

# FY15 Agency Mission Planning Model (AMPM)

Aligned with FY15 Congressional Request

FY		NOTIONAL				OUT YEARS, TENTATIVE																							
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035						
STMD	Space Technology	SST EDSN NODeS SST Phonedat 2.5 FO (SR) - 4 FO (A/C) - 4 FO - Virgin Galactic	DSAC GPIM SST EDSN OCSD FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2	SST ISARA SST CPOD Nanocomposite Fairing FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2	GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2	SST (ORB) LCRD FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2	SST (ORB) SEP Demo FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2	GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)	SST (ORB) GCD (SR) SST (ORB) FO (SR) - 4 FO (A/C) - 4 FO (CRSLP)- 2 TDM (ORB)					
	Exploration	EFT-1	CCiCap/Test CCiCap/Test CCiCap/Test	CCiCap/Test CCiCap/Test CCiCap/Test	EM-1^	AA-2			EM-2^	EM-3^		EM-4^		EM-5^		EM-6^			EM-7^	EM-8^		EM-9^							
HEOMD	Space Operations	TDRS-L		TDRS-M****	International Space Station Operations				TDRS-4G-1	TDRS-4G-2	TDRS-4G-3	TDRS-4G-4	ISS Transition/Retirement																
		SpaceX CRS SpaceX CRS Orbital CRS Orbital CRS Exp-38 Exp-39 Exp-40 Exp-41	SpaceX CRS SpaceX CRS SpaceX CRS SpaceX CRS Orbital CRS Orbital CRS Exp-42 Exp-43 Exp-44 Exp-45	SpaceX CRS SpaceX CRS SpaceX CRS SpaceX CRS Orbital CRS Orbital CRS Exp-46 Exp-47 Exp-48 Exp-49	Orbital CRS Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-50 Exp-51 Exp-52 Exp-53	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-54 Exp-55 Exp-56 Exp-57	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-58 Exp-59 Exp-60 Exp-61	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-62 Exp-63 Exp-64 Exp-65	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-66 Exp-67 Exp-68 Exp-69	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-70 Exp-71 Exp-72 Exp-73	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-74 Exp-75 Exp-76 Exp-77	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81	Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Future Cargo Exp-78 Exp-79 Exp-80 Exp-81					
SMD	Astrophysics	55-SOF(FOC)	ST-7	ISS-CREAM	TESS	JWST	Astro SMEX	Euclid	Astro SMEX	Astro SMEX	Astro SMEX	Astro EX-2	AFTAWFIRST	Astro SMEX	ESA-L2	Astro EX-3	Astro-2	Astro SMEX	Astro SMEX	Astro SMEX	Astro SMEX	Astro SMEX	Astro SMEX	Astro SMEX					
	Earth Sciences	GPM Core	SMAP	SAGE-III***	ICESat-2	GRACE FO	CYGNSS	PACE	SWOT	L-Band SAR	EVM-2	ASCENDS	ESDS	EVS-3*	ESDS-2	EVM-3	ESDS-3	EVS-4*	ESDS-4	EVM-4	EVI-9 MoO&	ESDS-5	EVS-5*	ESDS-6	ESDS-7	EVM-5	EVI-11 MoO&	EVI-12 MoO&	
	Heliophysics		MMS	SET-1	ICON	SPP	Solar Orb	Helio MoO		Helio MoO	Helio EX-2	Helio SMEX	Helio SMEX	Helio SMEX	Helio MoO	Helio SMEX	Helio EX-3	Helio MoO	Helio MoO	LWS-7	Helio MoO		Helio MoO		Helio MoO		Helio SMEX	Helio MoO	
	Planetary Science	MAVEN		Strofiio***	OSIRIS-Rex	MOMA***		Disc-13%	Mars-2020		JUICE	Disc-14%	Mars-2024	NewFront4%		Disc-15	Mars-2028	Disc-16	NewFront5%			Disc-17						NewFront6%	
	Joint Agency Satellite Division	TCTE	DSCOVR	GOES-R	GOES-S	Metop-C	GOES-T				JPSS-2	ADCS/SARSAT- SIDAR		GOES-U															
ARMID	Airspace Operations and Safety																												
	Advanced Air Vehicles	Milestones on Page 2		Milestones on Page 2				Milestones on Page 2															Milestones on Page 2						

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LEGEND	
*	Ground-based elements (includes suborbital)
**	Option
***	Instrument only
****	Content TBD
*****	No Launch Service
%	Radioisotope Power Systems (RPS) planned
&	MoO dates are for instrument delivery to spacecraft
	Commercial crew transportation services to ISS planned two flights per year starting in CY2018
^	SLS and Orion vehicle only - destination/mission elements TBD

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ARMD	Airspace Operations and Safety			<ul style="list-style-type: none"> <li>▲Improve arrival operations efficiency while increasing arrival throughput using integrated aircraft-based and ground-based automation technologies.</li> </ul>	<ul style="list-style-type: none"> <li>▲Document an approach for creating a safety-case framework for representative adaptive, i.e. autonomous, functionality.</li> </ul>	<ul style="list-style-type: none"> <li>▲Establish the basis for safe air/ground functional allocation for separation assurance including safe, graceful degradation of performance.</li> </ul>	<ul style="list-style-type: none"> <li>▲Mitigate problems and contributing factors that lead to flight crew loss of airplane state awareness</li> </ul>	<ul style="list-style-type: none"> <li>▲Simultaneously increase arrivals, departures, and surface operations efficiency while safely increasing overall throughput.</li> </ul>	<ul style="list-style-type: none"> <li>▲Develop a real/live, virtual, and constructive environment where NAS-level performance, safety, and benefits can be examined in an integrated fashion.</li> </ul>	<ul style="list-style-type: none"> <li>▲Increase efficiency and safety of flights by enabling trajectory-based operations.</li> </ul>	<ul style="list-style-type: none"> <li>▲Demonstrate integrated decision making and the cost-effective provision of air traffic management employing advanced networking capability.</li> </ul>	<ul style="list-style-type: none"> <li>▲Enable greatest use of autonomy to safely accommodate future demand, vehicle mix/airspace uses, and different operating business models.</li> </ul>											
	Advanced Air Vehicles		<ul style="list-style-type: none"> <li>▲Characterize in flight gaseous and particulate cruise emissions of alternative fuels such as hydroprocessed esters and fatty acid (HEFA) blended jet fuels and zero-sulfur jet fuel.</li> <li>▲Validate high fidelity analysis tools and design techniques applicable to the creation of low sonic boom supersonic aircraft, including all key relevant features such as inlet and nozzle flow.</li> <li>▲Conduct a round-robin benchmark evaluation of progressive damage analysis methodologies applicable to the first level of the building block (BB) approach to develop and certify composite structures. Deliver test results for first level of BB tests.</li> </ul>	<ul style="list-style-type: none"> <li>▲Characterize potential benefit of vehicle-integrated boundary-layer ingesting propulsion systems for a representative vehicle at TRL3.</li> <li>▲Demonstrate significant advances in variable speed power turbine technology and two-speed drive systems to enable fast and more efficient advanced rotorcraft configurations.</li> <li>▲Demonstrate lightweight aircraft quieting technologies and characterize the potential benefit/trades of an active flow control system that provides high lift for subsonic fixed wing aircraft.</li> <li>▲Demonstrate indoor and outdoor noise metrics, survey tools and test protocols required for the study of community response to overflight of low boom supersonic aircraft</li> <li>▲Demonstrate advanced low-emission, fuel-flexible (LE-FF) combustor concepts for emission reduction to 80% below CAEP6 standards via flametube tests.</li> </ul>	<ul style="list-style-type: none"> <li>▲Demonstrate through analysis and component testing technologies that enable a 50% fuel burn reduction/50% CO2 emissions reduction over current levels for fixed-wing aircraft</li> </ul>	<ul style="list-style-type: none"> <li>▲Demonstrate through analysis and component testing technologies to enable at least 70% reduction in aircraft fuel burn over current levels for subsonic fixed wing aircraft</li> </ul>	<ul style="list-style-type: none"> <li>▲Demonstrate through analysis and component testing technologies to enable a 52dB cumulative noise level below Stage 4 for subsonic fixed wing aircraft</li> </ul>																
	Integrated Aviation Systems		<ul style="list-style-type: none"> <li>▲Evaluate concepts related to UAS for separation assurance, sense and avoid, and ground control stations with communication system performance estimates through an Integrated Human in the Loop (IHITL) simulation to provide data for further technology development</li> <li>▲Complete flight test of the Adaptive Compliant Trailing Edge technology which contributes to weight reduction and therefore the fuel burn goal of the ERA project</li> <li>▲Demonstrate the Low NOx combustor in the full annular rig ground test to validate predicted reductions of Landing and Takeoff (LTO) and Cruise NOx emissions</li> <li>▲Complete ultra high bypass integrated systems test contributing to the goal of the ERA project to reduce fuel burn by 50% at the aircraft system level</li> <li>▲Complete the Active Flow Control enhanced vertical tail flight test supporting the ERA drag reduction challenge</li> <li>▲Complete high-speed performance testing of an ultra high bypass engine integrated with a hybrid wing body (semi-span)</li> <li>▲Flight test of the individual UAS-NAS subproject technologies integrated in a live flight environment representing the National Airspace System</li> <li>▲Deliver final recommendations for procedures and performance standards to enable UAS integration in the air transportation system</li> </ul>																				
		NOTIONAL								OUT YEARS, TENTATIVE													

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LEGEND

**Mission Data Sources**

Space Technology Missions Directorate (STMD)

Human Exploration and Operations (HEOMD)

Science Mission Directorate (SMD)

Aeronautics Research Mission Directorate (ARMD)

<b>Acronym</b>	<b>Definition/Explanation ('x' denotes total or increment number)</b>	<b>Mission Directorate</b>
A/C	aircraft	STMD
DSAC	Deep Space Atomic Clock	STMD
FO (A/C) - x	Flight Opportunity Program, x aircraft flights	STMD
FO (GT) - x	Flight Opportunity Program, x ground tests	STMD
FO (SR) - x	Flight Opportunity Program, x sounding rocket launches	STMD
FO (CRSLP) - x	Flight Opportunity Program, x commercial reusable suborbital launch providers (e.g. Virgin Galactic/ XCOR/ Blue Origin/ others)	STMD
GCD (SR)	Game Changing Development sounding rocket flight	STMD
GPIM	Green Propellant Infusion Mission	STMD
GT	ground test	STMD
LCRD	Laser Communications Relay Demonstration	STMD
MISSE-X	Materials International Space Station Experiment-X	STMD
OCSD	Optical Communications and Sensor Demonstration	STMD
ORB	orbiter	STMD
SR	sounding rocket	STMD
SSD	Solar Sail Demo	STMD
SST (ORB)	Small Spacecraft Technology mission - orbiter	STMD
TDM (ORB)	Tech Demo Mission - orbiter	STMD
AA-x	Ascent Abort Test #x	HEOMD, Exploration
CC Dev/Test	Commercial Crew Development Test	HEOMD, Exploration
EFT-1	Exploration Flight Test-1	HEOMD, Exploration
EM-x	Exploration Mission #x	HEOMD, Exploration
Exp-x	Expedition #x	HEOMD, Space Operations
FOC	Full Operational Capability	HEOMD, Space Operations
Future Cargo	Future Commercial Resupply Service mission (service provider TBD)	HEOMD, Space Operations
ISS	International Space Station	HEOMD, Space Operations
Orbital CRS	Orbital Science Commercial Resupply Service mission	HEOMD, Space Operations
SGSS	Space Network Ground Segment Sustainment	HEOMD, Space Operations
SpaceX CRS	SpaceX Commercial Resupply Service mission	HEOMD, Space Operations
TDRS	Tracking and Data Relay Satellite	HEOMD, Space Operations
TDRS-4G-x	Tracking and Data Relay Satellite 4th Generation Spacecraft #x	HEOMD, Space Operations
AFTA/WFIRST	Astrophysics Focused Telescope Assets/Wide-Field Infrared Survey Telescope	SMD, Astrophysics
Astro EX-x	Astrophysics Explorer Mission #x	SMD, Astrophysics
Astro MoO	Astrophysics Mission of Opportunity	SMD, Astrophysics
Astro SMEX	Astrophysics Small Explorer Mission	SMD, Astrophysics
Astro-H	also known as NeXT (New X-ray Telescope) Mission	SMD, Astrophysics
Astro-x	Astrophysics Decadal Mission #x	SMD, Astrophysics
ESA	European Space Agency	SMD, Astrophysics
HST Disposal	Hubble Space Telescope Disposal Mission	SMD, Astrophysics
ISS-CREAM	Cosmic-Ray Energetics and Mass on ISS	SMD, Astrophysics
JWST	James Webb Space Telescope	SMD, Astrophysics
L2	2nd Lagrangian Point	SMD, Astrophysics
NICER	Neutron-star Interior Composition Explorer	SMD, Astrophysics
SOF	SOFIA (Stratospheric Observatory for Infrared Astronomy)	SMD, Astrophysics
ST-7	New Millennium Program Space Technology Mission #7 (Lisa Pathfinder)	SMD, Astrophysics
TESS	Transiting Exoplanet Survey Satellite	SMD, Astrophysics
xx-Bal	number of balloon flights	SMD, Astrophysics
xx-SOF	number of SOFIA observations	SMD, Astrophysics
ASCENDS	Active Sensing of CO2 Emissions over Nights, Days, and Seasons Mission	SMD, Earth Science
CYGNSS	Cyclone Global Navigation Satellite System Mission	SMD, Earth Science
ESDS-x	Earth Science Decadal Survey Mission #x	SMD, Earth Science
EVI-x MoO&	Earth Venture Instrument Mission of Opportunity	SMD, Earth Science
EVM-x	Earth Venture Mission #x	SMD, Earth Science
EVS-x	Earth Venture Suborbital campaign	SMD, Earth Science
GPM Core	Global Precipitation Measurement Core	SMD, Earth Science
GRACE FO	Gravity Recovery and Climate Experiment Follow-On Mission	SMD, Earth Science
ICESat-x	Ice, Cloud, and land Elevation Satellite Mission #x	SMD, Earth Science
L-Band SAR	L-band Synthetic Aperture Radar (SAR)	SMD, Earth Science
OCO-x	Orbiting Carbon Observatory Mission #x	SMD, Earth Science
PACE	Pre-Aerosol, Clouds, and ocean Ecosystem Mission	SMD, Earth Science
SAGE-III	Stratospheric Aerosol and Gas Experiment 3 on ISS	SMD, Earth Science
SMAP	Soil Moisture Active Passive Mission	SMD, Earth Science
SWOT	Surface Water Ocean Topography Mission	SMD, Earth Science
TEMPO	Tropospheric Emissions: Monitoring of Pollution Mission	SMD, Earth Science
xx-Air	number of aircraft flights	SMD, Earth Science
GOLD	Global-scale Observations of the Limb and Disk Mission	SMD, Heliophysics
Helio EX-x	Heliophysics Explorer Mission #x	SMD, Heliophysics
Helio MoO	Heliophysics Explorer Mission of Opportunity	SMD, Heliophysics
Helio SMEX	Heliophysics Small Explorer Mission	SMD, Heliophysics
ICON	Ionospheric Connection Explorer	SMD, Heliophysics
LWS-x	Living with a Star Mission #x	SMD, Heliophysics
MMS	Magnetospheric Multiscale Mission	SMD, Heliophysics
SET-x	Space Environment Testbed Mission #x	SMD, Heliophysics
Solar Orb	Solar Orbiter Collaboration	SMD, Heliophysics
SPP	Solar Probe Plus	SMD, Heliophysics
STP-x	Solar Terrestrial Probe Mission #x	SMD, Heliophysics
xx-SR	number of sounding rocket flights	SMD, Heliophysics
Disc-xx	Discovery Mission #x	SMD, Planetary Science
Insight	Interior Exploration using Seismic Investigations, Geodesy and Heat Transport Mission	SMD, Planetary Science
JUICE	JUupiter ICy moons Explorer Mission	SMD, Planetary Science
MAVEN	Mars Atmosphere and Volatile Evolution Mission	SMD, Planetary Science
MOMA	Mars Organic Molecule Analyzer	SMD, Planetary Science