

Ref: 9001/20/E
June 23, 1957
Mr. A. Cornish
T. Roberts
Arrow Mk.2 HIGH SPEED MISSION

Herewith curves showing fuel flow and aircraft attitude as requested in your memo ref. 8929/05/J. You will notice that a fuel flow during combat assuming $m=1.5$ at an altitude of 50,000 ft. has been quoted.

It should however be realized that in the event of the aircraft accelerating and/or diving to lower altitudes the fuel demand for a short period of time would be greatly increased.

T. Roberts.

cc Messrs:
J.A. Chamberlin
F. Brame
D. Raymond
J. Lucas
Central Files (Without incl.)

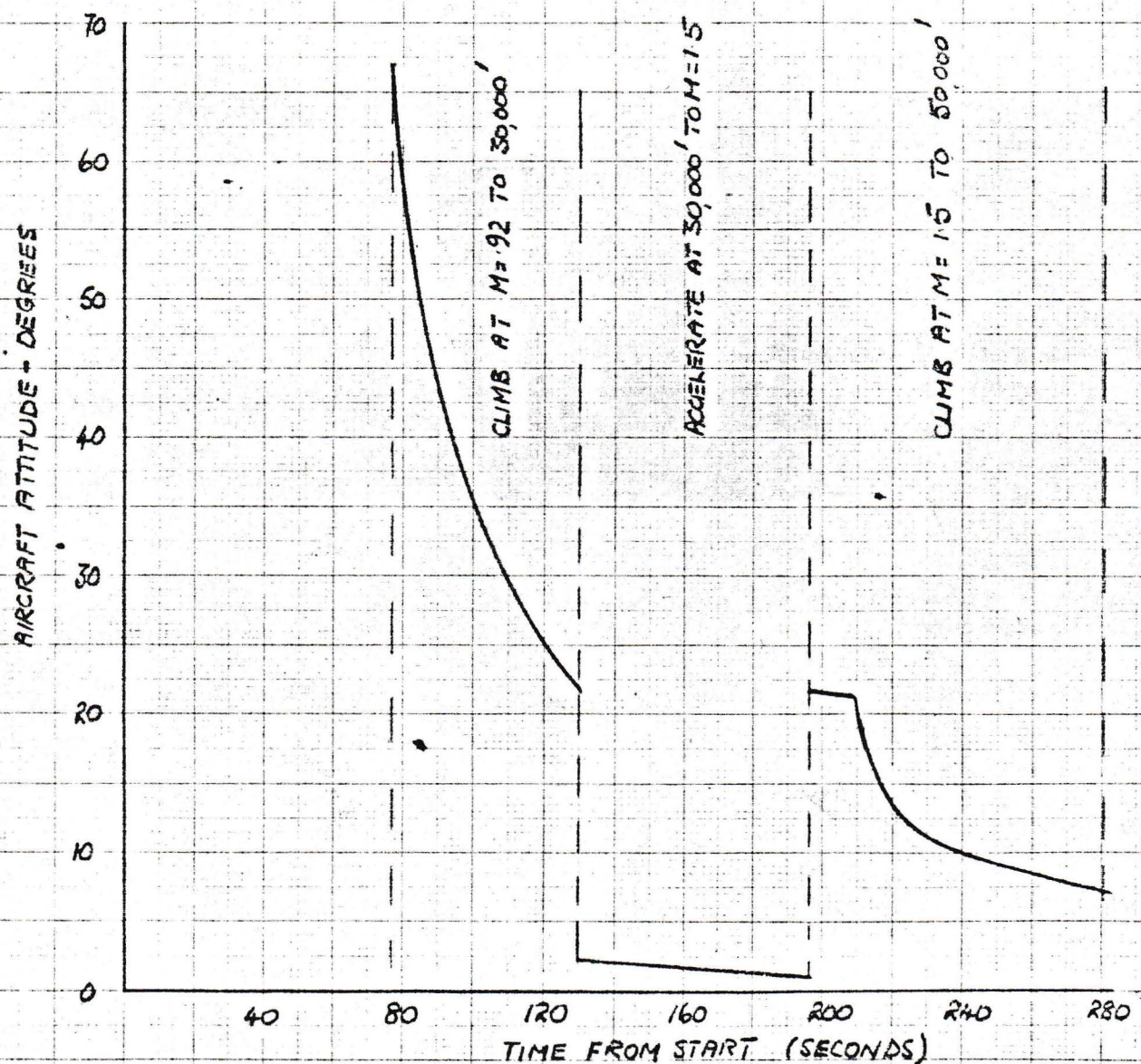
COPY

AIRCRAFT ATTITUDE ~ TIME. (PS 13)

HIGH SPEED MISSION WITH FULL A/B THROUGHOUT ACCELERATION AND CLIMB
PORTIONS OF FLIGHT PLAN

TAKE-OFF WEIGHT 63623 lb

FUEL WEIGHT 19438 lb



C-105 HIGH SPEED MISSION AS SPECIFIED IN AIR 7-4200 N.M. RADIUS

CONDITION	DIST. N.M.	TIME MINS.	FUEL LB.	A/C WT.
Start Weight	-	-	-	59,336
Engine Start	-	0.5	100	59,236
Take-off to Unstick Mil Rating	-	0.28	166	59,070
Accel. to 527 Kts.	4.2	0.74	516	58,554
Climb at 527 Kts. to 30,000' without A/B	17.7	2.10	1025	57,529
Accel. to 1.5 A/B Lit	12.4	1.03	1307	56,222
Climb to 50,000' 1.5 M.N. A/B Lit	17.9	1.28	1282	54,940
Cruise Out 50,000' 1.5 N.M. (4° Up Aileron)	147.8	10.30	3703	51,237
Combat 50,000' 1.5 M.N. A/B Lit	-	5.00	3500	46,009 ★
Descend to 45,000'	-	1.00	75	45,934
Cruise Back (Max. Range) at 45,000' (4° Up Aileron)	200.0	22.75	2080	43,854
Descend to 40,000'	-	0.90	66	43,788
Stack at 40,000' (Max. End.)	-	15.00	976	42,812
Descend to S.L.	-	6.90	350	42,462
Land with 5 Min. Fuel (Max. End.)	-	5.00	526	41,936
TOTAL	400.0	72.78	15,672	-

★ Ammo = 1,728 Lb.

(November 22, 1956).

C-105 HIGH SPEED MISSIONFULL INTERNAL FUEL

CONDITION	DIST. N.M.	TIME MINS.	FUEL LB.	A/C WT.
Start Weight	-	-	-	63,507
Engine Start	-	0.50	100	63,407
Take-Off to Unstick Mil Rating	-	0.31	132	63,225
Accel. to 527 Kts.	4.6	0.30	560	62,665
Climb at 527 Kts. to 30,000'	19.4	2.26	1120	61,545
Accel. to 1.5 A/B Lit	13.4	1.12	1414	60,131
Climb to 50,000' 1.5 M.N. A/B Lit	19.8	1.42	1400	58,731
Cruise Out 50,000' 1.5 M.N. (4° Up Aileron)	244.8	17.10	6390	52,341
Combat 50,000' 1.5 M.N. A/B Lit	-	5.00	3500	47,113 *
Descend to 45,000'	-	1.00	75	47,038
Cruise Back (Max. Range) at 45,000' (4° Up Aileron)	302.0	34.35	3184	43,854
Descend to 40,000'	-	0.90	66	43,788
Stack at 40,000' (Max. End.)	-	15.00	976	42,812
Descend to S.L.	-	6.90	350	42,462
Land with 5 Min. Fuel (Max. End.)	-	5.00	526	41,936
TOTAL	604.0	91.66	19,843	-

* Ammo = 1,728 Lb.

(November 22, 1956).

C-105 MAXIMUM RANGE MISSION AS SPECIFIED IN AIR 7-4300 N.M. RADIUS

CONDITION	DIST. N.M.	TIME MINS.	FUEL LBS.	A/C WT.
Start Weight	-	-	-	59,408
Engine Start	-	0.50	100	59,308
Take-Off to Unstick Mil Rating	-	0.28	168	59,140
Accel. to 527 Kts. Mil Rating	4.2	0.74	518	58,622
Climb at 527 Kts. Mil Rating to 40,000'	32.1	3.73	1440	57,182
Cruise Out 40,000' (Max. Range)	235.4	26.30	2920	54,262
Accel. to 1.5 M.N. 40,000' A/B Lit	16.7	1.45	1240	53,022
Climb at 1.5 M.N. to 50,000' A/B Lit	11.6	0.83	705	52,317
Combat at 1.5 M.N. 50,000' A/B Lit	-	5.00	3500	47,089 ★
Descend to 45,000' (Idling R.P.M.)	-	1.00	75	47,014
Cruise Back 45,000' (Max. Range) (4° Up Aileron)	300.0	34.13	3160	43,854
Descend to 40,000'	-	0.90	66	43,788
Stack at 40,000' (Max. Endurance)	-	15.00	976	42,812
Descend to Sea Level	-	6.90	350	42,462
Land with 5 Min. Fuel (Max. End.)	-	5.00	526	41,936
TOTAL	600.0	102.26	15,744	-

★ Ammo expended = 1,728 Lb.

(November 22, 1956)

C-105 MAXIMUM RANGE MISSIONFULL INTERNAL FUEL

CONDITION	DIST. N.M.	TIME MINS.	FUEL LB.	A/C WT.
Start Weight	-	-	-	63,507
Engine Start	-	0.50	100	63,407
Take-Off to Unstick Mil Rating	-	0.31	132	63,225
Accel. to 527 Kts. Mil Rating	4.6	0.30	560	62,665
Climb at 527 Kts. Mil Rating	36.0	4.18	1595	61,070
Cruise Out 40,000' (Max. Range)	380.0	42.20	5063	56,007
Accel. to 1.5 M.N. 40,000' A/B Lit	17.4	1.51	1290	54,717
Climb at 1.5 M.N. to 50,000' A/B Lit	12.0	0.86	730	53,937
Combat at 1.5 M.N. 50,000' A/B Lit	-	5.00	3500	48,759 *
Ascend to 45,000' (Idling R.P.M.)	-	1.00	75	48,684
Cruise Back 45,000' (Max. Range)	450.0	51.20	4830	43,354
Descend to 40,000'	-	0.90	66	43,733
Stack at 40,000' (Max. Endurance)	-	15.00	976	42,812
Descend to Sea Level	-	6.90	350	42,462
Land with 5 Min. Fuel (Max. End.)	-	5.00	526	41,936
TOTAL	900.0	136.36	19,843	-

* Ammo expended = 1,728 Lb.

(November 22, 1956).

C-105 FERRY RANGE MISSION

CONDITION	DIST. N.M.	TIME MINS.	FUEL LB.	A/C WT.
Start Weight	-	-	-	67717
Engine Start	-	0.50	100	67617
Take-off to Unstick Mil Rating	-	0.34	206	67411
Accel. to 527 Kts. Mil Rating	5.4	0.97	674	66737
Climb to 36,500' Mil Rating	29.4	3.65	1540	65197
Cruise climb to 40,000' (Max. Range)	1425.2	162.00	19208	45989
Stack at 40,000' (Max. Endurance)	-	15.00	1130	44859
Descend to S.L. (Idling)	-	6.90	350	44509
Land with 5 Min. Fuel (Max. Endurance)	-	5.00	535	43974
Total	1460.0	194.36	23743	

NOTE:

Missiles and external fuel tank carried throughout mission.

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ARROW Mk. 2 HIGH SPEED MISSION

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It should however be realized that in the event of the aircraft accelerating and/or diving to lower altitudes the fuel demand for a short period of time would be greatly increased.

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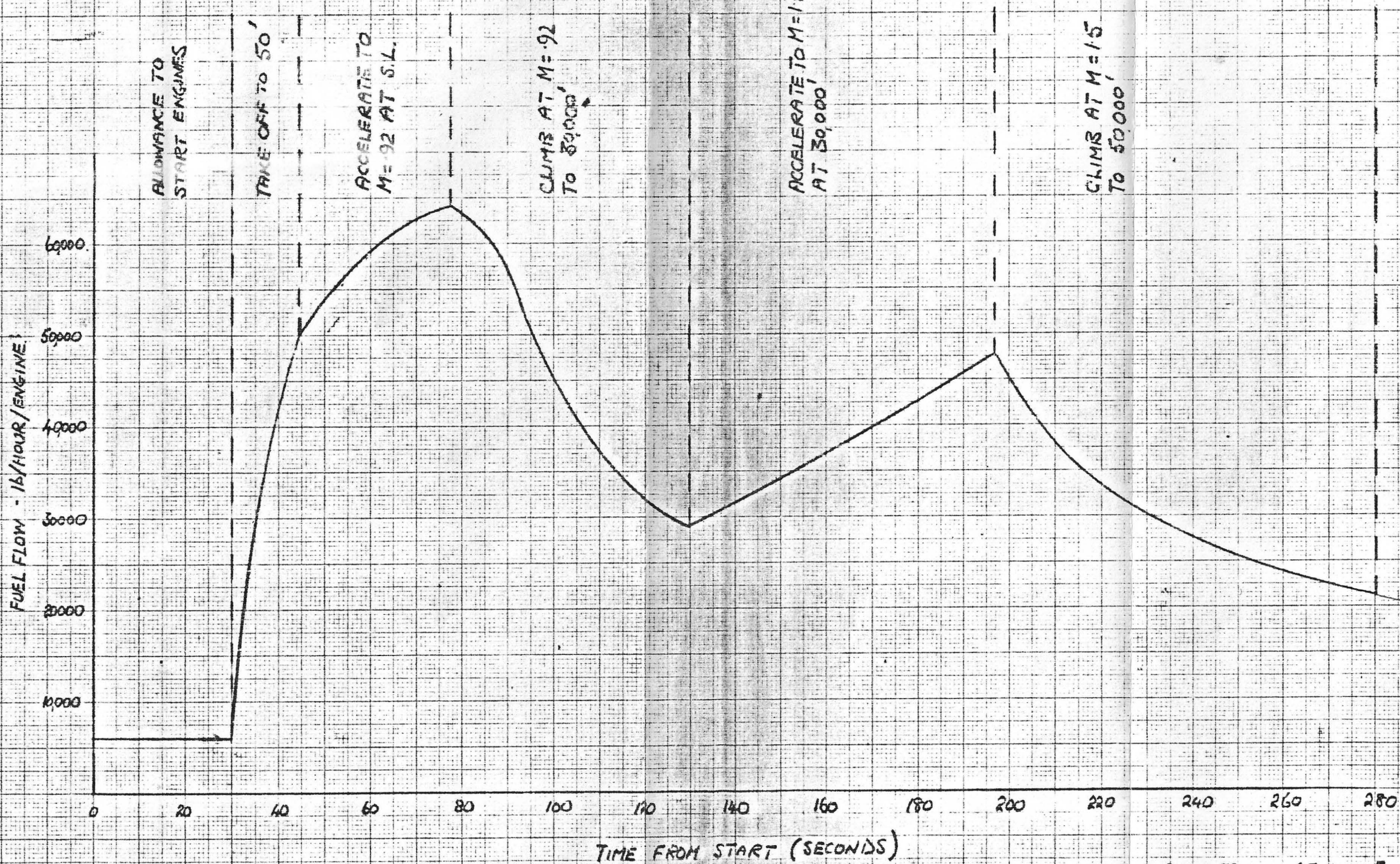
J.A. Chamberlin
T. Bruce
W.D. Raymond
J. Lucas
Central Files (without encl.)

C.F. 105

P/PERF/124

ENGINE FUEL FLOW - TIME (PS-13)

HIGH SPEED MISSION WITH FULL A/B THROUGHOUT ACCELERATION AND CLIMB PORTIONS
OF THE FLIGHT PLAN TAKE OFF WEIGHT 63,523 LB FUEL WEIGHT 19,438 LB



CRUISE FOR 15.58 MIN AT M=15 AT 50,000' ENGINE FUEL FLOW 11,200 lb/hr
5 MIN COMBAT AT M=15 AT 50,000' ENGINE FUEL FLOW 21,000 lb/hr

A.B.R. 27/6/57

C.F. 105

P/PERF/122

ENGINE FUEL FLOW - TIME (PS-13)

HIGH SPEED MISSION WITH FULL A/S THROUGHOUT ACCELERATION AND CLIMB PORTIONS
OF THE FLIGHT PLAN TAKE-OFF WEIGHT 59,336 lb. FUEL WEIGHT = 15,672 lb.

FUEL FLOW lb/HOUR/ENGINE

10000
20000
30000
40000
50000
60000

0 20 40 60 80 100 120 140 160 180 200 220 240 260

TIME FROM START (SECONDS)

ALLOWANCE TO START ENGINES

TAKE OFF TO 50'

ACCELERATE TO
M=0.92 AT SL

CLIMB AT M=0.92
TO 30,000'

ACCELERATE TO
M=1.5 AT 30,000'

CLIMB AT M=1.5
TO 50,000'

CRUISE FOR 8.06 MIN AT M=1.5
AT 50,000' ENGINE FUEL FLOW = 19,000 lb/hr
5 MIN COMBAT AT M=1.5 AT 50,000'
ENGINE FUEL FLOW = 21,000 lb/hr

ASS 27/11/57

AIRCRAFT ATTITUDE ~ TIME (PS. 13)HIGH SPEED MISSION WITH FULL A/B THROUGHOUT ACCELERATION AND CLIMB
PORTIONS OF FLIGHT PLAN.

TAKE-OFF WEIGHT 59,336 lb.

FUEL WEIGHT 15,672

