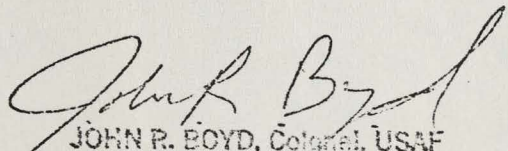


23 January 1975

Memo To: Major General Slay

Subject: ACF Wing Area

1. In 1972 during the LWF competition General Dynamics (GD) proposed a design that grossed out at 16,960 lbs. at the beginning of combat on the 500 nm Air Superiority Mission. Using a fixed engine (the F100) it was my understanding that GD after conducting many trade-offs provided the Air Force a well balanced design (optimized!) for this mission.
2. Now we find using essentially the same basic aerodynamic configuration and engine the proposed LWF will become the ACF with the addition of missionized avionics and other equipment packages and will gross out at approximately 21,000 lbs. on the same 500 nm Air Superiority Mission.
3. With 280 ft^2 of wing for both configurations this means that wingloading must go from about 61 lbs./ft² for the proposed LWF to about 75 lbs./ft² for the ACF as a result of some 4,000 lb. increase in gross weight. (The wingloading of the F-4E, with full internal fuel and 4 AIM-7's is 80 lbs./ft².)
4. Such a gross weight change raises the question of whether the wing area should be increased. In my opinion I feel we must seriously examine the possibility of adding additional wing to minimize a performance degradation related to the weight increase. If not we are placed in the position of supporting the idea that the selection of wing area is independent of gross weight.


JOHN R. BOYD, Colonel, USAF
Chief, Development Plans & Analysis Group
D/Opnl Rqmts & Dev Plans, DCS/R&D

RDQL

4 March 1975

MEMORANDUM FOR: Maj Gen Slay

SUBJECT: F-16 Wing Area

1. I have reviewed the ASD briefing concerning the selection of wing area for the F-16.
2. In considering three wing areas - 280 sq ft, 300 sq ft, and 320 sq ft - ASD implied that 300 sq ft, based upon Performance, Risk, and Cost, was superior to the other two.
3. Performance: ASD pointed out that in terms of takeoff, performance and mission radius 320 sq ft of wing is superior to 300 sq ft. For 1G acceleration they (ASD) showed 300 sq ft as superior. For sustained turn rates they showed 320 sq ft as superior. In the Energy Maneuverability (EM) comparisons - where climb, acceleration and turn are considered together - ASD was unable to declare in favor of one wing or the other using 1, 5, and 7G EM plots in which both wings were compared against an F-16A with 280 sq ft of wing. Such uncertainty can be resolved if the 300 sq ft and 320 sq ft wings are compared to one another as well as to the basic F-16A (280 sq ft) and if the ideas, logic, and plots associated with EM theory and the Max Maneuver Concept are used together in a systematic fashion. Such a comparison reveals that 320 sq ft is superior to 300 sq ft for air-to-air combat for almost the same reasons that the F-4E with leading edge slats is better than a like F-4E not so equipped. (At your convenience I would be glad to brief you on these comparisons.)

In addition, comments were made concerning lower roll rates for the 320 sq ft wing versus the 300 sq ft wing as a result of increased rolling moment of inertia. No charts showing differences were presented. When pushed on this subject the briefer tried to establish his point by comparing the YF-16 with YF-17. Such a comparison is not valid since the YF-16 aspect ratio (3.0) is quite different than the FY-17 aspect ratio (3.5). While I agree there may be a slight roll advantage for the 300 sq ft wing, on this basis I would also agree that the 280 sq ft wing would roll slightly better than the 300 sq ft wing - yet no disadvantage for 300 sq ft was cited here. Such comments, or the lack thereof, indicate a bias with no supporting evidence.

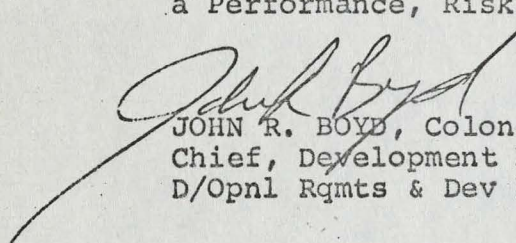
4. Risk: I do not agree that the risk for the 320 sq ft wing is moderate while the risk for 300 sq ft is low. Conveniently underplayed by the ASD briefing is the fact that the forebody, strake, and wing leading edge of the 320 sq ft wing retain the same relationship that exists in the YF-16. The 300 sq ft wing does not. Such an advantage protects the

ac/cg relationship existing in the prototype - hence the added performance attributed to the 320 sq ft wing appears less risky than that stipulated for 300 sq ft. Another point not explicitly addressed; the 8 cu ft associated with the 10-inch plug permits future weight growth. 320 sq ft is better than 300 sq ft of wing in minimizing performance losses related to a weight increase. The idea that design divergence is higher for 320 sq ft, (as opposed to 300 sq ft of wing), is associated with the possibility of exceeding 33,000 lbs takeoff gross weight (TOGW) for some loadings. If TOGW is restricted to 33,000 lbs (or less) that potential is no higher.

On the basis of these considerations, as well as those pointed out by ASD, I believe the risk of the 320 sq ft and 300 sq ft wing is a push (maybe even slightly lower for the 320 sq ft wing) instead of low for the 300 sq ft and moderate for the 320 sq ft wing.

5. Cost: I agree that a change to 300 sq ft is cheaper than going to 320 sq ft of wing. However, in view of the a priori bias toward the 300 sq ft by the ASD briefing, I remain unconvinced by the cost difference between these two wings.

6. Summary: The ASD briefing did not objectively nor systematically reflect the pros and cons for selecting the 300 sq ft over the 320 sq ft wing. Based upon the ASD data and my own analysis, I believe the 320 sq ft wing is superior overall on a Performance, Risk, and Cost basis.



JOHN R. BOYD, Colonel, USAF
Chief, Development Plans & Analysis Group
D/Opnl Rqmts & Dev Plans, DCS/R&D

RDQL

31 March 1975

MEMORANDUM FOR GENERAL SLAY

SUBJECT: F-16 Wing Area Selection

1. Once again I find myself commenting on the importance of wing area. As opposed to equipment and avionics decisions, wing area decisions are in essence irrevocable. The Air Force will have to live with the F-16 wing area and the resulting performance that is decided upon now. Since the original design, F-16 maneuvering performance has diminished significantly because of engineering necessity and conscious decisions that resulted in a substantial weight increase. With essentially a given engine the only avenue remaining for minimizing a performance loss is through the addition of wing area. This brings us to the question of whether the Air Force should select the 300 or 320 sq ft wing - the only two increased wing area options offered.

2. Per your suggestion, Col Thurman and I met in my office 11 March 1975, concerning the selection of wing area for the F-16 based upon Performance, Risk, and Cost. Also present during the discussion were Maj John Colwell and Lt Col Mike Loh.

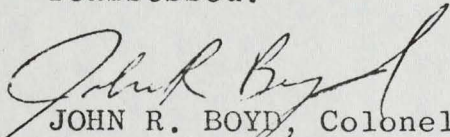
- Performance: After many words between Col Thurman and myself about the merit of turn and acceleration and how they are part of Energy Maneuverability Theory and the Max Maneuver Concept, Col Thurman admitted that the 320 sq ft wing is superior to the 300 sq ft wing on the basis of performance.

- Risk: On the basis of Risk, Col Thurman indicated that the 300 and 320 sq ft wings are "almost a push" - with the 320 being a bit more risky. During this discussion he pointed out that the 300 sq ft wing would cause a refairing of the fuselage - but not as much as would occur with the 320 sq ft wing. He also revealed that the 300 sq ft wing would need larger actuators - but not as many as the 320 sq ft wing. Neither of these points about the 300 sq ft wing were brought out during the ASD briefing to the Configuration Control Committee concerning wing area selection. It is important that the F-16 SPO now considers the Risk of the 300 and 320 sq ft wings to be "almost a push" instead of "low" for the 300 and "moderate" for the 320 as presented by the ASD briefing.

- Cost: In discussing cost, Col Thurman indicated the 320 sq ft wing would cost around \$30,000 to \$35,000 instead of the \$40,000 shown during the ASD briefing. In summing up his views on Performance, Risk, and Cost, Col Thurman stated the real reason for selecting the 300 over the 320 sq ft wing was on the basis of cost. If cost in fact was such a dominant consideration then logic would indicate that 280 sq ft of wing should have been selected.

3. Summary: In view of the information cited above it would appear that the Configuration Control Committee based its 300 sq ft wing area decision on inputs consisting of incomplete and/or misleading assessments of maneuvering performance, risk, and cost.

4. Action: Given that better wing area information can be made available, it is recommended that the Configuration Control Committee be convened and that the Committee's decision be reassessed.



JOHN R. BOYD, Colonel, USAF
Chief, Dev Plans & Analysis Gp
D/Opnl Rqmts & Dev Plns, DCS/R&D

JTF OBSERVATION LWF vs TYPE I/II

Test

THE OBSERVATIONS OF THE JOINT TEAM PILOTS DURING ACTUAL ENGAGEMENTS WITH TYPE I AND TYPE II AIRCRAFT ARE SUMMARIZED IN THIS CHART. AS WAS EXPECTED BOTH THE YF-16 AND YF-17 DOMINATED ENGAGEMENTS WITH THE TYPE AIRCRAFT. THE YF-16 WAS COMPLETELY DOMINATE AND ALLOWED THE PILOTS TO QUICKLY GAIN AND MAINTAIN A POSITION ADVANTAGE. THE YF-17 ON THE OTHER HAND WAS LESS DOMINATE AGAINST THE TYPE I AIRCRAFT IN THE LOW ALTITUDE (10,000 FEET), LOW AIRSPEED (AROUND 200 KIAS) ARENA AND REQUIRED THE PROPER USE OF FIGHTER MANEUVERS TO GAIN A POSITION OF ADVANTAGE. ADDITIONALLY THE TYPE II AIRCRAFT AGAINST THE YF-17 WAS CAPABLE OF EFFECTING SEPARATION AFTER THE INITIAL TURN IN A HEAD-ON PASS OR FOLLOWING A HIT AND RUN ATTACK. SIGNIFICANTLY, THIS WAS NOT TRUE WITH THE TYPE II AGAINST THE YF-16.

THESE TEST RESULTS SUGGEST THAT OTHER FACTORS CAN AND DO AFFECT THE OUTCOME OF AIR COMBAT MANEUVERING ENGAGEMENTS. ENERGY MANEUVERABILITY ANALYSIS AND COMPUTER MODELING ^{do} ~~DOES~~ NOT APPEAR TO BE COMPLETELY AMENABLE TO THESE FACTORS. FOR EXAMPLE UNDER THE FACTOR CONTROLLABILITY THE PILOTS ABILITY TO USE VERTICAL MANEUVERS, EASE OF GETTING MAXIMUM MANEUVERING PERFORMANCE, AND DECELERATION EFFECTIVENESS ARE INHERENT IN THE PILOT/AIRCRAFT INTERFACE AND DIFFICULT TO QUANTIFY. ALSO, THE EXCELLENT ACCELERATION PERFORMANCE ALLOWED ^A MULTITUDE OF ENGAGE/DISENGAGE OPTIONS. THESE WERE DOMINATE FACTORS IN THIS EVALUATION. OTHER FACTORS AFFECTING THE OUTCOME INCLUDED, OUT OF COCKPIT VISIBILITY, DIFFICULTY IN DETERMINING THE YF-16'S ASPECT ANGLE DUE TO ITS SIZE AND SHAPE AND THE HIGH "G" COCKPIT.

THESE TEST RESULTS SUGGEST THAT OTHER FACTORS CAN AND DO AFFECT THE OUTCOME OF AIR COMBAT MANEUVERING ENGAGEMENTS. ENERGY MANEUVERABILITY ANALYSIS AND COMPUTER MODELING DOES NOT APPEAR TO BE COMPLETELY AMENABLE TO THESE FACTORS. FOR EXAMPLE UNDER THE FACTOR CONTROLLABILITY THE EASE OF GETTING MAXIMUM MANEUVERING PERFORMANCE, THE PILOTS ABILITY TO USE VERTICAL MANEUVERS AND DECELERATION EFFECTIVENESS ARE INHERENT IN THE PILOT/AIRCRAFT INTERFACE AND DIFFICULT TO QUANTIFY. THEY WERE DOMINATE FACTORS IN THIS EVALUATION. OUT OF THE COCKPIT VISIBILITY IS OFTEN THE DETERMINING FACTOR IN SELECTING THE APPROPRIATE COMBAT MANEUVER. IT ALSO FOLLOWS THAT THE ABILITY TO CHOOSE THE MULTITUDE OF ENGAGE/DISENGAGE OPTIONS IS A FUNCTION OF PILOT EXPERIENCE AND ENVIRONMENT SITUATION (E.G., FUEL STATE, WEATHER, ETC., ETC). THE SIZE AND SHAPE OF THE AIRCRAFT PLAYS AN IMPORTANT PART IN THE INITIATION OF PROPER COUNTER MANEUVERING. THE TYPE PILOTS REPORTED DIFFICULTY IN DETERMINING THE ASPECT ANGLE OF THE YF-16. THIS IS ALSO TRUE DUE TO CAMOUFLAGE AND LOW CROSS SECTION FROM THE FORWARD OR AFT VIEW OF THE AIRCRAFT. FINALLY THE HIGH "G" COCKPIT AND SEAT COMFORT AFFORDED IN THE DESIGNS ENHANCE "G" SUSTAINABILITY AND EFFECTED THE RESULTS.

JOINT TEST FORCE OBSERVATIONS ON LWF

ACM AGAINST TYPE I/II FIGHTERS

- . BOTH YF-16 AND YF-17 DOMINATED TYPE I/II FIGHTER ENGAGEMENTS.
- . YF-16 COMPLETELY DOMINANT
- . YF-17 WAS LESS DOMINANT OVER TYPE I AT LOW ALTITUDE/AIRSPEED.
- . TYPE II FIGHTER WAS CAPABLE OF DISENGAGING FROM YF-17 IN A NUMBER OF ENGAGEMENT SITUATIONS, THIS WAS NOT TRUE WITH THE YF-16.

- . THESE RESULTS SUGGEST OTHER FACTORS AFFECTING OUTCOMES NOT COMPLETELY AMENABLE TO EM ANALYSIS OR COMPUTER MODELING:

- | | |
|---|-------------------------------|
| . CONTROLLABILITY | . VISIBILITY (OUT OF COCKPIT) |
| - USE OF VERTICAL MANEUVERING | . SIZE/SHAPE |
| - EASE OF GETTING MAX MANEUVERING PERFORMANCE | . HIGH G COCKPIT |
| - DECELERATION EFFECTIVENESS | |
| . ENGAGE/DISENGAGE OPTIONS | |

JOINT TEST FORCE OBSERVATIONS ON LWF

ACM AGAINST TYPE I/II FIGHTERS

- . BOTH YF-16 AND YF-17 DOMINATED TYPE I/II FIGHTER ENGAGEMENTS.
- . YF-16 COMPLETELY DOMINANT
- . YF-17 WAS LESS DOMINANT OVER TYPE I AT LOW ALTITUDE/AIR SPEED.
- . TYPE II FIGHTER WAS CAPABLE OF DISENGAGING FROM YF-17 IN ^{A NUMBER OF} ENGAGEMENT SITUATIONS,
THIS WAS NOT TRUE WITH THE YF-16.

RESULTS

THESE SUGGEST OTHER FACTORS AFFECTING OUTCOMES NOT COMPLETELY AMENABLE TO EM ANALYSIS OR COMPUTER MODELING:

- | | |
|---|---|
| . CONTROLLABILITY | . SIZE/SHAPE |
| - USE OF VERTICAL MANEUVERING | - COMPLICATES DETERMINATION OF ASPECT ANGLE |
| - EASE OF GETTING MAX MANEUVERING PERFORMANCE | - REDUCES ACQUISITION/WITH CAMOUFLAGE/LOW CROSS-SECTION |
| - DECELERATION EFFECTIVENESS | . G SUSTAINABILITY |
| . VISIBILITY (OUT OF COCKPIT) | - HIGH G COCKPIT |
| . ENGAGE/DISENGAGE OPTIONS | - SEAT COMFORT |

AIR BATTLE ARENA

507

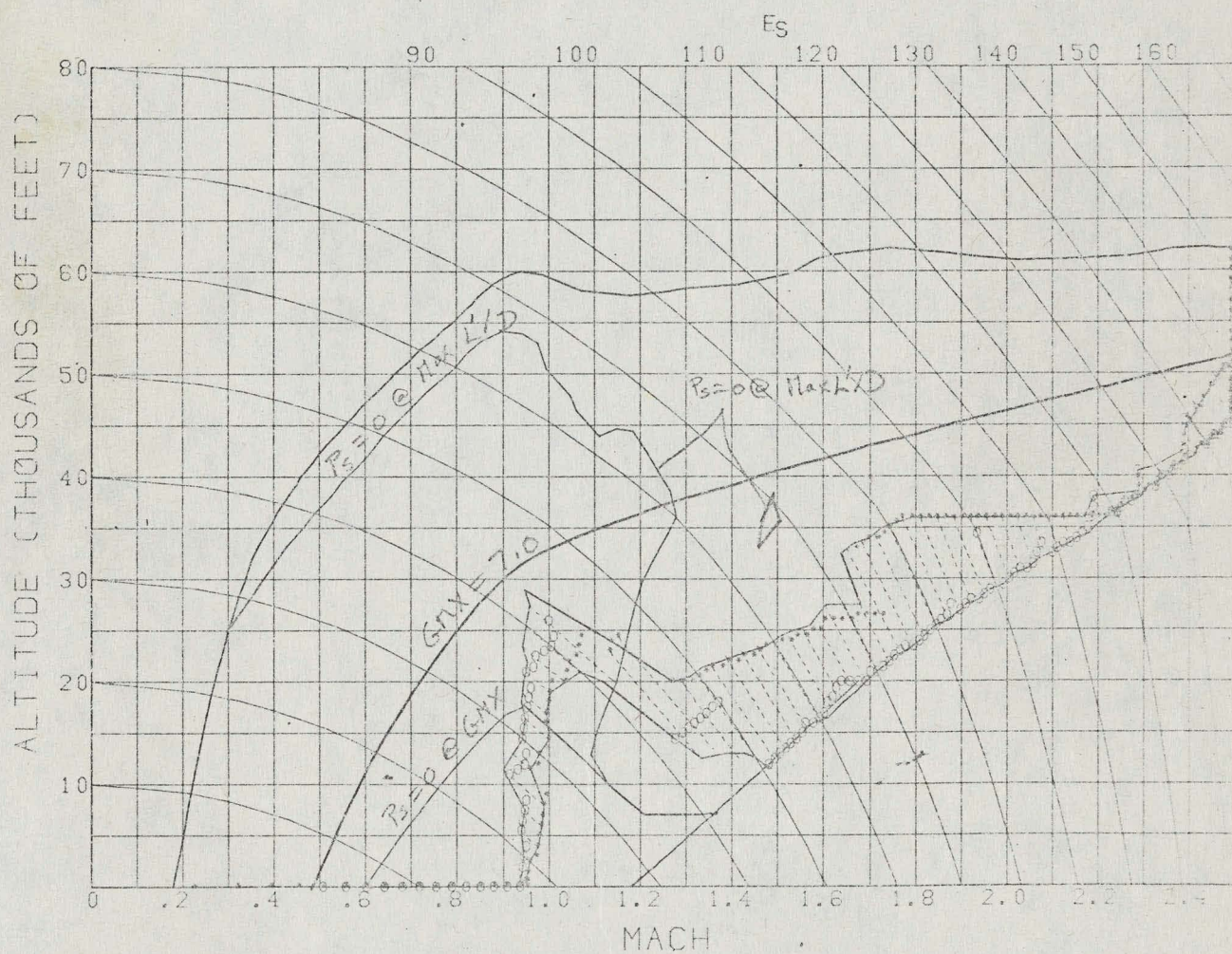
DC2 - MAX PWR

4A7

68% (7608)

36520

MAR 1 1974



PLOT PREPARED BY TSX, ADTC

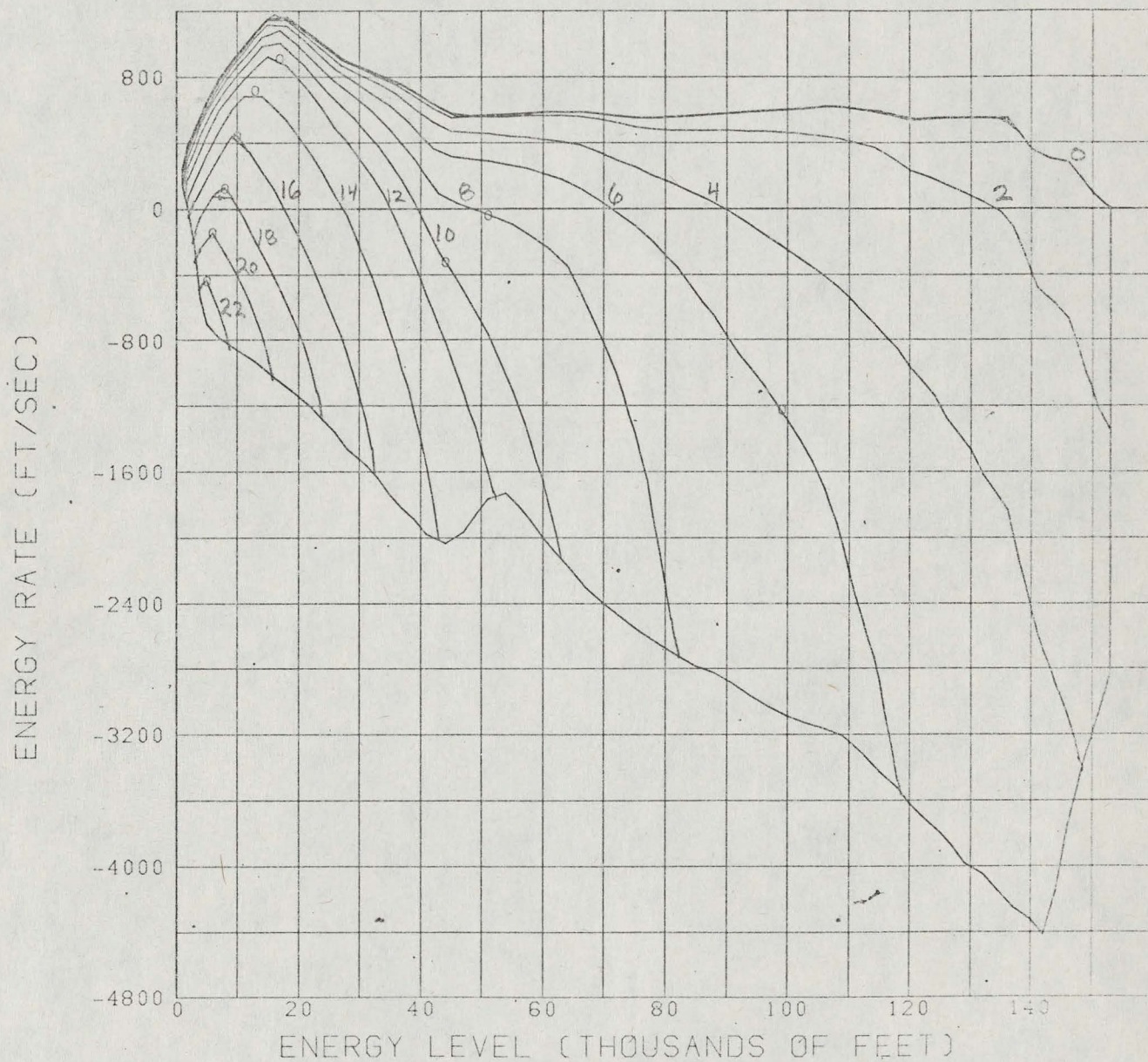
4A7
68% (7608)
36520
507

MAR 1 1974

MAX MANEUVER DIAGRAM

DC2 -MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

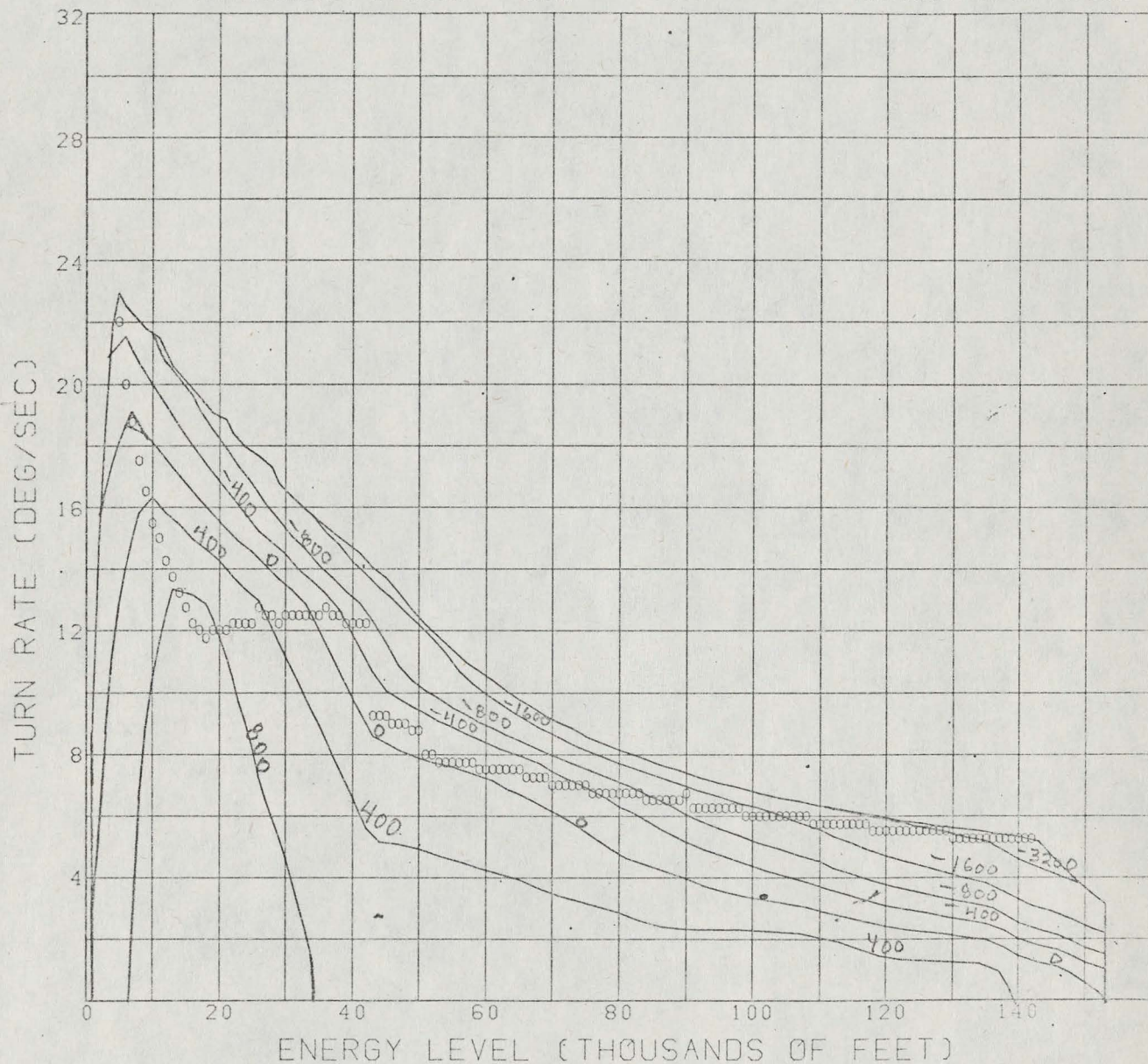
4A7
(68% (7600))
36520
507

MAR 1 1974

MAX MANEUVER DIAGRAM

DC 2 -MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

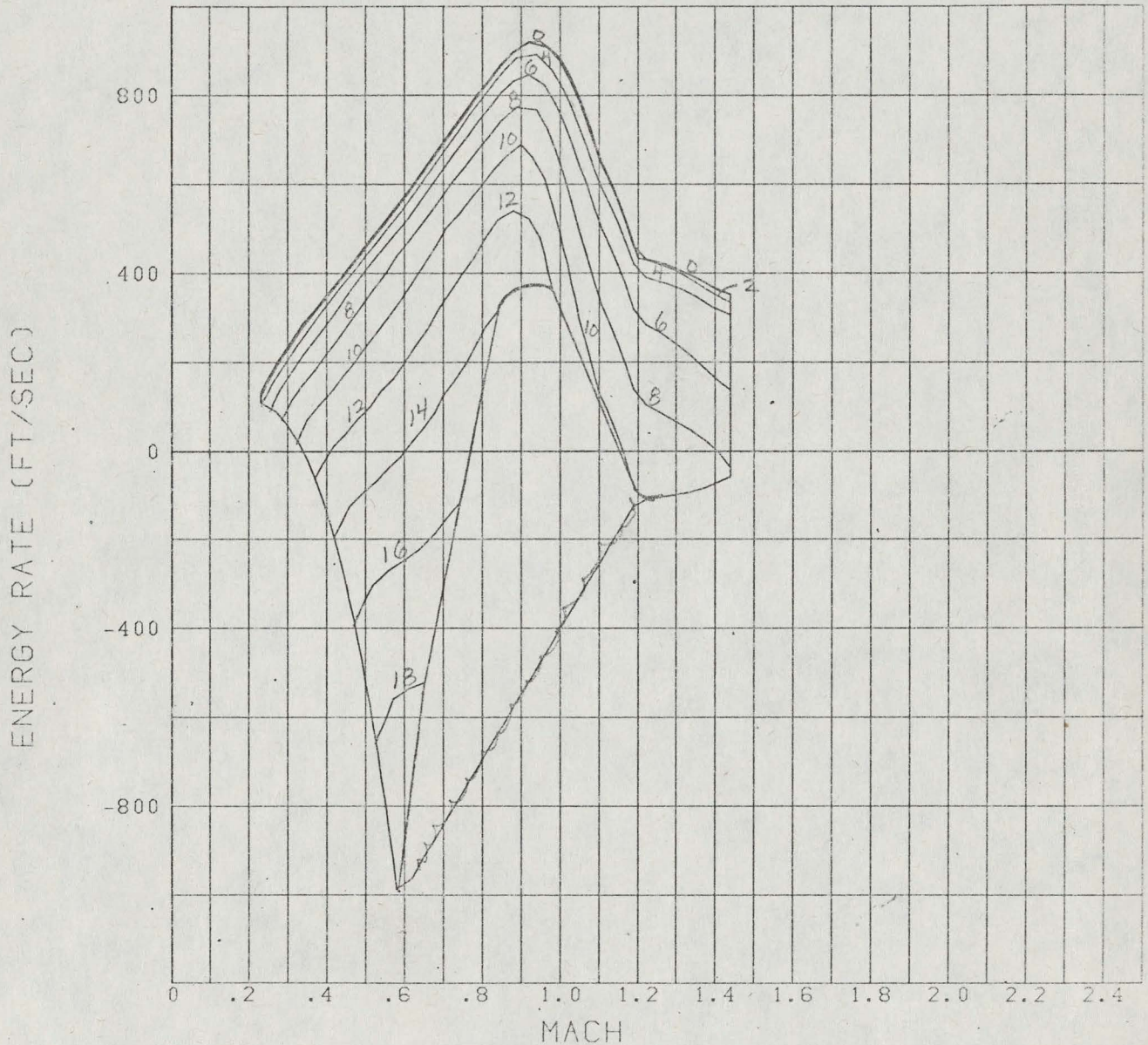
4A7
68392 (7607)
36519

MANEUVER DIAGRAM
ALTITUDE 10000 FEET

$\dot{\theta} = 507$

DC 2 -MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

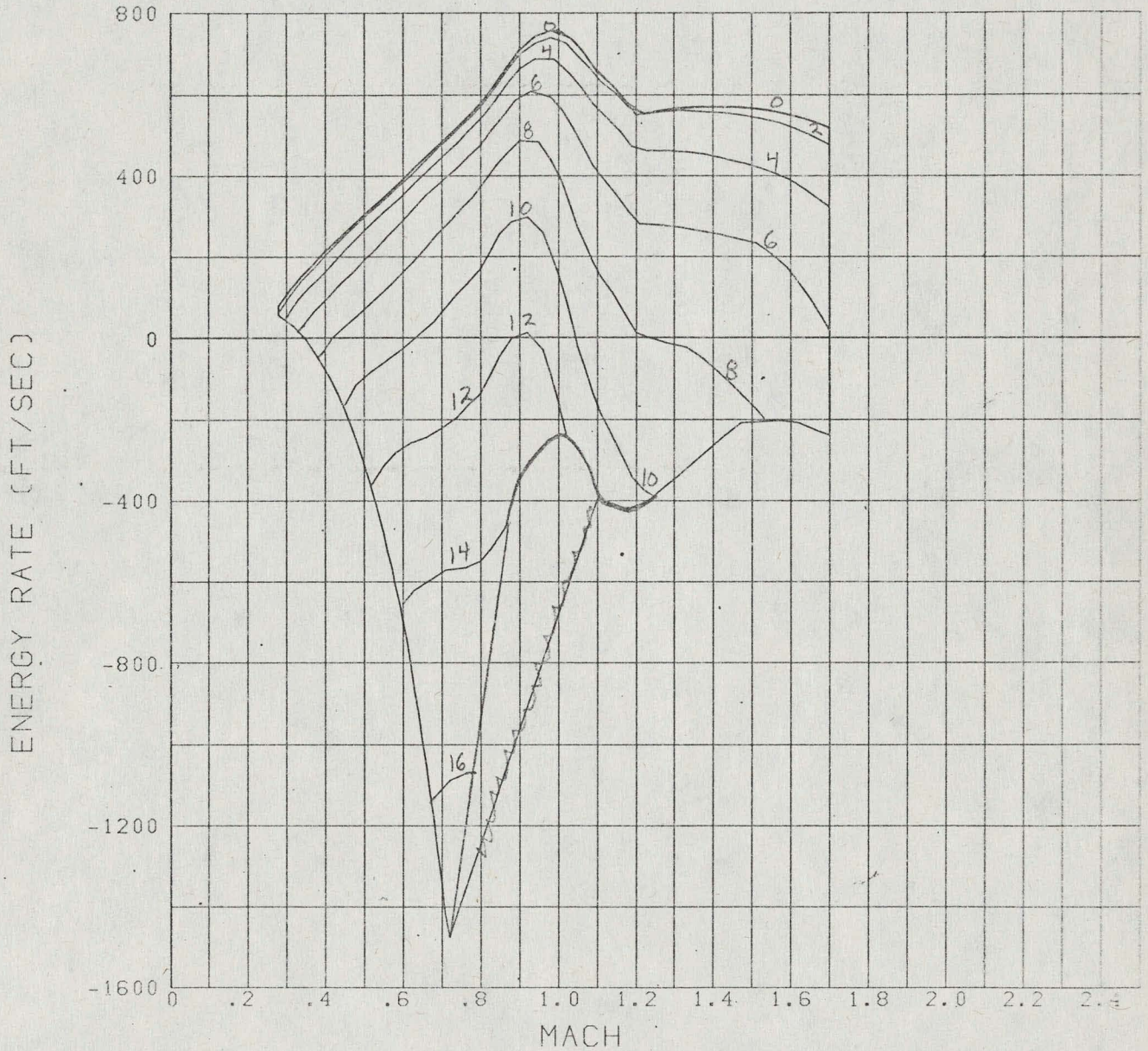
4A7
68.3% (7607)
36519

MAR 27 1974

MANEUVER DIAGRAM
ALTITUDE 20000 FEET

507
DC 2 -MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

4A7
68.3% (7607)
36519

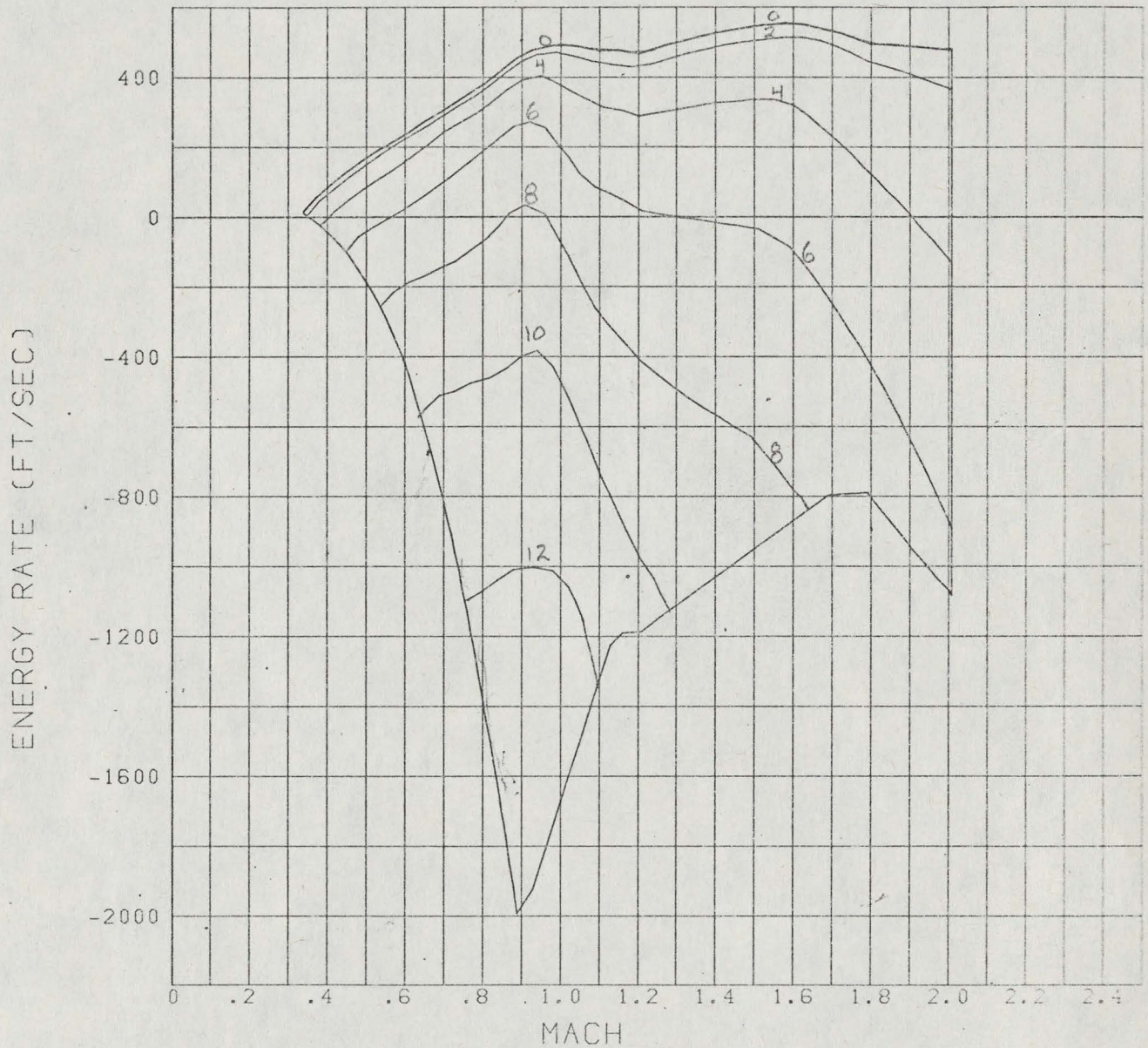
MAR 27 1974

MANEUVER DIAGRAM
ALTITUDE 30000 FEET

$\theta = 507$

DC2 -MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

4A7
6832(7607)
36519

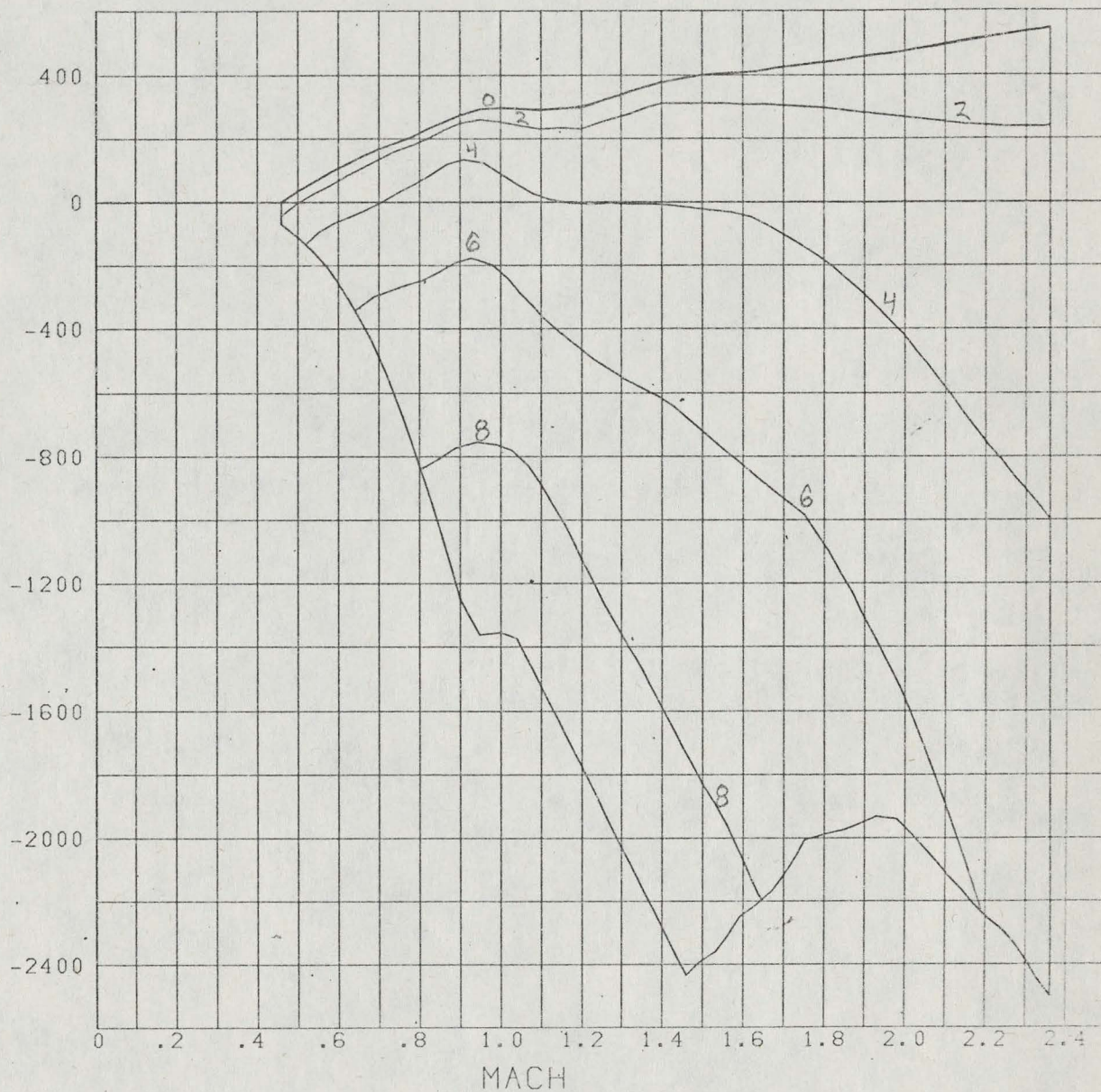
MANEUVER DIAGRAM
ALTITUDE 40000 FEET

$\dot{\theta} = 507$

DC 2 -MAX PWR

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

PS 507

MAR 1 1974

MAXIMUM POWER

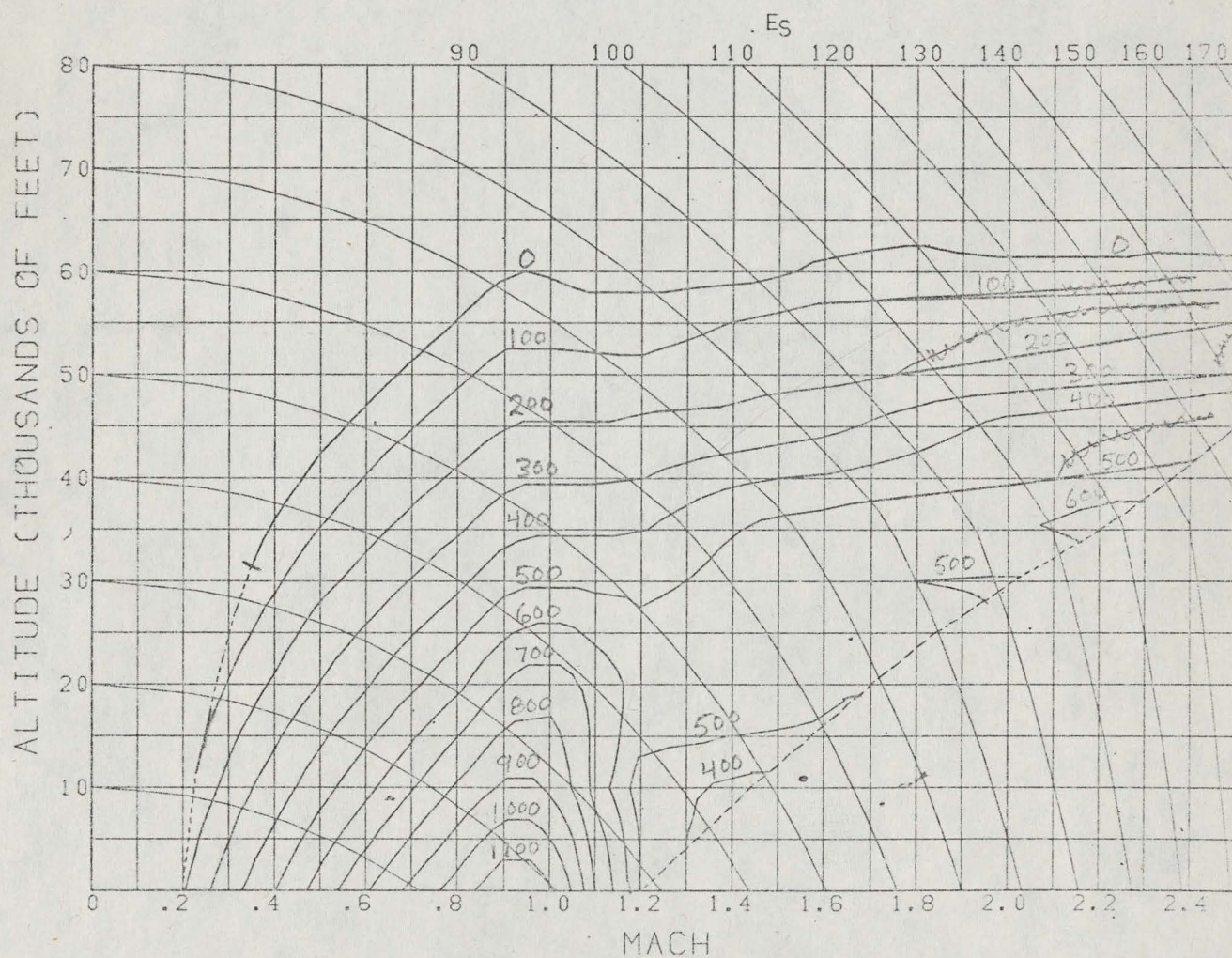
D/C 2

4A7

68% (7608)

36520

1.00 G DIAGRAM

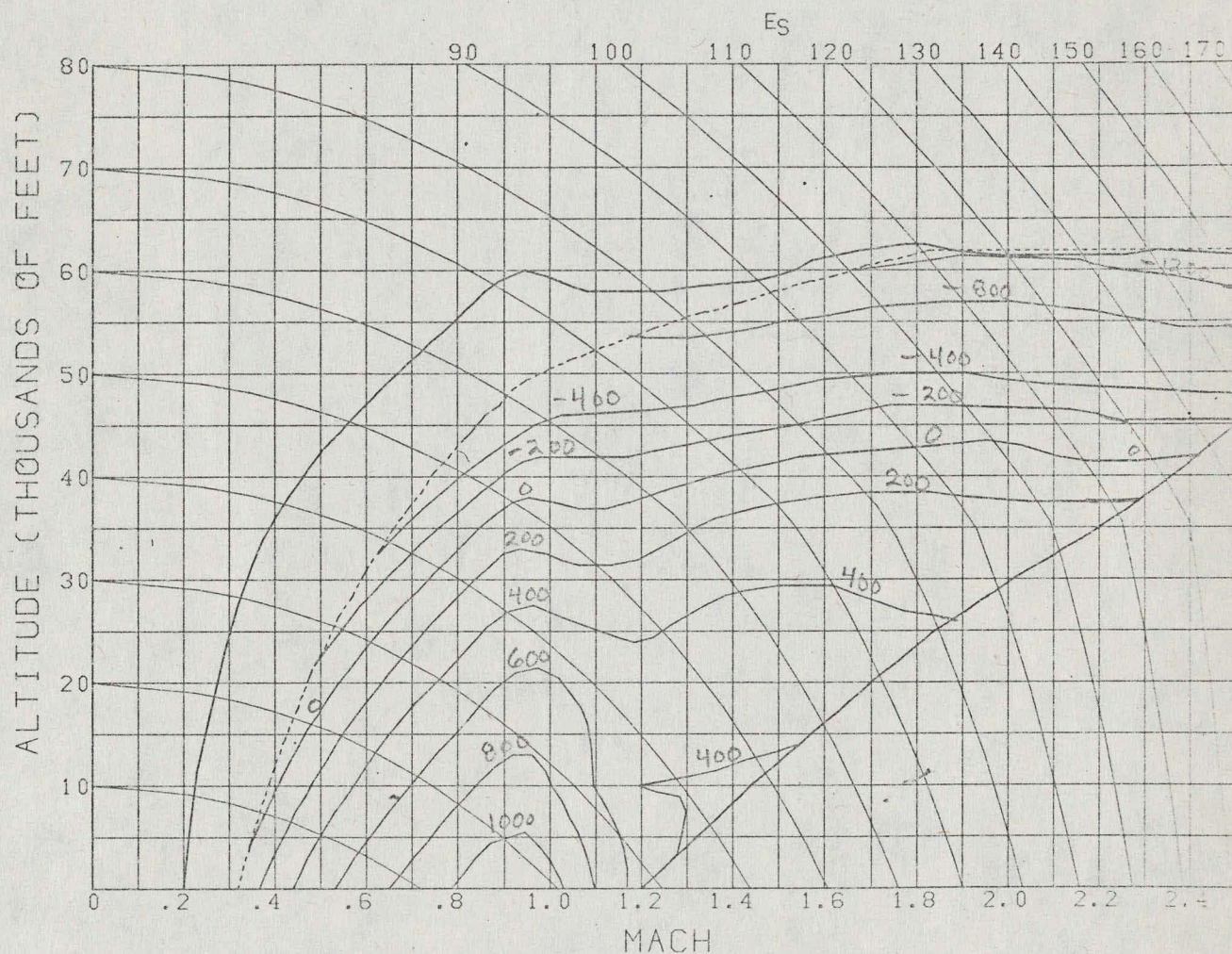


PLOT PREPARED BY TSX, ADTC

PS 507
MAXIMUM POWER
D/C 2
4A7
(687.7608)
36520

MAR 1 1974

3.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

PS 507

MAR 1 1974

MAXIMUM POWER

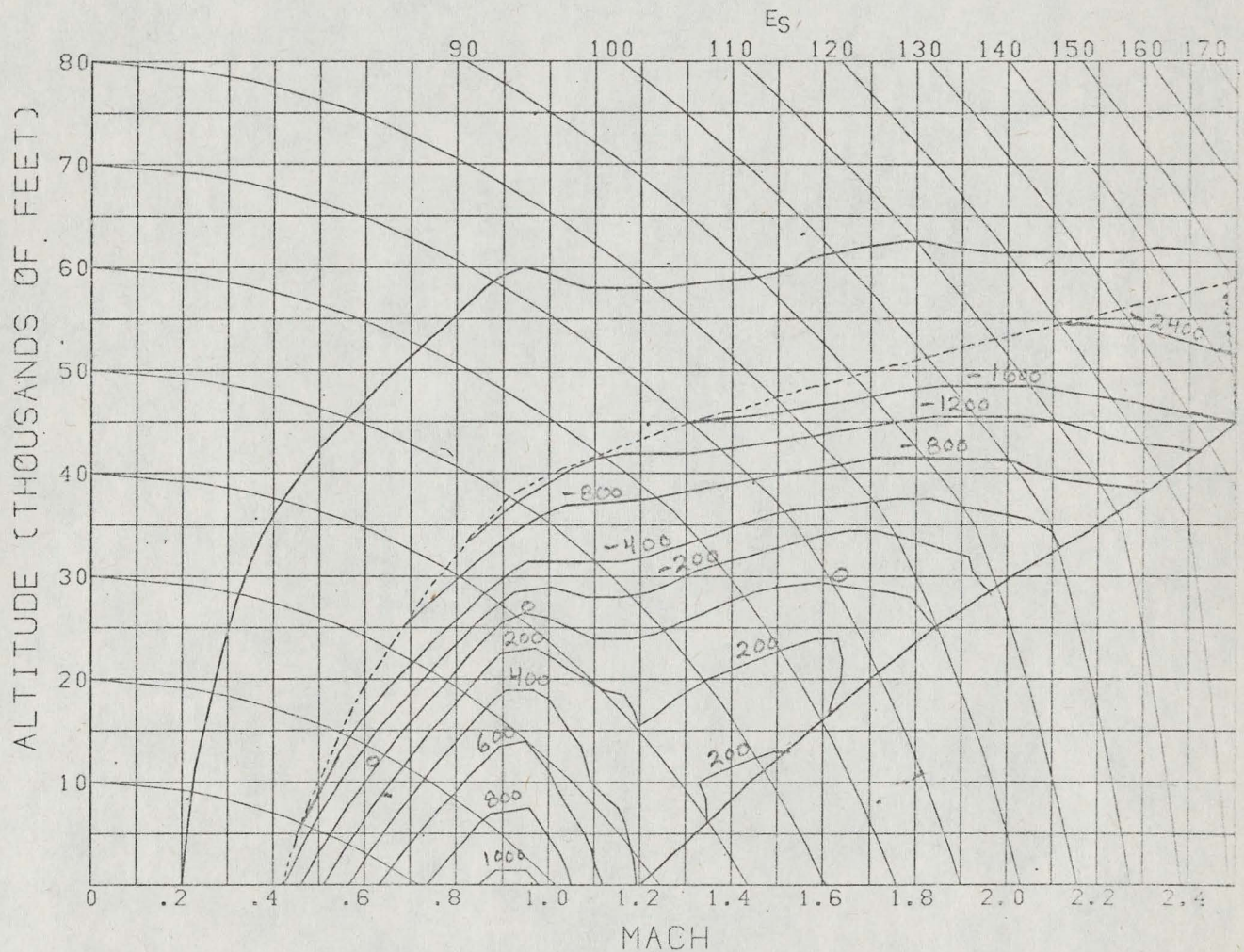
D/C 2

4A7

68% (7608)

36520

5.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

PS 507

MAXIMUM POWER

MAR 1 1974

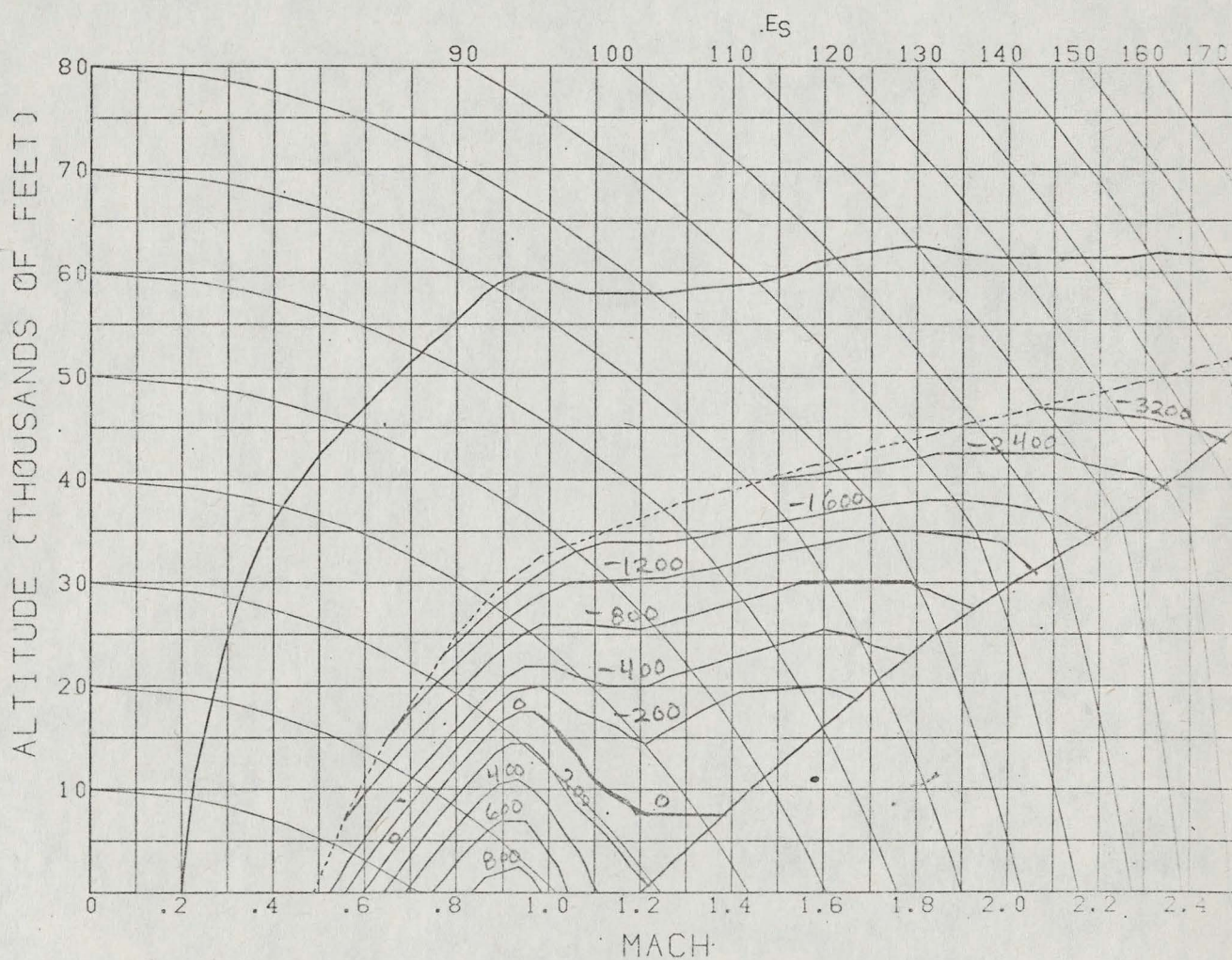
D/C 2

4A7

68% (7600)

36520

7.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

4A7
 1100 -7.36
 (500)
 ESTART = 42000
 507

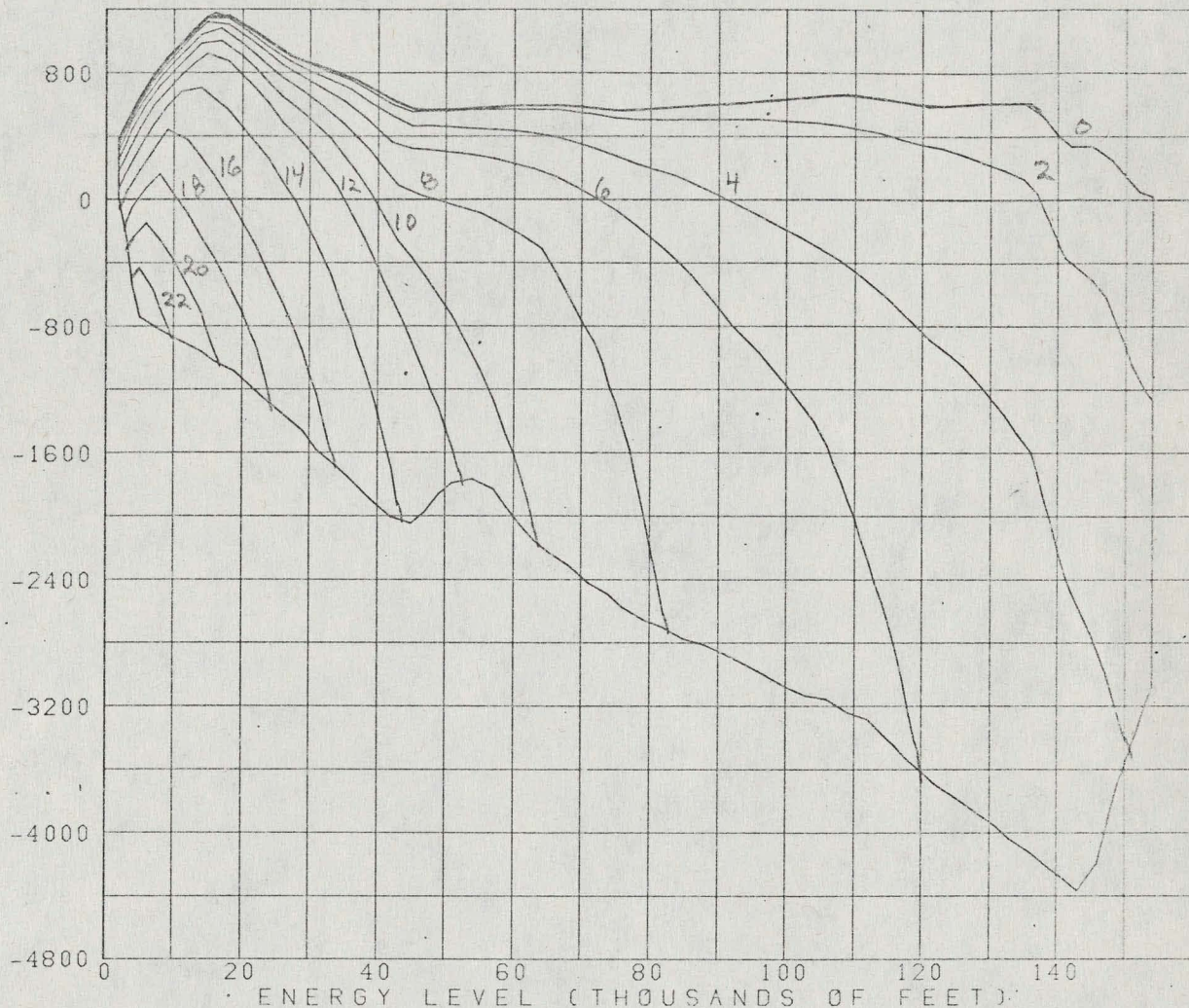
MAR 1 1974

MAX MANEUVER DIAGRAM

DC2 -MAX PWR

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



MGAT				0	15	34	52	71	89	106	123	139	157	175	211
MMP	11.4	11.4	11.2	10.5	3.5	3.0	2.6	1.8	1.6	1.0	0.8	0.6	0.4	0.3	0.1
MEMF	11.5	11.5	11.4	11.3	10.6	8.8	5.3	3.3	2.5	1.8	1.3	0.9	0.6	0.4	0.2

PLOT PREPARED BY TSX, ADTC

Persistence (Deg)

507
4A7
1.00 → 1.36
(500)

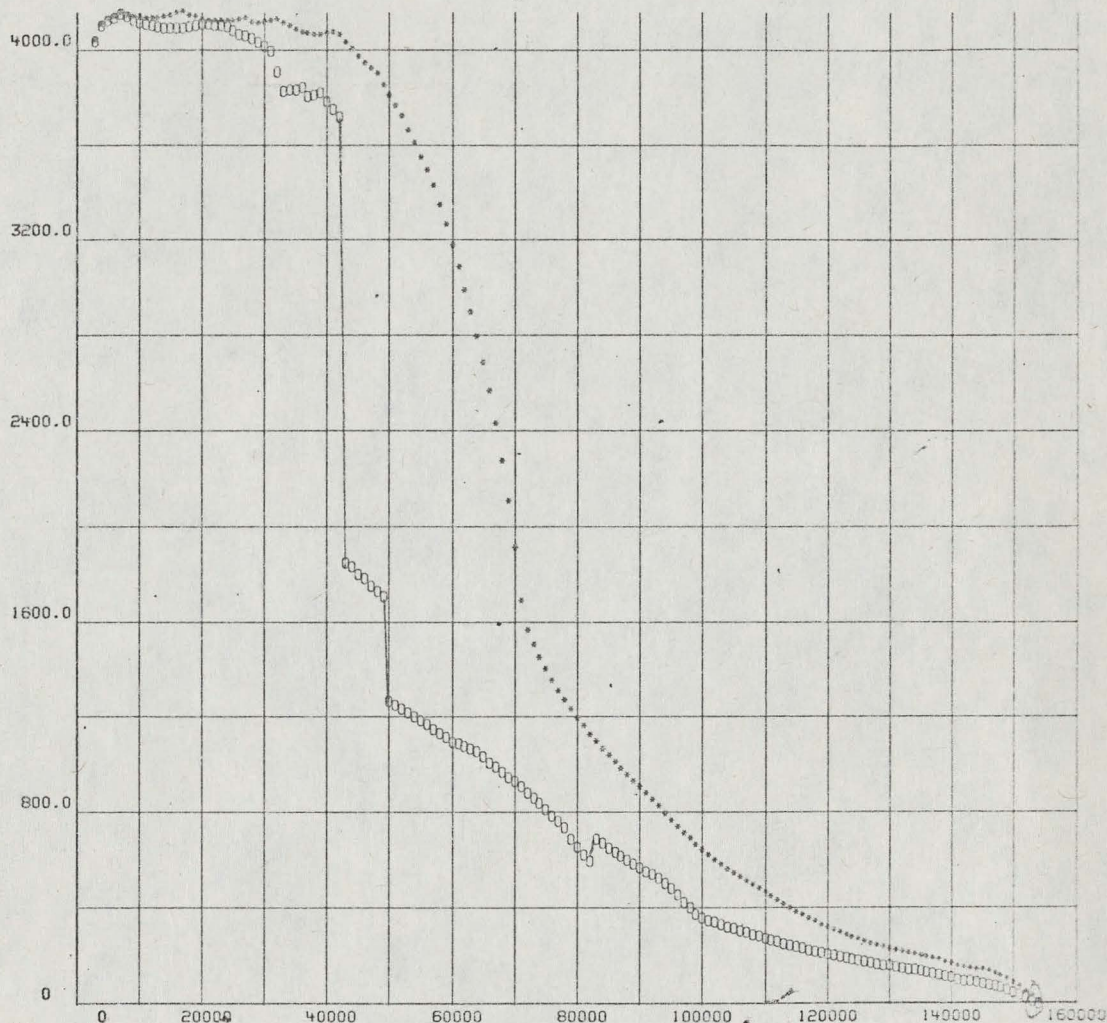
MAR 1 1974

ESTART = 42000

M
M
P
0
0

M
E
M
P
0
0

(DEG)



ENERGY LEVEL (THOUSANDS OF FEET)

PLOT PREPARED BY TSX, ADTC

Persistence Paths

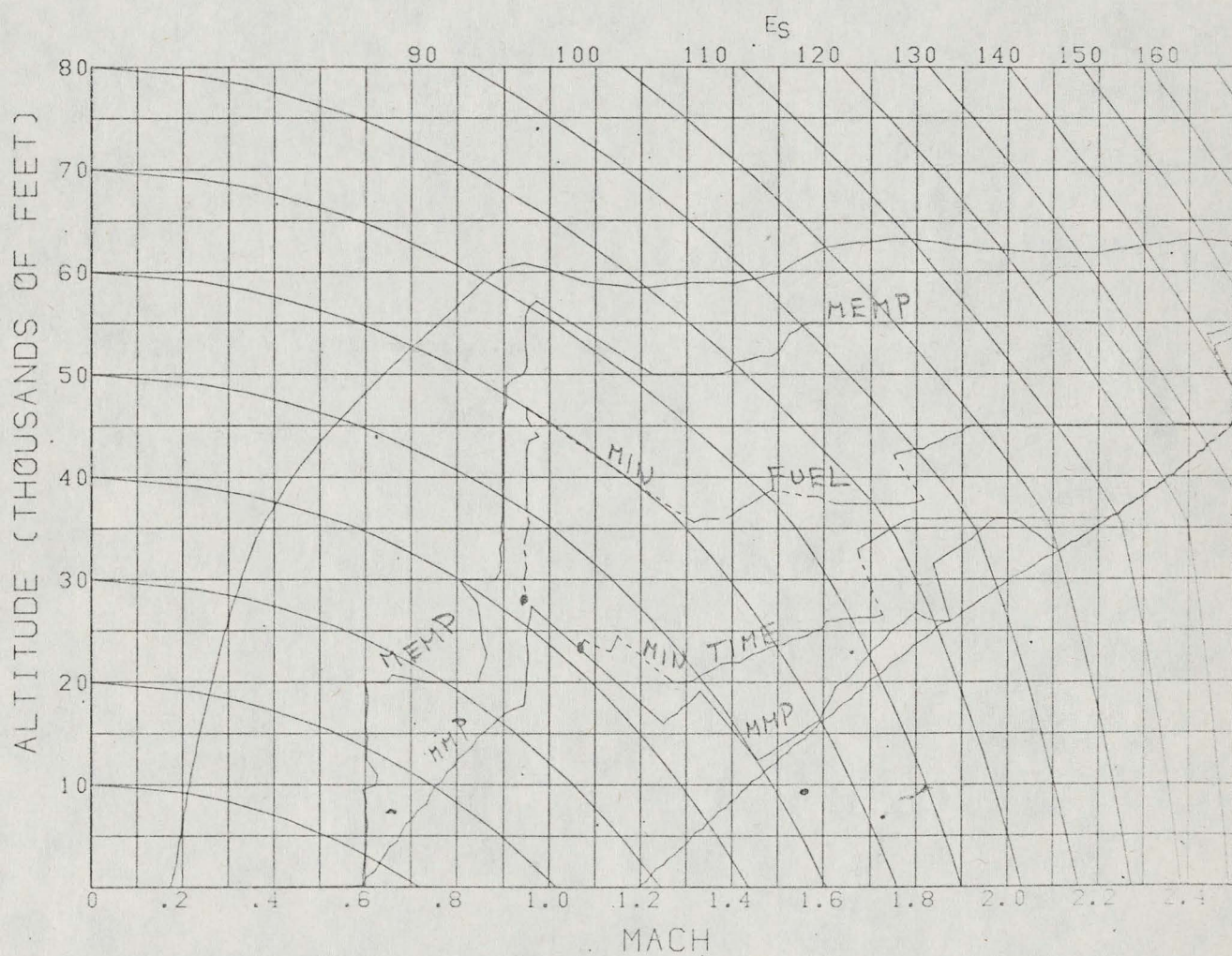
507

4A7

1100 → 136
(500)

ESTART = 42000

MAR 1 1974



PLOT PREPARED BY TSX, ADTC

Persistence (Turns)

507

DC2 - MAX PWR

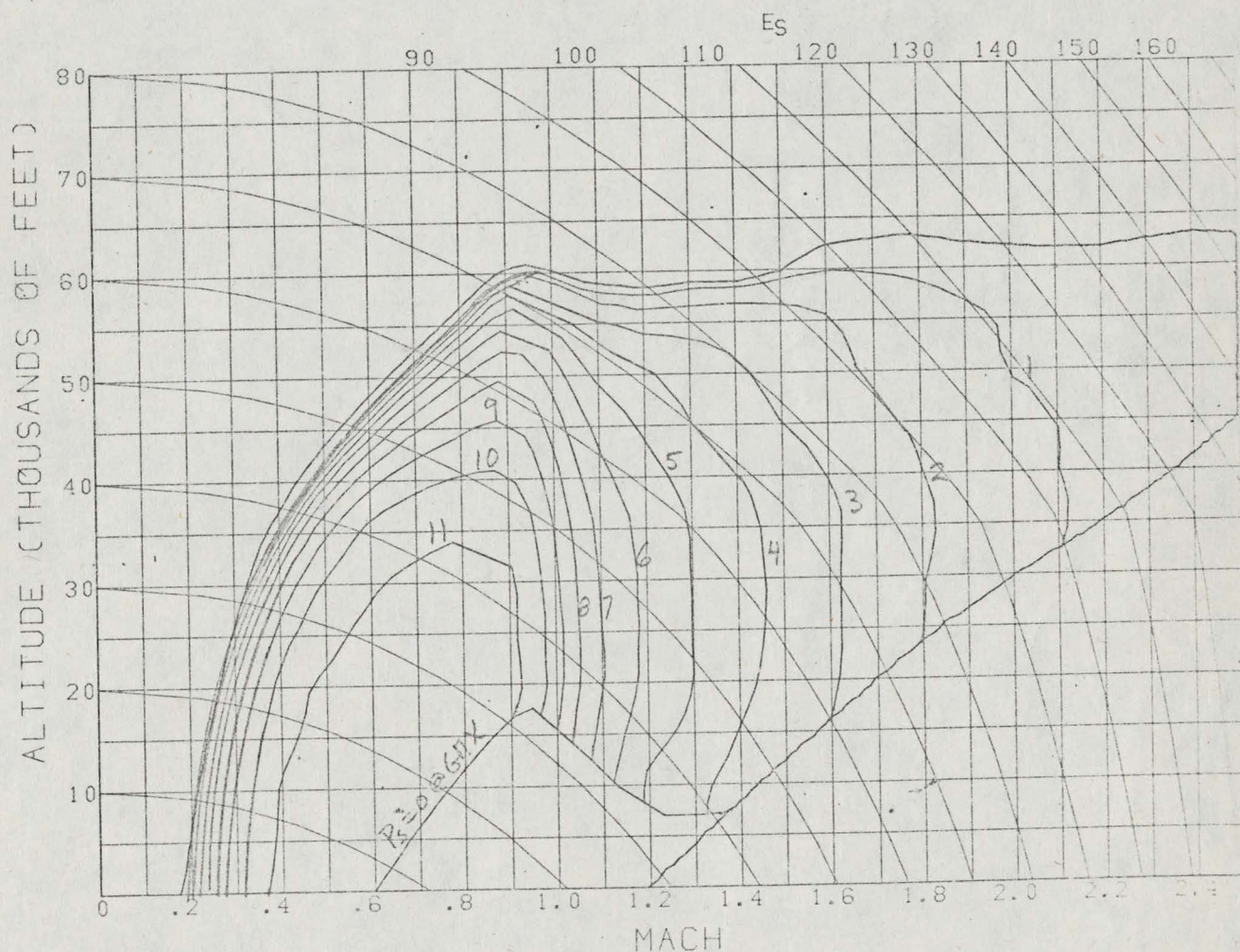
4A7

1.00 → .36
(500)

ESTART = 42000

MAR 1 1974

HORIZONTAL ATTITUDE

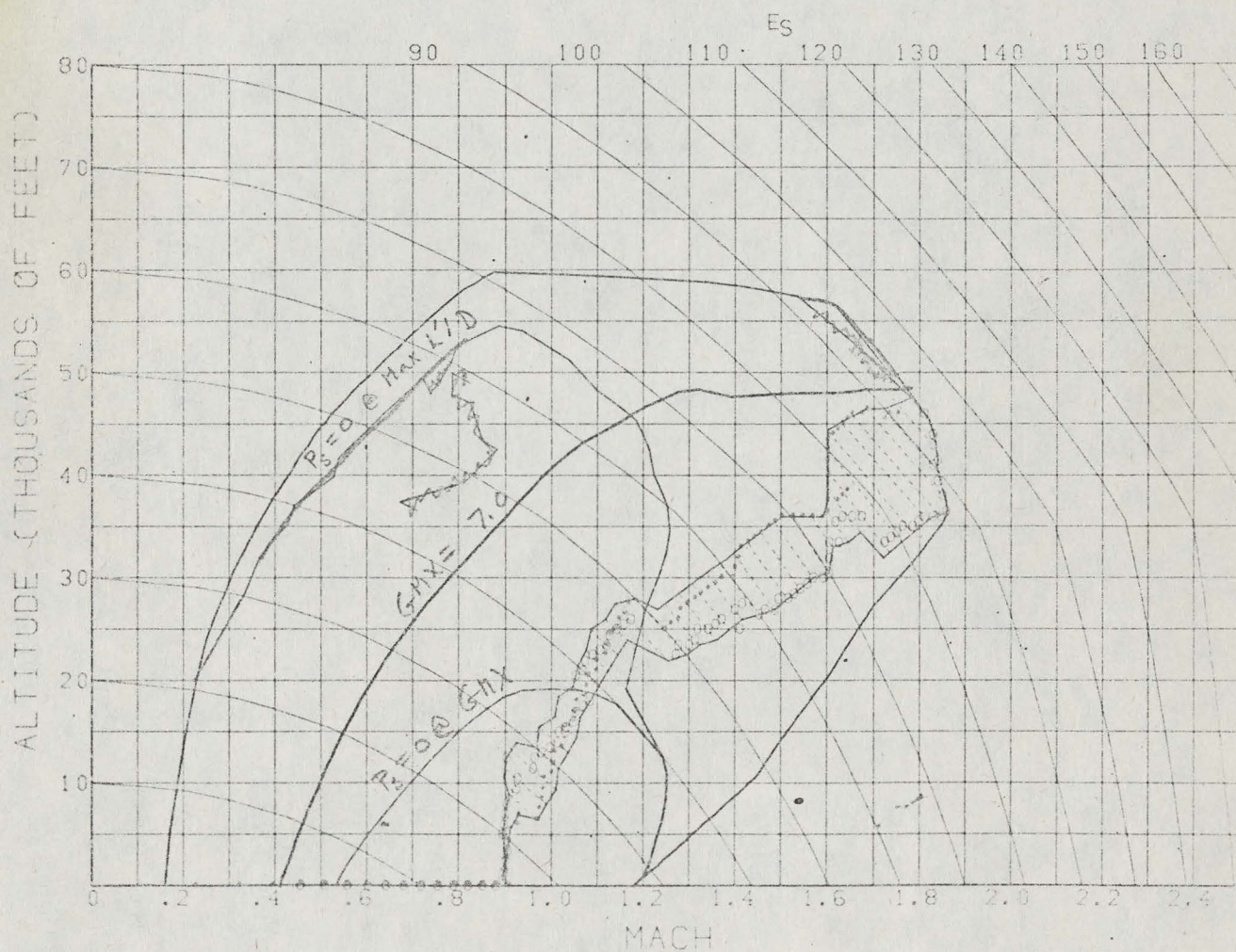


PLOT PREPARED BY TSX, ADTC

FEB 27 1974

AIR BATTLE ARENA

407
DC1 - MAX PWR
2A9
60% (3853)
17879



PLOT PREPARED BY TSX, ADTC

FEB 27 1974

2A9
60% (3853)

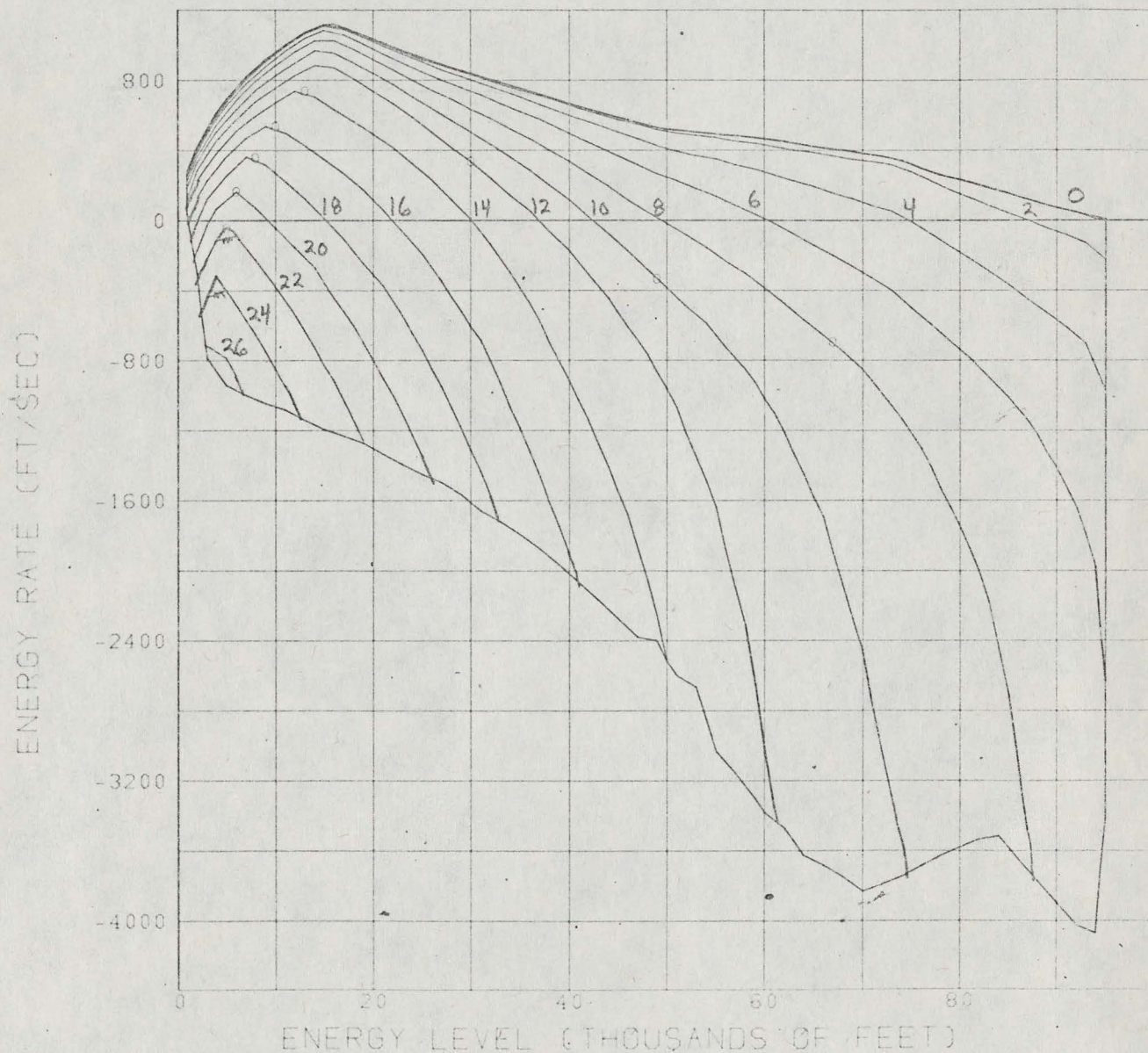
17878

$\Theta = 407$

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

FEB 27 1974

2A1
6070(3853)

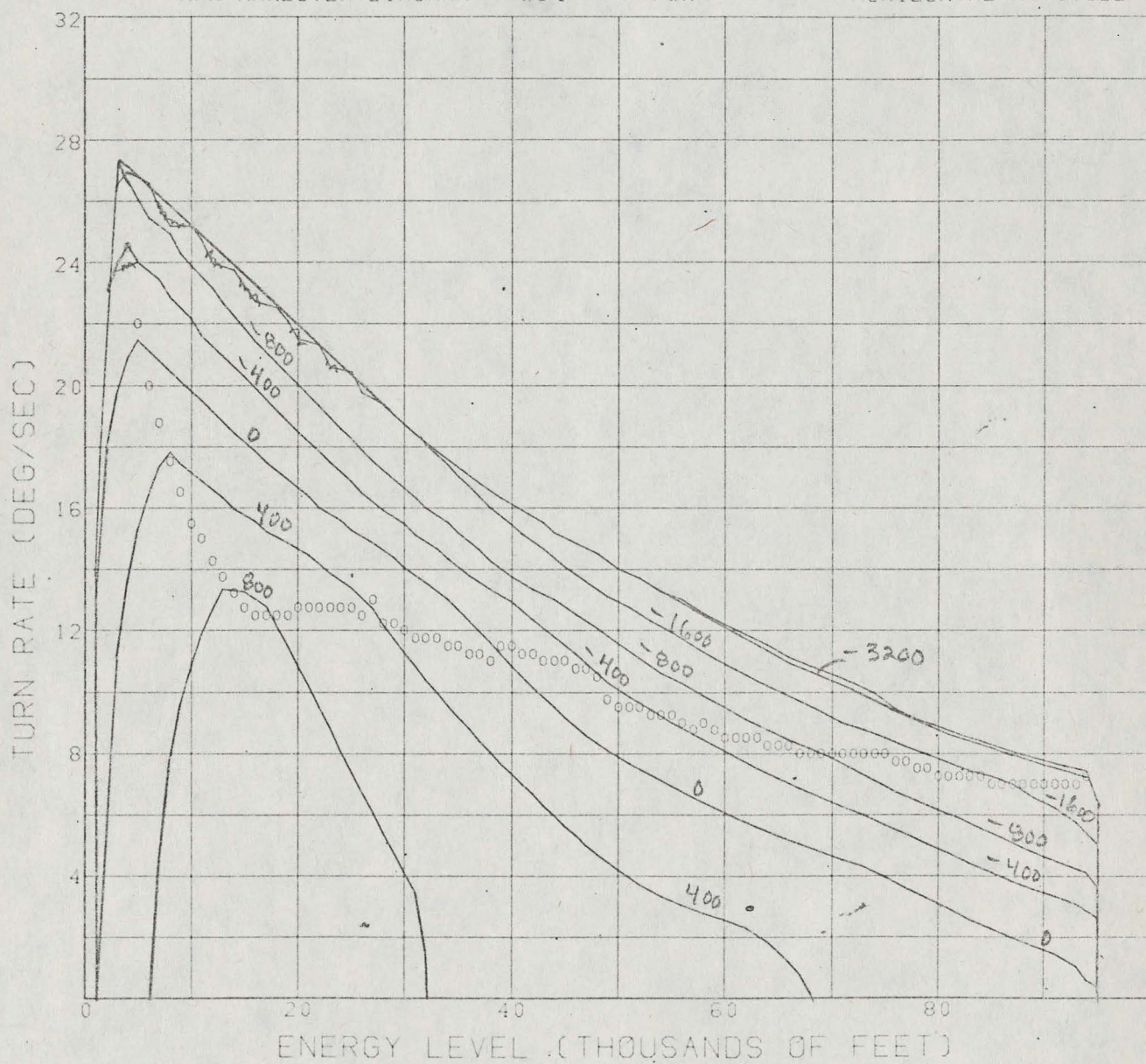
17878

407

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR

HORIZONTAL ATTITUDE



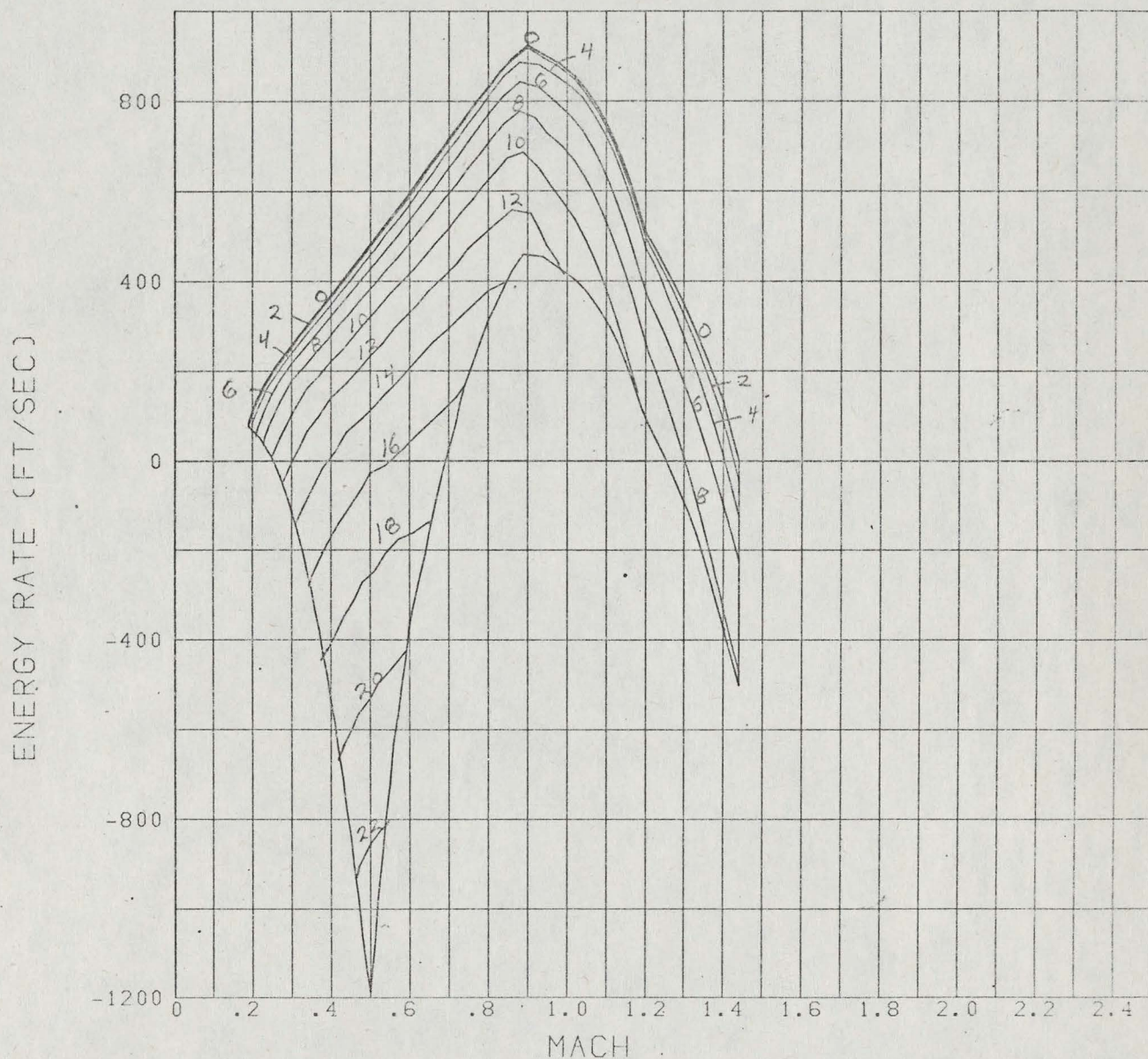
PLOT PREPARED BY TSX, ADTC

MAR 27 1974

2A9
60.2% (3852)
17877

MANEUVER DIAGRAM $\dot{\theta} = 407$
ALTITUDE 10000 FEET DC1 -MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

2A9
60.2% (3852)
17877

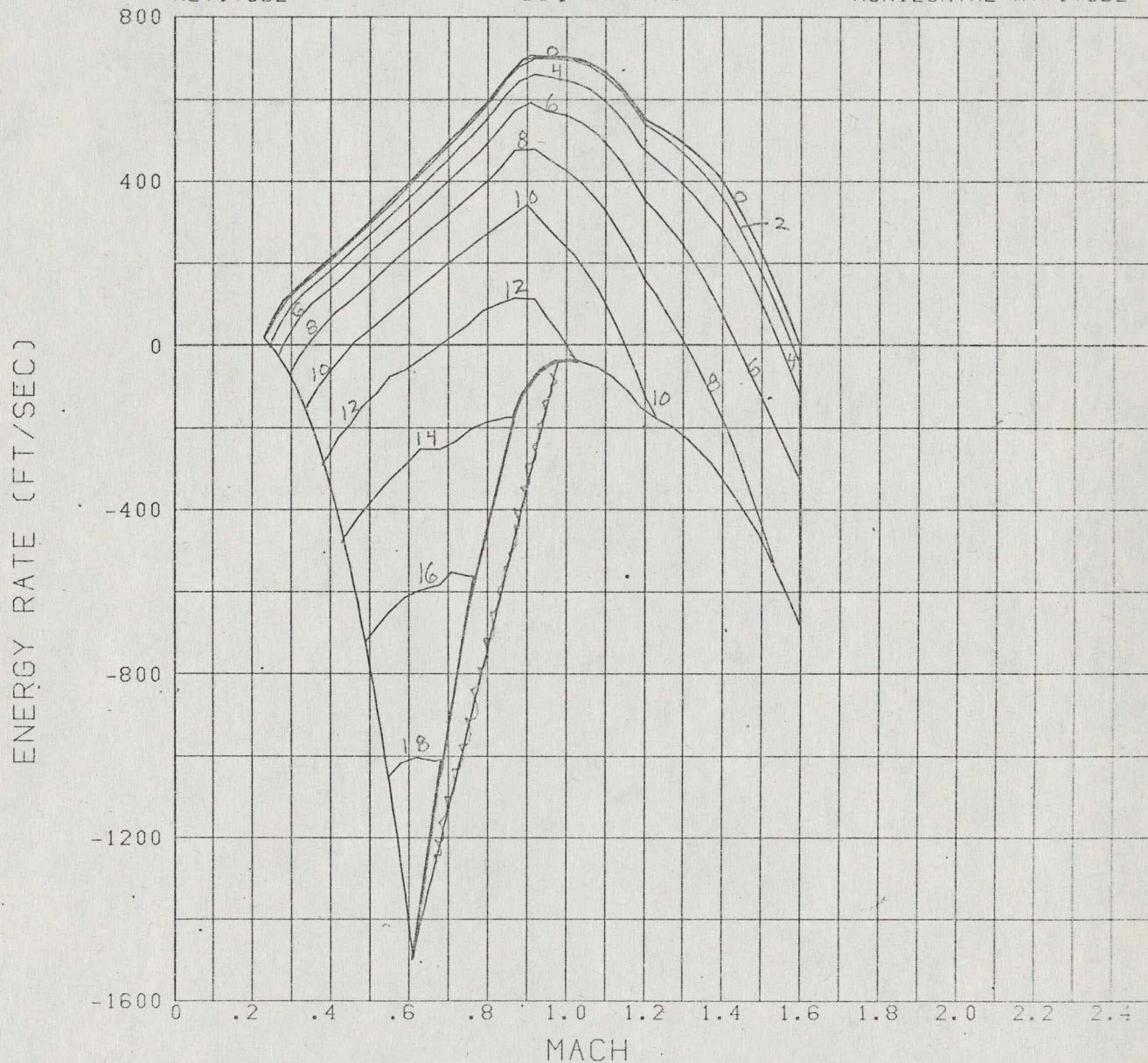
MAR 27 1974

MANEUVER DIAGRAM
ALTITUDE 20000 FEET

$\dot{\theta} = 407$

DC1 -MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

2A9

60.2% (3852)

17877

$\delta = 407$

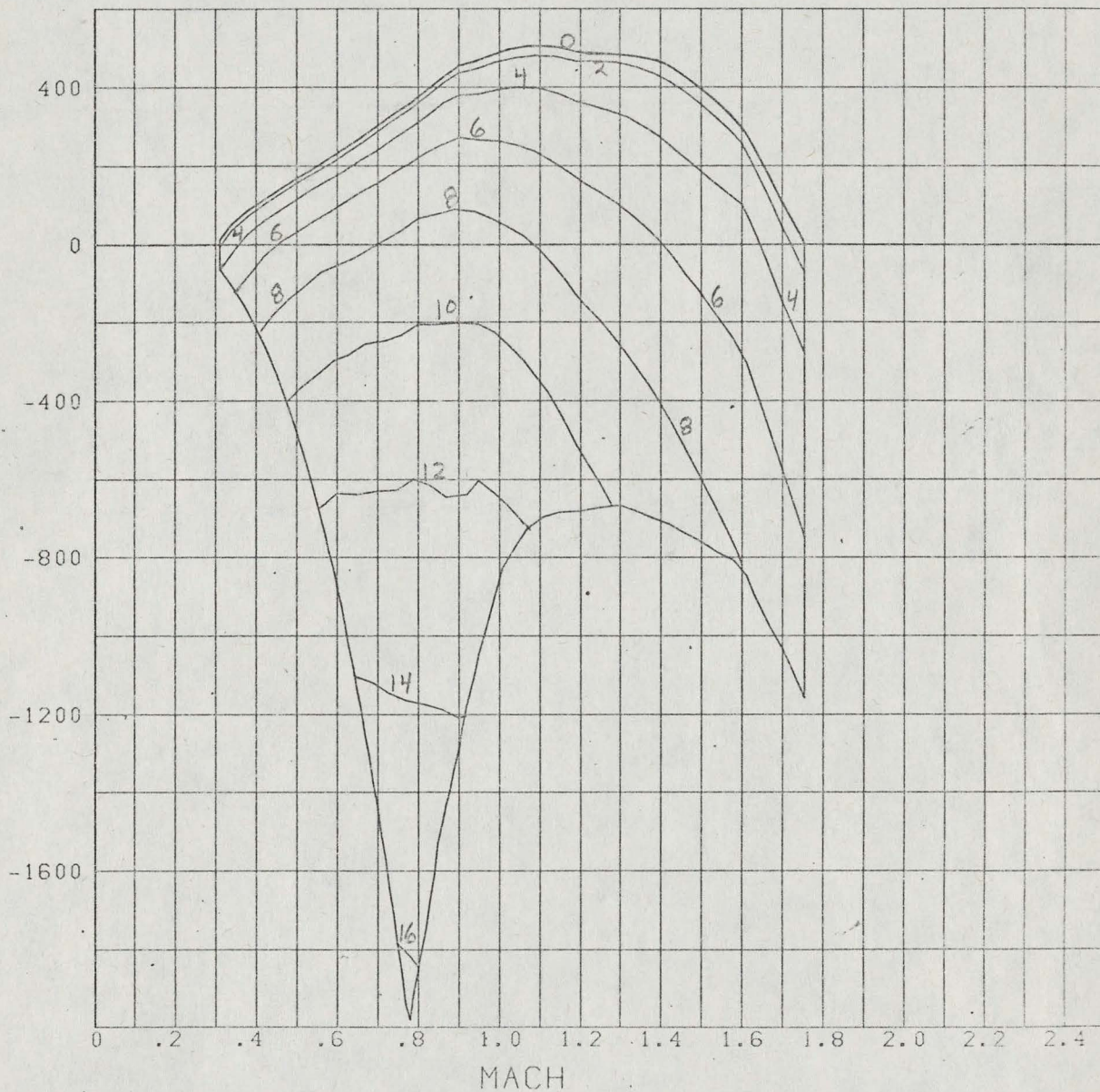
MANEUVER DIAGRAM

ALTITUDE 30000 FEET

DC 1 -MAX PWR

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



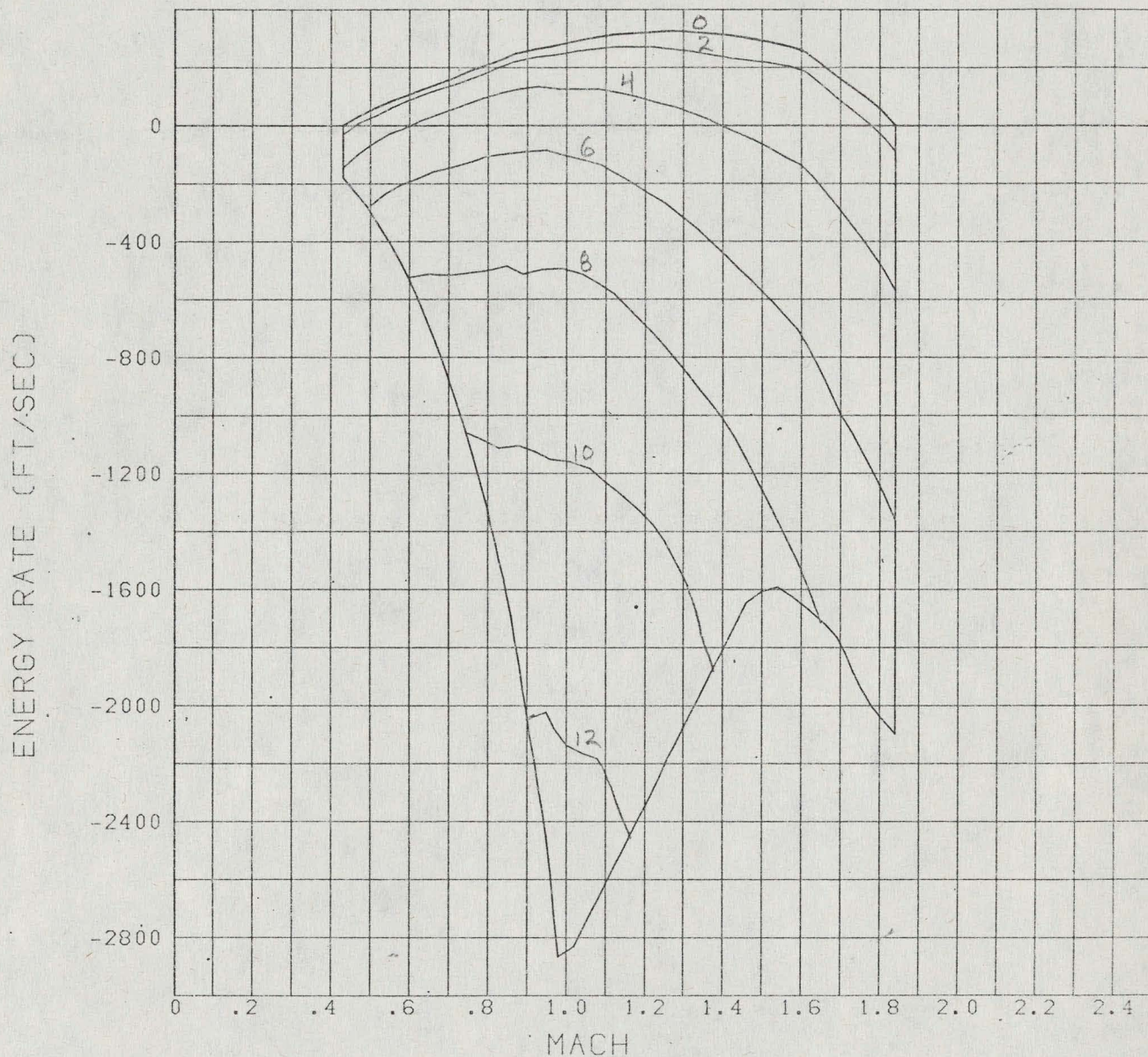
PLOT PREPARED BY TSX, ADTC

MAR 27 1974

2A9
60.2% (3852)
17877

MANEUVER DIAGRAM $\dot{\theta} = 407$
ALTITUDE 40000 FEET DC1 - MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

PS 407

MAXIMUM POWER

D/C 1

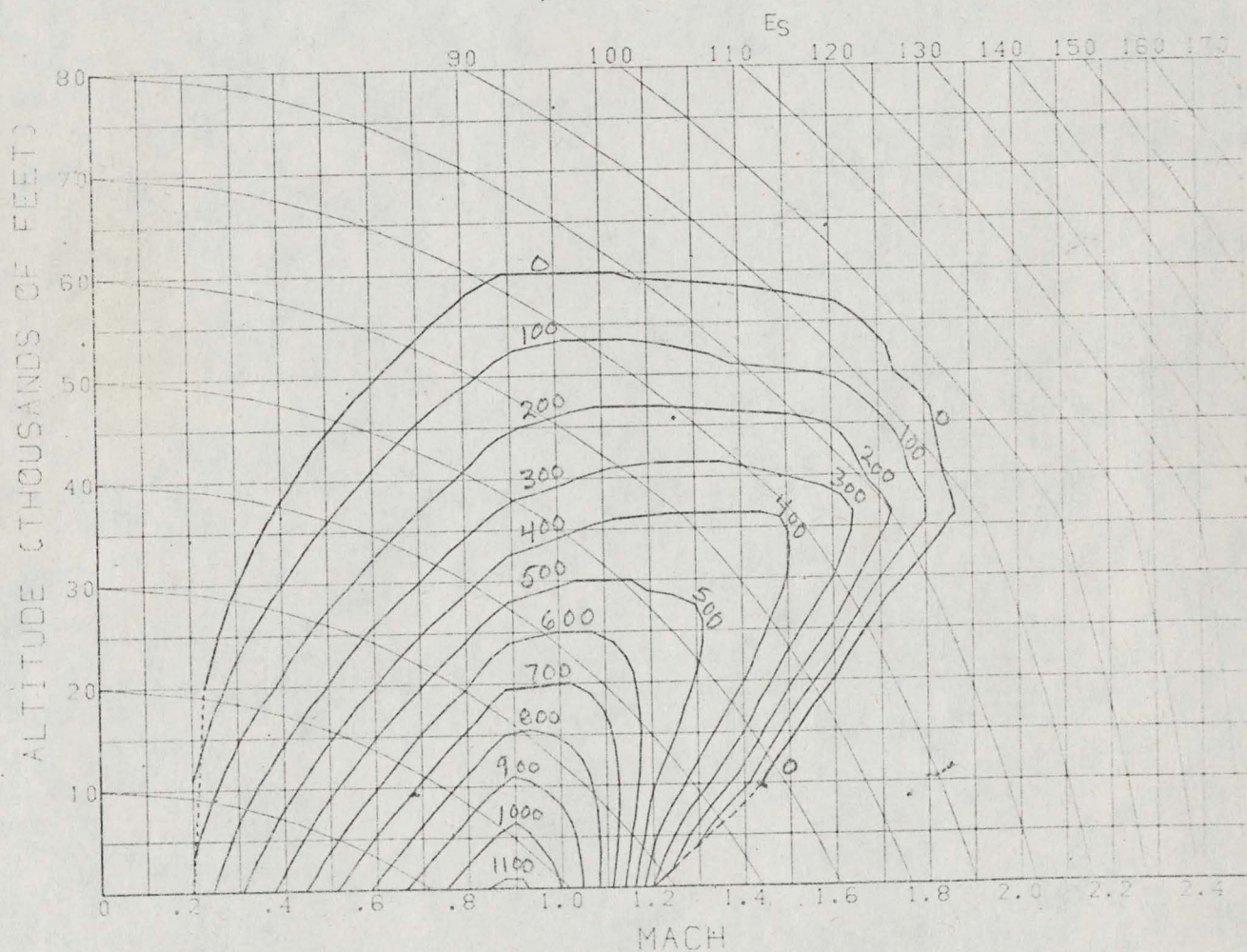
209

60% (3853)

17878

FEB 27 1974

1.00 G DIAGRAM



PLOT PREPARED BY TSX, ADIC

PS 407

FEB 27 1974

MAXIMUM POWER

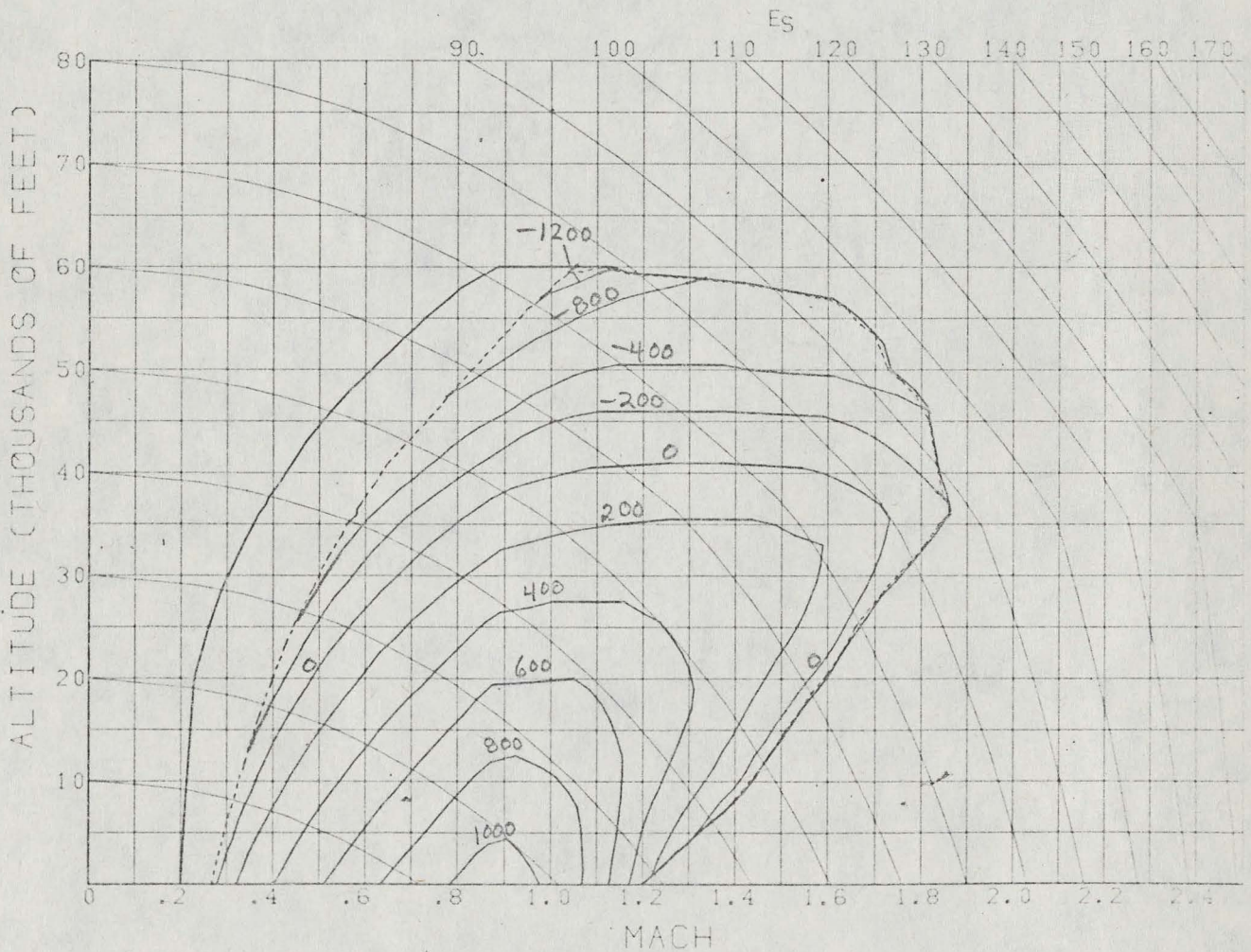
D/C 1

2A9

60% (3852)

17870

3.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

PS 407

MAXIMUM POWER

D/C 1

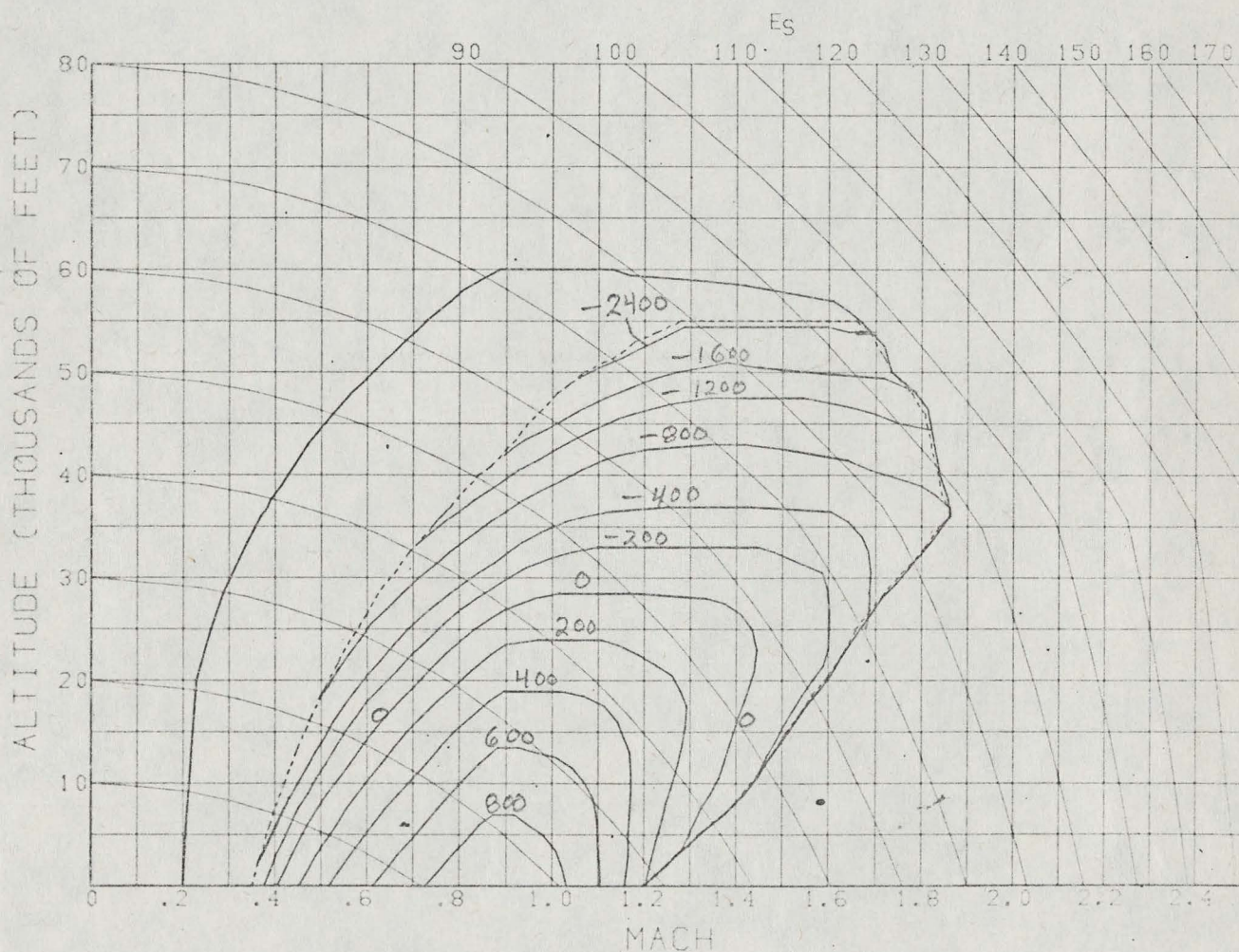
279

60% (3853)

17878

FEB 27 1974

5.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

PS 407

FEB 27 1974

MAXIMUM POWER

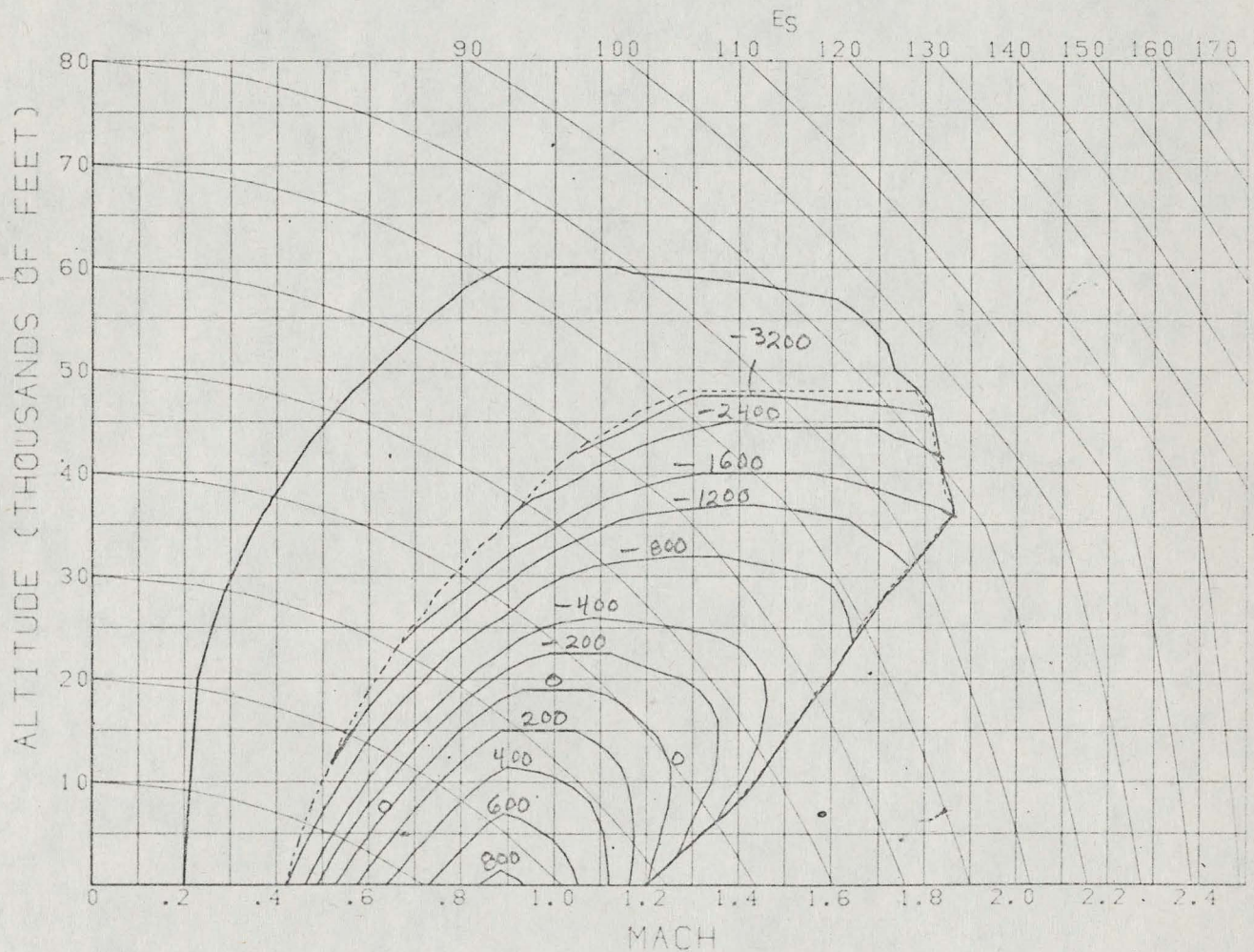
D/C 1

2A9

60% (3853)

17878

7.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

2A9
1100-134
(500)
ESTART = 42000
407

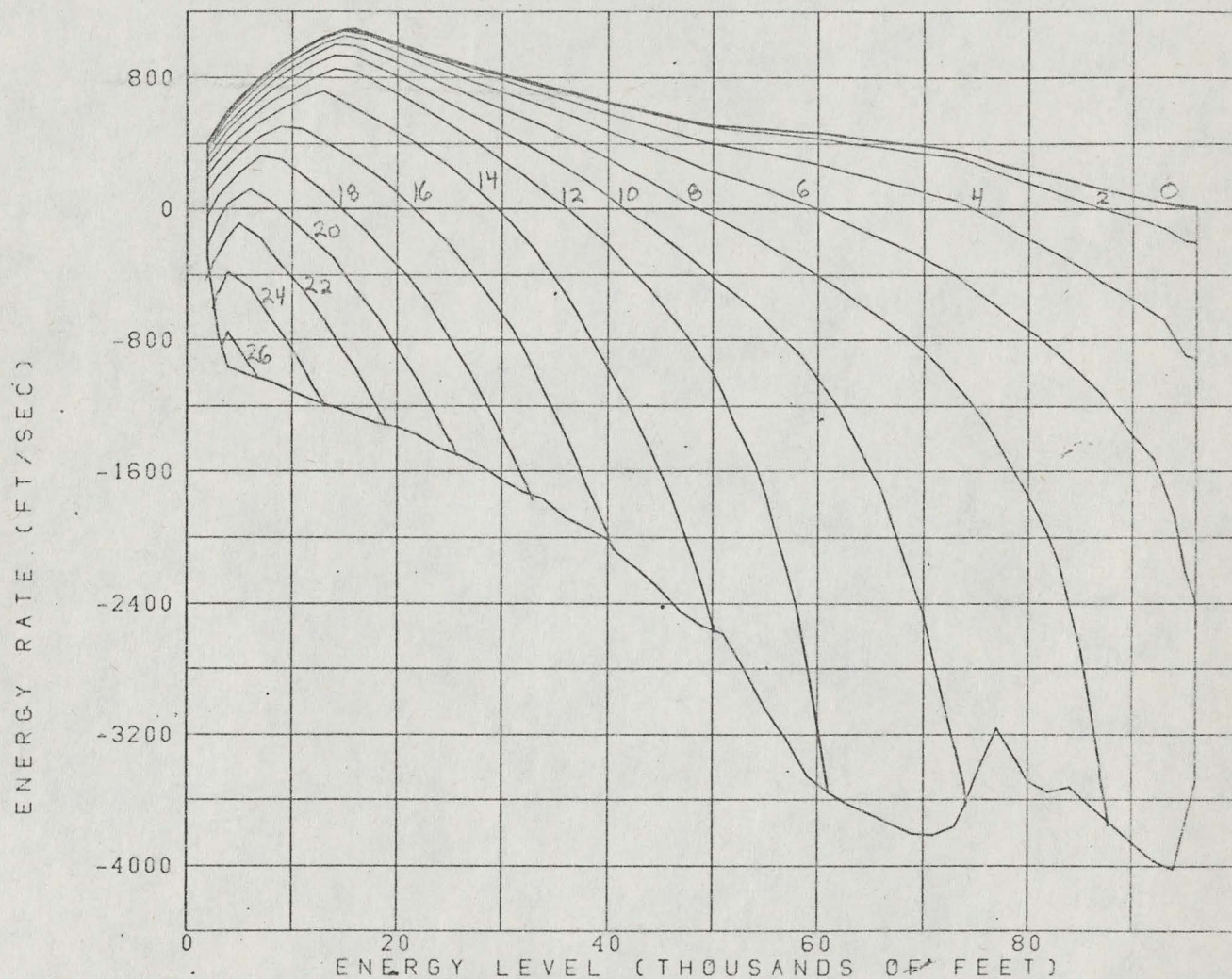
FEB 27 1974

+ Persistence

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR

HORIZONTAL ATTITUDE



MOAT	0 16 39 66 102 182								
MMP	14.8	14.6	13.6	10.3	6.8	5.6	4.4	2.7	1.8
MEMP	14.9	15.2	15.0	14.7	13.6	11.2	7.6	4.2	2.4

PLOT PREPARED BY TSX, ADTC

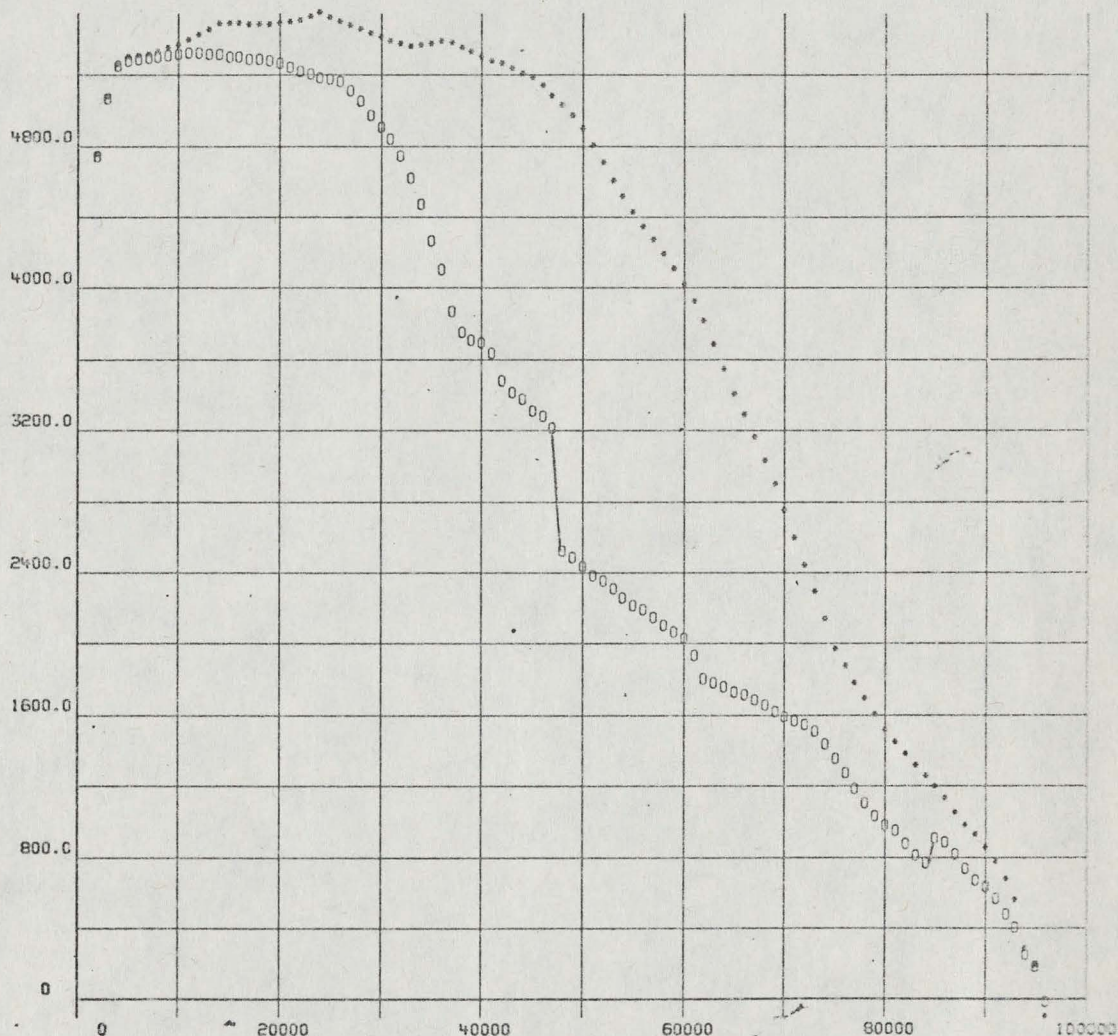
Persistence (Day)

407
289
1.00 → 7.34
(500)
ESTART = 42000

FEB 27 1974

M M
M P
0 0
0 *

(DEG)



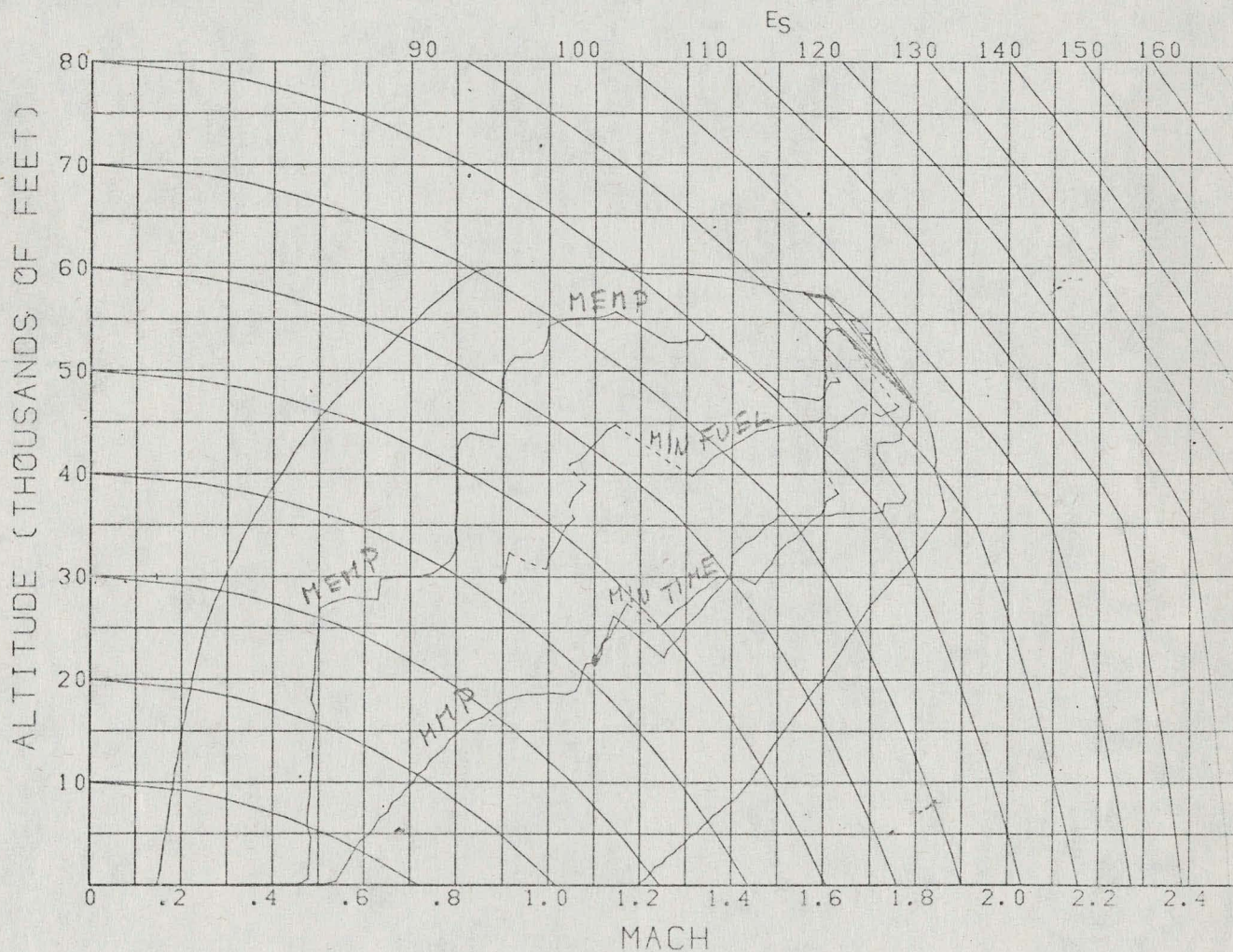
ENERGY LEVEL (THOUSANDS OF FEET)

PLOT PREPARED BY TSX, ADTC

Persistence Paths

407
2A9
1.00 → .34
(500)
ESTART = 42000

FEB 27 1974



PLOT PREPARED BY TSX, ADTC

FEB 28 1974

Persistence (Turns)

407

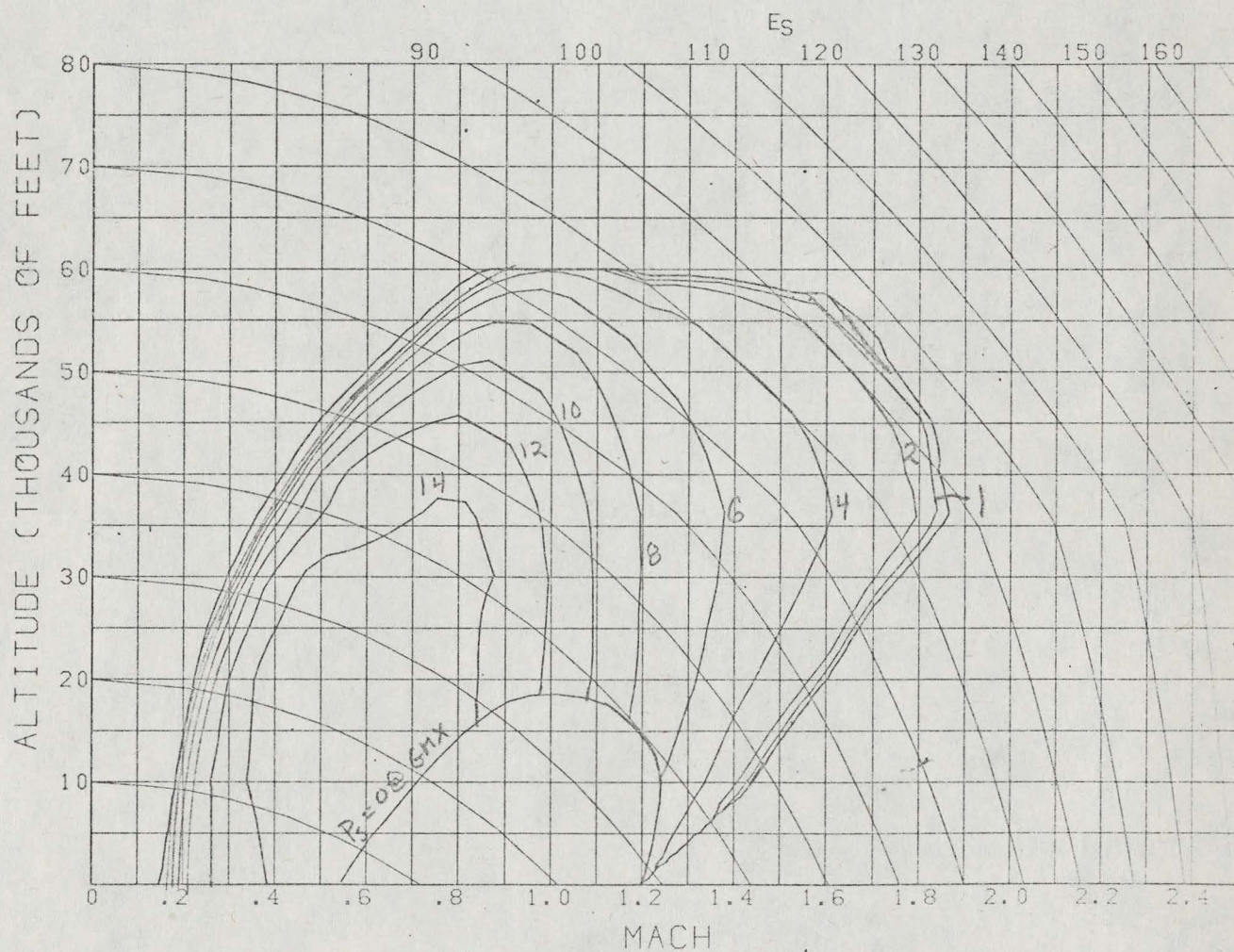
DC 1 - MAX PWR

2A9

1.00 → 1.34
(500)

ESTART = 42000

HORIZONTAL ATTITUDE

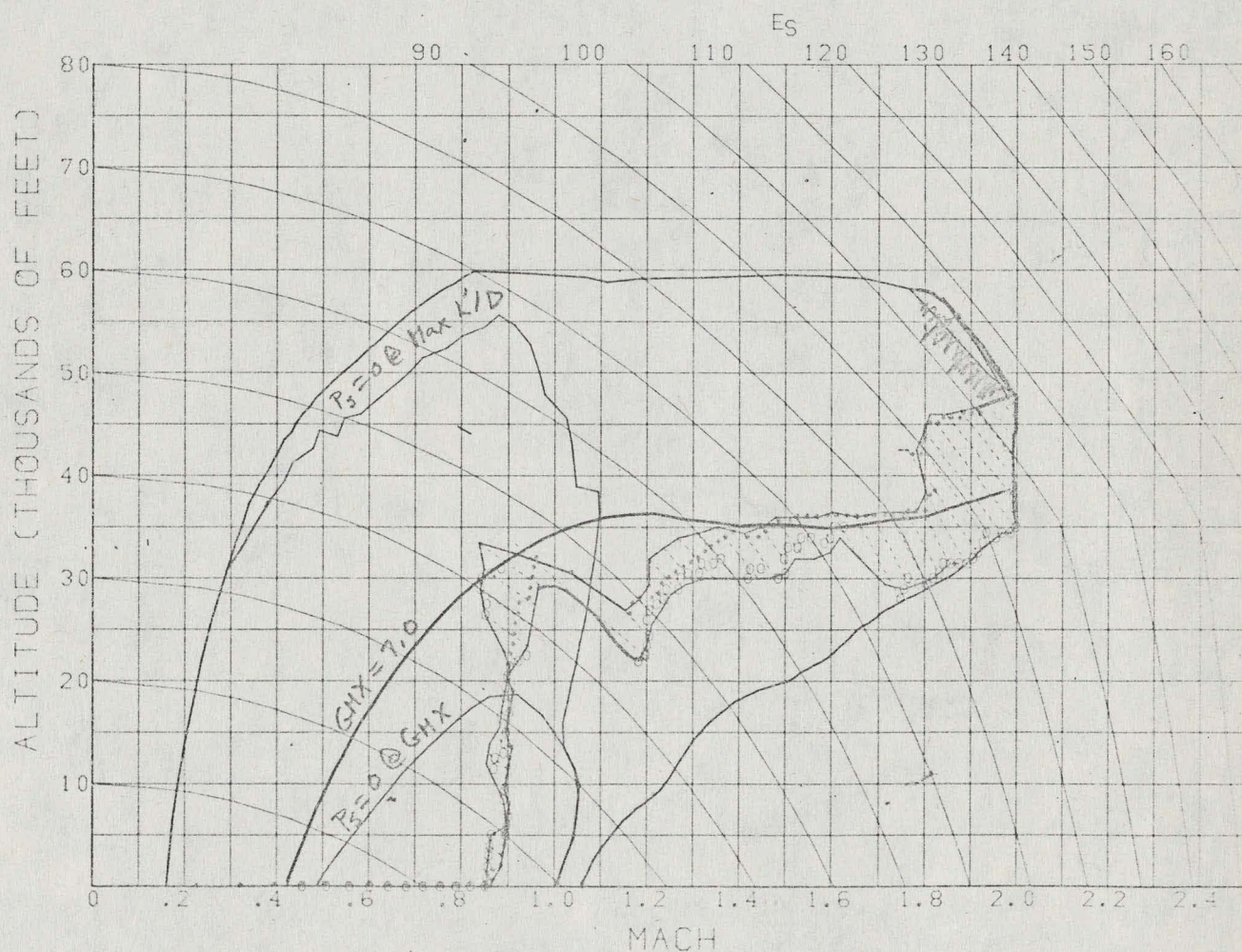


PLOT PREPARED BY TSX, ADTC

FEB 27 1974

AIR BATTLE ARENA

607
DC1 - MAX PWR
2A9
66% (4898)
22085



PLOT PREPARED BY TSX, ADIC

FEB 27 1974

2A9

66% (4898)

22085

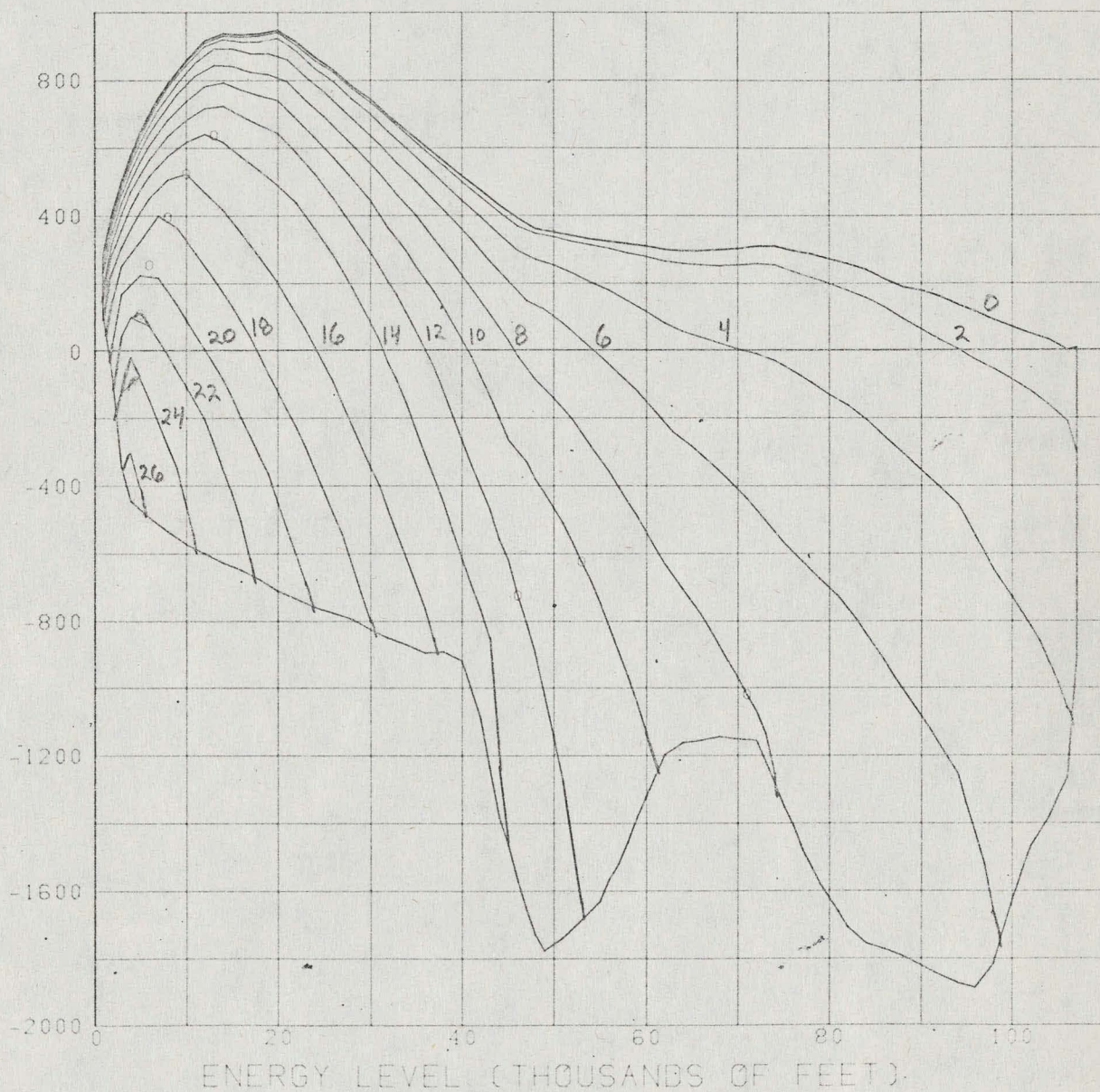
$\dot{\theta} = 607$

MAX MANEUVER DIAGRAM

DC1 - MAX PWR

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

FEB 27 1974

2A9
66% (4090)

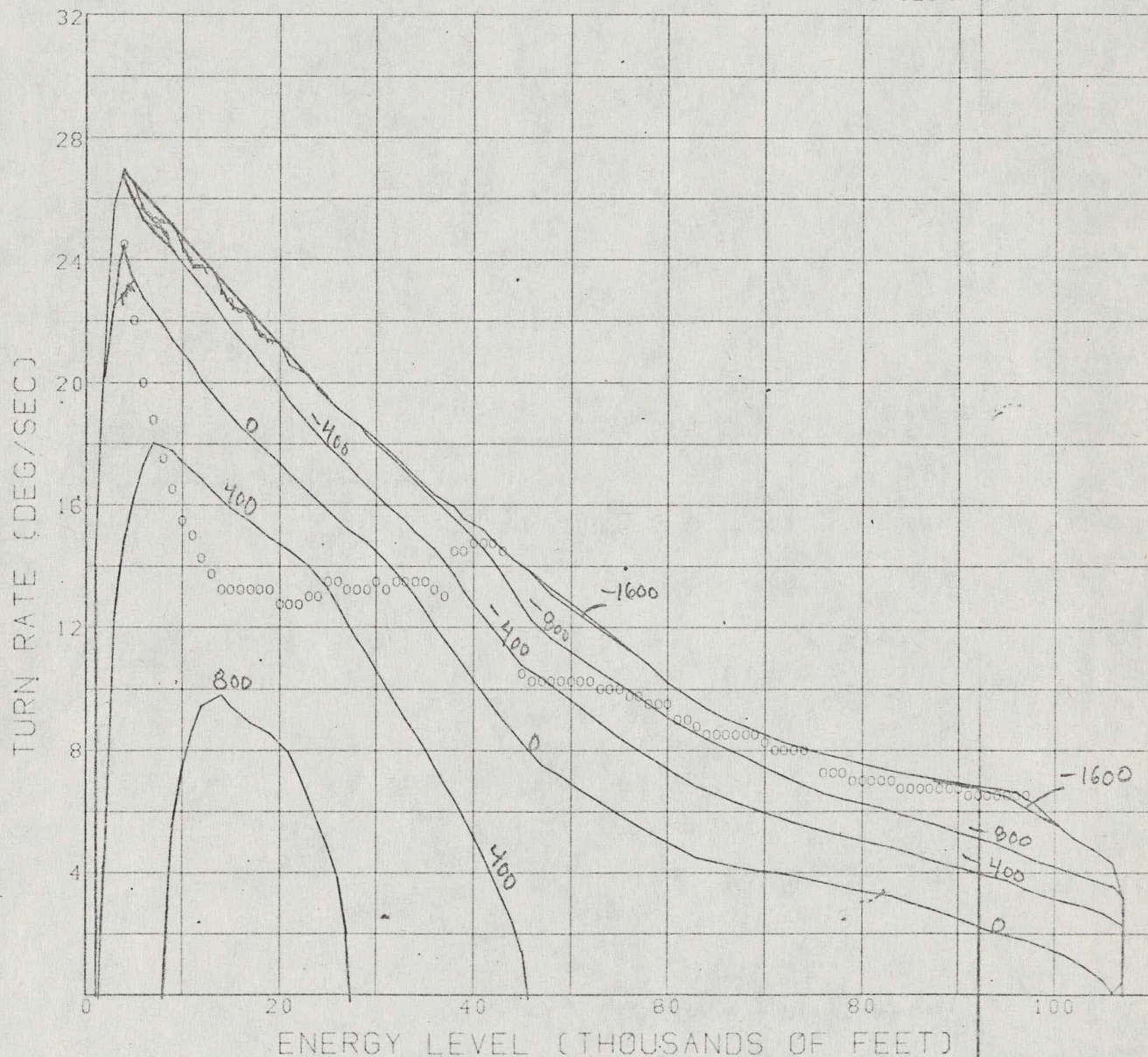
22085

$P_s = 607$

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

2A9

MAR 27 1974

66.2% (4898)

22085

MANEUVER DIAGRAM

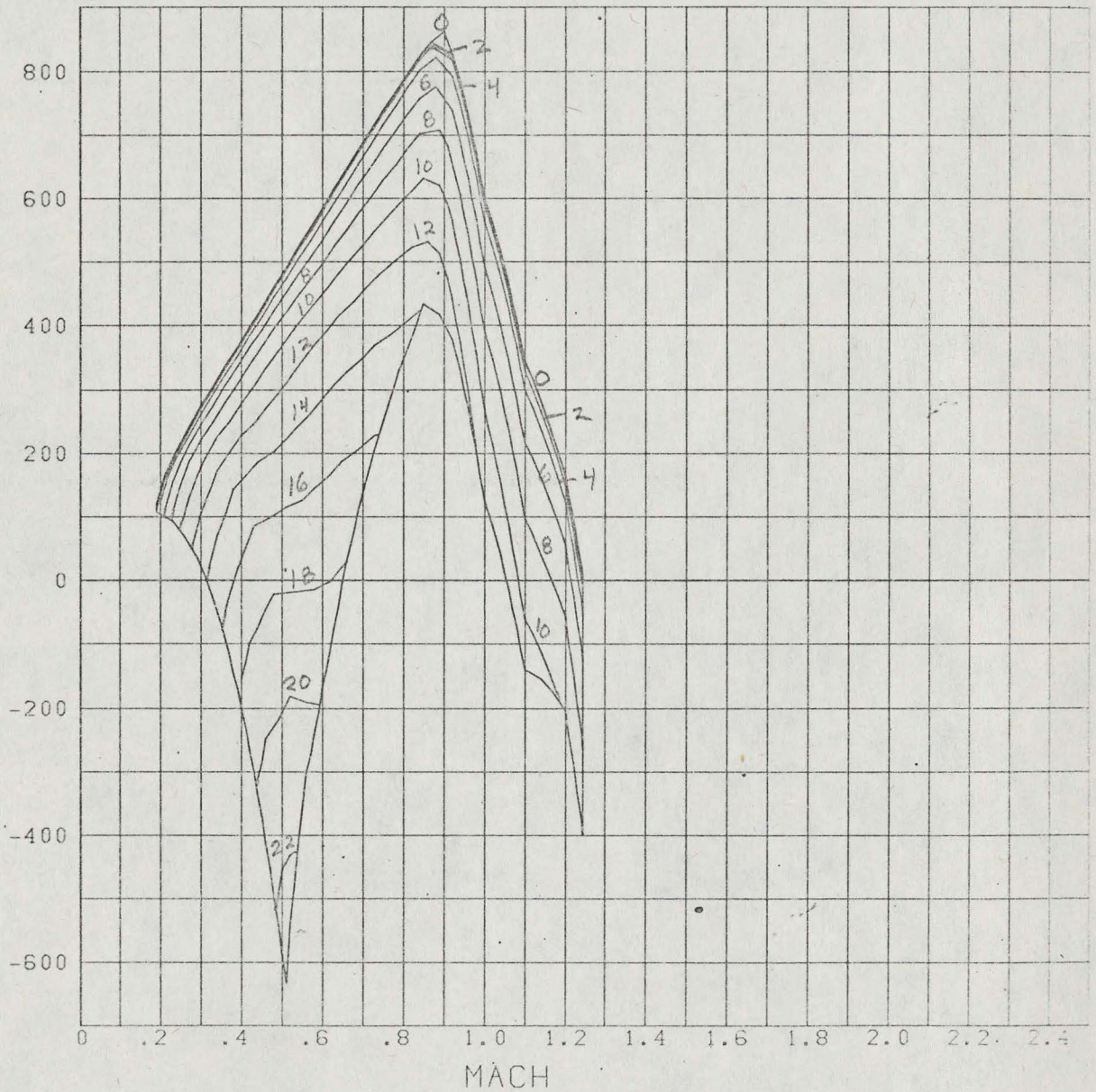
$\dot{\theta} = 607$

ALTITUDE 10000 FEET

DC 1 - MAX PWR

HORIZONTAL ALTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

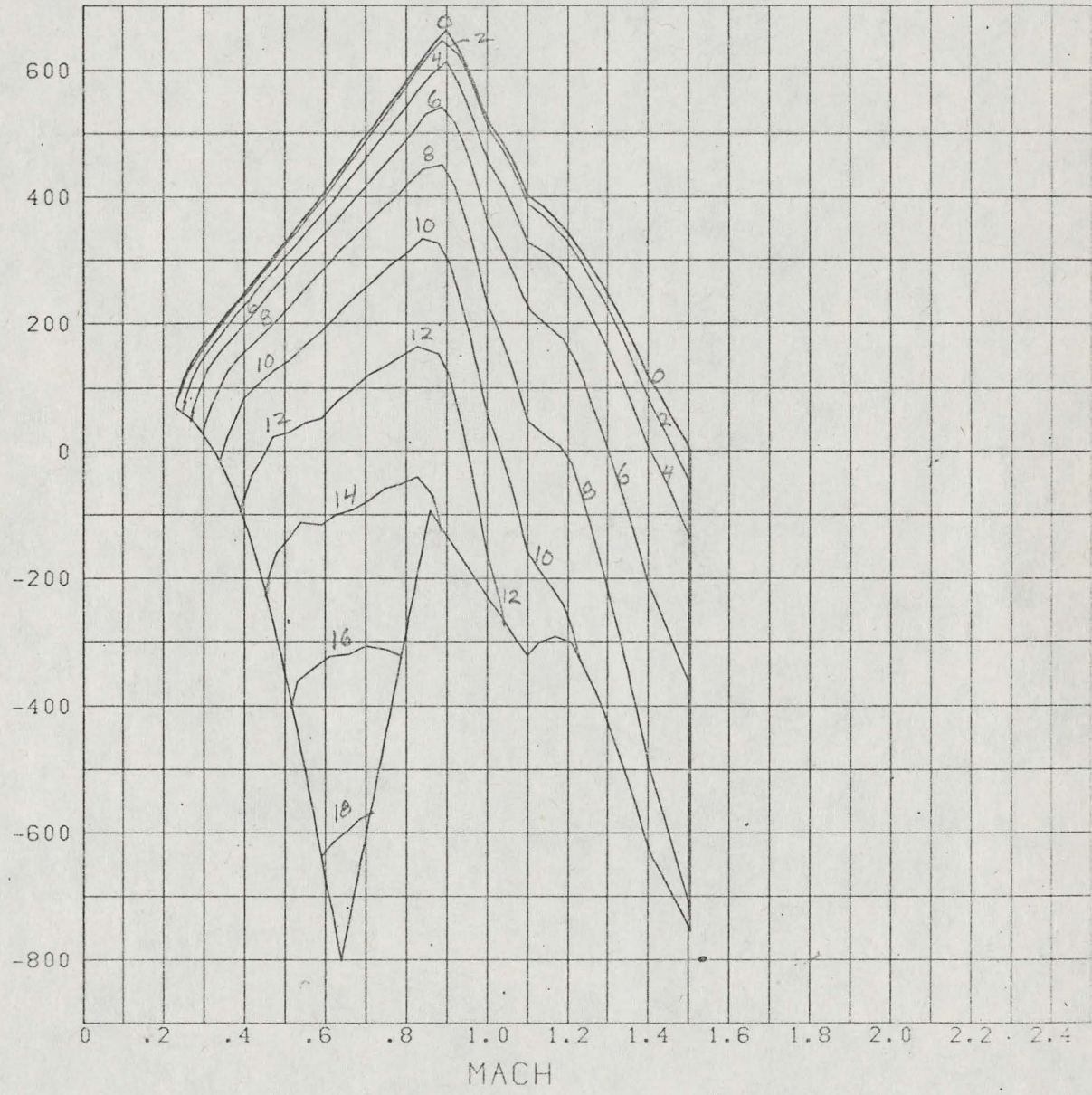
2A9
66.2% (4098)
22085

MANEUVER DIAGRAM
ALTITUDE 20000 FEET

$\theta = 607$
DC 1 - MAX PWR

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

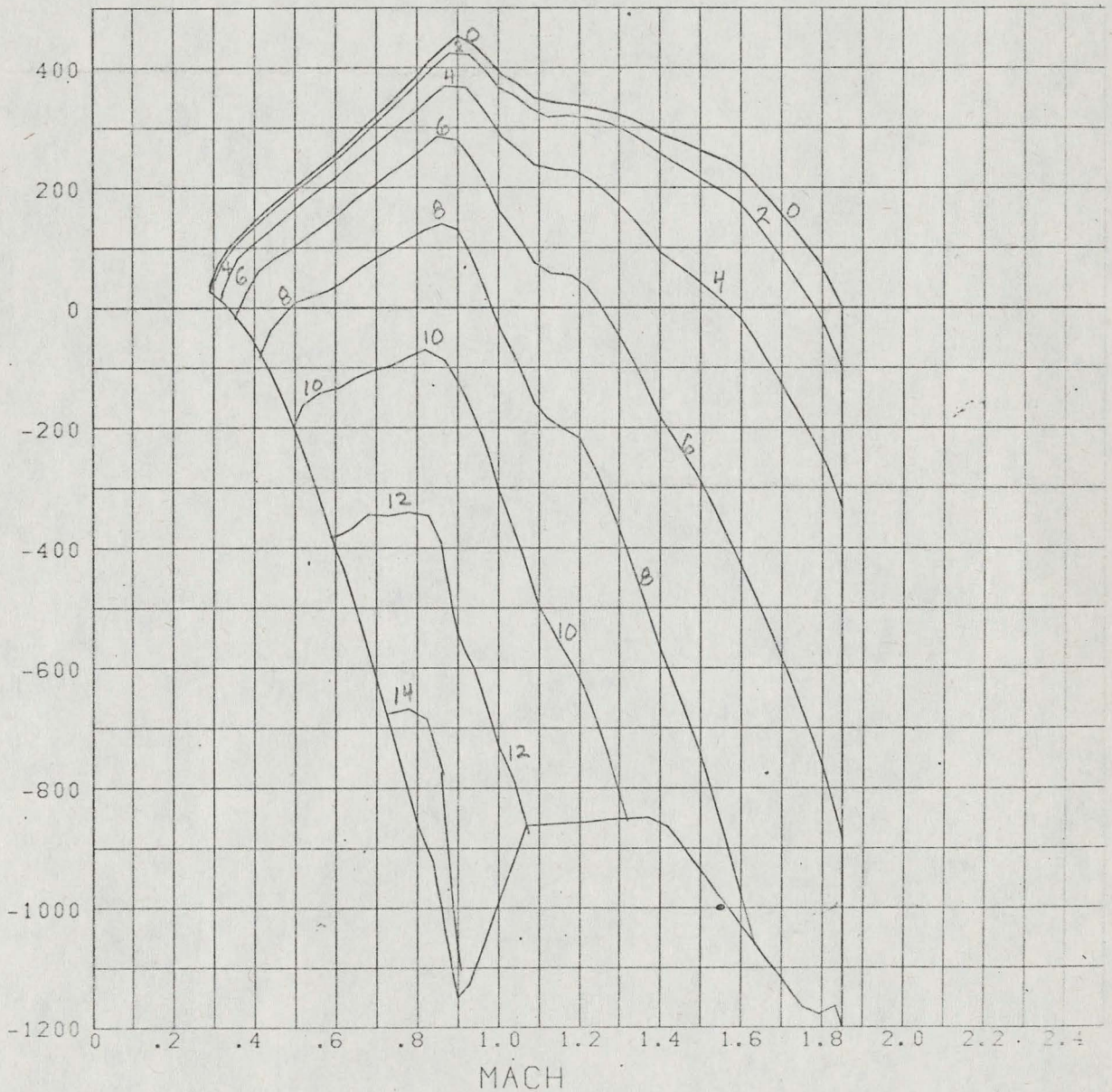
2A9
66.2% (4698)
22085

MANEUVER DIAGRAM
ALTITUDE 30000 FEET

607
DC1 -MAX PWR

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

2A9
66.276(4899)
22085

MAR 27 1974

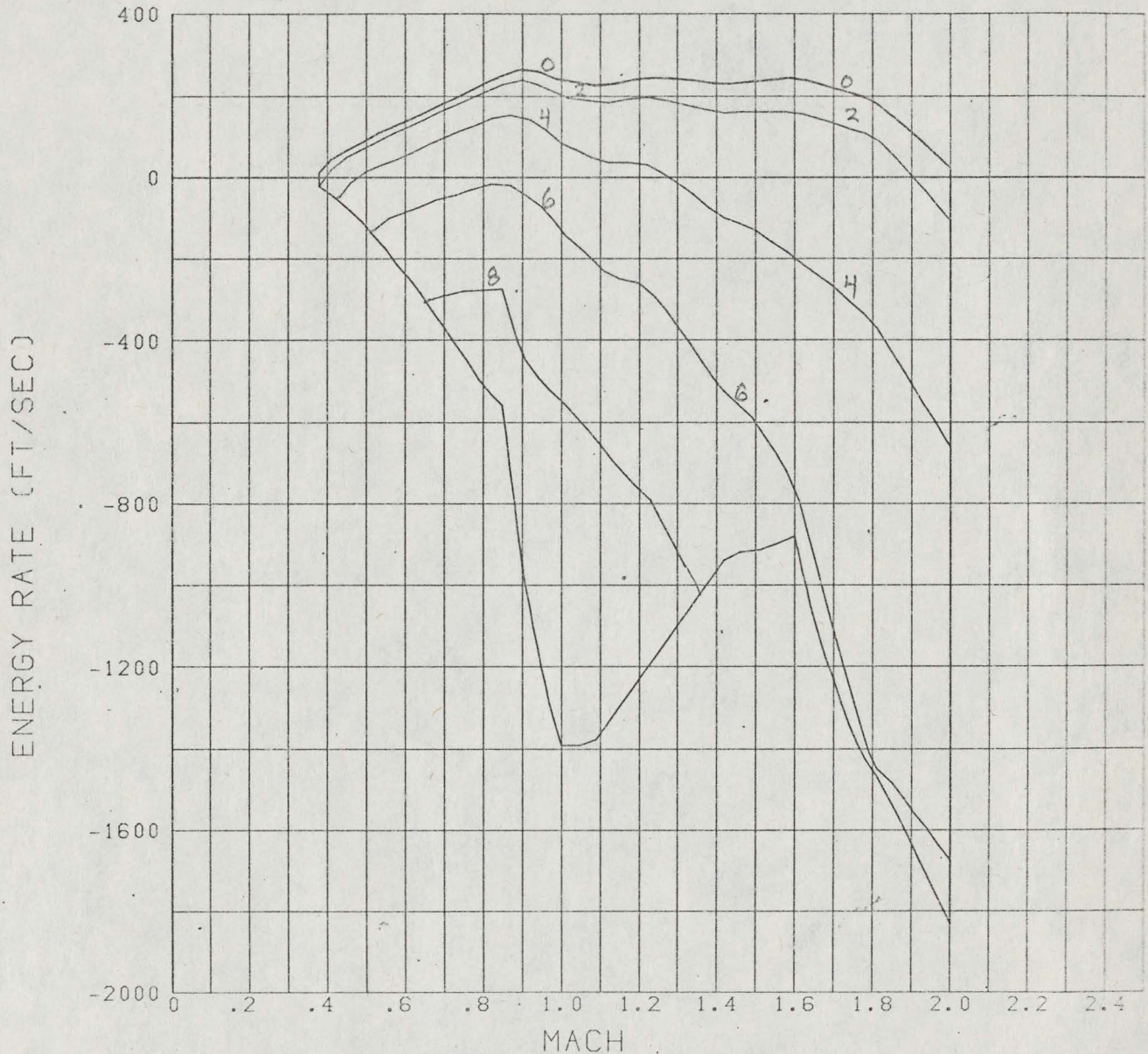
MANEUVER DIAGRAM

$\dot{\theta} = 607$

ALTITUDE 40000 FEET

DC1 -MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

FEB 27 1974

PS 607

MAXIMUM POWER

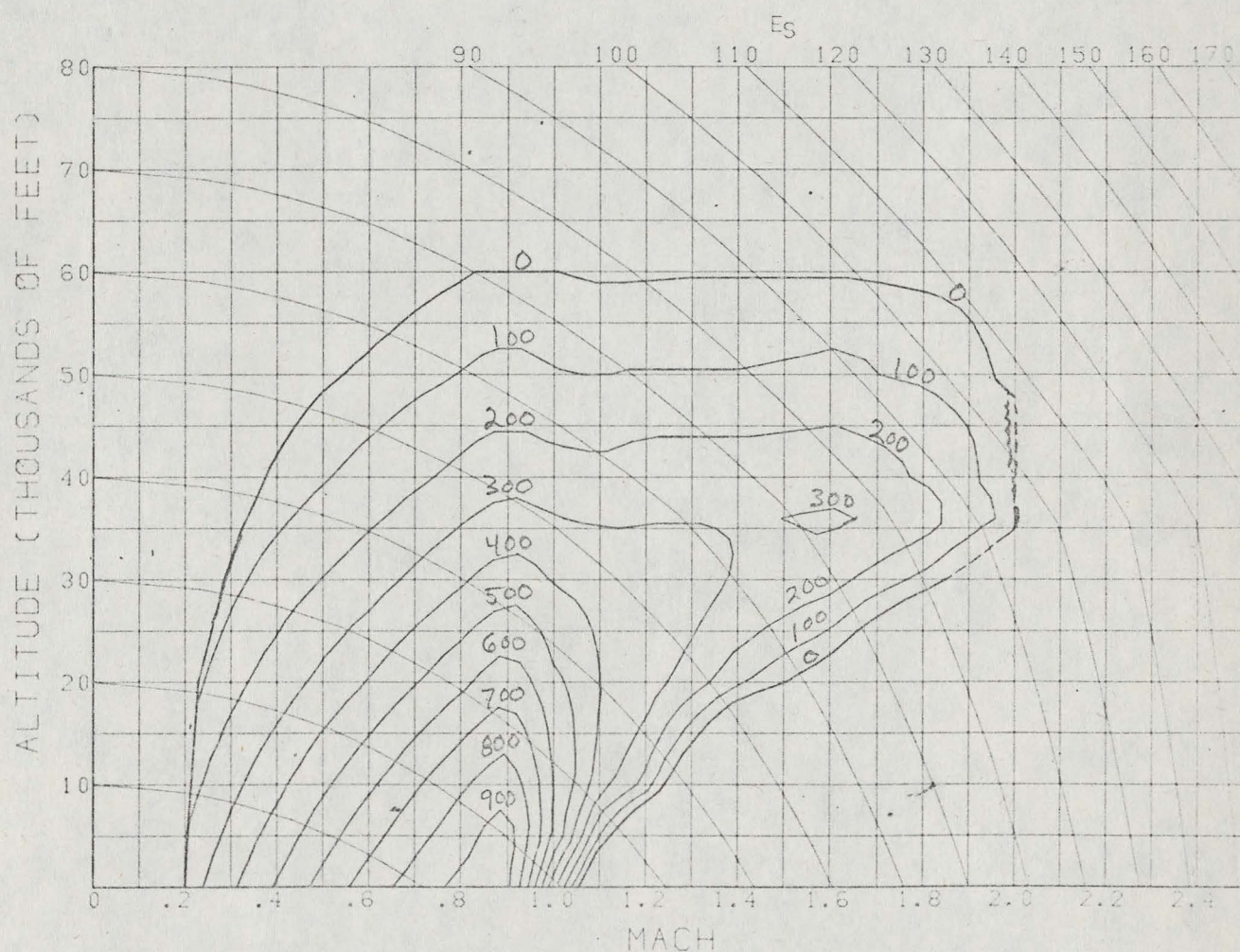
D/C 1

2A9

6602 (4896)

22085

1.006 DIAGRAM



PLOT PREPARED BY TSX, ADTC

PS 607

FEB 27 1974

MAXIMUM POWER

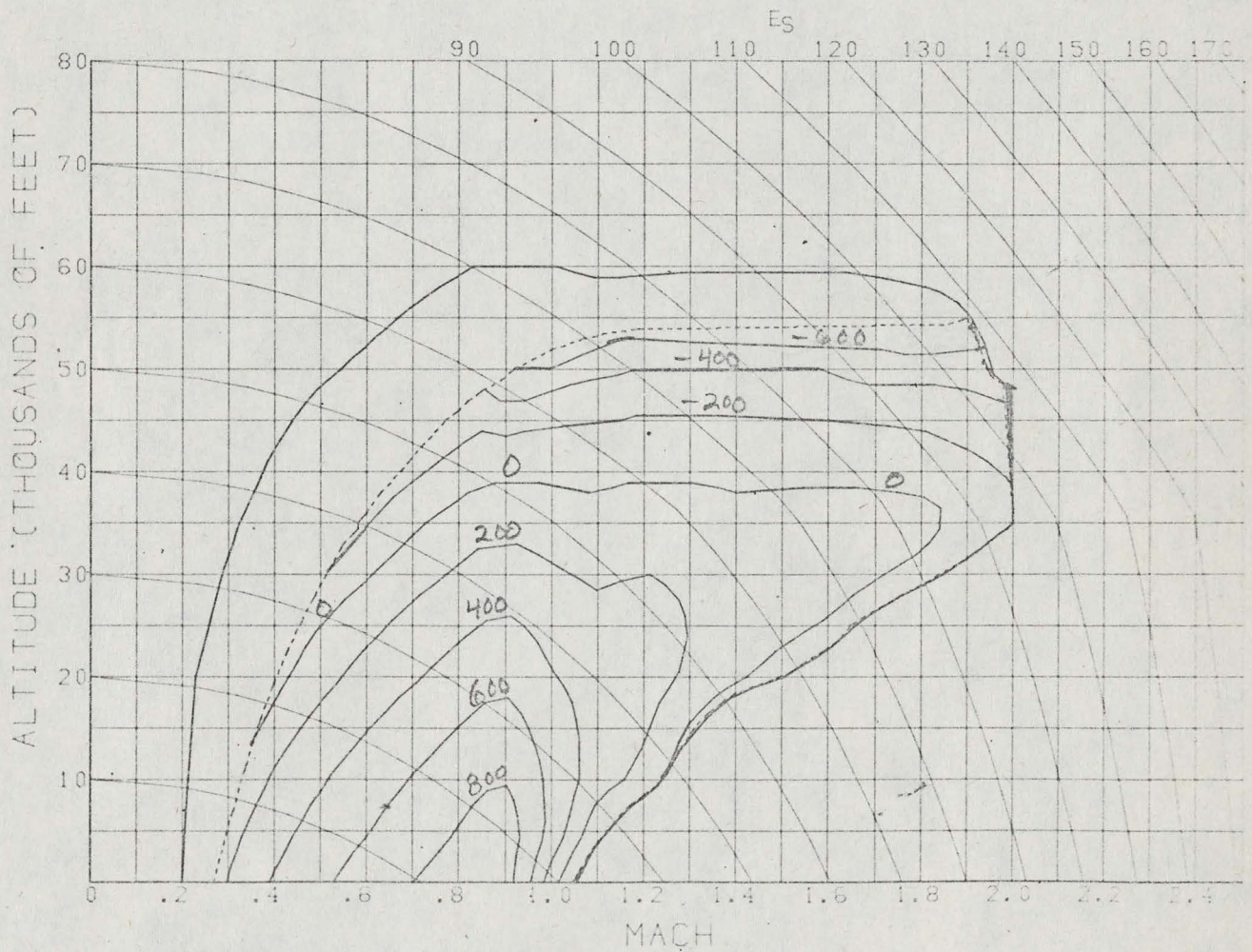
D/C 1

2A9

66% (4898)

22005

3.00 G DIAGRAM



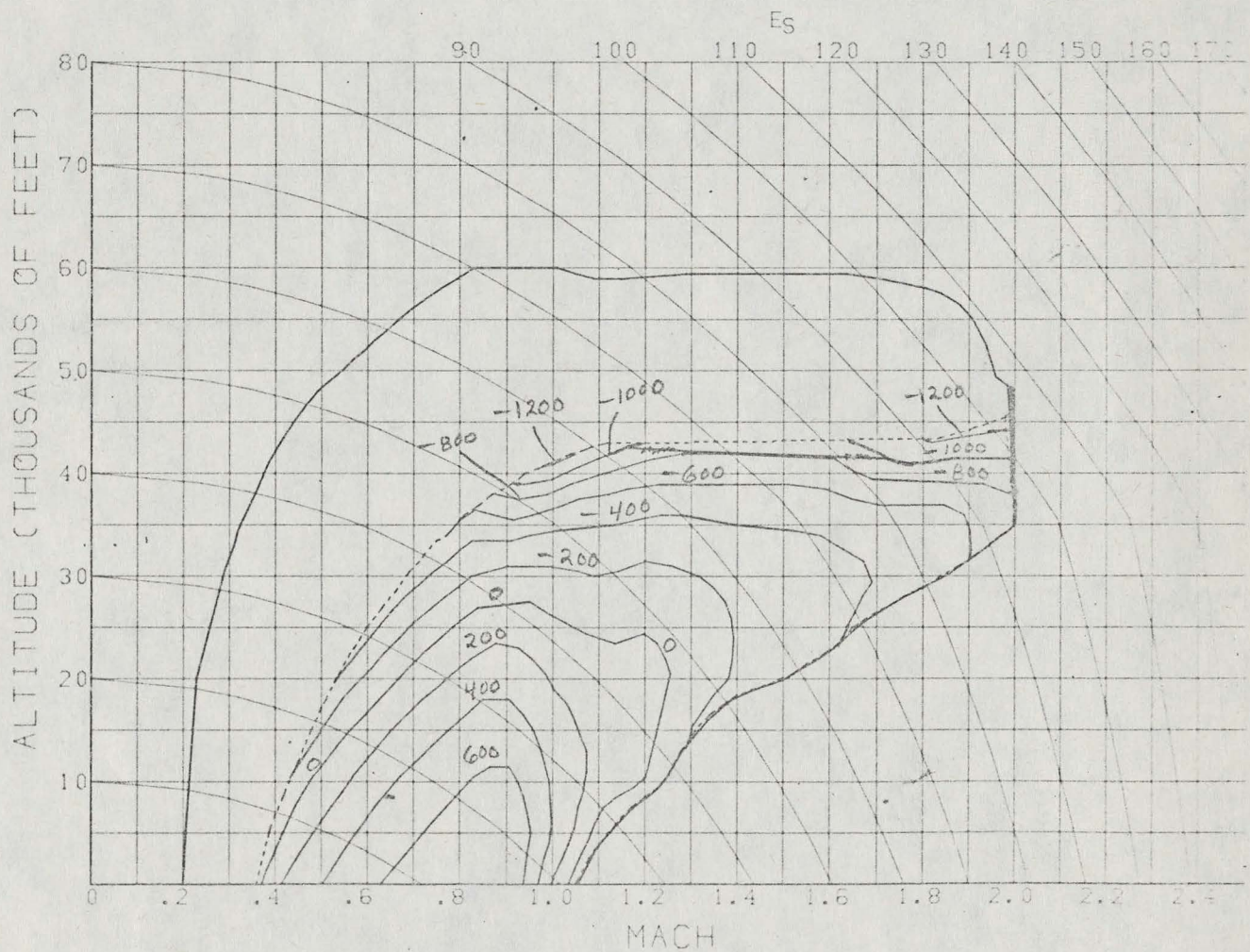
PLOT PREPARED BY TSX, ADTC

PS 607
MAXIMUM POWER
D/C 1

FEB 27 1974

5.00 G DIAGRAM

2A9
66% (4898)
22085



PLOT PREPARED BY TSX. ADTC

PS 607

FEB 27 1974

MAXIMUM POWER

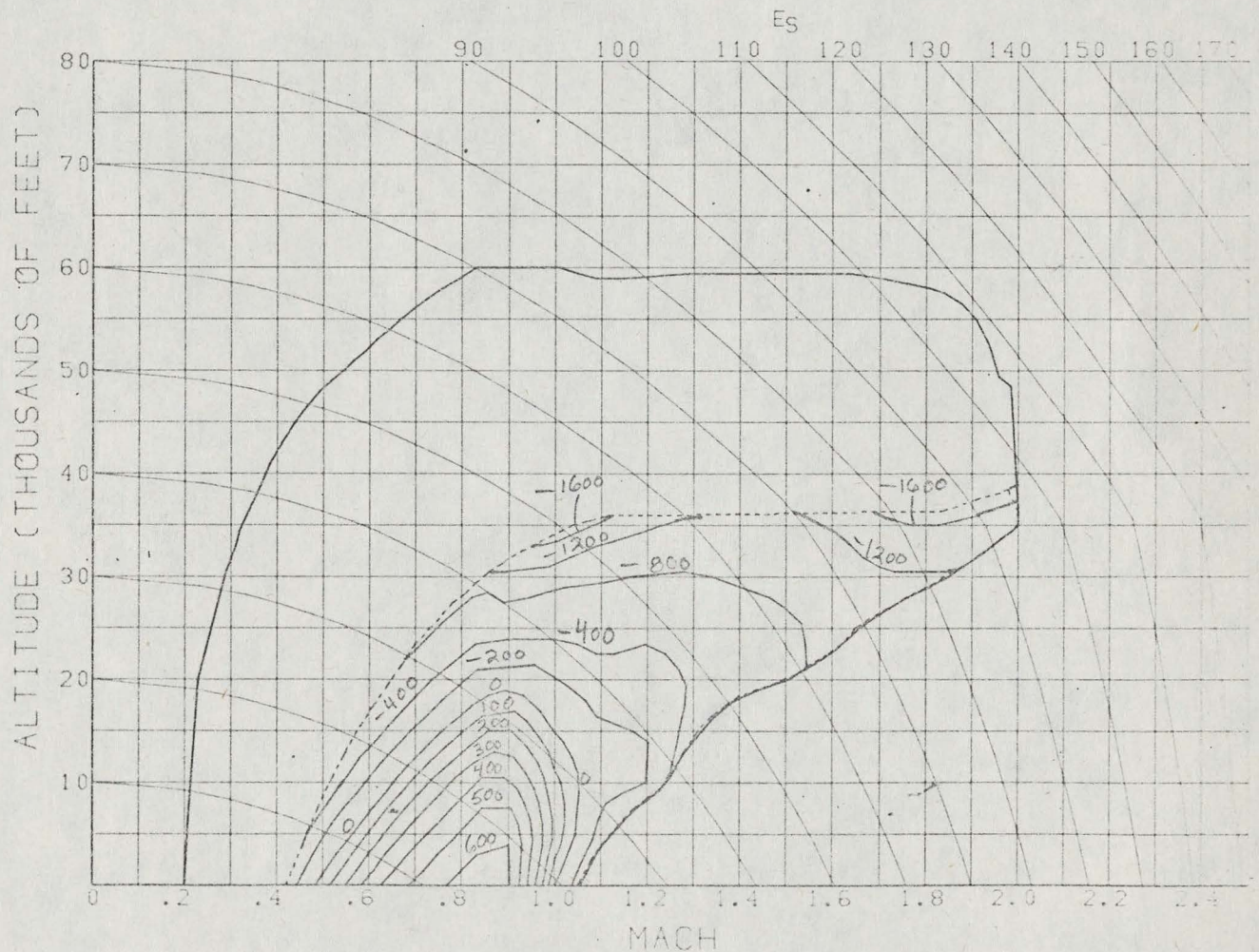
D/C 1

2A9

66% (4898)

22085

7.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

2A9

1.00 → 0.39
(500)

FEB 27 1974

ESTART = 42000.

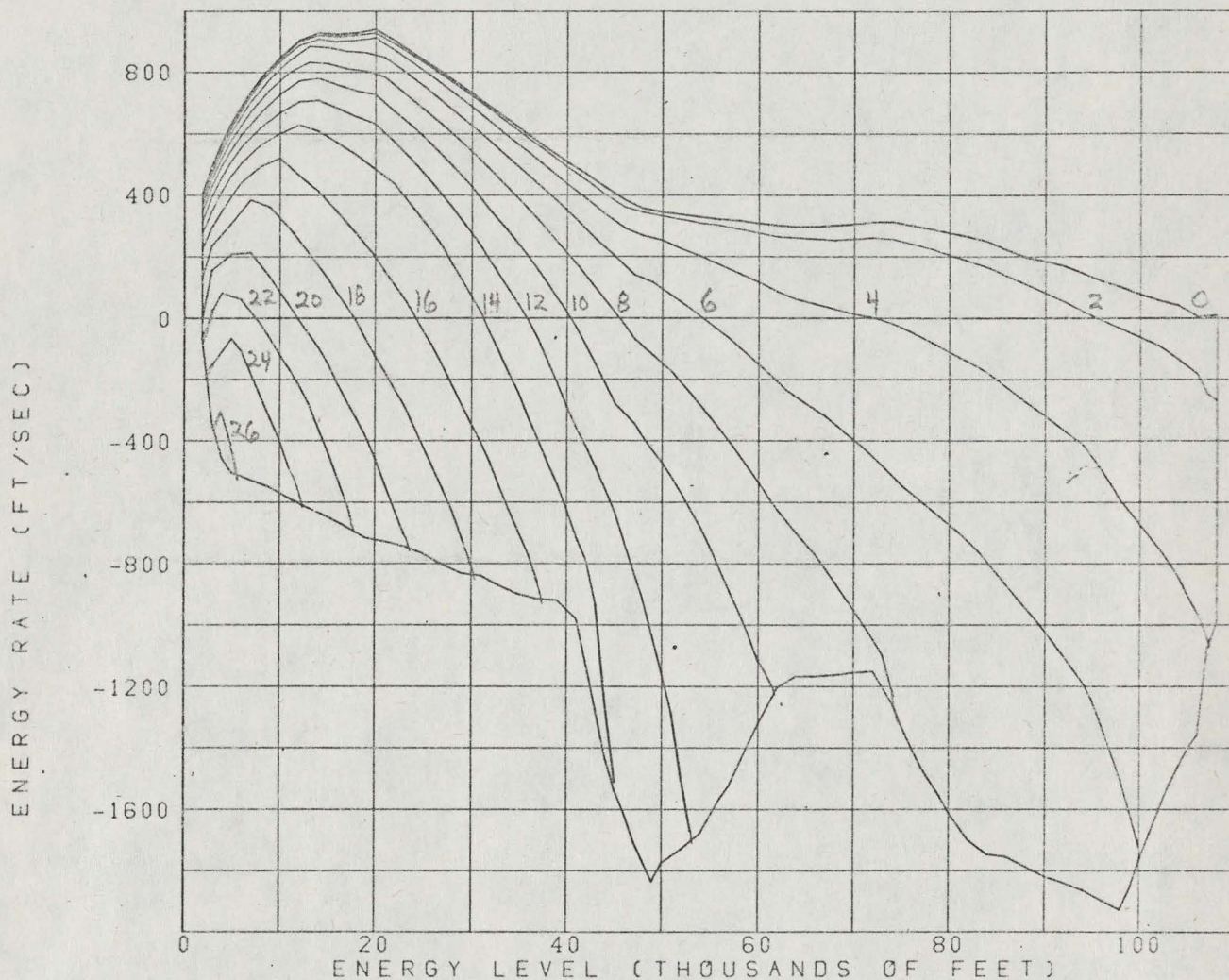
607

+ Persistence

MAX MANEUVER DIAGRAM

DC1 - MAX PWR

HORIZONTAL ATTITUDE



MGAT										
				0	23	56	93	129	177	264
MMP	17.0	16.4	15.0	13.8	7.0	5.3	3.3	2.4	1.5	0.9
MEMP	17.6	17.4	16.6	15.7	14.2	11.5	6.6	3.4	2.2	1.2

PLOT PREPARED BY TSX, ADTC

Persistence (Deg)

607

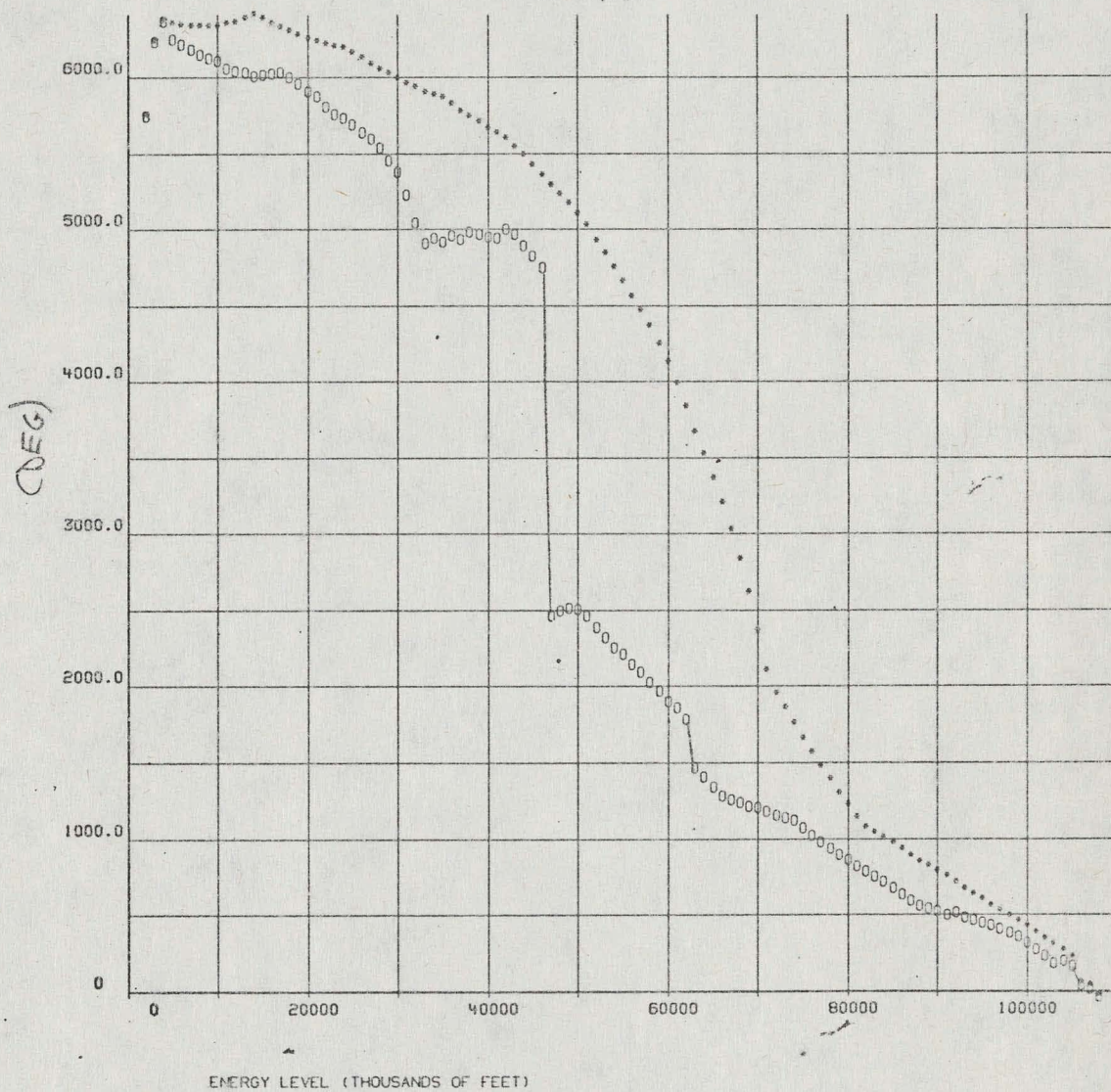
2A9

1.00 - 7.39
(500)

FEB 27 1974

ESTART = 42000

X M
M P
P .
0 .
0 .



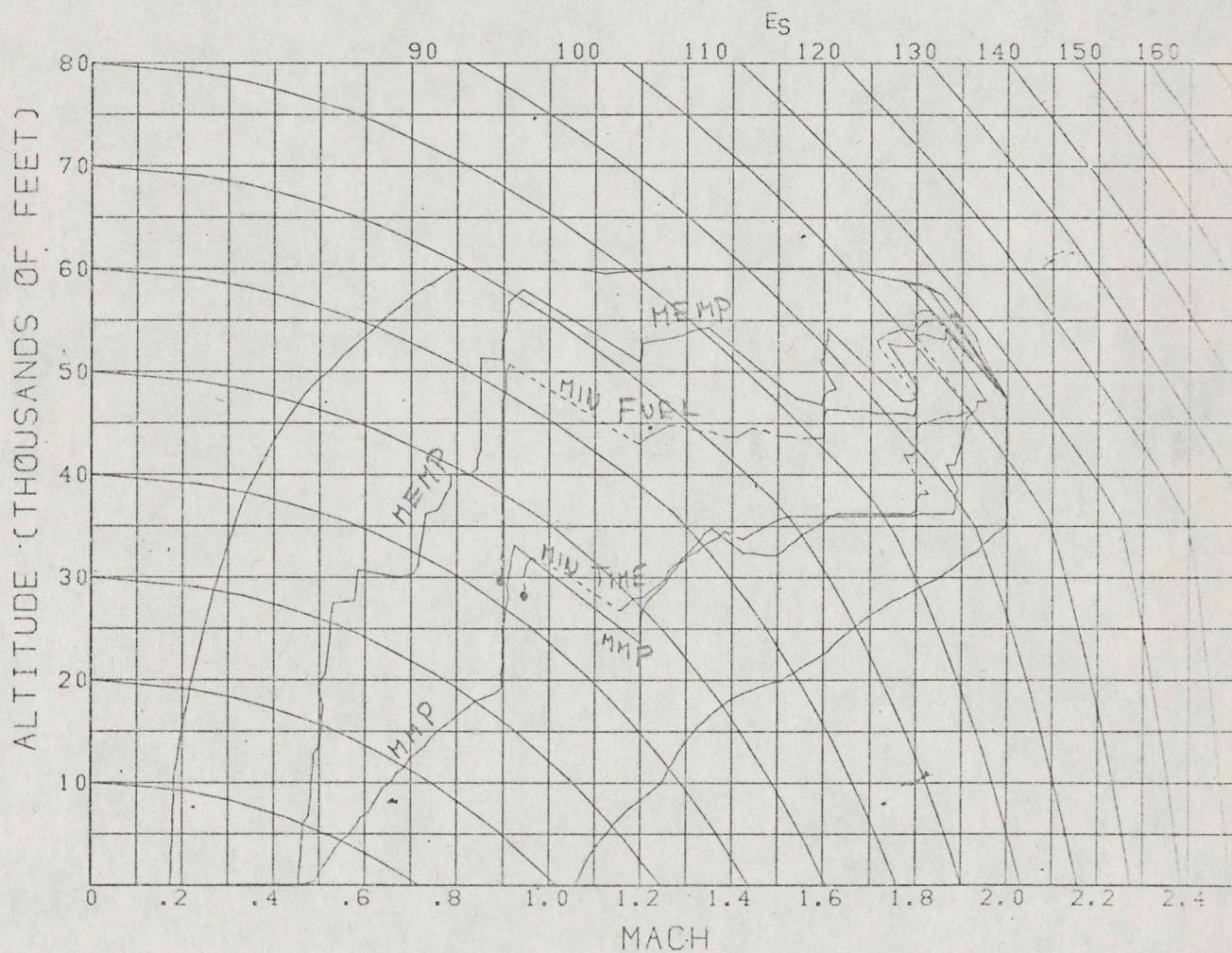
PLOT PREPARED BY TSX, ADTC

Persistence Paths

607
2A9
1.00 → .39
(500)

FEB 27 1974

ESTART = 42000



PLOT PREPARED BY TSX, ADTC

FEB 28 1974

Persistence (Turns)

607

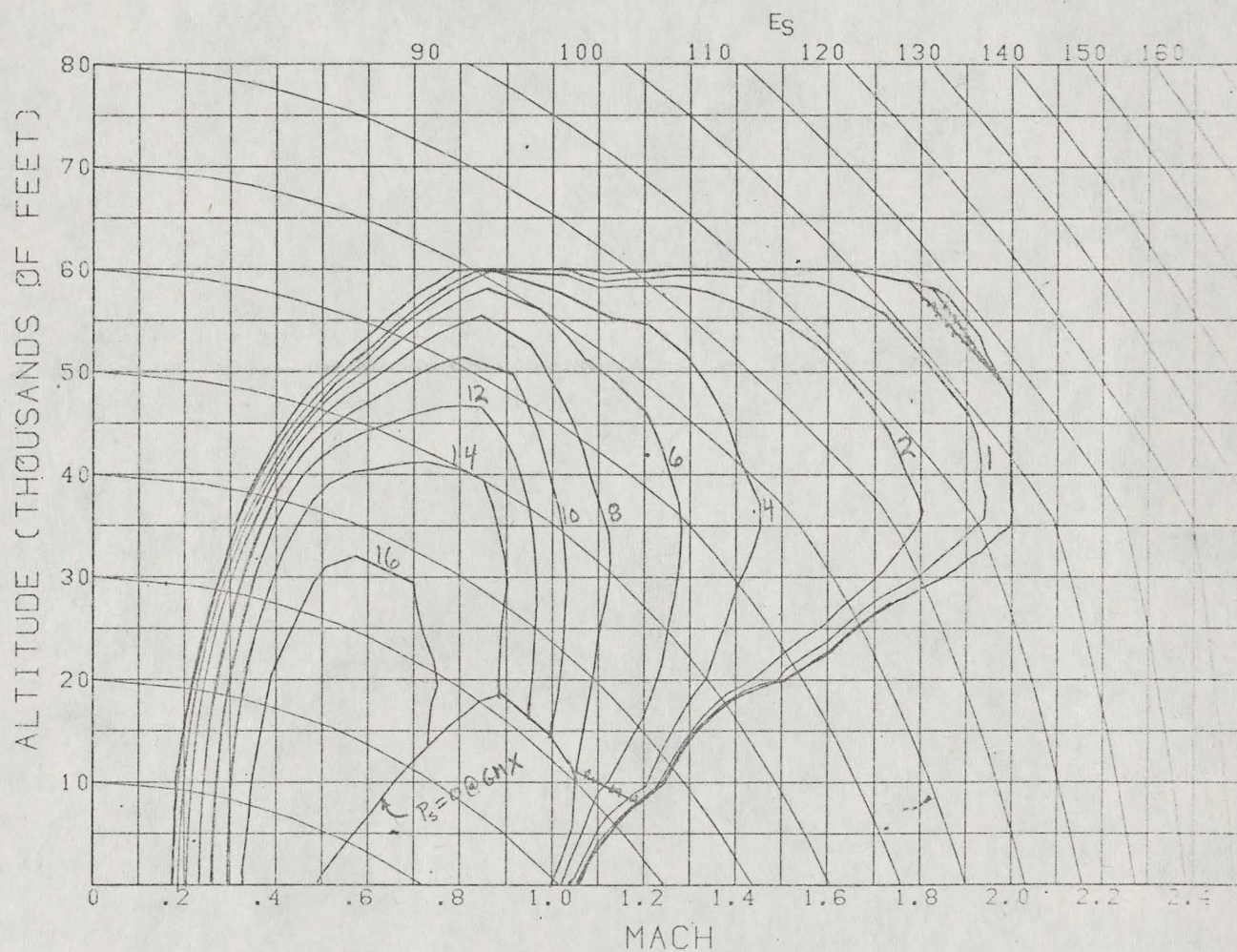
DC 1 - MAX PWR

2A9

1.00 → .139
(500)

ESTART = 42000

HORIZONTAL ATTITUDE

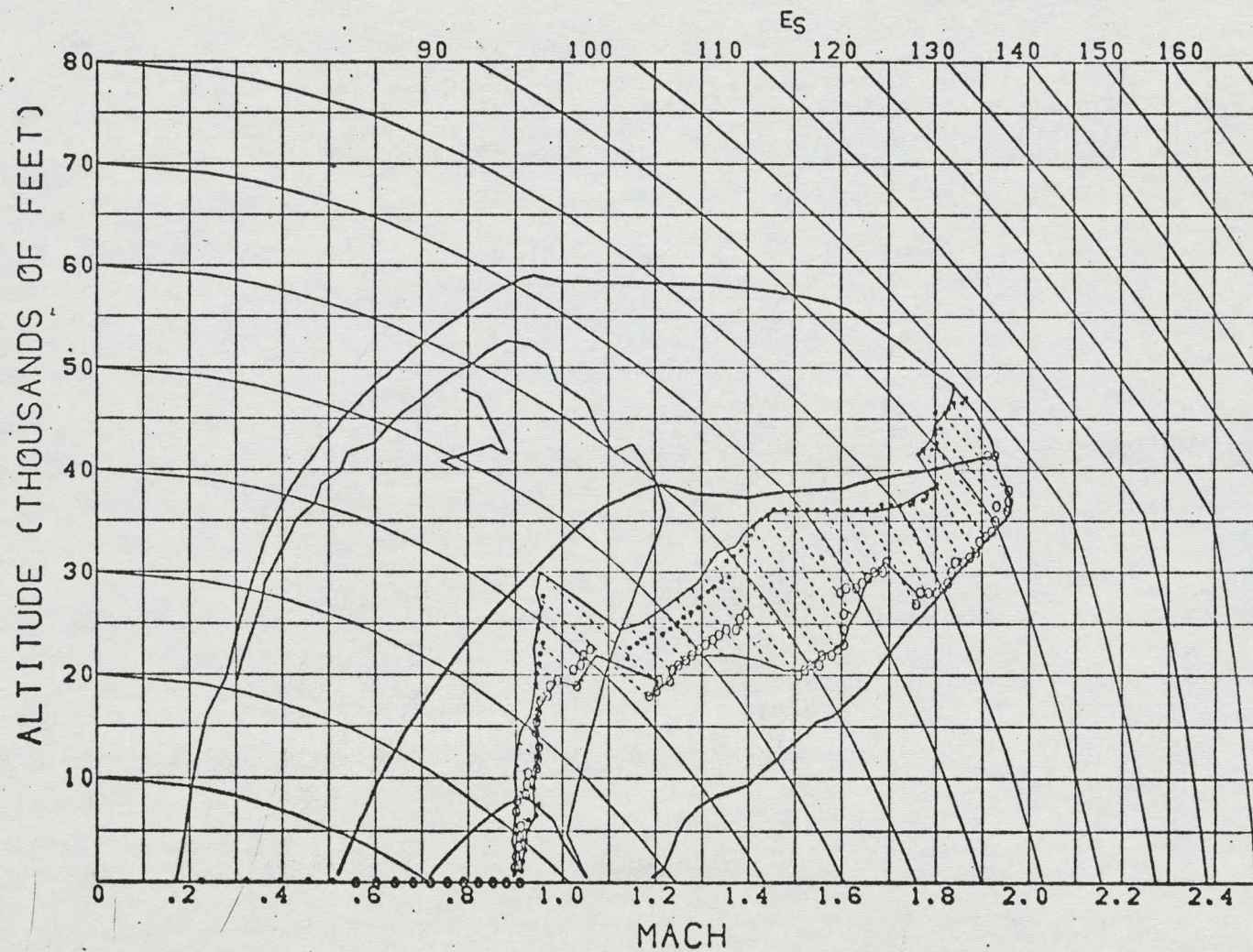


PLOT PREPARED BY TSX, ADTC

410234

AIR BATTLE ARENA

DC 1 - MAX PWR



410234

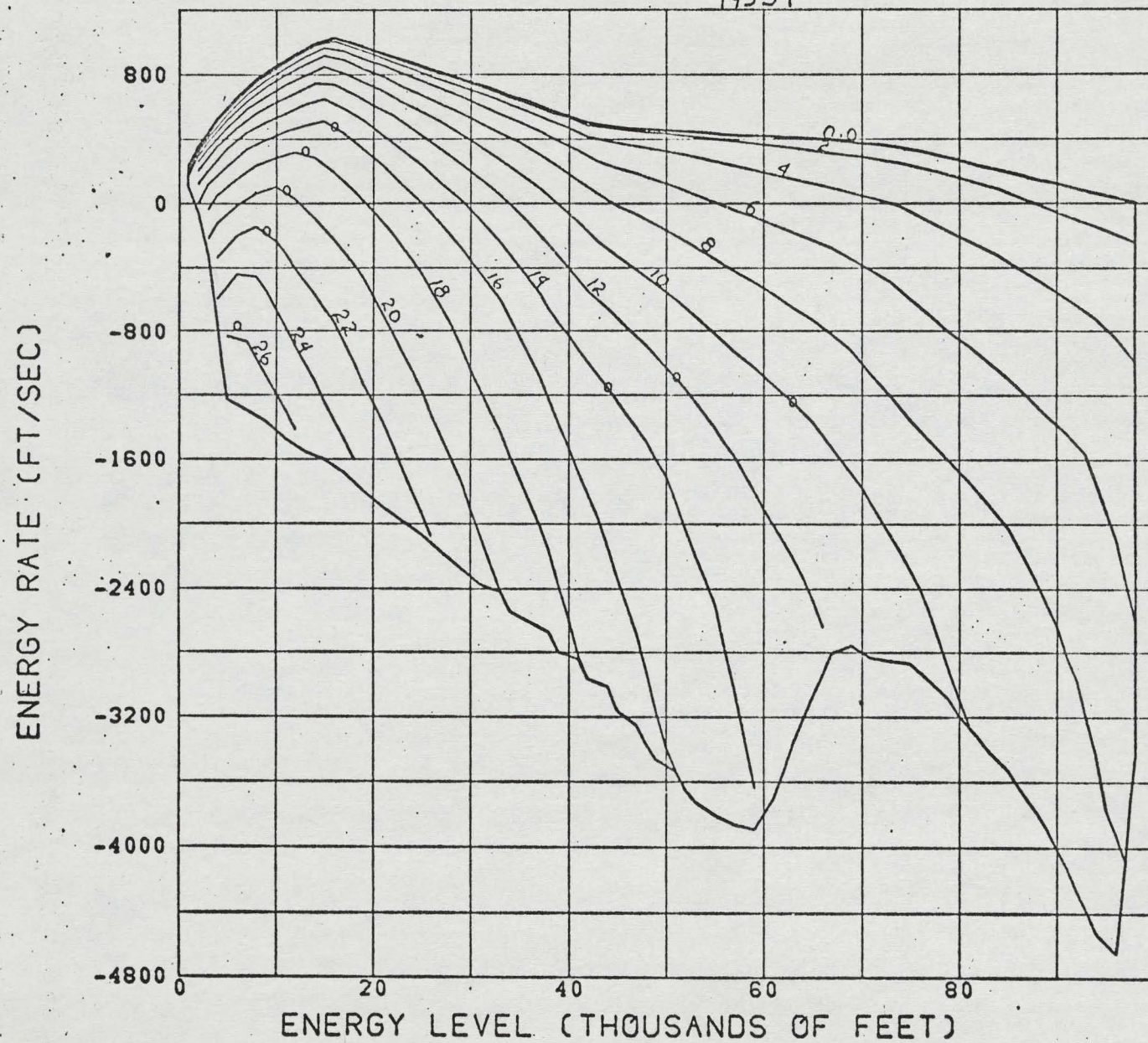
FEB 14 1975

MAX MANEUVER DIAGRAM

DC 1 -MAX PWR

19534

HORIZONTAL ATTITUDE



PLOT PREPARED BY ASD/ENFDP

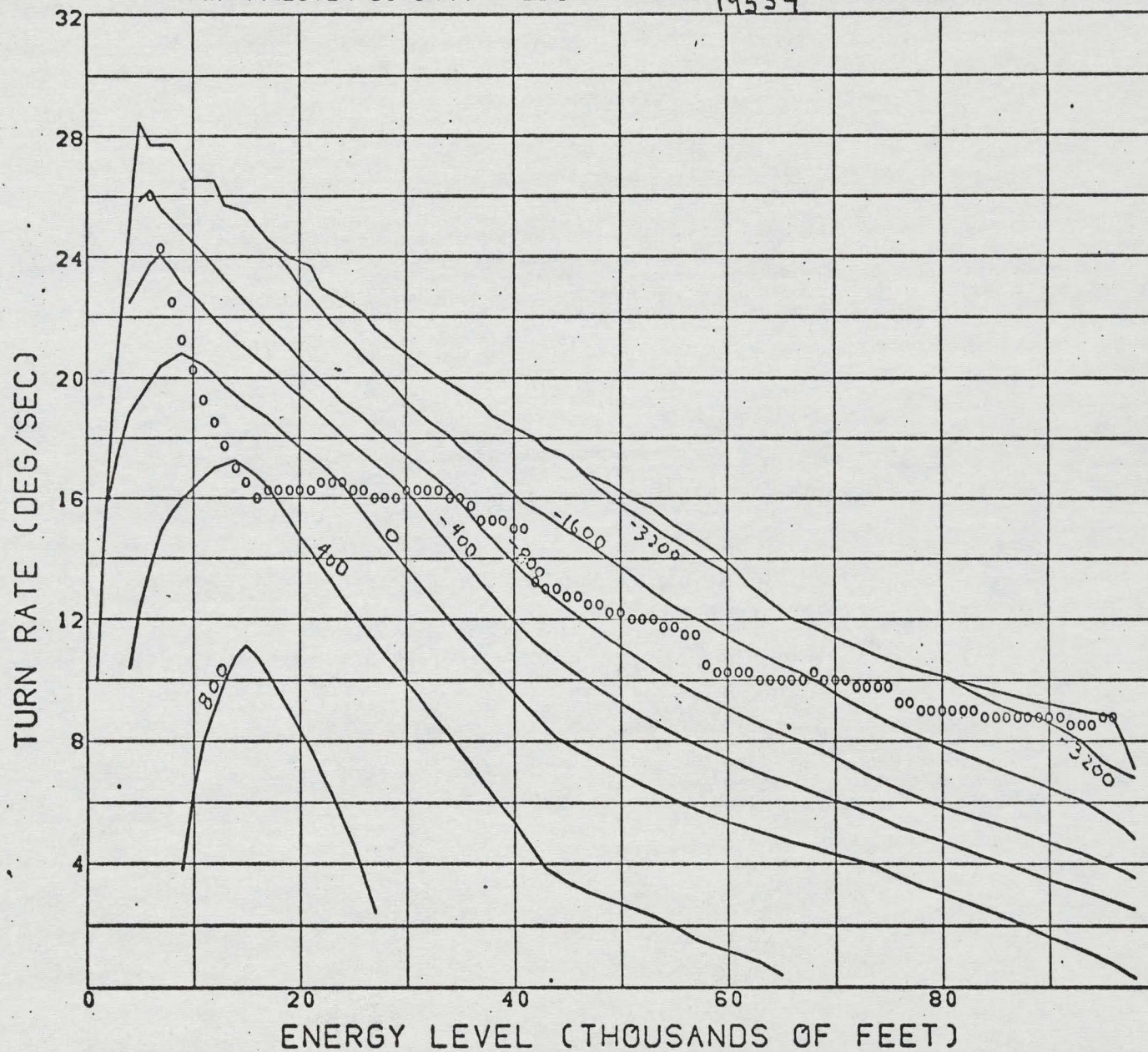
MAX MANEUVER DIAGRAM

410234

DC 1 -MAX PWR

19534

FEB 14 1975
HORIZONTAL ATTITUDE



PLOT PREPARED BY ASD/ENFDP

FEB 14 1975

410234

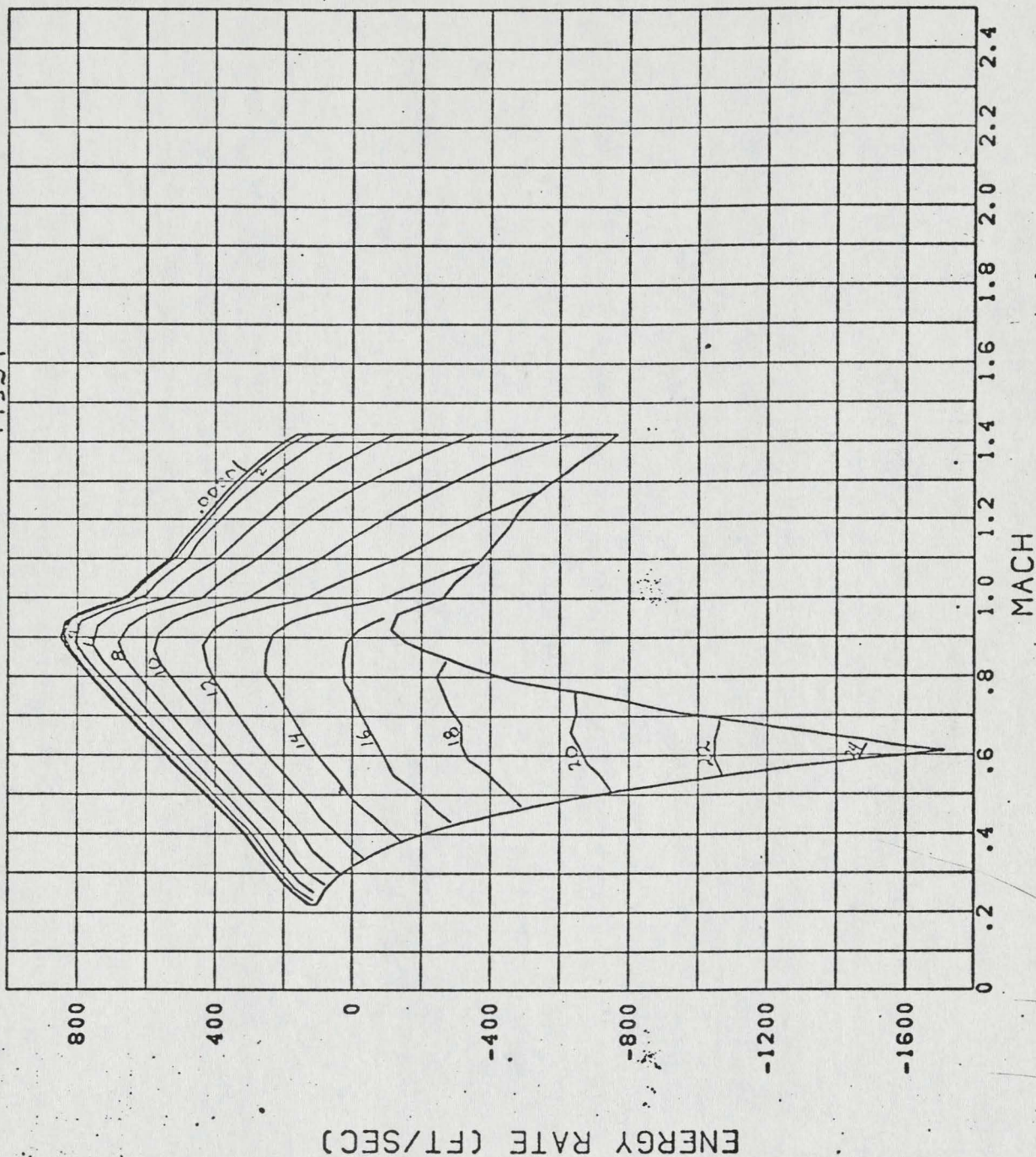
HORIZONTAL ALTITUDE

19534

DC1 - MAX PWR

MANEUVER DIAGRAM

ALTITUDE 10000



PLOT PREPARED BY ASD/ENFDP

MANEUVER DIAGRAM
ALTITUDE 30000

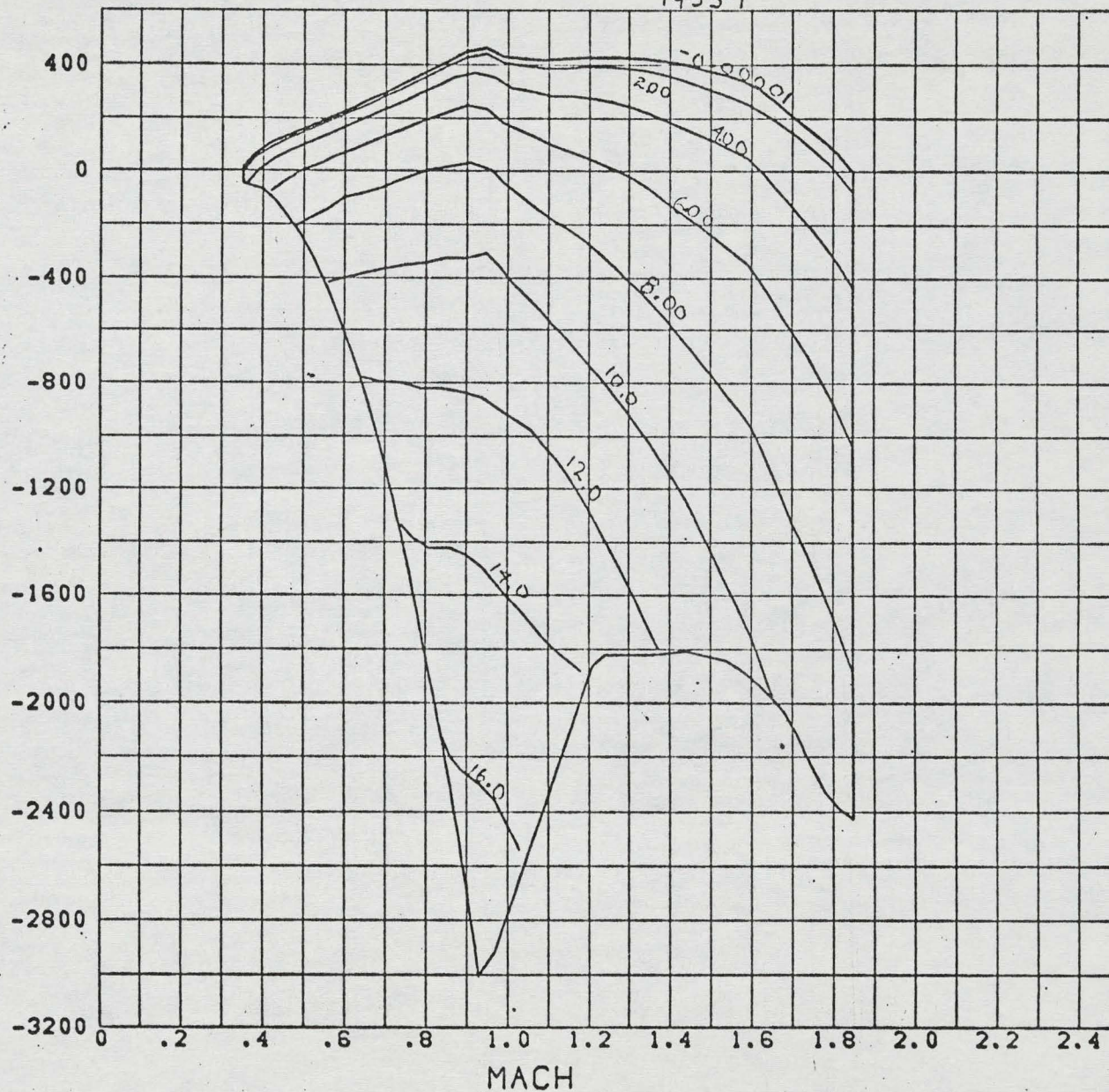
410234

DC1 -MAX PWR 195341

FEB 14 1975

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

410234

DC1 - MAX PWR
OPT/MAX L/D

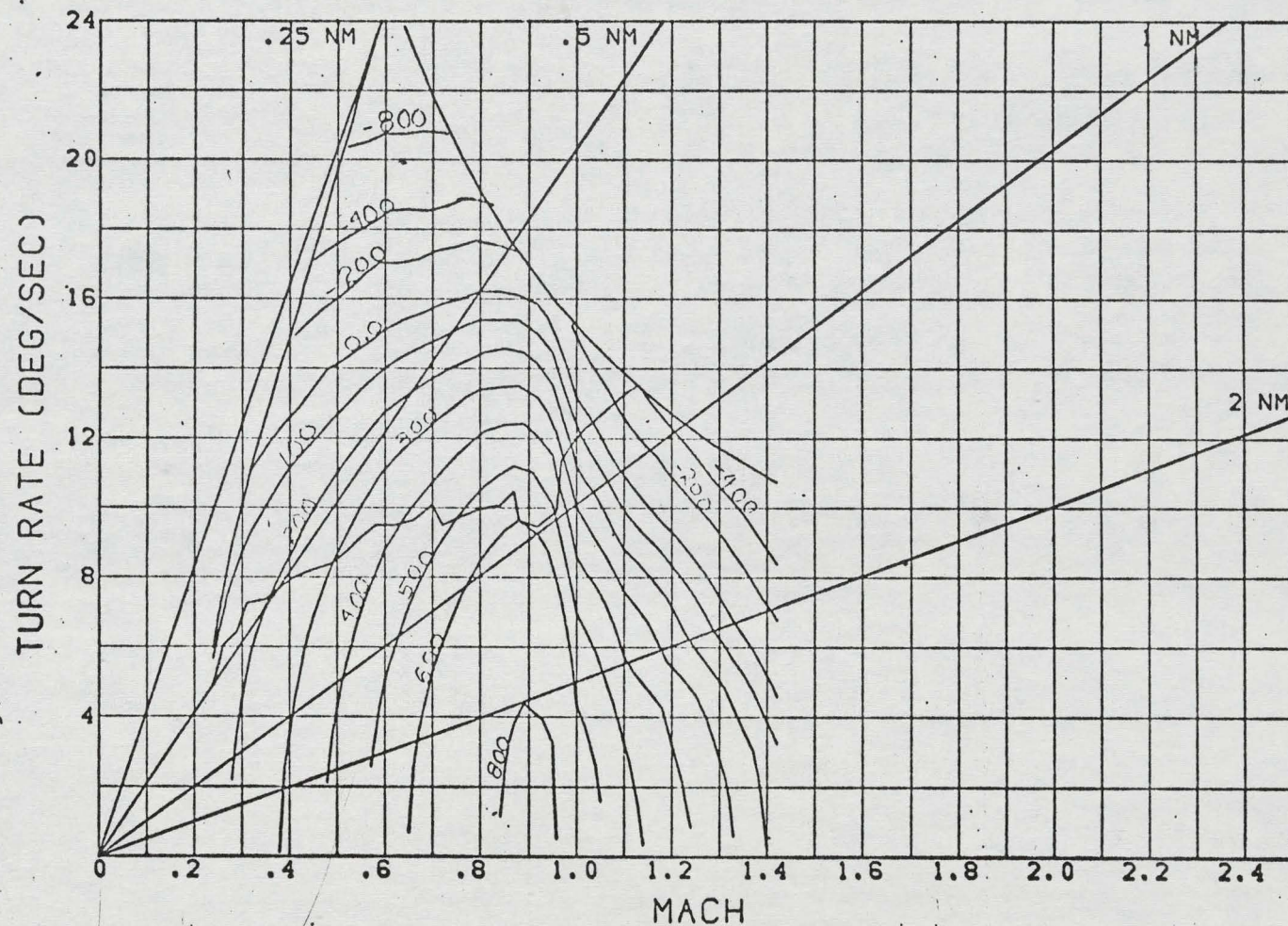
19534

HORIZONTAL ATTITUDE

MANEUVER DIAGRAM

ALTITUDE: 10000

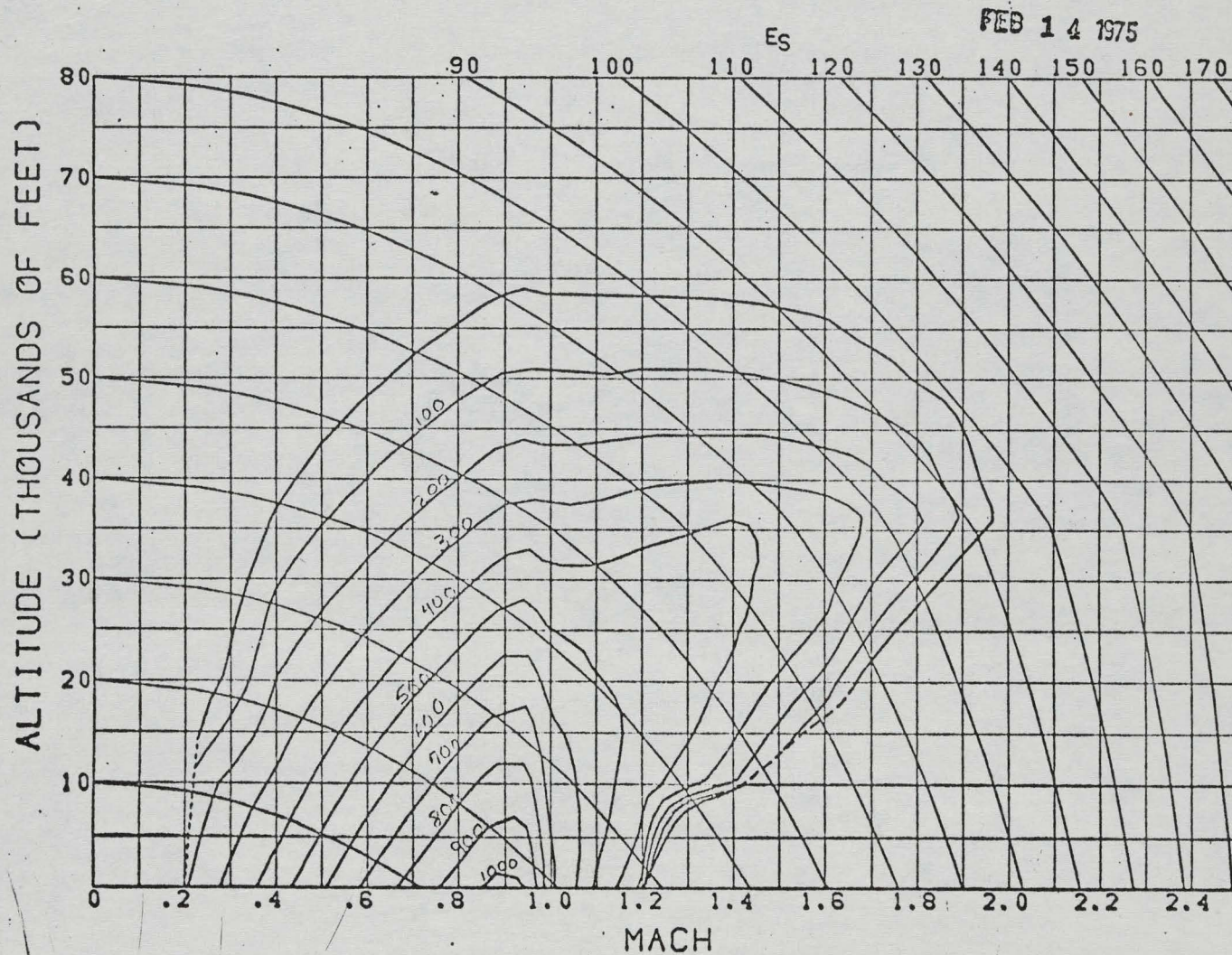
FEB 14 1975



FL01 PREPARED BY ASD/ENFDP

PS 410234
MAXIMUM POWER
D/C 1
19534

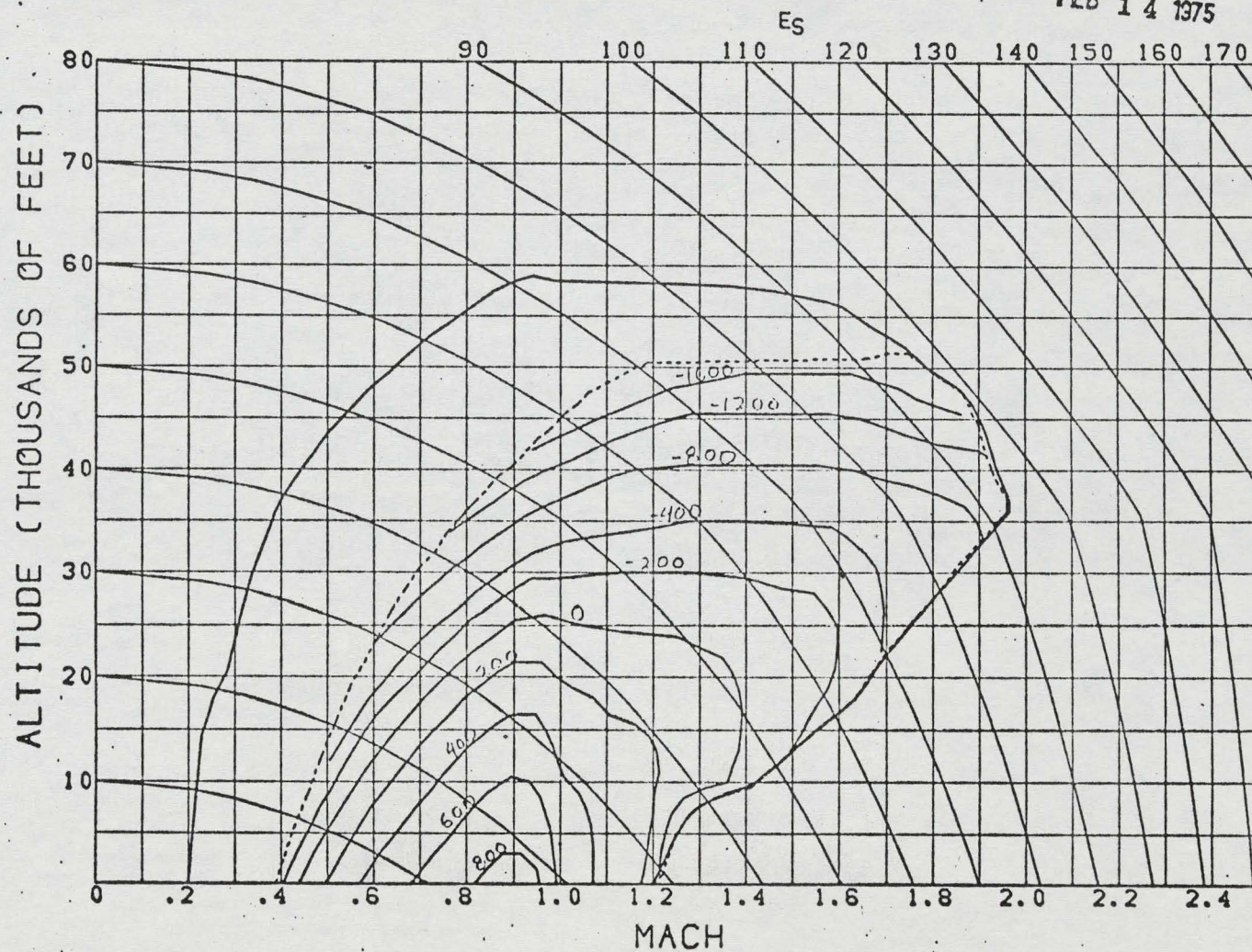
1.00 G DIAGRAM



PS 410234
MAXIMUM POWER
D/C 1
19534

5.00 G DIAGRAM

FEB 14 1975



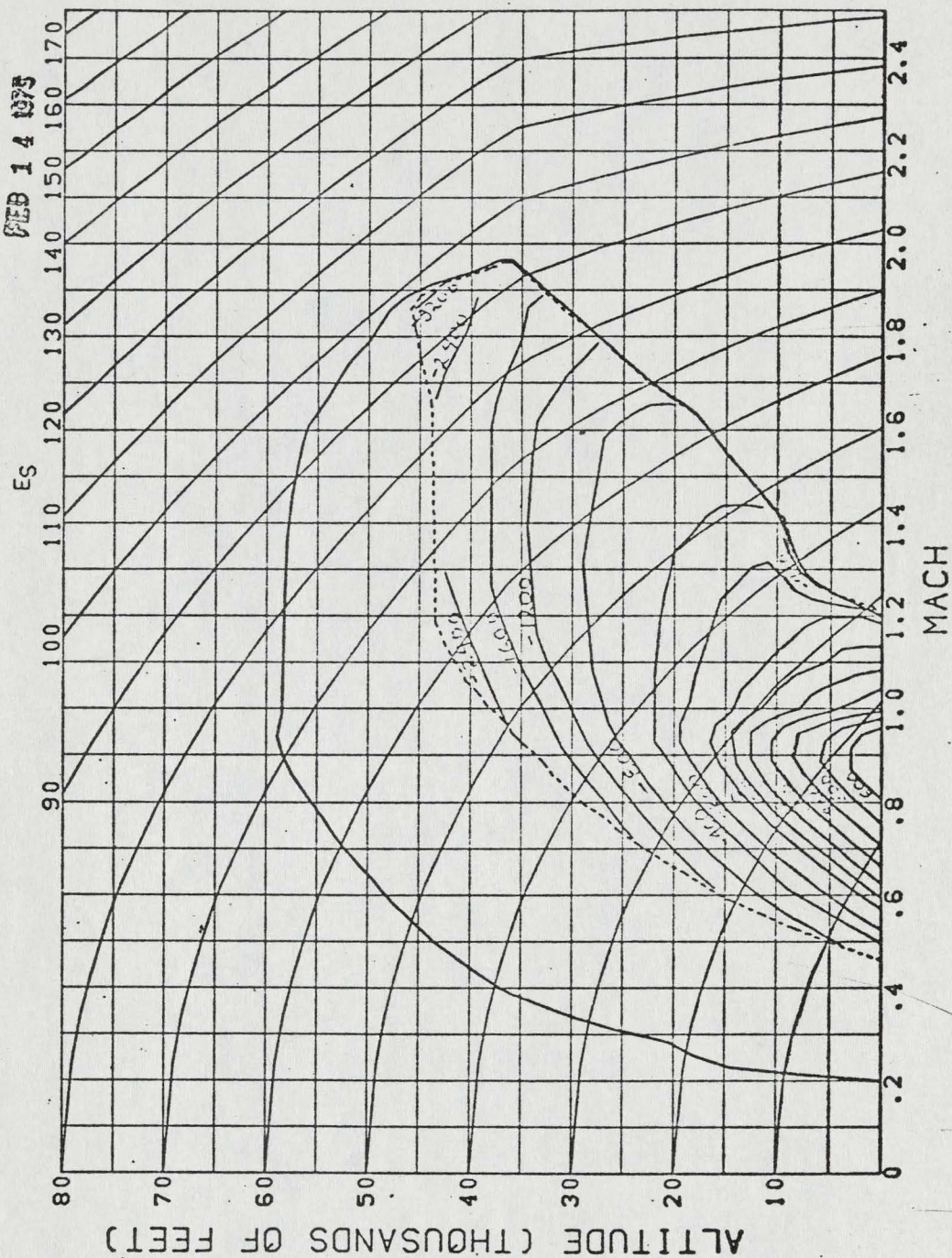
MAXIMUM POWER

D/C 1

19524

7.005 DIAGRAM

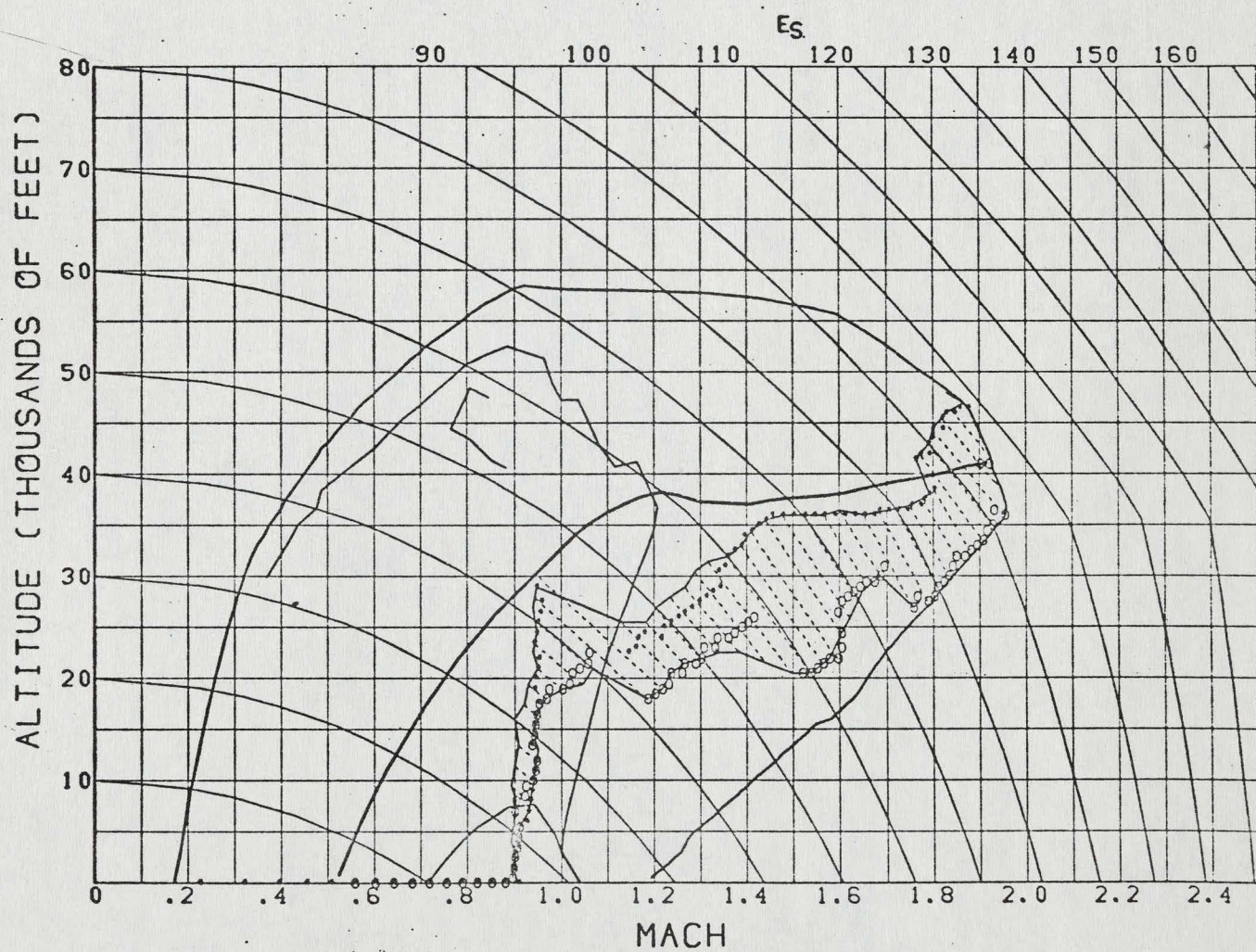
FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

AIR BATTLE ARENA

42810G
DC1 -MAX PWR
19790



PLOT PREPARED BY ASD/ENFDP

42810G

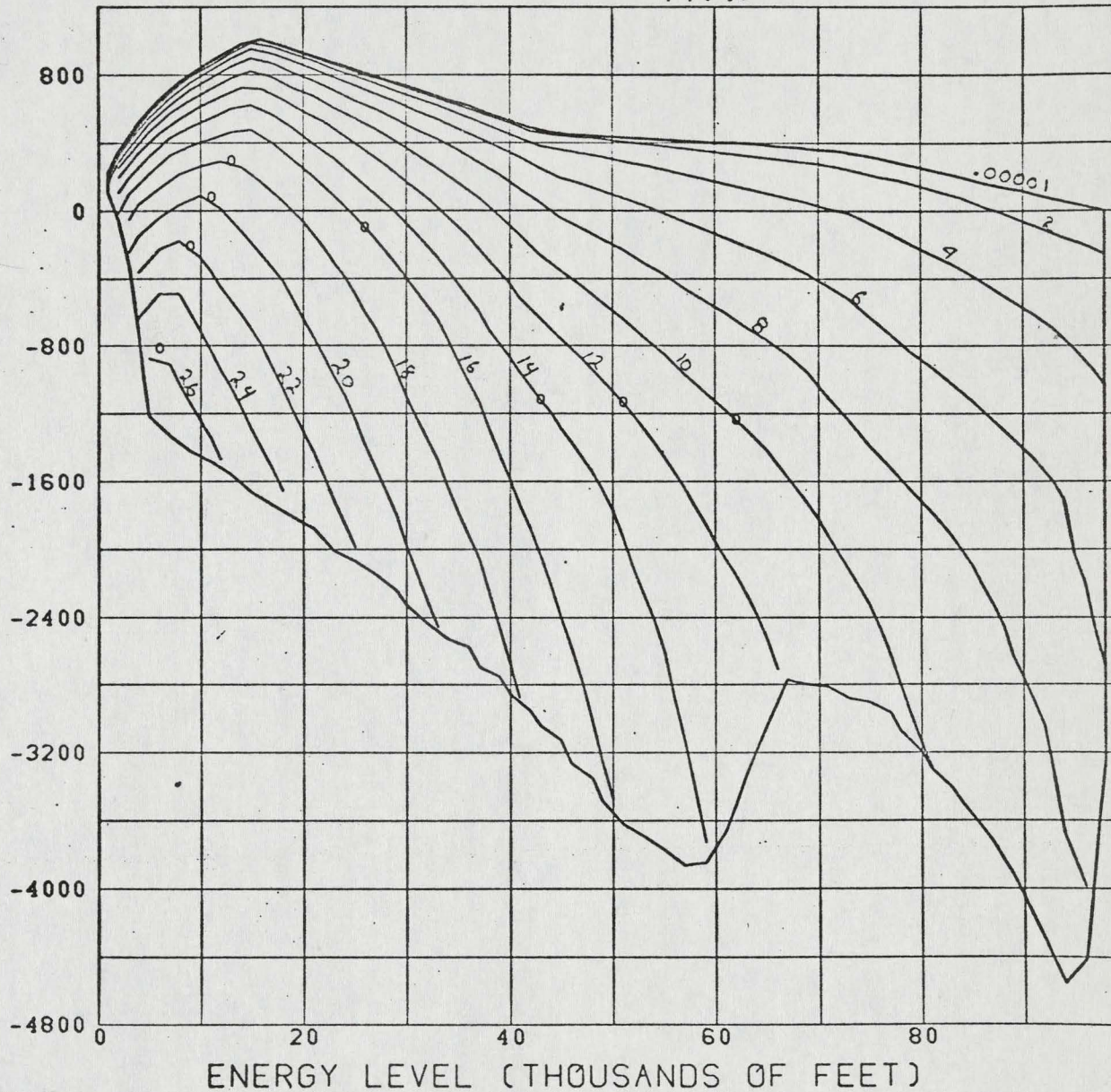
FEB 14 1975

MAX MANEUVER DIAGRAM

DC1 -MAX PWR 19790

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

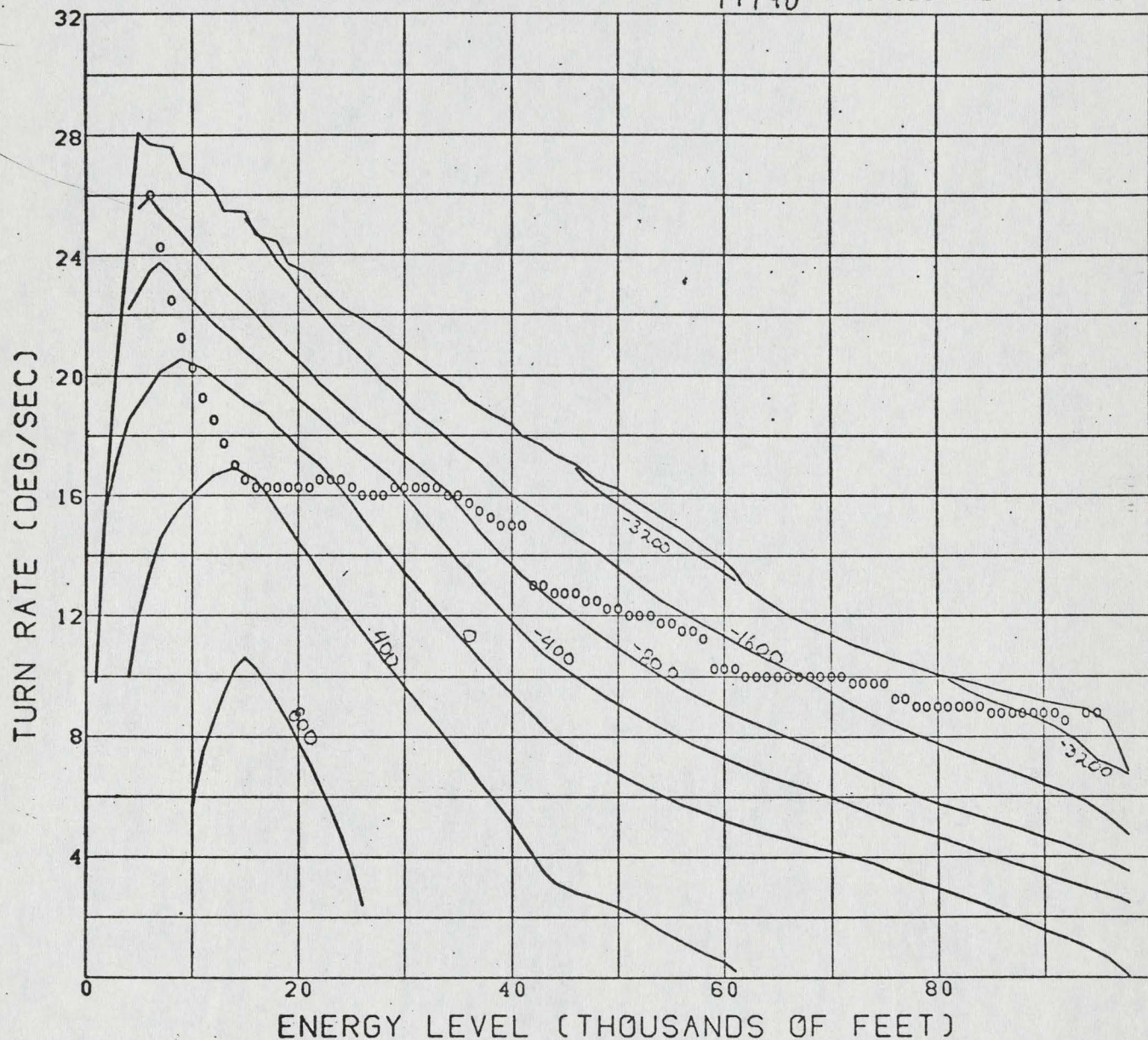
42810G

FEB 14 1973

MAX MANEUVER DIAGRAM

DC 1 -MAX PWR 19790

HORIZONTAL ATTITUDE



PLOT PREPARED BY ASD/ENFDP

MANEUVER DIAGRAM
ALTITUDE 10000

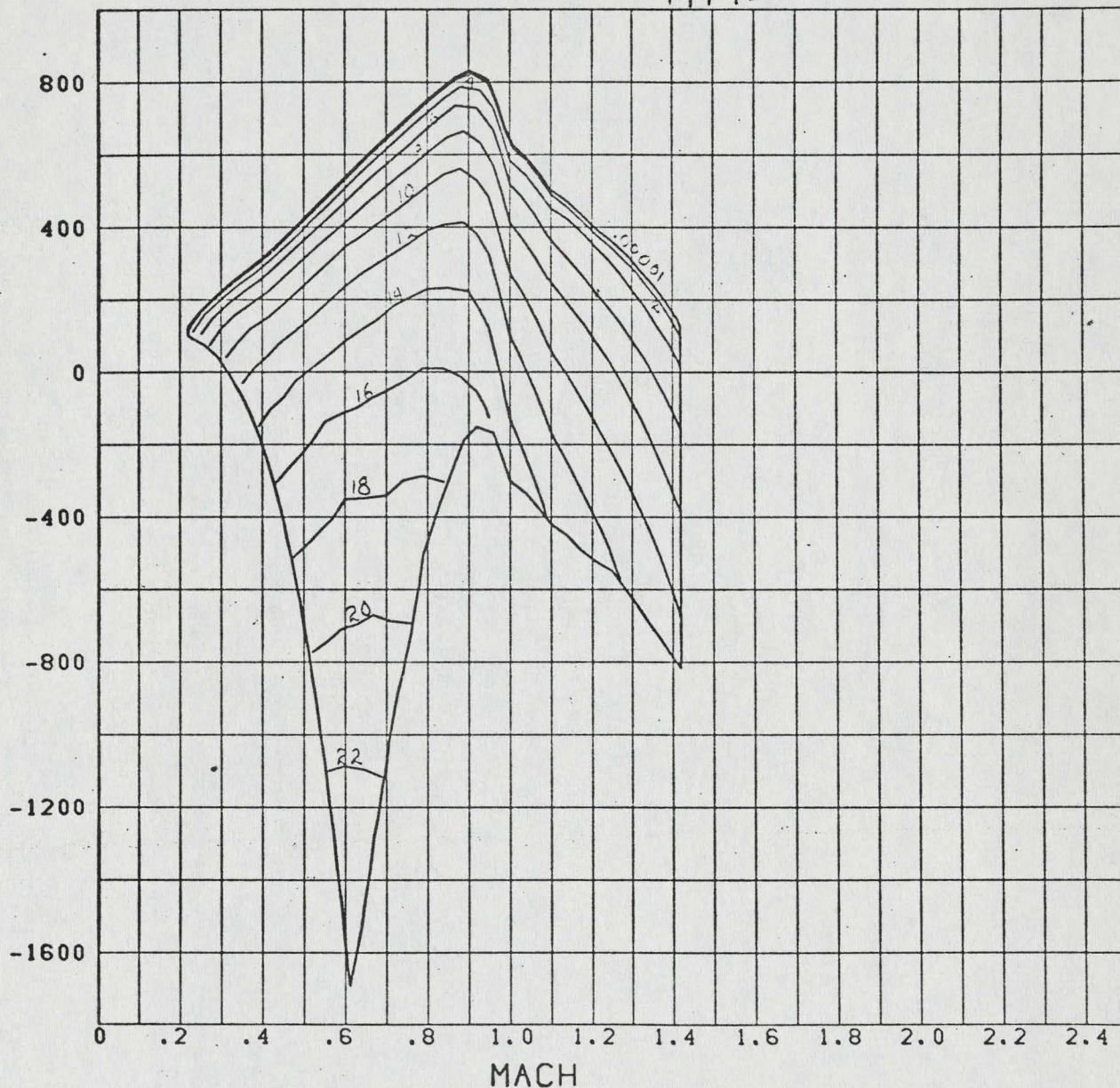
42810G

DC1 -MAX PWR 19790

FEB 14 1975

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

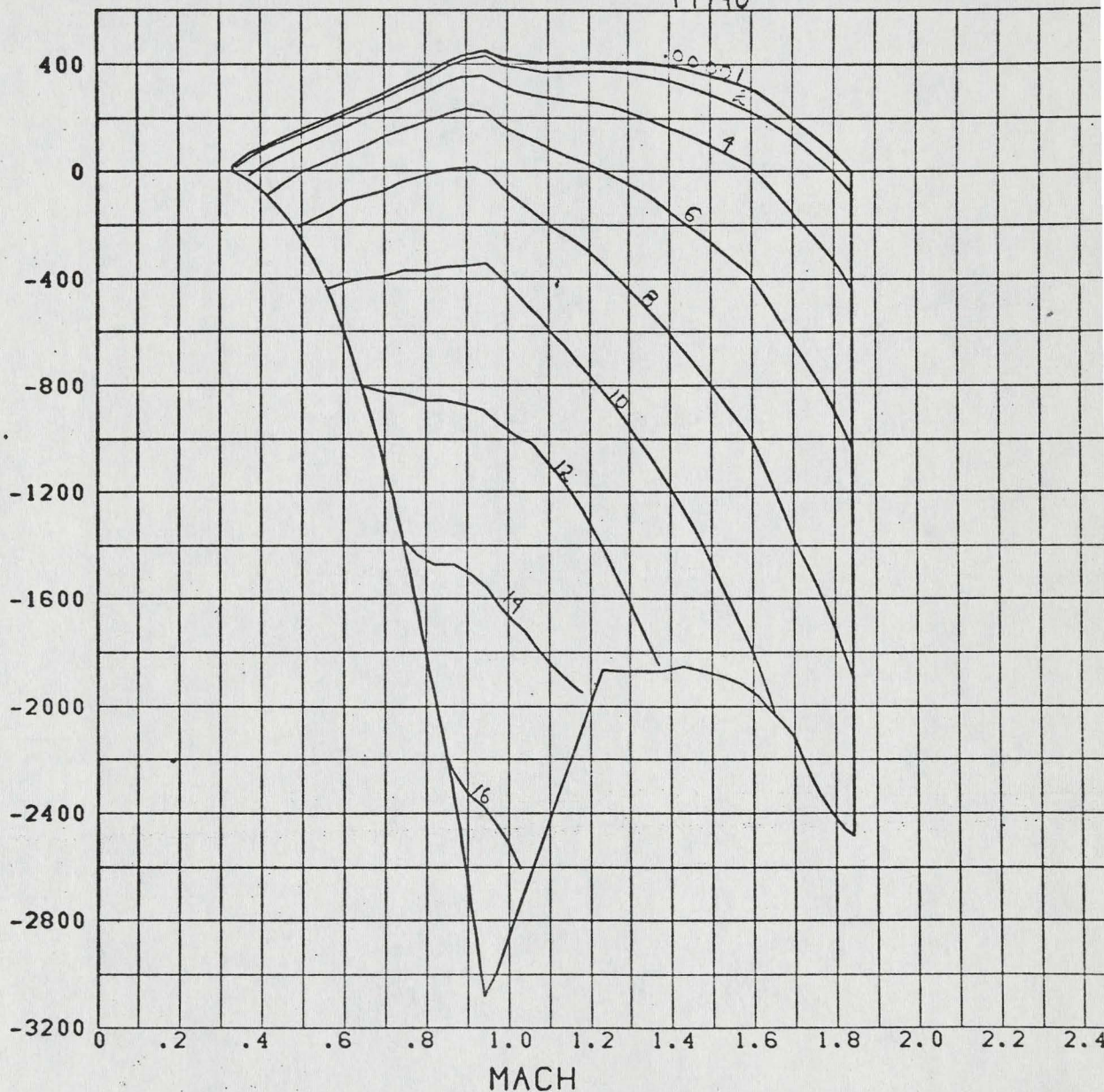
MANEUVER DIAGRAM
ALTITUDE 30000

42810G
DC 1 -MAX PWR

FEB 14 1975
HORIZONTAL ATTITUDE

19790

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

42810G

DC1 - MAX PWR

OPT/MAX L/D

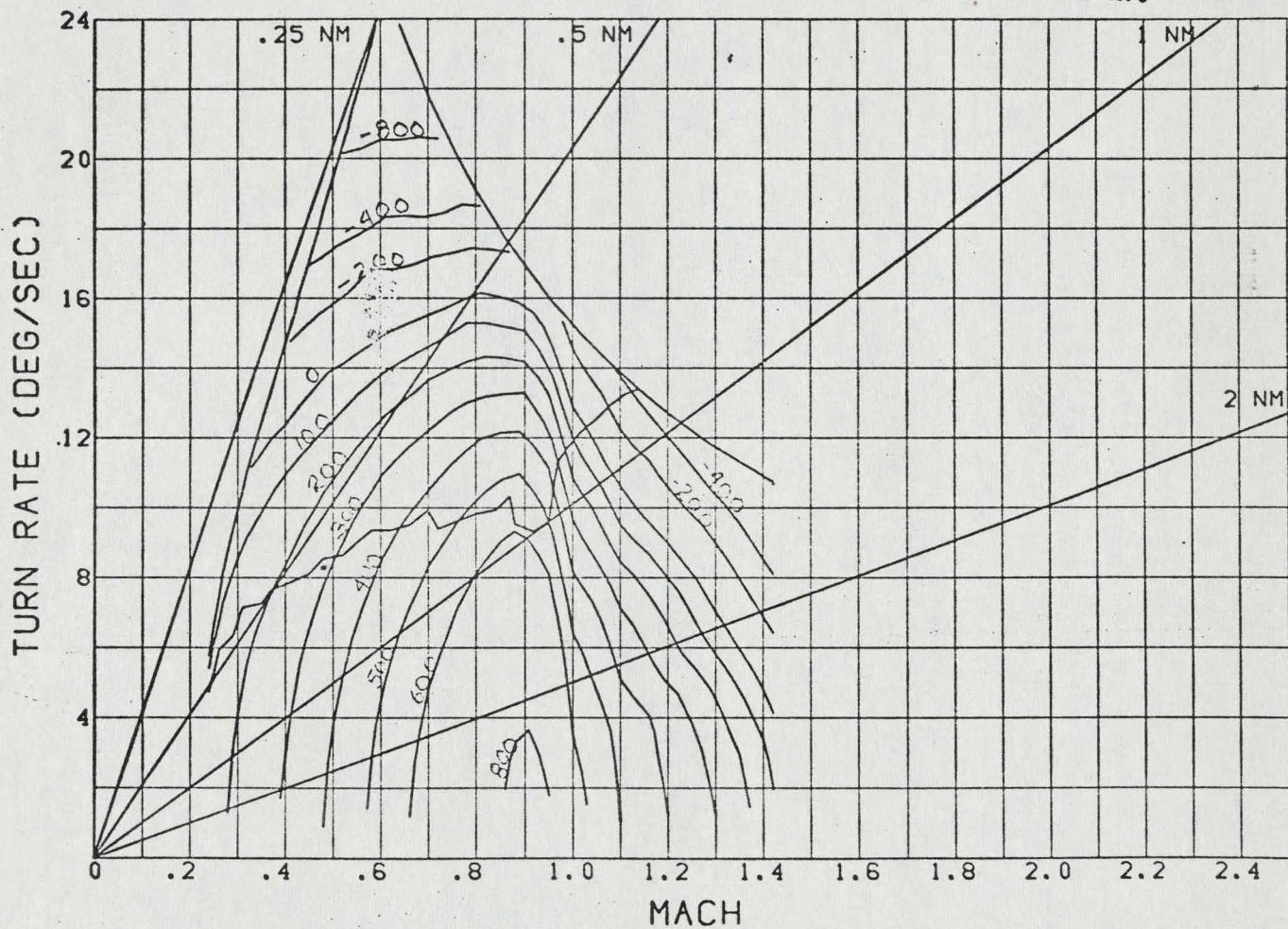
19790

HORIZONTAL ATTITUDE

MANEUVER DIAGRAM

ALTITUDE: 10000

FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

42810G

DC 1 -MAX PWR

OPT/MAX L/D

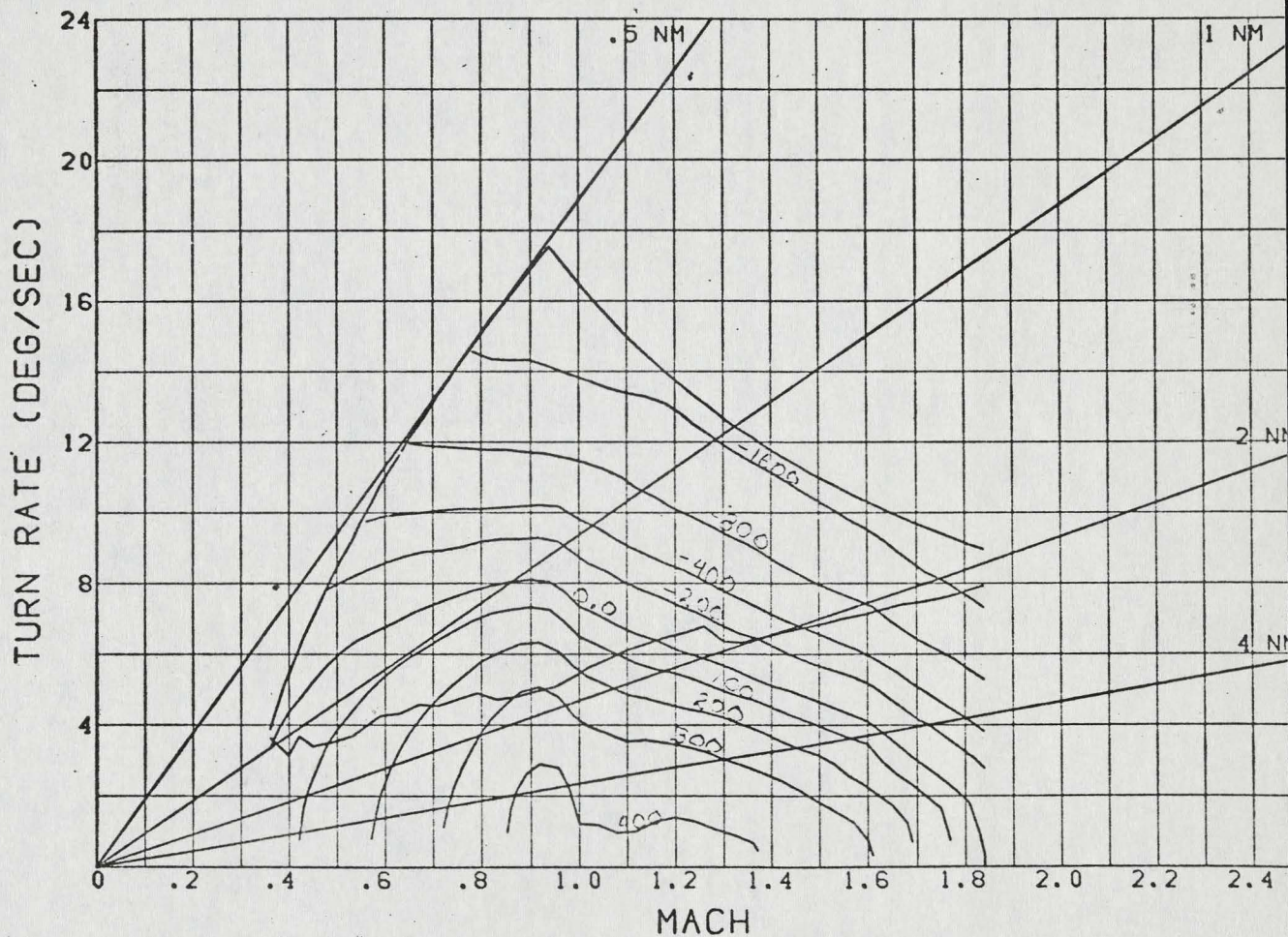
19790

HORIZONTAL ATTITUDE

MANEUVER DIAGRAM

ALTITUDE: 30000

FEB 14 1975

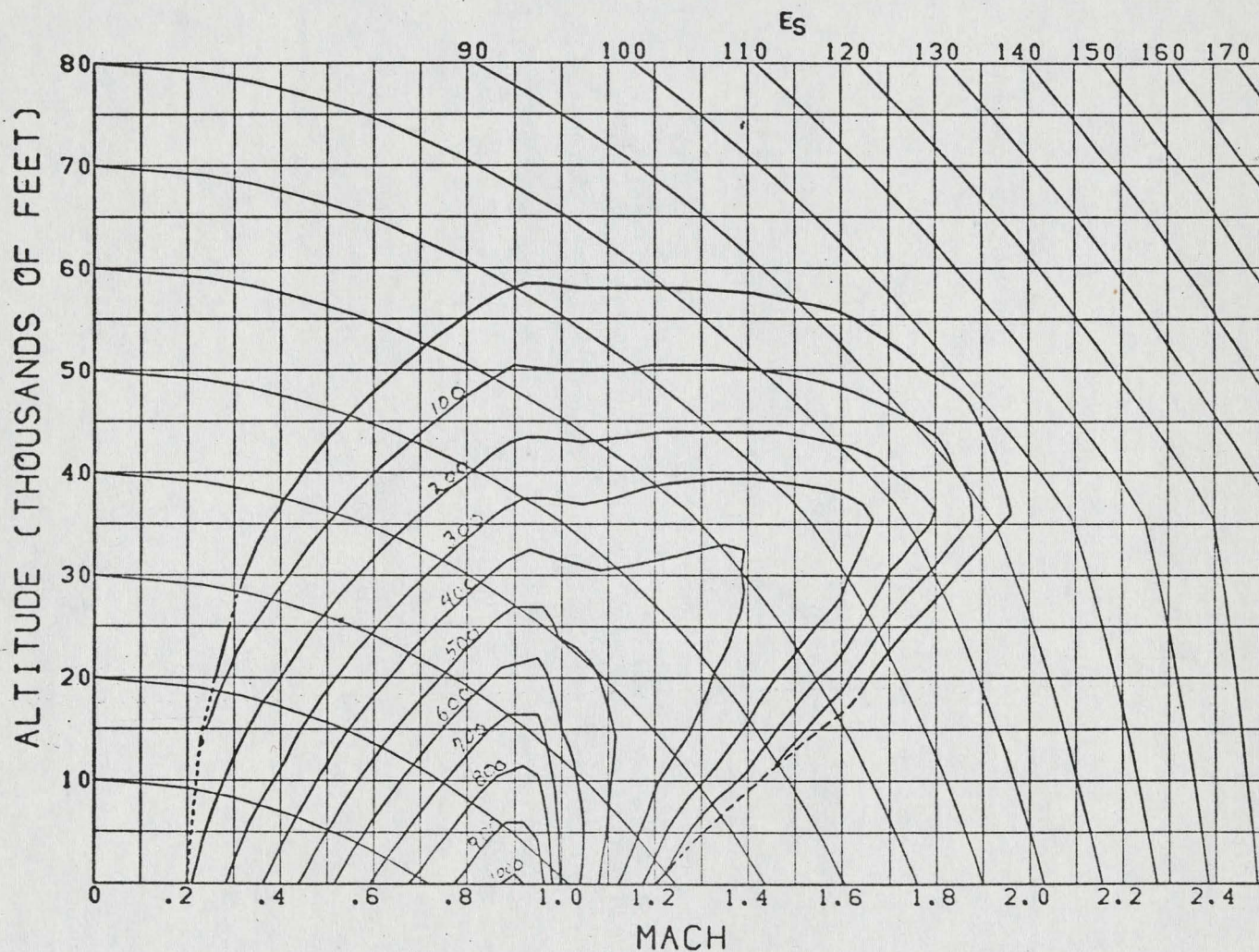


PLOT PREPARED BY ASD/ENFDP

PS 42810G
MAXIMUM POWER
D/C 1
19790

1.00 G DIAGRAM

FEB 14 1975

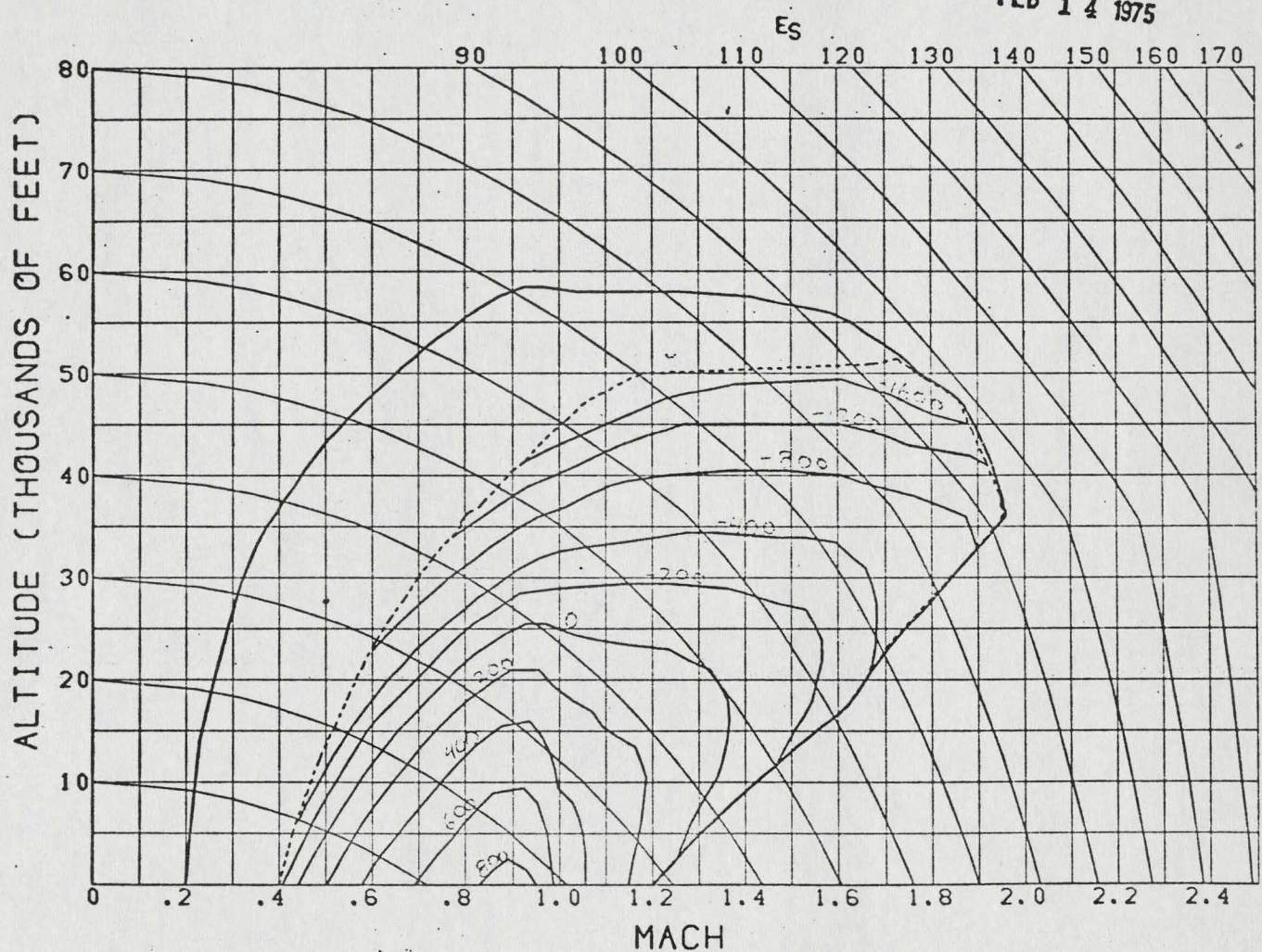


PLOT PREPARED BY ASD/ENFDP

PS 42810G
MAXIMUM POWER
D/C 1
19790

5.00 G DIAGRAM

FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

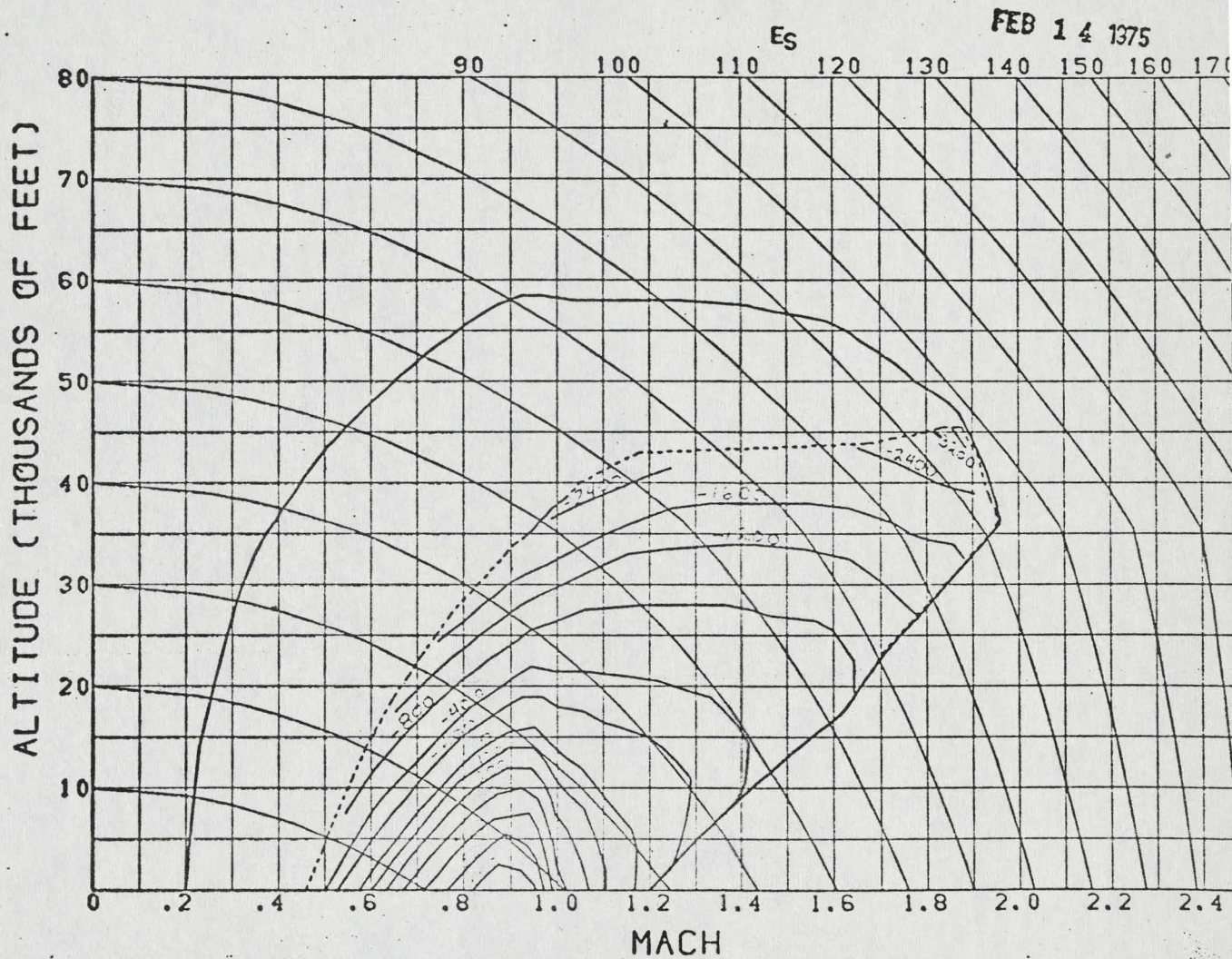
PS 42810G

MAXIMUM POWER

D/C 1

19790

7.00 G DIAGRAM



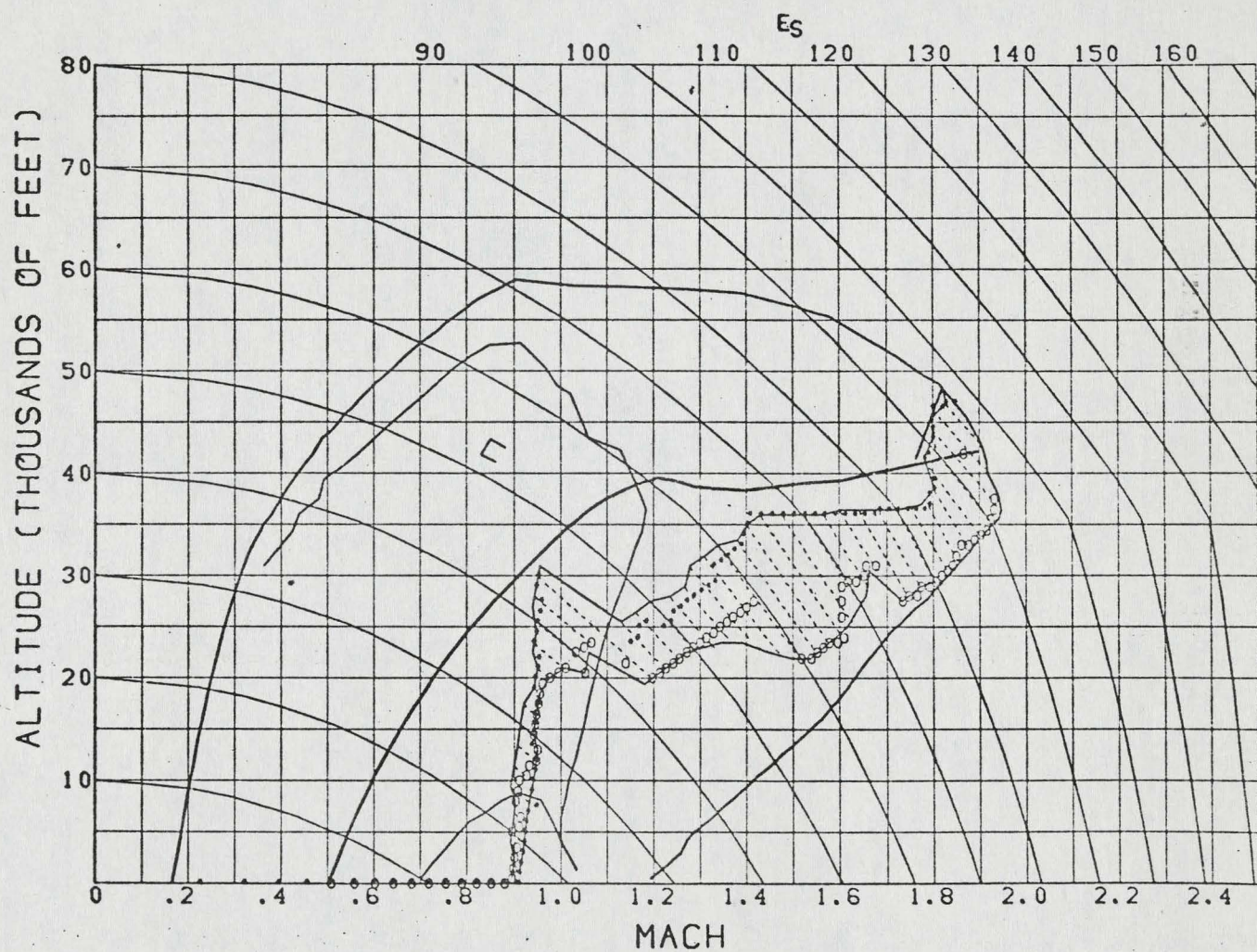
PLOT PREPARED BY ASD/ENFDP

AIR BATTLE ARENA

430106

DC 1 -MAX PWR

19951



PLOT PREPARED BY ASD/ENFDP

43010G

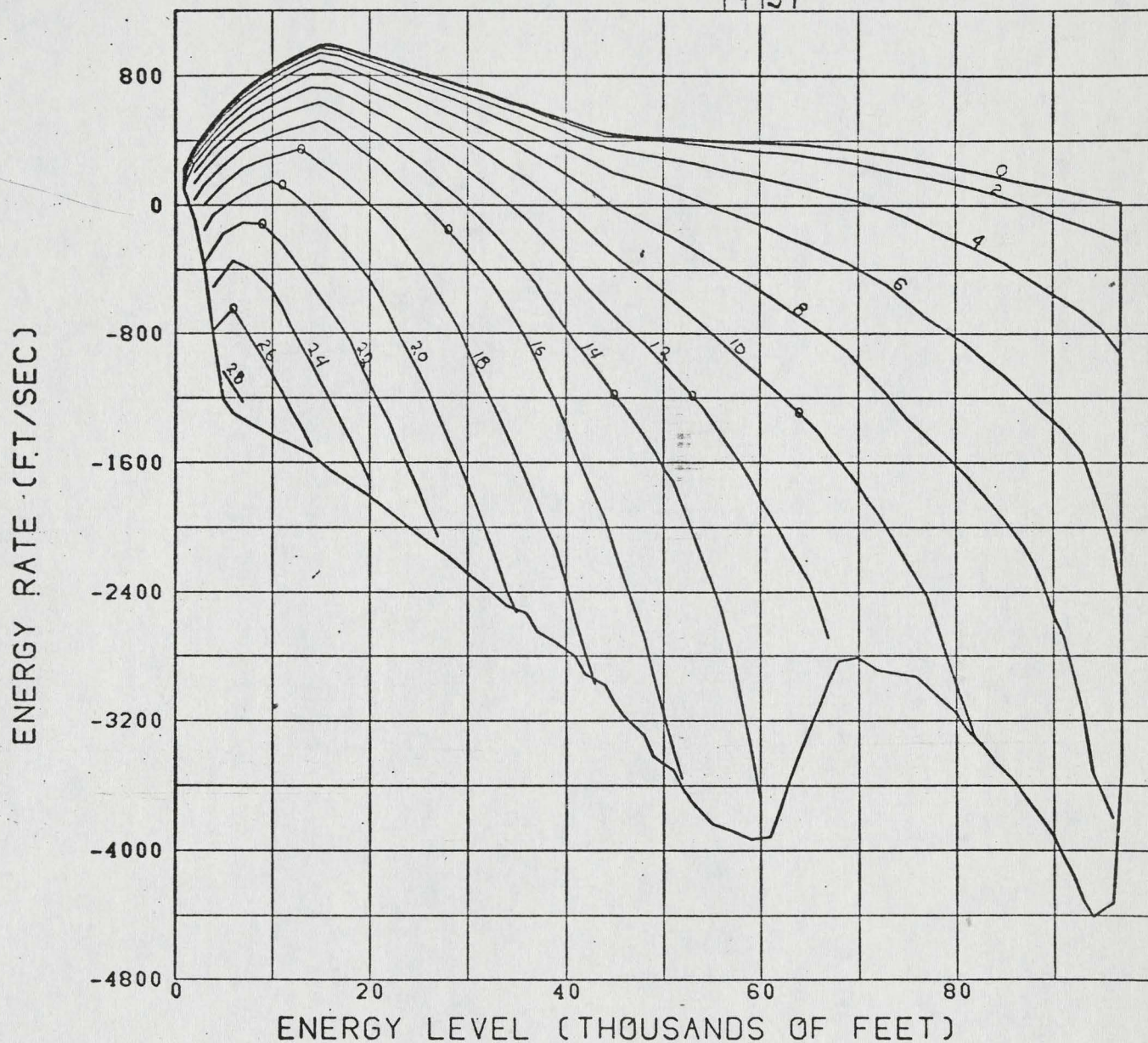
FEB 14 1975

MAX MANEUVER DIAGRAM

DC1 -MAX PWR

19951

HORIZONTAL ATTITUDE



PLOT PREPARED BY ASD/ENFDP

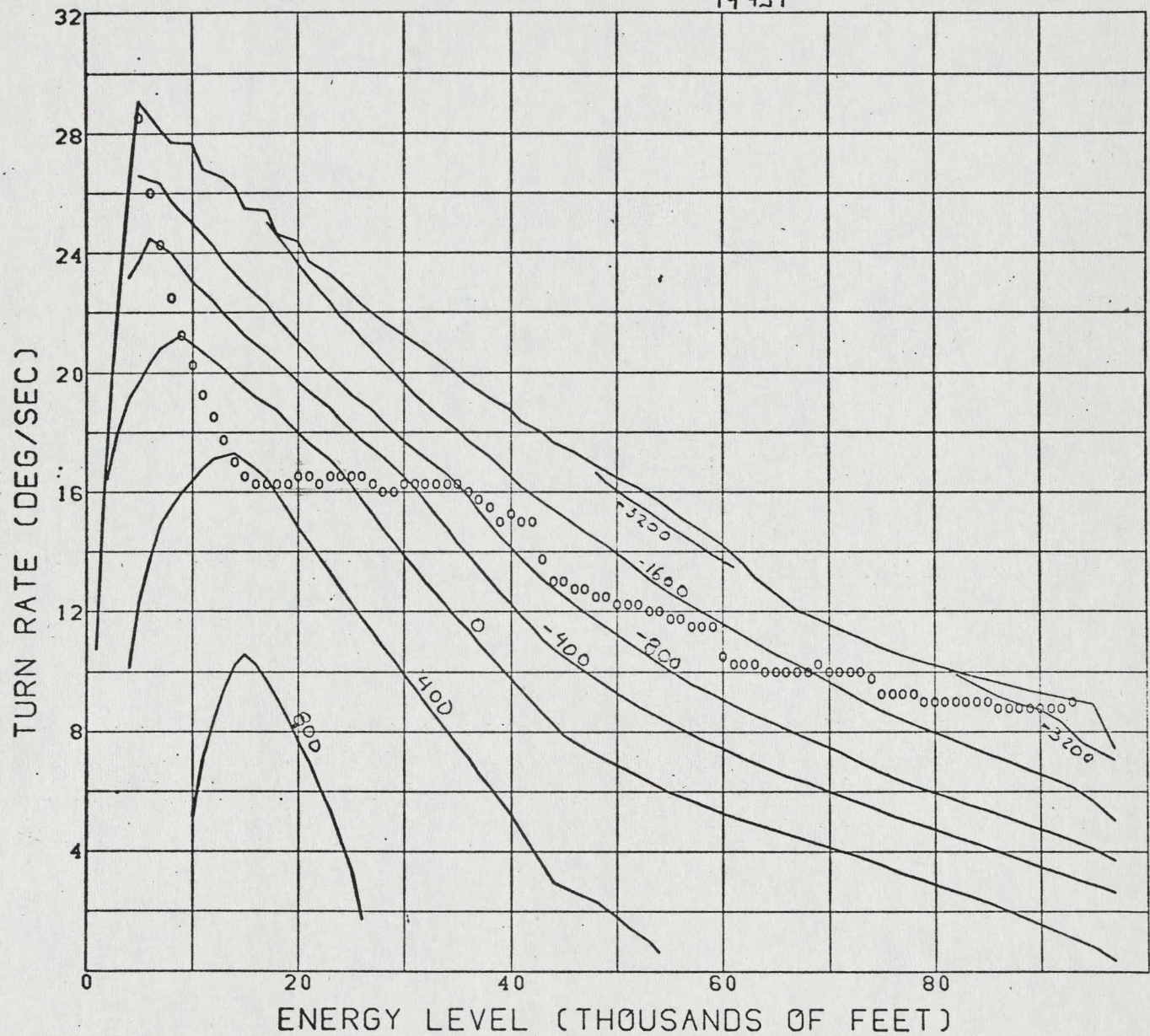
430106

FEB 14 1975

MAX MANEUVER DIAGRAM

DC1 -MAX PWR 19951

HORIZONTAL ATTITUDE



PLOT PREPARED BY ASD/ENFDP

MANEUVER DIAGRAM
ALTITUDE 10000

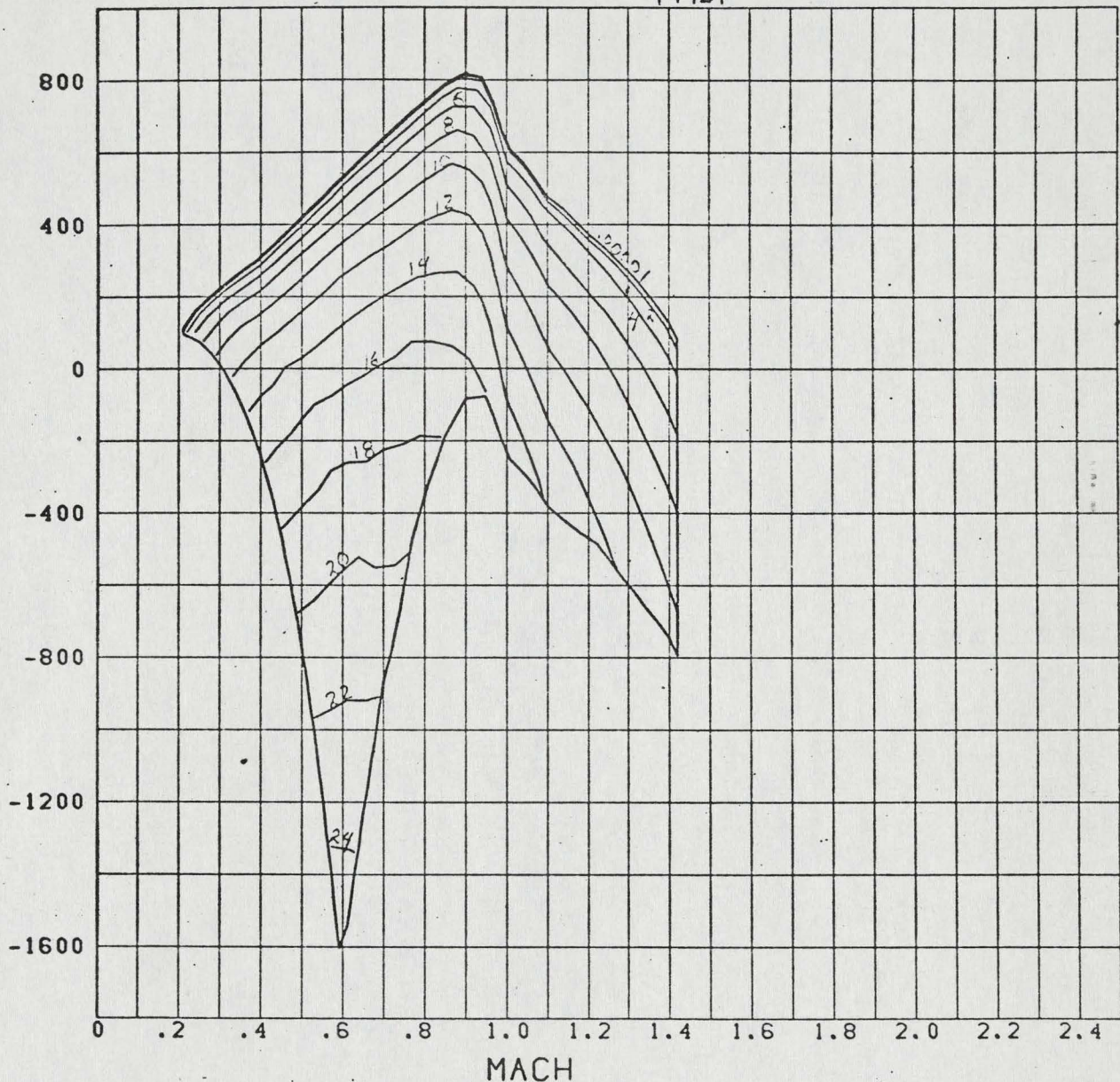
43010G

DC 1 -MAX PWR 19951

FEB 14 1975

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

MANEUVER DIAGRAM
ALTITUDE 30000

43010G

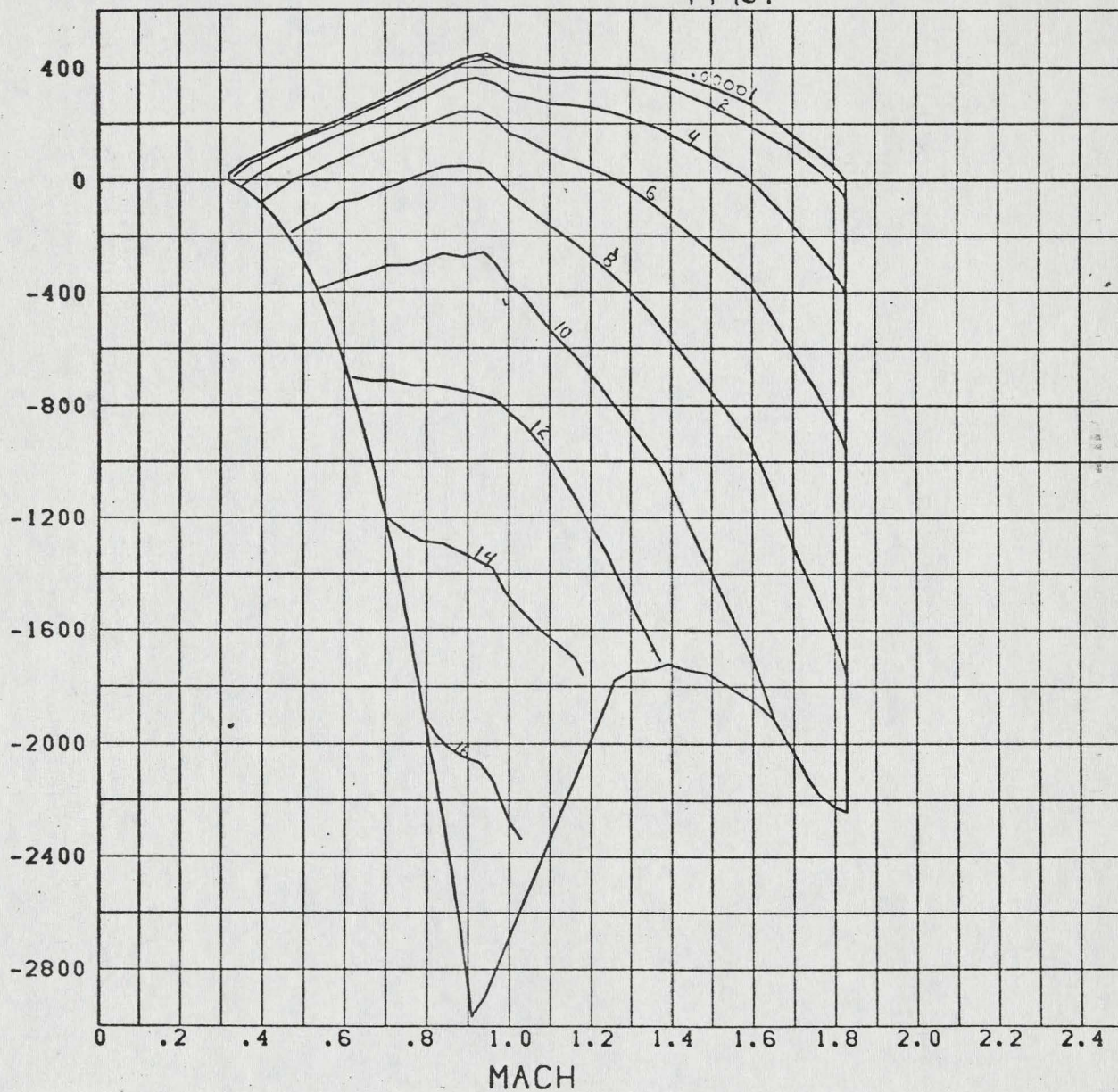
DC1 -MAX PWR

FEB 14 1975

19951

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFOP

430106

DC1 - MAX PWR

OPT/MAX L/D

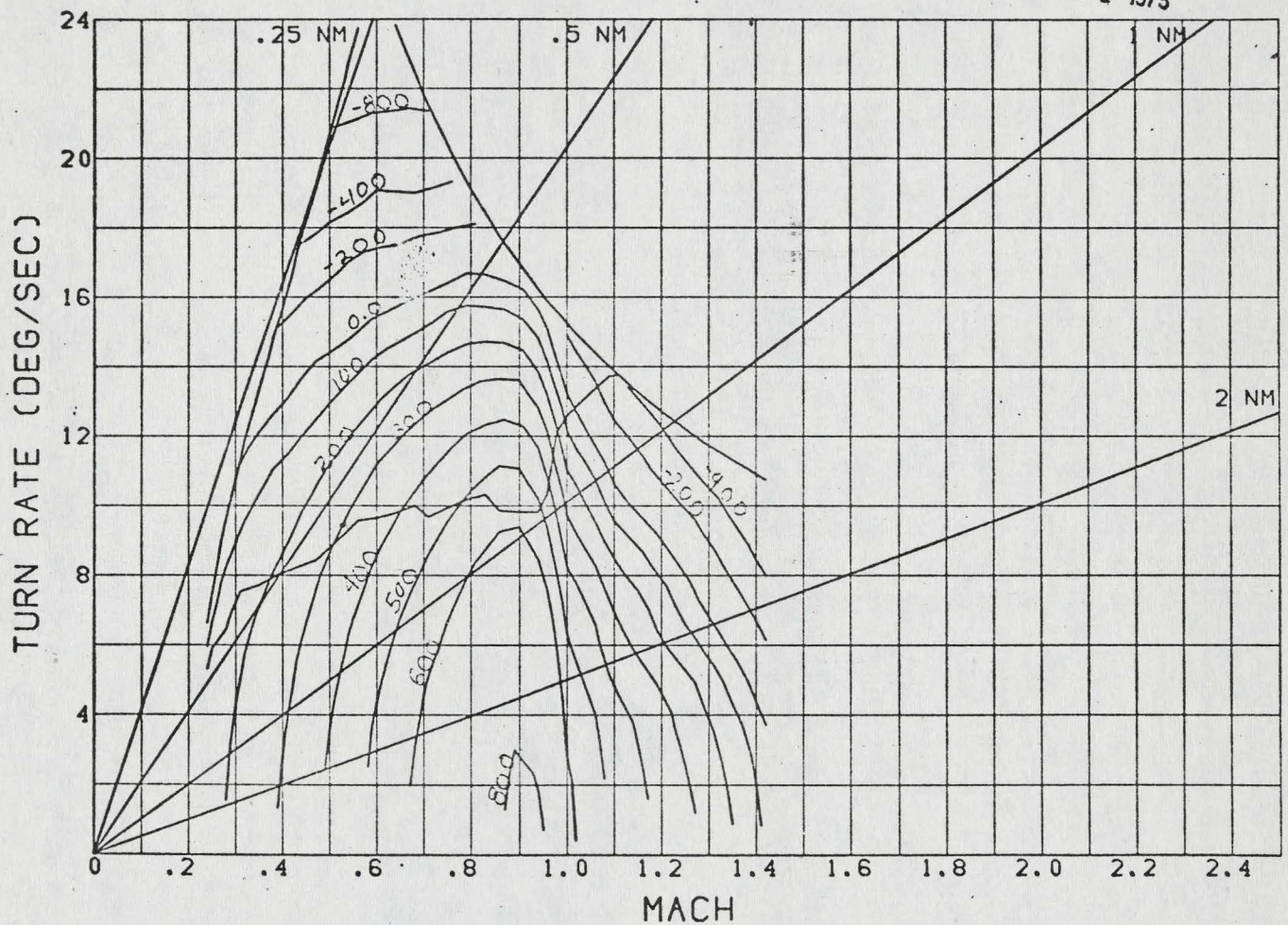
19951

HORIZONTAL ATTITUDE

MANEUVER DIAGRAM

ALTITUDE: 10000

FEB 14 1975



PLOT PREPARED BY ASD/ENFOP

430106

DC 1 -MAX PWR

OPT/MAX L/D

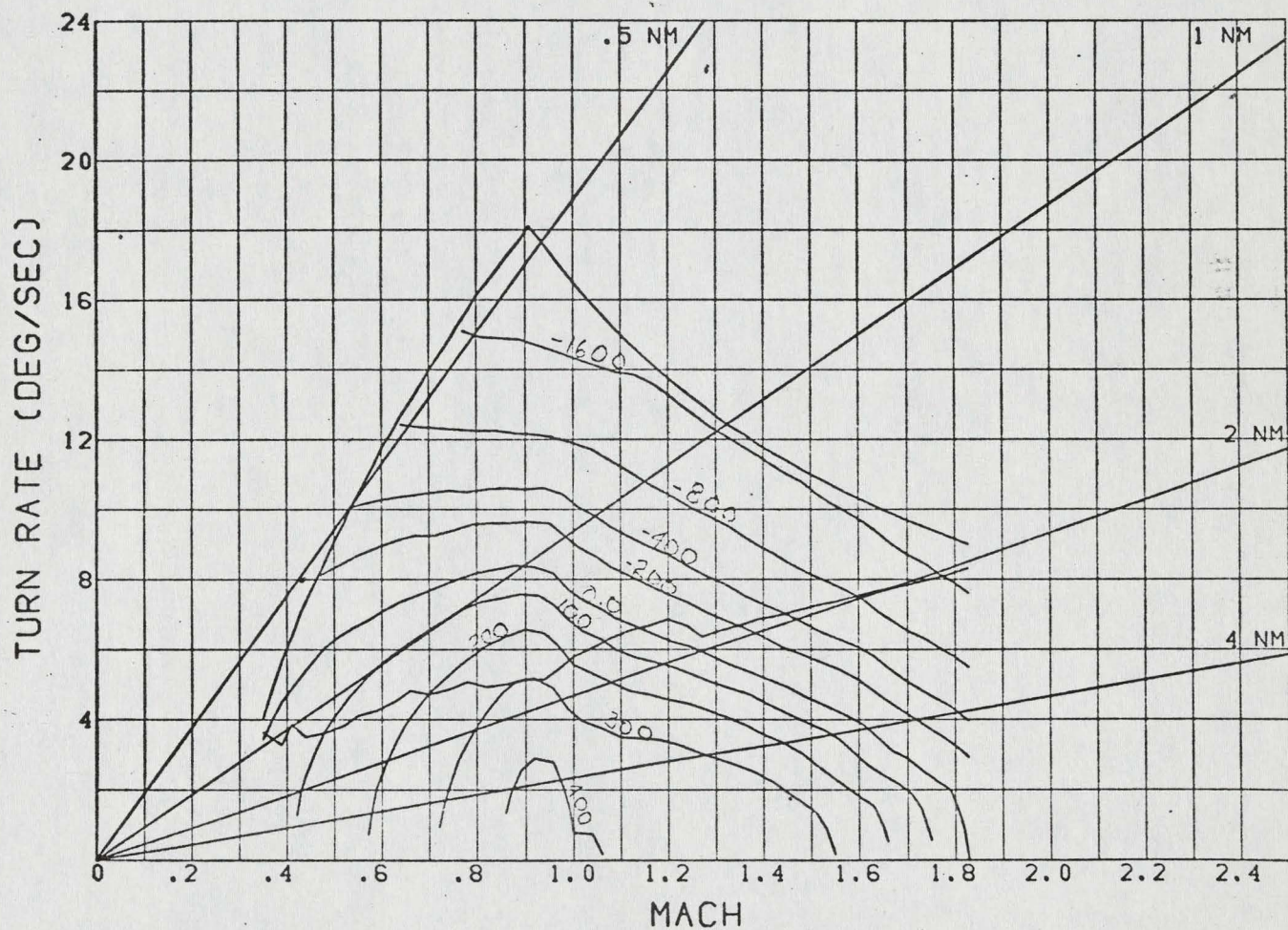
19951

HORIZONTAL ATTITUDE

MANEUVER DIAGRAM

ALTITUDE: 30000

FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

PS 43010G

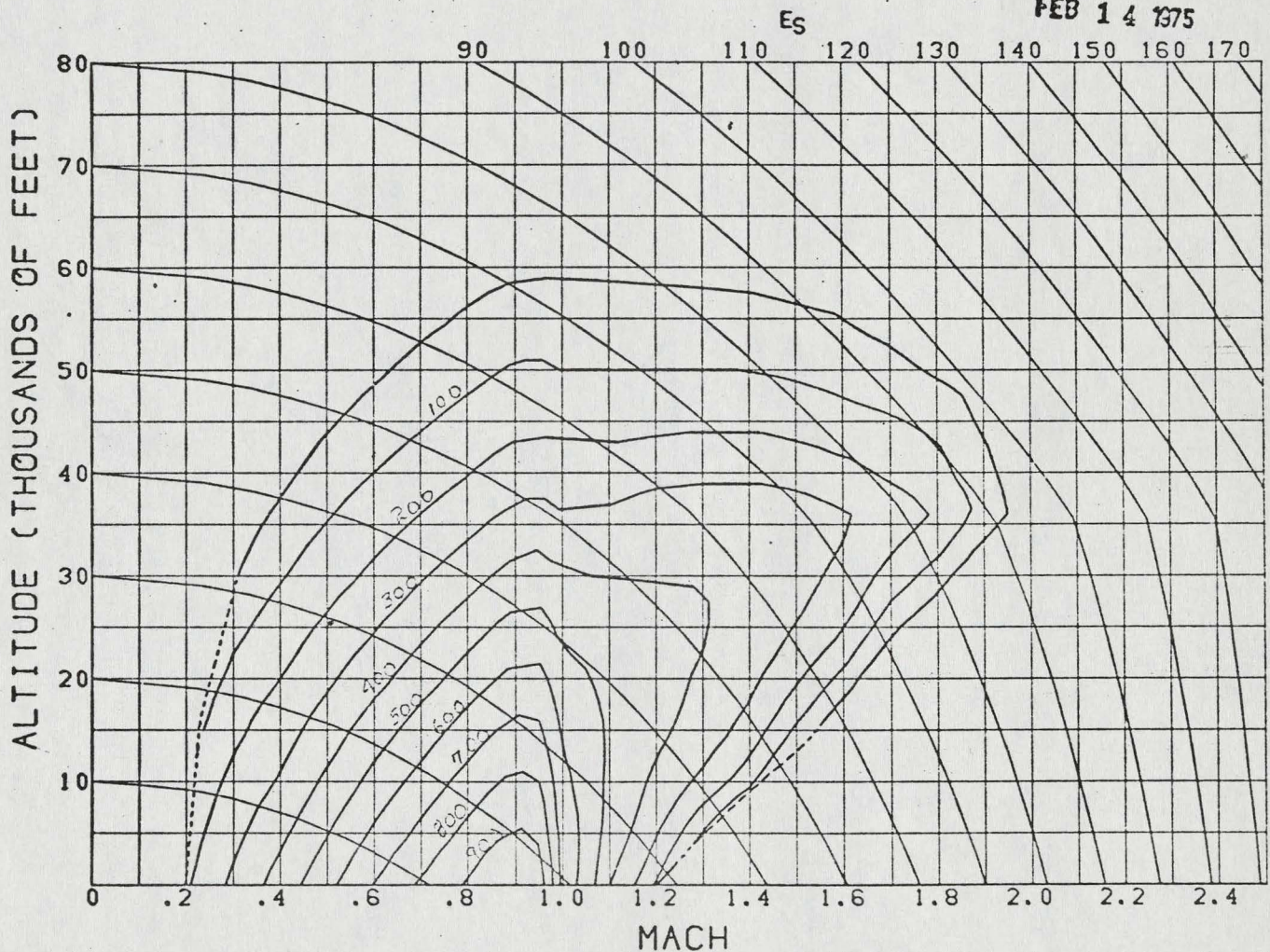
MAXIMUM POWER

D/C 1

19951

1.00 G DIAGRAM

FEB 14 1975

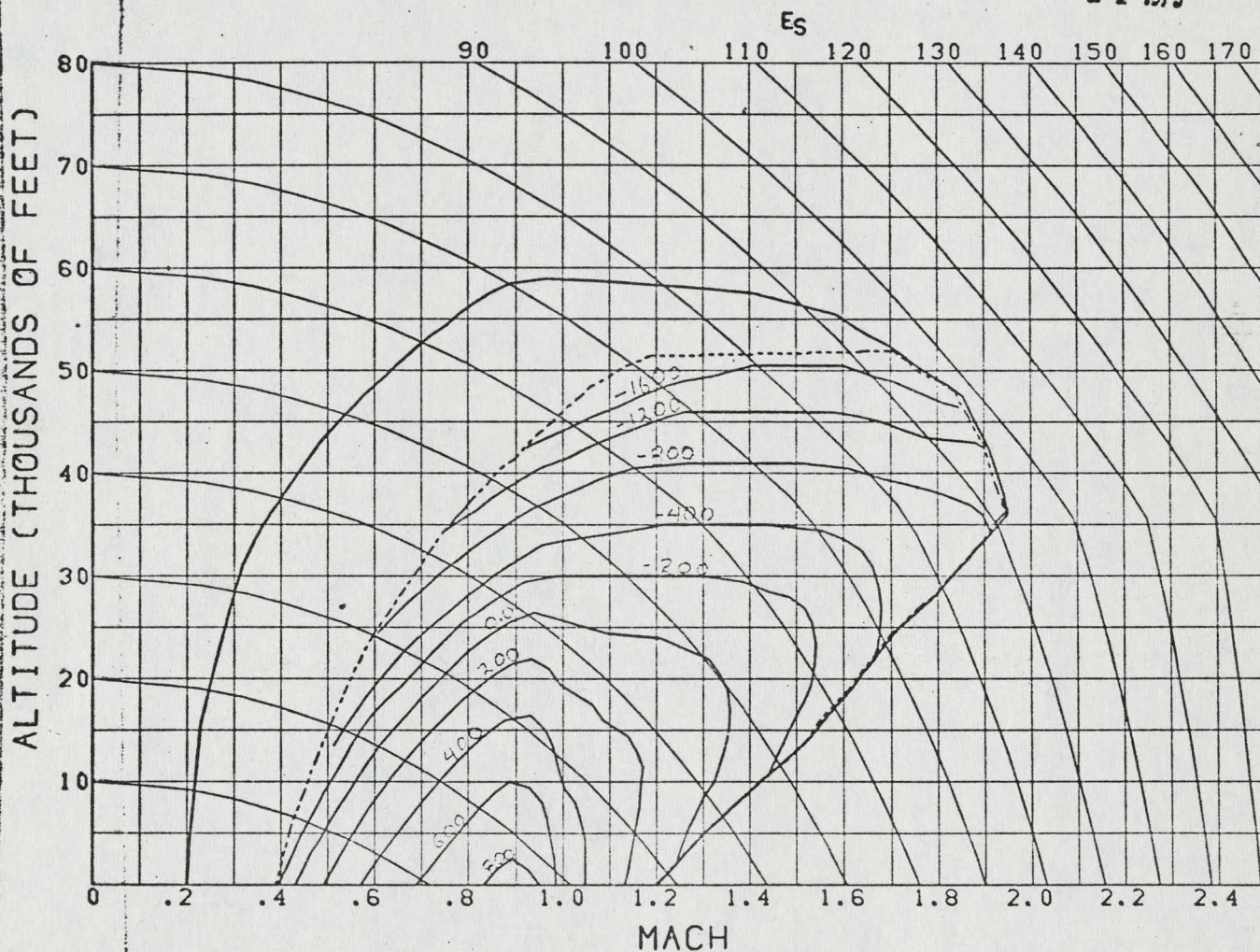


PLOT PREPARED BY ASD/ENFDP

PS 43010G
MAXIMUM POWER
D/C 1
19951

5.00G DIAGRAM

FEB 14 1975

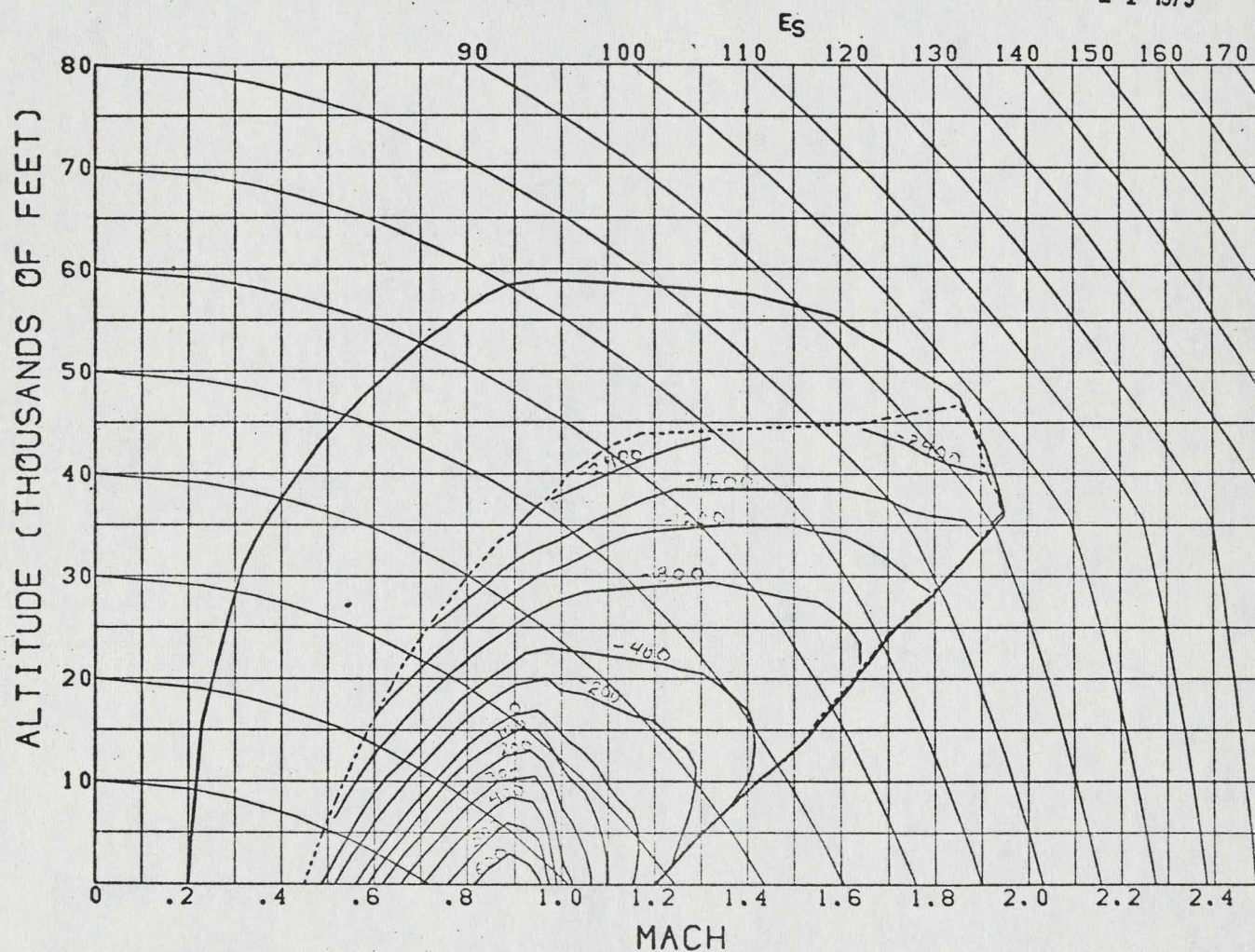


PLOT PREPARED BY ASD/ENFDP

PS 43010G
MAXIMUM POWER
D/C 1
19951

7.00G DIAGRAM

FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

-250
-180

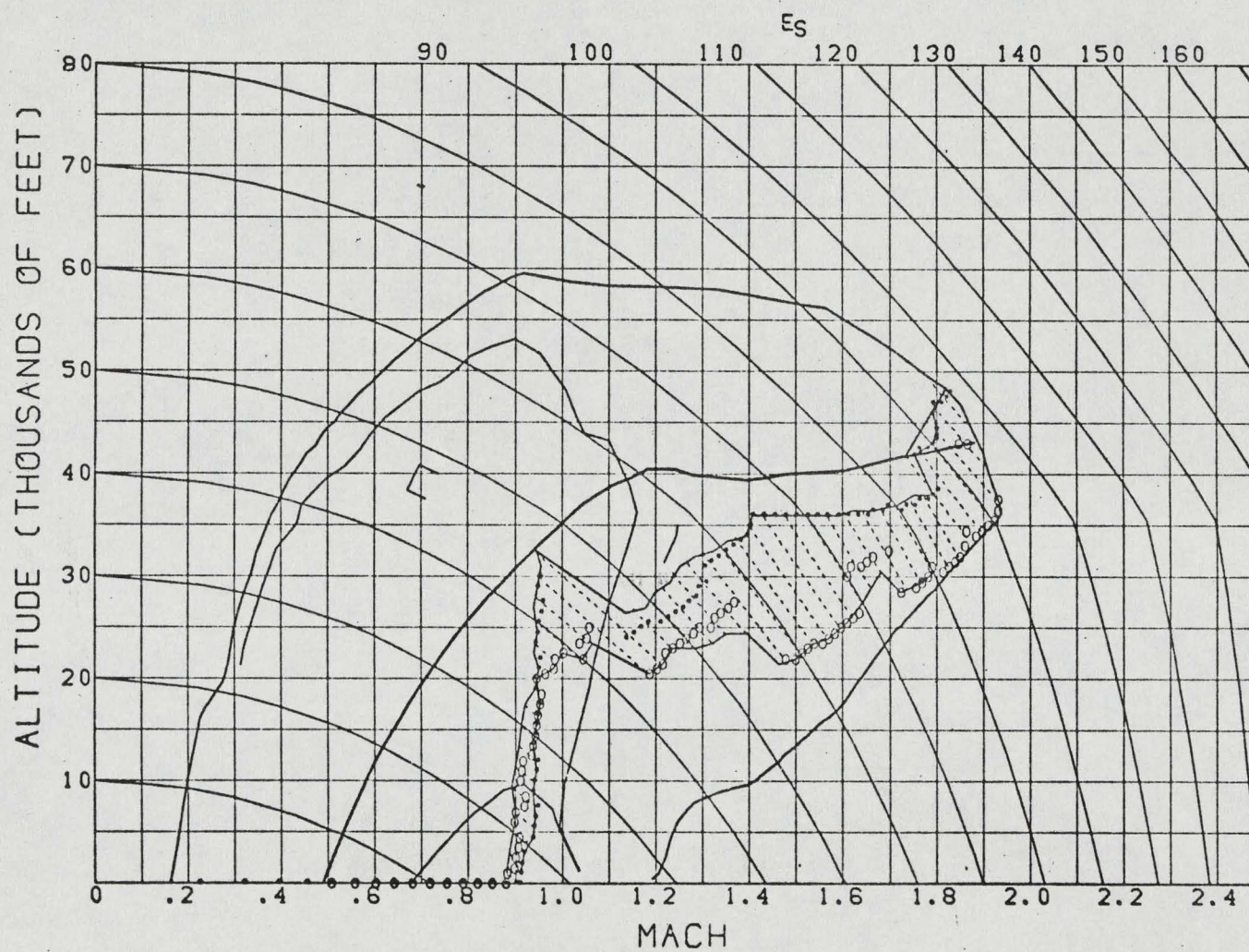
+1720

AIR BATTLE ARENA

43210G
DC 1 -MAX PWR

20163

FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

20163

43210G

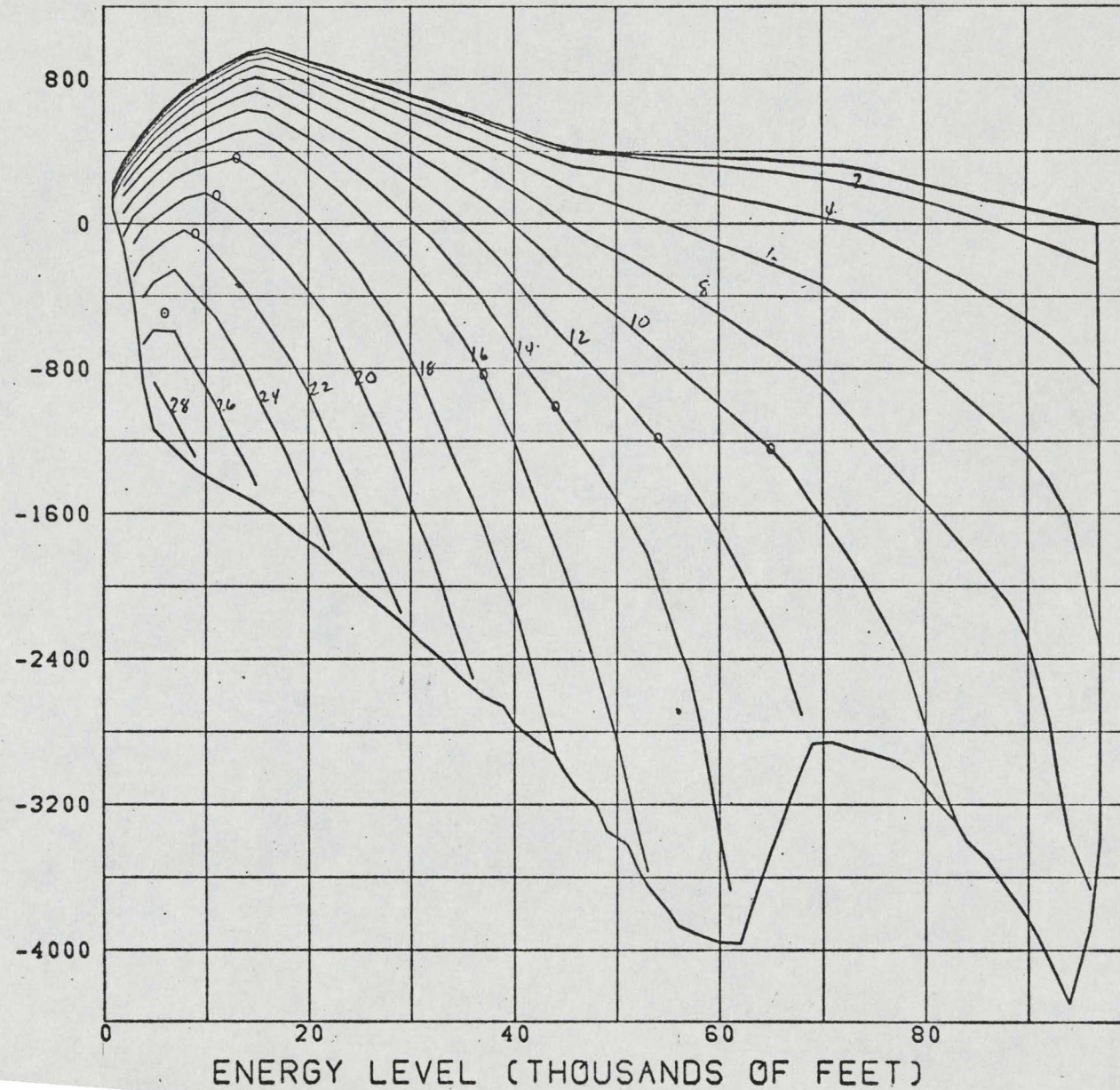
FEB 14 1975

MAX MANEUVER DIAGRAM

DC 1 -MAX PWR

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



20163

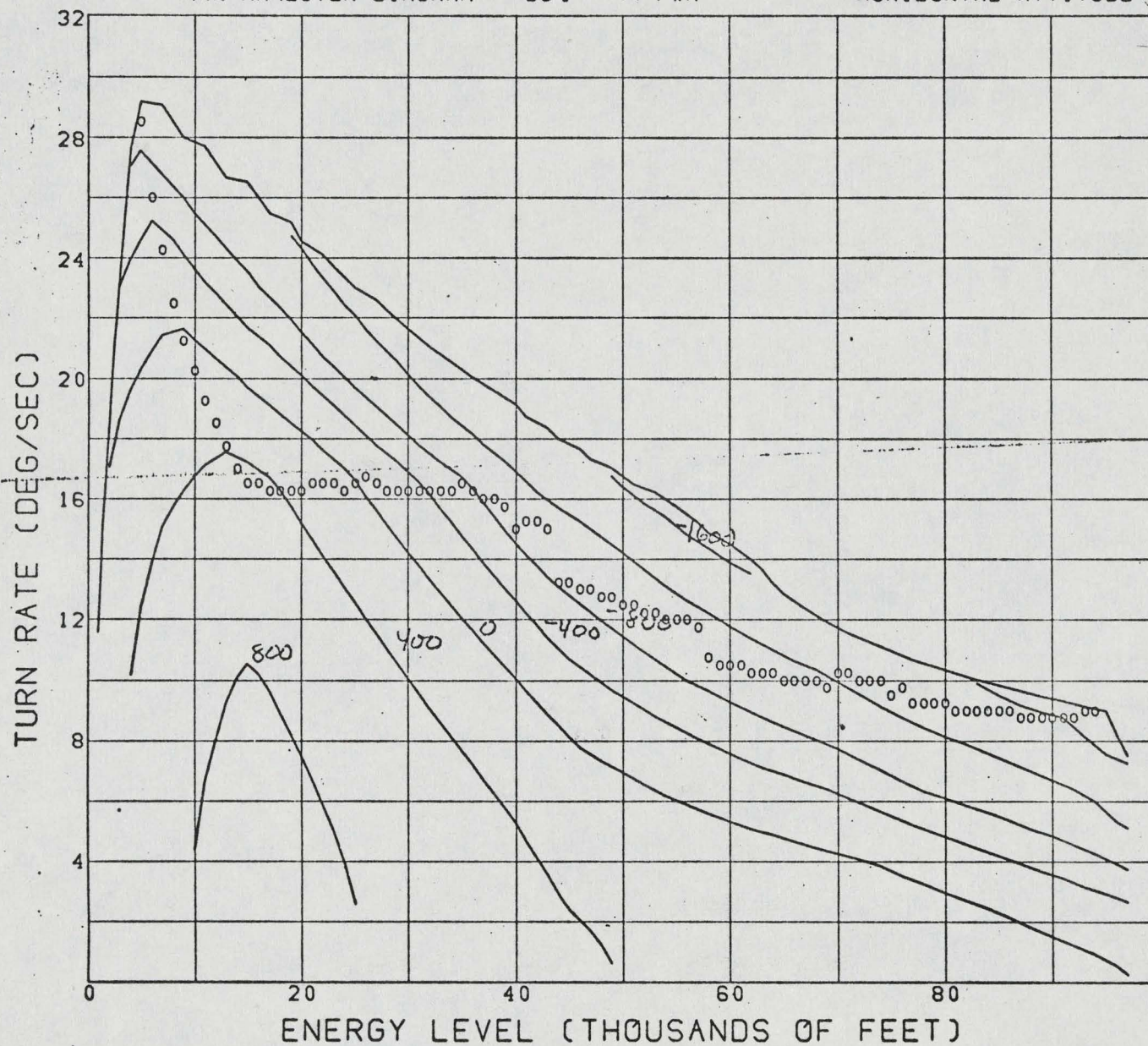
FEB. 1. 44 19355

43210G

MAX MANEUVER DIAGRAM

DC1 -MAX PWR

HORIZONTAL ATTITUDE



PLOT PREPARED BY ASD/ENFDP

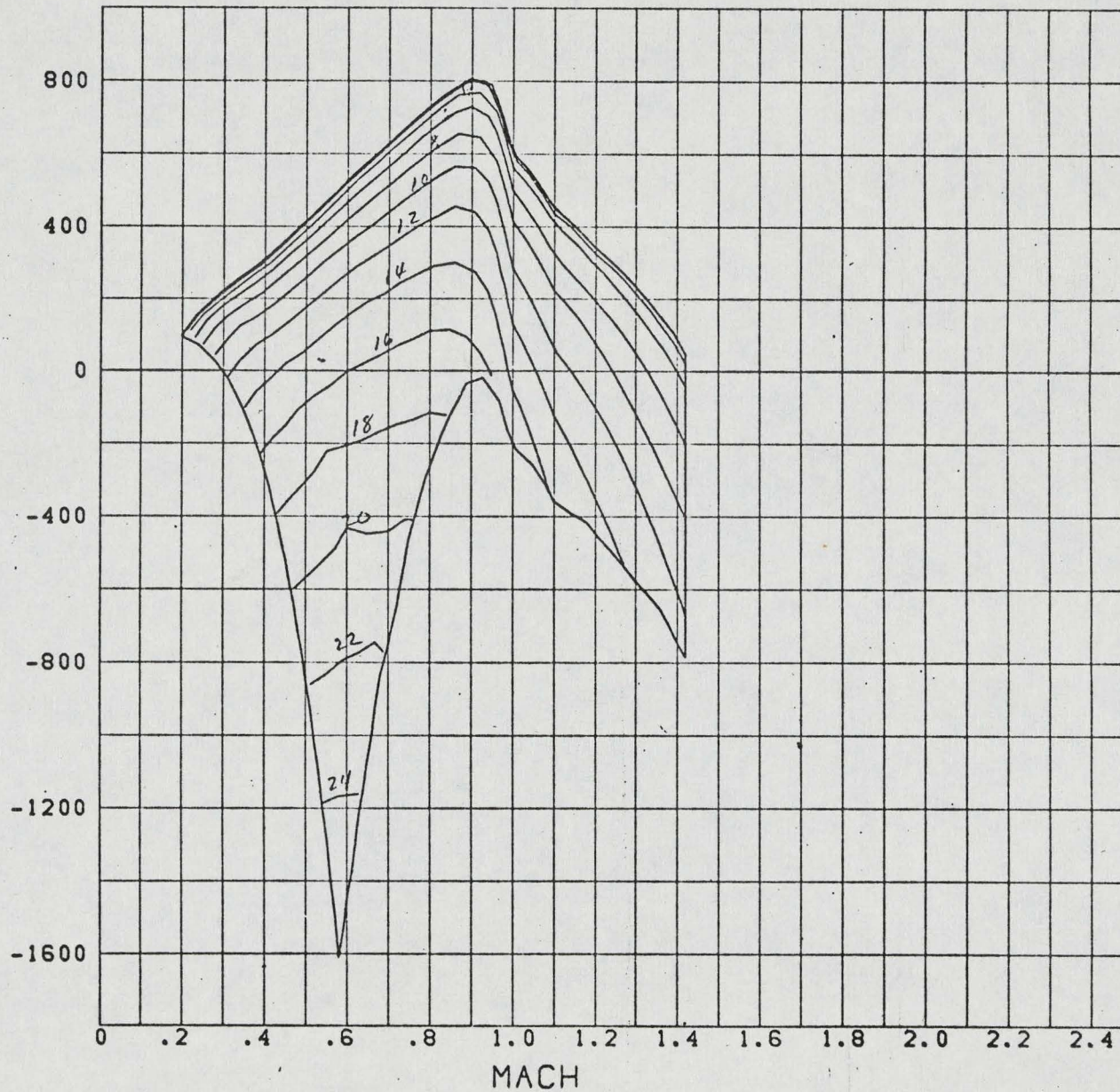
MANEUVER DIAGRAM
ALTITUDE 10000

20163
43210G
DC 1 -MAX PWR

FEB 14 1979

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

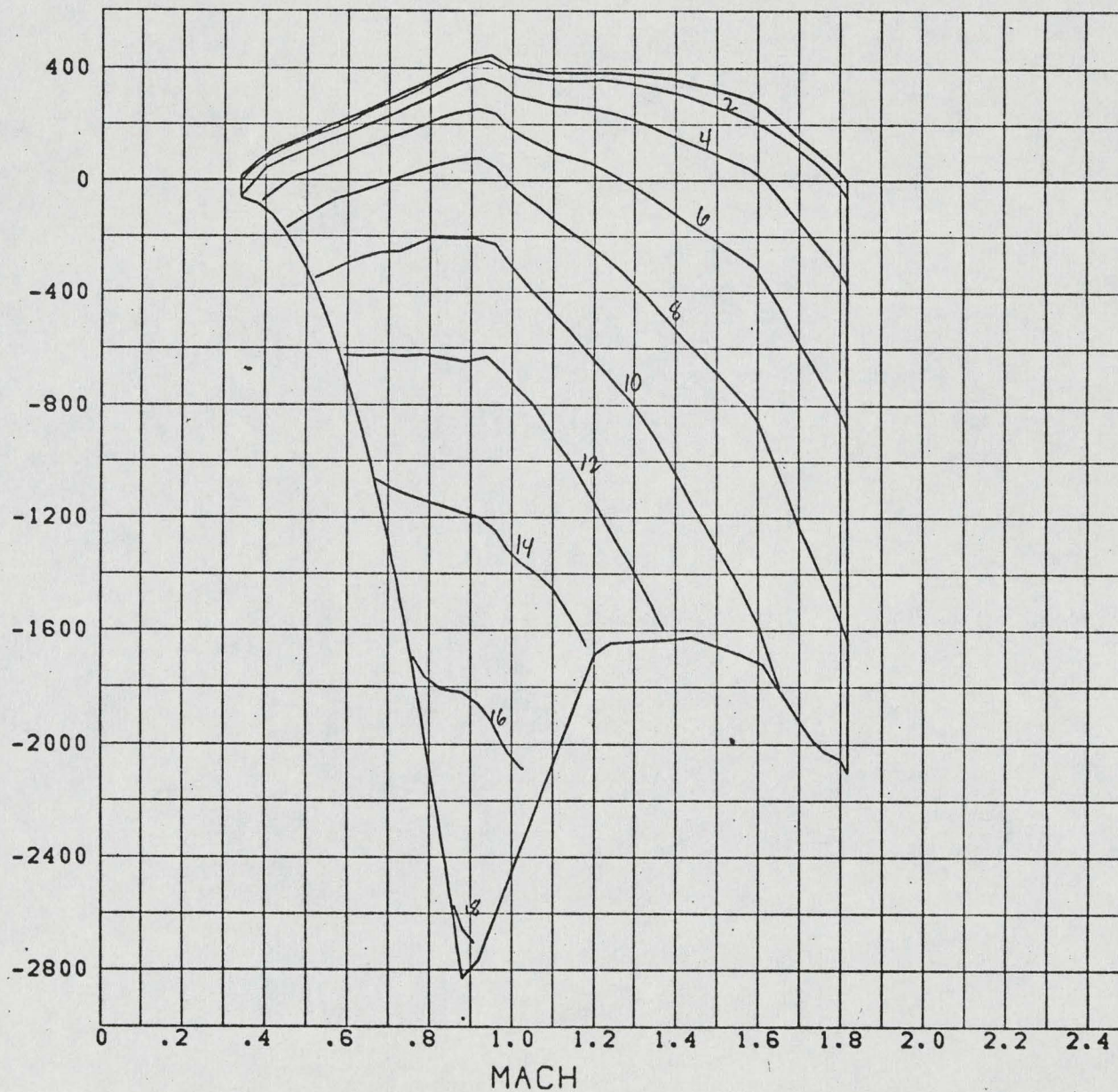
MANEUVER DIAGRAM
ALTITUDE 30000

20163
43210G
DC 1 -MAX PWR

FEB 14 1975

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

43210G

DC1 - MAX PWR
OPT/MAX L/D

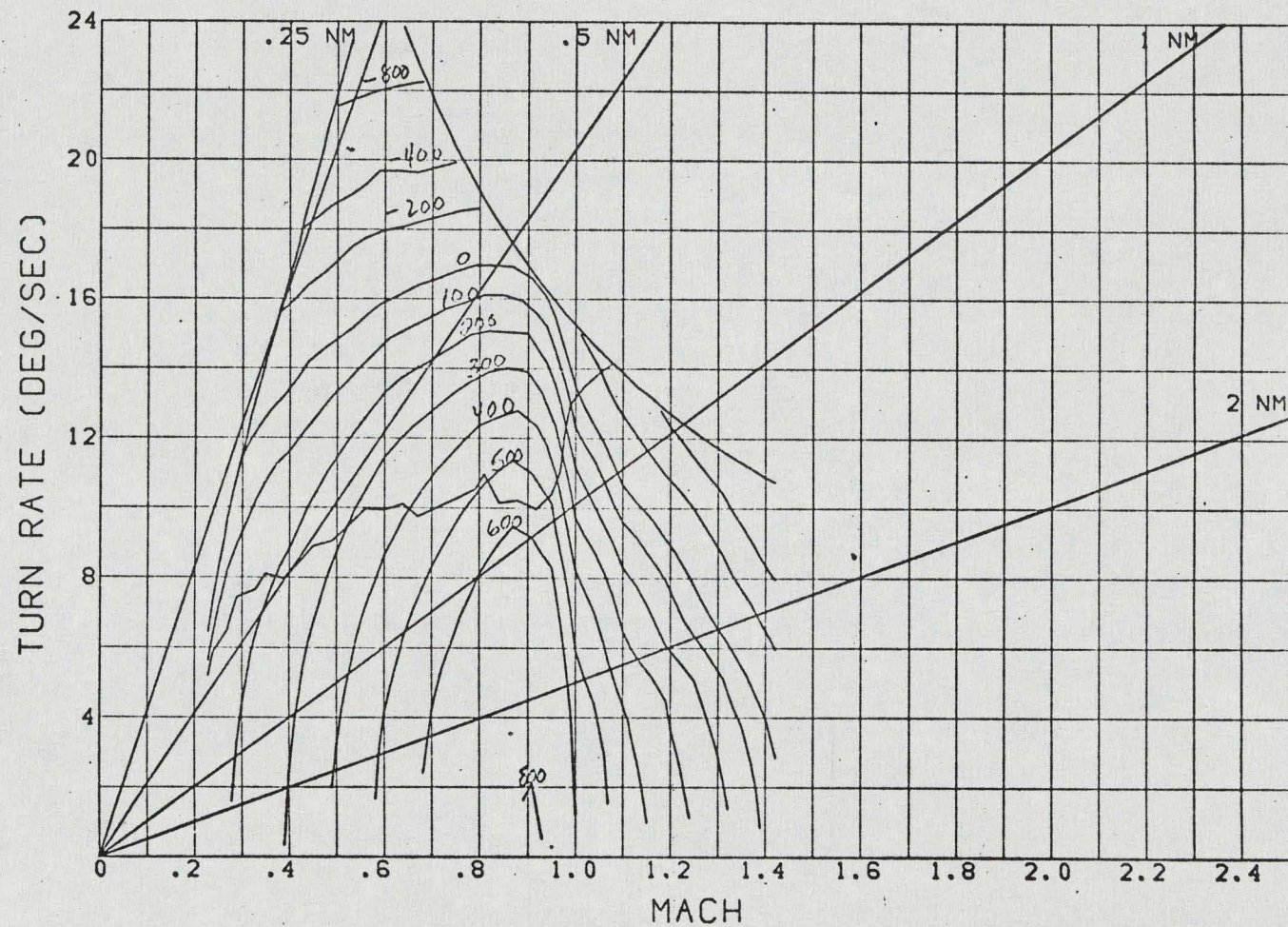
20163

HORIZONTAL ATTITUDE

FEB 14 1975

MANEUVER DIAGRAM

ALTITUDE: 10000



PLOT PREPARED BY ASD/ENFOP

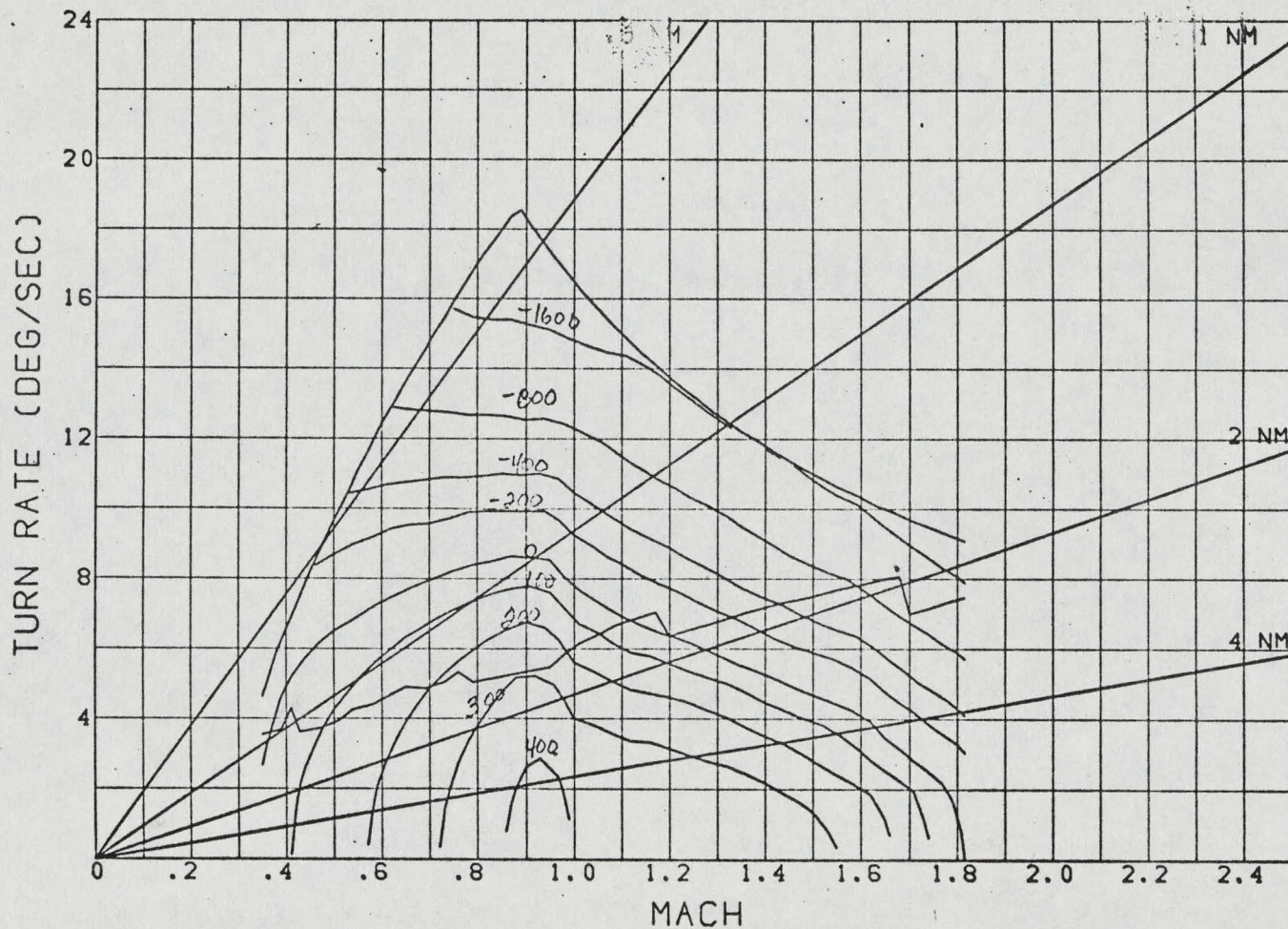
43210G
DC1 - MAX PWR
OPT/MAX L/D
20/63

HORIZONTAL ATTITUDE

FEB 14 1975

MANEUVER DIAGRAM

ALTITUDE: 30000

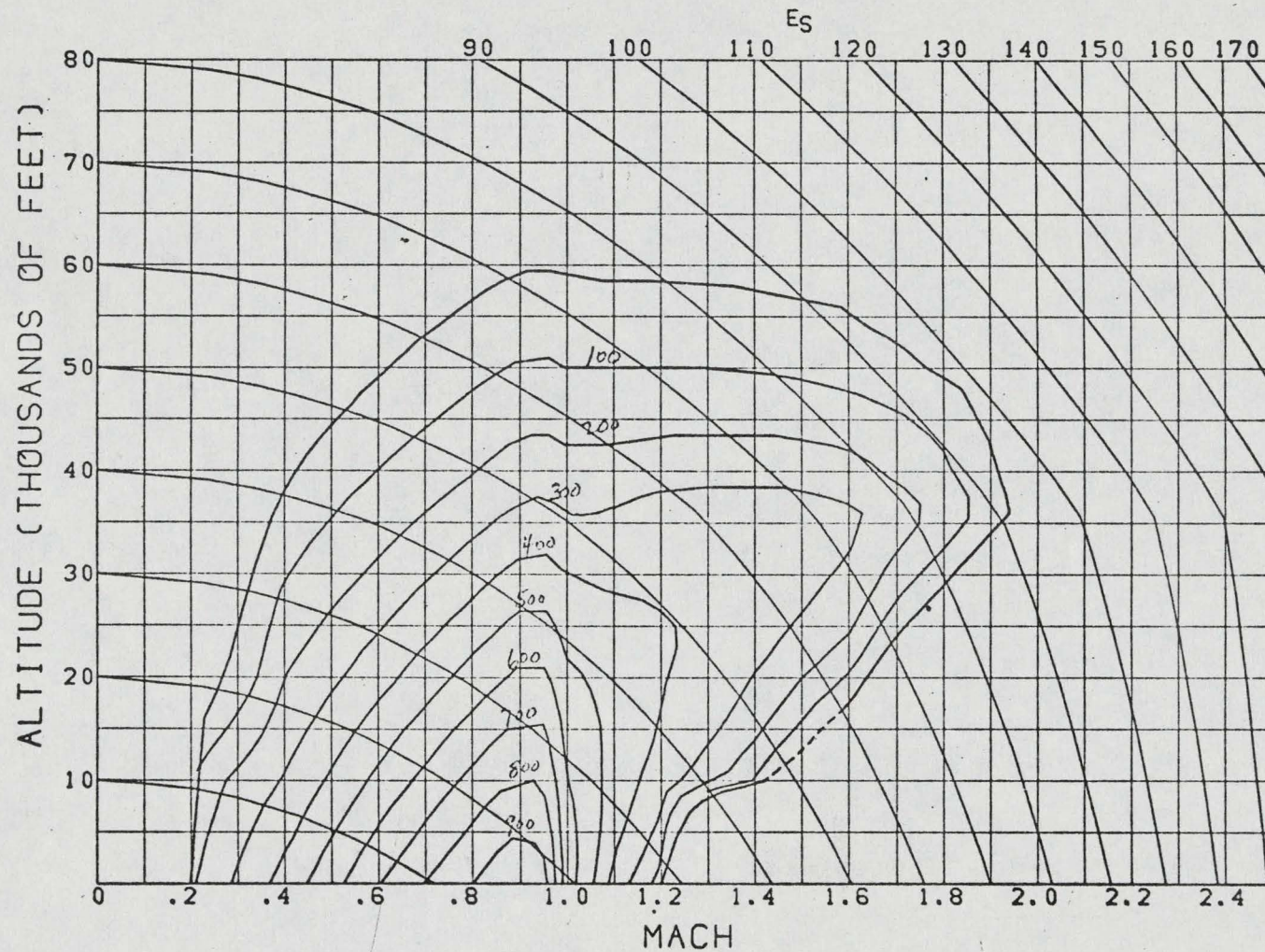


PLOT PREPARED BY ASD/ENFDP

PS 43210G
MAXIMUM POWER
D/C 1
20/63

1.00 G DIAGRAM

FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

PS 43210G

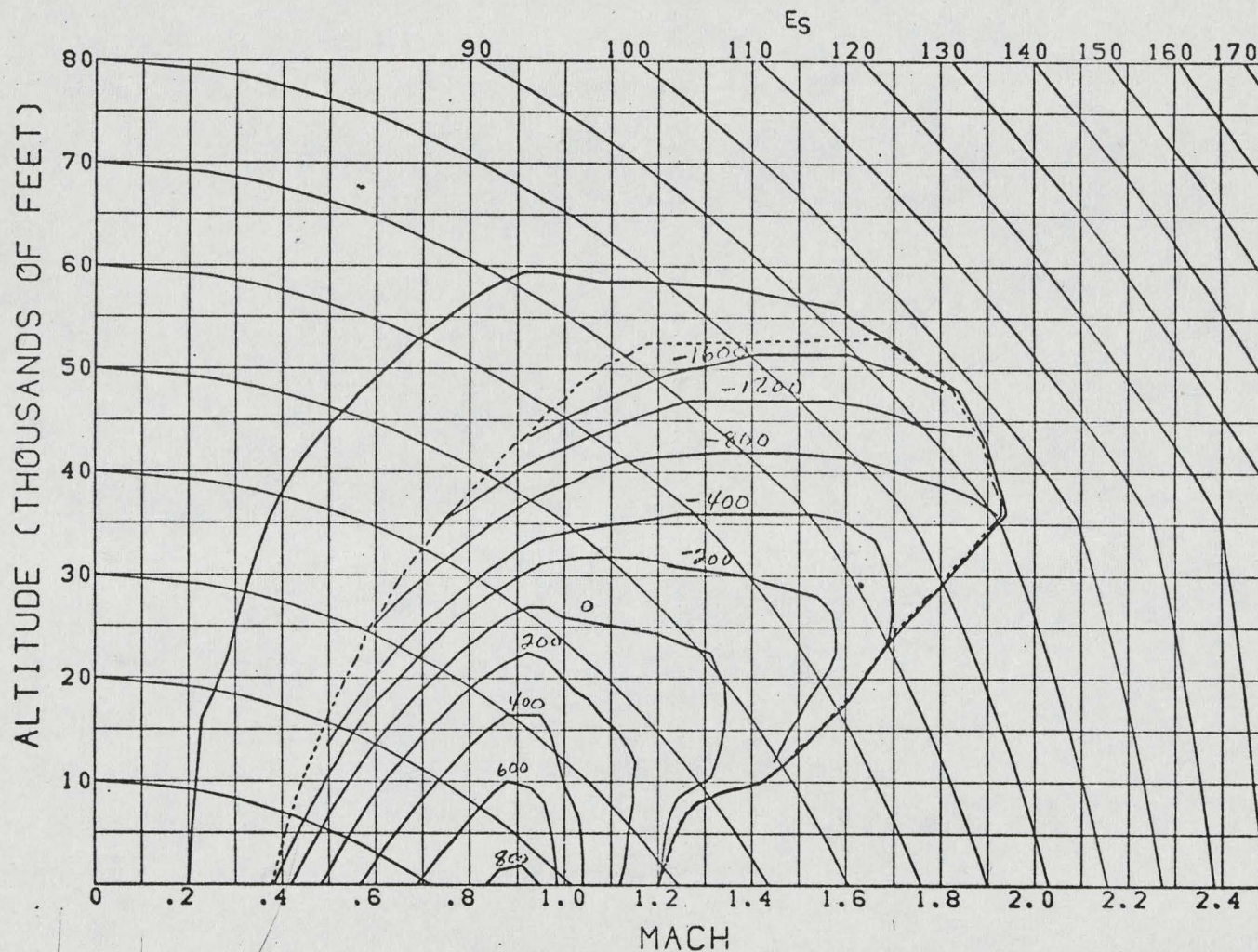
MAXIMUM POWER

D/C 1

20 163

5.00 G DIAGRAM

FEB 14 1975

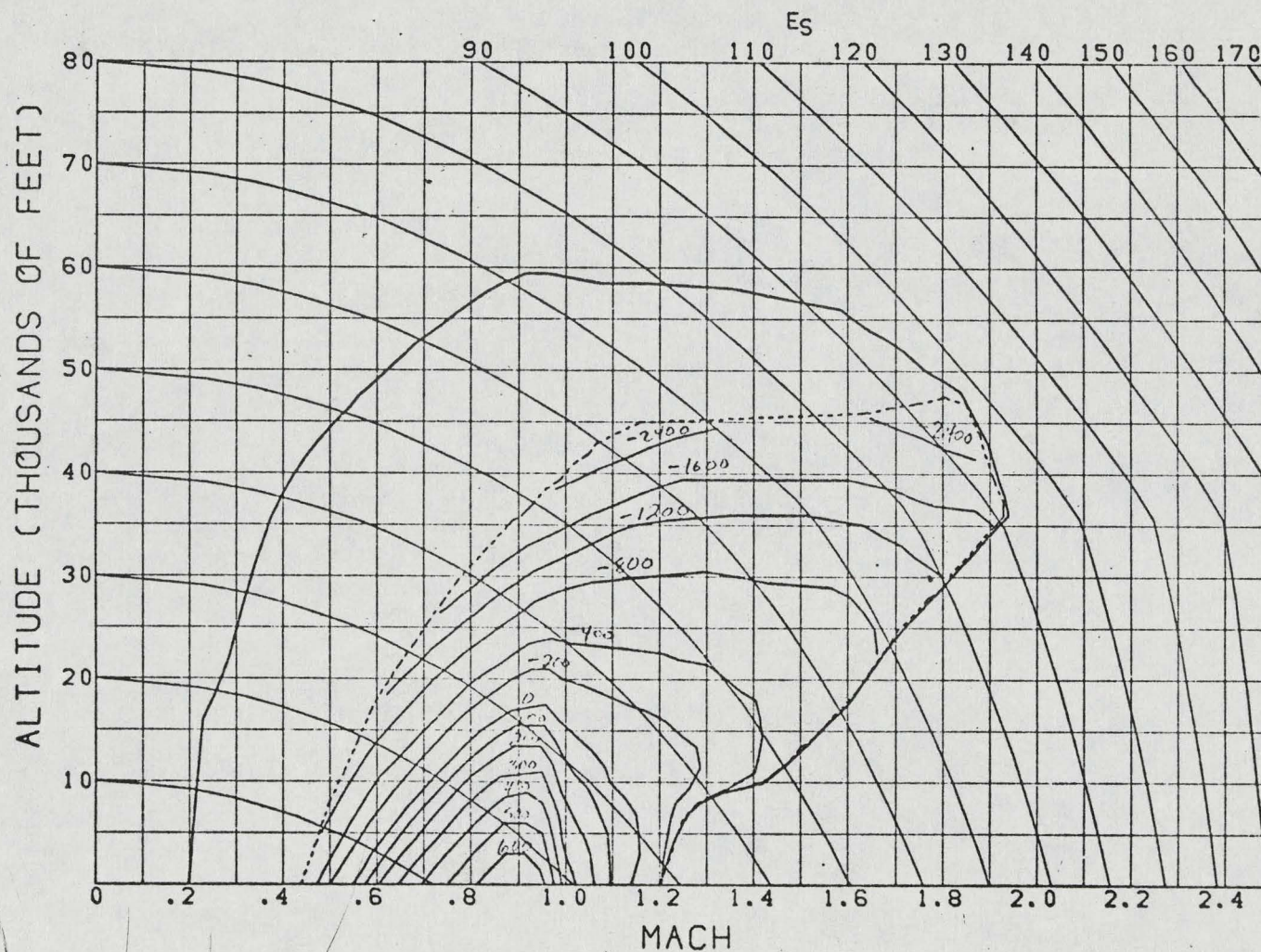


PLOT PREPARED BY ASD/ENFDP

PS 43210G
MAXIMUM POWER
D/C 1
20/63

7.00 G DIAGRAM

FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

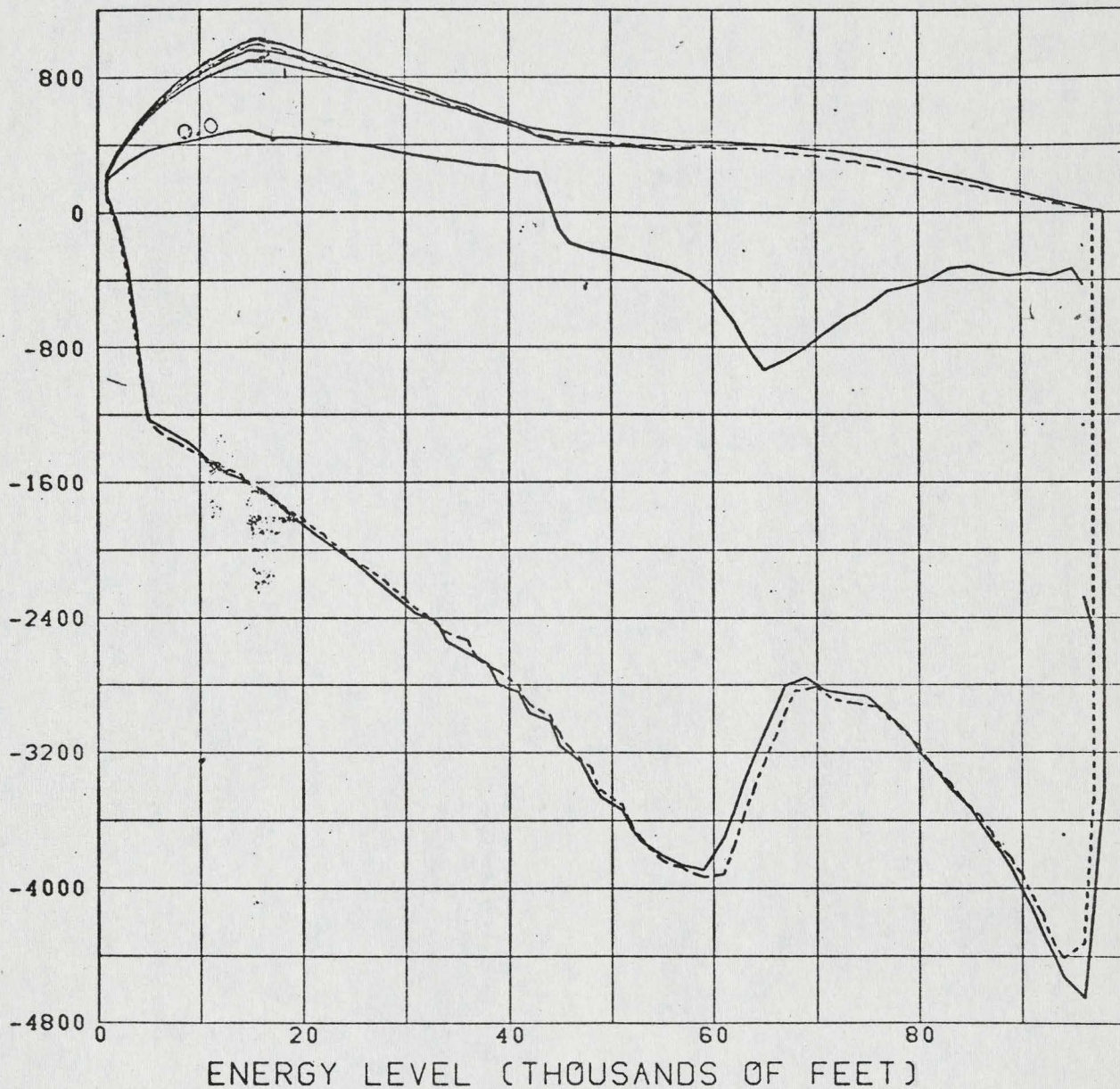
410234 - 430106

MAX MANEUVER DIAGRAM

DC 1 -MAX PWR-DC 1

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



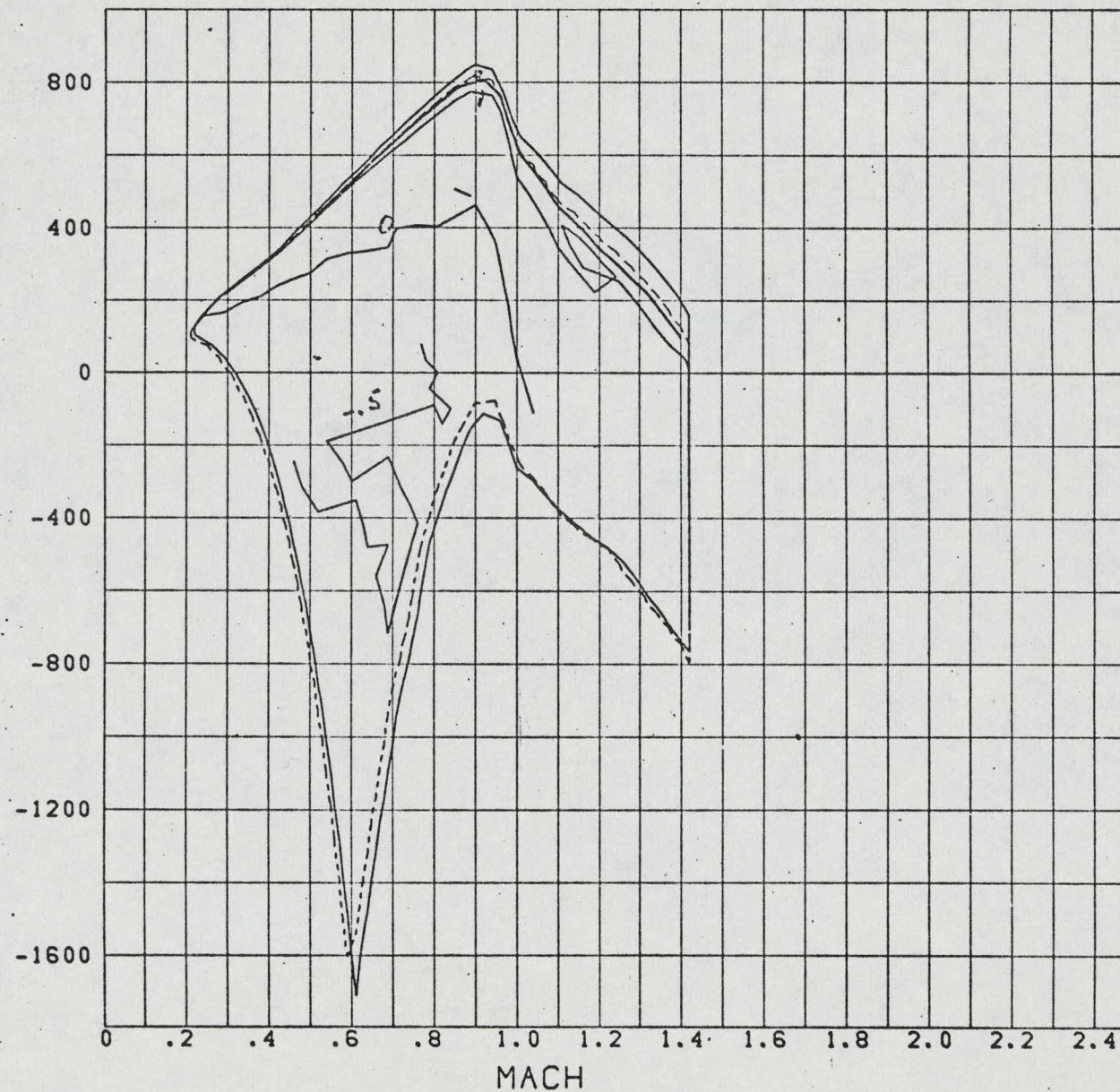
PLOT PREPARED BY ASD/ENFDP

MANEUVER DIAGRAM
ALTITUDE 10000

19543 19951
410234 - 43010G
DC 1 -MAX PWR-DC 1

FEB 14 1975

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

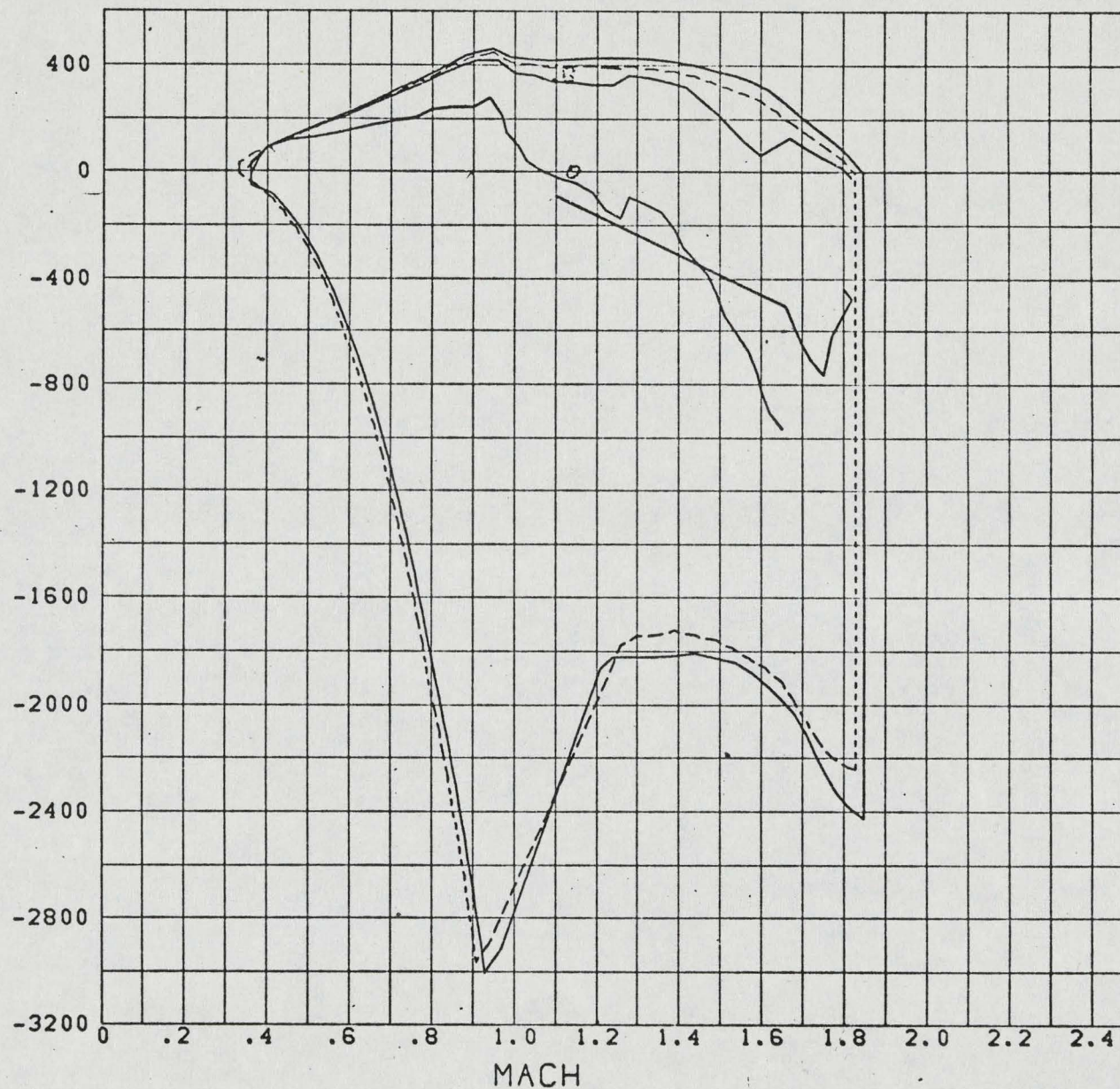
MANEUVER DIAGRAM
ALTITUDE 30000

19513 19951
410234 - 43010G
DC 1 - MAX PWR - DC 1

FEB 14 1975

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

$\Delta PS = 410234 - 430106$

DC 1 - MAX PWR - DC 1
OPT L/D

HORIZONTAL ATTITUDE

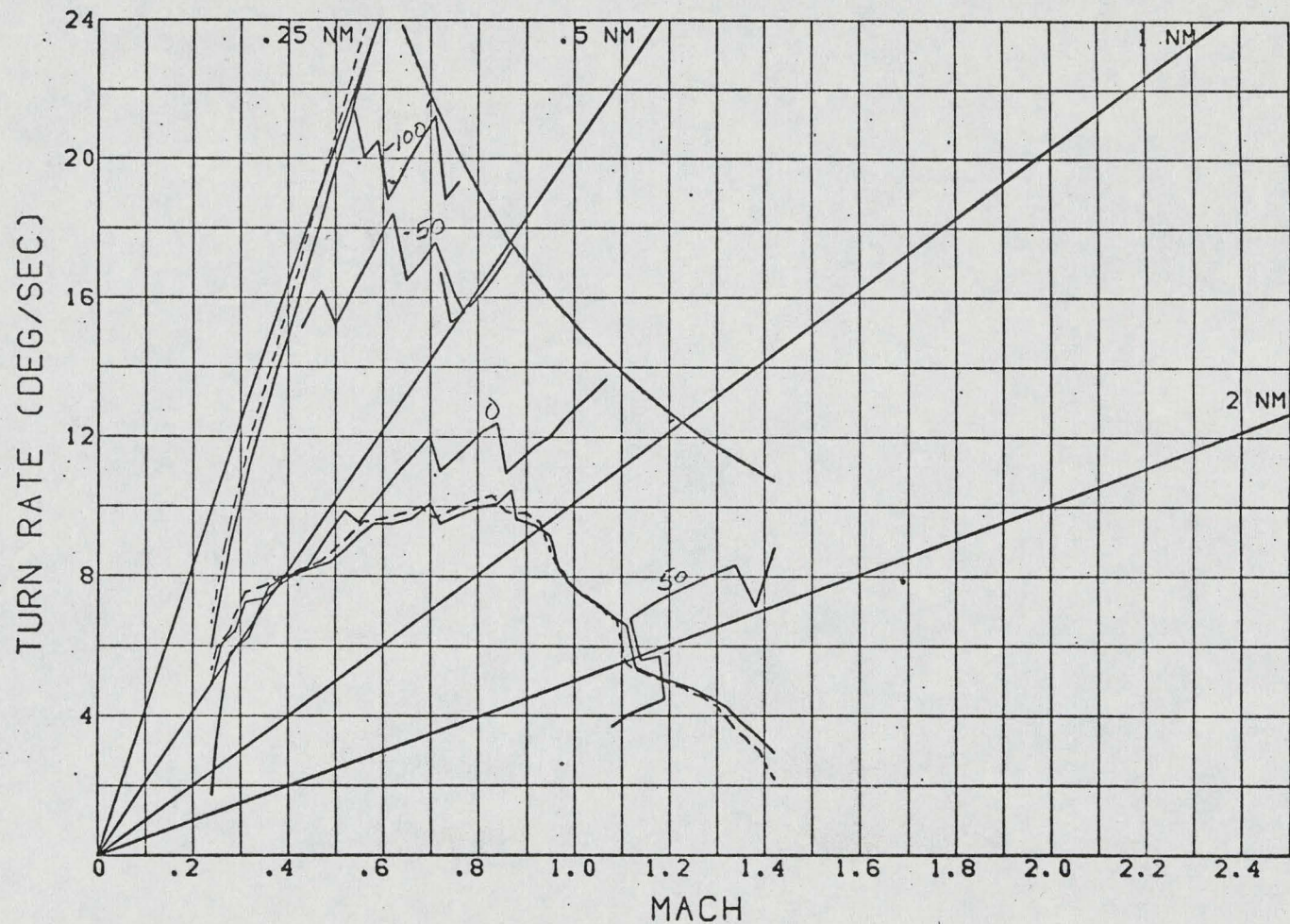
19543

19951

MANEUVER DIAGRAM

FEB 14 1975

ALTITUDE: 10000



PLOT PREPARED BY ASD/ENFDP

$\Delta PS = 410234 - 430106$

DC1 - MAX PWR - DC1

HORIZONTAL ATTITUDE

OPT L/D

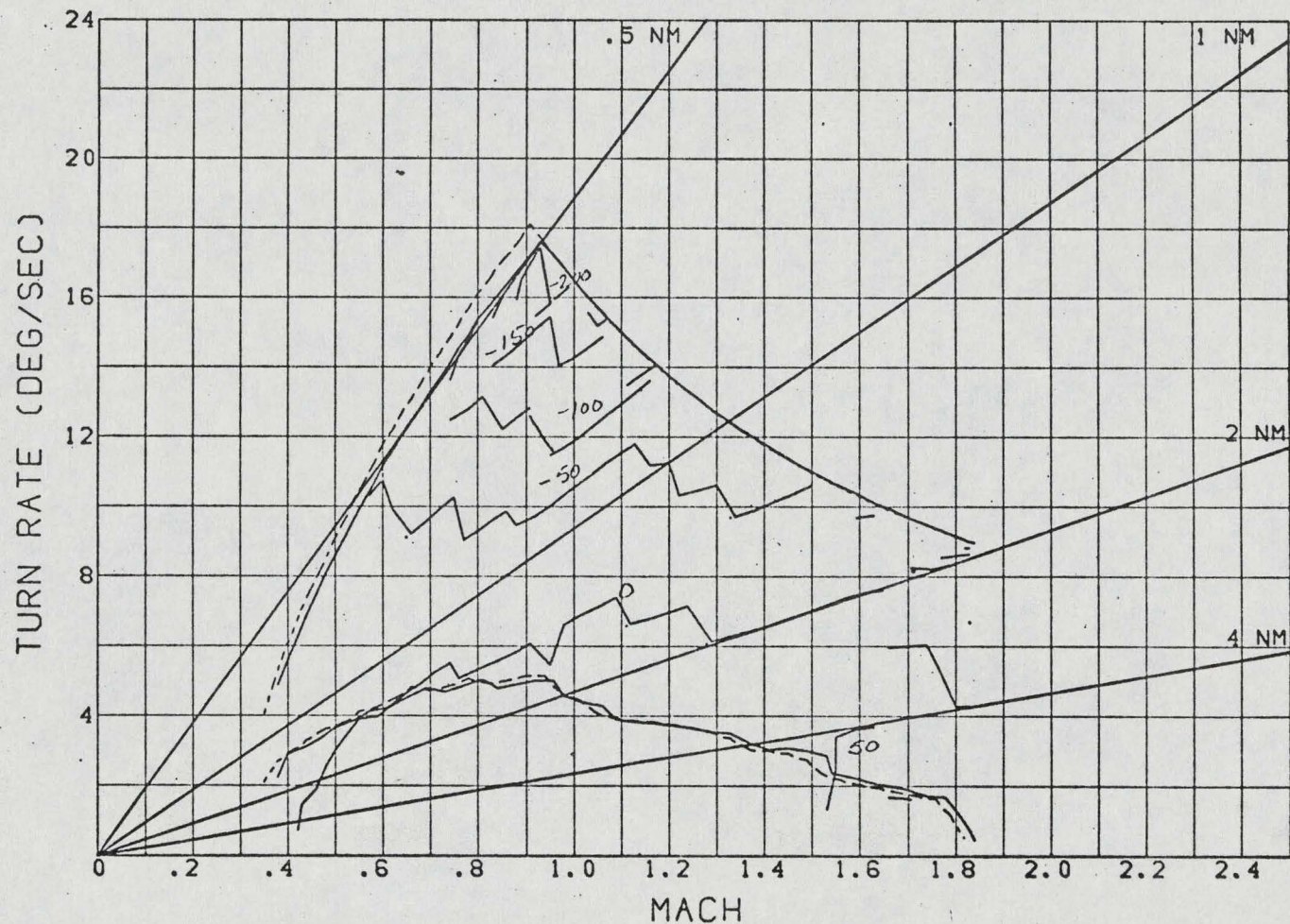
19543

19951

FEB 14 1975

MANEUVER DIAGRAM

ALTITUDE: 30000



PLOT PREPARED BY ASD/ENFDP

DPS 410234 - 430100

MAXIMUM POWER

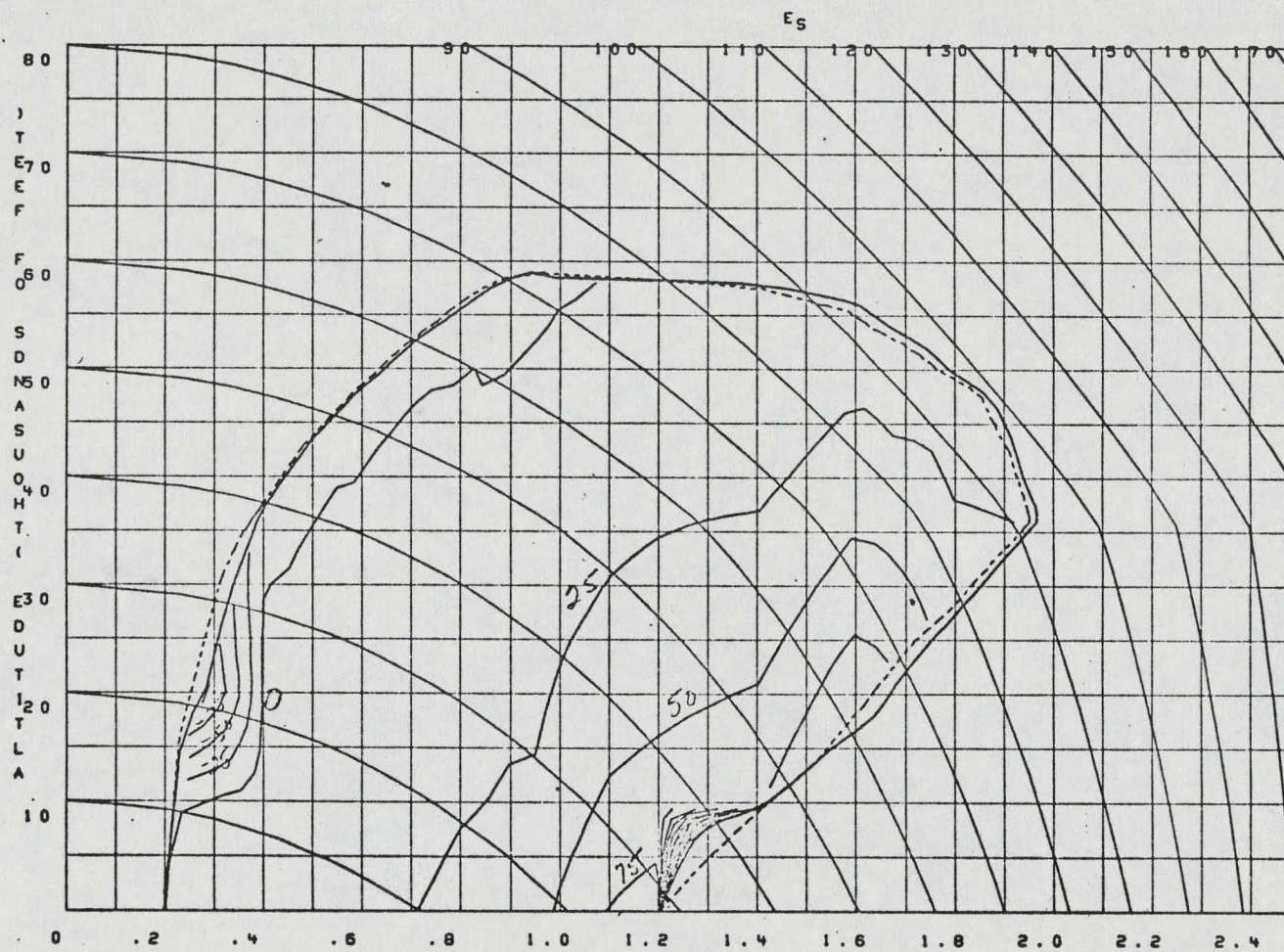
D/C 1 D/C 1

19543

79951

FEB 14 1975

1.00 G DIAGRAM



MACH
PLOT PREPARED BY ASD/ENFDP

DPS 410234 -430100

MAXIMUM POWER

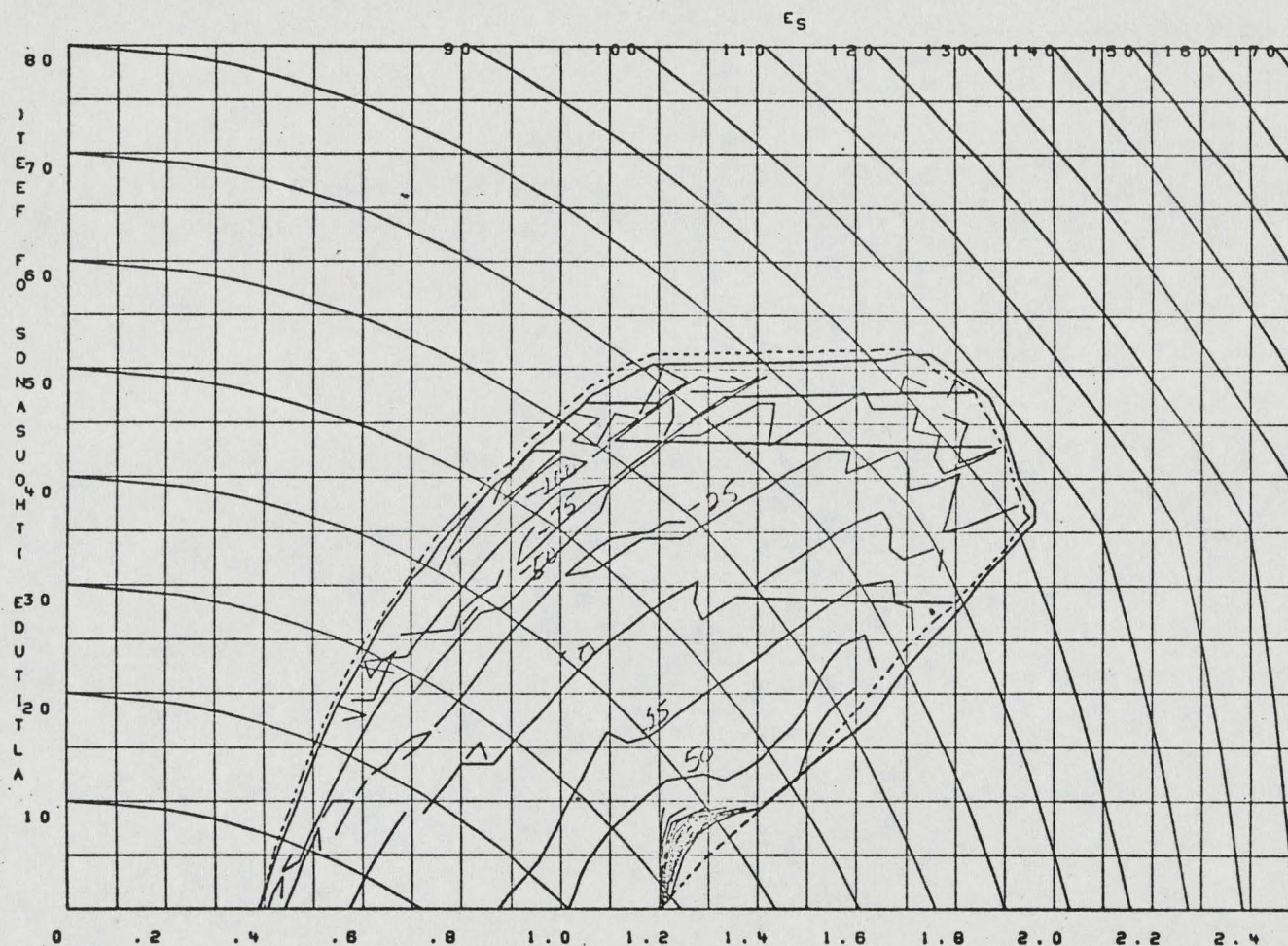
D/C 1 D/C 1

19543

19951

5.00 G DIAGRAM

FEB 14 1979



MACH

PLOT PREPARED BY ASD/ENFDP

RELABEL

D P S 4 1 0 2 3 4 - 4 3 0 1 0 0

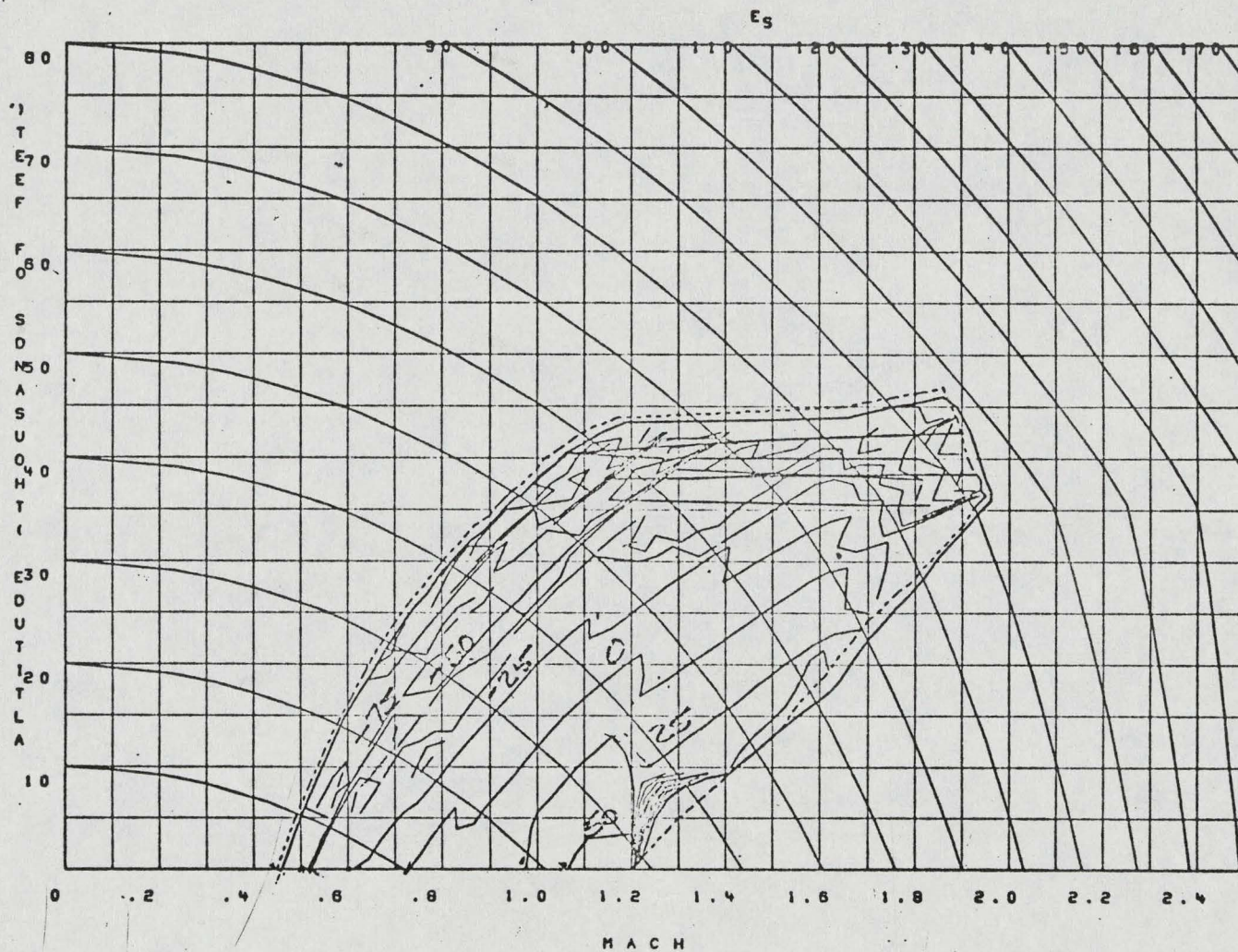
MAXIMUM POWER

D / C ! D / C !

19543 19951

7.00 0 DIAGRAM

FEB 14 1945



PLOT PREPARED BY ASD/ENFOP

19543 20163
410234 - 43210G

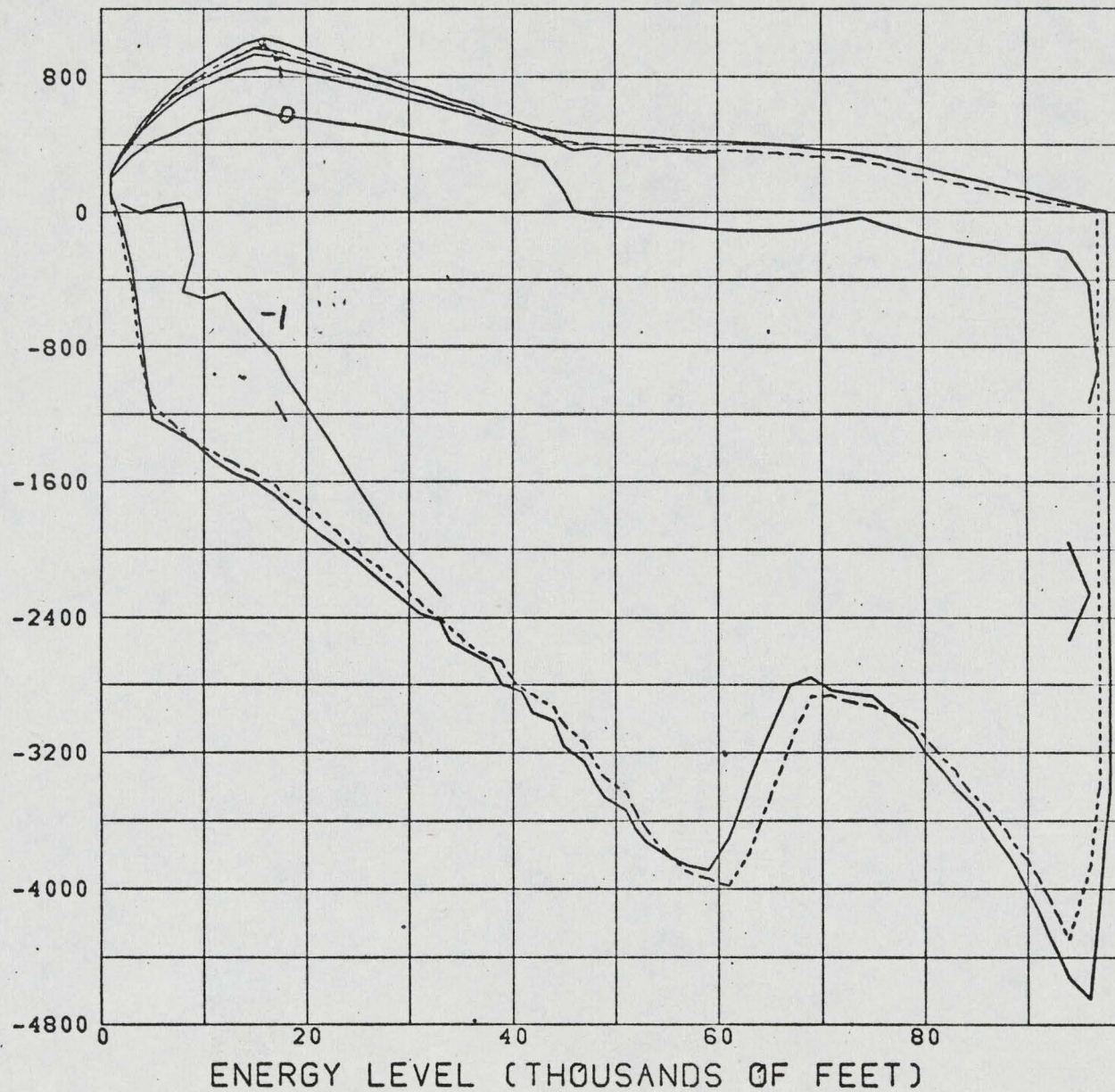
FEB 14 1975

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR - DC 1

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

19543

20163

FEB 14 1975

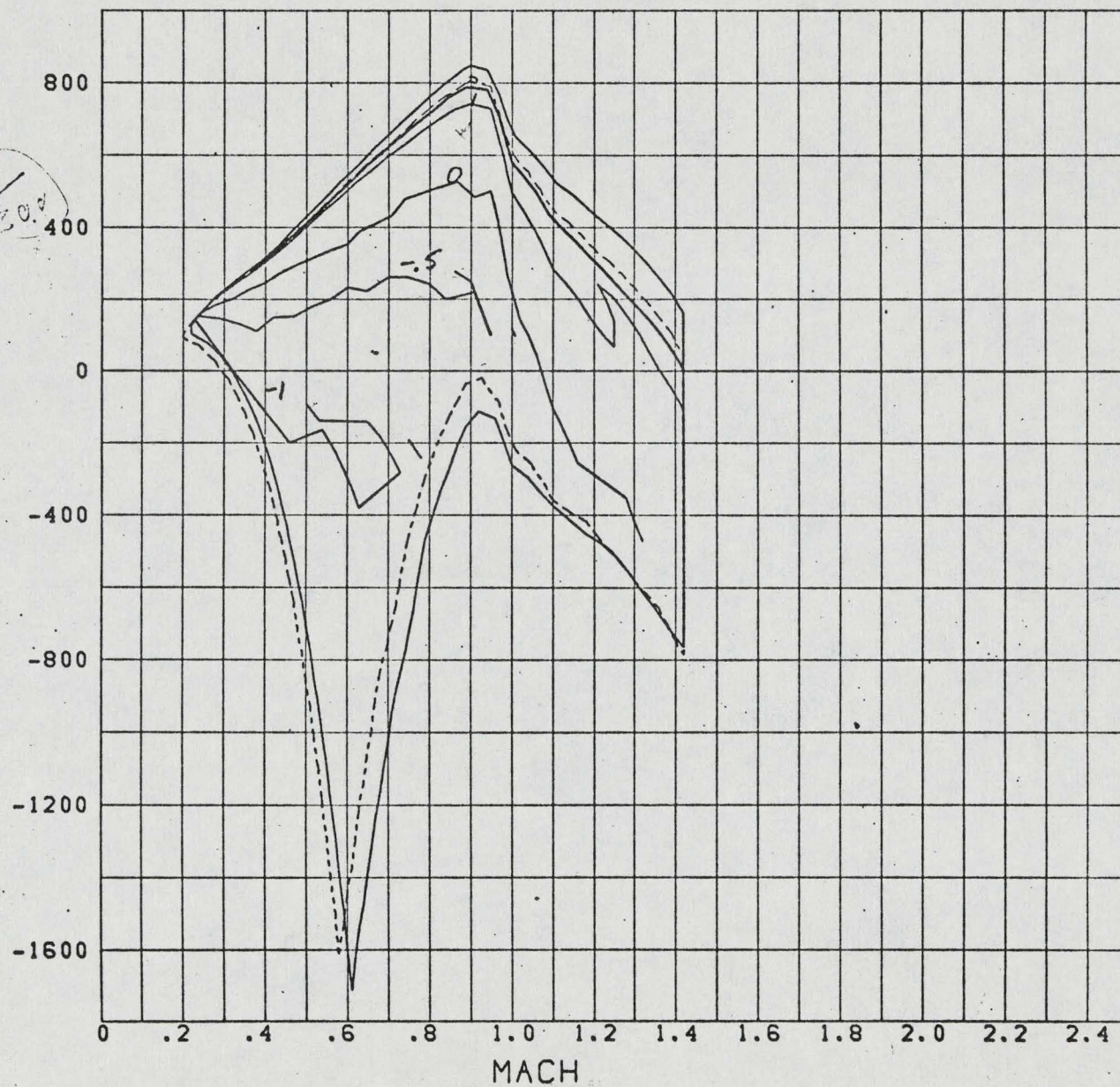
MANEUVER DIAGRAM

ALTITUDE 10000

410234 - 43210G

DC1 -MAX PWR-DC1

ENERGY RATE (FT/SEC)



PLOT PREPARED BY ASD/ENFDP

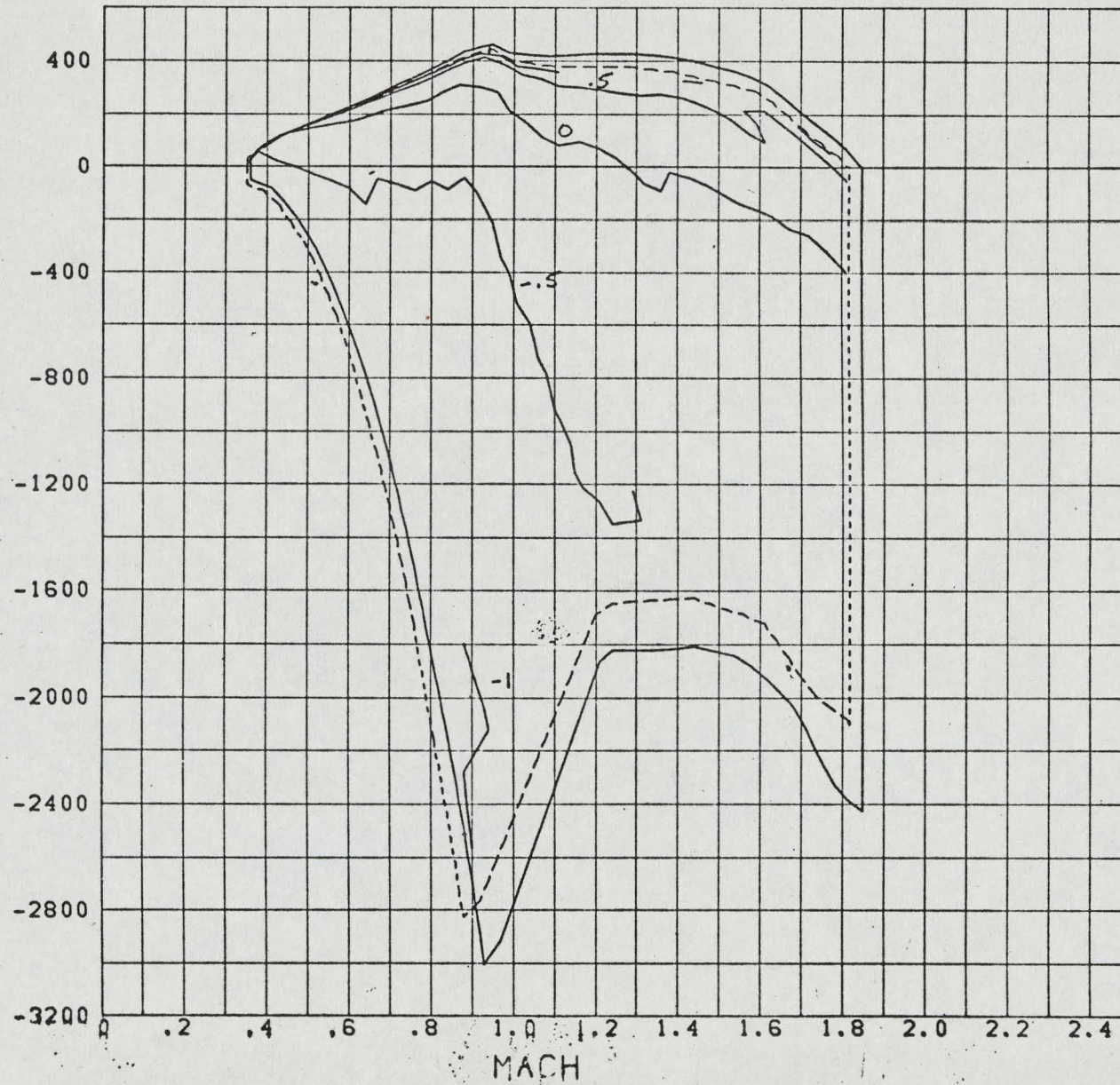
MANEUVER DIAGRAM
ALTITUDE 30000

19543 20163
410234 - 43210G
DC 1 - MAX PWR - DC 1

FEB 14 1965

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



$$\Delta PS = \frac{410234}{DC1 - MAX PWR - DC1} - \frac{432106}{OPT L/D}$$

DC1 - MAX PWR - DC1
OPT L/D

HORIZONTAL ATTITUDE

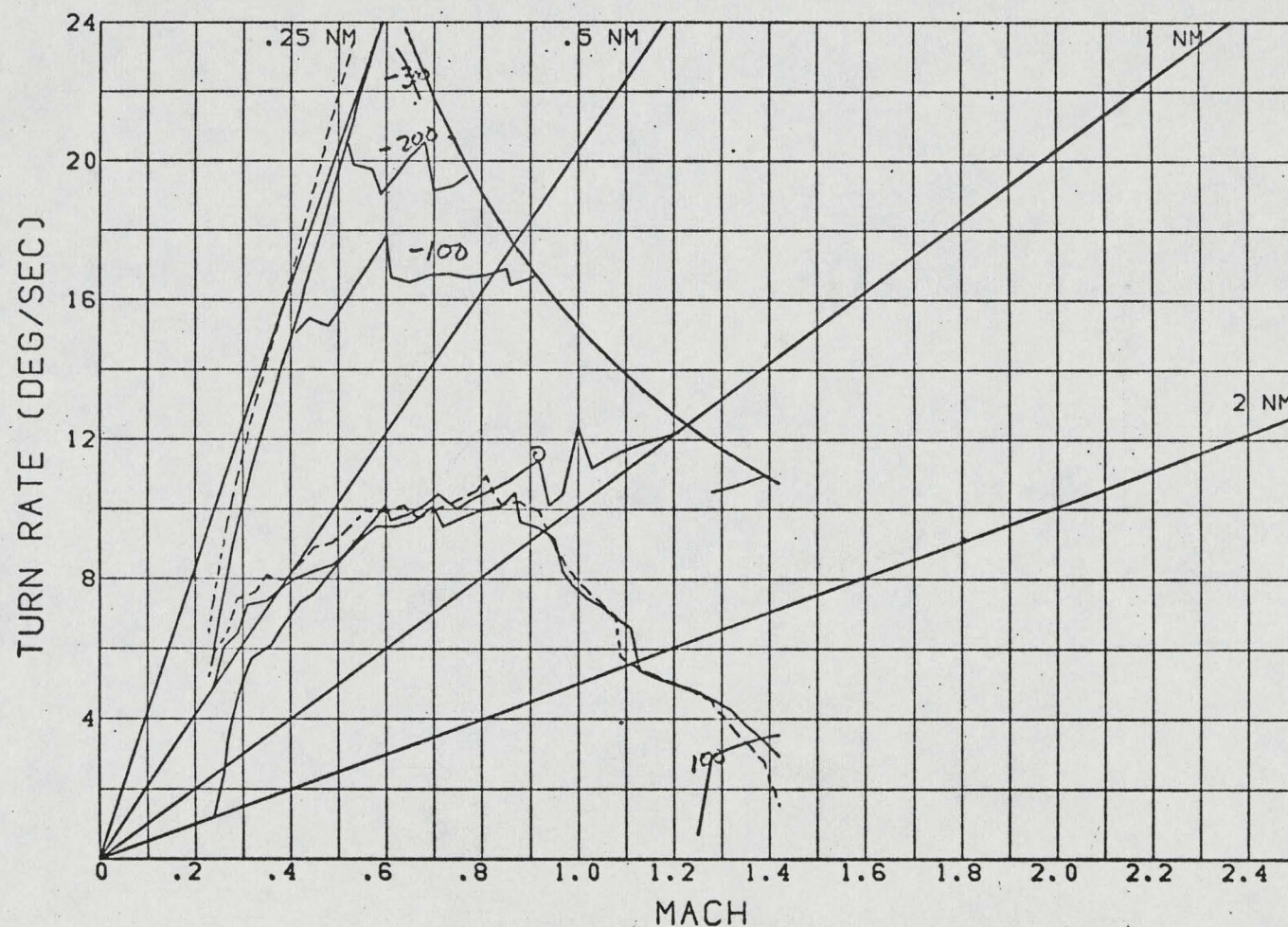
19543

20163

MANEUVER DIAGRAM

ALTITUDE: 10000

FEB 14 1978



PLOT PREPARED BY ASD/ENFOP

$\Delta PS = 410234 - 432106$

DC1 - MAX PWR - DC1
OPT L/D

HORIZONTAL ATTITUDE

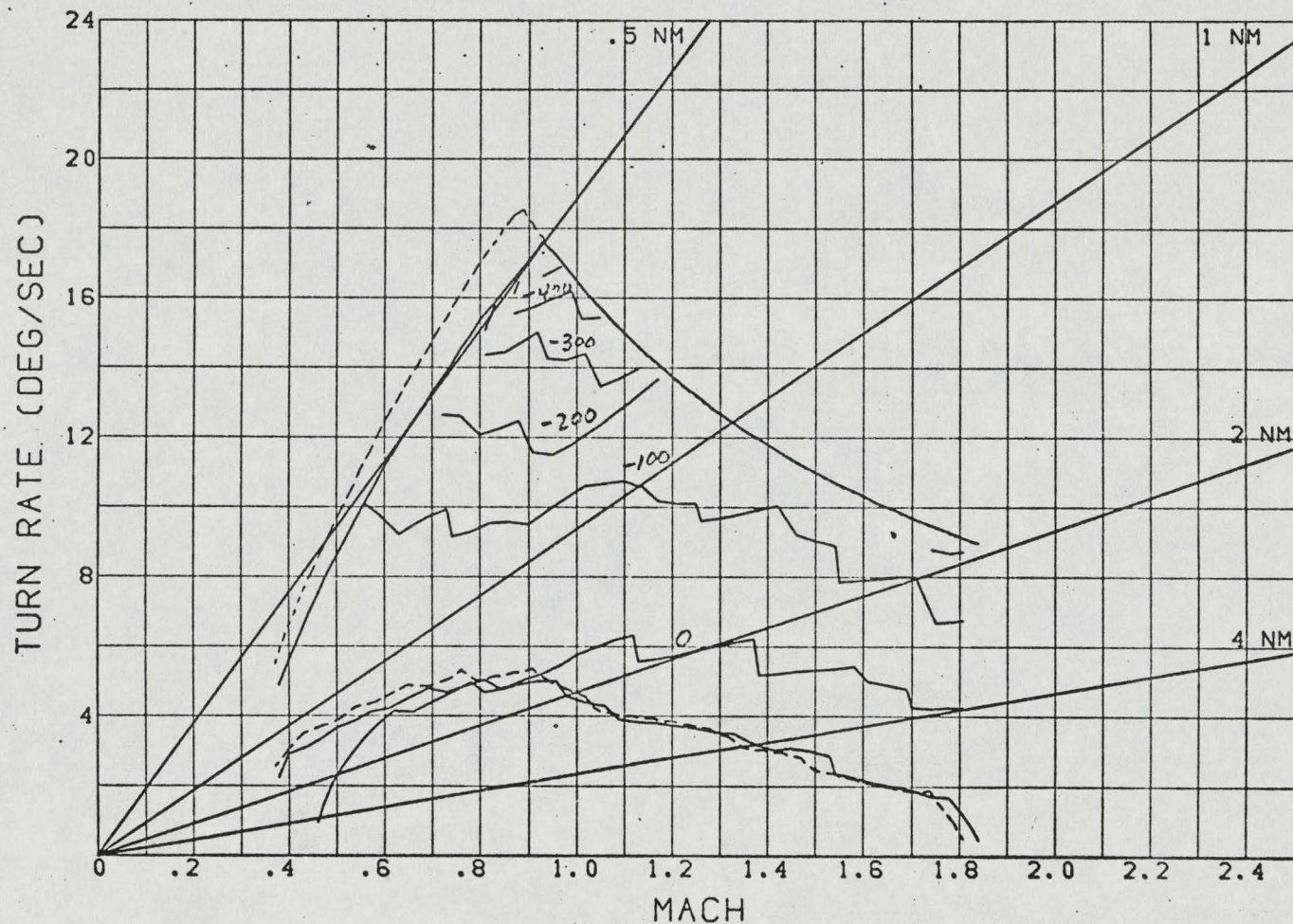
19543

20163

MANEUVER DIAGRAM

ALTITUDE: 30000

FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

DPS 410234 - 432100

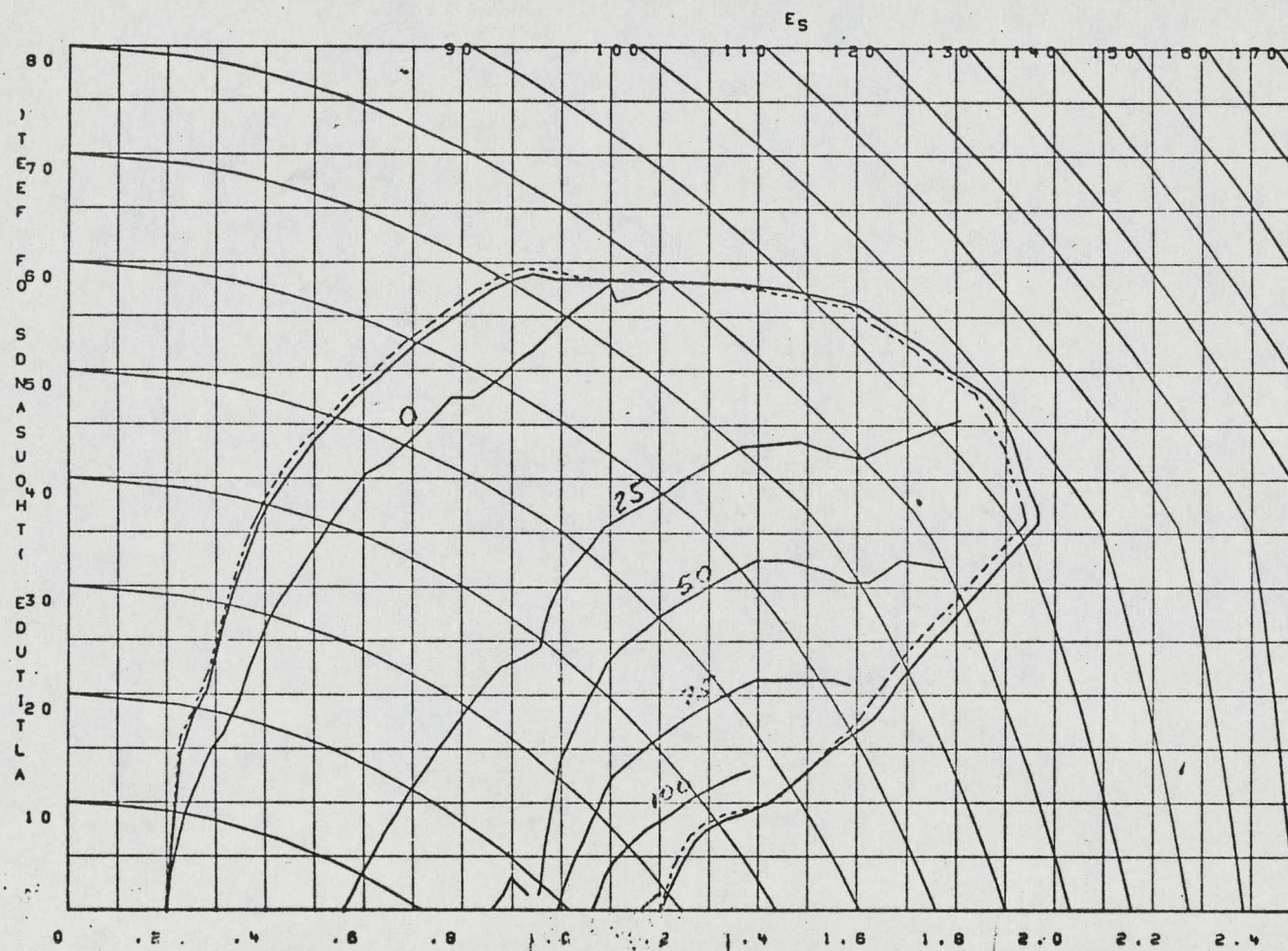
MAXIMUM POWER

D/C 1 D/C 1

14543 20163

1.000 DIAGRAM

FEB 14 1973



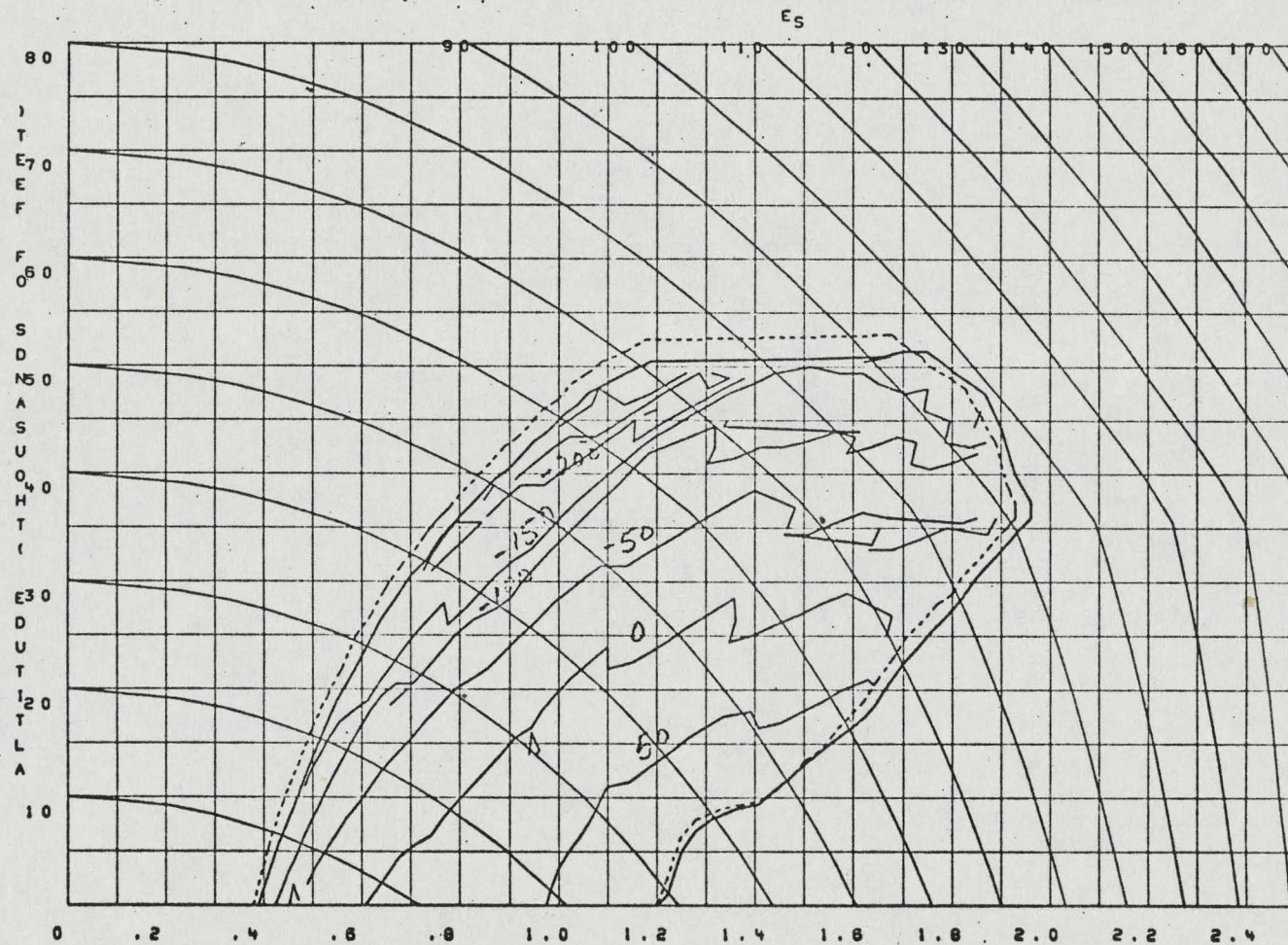
DPS 410234 - 432100

MAXIMUM POWER

D/C 1 D/C 1
19543 20163

FEB 14 1975

5.000 DIAGRAM



RELABEL

DPS 410234 - 432100

MAXIMUM POWER

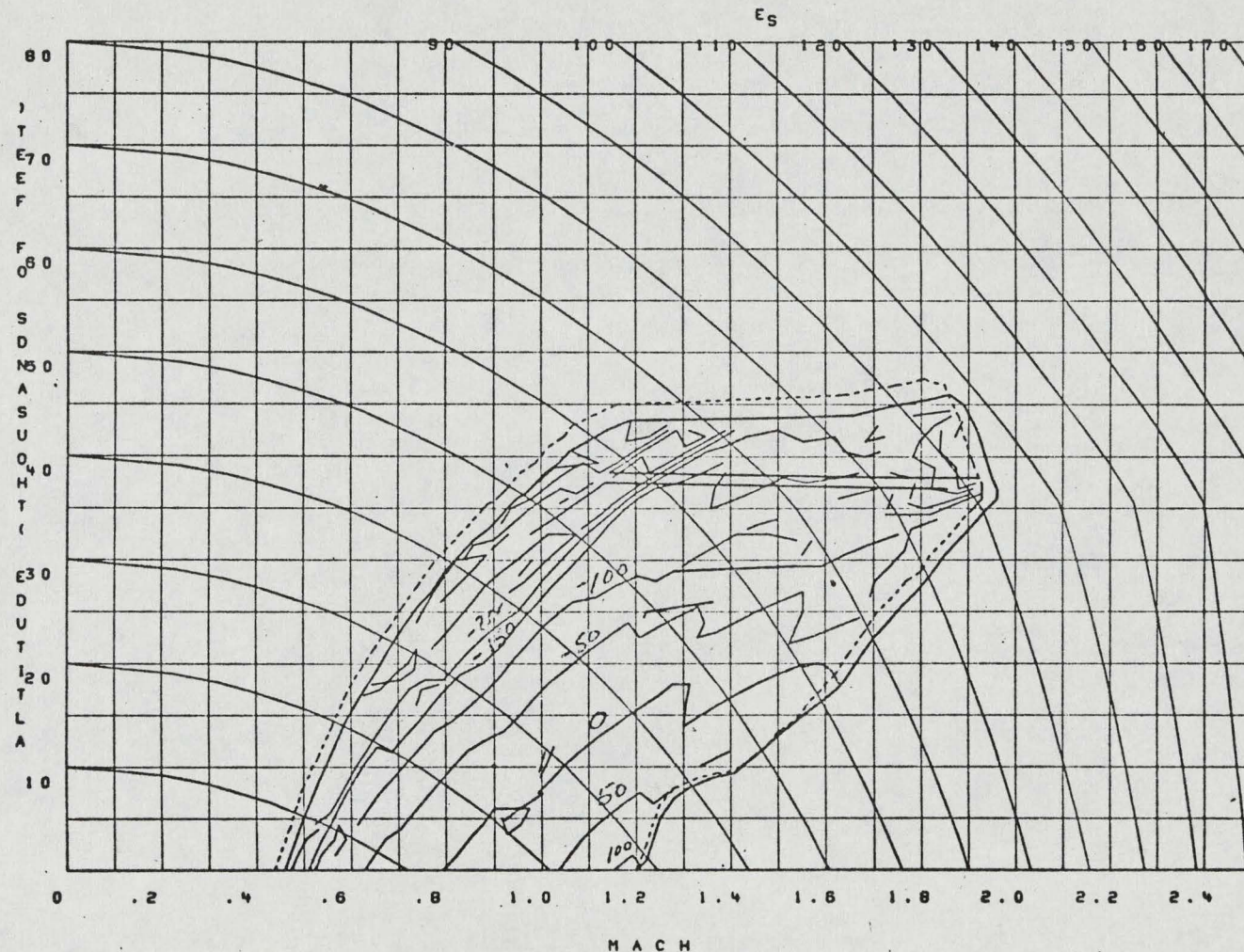
D/C 1 D/C 1

19543

20163

FEB 14 1975

7.000 DIAGRAM



PLOT PREPARED BY ASD/ENFDP

19951 20163

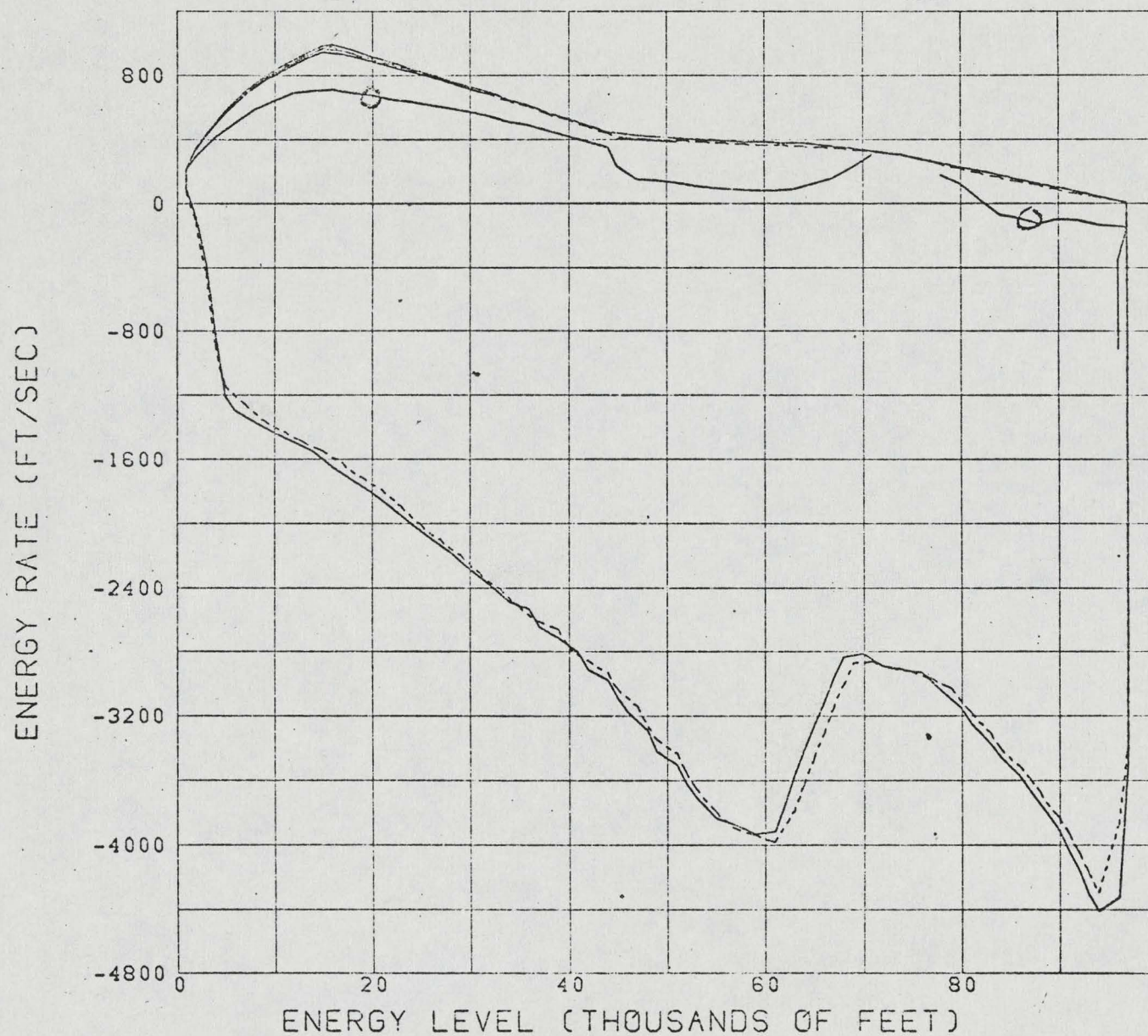
43010G - 43210G

18 FEB 75

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR - DC 1

HORIZONTAL ATTITUDE



PLOT PREPARED BY ASD/ENFDP

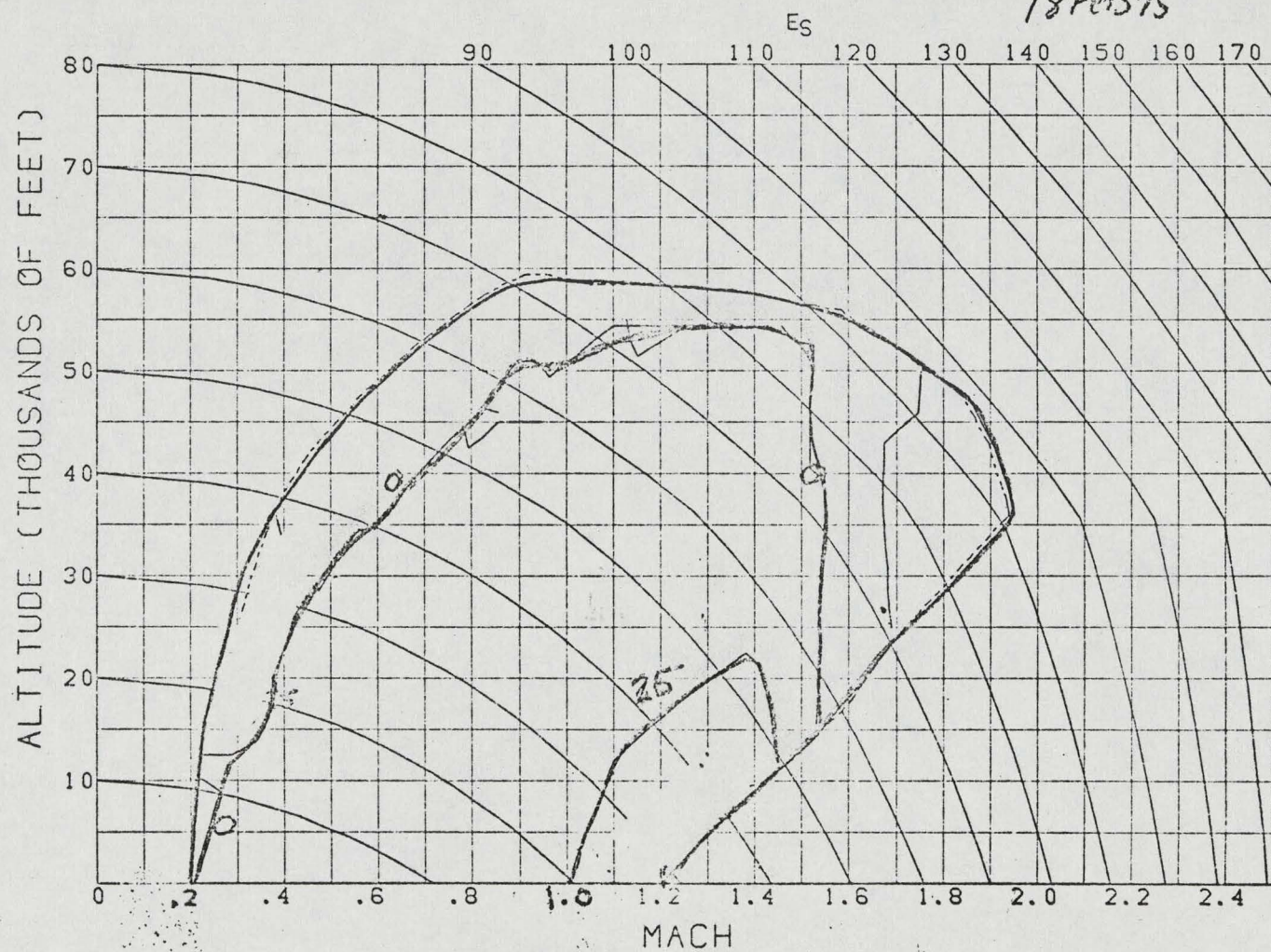
DPS 43010G -43210G

MAXIMUM POWER

D/C 1 D/C 1

19951 20163

1.00 G DIAGRAM



PLOT PREPARED BY ASD/ENFDP

DPS 43010G -43210G

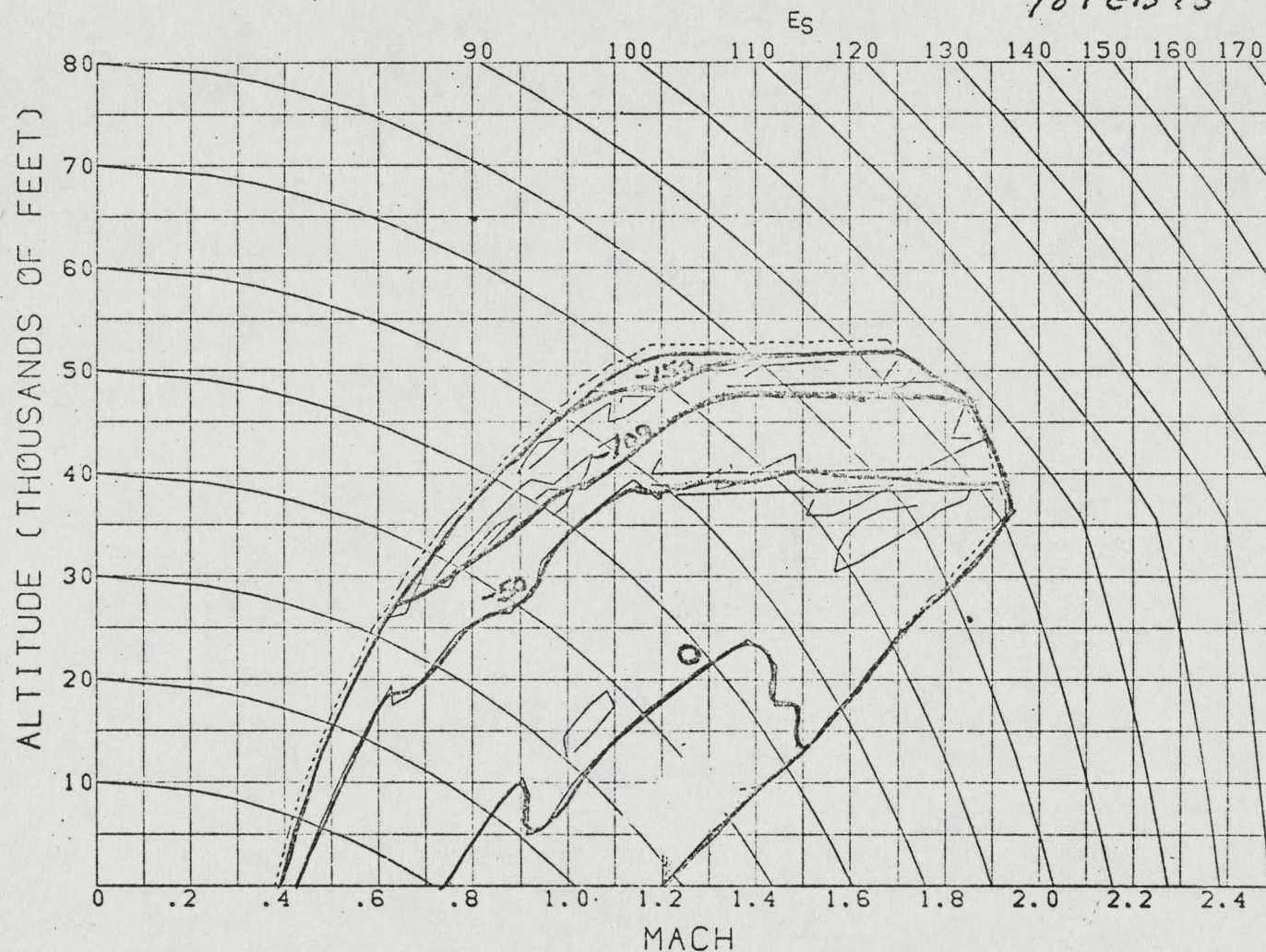
MAXIMUM POWER

D/C 1 D/C 1

19951 20163

5.00 G DIAGRAM

18 FEB 75



PLOT PREPARED BY ASD/ENFDP

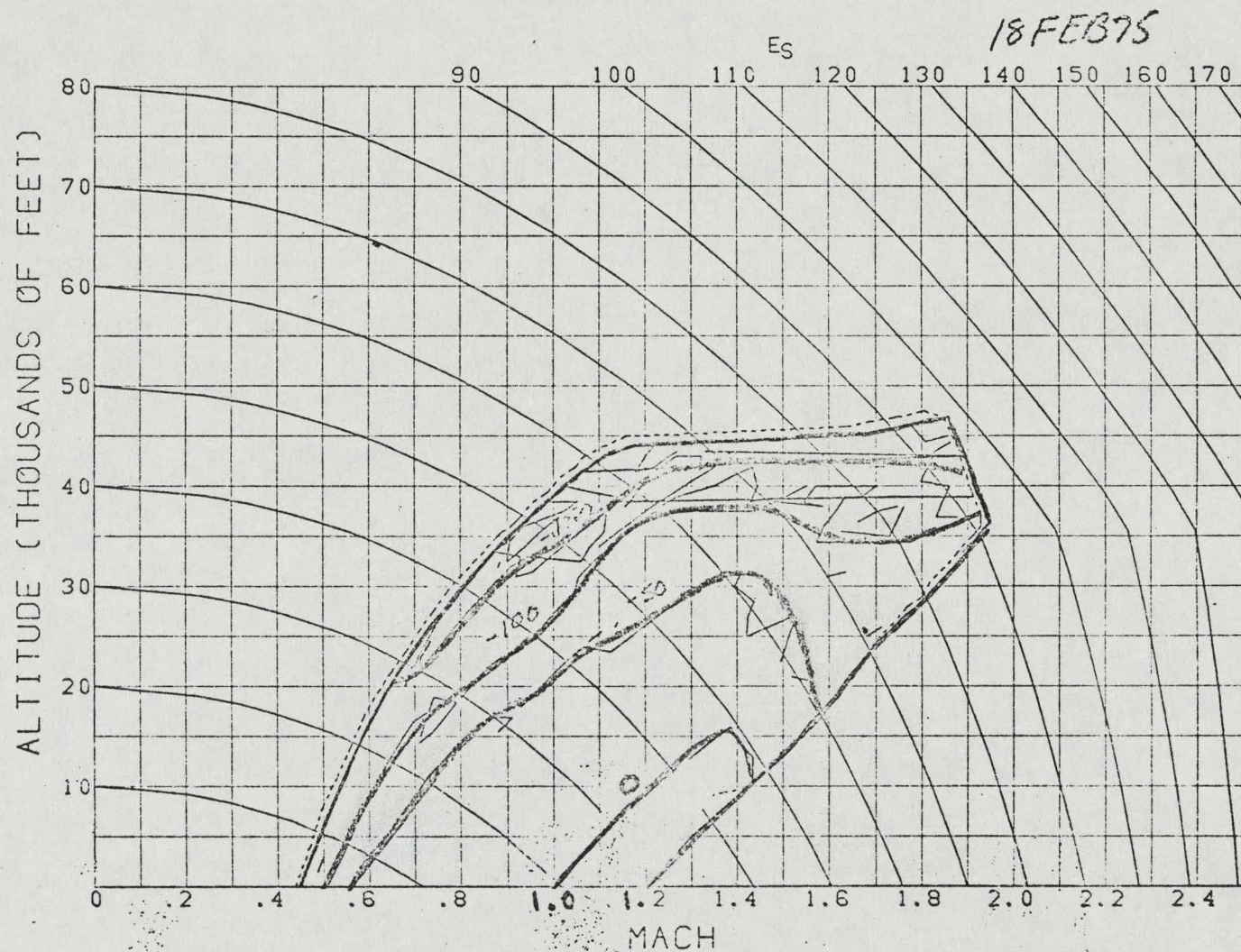
DPS 43010G -43210G

MAXIMUM POWER

D/C 1 D/C 1

19951 20163

7.00 G DIAGRAM



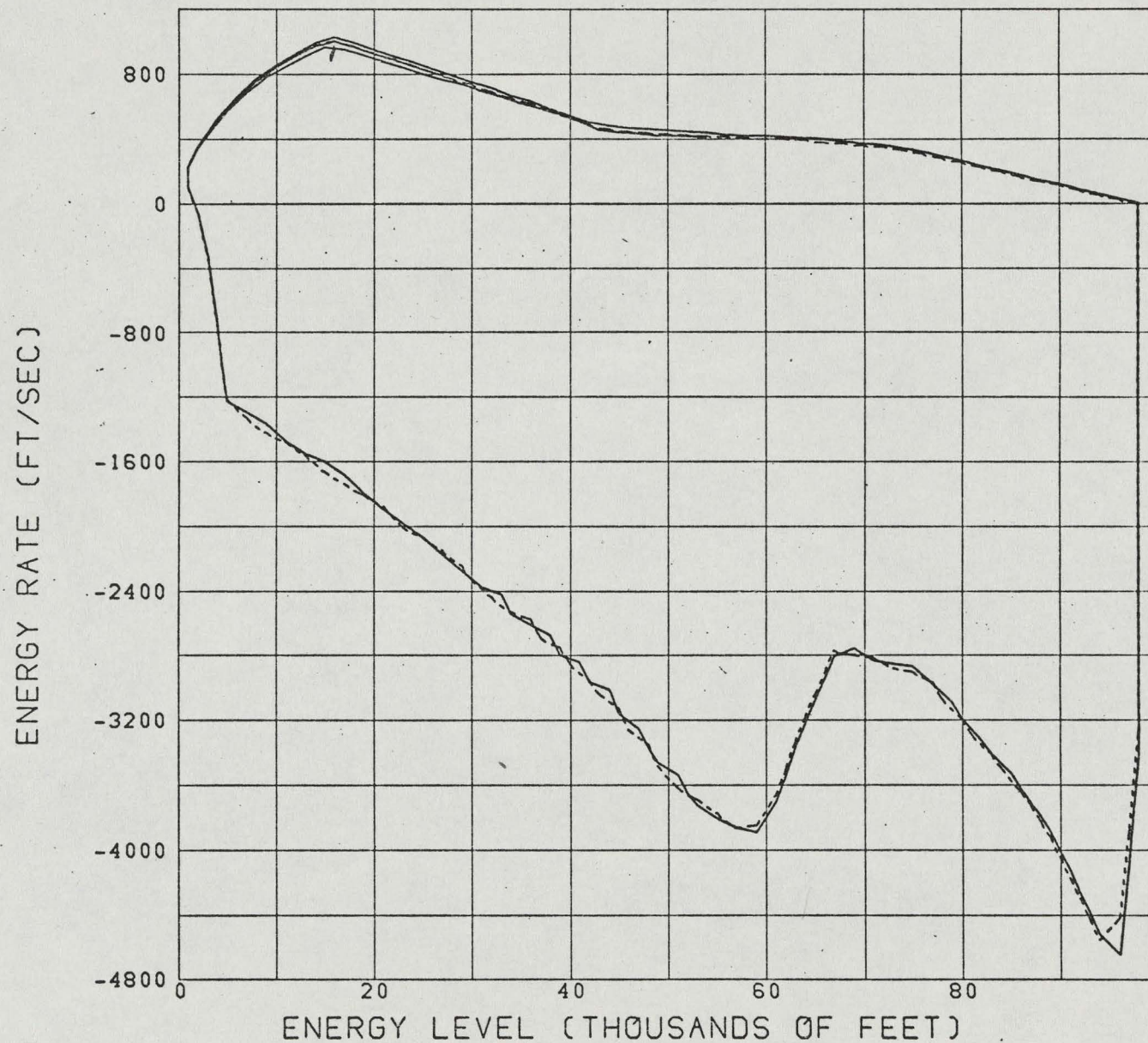
PLOT PREPARED BY ASD/ENFDP

19543 19790
410234 - 428106
DC 1 - MAX PWR - DC 1

FEB 14 1975

MAX MANEUVER DIAGRAM

HORIZONTAL ATTITUDE

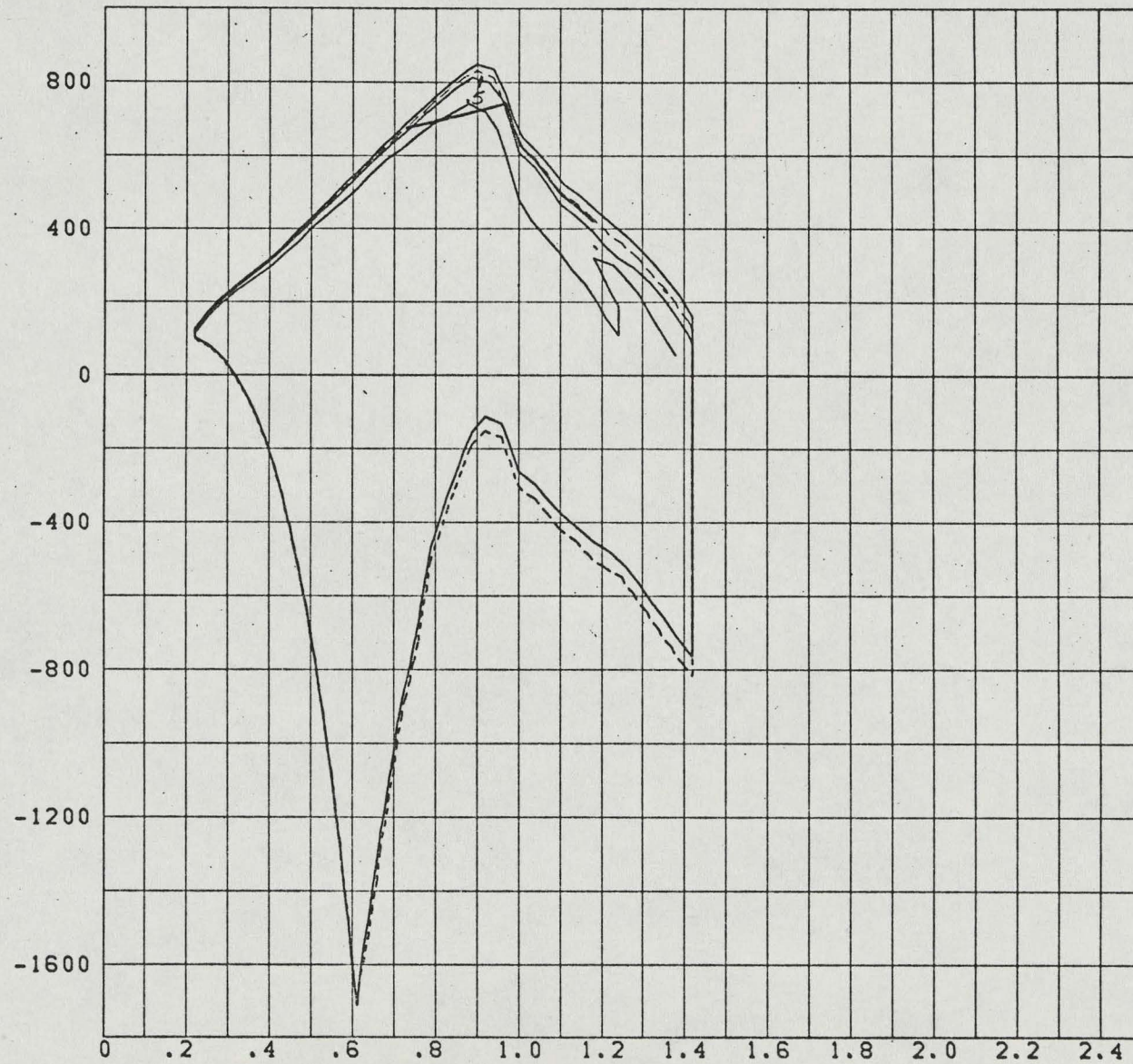


MANEUVER DIAGRAM
ALTITUDE 10000

19543 19790
410234 - 42810G
DC 1 - MAX PWR - DC 1

FEB 14 1975

ENERGY RATE (FT/SEC)

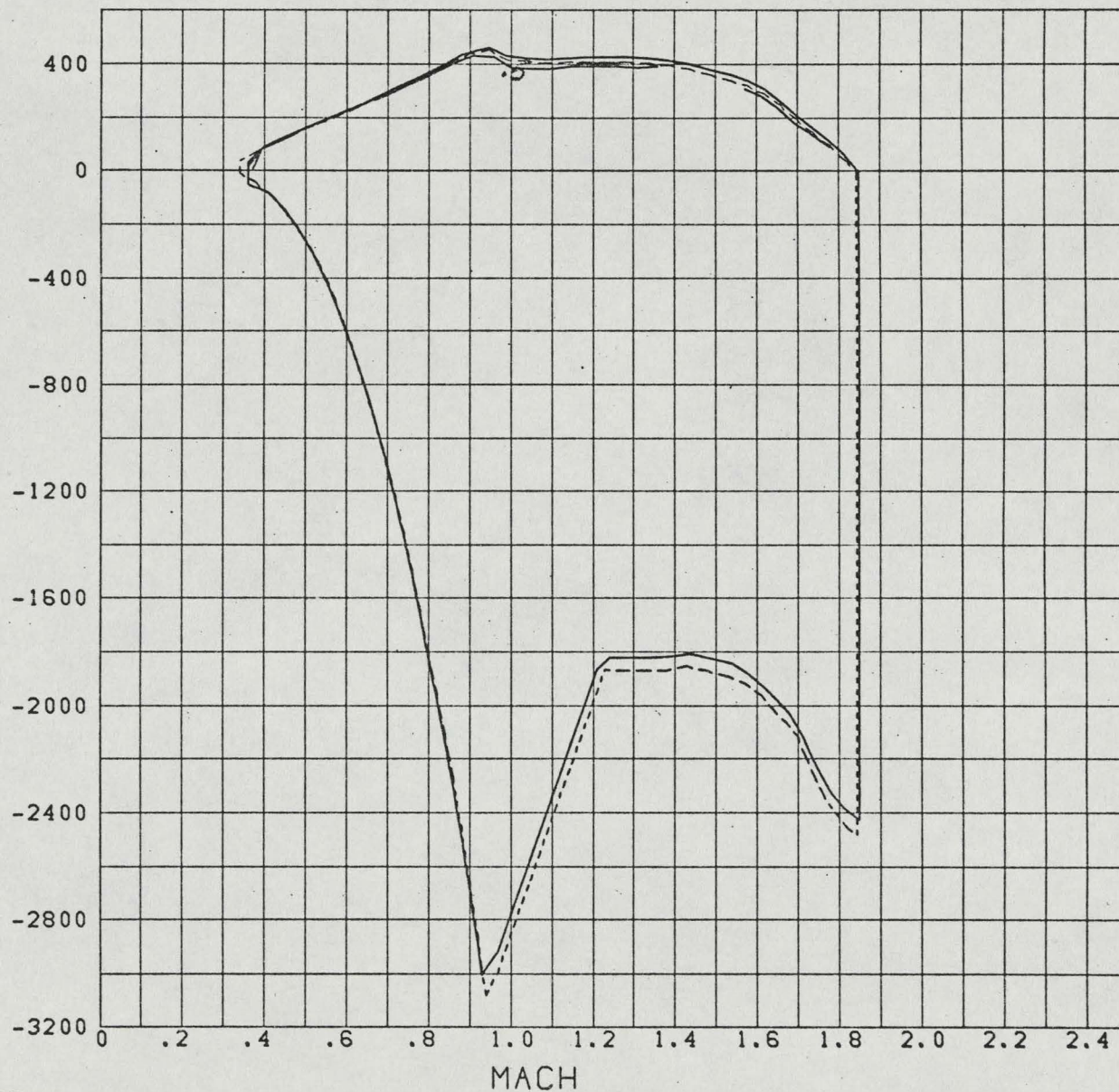


MANEUVER DIAGRAM
ALTITUDE 30000

19543 19790
410234 - 42810G
DC 1 - MAX PWR - DC 1

FEB 14 1975
HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



$\Delta PS = 410234 - 428106$

DC 1 - MAX PWR - DC 1

OPT L/D

HORIZONTAL ATTITUDE

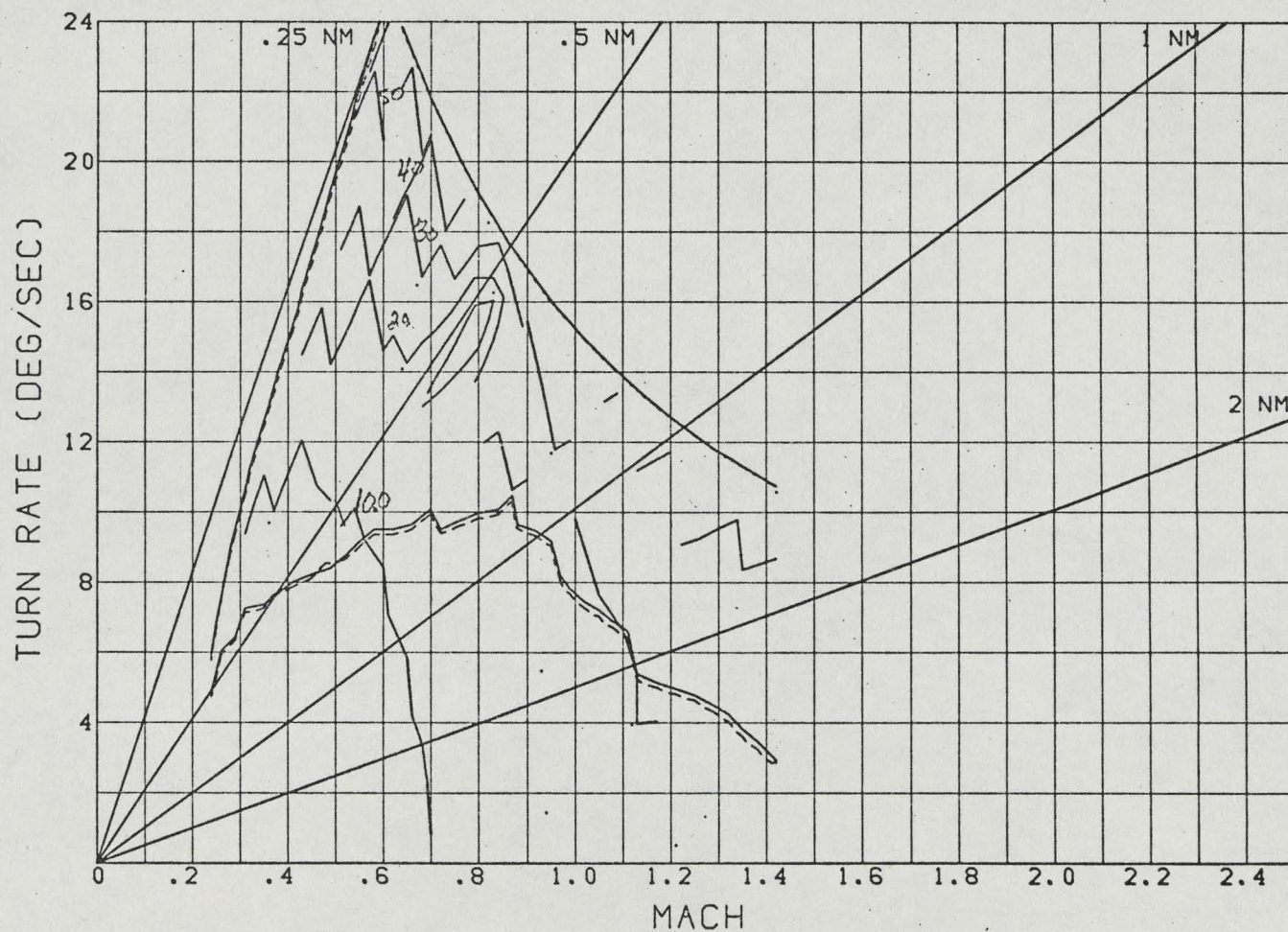
19543

19790

FEB 14 1976

MANEUVER DIAGRAM

ALTITUDE: 10000



$$\Delta PS = \frac{410234}{DC 1 - MAX PWR - DC 1} - \frac{428106}{OPT L/D}$$

19543 19790

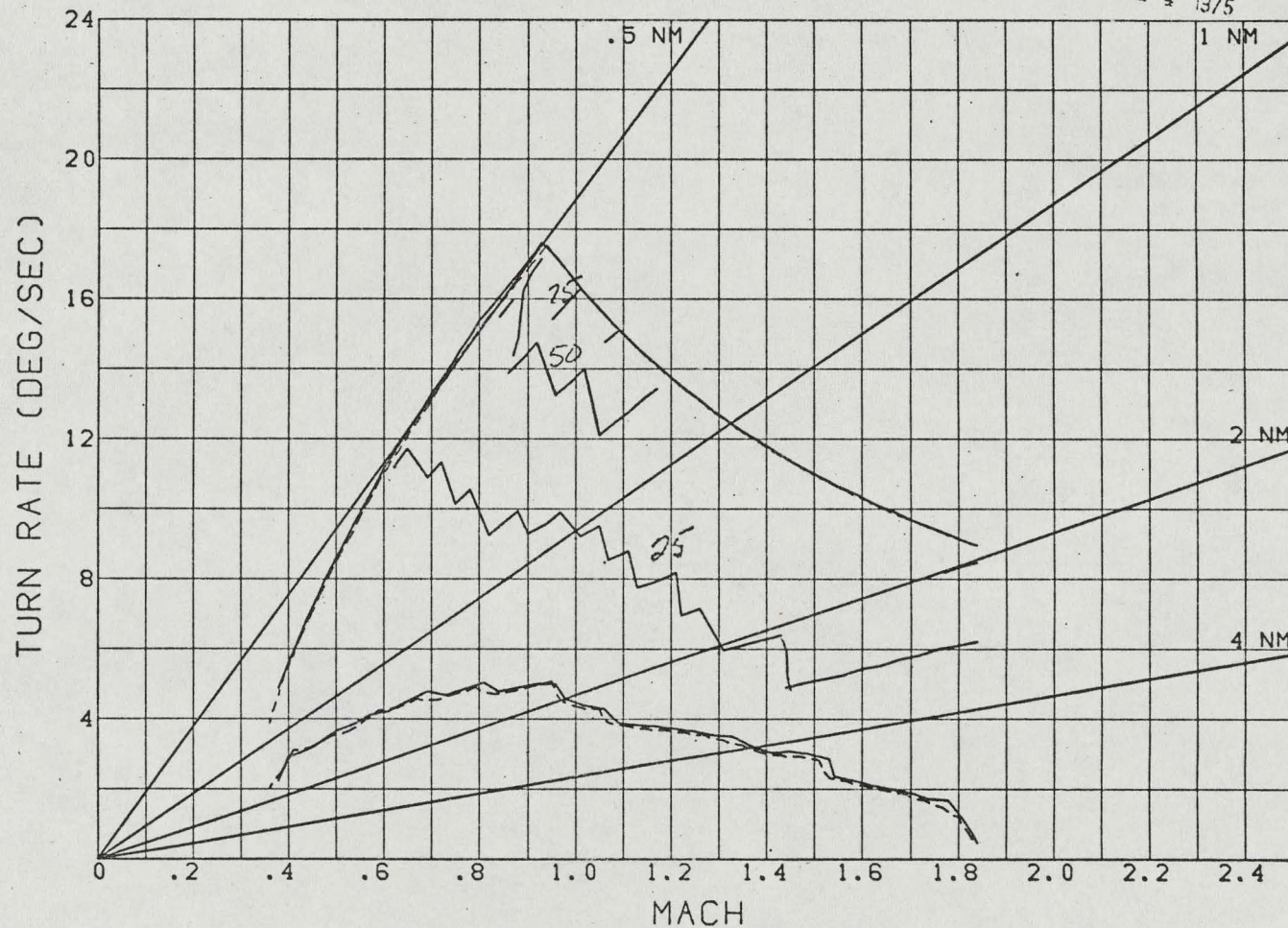
HORIZONTAL ATTITUDE

MANEUVER DIAGRAM

ALTITUDE: 30000

FEB 14 1975

FEB 14 1975



PLOT PREPARED BY ASD/ENFDP

DPS 410234 -42810G

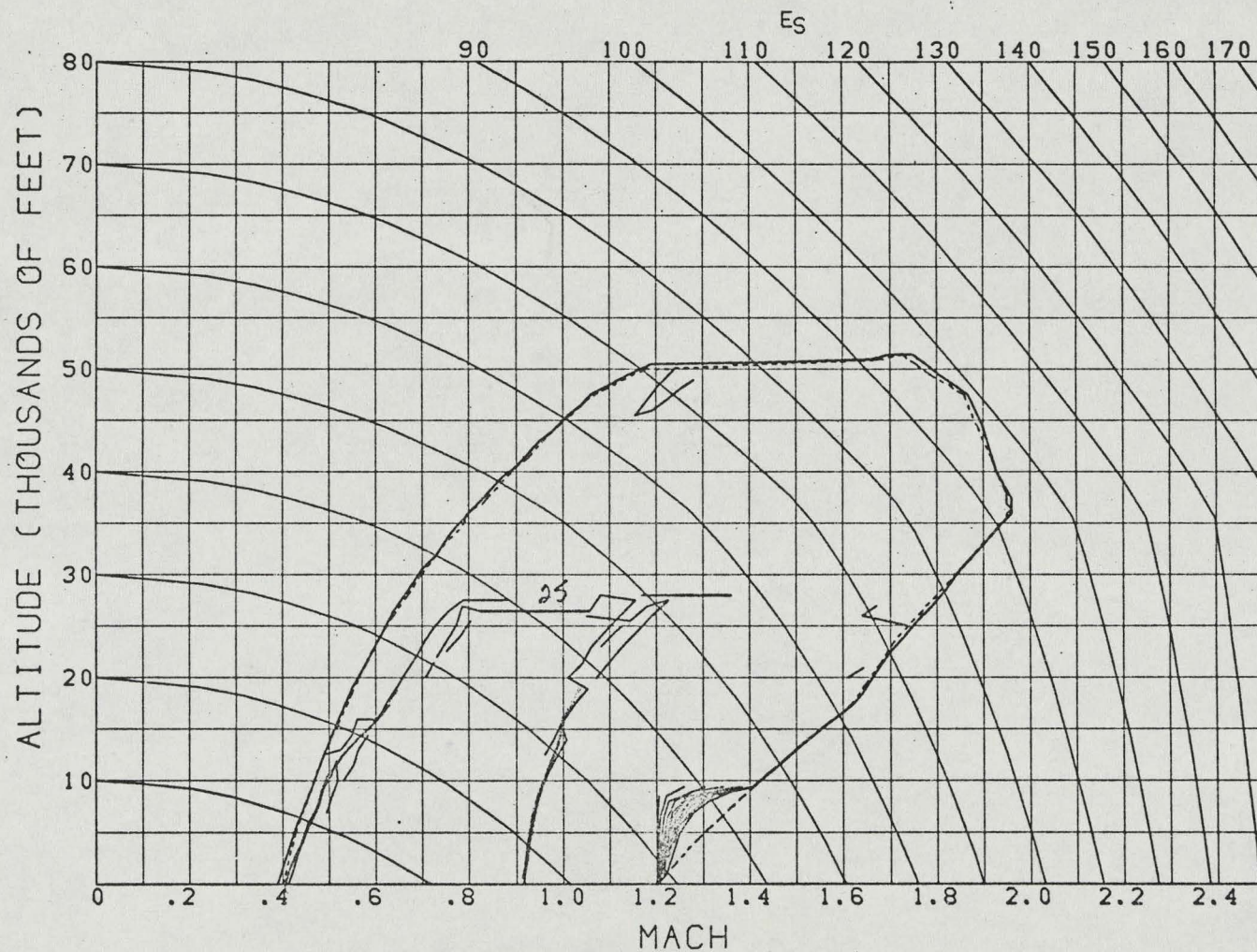
MAXIMUM POWER

D/C 1 D/C 1

19543 19790

FEB 14 1975

5.00 G DIAGRAM



PLOT PREPARED BY ASD/ENFDP

DPS 410234 -42810G

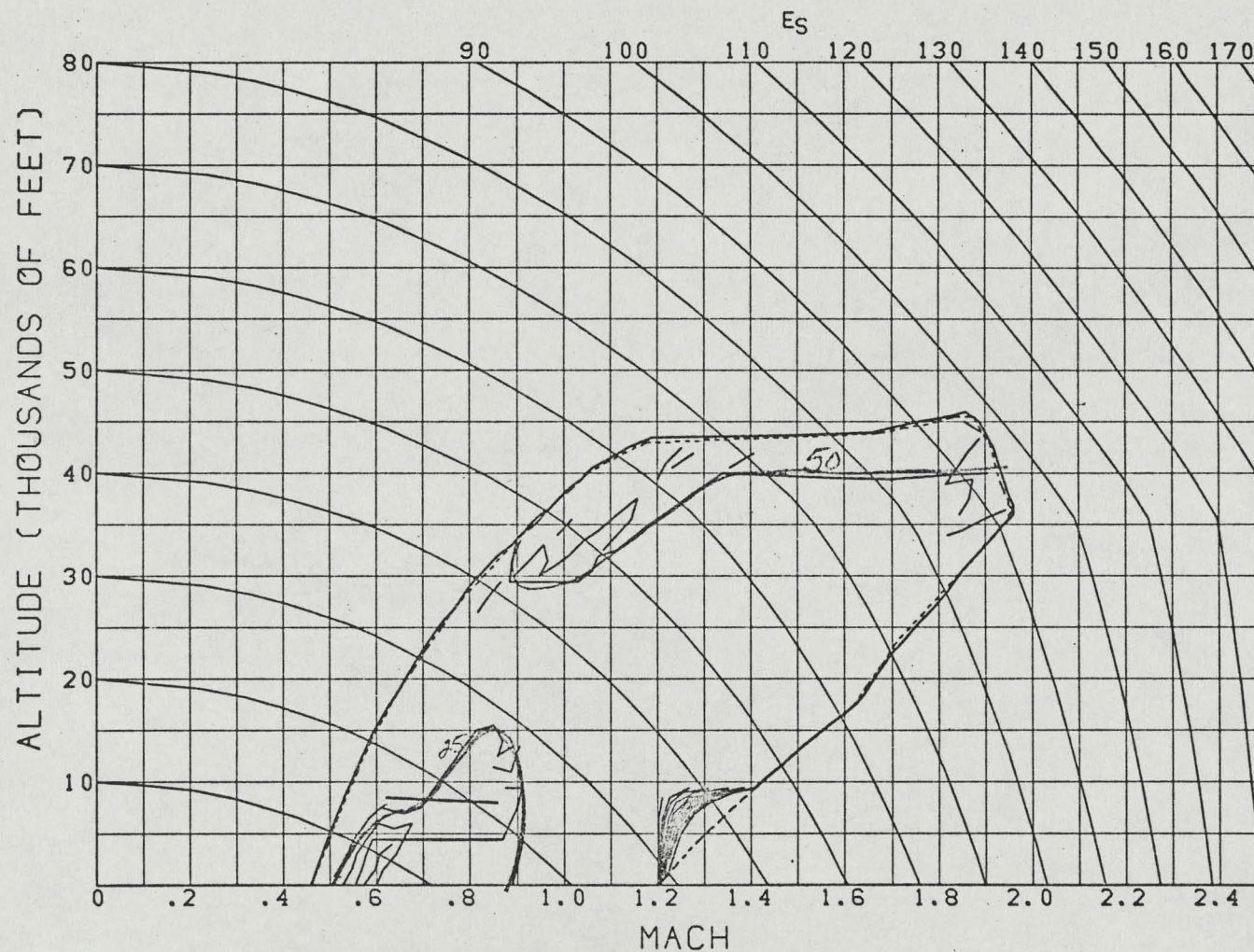
MAXIMUM POWER

D/C 1 D/C 1

19543 19796

FEB 14 1971

7.00 G DIAGRAM



MAR 27 1974

2A4 4A7
60.2% (3852) 60.3% (7607)
17877 36519

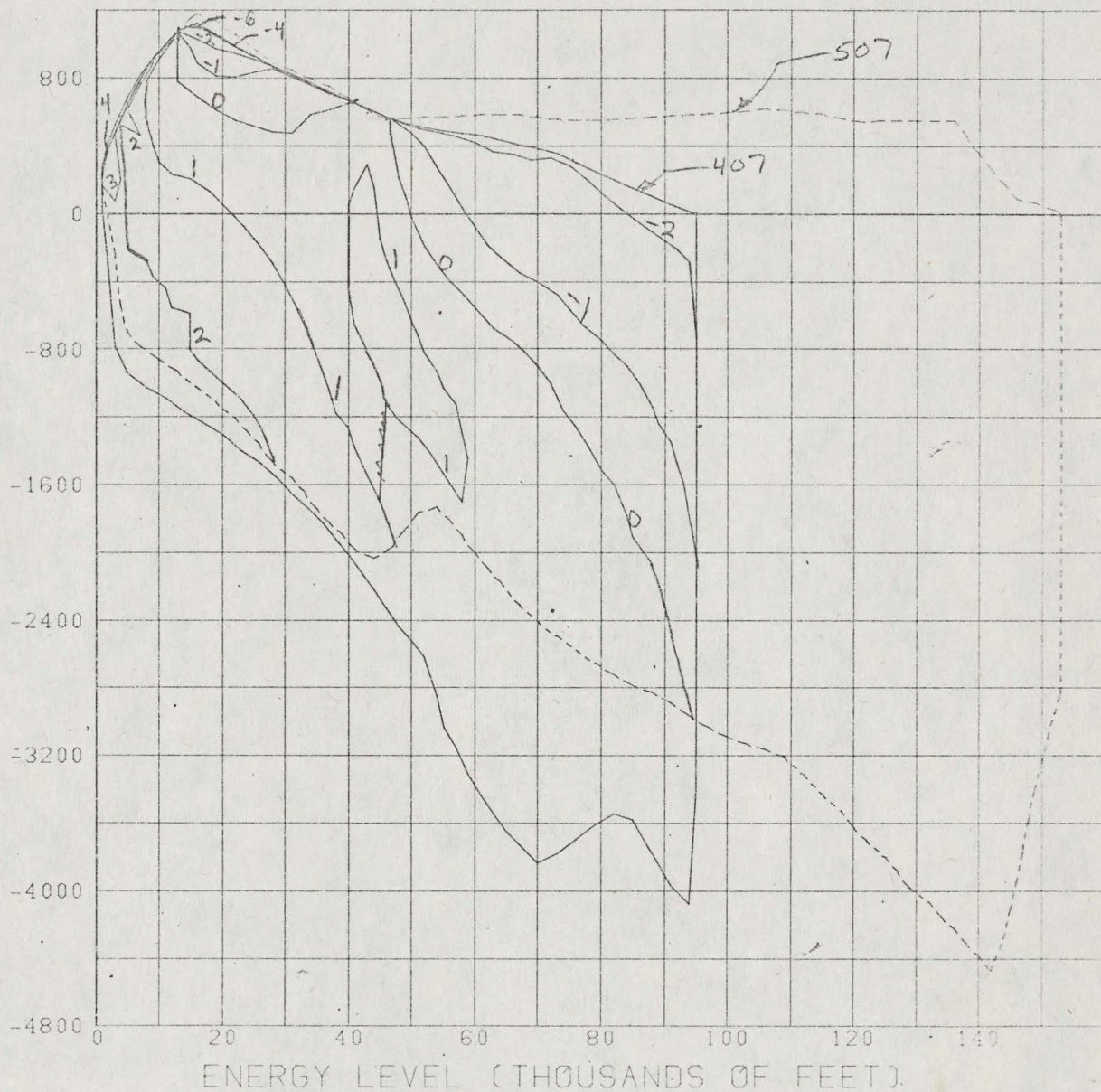
$\Delta\theta = 407 - 507$

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR - DC 2

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

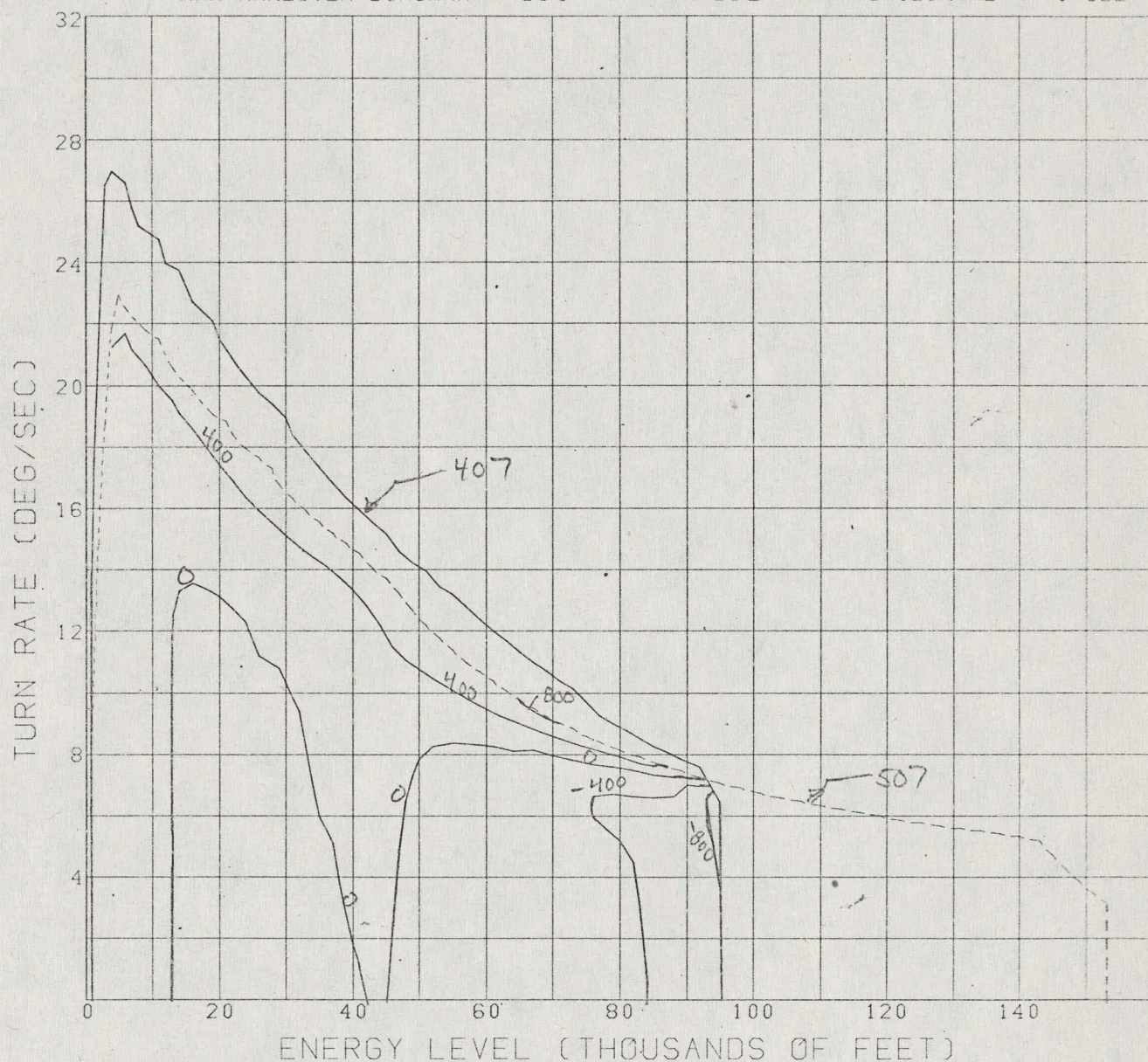
2A9 4A7
 60.2% (3852) 68.3% (7607)
 17877 36519

$\Delta P_s = 407$ - 507

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR - DC 2

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

2A9

4A7

MAR 28 1974

100 → 34

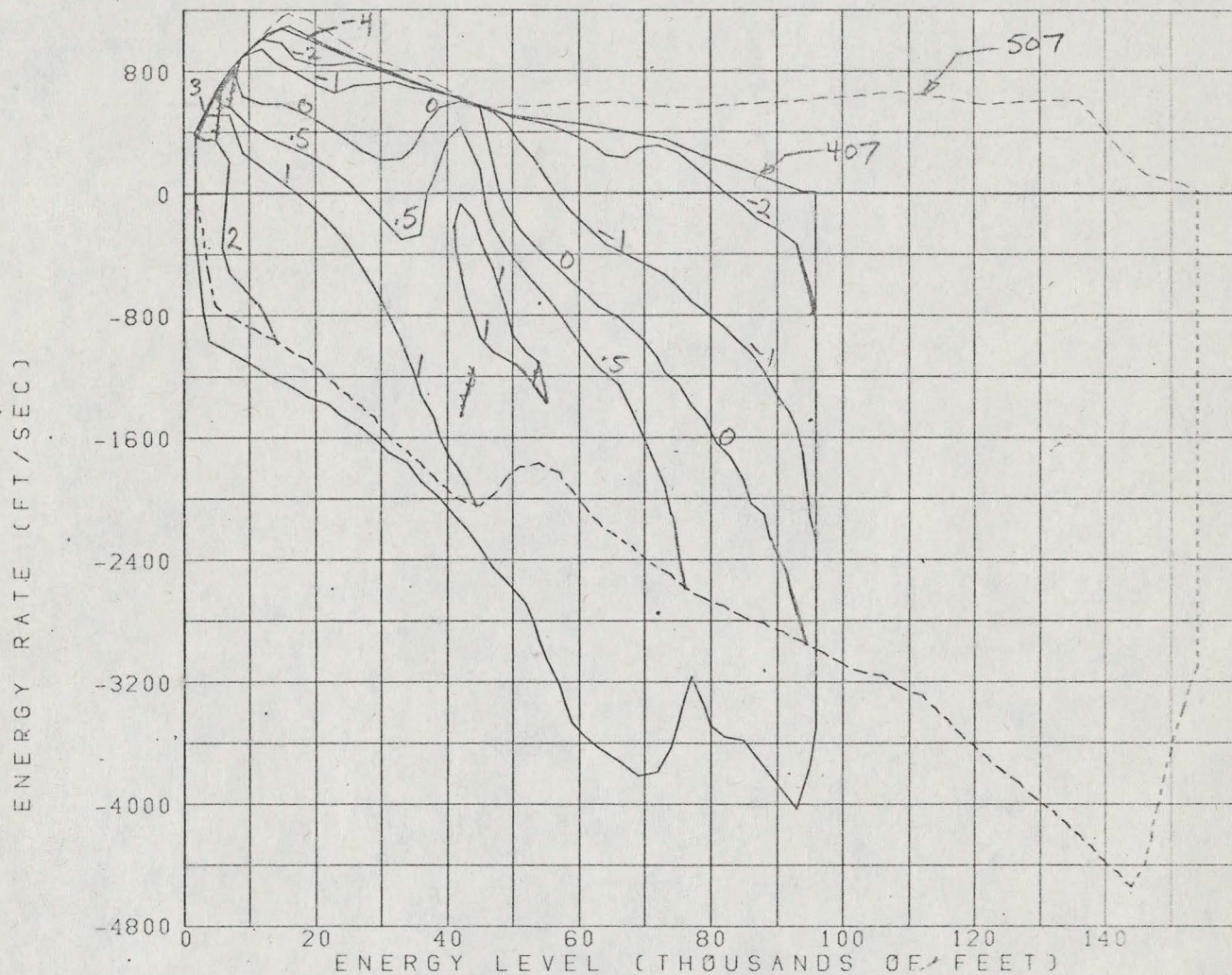
100 → 36

 $\Delta \theta = 407 - 507$

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR - DC 2

HORIZONTAL ATTITUDE



DMGAT				-0	-1	-5	-13	-31	-93
DMMP	3.4	3.2	2.5	-0.3	3.3	2.6	1.8	0.9	0.2
MSTA	307	241	98	300	-26	-205	-240	-238	-343
DMEMP	3.4	3.8	3.6	3.4	3.0	2.3	2.3	0.9	-0.1
MESTA	-42	-60	-1156	113	-525	109	764	-286	-241

PLOT PREPARED BY TSX, ADTC

A Persistence (Deg)

407 - 507
2A9 4A7
1.00 → .34 1.00 → .36

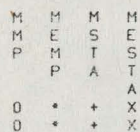
249

4A7

1.00 → 1.34

1.00-7.36

MAR 28 1974



6
III
A
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ENERGY LEVEL (THOUSANDS OF FEET)

PLOT PREPARED BY TSX, ADTC

MAR 28 1974

2A9

4A7

60.2% (3852)

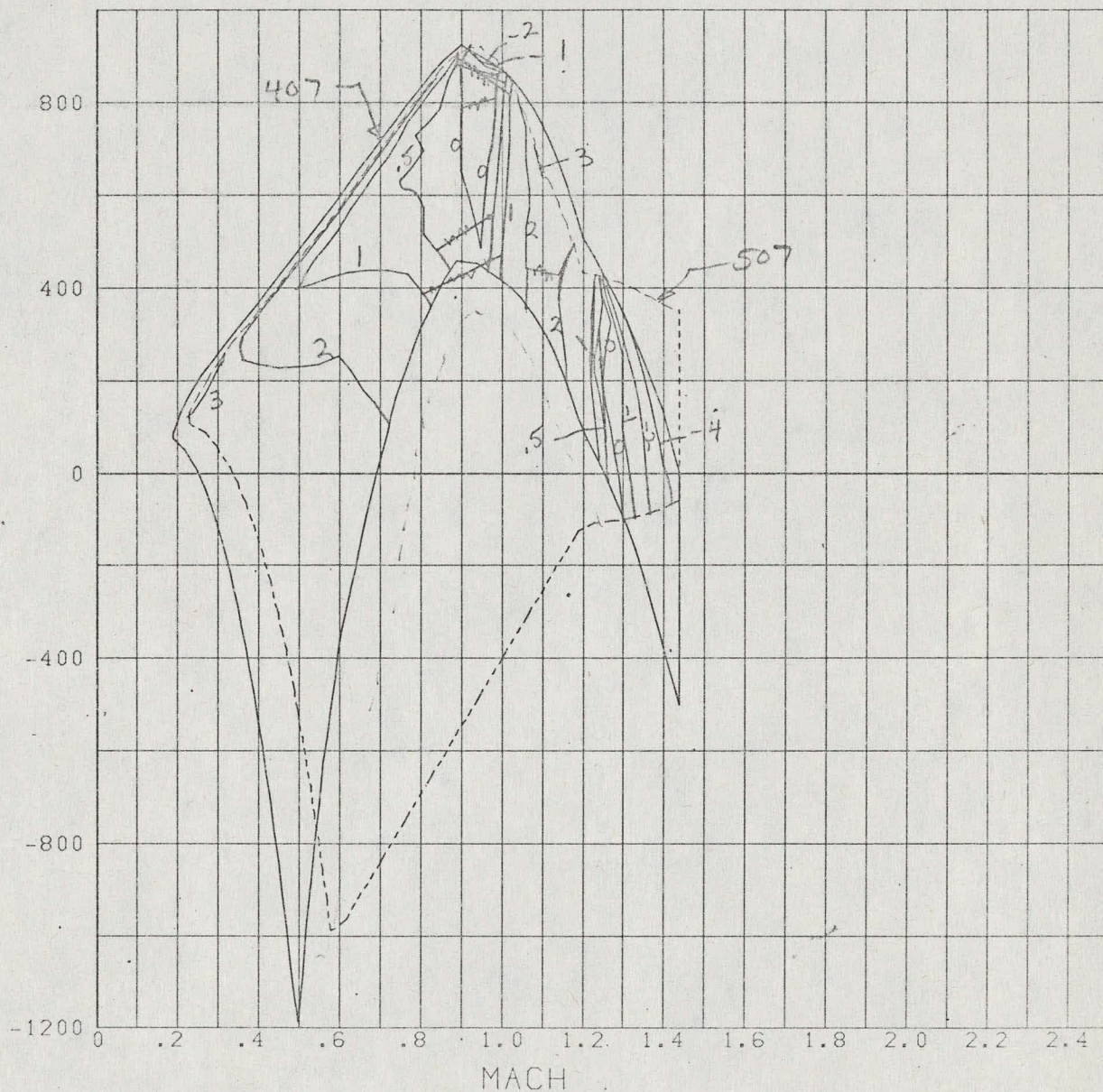
68.3% (7607)

17877

36519

MANEUVER DIAGRAM $\Delta\theta = 407$ - 507
ALTITUDE 10000 FEET DC 1 - MAX PWR - DC 2

ENERGY RATE (FT/SEC)



PLOT. PREPARED BY TSX, ADTC

2A9

4A7

MAR 28 1974

60.2% (3852)

68.3% (7607)

17877

36519

MANEUVER DIAGRAM

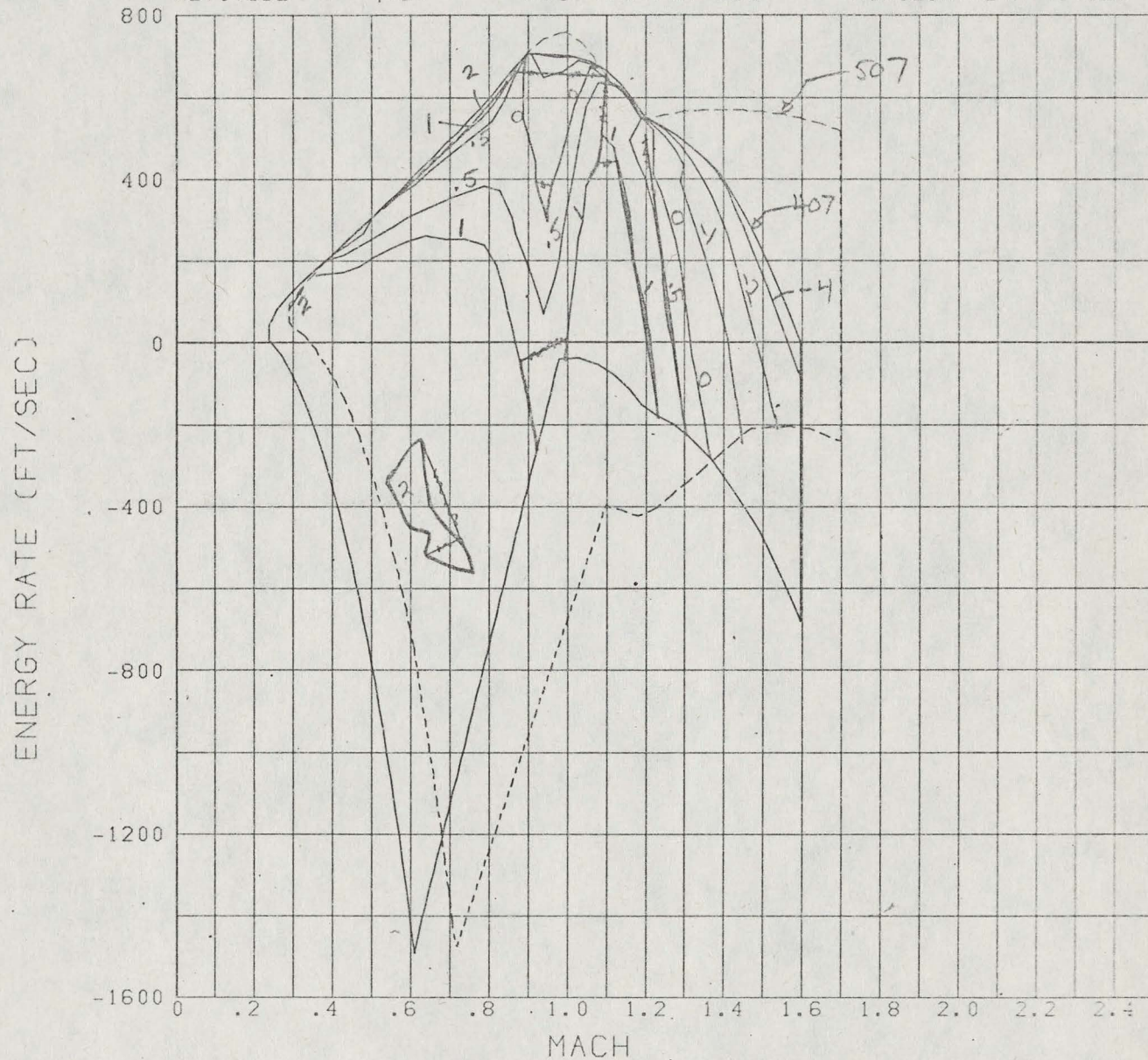
 $\Delta \theta = 407$

- 507

ALTITUDE 20000 FEET

DC 1 - MAX PWR - DC 2

HORIZONTAL ALTITUDE



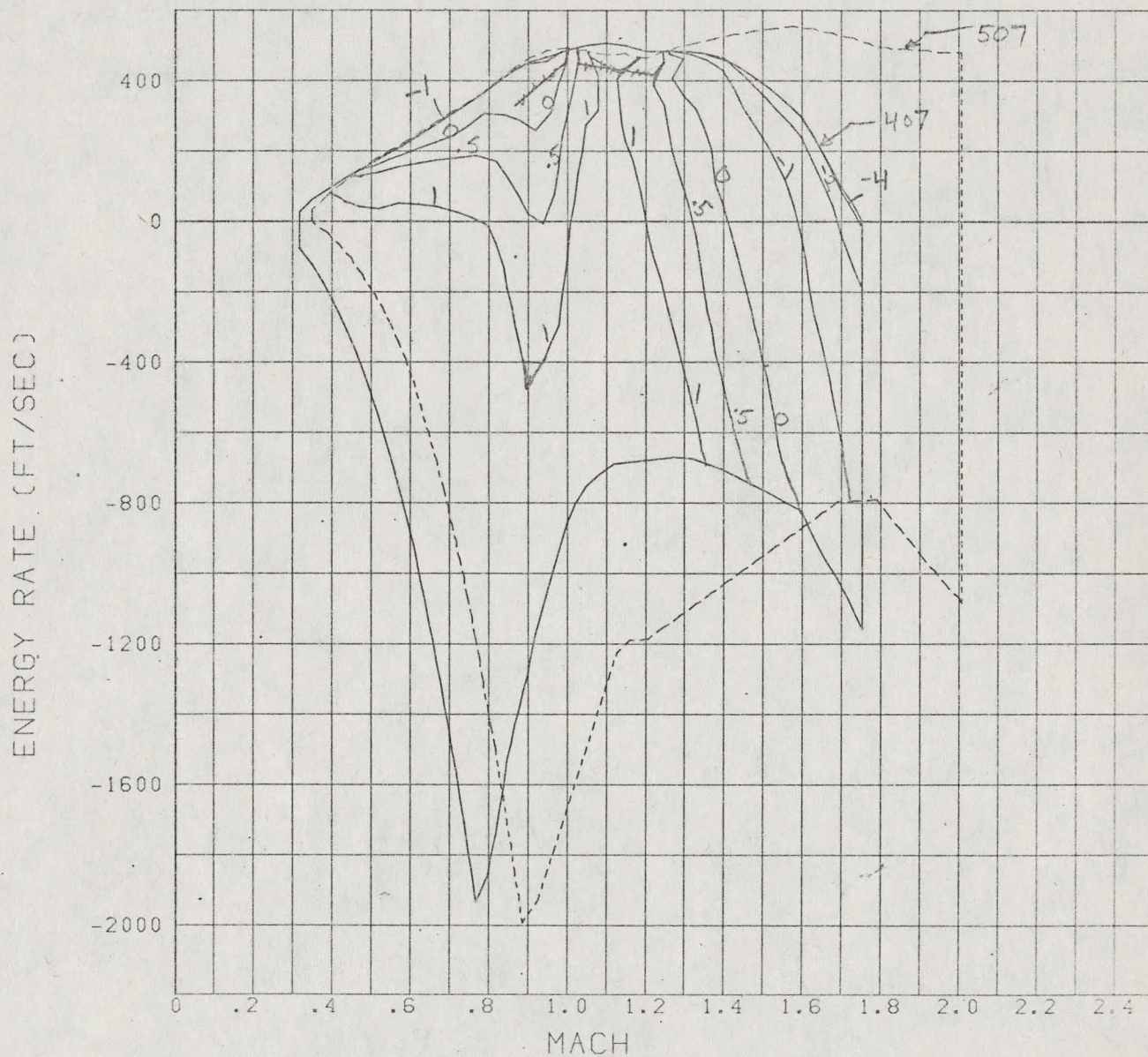
PLOT PREPARED BY TSX, ADTC

2A9
60.2% (3852)
17877

4A7
68.3% (7607)
36519

MAR 28 1974

MANEUVER DIAGRAM $\Delta \theta = 407$ - 507
ALTITUDE 30000 FEET DC 1 - MAX PWR - DC 2 HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

2A9
(60.2% (3852)
17877

4A7
(68.3% (7607)
36519

MANEUVER DIAGRAM
ALTITUDE 40000 FEET

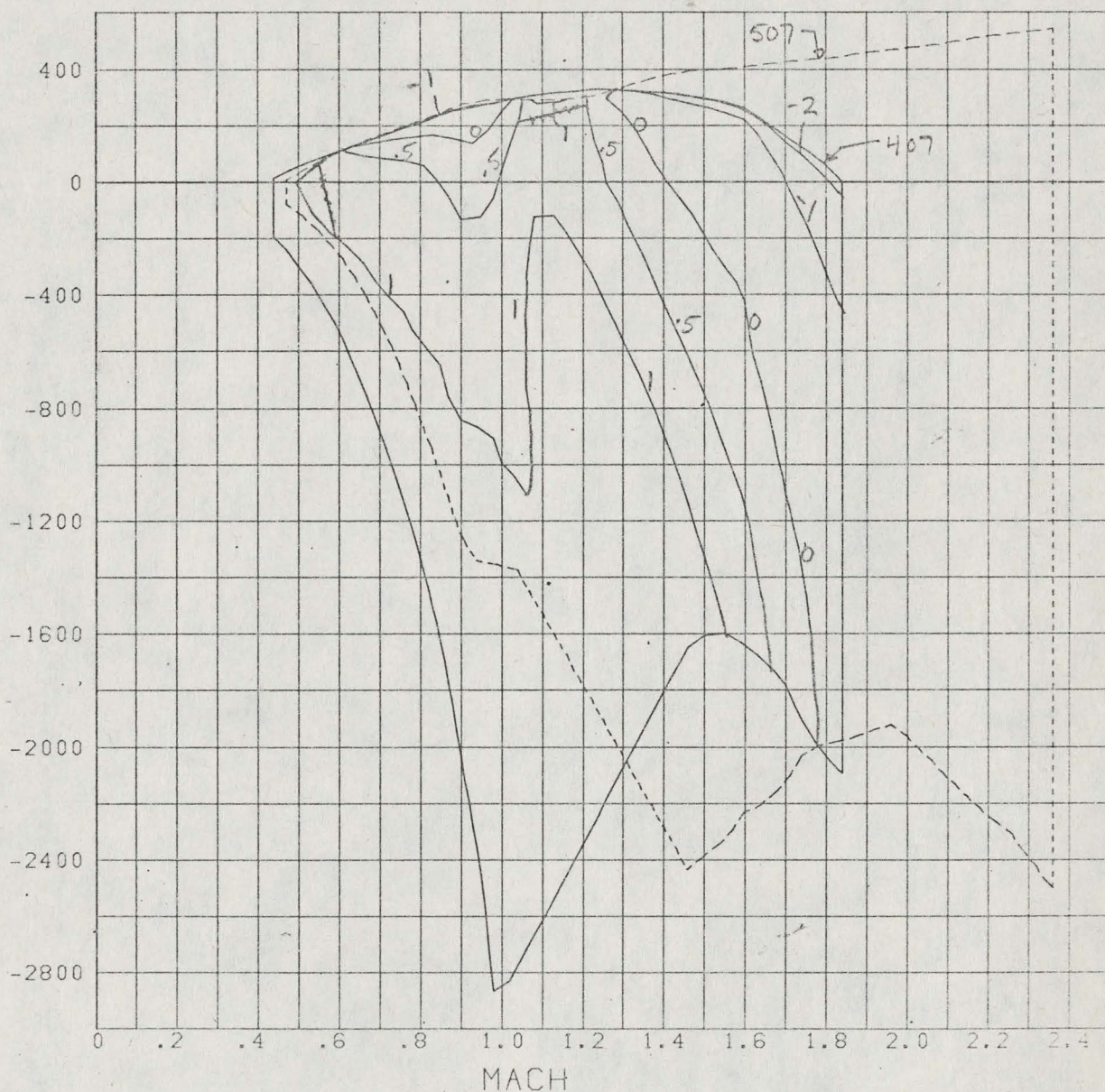
$\Delta \theta = 407$

- 507

DC 1 - MAX PWR - DC 2

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

$\Delta PS = 407 \quad -507$

MAXIMUM POWER

D/C 1 D/C 2

2A9

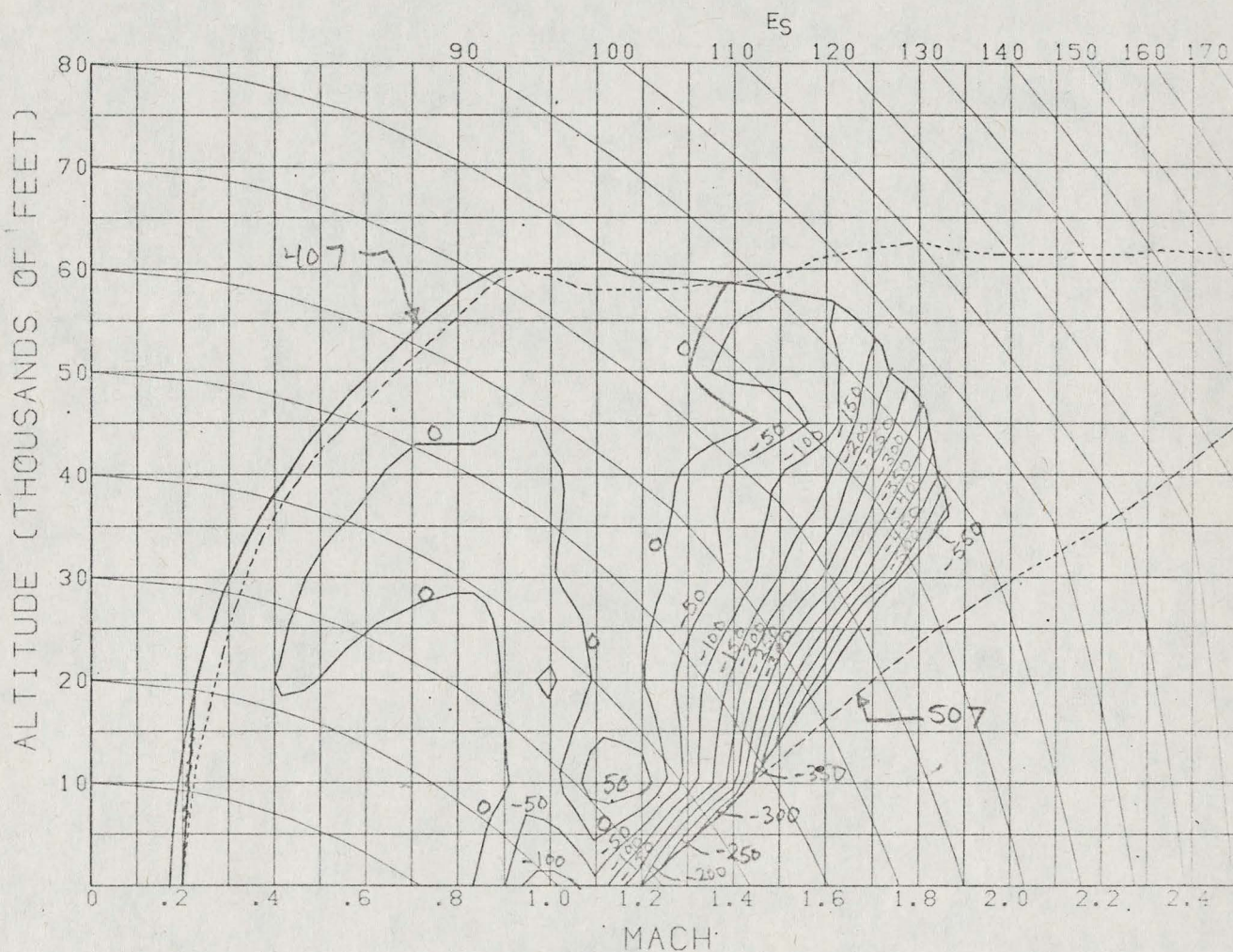
4A7

1.00 G DIAGRAM

60.2% (3852) 68.3% (7607)

17077

36519



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

DPS = 407 -507

MAXIMUM POWER

D/C 1 D/C 2

2A9 4A7

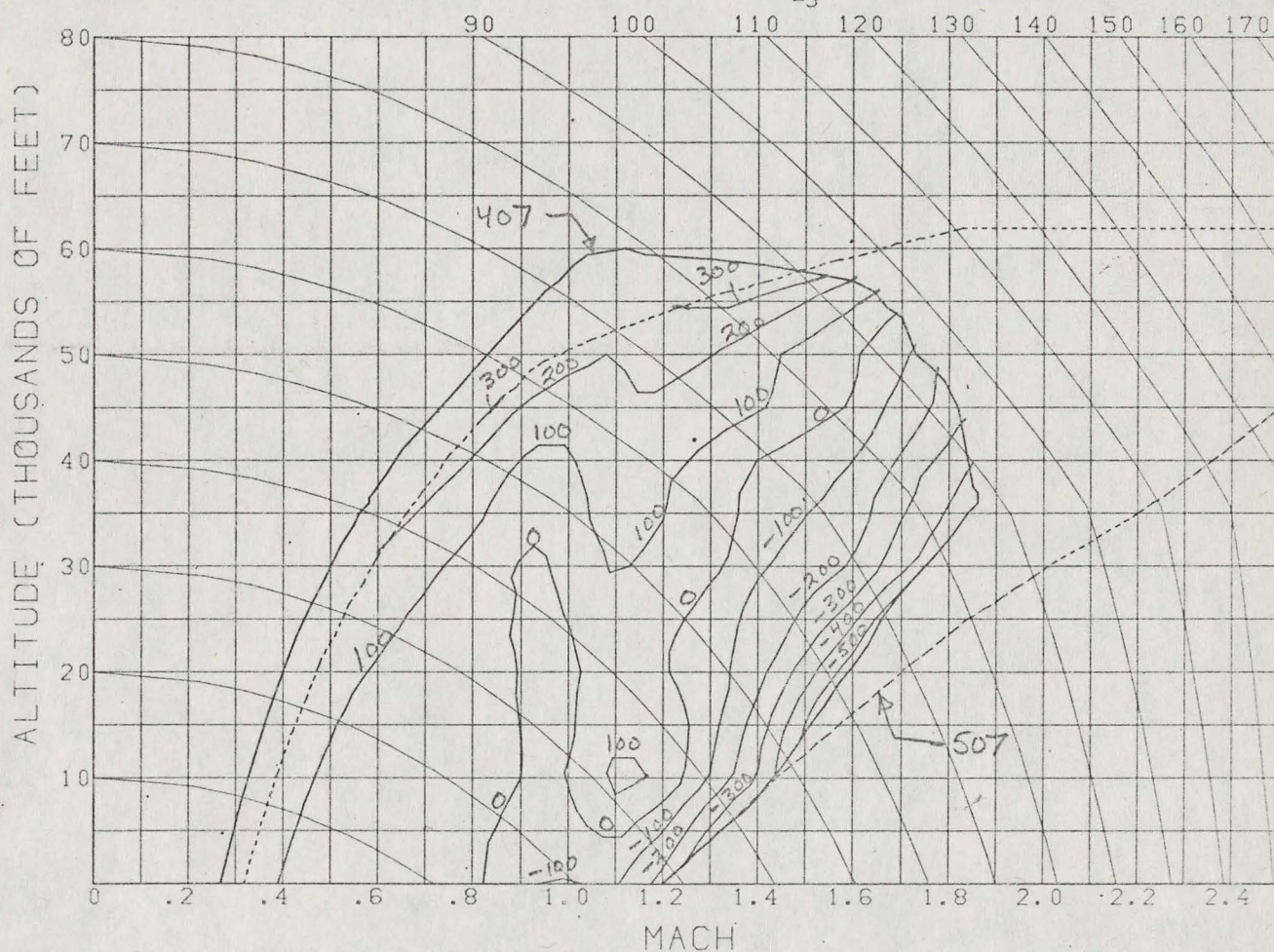
3.00 G DIAGRAM

(60.2% (3852) 68.3% (7607)

17877

36519

Es



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

$\Delta PS = 407 \quad -507$

MAXIMUM POWER

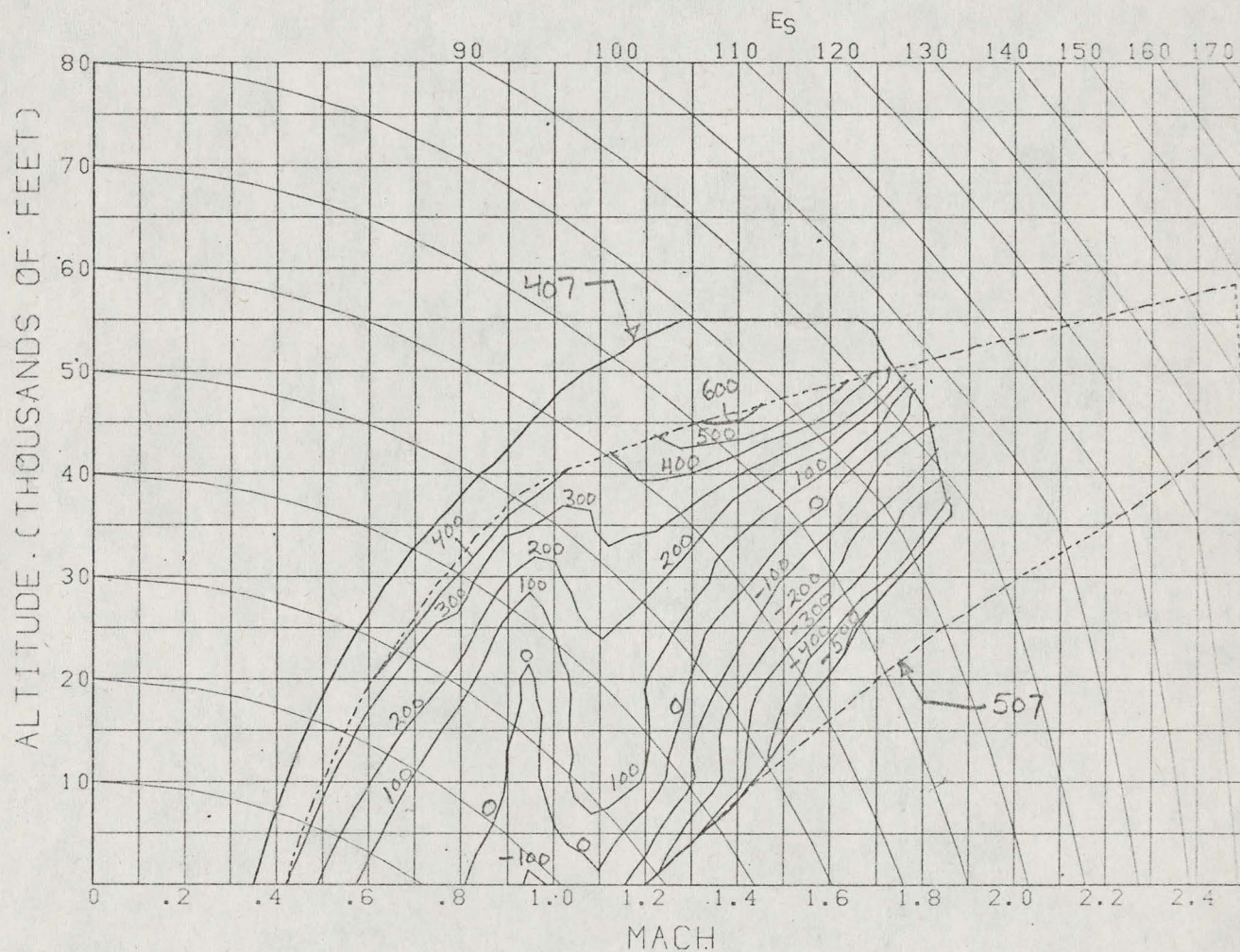
D/C 1 D/C 2

2A9 4A7

60.2% (3852) 68.3% (7607)

17877 36519

5.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

$\Delta PS = 407 - 507$

MAXIMUM POWER

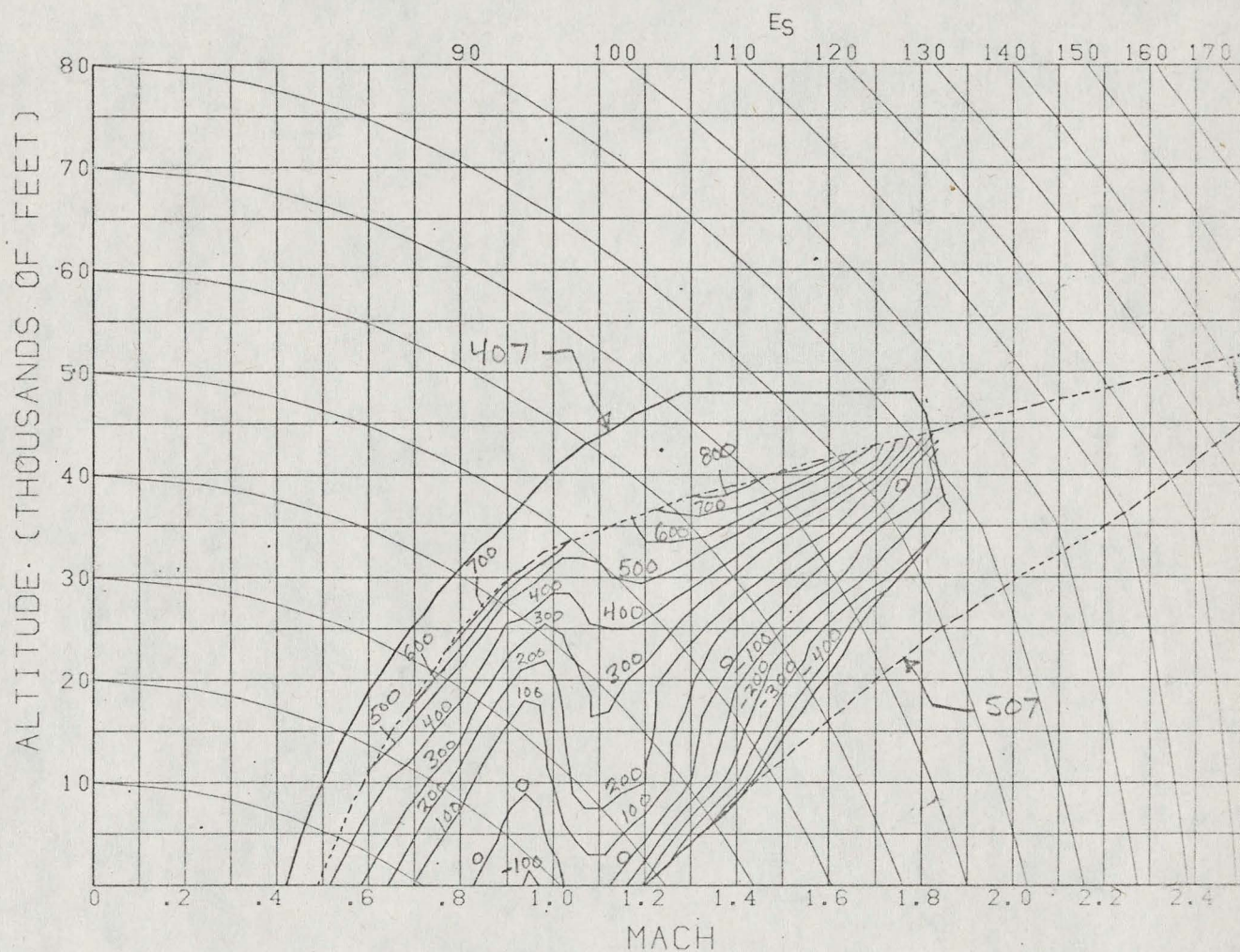
D/C 1 D/C 2

2A9 4A7

7.00 G DIAGRAM

66.2% (3852) 68.3% (7607)

17877 36519



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

2A9
66.2% (4898)

4A7
68.3% (7607)

22085

36519

$\Delta \theta =$

607

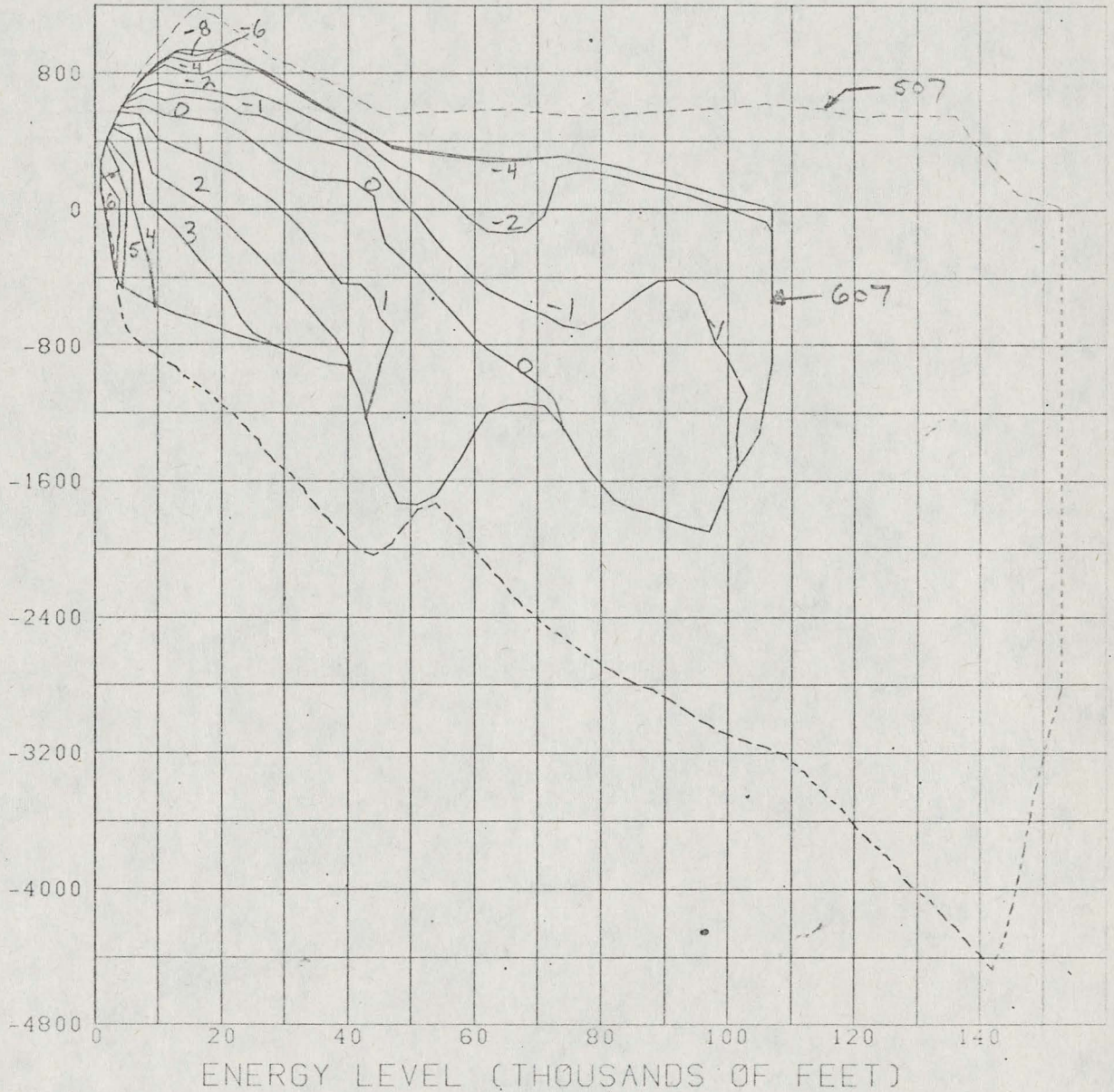
507

MAX MANEUVER DIAGRAM

DC1 - MAX PWR - DC2

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

2A9
66.2% (4898)

4A7
68.3% (7607)

MAR 28 1974

22085

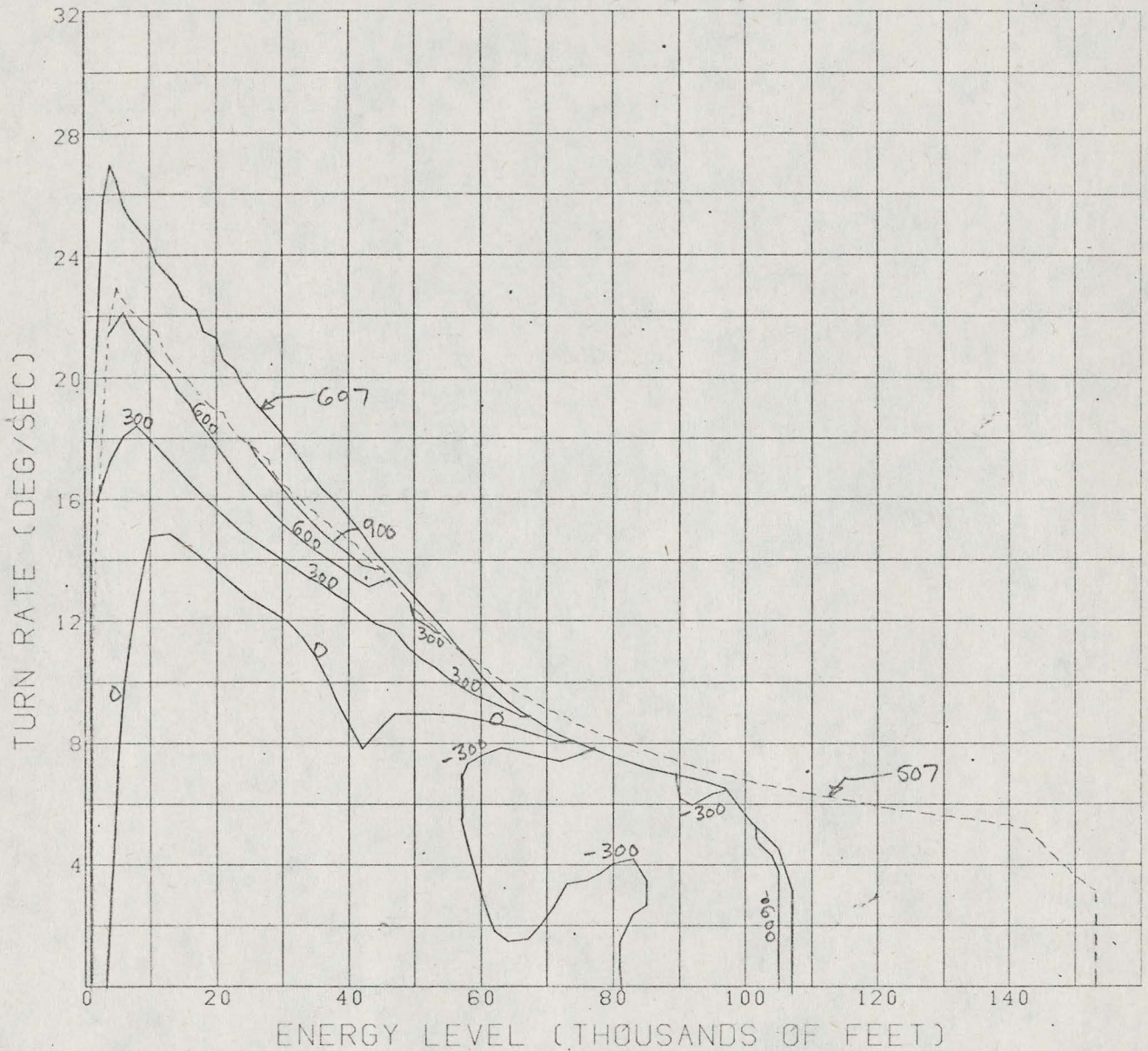
36519

$\Delta P_s = 607 - 507$

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR - DC 2

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

2A9
1.00-7.39

4A7
1.00-7.36

MAR 28 1974

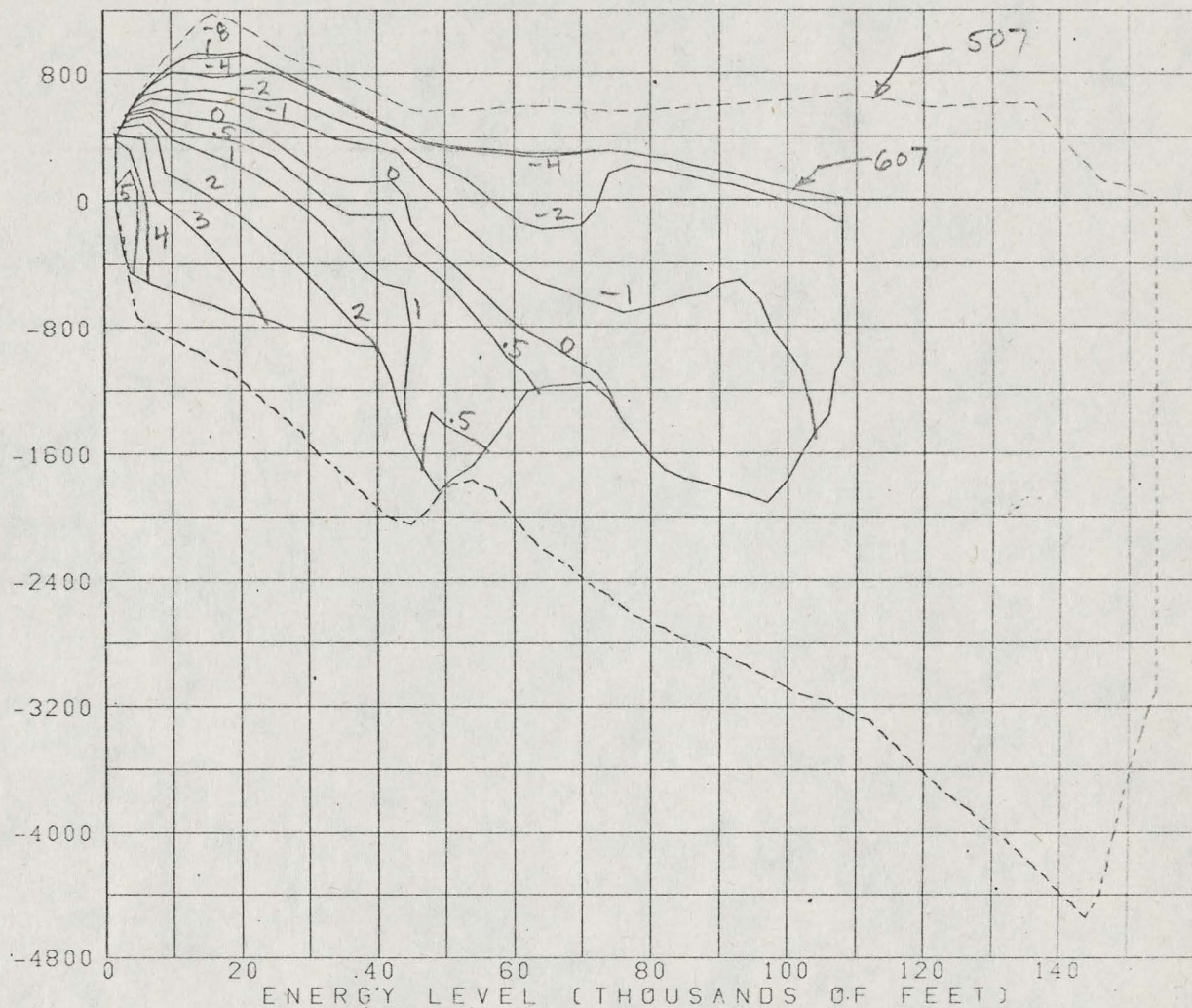
$$\Delta \theta = \frac{607}{507} - \frac{507}{607}$$

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR - DC 2

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



DMGAT	-0 -8 -23 -41 -58 -88 -157									
DMMP	5.5	5.0	3.8	3.3	3.4	2.2	0.8	0.6	-0.1	-0.1
MSTA	611	484	247	154	-163	-348	-320	-189	-214	-200
DMEMP	6.1	5.9	5.2	4.4	3.6	2.6	1.3	0.1	-0.3	-0.5
MESTA	535	714	-393	311	117	180	216	-319	-84	-351

PLOT PREPARED BY TSX, ADTC

Δ Persistence (Deg)

607 - 507

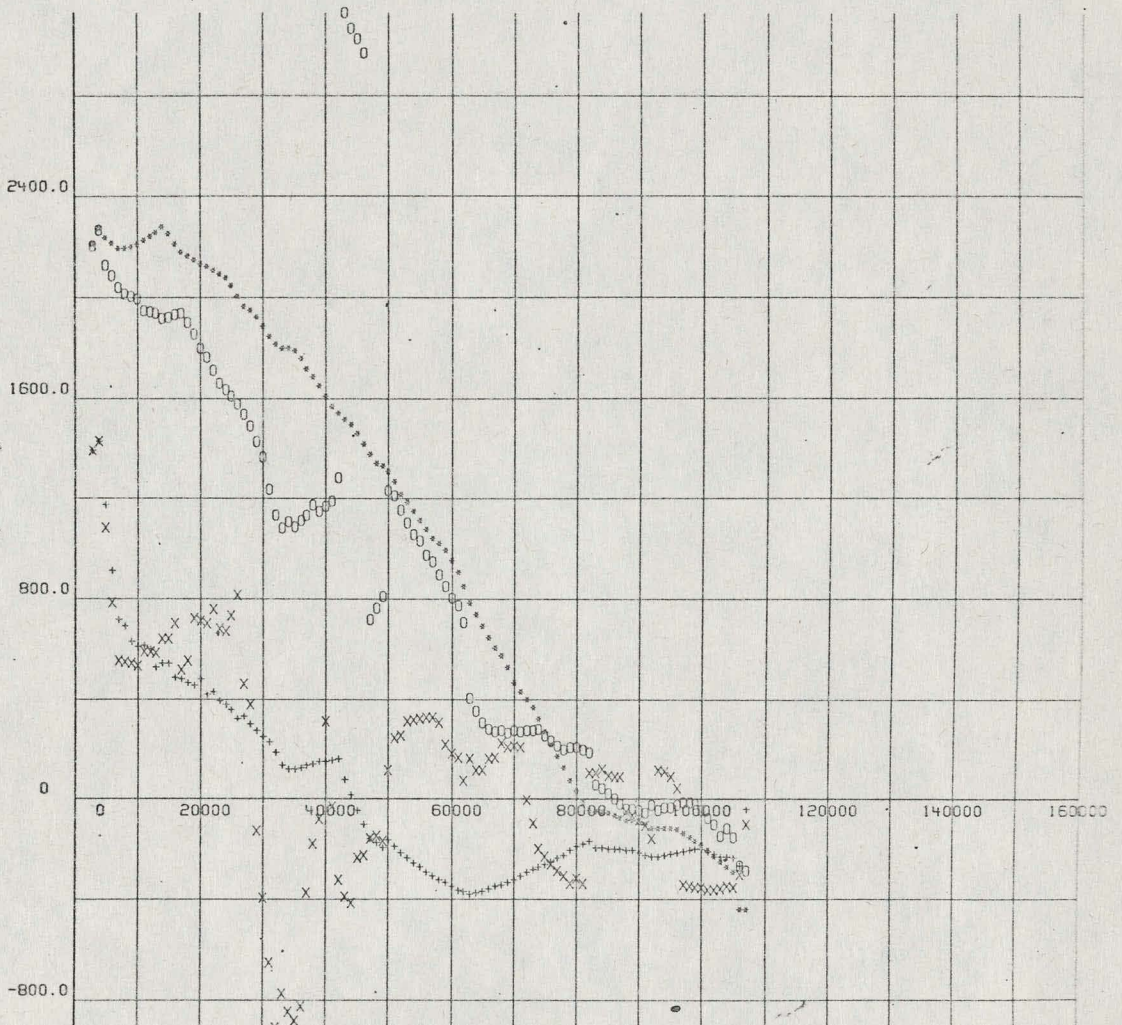
MAR 28 1974

2A9 4A7

1.00 $\rightarrow$ 2.39 1.00 $\rightarrow$ 2.36

M M M M
M M S M
P P T A
0 0 + +
0 0 + +
X X

(DEG)



ENERGY LEVEL (THOUSANDS OF FEET)

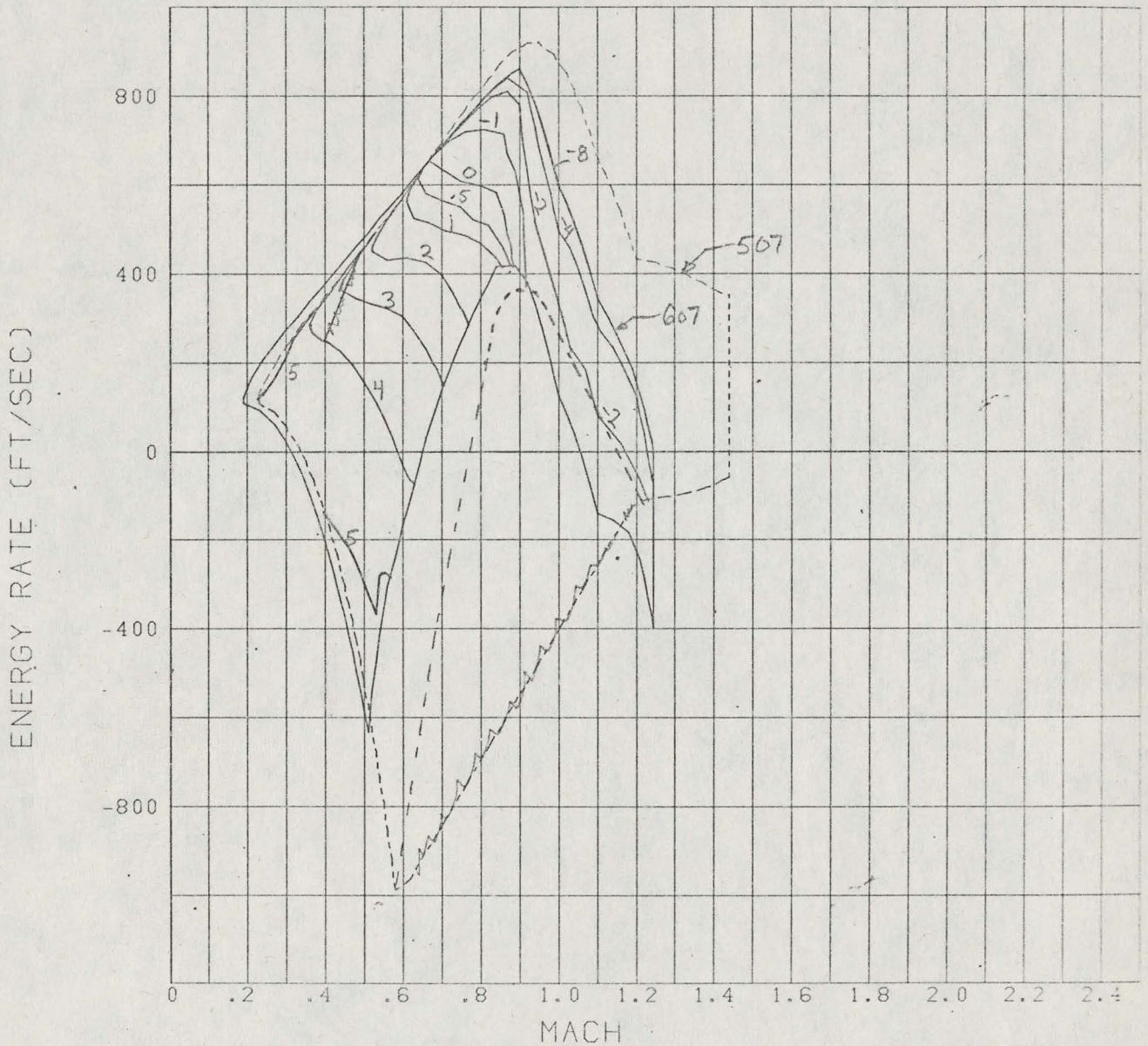
PLOT PREPARED BY TSX, ADIC

2A9 4A7
66.2% (4898) 68.3% (7607)
22085 36519

MAR 27 1974

MANEUVER DIAGRAM
ALTITUDE 10000 FEET

607 - 507
DC 1 - MAX PWR - DC 2



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

2A9
66.2% (4898)

4A7
68.3% (7607)

22085

36519

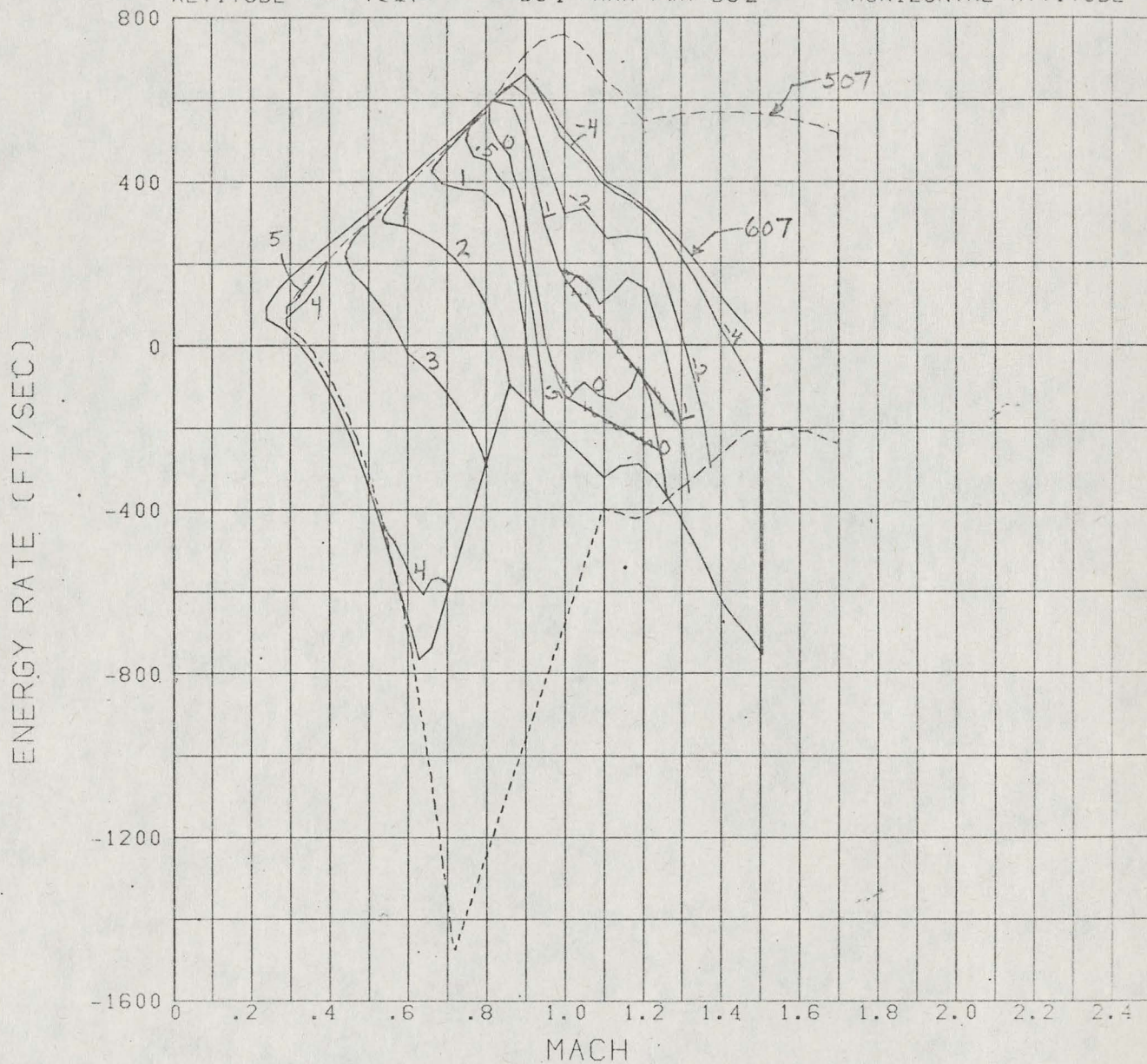
MANEUVER DIAGRAM
ALTITUDE 20000 FEET

$\Delta \theta = 607$

- 507

DC 1 -MAX PWR-DC 2

HORIZONTAL ATTITUDE

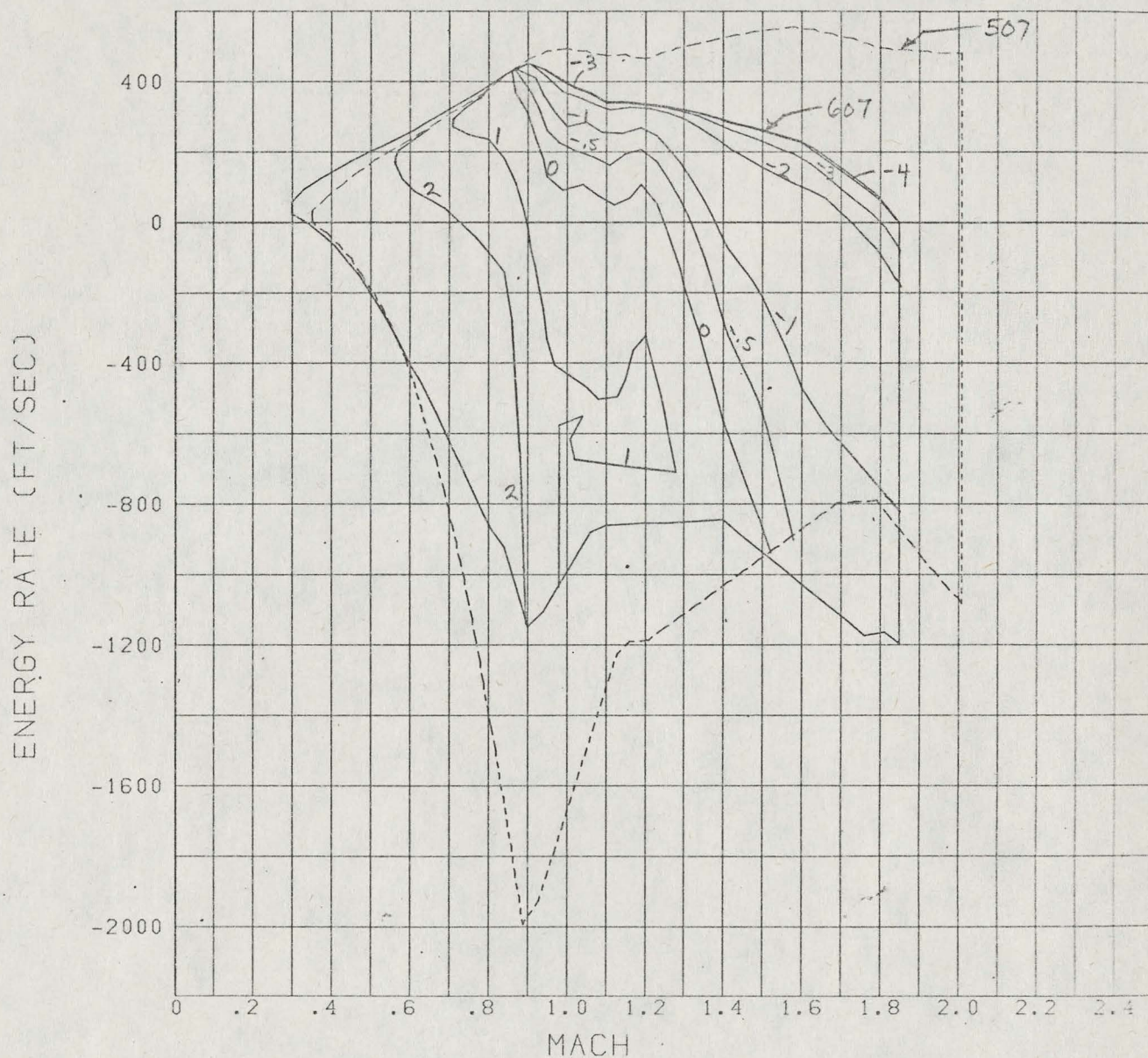


PLOT PREPARED BY TSX, ADTC

MAR 27 1974

2A4 4A7
66.2% (4898) 68.3% (7687)
22085 36519

MANEUVER DIAGRAM $\Delta \theta = 607$ - 507
ALTITUDE 30000 FEET DC 1 - MAX PWR - DC 2 HORIZONTAL ALTITUDE

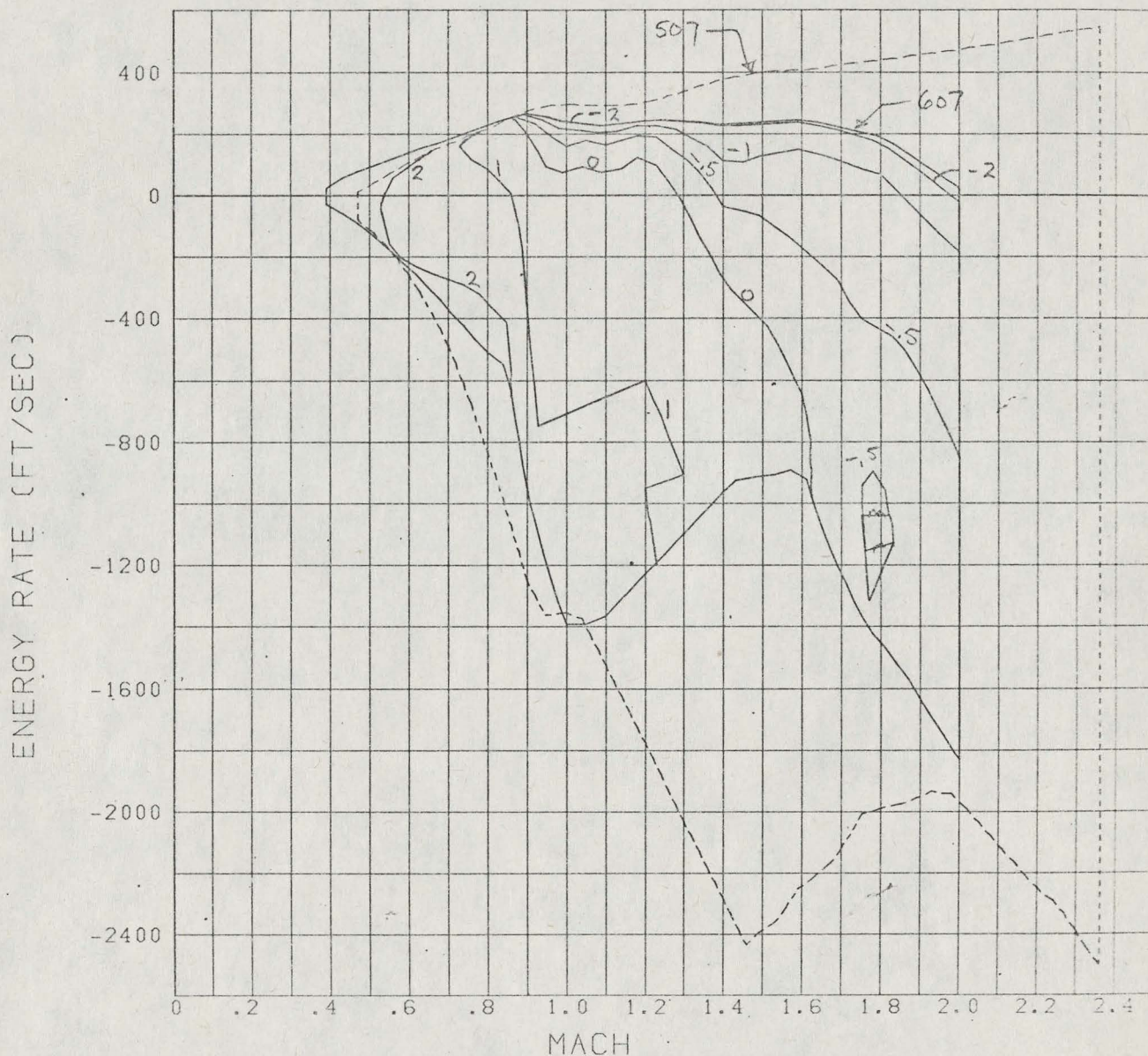


PLOT PREPARED BY TSX, ADTC

MAR 27 1974

2A9 4A7
66.2% (4898) 68.3% (7607)
22085 36519

MANEUVER DIAGRAM $\Delta \theta = 607$ - 507
ALTITUDE 40000 FEET DC1 - MAX PWR - DC2 HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

$\Delta PS = 607 - 507$

MAXIMUM POWER

D/C 1 D/C 2

2A9

4A7

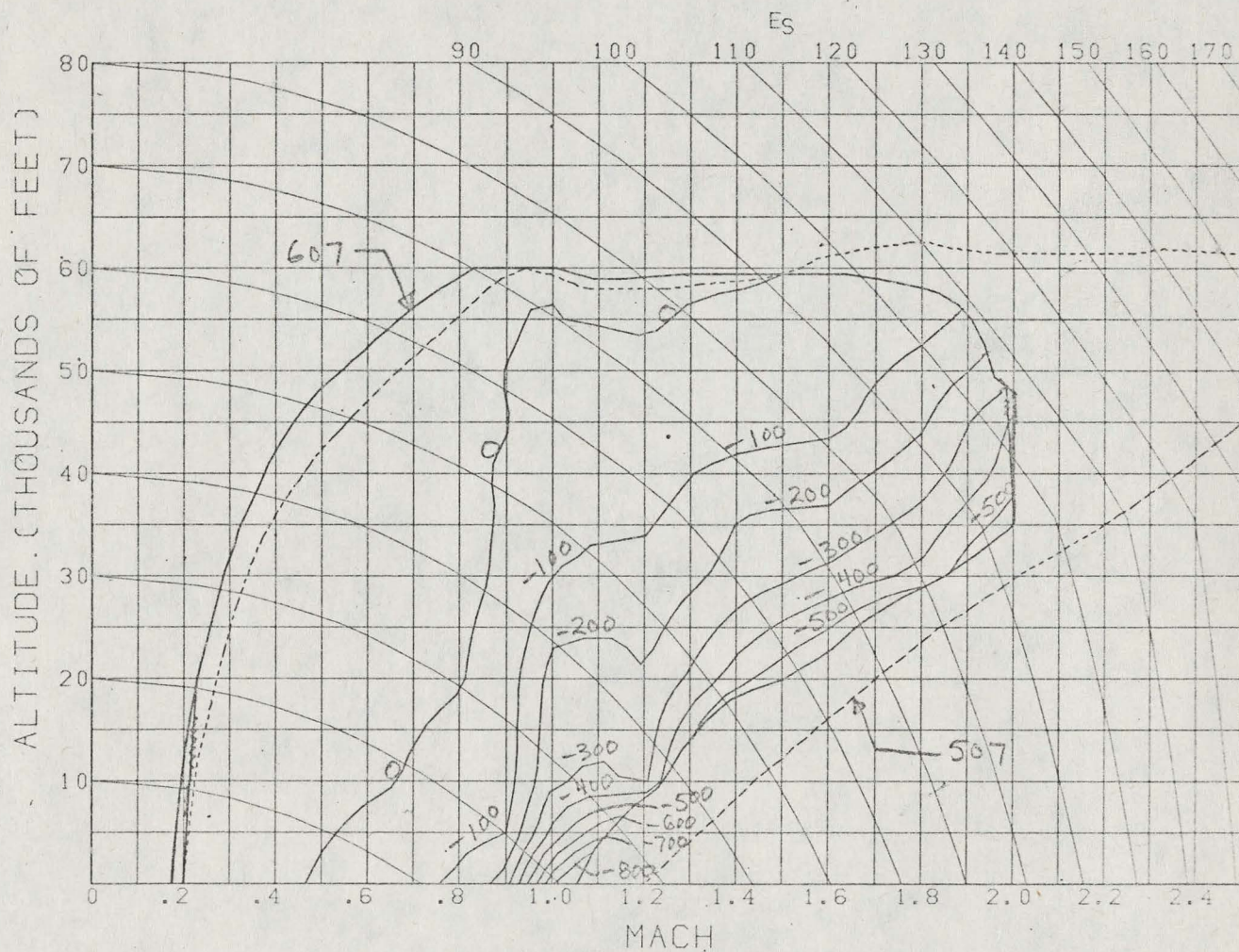
66.2% (4890)

68.3% (7607)

22085

36519

1.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

$\Delta PS = 607 \quad -507$

MAXIMUM POWER

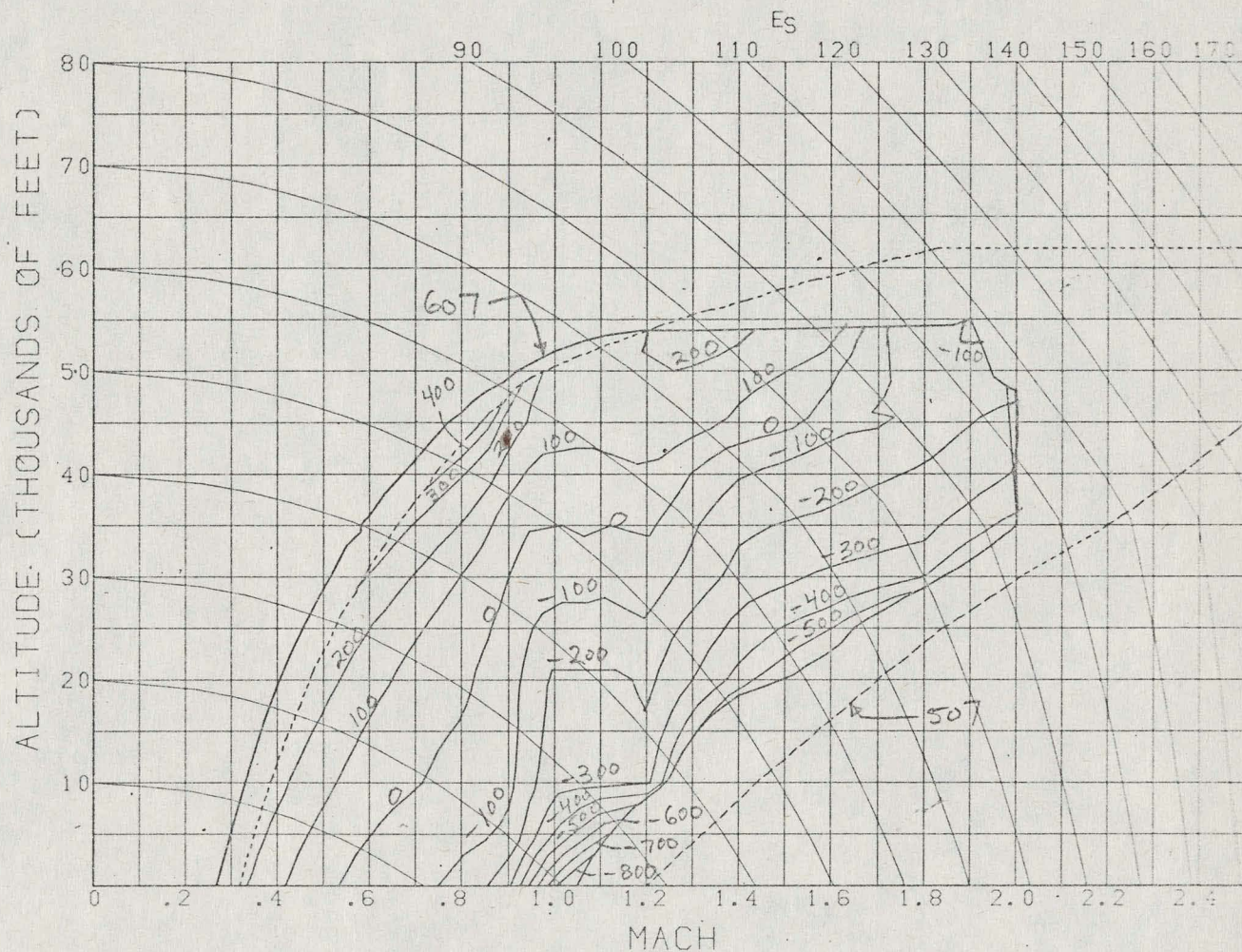
D/C 1 D/C 2

2A9 4A7

66.2% (4895) 68.3% (7607)

22085 36519

3.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

$\Delta PS = 607 - 507$

MAXIMUM POWER

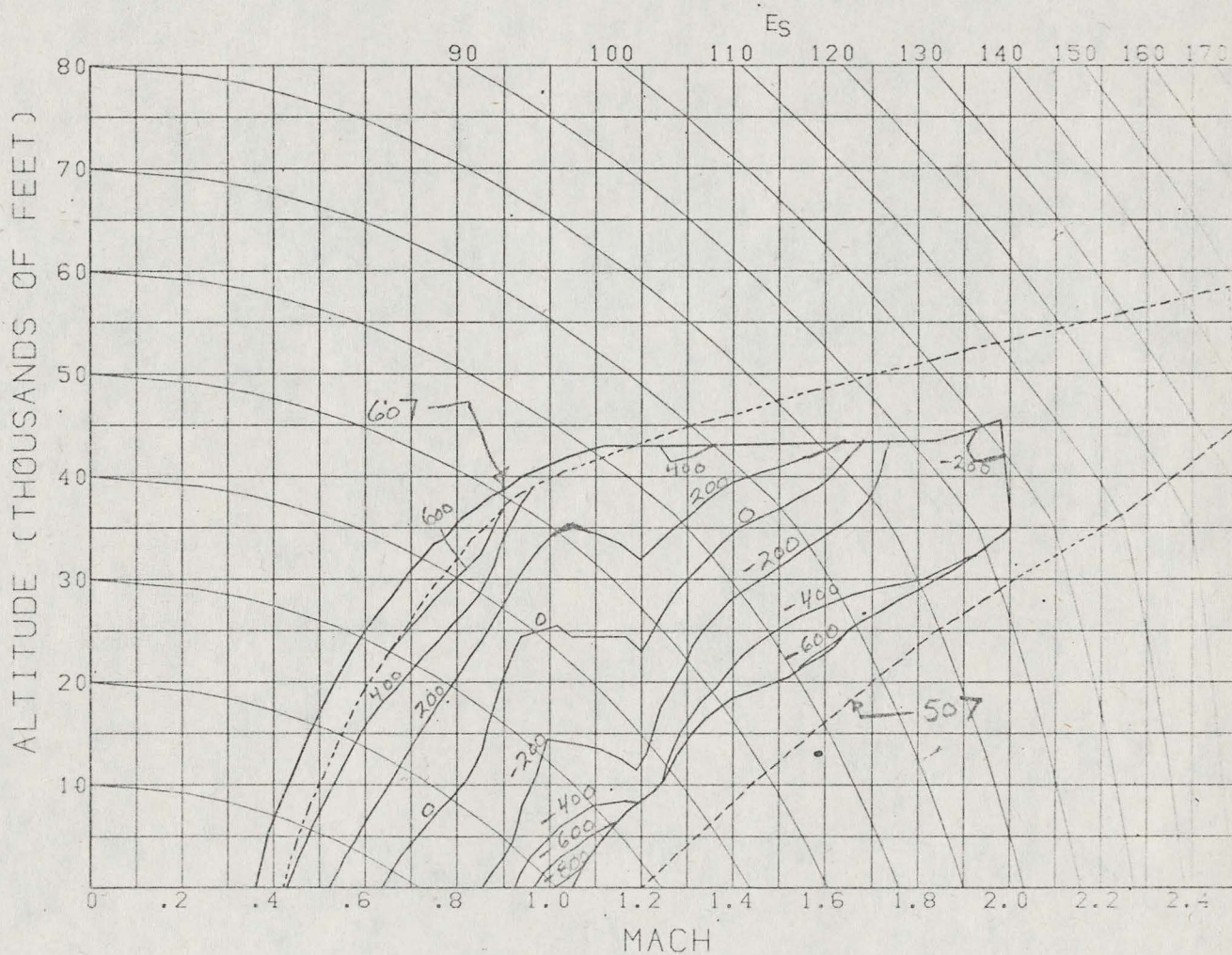
D/C 1 D/C 2

289 447

66.2% (4698) 68.3% (7607)

22085 36519

5.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC.

MAR 27 1974

$\Delta PS = 607 - 507$

MAXIMUM POWER

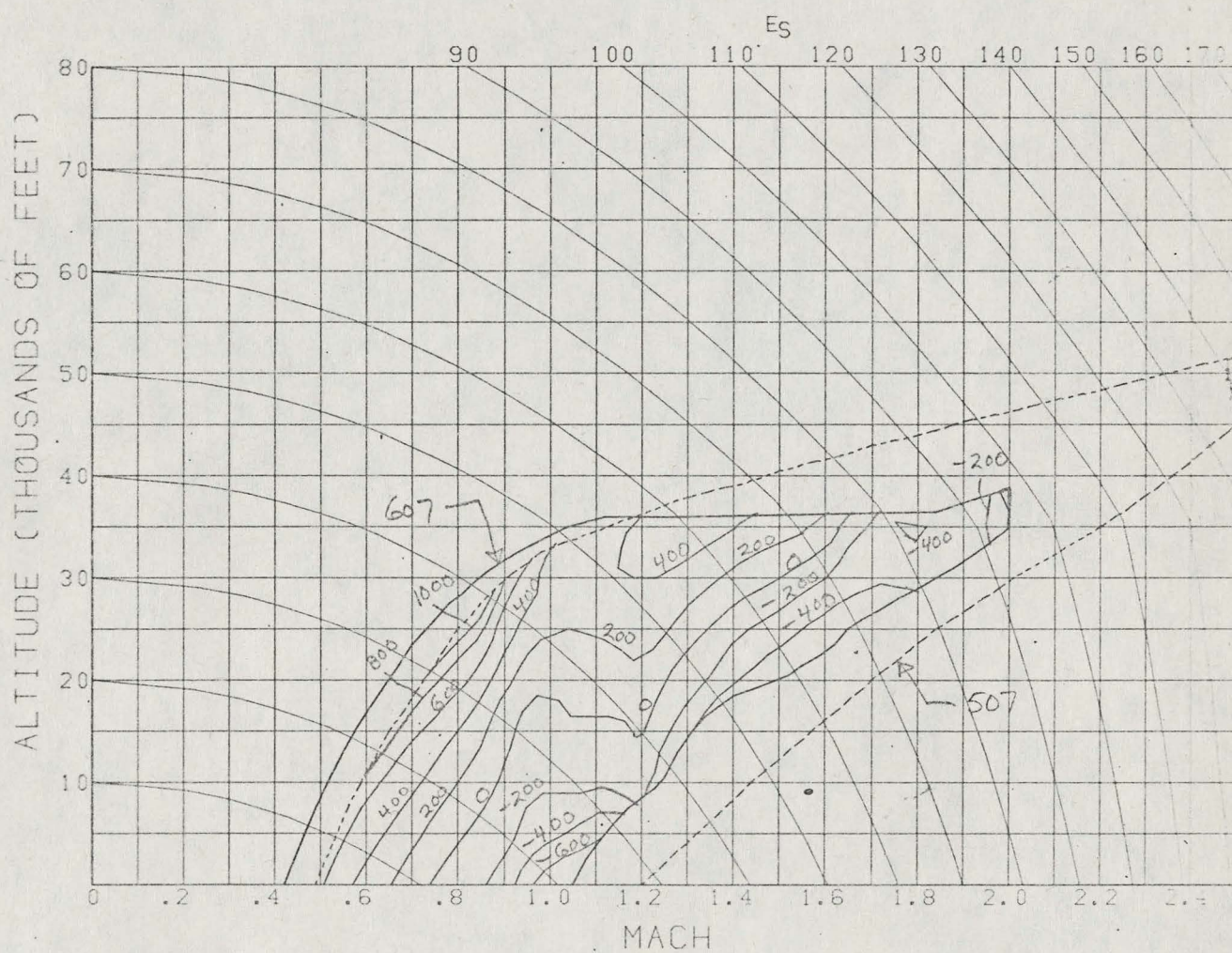
D/C 1 D/C 2

2A9 4A7

66.2% (4898) 68.3% (7607)

22085 36519

7.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

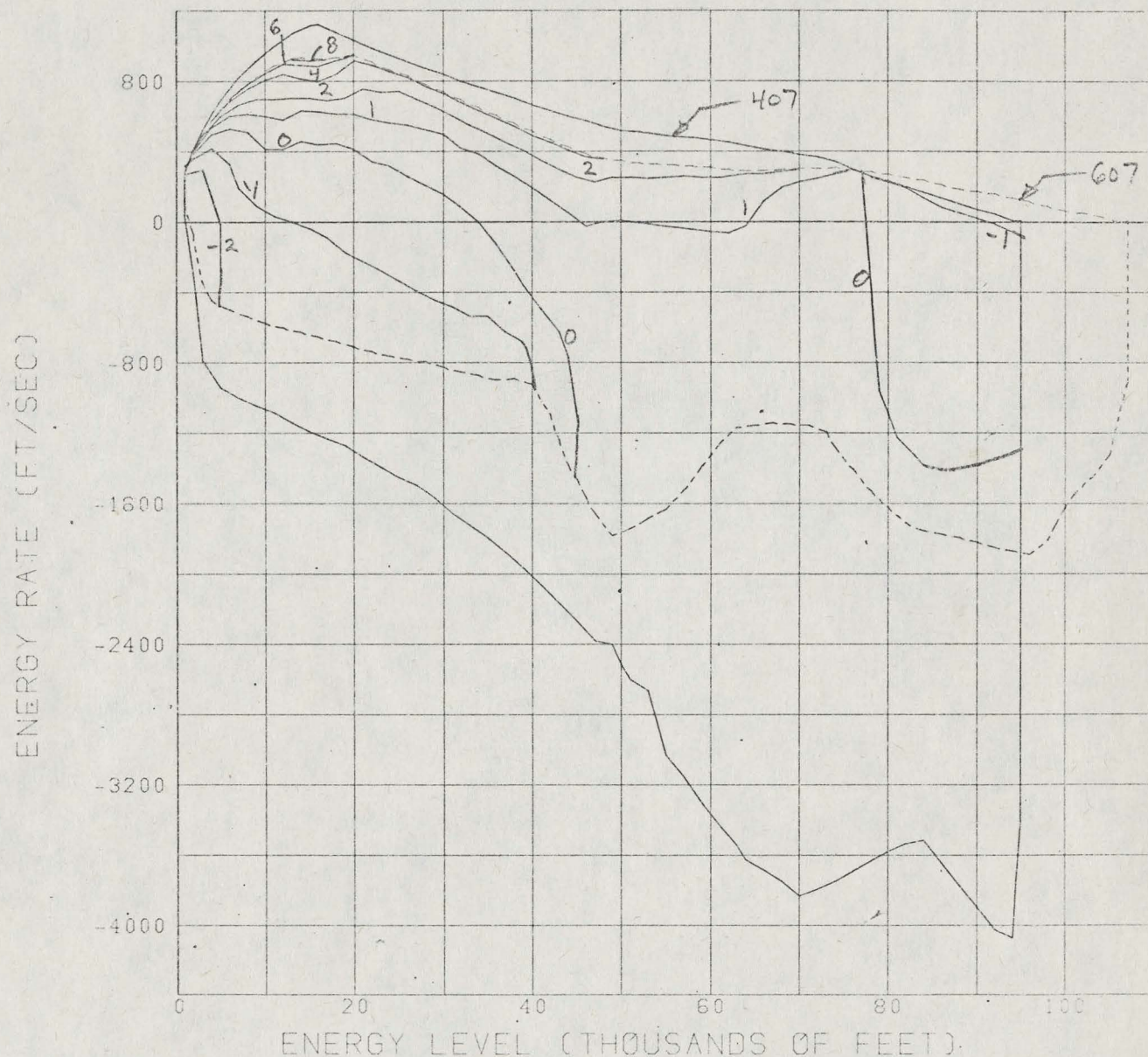
2A9 2A9
60.2% (3852) 66.2% (4898)
17877 22085

$\Delta \theta = 407 - 607$

MAX MANEUVER DIAGRAM

DC1 - MAX PWR - DC1

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

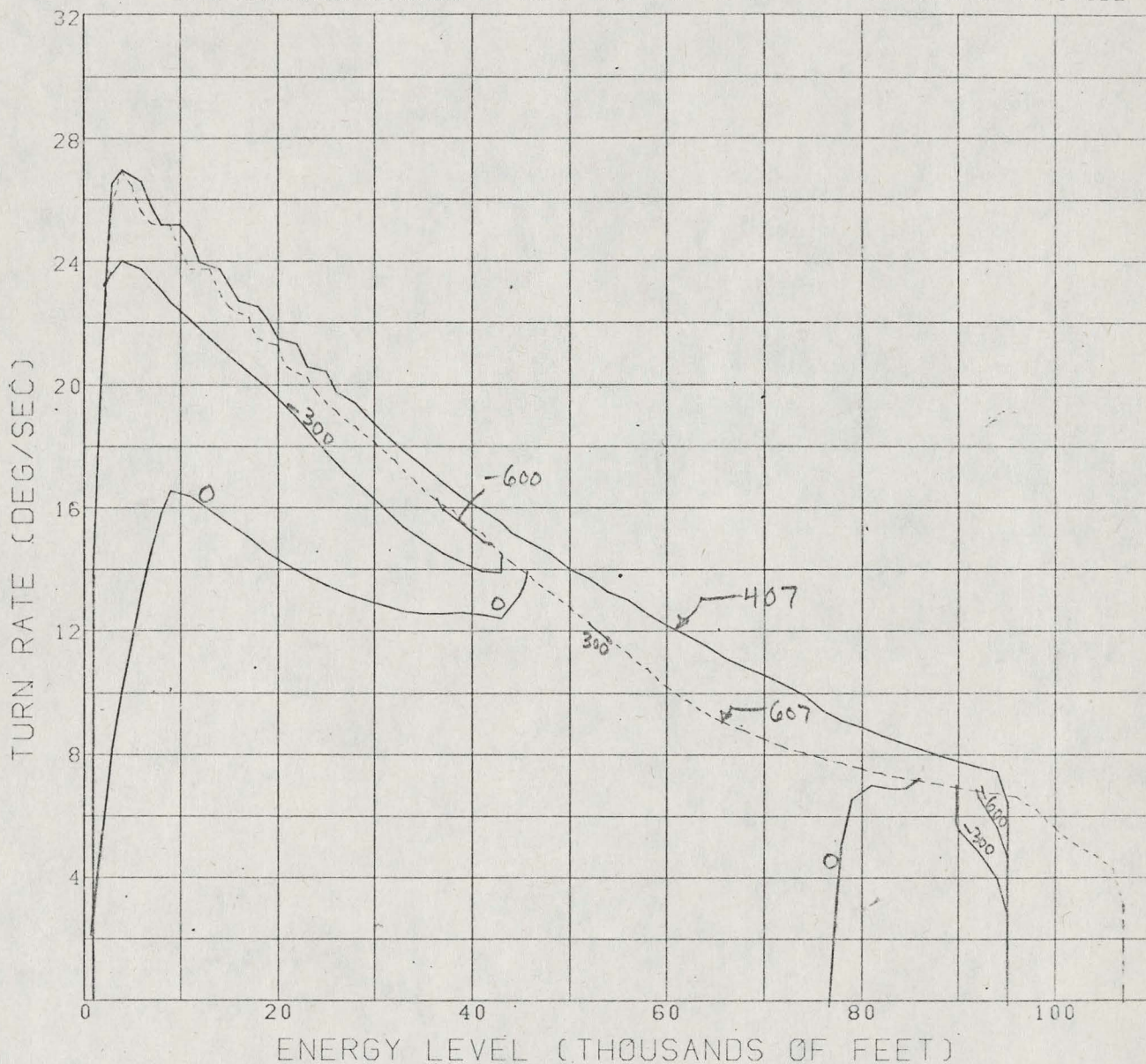
2A9 4A7
 60.2% (3852) 66.2% (4890)
 17877 22085

$\Delta P_0 = 407 - 607$

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR - DC 1

HORIZONTAL ATTITUDE



PLOT PREPARED BY TSX, ADTC

2A9
1.00 → 1.34

2A9
1.00 → 1.39

MAR 28 1974

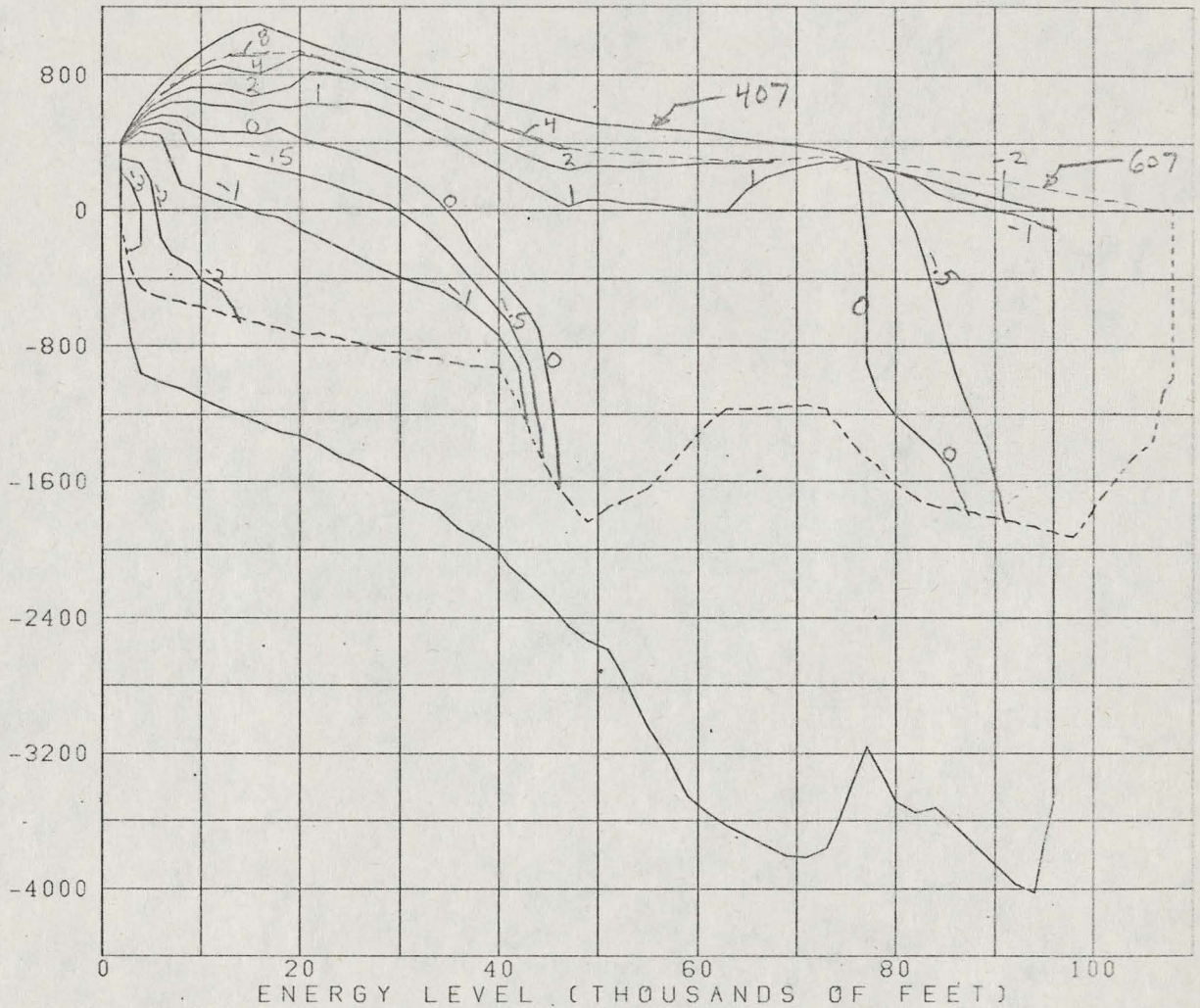
$$\Delta \hat{\theta} = \frac{407}{-607}$$

MAX MANEUVER DIAGRAM

DC 1 - MAX PWR - DC 1

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



DMGAT									
DMMP	-2.2	-1.8	-1.3	-3.5	-0.2	0.4	1.1	0.3	0.3
MSTA	-367	-293	-178	162	269	324	159	-90	-192
DMEMP	-2.7	-2.1	-1.6	-1.0	-0.6	-0.3	1.0	0.8	0.2
MESTA	-758	-1001	-1230	-252	-836	-87	563	45	-154

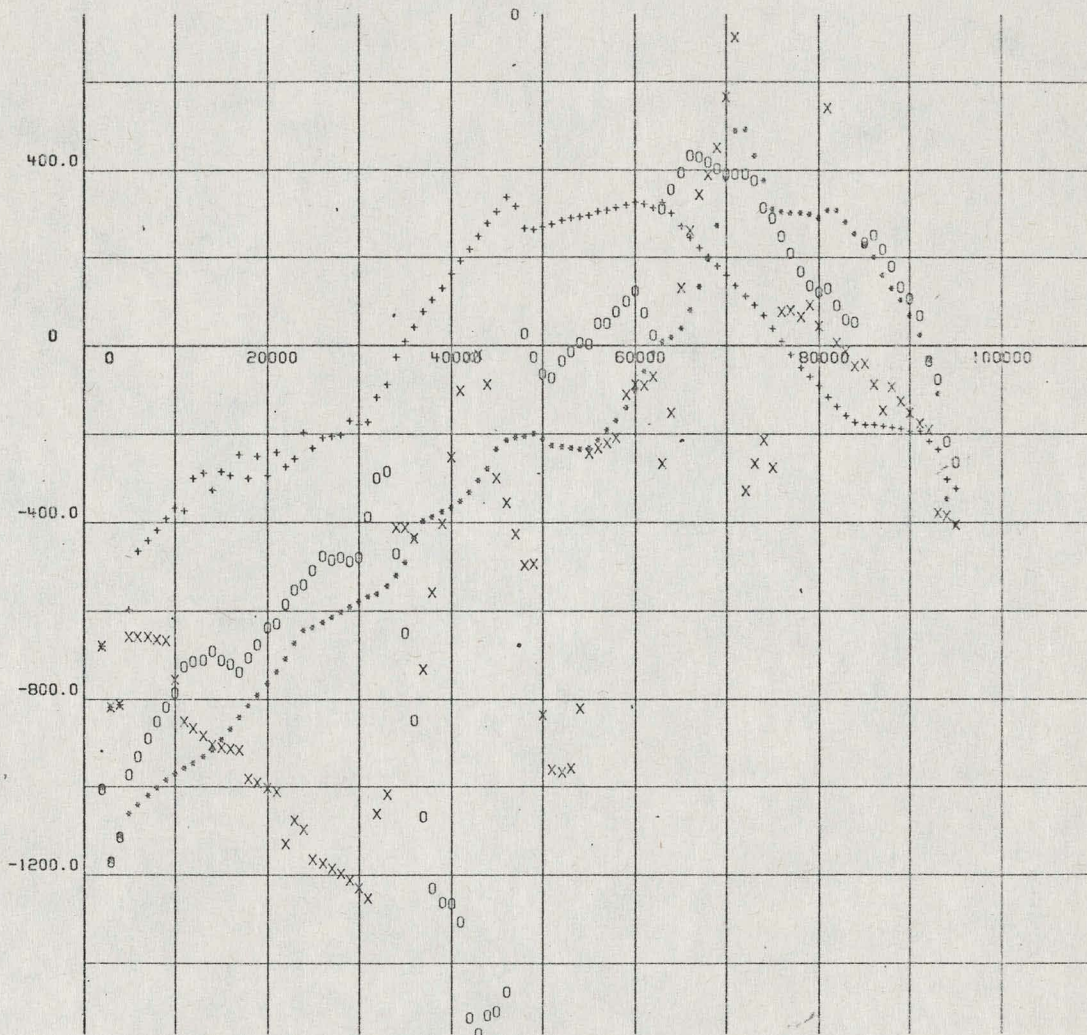
PLOT PREPARED BY TSX, ADTC

Δ Persistence

407. -607 MAR 28 1974
 2AA 2AA
 1.00 → 1.34 1.00 → 1.39

M M M M
 M M M M
 P P P P
 0 0 0 0
 0 0 0 0

(DEG)



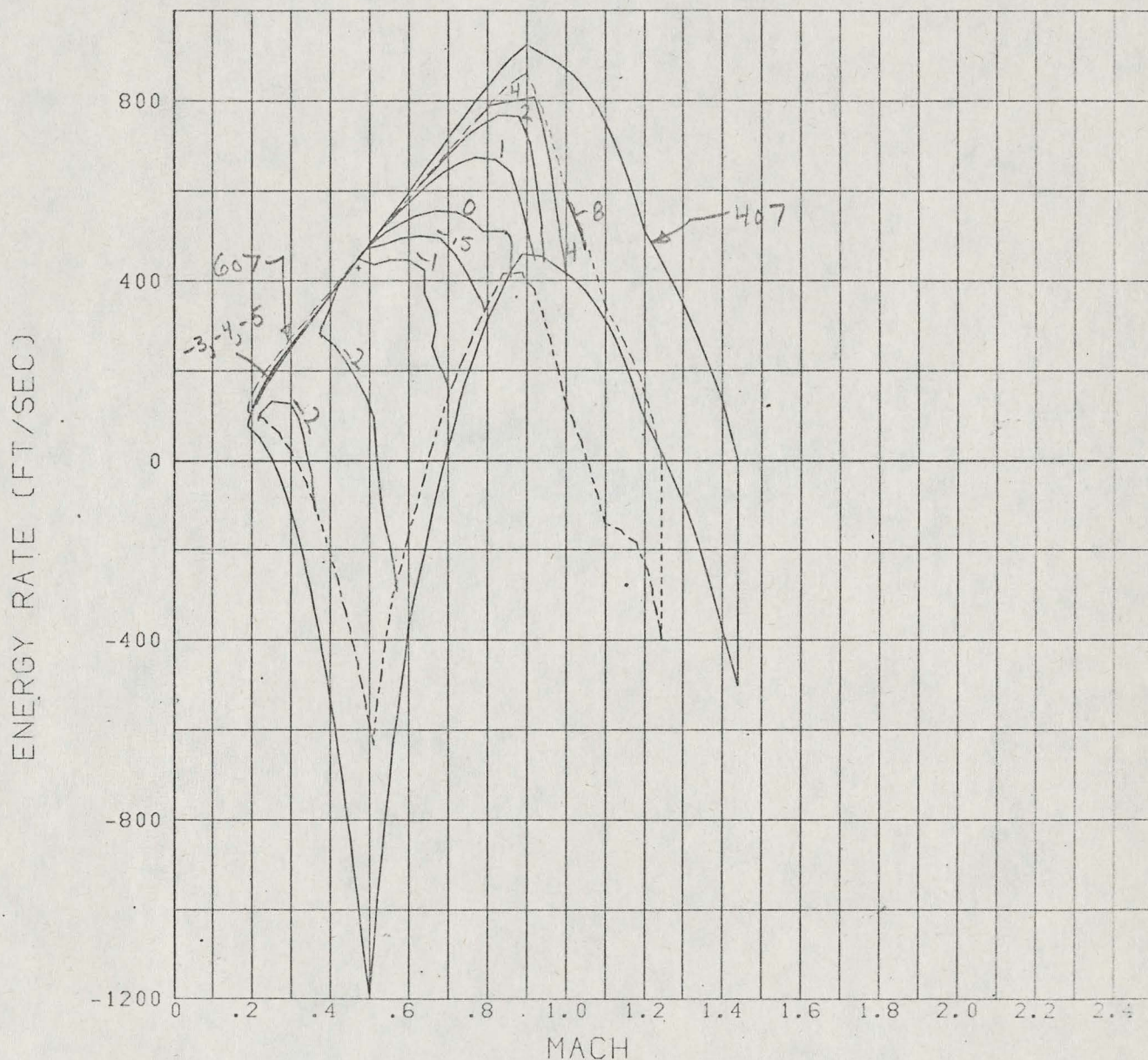
ENERGY LEVEL (THOUSANDS OF FEET)

PLOT PREPARED BY TSX, ADTC

MAR 27 1974

2A9 2A9
60.2% (3852) 66.2% (4696)
17877 22085

MANEUVER DIAGRAM $\Delta \theta = 407$ - 607
ALTITUDE 10000 FEET DC 1 - MAX PWR - DC 1



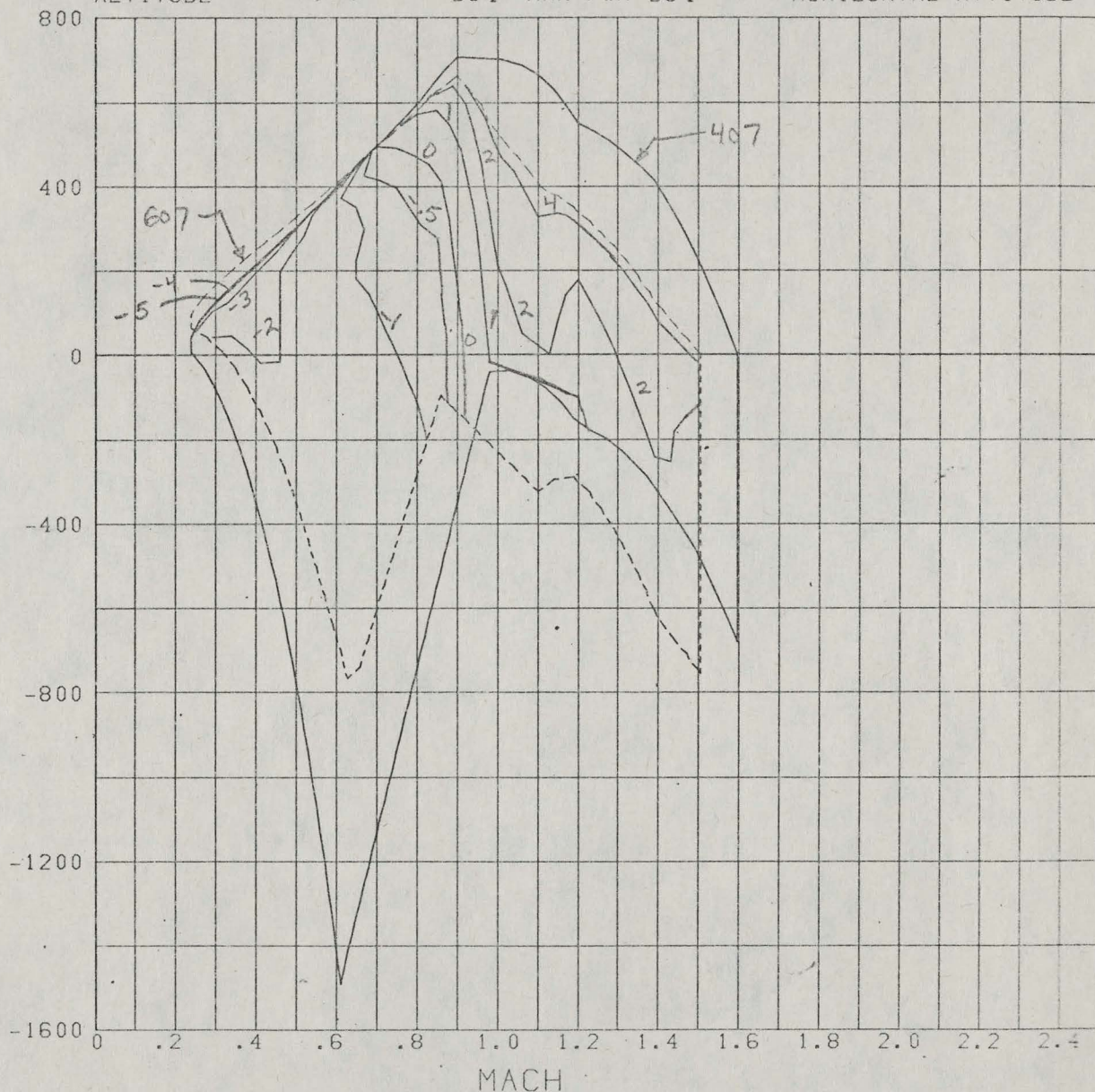
PLOT PREPARED BY TSX, ADTC

MAR 27 1974

2A9 2A9
60.2% (3852) 66.2% (4898)
17877 22085

MANEUVER DIAGRAM $\Delta \theta = 407$ - 607
ALTITUDE 20000 FEET DC 1 - MAX PWR - DC 1 HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

MAR 27 1974

2A9
60.2% (3852)

2A9
66.2% (4898)

17877

22085

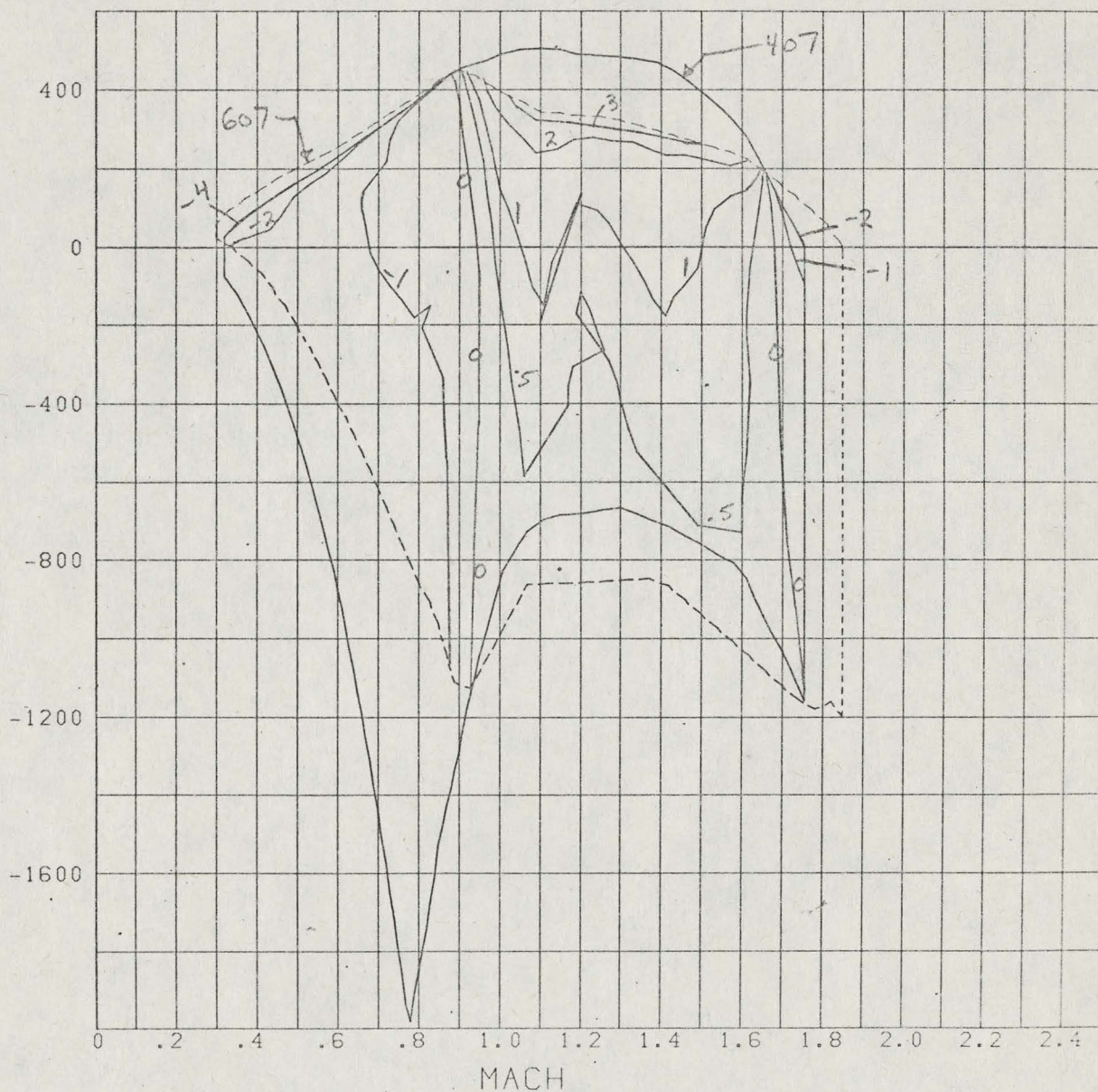
MANEUVER DIAGRAM
ALTITUDE 30000 FEET

$\Delta\theta = 407$ - 607

DC1 - MAX PWR - DC1

HORIZONTAL ATTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

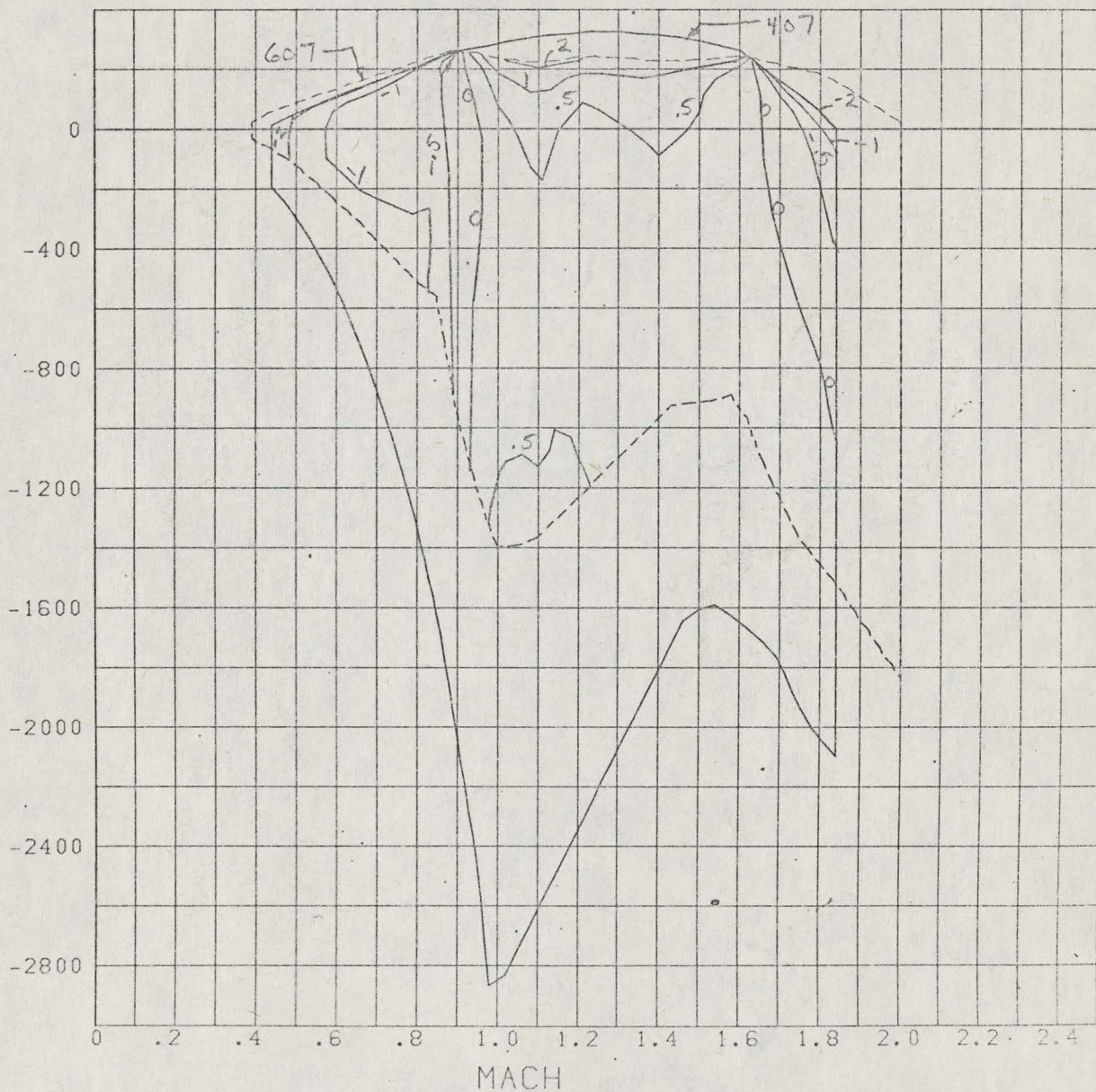
2A9
60.2% (3852)
17077

2A9
66.2% (4898)
22085

MAR 27 1974

MANEUVER DIAGRAM $A\theta = 407$ - 607
ALTITUDE 40000 FEET DC1 -MAX PWR-DC1 HORIZONTAL ALTITUDE

ENERGY RATE (FT/SEC)



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

$\Delta PS = 407 - 607$

MAXIMUM POWER

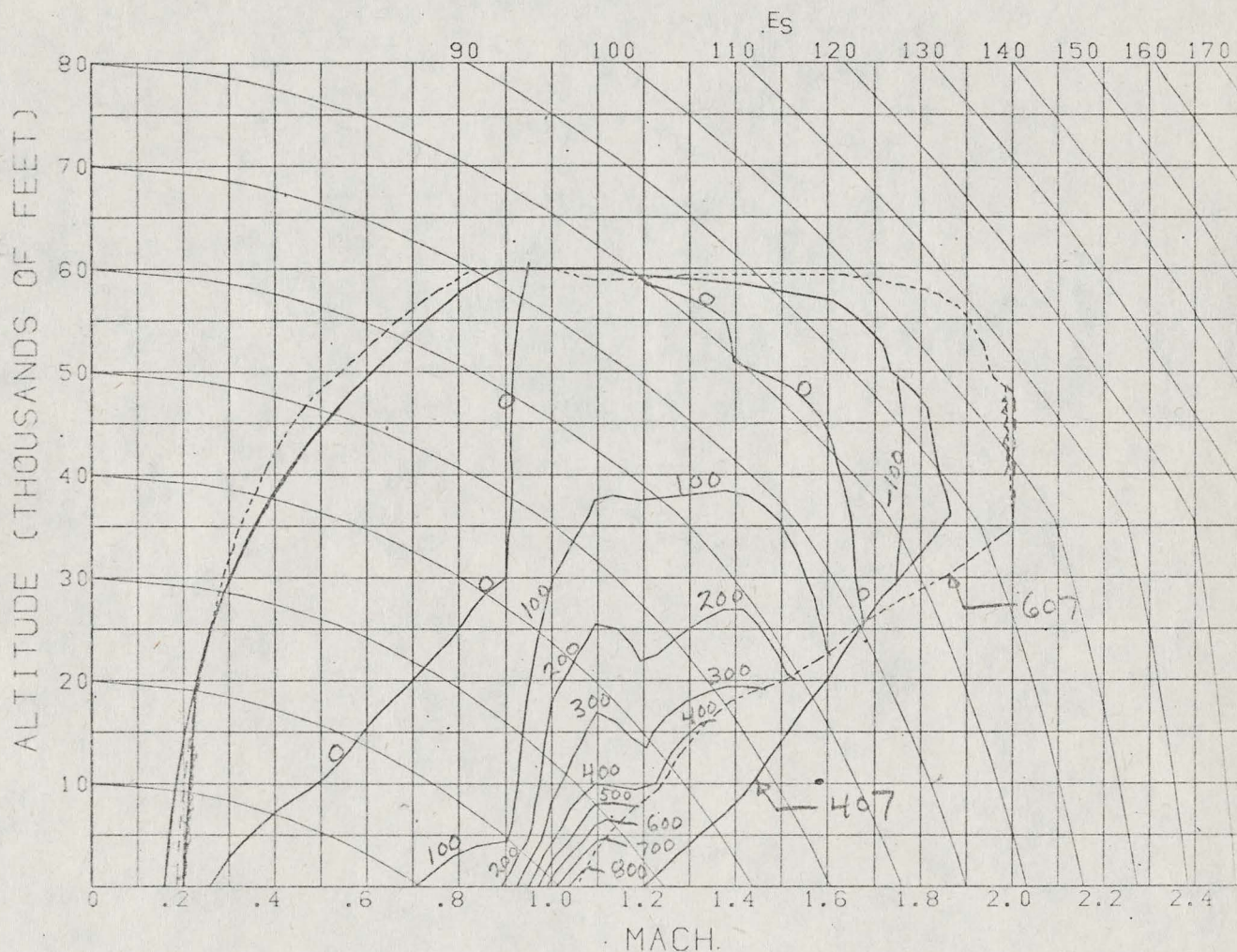
D/C 1 D/C 1

2A9 2A9

60.2% (3852) 66.2% (4698)

17877 22085

1.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

$\Delta PS = 407 \quad -607$

MAXIMUM POWER

D/C 1 D/C 1

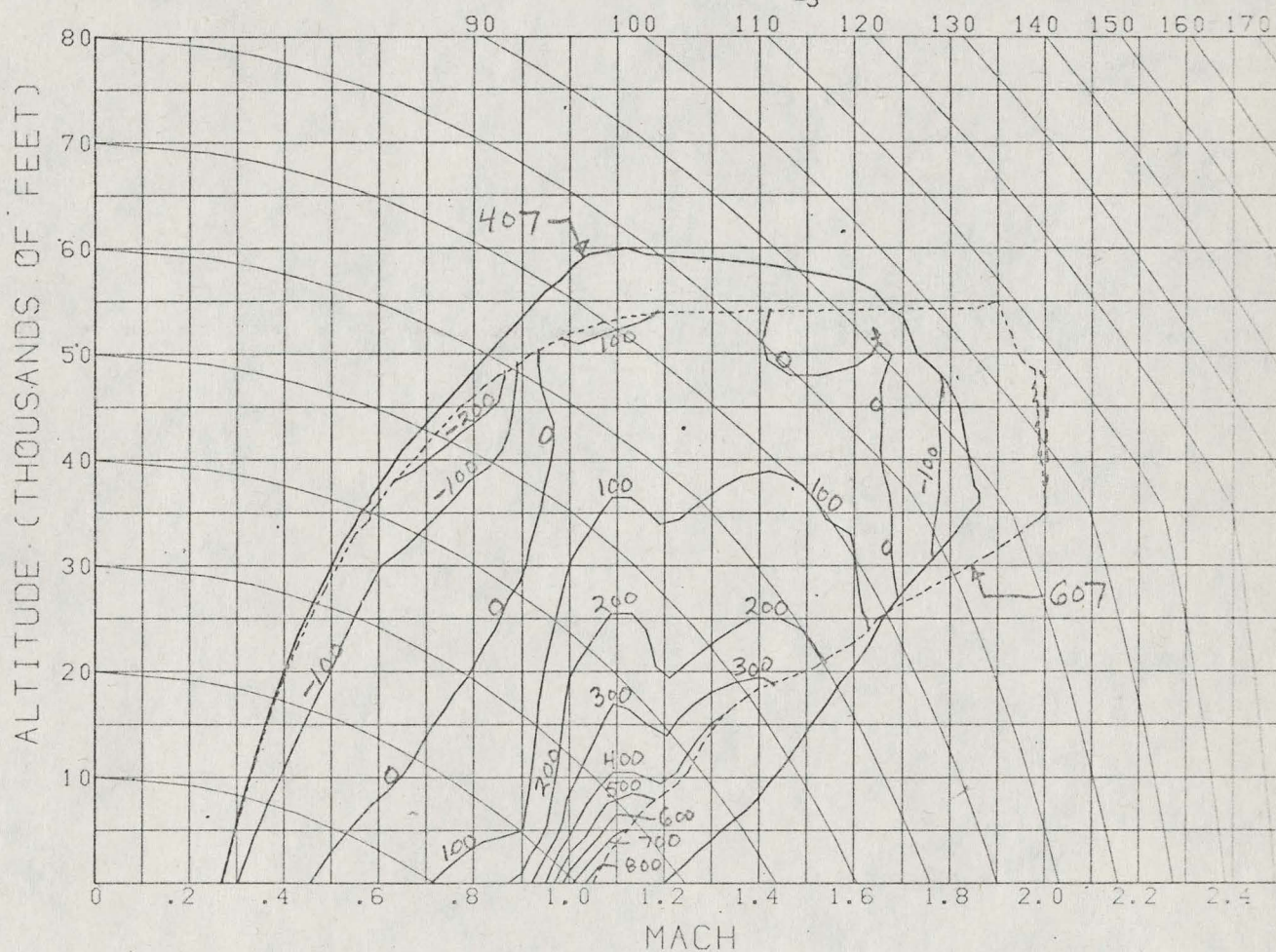
2A9 2A9

3.00 G DIAGRAM

60.2% (3852) 66.2% (4898)

17877 22085

E_s



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

$\Delta PS = 407 - 607$

MAXIMUM POWER

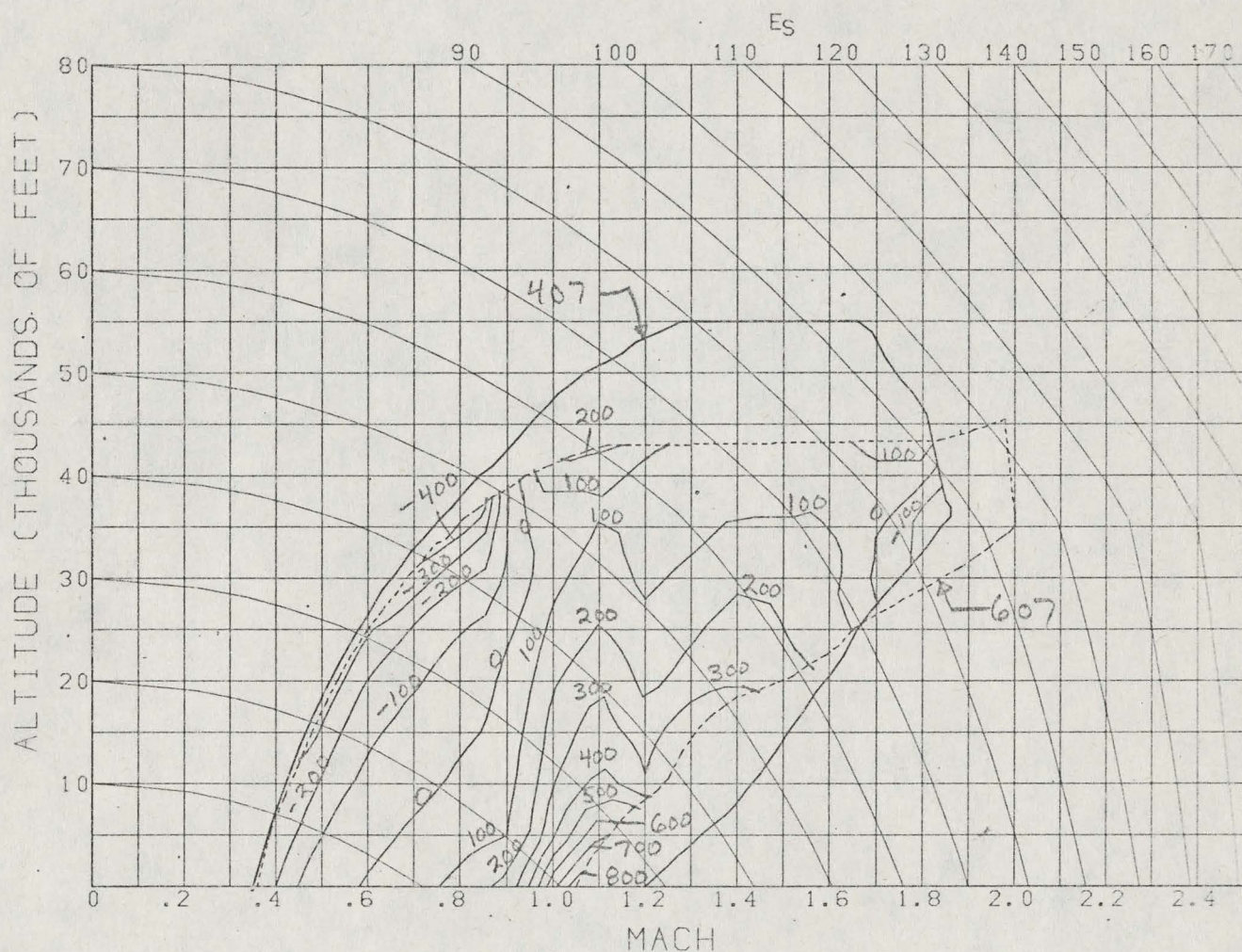
D/C 1 D/C 1

2A9 2A9

60.2% (3852) 66.2% (4898)

17870 22085

5.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC

MAR 28 1974

$\Delta PS = 407 \quad -607$

MAXIMUM POWER

D/C 1 D/C 1

2A9

2A9

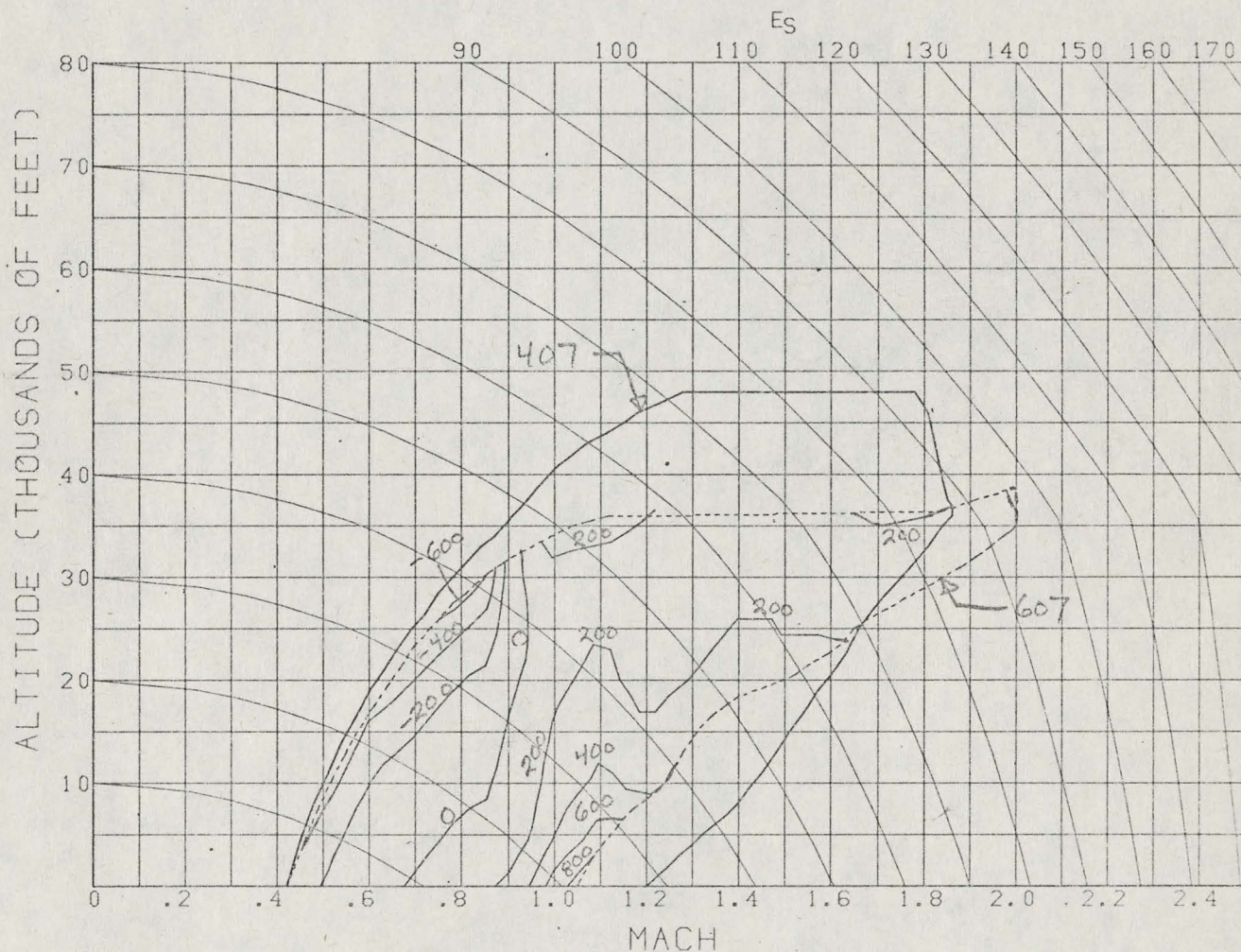
60.2% (3852)

66.2% (4890)

17877

22085

7.00 G DIAGRAM



PLOT PREPARED BY TSX, ADTC