

# DRACO Overview

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DRACO Project Team



# DRACO

## DESTRUCTIVE RE-ENTRY ASSESSMENT CONTAINER OBJECT



# Outline





# DRACO Top-down

## Mission Objectives

Demonstrate the **break-up process of a spacecraft** during re-entry to extrapolate ground-test to flight.

Establish an understanding by recording the **physics of destructive aerothermal break-ups**.

To test early fragmentation **design for demise (D4D)** techniques.

## Science Requirements

Design a **satellite to instrument**, and record the **physical behaviour** during its destruction upon atmospheric re-entry.

Have **spectral information** returned from in-situ observations.

Base the hardware on a **representative small satellite** platform.

Reach at least **20MB of return data**.

Target thermomechanical driven failure modes between **70 and 100km in altitude**.



# DRACO System Design Concept



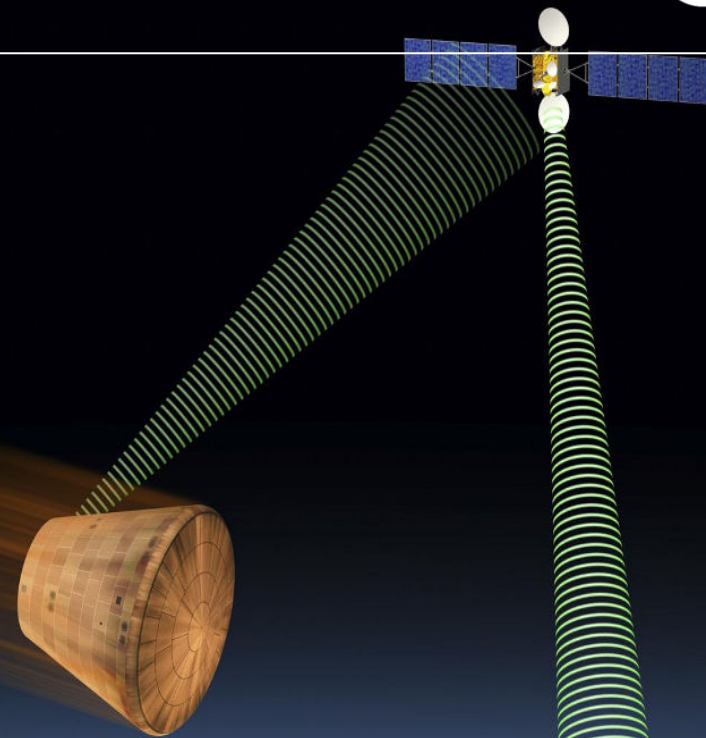
## Satellite platform

- Structure to be instrumented with thermocouples and cameras
- Thermal protections system to enable recording down to 70km
- High TRL D4D hardware
- Orbit and Attitude recording system

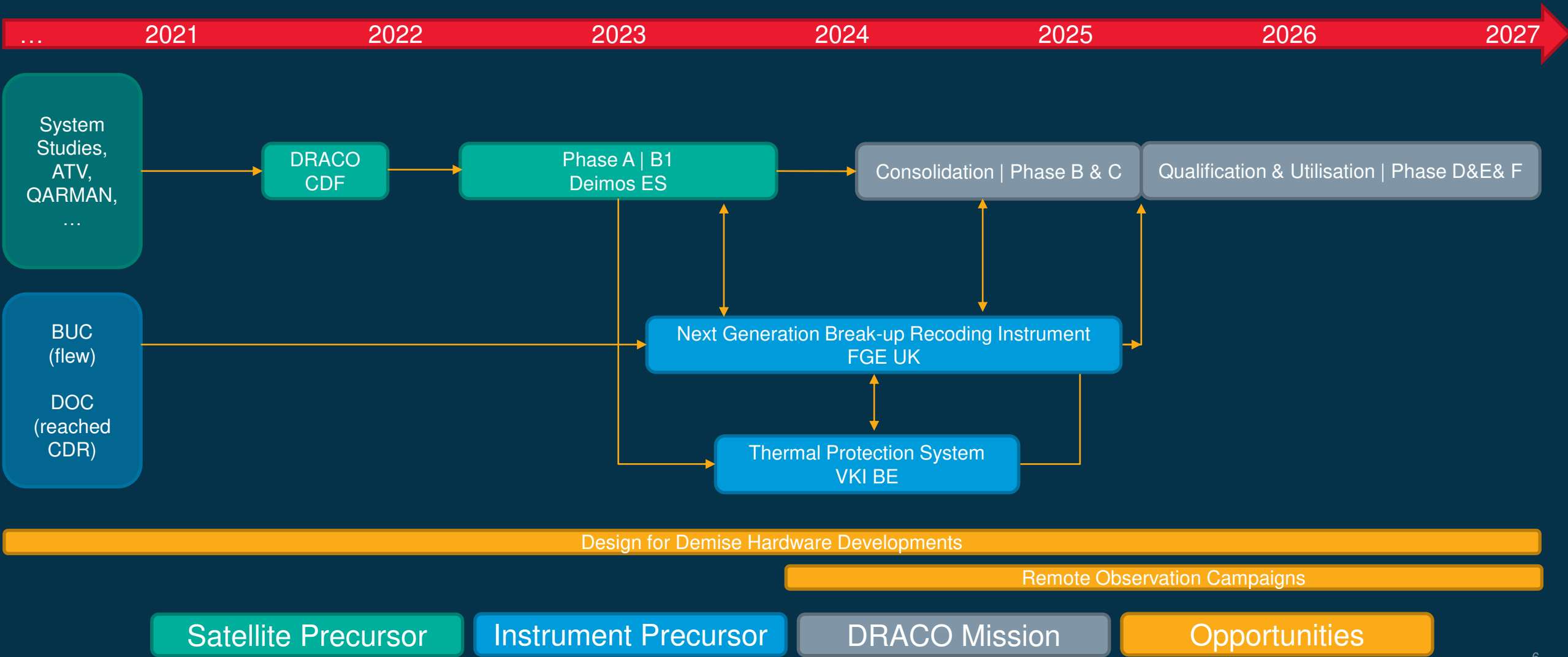


## Surviving Capsule

- Aeroshell to survive re-entry and delay impact
- Telecommunication system to relay data
- Passively stable attitude system



# DRACO Schedule



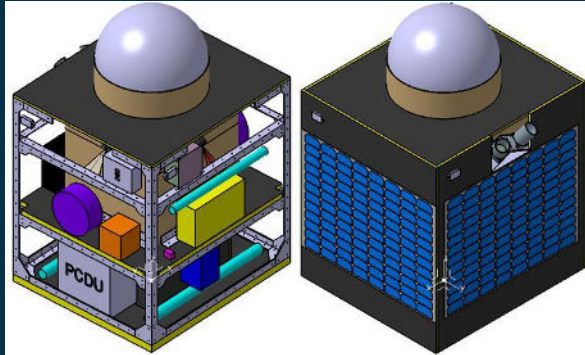


# DRACO Concept of Operations

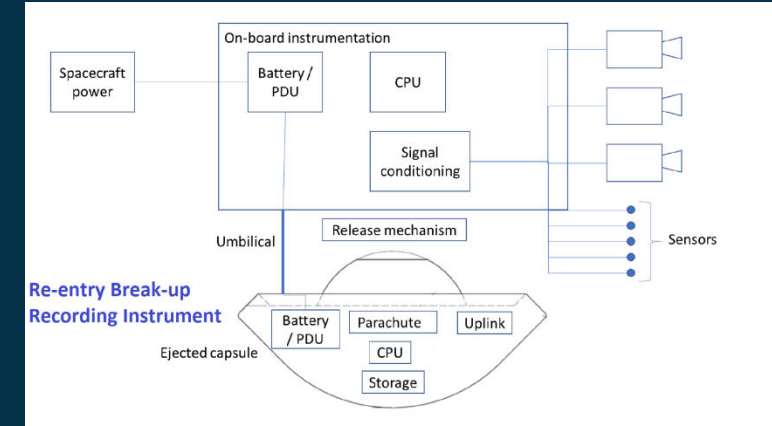
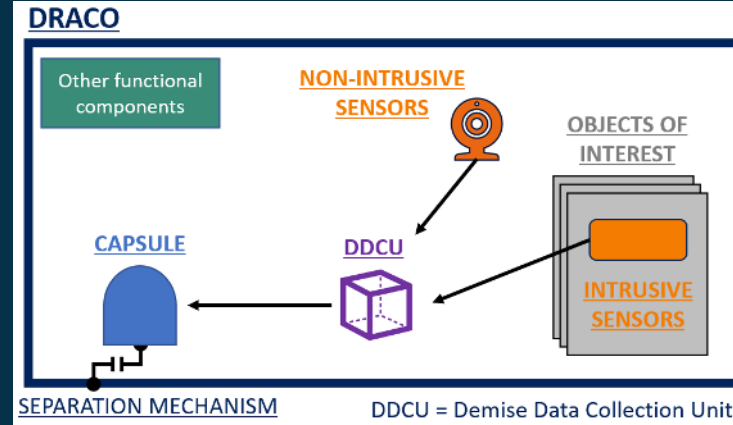


# DRACO Mission System Architecture

## System

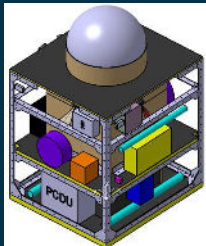


Structure, Data Handling System, Thermal Protection Systems, Attitude and Orbit Determination



Thermocouples, Strain gauges, Cameras, Inertial measurement Unit

## Objects of Interest



Demise of the structure



Demise of Composites



Material Response Characterisation



# DRACO Mission Characteristics



Mission (Class IV)	
Type/Classification	<ul style="list-style-type: none"> <li>•Destructive Atmospheric Re-Entry Experiment</li> <li>•In Orbit Demonstrator</li> </ul>
Duration	12hours (TBC)
Orbit	Controlled re-entry over an ocean, apogee 500km
Launch Date	2026 (TBC)
Ground Segment	None. Data is returned as a service

Science	
Objectives	<ul style="list-style-type: none"> <li>•<b>Record</b> physical conditions that lead to fragmentation during re-entry</li> <li>•<b>Assess</b> representativeness of ground-based facility for given flight condition</li> <li>•<b>Identify</b> physical events during re-entry that can be remotely observed</li> </ul>
Payload/Instruments	<ul style="list-style-type: none"> <li>•Re-entry Break-Up recording instrument, incl. capsule, cameras, sensors on the s/c platform</li> <li>•Objects of Interest: platform itself, structures, COPV pieces, material samples..</li> </ul>

System		
	S/C Platform	Re-entry capsule
Stabilization	None	Passively stable
Orientation	Tumbling	Velocity Aligned
Mass	S/C: 173kg (TBC) PL: 70kg (TBC)	16kg (TBC)
Power	250W (TBC)	150W (TBC)
TM band		L-Band
Data Volume	~3MByte	20MByte



# Questions / Discussion

