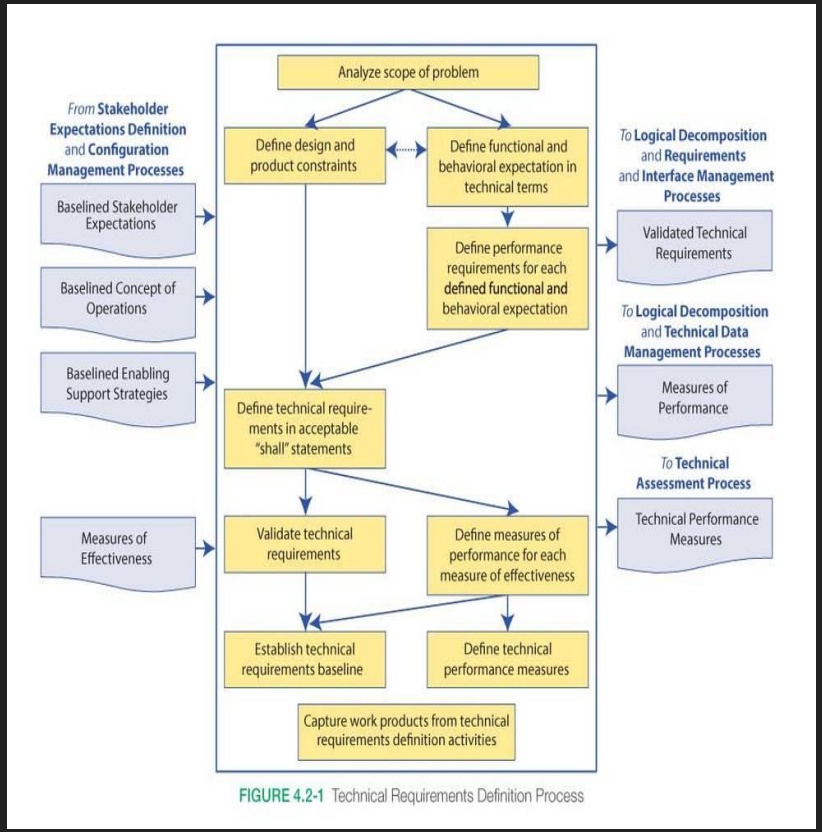

FIGURE 4.2-1 Technical Requirements Definition Process

An image to help you visualize NASA's process better.

Steps 3 and 4 Logical decomposition and Design solution definition.

This is the step where NASA engineers breakdown each step and logic through everything, this is where they take their big brain dump and break it down into smaller and more detailed Ideas, from this step is where we head into designing the final design.

Their final design process before building and testing is taking all the past steps ideas and turning them into the first final design and the one that will be put into action. This is where they go this is what we are going to try and how we will try it.

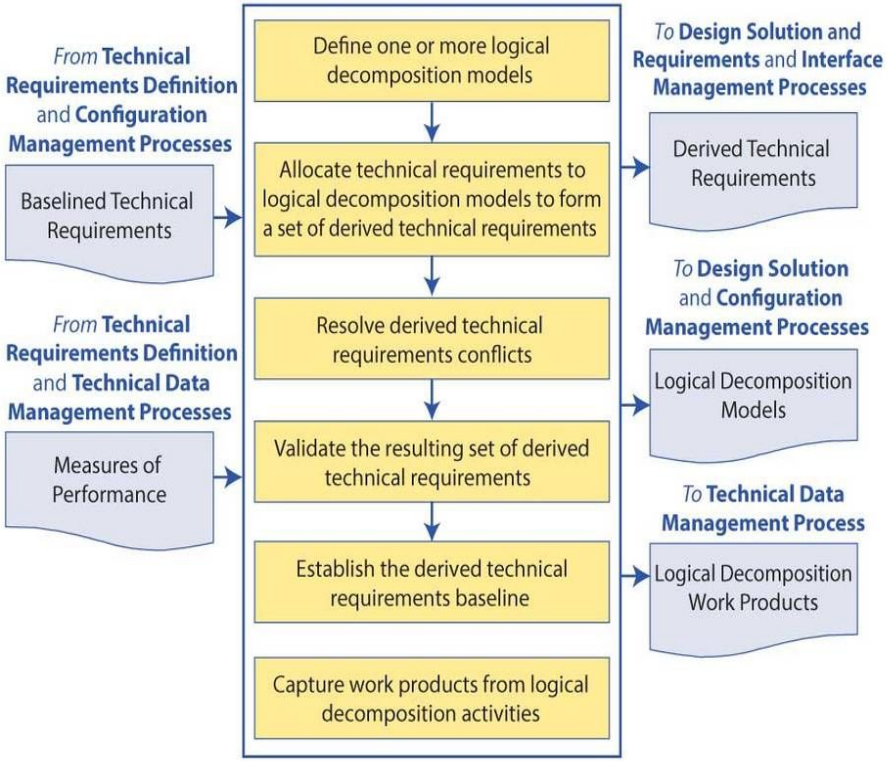

FIGURE 4.3-1 Logical Decomposition Process

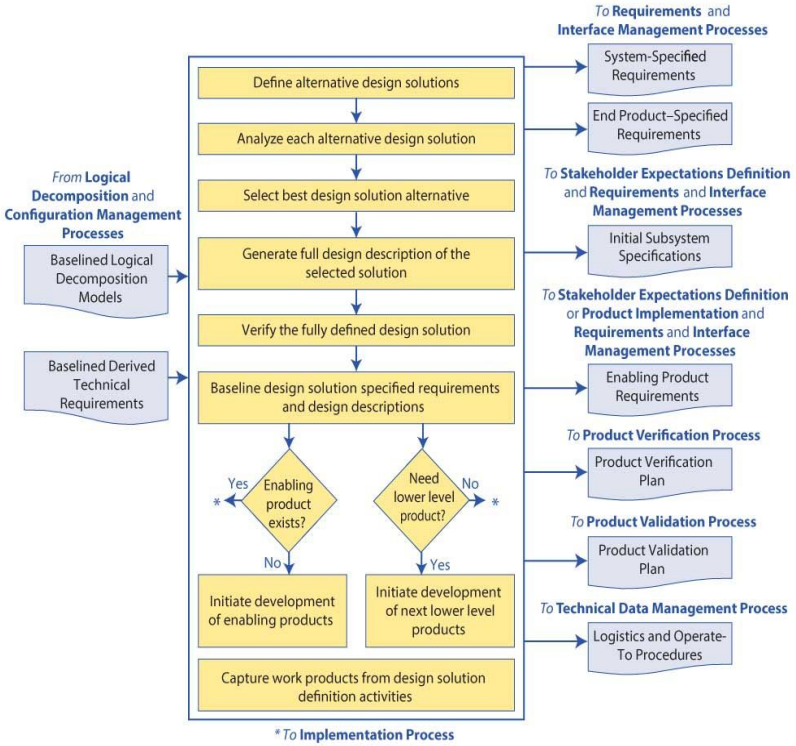

FIGURE 4.4-1 Design Solution Definition Process

More images for the last 2 steps.

How we relate the last pre-building steps to ours.

We also take time albeit quickly to logic through the designs that we want by thinking how fast we can get things done, how sturdy things will be, and where everything will go and how it will affect our structural integrity and how everything else will fall into place. After we have used logic to think through everything we go back to paper and sketch our final design that will be set into motion and make our robot and then, probably fail and have to go back to square one and so on and so forth for each part.

Why I chose this career and how VEX prepares me for this career

I chose this career because it as always seemed interesting to study space which is something that is still a huge mystery to mankind, n imagine being able to be the first person to discover something that has never been known to exist except for in theories. And then being apart of engineering something that proves that and then have people build things that go to different plan. Vex definitely prepares me for putting theory into practice. The vex challenges is not only our stakeholders, but our theory that we need to design and build something that goes along with it. It also prepare me for problem solving, teamwork, leadership, learning how to deal with things that don't go as planned, and so so much more.

Citations:

4.0 System Design Processes Written by:Garrett Shea, NASA Official: Brian Dunbar Used on Slide 3 and 4 (https://www.nasa.gov/seh/4-design-process)

Background images taken of google images.

Images taken from the same NASA article.