Shaft Design [MEMS1029 HW1-3]

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Problem Statement

In this exercise, I walked through the conponent selecting, demension designing, assemblying, and drawing creating. What's more, I used this time to become familiar of onShape -- the recomended online CAD tools.

What's more, as the description of this assignment said:

> "You may find an easier time locating commercially-available components if you scale back to a smaller size and loads than the text typically uses."

- I simplified this by requiring the smallest diameter on whole shaft body should be larger than 20mm. And then, I put more efforts on the compoment selection and geometry designing, including the key slot.

> The wedsite for downloading the components' Free CAD: https://b2b.partcommunity.com/3d-cad-models/sso?cwid=5594
>
> All of my commerical components are downloaded from here.

- To better simulate the real-world shaft, I combined both of the modeul gear and sprocket. For instance, gears will recieve the power from another/external power source, while the power will be transmit onto a belt by sprockets for robots motion.

> The difference was clearly being stated on (by the following link): In general, a gear is a toothed wheel designed to mesh with other gears and transmit movement to them, which in turn can cause movement elsewhere. A sprocket, conversely, is a toothed wheel designed to engage and directly move a flexible indented or perforated item, like a chain or belt.
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> refer to: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjioaK2itL1AhV9kmoFHV8xBY8QFnoECBEQAw&url=https%3A%2F%2Fwww.infobloom.com%2Fwhat-is-the-difference-between-a-sprocket-and-a-gear.htm&usg=AOvVaw25Xay5WHKXrOqzwEnDe7cD

- What's more, I found the module gear do not have the key slot for locating. Hence, I use collar+key for the sprocket feasten, and only collar for the gear. I do not know wether it is allowable. But as there are so many commercial gears without key-design, it must have its reason.

- In terms of the shaft body length, I mainly follow my intuition. My rule is adding at least 30 mm to each section and round them to the upper nearest tens' multiple.

Here is my Output in 3D view