

DRACO Overview

DRACO Project Team

DRACO

DESTRUCTIVE RE-ENTRY ASSESSMENT CONTAINER OBJECT



Outline



01 DRACO Top-down

System Design Concept 02

03 Implementation Schedule

Concept of Operations 04

05 Mission architecture

Mission characteristics 06

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**.

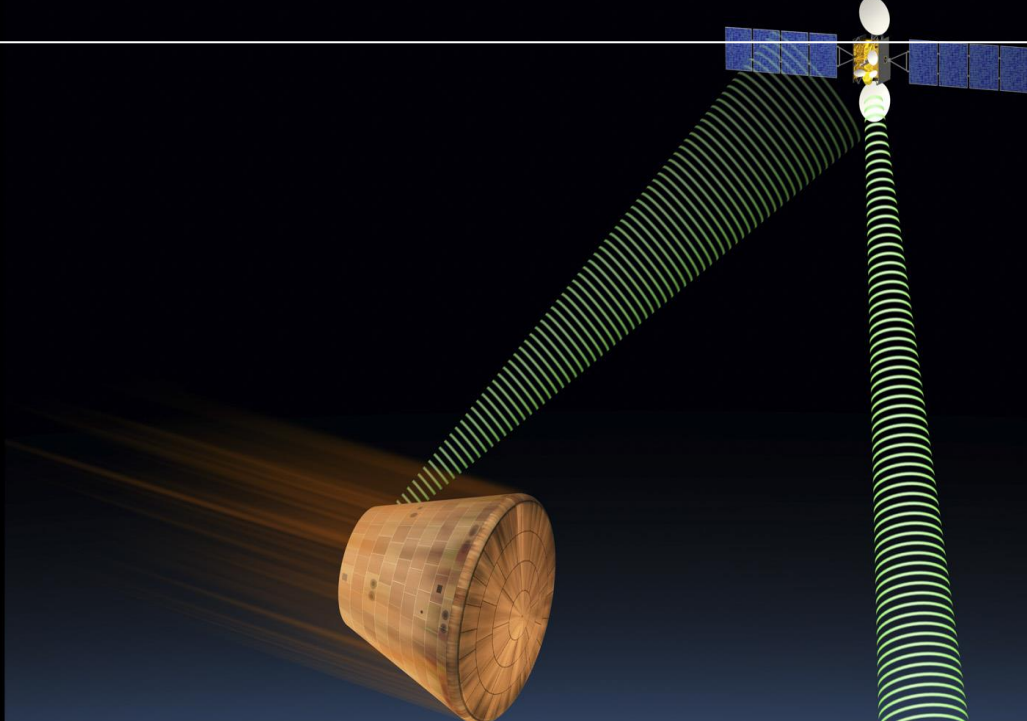


DRACO System Design Concept



Satellite platform

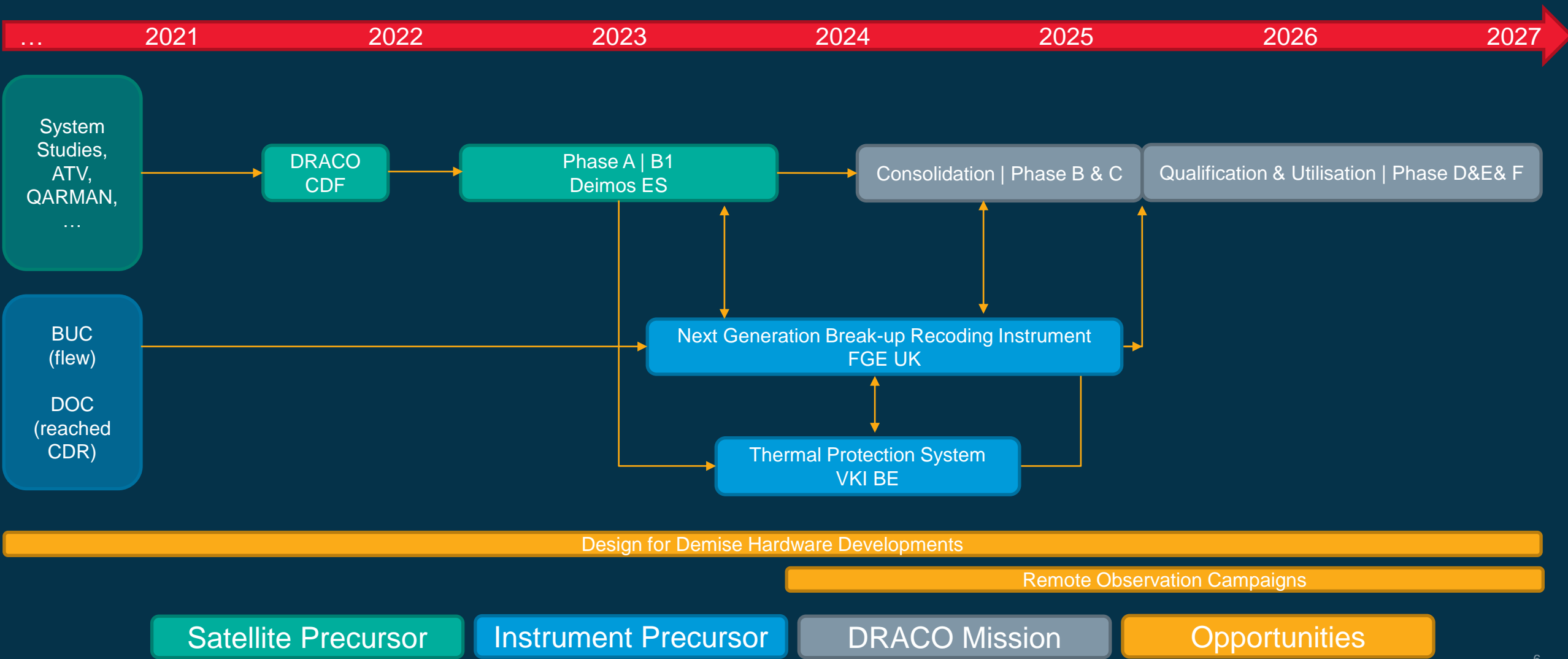
- Structure to be instrumented with thermocouples and cameras
- Thermal protections system to enable recording down to 70km
- High TRL D4D hardware
- Orbit and Attitude recording system



Surviving Capsule

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

DRACO Schedule

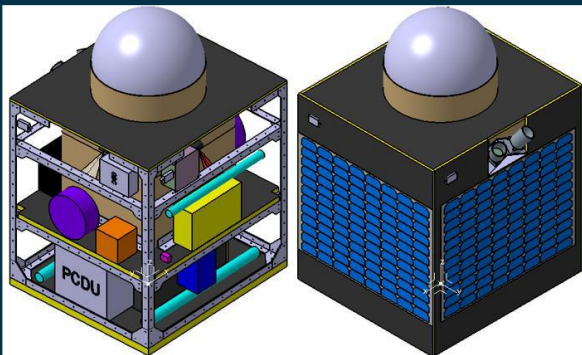


DRACO Concept of Operations

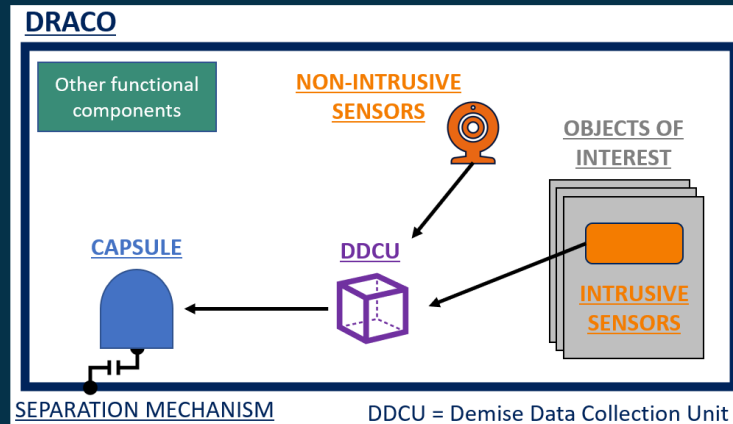


DRACO Mission System Architecture

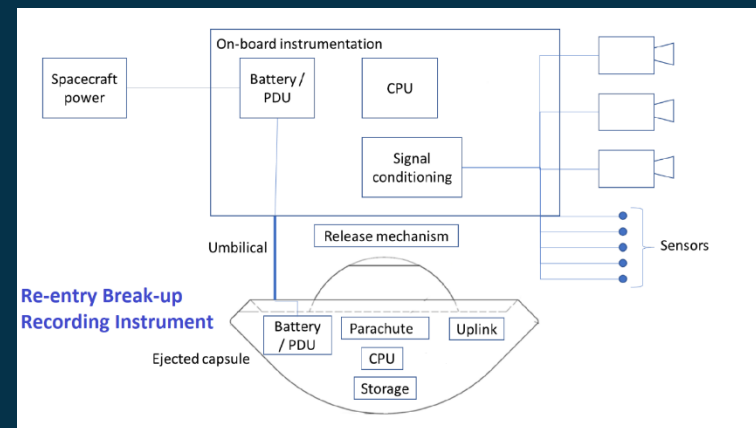
System



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

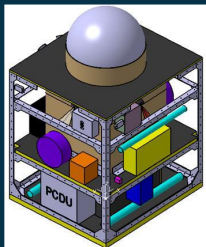


SEPARATION MECHANISM DDCU = Demise Data Collection Unit



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

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

