ASTG

AVES 02

Team Name	Aerospace Team Graz
Rocket Name	AVES
Category	S3 (3 km solid SRAD)
University	Technical University Graz
Country	Austria
Team ID	02

Introduction and Mission Goals

The Aerospace Team Graz was founded in late 2019 and consists of about 65 students from a variety of fields of study. Despite being the second project, **AVES** will be the first rocket designed and built by the team to be launched.

The main **mission goals** are to successfully launch our rocket, reach the target apogee of 3 km as accurate as possible and to safely land and recover AVES. Additionally, this mission and the competition itself will help the team members to gain experience, to expand their knowledge and to make new friends and colleagues from all over Europe.

Features & Highlights

SRAD
- Flight Computer
- Operating System
- Solid Rocket Motor
- Air-brake
- 360° Camera
- CanSats (Schools)

Hard Facts

- Diameter 123 mm
- Mass 24 kg
- max. velocity Mach 0.9
- max. acc. 10 g
- Length 2690 mm
- total impulse 7100 Ns
- burn time 3 sec

Avionics Subsystem

Student Researched And Developed (SRAD):

Flight-computer, Real Time Operating System (RTOS), Realtime Air-brake Control System in Cruise Phase, Telemetry System, Ground Station Software for realtime visualization

COTS flight-computer: redundant Recovery deployment

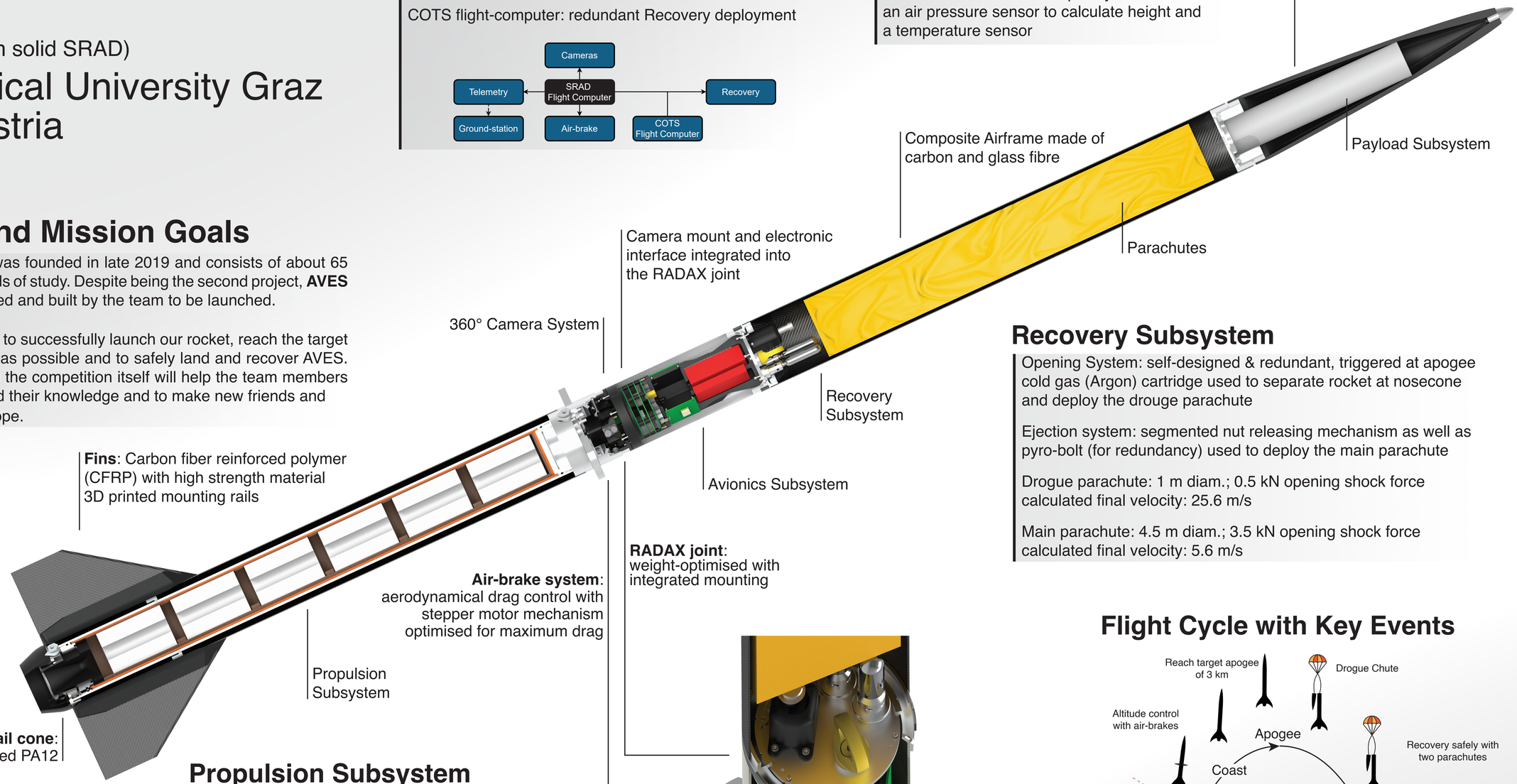
Payload Subsystem

3x CanSats: 345 mm length and 66 mm diam.

outsourced to projects by students:

HTL Neufelden school: Flight Computer with air pressure, vertical acceleration and temperature measurements

HTL Pinkafeld school: Raspberry Pi Pico with an air pressure sensor to calculate height and a temperature sensor



Recovery Subsystem

Opening System: self-designed & redundant, triggered at apogee cold gas (Argon) cartridge used to separate rocket at nosecone and deploy the drouge parachute

Ejection system: segmented nut releasing mechanism as well as pyro-bolt (for redundancy) used to deploy the main parachute

Drogue parachute: 1 m diam.; 0.5 kN opening shock force calculated final velocity: 25.6 m/s

Main parachute: 4.5 m diam.; 3.5 kN opening shock force calculated final velocity: 5.6 m/s

Propulsion Subsystem

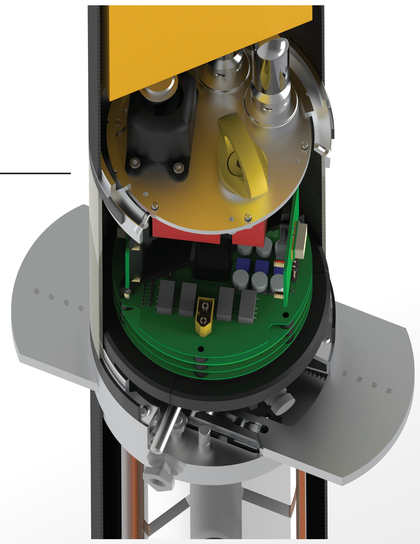
Aluminum structure: tube with inner axial threads, a „bulkhead“ on top and a nozzle retainer at the bottom along with O-rings seal the combustion chamber

Insulation: cotton-phenolic resin tube

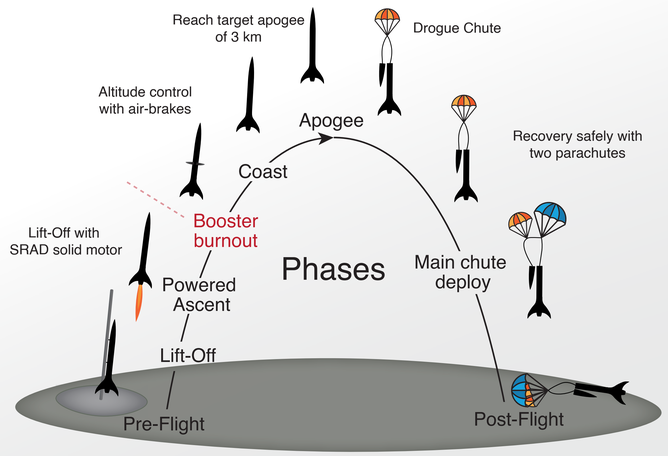
Nozzle: de Laval type and made of graphite

Propellant: Potassium Nitrate + Sorbitol (Rocket Candy) mixed, melted and casted into a 3D printed mold

Ignition: radial igniter inserted with „igniter elevator“



Flight Cycle with Key Events



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