



National Aeronautics and
Space Administration

EXPLORE

Exploiting “New Space” Technologies for Innovative Science Missions

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STP Tech Expo

June 2022



NASA Science SmallSat Status

Missions (formulation or development) as of April 2022

ASPERA (APD)
BLACKCAT (APD)
BURSTCUBE (APD)
COSI (APD)
PANDORA (APD)
SPARCS (APD)
SPHEREX (APD)
SPRITE (APD)
STARBURST (APD)

ACMES (ESD)
ARCSTONE (ESD)
CTIM-FD (ESD)
HYTI (ESD)
INCUS (ESD)
NACHOS (ESD)
PREFIRE (ESD)
SNOOPI (ESD)
TROPICS (ESD)
TSIS-2 (ESD)

AEPEX (HPD)
AERO/VISTA (HPD)
CIRBE (HPD)

CUBIXSS (HPD)
CURIE (HPD)
CUSP (HPD)
DIONE (HPD)
DYNAGLO (HPD)
ESCAPADE (HPD)
EZIE (HPD)
HELIOSWARM (HPD)
GLIDE (HPD)
GTOSAT (HPD)
I-COVEX (HPD)
ITC (HPD)
LLITED (HPD)
MUSE (HPD)
PADRE (HPD)
PETITSAT (HPD)
PUNCH (HPD)
REAL(HPD)
SOLAR CRUISER (HPD)
TRACERS (HPD)
SPORT (HPD)
SUNRISE (HPD)
SunCET (HPD)
WINDCUBE (HPD)

SWFO-L1 (JASD)

JANUS (PSD)
LUNAR TRAILBLAZER (PSD)
LunaH-Map (PSD)

Launched/Deployed

CIRIS-BATC (ESD)
CUPID (HPD)
SORTIE (HPD)

Deorbited/ EOM

CSIM-FD (ESD)
CUBERRT (ESD)
DELINGR (HPD)
HaloSat (APD)
HARP (ESD)
ICECUBE (ESD)
RAINCUBE (ESD)
TBEX (HPD)
TEMPEST-D (ESD)

Failed

CERES (HPD)
LMRST (ESD)
MINXSS-2 (HPD)
MIRATA (ESD)
Q-PACE (PSD)

Operating

CIRIS-BATC (ESD)
CYGNSS (ESD)
DAILI (HPD)
TROPICS Pathfinder (ESD)
CUTE (APD)
ELFIN (HPD)
Ingenuity (PSD)
ICON (HPD)
IXPE (APD)
NUSTAR (APD)
ICON (HPD)
SHIELDS (HPD)
TESS (APD)

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

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

NASA's Science SmallSat Missions at a Glance

Inclusive Missions and Studies

Data as of March 2022, Solicited/Directed 2010-2022



142 Total Science Missions & Studies

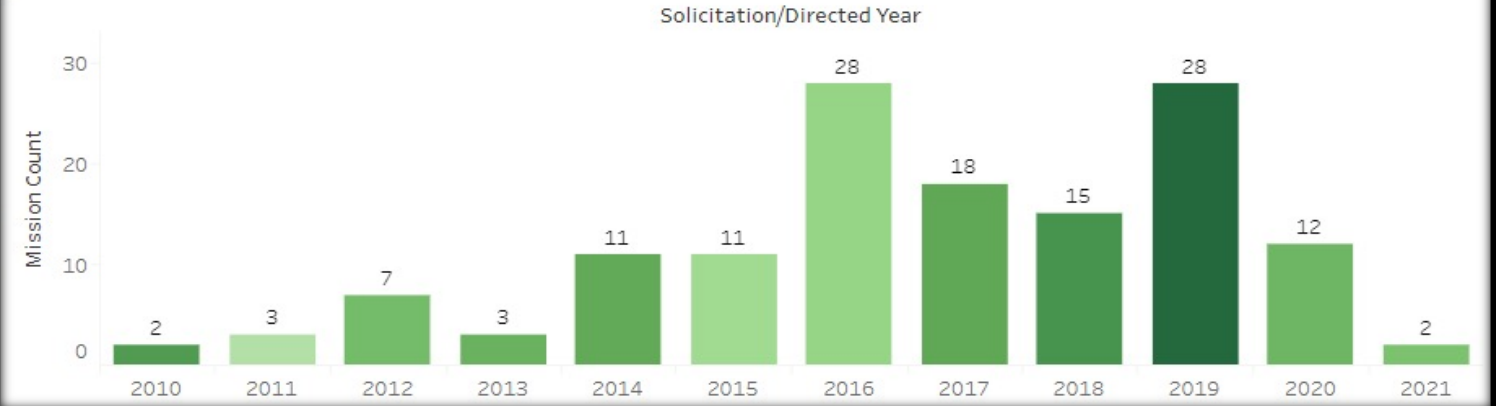
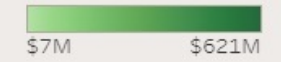


\$3B Total Investment Across all SMD Divisions

SMD Overview of Missions by Solicitation/Directed Year

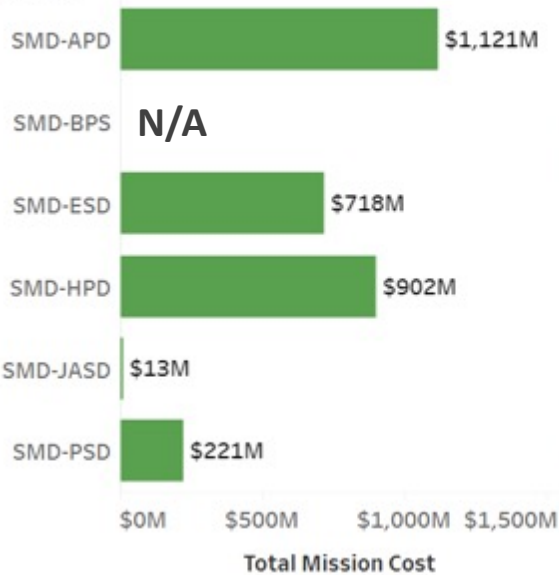
Inclusive of Missions & Studies

Total Mission Cost

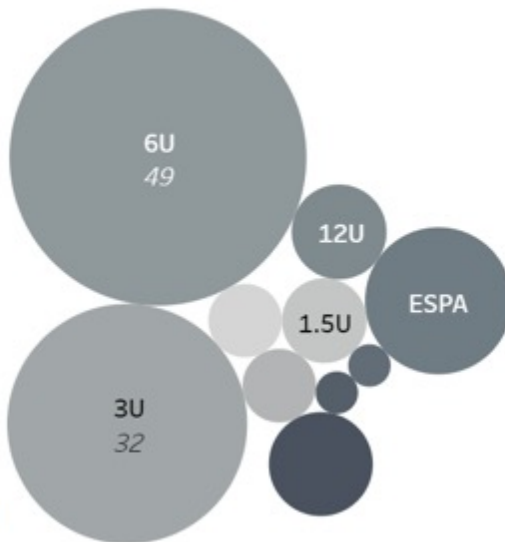


Total Mission Cost

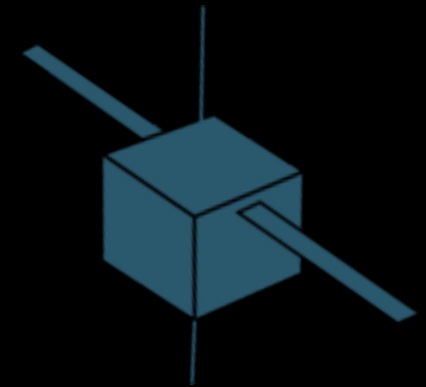
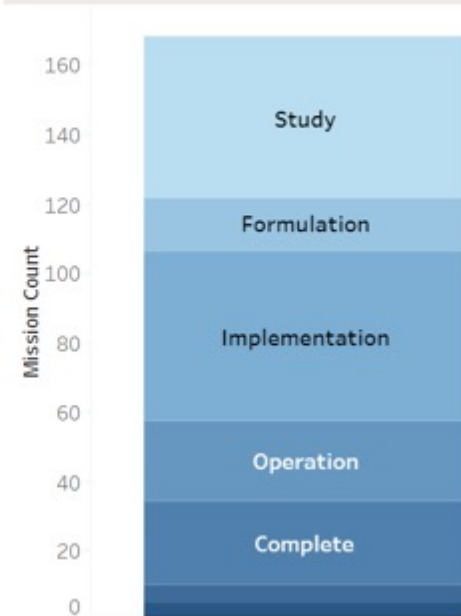
Spons. †



Spacecraft Size (excluding studies)



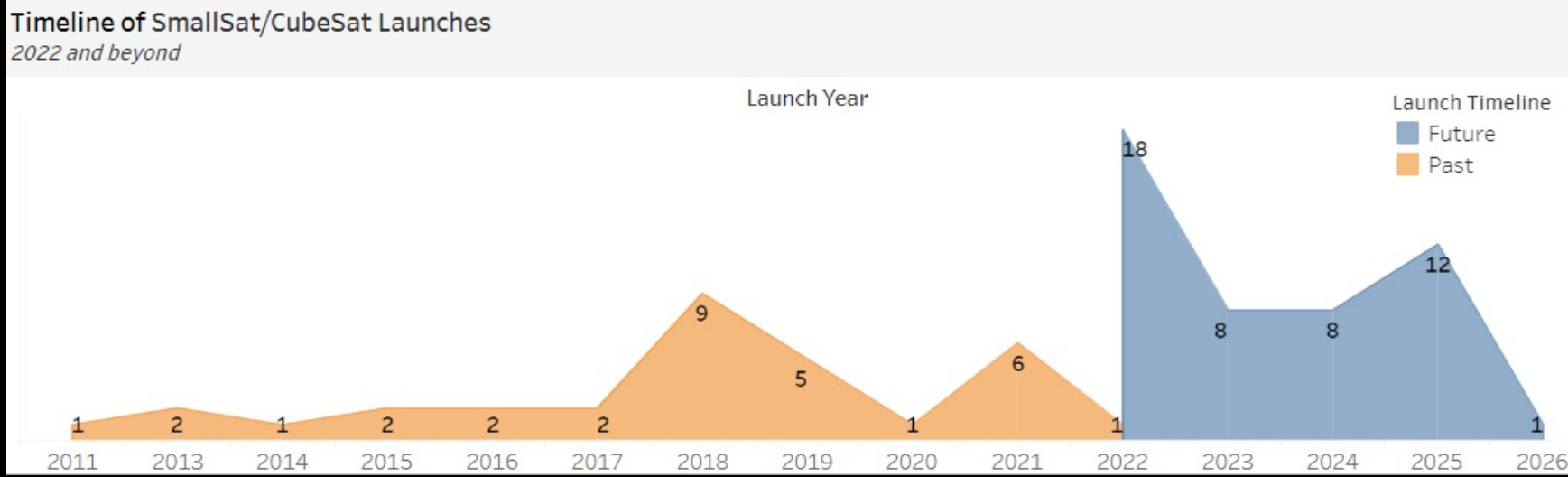
Mission Phase



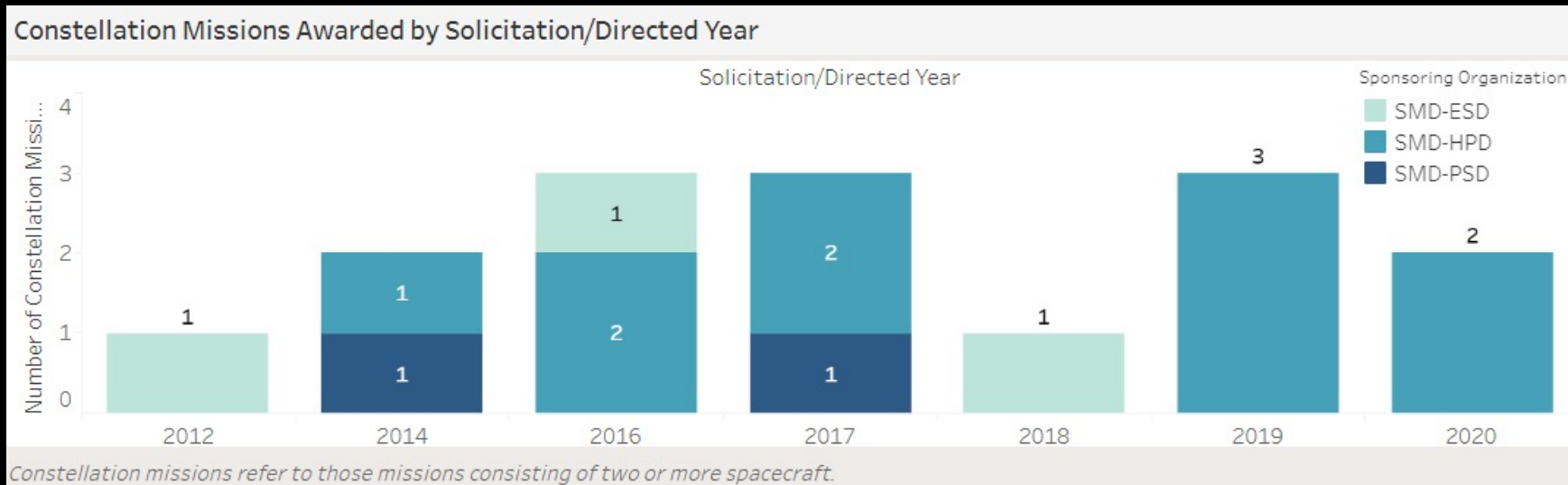
NASA's Science SmallSat Missions at a Glance

Inclusive Missions and Studies

Data as of March 2022, Solicited/Directed 2010-2022



53 SmallSat Missions (83 Spacecrafts) in Formulation/Implementation 2022 and beyond



2022 will launch the most science SmallSat constellation missions to date – four total across three of the Science divisions

Leveraging “New Space”

- Increasingly reliable and maturing spacecraft components and busses
 - Payloads coupled with Increasingly number of providers of reliable COTS components, systems, and busses for SmallSat and CubeSat
- Maturing Communications Infrastructure
 - SCAN NEN migration to NSN – 100% commercial providers for LEO and GEO communications needs
- Access to Space
 - Launch integrators and providers with higher capability
 - Cooperation with OGAs and international partners for access to space
- Increasing services availability and value proposition for Servicing options
 - Spacecraft as a service (Hosted payloads, persistent platforms)
 - In-Space Servicing (Refueling, Component Repair/Swap)
 - Data-as-a-Service

Future opportunities

New Space opportunities

- low-cost, more capable, SmallSats busses and components, increasingly mature communication infrastructure, frequent and higher capability launch vehicles, maturing robotics, new types servicing operations

has potential to positively impact the value proposition using multiple architectures:

- Dedicated missions of Larger Constellation SmallSat Missions
- SmallSat Loiter missions
- Deep Space Exploration

to perform Multi-point Spatial and Temporal observations, event-based coverage for transformative science measurements:

- Time Domain, Multi-wavelength, and Multi-messenger Astronomy
- Tip and Cue missions

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with us COME

"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