

ASTRO

NextSat

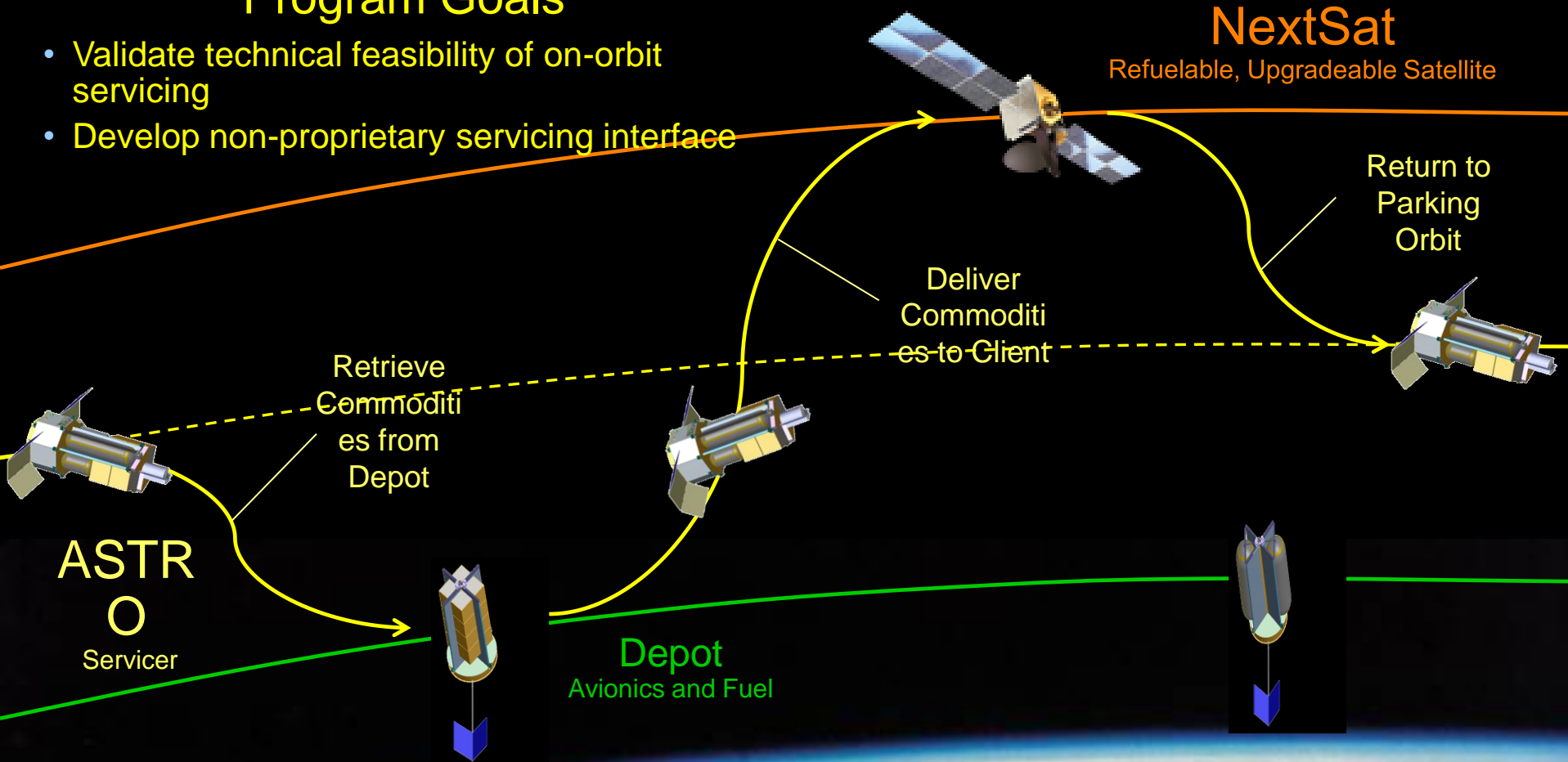
Cleared for Public Release – Distribution
Unlimited

On-Orbit Servicing System CONOPS

Architecture to Support Operations in Space

Program Goals

- Validate technical feasibility of on-orbit servicing
- Develop non-proprietary servicing interface





Cleared for Public Release – Distribution
Unlimited

Orbital Express Demonstration Timeline (136 days)

4. Scenario 1: Grapple NextSat, eject separation ring, recapture and perform additional propellant and ORU transfers (15 days)

3. Scenario 0: Perform propellant and orbital replacement unit transfers while mated (17 days)

2. ASTRO and NextSat Activation and Checkout (14 days)

NextSat (Client)

ASTRO (Servicer)

492 km circular, 46° inclination LEO

Up to 7 kilometers

60 x 120 meter
circumnavigation

60-meter

30-meter

10-meter

5. Scenarios 2-5: Release NextSat, Perform Critical Proximity Operations

6. Scenarios 6-8: Long-Range Rendezvous, Proximity Operations, and Capture with ORU and Propellant Transfers (18 days)

7. Decommissioning or Extended Demonstration with Air Force Space Command

1. Ascent to LEO
(Atlas V 401)
8 Mar 07

Boeing Huntington Beach ESR
(Engineering Support Room)

AFSCN (COOK)

AFSCN (PIKE)

RDT&E Support Center (RSC)—
ASTRO and NextSat mission
operations

White Sands (TDRSS Up/Downlink)

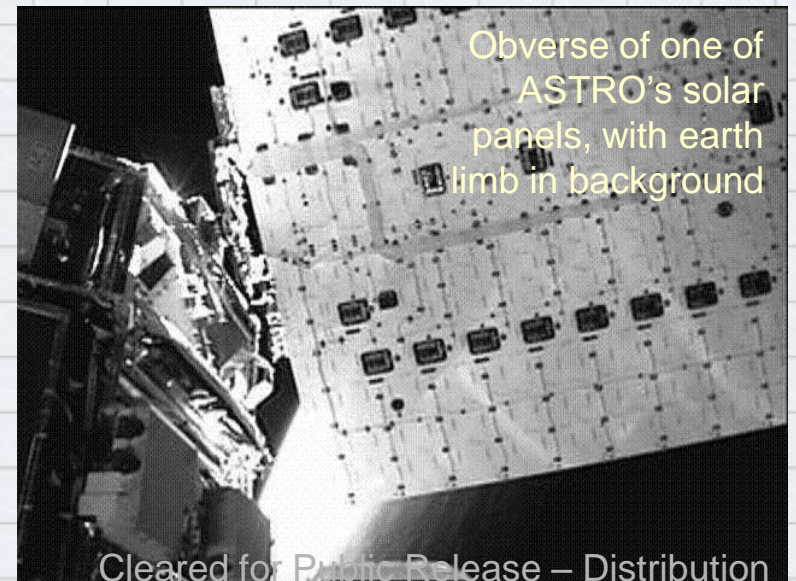
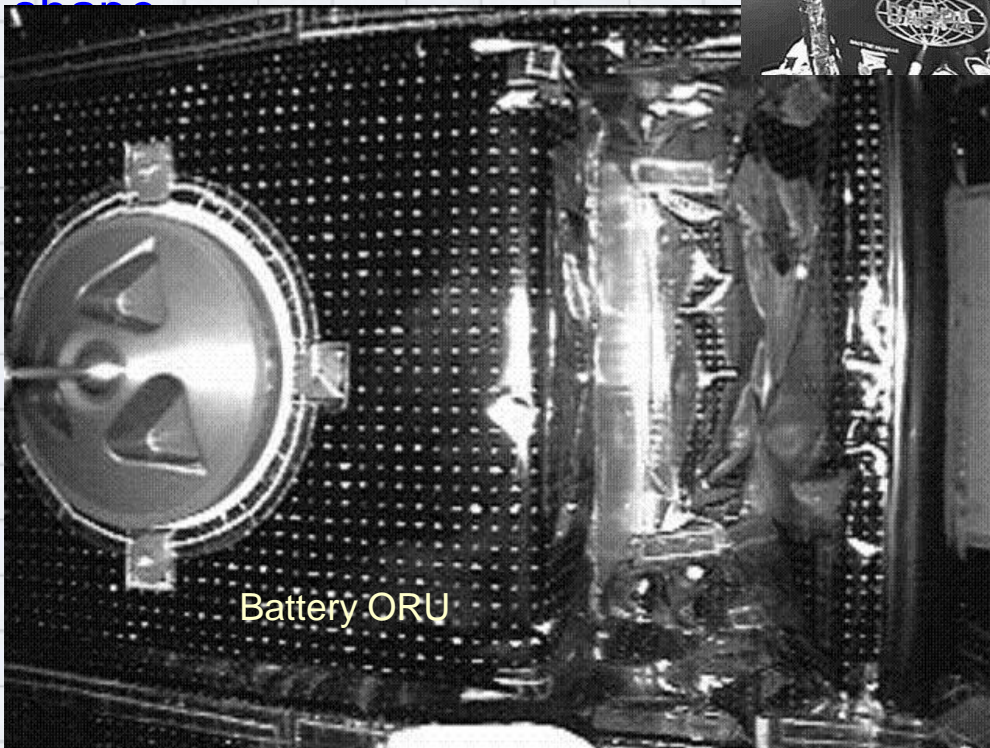
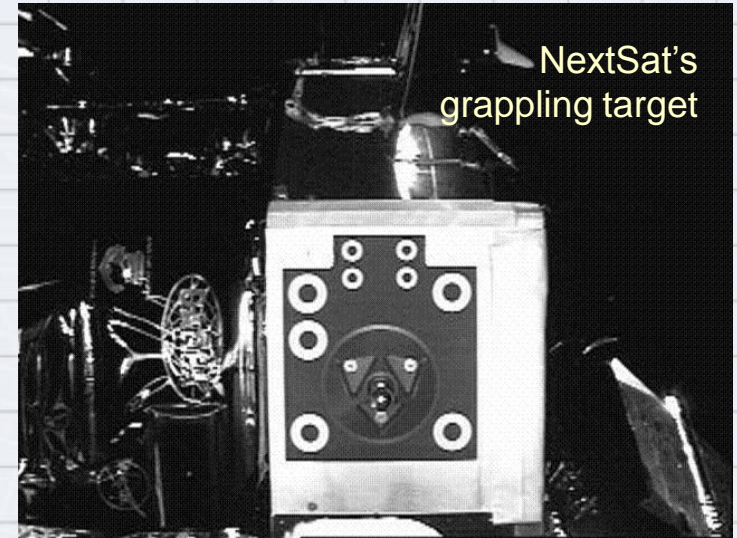
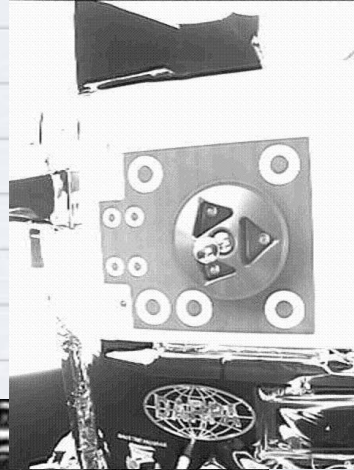
Boeing Houston RSR
(Rendezvous Support Room)

AFSCN (BOSS)

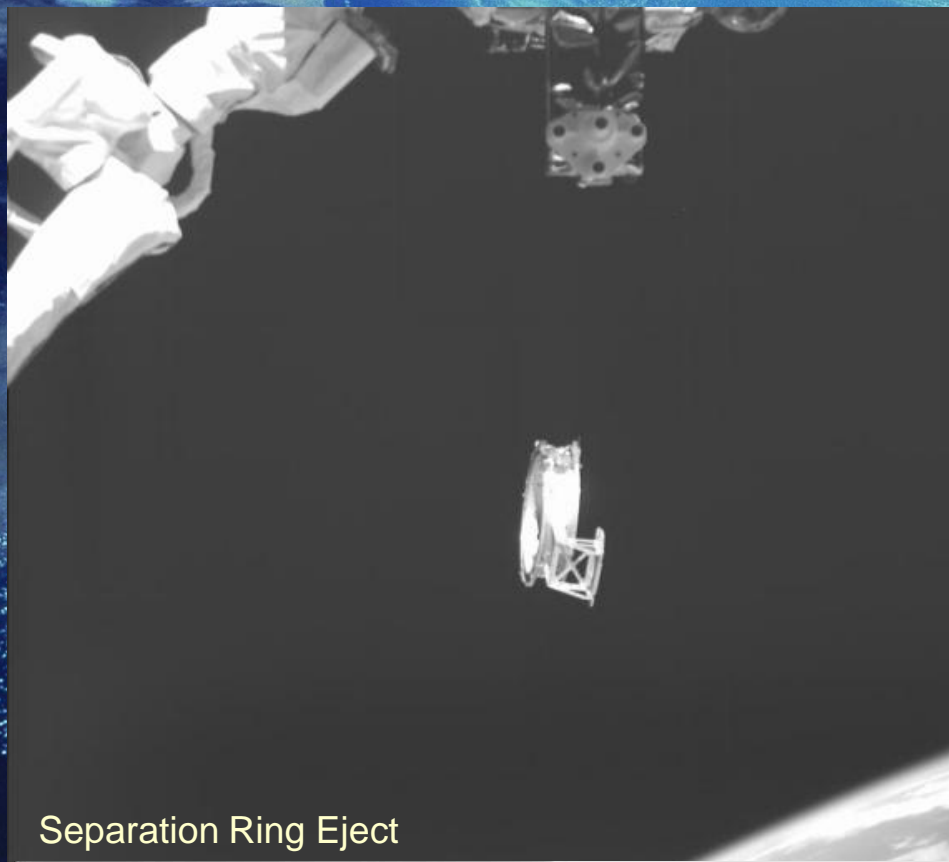
Cleared for Public Release — Distribution
Unlimited

Results of Global Survey

- Arm camera shot 1,660 photos over 54-minute period
- Single command executed arm global survey script
- Assembled video indicated both vehicles were in good shape



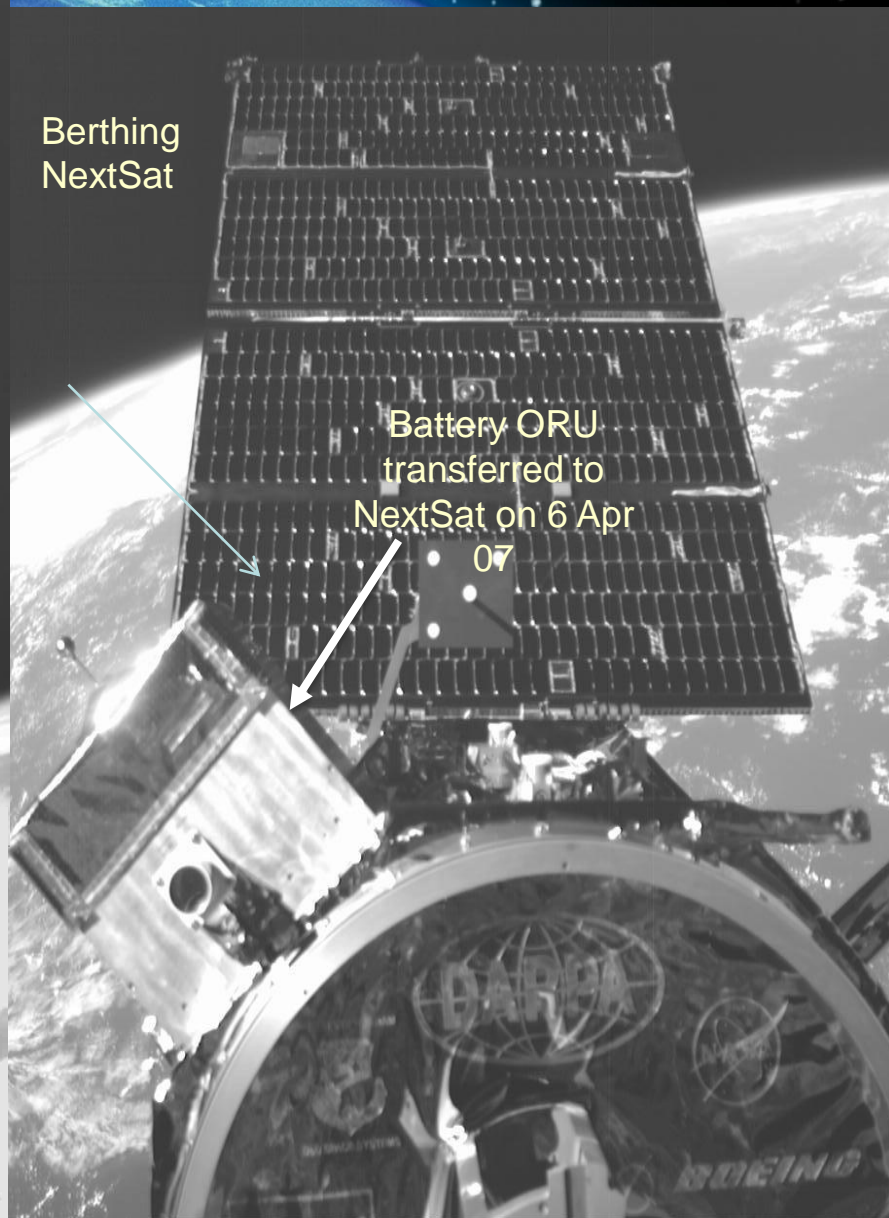
Cleared for Public Release – Distribution Unlimited



Separation Ring Eject

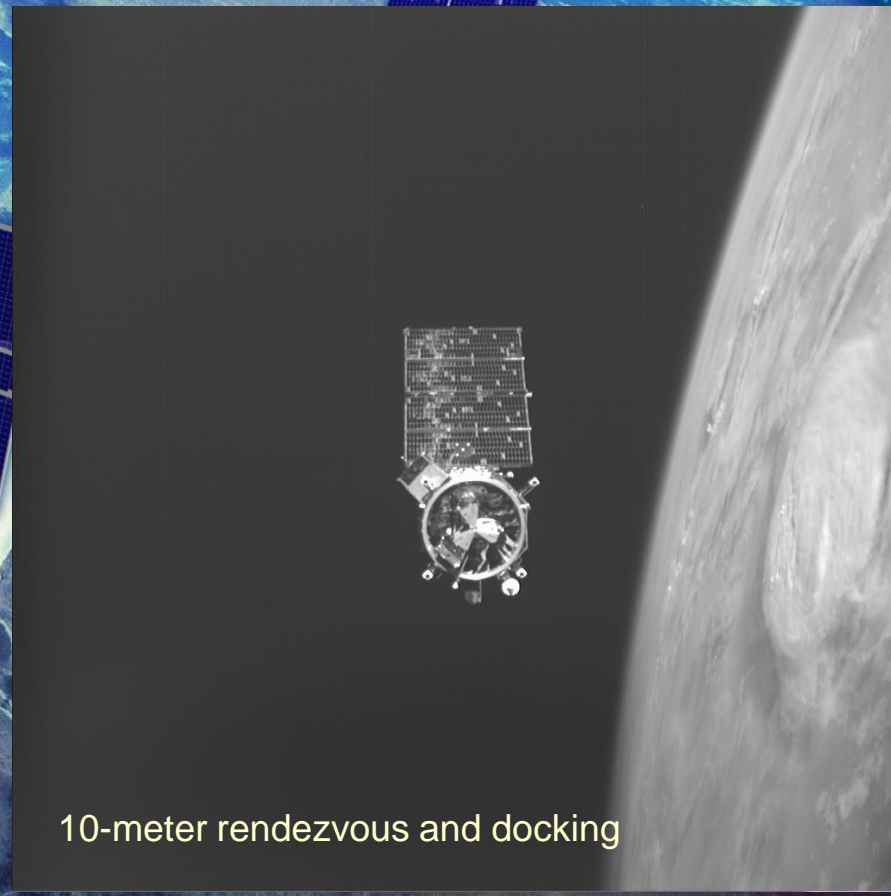


Separation Ring
Eject

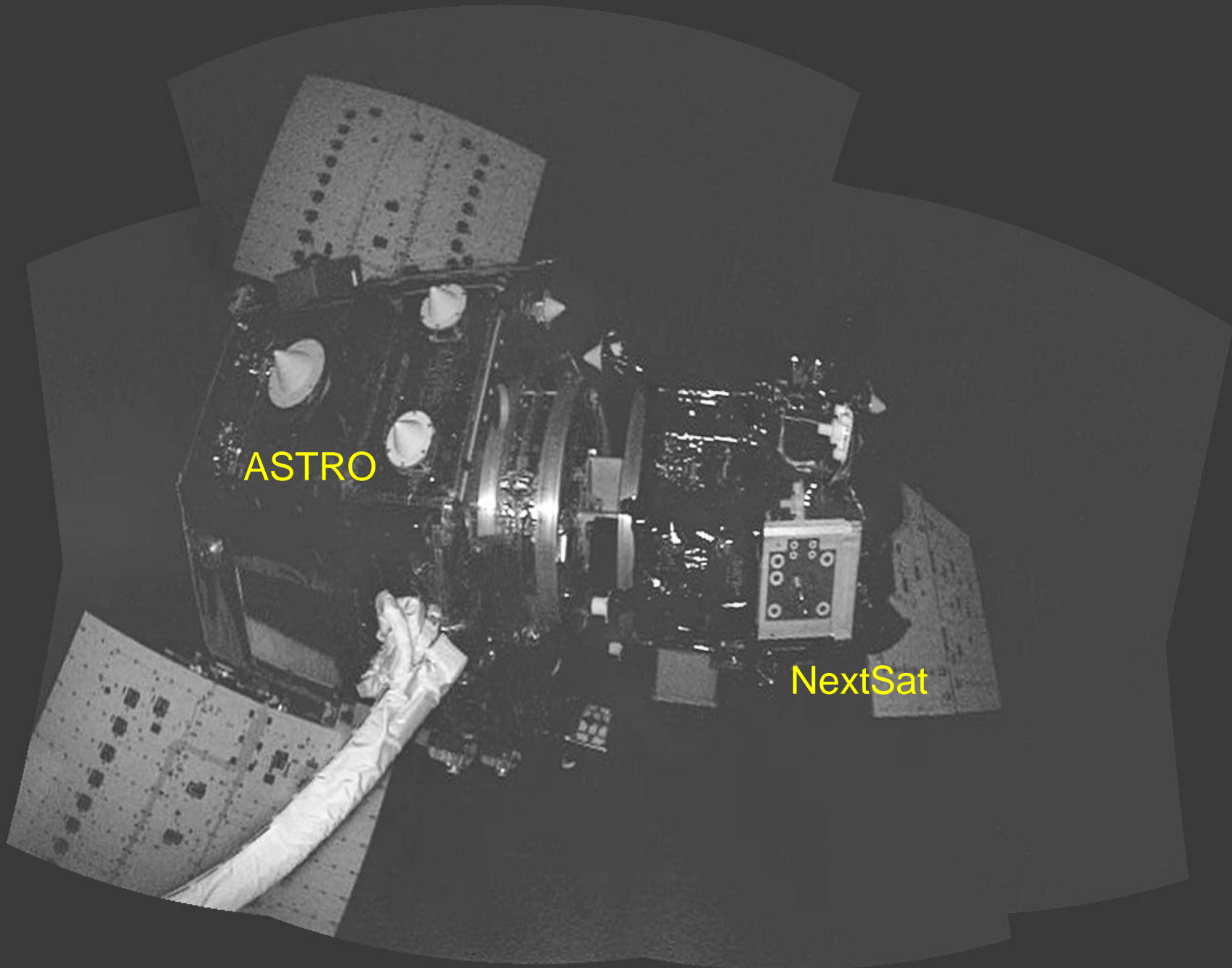


Berthing
NextSat

Battery ORU
transferred to
NextSat on 6 Apr
07

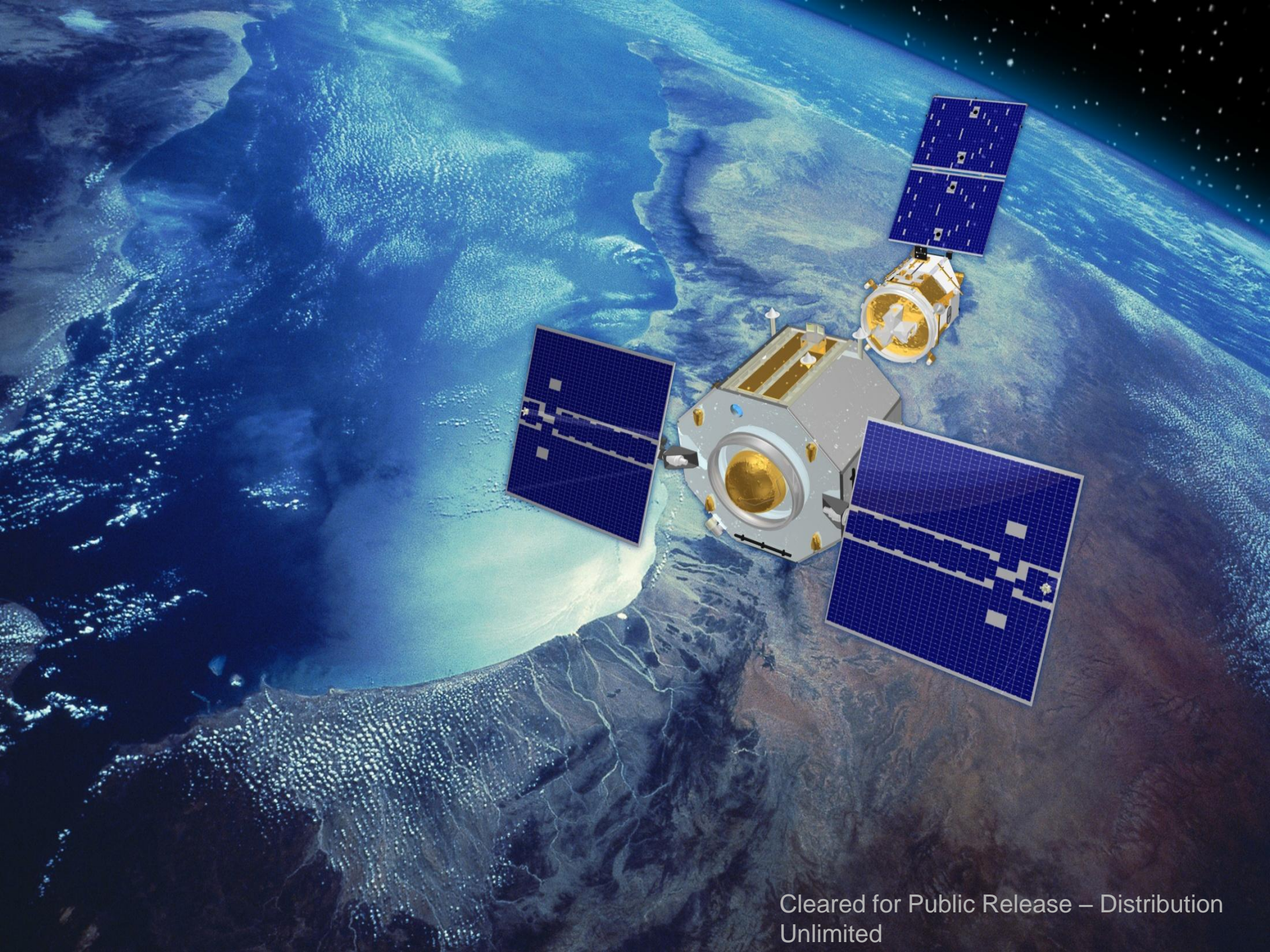


10-meter rendezvous and docking



ASTRO

NextSat



Cleared for Public Release – Distribution
Unlimited