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2023

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TEAM MEMBERS:

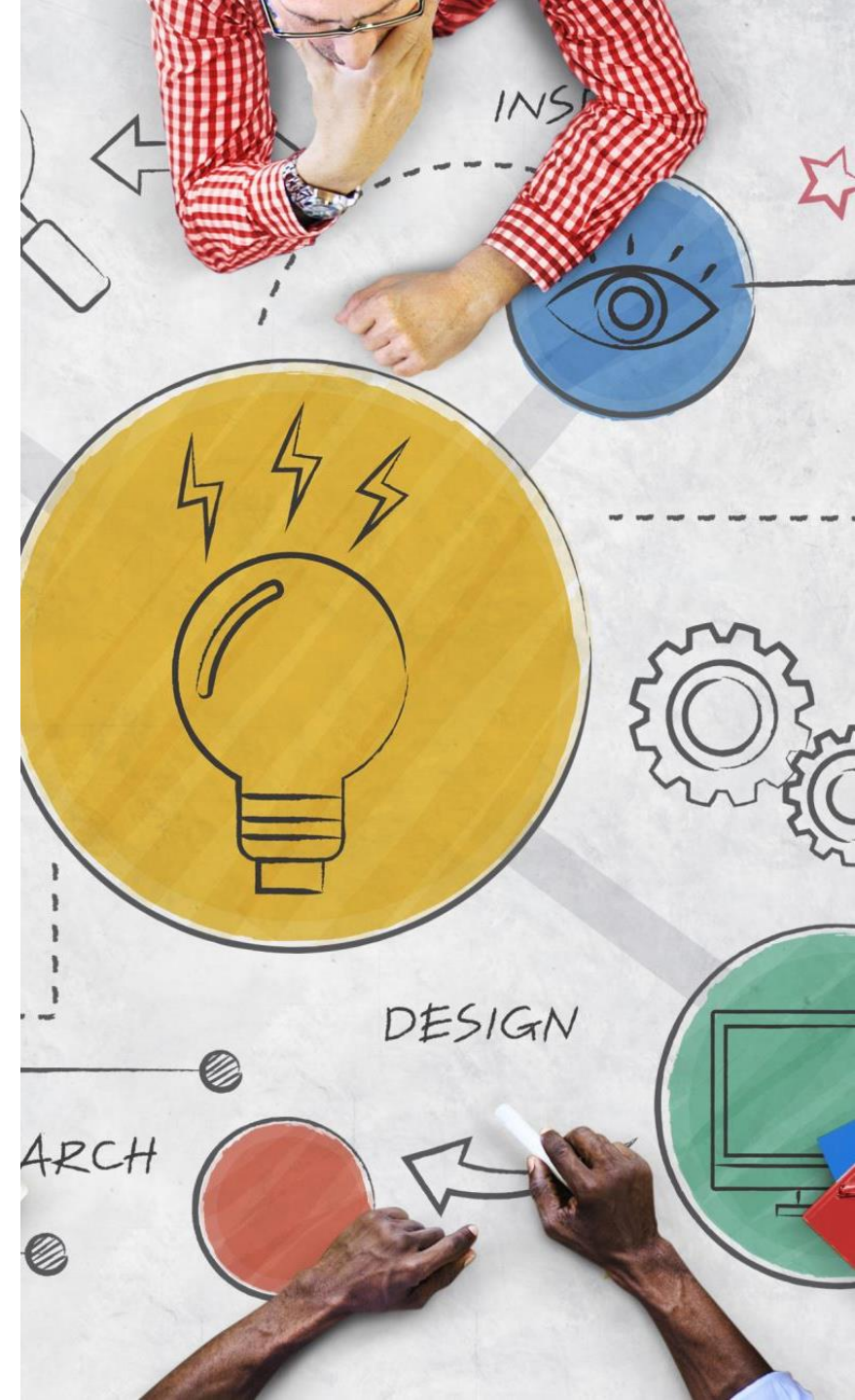
LANDON

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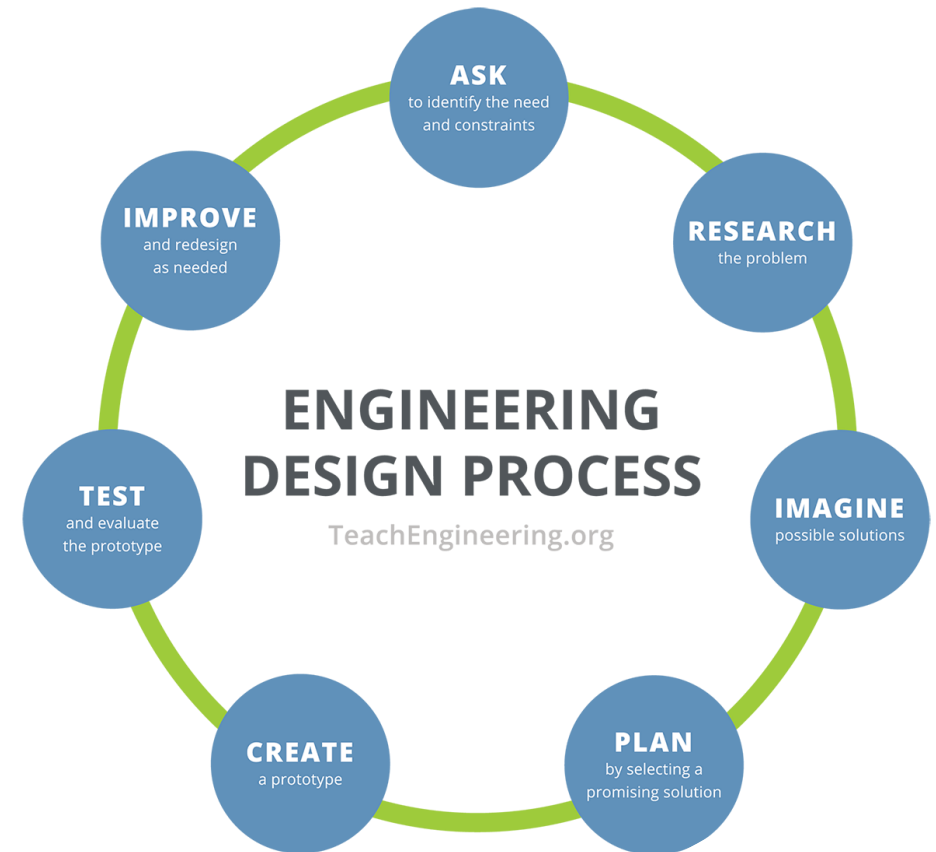
MAX

OKLAHOMA CITY,  
OKLAHOMA



# AEROSPACE ENGINEERING DESIGN PROCESS

Aerospace engineering is one of many careers that use the engineering design process. It also uses a 3-stage design process that would fall into the design category of the engineering design process. We chose this career because it is instrumental to travel, military, and government uses over the world, and we think it's a big example of how STEM careers use the design process. We can find many examples for how aerospace engineers use the design process.



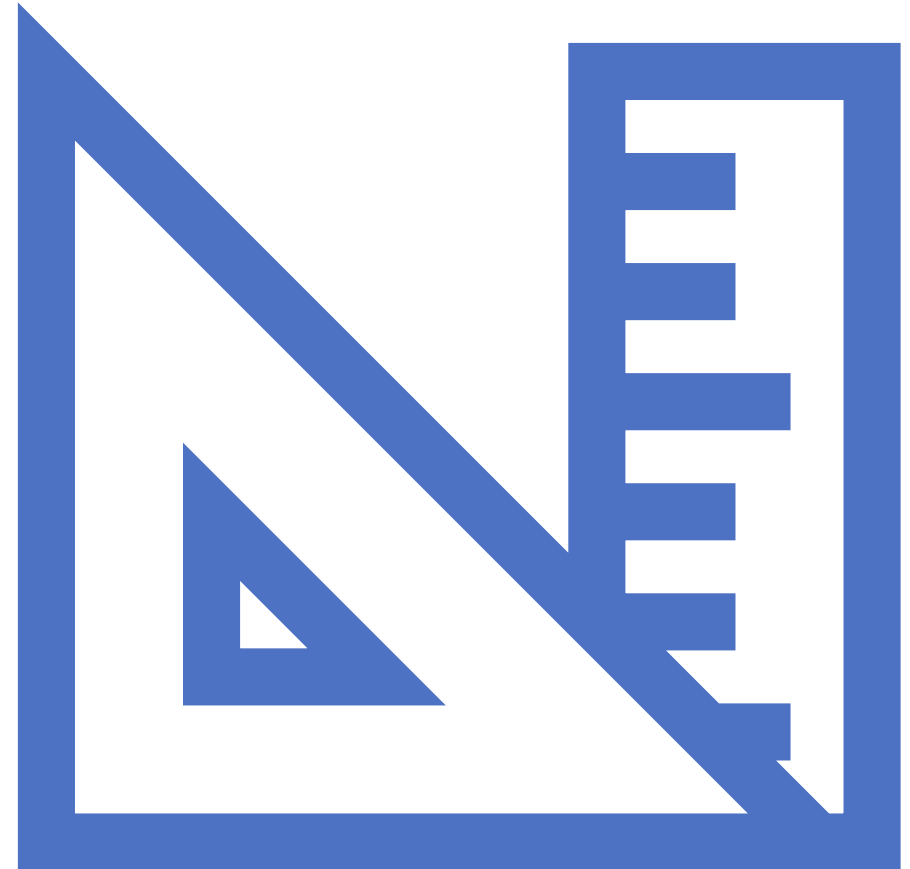
# CONCEPTUAL DESIGN

The three stages of the design process in aircraft design are conceptual design, preliminary design, and detail design. The first step, conceptual design, first begins with sketches are created of aircraft that would fit the dimensions necessary. The designers need to sketch and design an aircraft that would fit its requirements and make it optimal for its job in the air. They ask what the aircraft needs to do and they create parameters around those jobs. They must consider things like its aerodynamics and performance. They can also research or use designs of other aircraft for ideas and inspiration. This ties into the next step of the engineering design process, imagining solutions. They can use the solutions they researched or create entirely new ones. This wraps up the conceptual design.



# PRELIMINARY DESIGN

In the preliminary design stage, the designers must optimize the design to fit the necessary criteria. This stage uses the plan stage of the design process and start to select a solution. They can use existing designs and test them to see what they would expect with their solution. Structural and control tests are done to look for problems that would affect the aircraft performance.



# DETAIL DESIGN

- In this stage, designers and engineers must use solutions they have created or designs that exist already to create their complete design. This design must be extremely specific and must provide complete details of many parts of the aircraft. They create, test, and improve the design to ensure it will excel in the air. All aspects of the aircraft are tested thoroughly. They likely put their solution design through simulators to perfect the design.





# SUMMARY

- Even though some phases of the complete stages of the engineering design process more than others, all three stages of the aircraft design process use the engineering design process. They ask, research, plan, create, test, improve, and repeat over and over. This is just a small sample of how jobs use the engineering design process. It is vital in making sure that things we create work well and to make sure they are safe for everyone. After completing this document, we gained a whole different perspective of our own design process. We realized that our process could've been improved greatly. We often let our tiredness get to us and we often settle for a solution that is "good enough." Those problems we neglected to solve has come back to affect us in competition. We now know that we should take the time to carefully test and improve every aspect of our robot. Robotics has taught us many things. We never would've imagined how much we could come to learn and love from robotics. It taught us the importance of problem solving and teamwork. We are ready to use these skills anytime in our future or our future careers.



# SOURCES

**"The Three Stages of Aircraft Design," (2017, February 16)**

**Retrieved from** <https://monroeaerospace.com/blog/the-three-stages-of-aircraft-design/>