



# ESDMD Update

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October 31, 2022

# Briefing Topics



- Artemis I Status:
  - Integrated SLS and Orion are currently in Vehicle Assembly Building, scheduled for roll-out on November 4
  - Replacing Flight Termination Batteries and assessing Limited Operational Life Items
  - Preparing for next launch attempt on November 14
- Artemis II – IV Status
- Procurement Status:
  - Human Landing System
  - xEVAS
  - Lunar Terrain Vehicle
- Moon to Mars Program



# SOMD UPDATE

NASA Advisory Council • HEO Committee • 31 Oct 2022

Kathryn Lueders, Associate Administrator, Space Operations

# Briefing Topics



- Expedition 68
- Human Research Program
- Space Communications and Navigation
- Launch Services Program
- Upcoming Launches

# Increment 68 Highlights



## November 2022

- Northrop Grumman CRS-18 (NG-18) Launch/Dock
- US EVA #81: ISS Roll-Out Solar Array (iROSA) Prep 1B
- RS EVA #55
- SpaceX CRS-26 (SpX-26) Launch/Dock
- RS EVA #56
- US EVA #82: iROSA Install 4A

## December 2022

- US EVA #83: iROSA Install 3A
- RS EVA #57 and RS EVA #58

## January 2023

- SpX-26 Undock/Splashdown
- US EVA #84: iROSA Prep 1A
- NG-18 Release

## February 2023

- Boeing-CFT Mission
- SpX-Crew6 Launch/Dock
- SpX-Crew5 Undock/Splashdown
- SpaceX CRS-27 (SpX-27) Launch/Dock
- RS EVA #59
- Progress 81P Undock
- Progress 83P Launch/Dock

## March 2023

- Northrop Grumman CRS-19 (NG-19) Launch/Capture
- SpX-27 Undock/Landing
- Soyuz Crew Exchange (69S Launch/Dock, 68S Undock/Landing)



# Human Research Program

*Building on flight capabilities*



Increments 65-67  
621.75 hours of human research



ISS Crew Post-flight landing support  
Crew-1, Crew-2, 65S, Crew-3, Crew-4



Blood and saliva analysis studying immune system changes during spaceflight



Food item acceptability and food fatigue studies



rHEALTH ONE tech demo to complete flow cytometry in microgravity



Human health research hardware for Axiom-1, first private astronaut mission



# Human Research Program

*Building on analog capabilities*



**NASA SPACE RADIATION LABORATORY**  
Testing new galactic cosmic radiation simulator



**PARABOLIC FLIGHTS**  
Testing venous thrombosis seen in spaceflight



**ANTARCTICA**  
Analog for spaceflight immune dysregulation



**HUMAN EXPLORATION RESEARCH ANALOG**  
Isolation and confinement, team performance

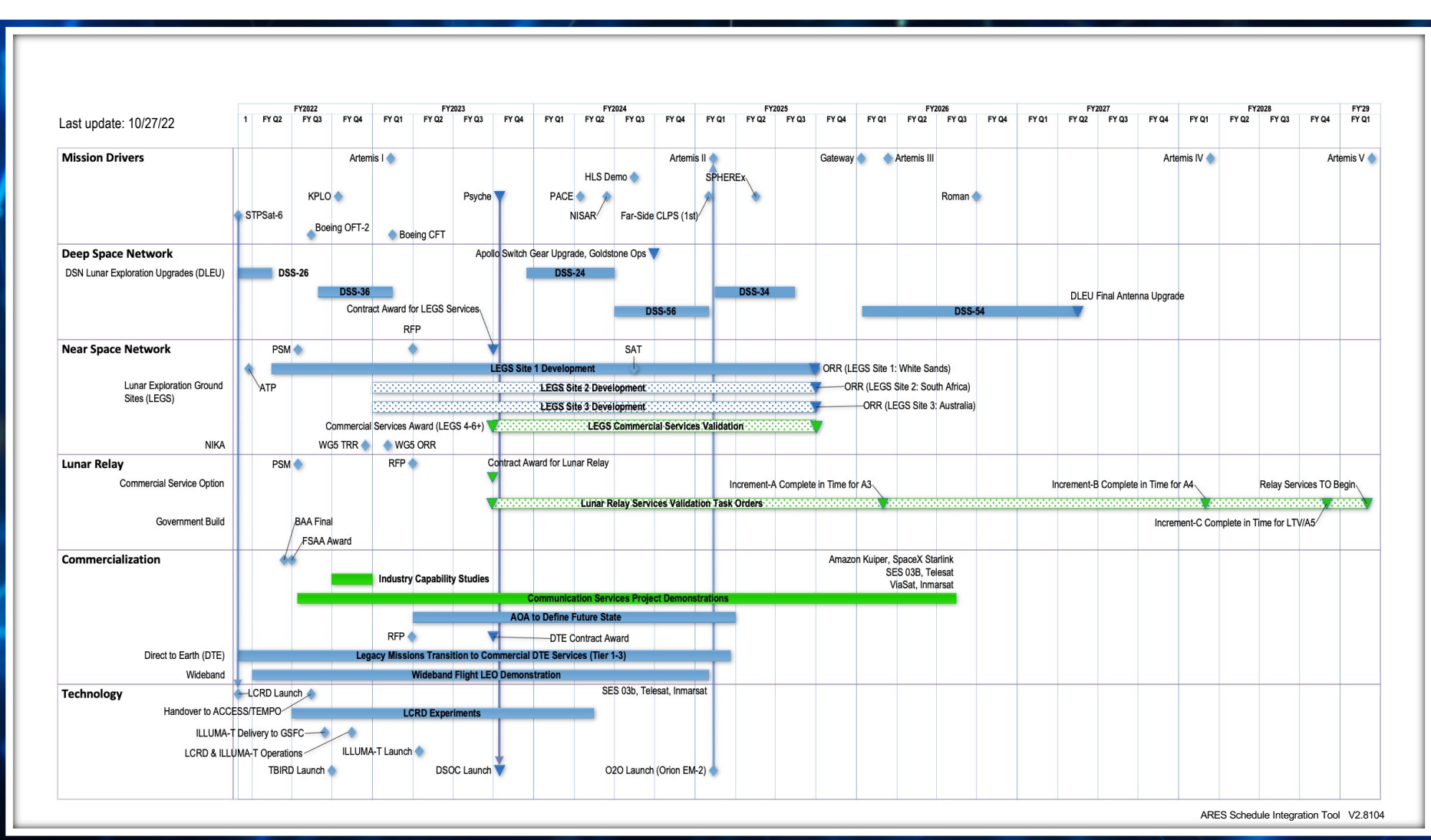


**CREW HEALTH & RESEARCH ANALOG**  
One-year Mars mission simulations



**Spaceflight-associated neuro-ocular syndrome**

# SCaN Program Mission Driver Schedule



*Network upgrades and transition to commercial services pave the way for robust space science, exploration, commerce.*



# LSP Advanced Planning & Awarded Missions in Flow

Sources: NASA Launch Services Manifest [Release: 10/5/2022; Launch Manifest Waterfall [Release: 9/29/2022], FPO Update: 10/6/2022]

VADR CLIN 2 and CSLI missions not depicted.

LEGEND	
<span style="color: green;">■</span>	APL
<span style="color: blue;">■</span>	GSFC
<span style="color: red;">■</span>	JPL
<span style="color: orange;">■</span>	LaRC
<span style="color: lightgreen;">■</span>	MSFC
<span style="color: purple;">■</span>	JSC
<span style="color: yellow;">■</span>	GRC
<span style="color: brown;">■</span>	KSC
<span style="color: black;">■</span>	No Assigned NASA Center
<span style="color: green;">■</span>	#C: #Cubesats
<span style="color: blue;">■</span>	CCSFS: Cape Canaveral Space Force Station
<span style="color: red;">■</span>	AV: Atlas V
<span style="color: orange;">■</span>	ER: Eastern Range
<span style="color: lightgreen;">■</span>	F9: Falcon 9 Full Thrust
<span style="color: purple;">■</span>	FH: Falcon Heavy
<span style="color: yellow;">■</span>	GTO: Geostationary Transfer Orbit
<span style="color: brown;">■</span>	HEO: Highly Elliptical Orbit
<span style="color: black;">■</span>	LEO: Low Earth Orbit
	LV: Launch Vehicle
	NET: No Earlier Than
	NLS: NASA Launch Service
	NLT: No Later Than
	SSO: Sun Synch Orbit
	TBD: To Be Determined
	U/R: Under Review
	VADR: Venture Class Dedicated and Rideshare
	VSBF: Vandenberg Space Force Base
	WR: Western Range



AOs

EVI-8 MO [Small LV/Hosted, 01/01/27]

MIDEX 2021 (Astro) MO [Small LV/ESPA/ISS, NLT 12/31/27]

MIDEX 2021 (Astro) AO [Med LV, NLT 12/31/28]

Astro Probe [.]

Earth Science Explorer [.]

Helio (SMEX) [.]

Ph II (NLS II Acq in work)

Sentinel 6-B [Class B, Med/Int LV, . 11/20/25]

## Awarded NLS II, One Offs, and LSP Advisory Missions

Ph II (ATP - L-30m) Roman Space Telescope [Class A, FH, Cx39A, 10/31/28]	Ph IV (L-18m - L-3m) PACE [Class C, F9, ER, 01/09/24] NISAR [Class C, GSLV, India, U/R 01/28/24]	Ph V (L-3m - L-10d) JPSS-2/LOFTID (2nd) [Class B, AV-401, WR, 11/01/22] SWOT [Class C, F9, WR, 12/05/22]	Ph VI (L-10d - L)	Ph VII (L+3m)
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NLS II Advanced Planning

AOS - I [Class C, SSO, Med/Int LV, 07/01/28]

AOS - P [Class C, SSO, Med/Int LV, 12/01/30]

COSI [Class D, LEO, Sm/Med LV, 04/01/27]

DAVINCI [Class B, Interplanetary, Med/Int LV, U/R 01/01/29]

Dragonfly [., Interplanetary, Int/Hvy LV, NET 06/01/27]

GDC [Class C, Multiple, Med LV, 08/01/27]

GeoXO [Class B, Orbit TBD, Med/Int LV, 01/01/30]

HelioSwarm [Class C, Lunar, Med LV, 01/01/28]

JPSS-3 [Class B, LEO, Med/Int LV, 01/01/27]

JPSS-4 [Class B, LEO, Med/Int LV, 01/01/32]

LandSat Next [., SSO, Med/Int LV, 01/01/30]

MAIA [Class C, SSO, TBD LV Class, NET 01/01/28]

Mars Sample Return [Class A, Interplanetary, Int/Hvy LV, NET 05/01/28]

MUSE [Class C, LEO, Sm/Med LV, 01/01/27]

NEO Surveyor [Class C, HEO, Med/Int LV, 03/01/26]

OSAM-1 [Class C, SSO, Med/Int LV, 02/01/28]

SBG [Class C, LEO, Med LV, 04/30/28]

VERITAS [Class B, Interplanetary, Heavy LV, U/R 12/01/27]

Ph III (L-30m - L-18m)

GOES-U [Class B, FH, ER, 04/30/24]

Europa Clipper [Class A, FH, Cx39A, NET 10/01/24]

HALO + PPE (CMV) [., FH, ER, 11/01/24]

IMAP w/ SWFO (2nd) +GLIDE (2nd) [Class C, F9, ER, 02/01/25]

SPHEREx/PUNCH(2nd) [Class C, F9, WR, 02/28/25]

INDEF

Psyche/Janus (2nd) [Class B, FH, Cx39A, INDEF]

## VADR CLIN 1 and VCLS Missions



VADR Acq in work PREFIRE [Class D, VADR, . NET 04/01/23] TROPICS (Launch 2) [Class D, VADR, . Orb Insert NET 05/01/23] TROPICS (Launch 3) [Class D, VADR, . Orb Insert NET 05/01/23] ESCAPADE [Class D, VADR, . 05/01/24]	ATP - L-12mo TSIS-2 [Class D, F9, CCSFS 08/07/24]	L-12m - L-2m VCLS D2-FB (10C) [Class D, VADR, NET U 12/22/22] VCLS D2-RS (3C) [Class D, Terran 1, ER, NET 04/30/23]	L-2m - L+1m
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## Supporting Programs

CCP CFT [Atlas, CCSFS, 02/03/23] Crew-6 [F9, Cx39A, 02/27/23] PCM-1 [Atlas, CCSFS, 05/30/23] Crew-7 [F9, Cx39A, 09/18/23] Crew-8 [F9, Cx39A, 03/02/24] PCM-2 [Atlas, CCSFS, 04/03/24] PCM-3 [Atlas, CCSFS, 09/01/24] Crew-9 [F9, Cx39A, 09/10/24] PCM-4 [Atlas, CCSFS, 03/01/25]	CRS (Advisory) NG-18(7C) [Antares, WFF, 11/06/22] SpX-26(9C) [F9, ER, 11/15/22] SpX-27 [F9, ER, 02/19/23] NG-19 [Antares, WFF, 03/11/23] SpX-28 [F9, ER, 06/15/23] SpX-29 [F9, ER, 12/10/23]	Artemis/Gateway Artemis-1 (10C) [., SLS, Cx39B, U/R 11/14/22] Artemis-2 [., SLS, Cx39B, 08/14/24] HLS [Hvy LV, Starship, . NET 01/01/25] Artemis-3 (HLS) [Hvy LV, SLS, Cx39B, 10/05/25] Gateway (Log Mod) [SpX Heavy LV, . . 01/01/26] ESPRIT [Hvy LV, . . 01/01/27] Gateway (iHAB/US-HAB) [Hvy LV, SLS, . NET 01/01/27] Gateway GERS [SpX Heavy LV, . . NET 01/01/27]
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VADR Adv. Planning

ULTRASat [Class D, GTO, VADR, U/R 06/01/25]

TRACERS [Class D, SSO, VADR, 07/01/24]

QuickSounder [Class D, LEO, VADR, 07/28/25]

INCUS [Class D, . VADR, NET 01/01/27]

GeoCARB [Class D, GTO, VADR, NET U/R 09/01/24]

# Launch Services Program

Launch Operations | Engineering | Integration | Analysis | Program Management

**25** YEARS  
OF  
LAUNCHING

**98**%  
MISSION  
SUCCESS

Tracking

**80**<sup>+</sup>  
LAUNCHES

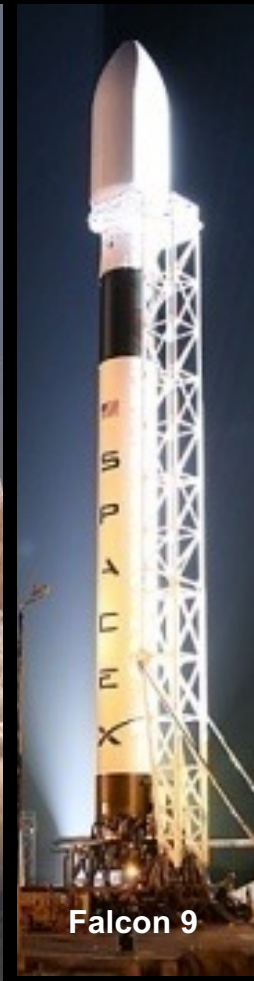
In FY2023



Antares



Atlas



Falcon 9



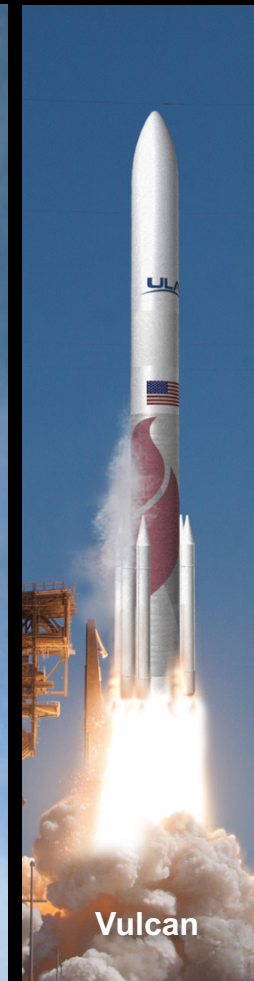
Falcon Heavy



Pegasus



New Glenn

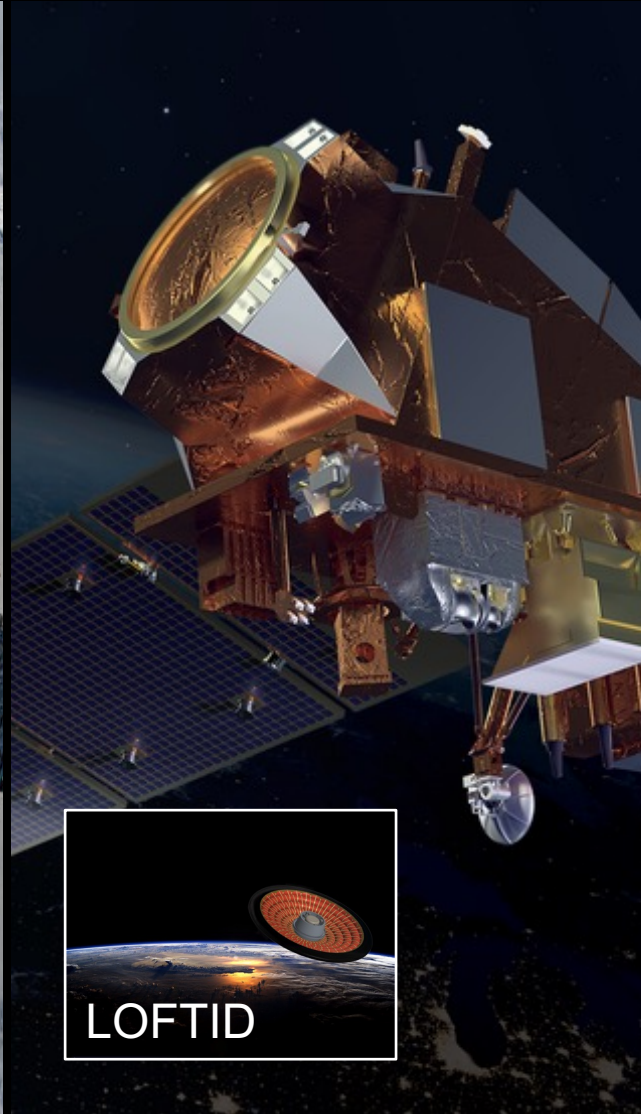


Vulcan

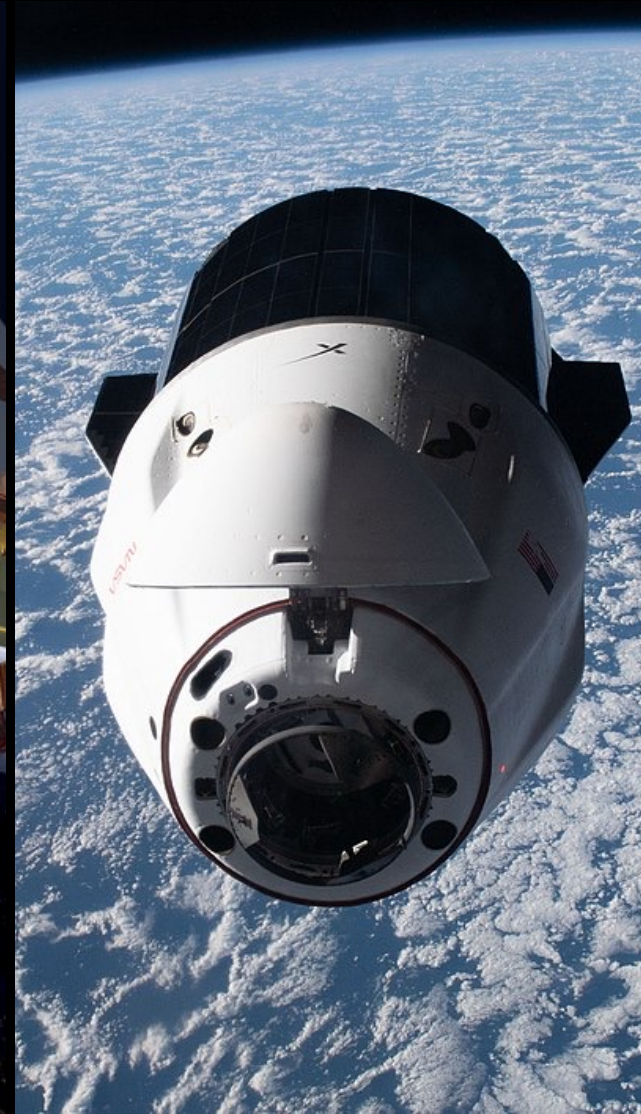
**NG-18**  
**November 6**



**JPSS-2**  
**November 9**

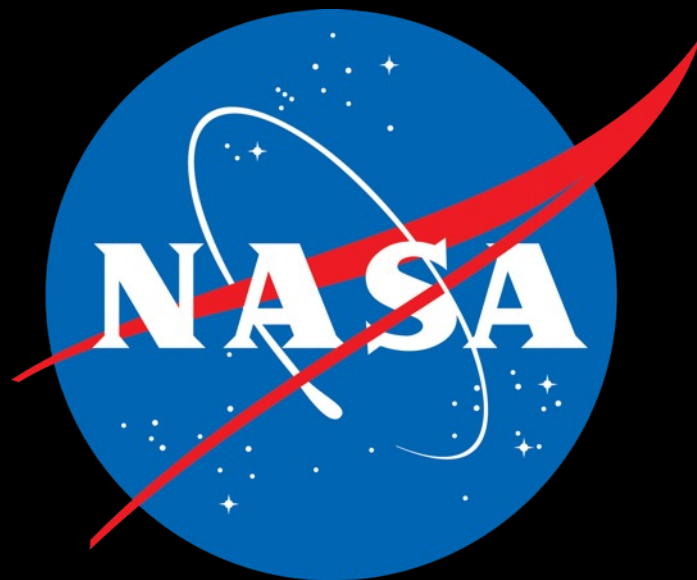


**SpX-26**  
**November 20**



**SWOT**  
**December 5**





National Aeronautics and Space Administration