Atomic Aggies

GROUP OVERVIEW

David Moreno

College of Engineering Mechanical and Aerospace

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New Mexico State University

Who are the Atomic Aggies?

The Atomic Aggies is New Mexico State University's Rocketry team

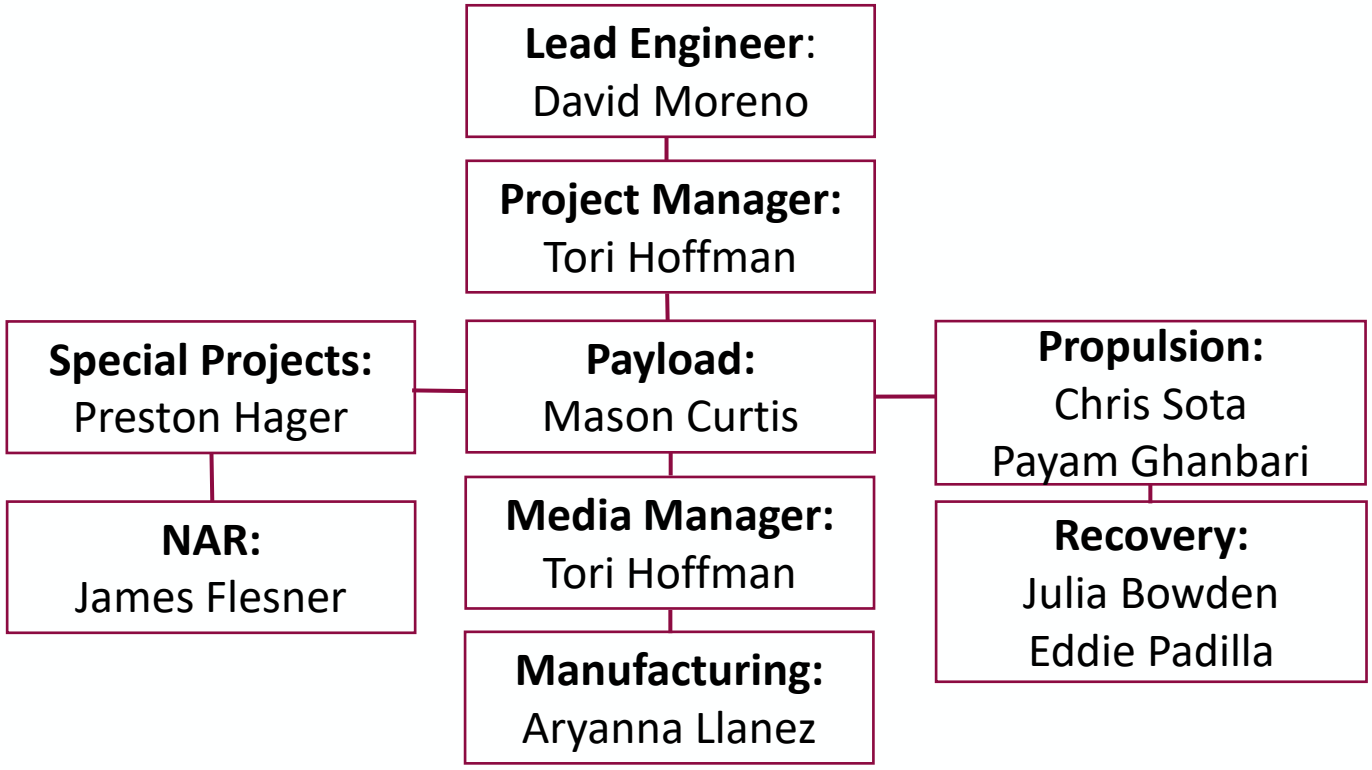
Annually we have 40+ members participating.
A combination of engineering and non-engineering majors

Spaceport America Cup

- World's largest intercollegiate rocket competition
  - 150+ teams with over 5,000 students attend
- Hosted at Spaceport America
- Results from last year:
  - 4th place in our category: 10k – COTS
  - 9th place overall (top ten in the world)
  - 2022 CHILE CUP WINNERS

Spaceport America Cup

Team Structure



Demographics

	Undergraduate (Freshman & Sophomore)	Undergraduate (Junior & Senior)	Graduate
Mechanical Engineering	12	42	-
Aerospace Engineering	8	29	1
Electrical Engineering	3	5	-
Other	2	4	1

- 33% of the leads are females

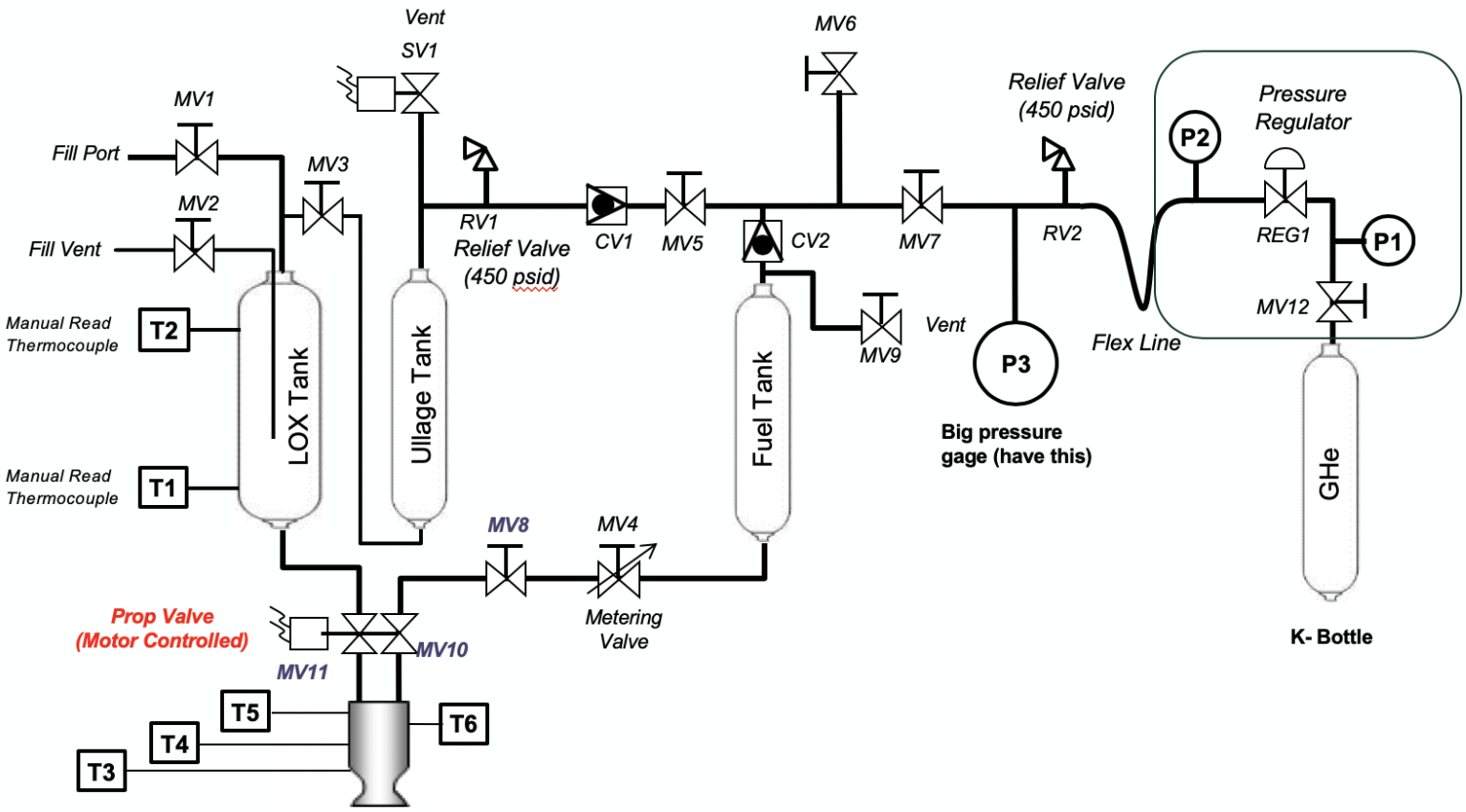
Funding

- This year the Atomic Aggies had a total budget of $13,756 that we used to design and construct the competition rocket for the 2023 Spaceport America Cup. The name of the rocket for this year's competition is Rising Phoenix. Funds were gathered from a variety of different sources to include grants, donations, and funds that existed from the previous year's team.
- New Mexico Space Grant Consortium Student Competition Grant: $5,000
- NMSU MAE Academy Alumni: $3,000
- Virgin Galactic Unite Grant: $2,500
- Residual funding left over from 2021 Spaceport America Cup funds: $4200
- Individual donations from community members and alumni: $2700

Sub-team overview

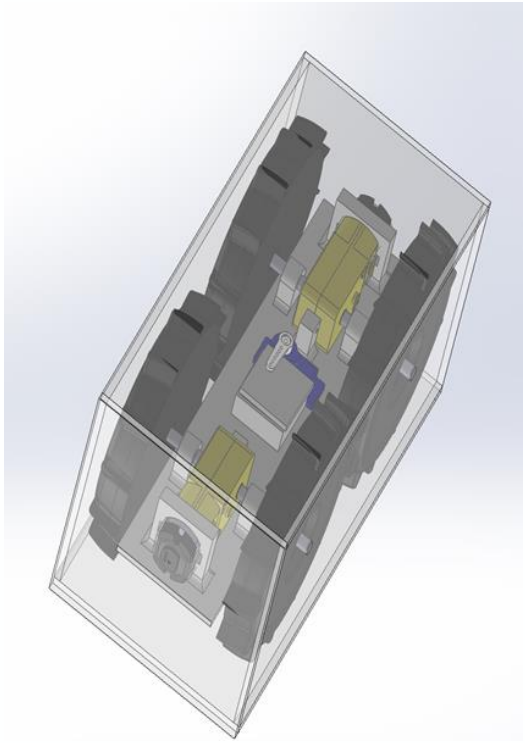
Propulsion

- Developing liquid bi-propellant rocket engine.
- Produces 225 lbf of thrust and will be run for 15 seconds.
- Propellants will be fed by a pressure blowdown system.
- The nozzle throat will feature a regenerative cooling system.
- This motor will be used in the 2024 Spaceport America Cup.


Vent
SV1
MV6
Relief Valve
(450 psid)
Pressure
Regulator
P2
MV1
Fill Port
MV3
MV2
Fill Vent
RV1
Relief Valve
(450 psid)
CV1
MV5
CV2
MV7
RV2
REG1
P1
MV12
Manual Read
Thermocouple
T2
LOX Tank
Ullage Tank
Fuel Tank
MV9
Vent
P3
Flex Line
Big pressure
gage (have this)
Manual Read
Thermocouple
T1
MV8
MV4
GHe
Prop Valve
(Motor Controlled)
MV11
MV10
Metering
Valve
K- Bottle
T5
T6
T4
T3

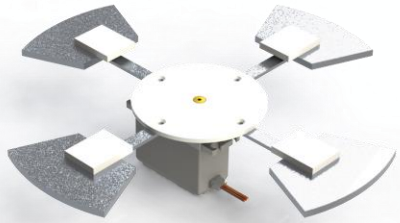
Payload

- Programmed Rover to dispense Green Chile Seeds in the New Mexico Desert
  - UV, temperature, gas, and pressure sensor
  - Predicts survivability of planted seeds
- 3D PLA printed sled
- 3D printed TPU wheels
- Acrylic chemically welded CubeSat body
- Rotational bearing system for housing in rocket



Special Projects

- Innovating Airbrakes to reach a specific target apogee
- Last year's design placed us in 6th place for closest to predicted apogee
- This year’s design improves on last years including more metal parts, lighter overall mass, and more dynamic code



Manufacturing

- Responsible for manufacturing and assembling entire airframe, fins and nosecone
- Works with composites materials, with a focus on carbon fiber and fiber glass
- All components of the rocket are made in house, apart from the rocket engine (at least for now)

National Association of Rocketry

- Our NAR team certifies over 20 members a year
- Over 100 members having been certified since the start of the Atomic Aggies
- Each member learns basic rocketry knowledge and has fun in the process.

Recovery

- Responsible for the safe and successful recovery of our rocket by use of parachutes.
- Main Ejection System
  - Fiberglass Electronics bay
  - RRC3 Altimeters
  - 45g CO_2 Ejection Charges
- Nose Cone Ejection System
  - 3D printed Electronics bay
  - RRC3 Altimeters
  - 30- 35g CO_2 Ejection Charges
  - Separate Parachute 32" Deploys at 300 feet
- Drogue and Main parachute
  - Main 120" Deploys at 1500 Feet
  - Drogue 32" Deploys at Apogee

Thank you

Questions?