

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION



CHRONOLOGICAL HISTORY  
FISCAL YEAR 1972  
BUDGET SUBMISSION

Prepared by:  
Office of Administration  
Budget Operations Division  
Code BT-1 EXT. 24146

FINAL 8/30/71

KEY TO PAGE NUMBERS UNDER LEGISLATIVE REFERENCE

<u>Page Nos.</u>	<u>Description</u>
1 - 8 ...	Statistics
9 - 28 ...	House Authorization Committee Report
29 - 40 ...	Senate Authorization Committee Report
41 - 45 ...	Conference Committee (Auth) Report
46 - 48 ...	Authorization Law
49 - 51 ...	House Appropriation Committee Report
52 - 54 ...	Senate Appropriation Committee Report
55 ...	Conference Committee (Approp) Report
56 - 57 ...	Appropriation Law
58 - 59 ...	Chronology of Events

LEGISLATIVE REFERENCE

Item	Sta- tistics	Authorization Page Nos.				Appropriation Page Nos.			
		House Auth Comm	Senate Auth Comm	Conf Comm (Auth)	PL	House Approp Comm	Senate Approp Comm	Conf Comm (Approp)	PL
		<u>Summary by Appropriation...</u>	1	9	29	41	46	49	
<u>Research and Development...</u>	3	10	31	41	46	49	52	55	56
Apollo.....	3	--	31	41	46				
Space Flight Operations..	3	10	31	41	46				
Advanced Missions.....	3	11	32	41	46				
Physics & Astronomy.....	3	11	32	41	46				
Lunar & Planetary Explor.	3	--	33	41	46				
Space Applications.....	4	--	33	41	46				
Launch Vehicle Proc.....	4	--	33	41	46				
Aeronautical Res. & Tech.	5	11	33	41	46				
Space Res. & Tech.....	5	--	34	41	46				
Nuclear Power & Prop.....	5	13	34	41	46				
Tracking & Data Acq.....	5	--	34	41	46				
Technology Util.....	6	14	34	41	46				
<u>Construction of Facilities.</u>	7	15	35	41	46	49	52	55	56
ARC.....	7	--	--	41	46				
KSC.....	7	15	--	41	46				
Various Locations.....	7	--	--	41	46				
Fac. Planning & Design...	7	--	--	41	46				
<u>Research and Program</u>									
<u>Management</u> .....	8	15	37	41	46	49	53	55	56
R&PM - General.....	8	15	--	41	46				
Committee Views.....	--	17	37	41					
Sectional Analysis.....	--	19	38	--					
General Provisions.....						50	53		57

(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 1972 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 7109 Rep 92-143 4/22/71	House Approved 6/3/71	Senate Comm Approved HR 7109 Rep 92-146 6/8/71	Senate Approved 6/29/71	Conf Comm Appd 7/21/71 Rep 92-368 P.L. 92-68 8/6/71	Diff from Budget Submission	House HR 9382 Rep 92-305 6/23/71 Appd 6/30/71	Senate HR 9382 Rep 92-264 7/15/71 Appd 7/20/71	Conf Comm Appd 7/26/71 Rep 92-377 P.L. 92-78 8/10/71	Diff from Budget Submission	Diff from Authori- zation
<b>TOTAL APPROPRIATIONS:</b>												
Research & Development..	2,517,700	2,668,100	2,667,600	2,543,200	2,543,200	2,603,200	+85,500	2,517,700	2,541,700	2,522,700	+5,000	-80,500
Construction of Facilities.....	56,300	58,630	58,630	56,300	56,300	58,400	+2,100	33,800	56,300	52,700	-3,600	-5,700
Research and Program Management:												
Basic submission....	697,350	706,850 <sup>1/</sup>	706,850 <sup>1/</sup>	681,350	681,350	693,350 <sup>2/</sup>	-4,000	690,715	693,350	693,350	-4,000	---
Amendment (pay incr.)	29,285	---	---	29,285 <sup>2/</sup>	29,285 <sup>2/</sup>	29,285 <sup>2/</sup>	---	29,285	29,285	29,285	---	---
<b>TOTAL R&amp;PM.....</b>	<b>726,635</b>			<b>710,635</b>	<b>710,635</b>	<b>722,635</b>	<b>-4,000</b>	<b>720,000</b>	<b>722,635<sup>3/</sup></b>	<b>722,635</b>	<b>-4,000</b>	<b>---</b>
<b>GRAND TOTAL.....</b>	<b>3,300,635</b>	<b>3,433,580</b>	<b>3,433,080</b>	<b>3,310,135</b>	<b>3,310,135</b>	<b>3,384,235</b>	<b>+83,600</b>	<b>3,271,500</b>	<b>3,320,635</b>	<b>3,298,035</b>	<b>-2,600</b>	<b>-86,200</b>
<b>R&amp;D Appropriation:</b>												
OMSF.....	1,286,475	1,367,475	1,367,475	1,286,475	1,286,475	1,320,475	+34,000	1,299,475	1,286,475	*		
OSSA.....	750,400	752,900	752,900	732,900	732,900	745,400	-5,000	735,400	750,400	*		
OART.....	212,825	277,725	277,225	255,825	255,825	268,325	+55,500	217,825	236,825	*		
OTDA.....	264,000	264,000	264,000	264,000	264,000	264,000	---	260,000	264,000	*		
OTU.....	4,000	6,000	6,000	4,000	4,000	5,000	+1,000	5,000	4,000	*		
<b>TOTAL R&amp;D.....</b>	<b>2,517,700</b>	<b>2,668,100</b>	<b>2,667,600</b>	<b>2,543,200</b>	<b>2,543,200</b>	<b>2,603,200</b>	<b>+85,500</b>	<b>2,517,700</b>	<b>2,541,700</b>	<b>2,522,700</b>	<b>+5,000</b>	<b>-80,500</b>
<b>CoF Appropriation:</b>												
OMSF.....	15,700	18,030	18,030	15,700	15,700	17,800	+2,100	---	17,800	14,200	-1,500	-3,600
OSSA.....	15,200	15,200	15,200	15,200	15,200	15,200	---	15,200	15,200	15,200	---	---
OART.....	10,800	10,800	10,800	10,800	10,800	10,800	---	6,500	10,800	10,800	---	---
OTDA.....	1,100	1,100	1,100	1,100	1,100	1,100	---	1,100	1,100	1,100	---	---
O&M.....	10,000	10,000	10,000	10,000	10,000	10,000	---	7,500	7,900	7,900	-2,100	-2,100
Fac. Plan'g and Design..	3,500	3,500	3,500	3,500	3,500	3,500	---	3,500	3,500	3,500	---	---
<b>TOTAL CoF.....</b>	<b>56,300</b>	<b>58,630</b>	<b>58,630</b>	<b>56,300</b>	<b>56,300</b>	<b>58,400</b>	<b>+2,100</b>	<b>33,800</b>	<b>56,300</b>	<b>52,700</b>	<b>-3,600</b>	<b>-5,700</b>
<b>R&amp;PM Appropriation:</b>												
OMSF.....	332,005	333,005	333,005	*	*	*	*	*	*	*		
OSSA.....	100,326	100,326	100,326	*	*	*	*	*	*	*		
OART.....	205,338	209,838	209,838	*	*	*	*	*	*	*		
Supporting Operations...	59,681	63,681	63,681	*	*	*	*	*	*	*		
Subtotal R&PM (Basic)...	697,350	706,850	706,850	681,350	681,350	693,350	-4,000	690,715	693,350	693,350	-4,000	---
Amendment (pay incr.)...	29,285	---	---	29,285 <sup>2/</sup>	29,285 <sup>2/</sup>	29,285 <sup>2/</sup>	---	29,285	29,285	29,285	---	---
<b>TOTAL R&amp;PM.....</b>	<b>726,635</b>	<b>706,850<sup>1/</sup></b>	<b>706,850<sup>1/</sup></b>	<b>710,635</b>	<b>710,635</b>	<b>722,635</b>	<b>-4,000</b>	<b>720,000</b>	<b>722,635<sup>3/</sup></b>	<b>722,635</b>	<b>-4,000</b>	<b>---</b>
<b>TOTAL NASA.....</b>	<b>3,300,635</b>	<b>3,433,580</b>	<b>3,433,080</b>	<b>3,310,135</b>	<b>3,310,135</b>	<b>3,384,235</b>	<b>+83,600</b>	<b>3,271,500</b>	<b>3,320,635</b>	<b>3,298,035</b>	<b>-2,600</b>	<b>-86,200</b>

<sup>1/</sup> Excludes \$29,285,000 budget amendment in House Document No. 92-93 (4-20-71) to cover costs pursuant to Federal Pay Comparability Act of 1970 (P.L. 91-656).

<sup>2/</sup> Authorized pursuant to provisions of the Federal Pay Comparability Act of 1970, P.L. 91-656 -- See page 37 for Committee comment which appears in Senate Authorization Committee Report 92-146 (P. 94).

<sup>3/</sup> Senate Committee approved \$726,635,000 (Report 92-264); Senate floor action on 7-20-71 reduced this amount by \$4,000,000 to \$722,635,000 to agree with the Conference Committee action on the Authorization Bill as of 7-20-71.

• Undistributed.

# NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Chronological History of the FY 1972 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 (as amended)	House Comm Approved HR 7109 Rep 92-143 4/22/71	House Approved 6/3/71	Senate Comm Approved HR 7109 Rep 92-146 6/8/71	Senate Approved 6/29/71	Conf. Comm. Appd 7/21/71 Rep 92-368 P.L. 92-68 8/6/71	Diff From Budget Submission	House HR 9382 Rep 92-305 6/23/71 Appd 6/30/71	Senate HR 9382 Rep 92-264 7/15/71 Appd 7/20/71	Conf. Comm. Appd 7/26/71 Rep 92-377 P.L. 92-78 8/10/71	Difference from Budget Submission	Difference from Authori- zation
<b>RESEARCH AND DEVELOPMENT</b>	2,517,700	2,668,100	2,667,600	2,543,200	2,543,200	2,603,200	+85,500	2,517,700	2,541,700	2,522,700	+5,000	-80,500
Apollo.....	612,200	612,200	612,200	612,200	612,200	612,200	---	610,200	612,200			
Space Flight Operations.	672,775	745,275	745,275	672,775	672,775	702,775	+30,000	687,775	672,775			
Advanced Missions.....	1,500	10,000	10,000	1,500	1,500	5,500	+4,000	1,500	1,500			
Physics & Astronomy.....	110,300	112,800	112,800	110,300	110,300	112,800	+2,500		110,300			
Lunar & Planetary.....	311,500	311,500	311,500	291,500	291,500	301,500	-10,000	735,400	311,500			
Space Applications.....	182,500	182,500	182,500	185,000	185,000	185,000	+2,500		182,500			
Launch Vehicle Proc.....	146,100	146,100	146,100	146,100	146,100	146,100	---		146,100			
Aeronautical Research & Technology.....	110,000	135,000	134,500	110,000	110,000	122,500	+12,500	115,000	110,000			
Space Research & Tech....	75,105	75,105	75,105	75,105	75,105	75,105	---	75,105	75,105			
Nuclear Power & Prop....	27,720	67,620	67,620	70,720	70,720	70,720 <sup>1</sup>	+43,000	27,720	51,720 <sup>2</sup>			
Tracking & Data Acq.....	264,000	264,000	264,000	264,000	264,000	264,000	---	260,000	264,000			
Technology Utilization..	4,000	6,000	6,000	4,000	4,000	5,000	+1,000	5,000	4,000			
<b>CONSTRUCTION OF FACILITIES</b>	56,300	58,630	58,630	56,300	56,300	58,600	+2,100	33,800	56,300	52,700	-3,600	-5,700
Ames Research Center.....	6,500	6,500	6,500	6,500	6,500	6,500	---	6,500	6,500			
Kennedy Space Center.....	15,200	17,530	17,530	15,200	15,200	17,300	+2,100	15,200	17,300			
Various Locations.....	31,100	31,100	31,100	31,100	31,100	31,100	---	8,600	29,000			
Facility Planning & Design	3,500	3,500	3,500	3,500	3,500	3,500	---	3,500	3,500			
<b>RESEARCH AND PROGRAM MGMT.</b>	726,635	706,830	706,830	710,635	710,635	722,635	-4,000	720,000	722,635	722,635	-4,000	---
<b>TOTAL, NASA.....</b>	<b>3,300,635</b>	<b>3,433,580</b>	<b>3,433,080</b>	<b>3,310,135</b>	<b>3,310,135</b>	<b>3,384,235</b>	<b>+83,600</b>	<b>3,271,500</b>	<b>3,320,635</b>	<b>3,298,035</b>	<b>-2,600</b>	<b>-86,200</b>

GPO 911-408

1/ \$58,000,000 to be used only for NERVA engine development and related nuclear propulsion activities.  
2/ \$38,000,000 shall be used only for the NERVA program for FY 1972.

# NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Chronological History of the FY 1972 Budget Submission  
(In thousands of dollars)

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<b>RESEARCH &amp; DEVELOPMENT APPROPRIATION:</b>	2,517,700	2,668,100	2,667,600	2,543,200	2,543,200	2,603,200	+85,500	2,517,700	2,517,700	2,541,700	2,541,700	2,522,700
<b>OFFICE OF MANNED SPACE FLIGHT.....</b>	1,286,475	1,367,475	1,367,475	1,286,475	1,286,475	1,320,475	+34,000	1,299,475	1,299,475	1,286,475	1,286,475	*
Apollo Program.....	(612,200)	(612,200)	(612,200)	(612,200)	(612,200)	(612,200)	(---)	(610,200)	(610,200)	(612,200)	(612,200)	
Spacecraft.....	164,152	164,152	164,152	164,152	164,152	164,152	---	*	•	164,152	164,152	
Saturn V.....	186,003	186,003	186,003	186,003	186,003	186,003	---	*	*	186,003	186,003	
MSF operations.....	262,045	262,045	262,045	262,045	262,045	262,045	---	*	•	262,045	262,045	
Space Flight Operations Program.....	(672,775)	(745,275)	(745,275)	(672,775)	(672,775)	(702,775)	(+30,000)	(687,775)	(687,775)	(672,775)	(672,775)	
Skylab.....	535,400	580,400	580,400	535,400	535,400	550,400	+15,000	550,400	550,400	535,400	535,400	
Space shuttle.....	100,000	125,000	125,000	100,000	100,000	115,000	+15,000	100,000	100,000	100,000	100,000	
Orbital systems & experiments.....	37,375	39,875	39,875	37,375	37,375	37,375	---	37,375	37,375	37,375	37,375	
Advanced Missions Program. Adv. missions studies...	(1,500) 1,500	(10,000) 10,000	(10,000) 10,000	(1,500) 1,500	(1,500) 1,500	(5,500) 5,500	(+4,000) +4,000	(1,500) 1,500	(1,500) 1,500	(1,500) 1,500	(1,500) 1,500	
<b>OFFICE OF SPACE SCIENCE AND APPLICATIONS.....</b>	750,400	752,900	752,900	732,900	732,900	745,400	(-5,000)	735,400	735,400	750,400	750,400	*
Physics and Astronomy Program.....	(110,300)	(112,800)	(112,800)	(110,300)	(110,300)	(112,800)	(+2,500)	(*)	(*)	(110,300)	(110,300)	
Large observatories.....	43,400	43,400	43,400	43,400	43,400	43,400	---			43,400	43,400	
Orbiting explorers.....	24,500	24,500	24,500	24,500	24,500	24,500	---			24,500	24,500	
Sub-orbital programs....	21,500	24,000	24,000	21,500	21,500	24,000	+2,500			21,500	21,500	
Supporting activities...	20,900	20,900	20,900	20,900	20,900	20,900	---			20,900	20,900	
Lunar and Planetary Exploration Program....	(311,500)	(311,500)	(311,500)	(291,500)	(291,500)	(301,500)	(-10,000)	(*)	(*)	(311,500)	(311,500)	
Mariner.....	52,800	52,800	52,800	52,800	52,800	52,800	---			52,800	52,800	
Viking.....	180,400	180,400	180,400	180,400	180,400	180,400	---			180,400	180,400	
Outer planets mission...	30,000	30,000	30,000	10,000	10,000	20,000	-10,000			30,000	30,000	
Pioneer/Helios.....	20,100	20,100	20,100	20,100	20,100	20,100	---			20,100	20,100	
SR&T advanced studies...	18,800	18,800	18,800	18,800	18,800	18,800	---			18,800	18,800	
Planetary astronomy.....	4,800	4,800	4,800	4,800	4,800	4,800	---			4,800	4,800	
Data analysis.....	2,400	2,400	2,400	2,400	2,400	2,400	---			2,400	2,400	
Planetary quarantine....	2,200	2,200	2,200	2,200	2,200	2,200	---			2,200	2,200	

NSA 911-478

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Prepared by:  
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## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Chronological History of the FY 1972 Budget Submission  
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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				
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Space Applications Program	(182,500)	(182,500)	(182,500)	(185,000)	(185,000)	(185,000)	(+2,500)	(*)	(*)	(182,500)	(182,500)	
Earth resources survey..	48,500	48,500	48,500	51,000	51,000	51,000	+2,500			48,500	48,500	
Applications tech. sats..	60,300	60,300	60,300	60,300	60,300	60,300	---			60,300	60,300	
Nimbus.....	23,100	23,100	23,100	23,100	23,100	23,100	---			23,100	23,100	
Synchronous met. sats...	13,000	13,000	13,000	13,000	13,000	13,000	---			13,000	13,000	
Cooperative appl. sats..	2,600	2,600	2,600	2,600	2,600	2,600	---			2,600	2,600	
Global atmospheric research program.....	2,500	2,500	2,500	2,500	2,500	2,500	---			2,500	2,500	
Meteorological soundings	2,500	2,500	2,500	2,500	2,500	2,500	---			2,500	2,500	
TIROS/TOS improvements..	1,600	1,600	1,600	1,600	1,600	1,600	---			1,600	1,600	
Radio interference and propagation program...	1,000	1,000	1,000	1,000	1,000	1,000	---			1,000	1,000	
Geodetic sats.....	1,300	1,300	1,300	1,300	1,300	1,300	---			1,300	1,300	
Earth observ. sat. studies.....	1,000	1,000	1,000	1,000	1,000	1,000	---			1,000	1,000	
SRT advanced studies....	25,100	25,100	25,100	25,100	25,100	25,100	---			25,100	25,100	
Launch Vehicle Procurement Program.....	(146,100)	(146,100)	(146,100)	(146,100)	(146,100)	(146,100)	(---)	(*)	(*)	(146,100)	(146,100)	
SR&T/Advanced studies...	4,000	4,000	4,000	4,000	4,000	4,000	---			4,000	4,000	
Scout.....	16,500	16,500	16,500	16,500	16,500	16,500	---			16,500	16,500	
Delta.....	37,200	37,200	37,200	37,200	37,200	37,200	---			37,200	37,200	
Centaur.....	75,900	75,900	75,900	75,900	75,900	75,900	---			75,900	75,900	
Titan IIIC.....	12,500	12,500	12,500	12,500	12,500	12,500	---			12,500	12,500	

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<b>OFFICE OF ADVANCED RESEARCH AND TECHNOLOGY.....</b>	212,825	277,725	277,225	255,825	255,825	268,325	+55,500	217,825	217,825	236,825	236,825	*
Aeronautical Research and Technology Program.....	(110,000)	(135,000)	(134,500)	(110,000)	(110,000)	(122,500)	(+12,500)	(115,000)	(115,000)	(110,000)	(110,000)	
Exp. STOL res. airplane..	15,000	22,000	22,000	15,000	15,000	*	*	*	*	15,000	15,000	
Aerodynamics and vehicle systems.....	42,000	45,600	45,600	42,000	42,000	*	*	*	*	42,000	42,000	
Life sciences.....	3,100	3,100	3,100	3,100	3,100	*	*	*	*	3,100	3,100	
Propulsion.....	22,300	28,000	28,000	22,300	22,300	*	*	*	*	22,300	22,300	
Operating systems.....	6,500	8,100	7,600	6,500	6,500	*	*	*	*	6,500	6,500	
Materials and structures..	11,000	14,500	14,500	11,000	11,000	*	*	*	*	11,000	11,000	
Guidance, control and information systems...	3,000	5,200	5,200	3,000	3,000	*	*	*	*	3,000	3,000	
Power.....	400	400	400	400	400	*	*	*	*	400	400	
Supercritical technology..	6,700	6,700	6,700	6,700	6,700	*	*	*	*	6,700	6,700	
Graduate research and studies program.....	---	1,400	1,400	---	---	*	*	*	*	---	---	
Space Research and Technology Program.....	(75,105)	(75,105)	(75,105)	(75,105)	(75,105)	(75,105)	(---)	(75,105)	(75,105)	(75,105)	(75,105)	
Space propulsion and power generation.....	28,600	28,600	28,600	28,600	28,600	28,600	---	28,600	28,600	28,600	28,600	
Materials and structures..	18,600	18,600	18,600	18,600	18,600	18,600	---	18,600	18,600	18,600	18,600	
Guidance, control and information systems...	17,055	17,055	17,055	17,055	17,055	17,055	---	17,055	17,055	17,055	17,055	
Safety and oper. systems..	1,700	1,700	1,700	1,700	1,700	1,700	---	1,700	1,700	1,700	1,700	
Entry technology.....	9,150	9,150	9,150	9,150	9,150	9,150	---	9,150	9,150	9,150	9,150	
Nuclear Power and Propulsion Program.....	(27,720)	(67,620)	(67,620)	(70,720)	(70,720)	(70,720)	(+43,000)	(27,720)	(27,720)	(51,720)	(51,720)	
Nuclear power research and technology.....	9,320	9,320	9,320	9,320	9,320	9,320	---	9,320	9,320	9,320	9,320	
Nuclear propulsion.....	15,000	56,900	54,900	58,000	58,000	58,000	+43,000	15,000	15,000	39,000	39,000	39,000
NERVA.....	(9,900)	(44,900)	(44,900)	(48,000)	(48,000)	(48,000)	(+38,100)	(9,900)	(9,900)	(*)	(*)	(*)
Nuclear propulsion R&T	(5,000)	(8,000)	(8,000)	(8,000)	(8,000)	(8,000)	(+3,000)	(5,000)	(5,000)	(*)	(*)	(*)
NRDS operations.....	(100)	(2,000)	(2,000)	(2,000)	(2,000)	(2,000)	(+1,900)	(100)	(100)	(*)	(*)	(*)
Electrophysics.....	3,400	3,400	3,400	3,400	3,400	3,400	---	3,400	3,400	3,400	3,400	
<b>OFFICE OF TRACKING AND DATA ACQUISITION.....</b>	264,000	264,000	264,000	264,000	264,000	264,000	(---)	260,000	260,000	264,000	264,000	*
Tracking and Data Acquisi- tion Program.....	(264,000)	(264,000)	(264,000)	(264,000)	(264,000)	(264,000)	(---)	(260,000)	(260,000)	(264,000)	(264,000)	
Operations.....	210,000	210,000	210,000	210,000	210,000	210,000	---	*	*	210,000	210,000	
Equipment.....	42,500	42,500	42,500	42,500	42,500	42,500	---	*	*	42,500	42,500	
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 1972 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 7109 Rep 92-143 4/22/71	House Approved 6/3/71	Senate Comm Approved HR 7109 Rep 92-146 6/8/71	Senate Approved 6/29/71	Conf. Comm. Appd 7/21/71 Rep 92-368 P.L. 92-68 8/6/71	Diff From Budget Submission	House Comm Approved HR 9382 Rep 92-305 6/23/71	House Approved 6/30/71	Senate Comm Approved HR 9382 Rep 92-264 7/15/71	Senate Approved 7/20/71	Conf. Comm. Appd 7/26/71 P.L. 92-78 8/10/71
<b>OFFICE OF TECHNOLOGY UTILIZATION.....</b>	4,000	6,000	6,000	4,000	4,000	5,000	(+1,000)	5,000	5,000	4,000	4,000	•
Technology Utilization Program.....	(4,000)	(6,000)	(6,000)	(4,000)	(4,000)	(5,000)	(+1,000)	(5,000)	(5,000)	(4,000)	(4,000)	
New technology identification and evaluation.....	625	*	*	625	625	*	*	*	*	625	625	
Publication.....	665	*	*	665	665	*	*	*	*	665	665	
New technology dissemination.....	2,230	*	*	2,230	2,230	*	*	*	*	2,230	2,230	
Program evaluation.....	480	*	*	480	480	*	*	•	•	480	480	

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CONSTRUCTION OF FACILITIES APPROPRIATION:	56,300	58,630	58,630	56,300	56,300	58,400	+2,100	33,800	33,800	56,300	56,300	52,700
AMES RESEARCH CENTER.....	(6,500)	(6,500)	(6,500)	(6,500)	(6,500)	(6,500)	---	(6,500)	(6,500)	(6,500)	(6,500)	(6,500)
R-Modernization of 40X80-foot wind tunnel	6,500	6,500	6,500	6,500	6,500	6,500	---	6,500	6,500	6,500	6,500	6,500
KENNEDY SPACE CENTER.....	(15,200)	(17,530)	(17,530)	(15,200)	(15,200)	(17,300)	(+2,100)	(15,200)	(15,200)	(17,300)	(17,300)	(15,200)
S-Centaur modifications of Titan III launch area.....	10,700	10,700	10,700	10,700	10,700	10,700	---	10,700	10,700	10,700	10,700	10,700
S-Alterations to launch complex 17.....	4,500	4,500	4,500	4,500	4,500	4,500	---	4,500	4,500	4,500	4,500	4,500
M-Expansion of the education center.....	---	2,330	2,330	---	---	2,100	+2,100	---	---	2,100	2,100	---
VARIOUS LOCATIONS.....	(31,100)	(31,100)	(31,100)	(31,100)	(31,100)	(31,100)	---	(8,600)	(8,600)	(29,000)	(29,000)	(27,500)
Space shuttle facilities:												
M-Main engine sea level test stands (2) MTF...	11,000	11,000	11,000	11,000	11,000	11,000	---	---	---			13,000 <sup>1/</sup>
M-Main engine altitude test facility, AFAEDC.	2,000	2,000	2,000	2,000	2,000	2,000	---	---	---			
M-Auxiliary propulsion test facilities, undesig. location....	1,500	1,500	1,500	1,500	1,500	1,500	---	---	---			---
R/M-Thermal protection system development facilities.....	5,500	5,500	5,500	---	---	---	---	---	---	20,000	20,000	5,500
R- Interaction heating shuttle panel test fac. mod., ARC.....	3,000	3,000	3,000	3,000	3,000	3,000	---	---	---			5,500
R- Mod. to 9X6 thermal tunnel, LaRC.....	500	500	500	500	500	500	---	---	---			
M- Upgrade atmospheric re-entry materials and structures eval- uation facility, MSC.	1,200	1,200	1,200	1,200	1,200	1,200	---	---	---			600
R- Undesignated location <sup>2/</sup>	800	800	800	800	800	800	---	---	---			
T-Power plant facilities	600	600	600	---	---	---	---	600	600	600	600	600
Goldstone, Calif.....	370	370	370	370	370	370	---	---	---			
Santiago, Chile.....	230	230	230	230	230	230	---	---	---			
T-ATS, ground station, Western Europe.....	500	500	500	500	500	500	---	500	500	500	500	500
O-Facility rehabs. and mods.....	10,000	10,000	10,000	10,000	10,000	10,000	---	7,500	7,500	7,900	7,900	7,900
FACILITY PLANNING AND DESIGN.....	(3,500)	(3,500)	(3,500)	(3,500)	(3,500)	(3,500)	---	(3,500)	(3,500)	(3,500)	(3,500)	(3,500)

<sup>1/</sup> Appropriation Act provided \$13,000,000 for "Space Shuttle Main Engine Test Facilities."

<sup>2/</sup> Title and location of this project: "Combustion facility mod. for shuttle thermal protection testing LaRC."

M - Manned Space Flight facilities.

S - Space Science and Applications facilities.

R - Advanced Research and Technology facilities.

T - Tracking and Data Acquisition facilities.

O - Office of Organization and Management project.

# NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Chronological History of the FY 1972 Budget Submission  
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<b>RESEARCH AND PROGRAM MANAGEMENT APPROPRIATION</b>	697,350	726,635	706,850 <sup>1/</sup>	710,635 <sup>2/</sup>	710,635 <sup>2/</sup>	722,635 <sup>2/</sup>	-4,000	720,000 <sup>2/</sup>	720,000 <sup>2/</sup>	726,635 <sup>2/</sup>	722,635 <sup>2/</sup>	722,635 <sup>2/</sup>
<b>BY OBJECT CLASSIFICATION:</b>	(697,350)	(726,635)	706,850	(710,635)	(710,635)	(722,635)	(-4,000)	(720,000)	(720,000)	(726,635)	(722,635)	(722,635)
Personnel compensation.....	484,074	511,013										
Personnel benefits.....	41,440	43,655										
Benefits for former personnel.....	2,036	2,167										
Travel & transportation of persons.....	18,961	18,961										
Transportation of things	3,651	3,651										
Rent, comm. & utilities.	41,043	41,043										
Printing and reprod.....	5,173	5,173	706,850	706,850	710,635	710,635	722,635	-4,000	720,000	720,000	726,635	722,635
Other services.....	85,629	85,629										
Supplies and materials..	12,495	12,495										
Equipment.....	1,776	1,776										
Lands and structures....	986	986										
Grants, subsidies and contributions.....	51	51										
Insurance claims and indemnities.....	35	35										
<b>BY INSTALLATION:</b>												
Kennedy Space Center....	95,559	98,439										
Manned Spacecraft Center	106,255	110,928	333,005	333,005								
Marshall Sp. Flt. Center	130,191	136,023										
Goddard Sp. Flt. Center.	90,299	94,734										
Wallops Station.....	10,027	10,408	100,326	100,326	710,635	710,635	722,635	-4,000	720,000	720,000	726,635	722,635
Ames Research Center....	39,719	41,390										
Flight Research Center..	10,974	11,353										
Langley Research Center.	74,191	77,955	209,838	209,838								
Lewis Research Center...	77,866	80,749										
Space Nuc. Sys. Office..	2,588	2,722										
NASA Headquarters.....	59,681	61,934	63,681	63,681								
<b>BY FUNCTION:</b>												
Personnel.....	530,916	560,201	540,416	540,416	547,201	547,201	559,201	-1,000		560,201		
Travel.....	17,061	17,061	17,061	17,061						17,061		
Facilities services.....	78,527	78,527	78,527	78,527	163,434	163,434	163,434	-3,000	720,000	720,000	78,527	722,635
Technical services.....	31,265	31,265	31,265	31,265							31,265	
Administrative support..	39,581	39,581	39,581	39,581							39,581	

GFU 911-418

1/ Excludes \$29,285,000 budget amendment.

2/ Includes \$29,285,000 budget amendment in House Document No. 92-93 (4-20-71) to cover costs pursuant to Federal Pay Comparability Act of 1970 (P.L. 91-656).

Prepared by:  
Office of Administration  
Budget Operations Div.  
Code BT-1 Ext. 24146

**AUTHORIZING APPROPRIATIONS TO THE NATIONAL  
 AERONAUTICS AND SPACE ADMINISTRATION**

APRIL 22, 1971.—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**

together with

**ADDITIONAL AND SEPARATE VIEWS**

[To accompany H.R. 7109]

The Committee on Science and Astronautics, to whom was referred  
 the bill (H.R. 7109) 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 1972, as follows:

Programs	Authorization	Page No.
Research and development.....	\$2, 668, 100, 000	3
Construction of facilities.....	58, 630, 000	117
Research and program management...	706, 850, 000	133
<b>Total.....</b>	<b>\$3, 433, 580, 000</b>	

**EXPLANATION OF THE BILL**

**RESEARCH AND DEVELOPMENT**

**SUMMARY**

Programs	Authorization	Page No.
1. Apollo.....	\$612, 200, 000	5
2. Space flight operations.....	745, 275, 000	10
3. Advanced missions.....	10, 000, 000	18
4. Physics and astronomy.....	112, 800, 000	19
5. Lunar and planetary exploration..	311, 500, 000	30
6. Space applications.....	182, 500, 000	42
7. Launch vehicle procurement.....	146, 100, 000	60
8. Aeronautical research and technology.....	135, 000, 000	64
9. Space research and technology....	75, 105, 000	83
10. Nuclear power and propulsion....	67, 620, 000	97
11. Tracking and data acquisition....	264, 000, 000	103
12. Technology utilization.....	6, 000, 000	115
<b>Total.....</b>	<b>\$2, 668, 100, 000</b>	

## COMMITTEE ACTIONS

### RESEARCH AND DEVELOPMENT

The NASA Fiscal Year 1972 request for Research and Development totaled \$2,517,700,000. The Committee's review of the authorization request resulted in the addition of \$150,400,000. This action results in a recommended authorization of \$2,668,100,000 for Research and Development. Specific adjustments to major programs were as follows:—

#### SPACE FLIGHT OPERATIONS

NASA requested \$672,775,000 for Space Flight Operations in Fiscal Year 1972. The committee recommends an increase of \$72,500,000 for a total authorization of \$745,275,000 for Fiscal Year 1972 for Space Flight Operations.

The Committee recommended increases are as follows:

#### *Skylab*

NASA requested \$535,400,000 for the Skylab portion of the Space Flight Operations program. The committee recommends an increase of \$15,000,000 for Skylab for a rescue capability for the most probable mission failure situations. The approach calls for converting the next launch ready Skylab Command and Service Module into a rescue carrier by removing stowage lockers and adding two additional crew couches. Minor modifications would be required to provide extra outlets for communications and environmental control. The Command and Service Module would be launched with two crew members and return with five.

An additional \$15 million in fiscal year 1972 would permit proceeding more promptly than possible under the present budget request with the fabrication of the kits to provide the rescue capability and the modifications necessary for installation of the kits into the Command and Service Module.

#### *Second Skylab—Applications Flights*

Following Apollo 17 and Skylab, there is a gap in manned flight of over 3 years. The committee recommends the addition of \$30,000,000 to the budget for the purpose of "filling the gap" in manned space flight which would permit NASA to (1) evaluate the potential of either a Second Skylab, or Command and Service Module, only, flight and (2) report back on a program providing high utility using existing vehicles. Several alternatives are to be evaluated.

A second set of Skylab missions can be flown in 1974 with two manned visits of 90 days each and using only backup flight modules and experimental hardware produced for Apollo and Skylab programs. The experience and knowledge gained from the initial Skylab should

permit enhancement and redirection of a second Skylab to an orbital research facility. This would allow new investigations and observations which could not be accomplished on the initial Skylab because of insufficient crew time. In addition to the expansion of experience that could be gained by repeating selected experiments, other specific new experiments have been identified that could be added to the payload thereby greatly enhancing the value of a second Skylab.

The current Skylab plan includes the capability to launch a backup workshop approximately ten months after a go-ahead decision. Previous budgetary constraints have necessitated planning for only partial checkout of the backup hardware; however, fiscal year 1972 funding would permit a more cost-effective completion of checkout.

In addition, it would provide for initiating conversion of Apollo Command and Service Module hardware to the Skylab configuration, mission planning, sustaining ground-based scientific investigations and enhancement of experiments.

Following Apollo 17 and Skylab, with a gap in manned flight of over 3 years two of the Command and Service Modules and Saturn IB launch vehicles excess to the current manned program could be effectively used to perform earth survey missions. The Scientific Instrumentation Module bay provisions in the Service Module and the operations experience gained in lunar orbit make it logical to consider earth survey missions with earth sensors integrated into the bay. A mission at 50° inclination and 150 nautical mile altitude would permit three separate, complete coverages of continental United States in 15 days. Integration of special cameras, a multispectral scanner and an infrared spectrometer into the Scientific Instrumentation Module bay in a manner which would yield earth survey data would be examined. Two missions would permit coverage with seasonal variation, extensive film return, and utilization of the crew for selective operation of the system. These missions would provide highly useful information and maintain the operating proficiency of the launch and mission teams.

Fiscal year 1972 funding would be used for program definition, development of experiments, and spacecraft modifications and checkout.

#### *Space Shuttle*

NASA requested \$100,000,000 for the Space Shuttle program for fiscal year 1972. The committee recommends an increase of \$25,000,000 for a total of \$125,000,000 for the Space Shuttle portion of the Space Flight Operations item.

An additional \$25 million in fiscal year 1972 will support a more intensive undertaking of the pacing vehicle development tasks, the thermal protection and vehicle structures. In the thermal protection area, ultimate refurbishment costs may be reduced by the development of improved thermal protection materials including the basic insulation materials and protective coatings. The cost effectiveness of the current external insulation system could be enhanced by these development efforts. In the structures area, increased support would be utilized in developing composite materials such as graphite aluminum for the primary structure which could reduce the vehicle lift-off weight. Similar intensified efforts can be applied to improving beryllium fabrication techniques for application to both the primary and secondary structures.

*Experiment Definition*

NASA requested \$37,375,000 for Orbital Systems and experiments in the Space Flight Operations line item for fiscal year 1972. The committee recommends an increase of \$2,500,000 for experiment definition when the shuttle is used as a short duration laboratory returning to earth in one to seven days.

An additional \$2,500,000 for Experiment Definition in FY 1972 would be used mainly in three areas: Earth Observations; Communications and Navigation; and Materials Science and Space Manufacturing. Primarily, study efforts would explore the potential of the Space Shuttle to fly short duration laboratory missions carrying experiment systems for use in orbits tailored to specific experiments. Other studies would be initiated to determine requirements for data sensors, processors, analysers and display equipment. Increased laboratory and theoretical investigations would be made in all disciplines, directed toward maximum efficiency in mission planning and the means for making observations utilizing the unique capabilities that man provides to a laboratory in space.

## ADVANCED MISSIONS

For fiscal year 1972 NASA requested \$1,500,000 for advanced mission studies. The committee recommends an increase of \$8,500,000 for advanced missions for a total authorization of \$10,000,000 for fiscal year 1972.

The committee notes that with the continuing decline in the manned space flight and total NASA programs that intensive advanced planning and analysis is needed. More emphasis is needed on the analyses and planning to develop the best directions for future effort in the 1970's. The increase of \$8,500,000 in Advanced Missions programs would provide for:

- a. More detailed study of improved information retrieval and dissemination from future manned space systems.
- b. Studies of orbital retrieval and orbital equipment reuse in the 1970's and 1980's.
- c. Planning for on-orbit large payload handling,
- d. Analysis of the potential for lunar resources utilization and lunar base operations,
- e. Study of large equipment erection and handling in space, and
- f. Study of the potential for increased use of synchronous orbit and near-earth polar orbit missions.

## PHYSICS AND ASTRONOMY

NASA requested only \$18 million for Sounding Rockets for fiscal year 1972, \$1 million less than the amount earmarked for this purpose during the current fiscal year. When the effects of inflation are considered, the result is that the Sounding Rocket Program will have fallen substantially below the level of effort of prior years.

These relatively inexpensive devices have proved to be highly effective in the conduct of many scientific investigations, as well as for testing equipment and experiments prior to their use in satellites.

The increased authorization of \$2 million recommended by the committee will tend to reverse this decline in these important activities.

The use of balloons is another very economical, rather unglamorous, yet fruitful, technique for accomplishing important scientific work in the Physics and Astronomy Program. Unfortunately, NASA has given only minimal support to these activities. The Administration's request for \$1 million is considered inadequate, and the committee therefore recommends funding be increased to \$1.5 million.

## ADVANCED RESEARCH AND TECHNOLOGY

The Advanced Research and Technology (ART) area is the original source for many of the applications which are developed for the benefit of man in the aeronautics and space area. The ideas resulting from investment in this area will be reflected in the applications five to twenty years hence. Lowered budget support means that future applications will suffer. With the overall NASA budget request remaining about the same, the ART area was reduced from a FY 1971 level of \$264,200,000 to \$212,825,000, for a reduction of \$51,375,000.

To remedy what the Committee feels to be a major defect in the NASA budget request, an increase of \$64,900,000 is recommended to restore this program area to slightly more than the FY 1971 level and to help insure that we will have an adequate store of science and technology in the future. The components of the increase are described in following paragraphs.

## AERONAUTICAL RESEARCH AND TECHNOLOGY

NASA's budget request for aeronautical research and technology was \$110,000,000.

To the amount requested, the Committee recommends an increase of \$25,000,000 for a total authorization of \$135,000,000.

During past years the Committee has consistently called for and supported increasing attention to aeronautics research and development within NASA. Evidence has been accumulated both in the regular authorization hearings and in special hearings on aeronautics that unless major attention is given to correcting many deficiencies we will encounter increasing risks in:

1. Falling behind our world competitors in more and more areas of aeronautics and aviation.
2. Erosion of our store of technical and scientific knowledge, physical plant, and skilled people.
3. Unsafe travel by air arising from traffic congestion on the airways and around air terminals.

With this overall idea firmly in mind, the Committee unanimously concluded that an increase of \$25 million should be made in NASA's aeronautical research and technology line item. These additional funds would be allocated for increased effort in attacking four major problem areas:

1. Noise abatement.
2. Filling a number of unmet needs in our technological base ranging from basic research through flight development.

3. Airway and airport congestion.  
 4. Short haul transportation (both short take off and landing and low population density areas).

The recommended increase of \$25 million would be used generally in the following ways:

	Budget request 1972	Recommended change	Recommended amount
Graduate research and study program		+\$1,400,000	\$1,400,000
Experimental STOL transport research airplane	\$15,000,000	+7,000,000	22,000,000
Aerodynamics and vehicle systems	42,000,000	+3,600,000	45,600,000
Life sciences	3,100,000		3,100,000
Propulsion	22,300,000	+5,700,000	28,000,000
Operating systems	6,500,000	+1,600,000	8,100,000
Materials and structures	11,000,000	+3,500,000	14,500,000
Guidance, control, and information systems	3,000,000	+2,200,000	5,200,000
Power	400,000		400,000
Supercritical technology	6,700,000		6,700,000
Total	\$110,000,000	+\$25,000,000	\$135,000,000

#### *Aeronautics research and graduate study program*

These would be an increase of \$1,400,000 for a program started during FY 1971 based on an authorization recommendation of the Committee. Its purpose is to help solve the problem of attracting new, younger scientific and engineering men and women to aeronautics research and development.

As presently being carried out, it is a program designed to spend \$1,400,000 over a 3-year period. The Committee strongly believes that there is substantial justification for carrying out this highly important work at the level originally authorized for FY 1971—\$1,400,000 on an annual basis until significant progress has been made.

The added funds would be used to expand the program to more students and more schools. The basic plan is for the graduate student to spend two years in school and one year at a NASA center.

#### *Experimental STOL transport research airplane*

An increase of \$7,000,000 from \$15,000,000 to \$22,000,000 is recommended.

This is a project to design, manufacture, develop, and test in flight, two experimental aircraft whose purpose is to advance the technology of short takeoff and landing (STOL) applicable to civil aviation. The research aircraft will incorporate a propulsion system that is quiet by today's standards, operating with a 500-foot sideline EPN db as low as approximately 95.

It is intended that the program will be a joint enterprise between government and industry. On the government side it is planned that NASA and DOT/FAA will jointly direct the program, with DOD participation to some degree, since there will be the potential of a military application of the technology. On the industry side it is

intended that the aircraft and engine companies, and the airlines, will participate.

It is emphasized that the joint enterprise would be formed only to develop the technology of STOL through the testing of experimental aircraft, leaving the involved companies free to compete as they conventionally do when the technology would be applied to prototype aircraft in seeking market opportunities. Thus the joint enterprise is not a program wherein the government would in any way underwrite a prototype development program by a segment of the industry.

The justification for such a program rests on the results of a study jointly performed by NASA and the Department of Transportation on Civil Aviation Research and Development. Conclusions were reached in the study that the three most serious problems in civil aviation are: severe noise pollution, congestion of the airways and terminals, and the economics of low density, short-haul air transportation. A STOL aircraft with quiet engines directly alleviates the first two of these problems.

Increasing NASA's FY 72 budget request for the experimental STOL aircraft from \$15 million to \$22 million would permit NASA to accelerate the attack on the noise abatement technology that will be required in order that the experimental aircraft can be configured with low noise engines early in its flight program. This will permit earlier achievement of public confidence that environmentally acceptable STOL vehicles are realistic.

#### *Aerodynamics and vehicle systems*

The recommended increase of \$3,600,000 in this program area would permit a needed expansion of basic research and increased attention to problems related to the development of new aircraft—civil and military.

\$2,000,000 would be used in the areas of aerodynamics, fluid mechanics, aeroelasticity and flight dynamics. Specific work would include such tasks as the following:

Studies and wind tunnel tests relating to optimizing supersonic aircraft configurations for minimum sonic booms.

Greater range of models to deal with scaling problems in the transonic speed range which is of great importance to both civil and military aircraft.

Expansion of spin research to develop an automatic spin prevention system applicable to all classes of aircraft.

\$1,600,000 would be used to study the major systems integration problems of high performance supersonic aircraft. These major systems problems (propulsion system—airframe interaction in which flow distortions and shocks affect engine operation, control system— aerodynamic stability) would be studied by means of an expanded and accelerated YF-12 flight test program.

#### *Propulsion*

The recommended increase of \$5,700,000 would be divided between increased attention to noise abatement problems and other important areas of advanced components and systems.

In the noise related activities, \$3,000,000 would be used to increase efforts in basic noise research so as to increase our knowledge and provide a better understanding of the fundamental factors affecting the

generation, propagation, and attenuation of aircraft noise. An increase in noise research efforts will also provide an opportunity for broadening the technological base required for the development of low noise fans for quiet engines for both CTOL and V/STOL aircraft.

In the engine component related activities, \$2,700,000 would be used to increase the research efforts on advanced engine components and systems required for all classes of jet aircraft including small gas turbines for general aviation applications. The research would be focused on improving performance, reducing exhaust gas emissions, investigating methods for developing low cost small gas turbine engines, and providing increased safety and reliability.

#### *Operating systems*

The recommended increase of \$1,600,000 would be used in four areas as follows:

**Feasibility Study of Off-shore Airports (\$500,000).** To establish technical feasibility and economic practicality, the best methods of off-shore construction and accessibility must be determined. The results must then be compared with alternative approaches. A specific locality would be chosen for the systems analysis; however, the results and methodology would be applicable to other cities and regions.

**Inertial Navigation Technology for STOL (\$500,000).** It should be valuable from several points of view to develop STOL avionics systems which integrate the flight control and guidance functions with the navigation function through the use of common components.

**Aircraft Trailing Vortex Research (\$500,000).** Intensified research is required to obtain details of the trailing vortex caused by large transport aircraft. The trailing vortex is highly dangerous for other aircraft.

**Study Ways to Improve Flow of Airfield Traffic (\$100,000).** This work would be concerned with runway use, high-speed taxiways, airfield layout and other factors.

#### *Guidance, control and information systems*

The recommended additional funds of \$2,200,000 would be applied in three main areas: basic research, avionics technology and digital electronics control systems.

For basic research (\$600,000) work would be concentrated on design information for automated aircraft operations to reduce pilot workload. This is especially important in connection with flight paths required for noise reduction, increased traffic and adverse weather.

In avionics technology (\$1,100,000) space-developed electronic concepts are being applied to avionic systems to increase economy and safety of aircraft operation.

For the digital electronics control system (\$500,000), initiate the second phase of a program to replace modified Apollo equipment with advanced hardware.

#### *Materials and structures*

The recommended \$3,500,000 increase would be divided between three areas: refractory metals and coatings for noise suppression, ap-

plication studies of composite materials, and non-destructive evaluation studies for aircraft structures.

For the metal and coating work, \$500,000 would be used to investigate improved lifetime and reliability of the materials used for noise suppression in the exhaust areas of jet engines.

The principal aim of the applications studies in composite materials (\$2,200,000) is to gain enough experience so that confidence is built up and there is general acceptance. The purpose of these materials is to increase aircraft reliability and reduce structural weight.

In the third area, \$800,000 would be used for the nondestructive evaluation of aircraft structures. The reliability of aircraft is of paramount concern today both because the aircraft are getting larger and because of some of the structural failures being encountered in military aircraft. To improve inspection techniques, more advanced nondestructive approaches must be found and tested.

### NUCLEAR POWER AND PROPULSION

NASA's budget request for the Nuclear Power and Propulsion Program for fiscal year 1972 is \$27,720,000. This amount represents a substantial reduction from the \$55,200,000 for fiscal year 1971 and the \$55,269,000 program for fiscal year 1970.

Part of this program is the NERVA nuclear rocket engine. The Committee recommends that NASA be permitted to proceed with development of the NERVA engine at a rate efficiently timed to the development of the space shuttle transportation system. To avoid loss of skilled people, inefficiency and increased total program costs resulting from a stretch out, an increase in the nuclear propulsion program of \$39,900,000 is recommended—to be used only for this program.

The Committee has taken this action based upon the significant advance in propulsion capability represented by the NERVA system. The advantages of nuclear propulsion over the alternative chemical propulsion system are the high payload performance, propulsion efficiency and versatility. The NERVA system will provide greater than twice the specific impulse (power) of the most advanced chemical rockets. This power will be required in missions involving high energy, long duration, and large payloads.

In operation, the NERVA will be built into a reusable, long endurance nuclear stage as an integral part of a new capability for space transportation. The system will be used for a great variety of purposes including moving men, spacecraft and supplies between earth orbit and lunar orbit, between low earth orbit and geosynchronous orbit, unmanned missions to the nearby planets for returning samples, and fast unmanned missions to the distant planets.

In essence, the NERVA should increase payloads, reduce trip times and provide great reliability for the successful completion of missions. It is, in fact, this country's only program to develop a significant advance in space propulsion capability in the next decade or two.

In testimony before this Committee, NASA has emphasized that the \$15 million budget request for fiscal year 1972 committed the NERVA development program to a holding action and would result in a two-third's reduction in force by the contractor organizations. The \$39,900,000 budget increase is required as a means by which

to capitalize on the technology developed and permit continued work on components, fuel reactor and engine systems in an integrated and efficiently phased manner. On this basis, it is estimated that the first development test of a NERVA design reactor can take place in 1973 with the test of the first complete developmental engine late in 1974. It is further estimated that the NERVA engine could be available for its first flight test in the 1978-79 time period and be operationally qualified in the very early 1980's.

During the past 2 years, the Nuclear Propulsion Program has largely been engaged in the design and development of a flight-rated NERVA engine. The achievements of the program have provided a sound technological foundation for the development of the advanced, high performance propulsion system. Eighteen rocket reactors have been tested and two experimental engines have been operated. Over 14 hours of system operating experience has been accumulated, including more than 4 hours at or near design power. Fiscal year 1971 activity, in particular, resulted in a final base line design for the engine.

The increased funding would be used for the following tasks:

Development of critical components, including the reactor shield, reflector, pressure vessel, and other associated components and subsystems.

Fabrication of the first ground test reactor and engine.

Initiation of experiments, instrumentation, and engine thrust structure designs.

Within the Nuclear Power and Propulsion Program, the recommended increase of \$39,900,000 should be allocated to the Nuclear Propulsion Program (as shown in the tables below) and results in a total authorization of \$67,620,000 for Nuclear Power and Propulsion.

Line item	Budget request 1972	Recommended increase	Recommended amount
Nuclear power research and technology	\$9,320,000		\$9,320,000
Electrophysics	3,400,000		3,400,000
Nuclear propulsion	15,000,000	39,900,000	54,900,000
Total	\$27,720,000	\$39,900,000	\$67,620,000

Within the Nuclear Propulsion Program the increase of \$39,900,000 would be divided as follows:

	Budget request 1972	Recommended increase	Recommended amount
Nuclear propulsion	\$15,000,000	\$39,900,000	\$54,900,000
NERVA	(9,900,000)	(35,000,000)	(44,900,000)
Nuclear propulsion research and technology	(5,000,000)	(3,000,000)	(8,000,000)
Nuclear rocket development site	(100,000)	(1,900,000)	(2,000,000)

#### TECHNOLOGY UTILIZATION

NASA's budget request for Technology Utilization was \$4,000,000.

An increase of \$2,000,000 as recommended, for a total of \$6,000,000. Over the years the Committee has strongly supported the Technology Utilization program. The Committee has taken this position because it firmly believes in the basic principle behind the technology utilization effort: scientific, technological and management knowledge developed with public funds and support should be made available to the public for its benefit as quickly and efficiently as possible. It is believed that this knowledge should be readily accessible to all potential users, whether a major corporation, a small businessman, a school, or a private citizen. Among the specific objectives of the Technology Utilization program are:

(1) To increase the return on the national investment in aerospace R&D by encouraging additional uses of the knowledge gained.

(2) To shorten the time gap between the discovery of new knowledge and its effective use in the market place.

(3) To aid the movement of new knowledge across industry, scientific discipline and geographic boundaries.

(4) To contribute to finding better ways of transferring technology from its points of origin to its points of potential use.

During the past few years the Technology Utilization program has concentrated a good part of its effort in the medical area. This has included improved instruments, diagnostic techniques, surgical techniques and medical systems management. More recently there has been a turning towards work in public sector problems: water pollution, air pollution, crime, transportation, housing construction and rehabilitation, and mine safety. It is in large degree to support additional work in these areas that the Committee strongly recommends an additional \$2,000,000. The following categories indicate approximately how the increased funds would be used as follows:

#### *Applications Engineering in NASA Field Centers, \$500,000*

The applications would be selected from problem definitions developed by application teams. Representative examples would be: life support systems for firemen and miners, fire safety technology for urban dwellings, and instruments for air pollution monitoring.

#### *Applications Engineering in Non-NASA Facilities, \$500,000*

Industry capability would be used to design, develop, build, test and evaluate engineering prototypes of selected new applications. Particular opportunities would be given to small business, which does not generally have access to advanced technology.

#### *Technology Applications Team Activities, \$300,000*

These activities would be expanded to increase present transfer work in the solution of technical problems in the public sector. Close integration would be maintained with the work done under the first two categories listed above.

*Augmentation of Regional Dissemination Network and Resources, \$225,000*

New data bases and dissemination activities would be added.

*Technology and Systems Studies, \$200,000*

These would be done to determine significant problem areas where the utilization of space technology has high potential. Examples might be: sewage treatment system requirements, solar panel technology application for dwellings, and acoustic damping techniques.

*Computer Software Evaluation, \$100,000*

Development of a new evaluation and classification system for software made available through NASA dissemination programs.

*Program Evaluation and Economic Support Studies, \$100,000*

Studies designed to trace the economic impact of NASA technology in areas where it is used.

*Technology Applications Publications, \$75,000*

Preparation of publications designed to show to the public the value of applications of NASA technology. These would be distributed by the Office of Public Affairs.

The Committee notes that the predominant approach followed by NASA in the past in transferring technology has been generally passive. More specifically, attention has been concentrated on identifying potential transfers and making the information available on a "here it is if you would like to use it" basis. There is an apparent shift taking place towards a more aggressive role in "selling" the technology in areas where it is greatly needed: the public sector and small business. The Committee encourages this shift in emphasis and calls for strongly increased effort along these lines.

### CONSTRUCTION OF FACILITIES

The NASA Fiscal Year 1972 request for Construction of Facilities totaled \$56,300,000. The Committee increased the request by \$2,330,000, recommending that a total of \$58,630,000 be authorized. The adjustment to the program was as follows:

#### JOHN F. KENNEDY SPACE CENTER

*Space Information and Education Center*

The Committee added to the NASA request for Construction of Facilities, a new project which will implement Phase I of a plan to modernize and expand the existing Visitors Information Center at the Kennedy Space Center.

The master plan for the improved center proposes new construction, rehabilitation and improvements to existing facilities, and general improvements to the site and ancillary utilities, over a period of years in three phases at an estimated cost of \$10.0 million. The first phase envisioned by this project involves the construction of a Reception and Exhibit Building; a Hall of History Building; modifications and improvements to existing facilities; and improvements to existing site utilities, at an estimated cost of \$2,330,000.

The existing center was authorized in fiscal year 1964 by the Congress. Because of limited funds made available at that time only temporary, prefabricated structures could be erected. Some improvements have been made over the years using funds derived from revenues collected from the visiting public. However, again because of limited funds, these improvements have been minimal.

In conjunction with the Committee's action during the past year to bring about an improved public understanding of our national space effort, a review of the requirement for an improved public information and education outlet at the Kennedy Space Center was conducted. The Committee's review concluded that the existing facility is inadequate not only to meet the existing visitor load, but will be grossly inadequate to meet the anticipated increase in visitor load which will be caused by the opening of Disney World East later this year.

The Committee has long considered that a more appropriate and modern complex should be available to the general public for informational and educational purposes. Millions of people have visited this facility and it appears that with the opening of Disney World East in Orlando later this year, an additional 600,000 persons will visit the Center annually. The Committee believes that improved facilities could contribute a great deal to a better public understanding and appreciation of the space program.

Accordingly, the Committee considers that action should be initiated now to provide a more modern and expanded facility to meet the growing need in the Cape Kennedy area.

### RESEARCH AND PROGRAM MANAGEMENT

The NASA Fiscal Year request for Research and Program Management totaled \$697,350,000. The Committee added \$9,500,000 to the request, recommending that \$706,850,000 be authorized. Specific adjustments to the program were as follows:

*Non-Permanent Positions*

The Committee added \$1.0 million to the NASA request for Research and Program Management to provide for an increase in the planned employment of non permanent personnel.

The Committee has been concerned for some time over the effect of the drain of scientists and engineers on the space program occasioned by the rapid decline in the annual funding for the nation's space effort. Five years ago there were over 420,000 people in Civil Service, industry and the universities involved in space research, development and related activities. This figure will drop to about 140,000 personnel by end fiscal year 1971.

Testimony received also indicates that young people entering the academic fields are no longer being attracted to the space program because of the uncertainty of the future of space. Other testimony indicated that the average age of the scientist and engineer component of the NASA work force is increasing at the rate of eight tenths of a year annually, indicating that the rate of young people entering the space program has declined to a considerable extent. As a matter of fact only 88 new college graduates were hired during the first half of fiscal year 1971, as compared to 271 hired during fiscal year 1970. It is quite ap-

parent that further emphasis must be placed on increasing the input of new blood into the nation's space activities.

One means of encouraging more young people to enter the space program is through the summer employment of high school and college students as well as faculty members. This program has been in existence in NASA for many years and the projected level for fiscal year 1972 was 2,300 positions, at an estimated cost of \$5,437,000, NASA-wide.

The Committee considers that this program should be expanded and accordingly has increased the Research and Program Management request by \$1.0 million for these purposes. This will add 800 employees to the nonpermanent work force for fiscal year 1972.

#### Permanent Positions

NASA requested \$205,338,000 for Research and Program Management for the operation of the centers under the Office of Advance Research and Technology. The Committee recommends adding \$4,500,000 to this amount making a total of \$209,838,000 which is the OART portion of the R & PM authorization.

The addition was the result of a continuing and profound concern by the Committee for the increasing and critical erosion of Office of Advanced Research and Technology (OART) personnel. In FY 1972, OART is expected to incur a reduction of 533 positions involved to a large extent with aeronautics research spread over the four research centers under its purview. This will have the effect of further increasing the average age of the professional employees and making it nearly impossible to recruit young personnel trained in disciplines related to aeronautics.

This situation has become very serious in the light of the fact that advanced research programs are governed by lead times of ten to fifteen years. The programs require innovative minds capable of dealing with challenges far out in the forefront of many complex disciplines. The additional money will allow OART to retain 500 positions of the 533 it will otherwise lose and will be allocated to the various centers as shown by the following data.

#### PERSONNEL POSITIONS

	Planned fiscal year 1972 ceiling	Recom- mended addition	Revised fiscal year 1972 ceiling
Ames Research Center .....	1,824	+93	1,917
Flight Research Center .....	508	+26	534
Langley Research Center .....	3,596	+184	3,780
Lewis Research Center .....	3,879	+197	4,076
Research center subtotal .....	9,807	+500	10,307
Space Nuclear Systems Office .....	108		108
Grand total .....	9,915		10,415

#### NASA Headquarters

NASA requested \$59,681,000 for the operation of the headquarters to defray the costs of the Washington offices and the NASA Pasadena

office at the Jet Propulsion Laboratory. The Committee increased the amount to be authorized by \$4.0 million specifically for the public affairs activities on a NASA-wide basis.

The Committee has been concerned for some time about the direction of the NASA public affairs effort. While NASA has established a reasonably effective system for providing to the press and public real time information concerning manned space flight and other missions, there has been too much attention directed toward the spectacular aspects of the space effort and not enough on the practical benefits of our space endeavors.

It is the view of the Committee that NASA has failed to convey to the public the benefits that accrue from NASA's programs in research and development. In short, NASA has done a good job in bringing to the public the "what" of the space program, but has not been effective in explaining the "why" of the space program.

That NASA has not done as effective a job as possible in explaining the benefits of the space program is reinforced by the Committee's own experience. During the last session of Congress the Committee published a House report entitled "For The Benefit of All Mankind." This report, which summarizes some of the practical benefits resulting from the space program and authoritative views on the space program, has been reprinted three times, and almost 60,000 copies have been distributed by the Committee in response to requests of people from every State of the Union. This experience points up the fact that there is a need for NASA to satisfy a very real desire on the part of the public to be aware of the benefits of the space program and to support NASA's program in aeronautics and space.

The so-called "Tech Brief" program is an effective means of disseminating information. However, because of the technical nature of the information contained in the briefs, it is of value only to the technical community. The application of this technical information to the benefit of man and how it affects his life is of greater importance to the average person.

Further, space means different things to different people. Geographical, societal and occupational divisions of public interest create demands for varying types of information. Our informational and educational material distribution methods have not been sufficiently well oriented toward meeting areas of interest in these various sectors. The Committee urges NASA to study this matter further with a view toward more objective dissemination.

The Committee believes that while public enthusiasm over space appears to have waned, there is still great interest in this nation's space endeavors, particularly as they affect the individual. The Committee feels that the American public will support the space program, but only if the true story of space and its related benefits is more effectively brought home.

It is the Committee's recommendation, therefore, that the additional \$4 million in funding be used to strengthen NASA's efforts in explaining the practical benefits of the space program to the public. These efforts could include establishing visitor information centers at those NASA centers which do not now have them, producing and widely distributing motion pictures explaining the content and result of NASA's programs, additional exhibits and additional support for the

NASA space mobile program which, although limited in scope, has been effective in describing to the public the results of our space endeavor.

Accordingly, the Committee has added \$4.0 million to the Research and Program Management request for the headquarters, recommending that \$63,681,000 be authorized and that the additional authorization be specifically used to bolster the NASA public affairs effort.

#### AMENDMENT TO THE NATIONAL AERONAUTICS AND SPACE ACT OF 1958

During the past year the Committee has undertaken a review of the reporting requirements levied upon NASA by the Congress to determine if reports now being submitted are still required.

One such report reviewed was the Semi-annual Report of NASA Activities required by Section 206 (a) of the National Aeronautics and Space Act, 1958. The Committee's review of this requirement indicated: the report costs \$102,000 to prepare annually; five man-years of effort in NASA are required to compile the material; over half of the number printed of each issue (20 issues published) remain in stock, indicating a limited demand; information in the report is 9 to 11 months old when published; and the same information is included in the President's annual report to Congress.

In coordination with the Senate Committee on Aeronautical and Space Sciences, this Committee advised NASA that this report was no longer required and requested that NASA include language in the fiscal year 1972 Authorization Bill to rescind the requirement.

Section 7 of H.R. 7109, the National Aeronautics and Space Act of 1972 will amend section 206 of the National Aeronautics and Space Act of 1958, repealing Subsection (a) to eliminate the requirement for the report.

## COMMITTEE VIEWS

### SHUTTLE FACILITIES

The Committee adopted a strong position in last year's legislative report concerning the requirement for facilities in support of the space shuttle program. In essence, the Committee urged that NASA make maximum use of existing facilities to meet the shuttle needs, and that no new facilities should be considered until exhaustive studies have been made to determine the capability of the present physical plant to meet the requirements.

The recent decision by NASA to locate the shuttle engine test activities at existing government-owned facilities is in accordance with the Committee views in this regard, and the Committee desires to compliment NASA for their prudent decision in this matter.

It is quite apparent from studies conducted thus far that there will be a sizable requirement for new or modified existing facilities in support of the shuttle program in addition to the engine requirements. The Committee reaffirms its previous position taken in this matter and requests that NASA keep the Committee currently informed of the status of the extensive NASA facilities study now underway to identify and locate further shuttle facilities requirements and that NASA consult with the Committee as appropriate in reaching its final decisions as to the location of facilities required to support the program.

### OAO PROJECT

The committee wishes to indicate its dissatisfaction with the Orbiting Astronomical Observatory (OAO) project. The Nation has made an enormous investment in the OAO project since its initiation in 1960. With the launch of OAO-C next year, the project will be completed, and run-out costs for the entire project are currently estimated at approximately \$420 million.

The Committee on Science and Astronautics authorized these vast expenditures for OAO based upon consistent testimony of NASA officials to the effect that all three distinctive missions which made up the project were essential to a scientifically sound program. The Committee was assured that each of the three OAO spacecraft incorporated unique instrumentation designed to make different, though complementary, astronomical observations in the ultraviolet region of the electromagnetic spectrum.

So important was each mission considered by NASA that, following the failure of the first OAO in April 1966, a costly "recovery program" was undertaken whereby identical instruments were launched in a second spacecraft, successfully, two-and-a-half years later in December 1968.

Unfortunately, last November the launch of OAO-B failed, and an investment of approximately \$100 million was lost. We have been informed that NASA had again considered a "recovery program" which, by making use of existing prototype equipment, could have been accomplished at a cost of about \$50 million. The decision was made not to undertake construction of a substitute for OAO-B and, therefore, for the first time in the history of the Office of Space Science and Applications, a unique mission has failed and no effort is being made to repeat it.

The committee is persuaded that if the investment of \$100 million in the OAO-B mission was justified in the first place, then the scientific objectives of that mission, which NASA officials have assured us are still valid, certainly justify the additional investment of half that amount. NASA management prefers instead to devote its admittedly limited resources to other projects, some of which are expensive new starts. This decision inevitably leaves a large gap in the scientific objectives of the OAO project.

Inasmuch as the strong testimony of NASA officials convinced the committee of the importance of all three unique OAO missions, the committee reluctantly concludes either that Congress was misled by that testimony, or that NASA management is willing to abandon a huge investment in an established project in order to embark upon expensive new ones. In any case, the implications of the decision not to launch a second OAO-B are such that our Members recommend that the Subcommittee on NASA Oversight investigate OASA management practices with emphasis on the desirability of the preparation of back-up spacecraft for unique missions.

### SPACE APPLICATIONS

Each year since the mid-1960's the Committee on Science and Astronautics has strongly recommended greater emphasis be placed on Space Applications. The NASA request for Space Applications for fiscal year 1972 is somewhat higher than the current fiscal year. Nonetheless, the request of \$182.5 million falls far short of the recommendations of the National Academy of Sciences which, as long ago as 1967, concluded that it was in the National interest to invest between \$200-\$300 million annually in space applications. With due regard for the effects of inflation since that time, it seems fair to assume that the National Academy's recommendation for funding support of Space Applications would be adjusted substantially upward were they to reconsider this matter today.

Suffice it to say, the committee is thoroughly convinced that the Space Applications Program is one of NASA's most important activities, that it engenders public support for the Space Program as a whole, and that it deserves much greater emphasis and financial support than it has received to date. The committee has consistently supported a more vigorous and ambitious Space Applications Program and intends to continue to express its displeasure, in its annual reports, with the relatively small scale of the effort until NASA management brings these activities up to an adequate level.

### ERTS PROJECT

The Science and Astronautics Committee believes that the newest, and potentially the most productive applications project in terms of cost effectiveness, is the Earth Resources Technology Satellite (ERTS) project. The committee is encouraged by the steady progress in this effort, but wishes to express its concern over the possibility of a proliferation of operational Earth Resources Survey Programs in other interested departments and agencies of government in the future. Accordingly, in order to avoid potentially wasteful duplication of effort, the committee takes the position that NASA should assume leadership of any future operational program, take responsibility for development and launch of spacecraft, and establish organizational arrangements with other departments and agencies so that their requirements can be effectively fulfilled. It is not too early, in our view, to express the intent of Congress on matters of organization and efficiency at a time when an experimental project is underway which can reasonably be expected to lead to a large-scale operational program involving several government agencies within a few years.

### TRACKING AND DATA ACQUISITION, DATA ANALYSIS

As noted elsewhere in this report, the committee wishes to express its concern over what appears to be inadequate support for tracking and data acquisition, and data reduction and analysis. The committee has been informed of NASA's intention to discontinue acquisition of data from spacecraft presently in orbit which are still producing valuable data. NASA officials have testified that the constraints on the Tracking and Data Acquisition budget will require that OAO-2 and several OGOs will be turned off, and that ATS-5 will also receive reduced support at the end of the current fiscal year.

The committee believes that any policy which results in failure to extract as much valuable data as possible from each space mission is inefficient and wasteful.

Similarly, the impression has been received that support for data reduction and analysis is inadequate. Since the real purpose of all space missions is the acquisition and analysis of data, and the resultant increase in knowledge and understanding achieved thereby, any policy which is inconsistent with that ultimate objective cannot be justified.

The committee would also like to be assured that ample time is provided between flights of spacecraft in a given project to analyze, evaluate, and apply the lessons of *each* flight experience, before NASA becomes preoccupied with the engineering of the next succeeding launch in that particular series.

The committee recommends these as appropriate questions for the NASA Oversight Subcommittee.

## CONSTRUCTION OF FACILITIES

The one major facility item in the FY 1972 budget is a rehabilitation of the 40 x 80 foot wind tunnel at Ames Research Center for \$6,500,000. This project is well justified and is a step in the direction of solving an overall problem of serious magnitude: aged condition of much of the OART physical plant.

It has been increasingly evident to the Committee that certain of the NASA research centers are facing steadily growing obsolescence. Langley Research Center was established in 1917, Ames Research Center in 1940, and the Lewis Research Center in 1941. All were formerly part of the National Advisory Committee for Aeronautics (NACA) until taken over by NASA in 1959. Although refurbishment and additions of facilities have been added to the Centers over the past years, the Committee believes it urgent that a thorough survey of the physical plant at the three named centers should be promptly undertaken by NASA for the purpose of determining what is needed to bring the centers to a more modern status. Such a survey will also have the prime objective of providing a solid basis for estimating what rehabilitation and modernization will cost.

## 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 \$3,433,580, as follows: (a) for "Research and development," a total of 12 program line items aggregating the sum of \$2,668,100,000; (b) for "Construction of facilities," a total of 2 locational line items, together with one for various locations and one for facility planning and design, aggregating the sum of \$58,630,000; and, (c) for "Research and program management," \$706,850,000.

*Subsection 1(d)* would authorize the use of appropriations for "Research and development" for: (1) items of a capital nature (other than the acquisition of land) required 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 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 no funds appropriated pursuant to subsection 1(c) for maintenance, repair, alteration and minor construction may be used to construct any new facility the estimated cost of which, including collateral equipment, exceeds \$100,000.

*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 (3).

#### *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 refus-

ing 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

This section would repeal subsection 206(a) of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2476), and renumber subsequent subsections accordingly. Such repeal would eliminate the requirement for NASA to "submit to the President for transmittal to the Congress, semiannually and at such other times as it deems desirable, a report of its activities and accomplishments." Thus, this section would eliminate the semiannual report to the Congress by NASA. However, it would not affect the annual report by the President to the Congress concerning the accomplishments of all agencies of the United States (including NASA) in the field of aeronautics and space activities that is required by the present subsection 206(b).

#### Section 8

Section 8 would provide that the Act may be cited as the "National Aeronautics and Space Administration Authorization Act, 1972."

### COST AND BUDGET DATA

The bill will authorize appropriations for Fiscal Year 1972 in the amount of \$3,433,580,000.

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 1973	FY 1974	FY 1975	FY 1976	FY 1977
\$3.70	\$3.95	\$3.75	\$3.71	\$3.68

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

The Committee favorably reported the Bill with all Members present voting aye with the exception of one Member voting "present".

## ADDITIONAL VIEWS OF THE HONORABLE DON FUQUA AND THE HONORABLE LOUIS FREY, JR.

### SPACE SHUTTLE FULFILLING A NATIONAL NEED

Our commitment as a nation to the national space program during the 1960's was an act of faith. This faith was built on a proven principle that technology derived from well-planned and well-executed research and development multiplies itself in terms of technological benefit to this nation and to the world. As we enter the 1970's the possibility exists that the substantial base of research and development derived thus far from our space program may be under-utilized, or at the worst it may be dissipated entirely.

The key to the future of space research and exploration lies in the reduction in the cost of carrying on this important work. In order to bring about reduced costs it will be necessary to diligently pursue programs which feature reusable, multi-purpose, and low operating cost systems.

The cornerstone program in this cost effective approach to space flight is the space shuttle, a low cost, reusable, highly reliable system of transportation between the surface of the earth and earth orbit. The space shuttle will have two stages: a booster and an orbiter. The shuttle will take off vertically like a two-stage rocket, but each stage after completing its mission will land horizontally like an airplane. After landing both stages will receive turnaround maintenance and be refurbished as required with an estimated time of seven days on the ground.

This high degree of reusability will permit expensive elements such as engines, electronics, and structures to be amortized over many missions, possibly as many as 300 flights, rather than charged to the cost of each mission as in the case in our present program of space flight operations.

Reuse translates into the operational efficiency. It has been shown that when a new aircraft is first introduced, the operational costs are the highest. Subsequent experience in maintenance and operations have a tremendous effect on reducing these costs. The space shuttle is expected to parallel the experience of commercial aviation so that at operational maturity the operational costs, including maintenance, will be reduced to \$2 million per mission or less.

We cannot use today's early space technology to build the practical low cost transportation systems of the future any more than the Wright Brothers could have built a DC-3 with their bicycle shop technology.

The first U.S. space payloads cost about \$100,000 per pound to launch into orbit. The research and development conducted in the Saturn program have reduced this cost by 99 percent. The three-stage Saturn V's used in the Apollo lunar program have placed payloads in orbit at a cost slightly below \$1,000 per pound.

In the 1980's space shuttle cargoes should be transported into orbit for between \$50 and \$100 per pound.

Every rocket now employed to launch satellites into orbit is used only one time. This is the equivalent of scrapping a Boeing 747 after its maiden flight. Our space transportation systems of the future must be capable of being used over and over again. Today's satellites are sent into space to perform their missions and then float lifelessly in orbit. Today there is no way to recover automated satellites that are not working properly or not working at all. In the future, malfunctioning satellites must be repaired in orbit or be retrieved and refurbished. Older satellites must be resupplied, updated and kept in useful service for many years.

It is also quite obvious that when the shuttle becomes fully operational the cost of unmanned space flight activities will be materially reduced. Because of the low cost of transportation to orbit, the large volume of cargo, the capability of servicing by man either in orbit or on board the shuttle and the retrieval capability, the cost of unmanned missions will be materially reduced.

Toward this end a recent study of the cost of placing in orbit the OAO-B by chemical propulsion vehicle means versus the shuttle was recently completed. The results of this study indicated that the actual research and development costs of the vehicle could have been reduced by almost 50 percent if it were launched by the shuttle because of the elimination of redundant systems now necessary. Also, because of the elimination of restrictions on weight and stowed volume offered by the shuttle, the satellite's weight could have been increased by 38 percent and the size of the vehicle increased by almost six times the present configuration.

The space shuttle system also offers a tremendous potential for aiding in improving man's life on earth. This is possible because of the tremendous cargo-carrying capability of the orbiter. Space applications satellites need no longer be restricted in size, weight and on-board experiments. The 15 x 60-foot cargo bay of the shuttle will remove most of the weight, size and configuration restrictions of satellites being transported to earth orbit.

Throughout the next decade there will be increased interest and attention on the use of space systems to aid men on earth. Our challenge of the 1970's in space applications is to demonstrate that space systems can in fact be applied as tools to protect the quality of the environment, preserve nature's balance, and address the problem of overpopulation.

Space technology may provide man with invaluable new tools to attack these worldwide problems on a global basis. The earth-oriented satellite and its sophisticated sensing equipment far out in space can determine the condition of the earth and can receive and transmit vast amounts of information to the four corners of the earth. There is the growing possibility that these systems, in conjunction with supporting aircraft and ground observations, and supported by worldwide data processing networks to provide information about "spacecraft earth," will add an immensely effective new dimension to the general advancement of human welfare for generations to come.

The shuttle will bring new dimensions to the unmanned space applications program, which in turn will greatly enhance the benefits to man from space exploration.

One obvious factor concerning the development of a low cost recoverable space transportation system, often overlooked, is its impact and contribution to the nation's economy. The latest estimates indicate that the taxpayer will be called upon to invest approximately \$8.6 billion to develop an operational space shuttle. This investment will probably be extended over a ten-year period and will multiply itself first in labor and materials by a factor of at least 5; secondly, with those who accomplish the research work; third, with those who spend their income for subsistence; and, last the effect on the economy occasioned by the increased purchasing power for goods and services from those who earned their living working in the development program. This translates itself into an increase in the gross national product of \$21.5 billion and an increase in personal income of \$17.1 billion. These factors in turn generate federal tax receipts estimated at \$4.3 billion, which is one-half of the original investment in the space shuttle program.

These overall national economic advantages, coupled with the savings to be realized in manned space flight operations and the much reduced costs of unmanned space science and applications activities, offer a program, which not only parallels the efficiency of an airline operation, but offers an economically attractive approach to the future of space endeavor.

This nation is at a crossroads in the space program. The last decade has seen us ascend to a highly sophisticated plateau in basic and applied space research. The prospects offered by the space shuttle represent an opportunity for the United States to move forward by shifting from the costly experimental research phase to the operational phase of space exploration at a relatively low cost.

We believe that the future of this nation's success in space rests with the development of an economical space transportation system. We urge NASA to proceed with meticulous care in the preliminary design phases of the space shuttle development. This is not a crash program, and all precautionary measures should be taken now to avoid costly redirections of effort as the design and development proceed.

The development of the space shuttle is essential if this nation is to maintain its pre-eminence in space. We should proceed without delay. The technology necessary for the space shuttle development is at hand. What is required is the will to do it.

DON FUQUA  
 LOUIS FREY, JR.  
 EARLE CABELL  
 WALTER FLOWERS  
 ALPHONZO BELL  
 JOHN W. WYDLER  
 LARRY WINN, JR.  
 ROBERT PRICE  
 BARRY M. GOLDWATER, JR.  
 JOHN N. HAPPY CAMP  
 JAMES G. FULTON

ADDITIONAL VIEWS OF THE HONORABLE  
ALPHONZO BELL

For the past few years I have grown increasingly concerned at the abruptness with which we are approaching the end of our first phase of manned space activity. I feel that much of the success the U.S. space program has enjoyed is directly attributable to the careful balance between manned and unmanned operations. Many of the techniques and background developed in the pursuit of unmanned programs provided an invaluable contribution to the latter successes of the manned activities. Similarly, much of the technology pioneered in our manned activities now serves as the basis for a more advanced generation of unmanned spacecraft.

I therefore strongly endorse the increase in authorization by the Committee this year in order to provide for further manned activity. The precipitous elimination of manned flights after the 1973 Skylab Program is tragically shortsighted. I understand the concern of NASA in wanting to proceed with the Shuttle Program. I agree with need for the shuttle and the necessity to proceed with the program on an accelerated schedule. But I do not agree that we should curtail all manned flight for a period of 4 to 6 years. There is equipment in inventory which would permit follow-on Skylab activity at a minimal additional investment. Furthermore, there are numerous productive experiments which could be flown, particularly in the area of earth applications.

I would like to make one other point regarding the Space Shuttle Program. I am concerned over the relative levels of funding being provided this developmental program by NASA and the Defense Department. It is my understanding that the U.S. Air Force is planning for the use of the Shuttle when it becomes available and furthermore that the DOD plans to equip an entire fleet of Shuttle vehicles for military peculiar missions. I agree that wherever feasible our inventory of space equipment should be designed for as large as possible a user community. But I also feel the development costs for the equipment should be spread throughout that community. The DOD is now forecasting phasing out virtually all its booster inventory with the exception of the Scout in favor of the Shuttle. Clearly, the DOD should share the funding responsibility as well as the benefits of the program.

In another area, I would like to add my total endorsement to the NERVA Program. The amount of money originally requested by NASA for NERVA provided too long a stretch-out of the program. The importance of the NERVA as an essential component in the total Space Shuttle system is too great to reduce the program to a caretaker status. The fact is that there is no other advanced propulsion concept under consideration which will offer the economy and versatility of the NERVA. I am convinced we cannot afford delay in a program as critical to our future posture in space as the NERVA.

I would also like to make clear my position on NASA's activities in aeronautics. Today, our airports and airways are encountering problems unforeseen as few as 2 to 3 years ago. The availability of new equipment to our fleets and the growing dependence of our population on air travel have thrown our air transportation system into turmoil. No longer do passengers speak of the ease and convenience of air travel; more frequently we hear of the airport congestion, the delays and a host of other problems.

I therefore welcome the increased emphasis given by NASA in its aeronautic research, particularly in the areas of air and noise pollution and traffic safety. I encourage NASA to treat the entire airway and airport activity as a total system with no facet of the system entirely independent of any other. Air pollution is not solely the headache of the community. To the aircraft owner, air pollution is the product of a less efficient engine more expensive to run. Air pollution is also the product of inadequate airport facilities which require longer holding times on the ground.

Similarly, the NASA aircraft vortex studies which I strongly support, impact not only on air travel safety but on the efficient use of our air corridors. Standards for aircraft separation are heavily influenced by vortex characteristics with spacing between adjacent aircraft a key factor in flight times and flight delays.

One further comment concerning noise pollution is appropriate. The issue of noise abatement is increasingly becoming one of the major topics of public controversy. The public is told of important strides being made to reduce engine noise levels and the improvements being incorporated into latest engine designs. Yet the earlier models of newest long range aircraft in our fleet, the 747, will require retrofit modifications of approximately \$1 billion to meet new noise regulations.

The conclusion is that we must emphasize research toward the problem at hand. The 3,000 commercial airliners in the current U.S. fleet will be in operation for many years to come and it is these aircraft for which practical noise reduction solutions must be proposed. I was, therefore, encouraged by NASA testimony this year which highlighted that NASA had successfully demonstrated how existing aircraft could be modified to significantly reduce engine noise. I am concerned now, however, that the results of this demonstration program may have been somewhat overstated.

The true measure of success of the NASA noise abatement program should be the viability of the solution—a solution which I evaluate against the following frame of reference. First, under Federal Aviation Regulations, the FAA cannot apply and enforce noise reduction techniques which do not meet the requirements of economic reasonableness or technological practicality. It is my understanding that the NASA demonstration program did not fully meet these criteria. Second, I also understand the NASA program did not address itself to one of the most important engine designs which is in wide use throughout the existing fleet. It is not clear to me, therefore, that we do have a reasonable solution.

I wish to make it clear that my comments on the NASA noise abatement program are not to be interpreted as a direct criticism of NASA or the work being done. I appreciate that the NASA low noise technology programs are not oriented towards immediate commercial ap-

plication, but I want to stress that I feel it incumbent upon NASA to direct certain of its research to the problems which are *presently* being encountered.

In summary, NASA's effort in the aeronautics field represents one of the most effective means by which we can return the elements of pleasure and convenience to our air transportation system, and I urge NASA to continue emphasis on work in this field.

ALPHONZO BELL  
BARRY M. GOLDWATER, Jr.  
JAMES G. FULTON

#### ADDITIONAL VIEWS OF THE HONORABLE JOHN W. WYDLER

The great emphasis placed on the space program during the early 1960's led to remarkable achievements. However, one of the prices we paid for this progress in space was the "short-changing" of attention to aeronautical research and development. As the implications of this became clear, the Committee began to press NASA to place more attention upon aeronautical problems. I have been a strong personal supporter of this change in allocating NASA resources to aviation problems.

By the latter half of the 1960's many problems in aviation had reached the crisis stage. The nature of these problems has been well documented in many reports, including a comprehensive analysis based on several weeks of hearings held by the Subcommittee on Advanced Research and Technology, on which I am privileged to serve. Among the numerous problems in aeronautics and aviation that we identified as being at the critical stage were (1) noise pollution and (2) airway and airport congestion.

It is clear to the public, as it is to those of us in the Congress who have studied the problems, that the airport and airway system of today is not adequate to meet even the current levels of air travel—let alone the growth projected for the 1970's. Also the public is pin-pointing airports as well as aircraft as being responsible for an ever increasing number of problems—and rightly so.

The public, with its concern over the environment, views the airplane and the airport as a perpetual source of both air and noise pollution. The air traveler, as a particular segment of the total public, voices his complaints concerning access to and congestion within the airport system. The direct result of this overall terminal problem is more often than not poor service and delayed connections.

The many shortcomings of our aviation system fall directly upon the airline owners and operators as well as the public. Congestion and delay, noise and exhaust emissions can all be related to money. The inadequacies and inconveniences of air travel contribute to reduced load factors. Pollution and congestion problems reflect upon poor aircraft utilization and operating patterns.

Many factors have converged, often in unforeseen and unexpected ways to contribute to today's confused and generally undesirable picture of our airway system. The public which so overwhelmingly accepted air travel is now demanding, in just as overwhelming a fashion, a solution to the problems wrought by this new form of transportation.

NASA has increased its attention in aviation areas during the **past few years** and I welcome this move wholeheartedly. Having examined their program in considerable detail, I particularly welcome their **new emphasis** in the specific areas of noise abatement and congestion relief

around airports and in the air. I have strongly supported such moves for a number of years.

While I fully recognize the jurisdictional responsibilities of NASA and the Federal Aviation Agency with regard to airports and airways, I am just as certain in my mind that the design of aircraft is inextricably related to the design of airports and airway patterns. These factors cannot be considered separately as has been done in the past. This point was amply demonstrated during our special hearings on aeronautical research and development.

I fully recognize the difficulties involved in planning new conventional airports over the nation. Not only is technology involved, but there are problems in land acquisition, access transportation, financing and community hostility, to mention a few.

With this situation in mind, I initiated a proposal during the budget hearings this year for NASA to devote effort to examining the technical and economic feasibility of planning and building non-conventional airports. Specifically, this would involve looking into the design of off-shore airport systems. I realize that a considerable amount of study has already been done on off-shore airports but very little has been produced in the way of comprehensive and conclusive results. Yet, off-shore airports may offer a satisfactory alternative in bypassing many of the problems we now face in building conventional airports.

For this reason, I was particularly pleased that the Committee saw fit to adopt my recommendation and incorporate a modest increase in the budget request to carry out a study on off-shore airports.

JOHN W. WYDLER

#### ADDITIONAL VIEWS OF THE HONORABLE LARRY WINN, JR., AND THE HONORABLE ROBERT PRICE

NASA is truly at a crossroads in its history. The major space programs initiated in the 1960's are yielding to the programs of the next decade. The pre-eminence we have gained in space is being challenged by a combination of re-ordered priorities at home and the accomplishments in space of our international neighbors.

The complexion of the problems we now face in space exploration and space travel has now changed but the magnitude of those problems has not. Our initial objectives in experimentation and basic research must now become oriented more to exploitation and application. We must reduce to practice the concepts and experiments we have been so successful in developing.

It therefore gives us cause for concern to note that the United States appears to be ignoring the very ingredients which contributed to this leadership we now enjoy. Specifically, we are heading into an era in which the careful balance of programs—manned and unmanned—is on the verge of being sacrificed. NASA's manned programs have clearly demonstrated the superiority of man to remote-controlled devices and machines. As a most recent example, Apollo 14, at a cost of \$400 million would have ended in absolute failure had it not been for the men on board. Yet, NASA is choosing to discard the role of man in space for a minimum of 4 to 6 years.

We therefore strongly endorse the actions by this Committee to minimize the gap between the Skylab Program of 1973 and the follow-on manned activity under the Space Shuttle program. We further emphasize that the gap must be reduced by approaching it from both sides; by extending the number of Skylab missions and by adhering to an accelerated shuttle schedule.

Regarding extended Skylab missions, following the Apollo 17 mission and the 3 manned Skylab visits, NASA will have a considerable equipment inventory which could readily be used for further manned activities. In particular, there will be 4 Command and Service Modules, 2 Lunar Modules, and 1 Skylab Workshop, in addition to 2 Saturn V launch vehicles and 3 complete Saturn I-B launch vehicles. In spite of a number of potentially valid applications of this flight hardware, no missions have been planned. It is felt to be an extremely poor use of resources to allocate funding for the indefinite storage of this equipment as the alternative to flying subsequent missions designed to enhance our capabilities in space.

It is also of the utmost importance for NASA to proceed with the timely development of the Space Shuttle. The present Phase B, or preliminary design activity, is due to be completed and submitted to NASA by the various contractors in late Spring. NASA is then scheduled to release the Phase C proposal requests shortly thereafter. We strongly recommend that NASA hold to this schedule as a means to insure the early operational availability of this important space trans-

portation system. The prompt award of Phase C is also desirable in order to reduce all unnecessary financial burden on the individual contractor teams. Any major delay in the contract award will threaten the contractors' ability to hold the full capability intact.

A final and very necessary complement to the Space Shuttle which we recommend to NASA is the initiation of an effective information program designed to more fully explain the Shuttle Program to the general public. We are convinced of the long-range benefits and the ultimate promise of the total space shuttle concept—the Space Shuttle plus the NERVA transportation system as a dynamic and revolutionary advance in our total space program. But it is becoming increasingly apparent that a highly skeptical public must be better informed on the purpose of our space activities, and the mission of the shuttle in particular, if the program is ever to be completed. This involves not only a greater stress on the concrete benefits the public has derived from space research, but an education on the contribution to be provided by the shuttle. Technology for the sake of technology can no longer be sold. But technology emphasizing civil or commercial applications—applications reflecting our nation's priorities—can and must be sold.

One further comment should be made regarding the Shuttle Program. The Congress and NASA are asking this nation to embark upon a long and expensive venture at a time when science and technology are under severe attack. The same nation that provided overwhelming support to our goal of placing a man on the moon is turning its back on science and technology in blaming our scientists and engineers for the multitude of ills which now beset society.

As grossly unfair and wholly unjustified as this negativism may be, the impact is real. But the beneficial outgrowth of this impact is an awakening—an increased awareness to the need to more carefully weigh and assess our technological products. This is aptly demonstrated by the case of the ill-fated supersonic transport. The point is not that the SST was, in effect, grounded by the House of Representatives; the point is that the SST was not adequately evaluated, analyzed, presented, and debated before and by the public until after this country had committed \$1.5 billion to its development!

Here is the heart of the problem as it affects the Space Shuttle Program. We must assess the merits and shortcomings, the contribution and the cost *now*, in order that once we commit, we do so as a nation with a firm understanding of our chosen direction. Let us not repeat the incredible errors of the SST program in which the price to terminate the program is no less than the price to complete the prototype development.

We also urge that NASA continue to emphasize the applications programs in the areas in which there are immediate and identifiable returns to this nation's public. The taxpayers of this nation have invested over \$38 billion in our space program for which they are demanding visible and measurable return, granted that much of this early investment was devoted to basic research and experimentation. But we feel the taxpayer is justified in demanding a return on his investment. The techniques and technology for civil and commercial applications have now been developed and refined. Specifically, in the areas of earth resources, environmental protection and surveillance, communications and navigation, the technology is available and should be incorporated into subsequent NASA programs on a high priority basis.

In summary, we feel that the NASA program as authorized by this Committee for fiscal year 1972 represents a continuing positive step in keeping this nation first in space. We are alarmed, however, at the trend through the latter half of this decade in which there will be a sharp elimination of all manned space activity for a number of years. We further strongly recommend to NASA that the agency recommit itself to the development and implementation of satellite systems oriented to the more immediate and pressing needs of the public sector.

LARRY WINN, Jr.  
ROBERT PRICE  
LOUIS FREY, Jr.  
BARRY M. GOLDWATER, Jr.  
JOHN N. HAPPY CAMP  
JAMES G. FULTON

## SEPARATE VIEWS OF THE HONORABLE LOUIS FREY, JR.

## PRACTICAL BENEFITS FROM THE SPACE PROGRAM

Last year, in April 1970, under special order, twelve members of the Committee on Science and Astronautics presented on the floor of the House, statements covering selected practical benefits that have been derived from our Nation's space program.

The special order for this purpose was requested because many Members of this Committee, as well as other Members of Congress, were deeply concerned that the true story of our space effort was not being effectively brought home to the general public. There was evidence to indicate that public support for the space effort was waning, and that the man on the street was losing interest in space basically because an insufficient amount of emphasis had been placed on relaying to him the practical benefits that accrue to mankind from space research and development.

The National Aeronautics and Space Act of 1958 specifically states as one of the principal objectives that: "The Congress hereby declares that it is the policy of the United States that activities in space should be devoted to peaceful purposes for the *benefit of all mankind*." Our national space program has been diligently oriented toward that objective these past twelve years, and mankind is now enjoying hundreds upon hundreds of benefits that contribute to his health and well-being, to his leisure, his comfort and his economic well-being. Unfortunately, although he knows his standard of living has improved, man does not realize that much of his better lot in life has been the result of space research. He doesn't realize this because he has not been told about the practical returns accruing to him from our investment in space research.

Subsequent to our action on the Floor of the House, the Committee on Science and Astronautics published a report entitled "For the Benefit of All Mankind—A survey of the Practical Returns From Space Investment." This report contained almost a hundred examples of space spinoff items of benefit to mankind. The public demand for the report was fantastic! Almost 60,000 copies of the report has been distributed to citizens in all fifty states. (Copies of this report are still available and may be obtained from the Publications Clerk, Committee on Science and Astronautics, Room 2321, Rayburn House Office Building, Washington, D.C. 20515).

The widespread public interest in this report is encouraging. It indicates that despite much pessimistic commentary to the contrary, the general public *is* interested in our space endeavors, and what these endeavors mean to the individual. It is quite evident that we must continue our efforts to bring the true story of space benefits home to the American public.

From the many and very impressive space accomplishments of this

country, it would appear that there would be less need for public justification of the space program. It would appear that the space program should speak for itself. The truth is, however, that never before in the short and vital history of the national space program has it been so mandatory to have clear and emphatic explanations regarding the returns on our space investments.

The economic benefits derived from the space program are extremely significant. More than \$44 billion has been spent on space since the inception of the program for goods and services in the most labor-intensive sector of the economy—the aerospace industry, where the ratio of cost of manpower to that of materials is very high. During the last decade the number of people working on the space program averaged about 250,000 in that part of the economy upon which the nation relies for its technological leadership. The money spent for salaries is rapidly recirculated into the rest of the economy; the annual economic multiplier has been estimated to be on the order of 7 for the salary dollar. Since some 90% of the NASA costs have been for salaries, then, the value to the economy has been over \$300 billion.

Another aspect of economic growth can be seen in the regional impact of space facilities. Employment levels, standards of living, educational opportunities, and industrial development have multiplied with the establishment in the past of the Mississippi Test Facility, the Sledell Computer Facility and the Centers at Cape Kennedy, Houston and Huntsville. The demands for the space program for high skill and superior performance have exceeded available talent pools and, therefore, have had to be met by training and a general upgrading of skill levels. The increment of skill resides in the individual as a permanent value. As with individuals so do institutions and organizations benefit from the demands imposed upon them by present-day technology. The standards of precision and reliability now accepted as common place in the electronics and machinery fields simply were inconceivable before the rigors of space exploration required them. New products and new techniques are continuously introduced from the space program into the commercial and public sectors.

A broader view of space returns must necessarily deal with quantitates and intangibles; for example, the real value of the human lives saved because a meteorological satellite spotted Hurricane Camille in time to permit advance warning and evacuation of the danger zone cannot be measured. The improvement in safety and comfort for transatlantic airline passengers due to the current satellite meteorology photographs of the plane's route now available to all pilots is real but intangible. Navy ice reconnaissance patrols have been reduced by 50 percent because of satellite coverage.

We have a better educated generation in school now than we could have had 10 years ago, before the Van Allen belts were known, the Moon and Mars photographed, and magnetic fields of Sun and Earth observed. We have a better qualified academic community today than ever before; they have taken advantage of the space age to explore and understand new phenomena, which then feeds back through their classrooms and publications to the general expansion of human knowledge. An educated nation in a technological world society is a requirement for progress. Research and technology make it possible.

These broader benefits to the general economy and to society, of course, are augmented by thousands of practical items evolving from

space research which benefit the individual. Ever since the last Committee publication on space benefits, hundreds of new products and services have been fed into the economy as a result of space research and development. These are the types of things that should be brought to the attention of the man on the street because the tangible benefits that he can see or feel are the things that he understands best.

Looking forward to returns both measurable and intangible of the space program not only to the value of the past but whole new fields of returns are becoming apparent. A number of space based applications appear within reach such as prediction of major earthquakes and their locations; accurate two-week forecasts of the weather; worldwide agriculture inventories and productivity, globe navigation and traffic control systems for both ships and aircraft; fresh water irrigation, power and consumption information. The values of these capabilities in economic terms have been cautiously estimated to be in the billions of dollars a year. Their value to a better environment may be immeasurable.

The economy of any nation is tied directly to its technological development and progress. One need only look at the developing nations of today and observe that those who have embarked on even a minimal program of technological advancement are progressing more rapidly economically than those who are depending solely on agrarian development. The application of science and technology to the benefit of man, and the exploitation of side benefits derived therefrom, automatically lead to more rapid economic progress. This progress in turn provides schools to educate the present and future generations, hospitals and clinics for the ailing, higher standards of living for the general population, and countless contributions toward the general well-being of the individual.

In the United States our economy has flourished in these last two decades because of our concentration on scientific research and development. This country's space effort has in fact constituted our science and technology program. It is quite apparent that we must now take measures necessary to assure that our economy continues to grow as it has been growing in recent years. For it is only through growth in productivity, based on knowledge derived from the advancement of technology, that we can create the wealth and the advances in education, science, health and industry which will be necessary to solve the problems of our times. We can and should do more to meet the needs of man on earth. The direct and indirect benefits derived from space research has, and will continue to contribute materially toward this end.

There has been some improvement over the past year in telling the true story of space benefits to the general public. However, I believe that we must continue to stress the spinoff aspects of our nation's space endeavors. I urge NASA to place more emphasis on the dissemination of information to the American public concerning the practical applications of space technology to the benefit of man.

LOUIS FREY, JR.  
JOSEPH E. KARTH  
DON FUQUA  
WALTER FLOWERS  
ALPHONZO BELL  
ROBERT PRICE  
JAMES G. FULTON

92D CONGRESS }  
1st Session }

SENATE

{ REPORT  
No. 92-146

NASA AUTHORIZATION FOR  
FISCAL YEAR 1972

REPORT

OF THE

COMMITTEE ON  
AERONAUTICAL AND SPACE SCIENCES  
UNITED STATES SENATE

TOGETHER WITH ADDITIONAL VIEWS

ON

H.R. 7109

AN ACT TO AUTHORIZE APPROPRIATIONS TO THE  
NATIONAL AERONAUTICS AND SPACE ADMINISTRA-  
TION FOR RESEARCH AND DEVELOPMENT, CON-  
STRUCTION OF FACILITIES, AND RESEARCH AND  
PROGRAM MANAGEMENT, AND FOR OTHER PURPOSES



JUNE 8, 1971.—Ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1971

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(II)

## Calendar No. 142

92D CONGRESS  
1st Session

SENATE

REPORT  
No. 92-146AUTHORIZING APPROPRIATIONS TO THE NATIONAL  
AERONAUTICS AND SPACE ADMINISTRATION

JUNE 8, 1971—Ordered to be printed

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

## REPORT

together with

## ADDITIONAL VIEWS

[To accompany H.R. 7109]

The Committee on Aeronautical and Space Sciences, to which was referred the bill (H.R. 7109) 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.

CONGRESSIONAL ADJUSTMENTS TO NASA FISCAL YEAR  
1972 REQUEST

## SUMMARY

	Budget request	House action	Senate committee action
<b>Research and development:</b>			
Apollo.....	\$612,200,000	\$612,200,000	\$612,200,000
Space flight operations.....	672,775,000	745,275,000	672,775,000
Advanced missions.....	1,500,000	10,000,000	1,500,000
Physics and astronomy.....	110,300,000	112,800,000	110,300,000
Lunar and planetary exploration.....	311,500,000	311,500,000	291,500,000
Space applications.....	182,500,000	182,500,000	185,000,000
Launch vehicle procurement.....	146,100,000	146,100,000	146,100,000
Aeronautical research and technology.....	110,000,000	134,500,000	110,000,000
Space research and technology.....	75,105,000	75,105,000	75,105,000
Nuclear power and propulsion.....	27,720,000	67,620,000	70,720,000
Tracking and data acquisition.....	264,000,000	264,000,000	264,000,000
Technology utilization.....	4,000,000	6,000,000	4,000,000
<b>Total.....</b>	<b>2,517,700,000</b>	<b>2,667,600,000</b>	<b>2,543,200,000</b>
<b>Construction of facilities.....</b>	<b>56,300,000</b>	<b>58,630,000</b>	<b>56,300,000</b>
<b>Research and program management.....</b>	<b>697,350,000</b>	<b>706,850,000</b>	<b>681,350,000</b>
<b>Grand total.....</b>	<b>3,271,350,000</b>	<b>3,433,080,000</b>	<b>3,280,850,000</b>

## PURPOSE OF THE BILL

The purpose of this bill is to authorize appropriations totaling \$3,280,850,000 to the National Aeronautics and Space Administration for fiscal year 1972, as follows:

	Budget request	House action	Senate committee action
Research and development.....	\$2,517,700,000	\$2,667,600,000	\$2,543,200,000
Construction of facilities.....	56,300,000	58,630,000	56,300,000
Research and program management.....	697,350,000	706,850,000	681,350,000

## LEGISLATIVE HISTORY

The fiscal year 1972 budget request for the National Aeronautics and Space Administration was introduced in the House under H.R. 3981 and in the Senate as S. 720. After holding hearings, the House Committee on Science and Astronautics reported out a clean bill, H.R. 7109, which was subsequently passed by the House after agreeing to an amendment reducing the committee recommendation for aeronautical research and technology by \$500,000 and prohibiting the use of such funds for research on airport construction in lakes.

Your committee held hearings on S. 720 and it was determined that amendments were required. Your committee, therefore, has reported out H.R. 7109 with an amendment striking out all after the enacting clause and inserting the committee amendment.

## SUMMARY

The NASA budget request for fiscal year 1972 contains funds for 12 program items under Research and Development with an accumulative total of \$2,517,700, funds for Construction of Facilities with an accumulative total of \$56,300,000, and a Research and Program Management budget totaling \$697,350,000. As a result of action by the House, Research and Development items were increased by \$149,900,000, Construction of Facilities items were increased by \$2,330,000, and Research and Program Management was increased by \$9,500,000. The total funds authorized for NASA by the House for fiscal year 1972 are \$3,433,080,000.

Your committee, after consideration of the bill, recommends an authorization totaling \$3,280,850,000, a reduction of \$152,230,000 from the amount authorized by the House. The authorization recommended by your committee is \$9,500,000 more than the total amount requested in the President's budget. The recommended authorization would provide \$2,543,200,000 for Research and Development, \$56,300,000 for Construction of Facilities, and \$681,350,000 for Research and Program Management. The reasoning accompanying the action of your committee is contained in the report under the various programs or items therein.

Your committee held hearings in connection with the NASA authorization request on February 23 and 24, March 30, and April 1, 2, and 5. On May 17, 1971, the committee met in Executive session to prepare its recommendations to the Senate and mark up the bill.

The total of \$3,280,850,000 which your committee is recommending represents the lowest total recommended by your committee since fiscal year 1962, and one which is \$35,100,000 less than the total amount recommended by your committee in the last fiscal year.

## RESEARCH AND DEVELOPMENT

## Summary

	Budget request	House action	Senate committee action
Apollo	\$612,200,000	\$612,200,000	\$612,200,000
Space flight operations	672,775,000	754,275,000	672,775,000
Advanced missions	1,500,000	10,000,000	1,500,000
Physics and astronomy	110,300,000	112,800,000	110,300,000
Lunar and planetary exploration	311,500,000	311,500,000	291,500,000
Space applications	182,500,000	182,500,000	185,000,000
Launch vehicle procurement	146,100,000	146,100,000	146,100,000
Aeronautical research and technology	110,000,000	134,500,000	110,000,000
Space research and technology	75,105,000	75,105,000	75,105,000
Nuclear power and propulsion	27,720,000	67,620,000	70,720,000
Tracking and data acquisition	264,000,000	264,000,000	264,000,000
Technology utilization	4,000,000	6,000,000	4,000,000
Total	2,517,700,000	2,667,600,000	2,543,200,000

## APOLLO PROGRAM, \$612,200,000

## COMMITTEE COMMENT

Your committee believes that the administration's fiscal year 1972 request for Apollo is basically sound and reflects the continuing phase-out of funding as the Apollo program draws to a close. The fiscal year 1972 budget request is \$344,300,000 less than the request for fiscal year 1971. Your committee, therefore, agrees with the action of the House in approving the administration's budget request of \$612,200,000 for the Apollo program.

## SPACE FLIGHT OPERATIONS PROGRAM, \$672,775,000

## COMMITTEE COMMENT

Your committee recommends that the administration's budget request of \$672,775,000 for the Space Flight Operations program be approved. The House approved a total authorization for this program of \$745,275,000. This amount represents an increase of \$72,500,000 over the budget request. The House increased the funds for the Skylab program by \$45 million, \$15 million of which was for additional rescue capability and \$30 million to evaluate the potential of either a second Skylab, or a Command and Service Module, flight program. The House also added \$25 million for the Space Shuttle to support a more intensive undertaking of the pacing vehicle development tasks, the thermal protection system and vehicle structures, and increased by \$2,500,000 the funds for Orbital Systems and Experiments for additional experiment definition in fiscal year 1972.

Your committee strongly supports NASA's Space Flight Operations program as it represents this Nation's efforts to continue a strong and viable space program during the 1970's. Our Nation has developed the scientific, technological and operational capability to explore space and it now must utilize this capability to exploit space for direct practical benefits and to expand man's exploration of that environment. The Skylab program will represent the first effort looking towards the development of a fully operable space station in the future. The Space Shuttle represents a concept which will result in a reusable transportation system with characteristics which not only reduce the direct cost of transportation to earth-orbit, but permit accompanying reductions in the costs of payloads. While a reusable transportation system would be cost effective because of the high cost resulting from the loss of expendable launch vehicle systems, this will not represent the primary cost saving. As payloads become more sophisticated they also become more expensive. Much of this expense is caused by the sophistication and redundancy which must be built into the systems and the enormous amount of testing that must be done in order to achieve reliability. With the ability to reach systems in orbit to repair them when necessary or to bring them back to the surface of the earth for repair if required, substantial reductions in the per pound cost of present day payloads can be effected. Furthermore, it is necessary for this Nation to continue to lead in technology if it wishes to maintain a strong and viable economy. The space shuttle transportation system represents a major step in advancing technology over the cumbersome and expensive, expendable launch vehicles in use today.

Your committee does not agree with the position taken by the House of increasing funds in this program by \$72,500,000 for the Space Flight Operations program. NASA has testified that they have no intention of going forward with a second Skylab. Therefore, your committee feels that the additional \$45 million is unnecessary. Furthermore, your committee approves of the step-by-step fashion which NASA has adopted in carrying forward the Shuttle program and has received assurances from NASA that the \$100 million is adequate to support this program during fiscal year 1972. Your committee believes that the \$37,375,000 budgeted for Orbital Systems and Experiments is adequate for fiscal year 1972. It is for these reasons that your committee does not agree with the House addition of \$72,500,000 to the budget request for this program.

#### ADVANCED MISSIONS PROGRAM, \$1,500,000

##### COMMITTEE COMMENT

The House increased by \$8,500,000 the amount requested by NASA for advanced mission studies. Your committee does not subscribe to the position of the House that a substantial increase in this program is necessary at this time. In fact, last year the House cut NASA's request from \$2,500,000 to \$1,000,000 for this program stating that \$1 million was sufficient and would adequately support study requirements for fiscal year 1971. Furthermore, with the termination of Saturn V production and no new launch vehicle production for the next several years, your committee feels that there is no need to substantially increase advanced missions studies beyond those contemplated by NASA and included in its budget request for fiscal year 1972. Your committee therefore does not agree with the position of the House and recommends approval of the budget request of \$1,500,000 for advanced missions.

#### PHYSICS AND ASTRONOMY PROGRAMS, \$110,300,000

##### COMMITTEE COMMENT

Your committee recommends funding the Physics and Astronomy program at \$110,300,000, the amount requested by NASA. In its review of the program, the committee noted the House addition of \$2,000,000 for the sounding rocket project and \$500,000 for balloon support, however, it was believed that adequate funding and flexibility existed within the total program amount recommended to assure that these activities were provided proper financial support by NASA.

#### LUNAR AND PLANETARY EXPLORATION PROGRAM, \$291,500,000

##### COMMITTEE COMMENT

Your committee reduced the Lunar and Planetary Exploration program by \$20 million. This reduction is directed to the Outer Planets Mission request reducing the requested amount of \$30 million to \$10 million.

Your committee denied funds for this project for the following reasons:

1. The high cost of the missions. NASA estimated the cost to be between \$850 million and \$1 billion.
2. The next "grand tour" mission opportunities do not occur until after the year 2150. However, two planet mission opportunities occur more frequently and the nuclear rocket engine, when developed, will open up numerous opportunities to visit the outer planets.

3. The Space Science Board of the National Academy of Sciences in a recent report recommended that the "grand tour" missions be carried out only if NASA's budget for the Office of Space Science and Applications was on the average 50 percent above the current budget for the remainder of this decade. The Board was concerned that to proceed with the "grand tour" missions at lower budget levels would prevent higher priority space missions from being carried out.

It is your committee's view that the plan presented to the committee for the exploration of the outer planets (Jupiter, Saturn, Uranus, Neptune, and Pluto) should be reconsidered in relation to the overall space science program and to the budget resources that might be available to NASA during the 1970's.

#### SPACE APPLICATIONS PROGRAM, \$185,000,000

##### COMMITTEE COMMENT

Your committee recognizes the value of the several pilot earth resources survey aircraft projects, either proposed or underway, as a part of the NASA earth resources survey program. These projects, as well as generating sensor development and other data for the earth resources satellite program, have the capability also for providing broad survey data for the early study of many environmental factors present in a particular area. Your committee believes this program can make substantial contributions to help solve environmental and ecological problems notably to detect and gauge sources of air and water pollution. Accordingly, your committee has added \$2,500,000 to the Space Applications program to support additional aircraft type earth resources survey pilot projects and data analysis in cooperation with appropriate government agencies, industry and universities.

#### LAUNCH VEHICLE PROCUREMENT PROGRAM, \$146,100,000

#### AERONAUTICAL RESEARCH AND TECHNOLOGICAL PROGRAM, \$110,000,000

##### COMMITTEE COMMENT

The committee filed a report with the Senate on January 31, 1968, entitled "Aeronautical Research and Development Policy." (S. Rept. 957, 90th Congress, second sess.). One of the principal recommendations made in that report was that the National Aeronautics and Space Administration and the Department of Transportation should jointly undertake an in-depth study in order to try to determine the level of effort of aeronautical R. & D. that should be maintained.

The study was delayed because of the change of administrations, problems of obtaining adequate staff, and an evolving realization of the magnitude of the effort. Nevertheless, work progressed and the study entitled "Joint DOT-NASA Civil Aviation Research and Development Policy Study Report" (CARD study) was completed and copies delivered to the committee in early May. The comprehensiveness of this joint report and the short interval between its receipt and the considerations of S. 720 by the committee do not allow for a complete assessment here. Your committee, therefore, withholds judgment at this time. It is to be hoped, however, that the report receives wide distribution and careful study by interested parties, and that this will lead to the establishment of a sound policy for aeronautical research and development.

One of the critical areas outlined by the joint study involved mass short haul transportation. More specifically, the development of an experimental short take off and landing (STOL) aircraft was identified as one of the key elements in the evolution of such a short haul transportation system. Consequently, NASA requested \$15 million for the beginning of a project to build two experimental aircraft at a total cost of up to \$100 million over a 4- or 5-year period.

As originally presented in the fiscal year 1972 budget request, it was proposed that NASA (working together mostly with the DOT, but also to some extent with the DOD) supply the direction for the project and provide funds for the Government's contribution. A "joint industry" group was to supply an unspecified amount of funds for "industry's" contribution. Being an outgrowth of the CARD study it was a late addition to the fiscal year 1972 budget and insufficient thought was given to the idea of a "joint venture" prior to its presentation to the Congress; for example, the views of "industry" had not been obtained. Moreover, no such "industry" group exists and there are no existing mechanisms whereby such a "joint venture" could be undertaken. Faced with this reality, NASA assembled an ad hoc group composed of 23 aerospace companies (as well as observers from the DOT and the National Aeronautics and Space Council) called the STOL Joint Venture Working Group. Simply, and unanimously, this group accepted the idea of building two experimental STOL's but rejected as unworkable the "joint venture" approach. Instead, they suggested that the program be approached through normal procurement means. They believed that this competitive approach would permit the commitment of individual company resources and the formation of industry teams as a better means of developing the STOL technology.

NASA, in a letter to the committee dated May 13, 1971, has stated their acceptance of this competitive approach (see p. 989 of Hearings). The same letter also described a shift in the design concept. Under the new plan, the two experimental aircraft will be somewhat smaller, powered by smaller "interim" quieted engines, and be convertible in order to test two or more experimental concepts.

Your committee strongly endorses this research effort to develop the necessary STOL technology for short haul air transportation and, specifically, NASA's effort to build and test two experimental STOL aircraft. The committee believes that, as has been the case with previous NASA research aircraft, NASA has ample authority and responsibility under the National Aeronautics and Space Act of 1958

to conduct aeronautical R. & D. and to proceed with experimental research projects of this nature utilizing normal procurement procedures.

The committee does have a concern as to whether the "interim" quieted engines will offer a satisfactory solution to the problem of noise reduction. The committee strongly urges that, as a matter of overall policy, satisfactory noise reduction be given the top priority in development of the experimental STOL aircraft.

In view of the somewhat uncertain circumstances surrounding the institutional and funding aspects of this project, however, it is suggested that NASA consult with the committee as appropriate before determining the final contractual arrangements.

The House added \$24.5 million to the Aeronautical Research and Technology budget spread across a number of subcategories. The justification, received by the committee from NASA to support this increase, states that the ". . . additions would be used to accelerate both in-house and contract research and technology . . ." (see p. 858 of the Hearings). Your committee does not concur with the House action.

SPACE RESEARCH AND TECHNOLOGY PROGRAM, \$75,105,000

NUCLEAR POWER AND PROPULSION PROGRAM, \$70,720,000

#### COMMITTEE COMMENT

The Nuclear Engine for Rocket Vehicle Applications (NERVA) was begun as a joint Air Force/AEC project in 1955 and the AF responsibility transferred to NASA in 1958. The interest in developing a nuclear rocket engine is based on one simple fact: it would be twice as efficient as any known mixture of chemical fuels for space propulsion.

The technical problems in developing such an engine were formidable but through the years, they have been solved one by one. All technical goals have been met. Since its inception, the program has been supported by every President, every NASA Administrator, every Commissioner of the AEC, and every Congress. In September 1969, the President's Space Task Group identified a reusable nuclear stage as one of the three key elements of a space transportation system. More than \$1.4 billion has been invested on what NASA describes to the committee as an "extremely successful" program and "that it is absolutely essential to continue moving forward in developing this capability . . ." (p. 759-760 of the Hearings).

In view of the above facts, it would be easy to assume that the fiscal year 1972 budget request would be commensurate with a rational and steady development towards an operational date of the late 1970's or early 1980's. Unfortunately, this surmise would be incorrect. The budget request for NERVA, Nuclear Propulsion Research and Technology, and operation of the Nuclear Rocket Development Station (NRDS) was only \$15 million, a sharp reduction from the minimal budget of fiscal year 1971.

Furthermore, in anticipation of the fiscal year 1972 reduction, NASA initiated immediately lay-off procedures for large numbers of the skilled scientists and engineers, many of whom had been with the program for 10 years or more.

As a consequence of these actions, the committee held hearings on February 23 and 24, on the "Nuclear Rocket Engine Development Program" in order to establish a clear record on the history, status, and future prospects for this promising program. Testimony or statements were taken from seven witnesses in addition to four Senators and five Congressmen. Except for the seemingly contradictory testimony of the Acting Administrator of NASA, who supported the program but recommended its severe reduction, the evidence was overwhelmingly favorable to the continuation of the program at viable levels. It was also disclosed that NASA had originally determined that the funding required to permit program impetus was \$48 million for NERVA, \$8 million for Nuclear Propulsion Research and Technology, and \$2 million for NRDS operations for a total of \$58 million, and had originally recommended this amount for fiscal year 1972.

Your committee would like to point out that even this latter figure is well below peak expenditures of a few years ago, only somewhat more than expenditures of the last two fiscal years, and does not provide for initiation of the development of a nuclear flight stage. However, the \$58 million provides for a realistic engine development program in view of the fact that the operational stage will probably be needed by the end of the decade.

Your committee strongly recommends, therefore, that the \$58 million be authorized as the minimum for this important program. Furthermore, because of past instances of NASA transferring authorized monies away from this program into other programs, your committee recommends language which would prohibit these funds from being transferred to other programs if unspent for the purposes authorized.

The House, utilizing very similar reasoning, approved an increase of \$54.9 million for nuclear propulsion. Because of the previously cited testimony, however, your committee believes that the minimum figure should be \$58 million.

TRACKING AND DATA ACQUISITION PROGRAM, \$264,000,000

TECHNOLOGY UTILIZATION PROGRAM, \$4,000,000

#### COMMITTEE COMMENT

Your committee recommends funding this program at the \$4,000,000 level proposed in the NASA budget request. This amount will maintain the program at the same funding level as for fiscal year 1971. While the committee concurs with the House in the importance of this activity, it believed that positive results could continue to be realized without the \$2,000,000 increase approved by the House. Accordingly, your committee did not concur with the House addition.

## CONSTRUCTION OF FACILITIES

The facility items presented herein and the estimated cost thereof, totaling \$56,300,000, are identical to the fiscal year 1972 budget request. The committee, however, has modified the manner in which facility items are presented in the bill as explained on page 89 in this report. The House Committee added \$2,330,000 to the Construction of Facilities request to provide for expansion of the Visitors Information Center at the Kennedy Space Center. This fiscal year 1972 funding addition is proposed to support Phase One of a three-phase development extending the present facilities into a Space Information and Education Center with an estimated total cost of \$10 million. Your committee did not concur with the House addition.

<i>Summary</i>	
Item:	Amount
1. Modernization of the 40 x 80-foot wind tunnel, Ames Research Center.....	\$6,500,000
2. Centaur modifications to Titan III launch area, John F. Kennedy Space Center.....	10,700,000
3. Alterations to launch complex 17, John F. Kennedy Space Center.....	4,500,000
4. Space shuttle facilities, as follows:	
Main engine sea level test stands (2), Mississippi Test Facility.....	11,000,000
Main engine altitude test facility, Air Force Arnold Engineering Development Center.....	2,000,000
Auxiliary propulsion test facilities, undesignated location.....	1,500,000
Thermal protection system development facilities:	
Ames Research Center.....	3,000,000
Langley Research Center.....	500,000
Manned Spacecraft Center.....	1,200,000
Undesignated location.....	800,000
5. Power plant replacements:	
Golstone, California.....	370,000
Santiago, Chile.....	230,000
6. ATS ground station: Western Europe.....	500,000
7. Facility rehabilitations and modifications, various locations.....	10,000,000
8. Facility planning and design.....	3,500,000
Total.....	56,300,000

## COMMITTEE COMMENT

The committee has had under examination for some time, as evidenced by its report comments in previous years, the procedures followed by NASA in planning and budgeting, justifying, acquiring, and accounting for new facilities and equipment and/or the expansion or modification of existing facilities. This process, in the committee's view, represents the establishment of functions or the acquisition, expansion or modification of agency capabilities and, therefore, is of great interest to and a significant responsibility of the Congress. The committee, in its examination, has reviewed the published procedures adopted by the agency, has noted the very definite deviations from these procedures in recent years and has considered the merits of the diverse approaches to facility and/or capability acquisition. The committee has had the benefit of formal reviews of selected facility activities by the General Accounting Office and has requested additional reviews on its own initiative. In addition, the committee in its report on the fiscal year 1971 authorization request asked NASA to undertake a comprehensive study of the entire facilities acquisition

process. This study, in the committee's judgment, was not conducted with sufficient scope and in sufficient depth as to be fully responsive to the committee's request and, therefore, did not present acceptable solutions to the problems which have been identified.

The committee has not, as yet, found any inherent weaknesses in the NASA policies and procedures which are set forth in NASA Handbook 7330.1, issued by the Administrator of NASA on July 1, 1966, and has not been persuaded by any information furnished by NASA that this directive should be discarded. In fact, the committee has been unable to determine the reasons why this published directive has not been followed in recent years, particularly since the committee was given no indication that such procedures were not still in effect and consequently it assumed they were being followed in the facility acquisition budget request and execution processes. These circumstances have resulted in the initiation of facility projects that have not, in the committee's judgment, included provision for all elements essential to the proper assessment of the project's function and cost, and resulted in the diversion of facility authorization to provide a capability other than that for which the facility was authorized. There have been instances also wherein minor construction funds (or other appropriated funds through agency interpretation) have been utilized in annual increments to acquire new facilities or expand or modify existing facilities, thereby acquiring new capabilities which ordinarily would have required specific authorization.

The committee does not understand why NASA has not given this entire matter prompt and detailed attention and why there has been an apparent reluctance to do so. This is considered to be a principal responsibility of agency management—one that the committee expects should be executed with thoroughness and dispatch. Unfortunately this has not been in evidence and, in addition, the committee continues to find additional instances which testify to the need for a major overhaul of present practices.

As already mentioned, there are, in the committee's view, several potential areas involved and which vary in complexity and impact. One of the more obvious situations requiring attention, although not necessarily the most important, is that involving the utilization of an unfunded authority for an office building to construct and equip a laboratory in a new and different program area. This action is completely unsupported and unacceptable, and more so when the committee reflects on certain statements made by NASA officials with respect to interpretations of the agency's authority to take such action. Therefore, your committee has modified section 1(b) of the bill to specify the facility project authorized, and the estimated cost thereof, which limits it to its stated function and justified need, rather than, as in years past, specifying a sum of money for the various NASA locations without designating the facilities authorized. Your committee has determined that each individual item in the fiscal year 1972 request was justified and the cost estimates reasonable and, therefore, no adjustment has been made in the cost of an individual item or in the total request for Construction of Facilities (C of F).

The committee is continuing its consideration of legislative changes directed to the other deficiencies noted with the very definite view that such changes probably are necessary also; however, in deference to a most recent communication from the Deputy Administrator of

NASA advising of the appointment of a top level committee to review this matter within 60 days and emphasizing that further changes in the facility process are most efficiently and effectively made in connection with the budget preparation for the next fiscal year, the committee withheld further legislative action at this time. The committee expects that NASA will expeditiously conduct this review, will consult in detail with the committee for its views and that the fiscal year 1973 budget request will be submitted in a form agreeable to the committee. Nevertheless, the committee believes it is appropriate to state its tentative conclusions on these matters here. In so doing, it is the intent of the committee to recognize NASA's role as a research and development agency and, therefore, requires certain flexibility in its facilities program in order to support new developments or urgent program changes which may arise subsequent to the annual authorization review. Conversely, however, the committee expects that the acquired knowledge in space technology, combined with the continued provision of facility planning and design funding and the phased project planning approach, should enable the agency to present reasonably accurate and complete forecasts of facility requirements and the cost thereof, thereby limiting the use of reprogramming authorities which the committee continues to support as an essential provision in the annual authorization act.

The committee is of the firm belief that a facility request should be presented as a complete package, including collateral equipment, so that the Congress shall have a full understanding of the capability, and the cost thereof, which the agency is requesting and may subsequently be authorized to acquire. The committee's position on this particular matter is appropriately expressed in NASA Handbook 7330.1, chapter 3, paragraph 302, amplified by the definition of the term "collateral equipment" as stated in Appendix A of the Handbook. The appropriate references are quoted as follows:

#### 302 "TURN-KEY" PROJECT

Each facility project shall be planned and managed (including budgeting, project approval, and funding) by NASA as a "turn-key" project. Consequently, each facility project presented to approval authority within NASA and to external review agencies for authorization and appropriation shall include, as a part of the cost estimate therefor, the estimated cost of any collateral equipment required, and all other reasonably identifiable elements of cost involved in the attainment of an operable facility.

5. **COLLATERAL EQUIPMENT** is all that non-integral, severable equipment which is acquired for use, or used, in a facility. "Collateral equipment" is not required to make the structure or building useful and operable as a structure or building, but imparts to the facility its particular character at the time, e.g., furniture in an office building, laboratory equipment in a laboratory building, test equipment in a test stand, machine tools in a manufacturing facility, electronic computers in a computer facility, etc. "Collateral equipment" is placed in use in a facility but is not permanently attached thereto except for operating purposes and is removable without significant damage to the real property.

In this connection the committee recognizes that there are items of equipment that either fly with flight hardware or are specifically developed or assembled into a system to test or check out flight hardware and which have in their present form little or no value for other purposes. It is not the intent that such items be included in a facility project. It is, however, intended that every item of equipment that can be reasonably identified or projected to make a building or facility serve

its stated function shall be included in the request package. A case in point is the engineering building, Project 7245, now under construction at the Manned Spacecraft Center wherein some \$14 million of various items of equipment is being included in a \$2.6 million facility to make it an operating laboratory. The record is clear that the agency was able to identify this equipment in this instance and the committee expects that in the future the agency shall be able to identify and include within reasonable limits the equipment which, together with land and building costs, makes up the total package which is being requested for authorization. This approach also enhances management control during the execution phase of an authorized project.

Another major concern is the several categories of facility rehabilitations, alterations, additions, modifications, and minor construction, the job content of which is relatively indistinguishable between each other, and, therefore, the committee believes that a persuasive case does not exist for funding these types of projects in different appropriations. The committee's review of budget justifications and reports submitted by NASA indicates that the projects accomplished or proposed for accomplishment under these categories are essentially identical in nature as between those funded under Research and Development (R. & D.), those funded under Research and Program Management (R. & P. M.), and those funded under the Construction of Facilities subcategory of rehabilitations and modifications. For example, testimony indicated a basic inconsistency between funding institutional type facilities at the Jet Propulsion Laboratory from R. & D. funds and funding of similar institutional type facilities from R. & P. M. funds at Wallops Station. There are other examples and it is the committee's judgment that a similar situation exists between these minor construction projects and those projects proposed for accomplishment as facility rehabilitations and modifications. The committee is convinced that this situation represents an unnecessary duplication, overlapping of authorities, and a loss of management control which should be eliminated. Therefore, the committee is considering legislative changes that would require that all such work should be budgeted for and accomplished under the C. of F. appropriation with authority, provided in past years, to perform such work under R. & D. and R. & P. M. deleted. In making this recommendation, the committee expects that the concept of including collateral equipment in these projects will be retained which is identical to the provisions of the current authorization bill and identical to that recommended in the discussion of C. of F. line items above.

In expressing its position with respect to the consolidation of facility rehabilitation, modification and minor construction projects, the committee recognizes the necessity for flexibility within the NASA organization to have funds available to support these varying smaller projects which are not always fully identifiable in advance and which can be administered appropriately by the agency on a priority-of-need basis during the fiscal year. But, in endorsing this flexibility and recommending the establishment of a general purpose fund for facility rehabilitation, modifications and minor construction, the committee believes there is a positive need for a reasonable limitation and control on the magnitude of such projects. This presents a question of workable definition and the committee has under consideration the establishment of a limitation of \$500,000 on such projects with a sub-

## COMMITTEE COMMENT

sidary limitation of \$100,000 on any new building or on any addition to an existing building proposed in such project. It is the judgment of the committee that if a project in excess of this limitation becomes urgently needed during the course of the ensuing fiscal year, sufficient reprogramming authority should exist to establish with appropriate advice to the Congress a new line item to accommodate a justified need. All other projects of this nature in excess of the limitation, with the advance planning and study funds available to the agency, should be subject to reasonable identification and presentation in the annual authorization request. Finally, the committee expects that any such project that will accommodate or establish a new function or capability at a NASA installation normally will be included and identified as a separate line item in the annual authorization request.

The committee, during its review of the facilities process, noted that the House Committee on Science and Astronautics has requested an annual report on minor construction and additions with the initial report covering fiscal year 1970 projects. Your committee believes that in conjunction with the suggested flexibility discussed above, particularly recognition that all such projects are not identified in advance, a report should be furnished both authorizing committees of the Congress showing each project funded as a rehabilitation, modification, or as minor construction during the fiscal year. This report should be submitted six months after the close of the fiscal year for which the funds were authorized.

## RESEARCH AND PROGRAM MANAGEMENT

## Summary

	Budget request	House action	Senate committee action
Personnel compensation .....	\$484,074,000		
Personnel benefits .....	41,440,000		
Benefits for former personnel .....	2,036,000		
Travel and transportation of persons .....	18,961,000		
Transportation of things .....	3,651,000		
Rent, communications, and utilities .....	41,043,000		
Printing and reproduction .....	5,173,000		
Other services .....	85,629,000		
Supplies and materials .....	12,495,000		
Equipment .....	1,776,000		
Land and structures .....	986,000		
Grants, subsidies, and contributions .....	51,000		
Insurance claims and indemnities .....	35,000		
Total .....	697,350,000	\$706,850,000	\$681,350,000

While your committee recognized that the fiscal year 1972 budget request incorporated reductions in the total number of NASA permanent positions, it believed that further reductions were warranted. Accordingly, your committee made a reduction of \$16,000,000 in the request for Research and Program Management (R. & P. M.) funds, \$13,000,000 of which was assessed against personnel and related costs (as defined in the budget submission), with \$3,000,000 to be applied against the other expense categories within this appropriation.

Concurrently with these reductions, your committee has also inserted in section 1(c) of the bill a provision, initially adopted for fiscal year 1971, limiting the amount available for personnel and related costs to \$517,916,000. In summary, therefore, your committee recommends a total R. & P. M. budget of \$681,350,000, of which \$517,916,000 is for personnel and related costs and \$163,434,000 is for other R. & P. expenses. The recommendations are based upon the fiscal year 1972 budget request as originally submitted and the amounts do not take into account the additional request of \$29,285,000 to cover those increased fiscal year 1972 salary costs which will be incurred in fiscal year 1972 pursuant to the provisions of the Federal Pay Comparability Act of 1970 (P.L. 91-656; 80 Stat. 1946). Any funds appropriated for these increased salary costs would be in addition to the \$517,916,000 authorized in the bill for personnel and related costs.

The House increased the NASA request by \$9,500,000, with \$4,500,000 to be used to maintain current personnel levels in the NASA centers reporting to the Office of Advanced Research and Technology, with \$1,000,000 designated to expand NASA's summer employment program, and with \$4,000,000 to strengthen NASA public information activities. Your committee did not concur with the addition believing that its recommended funding level provides adequate resources within which NASA management can effect the necessary emphasis and proper balance to meet its responsibilities in aeronautics and space.

## COST AND BUDGET DATA

This bill, H.R. 7109, as reported by your committee would authorize appropriations for the National Aeronautics and Space Administration for fiscal year 1972 in the amount of \$3,280,850,000. This is \$9,500,000 more than the administration's request of \$3,271,350,000. The differences are explained in this report.

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

Fiscal year:	NASA estimate (in billions)	Committee estimate (in billions)
1973.....	\$3.70	\$3.65
1974.....	3.95	3.82
1975.....	3.75	3.61
1976.....	3.71	3.57
1977.....	3.68	3.55

The above estimates do not provide for the initiation of any new programs for future years nor for program augmentations that may be recommended in future years nor do they include any provisions for administrative adjustments that may be required. The substantial differences between the NASA estimates and the committee estimates are due to the \$20 million reduction the committee made in the Lunar and Planetary Exploration program, the \$16 million reduction made in Research and Program Management and the addition for the NERVA engine development and related nuclear propulsion activities.

#### LEGISLATIVE CHANGES

Your committee has recommended several legislative amendments to the NASA fiscal year 1972 request.

One amendment would specify that \$58 million of the \$70,720,000 authorized for the Nuclear Power and Propulsion program in section 1(a) shall be used only for NERVA engine development and related nuclear propulsion activities. (See comment under Nuclear Power and Propulsion.)

Another amendment would modify section 1(b) "Construction of Facilities" to specify the facility authorized and the estimated cost thereof, which relates it to its stated function and justified need rather than, as in years past, specifying a sum of money for undesignated facilities at the various NASA locations. (See comment under Construction of Facilities.)

Another amendment would establish a ceiling of \$517,916,000 which would be available for personnel and related costs. (See comment under Research and Program Management.) As a result of this ceiling, your committee has added a subsection to section 4 which would specify that nothing in such section shall be construed to authorize the expenditure of amounts for personnel and related costs in excess of the ceiling placed on such costs.

Two final amendments were made to sections 2 and 3 in order to conform the provisions of these sections to the modifications to section 1(b) made by your committee.

#### CHANGES IN EXISTING LAW

In compliance with subsection (4) of rule XXIX of the Standing Rules of the Senate, changes in existing law made by the bill, H.R. 7109, as reported, are shown as follows:

**EXISTING LAW**  
National Aeronautics and Space Act of 1958, Public Law 85-568 (42 U.S.C. 2476)  
Sec. 206. (a) The Administration shall submit to the President for transmittal to the Congress, semiannually and at such times as it deems desirable, a report of its activities and accomplishments.

**THE BILL**  
Sec. 206. Subsection (a) is hereby repealed. Subsections (b), (c), and (d) are renumbered as subsections (a), (b), and (c), respectively.

#### 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 \$3,280,850,000, as follows: (a) for "Research and development," a total of 12 program line items aggregating the sum of \$2,543,200,000; (b) for "Construction of facilities," a total of 7 facility items, together with one for facility planning and design, aggregating the sum of \$56,300,000; and (c) for "Research and program management," \$681,350,000, of which not to exceed \$517,916,000 shall be available for personnel and related costs.

*Subsection 1(d)* would authorize the use of appropriations for "Research and development" for: (1) items of a capital nature (other than the acquisition of land) required 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 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 no funds appropriated pursuant to subsection 1(c) for maintenance, repair, alteration and minor construction may be used to construct any new facility the estimated cost of which, including collateral equipment, exceeds \$100,000.

*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 (7).

#### *Section 3*

Section 3 would provide that not more than one-half of 1 per cent 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 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

## ADDITIONAL VIEWS OF MR. GAMBRELL

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*

This section would repeal subsection 206(a) of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2476), and renumber subsequent subsections accordingly. Such repeal would eliminate the requirement for NASA to "submit to the President for transmittal to the Congress, semiannually and at such other times as it deems desirable, a report of its activities and accomplishments." Thus, this section would eliminate the semiannual report to the Congress by NASA. However, it would not affect the annual report by the President to the Congress concerning the accomplishments of all agencies of the United States (including NASA) in the field of aeronautics and space activities that is required by the present subsection 206(b).

*Section 8*

Section 8 would provide that the Act may be cited as the "National Aeronautics and Space Administration Authorization Act, 1972."

The Space program which this country has pursued, particularly since the early 1960's has been one of outstanding success, both in terms of scientific and technological advances, and as a source of pride in achievement for our people. However, in recent years, it has been subjected to substantial reduction in authorization levels, as a result of budget consciousness on the part of the Congress and the people of this country.

Neither those engaged in the space program nor those who believe in maintaining this country's leadership in various fields of endeavor, should interpret these expense reductions, as representing a lessening of our national determination to lead and achieve, or as a criticism of themselves or the program itself.

What it does represent is a growing awareness that, having spent upwards of \$100 billion on the war in Southeast Asia, the country cannot afford to give as much priority to programs of this type, as otherwise might have been done. This, in my judgment, is a sound approach toward dealing with many of our country's problems. A healthy economy is vital to all forms of leadership and achievement, and some system of priorities must be introduced if we are to live within our means.

I am in favor of a space program which would shift the priorities from outer space exploration to earth science research and application. The benefits from the earth science programs greatly overshadow the knowledge to be gained by outerplanetary expeditions. NASA officials have testified that there will be other opportunities to explore Mars and the outer planets during the next decades. On the other hand, there is an undeniable pressing need for additional meteorological and atmospheric research and earth resource surveys. In addition, noise pollution and airway and airport congestion have reached a critical stage and programs in this area must be pursued.

In the space authorization bill presented to this committee, there are included two proposed programs which, when commenced and carried out will result in expenditures of nearly a billion dollars each. These are the Viking and Outer Planets Missions. In my opinion, it would be a mistake to commit ourselves to these programs in fiscal year 1972, even though a delayed schedule may result in higher cost in the future. Without abandoning them, I think that entry upon these projects should be deferred.

I am also troubled by and reserve judgment in regard to the funding of two proposed moon exploration flights under the Apollo program at a cost of \$612 million. Circumstances have been suggested which might justify expenditure on this scale for such flights. However, it would be with regret that I would place such expenditures at a higher priority than many neglected programs of earth science exploration and research.

I would also hesitate to approve such an authorization, if we did not at the same time approve the additional funds to improve the visitors' information center at the John F. Kennedy Space Center. We have an enormous store of space exploration information which we could, at a very small comparative cost, share with millions of our citizens through the extension of the Visitors' Information Center.

DAVID M. GAMBRELL.

14

NASA AUTHORIZATION OF APPROPRIATIONS FOR  
 FISCAL YEAR 1972

JULY 21, 1971.—Ordered to be printed

Mr. MILLER of California, from the committee of conference,  
 submitted the following

CONFERENCE REPORT

[To accompany H.R. 7109]

The committee of conference on the disagreeing votes of the two Houses on the amendment of the Senate to the bill (H.R. 7109) 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 met, after full and free conference, have agreed to recommend and do recommend to their respective Houses as follows:

That the House recede from its disagreement to the amendment of the Senate and agree to the same with an amendment as follows:

In lieu of the matter proposed to be inserted by the Senate amendment insert the following:

*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, \$612,200,000;
- (2) Space flight operations, \$702,775,000;
- (3) Advanced missions, \$5,500,000;
- (4) Physics and astronomy, \$112,800,000;
- (5) Lunar and planetary exploration, \$301,500,000;
- (6) Space applications, \$185,000,000;
- (7) Launch vehicle procurement, \$146,100,000;
- (8) Aeronautical research and technology, \$122,500,000;
- (9) Space research and technology, \$75,105,000;
- (10) Nuclear power and propulsion, \$70,720,000 of which \$58,000,000 is to be used only for NERVA engine development and related nuclear propulsion activities;
- (11) Tracking and data acquisition, \$264,000,000;
- (12) Technology utilization, \$5,000,000.

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

(1) Modernization of the 40 x 80-foot Wind Tunnel, Ames Research Center, \$6,500,000;

(2) Centaur Modifications to Titan III launch area, John F. Kennedy Space Center, \$10,700,000;

(3) Alterations to Launch Complex 17, John F. Kennedy Space Center, \$4,500,000;

(4) Space Shuttle Facilities, as follows:

Main engine sea level test stands (2), Mississippi Test Facility, \$11,000,000,

Main engine altitude test facility, Air Force Arnold Engineering Development Center, \$2,000,000,

Auxiliary propulsion test facilities, undesignated location, \$1,500,000.

Thermal protection system development facilities, Ames Research Center, \$3,000,000, Langley Research Center, \$500,000,

Manned Spacecraft Center, \$1,200,000, Undesignated location, \$800,000;

(5) Power Plant Replacements, Goldstone, Calif., \$370,000 and Santiago, Chile, \$230,000;

(6) AST Ground Station, Western Europe, \$500,000;

(7) Facility rehabilitations and modifications, various locations, \$10,000,000;

(8) Expansion of the Visitors Information Center, John F. Kennedy Space Center, \$2,100,000;

(9) Facility Planning and Design, \$3,500,000.

(c) For "Research and program management," \$693,350,000, of which not to exceed \$529,916,000 to be available for personnel and related costs.

(d) 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 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 for 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.

(g) No part of the funds appropriated pursuant to subsection 1(c) for maintenance, repairs, alterations, and minor construction shall be used for the construction of any new facility the estimated cost of which, including collateral equipment, exceeds \$100,000.

(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 the total of any of the amounts prescribed by paragraphs (1), (2), (3), (4), (5), (6), (7), and (8) of subsection 1(b) may, in the discretion of the Administrator of the National Aeronautics and Space Administration, be varied upward of 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 (9) 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 aero-

nautical 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) 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 attend-

ing, 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 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 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.

(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.

(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 expression of individual views or opinions.

SEC. 7. Section 206 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2476), is amended as follows: (1) subsection (a) is hereby repealed, and (2) subsections (b), (c), and (d) are renumbered as subsections (a), (b), and (c), respectively.

SEC. 8. This Act may be cited as the "National Aeronautics and Space Administration Authorization Act, 1972".

And the Senate agree to the same.

GEORGE P. MILLER,  
OLIN E. TEAGUE,  
JOSEPH KARTH,  
KEN HECHLER,  
JAMES G. FULTON,  
CHARLES A. MOSHER,  
ALPHONZO BELL,  
*Managers on the Part of the House.*

CLINTON P. ANDERSON,  
STUART SYMINGTON,  
HOWARD W. CANNON,  
CARL T. CURTIS,  
MARGARET CHASE SMITH,  
*Managers on the Part of the Senate.*

JOINT EXPLANATORY STATEMENT OF THE  
COMMITTEE OF CONFERENCE

The managers on the part of the House and the Senate at the conference on the disagreeing votes of the two Houses on the amendment of the Senate to the bill (H.R. 7109) to authorize appropriations to the National Aeronautics and Space Administration for research and development, construction of facilities, and research and program management submit the following joint statement to the House and the Senate in explanation of the effect of the action agreed upon by the managers and recommended in the accompanying conference report:

The NASA request for Fiscal Year 1972 totaled \$3,271,350,000. The House authorized \$3,433,080,000 and the Senate amendment authorized \$3,280,850,000. The Committee of Conference agrees to a total authorization of \$3,354,950,000.

The points in disagreement and the conference resolution of them are as follows:

1. The House authorized \$745,275,000 for Space Flight Operations, which is an increase of \$72,500,000 over the NASA request of \$672,775,000. This would allow for \$15 million for Skylab rescue capability, \$30 million for studies of a second Skylab flight or Saturn IB applications flights, \$25 million for additional shuttle development work and \$2.5 million for additional shuttle experiment definition.

The Senate amendment authorized \$672,775,000, which is the exact amount of the NASA request.

The Conference substitutes \$702,775,000 for Space Flight Operations, which is \$30 million more than the NASA request; \$15 million is for the Skylab rescue capability and \$15 million is for the space shuttle.

2. The House authorized \$10 million for the Advanced Missions program, which is \$8,500,000 more than the NASA request of \$1,500,000. These funds are for studies for information retrieval, equipment retrieval, payload handling, large equipment erection and handling, orbit analyses, and lunar resource and base utilization.

The Senate amendment authorized \$1,500,000, which is the exact amount of the NASA request.

The Conference substitute authorizes \$5,500,000 for Advanced Missions, which is \$4 million more than the NASA request.

3. NASA requested \$110,300,000 for the Physics and Astronomy Program. The House authorized \$112,800,000, an increase of \$2,500,000 for additional support of the scientific effort which utilizes sounding rockets and balloons.

The Senate approved the amount of the NASA request.

The Conference substitute adopts the House provision.

4. NASA requested \$311,500,000 for the Lunar and Planetary Exploration Program, which included \$30,000,000 for the Outer Planets

Missions using Thermoelectric Outer Planets Spacecraft (TOPS) for the Grand Tour missions in the latter half of the decade of the 1970s.

The House approved the full amount of the NASA request.

The Senate approved only \$10,000,000 for the Outer Planets Missions and therefore authorized \$291,500,000 for the Lunar and Planetary Exploration Program, a reduction of \$20,000,000.

The Conference substitute authorizes \$301,500,000 for the Lunar and Planetary Exploration Program, including \$20,000,000 to support initiation of the Grand Tour missions.

The Conference agrees that NASA should examine the TOPS concept with the view to designing a less sophisticated, less expensive spacecraft for carrying out the Grand Tour missions in the latter half of the decade of the 1970s, and to consider subsequent opportunities to explore the outer planets during the 1980s and 1990s using vehicles incorporating the NERVA engine.

5. NASA requested \$182,500,000 for the Space Applications Program.

The House approved the full amount of the request.

The Senate authorized \$185,000,000, an increase of \$2,500,000 to support additional aircraft-type Earth Resources Survey pilot projects and data analysis in cooperation with appropriate government agencies, industry, and universities.

The Conference substitute adopts the Senate provision.

6. The House authorized \$134,500,000 for Aeronautical Research and Technology, which is an increase of \$24,500,000 over the NASA request of \$110,000,000. The House increase is designed to deal with a number of serious problems in aviation including noise abatement, safety, the need for a short take-off and landing aircraft system, and the need for new, younger individuals in aeronautics research and development. A proviso was included that none of the funds in this area would be used to finance research with respect to construction of airports on lakes or their tributaries.

The Senate authorized \$110,000,000 because it did not agree with the necessity for the House increases; however, it does support a strong national aeronautics research and development program.

The Conference substitute authorized \$122,500,000. Flexibility is granted to NASA for the allocation of the \$12,500,000 increase; however, the allocation should be made in keeping with the serious nature of problems identified by both the House and Senate dealing with noise abatement, congestion, safety and the need to attract new, younger scientists and engineers into aeronautical research and development. The restrictive language on airport research was not included.

7. NASA requested \$27,720,000 for the Nuclear Power and Propulsion program, of which \$15 million was for nuclear propulsion.

The House authorized a total of \$67,620,000, adding \$39,900,000 for nuclear propulsion, making a total for nuclear propulsion of \$54,900,000.

The Senate authorized \$70,720,000 for the Nuclear Power and Propulsion program, and added language to the Act which provides that \$58 million of the \$70,720,000 is to be used only for NERVA engine development and related nuclear propulsion activities.

The Conference substitute adopts the Senate provisions.

8. The House authorized \$6,000,000 for the Technology Utilization program, which is \$2,000,000 more than the NASA request. The increase was designed to allow for increased effort across a number of areas, each of which is intended to enhance and increase the transfer of NASA's advanced technology into the public domain.

The Senate authorized \$4,000,000, which is the same amount as the NASA request, while at the same time agreeing with the House that this is an important activity. The Senate would maintain the program at the same funding level as for FY 1971.

The Conference substitute authorizes \$5,000,000 for a number of the purposes identified by the House. Flexibility is granted to NASA but emphasis should be maintained on transferring technology to attack urgent national problems.

9. The House approved \$58,630,000 for construction of facilities, an increase of \$2,330,000 over the NASA request of \$56,300,000. This increase provided for the construction of a Space Information and Education Center at John F. Kennedy Space Center, Cape Kennedy, Florida.

The Senate approved the NASA request. Additionally, the Senate adopted a modification to this section (Sec. 1b) to specify the facility construction project authorized, and the estimated cost thereof, which limits it to its stated function and justified need, rather than, as in past years, specifying a sum of money for various NASA locations without designating the facilities authorized.

The Conference substitute approves the expansion of the existing Visitors Information Center at the John F. Kennedy Space Center, Florida, to accommodate the anticipated visitor loads at the Kennedy Center. The total amount approved for construction of facilities is \$58,400,000, including \$2,100,000 for the expansion of the Visitors Information Center. The Conference also adopts the Senate legislative language for Section 1(b) of the Act specifying the construction of facility projects.

10. The House increased the NASA request of \$697,350,000 for Research and Program Management by \$9,500,000 for a total authorization of \$706,850,000.

The Senate made a reduction of \$16,000,000 for an authorization of \$681,350,000. Additionally, language was included in the bill stipulating a limitation of not more than \$517,916,000 for personnel and related costs.

The Conference substitute approves a total amount of \$693,350,000 for Research and Program Management and includes language stipulating that not more than \$529,916,000 can be utilized for personnel and related costs.

11. The Committee of Conference agrees to a change in Section 2 to conform with the changes resulting from the Conference substitute for Section 1(b).

12. The Senate modified Section 4 of the bill with an addition which restricts the amount authorized by the bill for personnel and related costs. Also any reprogramming for increased expenditures for personnel and related costs shall be subject to the approval of the Congress in accordance with the reprogramming procedure specified in that section.

The House had no provision on this subject.  
The Conference substitute adopts the Senate modification.

GEORGE P. MILLER,  
OLIN E. TEAGUE,  
JOSEPH KARTH,  
KEN HECHLER,  
JAMES G. FULTON,  
CHARLES A. MOSHER,  
ALPHONZO BELL,

*Managers on the Part of the House.*

CLINTON P. ANDERSON,  
STUART SYMINGTON,  
HOWARD W. CANNON,  
CARL T. CURTIS,  
MARGARET CHASE SMITH,

*Managers on the Part of the Senate.*

○



**An Act**

85 STAT. 174

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, \$612,200,000;
  - (2) Space flight operations, \$702,775,000;
  - (3) Advanced missions \$5,500,000;
  - (4) Physics and astronomy, \$112,800,000;
  - (5) Lunar and planetary exploration, \$301,500,000;
  - (6) Space applications, \$185,000,000;
  - (7) Launch vehicle procurement, \$146,100,000;
  - (8) Aeronautical research and technology, \$122,500,000;
  - (9) Space research and technology, \$75,105,000;
  - (10) Nuclear power and propulsion, \$70,720,000 of which \$58,000,000 is to be used only for NERVA engine development and related nuclear propulsion activities;
  - (11) Tracking and data acquisition, \$264,000,000;
  - (12) Technology utilization, \$5,000,000.
- (b) For "Construction of facilities," including land acquisitions, as follows:
- (1) Modernization of the 40 x 80-foot Wind Tunnel, Ames Research Center, \$6,500,000;
  - (2) Centaur Modifications to Titan III launch area, John F. Kennedy Space Center, \$10,700,000;
  - (3) Alterations to Launch Complex 17, John F. Kennedy Space Center, \$4,500,000;
  - (4) Space Shuttle Facilities, as follows:
    - Main engine sea level test stands (2), Mississippi Test Facility, \$11,000,000.
    - Main engine altitude test facility, Air Force Arnold Engineering Development Center, \$2,000,000.
    - Auxiliary propulsion test facilities, undesignated location, \$1,500,000.
    - Thermal protection system development facilities, Ames Research Center, \$3,000,000, Langley Research Center, \$500,000, Manned Spacecraft Center, \$1,200,000, Undesignated location, \$800,000;
  - (5) Power Plant Replacements, Goldstone, Calif., \$370,000 and Santiago, Chile, \$230,000;
  - (6) ANT Ground Station, Western Europe, \$500,000;
  - (7) Facility rehabilitations and modifications, various locations, \$10,000,000;
  - (8) Expansion of the Visitors Information Center, John F. Kennedy Space Center, \$2,100,000;
  - (9) Facility Planning and Design, \$3,500,000.
- (c) For "Research and program management," \$693,350,000, of which not to exceed \$529,916,000 to be available for personnel and related costs.
- (d) 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 for the performance of research and development contracts, and (2) for grants to nonprofit institutions of higher

National Aeronautics and Space Administration Authorization Act, 1972. Research and development.

Construction of facilities.

Research and program management.

Program specifications.

85 STAT. 175

Notice to Congress.

Funds, limitation.

Grants, prohibition.

Report to Administrator.

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 for 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.

(g) No part of the funds appropriated pursuant to subsection 1(c) for maintenance, repairs, alterations, and minor construction shall be used for the construction of any new facility the estimated cost of which, including collateral equipment, exceeds \$100,000.

(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 the total of any of the amounts prescribed by paragraphs (1), (2), (3), (4), (5), (6), (7), and (8) of subsection 1(b) may, in the discretion of the Administrator of the National Aeronautics and Space Administration, be varied upward of 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.

August 6, 1971

- 3 -

Pub. Law 92-68

85 STAT. 176

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 (9) 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) 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.

Transfer of funds.

Report to Congress

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

Use of funds, restrictions.

- (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.

Notice to Congress.

(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.

Research funds, geographical distribution.

Pub. Law 92-68

- 4 -

August 6, 1971

85 STAT. 177

Campus disrupters, denial of payment.

72 Stat. 426. 42 USC 2451 note.

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 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 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.

(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.

(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 expression of individual views or opinions.

Freedom of speech.

August 6, 1971

- 5 -

Pub. Law 92-68

85 STAT. 177

Sec. 7. Section 206 of the National Aeronautics and Space Act of 1958 (42 U.S.C. 2476), is amended as follows: (1) subsection (a) is hereby repealed, and (2) subsections (b), (c), and (d) are renumbered as subsections (a), (b), and (c), respectively.

Repeal.

72 Stat. 432.

Sec. 8. This Act may be cited as the "National Aeronautics and Space Administration Authorization Act, 1972".

Short title.

Approved August 6, 1971.

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LEGISLATIVE HISTORY:

HOUSE REPORTS No. 92-143 (Comm. on Science and Astronautics) and No. 92-368 (Comm. of Conference).  
SENATE REPORT No. 92-146 (Comm. on Aeronautical and Space Sciences).  
CONGRESSIONAL RECORD, Vol. 117 (1971):  
June 3, considered and passed House.  
June 28, 29, considered and passed Senate, amended.  
July 27, House agreed to conference report.  
July 28, Senate agreed to conference report.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT; SPACE, SCIENCE, VETERANS, AND CERTAIN OTHER INDEPENDENT AGENCIES APPROPRIATION BILL, 1972

JUNE 23, 1971.—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. 9382]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

RESEARCH AND DEVELOPMENT

1971 appropriation.....	\$2,565,000,000
Estimate, 1972.....	2,517,700,000
Recommended in the bill.....	2,517,700,000

The Committee recommends the full budget estimate for research and development activities, but suggests several major changes within the total appropriation.

1. The Apollo program should be reduced to \$610,200,000 from the \$612,200,000 requested by applying sound financial management principles and a continuous and careful review of costs as this program moves toward completion.
2. The Skylab program should be increased from \$535,400,000 to \$550,400,000 to provide rescue capability more promptly than is provided by the current budget plan.
3. The proposed growth rate in space science and applications from \$565,700,000 in 1971 to \$750,400,000 is very rapid. It is recommended that \$735,400,000 be provided to permit a more modest expansion of this effort.
4. The aeronautical research and technology program has an accelerated effort in STOL development in 1972. An additional \$5,000,000 over the estimate is recommended to maintain at least a current level in other research, for a total of \$115,000,000 for this program.

5. The tracking and data acquisition operating budget is \$264,000,000. The Committee recommends \$260,000,000 for this activity.

6. The technology utilization effort of NASA has not impressed the Committee to date. As the hearings indicate, this area can be substantially improved. The \$5,000,000 recommended should facilitate strengthening of the program next year.

CONSTRUCTION OF FACILITIES

1971 appropriation.....	\$24,950,000
Estimate, 1972.....	58,300,000
Recommended in bill.....	33,800,000
Reduction below estimate.....	-22,500,000

The bill provides funds as requested except for two instances:

1. The estimate of \$10,000,000 for rehabilitation and modification of facilities has been reduced to \$7,500,000. This item is for many smaller projects, and the sum recommended provides for those of the highest priority.
2. The Committee recommends that the \$20,000,000 proposed for space shuttle facilities be deferred at this time. When more definite requirements have been set, proper consideration will be given to a request for funds on the basis of full funding of projects based on well considered estimates.

During hearings on the bill the Committee was informed that a total of twenty-one projects authorized in the period between 1965 and 1971, and estimated to cost \$51,755,450, had not been started and there were no plans for starting them under the current budget plan. The record further indicates that another seven projects were started or completed in this same period of time at a cost estimate of \$9,488,236, for which no specific appropriation requests were submitted. The General Accounting Office has invited the attention of the Congress to the construction program of NASA and indicated that a clearer direction of congressional intent may be in order.

The Committee feels that the Congress should specifically approve and fund NASA construction projects. The language of the bill for the construction program therefore delineates the specific projects and the purposes for which these funds can be obligated for the 1972 construction program, and provides three-year availability for use of funds. If not obligated in that period of time they will revert to the Treasury.

RESEARCH AND PROGRAM MANAGEMENT

1971 appropriation.....	\$722,669,000
Estimate, 1972.....	726,635,000
Recommended in bill.....	720,000,000
Reduction below estimate.....	-6,635,000

The bill provides \$720,000,000 for the research and program management appropriation. This is a reduction of \$6,635,000 from the \$726,635,000 requested. The Committee is of the opinion that better financial management can be practiced in this program. By applying better control of both personnel and non-personnel costs, the total reduction in force contemplated in the estimates should not be necessary and the amounts should be fully adequate for efficiently managing and operating the centers and other activities covered in this appropriation.

## GENERAL PROVISIONS

The Committee has deleted language that would have continued the five percent transfer authority between appropriations. The Committee feels that this authority was justified in years of rapid expansion in NASA programs on the basis that it was seeking to land men on the moon within a decade, but such latitude no longer appears to be necessary or warranted. NASA's programs now permit more orderly planning and presentation to the Congress for consideration. The organization has attained a certain maturity that should permit the development of sound budget and program support in advance of the request for appropriations and vitiate the need for the general transfer authority provided in previous years. This is in keeping with the practices followed with respect to most other departments and agencies.

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, under certain conditions, and other limited program adjustments that should be adequate in most circumstances.

The general provision for NASA that has been carried for a number of years making \$35,000 available for scientific consultations or extraordinary expense is unchanged for 1972.

## TITLE IV

## GENERAL PROVISIONS

The general provisions applicable to the Department and agencies in the bill are identical to those carried in the current year except for two which are eliminated. One had to do with the ratio of employees engaged in personnel work, which the Committee feels has served its purpose. The other had to do with inciting or carrying on a riot for which general legislation now applies. The sections have been renumbered to reflect the new titles in the bill.

## LIMITATIONS AND LEGISLATIVE PROVISIONS

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

On page 12 in connection with NASA's construction of facilities appropriation:

*, to remain available until June 30, 1974.*

**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, 1971 (2)	Budget estimate of new (obligational) authority, 1972 (3)	Increase (+) or decrease (-) (4)
National Aeronautics and Space Administration: Miscellaneous trust funds.....	\$11, 870, 000	\$12, 050, 000	+\$180, 000

**COMPARATIVE STATEMENT OF THE NEW BUDGET (OBLIGATIONAL) AUTHORITY FOR FISCAL YEAR 1971 AND  
THE BUDGET ESTIMATES FOR FISCAL YEAR 1972**

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

Agency and item (1)	New budget (obligational) authority, fiscal year 1971 (2)	Budget estimates of new budget (obligational) authority, fiscal year 1972 (3)	New budget (obligational) authority, recommended in bill (4)	Bill compared with—	
				New budget (obligational) authority, fiscal year 1971 (5)	Budget estimates of new budget (obligational) authority, fiscal year 1972 (6)
<b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b>					
Research and development.....	2, 565, 000, 000	2, 517, 700, 000	2, 517, 700, 000	-47, 300, 000	-----
Construction of facilities.....	24, 950, 000	56, 300, 000	33, 800, 000	+8, 850, 000	-22, 500, 000
Research and program management.....	722, 669, 000	10 726, 635, 000	720, 000, 000	-2, 669, 000	-6, 635, 000
Total, National Aeronautics and Space Administration.....	3, 312, 619, 000	3, 300, 635, 000	3, 271, 500, 000	-41, 119, 000	-29, 135, 000

## Calendar No. 257

92D CONGRESS }  
1st Session }

SENATE }

REPORT  
No. 92-264DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT; SPACE,  
SCIENCE, VETERANS, AND CERTAIN OTHER INDEPENDENT  
AGENCIES APPROPRIATION BILL, 1972

JULY 15, 1971.—Ordered to be printed

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

## REPORT

[To accompany H.R. 9382]

## NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

## RESEARCH AND DEVELOPMENT

1971 appropriation.....	\$2,565,000,000
Estimate, 1972.....	2,517,700,000
House allowance.....	2,517,700,000
Committee recommendation.....	2,541,700,000

The Committee recommends \$2,541,700,000 for the Research and Development activities of the National Aeronautics and Space Administration, which \$24,000,000 more than the budget estimate and the House allowance. The \$24,000,000 added by the committee is ear-

marked for the NERVA program, which the Administration had requested be funded at a \$15,000,000 level in fiscal year 1972. Thus the committee addition will increase the funding for this program to \$39,000,000, and funds are earmarked in the bill to accomplish this objective.

The Committee was advised by NASA that it will consider the suggestions contained in the House Report concerning the allocation of the \$2,517,700,000 to various programs but it felt, nevertheless, that the distribution of the funds, as proposed in the estimates, presented a more desirable allocation of such funds. Therefore, the Committee is not suggesting any changes in the budget program other than the aforementioned increase for the NERVA program.

## CONSTRUCTION OF FACILITIES

1971 appropriation.....	\$24,950,000
Estimate, 1972.....	56,300,000
House allowance.....	33,800,000
Committee recommendation.....	56,300,000

For Construction of Facilities, the Committee is recommending the full budget estimate, which is \$22,500,000 more than the House allowance. However, in recommending the full budget estimate, the Committee is deviating from past practices and is enumerating within the bill the items to be funded by the \$56,300,000. Included in the bill is \$2,100,000 for the expansion of Visitor's Center at the Kennedy Space Center.

In recommending line item appropriations for the various construction projects funded hereunder, it is not the desire of the Committee to diminish in any way the flexibility that is provided in the authorizing legislation. The Committee feels that NASA should have the necessary flexibility to cover both cost variations in individual projects and necessary reprogramming to meet unforeseen requirements which are absolutely essential to NASA in the conduct of its myriad programs. Consequently, if there should be any deviation in the amounts specified for each of the items funded hereunder, notice to the Committee of such cost variations or reprogramming will suffice.

The Committee has also included language in the bill that would, as in past years, continue the funds provided hereunder to remain available until expended. This recommendation differs from the language in the House bill wherein it was provided that the funds will remain available only until June 30, 1974.

## RESEARCH AND PROGRAM MANAGEMENT

1971 appropriation.....	\$722, 669, 000
Estimate, 1972.....	726, 635, 000
House allowance.....	720, 000, 000
Committee recommendation.....	726, 635, 000

For this item, the Committee recommends the full budget estimate of \$726,635,000, which is \$6,635,000 over the sum allowed by the House. The Committee feels that it is penny-wise and pound-foolish to be parsimonious in any way in funding the administration of the programs which are as complex and varied as the NASA programs.

In making the full budget estimate available, the Committee has taken cognizance of the fact that the amended budget request of NASA is at an extremely austere level in that it already requires a reduction of 1,500 in the NASA personnel complement. This reduction brings the total reduction in NASA Civil Service personnel during the past four years to approximately 7,000, which represents—percentage-wise—a reduction of 20 percent, which is a cut sharper than that experienced by any other major agency of our Government.

## GENERAL PROVISIONS

The Committee has included language in the bill which restores the 5 percent transfer authority that NASA has had since it came into being. This provision had been deleted by the House on the grounds that NASA has attained a certain maturity.

The Committee feels that the flexibility derived from the 5 percent transfer authority is warranted because it will have the effect of permitting the more efficient administration of the NASA programs.

## LANGUAGE PROVISIONS

The Committee has included the following language provisions in the bill:

On page 13, after line 3 add:

*Not to exceed 5 per centum of any appropriation made available to the National Aeronautics and Space Administration by this Act may be transferred to any other such appropriation."*

On page 14, line 5, after the word "institutes" add the following: *"and other programs of supplementary training."*

On page 15, line 1 after "\$3,000,000" add the following: *"to remain available until expended: \* \* \*"*

**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, 1971 (2)	Budget estimate of new (obligational) authority, 1972 (3)	Increase (+) or decrease (-) (4)
National Aeronautics and Space Administration: Miscellaneous trust funds.....	\$11,870,000	\$12,050,000	+\$180,000

**COMPARATIVE STATEMENT OF NEW BUDGET (OBLIGATIONAL) AUTHORITY FOR 1971 AND BUDGET ESTIMATES  
AND AMOUNTS RECOMMENDED IN THE BILL FOR 1972**

Agency and title (1)	New budget (obligational) authority enacted to date, fiscal 1971 (2)	Budget estimates of new (obligational) authority, fiscal 1972 (3)	New budget (obligational) authority recommended in House bill, 1972 (4)	Amount recommended by Senate committee, 1972 (5)	Increase (+) or decrease (-), Senate bill compared with—		
					Appropriations or new budget (obligational) authority, fiscal year 1971 to date (6)	Budget estimates, 1972 (7)	House bill, 1972 (8)
<b>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</b>							
Research and development.....	2,565,000,000	2,517,700,000	2,517,700,000	2,541,700,000	-23,300,000	+24,000,000	+24,000,000
Construction of facilities.....	24,950,000	56,300,000	33,800,000	56,300,000	+31,350,000	-----	+22,500,000
Research and program management.....	722,669,000	726,635,000	720,000,000	726,635,000	+3,966,000	-----	+6,635,000
<b>Total, National Aeronautics and Space Administration.</b>	<b>3,312,619,000</b>	<b>3,300,635,000</b>	<b>3,271,500,000</b>	<b>3,324,635,000</b>	<b>+12,016,000</b>	<b>+24,000,000</b>	<b>+53,135,000</b>

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT AND OTHER AGENCIES, APPROPRIATIONS, 1972

JULY 26, 1971.—Ordered to be printed

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

CONFERENCE REPORT

[To accompany H.R. 9882]

TITLE II

SPACE, SCIENCE, VETERANS, AND CERTAIN OTHER INDEPENDENT AGENCIES,  
OFFICE OF SCIENCE AND TECHNOLOGY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Amendment No. 25: Appropriates \$2,522,700,000 for research and development instead of \$2,517,700,000 as proposed by the House and \$2,541,700,000 as proposed by the Senate.

Amendment No. 26: Earmarks \$39,000,000 for the NERVA program as proposed by the Senate.

Amendment No. 27: Appropriates \$52,700,000 for construction of facilities, instead of \$33,800,000 as proposed by the House and \$56,300,000 as proposed by the Senate.

Amendment No. 28: Authorizes \$7,900,000 for rehabilitation and modification of facilities as proposed by the Senate, instead of \$7,500,000 as proposed by the House.

Amendment No. 29: Deletes the word "and" as proposed by the Senate.

Amendment No. 30: Deletes the \$2,100,000 proposed by the Senate for the expansion of the Visitor's Information Center at The Kennedy Space Center.

Amendment No. 31: Provides that \$13,000,000 be authorized for space shuttle main engine test facilities and \$5,500,000 for space shuttle thermal protection facilities, instead of \$20,000,000 for space shuttle facilities as proposed by the Senate.

Amendment No. 32: Provides that construction of facilities funds shall remain available through June 30, 1974, as proposed by the House, instead of until expended as proposed by the Senate.

Amendment No. 33: Appropriates \$722,635,000 for research and program management as proposed by the Senate, instead of \$720,000,000 as proposed by the House.

Amendment No. 34: Authorizes transfers not to exceed 2 percent between the appropriations of the National Aeronautics and Space Administration, but no transfers shall be made to the appropriation "Research and program management," instead of 5 percent transfer authority between appropriations as proposed by the Senate.

EDWARD P. BOLAND,  
JOE L. EVINS,  
GEORGE E. SHIPLEY,  
ROBERT N. GHAIMO,  
DAVID PRYOR,  
J. EDWARD ROUSH,  
GEORGE MAHON,  
CHARLES R. JONAS,  
JOSEPH M. MCDADE,

*Managers on the Part of the House.*

JOHN O. PASTORE,  
WARREN G. MAGNUSON,  
ALLEN J. ELLENDER,  
JOHN C. STENNIS,  
CLINTON P. ANDERSON,  
GORDON ALLOTT,  
MARGARET CHASE SMITH,  
ROMAN L. HRUSKA,  
MILTON R. YOUNG,

*Managers on the Part of the Senate.*



Public Law 92-78  
92nd Congress, H. R. 9382  
August 10, 1971

## 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, 1972, 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, 1972, and for other purposes, namely:

Department of Housing and Urban Development; Space, Science, Veterans, and Certain Other Independent Agencies Appropriation Act, 1972.

## TITLE II

### SPACE, SCIENCE, VETERANS, AND CERTAIN OTHER INDEPENDENT AGENCIES

16 STAT., 277

#### NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

##### RESEARCH AND DEVELOPMENT

For necessary expenses, not otherwise provided for, including research, development, operations, services, minor construction, maintenance, repair, and alteration 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, \$2,522,700,000, to remain available until expended: *Provided*, That \$39,000,000 of the amount made available shall be used only for the NERVA program in fiscal year 1972.

#### CONSTRUCTION OF FACILITIES

For advance planning, design, and construction of facilities for the National Aeronautics and Space Administration, and for the acquisition or condemnation of real property, as authorized by law, \$52,700,000, including \$6,500,000 for modernization of a forty by eighty foot wind tunnel, \$10,700,000 for Centaur modifications to Titan III launch area, \$4,500,000 for alterations to launch complex 17, \$7,900,000 for rehabilitation and modification of facilities, \$600,000 for power plant replacements, \$500,000 for relocation of an Applications Technology Satellite transportable ground station, \$3,500,000 for facility planning and design, \$13,000,000 for space shuttle main engine test facilities and \$5,500,000 for space shuttle thermal protection facilities, to remain available until June 30, 1974.

#### 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); minor construction; awards; hire, maintenance and operation of administrative aircraft; purchase (not to exceed thirty-five for replacement only) and hire of passenger motor vehicles; and maintenance, repair, and alteration of real and personal property; \$722,635,000: *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.

30 Stat. 201;  
1 Stat. 201.

#### GENERAL PROVISION

Not to exceed 2 per centum of any appropriation made available to the National Aeronautics and Space Administration by this Act may be transferred to any other such appropriation, but no transfers shall be made to the appropriation "Research and Program Management".

Not to exceed \$35,000 of the appropriation "Research and Program Management" in this Act for the National Aeronautics and Space Administration 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.

## TITLE IV

## GENERAL PROVISIONS

Sec. 501. 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 interagency motor pools where separately set forth in the budget schedules.

Sec. 502. Appropriations and funds available for the administrative expenses of the Department of Housing and Urban Development shall be available in the current fiscal year for purchase of uniforms, or allowances therefor, 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.

Uniforms, etc.

80 Stat. 508;

81 Stat. 206.

80 Stat. 416.

85 STAT. 295

Legal and  
banking ser-  
vices.

Sec. 503. 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).

64 Stat. 873;  
64 Stat. 1114.  
Research  
projects.

Sec. 504. 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. 505. No part of any appropriation contained in this Act shall remain available for obligation beyond the current fiscal year unless expressly so provided herein.

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, 1972".

Approved August 10, 1971.

## LEGISLATIVE HISTORY:

HOUSE REPORTS: No. 92-305 (Comm. on Appropriations)  
and No. 92-377 (Comm. of Conference).  
SENATE REPORT No. 92-264 (Comm. on Appropriations).  
CONGRESSIONAL RECORD: Vol. 117 (1971):  
June 30, considered and passed House.  
July 20, considered and passed Senate, amended.  
July 29, House agreed to conference report.  
Aug. 2, Senate agreed to conference report.

CHRONOLOGY OF EVENTSOMB Submission

10/1/70 Vol. I Summary and Research and Development  
 10/1/70 Vol. II Construction of Facilities and Research and Program Management

Congressional Submission

2/23/71 Vol. I Agency Summary  
 2/24/71 Vol. II Research and Development  
 2/22/71 Vol. III Construction of Facilities  
 2/24/71 Vol. IV Research and Program Management

AUTHORIZATION BILLHOUSE (H.R. 3981)(Superseded by H.R. 7109)

3/2/71 Dr. Low, Capt. Shepard, Col. Roosa, Capt. Mitchell  
 3/3/71 Dr. Low, Mr. Shapley, Dr. von Braun  
 3/4/71 Mr. Myers, Dr. Naugle  
 3/9/71 Dr. Naugle, Dr. Newell, Mr. Vincent Johnson, Dr. Smith, Mr. Jaffe  
 3/10/71 Mr. Trusczynski, Mr. Shapley, Mr. Lucas, Mr. Brockett, Gen. Curtin  
 3/11/71 Mr. Jackson, Mr. Armstrong, Mr. Klein, Mr. Kilgore  
 3/16/71 Mr. McCurdy, Mr. Harnett, Mr. Shapley  
 3/18/71 Dr. Naugle, Mr. Jackson, Mr. Kilgore, Mr. Klein, Mr. Trusczynski  
 3/19/71 Dr. Naugle  
 3/22/71 Mr. Vincent Johnson, Mr. Jaffe, Dr. Marsten  
 3/23/71 Mr. Harnett, Mr. Jackson, Dr. Mark, Mr. Cortright, Mr. Lundin,  
 Mr. Armstrong  
 4/2/71 Field Hearings: McDonnell Douglas Co., North American Rockwell Corp.  
 4/3/71 Field Hearings: TRW Systems Group, Aerojet Liquid Rocket Co.  
 4/5/71 Field Hearings: Lockheed Missiles and Space Co.  
 4/22/71 Authorization Committee Report No. 92-143  
 5/18/71 Mr. Frutkin  
 5/19/71 Mr. Frutkin  
 5/20/71 Mr. Frutkin  
 6/3/71 House Floor Action

SENATE (S. 720)

3/17/71 Mr. Frutkin  
 3/30/71 Dr. Low, Mr. Shapley, Mr. Harnett, Mr. McCurdy, Mr. Lilly,  
 Gen. Curtin, Mr. Myers, Dr. Naugle, Dr. Petrone,  
 Mr. Gorman, Mr. Donlan, Mr. Disher  
 4/1/71 Dr. Low, Mr. Myers, Mr. Lindley, Dr. Naugle, Mr. Vincent  
 Johnson, Mr. Jaffe  
 4/2/71 Dr. Foster (DoD), Mr. Ross (DoD), Mr. Barfield (DoD),  
 Mr. Heilmeyer (OSD), Mr. Alvarado (AF), Capt. Jarrell (Navy)  
 4/5/71 Mr. Jackson, Dr. Low, Mr. Armstrong, Mr. Kilgore, Mr. Klein,  
 Mr. Trusczynski, Mr. Brockett, Mr. Lucas, Mr. Myers,  
 Dr. Naugle, Dr. Seamans (AF)  
 6/8/71 Authorization Committee Report No. 92-146  
 6/29/71 Senate Floor Action

CONFERENCE COMMITTEE ACTION

7/21/71 Conference Committee Report No. 92-368  
 7/27/71 House adopted Conference Report  
 7/28/71 Senate adopted Conference Report  
 8/6/71 President approved P.L. 92-68

APPROPRIATION BILLHOUSE (H.R. 9382)

3/22,23,24/71 Dr. Low, Mr. Shapley, Mr. Lilly, Mr. Jackson, Mr. McCurdy,  
 Mr. Myers, Dr. Naugle, Mr. Truszynski, Mr. Mathews,  
 Mr. Grubb, Dr. Petrone, Mr. Malaga, Mr. Armstrong,  
 Gen. Curtin, Mr. Kilgore, Mr. Klein, Mr. Vogel  
 6/23/71 Appropriation Committee Report No. 92-305  
 6/30/71 House Floor Action

SENATE (H.R. 9382)

6/23/71 Dr. Fletcher, Dr. Low, Mr. Shapley, Mr. McCurdy,  
 Mr. Lilly, Mr. Grubb  
 7/15/71 Appropriations Committee Report No. 92-264  
 7/20/71 Senate Floor Action

CONFERENCE COMMITTEE ACTION

7/26/71 Conference Committee Report No. 92-377  
 7/29/71 House adopted Conference Report  
 8/2/71 Senate adopted Conference Report  
 8/10/71 President approved P.L. 92-78