

401

DATAFAX TRANSMISSION

	MESSAGE NO. 189 / OF 13	DATE 3-13-72
WAYNE YOUNG 61	MSFC ATTN: BILL HALLISEY 453-3154	KSC ATTN: BOB LONG 867-6308
C LLEN INB - 53195		

PLEASE CALL ALL FOR PICK-UP UPON RECEIPT.

THIS IS BACKUP MATERIAL TO SUPPORT THE \$5.150B DDT&E
 LIEB SRM 156" (RECOVERABLE) PROGRAM. A RUNOUT
 SECTION IS ALSO INCLUDED WITH THE BACKUP. THIS
 INFORMATION IS GOVERNMENT SENSITIVE. FOR FURTHER
 INFORMATION AND DETAILS PLEASE CALL DON RYAN, 755-3188.

JERRY

13 MAR 16 11 21 AM '72
 TELECOMMUNICATIONS
 NASA-HSC

RECEIVED

681-8

DDT&E ESTIMATE
FOR
PARALLEL SRM 156" (RECOVERABLE)
15 X 60 PAYLOAD BAY ORBITER
(1971 DOLLARS - FEE INCLUDED)

ORBITER	\$3.750B
BOOSTER	.350B
SSME	.580B
PROGRAM SUPPORT	.470B
<hr/>	
OMSF TOTAL (W/O OVERRUN)	\$5.150B

3/18/72

3-189

DDT&E ESTIMATE
 FOR
 PARALLEL SRM 156" (RECOVERABLE)
 15 X 60 PAYLOAD BAY ORBITER
 (1971 DOLLARS - FEE INCLUDED)

ORBITER/INTEGRATION
AND NO TANK

TASK TEAM ESTIMATE 3,210

PLUS:

PAD ABORT & EARLY POST LAUNCH ABORT + .260

INCREASED FLIGHT TEST + .057

PARALLEL BURN SRM INTEGRATION + .089

SUBTOTAL 3,616

LESS:

TASK TEAM CLASS I CHANGES
 AND OVERRUN..... - .439

SUBTOTAL 3,177

ADD 18% CLASS I CHANGES + .573

ONSF ORBITER TOTAL 3,750

681-4

DDT&E ESTIMATE
FOR
PARALLEL SRM 156" (RECOVERABLE)
15 X 60 PAYLOAD BAY ORBITER
(1971 DOLLARS - FEE INCLUDED)

<u>BOOSTER</u>	TASK TEAM ESTIMATE	.238
	PLUS:	
	SRM RECOVERY	+ .86
	SUBTOTAL	.324
	LESS:	
	TASK TEAM CLASS I CHANGES AND OVERRUN	- .023
	SUBTOTAL	.301
	ADD 16% CLASS I CHANGES	+ .049
	ONSF BOOSTER TOTAL W/O OVERRUN	.350

5/10/72

5-189

DDT&E ESTIMATE
FOR
PARALLEL SRM 156" (RECOVERABLE)
15 X 60 PAYLOAD BAY ORBITER
(1971 DOLLARS - FEE INCLUDED)

SSME

TASK TEAM ESTIMATE .529

PLUS:

INCREASED EPL OR ALTERNATE
ABORT IMPROVEMENT + .025

SUBTOTAL .554

LESS:

TASK TEAM CLASS I CHANGES
AND OVERRUN - .090

SUBTOTAL .464

ADD 25% CLASS I CHANGES + .116

OWSF SSME TOTAL W/O OVERRUN .580

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DDT&E ESTIMATE
FOR
PARALLEL SRM 156" (RECOVERABLE)
15 X 60 PAYLOAD BAY ORBITER
(1971 DOLLARS - FEE INCLUDED)

PROGRAM SUPPORT

TASK TEAM ESTIMATE

.427

ADD 10% CLASS I CHANGES

+ .043

OFFSF PROGRAM SUPPORT TOTAL
W/O OVERRUN

.470

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ADDITIONAL REQUIREMENTS
IDENTIFIED FROM FEBRUARY 22 CONTRACTOR DATA

PAD AND EARLY POST LAUNCH ABORT	\$250M
INCREASED FLIGHT TEST	57M
PARALLEL BURN SRM INTEGRATION	89M
SRM RECOVERY	86M
INCREASE EMERGENCY POWER LEVEL FOR SSME OR ALTERNATE ABORT IMPROVEMENT	25M

3/10/72

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ORBITER DDT&E ESTIMATE
(1971 \$ DOLLARS - FEE INCLUDED)

	<u>DDT&E W/O CONTING.</u>	<u>CONTING.</u>	<u>CONTING. PERCENT</u>	<u>TOTAL DDT&E</u>
STRUCTURE	530	148	28%	678
PROPULSION	348	118	34%	466
AVIONICS	322	80	25%	402
POWER	220	33	15%	253
ECLSS	143	27	19%	170
INSTALLATION-ASSEMBLY-CHECKOUT	60	11	18%	71
COMBINED SYSTEM DEVELOPMENT TEST	115	23	20%	138
SYSTEM ENG. INTEGRATION	166	41	25%	207
SYSTEMS SUPPORT	360	90	25%	450
MANAGEMENT	66	18	28%	84
TOOLING	137	41	30%	178
	<u>SUBTOTAL</u>	<u>630</u>	<u>26%</u>	<u>3,097</u>
PROGRAM INTEGRATION	213	0	0	213
PAD ABORT	260	14	5%	274
FLIGHT TEST	157	9	5%	166
	<u>TOTAL</u>	<u>653</u>	<u>21%</u>	<u>3,750</u>

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BOOSTER DDT&E ESTIMATE
(1971 \$ DOLLARS - FEE INCLUDED)

	<u>DDT&E W/O CONTING.</u>	<u>CONTING.</u>	<u>CONTING. PERCENT</u>	<u>TOTAL DDT&E</u>
DEVELOPMENT	201	40	20%	241
FLIGHT TEST	5	1	20%	6
SRM RECOVERY	86	17	20%	103
TOTAL	292	58	20%	350

5/19/72

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SSME DDT&E ESTIMATE
(1971 \$ DOLLARS - FEE INCLUDED)

	<u>DDT&E W/O CONTING.</u>	<u>CONTING.</u>	<u>CONTING. PERCENT</u>	<u>TOTAL DDT&E</u>
ENGINE DEVELOPMENT	315	111	35%	426
INCREASED EPL	25	6	25%	31
PROPELLANTS	55	14	25%	69
GOVERNMENT SUPPORT	43	11	25%	54
TOTAL	438	142	32%	580

3/10/72

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SPACE SHUTTLE INVESTMENT
(1971 BILLION DOLLARS - FEE INCLUDED)

	SERIES PRESSURE FED		SERIES PUMP FED		PARALLEL SRM (156")	
	WITH OUT CONTING.	WITH CONTING.	WITH OUT CONTING.	WITH CONTING.	WITH OUT CONTING.	WITH CONTING.
ORBITER						
3 PLUS REFURB 2 RDT&E	.69	.86	.69	.85	.69	.86
BOOSTER						
PRESSURE FED 8	.65	.81				
PUMP FED 8			.44	.55		
SRM 6					.17	.21
ENGINES						
ORBITER (SSME) 17	.07	.09	.07	.09	.07	.09
BOOSTER						
PRESSURE FED 77	.19	.24				
PUMP FED 36			.10	.13		
SRM PRODUCTION FACILITIES	-	-	-	-	.12	.15
SUBTOTAL	1.60	2.00	1.30	1.63	1.05	1.31
FACILITIES		.32		.27		.30
TOTAL INVESTMENT		2.32		1.90		1.61

ANALYSIS OF THE SHUTTLE

<u>ORBITER</u>	<u>3.210</u>	CFE 2908 CFE 302
Pad Abort	.260	
Increased Flight Test	.060	
Parallel Burn/SRM Integ.	<u>.090</u>	
	3.620	
Contingency added for Structures/ Tooling/Avionics	<u>.130</u>	
	<u>3.750</u>	
<u>PROGRAM SUPPORT</u>	<u>.470</u>	
	Reduced for Solid Requirements Different for Liquid	
<u>SSME</u>	.529	Increased to Support 6 DDT&E Flights + 10 Engines
	.051	Changes Including EPL
	<u>.580</u>	
<u>BOOSTER</u>		CFE/54 ↑ CFE 170
SRM	.324	(Includes Recovery)
Additional Tests Vibration/Dynamic	<u>.026</u>	(10% Contingency) CFE
	<u>.350</u>	
<u>SUMMARY</u>		
Orbiter	3.750	
SSME	.580	
Booster w/Eng.	.350	
Program Support	<u>.470</u>	
TOTAL	<u>5.150</u>	

SPACE SHUTTLE EXPENDITURES

PHASE B STUDIES

(\$ IN MILLIONS)

		<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>TOTAL</u>	<u>CUST</u>	<u>NR</u>
		<u>ACTUAL</u>	<u>ACTUAL</u>	<u>ACTUAL</u>	<u>ACTUAL</u>	<u>FUNDS</u>	<u>FUNDS</u>
<u>CONTRACT FUNDS:</u>							
PHASE B	RY \$	1.58	10.59	11.86	24.03	24.03	
SHUTTLE PROGRAM	1983 \$	4.514	28.455	30.148	63.117		
TECHNOLOGY							
<u>INDIRECT FUNDS:</u>							
PA TMA							
PHASE B	RY \$	2.18	1.92	3.60	7.70	7.70	
SHUTTLE PROGRAM	1983 \$	6.228	5.159	9.151	20.538		
ENGINEERING AID	RY \$	4.09	7.61	6.66	18.36	16.00	2.36
IR&D	1983 \$	11.685	20.448	16.930	49.063		
		1.00					
<u>PROFIT REINVESTMENT</u>							
	RY \$	1.00		(.29)	.71		.71
	1983 \$	2.86		(.74)	2.12		
TOTAL	RY \$	8.85	20.12	21.83	50.80	47.73	3.07
ESCALATION FACTORS		2.857	2.687	2.542	2.653		
	1983 \$	25.284	54.062	55.492	134.838		
	\$/MAN YEAR	66.000	66.000	66.000			
		383	819	840			