

Morph Chart

Primary principle for feature selection: **Simplicity - easy to design, build and operate.**

Secondary principle: **Powerful and large enough to collect and move 5kg of regolith in four minutes.**

Function / Feature	Option 1	Option 2	Option 3	Option 4
Body Material	Plywood	Aluminum Sheet	Fiberglass	Carbon Fiber
Fabrication Method (subsystem of material)	Nuts & Bolts	Glue (Titebond or JB Weld)	Screws	
Power Source	Batteries	Fuel Cell	Solar Panels	Internal combustion
Battery Type (Power source subsystem)	Li-po	Lead-Acid	Ni-Cad	
Voltage (Battery subsystem)	24v	12v	9v	5v
Propulsion (power source subsystem)	DC Electric Motors (Direct Drive)	DC Electric Motors (Indirect Drive)		
Movement	Wheels (Four-Wheel Drive)	Wheels (Two-Wheel Drive)	Tracks	
Steering	Differential steering	Two moveable wheels	Four moveable wheels	
Control Method (Microprocessor)	Arduino	Raspberry Pi	STMicroelectronics NUCLEO-F401RE	
Control Method (Communication)	Radio Control 2.4 GH RC transmitter and receiver	Bluetooth	Wi-Fi	Autonomous
Regolith Collection	Scoop	Horizontal sweeping roller	Vacuum System	Rotating Drum with scoops
Scoop Actuator (Regolith Collection sub-system)	Linear actuator	Servo	Pneumatic/Hydraulic	
Regolith Dispatching System	Gravity fed with gravity opened gate.	"Dump-Truck" – tipping tray.		
Gate Actuator (Regolith Dispatching sub-system)	Solenoid	Linear actuator	Servo	