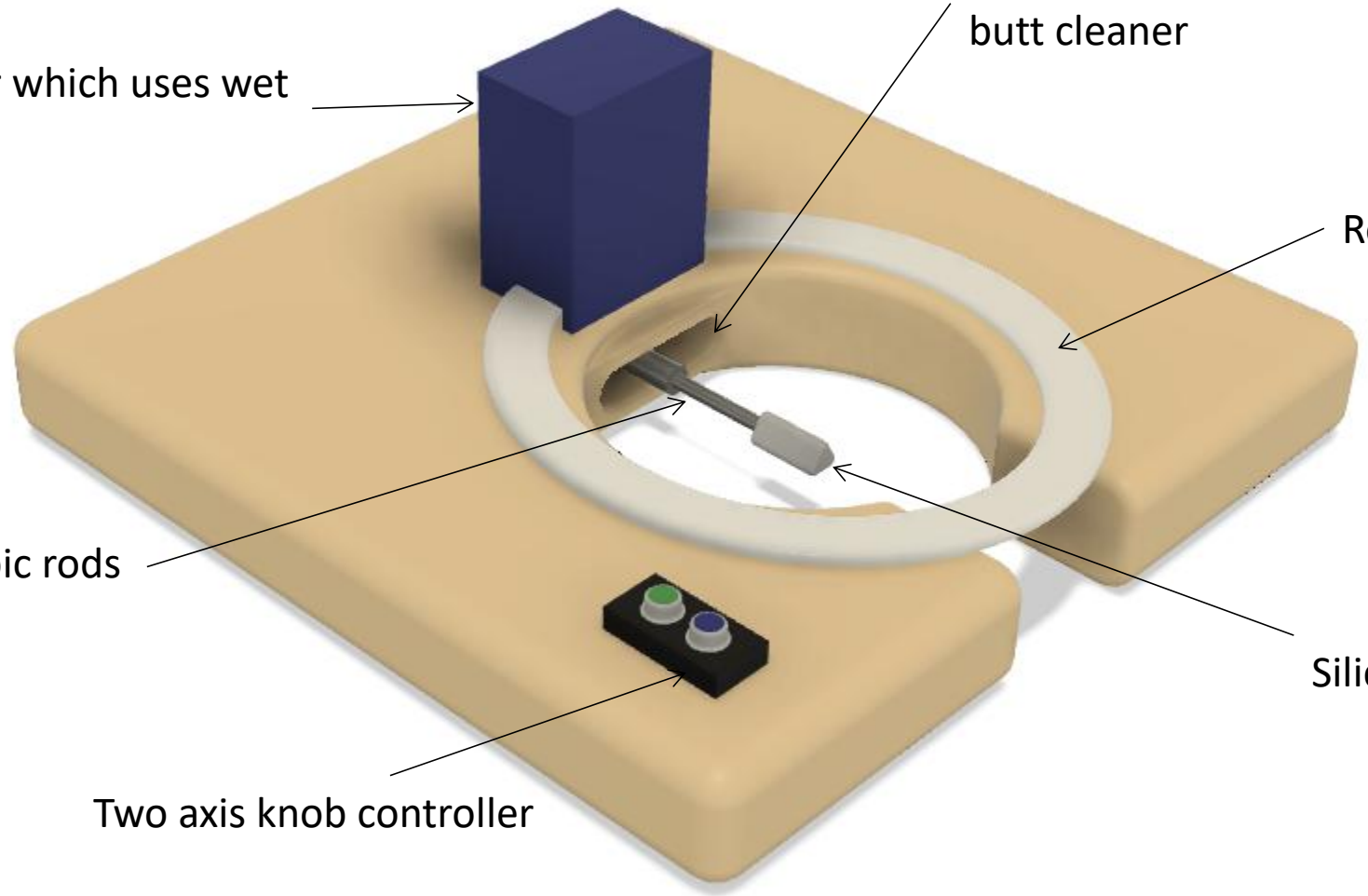
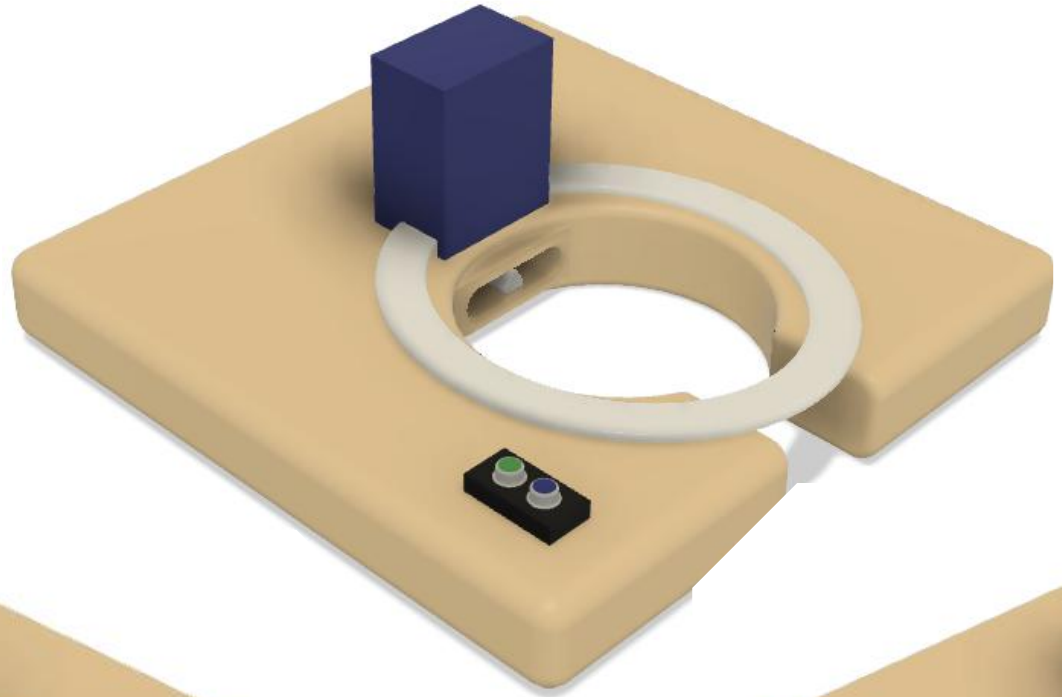
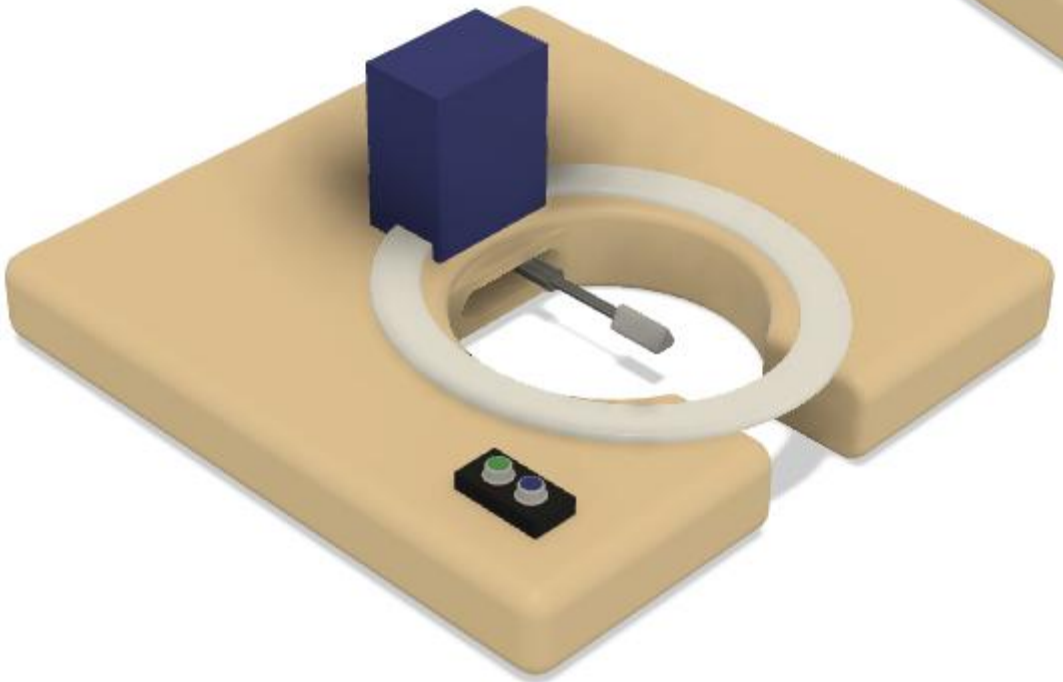
Automatic Seat

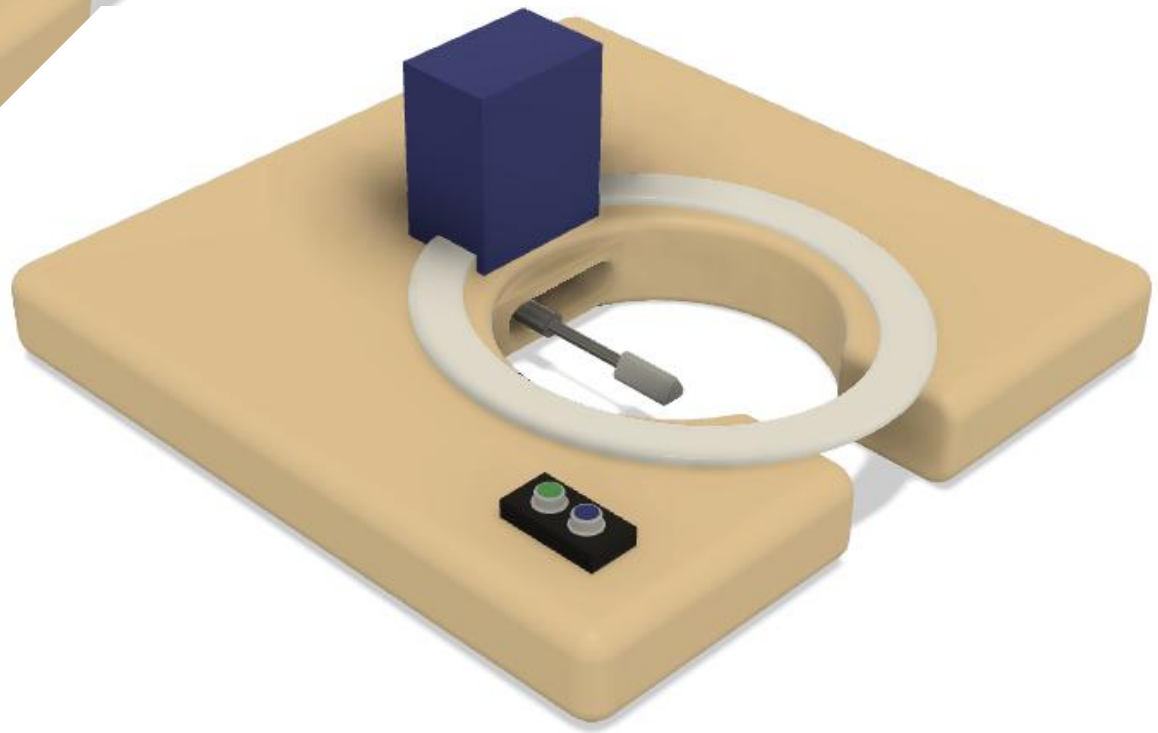


Rest Position- The silicon cleaner stays in the area provided to it.



It has two axis movement, first one is sliding left and rigth the slot and the second one moving back and forth

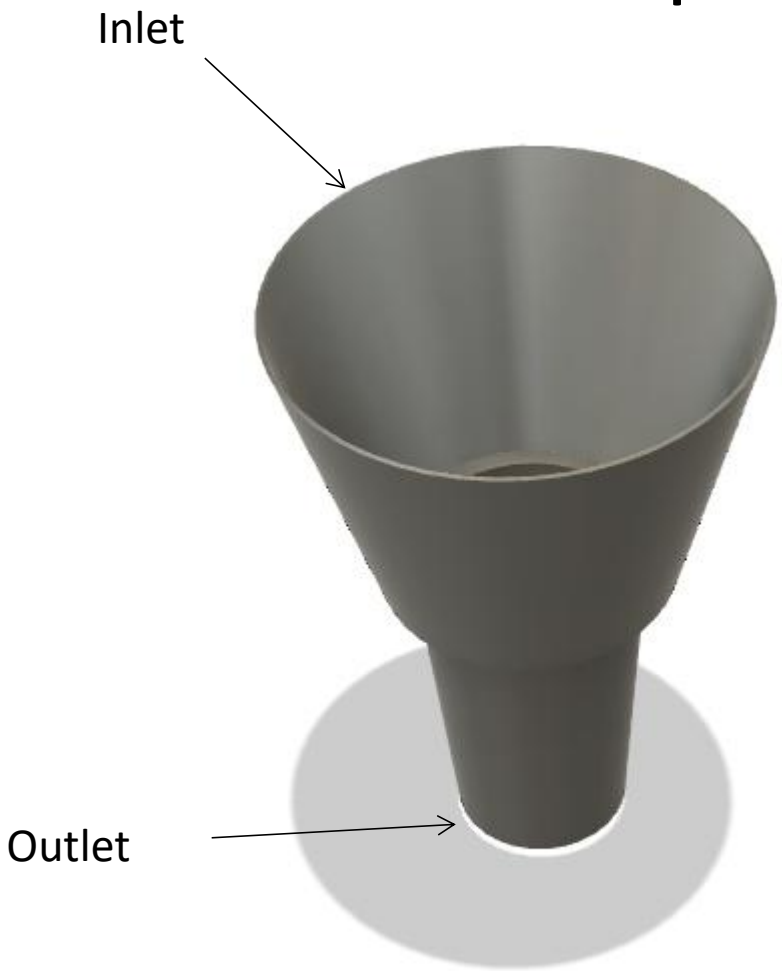




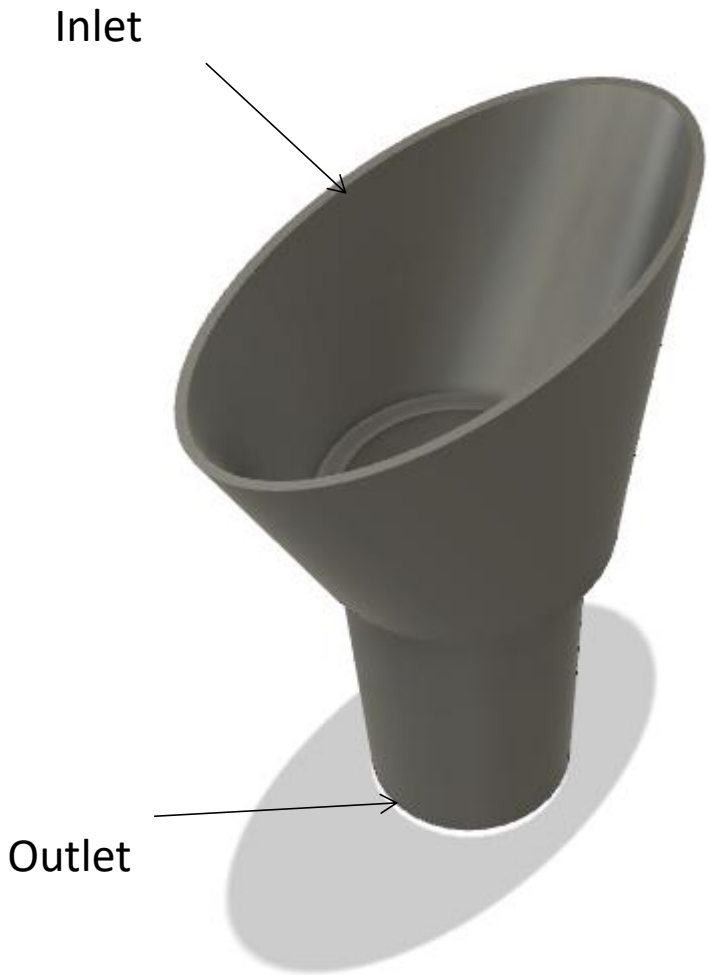
Cleaning Position 1- The telescopic rod expands and moves in forward direction and the whole mechanism moves on right side. It is controlled using the green and blue knobs

Cleaning Position 2- The telescopic rod moves towards left side and the assembly moves on right side. It is controlled using green and blue knob.

Unique Funnel Design with Long Outlet

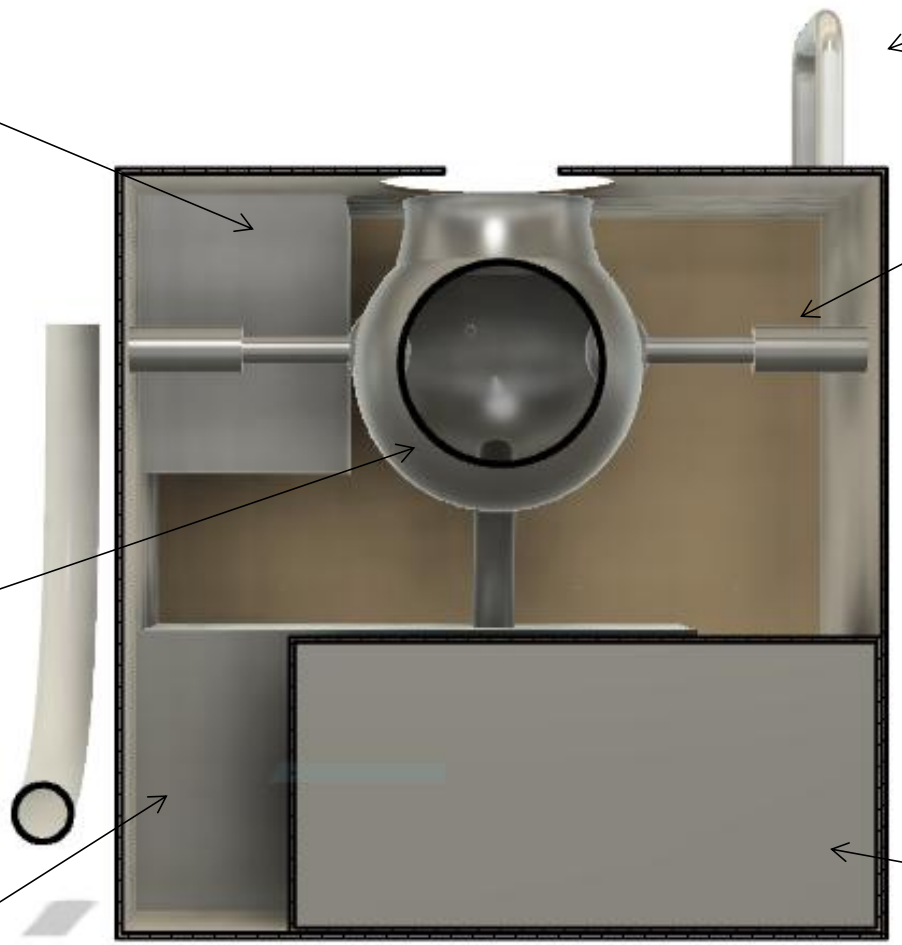


For Male Astrounouts



For Female Astrounouts

Sectional View



Handle for self restrain

Water Tank

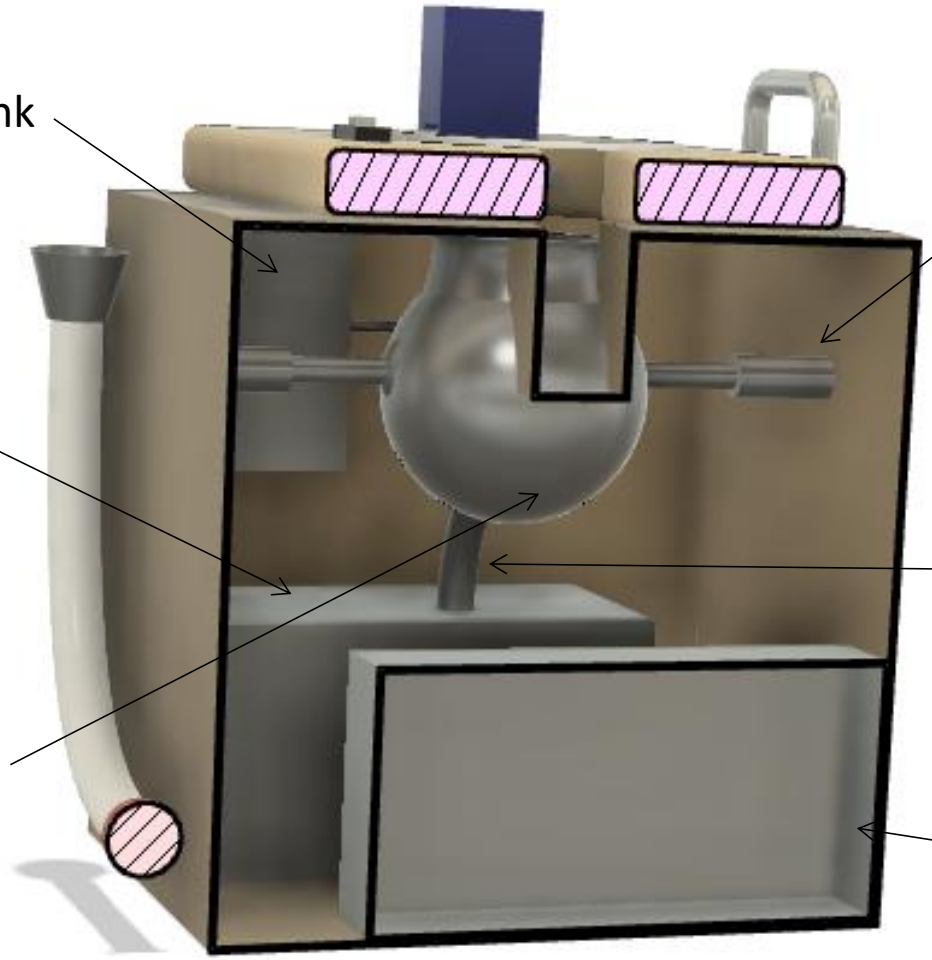
Telescopic Piston used for rocking the bowel back and forth

Feces Collector Bowel (First Stage)

Urine Storage Tank

Feces Stroage Tank (Second Stage)

3D Sectional View



Water Tank

Telescopic Piston- It is conneted to the surface of the bowel and moves it back and forth.

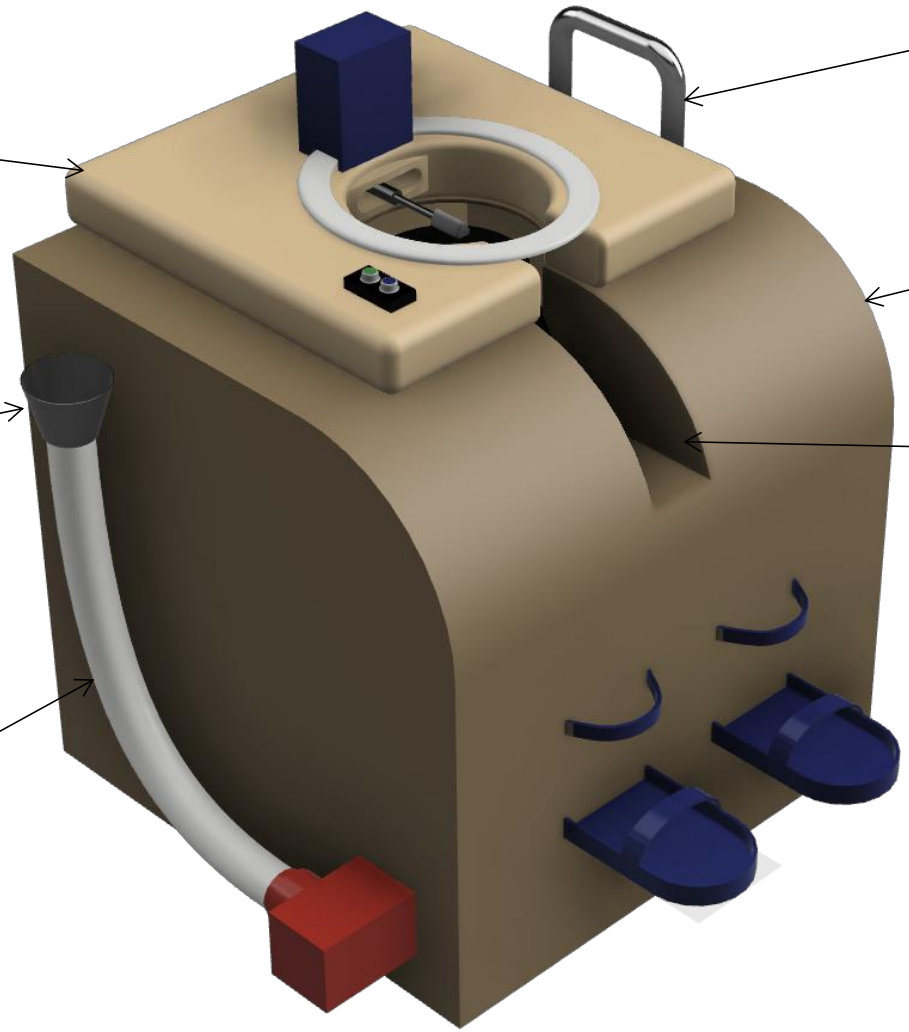
Feces Storage Container (Second Stage)- This is container can withstand very high pressures.

Fexible Pipe for feces transfer

Feces Collector Bowl (First Stage)- Vaccum is created in this bowl which will help the feces to drop in bowl. The inlet is closed and the water along with feces is mixed, which helps the inner of bowl to be clean. The oulet is opened and all the waste is transfered into another container.

Urine Storage Container

Fully Assembled Model



Seat Mount

Self Restrain Handle

Outer Body

Detechable
Funnel

Slot for easy use of
urine pipe

Foot Restarin

Urine Collector Pipe

Title

Automatic self-cleaning Loo

Short description

Our main objective is to provide a hygienic system for fecal matter collection and use of telescopic rod for butt cleaning

Lunar toilet description: Please describe your lunar toilet design. How does it work? Why will it work in both "zero-gravity" and lunar gravity?

Key features

- Suction mechanism for solid waste collect and urine collection
- Unique rocking bowl that can collect solid waste of more than 500 g at a time
- Detachable funnel for urine collection – round shape for male astronauts and elliptical shape for female astronauts
- Hand and foot restraints considering ergonomics
- Telescopic rod arrangement for automatic cleaning
- Automatic rotating seat cleaning system

Urine Collection System

- Detachable funnels ensure that anyone using, can simply remove it and keep it in a box fitted near the urine collection tank
- The urine pipe is attached to the seat itself
- The urine is collected into an airtight container because storing urine otherwise could cause infection to crew members due to possible explosion of collected urine and generation of gas and particulates

Fecal matter collection system

- By considering all the factors in zero gravity and lunar gravity, we decided to use a suction mechanism for solid waste collection coupled with a rocking bowl design
- The solid waste is collected in the rocking bowl which has one inlet and one outlet

- Once it is collected in the bowl the inlet of bowl is closed and water is sprayed through nozzles provided on the side walls
- Telescopic pistons help clean up the side walls and bottom
- Through the outlet, the solid waste along with the water gets sucked using a vacuum suction and stored in a secondary container
- To ensure astronauts can clean themselves after pooping, we designed a telescopic rod which has a long triangular silicon attached to its end
- A wet wipe is attached to this triangular silicon and the whole telescopic rod goes back and forth resulting in automatic cleaning

Safety: Please describe how your lunar toilet design will protect the astronauts' safety.

Unique detachable funnel design for male and female astronauts

- Proper urine collection by considering hygiene is the main challenge that astronauts are facing especially in space
- The solution that we found for this problem are unique and personalized funnel designs for both male and female astronauts
- We designed a simple round shaped funnel for male astronauts and a special elliptical shaped funnel for female astronauts
- The long outlet of funnel helps to keep the end of the pipe urine free, thus maintaining hygiene

Rotating seat cleaning system

- To avoiding seat infection after pooping, we have created a system where the seat is rotated through a biodegradable paper roll for one rotation after every use
- The idea is to give every user a new, fresh and clean seat

Telescopic rod for butt cleaning

- A telescopic rod was designed so that astronauts can clean themselves after pooping
- A triangular silicon is attached at the other end of the rod
- The biodegradable wet wipes are attached to silicon end so that it is easy to complete the cleaning without any kind of infection
- The rod is provided with back-and-forth motion so that cleaning can be done properly

- A system is created to get the new fresh wipe on the rod when the next astronaut will use it

Foot and hand restraints

- In low gravity it is not possible to sit or use the toilet without restraints because the astronaut might float off
- Foot restraints have been added which are easy to lock and unlock
- To balance, hand supports are on both sides, which also have a rubber belt that can lock at one end to keep your hands secure

Automatic collection of waste using suction

- It is not possible to use water to clean urine or the fecal matter collection system in low gravity
- There must be no possibility that any solid waste will come out from the system which is very important while considering the safety of astronauts
- We used a vacuum suction mechanism for both

Rocking bowl with telescopic piston

- Right now, astronauts are using polythene bags for collection of solid waste, where there is high possibility of contamination and possible infection/disease
- To avoid this, we designed a rocking bowl which is collecting more than 500 g for fecal matter and delivering it to the next container by using suction mechanism
- The rocking bowl has a piston arrangement attached to it so that feces does not stick to the walls of the bowl