



National Aeronautics and
Space Administration

EXPLORE

Transformative Science Opportunities with Small Satellites in NASA SMD

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NASA's Key Science Themes

PROTECT & IMPROVE
LIFE ON EARTH &
IN SPACE



SEARCH FOR LIFE
ELSEWHERE



DISCOVER SECRETS
OF THE UNIVERSE



SCIENCE 2020-2024: A Vision for Scientific Excellence

VISION

Lead a globally interconnected program of scientific discovery that encourages innovation, positively impacts people's lives, and is a source of inspiration

MISSION

Discover the secrets of the universe

Search for life elsewhere

Protect and improve life on Earth and in Space

VALUES

Excellence

Inclusion

Leadership

Integrity

Teamwork

Safety

PRIORITIES

Exploration and Scientific Discovery

Innovation

Interconnectivity and Partnerships

Inspiration

RESEARCH

~**10,000** U.S. Scientists Funded
~**3,000** Competitively Selected Awards
~**\$600M** Awarded Annually

TECHNOLOGY DEVELOPMENT

~**\$397M** Invested Annually

EARTH-BASED OBSERVATIONS

23 Operating Missions
5 Upcoming Earth System
Observatory Missions

MISSIONS

114 Missions from
formulation through
extended operations

SMALLSATS/ CUBESATS

49 Science Missions
29 Technology Demos

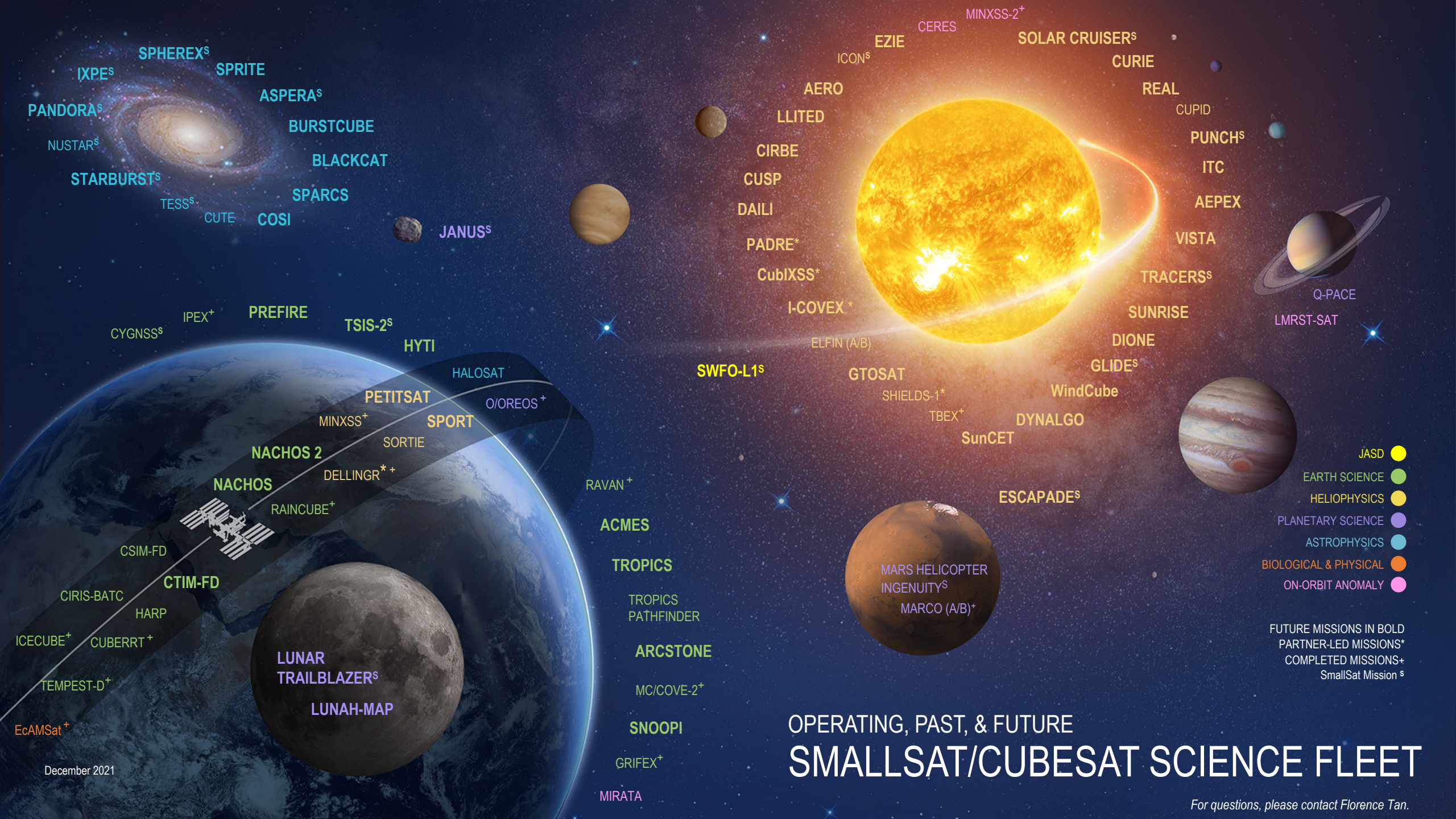
SOUNDING ROCKETS

2 Science Missions Launched
45 In Development

BALLOONS

54 Missions in Development

Science by the
NUMBERS

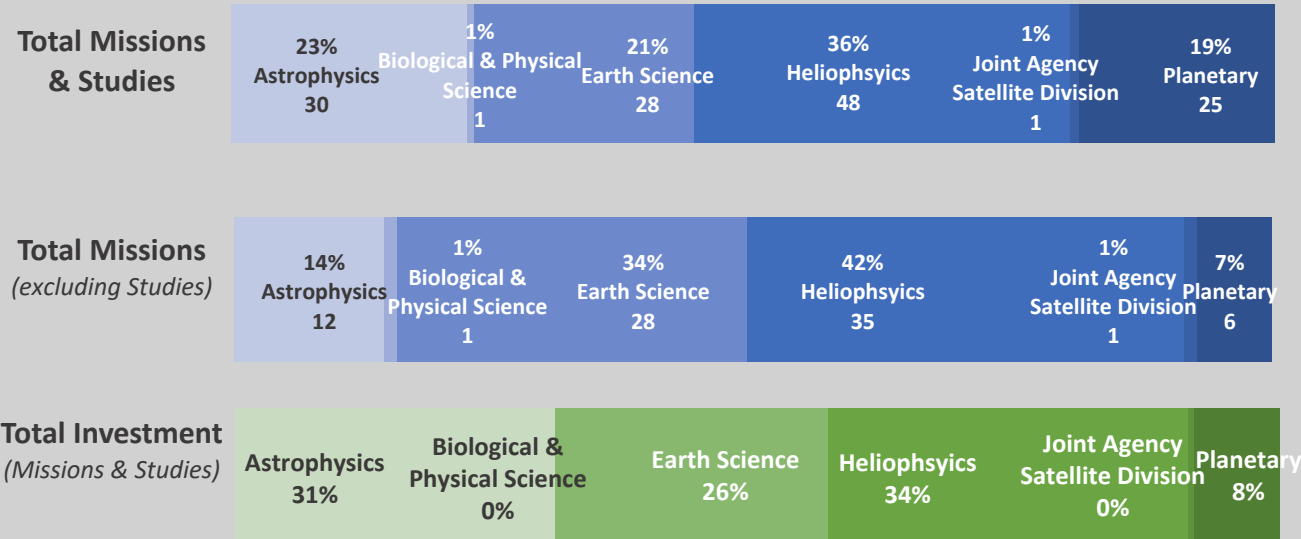


NASA's Science SmallSat Missions at a Glance

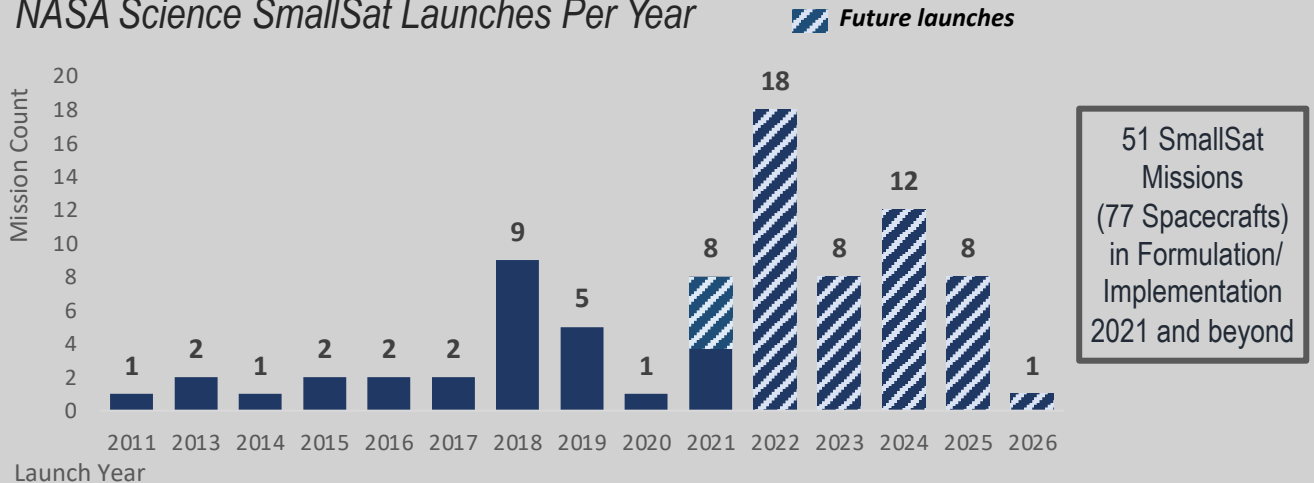
Inclusive Missions and Studies

Data as of December 2021

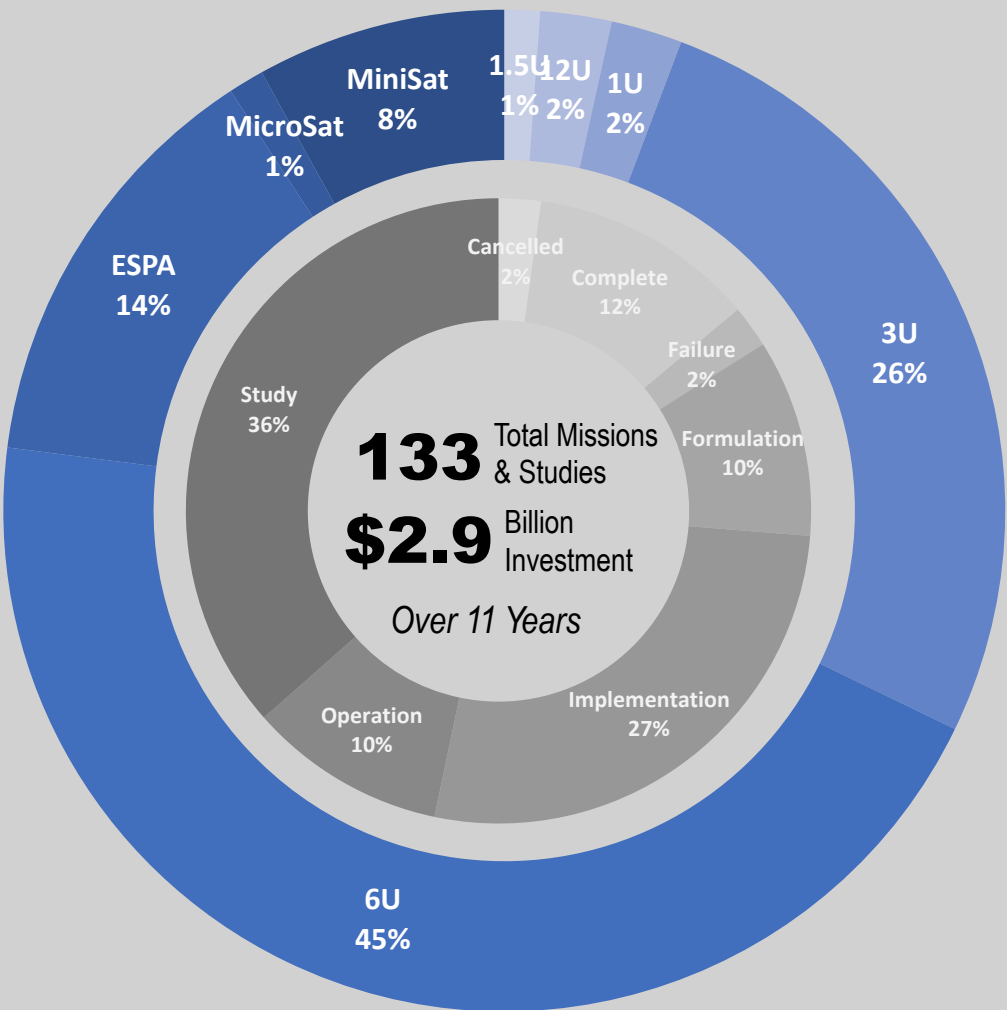
SmallSat/CubeSat Missions by Division



NASA Science SmallSat Launches Per Year



Total Missions by Phase and Satellite Size (excluding studies)



*Data inclusive of missions solicited or directed from 2010-2021.

NASA Science Mission Architecture Trends

Science Mission Directorate, Missions Solicited/Directed from 2010-2021, Data as of December 2021

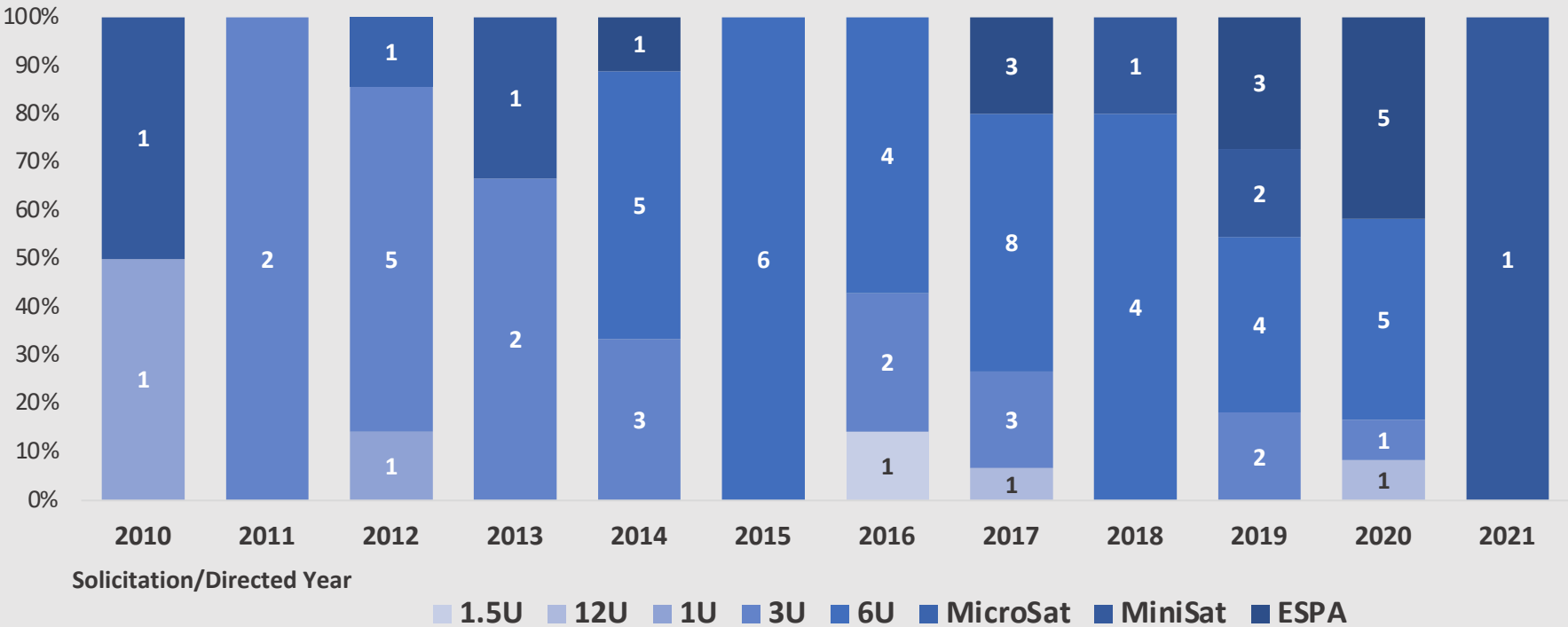
A shift away from 3U or smaller to larger satellites, ESPA-class missions, and constellations

Total Number of Missions (excluding studies)

2	2	7	3	9	6	7	15	5	11	12	1
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% of Total Missions that are Constellations (excluding studies)

-	-	14%	-	22%	-	29%	20%	20%	36%	17%	0%
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NASA SmallSat Status

Missions (formulation or development)

ASPERA (APD)	DIONE (HPD)	CLICK A (STMD)
BLACKCAT (APD)	DYNAGLO (HPD)	CLICK B/C (STMD)
BURSTCUBE (APD)	ESCAPADE (HPD)	CAPSTONE (STMD / HEOMD)
COSI (APD)	EZIE (HPD)	COURIER SEP DEMO (STMD)
IXPE (APD)	GLIDE (HPD)	CPOD (STMD)
PANDORA (APD)	GTOSAT (HPD)	CU-E3 (STMD)
SPARCS (APD)	I-COVEX (HPD)	DUPLEX (STMD)
SPHEREX (APD)	ITC (HPD)	LUNAR FLASHLIGHT (STMD)
SPRITE (APD)	LLITED (HPD)	PACE-2 (STMD)
STARBURST (APD)	PADRE (HPD)	PACE 3 (STMD)
ACMES (ESD)	PETITSAT (HPD)	PACE 4 (STMD)
ARCSTONE (ESD)	PUNCH (HPD)	PTD-3 TBIRD (STMD)
CTIM-FD (ESD)	REAL(HPD)	PTD-4 LISA-T (STMD)
HYTI (ESD)	SOLAR CRUISER (HPD)	STARLING (STMD)
NACHOS (ESD)	TRACERS (HPD)	TEAM MILES (STMD)
PREFIRE (ESD)	SPORT (HPD)	X-NAV (STMD)
SNOOPI (ESD)	SUNRISE (HPD)	BIOSENTINEL (HEOMD)
TROPICS (ESD)	SunCET (HPD)	LUNAR ICECUBE (HEOMD)
TSIS-2 (ESD)	WINDCUBE (HPD)	LUNIR (HEOMD)
AEPEX (HPD)	SWFO-L1 (JASD)	NEASCOUT (HEOMD)
AERO/VISTA (HPD)	JANUS (PSD)	
CIRBE (HPD)	LUNAR TRAILBLAZER (PSD)	
CUBIXSS (HPD)	ACS3 (STMD)	
CURIE (HPD)	CISLUNAR EXPLORERS(STMD)	
CUSP (HPD)		
DAILI (HPD)		

Studies Selected

DORADO (APD)
HELIOSWARM, ARCS (HPD)
MIDEX)

Launched/Deployed

CIRIS-BATC (ESD)
CUPID (HPD)
SORTIE (HPD)
Q-PACE (PSD)
Tropics Pathfinder (ESD)
PACE 1 (STMD)
TECHEDSAT-7 (STMD)
TECHEDSAT-12 (STMD)
TILE DEMO (STMD)

Deorbited/ EOM

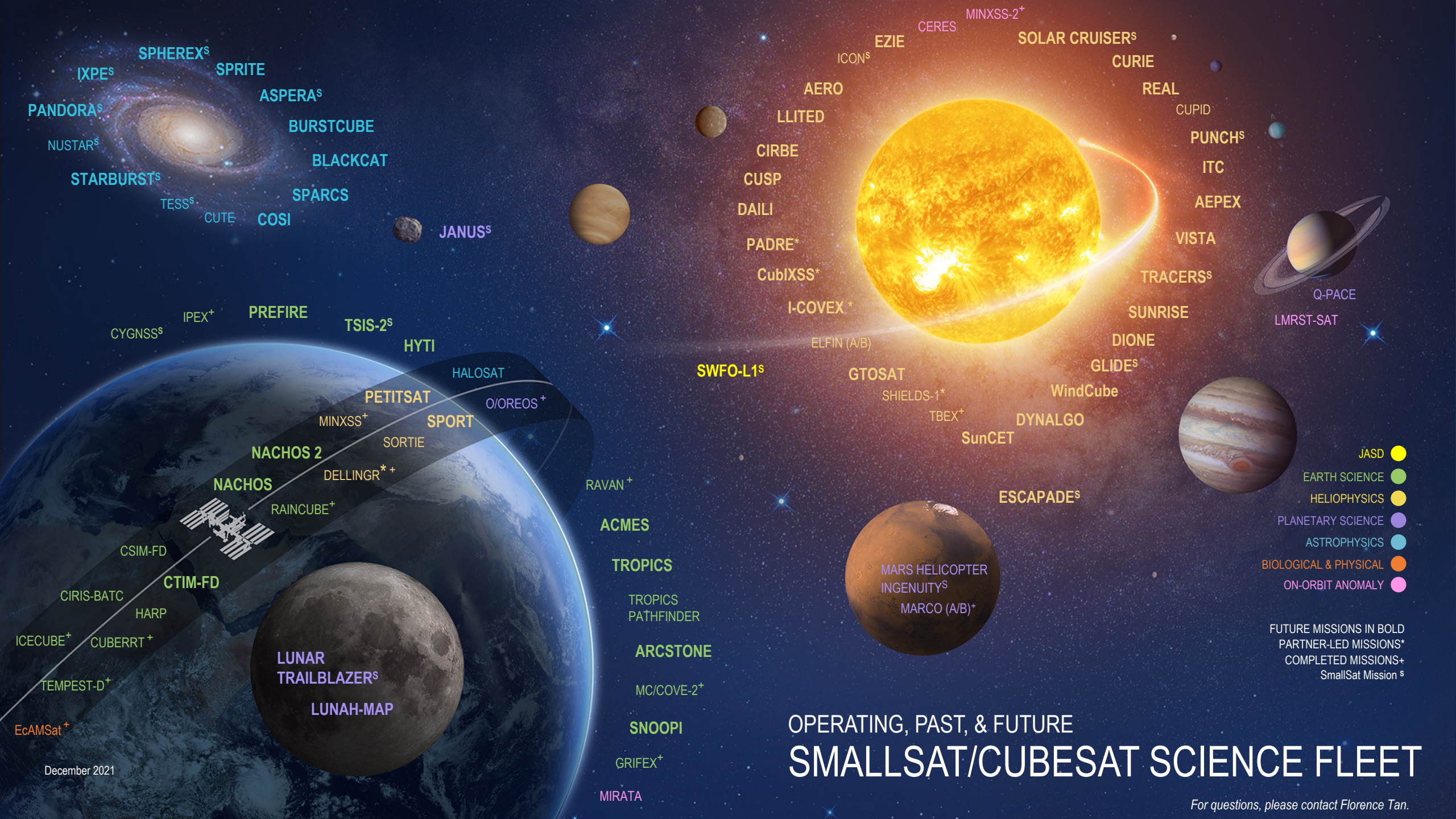
CUBERRT (ESD)
DELINGR (HPD)
HaloSat (APD)
RAINCUBE (ESD)
TBEX (HPD)
TEMPEST-D (ESD)
V-R3X (STMD)

Operating

CIRIS-BATC (ESD)
CSIM-FD (ESD)
CYGNSS (ESD)
CHOMPTT (STMD)
CUTE (APD)
ELFIN (HPD)
HARP (ESD)
PTD11 HYDROS (STMD)
ICON (HPD)
NUSTAR (APD)
ICON (HPD)
PTD-1 (STMD)
RADSAT-G (STMD)
SHIELDS (HPD)
TECHEDSAT-8 (STMD)
TESS (APD)

White: 3U or 6U units
Orange: MiniSat
Yellow: Multiple units
Blue: ESPA-Class Mission
Green: 12U Mission

Missions in formulation or development are trending towards larger form factors or constellations



OPERATING, PAST, & FUTURE SMALLSAT/CUBESAT SCIENCE FLEET

National Aeronautics and
Space Administration



COME
with us

"Twenty years from now you will be more disappointed by the things that you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbor. Catch the trade winds in your sails. Explore. Dream. Discover." Mark Twain