

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION



CHRONOLOGICAL HISTORY
FISCAL YEAR 1973
BUDGET SUBMISSION

Prepared by:
Office of Administration
Budget Operations Division
Code BT-1 EXT. 58400

9/5/72
Final

KEY TO PAGE NUMBERS UNDER LEGISLATIVE REFERENCE

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Note: Legislative documents reproduced herein are not complete in all cases. For complete text refer to the document itself.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Chronological History of the FY 1973 Budget Submission
(In thousands of dollars)

I T E M	A U T H O R I Z A T I O N							A P P R O P R I A T I O N				
	NASA Budget Submission	House Comm Approved HR 14070 Rep 92-976 4/11/72	House Approved 4/20/72	Senate Comm Approved HR 14070 Rep 92-779 5/3/72	Senate Approved 5/11/72	PL 92-304 5/19/72	Diff. from Budget Submission	House HR 15093 Rep 92-1071 5/18/72 Appd 5/23/72	Senate HR 15093 Rep 92-820 5/31/72 Appd 6/14/72	Conf Comm Rep 92-1261 PL 92-383 8/14/72	Diff from Budget Submission	Diff from Authorization
TOTAL APPROPRIATIONS:												
Research & Development..	2,600,900	2,650,850	2,650,850	2,613,400	2,637,400	2,637,400	+36,500	2,550,000 ^{3/}	2,624,900 ^{6/}	2,600,900 ^{6/}	---	-36,500
Construction of Facilities.....	77,300	77,300	77,300	77,300	77,300	77,300	---	69,760 ^{4/}	77,300	77,300	---	---
Research and Program Management:												
Basic submission....	(700,800)	(700,800)	(700,800)	(700,800)	(700,800)	(700,800)	(---)	(700,800)	(700,800)	(700,800)	---	---
Amendment (pay incr.)	(28,650)	(---) ^{2/}	(---) ^{2/}	(28,650)	(28,650)	(28,650)	(---)	(28,650)	(28,650)	(28,650)	---	---
TOTAL R&PM.....	729,450	700,800	700,800	729,450	729,450	729,450	---	729,450^{5/}	729,450	729,450	---	---
GRAND TOTAL.....	3,407,650	3,428,950	3,428,950	3,420,150	3,444,150	3,444,150	+36,500	3,349,210	3,431,650	3,407,650	---	-36,500
R&D Appropriation:												
OMSF.....	1,224,400	1,224,400	1,224,400	1,224,400	1,224,400	1,224,400	---	*	1,224,400	1,224,400	*	*
OSS.....	669,400	665,400	665,400	669,400	669,400	669,400	---	*	669,400	669,400	*	*
OA.....	194,700	198,700	198,700	207,200	207,200	207,200	+12,500	*	194,700	194,700	*	*
OAST.....	249,300	297,750	297,750	249,300	273,300	273,300	+24,000	*	273,300	249,300	*	*
OTDA.....	259,100	259,100	259,100	259,100	259,100	259,100	---	*	259,100	259,100	*	*
OTU.....	4,000	5,500	5,500	4,000	4,000	4,000	---	*	4,000	4,000	*	*
TOTAL R&D.....	2,600,900	2,650,850	2,650,850	2,613,400	2,637,400	2,637,400	+36,500	2,550,000	2,624,900	2,600,900	6/	-36,500^{6/}
CoF Appropriation:												
OMSF.....	585	585	585	585	585	585	---	585	585	585	---	---
OSS.....	11,690	11,690	11,690	11,690	11,690	11,690	---	11,690	11,690	11,690	---	---
OAST.....	15,825	15,825	15,825	15,825	15,825	15,825	---	15,825	15,825	15,825	---	---
O&M.....	13,300	13,300	13,300	13,300	13,300	13,300	---	13,300	13,300	13,300	---	---
Space Shuttle ^{1/}	27,900	27,900	27,900	27,900	27,900	27,900	---	22,360	27,900	27,900	---	---
Fac. Plan'g and Design..	8,000	8,000	8,000	8,000	8,000	8,000	---	8,000	8,000	8,000	---	---
TOTAL CoF.....	77,300	77,300	77,300	77,300	77,300	77,300	---	69,760	77,300	77,300	---	---
R&PM Appropriation:												
OMSF.....	327,767	327,767	327,767	327,767	327,767	327,767	---	327,767	327,767	327,767	---	---
OSS.....	102,507	102,507	102,507	102,507	102,507	102,507	---	102,507	102,507	102,507	---	---
OAST.....	210,409	210,409	210,409	210,409	210,409	210,409	---	210,409	210,409	210,409	---	---
Supporting Operations...	60,117	60,117	60,117	60,117	60,117	60,117	---	60,117	60,117	60,117	---	---
Subtotal R&PM (Basic)...	700,800	700,800	700,800	700,800	700,800	700,800	---	700,800	700,800	700,800	---	---
Amendment (pay incr.)...	28,650	---	---	28,650	28,650	28,650	---	28,650	28,650	28,650	---	---
TOTAL R&PM.....	729,450	700,800	700,800	729,450	729,450	729,450	---	729,450	729,450	729,450	---	---
TOTAL NASA.....	3,407,650	3,428,950	3,428,950	3,420,150	3,444,150	3,444,150	+36,500	3,349,210	3,431,650	3,407,650	---	36,500

GPO 911-408

1/ OMSF and OAST are both program offices for Space Shuttle.
 2/ \$28,650,000 Budget Amendment (Pay Incr.) not included in House action.
 3/ Committee indicated that the \$50.9 million reduction in R&D was an overall reduction but that the authorized levels for aviation safety and noise reduction should be carried out.
 4/ Available for obligation through June 30, 1975.
 5/ Includes authority to replace one administrative aircraft.
 * Undistributed.

6/ Senate Bill and P.L. 92-383 specifically earmark \$24,000,000 available only for aeronautical research in the fields of noise abatement and aviation safety.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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(In thousands of dollars)

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RESEARCH AND DEVELOPMENT	2,600,900	2,650,850	2,650,850	2,613,400	2,637,400	2,637,400	+36,500	2,550,000	2,624,900 ^{2/}	2,600,900 ^{2/}	--- ^{2/}	-36,500 ^{2/}
Apollo.....	128,700	128,700	128,700	128,700	128,700	128,700	---	*	128,700	*	*	*
Space Flight Operations..	1,094,200	1,094,200	1,094,200	1,094,200	1,094,200	1,094,200	---	*	1,094,200	*	*	*
Advanced Missions.....	1,500	1,500	1,500	1,500	1,500	1,500	---	*	1,500	*	*	*
Physics & Astronomy.....	156,600	152,600	152,600	156,600	156,600	156,600	---	*	156,600	*	*	*
Lunar & Planetary.....	321,200	321,200	321,200	321,200	321,200	321,200	---	*	321,200	*	*	*
Launch Vehicle Proc.....	191,600	191,600	191,600	191,600	191,600	191,600	---	*	191,600	*	*	*
Space Applications.....	194,700	198,700	198,700	207,200	207,200	207,200	+12,500	*	194,700	*	*	*
Aeronautical Research & Technology.....	163,440	211,890	211,890	163,440	187,440	187,440	+24,000	*	187,440	*	*	*
Space Research & Tech....	64,760	64,760	64,760	64,760	64,760	64,760	---	*	64,760	*	*	*
Nuclear Power & Prop.....	21,100	21,100	21,100	21,100	21,100	21,100	---	*	21,100	*	*	*
Tracking & Data Acq.....	259,100	259,100	259,100	259,100	259,100	259,100	---	*	259,100	*	*	*
Technology Utilization...	4,000	5,500	5,500	4,000	4,000	4,000	---	*	4,000	*	*	*
CONSTRUCTION OF FACILITIES	77,300	77,300	77,300	77,300	77,300	77,300	---	69,760	77,300	77,300	---	---
Ames Research Center.....	1,825	1,825	1,825	1,825	1,825	1,825	---	1,825	1,825	1,825	---	---
Coddard Space Flight Center	590	590	590	590	590	590	---	590	590	590	---	---
Jet Propulsion Laboratory..	610	610	610	610	610	610	---	610	610	610	---	---
Kennedy Space Center.....	10,140	10,140	10,140	10,140	10,140	10,140	---	10,140	10,140	10,140	---	---
Langley Research Center....	4,290	4,290	4,290	4,290	4,290	4,290	---	4,290	4,290	4,290	---	---
Levis Research Center.....	9,710	9,710	9,710	9,710	9,710	9,710	---	9,710	9,710	9,710	---	---
Manned Spacecraft Center...	585	585	585	585	585	585	---	585	585	585	---	---
Wallops Station.....	350	350	350	350	350	350	---	350	350	350	---	---
Various Locations (Shuttle) Rehabilitation and Modifi- cation of facilities....	27,900	27,900	27,900	27,900	27,900	27,900	---	22,360	27,900	27,900	---	---
Minor Construction.....	11,580	11,580	11,580	11,580	11,580	11,580	---	11,580	11,580	11,580	---	---
Facility Planning & Design.	1,720	1,720	1,720	1,720	1,720	1,720	---	1,720	1,720	1,720	---	---
	8,000	8,000	8,000	8,000	8,000	8,000	---	6,000	8,000	8,000	---	---
RESEARCH AND PROGRAM MGMT.	729,450	700,800	700,800	729,450	729,450	729,450	---	729,450	729,450	729,450	---	---
Basic Submission.....	700,800	700,800	700,800	700,800	700,800	700,800	---	700,800	700,800	700,800	---	---
Amendment.....	28,650	--- ^{1/}	--- ^{1/}	28,650	28,650	28,650	---	28,650	28,650	28,650	---	---
TOTAL NASA.....	3,407,650	3,428,950	3,428,950	3,420,150	3,444,150	3,444,150	+36,500	3,349,210	3,431,650	3,407,650	---	-36,500

GPO 911-408

^{1/} \$28,650,000 not included in House action.

^{2/} Senate Bill and P.L. 92-383 specifically earmark \$24,000,000 available only for aeronautical research in the fields of noise abatement and aviation safety. No further distribution was indicated in the law.

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RESEARCH & DEVELOPMENT APPROPRIATION:	2,600,900	2,650,850	2,650,850	2,613,400	2,637,400	2,637,400	+36,500	2,550,000	2,550,000	2,624,900	2,624,900	2,600,900 ^{1/}
OFFICE OF MANNED SPACE FLIGHT.....	1,224,400	1,224,400	1,224,400	1,224,400	1,224,400	1,224,400	---			1,224,400	1,224,400	
Apollo Program.....	(128,700)	(128,700)	(128,700)	(128,700)	(128,700)	(128,700)	(---)			(128,700)	(128,700)	
Spacecraft.....	79,500	79,500	79,500	79,500	79,500	79,500	---			79,500	79,500	
Saturn V.....	49,200	49,200	49,200	49,200	49,200	49,200	---			49,200	49,200	
Space Flight Operations Program.....	(1,094,200)	(1,094,200)	(1,094,200)	(1,094,200)	(1,094,200)	(1,094,200)	(---)			(1,094,200)	(1,094,200)	
Skylab.....	540,500	540,500	540,500	540,500	540,500	540,500	---			540,500	540,500	
Space shuttle.....	200,000	200,000	200,000	200,000	200,000	200,000	---			200,000	200,000	
Orbital systems and payloads.....	23,000	23,000	23,000	23,000	23,000	23,000	---			23,000	23,000	
Space life sciences.....	25,500	25,500	25,500	25,500	25,500	25,500	---			25,500	25,500	
Development, test, and mission operations....	305,200	305,200	305,200	305,200	305,200	305,200	---			305,200	305,200	
Advanced Missions Program. Advanced missions.....	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(1,500)	(---)			(1,500)	(1,500)	
1,500	1,500	1,500	1,500	1,500	1,500	1,500	---			1,500	1,500	
OFFICE OF SPACE SCIENCE...	669,400	665,400	665,400	669,400	669,400	669,400	---			669,400	669,400	
Physics and Astronomy Program.....	(156,600)	(152,600)	(152,600)	(156,600)	(156,600)	(156,600)	(---)			(156,600)	(156,600)	
Large observatories.....	79,700	75,700	75,700	79,700	79,700	79,700	---			79,700	79,700	
OSO.....	(14,500)	(14,500)	(14,500)	(14,500)	(14,500)	(14,500)	(---)			(14,500)	(14,500)	
OAO.....	(5,600)	(5,600)	(5,600)	(5,600)	(5,600)	(5,600)	(---)			(5,600)	(5,600)	
HEAO.....	(59,600)	(55,600)	(55,600)	(59,600)	(59,600)	(59,600)	(---)			(59,600)	(59,600)	
Orbiting explorers.....	32,000	32,000	32,000	32,000	32,000	32,000	---			32,000	32,000	
Sub-Orbital programs....	25,000	25,000	25,000	25,000	25,000	25,000	---			25,000	25,000	
Supporting activities....	19,900	19,900	19,900	19,900	19,900	19,900	---			19,900	19,900	
Lunar and Planetary Exploration Program....	(321,200)	(321,200)	(321,200)	(321,200)	(321,200)	(321,200)	(---)			(321,200)	(321,200)	
Mariner.....	43,000	43,000	43,000	43,000	43,000	43,000	---			43,000	43,000	
Viking.....	229,500	229,500	229,500	229,500	229,500	229,500	---			229,500	229,500	
Outer planets mission...	7,000	7,000	7,000	7,000	7,000	7,000	---			7,000	7,000	
Pioneer/Helios.....	12,500	12,500	12,500	12,500	12,500	12,500	---			12,500	12,500	
SR&T advanced studies...	18,700	18,700	18,700	18,700	18,700	18,700	---			18,700	18,700	
Planetary astronomy.....	4,800	4,800	4,800	4,800	4,800	4,800	---			4,800	4,800	
Data analysis.....	3,500	3,500	3,500	3,500	3,500	3,500	---			3,500	3,500	
Planetary quarantine....	2,200	2,200	2,200	2,200	2,200	2,200	---			2,200	2,200	

GPO 911-408

1/ P.L. 92-383 earmarks \$24,000,000 available only for aeronautical research in the fields of noise abatement and aviation safety. No further distribution was indicated in the Law.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Chronological History of the FY 1973 Budget Submission
(In thousands of dollars)

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Launch Vehicle Procurement Program.....	(191,600)	(191,600)	(191,600)	(191,600)	(191,600)	(191,600)	(---			(191,600)	(191,600)	
SR&T/Advanced studies...	4,000	4,000	4,000	4,000	4,000	4,000	---			4,000	4,000	
Scout.....	21,000	21,000	21,000	21,000	21,000	21,000	---			21,000	21,000	
Centaur.....	106,500	106,500	106,500	106,500	106,500	106,500	---			106,500	106,500	
Delta.....	41,900	41,900	41,900	41,900	41,900	41,900	---			41,900	41,900	
Titan IIIC.....	18,200	18,200	18,200	18,200	18,200	18,200	---			18,200	18,200	
OFFICE OF APPLICATIONS....	194,700	198,700	198,700	207,200	207,200	207,200	+12,500			194,700	194,700	
Space Applications Program	(194,700)	(198,700)	(198,700)	(207,200) ^{1/}	(207,200)	(207,200)	(+12,500)			(194,700)	(194,700)	
Earth resources survey..	48,400	48,400	48,400	48,400	48,400	48,400	---			48,400	48,400	
Earth resources technology satellites...	(35,400)	(35,400)	(35,400)	(35,400)	(35,400)	(35,400)	(---			(35,400)	(35,400)	
Aircraft program.....	(13,000)	(13,000)	(13,000)	(13,000)	(13,000)	(13,000)	(---			(13,000)	(13,000)	
Applications technology satellites.....	61,200	61,200	61,200	61,200	61,200	61,200	---			61,200	61,200	
Nimbus.....	28,300	28,300	28,300	28,300	28,300	28,300	---			28,300	28,300	
Synchronous meteorological satellites....	11,500	11,500	11,500	11,500	11,500	11,500	---			11,500	11,500	
Cooperative applications satellites.....	3,300	3,300	3,300	3,300	3,300	3,300	---			3,300	3,300	
TIROS/TOS improvements..	8,000	8,000	8,000	9,000	9,000	9,000	+1,000			8,000	8,000	
TOS improvements.....	(2,200)	(2,200)	(2,200)	(3,200)	(3,200)	(3,200)	(+1,000)			(2,200)	(2,200)	
TIROS-N.....	(5,800)	(5,800)	(5,800)	(5,800)	(5,800)	(5,800)	(---			(5,800)	(5,800)	
Geodetic satellites.....	5,000	5,000	5,000	5,000	5,000	5,000	---			5,000	5,000	
Global atmospheric research program.....	4,500	4,500	4,500	6,500	6,500	6,500	+2,000			4,500	4,500	
Meteorological soundings	1,500	1,500	1,500	1,500	1,500	1,500	---			1,500	1,500	
Supporting research and technology/advanced studies.....	22,000	22,000	22,000	23,000	23,000	23,000	+1,000			22,000	22,000	
Earth observatory satellite studies....	1,000	5,000	5,000	2,000	2,000	2,000	+1,000			1,000	1,000	
Small applications technology satellites.	---	---	---	5,000	5,000	5,000	+5,000			---	---	
Radio interference and propagation program...	---	---	---	2,500	2,500	2,500	+2,500			---	---	

GPO 811-408

^{1/} Senate Committee recommendation also includes restoration of \$7,500,000 to offset an across-the-board reduction by OMB. Distribution of this amount by project is in accordance with information provided in hearings before the House Authorization Committee.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Chronological History of the FY 1973 Budget Submission
(in thousands of dollars)

I T E M	A U T H O R I Z A T I O N							A P P R O P R I A T I O N				
	NASA Budget Submission	House Comm Approved HR 14070 Rep 92-976 4/11/72	House Approved 4/20/72	Senate Comm Approved HR 14070 Rep 92-779 5/3/72	Senate Approved 5/11/72	PL 92-304 5/19/72	Diff. from Budget Submission	House Comm Approved HR 15093 Rep 92-1071 5/18/72	House Approved 5/23/72	Senate Comm Approved HR 15093 Rep 92-820 5/31/72	Senate Approved 6/14/72	Conf Comm Appd 7/27/72 PL 92-383 8/14/72
OFFICE OF AERONAUTICS AND SPACE TECHNOLOGY.....	249,300	297,750	297,750	249,300	273,300	273,300	+24,000			273,300	273,300	
Aeronautical Research and Technology Program.....	(163,440)	(211,890)	(211,890)	(163,440)	(187,440)	(187,440)	(+24,000)			(187,440)	(187,440)	
Research and technology base.....	90,640	98,090	98,090	90,640	93,640	93,640	+3,000			93,640	93,640	
Systems and design studies.....	7,000	7,000	7,000	7,000	7,000	7,000	---			7,000	7,000	
Systems and experimental programs.....	65,800	106,800	106,800	65,800	86,800	86,800	+21,000			86,800	86,800	
Space Research and Technology Program.....	(64,760)	(64,760)	(64,760)	(64,760)	(64,760)	(64,760)	(---)			(64,760)	(64,760)	
Research and technology base.....	53,485	53,485	53,485	53,485	53,485	53,485	---			53,485	53,485	
Systems and design studies.....	1,000	1,000	1,000	1,000	1,000	1,000	---			1,000	1,000	
Systems and experimental programs.....	10,275	10,275	10,275	10,275	10,275	10,275	---			10,275	10,275	
Nuclear Power and Propulsion Program.....	(21,100)	(21,100)	(21,100)	(21,100)	(21,100)	(21,100)	(---)			(21,100)	(21,100)	
Nuclear power.....	9,200	9,200	9,200	9,200	9,200	9,200	---			9,200	9,200	
Nuclear propulsion.....	8,500	8,500	8,500	8,500	8,500	8,500	---			8,500	8,500	
Electrophysics.....	3,400	3,400	3,400	3,400	3,400	3,400	---			3,400	3,400	
OFFICE OF TRACKING AND DATA ACQUISITION.....	259,100	259,100	259,100	259,100	259,100	259,100	---			259,100	259,100	
Tracking and Data Acquisition Program.....	(259,100)	(259,100)	(259,100)	(259,100)	(259,100)	(259,100)	(---)			(259,100)	(259,100)	
Operations.....	203,600	203,600	203,600	203,600	203,600	203,600	---			203,600	203,600	
Equipment.....	44,000	44,000	44,000	44,000	44,000	44,000	---			44,000	44,000	
SR&T.....	11,500	11,500	11,500	11,500	11,500	11,500	---			11,500	11,500	

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Chronological History of the FY 1973 Budget Submission
(In thousands of dollars)

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OFFICE OF TECHNOLOGY												
UTILIZATION.....	4,000	5,500	5,500	4,000	4,000	4,000	---			4,000	4,000	
Technology Utilization Program.....	(4,000)	(5,500)	(5,500)	(4,000)	(4,000)	(4,000)	(---)			(4,000)	(4,000)	
New technology dissemination.....	850	1,150	1,150	850	850	850	---			850	850	
New technology identifi- cation, evaluation and publication.....	1,100	1,100	1,100	1,100	1,100	1,100	---			1,100	1,100	
Technology applications..	1,600	2,800	2,800	1,600	1,600	1,600	---			1,600	1,600	
Program evaluation and benefits.....	450	450	450	450	450	450	---			450	450	

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Prepared by:
Office of Administration
Budget Operations Div.
Code BT-1 Ext. 58400

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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CONSTRUCTION OF FACILITIES APPROPRIATION:	77,300	77,300	77,300	77,300	77,300	77,300	---	69,760	69,760	77,300	77,300	77,300
AMES RESEARCH CENTER.....	(1,825)	(1,825)	(1,825)	(1,825)	(1,825)	(1,825)	(---)	(1,825)	(1,825)	(1,825)	(1,825)	(1,825)
R-Rehab. and mod. of aeronautical, airborne science and support facilities.....	1,065	1,065	1,065	1,065	1,065	1,065	---	1,065	1,065	1,065	1,065	1,065
R-Rehab. of unitary plan wind tunnel model supports, control sys. and model prep. areas.	760	760	760	760	760	760	---	760	760	760	760	760
GODDARD SPACE FLIGHT CENTER	(590)	(590)	(590)	(590)	(590)	(590)	(---)	(590)	(590)	(590)	(590)	(590)
S-Rehab. and mod. of utility systems.....	590	590	590	590	590	590	---	590	590	590	590	590
JET PROPULSION LABORATORY.	(610)	(610)	(610)	(610)	(610)	(610)	(---)	(610)	(610)	(610)	(610)	(610)
S-Rehab. and mod. of roadway system.....	610	610	610	610	610	610	---	610	610	610	610	610
KENNEDY SPACE CENTER.....	(10,140)	(10,140)	(10,140)	(10,140)	(10,140)	(10,140)	(---)	(10,140)	(10,140)	(10,140)	(10,140)	(10,140)
S-Mods. of and adds. to spacecraft assembly facilities.....	8,100	8,100	8,100	8,100	8,100	8,100	---	8,100	8,100	8,100	8,100	8,100
S-Mods. of TITAN Centaur facilities.....	2,040	2,040	2,040	2,040	2,040	2,040	---	2,040	2,040	2,040	2,040	2,040
LANGLEY RESEARCH CENTER...	(4,290)	(4,290)	(4,290)	(4,290)	(4,290)	(4,290)	(---)	(4,290)	(4,290)	(4,290)	(4,290)	(4,290)
R-Rehab. of full scale wind tunnel.....	2,465	2,465	2,465	2,465	2,465	2,465	---	2,465	2,465	2,465	2,465	2,465
R-Mod. of central air supply system.....	1,175	1,175	1,175	1,175	1,175	1,175	---	1,175	1,175	1,175	1,175	1,175
R-Environmental mods. for utility operations	650	650	650	650	650	650	---	650	650	650	650	650
LEWIS RESEARCH CENTER.....	(9,710)	(9,710)	(9,710)	(9,710)	(9,710)	(9,710)	(---)	(9,710)	(9,710)	(9,710)	(9,710)	(9,710)
R-Mod. of high temp. and high press. turbine and combustor res. fac.	9,710	9,710	9,710	9,710	9,710	9,710	---	9,710	9,710	9,710	9,710	9,710
MANNED SPACECRAFT CENTER..	(585)	(585)	(585)	(585)	(585)	(585)	(---)	(585)	(585)	(585)	(585)	(585)
M-Mod. of fire protection system.....	585	585	585	585	585	585	---	585	585	585	585	585
Wallops Station.....	(350)	(350)	(350)	(350)	(350)	(350)	(---)	(350)	(350)	(350)	(350)	(350)
S-Warehouse replacement.	350	350	350	350	350	350	---	350	350	350	350	350

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M - Manned Space Flight facilities.
S - Space Science facilities.
R - Aeronautics and Space Technology facilities.
O - Office of Organization and Management projects.

Prepared by:
Office of Administration
Budget Operations Div.
Code BT-1 Ext. 58400

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Chronological History of the FY 1973 Budget Submission
(In thousands of dollars)

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VARIOUS LOCATIONS:												
Space shuttle facs:.....	(27,900)	(27,900)	(27,900)	(27,900) ^{1/}	(27,900) ^{1/}	(27,900) ^{1/}	---	(22,360)	(22,360)	(27,900)	(27,900)	(27,900)
M-Mod. of altitude test facilities, AEDC.....	6,800	6,800	6,800	6,800	6,800	6,800	---	6,800	6,800	6,800	6,800	6,800
M-Rehab. of propellant and high pressure gaseous systems, MTF..	1,160	1,160	1,160	1,160	1,160	1,160	---	1,160	1,160	1,160	1,160	1,160
R-Mod. of entry structures fac., LRC..	1,635	1,635	1,635	1,635	1,635	1,635	---	1,635	1,635	1,635	1,635	1,635
M-Add. for systems integration and mockup lab., MSC.....	2,545	2,545	2,545	2,545	2,545	2,545	---	2,545	2,545	2,545	2,545	2,545
M-Mod. of vibration and acoustic test facility MSC.....	2,770	2,770	2,770	2,770	2,770	2,770	---	2,770	2,770	2,770	2,770	2,770
M-Mod. of structures and mechanics lab., MSFC..	4,700	4,700	4,700	4,700	4,700	4,700	---	4,700	4,700	4,700	4,700	4,700
M-Add. for electrical power lab., MSFC.....	320	320	320	320	320	320	---	320	320	320	320	320
M-Mod. of acoustic model engine test fac., MSFC	2,430	2,430	2,430	2,430	2,430	2,430	---	2,430	2,430	2,430	2,430	2,430
M-Mod. of manufacturing and final asmb. fac., undesignated locations	5,540	5,540	5,540	5,540	5,540	5,540	---	---	---	5,540	5,540	5,540
REHABILITATION AND MODIFICATION OF FACILITIES (0)	(11,580)	(11,580)	(11,580)	(11,580)	(11,580)	(11,580)	---	(11,580)	(11,580)	(11,580)	(11,580)	(11,580)
MINOR CONSTRUCTION OF FACILITIES (0).....	(1,720)	(1,720)	(1,720)	(1,720)	(1,720)	(1,720)	---	(1,720)	(1,720)	(1,720)	(1,720)	(1,720)
FACILITY PLANNING AND DESIGN (0).....	(8,000)	(8,000)	(8,000)	(8,000)	(8,000)	(8,000)	---	(6,000)	(6,000)	(8,000)	(8,000)	(8,000)

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^{1/} The Senate amended the Authorization Bill to identify each Space Shuttle project as subline items for each facility; this amendment was agreed to by the House and is included in the Authorization Act.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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RESEARCH AND PROGRAM												
MANAGEMENT APPROPRIATION												
BY OBJECT CLASSIFICATION:	(700,800)	(700,800)	(700,800)	(700,800)	(700,800)	(700,800)	(---	(700,800)	(700,800)	(700,800)	(700,800)	(700,800)
Personnel compensation..	497,516	497,516	497,516	497,516	497,516	497,516	---	497,516	497,516	497,516	497,516	497,516
Personnel benefits.....	42,724	42,724	42,724	42,724	42,724	42,724	---	42,724	42,724	42,724	42,724	42,724
Benefits for former personnel.....	185	185	185	185	185	185	---	185	185	185	185	185
Travel & transportation of persons.....	17,545	17,545	17,545	17,545	17,545	17,545	---	17,545	17,545	17,545	17,545	17,545
Transportation of things	3,527	3,527	3,527	3,527	3,527	3,527	---	3,527	3,527	3,527	3,527	3,527
Rent, comm. & utilities.	39,219	39,219	39,219	39,219	39,219	39,219	---	39,219	39,219	39,219	39,219	39,219
Printing and repro.....	4,838	4,838	4,838	4,838	4,838	4,838	---	4,838	4,838	4,838	4,838	4,838
Other services.....	79,752	79,752	79,752	79,752	79,752	79,752	---	79,752	79,752	79,752	79,752	79,752
Supplies and materials..	12,577	12,577	12,577	12,577	12,577	12,577	---	12,577	12,577	12,577	12,577	12,577
Equipment.....	2,675	2,675	2,675	2,675	2,675	2,675	---	2,675	2,675	2,675	2,675	2,675
Lands and structures....	157	157	157	157	157	157	---	157	157	157	157	157
Grants, subsidies and contributions.....	51	51	51	51	51	51	---	51	51	51	51	51
Insurance claims and indemnities.....	34	34	34	34	34	34	---	34	34	34	34	34
BY INSTALLATION:												
Kennedy Space Center....	89,253	89,253	89,253	89,253	89,253	89,253	---	89,253	89,253	89,253	89,253	89,253
Manned Spacecraft Center	106,891	106,891	106,891	106,891	106,891	106,891	---	106,891	106,891	106,891	106,891	106,891
Marshall Sp. Flt. Center	131,623	131,623	131,623	131,623	131,623	131,623	---	131,623	131,623	131,623	131,623	131,623
Goddard Sp. Flt. Center.	92,056	92,056	92,056	92,056	92,056	92,056	---	92,056	92,056	92,056	92,056	92,056
Wallops Station.....	10,451	10,451	10,451	10,451	10,451	10,451	---	10,451	10,451	10,451	10,451	10,451
Ames Research Center....	41,139	41,139	41,139	41,139	41,139	41,139	---	41,139	41,139	41,139	41,139	41,139
Flight Research Center..	10,824	10,824	10,824	10,824	10,824	10,824	---	10,824	10,824	10,824	10,824	10,824
Langley Research Center.	76,279	76,279	76,279	76,279	76,279	76,279	---	76,279	76,279	76,279	76,279	76,279
Lewis Research Center...	82,167	82,167	82,167	82,167	82,167	82,167	---	82,167	82,167	82,167	82,167	82,167
NASA Headquarters.....	60,117	60,117	60,117	60,117	60,117	60,117	---	60,117	60,117	60,117	60,117	60,117
BY FUNCTION:												
Personnel.....	543,587	543,587	543,587	572,237 ^{2/}	572,237 ^{2/}	572,237	---	572,237	572,237	572,237	572,237	572,237
Travel.....	15,741	15,741	15,741	15,741	15,741	15,741	---	15,741	15,741	15,741	15,741	15,741
Facilities services.....	67,714	67,714	67,714	67,714	67,714	67,714	---	67,714	67,714	67,714	67,714	67,714
Technical services.....	32,038	32,038	32,038	32,038	32,038	32,038	---	32,038	32,038	32,038	32,038	32,038
Administrative support..	41,720	41,720	41,720	41,720	41,720	41,720	---	41,720	41,720	41,720	41,720	41,720
AMENDMENT (Pay Incr.)	(28,650)	(---	(---	(28,650)	(28,650)	(28,650)	(---	(28,650)	(28,650)	(28,650)	(28,650)	(28,650)
TOTAL R&PM	729,450	700,800	700,800	729,450	729,450	729,450	---	729,450	729,450	729,450	729,450	729,450

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1/ \$28,650,000 Budget Amendment (Pay Incr.) not included in House action.

2/ The Senate Report specifically added the \$28,650,000 pay increase Amendment to the Personnel Function and established a limitation of \$572,237,000 for this function.

AUTHORIZING APPROPRIATIONS TO THE NATIONAL
 AERONAUTICS AND SPACE ADMINISTRATION

APRIL 11, 1972.—Committed to the Committee of the Whole House on the
 State of the Union and ordered to be printed

Mr. MILLER of California, from the Committee on Science and
 Astronautics, submitted the following

REPORT

[To accompany H.R. 14070]

The Committee on Science and Astronautics, to whom was referred
 the bill (H.R. 14070) to authorize appropriations to the National
 Aeronautics and Space Administration for research and development,
 construction of facilities, and research and program management, and
 for other purposes, having considered the same, report favorably
 thereon without amendment and recommend that the bill do pass.

PURPOSE OF THE BILL

The purpose of the bill is to authorize appropriations to the National
 Aeronautics and Space Administration for fiscal year 1973, as follows:

Programs	Authorization	Page No.
Research and development.....	\$2, 650, 850, 000	3
Construction of facilities.....	77, 300, 000	111
Research and program management...	700, 800, 000	159
Total.....	3, 428, 950, 000	

EXPLANATION OF THE BILL

RESEARCH AND DEVELOPMENT

SUMMARY

Programs	Authorization	Page No.
1. Apollo.....	\$128, 700, 000	5
2. Space flight operations.....	1, 094, 200, 000	8
3. Advanced missions.....	1, 500, 000	17
4. Physics and astronomy.....	152, 600, 000	18
5. Lunar and planetary exploration..	321, 200, 000	29
6. Launch vehicle procurement.....	191, 600, 000	39
7. Space applications.....	198, 700, 000	43
8. Aeronautical research and technology.....	211, 890, 000	60
9. Space research and technology....	64, 760, 000	82
10. Nuclear power and propulsion....	21, 100, 000	95
11. Tracking and data acquisition....	259, 100, 000	98
12. Technology utilization.....	5, 500, 000	109
Total.....	2, 650, 850, 000	

COMMITTEE ACTIONS

RESEARCH AND DEVELOPMENT

PHYSICS AND ASTRONOMY

The committee has reduced the NASA request of \$59,600,000 for the HEAO project by \$4,000,000. The committee approves of the objectives of the HEAO project, having been persuaded that it is of great scientific interest, and the small reduction in the funding request is not expected to have any significant impact upon the spacecraft development program, or upon the launch schedule.

On the other hand, this action by the committee provides an opportunity to express its concern over the fact that NASA evidently places a higher priority upon certain expensive scientific projects, such as HEAO, than it does upon space applications projects which Congress considers most important and for which members of this committee have repeatedly urged more aggressive action and higher levels of funding. Accordingly, the \$4 million reduction in the HEAO project is to be specifically applied to the Earth Observation Satellite project.

SPACE APPLICATIONS

The committee has, in the past, expressed its dissatisfaction with the slow pace and narrow scope of the Earth Resources Survey program, and wishes to do so again in this report. The Earth Resources Technology Satellites project is finally reaching fruition with the approaching launch of the first of two ERTS Satellites in June of this year. There is no follow-on project currently under development, however, and unless some action is taken soon, there will be a hiatus in the remote sensing effort following the launch of ERTS-B in 1973.

The committee feels that it is not too early to undertake a follow-on development to the ERTS project. The Earth Observation Satellite, now under study, is conceived as the follow-on to ERTS, but NASA has requested only \$1 million for this work for fiscal year 1973.

However, in its original submission to the Office of Management and Budget, \$5 million was requested for EOS so that phase C might be undertaken during the forthcoming fiscal year. The committee voted to restore the \$4 million cut imposed by OMB so that NASA will be permitted to proceed with this important project.

AERONAUTICS AND SPACE TECHNOLOGY

The Aeronautics and Space Technology (AST) program provides the research which leads to many aeronautics and space applications. The results of investment in this research will be reflected in applications one to twenty years hence. The FY 1971 amount was \$260,336,000 and the FY 1972 level was \$212,825,000; this reduction was a serious setback in maintaining a research and development base for solving current and future problems.

The FY 1973 budget request is \$249,300,000, which is less than the FY 1971 amount but is higher than FY 1972. The increase of FY 1973

over FY 1972 is primarily for aeronautical research and development—an area which has been somewhat neglected in recent years.

To correct what the Committee believes to be two major deficiencies in the NASA budget request, an increase of \$48,450,000 is recommended. The increase is designed to expedite solutions to two of the major problems in civil aviation today: noise pollution and safety. The specific details of the increase are described in the following paragraphs.

AERONAUTICAL RESEARCH AND TECHNOLOGY

NASA's budget request for Aeronautical Research and Technology was \$163,440,000.

To the amount requested, the Committee recommends an increase of \$48,450,000 for a total authorization of \$211,890,000.

In special hearings during January of this year the Committee reviewed in considerable detail the results of the Joint DOT-NASA Civil Aviation Research and Development (CARD) Policy Study Report. A major conclusion of this report is that aircraft noise is the number one problem in domestic civil aviation today.

Another major problem identified in the report is terminal area congestion—of which an important element is safety.

Testimony taken in the January hearings and during the FY 1973 authorization hearings showed that more could and should be done in attacking these two critical problems: aircraft noise and safety. This testimony, plus Committee investigation, provided a basis for the actions of the Committee in increasing the FY 1973 NASA Budget request. The increases are consistent with and in support of the CARD Study Report findings and recommendations which follow:

Summary of Card Study Findings

1. As a result of the government's past supportive policies, the contributions of research and development, and the domestic success of civil aviation, the United States currently enjoys a recognized position of world leadership. The seven largest free world airlines are United States carriers. Over half of the free world passenger miles are flown by U.S. carriers. Three-fourths of the free world's commercial aircraft are U.S. manufactured. The United States exports over two and one-half times as many general aviation aircraft as the rest of the world. The government has supported and fostered civil aviation; civil aviation has responded with impressive growth and has achieved widespread acceptance; and in return, the user, the public, and the nation have received a variety of benefits.

2. The growth pattern of the past will not necessarily continue in the future. Unless changing attitudes and conditions are recognized and new priorities are established, noise, pollution, ground congestion, delays, declining profits and other factors will combine to defeat the success the aviation industry enjoyed in the years between 1958 and 1968.

3. To the general public, deeply concerned with the environment, the major problem is pollution—primarily noise.

4. To the user, concerned with service, delays caused by terminal congestion are most important. The cost to passengers of airborne delays has been estimated at about \$100 million in 1969. The cost to

carriers from aircraft terminal area delays due to congestion have been estimated at over \$150 million. Without corrective action, these costs could grow to approximately \$400 million and \$600 million respectively in 1980.

5. To the operators, concerned with finances, major losses are occurring due to airport and airplane congestion. Operators are also confronted with large operating losses relating to the short-haul market. This market is a major contributor to airline industry losses which preliminary estimates place at over \$150 million in 1970.

6. The aircraft manufacturers are also facing severe financial problems. The research and prototype development of a modern transport aircraft may require a peak commitment on the order of several times the net worth of the producing company. Production runs of several hundred aircraft may be required to reach the break-even point. If the market for these aircraft falters, serious financial problems result for the producing company as well as for the aerospace industry as a whole.

7. Research and development are essential to the solution of some of the current problems. However, the aviation industry is being increasingly affected by problems which are not solely technical. Solutions will involve not only traditional applications of the physical sciences and engineering, but far greater emphasis on economics, the social sciences, and institutional considerations (legal, regulatory, organizational, etc.).

Card Study Recommendations

1. Aircraft noise abatement should be given high priority because of widespread concern for the environment and because success in the noise abatement program will affect the solution to other problems. It is recommended that time-phased research goals be established calling for reductions in aircraft noise by a factor of between 10 and 30 every 10 years until aircraft noise is no longer noticeable.

2. An organized effort should be directed toward the solution of terminal area congestion. This solution will involve a combination of air traffic control, runway capacity, ground control aircraft, terminal processing, passenger access and egress, and parking. An important part of the solution to the congestion problem will lie in the two areas of airport location, and acquisition and development of land for future airports. It is recommended that several airports, including the National Aviation Facilities Experimentation Center and Edwards AFB, be used for demonstration and experimental purposes to develop technology and procedures related to alleviating terminal congestion.

3. The government should fund studies for the conceptual design and analysis of economical aircraft for the low density, short-haul market. In addition to studying the technical problems involved in the short-haul market, a program should be established to determine market sensitivities to changes in service, fare, frequency, and equipment. It is felt that a government sponsored market demonstration will be required for this purpose.

4. A research and development program for aviation propulsion systems is essential to continued United States aviation leadership. Main areas of concentration should include short-haul and supersonic

aircraft engine designs with special emphasis on noise and air pollution reduction.

5. In the fields of general aviation and air cargo handling, the government's role for the present should focus on overall standard setting and flight safety. In accepting the responsibility for standards and safety, it is important that the government sponsor the R&D necessary to discharge the obligation effectively.

6. A series of indicators should be developed which will allow the United States to accurately assess the status and trends of its aviation industry. It is felt that the responsibility for measuring these indicators would best lie with the Department of Commerce.

7. The government should examine carefully its regulatory role in a number of areas to insure that its regulatory policies are not inhibiting industry innovation. One prime example is the current policy opposing multi-modal mergers involving air carriers. The regulation may represent one major barrier to realizing the full potential of air cargo and inter-modal cargo shipment. It should also be noted that in this area the Ash Council recommended the establishment of a single transportation regulatory agency.

8. It is recommended that there be a personnel exchange program between DOT, NASA, DOD, and possibly CAB. This program would involve middle management personnel and would contribute to providing a group of broadly trained personnel with experience in all elements of civil aviation.

9. The National Aeronautics and Space Council should develop a permanent mechanism to review and recommend those policies affecting civil aviation that embrace more than one aviation-related agency.

10. Constant attention should be given to the transfer of technology between military and civilian aviation.

11. Offices should be established in the Department of Transportation to manage all interagency or joint programs. These offices should be staffed by personnel from DOT, NASA, CAB, and DOD as appropriate.

12. To take full advantage of the expertise and other resources in the airline and aerospace industries, joint enterprises between government and industry should be considered for major experimental demonstration and hardware programs.

The recommended increase of \$48,450,000 would be used in the following ways:

SUMMARY OF COMMITTEE ACTIONS

	Budget request 1973	Recommended change	Recommended amount
Noise reduction R. & D. for existing civil air fleet.....	\$9,000,000	+\$41,000,000	\$50,000,000
Aviation safety R. & D.—commercial and general aviation.....	17,200,000	+7,450,000	24,650,000
Remainder of aeronautics research and technology.....	137,240,000		137,240,000
Total.....	163,440,000	+48,450,000	211,890,000

SUMMARY OF RESOURCES REQUIREMENTS

	1971	1972	1973
Research and technology base	\$74, 109, 000	\$70, 076, 000	\$98, 090, 000
Systems and design studies	5, 143, 000	8, 094, 000	7, 000, 000
Systems and experimental programs	20, 880, 000	31, 830, 000	\$106, 800, 000
Total	100, 132, 000	110, 000, 000	\$211, 890, 000

RESEARCH AND TECHNOLOGY BASE

	1971	1972	1973
Materials research and technology	\$4, 216, 000	\$5, 800, 000	\$7, 200, 000
Structures research and technology	3, 150, 000	3, 776, 000	8, 070, 000
Avionics research and technology	3, 885, 000	2, 543, 000	12, 100, 000
Propulsion research and technology	17, 051, 000	20, 005, 000	26, 900, 000
Aerodynamics research and technology	13, 702, 000	12, 922, 000	10, 170, 000
Configuration research and technology	23, 828, 000	18, 930, 000	25, 300, 000
Life sciences research and technology	2, 100, 000	3, 100, 000	3, 050, 000
Operations research and technology	5, 277, 000	2, 100, 000	4, 400, 000
Technical assistance to DOD	900, 000	900, 000	900, 000
Total	74, 109, 000	70, 076, 000	98, 090, 000

SYSTEMS AND DESIGN STUDIES

	1971	1972	1973
System studies	\$993, 000	\$1, 594, 000	\$2, 200, 000
Study and analysis	993, 000	1, 294, 000	1, 500, 000
Air transportation system studies		300, 000	700, 000
Experimental design studies	4, 150, 000	6, 500, 000	4, 800, 000
Conventional takeoff and landing			500, 000
Advanced technology experimental fighter study			2, 000, 000
Lift fan research vehicle	500, 000	1, 000, 000	500, 000
Advanced transport technology systems studies	3, 650, 000	2, 700, 000	1, 300, 000
Short takeoff landing system and design study		2, 800, 000	500, 000
Total	5, 143, 000	8, 094, 000	7, 000, 000

SYSTEMS AND EXPERIMENTAL PROGRAMS

	1971	1972	1973
Experimental engine programs	\$8, 054, 000	\$5, 000, 000	\$53, 000, 000
CTOL experimental quiet engine	8, 054, 000	5, 000, 000	1, 000, 000
STOL experimental quiet engine			2, 000, 000
JT3D/JT8D engine quieting			50, 000, 000
Flight experiments program	9, 176, 000	9, 200, 000	12, 700, 000
C-8 augmentor wing research aircraft	2, 971, 000	2, 200, 000	1, 500, 000
F-8 transport technology flight research	780, 000	1, 000, 000	2, 500, 000
YF-12 research aircraft technology program	4, 900, 000	2, 900, 000	4, 700, 000
F-111 TACT (transonic aircraft technology)		100, 000	200, 000
Fly-by-wire	525, 000	1, 000, 000	1, 700, 000
Composite structures flight experiment		2, 000, 000	2, 100, 000
Research/experiments vehicle program	1, 150, 000	13, 340, 000	30, 500, 000
Rotor test vehicle research aircraft		740, 000	1, 500, 000
Tilt rotor research aircraft		400, 000	1, 500, 000
Quiet experimental STOL aircraft (Questol)	1, 150, 000	12, 200, 000	27, 500, 000
Operating systems experiments program	2, 500, 000	4, 290, 000	10, 600, 000
Noise reduction flight procedures experiment		300, 000	3, 400, 000
Terminal configured vehicle operations experiments		400, 000	4, 200, 000
V/TOL operating systems experiments		300, 000	500, 000
STOL operating system experiments	2, 500, 000	3, 290, 000	2, 500, 000
Total	20, 880, 000	31, 830, 000	106, 800, 000

Noise Reduction of Existing Civil Air Fleet

An increase of \$41,000,000 from \$9,000,000 to \$50,000,000 is recommended.

There are three basic ways of approaching the problem of aircraft noise abatement: (1) reducing the noise at the source (the aircraft) by advances resulting from research and development; (2) modifying aircraft operating procedures which involves a combination of changing traditional procedures and introducing advances in technology; and (3) land use control. Only the first approach is clearly within the jurisdiction of this Committee although a part of the second approach is included also.

During our hearings extensive discussion was devoted to the aircraft noise abatement problem—with major attention being given to the highly controversial subject of what to do about the noisier part of our current civil aviation fleet. Among the alternatives identified during the hearings were the following:

- (1) Retrofitting the existing civil fleet with modifications which will make current engines more quiet.
- (2) Retrofitting some parts of the existing fleet with new quiet engines.
- (3) Retiring larger numbers of the civil fleet earlier than otherwise might be the case except for the noise problem.
- (4) Closing airports to aircraft creating noise above certain levels.
- (5) Purchasing land and buildings near airports subjected to objectionably high noise levels.

Only the first two alternatives were discussed in detail during the Committee hearings—as these fall, in varying degree, within the jurisdiction of NASA and this Committee. As a result of our hearings the following conclusions may be reached:

- (1) New quiet engines are not generally feasible—either technically or economically—for retrofitting the existing civil and general aviation fleets. However, such engines will be used with new generations of aircraft.
- (2) Retrofitting by means of modifications to existing engines appear technically feasible for the DC-8 and 707 aircraft (which use the JT3D engine) and the 727, 737 and DC-9 aircraft (which use the JT8D engine).
- (3) NASA has been doing research on large quiet fans while the Department of Transportation is currently carrying out engine nacelle treatment investigations (this work involves lining the inside of the engine nacelle with sound absorbing material). The “new large fan” approach used with nacelle treatment offers the potential of substantial noise reductions on both landing and take-off: however, nacelle treatment—used alone—reduces only the landing noise.

NASA has \$9,000,000 in its FY 1973 budget request to begin a development and demonstration program which will take about \$130,000,000 to complete. However, the FY 1973 amount does not permit an expedited program; it would not be possible to begin modifying fleet airplanes until the end of 1976. The Committee determined that it was technically feasible to undertake an R&D program which could lead to the initiation of civil fleet retrofitting during the latter half of 1975. Achieving such a schedule calls for increased funding in FY 1973. Therefore, the Committee recommends the increase of \$41,000,000

for the specific purpose of accelerating the R&D retrofit program by one year—without increasing total program costs. This action would represent a major step in solving what the CARD Study demonstrated to be the number one problem in civil aviation.

The Committee also recommends that future national plans and decisions concerning the civil air fleet retrofit program should consider the possibility of recovery of the Government's research and development investment. It is too early to specify the precise mechanism but the idea would be essentially as follows: Whenever the decision is made to proceed with the production retrofit—which will cost several billion dollars—it is conceivable that the government could recover the \$130,000,000 R&D package as being part of the overall retrofit program cost. (The determination of how the production retrofit should be paid for is beyond the scope of this Committee, but there are Bills now before the Congress which deal with this issue.)

Aviation Safety

An increase of \$7,450,000 from \$17,200,000 to \$24,650,000 is recommended.

- (1) *Aircraft Compatibility With New FAA Microwave Landing System by 1978 (\$3,750,000)*

During a recent five year period, half of the accidents involving civil aircraft occurred during approach and landing. Of these, half occurred in low-visibility weather, i.e., weather in which fog, low clouds, or precipitation made the pilot's task more difficult. The current technique for low-visibility approach and landing involves non-visual, automatic flight down to a “decision height.” At the decision height the pilot continues the landing manually if he can see to land; he aborts the landing if he cannot see to land or if he perceives that he is not properly aligned to land.

This mixed “automatic-then-manual” procedure which is necessary with today's instrument landing systems and airborne equipment increases the risk of landing in low-visibility weather by a factor of 100 over the risk of landing in good weather. The Committee believes that the best technique to achieve approach and landing safety would be to provide a very reliable, fully automatic system whose performance can be monitored by the pilot and which does not depend on outside visibility. Relieving the pilot of controlling the actual touchdown of the aircraft on the runway does not belittle his role or reduce his responsibility. The pilot is “promoted” from being an operator to becoming a systems manager, still bearing responsibility for his airplane's and passengers' safety.

NASA has a program for providing and demonstrating the airborne technology and systems engineering for automatic approach and landing, based on the new FAA Microwave Landing System. However, the present level of funding by NASA does not permit a rate of progress which would demonstrate the technology and systems engineering in time for civil aircraft, especially commercial civil aircraft, to be prepared for fully automatic flight at the time of deployment of the new Microwave Landing System which is planned for 1978.

To make automatic landings work in airline operations requires a determined effort by the airlines—even after the technology and feasibility have been clearly demonstrated. The necessary airline effort includes equipment procurement and certification, pilot and crew training, issuance of new operating procedures, and new maintenance capability, training, and practices.

The NASA program, which is being integrated with the "National Plan for Development of the Microwave Landing System," could be accelerated to demonstrate the airborne technology and systems engineering for safe, reliable automatic landing early enough for the airlines to be prepared for the availability of the ground portion of the approach and landing system. This program would include the elements of autopilots, computers and flight control sensors, displays, and techniques and instrumentation for assessing and monitoring the performance of the automatic equipment. The additional funds are required in FY 1973 to assure routine, safe, reliable automatic approach and landing by means of the Microwave Landing System by 1978.

(2) *Turbulence Research* (\$700,000)

Besides increasing NASA's focus on approach and landing safety, the Committee recommends an increase of the rate of progress on achieving protection from turbulence. Incidents and accidents involving aircraft encounters with turbulence account for about 30% of the total number of accidents. Although all aircraft are affected by natural turbulence, often found in clouds and clear air, smaller aircraft are particularly susceptible to the hazards associated with the turbulent wakes created by larger airplanes. Research planned in FY 1973 to help reduce the impact of the aircraft/turbulence problem would be greatly accelerated by additional funding of \$700,000 in the following areas:

(A) *Clear Air Turbulence (CAT) Detection*—NASA's airborne CAT detection program using the laser-Doppler concept is underway. For an additional \$400,000 in funds, ground testing, checkout, flight tests, and evaluation could be accelerated. At the same time, necessary work on equipment development such as power amplifiers, detectors, optical radomes, and ruggedized lasers can be undertaken to improve the performance of the system.

(B) *Trailing Vortex Attenuation*—With an increase of \$300,000, more research emphasis can be directed to investigating ways to reduce or eliminate the hazardous aspects of wing-tip vortices by aerodynamic, mechanical or other techniques. Additional analytical and experimental studies of various concepts for vortex modification could be carried out to determine their effectiveness. These investigations would involve wind tunnel tests, water tank tests, and full scale evaluation of ideas such as wing design changes, wing tip pumping, etc.

(3) *Aircraft Collision Avoidance Research* (\$3,000,000)

Another major cause of accidents is the mid-air collision. As the number of aircraft increases over time, the pressure to prevent this type of accident also increases. Further, although infrequent, the cata-

strophic nature of collisions between general aviation aircraft and air carriers warrants considerable attention.

While NASA has been active in this area for a number of years, it was the judgment of the Committee that additional work should be done to speed up the availability of low-cost, reliable collision avoidance devices and systems for general aviation aircraft. A major problem is to determine whether and how such devices should be related to collision avoidance systems to be used by the civil fleet aircraft. It was concluded that additional funds in the following areas could be fruitfully used as follows:

(A) *Synchronous Systems*

- **Satellite Synchronization Systems** (\$250,000)
Techniques for communicating precise time from a synchronous satellite to ground stations or to aircraft will be investigated, and a development program defined. Costs will be determined and compared with other proposed synchronizing techniques to permit trade offs in the design of operational systems.
- **Precise Clock for Collision Avoidance System Synchronization (CAS)** (\$400,000)
A mercury ion frequency standard will be developed for aircraft use. It offers promise of lighter weight than rubidium and cesium standards with stability equivalent to that of a hydrogen maser. This would be particularly useful for a low cost CAS clock in aircraft but is also needed for other purposes such as one-way ranging and secure communication systems.
- **Low Cost Time/Frequency CAS Subsystems** (\$450,000)
A study has been made to determine which subsystems of the time-frequency airborne CAS equipment are responsible for its high cost and which are amenable to lowering in cost by the use of new techniques. Selected components and subsystems such as the digital altitude decoders and Doppler processors will be examined for application of new technology or elimination by other techniques.
- **Minimum-Modular Time/Frequency CAS Equipment** (\$200,000)
Concepts will be explored which will permit a general aviation aircraft owner to participate in the time-frequency collision avoidance system on the most basic level—that in which he transmits in a time-slot but receives no warnings himself. Add-on modules will also be planned which will permit him to participate in this well-defined system at progressively higher levels at minimal cost.

(B) *Asynchronous Systems*

- **Open-Access Pilot Warning System (PWI)** (\$250,000)
This pilot warning technique was successfully flight tested in 1969 to determine its feasibility and has since been redesigned in-house to lower its cost. Operational flight test equipments will be contracted for in June of 1972 and tests completed in 1973.
- **Minimum-Modular Asynchronous CAS Equipment** (\$100,000)
A modular set of equipments will be examined which would permit a general aviation aircraft owner to participate in asynchronous collision avoidance systems on any level his pocket book permits from the most basic reply-only with no warning, to com-

plete warn-and-be-warned capability. If one of these systems becomes well enough defined during the period, equipment will be constructed for test.

General

- **Operational Simulation of CAS and PWI (\$600,000)**
Candidate CAS and PWI systems will be simulated in a realistic traffic environment and warning times, false alarm rates, and operational effectiveness will be determined. The Langley Research Center differential maneuver simulator may also be used to determine the effect of collision warnings on pilot workload and safety of flight.
- **General Aviation Collision Avoidance Equipment (\$450,000)**
As part of NASA's overall effort to involve the General Aviation Manufacturers Association in solving the technical problems of the private flyer, collision avoidance equipment will be made a specific subject for cost reduction analysis and development work. The market knowledge and low cost construction expertise of these people is a relatively untapped source of information on what and how to build for general aviation.
- **Integrated General Aviation Avionics Equipment (\$300,000)**
Investigate low-cost aircraft functions, e.g., display, computation and flight path guidance that could be integrated with CAS/PWI systems to reduce total cost of general aviation avionics systems.

TECHNOLOGY UTILIZATION

NASA's budget request for Technology Utilization was \$4,000,000 which was a reduction of \$1,000,000 from the FY 1972 amount.

An increase of \$1,500,000 is recommended for a total of \$5,500,000.

For many years the Committee has strongly supported this program and this support has been firmly endorsed by the Congress. This position has been taken because of a firm belief in the basic principle behind the Technology Utilization program: scientific, technological, and management knowledge acquired with public funds should be made available to the public sector for its benefit as quickly and efficiently as possible.

Technology Application Areas

In reviewing the FY 1973 budget request and progress made during the past year it was determined that technology applications activities could be productively increased in a number of areas. Experience gained by NASA during the recent past in initiating new engineering transfer projects—primarily in medicine and environmental pollution—indicate that similar approaches can be used in other public sector problem areas. Additional funds of \$1,200,000 could be used for working on problems in urban structures, fire safety, transportation systems and energy conversion.

Applications Engineering Products and Patent Licensing

A number of items have progressed to the applications engineering phase where hardware from NASA laboratories has been made available for test and demonstration by the public sector organization identifying the original requirement. Industrial commercialization of

these products is required to insure that the public will attain the benefits of the NASA technology.

The NASA Regional Dissemination Centers (RDC) are in a unique position to introduce these products into the market place because they presently have a client relationship with more than a thousand industrial organizations—large and small. There are six RDC's and \$50,000 would be used for each to help expand this activity for a total increase of \$300,000.

COMMITTEE VIEWS

Testimony was received to the effect that the follow-on Orbiting Solar Observatory project, consisting of OSO's—I, J, & K, has been under review within NASA. A decision was made to proceed with OSO-I, but to defer OSO's-J&K until late this calendar year, when the NASA budget for fiscal year 1974 is being prepared, at which time a final decision would be made to determine whether development of the OSO J&K spacecraft should be pursued or cancelled.

Since the conclusion of the committee's hearings, additional information has been received indicating that substantial cost increases have been experienced in the development of the OSO-I spacecraft. This has led NASA to take this project under further consideration, and the committee understands that there exists a strong possibility that further negotiations with the OSO contractor may result in a decision to cancel the OSO-I contract. Such an action would result in a substantial unrecoverable loss of several million dollars to the Government.

The committee wishes that the Subcommittee on Space Science and Applications be kept currently informed of the negotiations between NASA and the OSO contractor, and desires consultation with that subcommittee prior to any decision to cancel the OSO-I contract.

In the event the decision is made to cancel the OSO-I contract, the committee takes the position that funds authorized and appropriated for the OSO project should not be reprogrammed into any other project.

The committee notes that NASA funding of sounding rockets and balloon experiments will continue to be funded during fiscal year 1973 at approximately the same level as the current fiscal year; accordingly, NASA continues to disregard the recommendation of the Space Science Board of the National Academy of Sciences 1971 report, entitled "Priorities for Space Research, 1971-1980," states that "a 100% increment in support of rockets and balloons is ranked with highest priorities in astronomy."

The committee has expressed its support for increased funding for sounding rockets and balloon experiments in the past, and takes this opportunity to indicate again its view that these relatively inexpensive devices should play a larger role in the NASA program. The committee urges a substantial increase in funding for sounding rockets and balloons in fiscal year 1974.

For several years the committee has urged NASA to give greater emphasis to space applications. These recommendations have been largely disregarded by NASA. Nor has the committee been alone in its conviction that space applications should receive a greater portion of the NASA budget. The Space Science Board of the National Academy of Sciences, in its report issued in 1968, concluded that it would be in the national interest to increase the space applications budget by at least 100%, and perhaps as much as 200%. At the time, NASA was investing approximately \$100 million per year in space applications.

In December 1971, a major reorganization of NASA was announced under which a new Office of Applications was established. The stated purpose of that action was to give greater emphasis to the effort to

develop those satellite systems which provide practical benefits to mankind such as communications services, meteorological observations and remote sensing of earth resources.

The announcement of the creation of the new Office of Applications was greeted with enthusiasm by many in Congress who have long believed that public support for the national space program in the future will depend very heavily upon these practical applications of space technology. Proponents of the space effort invariably point to the remarkable advances that have already been made in global communications, in weather prediction, and to the anticipated benefits from an earth resources survey system using satellites.

The members of the committee are convinced that the best way to persuade American taxpayers that public funds should be used to support a national space program is to demonstrate, in economic terms, the usefulness of space technology in their everyday lives.

For these reasons, the committee fully expected that the establishment of the new Office of Applications would be accompanied by substantially increased financial support of the space applications program.

Unfortunately, the budget submitted for that important program for fiscal year 1973 is only slightly larger than the current fiscal year, and considering the effects of inflation, the funding requested will support these activities at about the same level of effort.

The committee wishes to take this opportunity to express its belief that the current level of funding for space applications is inadequate, and to urge a substantial increase in the budget for fiscal year 1974. NASA's stated goal of increased emphasis on space applications can be achieved only if sufficient financial support for this work is forthcoming.

The committee is concerned over testimony received with respect to constraints in data acquisition as well as in the scientific analysis of acquired data. A considerable number of operating satellites have been retired or are about to be turned off—including the last of the OGO system (6), 2 ATS satellites, 2 Explorers, and Alouette.

Two reasons were given by NASA for turning off some satellites which carry experiments still in good operating condition. One is that, in some cases, certain satellites have fulfilled their primary mission and the additional data which might be extracted and analyzed would be of marginal value. The other stated reason was insufficient funding of data acquisition.

In this connection, the subcommittee examined a staff analysis of a NASA oversight investigation of the data analysis function conducted in 1971, which involved 23 universities and 8 Government laboratories. Some 54 principal investigators of space science projects, all of whom work under contract with NASA, responded to the committee questionnaire. Of this number, 15 of the scientists expressed strong dissatisfaction with the degree and pace of data analysis—due largely they said, to a shortage of funds. Another 20 expressed moderate dissatisfaction, giving as reasons lack of time, inadequate facilities and limited funding. Only 19 of the 54 PT's replied that they were content with the pace and financing of the data reduction and analysis process.

The committee hereby reiterates its conviction, which it expressed in its report a year ago, that any policy which results in failure to extract as much valuable data as possible from each space mission is inefficient and wasteful.

SECTIONAL ANALYSIS

Section 1

Subsections (a), (b), and (c) would authorize to be appropriated to the National Aeronautics and Space Administration funds, in the total amount of \$3,428,950,000, as follows: (a) for "Research and development," a total of 12 program line items aggregating the sum of \$2,650,850,000; (b) for "Construction of facilities," a total of sixteen line items aggregating the sum of \$77,300,000; and, (c) for "Research and program management," \$700,800,000.

Subsection 1(d) would authorize the use of appropriations for "Research and development" without regard to the provisions of subsection 1(g): (1) items of a capital nature (other than the acquisition of land) required at locations other than NASA installations for the performance of research and development contracts; and (2) grants to nonprofit institutions of higher education, or to nonprofit organizations whose primary purpose is the conduct of scientific research, for purchase or construction of additional research facilities. Title to such facilities shall be vested in the United States unless the Administrator determines that the national program of aeronautical and space activities will best be served by vesting title in any such grantee institution or organization. Moreover, each such grant shall be made under such conditions as the Administrator shall find necessary to insure that the United States will receive benefit therefrom adequate to justify the making of that grant.

In either case no funds may be used for the construction of a facility in accordance with the subsection the estimated cost of which, including collateral equipment exceeds \$250,000, unless the Administrator notifies the Speaker of the House, the President of the Senate and the specified committees of the Congress of the nature, location, and estimated cost of such facility.

Subsection 1(e) would provide that, when so specified in an appropriation Act, (1) any amount appropriated for "Research and development" or for "Construction of facilities" may remain available without fiscal year limitation, and (2) contracts for maintenance and operation of facilities and support services may be entered into under the "Research and program management" appropriation for periods not in excess of twelve months beginning at any time during the fiscal year.

Subsection 1(f) would authorize the use of not to exceed \$35,000 of "Research and program management" appropriation funds for scientific consultations or extraordinary expenses, including representation and official entertainment expenses, upon the authority of the Administrator, whose determination shall be final and conclusive.

Subsection 1(g) would provide that of the funds appropriated for "Research and development" and "Research and program management," not in excess of \$10,000 per project (including collateral equip-

ment) may be used for construction of new, or additions to existing, facilities, and not in excess of \$25,000 per project (including collateral equipment) may be used for rehabilitation or modification of existing facilities; however, of the funds appropriated for "Research and development," not in excess of \$250,000 per project (including collateral equipment) may be used for construction of new facilities or additions to, or rehabilitation or modification of existing facilities required for unforeseen programmatic needs.

Subsection 1(h) would provide that no part of the funds appropriated for "Research and development" may be used for grants to any nonprofit institution of higher learning unless the Administrator determines that recruiting personnel of any of the Armed Forces are not being barred from the premises or property of such institution. Subsection 1(h) would not apply if the Administrator determines that the grant is a continuation or renewal of a previous grant to such institution which is likely to make a significant contribution to the aeronautical and space activities of the United States. The Secretary of Defense would be required to furnish to the Administrator on the dates prescribed the names of any nonprofit institutions of higher learning which the Secretary of Defense determines are barring such recruiting personnel from premises or property of any such institution.

Section 2

Section 2 would authorize the 5 per centum upward variation of any of the sums authorized for the "Construction of facilities" line items (other than facility planning and design) when, in the discretion of the Administrator, this is needed to meet unusual cost variations. However, the total cost of all work authorized under these line items may not exceed the total sum authorized for "Construction of facilities" under subsection 1(b), paragraphs (1) through (15).

Section 3

Section 3 would provide that not more than one-half of 1 per centum of the funds appropriated for "Research and development" may be transferred to the "Construction of facilities" appropriation and, when so transferred, together with \$10,000,000 of the funds appropriated for "Construction of facilities," shall be available for the construction of facilities and land acquisition at any location if (1) the Administrator determines that such action is necessary because of changes in the space program or new scientific or engineering developments, and (2) that deferral of such action until the next authorization Act is enacted would be inconsistent with the interest of the Nation in aeronautical and space activities. However, no such funds may be obligated until 30 days have passed after the Administrator or his designee has transmitted to the Speaker of the House, the President of the Senate and the specified committees of Congress a written report containing a description of the project, its cost, and the reason why such project is necessary in the national interest, or each such committee before the expiration of such 30-day period has notified the Administrator that no objection to the proposed action will be made.

Section 4

Section 4 would provide that, notwithstanding any other provision of this Act—

(1) no amount appropriated pursuant to this Act may be used for any program deleted by the Congress from requests as originally made to either the House Committee on Science and Astronautics or the Senate Committee on Aeronautical and Space Sciences;

(2) no amount appropriated pursuant to this Act may be used for any program in excess of the amount actually authorized for that particular program by subsections 1(a) and 1(c); and,

(3) no amount appropriated pursuant to this Act may be used for any program which has not been presented to or requested of either such committee,

unless (A) a period of 30 days has passed after the receipt by the Speaker of the House, the President of the Senate and each such committee of notice given by the Administrator or his designee containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of such proposed action, or (B) each such committee before the expiration of such period has transmitted to the Administrator written notice to the effect that such committee has no objection to the proposed action.

Section 5

Section 5 would express the sense of the Congress that it is in the national interest that consideration be given to geographical distribution of Federal research funds whenever feasible and that the National Aeronautics and Space Administration should explore ways and means of distributing its research and development funds whenever feasible.

Section 6

Subsection 6(a) would provide that if an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution, that such individual has been convicted by any court of record of any crime which was committed after the date of enactment of the Act and which involved the use of (or assistance to others in the use of) force, disruption, or the seizure of property under control of any institution of higher education to prevent officials or students from engaging in their duties or pursuing their studies, and that such crime was of a serious nature and contributed to a substantial disruption of the administration of the institution, then the institution would be required to deny for a period of two years any further payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958, the funds for which are authorized pursuant to the Act. If an institution denies an individual assistance under the authority of the first sentence of subsection 6(a), then any institution which such individual subsequently attends would be similarly required to deny for the remainder of the two-year period any further payment to, or for the direct benefit of, such individual.

Subsection 6(b) would provide that if an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution, that such individual has willfully refused to obey a lawful regulation or order of such institution after the date of enactment of the Act, and that such refusal was of a serious nature and contributed to a substantial disruption of the administration of such institution, then such institution would be required to deny, for a period of two years, any further payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958, the funds for which are authorized pursuant to the Act.

Subsection 6(c)(1) would provide that nothing in the Act shall be construed to prohibit any institution of higher education from refusing to award, continue, or extend any financial assistance under any such Act to any individual because of any misconduct which in its judgment bears adversely on his fitness for such assistance.

Subsection 6(c)(2) would provide that nothing in section 6 shall be construed as limiting or prejudicing the rights and prerogatives of any institution of higher education to institute and carry out an independent, disciplinary proceeding pursuant to existing authority, practice, and law.

Subsection 6(c)(3) would provide that nothing in section 6 shall be construed to limit the freedom of any student to verbal expression of individual views or opinions.

Section 7

Section 7 would provide that the Act may be cited as the "National Aeronautics and Space Administration Authorization Act, 1973."

COST AND BUDGET DATA

The bill will authorize appropriations for Fiscal Year 1973 in the amount of \$3,428,950.

In accordance with the requirements of Section 252(b) of the Legislative Reorganization Act of 1970 the Committee estimate for the next 5 years of the NASA Budget Request is as follows:

(In Billions)

FY 1974	FY 1975	FY 1976	FY 1977	FY 1978
\$3.37	\$3.3	\$3.2	\$3.1	\$2.8

These estimates do not include provisions for new programs or program augmentations that may be recommended nor do they include any provisions for administrative adjustments that may be required.

COMMITTEE RECOMMENDATIONS

A quorum being present, the committee unanimously approved the bill by a record vote of 22 members voting "Aye" and none voting "No."

NASA RECOMMENDATIONS

This is a National Aeronautics and Space Administration legislative item approved with exceptions noted in this report, by the Office of Management and Budget as indicated by the following letter:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
Washington, D.C., January 26, 1972.

HON. CARL B. ALBERT,
Speaker of the House of Representatives,
Washington, D.C.

DEAR MR. SPEAKER: Submitted herewith is a draft of a bill, "To authorize appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, and research and program management, and for other purposes," together with the sectional analysis thereof. It is submitted to the Speaker of the House of Representatives pursuant to Rule XL of the House.

Section 4 of the Act of June 15, 1959, 73 Stat. 73, 75 (42 U.S.C. 2460), provides that no appropriation may be made to the National Aeronautics and Space Administration unless previously authorized by legislation. It is the purpose of the enclosed bill to provide such requisite authorization in the amounts and for the purposes recommended by the President in the Budget of the United States Government for the fiscal year ending June 30, 1973. The bill would authorize appropriations totaling \$3,379,000,000 to be made to the National Aeronautics and Space Administration as follows:

(1) for "Research and development" amounts totaling \$2,600,900,000; (2) for "Construction of facilities" amounts totaling \$77,300,000 and (3) for "Research and program management," \$700,800,000.

The enclosed draft bill follows the format of the National Aeronautics and Space Administration Authorization Act, 1972 (Public Law 92-68), except for the omission of section 7 of that Act, which section is permanent law, having amended the National Aeronautics and Space Act of 1958. However, the bill does differ in substance from the prior Act in several respects. First, subsections 1(a), 1(b) and 1(c), which would provide the authorization to appropriate for the three NASA appropriations, differ in the dollar amounts and the "Construction of facilities" projects for which authorization to appropriate is requested.

Second, subsection 1(a) contains a numerical realignment of the program line items related to the activities of the former Office of Space Science and Applications, so that all of the program line items related to new Office of Space Science are grouped together. To this end, the program line item "Launch vehicle procurement" precedes (rather than follows, as in the prior Act) the "Space applications" program line item. This latter line item relates to the program activities of the new Office of Application.

Third, subsection 1(b) contains two line items covering minor construction and rehabilitation and modification of facilities which re-

late to classes of activity (delimited as hereinafter discussed) to some extent covered within the authorizations for subsections 1(a) and 1(c) in prior years.

Fourth, subsection 1(c) omits the limitation contained in the prior year's Act on the amount available for personnel and related costs. Such limitation is deemed unnecessary for the fiscal year starting July 1, 1972.

Fifth, there are changes in statutory language related to the implementation of certain of the recommendations of the NASA Facilities Management Review Committee which I have approved. Copies of this Committee's report have previously been furnished to the respective Congressional Committees having cognizance over legislation and appropriations for NASA. The changes in statutory language consist of (1) the line items in subsection 1(b) covering limited construction and rehabilitation and modification activities, alluded to above; (2) the addition of language to subsection 1(d) clarifying that such provision relates to items of a capital nature, particularly facilities, at locations other than NASA installations; and (3) an overall revision to the language of subsection 1(g) which has the effect of restricting the use of "Research and development" and "Research and program management" funds for certain facilities purposes.

The report of the NASA Facilities Review Committee previously alluded to make several recommendations of a fundamental nature, each of which I have approved. As indicated above, certain limited changes to the statutory language were required to implement them; however, their main impact is to be found in a revised approach to the management of NASA's facilities activities. The NASA budget which would be implemented by the proposed bill, is structured in accordance with such approach, the principal points of which, as related to the changes in statutory language, are as follows:

One major area dealt with by the Committee involves the method of presenting for approval facilities projects (i.e., all projects involving the acquisition of new, or the enhancement of existing, facilities consisting of real property and equipment connected therewith). All such projects comprehended within the instant proposed bill have been presented—and any other such projects proposed after the date of enactment of the NASA Authorization Act, 1973 (without regard to the fiscal year during which the funds therefor became, or become, available), will be presented—for approval and ultimate funding under a full disclosure concept. That is, all elements required for the initial stated operational use of that facility, whether construction or equipment, will be fully disclosed to the extent that each of these elements has been or can be identified and quantified and estimates prepared therefor. (To the extent that elements can be identified but not quantified, and/or meaningful estimates cannot be prepared therefor, this also will be disclosed.) However, for purposes of funding under the applicable facilities authorities, only those elements constituting actual construction trades activity (i.e., "brick and mortar"), together with collateral equipment (i.e., equipment which is an inherent part of the structure, or is built in, or is large and substantially affixed to the structure) will be considered a part of the facility project. All other equipment, while it is to be disclosed as being re-

lated to the facilities project, will, nevertheless, be funded from sources otherwise available therefor. Also, greater emphasis than has been accorded in the past will be given to identifying the funding source for all equipment.

The above concept is not directly reflected in the enclosed draft bill other than by the term "collateral equipment" in subsections 1(d) and 1(g), which would take on the redefined meaning described above. However, the concept is followed in the NASA Budget which the enclosed draft bill would implement.

An additional recommendation of the Facilities Management Review Committee, which is also reflected in the enclosed draft bill, is that any facilities project (defined as above), the estimated cost of which at the time of approval is above a very minimal level (i.e., \$10,000 for construction of new, or additions to existing, facilities, and \$25,000 for rehabilitation or modification of facilities) will be funded from the "Construction of facilities" appropriation; provided, however, that a project required to satisfy unforeseen programmatic needs, the estimated cost of which project at the time of approval does not exceed \$250,000, will continue to be funded from the "Research and development" appropriation. Projects involving maintenance or repair of facilities will continue to be funded from the "Research and development" and "Research and program management" appropriations without a per project dollar limitation.

The implementation of this second major recommendation is evidenced (1) by subsection 1(g) of the enclosed draft bill; and (2) by the language of the three NASA appropriations as recommended by the President in the Appendix to the Budget of the United States Government, 1973. The enclosed draft bill would further provide for two line items under the "Construction of facilities" head covering (a) the construction of new, and addition to existing, facilities, the estimated cost of which (including collateral equipment) is not in excess of \$250,000 for each project at the time of approval; and (b) the rehabilitation and modification of facilities, the estimated cost of which (including collateral equipment) is not in excess of \$500,000 for each project at the time of approval. Any project for these purposes, the estimated cost of which exceeds the applicable project limitation, would be separately stated as a budget line item and justified as such.

It will be noted that under subsection 1(g), revised in accordance with the above, "Research and development" funds would continue to be legally available for facility projects, required to satisfy unforeseen programmatic needs at NASA installations and other locations, the estimated cost of which projects, including collateral equipment, does not at the time of approval exceed \$250,000. Any unforeseen requirement, the estimated cost of which exceeds the stated amount, would be funded from the "Construction of facilities" appropriation using, where necessary and appropriate, one of the statutory flexibility provisions (unless, of course, it is fundable under the provisions of subsection 1(d)).

It will also be noted that subsection 1(d) has been revised so as to clarify that the use of "Research and development" funds thereunder for items of a capital nature is limited to locations other than NASA

installations, and that the reporting requirement, which is a part of such subsection, relates only to construction of a major facility in accordance with the subsection.

It will be noted further that none of the specific flexibility provisions included in prior NASA Authorization Acts has been substantively affected by any of the foregoing. It is NASA's view that such flexibility provisions are essential to NASA's dynamic and evolving research and development activity.

Where required by section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4332(2)(C)), environmental impact statements covering NASA installations and the programs to be funded in fiscal year 1973 have been furnished to the Committee on Science and Astronautics.

The National Aeronautics and Space Administration recommends that the enclosed bill be enacted. The Office of Management and Budget advises that such enactment would be in accord with the program of the President.

Sincerely,

JAMES C. FLETCHER,
Administrator.

SUPPLEMENTAL VIEWS OF THE HONORABLE
CHARLES B. RANGEL ON H.R. 14070

The United States commitment to our space program has been based in large part on the desire for a better life for all mankind. Innovations in medicine, nutrition, technology and education have stemmed from our exploration of the universe. Jobs have been created as a direct result of American space efforts. We have walked on the surface of the moon and are now probing the deepest corners of the galaxy.

Unfortunately, this commitment to a more prosperous and peaceful world is compromised by the continued operation of the NASA tracking station in Johannesburg, South Africa. Our Subcommittee on Aeronautics and Space Technology was told on February 29 by NASA Associate Administrator Gerald M. Truszynski that we spend approximately \$2.5 million annually on this South African operation where apartheid and racial discrimination are established policies.

The United States has negotiated an agreement with the South African Council for Scientific and Industrial Research (CSIR), a government agency, under which CSIR operates the Johannesburg facility for us. Willis H. Shapley, NASA Associate Deputy Administrator, told the House Foreign Affairs Subcommittee on Africa that facilities at the South African NASA station are segregated, that there are separate medical systems and dining arrangements based on race, that black and white employees are paid on different salary scales and that "any inter-racial social contacts are chance ones." In addition, no black employees are included in the training programs run there by CSIR and there is no collective bargaining. Despite the claim by Mr. Truszynski to our Subcommittee that racial policies there are determined by the South African government, that CSIR—not NASA—makes personnel determinations, the truth is that NASA has deliberately catered to the South African apartheid approach. Mr. Shapley stated in September that from 1961 to 1969, 243 NASA employees visited the Johannesburg tracking station, and that 28 such visits were made in 1970. The visits, he continued, "were made by technical personnel primarily for such purposes as installing special equipment, correcting deficiencies in operating equipment, or instructing CSIR personnel in technical procedures. Our best information is that none of the above personnel were black." Does that mean, then, that NASA has no qualified black staff to send to South Africa?

The answer is no. Mr. Truszynski's testimony makes that clear:

Mr. RANGEL. . . . Do you have qualified black personnel operating equipment at stations in other parts of the world as part of the operations program?

Mr. TRUSZYNSKI. . . . Yes, we do. There are black personnel operating equipment at stations in other parts of the world as part of the operations program.

Mr. RANGEL. . . . Then there were no blacks at Johannesburg from the technical point of view, rather than your agency cooperating with the policies of South Africa?

Mr. TRUSZYNSKI. . . . In the main, that's the reason why. People are chosen to go to a particular place on a temporary basis.

Mr. RANGEL. . . . When you say "in the main," was it in cooperation with the South African Government's racial policies?

Mr. TRUSZYNSKI. . . . The question in that sense never really came up, and I don't think we would hesitate to send a black engineer to Johannesburg to install or check out equipment if he were the man from a capable standpoint.

It seems strange that NASA has qualified black personnel to send to our other tracking stations around the globe, but none to send to South Africa.

It is time for Congress to state, once and for all, that we will no longer subsidize racial discrimination abroad.

I believe that our scientific goals should be put in accord with our goals of equality and justice. We cannot morally make NASA an exception to our commitment to human dignity. Mr. Shapley's contention that "we have monitored station operations mainly from the standpoint of technical effectiveness and sound financial management," rather than with a goal of social justice in mind must be rejected as a fundamental conflict with the aim of our space program: a better life for all mankind.

I regret the failure of our Committee to include a provision in the NASA authorization legislation barring the use of our funds—raised by taxes paid by both black and white Americans—for the Johannesburg facility as long as the evil doctrine of apartheid is required or officially sanctioned at the tracking station.

We have developed a vast amount of technical expertise through our space program. We maintain a NASA facility in Madagascar, in the Indian Ocean. In the past we maintained a NASA station in Zanzibar. Several independent African nations which share our commitment to racial justice and equal opportunity are located in the southern portion of the African continent. These conditions, together with a sincere belief in non-discrimination, make it possible for us to relocate our tracking station elsewhere if the South African CSIR does not end its apartheid practices at the Johannesburg facilities.

Congress should demand an end to this dual standard—equal justice for all, except when it's inconvenient. Let us make conscience a key element in our space program. Congress should put an end to our subsidy of racism and discrimination.

CHARLES B. RANGEL,
Member of Congress.

ADDITIONAL VIEWS OF THE HONORABLE
ALPHONZO BELL

The recognition by this Committee of the need to increase efforts to reduce noise pollution created by civil fleet aircraft represents a monumental step toward alleviating this aggravating and often injurious problem. Aside from the obvious discomfort and inconvenience caused by jet aircraft noise, medical studies have indicated that numerous vascular, digestive and nervous maladies are produced by exposure to either sharp, sudden noise or constant, prolonged noise. *Medical World News* has concluded that noise pollution is as much a threat to certain patients as air pollution is to asthmatics or those suffering from emphysema.

The experiences of the 28th California Congressional District, which I have the privilege of representing, are illustrative of the distressing consequences of airport noise. There, thirty schools and forty thousand children are affected daily by the operations of the Los Angeles International Airport. The teaching process in many of these schools is interrupted continually, one school having to halt instruction every nine minutes. An elementary school and junior high school were forced to close due to the excessive noise level and several other schools had to be insulated in order to continue operations.

Homeowners, meanwhile, have watched their homes slowly depreciate in value. During a recent period, ninety-two homes were listed for sale in one suburban community near Los Angeles International Airport. Only eleven of these homes were sold and listings eventually expired or were canceled on sixty-eight. Those individuals who were fortunate enough to sell their homes were forced to accept prices well below the fair market value of their properties.

Losses accrue to the entire Southern California Community. A nearby Los Angeles beach has become virtually unusable. Man-hours are lost due to the loss of sleep, headaches, earaches, loss of powers of concentration and general irritability. Children can no longer play in their patios or in the neighborhood parks. The list of harms from jet aircraft noise is endless.

Last year I included in this Committee's report on the NASA authorization a statement that emphasized the importance of strengthening our efforts to reduce aircraft noise pollution. I am particularly pleased that this year's Committee action represents an increased commitment to research and development in the area of jet noise abatement. While the original budget request for jet noise abatement totaled a mere \$9 million, this Committee has added to that total \$41 million, a figure which will expedite the development and future implementation of jet noise control devices.

In previous years the efforts of NASA have been greatly inhibited by the lack of funding in aircraft noise control. Despite the inadequacy of the funding, NASA has clearly demonstrated its competence and efficiency in dealing with problems in this area. I am quite optimistic about NASA's ability to expend its increased budgetary allotment in such a way as to secure a remedy to this pressing domestic problem.

ALPHONZO BELL

ADDITIONAL VIEWS OF THE HONORABLE
LARRY WINN, JR.

The importance of civil aviation in the United States today is beyond dispute. However, major importance is not a justification for improper funding of those research and development programs necessary to alleviate the imposing problems presently facing civil aviation.

Wide acceptance by the public of the aviation industry has produced a host of benefits to both the public and to the nation. This acceptance is due in large part to improvement in productivity, reliability, and safety which have been made possible through *broad-based* government sponsored research and development programs.

In January of this year the Subcommittee on Aeronautics and Space Technology reviewed in considerable detail the results of the Joint DOT-NASA Civil Aviation Research & Development Policy (CARD) Study, and its major conclusion that aircraft noise is one of the three most important problems facing domestic civil aviation today. Testimony taken in these January hearings, and during the NASA Authorization hearings in March, strongly indicated that more could, and should, be done in attacking the critical jet noise problem.

The Subcommittee on Aeronautics and Space Technology determined that retrofitting the existing United States commercial fleet, with modifications to the currently-used jet engines which would make them more quiet, would provide the quickest means of alleviating the excessive noise created by the majority of today's commercial jet aircraft.

NASA and DOT witnesses projected a total program cost of approximately \$130 million to develop and certify a much quieter version of the JT8D and JT3D engines which are the major noise offenders in today's airline fleet. In order to begin retrofitting our airline fleet by the middle or end of 1975, a first year program of approximately \$50 million was pronounced necessary.

Consequently, the Subcommittee on Aeronautics and Space Technology increased the NASA request for noise abatement research and development by \$41 million. This increase brought the total NASA noise abatement program to \$50 million for fiscal year 1973.

I do not question the need for a major noise abatement program in this country. But, I *do* question the propriety of making the NASA budget bear essentially the entire remaining research and development costs for a retrofit program which should really be funded by a combination of NASA, DOT, DOD, HUD, and HEW, supplemented by the airline industry itself. These other government agencies and the airline industry should be made to bear their proportionate share of program costs.

We have chosen to implement one recommendation of the CARD Study: to make jet aircraft noise a major priority in this country. We must seek more than favorable reassurances from government agency

heads with regard to another major recommendation of the CARD Study; to establish an aircraft noise abatement program plan "... incorporating activities of DOT, NASA, HUD, and HEW and the Environmental Protection Agency." which "... should clearly delineate the role and areas of responsibility of the participating agencies and require commitments from these agencies to support these activities with the appropriate resources, consistent with funding limitation."

Perhaps in our zeal to deal with a pressing national problem, we have imposed an unnecessary burden on NASA which should more appropriately be borne by several different government agencies and the airline industry.

The FAA has an additional responsibility in the solution of the noise abatement problem. It must insure through the ICAO (International Civil Aviation Organization), or other international body, that foreign aircraft taking off and landing from American airports conform to noise levels consistent with the retrofitted American fleet.

While in most cases foreign aircraft do not represent a majority of the take-offs and landings from our major international airports, the American public will still not reap the full benefits of a costly and time-consuming retrofit program if foreign carriers are not required to conform to the new lower noise levels.

Not only must the FAA insure that new noise regulations imposed as a result of the United States noise abatement program are adhered to by foreign carriers, but they must accomplish this on a timely basis so that the United States does not become involved in a last minute international squabble concerning the availability of United States airports to foreign flag airlines.

In conclusion, I wish to state that jet aircraft noise abatement does deserve a high priority in the United States today. However, the total remaining research and development costs should not be borne by NASA. These costs for alleviating jet aircraft noise should be apportioned among all the government agencies involved, and the airline industry.

LARRY WINN, JR.

ADDITIONAL VIEWS OF THE HONORABLE ROBERT D. PRICE

The NASA Authorization Bill for Fiscal Year 1973 which has been reported by the Committee on Science and Astronautics will offer a financially constrained but well-balanced space program. The total budget was raised only 1.55 percent or \$50 million with the bulk of this increase being directed toward the elimination of aircraft noise pollution.

Because of the tight dollar restrictions, it is all the more imperative that NASA exert the most careful control in the supervision of its program contracts. I am therefore concerned at what I feel to be the lack of proper management of one of NASA's most productive and cost-effective space science programs, the Orbiting Solar Observatory (OSO).

The objective of the OSO Program is to obtain new knowledge of the sun, the earth's atmosphere, and sun-activated terrestrial phenomena over a broad range of the electro-magnetic spectrum. The research being carried out by the OSO is uniquely valuable in that it is impossible to carry out this same type of experimentation using ground-based observatories because of the interference of the earth's atmosphere. The OSO's have therefore provided significant discoveries about the sun and the earth in greatly expanding man's understanding of this most important star and its interactions with the earth.

I would also like to emphasize that the strong sentiments I have for this particular program are shared throughout the scientific community. The National Academy of Sciences in their study last year entitled, "*Priorities for Space Research; 1971 to 1980*" recommended that the OSO Program be continued even at the most restricted NASA budget level. The OSO effort was felt uniquely important in this nation's basic space research because of the major influence of the sun and general solar activities to our most vital processes here on earth including global weather, temperature, and season length.

My concern for the program stems from the fact that the FY 1973 NASA Authorization budget will require NASA to reduce its present OSO procurement contract from three spacecraft to one. This not only means a severe reduction in the benefits which will flow from this program but it also indicates a procurement procedure which is extremely costly. With the procurement cutback, all non-recurring costs will have to be borne by a single spacecraft. Specifically, the total non-recurring research and development plus one spacecraft will be approximately \$27 million. The two additional spacecraft originally requested by NASA could be procured for approximately \$6.5 million per spacecraft. This means that instead of three spacecraft for \$40 million as originally planned, NASA will be procuring one spacecraft for \$27 million.

I accept NASA's position for FY 1973 that the \$14.7 million which they requested is adequate funding for production of the one OSO-I

satellite and I feel it imperative that development of this spacecraft be continued under the schedule currently established. I would insist, however, that NASA continue to maintain its option to buy the remaining two OSO spacecraft at least through the FY 1974 budget cycle. I am also asking NASA to report immediately to this Committee any deviation from this plan whether in the form of a reduced funding commitment to OSO-I or a cancellation of the option to buy either of the OSO J or K spacecraft.

I would like to emphasize that the hearings held this year to review the NASA budget were some of the most comprehensive I have ever been a party to. I also commend the Committee in its actions in holding this year's budget to a minimum above that submitted by NASA. But I stress that I do not want to see the budget held at the recommended figure at the expense of eliminating or reducing the cost effectiveness of its more important programs. I therefore give my complete endorsement to the final budget as presented by the Committee but encourage the Members to give full attention to the progress of the Orbiting Solar Observatory Program throughout the coming fiscal year.

ROBERT D. PRICE.

ADDITIONAL VIEWS OF THE HONORABLE
LOUIS FREY, JR..
SPACE SHUTTLE—A NATIONAL NECESSITY

The shuttle will turn our work in space from an experimental to an operational nature for the benefit of man on earth. It will be for both manned and unmanned launches at a cost savings over present systems. If we are to stay in space—which even the severest critics don't dispute—this is the common sense way. The economic savings are based on the following facts:

(a) Approximately \$12 to \$13 billion will be saved from 1978-1990 based on launch rates of less than 50 a year. In fact, it is estimated that the system will be economical with as few as 20 a year.

(b) Of the \$12 to \$13 billion savings, \$5 billion will be saved in launch costs.

(c) Of the \$12 to \$13 billion savings, \$7 to \$8 billion will be in design of satellites and our ability to check out and return satellites from space.

(d) The cost of placing a pound in space will be reduced from approximately \$800 to \$4000 per pound to \$120 per pound.

(e) The cost of launch will be reduced to \$10 to \$11 million a flight.

(f) The shuttle can be developed over the next 6 years within the present level of NASA funding.

The items cited above represent detailed analysis of the direct costs associated with the development and use of a space shuttle. The total development cost for this reusable vehicle is estimated to be \$5.15 billion over the next six years. At the completion of development it is expected that three production orbiters will be purchased and the two

orbiters used for the development of the vehicle would be refurbished. Recoverable solid boosters would be purchased as required during the operational phase of the program. In terms of annual funding NASA has determined that the peak year of expenditure for the development of the shuttle will not exceed \$1.3 billion and will, therefore, not require an increase over the current total NASA annual budget level. The savings estimates are based on a conservative analysis of required missions over the period 1978 to 1990. This mission listing includes some 500 missions at a rate of less than 50 missions per year.

The savings come largely from two areas: First, because of the reusability of the shuttle, the operational costs per flight are reduced to the level of \$10 to \$11 million per flight. Secondly, because of the large payload bay and less rigorous launch conditions, substantial savings in payload costs can be made in redesign, recovery and repair. For example, analysis made of the Orbiting Astronomical Observatory indicates that based on a shuttle adapted design, the R&D test and evaluation costs are reduced to 67 percent of conventional satellite costs. The costs for building additional satellites are reduced to 70 percent of conventional satellite costs and operations costs are reduced to 48 percent of conventional satellite costs.

A comparison made on the cost reductions by redesign of two additional satellites, SEO and SRS, showed similar or greater cost reductions when configured for the shuttle rather than for typical conventional launch vehicles.

These statistics are based on conservative hard-headed analysis of the potential of the space shuttle program. There are many other reasons for undertaking the development of a low cost earth orbital transportation system. These reasons cited above, by themselves, offer a convincing argument that makes sense.

LOUIS FREY, JR.
ALPHONZO BELL.
THOMAS M. PELLY.
JOHN W. DAVIS, GA.
JOHN W. WYDLER.
DON FUQUA.
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R. LAWRENCE COUGHLIN.
JOHN N. HAPPY CAMP.

92D CONGRESS }
2d Session }

SENATE

{ REPORT
No. 92-779

NASA AUTHORIZATION FOR
FISCAL YEAR 1973

REPORT

OF THE

COMMITTEE ON
AERONAUTICAL AND SPACE SCIENCES
UNITED STATES SENATE

TOGETHER WITH ADDITIONAL VIEWS

ON

H.R. 14070

AN ACT TO AUTHORIZE APPROPRIATIONS TO THE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
FOR RESEARCH AND DEVELOPMENT, CONSTRUCTION
OF FACILITIES, AND RESEARCH AND PROGRAM
MANAGEMENT, AND FOR OTHER PURPOSES



MAY 3, 1972.—Ordered to be printed

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CONGRESSIONAL ADJUSTMENTS TO NASA FISCAL
YEAR 1973 REQUEST—Summary

	Budget request (as amended)	House action	Senate com- mittee action
Research and development:			
Apollo.....	\$128,700,000	\$128,700,000	\$128,700,000
Space flight operations.....	1,094,200,000	1,094,200,000	1,094,200,000
Advanced missions.....	1,500,000	1,500,000	1,500,000
Physics and astronomy.....	156,600,000	152,600,000	156,600,000
Lunar and planetary exploration.....	321,200,000	321,200,000	321,200,000
Launch vehicle procurement.....	191,600,000	191,600,000	191,600,000
Space applications.....	194,700,000	198,700,000	207,200,000
Aeronautical research and technology.....	183,440,000	211,890,000	183,440,000
Space research and technology.....	64,760,000	64,760,000	64,760,000
Nuclear power and propulsion.....	21,100,000	21,100,000	21,100,000
Tracking and data acquisition.....	259,100,000	259,100,000	259,100,000
Technology utilization.....	4,000,000	5,500,000	4,000,000
Total.....	2,600,900,000	2,650,850,000	2,613,400,000
Construction of facilities.....	77,300,000	77,300,000	77,300,000
Research and program management.....	729,450,000	700,800,000	729,450,000
Grand total.....	3,407,650,000	3,428,950,000	3,420,150,000

PURPOSE OF THE BILL

The purpose of this bill is to authorize appropriations totaling \$3,420,150,000 to the National Aeronautics and Space Administration for fiscal year 1973, as follows:

	Budget request (as amended)	House action	Senate com- mittee action
Research and development.....	\$2,600,900,000	\$2,650,850,000	\$2,613,400,000
Construction of facilities.....	77,300,000	77,300,000	77,300,000
Research and program management.....	729,450,000	700,800,000	729,450,000

LEGISLATIVE HISTORY

The fiscal year 1973 budget request for the National Aeronautics and Space Administration was introduced in the House under H.R. 12824, and in the Senate as S. 3094. After holding hearings, the House Committee on Science and Astronautics reported out a clean bill, H.R. 14070, which was passed by the House without amendment and subsequently referred to this committee.

Your committee held hearings on S. 3094 during March and April 1972. During its consideration of the bill, the committee determined that amendments were required, including provision for a budget amendment (H. Doc. 92-267) for increased personnel costs for fiscal year 1973 due to the upward adjustment of Federal salary rates that became effective January 1, 1972.

Your committee has reported out H.R. 14070, with an amendment striking out all after the enacting clause and inserting the committee amendment.

Calendar No. 747

92D CONGRESS } SENATE { REPORT
2d Session } { No. 92-779

AUTHORIZING APPROPRIATIONS TO THE NATIONAL
AERONAUTICS AND SPACE ADMINISTRATION

MAY 3, 1972.—Ordered to be printed

Mr. ANDERSON, from the Committee on Aeronautical and Space
Sciences, submitted the following

REPORT

[To accompany H.R. 14070]

The Committee on Aeronautical and Space Sciences, to which was referred the bill (H.R. 14070) to authorize appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, and research and program management, and for other purposes, having considered the same, reports favorably thereon, with an amendment striking out all after the enacting clause and inserting the committee amendment, and recommends that the bill be passed.

SUMMARY

The budget request for the National Aeronautics and Space Administration (NASA) for fiscal year 1973 contains funds for 12 program items under research and development with a cumulative total of \$2,600,900,000; funds for construction of facilities with a cumulative total of \$77,300,000; and a research and program management total of \$729,450,000. The original request for research and program management was \$700,800,000; however, a budget amendment sent to the Congress on March 20, 1972 (H. Doc. 92-267), requested an additional \$28,650,000 for NASA's research and program management budget. The purpose of the budget amendment is to provide authority to fund the increased personnel costs for fiscal year 1973 resulting from the upward adjustment of salary rates on January 1, 1972.

As a result of action by the House, the authorization for research and development items was increased by \$49,950,000. The House approved the amount requested for the construction of facilities program and approved the amount of the original request for the research and program management appropriation. The budget amendment to the research and program management request was not acted upon. The total funds authorized for NASA by the House bill for fiscal year 1973 are \$3,423,950,000.

Your committee after consideration of the bill recommends an authorization totaling \$3,420,150,000, an amount \$12,500,000 above the NASA request. This recommendation is \$8,800,000 below that amount authorized by the House bill. Excluding the effect of the amendment, \$28,650,000, for increased personnel costs for fiscal year 1973 which is not included in the House approved bill, your committee is recommending a bill \$37,450,000 less than the amount authorized by the House. The authorization recommended by your committee would provide \$2,613,400,000 for research and development; \$77,300,000 for construction of facilities; and \$729,450,000 for research and program management. The research and program management authorization contains a limitation on the amount that can be used for personnel and related costs of \$572,237,000; the amount of this limitation is identical to the administration's request for such expenses. The reasoning accompanying the actions of your committee is contained in the report under the various programs or items therein.

Your committee held hearings in connection with the NASA fiscal year 1973 authorization request on March 14, 15, 16, 22, and 23, and on April 12 and 14. The committee heard both Government witnesses and witnesses from outside the Government. On April 25, 1972, the committee met in executive session to mark up the bill and prepare its recommendations to the Senate. The bill was ordered to be reported without objection.

The total of \$3,420,150,000 which your committee is recommending is slightly above the total authorized for fiscal year 1972 but is substantially below the estimate of \$3.65 billion for fiscal year 1973 which the committee made in its report last year (S. Rept. 92-146, p. 95).

RESEARCH AND DEVELOPMENT

Summary

	Budget request	House action	Senate committee action
Research and development:			
Apollo.....	\$128,700,000	\$128,700,000	\$128,700,000
Space flight operations.....	1,094,200,000	1,094,200,000	1,094,200,000
Advanced missions.....	1,500,000	1,500,000	1,500,000
Physics and astronomy.....	156,600,000	152,600,000	156,600,000
Lunar and planetary exploration.....	321,200,000	321,200,000	321,200,000
Launch vehicle procurement.....	191,600,000	191,600,000	191,600,000
Space applications.....	194,700,000	198,700,000	207,200,000
Aeronautical research and technology.....	163,440,000	211,890,000	163,440,000
Space research and technology.....	64,760,000	64,760,000	64,760,000
Nuclear power and propulsion.....	21,100,000	21,100,000	21,100,000
Tracking and data acquisition.....	259,100,000	259,100,000	259,100,000
Technology utilization.....	4,000,000	5,500,000	4,000,000
Total.....	2,600,900,000	2,650,850,000	2,613,400,000

SPACE FLIGHT OPERATIONS PROGRAM, \$1,094,200,000

COMMITTEE COMMENT

Your committee recognizes that as the space shuttle proceeds through the development process in subsequent years rather large annual funding increments will be requested, and that this program may well be the largest individual item in the NASA budget in any one year. Consequently, committee members questioned the Administrator of NASA with respect to presenting the space shuttle as a separate program line item in the fiscal year 1974 authorization request, and essential agreement was reached that this should be done. Accordingly, the committee expects that beginning with the fiscal year 1974 budget request, the space shuttle program will be so presented. This line item should include also identifiable supporting costs so that a complete programmatic picture will be presented.

For all practical purposes, fiscal year 1973 will conclude funding for the Apollo program. Yet the Space Flight Operations program currently contains almost one-third of the NASA budget request and includes a wide variety of activity such as flight projects, development projects, advanced studies and development, space life sciences, and supporting activities while the advanced missions program is confined to the single activity of advanced studies and is budgeted at only \$1,500,000. This is inconsistent.

There appear to be other inconsistencies. For example, in the space flight operations program, there is a subcategory called development, test and mission operations with an estimated cost of \$305,200,000 but testimony before the committee shows that this activity is a supporting activity directly related to carrying out the remaining Apollo mission and the Skylab missions. Further, from an overall Agency functional standpoint, continuing to consider space life sciences as a subcategory of space flight operations suggests that it has only a close and sole relationship to manned space flight; the appropriateness of this should be reviewed.

Similarly, the subcategory of orbital systems and payloads is closely identified with certain advanced systems being studied but not now part of any approved program for development or flight; consequently, such advanced work and study are not closely related to current flight programs and might be combined with other such efforts in the agency to give the Congress a better understanding of the directions NASA is pursuing for the future.

Accordingly, your committee believes that in conjunction with establishing the space shuttle program as a line item in the authorization bill, a careful study of the manned space flight budget program structure should be undertaken with the view toward restructuring this large portion of the NASA budget to give the public and the Congress better visibility of the total effort currently being funded under the Office of Manned Space Flight.

PHYSICS AND ASTRONOMY PROGRAM, \$156,600,000

COMMITTEE COMMENT

Your committee did not concur with the House cut of \$4 million in the High Energy Astronomical Observatory project. This project, approved in prior years, is assigned a very high priority by the scientific community and is now entering the hardware phase. Your committee, based upon its study of other spacecraft projects, believes that the appropriate level of funding is necessary at this stage for a project to be pursued successfully. Accordingly, your committee does not agree that a reduction should be made in this project at this time.

SPACE APPLICATIONS PROGRAM, \$207,200,000

COMMITTEE COMMENT

Space applications

The space applications program is considered to be of the highest priority. Accordingly, your committee, as in previous years, continues to emphasize the need to pursue vigorously those space flight projects dedicated to applying space technology to assist in solving current earth environmental problems, to providing data with which to enhance the management of earth resources, and to continuing already productive applications technologies such as meteorology and communications. The committee noted with satisfaction that in December 1971, NASA established an Office of Applications headed by an Associate Administrator to more fully coordinate and provide priority attention to the applications activities.

Testimony before the committee, however, revealed that reductions in the amount of \$20 million were made by the Office of Management and Budget (OMB) to the NASA minimum recommended budget request for the space applications program. With the exception of a \$21 million reduction in lunar and planetary program because of the termination of the grand tour missions, this is the largest program

reduction made by the OMB. Considering the high priority of these applications programs and the fact that this reduction would impact the overall conduct of the program and defer some recommended high priority new starts, this is indeed surprising. Accordingly, your committee has added \$12,500,000 to the program—\$5 million for the small applications technology satellite project and \$7,500,000 to offset an across-the-board reduction by OMB.

In taking the foregoing action, your committee noted that the House added \$4 million to accelerate the proposed Earth Observatory Satellite project. While it is recognized that this project has potential as a follow-on to the Earth Resources Technology Satellite project, NASA witnesses appearing before the committee asserted a higher priority for the two items identified by your committee. Consequently, the committee does not agree with the House addition to this program.

Solar Energy

Your committee is very much aware of the marginal availability of energy to meet the Nation's current needs and that the energy requirements for the near future are forecast to increase greatly. Therefore, it is clear that to obtain adequate supplies of energy, aside from the necessity for supplying clean energy, all potential sources of energy should be fully and expeditiously explored.

Your committee notes that NASA, in conjunction with the National Science Foundation, was given a mandate by the President on June 4, 1971, to give greater attention to the use of solar energy to meet our energy needs. The committee supports this mandate and it is the judgment of your committee that NASA possesses substantial managerial and technical know-how which can be applied to this problem. Yet based on testimony presented to the committee, NASA has not given the terrestrial uses of solar energy the high-priority attention which the "energy crisis" requires and which the President intended in his energy message of last June.

The committee recognizes that NASA and the National Science Foundation are discussing how best to approach this problem; however, the committee had expected NASA to be more responsive to the President's direction in its fiscal year 1973 NASA budget request.

The need for developing solutions to the energy shortage is great. Your committee believes that NASA should pursue this study of solar energy for terrestrial needs whether such energy is gathered by space-based stations or terrestrial-based stations. It is now about 11 months after the President directed NASA to make the effort. Therefore, your committee expects NASA to formulate a program for the study and development of the terrestrial uses of solar energy as expeditiously as possible and to pursue the implementation of that program vigorously; and requests that the Administrator of NASA keep the committee currently and fully informed of the Agency's efforts in this program area.

AERONAUTICAL RESEARCH AND TECHNOLOGY PROGRAM, \$163,440,000

COMMITTEE COMMENT

The committee is pleased to note the steady increase in aeronautical research and development, an increase motivated in part by the recommendations of the Civilian Aviation Research and Development (CARD) study—a study which was recommended by this committee in Senate Report No. 957, January 31, 1968. Despite the fact that the NASA request for \$163,440,000 is 48.6 percent higher than the budget for fiscal year 1972, the committee feels that this increase is consistent with the current needs of the Nation and was well justified by the presentations of NASA officials.

One new program, for the development of engine-nacelle retrofit kits to reduce the noise made by slim-bodied jet aircraft in the domestic airline fleet, was a last minute \$9 million addition to the budget as a result of the Administration's new technology opportunities program. This NASA engine-nacelle retrofit program would be in addition to an ongoing \$21.2 million nacelle and jet exhaust acoustical treatment program being conducted by the FAA.

The House committee added \$41 million to the NASA retrofit program in an effort to expedite this program. Your committee, while strongly supporting efforts to reduce aircraft engine noise, believes that the \$9 million requested is sufficient for the first year startup of this program. Your committee believes that a more carefully integrated program between hardware development, rulemaking, financing, and the public need is desirable and urges that such a detailed program be presented in the fiscal year 1974 budget request.

Another area of serious concern to the committee is that area of aviation safety. NASA has an extensive ongoing effort in this area, amounting to \$17,245,000, including research into approach and landing problems, fog, slippery runways, landing aids, aircraft response, low level turbulence, wind shear, low visibility instrument approach and landing, microwave landing systems, proximity warning systems, clear air turbulence avoidance, and crash survival. The House committee added \$3,750,000 for the microwave landing system, \$700,000 for turbulence research, and \$3 million for aircraft collision avoidance research, for a total increase of \$7,450,000. As worthy as these projects are, the committee was not persuaded that these funds, if authorized, could profitably be spent during fiscal year 1973 and thus approved these items at the budget level as requested by NASA.

NUCLEAR POWER AND PROPULSION PROGRAM, \$21,100,000

COMMITTEE COMMENT

The committee is in complete disagreement with the decision to cancel development of the 75,000-pound thrust NERVA nuclear rocket engine.

When the administration, in conjunction with its submission of the fiscal year 1972 budget request, reduced the NERVA development to a technology holding action, the committee held hearings to review the progress made in the technology program and in the flight engine development program since the decision was made to undertake development in fiscal year 1970. During these hearings, the committee also examined in depth the decision to reduce the program to a level that supposedly would maintain the capability to continue the development at a later date. These hearings showed that the nuclear rocket technology program had been one of the most successful ever undertaken, and that it was the unanimous opinion of the witnesses, all knowledgeable on space program requirements, that there were no other competitive systems that would offer the efficiency and capability of this space propulsion system. As a result, the committee recommended and the Congress specifically restored and reserved funding to continue the NERVA engine development program in accordance with the schedule established 2 years previously.

This funding was not utilized, and the program development schedule was not reestablished. Rather, in conjunction with the submission of the fiscal year 1973 budget, a decision was announced to terminate the program, and the development contracts for the NERVA engine system and reactor subsystem are now in termination with this action to be completed by June 30, 1972. This termination is after the expenditure of some \$1.4 billion. The principal reasons given for this termination are understood to be that the annual funding requirements for the 75,000-pound thrust NERVA engine would create severe fiscal pressures in years of severe fiscal constraints on the NASA program, and that the space flight programs for which this engine would be used has been moved on out so that development now was not necessary.

Yet, testimony before the committee revealed that in a letter dated November 19, 1971. (see hearings, p. 60), Dr. James C. Fletcher, Administrator of NASA, presented to Mr. Caspar W. Weinberger, Deputy Director, Office of Management and Budget, a three-phase program for the continued development of the NERVA engine with phase 1 extending for 5 years, through 1976, with the objective of completing development and exploratory ground testing of the 75,000-pound thrust NERVA engine with continued development beyond that point to be a separate and later decision. This phase was estimated to cost \$195 million, with \$102 million and \$93 million allocated for funding by NASA and the AEC, respectively, and with a peak annual funding of \$55 million. Phase 2, if undertaken, would

have encompassed development of a flight certified prototype engine at an estimated cost of \$230 million. Phase 3, again if a decision was made to proceed, would have provided the operational capability for the NERVA engine at an estimated cost of \$135 million. The total estimate for this program is \$560 million. This proposal not only would build upon the technology developed and retain and utilize the on-board scientific and engineering talent, but also would produce specific end products at the completion of each phase, while meeting the criteria for low annual funding in the immediate future. It was further revealed that in addition to developing a flight engine for space propulsion, the program would provide the added benefit of providing a reactor which could drive a power conversion system producing energy to operate high power laser systems which appear to be of great future interest to NASA and the Department of Defense.

In all congressional hearings prior to fiscal year 1972 NERVA was supported strongly by the technical people as being needed for future space activities in the late 1970's or early 1980's. The thrust levels were related to several manned space flights and heavy logistic flights which seemed to be ideally suited to nuclear energy, but there was no specific mission assignment as a focal point for the development program. The unknown factor in funding the program always seemed to be the exact time frame when it was needed and that depended a great deal upon how the space program unfolded in terms of future programs. The committee believes it is most inappropriate to continue to submit and justify to the Congress year after year a program which, after a very large investment of tax dollars, is to be terminated. The planning and decisionmaking in such matters must be improved.

Furthermore, concurrent with the termination decision, NASA proposes to study the definition of a 20,000-pound thrust nuclear engine which, in turn, would be evaluated against other potential propulsion systems in this thrust class which might be used for several unmanned high energy, long-duration planetary missions. For this smaller engine, with a total estimated cost of about \$200 million, NASA has requested \$8.5 million, and the AEC \$5 million for fiscal year 1973. There is a very strong feeling among the technical people and the AEC that an additional \$7 million should be provided to the AEC for fiscal year 1973 for a new AEC total of \$12 million. The purpose of the additional money is to provide for the continued development of advanced fuel rods and other critical components, and to provide money to proceed with the purchase of long-lead components when and if the decision is made, as scheduled in early 1973, to proceed with the development of the 20,000-pound thrust nuclear engine in lieu of waiting until fiscal year 1974 to fund the purchase of needed hardware. While the testimony has indicated that NERVA technology will be of some value in the new 20,000-pound thrust engine program, if it is undertaken, it is reasonably clear to the committee that the termination action does not permit full utilization of the investment of \$1.4 billion in this program, as well as substantially dismembers the carefully established and highly trained technical teams that have conducted the highly successful NERVA engine technology program. The principal justification NASA has made in proposing to proceed with a 20,000-pound thrust engine in lieu of the 75,000-pound thrust engine is that the smaller

engine is compatible with the need for high-energy planetary probes. Other defenses advanced for the smaller engine include its compatibility with the time phase of the shuttle program. Further, it has been indicated that if the 20,000-pound thrust engine is developed, it can then be clustered to provide the higher thrust ranges of a larger nuclear rocket engine when the need arises. There appears to be an inconsistency here inasmuch as the large engine program, nicely underway, is terminated in favor of another program which may eventually lead to the same result. There is also the question as to whether the single 75,000-pound thrust NERVA engine would not be more efficient and reliable than clustering smaller engines, and avoid the engineering problems of clustering as well. These, however, are technical judgments and the committee requests they be studied carefully and the correct choice made.

The committee would prefer that NASA continue the development of the 75,000-pound thrust nuclear rocket engine as proposed by Dr. Fletcher to the Office of Management and Budget in his letter of November 19, 1971. The program is a three-phase development, the first phase of which would result in the development and ground test of a 75,000-pound thrust NERVA engine. To support this development work, the committee recommends a new authorization of \$8.5 million for the nuclear propulsion program as requested by NASA be made available in fiscal year 1973; and, in addition, that \$10.5 million of the unused funds specifically authorized and appropriated for the NERVA 75,000-pound thrust nuclear rocket engine in fiscal year 1972 be allocated to this project for fiscal year 1973. This will make a total of \$25 million for continuing the development of the 75,000-pound thrust nuclear rocket engine during fiscal year 1973. It seems clear that pursuing a development program with three discrete phases, as outlined, would bring in a 75,000-pound thrust nuclear engine in the time frame which would support those missions which NASA previously said have been pushed out into the late 1980's.

The committee makes the above recommendation without prejudice to the development of the 20,000-pound engine, if this is the direction chosen by the administration. However, the committee feels strongly that the development of the 20,000-pound thrust engine, if initiated, should receive adequate annual funding and a mission assignment. The committee would hope that this smaller sized engine would not be treated as NERVA has been treated historically, and that it would be developed as a stable program and receive the proper funding and direction to bring it to early and timely fruition. The committee also would strongly recommend that while it is unrealistic at this late date to reconstruct the teams of trained people originally engaged in NERVA, at least the nucleus of qualified people with the broad experience needed to proceed with even the small engine be maintained; and all engineering criteria and data on the 75,000-pound thrust engine be retained for future application so that alternatives can be studied when the need for a larger engine becomes apparent.

TECHNOLOGY UTILIZATION PROGRAM, \$4,000,000

COMMITTEE COMMENT

Your committee recommends funding this program at the \$4 million level as presented in the NASA budget request. The committee considered this to be a reasonable level for this important activity. The committee notes the increased direct participation of NASA technical personnel at the various centers in solving problems presented by the nonaerospace community. This is considered to be a most effective way of transferring and applying advanced technology developed within NASA. In view of these factors, your committee did not concur with the \$1,500,000 addition to this program approved by the House.

CONSTRUCTION OF FACILITIES

The Construction of Facilities authorization recommended by your Committee totals \$77,300,000, of which \$8,000,000 is for facility planning and design activities and \$69,300,000 is for actual construction and construction-related work.

The construction funding is characterized by the amount, almost 60 percent, which is recommended to support the rehabilitation and modification of existing facilities (exclusive of those directly related to the space shuttle). These projects reflect the aging of the overall NASA capital plant, and the deterioration resulting from age and extensive utilization, and the fact that periodic modifications, in the form of upgrading as well as general overhaul, is required in order to support advanced research efforts and to accommodate progress in technology occurring since the facilities were first placed in service. For example, one of the projects at the Langley Research Center is to rehabilitate a wind tunnel that has provided 40 years of aeronautical research service. On the other hand, modifications of newer structures at the Kennedy Space Center are necessary to support the Viking unmanned mission to Mars.

The remaining 40 percent of the construction projects recommended herein, totaling \$27,900,000, are occasioned by the research tasks, development, fabrication, assembly, and test activities associated with proceeding with the space shuttle program. Here again, however, it will be noted that the project funding recommended, almost without exception, is for modifications and additions to existing facilities thereby maximizing the use of the national investment in existing facilities and minimizing the costs of providing new facilities for the shuttle program.

Item	Summary	Amount
1	Rehabilitation and modification of aeronautical, airborne science and support facilities, Ames Research Center.....	\$1,065,000
2	Rehabilitation of Unitary Plan Wind tunnel model supports, control systems and model preparation areas, Ames Research Center.....	760,000
3	Rehabilitation and modification of utility systems, Goddard Space Flight Center.....	590,000
4	Rehabilitation and modification of roadway system, Jet Propulsion Laboratory.....	610,000
5	Modifications of, and additions to, spacecraft assembly facilities, Kennedy Space Center.....	8,100,000
6	Modification of Titan Centaur facilities, Kennedy Space Center..	2,040,000
7	Rehabilitation of Full Scale Wind Tunnel, Langley Research Center.....	2,465,000
8	Modification of central air supply system, Langley Research Center.....	1,175,000
9	Environmental modifications for utility operations, Langley Research Center.....	650,000
10	Modification of high temperature and high pressure turbine and combustor research facility, Lewis Research Center.....	9,710,000
11	Modification of fire protection system, Manned Spacecraft Center.....	585,000
12	Warehouse replacement, Wallops Station.....	350,000
13	Space shuttle facilities, as follows:	
	(a) Modification of altitude test facilities, Arnold Engineering Development Center.....	6,800,000
	(b) Rehabilitation of propellant and high pressure gaseous systems, Mississippi Test Facility.....	1,160,000
	(c) Modification of entry structures facility, Langley Research Center.....	1,635,000
	(d) Addition for systems integration and mockup laboratory, Manned Spacecraft Center.....	2,545,000
	(e) Modification of vibration and acoustic test facility, Manned Spacecraft Center.....	2,770,000
	(f) Modification of structures and mechanics laboratory, Marshall Space Flight Center.....	4,700,000
	(g) Addition for electrical power laboratory, Marshall Space Flight Center.....	320,000
	(h) Modification of acoustic model engine test facility, Marshall Space Flight Center.....	2,430,000
	(i) Modification of manufacturing and final assembly facilities, undesignated locations.....	5,540,000
14	Rehabilitation and modification of facilities at various locations.....	11,580,000
15	Minor construction of new facilities and additions to existing various locations.....	1,720,000
16	Facility planning and design.....	8,000,000
	Total.....	77,300,000

COMMITTEE COMMENT

Your committee, in its report on the fiscal year 1973 NASA authorization bill, expressed its continuing dissatisfaction with the Agency's conduct of its facilities program, and made changes in that bill to fully identify the specific facilities authorized. The committee deferred further legislative changes in view of the commitment by the Deputy Administrator to perform promptly an in-depth review of this matter. The report of the NASA Facilities Management Review Committee was submitted to your committee in January 1972, and several recommendations of the review group were implemented in the fiscal year 1973 budget request presented to the Congress. The recommendation most significantly impacting the fiscal year 1973 budget request is that, with two exceptions, all facilities projects whether involving major or minor construction, new facilities or additions to existing facilities, or whether new construction or rehabilitation and modification of existing facilities are included in the construction of facilities (C of F) appropriation category rather than provided for in various forms in all three appropriations categories as in past years. This has the effect of increasing the C of F budget through the establishment in this bill under Section 1(b) of line item 15, the inclusion of smaller rehabilitation and modification projects in line 14, and the consolidation and identification as line item projects of several requirements which otherwise might have been accomplished on a piecemeal basis in the other two appropriations categories. An equivalent reduction in the research and development and research and program management funding areas has been made.

Consistent with its action last year to provide better visibility and control over major construction of facilities projects, your committee has established under Section 1(b)(13) space shuttle facilities, line items identifying the specific facility projects, including estimated costs, and locations thereof if presently known, recommended in this bill as necessary to support the space shuttle development program. The committee expects that the Administrator of NASA will advise it promptly when sites are designated for those activities whose locations are not yet selected.

The committee believes most of the recommendations of the NASA Facilities Management Review Committee, if fully implemented, will result in positive improvements in the management of the NASA facilities program. These recommendations, therefore, should be expeditiously implemented. The committee noted, however, that as a result of its review, NASA, in its draft legislation, proposed a new provision, Section 1(g), in the fiscal year 1973 authorization bill which would provide that minor new construction up to \$10,000 per project

and facility rehabilitations and modifications up to \$25,000 per project could be performed under the research and development and the research and program management appropriations. Also, either type of project up to an estimated cost of \$250,000 could be accomplished from research and development funds to satisfy an unforeseen programmatic need. This provision is not consistent with the views of the committee as expressed last year inasmuch as your committee believes that such items of work should be restricted to and consolidated with work of similar character budgeted under C of F. Your committee is not fully persuaded at this time that NASA has made a convincing case as to the need for this additional flexibility. The committee's view is based upon the fact that C of F line items 14 and 15 provide for the capability of performing this kind of work with the recognition that each project cannot necessarily be and therefore is not required to be defined in advance. Rather, that the Agency should have an experience factor which can be used for sound budgeting and management of these smaller projects.

A similar situation exists with respect to the funding of projects up to \$250,000 to meet unforeseen programmatic needs. Basically, programmatic facility needs are budgeted in the construction of facilities appropriation. Therefore, there is an inconsistency with respect to the need for authority to provide for similar projects under the research and development appropriation, particularly when maturity in space technology should provide increased ability to forecast needs. Further, there exists in Section 3 of the bill the authority to proceed with projects of unspecified magnitude to meet unforeseen programmatic needs upon such a finding by the Administrator. Consequently, the committee is not yet convinced that its views on this item as expressed last year would unduly restrict the Agency in the conduct of its responsibilities. Further, with respect to the unforeseen programmatic need portion of Section 1(g), your committee, based upon a review of projects undertaken in previous years, and study of the NASA response to questions posed by committee members during hearings, has reservations about the definition of the term unforeseen programmatic need, inasmuch as the evidence indicates that this has been and might well continue to be construed beyond a reasonable interpretation and thereby provide facilities which properly should have been provided under C of F.

However, in view of the lengthy examination of its facilities activities conducted by NASA during 1972, the committee has decided to withhold in final judgment on the authorities provided in Section 1(g) of the 1973 authorization bill in order to provide the Administrator sufficient opportunity to implement the overall recommendations of the Facilities Management Review Committee. Therefore, your committee will monitor the Agency's progress in implementing the recommendations of the review group and, in particular, will review the utilization of the authorities provided under Section 1(g) as the reoriented facilities program is placed into effect.

RESEARCH AND PROGRAM MANAGEMENT

Summary

	Budget request	House action	Senate committee action
Personnel compensation.....	\$497,516,000		
Personnel benefits.....	42,724,000		
Benefits for former personnel.....	185,000		
Travel and transportation of persons.....	17,845,000		
Rent, communications, and utilities.....	3,327,000		
Printing and reproduction.....	39,219,000		
Other services.....	4,838,000		
Supplies and materials.....	79,752,000		
Equipment.....	12,377,000		
Lands and structures.....	2,675,000		
Grants, subsidies, and contributions.....	157,000		
Insurance claims and indemnities.....	51,000		
	34,000		
Total.....	700,800,000	700,800,000	
Amended request for pay increase.....	28,650,000	0	
Total.....	729,450,000	700,800,000	729,450,000

COMMITTEE COMMENT

In acting on the research and program management request, your committee has included \$28,650,000, the amount set forth in the budget amendment (H. Doc. 92-267) submitted to the Congress on March 20, 1972, for the fiscal year 1973 cost of the Federal pay increase that became effective January 1, 1972. The House, in its action on H.R. 14070, did not include the amended budget request, which accounts for the difference between H.R. 14070 and the recommendation of your committee.

For fiscal year 1973, your committee is recommending the full amount of the budget request for this appropriation category. In doing so, however, your committee has inserted in Section 1(c) of the bill a provision limiting the amount available for personnel and related costs, as defined in the NASA budget submission, to \$572,237,000. This provision, in principle, has been included in the NASA authorization acts for the 2 previous years.

COST AND BUDGET DATA

This bill, H.R. 14070, as reported by your committee would authorize appropriations for the National Aeronautics and Space Administration (NASA) for fiscal year 1973 in the amount of \$3,420,150,000. This is \$12,500,000 more than the administration's request of \$3,407,650,000. The differences are explained in this report.

In accordance with the requirements of Section 252(a) of the Legislative Reorganization Act of 1970, the estimates for the next 5 years of the NASA budget are as follows:

(in billions of dollars)		
Fiscal year	NASA estimate	Committee estimate
1974.....	3.4	3.4
1975.....	3.3	3.3
1976.....	3.2	3.2
1977.....	3.1	3.1
1978.....	2.8	2.8

The above estimates are of future year funding requirements for the continuation of NASA programs (including development of the space shuttle system) and other activities included in the fiscal year 1973 budget estimates. These estimates do not provide for the initiation of any new programs during these future years nor do they include any provisions for administrative adjustments that may be required.

The committee uses NASA's estimate as a starting point for its estimate; since the committee recommendations will not have a substantial impact on the NASA funding required for the next 5 years, the committee's estimate is identical to the NASA estimate.

These future year estimates are lower for the years 1974 through 1977 than those given in the committee's report last year because the configuration of the space shuttle system has been changed substantially from what was presented to the Congress last year; this has resulted in greatly reduced estimated total program costs for the shuttle and consequently lower annual funding.

The above estimates are not an estimate of what the NASA budget request will be in future years. It is expected that as existing programs and projects are phased out, new programs and projects will be requested; the Congress will have an opportunity to exercise its judgment on such programs and projects when authority and funds are requested to carry them forward. NASA officials testified that they expect NASA's budget to remain at about the level of fiscal year 1973 during the next few years.

LEGISLATIVE CHANGES

Your committee has recommended three legislative amendments to the NASA fiscal year 1973 request.

The first amendment would modify Section 1(b) "Construction of facilities," item (13), space shuttle facilities at various locations, \$27,900,000, to specify, as subline items (13) (A) through (H), the individual facilities, their estimated cost and location thereof, recommended for authorization for the space shuttle program.

The second amendment would modify Section 1(c) to establish a ceiling of \$572,237,000 on the amount available for personnel and related costs.

A third amendment is complementary to the second amendment and would modify Section 4 by establishing the existing provisions as subsection (a) and then adding subsection (b) specifying that nothing in the section shall be construed to authorize the expenditure of amounts for personnel and related costs in excess of the ceiling placed on such costs.

The committee also considered amendment No. 1141 to S. 3094 proposed by Senator Gambrell and referred to the committee. This amendment would establish an Office of Cost-Benefit in the National Aeronautics and Space Administration, headed by an Assistant Administrator, the function of which would be to evaluate and report on the costs of and projected benefits from any proposed program, project or undertaking in which NASA is a participant or sponsor. Further, the amendment would preclude initiation of such an undertaking by NASA unless preceded by such a report.

NASA has provided a focus for cost-benefit analyses within the Agency in a special organizational unit under the Assistant Administrator for Administration who is the principal adviser to NASA's senior management on matters relating to the evaluation of programs and resources and NASA does now conduct such studies. For example, the committee received testimony on a major effort in this regard; namely, the Mathematica, Inc., report on the space shuttle program.

Your committee agrees, in principle, with the concept of cost-benefit analysis; however, such analyses are not always possible or relevant. The very nature of part of the NASA mission, that is exploration, contains intangibles that sometimes preclude knowing the benefits, certainly in the short run, to be expected from certain undertakings. For example, there would be some difficulty in making such a study with respect to a proposed astronomy mission or a planetary science mission. In such cases, it appears it would be inappropriate to preclude initiating such a mission because of the absence of a cost-benefit report.

In view of the foregoing, your committee has recommended against the amendment in the bill. Nevertheless, the committee expects the Administrator of NASA to continue making cost-benefit analyses of its activities when relevant and that the justifications for programs presented to the Congress contain such evaluations even though they may, of necessity, have to be expressed in the most general terms of how a scientific endeavor may relate to the common good. Furthermore, the committee believes the Administrator should continue to strengthen the Agency's capability to make cost-benefit studies.

SECTIONAL ANALYSIS OF COMMITTEE AMENDMENT TO A BILL "TO AUTHORIZE APPROPRIATIONS TO THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION FOR RESEARCH AND DEVELOPMENT, CONSTRUCTION OF FACILITIES, AND RESEARCH AND PROGRAM MANAGEMENT, AND FOR OTHER PURPOSES"

Section 1. Subsections (a), (b), and (c) would authorize to be appropriated to the National Aeronautics and Space Administration funds, in the total amount of \$3,420,150,000 as follows: (a) for "Research and development," a total of 12 program line items aggregating the sum of \$2,613,400,000; (b) for "Construction of facilities," a total of sixteen line items aggregating the sum of \$77,300,000; and, (c) for "Research and program management," \$729,450,000 of which not more than \$572,237,000 is to be used for personnel and related costs.

Subsection 1(d) would authorize the use of appropriations for "Research and development" without regard to the provisions of subsection 1(g) for: (1) items of a capital nature (other than the acquisition of land) required at locations other than NASA installations for the performance of research and development contracts; and (2) grants to nonprofit institutions of higher education, or to nonprofit organizations whose primary purpose is the conduct of scientific research, for purchase or construction of additional research facilities. Title to such facilities shall be vested in the United States unless the Administrator determines that the national program of aeronautical and space activities will best be served by vesting title in any such grantee institution or organization. Moreover, each such grant shall be made under such conditions as the Administrator shall find necessary to insure that the United States will receive benefit therefrom adequate to justify the making of that grant.

In either case no funds may be used for the construction of a facility in accordance with the subsection the estimated cost of which, including collateral equipment, exceeds \$250,000 unless the Administrator notifies the Speaker of the House, the President of the Senate and the specified committees of the Congress of the nature, location, and estimated cost of such facility.

Subsection 1(e) would provide that, when so specified in an appropriation Act, (1) any amount appropriated for "Research and development" or for "Construction of facilities" may remain available without fiscal year limitation, and (2) contracts for maintenance and operation of facilities and support services may be entered into under the "Research and program management" appropriation for periods not in excess of twelve months beginning at any time during the fiscal year.

Subsection 1(f) would authorize the use of not to exceed \$35,000 of "Research and program management" appropriation funds for scientific consultations or extraordinary expenses, including representation and official entertainment expenses, upon the authority of the Administrator, whose determination shall be final and conclusive.

Subsection 1(g) would provide that of the funds appropriated for "Research and development" and "Research and program management," not in excess of \$10,000 per project (including collateral

equipment) may be used for construction of new, or additions to existing, facilities, and not in excess of \$25,000 per project (including collateral equipment) may be used for rehabilitation or modification of existing facilities; however, of the funds appropriated for "Research and development," not in excess of \$250,000 per project (including collateral equipment) may be used for construction of new facilities or additions to, or rehabilitation or modification of, existing facilities required for unforeseen programmatic needs.

Subsection 1(h) would provide that no part of the funds appropriated for "Research and development" may be used for grants to any non-profit institution of higher learning unless the Administrator determines that recruiting personnel of any of the Armed Forces are not being barred from the premises or property of such institution. Subsection 1(h) would not apply if the Administrator determines that the grant is a continuation or renewal of a previous grant to such institution which is likely to make a significant contribution to the aeronautical and space activities of the United States. The Secretary of Defense would be required to furnish to the Administrator on the dates prescribed the names of any nonprofit institutions of higher learning which the Secretary of Defense determines are barring such recruiting personnel from premises or property of any such institution.

Section 2. Section 2 would authorize the 5 per centum upward variation of any of the sums authorized for the "Construction of facilities" line items (other than facility planning and design) when, in the discretion of the Administrator, this is needed to meet unusual cost variations. However, the total cost of all work authorized under these line items may not exceed the total sum authorized for "Construction of facilities" under subsection 1(b), paragraphs (1) through (15).

Section 3. Section 3 would provide that not more than one-half of 1 per centum of the funds appropriated for "Research and Development" may be transferred to the "Construction of facilities" appropriation and, when so transferred, together with \$10,000,000 of the funds appropriated for "Construction of facilities," shall be available for the construction of facilities and land acquisition at any location if (1) the Administrator determines that such action is necessary because of changes in the space program or new scientific or engineering developments, and (2) that deferral of such action until the next authorization Act is enacted would be inconsistent with the interest of the Nation in aeronautical and space activities. However, no such funds may be obligated until 30 days have passed after the Administrator or his designee has transmitted to the Speaker of the House, the President of the Senate and the specified committees of Congress a written report containing a description of the project, its cost, and the reason why such project is necessary in the national interest, or each such committee before the expiration of such 30-day period has notified the Administrator that no objection to the proposed action will be made.

Section 4. Section 4(a) would provide that, notwithstanding any other provision of this Act—

(1) no amount appropriated pursuant to this Act may be used for any program deleted by the Congress from requests as originally made to either the House Committee on Science and Astronautics or the Senate Committee on Aeronautical and Space Sciences;

(2) no amount appropriated pursuant to this Act may be used for any program in excess of the amount actually authorized for that particular program by subsections 1(a) and 1(c); and,

(3) no amount appropriated pursuant to this Act may be used for any program which has not been presented to or requested of either such committee,

unless (A) a period of 30 days has passed after the receipt by the Speaker of the House, the President of the Senate and each such committee of notice given by the Administrator or his designee containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of such proposed action, or (B) each such committee before the expiration of such period has transmitted to the Administrator written notice to the effect that such committee has no objection to the proposed action.

Section 4(b) would provide that nothing in this section shall be construed to authorize the expenditure of amounts for personnel and related costs pursuant to section 1(c) to exceed amounts authorized for such costs.

Section 5. Section 5 would express the sense of the Congress that it is in the national interest that consideration be given to geographical distribution of Federal research funds whenever feasible and that the National Aeronautics and Space Administration should explore ways and means of distributing its research and development funds whenever feasible.

Section 6. Subsection 6(a) would provide that if an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution that such individual has been convicted by any court of record of any crime which was committed after the date of enactment of the Act and which involved the use of (or assistance to others in the use of) force, disruption, or the seizure of property under control of any institution of higher education to prevent officials or students from engaging in their duties or pursuing their studies, and that such crime was of a serious nature and contributed to a substantial disruption of the administration of the institution, then the institution would be required to deny for a period of two years any further payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958, the funds for which are authorized pursuant to the Act. If an institution denies an individual assistance under the authority of the first sentence of subsection 6(a), then any institution which such individual subsequently attends would be similarly required to deny for the remainder of the two-year period any further payment to, or for the direct benefit of, such individual.

Subsection 6(b) would provide that if an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution, that such individual has willfully refused to obey a lawful regulation or order of such institution after the date of enactment of the Act, and that such refusal was of a serious nature and contributed to a substantial disruption of the administration of such institution, then such institution would be required to deny, for a period of two years, any further

payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958, the funds for which are authorized pursuant to the Act.

Subsection 6(c)(1) would provide that nothing in the Act shall be construed to prohibit any institution of higher education from refusing to award, continue, or extend any financial assistance under any such Act to any individual because of any misconduct which in its judgment bears adversely on his fitness for such assistance.

Subsection 6(c)(2) would provide that nothing in section 6 shall be construed as limiting or prejudicing the rights and prerogatives of any institution of higher education to institute and carry out an independent, disciplinary proceeding pursuant to existing authority, practice, and law.

Subsection 6(c)(3) would provide that nothing in section 6 shall be construed to limit the freedom of any student to verbal expression of individual views or opinions.

Section 7. Section 7 would provide that the Act may be cited as the "National Aeronautics and Space Administration Authorization Act, 1973."

ADDITIONAL VIEWS OF MR. GOLDWATER

I offer my individual views in order to suggest that the NASA authorization bill should include the addition of \$48.45 million approved by the House of Representatives in the two areas of jet aircraft noise reduction and aviation safety.

In my opinion, the weight of evidence indicates that the quickest method of reducing jet aircraft noise is by development of an engine modification-retrofit program leading to actual fleet-wide retrofit. If the \$41 million increase recommended by the House is approved, retrofit can begin in mid-1975. On the other hand, if the \$9 million program allowed by the committee stands, actual retrofit could not begin until about a year and a half later, by the end of 1976. Although the approval of a \$41 million increase would result in the accelerated implementation of an operative jet noise abatement program, I wish to emphasize that it would not increase total development and demonstration costs. It would merely spend the same amount of funds over a shorter period of time, thereby bringing practical benefits to the public at an earlier date.

In the area of aviation safety, the House committee added \$7.45 million, including \$3.75 million for aircraft compatibility with the FAA Microwave Landing System by 1978, \$700,000 for turbulence research, and \$3 million for aircraft collision avoidance research. The Senate committee does not challenge the merit or need for these programs, but states that it was not persuaded that these funds could profitably be spent during fiscal year 1973. Again, I suggest that the additional funds should be authorized and that NASA has the ability to deal effectively with problems in this area.

First, I do not believe the present level of funding would permit development to progress sufficiently so that civil aviation will be prepared for fully automatic flight by 1978, which is the projected deployment date for the FAA Microwave Landing System. The development of a fully automatic system, the performance of which could be monitored by the pilot, would be a major leap toward approach and landing safety and I believe work in this area must not be hampered by any possibility of insufficient funding. Second, I would point out that aviation incidents involving turbulence account for about 30 percent of the total number of aircraft accidents. If research on this problem could be effectively accelerated in fiscal year 1973 by additional funding, as I believe it could, there should be no hesitancy in approving the small increase recommended in this important field. Third, it is time for the United States to embark upon a national program to make low-cost, reliable collision avoidance systems available for all aircraft flying in this country. Representatives from NASA, DOD, and the FAA have now joined together to coordinate an attack on this major problem and, in order to contribute to this essential work, NASA must be funded at a level comparable with that of the two other agencies, each of which have budget allocations of about \$3 million for collision avoidance research.

In summary, the addition of the \$48.45 million in authorization which I endorse would be applied to the two problem areas, jet aircraft noise and airway congestion, with its attendant safety problems, which are probably the two major stumbling blocks facing civil aviation in the United States in the 1970's. I strongly believe the investment of an additional \$48.45 million in the future of aviation and in the interest of public safety would be fully justified.

BARRY GOLDWATER.



An Act

To authorize appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, and research and program management, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby authorized to be appropriated to the National Aeronautics and Space Administration:

(a) For "Research and development," for the following programs:

- (1) Apollo, \$128,700,000;
- (2) Space flight operations, \$1,094,200,000;
- (3) Advanced missions, \$1,500,000;
- (4) Physics and astronomy, \$156,600,000;
- (5) Lunar and planetary exploration, \$321,200,000;
- (6) Launch vehicle procurement, \$191,600,000;
- (7) Space applications, \$207,200,000;
- (8) Aeronautical research and technology, \$187,440,000;
- (9) Space research and technology, \$64,760,000;
- (10) Nuclear power and propulsion, \$21,100,000;
- (11) Tracking and data acquisition, \$259,100,000;
- (12) Technology utilization, \$4,000,000.

(b) For "Construction of facilities," including land acquisitions, as follows:

- (1) Rehabilitation and modification of aeronautical airborne science, and support facilities, Ames Research Center, \$1,065,000;
- (2) Rehabilitation of Unitary Plan wind tunnel model supports, control systems, and model preparation areas, Ames Research Center, \$760,000;
- (3) Rehabilitation and modification of utility systems, Goddard Space Flight Center, \$590,000;
- (4) Rehabilitation and modification of roadway system, Jet Propulsion Laboratory, \$610,000;
- (5) Modifications of, and additions to, spacecraft assembly facilities, Kennedy Space Center, \$8,100,000;
- (6) Modification of Titan Centaur facilities, Kennedy Space Center, \$2,040,000;
- (7) Rehabilitation of full-scale wind tunnel, Langley Research Center, \$2,465,000;
- (8) Modification of central air supply system, Langley Research Center, \$1,175,000;
- (9) Environmental modifications for utility operations, Langley Research Center, \$650,000;
- (10) Modification of high temperature and high pressure turbine and combustor research facility, Lewis Research Center, \$9,710,000;
- (11) Modification of fire protection system, Manned Spacecraft Center, \$585,000;
- (12) Warehouse replacement, Wallops Station, \$350,000;
- (13) Space shuttle facilities, as follows:
 - (A) Modification of Altitude Test Facilities, Arnold Engineering Development Center, \$6,800,000,
 - (B) Rehabilitation of Propellant and High Pressure Gaseous Systems, Mississippi Test Facility, \$1,160,000,
 - (C) Modification of the Entry Structures Facility, Langley Research Center, \$1,635,000,

National Aeronautics and Space Administration Act, 1973.
Research and development.

86 STAT. 157
86 STAT. 158

Construction of facilities.

86 STAT. 158
86 STAT. 159

Research and program management.
Program specifications.

Notification to Congress.

- (D) Addition for Systems Integration and Mockup Laboratory, Manned Spacecraft Center, \$2,545,000,
- (E) Modification of the Vibration and Acoustic Test Facility, Manned Spacecraft Center, \$2,770,000,
- (F) Modification of the Structures and Mechanics Laboratory, Marshall Space Flight Center, \$4,700,000,

(G) Addition for Electrical Power Laboratory, Marshall Space Flight Center, \$320,000,

(H) Modification of Acoustic Model Engine Test Facility, Marshall Space Flight Center, \$2,430,000,

(I) Modification of Manufacturing and Final Assembly Facilities, Undesignated Locations, \$5,540,000;

(14) Rehabilitation and modification of facilities at various locations, not in excess of \$500,000 per project, \$11,580,000;

(15) Minor construction of new facilities and additions to existing facilities at various locations, not in excess of \$250,000 per project, \$1,720,000;

(16) Facility planning and design not otherwise provided for, \$8,000,000.

(c) For "Research and program management," \$729,450,000, of which not to exceed \$572,237,000 to be available for personnel and related costs.

(d) Notwithstanding the provisions of subsection 1(g), appropriations for "Research and development" may be used (1) for any items of a capital nature (other than acquisition of land) which may be required at locations other than installations of the Administration for the performance of research and development contracts, and (2) for grants to nonprofit institutions of higher education, or to nonprofit organizations whose primary purpose is the conduct of scientific research, for purchase or construction of additional research facilities; and title to such facilities shall be vested in the United States unless the Administrator determines that the national program of aeronautical and space activities will best be served by vesting title in any such grantee institution or organization. Each such grant shall be made under such conditions as the Administrator shall determine to be required to insure that the United States will receive therefrom benefit adequate to justify the making of that grant. None of the funds appropriated for "Research and development" pursuant to this Act may be used in accordance with this subsection for the construction of any major facility, the estimated cost of which, including collateral equipment, exceeds \$250,000, unless the Administrator or his designee has notified the Speaker of the House of Representatives and the President of the Senate and the Committee on Science and Astronautics of the House of Representatives and the Committee on Aeronautical and Space Sciences of the Senate of the nature, location, and estimated cost of such facility.

(e) When so specified in an appropriation Act, (1) any amount appropriated for "Research and development" or for "Construction of facilities" may remain available without fiscal year limitation, and (2) maintenance and operation of facilities, and support services contracts may be entered into under the "Research and program management" appropriation for periods not in excess of twelve months beginning at any time during the fiscal year.

(f) Appropriations made pursuant to subsection 1(c) may be used, but not to exceed \$35,000, for scientific consultations or extraordinary expenses upon the approval or authority of the Administrator and his determination shall be final and conclusive upon the accounting officers of the Government.

86 STAT. 160
Limitations.

(g) Of the funds appropriated pursuant to subsections 1(a) and 1(c), not in excess of \$10,000 for each project, including collateral equipment, may be used for construction of new facilities and additions to existing facilities, and not in excess of \$25,000 for each project, including collateral equipment, may be used for rehabilitation or modification of facilities: *Provided*, That of the funds appropriated pursuant to subsection 1(a), not in excess of \$250,000 for each project, including collateral equipment, may be used for any of the foregoing for unforeseen programmatic needs.

(h) No part of the funds appropriated pursuant to subsection (a) of this section may be used for grants to any nonprofit institution of higher learning unless the Administrator or his designee determines at the time of the grant that recruiting personnel of any of the Armed Forces of the United States are not being barred from the premises or property of such institution except that this subsection shall not apply if the Administrator or his designee determines that the grant is a continuation or renewal of a previous grant to such institution which is likely to make a significant contribution to the aeronautical and space activities of the United States. The Secretary of Defense shall furnish to the Administrator or his designee within sixty days after the date of enactment of this Act and each January 30 and June 30 thereafter the names of any nonprofit institutions of higher learning which the Secretary of Defense determines on the date of each such report are barring such recruiting personnel from premises or property of any such institution.

Sec. 2. Authorization is hereby granted whereby any of the amounts prescribed in paragraphs (1) through (15), inclusive, of subsection 1(b) may, in the discretion of the Administrator of the National Aeronautics and Space Administration, be varied upward 5 per centum to meet unusual cost variations, but the total cost of all work authorized under such paragraphs shall not exceed the total of the amounts specified in such paragraphs.

Sec. 3. Not to exceed one-half of 1 per centum of the funds appropriated pursuant to subsection 1(a) hereof may be transferred to the "Construction of facilities" appropriation, and, when so transferred, together with \$10,000,000 of the funds appropriated pursuant to subsection 1(b) hereof (other than funds appropriated pursuant to paragraph (16) of such subsection) shall be available for expenditure to construct, expand, or modify laboratories and other installations at any location (including locations specified in subsection 1(b)), if (1) the Administrator determines such action to be necessary because of changes in the national program of aeronautical and space activities or new scientific or engineering developments, and (2) he determines that deferral of such action until the enactment of the next authorization Act would be inconsistent with the interest of the Nation in aeronautical and space activities. The funds so made available may be expended to acquire, construct, convert, rehabilitate, or install permanent or temporary public works, including land acquisition, site preparation, appurtenances, utilities, and equipment. No portion of such sums may be obligated for expenditure or expended to construct, expand, or modify laboratories and other installations unless (A) a period of thirty days has passed after the Administrator or his designee has transmitted to the Speaker of the House of Representatives and to the President of the Senate and to the Committee on Science and Astronautics of the House of Representatives and to the Committee on Aeronautical and Space Sciences of the Senate a written report containing a full and complete statement concerning (1) the nature of such construction, expansion, or modification, (2)

Campuses barring military recruiters, grants prohibition.

Construction cost variations

Transfer of funds.

Report to Congress.

86 STAT. 161

Use of funds, restrictions.

Notice to Congress.

Research funds, geographical distribution.

Campus disrupters, denial of payment.

72 Stat. 426.
42 USC 2451
note.

the cost thereof including the cost of any real estate action pertaining thereto, and (3) the reason why such construction, expansion, or modification is necessary in the national interest, or (B) each such committee before the expiration of such period has transmitted to the Administrator written notice to the effect that such committee has no objection to the proposed action.

Sec. 4. (a) Notwithstanding any other provision of this Act--

(1) no amount appropriated pursuant to this Act may be used for any program deleted by the Congress from requests as originally made to either the House Committee on Science and Astronautics or the Senate Committee on Aeronautical and Space Sciences,

(2) no amount appropriated pursuant to this Act may be used for any program in excess of the amount actually authorized for that particular program by sections 1(a) and 1(c), and

(3) no amount appropriated pursuant to this Act may be used for any program which has not been presented to or requested of either such committee,

unless (A) a period of thirty days has passed after the receipt by the Speaker of the House of Representatives and the President of the Senate and each such committee of notice given by the Administrator or his designee containing a full and complete statement of the action proposed to be taken and the facts and circumstances relied upon in support of such proposed action; or (B) each such committee before the expiration of such period has transmitted to the Administrator written notice to the effect that such committee has no objection to the proposed action.

(b) Nothing in this section shall be construed to authorize the expenditure of amounts for personnel and related costs pursuant to section 1(c) to exceed amounts authorized for such costs.

Sec. 5. It is the sense of the Congress that it is in the national interest that consideration be given to geographical distribution of Federal research funds whenever feasible, and that the National Aeronautics and Space Administration should explore ways and means of distributing its research and development funds whenever feasible.

Sec. 6. (a) If an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution, that such individual has been convicted by any court of record of any crime which was committed after the date of enactment of this Act and which involved the use of (or assistance to others in the use of) force, disruption, or the seizure of property under control of any institution of higher education to prevent officials or students in such institution from engaging in their duties of pursuing their studies, and that such crime was of a serious nature and contributed to a substantial disruption of the administration of the institution with respect to which such crime was committed, then the institution which such individual attends, or is employed by, shall deny for a period of two years any further payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958, the funds for which are authorized pursuant to this Act. If an institution denies an individual assistance under the authority of the preceding sentence of this subsection, then any institution which such individual subsequently attends shall deny for the remainder of the two-year period any further payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958, the funds for which are authorized pursuant to this Act.

May 19, 1972

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Pub. Law 92-304

86 STAT. 162

(b) If an institution of higher education determines, after affording notice and opportunity for hearing to an individual attending, or employed by, such institution, that such individual has willfully refused to obey a lawful regulation or order of such institution after the date of enactment of this Act, and that such refusal was of a serious nature and contributed to a substantial disruption of the administration of such institution, then such institution shall deny, for a period of two years, any further payment to, or for the direct benefit of, such individual under any of the programs authorized by the National Aeronautics and Space Act of 1958, the funds for which are authorized pursuant to this Act.

72 Stat. 426.
42 USC 2451
note.

(c) (1) Nothing in this Act shall be construed to prohibit any institution of higher education from refusing to award, continue, or extend any financial assistance under any such Act to any individual because of any misconduct which in its judgment bears adversely on his fitness for such assistance.

(2) Nothing in this section shall be construed as limiting or prejudicing the rights and prerogatives of any institution of higher education to institute and carry out an independent, disciplinary proceeding pursuant to existing authority, practice, and law.

(3) Nothing in this section shall be construed to limit the freedom of any student to verbal expressions of individual views or opinions.

Freedom of
speech.

SEC. 7. This Act may be cited as the "National Aeronautics and Space Administration Authorization Act, 1973".

Short title.

Approved May 19, 1972.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 92-976 (Comm. on Science and Astronautics).
SENATE REPORT No. 92-779 (Comm. on Aeronautical and Space Sciences).
CONGRESSIONAL RECORD, Vol. 118 (1972):

Apr. 20, considered and passed House.
May 11, considered and passed Senate, amended.
May 16, House concurred in Senate amendment.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT;
 SPACE, SCIENCE, VETERANS, AND CERTAIN OTHER
 INDEPENDENT AGENCIES APPROPRIATION BILL, 1973

MAY 18, 1972.—Committed to the Committee of the Whole House on the State
 of the Union and ordered to be printed.

Mr. BOLAND, from the Committee on Appropriations,
 submitted the following

REPORT

[To accompany H.R. 15093]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

RESEARCH AND DEVELOPMENT	
1972 appropriation.....	\$2,522,700,000
Estimate, 1973.....	2,600,900,000
Recommended in the bill.....	2,550,000,000
Decrease below estimate.....	-50,900,000

During fiscal year 1973 the National Aeronautics and Space Administration will conclude the Apollo program when Apollo 17 returns from the moon. The citizens of our Nation owe a debt of gratitude to those dedicated employees who have made this tremendous pioneering effort successful. Future generations will be deeply indebted to those responsible for the Apollo program, and to the taxpayers for their role in making this great effort possible.

The Committee recommends an appropriation of \$2,550,000,000 to support a balanced research and development program in 1973 that will continue a useful and significant program of projects in space science, exploration, practical applications of advanced technology, and aeronautics. This total is \$50,900,000 less than the budget estimate.

The Committee feels that the levels approved in the authorizing legislation for the aviation safety and noise reduction programs in aeronautics research and technology should be carried out. Funds are included in the total of the bill for this purpose. The cost estimates for some research activities are not firm and some reductions can be applied to the overall program without impairing any of the objectives included in the budget, nor interfering with the aeronautics research program referred to above.

CONSTRUCTION OF FACILITIES

1972 appropriation.....	\$52,700,000
Estimate, 1973.....	77,300,000
Recommended in bill.....	69,760,000
Decrease below estimate.....	-7,540,000

The Committee recommends the funds requested, except in two instances:

1. The request of \$5,540,000 for "Various locations" for the manufacturing and final assembly of the space shuttle is not recommended. Specific sites and designs for these functions have not been selected, and until such sites are decided upon and plans are developed, funds should not be provided.

2. A total of \$8,000,000 is requested for planning and design. This is an increase of \$4,500,000 over the \$3,500,000 provided for 1972. The bill provides \$6,000,000 for this activity, which should be adequate to carry out the program recommended in the bill for the next fiscal year.

The Committee continues to feel that the Congress should specifically approve and fund major NASA construction projects. The language recommended in the bill for the construction program therefore delineates the specific major projects and the purposes for which these funds can be obligated for the 1973 construction program. Three-year availability is again provided for use of funds. If not obligated in that period of time, and for the purposes intended, the unused funds will revert to the Treasury.

RESEARCH AND PROGRAM MANAGEMENT

1972 appropriation.....	\$734,722,000
Estimate, 1973.....	729,450,000
Recommended in bill.....	729,450,000

The Committee recommends the full budget estimate of \$729,450,000 in support of research and program management activities. This appropriation provides for the operation of all NASA installations, research in Government laboratories, and the salaries and expenses of NASA personnel. This is \$5,272,000 below the amount appropriated for 1972.

The language of the bill has been changed to limit construction of new facilities and additions to existing facilities in this appropriation to \$10,000, and to limit rehabilitation and modification of facilities to \$25,000. It also permits the replacement of a Grumman Gulfstream I purchased in 1963 with a more modern aircraft to provide for greater efficiencies and safety.

The Committee has deleted the general provisions section of the bill this year, including the language for a two percent transfer authority between appropriations. The authorizing legislation for NASA programs continues to permit a more limited transfer of not to exceed one-half of one percent of research and development funds to the construction of facilities account. This should be adequate for the needs of the agency at this time.

LIMITATIONS AND LEGISLATIVE PROVISIONS

The following limitations and legislative provisions not heretofore carried in connection with any appropriation bill are recommended:

On page 14, in connection with aircraft under Research and Program Management, National Aeronautics and Space Administration:

*purchase (not to exceed one for replacement only),
and not in excess of \$10,000 per project for construction of new facilities and additions to existing facilities, and not in excess of \$25,000 per project for rehabilitation and modification of facilities*

COMPARATIVE STATEMENT OF THE NEW BUDGET (OBLIGATIONAL) AUTHORITY FOR FISCAL YEAR 1972 AND THE BUDGET ESTIMATES FOR FISCAL YEAR 1973

[NOTE.—All amounts are in the form of appropriations unless otherwise indicated]

Agency and item (1)	New budget (obligational) authority, fiscal year 1972 (*) (2)	Budget estimates of new budget (obligational) authority, fiscal year 1973 (3)	New budget (obligational) authority recommended in bill (4)	Bill compared with—	
				New budget (obligational) authority, fiscal year 1972 (5)	Budget estimates of new budget (obligational) authority, fiscal year 1973 (6)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION					
Research and development.....	2,522,700,000	2,600,900,000	2,550,000,000	+27,300,000	-50,900,000
Construction of facilities.....	52,700,000	77,300,000	69,760,000	+17,060,000	-7,540,000
Research and program management.....	734,722,000	729,450,000	729,450,000	-5,272,000	-----
Total, National Aeronautics and Space Administration.....	3,310,122,000	3,407,650,000	3,349,210,000	+39,088,000	-58,440,000

PERMANENT NEW BUDGET (OBLIGATIONAL) AUTHORITY—TRUST FUNDS

[Becomes available automatically under earlier, or "permanent" law without further, or annual, action by the Congress. Thus, these amounts are not included in the accompanying bill]

Agency and item (1)	New budget (obligational) authority, 1972 (2)	Budget estimate of new (obligational) authority, 1973, (3)	Increase (+) or decrease (-) (4)
National Aeronautics and Space Administration: Miscellaneous trust funds.....	\$11,700,000	\$9,800,000	-\$1,900,000

Calendar No. 786

92d CONGRESS }
2d Session }

SENATE {

REPORT
No. 92-820

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT;
SPACE, SCIENCE, VETERANS, AND CERTAIN OTHER
INDEPENDENT AGENCIES APPROPRIATIONS BILL, 1973

MAY 31, 1972.—Ordered to be printed

Mr. PASTORE, from the Committee on Appropriations,
submitted the following

REPORT

[To accompany H.R. 15093]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

The National Aeronautics and Space Administration, established October 1, 1958, conducts space and aeronautical activities for peaceful purposes for the benefit of all mankind. In maintaining United States leadership in research, technology, and utilization in these fields, NASA's programs:

- extend man's knowledge of the earth, its environment, the solar system, and the universe;
- expand practical applications of space technology;
- develop, operate, and improve manned and unmanned space vehicles;
- improve the civil and military usefulness of aeronautical vehicles while minimizing their environmental effects;
- disseminate pertinent findings widely to potential users;
- promote international cooperation in peaceful activities in space; and
- effectively utilize a significant segment of the nation's scientific and engineering talents and facilities.

The industrial community, under contracts with NASA, will continue to carry forward the prime design, development, and fabrication effort of the major hardware elements involved in the NASA programs.

Other elements of the programs will be pursued within NASA installations, other government agencies, universities, and research contractors.

RESEARCH AND DEVELOPMENT	
1972 appropriation.....	\$2, 522, 700, 000
Estimate, 1973.....	2, 606, 900, 000
House allowance.....	2, 550, 000, 000
Committee recommendation.....	2, 624, 900, 000

The National Aeronautics and Space Administration program of research and development maintains and advances the United States' position of world leadership in aeronautics and space. The major program elements for achieving this objective are:

Manned space flight.—A program for the development of a capability for peaceful manned space operations and the utilization of that capability for earth orbit and lunar missions.

Space science.—An unmanned space flight program directed toward scientific investigations of the earth, the atmosphere, the moon, the sun, the planets, the stars, and interplanetary space.

Applications.—Established as a program in its own right during FY 1972 to give needed emphasis to development of spacecraft systems and technology for meteorology, communications, and geodetic and earth resources observations.

Aeronautics and space technology.—A sustained effort providing the fundamental knowledge and technological base for future aeronautics and space programs.

Tracking and data acquisition.—The worldwide activity supporting the NASA manned and unmanned flight programs.

Technology utilization.—A program that provides for the expeditious public availability of scientific, technological and engineering information, and concepts which flow from NASA's work.

For Research and Development of the National Aeronautics and Space Administration, the Committee recommends an appropriation of \$2,624,900,000, which is \$74,900,000 more than the sum recommended by the House and \$24,000,000 above the budget estimate.

Of the \$74,900,000 added by the Committee to the House allowance, \$24,000,000 has been specifically earmarked in the bill for aeronautical research in the fields of noise abatement and aviation safety. The remaining \$50,900,000 has been provided to fund all other research programs of the Space Administration and is a restoration of the House reduction.

CONSTRUCTION OF FACILITIES	
1972 appropriation.....	\$52, 700, 000
Estimate, 1973.....	77, 300, 000
House allowance.....	69, 760, 000
Committee recommendation.....	77, 300, 000

This appropriation provides for contractual services for the design, major rehabilitation, and modification of facilities; the construction of new facilities; minor construction; the purchase of related equipment and advanced design related to facilities planned for future authorization.

For Construction of Facilities, the Committee recommends an appropriation of \$77,300,000, which is the budget estimate and \$7,540,000 above the amount allowed by the House.

The Committee has included the request for \$5,540,000 for modification of Space Shuttle manufacturing and final assembly facilities, which

is the first increment for facility work needed to support orbiter assembly and the external hydrogen/oxygen tank manufacture.

The Committee was advised that although no decisions on the specific locations of these facilities have been or can be made at this time, the estimates for the orbiter assembly and the external hydrogen/oxygen tank manufacturing facility modifications, for which the fiscal year 1973 item of \$5,540,000 is the first increment, have been baselined for estimating purposes on the NASA-owned Michoud Assembly Facility, one of the possible sites for either or both of these functions.

The Committee concurs with the House and recommends that funds appropriated under this head continue available for a period of three years.

The Committee has added \$2,000,000 over the House amount to be used solely for planning and design, as requested in the Space Administration's budget.

RESEARCH AND PROGRAM MANAGEMENT

1972 appropriation.....	\$722,635,000
Estimate, 1973.....	729,450,000
House allowance.....	729,450,000
Committee recommendation.....	729,450,000

The Research and Program Management appropriation includes funding for research in Government laboratories, management of programs, and other activities of the National Aeronautics and Space Administration. Principally, it is intended to:

Provide the civil service staff necessary for in-house research, and to plan, manage, and support the Research and Development programs.

Provide other elements of operational capability to the laboratories and facilities such as logistics support, (travel and transportation, maintenance, and operation of facilities), and technical and administrative support.

For this item, the Committee recommends the full amount of the budget estimate of \$729,450,000, which is also the amount provided by the House.

The Committee concurs with the House and has deleted the language which provides for a two-percent transfer authority appropriation. Existing substantive legislation for NASA provides transfer authority of not to exceed one-half of one percent of Research and Development funds to the Construction of Facilities account. Concurring with the House, the Committee feels this authority affords the Agency the necessary flexibility which should be adequate if funds are administered properly.

LANGUAGE PROVISIONS

The Committee has concurred with the house and included the following language provisions in the bill.

On page 14, in connection with aircraft under Research and Program Management, National Aeronautics and Space Administration:

*purchase (not to exceed one for replacement only),
 , and not in excess of \$10,000 per project for construction of
 new facilities and additions to existing facilities, and not in
 excess of \$25,000 per project for rehabilitation and modifica-
 tion of facilities.*

**COMPARATIVE STATEMENT OF THE NEW BUDGET (OBLIGATIONAL) AUTHORITY FOR FISCAL YEAR 1972 AND
THE BUDGET ESTIMATES FOR FISCAL YEAR 1973**

[Note.—All amounts are in the form of appropriations unless otherwise indicated.]

Agency and item (1)	New budget (obligational) authority, fiscal year 1972 (*) (2)	Budget estimates of new budget (obligational) authority, fiscal year 1973 (3)	New budget (obligational) authority recommended in House bill (4)	Committee recommenda- tions (5)	Committee recommendations compared with ... (+) increase (-) decrease		
					Appropriations 1972 (6)	Estimates 1973 (7)	House bill (8)
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION							
Research and development.....	2,522,700,000	2,600,900,000	2,550,000,000	2,624,900,000	+102,300,000	+24,000,000	+\$74,900,000
Construction of facilities.....	52,700,000	77,300,000	69,760,000	77,300,000	+24,600,000	+7,540,000
Research and program management.....	734,722,000	729,450,000	729,450,000	729,450,000	-5,272,000
Total, National Aeronautics and Space Administration...	3,310,122,000	3,407,650,000	3,349,210,000	3,431,650,000	+121,528,000	+24,000,000	+82,440,000

PERMANENT NEW BUDGET (OBLIGATIONAL) AUTHORITY—TRUST FUNDS

[Becomes available automatically under earlier, or "permanent" law without further, or annual, action by the Congress. Thus, these amounts are not included in the accompanying bill.]

Agency and item (1)	New budget (obligational) authority, 1972 (2)	Budget estimate of new (obligational) authority, 1973 (3)	Increase (+) or decrease (-) (4)
National Aeronautics and Space Administration: Miscellaneous trust funds.....	\$11,700,000	\$9,800,000	-\$1,900,000

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
APPROPRIATION BILL, 1973

JULY 27, 1972.—Ordered to be printed

Mr. BOLAND, from the committee of conference,
submitted the following

CONFERENCE REPORT

[To accompany H.R. 15093]

TITLE II—SPACE, SCIENCE, VETERANS, AND CERTAIN OTHER
INDEPENDENT AGENCIES

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Amendment No. 20: Appropriates \$2,600,900,000 for research and development, instead of \$2,550,000,000 as proposed by the House and \$2,624,900,000 as proposed by the Senate.

Amendment No. 21: Earmarks \$24,000,000 for aeronautical research in the fields of noise abatement and aviation safety as proposed by the Senate.

Amendment No. 22: Appropriates \$77,300,000 for construction of facilities as proposed by the Senate, instead of \$69,760,000 as proposed by the House.

Amendments No. 23, 24, and 25: Earmark \$5,540,000 for modification of manufacturing and final assembly facilities incident to the space shuttle program as proposed by the Senate and renumber the subsequent items as a result of adding this item.

Amendment No. 26: Changes the earmarking number as the result of action on amendment No. 23, and earmarks \$8,000,000 for facility planning and design as proposed by the Senate, instead of \$6,000,000 as proposed by the House.

EDWARD P. BOLAND,
JOE L. EVINS,
GEORGE E. SHIPLEY,
ROBERT N. GIAIMO,
DAVID PRYOR,
J. EDWARD ROUSH,
GEORGE H. MAHON,
CHARLES R. JONAS,
BURT L. TALCOTT,
JOSEPH M. MCDADE,
DEL CLAWSON,
FRANK T. BOW,
Managers on the Part of the House.
JOHN O. PASTORE,
WARREN G. MAGNUSON,
ALLEN J. ELLENDER,
CLINTON P. ANDERSON,
GORDON ALLOTT,
MARGARET SMITH,
MILTON R. YOUNG,
Managers on the Part of the Senate.



Public Law 92-383
92nd Congress, H. R. 15093
August 14, 1972

An Act

Making appropriations for the Department of Housing and Urban Development; for space, science, veterans, and certain other independent executive agencies, boards, commissions, corporations, and offices for the fiscal year ending June 30, 1973, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, for the Department of Housing and Urban Development; for space, science, veterans, and certain other independent executive agencies, boards, commissions, corporations, and offices for the fiscal year ending June 30, 1973, and for other purposes, namely:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

RESEARCH AND DEVELOPMENT

For necessary expenses, not otherwise provided for, including research, development, operations, services, minor construction, maintenance, repair, rehabilitation and modification of real and personal property; and purchase, hire, maintenance, and operation of other than administrative aircraft, necessary for the conduct and support of aeronautical and space research and development activities of the National Aeronautics and Space Administration, \$2,600,900,000, of which \$24,000,000 shall be available only for aeronautical research in the fields of noise abatement and aviation safety, to remain available until expended.

CONSTRUCTION OF FACILITIES

For advance planning, design, rehabilitation, modification and construction of facilities for the National Aeronautics and Space Administration, and for the acquisition or condemnation of real property, as authorized by law, \$77,300,000, including (1) \$1,065,000 for rehabilitation and modification of aeronautical, airborne science and support facilities, Ames Research Center; (2) \$760,000 for rehabilitation of unitary plan wind tunnel model supports, control systems and model preparation areas, Ames Research Center; (3) \$590,000 for

86 STAT. 540

Department of Housing and Urban Development; Space, Science, Veterans, and Certain Other Independent Agencies Appropriation Act, 1973.

86 STAT. 545

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August 14, 1972

rehabilitation and modification of utility systems, Goddard Space Flight Center; (4) \$610,000 for rehabilitation and modification of roadway system, Jet Propulsion Laboratory; (5) \$8,100,000 for modifications of, and additions to, spacecraft assembly facilities, Kennedy Space Center; (6) \$2,040,000 for modification of Titan Centaur facilities, Kennedy Space Center; (7) \$2,465,000 for rehabilitation of full scale wind tunnel, Langley Research Center; (8) \$1,175,000 for modification of central air supply system, Langley Research Center; (9) \$650,000 for environmental modifications for utility operations, Langley Research Center; (10) \$9,710,000 for modification of high temperature and high pressure turbine and combustor research facility, Lewis Research Center; (11) \$585,000 for modification of fire protection system, Manned Spacecraft Center; (12) \$350,000 for warehouse replacement, Wallops Station; (13) \$6,800,000 for modification of altitude test facilities, Arnold Engineering Development Center; (14) \$1,160,000 for rehabilitation of propellant and high pressure gaseous systems, Mississippi Test Facility; (15) \$1,635,000 for modification of entry structures facility, Langley Research Center; (16) \$2,545,000 for addition for systems integration and mockup laboratory, Manned Spacecraft Center; (17) \$2,770,000 for modification of vibration and acoustic test facility, Manned Spacecraft Center; (18) \$4,700,000 for modification of structures and mechanics laboratory, Marshall Space Flight Center; (19) \$320,000 for addition for electrical power laboratory, Marshall Space Flight Center; (20) \$2,430,000 for modification of acoustic model engine test facility, Marshall Space Flight Center; (21) \$5,540,000 for modification of manufacturing and final assembly facilities at undesignated locations; (22) \$11,580,000 for minor rehabilitation and modification of facilities at various locations; (23) \$1,720,000 for minor construction of new facilities and additions to existing facilities at various locations; (24) \$8,000,000 for facility planning and design not otherwise provided for; to remain available for obligation until June 30, 1975.

RESEARCH AND PROGRAM MANAGEMENT

For necessary expenses of research in Government laboratories, management of programs and other activities of the National Aeronautics and Space Administration, not otherwise provided for, including uniforms or allowances therefor, as authorized by law (5 U.S.C. 5901-5902); awards; purchase (not to exceed one for replacement only), hire, maintenance and operation of administrative aircraft; purchase (not to exceed twenty-seven for replacement only) and hire of passenger motor vehicles; and maintenance and repair of real and personal property, and not in excess of \$10,000 per project for construction of new facilities and additions to existing facilities, and not in excess of \$25,000 per project for rehabilitation and modification of facilities; \$729,450,000: *Provided*, That contracts may be entered into under this appropriation for maintenance and operation of facilities, and for other services, to be provided during the next fiscal year. *Provided further*, That not to exceed \$35,000 of the foregoing amount shall be available for scientific consultations or extraordinary expense, to be expended upon the approval or authority of the Administrator and his determination shall be final and conclusive.

80 Stat. 508;
81 Stat. 206.

TITLE IV
GENERAL PROVISIONS

Sec. 401. Where appropriations in titles I and II of this Act are expendable for travel expenses of employees and no specific limitation has been placed thereon, the expenditures for such travel expenses may not exceed the amounts set forth therefor in the budget estimates submitted for the appropriations: *Provided*, That this section shall not apply to travel performed by uncompensated officials of local boards and appeal boards of the Selective Service System; to travel performed directly in connection with care and treatment of medical beneficiaries of the Veterans Administration; or to payments to inter-agency motor pools where separately set forth in the budget schedules.

Sec. 402. Appropriations and funds available for the administrative expenses of the Department of Housing and Urban Development and the Selective Service System shall be available in the current fiscal year for purchase of uniforms, or allowances thereof, as authorized by law (5 U.S.C. 5901-5902); hire of passenger motor vehicles; and services as authorized by 5 U.S.C. 3109.

Sec. 403. Funds made available for the Department of Housing and Urban Development under title III of this Act shall be available, without regard to the limitations on administrative expenses, for legal services on a contract or fee basis, and for utilizing and making payment for services and facilities of Federal National Mortgage Association or Government National Mortgage Association, Federal Reserve banks or any member thereof, Federal home loan banks, and any insured bank within the meaning of the Federal Deposit Insurance Corporation Act, as amended (12 U.S.C. 1811-1831).

Uniforms,
etc.

80 Stat. 508;
81 Stat. 206,
80 Stat. 416.

Legal and
banking serv-
ices.

64 Stat. 813;
84 Stat. 1114.

Pub. Law 92-383

August 14, 1972

86 STAT. 553

Research
projects.

Sec. 404. None of the funds provided in this Act may be used for payment, through grants or contracts, to recipients that do not share in the cost of conducting research resulting from proposals for projects not specifically solicited by the Government: *Provided*, That the extent of cost sharing by the recipient shall reflect the mutuality of interest of the grantee or contractor and the Government in the research.

Sec. 405. No part of any appropriation contained in this Act shall remain available for obligation beyond the current fiscal year unless expressly so provided herein.

Transfer of
funds.

Sec. 406. The Secretary of Housing and Urban Development is authorized to establish a fund and to transfer to such fund from appropriations or funds available to the Department of Housing and Urban Development, such amounts as may be necessary to provide disaster assistance for which the Secretary has been requested by the Director of the Office of Emergency Preparedness to make resources available pursuant to the authority of the Disaster Relief Act of 1970 (84 Stat. 1744).

42 USC 4401 note.
Short title.

This Act may be cited as the "Department of Housing and Urban Development; Space, Science, Veterans, and Certain Other Independent Agencies Appropriation Act, 1973".

Approved August 14, 1972.

LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 92-1071 (Comm. on Appropriations) and No. 92-1261 (Comm. of Conference).

SENATE REPORT No. 92-820 (Comm. on Appropriations).

CONGRESSIONAL RECORD, Vol. 118 (1972):

May 23, considered and passed House.

June 14, considered and passed Senate, amended.

Aug. 3, House and Senate agreed to conference report.

CHRONOLOGY OF EVENTSOMB Submission

9/30/71 Vol. I Summary and Research and Development
 9/30/71 Vol. II Construction of Facilities and Research and Program Management

Congressional Submission

2/7/72 Vol. I Agency Summary and Research and Development
 2/7/72 Vol. II Construction of Facilities
 2/15/72 Vol. III Research and Program Management and Special Analyses

AUTHORIZATION BILLHOUSE (H.R. 12824) (Superseded by H.R. 14070)SENATE (S. 3094)

2/8/72	Dr. Fletcher, Dr. Low, Mr. Shapley	3/14/72	Dr. Fletcher, Dr. Low, Mr. Shapley, Dr. Von Braun, Mr. Lilly, Mr. Myers, Dr. Naugle, Mr. Jackson, Mr. Jaffe, Mr. Truszynski, Mr. McCurdy, Mr. Harnett, Gen. Curtin, Mr. Grubb
2/17/72	Mr. Myers, Mr. Gorman, Mr. Donlan; Dr. Naugle, Mr. Johnson; Mr. Jackson		
2/22/72	Mr. Petrone, Mr. Gorman, Mr. Schneider; Dr. Naugle, Dr. Smith, Mr. Mitchell	3/15/72	Dr. Fletcher, Dr. Low, Mr. Myers, Mr. Shapley, Mr. Lilly, Dr. Naugle, Mr. Truszynski, Mr. McCurdy, Gen. Curtin, Mr. Grubb, Mr. Mathews, Mr. Gabriel
2/23/72	Mr. Jackson, Mr. Cherry, Mr. Kayten		
2/24/72	Dr. Berry, Mr. Culbertson; Dr. Naugle; Mr. Jackson, Mr. Evans, Mr. Cherry	3/16/72	Dr. Fletcher, Dr. Low, Dr. Naugle, Mr. Shapley, Mr. Jackson, Mr. Jaffe, Mr. Truszynski, Mr. McCurdy, Mr. Harnett, Gen. Curtin, Mr. Grubb, Mr. Gabriel
2/29/72	Dr. Naugle; Mr. Truszynski, Mr. Pozinsky, Mr. Lucas; Mr. Harnett		
3/1/72	Mr. Gorman; Mr. Johnson, Mr. Mahon, Mr. Daniels; Mr. Jackson, Mr. Tischler, Mr. Gabriel, Mr. Sullivan	3/22/72	Dr. Fletcher, Mr. Lilly, Mr. Mathews, Mr. McCurdy, Dr. Marsten
3/2/72	Dr. Rees, Dr. Kraft, Dr. Debus; Mr. Mathews, Mr. Jaffe; Mr. Jackson, Mr. Woodward, Mr. Kilgore, Mr. Ginter	3/23/72	Mr. Rosen, Various DOD witnesses

AUTHORIZATION BILL (CONT'D)

HOUSE (H.R. 12824) (Superseded by H.R. 14070)

SENATE (S. 3094)

3/7/72	Dr. Zissis (University of Michigan)	4/12/72	Private industry witnesses
3/8/72	Mr. Mathews, Mr. DeNoyer, Dr. Marsten; Various witnesses from private industry for MSF	5/3/72	Authorization Committee Report No. 92-779
3/9/72	Various witnesses from private industry for MSF and OSS	5/11/72	Senate Floor Action
3/14/72	Mr. Mathews, Dr. DeNoyer, Mr. Rosenberg; Various witnesses from private industry for MSF		
3/17/72	Mr. McCurdy, Mr. Moritz, Gen. Curtin, Mr. Cherry		
4/11/72	Authorization Committee Report No. 92-976		
4/20/72	House Floor Action		

CONFERENCE COMMITTEE ACTION

5/16/72 No Conference , House Committee adopted Act passed by Senate

5/16/72 House adopted Act passed by Senate

5/19/72 President approved P.L. 92-304

APPROPRIATION BILL

3/7,8, Dr. Fletcher, Dr. Low, Mr. Shapley,
9/72 Dr. Von Braun, Mr. Lilly, Mr. Myers,
Dr. Naugle, Mr. Jackson, Mr. Mathews,
Mr. Truszynski, Mr. McCurdy, Mr. Grubb,
Mr. Harnett, Gen. Curtin, Dr. Jaffe

5/18/72 Appropriation Committee Report No. 92-1071

5/23/72 House Floor Action

4/12/72 Dr. Fletcher, Dr. Low, Dr. Von Braun,
Mr. Shapley, Mr. Jackson, Mr. McCurdy,
Mr. Lilly

5/31/72 Appropriation Committee Report No. 92-820

6/14/72 Senate Floor Action

CONFERENCE COMMITTEE ACTION

7/27/72 Conference Committee Report No. 92-1261

8/ 3/72 House adopted Conference Report

8/ 3/72 Senate adopted Conference Report

8/14/72 President approved P.L. 92-383