

CATSAT: A 6U Inflatable antenna technology demonstrator mission

Aman Chandra, J.C. Tonazzi, Christopher Walker

University of Arizona, Tucson

CATSAT Mission overview

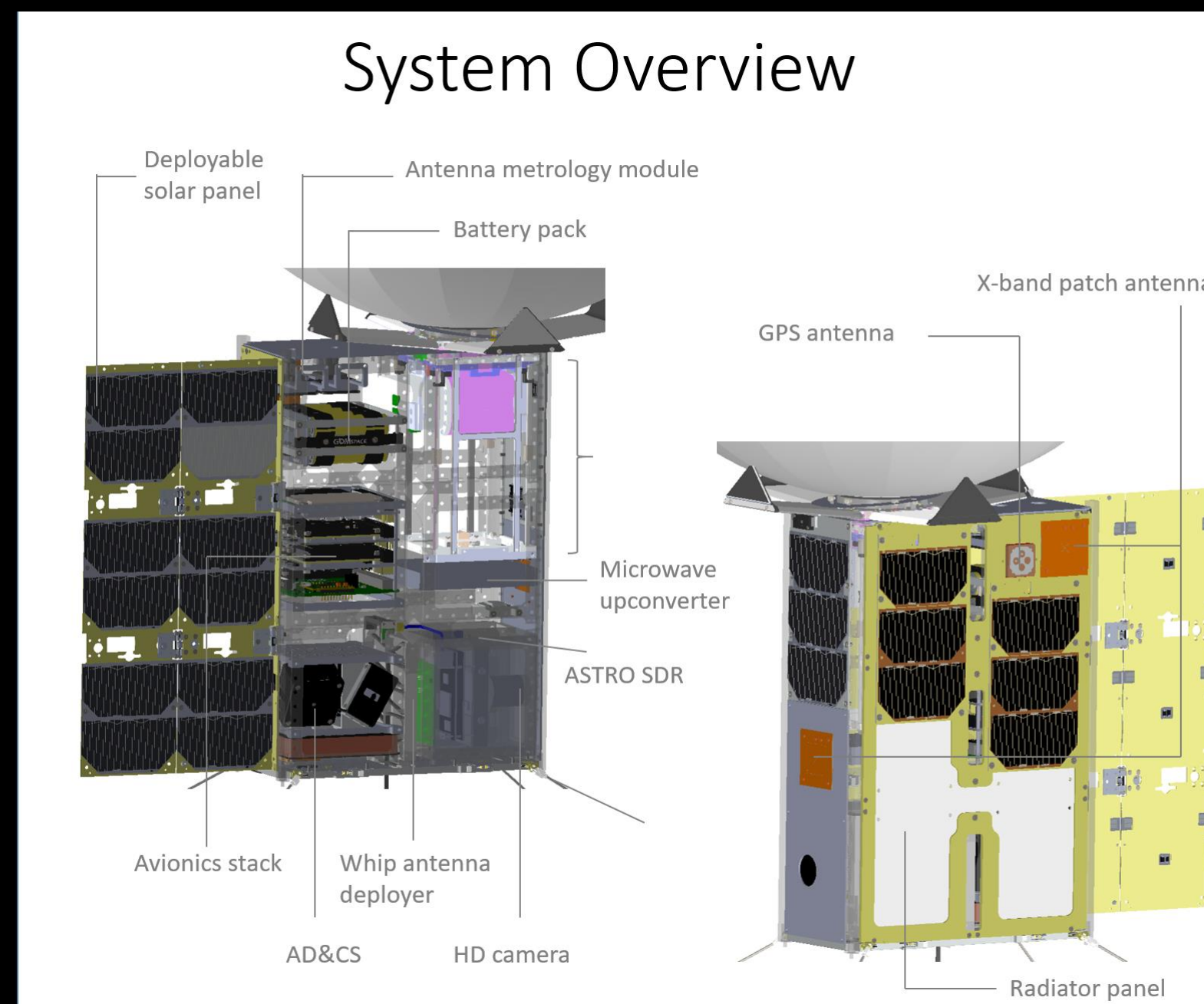
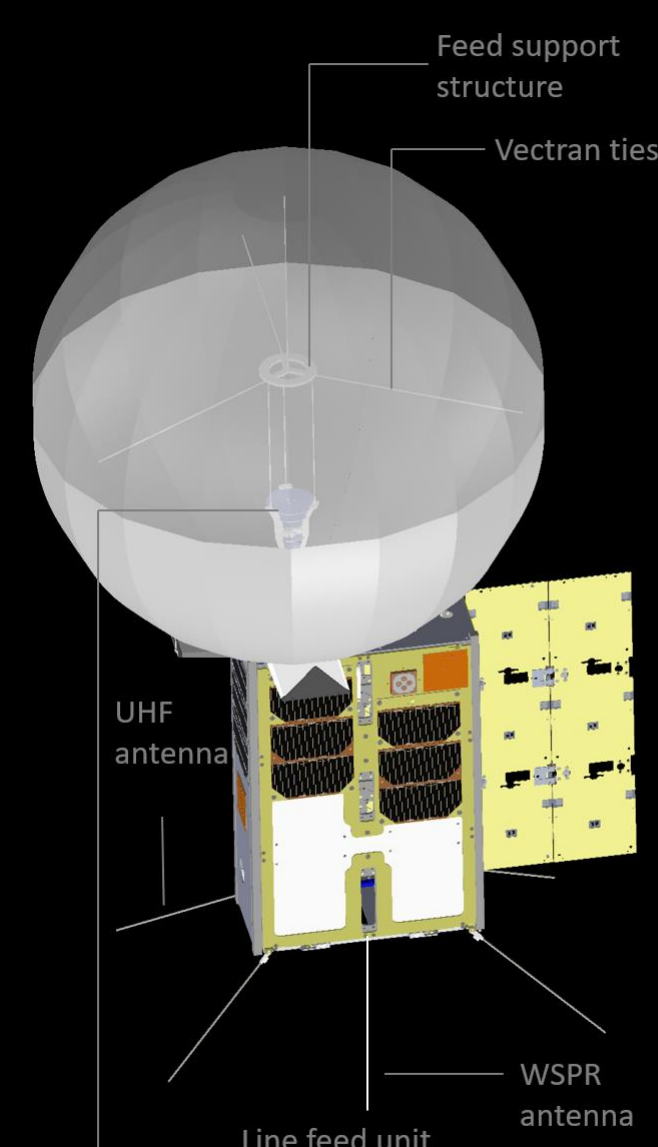
- Selected for launch under NASA CSLI program.
- Sun synchronous orbit at 550 km.
- Launch NET April 2022 on board Fire-Fly Black Alpha.
- Nominal mission lifetime: 6 months.

Primary Mission Objectives:

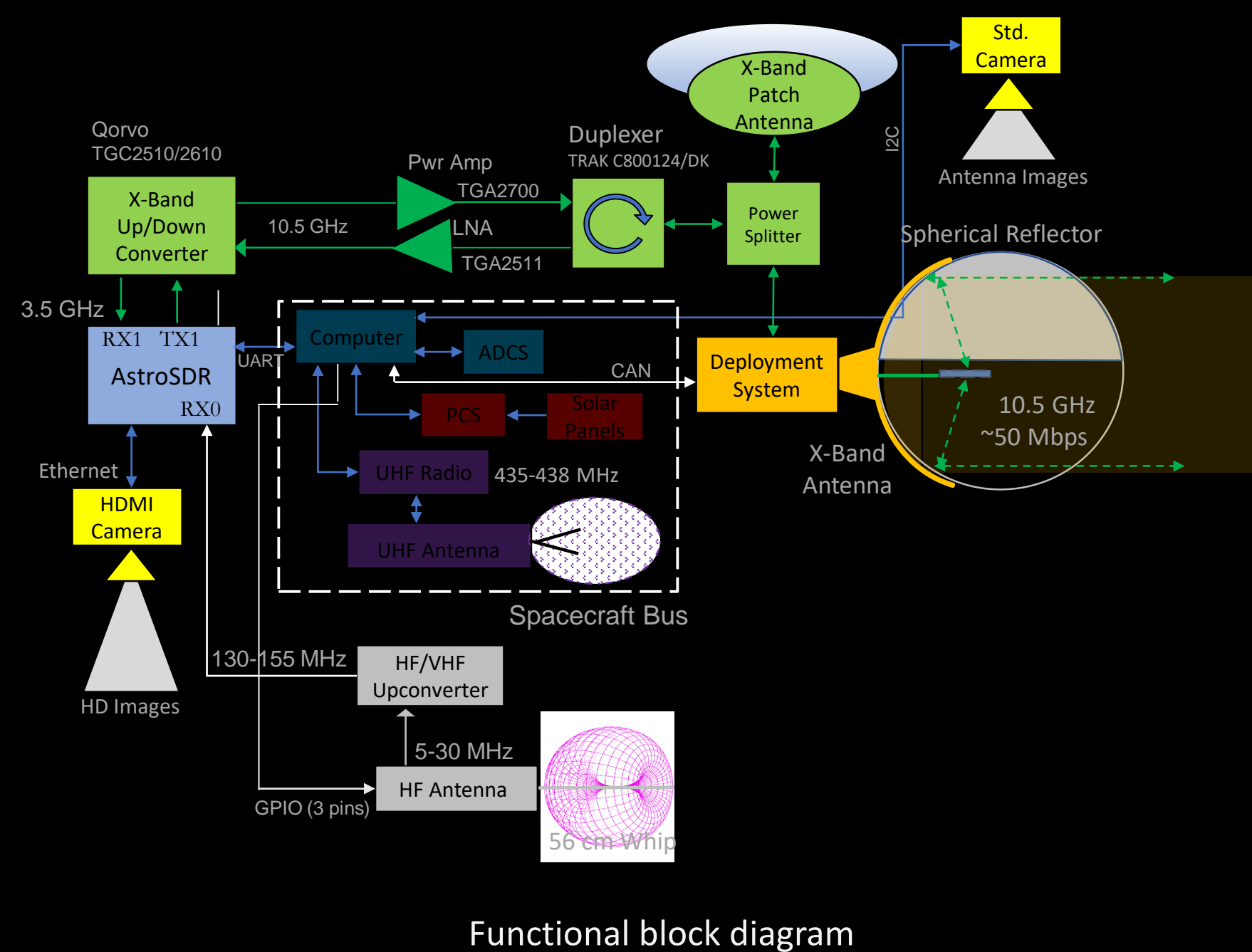
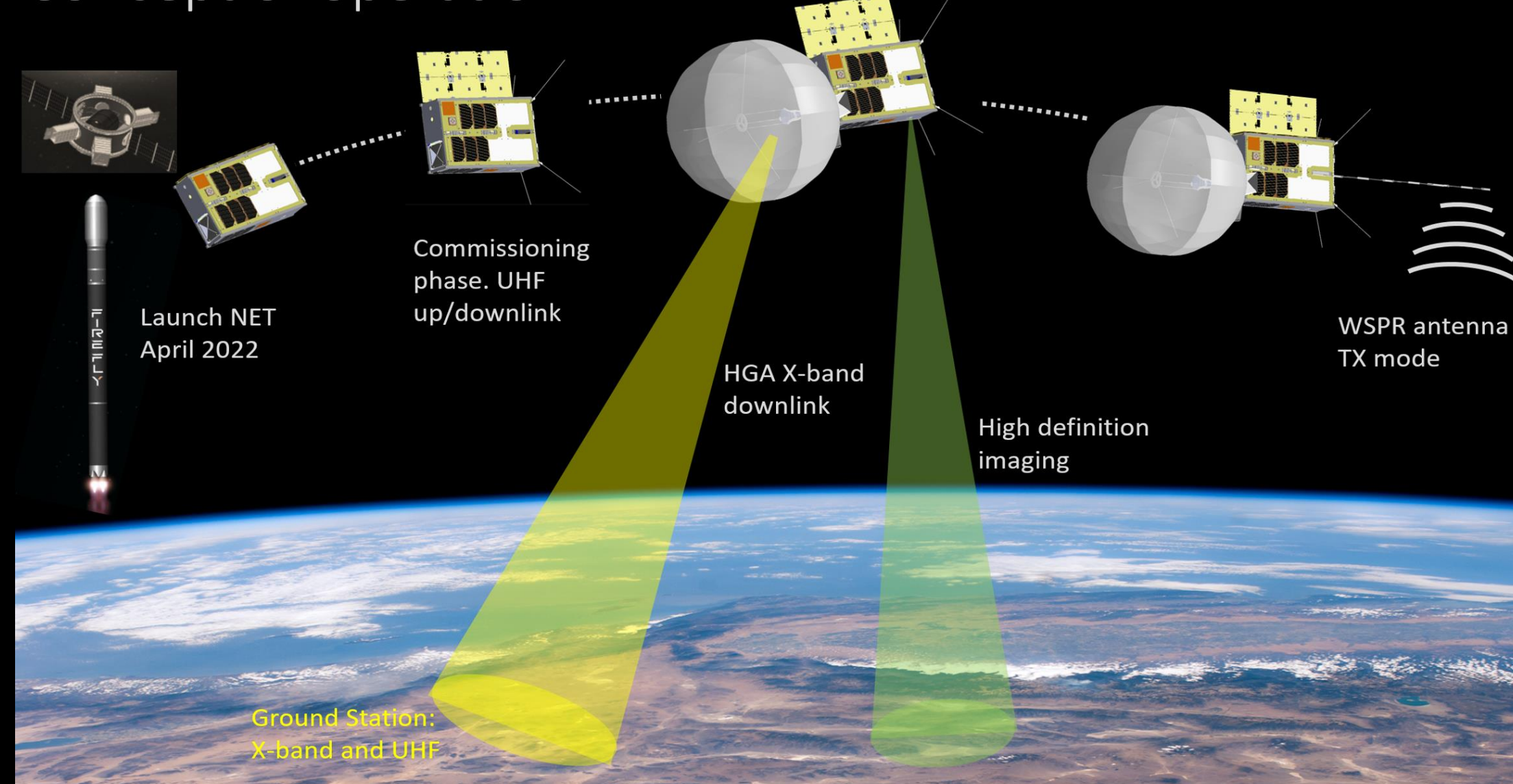
- 10.5 GHz transmission link demo from a 0.5 m inflatable antenna system.
- Ionosphere measurements using an HF Monopole whip antenna

Secondary Mission Objectives:

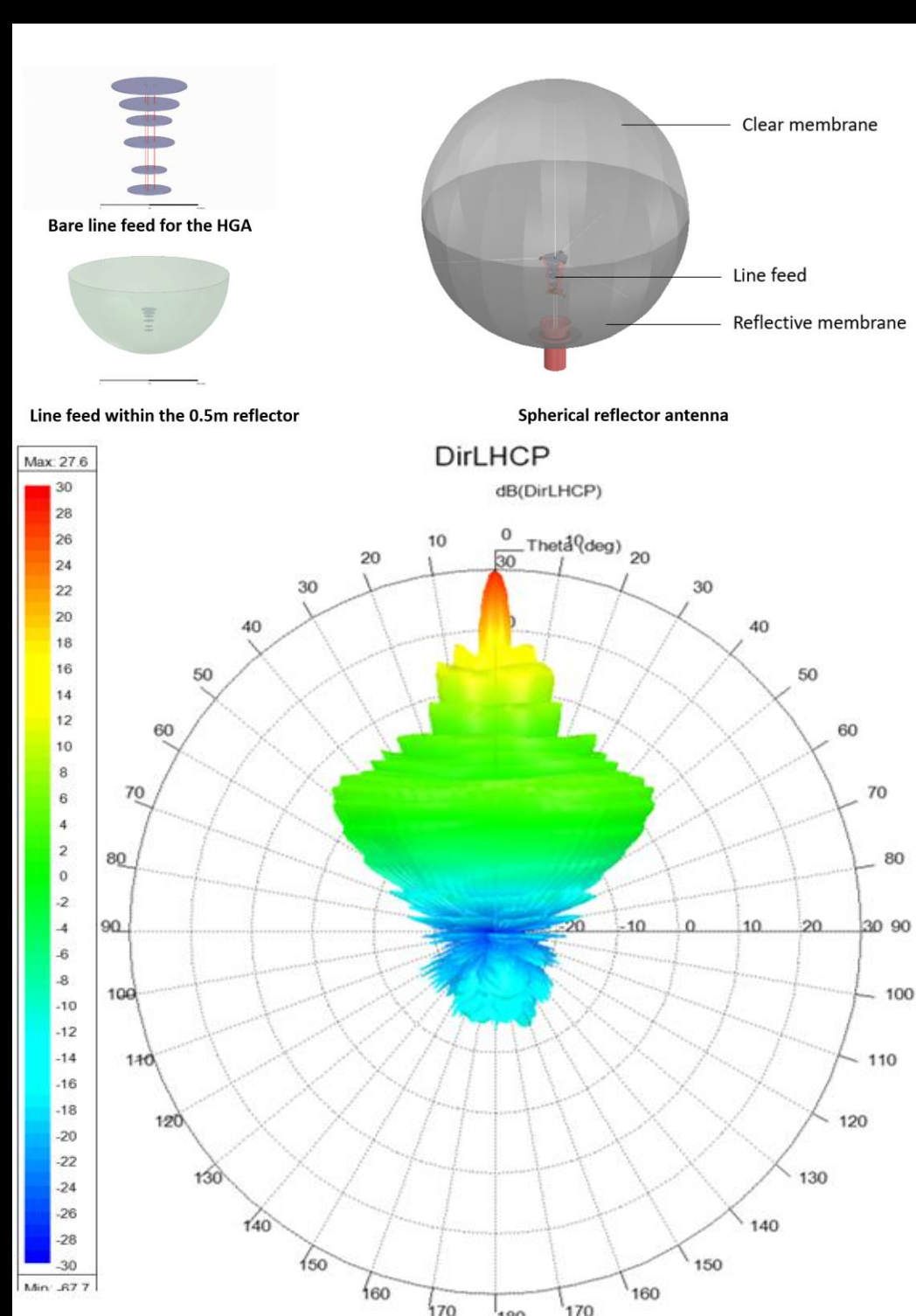
- Metrological study of inflatable membrane surface



Concept of operation



Functional block diagram



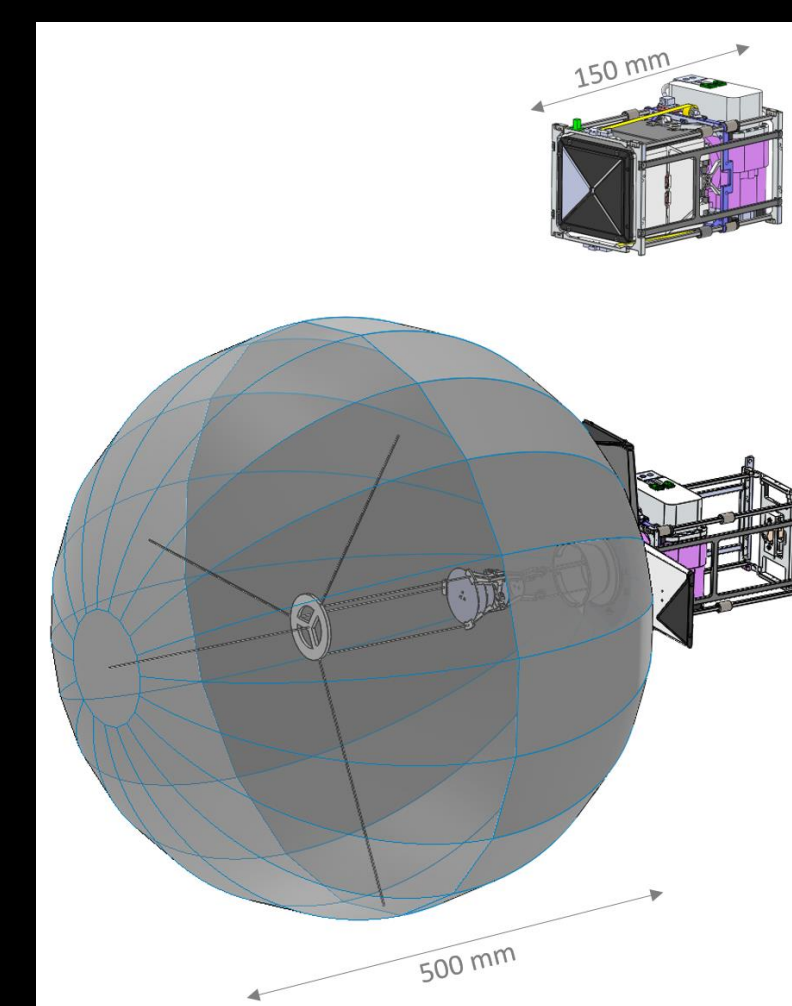
LHCP component of antenna pattern

Spherical correction: Line Feed

- The gain from the antenna is 26.7 dBi, the first side-lobe level is -18 dB.
- A peak directivity of 31 dBi is expected assuming no losses.

1.5 U Packaging and deployment system

- 95/5 Argon – Helium mixture for chosen for inflation.
- Gas release and control system has been built and tested.
- The intent is to over-pressurize the inflatable to compensate for relative loss in pressure during eclipse phases.



Deployment system in pre and post deploy configurations

Current status

- Spacecraft bus received and fitment verified.
- Payload components pre-flight prototypes undergoing testing and FlatSat integration.
- On schedule for delivery in February 2022.



6U Bus system checks



Deployment and inflation system testing