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AD 907824

AFATL-TR-73-5

A TECHNIQUE FOR DETERMINING THE RADIUS OF ACTION FOR A TACTICAL FIGHTER AIRCRAFT

AIRCRAFT COMPATIBILITY AND WEAPON FLIGHT DYNAMICS BRANCH
PRODUCT ASSURANCE DIVISION

TECHNICAL REPORT AFATL-TR-73-5

JANUARY 1973

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AIR FORCE ARMAMENT LABORATORY

AIR FORCE SYSTEMS COMMAND • UNITED STATES AIR FORCE

EGLIN AIR FORCE BASE, FLORIDA

A Technique for Determining the Radius of Action for a Tactical Fighter Aircraft

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FOREWORD

The work described in this report was performed between January 1971 and January 1972 as a part of Project 2567 in support of munition development programs such as the Close Air Support Weapon and the Modular Weapon Series at the Air Force Armament Laboratory, Eglin Air Force Base, Florida.

This technical report has been reviewed and is approved.

RANDALL L. FETTY, Colonel, USAF
Chief, Product Assurance Division

ABSTRACT

A computer program using an iterative technique was developed for determining the radius of action of F-4E and A-7D aircraft with any configuration of external stores. The program uses performance data from the aircraft flight manuals to calculate fuel and distance required to achieve military power climbs and optimum cruise fuel consumption. Required inputs to the program include the initial amount of fuel onboard and aircraft gross weight, the cruise and loiter altitudes, and the outbound and returning drag indicies due to aerodynamic drag of the external stores. Optional inputs that provide increased accuracy include fuel for engine start and taxi, and fuel and distance for takeoff and descent. The program calculates sequential increments of the outbound cruise portion of the mission profile until the fuel reserve desired at the end of mission (return to home base) is obtained; thus the radius of action is determined.

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SECTION I

INTRODUCTION

Carriage of external stores (weapons, fuel tanks, instrumentation packages, and suspension equipment) can result in large degradations to the range and speed performance of tactical fighter aircraft such as the F-4E and A-7D. Some weapon configurations exhibit aerodynamic drag characteristics that are as great as those of the aircraft itself; consequently, the aircraft range performance may be reduced as much as 50 percent. Therefore degradation plays a significant role in overall mission effectiveness, and the store developer must consider aerodynamic drag as an important parameter in the many trade-offs leading to the final design. This report describes a computer program developed for evaluating range performance effectiveness. The program can readily be used on a parametric basis and will provide a quantitative method of assessing the effect of aerodynamic drag on the aircraft combat radius of action.

The validity of the program results depends primarily on the accuracy of the store drag input data. Both the F-4E and A-7D aircraft utilize a drag index system based on the increment of aerodynamic drag due to external stores. Each external store authorized for carriage has a drag index assigned which included interference effects resulting from the additional drag of stores in close proximity to one another. The total drag index of a particular configuration is obtained by summing the individual drag indicies of the external stores as described in the appropriate aircraft flight manuals (e.g., References 1 and 2). Precise drag indicies cannot be determined without extensive wind tunnel tests and/or flight testing; however, good approximations for an untested store can be obtained from wind tunnel data of similar stores. References 3 and 4 describe techniques for the latter procedure, and methods for reducing wind tunnel data to obtain more accurate drag indicies may be found in Reference 5. A typical mission profile is shown in Figure 1. Performance data from the F-4E and A-7D aircraft flight manuals (References 1 and 2) are used to calculate the fuel and distance required for military power climbs and optimum cruise fuel consumption rates. Inputs to the program are the initial fuel weight and aircraft gross weight, the cruise and loiter altitudes, and the outbound and returning drag indicies of the external stores. The amount of fuel required for engine start, taxi, takeoff, and descent, as well as the distance required for takeoff and for descent, are optional inputs that can provide increased accuracy. The program calculates sequential increments of the outbound cruise portion of the mission profile until the fuel reserve desired after returning to base is obtained; thus determining the radius of action. The program can be used for any mission profile provided that the cruise portion is conducted at the optimum condition for the altitude selected and that a military power climb to altitude is assumed.

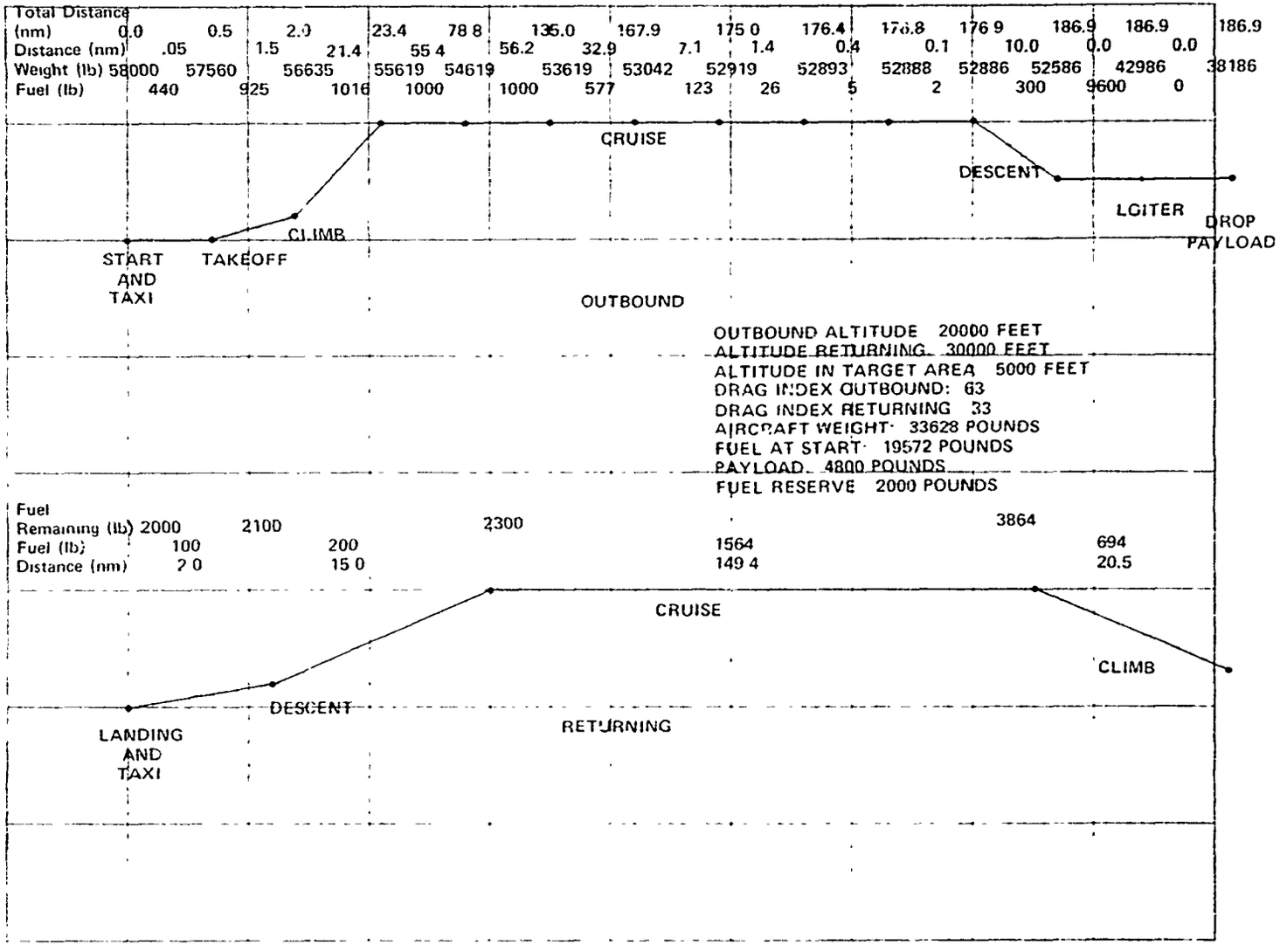

Figure 1. Final Iteration for a Typical High-Low-High Tactical Fighter Mission

SECTION II

DEVELOPMENT OF THE ITERATIVE TECHNIQUE

The fuel and distance required for the climb and cruise portions of the mission are highly dependent upon the outbound and returning altitudes and drag indicies; however, the fuel and distance for engine start, taxi, and takeoff are independent of these parameters. Also, a good approximation for descent from any altitude for any drag index is that the fuel expended and the distance traveled are both zero. Therefore, for parametric studies, engine start, taxi, takeoff, and descent can be considered as constants. Guide lines for obtaining accurate estimates for these portions of the mission are contained in the aircraft flight manuals. The program is designed to accept the following estimates as input data:

a. Fuel and distance traveled away from home base for start and taxi.

b. Fuel and distance traveled away from home base for takeoff.

c. Fuel and distance traveled away from home base for outbound descent.

d. Fuel and distance traveled away from target for descent returning.

e. Fuel and distance traveled away from home base during loiter in target area.

Additional required program inputs are as follows:

a. Aircraft type.

b. Altitude outbound in the target area, and returning.

c. Fuel at engine start.

d. Payload (any weight which might be dropped, ejected, or jettisoned during mission).

e. Basic aircraft weight (gross weight minus fuel and payload).

f. Fuel reserve at end of mission.

g. Payload not dropped, ejected, or jettisoned during mission.

h. Drag index outbound and returning.

The drag indicies outbound and returning from the target area should be determined by the best available means.

For each set of input data, radii of action are determined for loiter fuels of 9600 pounds down to 0 in increments of 1200 pounds. Obviously, the amount of fuel available for loiter can be used to approximate a permissible loiter time.

If the altitude in the target area is greater than zero but less than 5000 feet, the program automatically changes to either zero or 5000 feet based upon the magnitude of the input value. This conversion is necessary because the subroutines are unable to determine accurate values for this range of altitudes.

Further, if the aircraft gross weight at engine start exceeds that allowable for the aircraft, fuel is downloaded automatically in the program to the point where the gross weight is within allowable limits.

The weight and distance traveled away from home base is determined by subtracting all fuel used and adding all distances traveled. Subroutines are then called which provide the fuel and distance required to climb to the outbound altitude; at that time new weight and distance values are determined and retained. If this is followed by a cruise, it will be a 1000-pound-fuel cruise, and the gross weight at the beginning of the cruise will be used. The estimated subsequent fuel requirements determine whether a 1000-pound-fuel cruise is undertaken. Another subroutine provides the fuel consumption rate. After the outbound climb or the 1000-pound-fuel cruise, as the case may be, the outbound descent is made, a 9600-pound-fuel loiter is completed; all, none, or some portion of the payload is dropped; and the return trip home is begun after the distance from home base to the target is noted.

Each of the climb subroutines is called twice to determine the fuel and distance required to proceed from target altitude to the return altitude. The amount required to climb from sea level to the target altitude is subtracted from the amount required to climb from sea level to the return altitude.

After the return climb is completed, the cruise subroutine is called to determine a fuel consumption rate for the beginning of the return cruise. With the fuel data for the return descent and for landing and taxi, the desired gross weight at the end of the return cruise and the fuel consumption rate at this point are known. The same distance data, the return climb distance, and the distance from home base to the target, are used to calculate the return cruise distance. The fuel consumption rates are averaged, and the fuel required for the return cruise is computed.

The trial mission is completed and the extra fuel determined. If the extra fuel is less than minus one pound, the mission can not be completed for the specified loiter fuel, and another simulated mission is attempted with 1200 pounds less fuel for loiter. If the extra fuel amounts to one pound or more, either one-half, one-third, or 1000 pounds of it are used for a cruise or an additional outbound cruise to the target area. The appropriate quantity to be used is determined by the relation of the outbound and returning drag indices combined with the amount of extra fuel. The iteration is repeated using either the weight and distance after the outbound climb or the weight and distance after the last outbound cruise, if one has occurred, until the mission is completed with the desired quantity of extra fuel (zero or minus one pound). Thus, the radius of action has been determined.

Subsequent radii are determined for loiter fuels incremented by minus 1200 pounds until the fuel for loiter has been reduced to zero pounds. Instead of simulating the new mission from the very beginning, the new iteration is begun after the outbound climb or the last 1000-pound-fuel cruise, if one has occurred.

Appendixes I, II, and III contain the radius-of-action program listing, input list, and limitations, respectively.

SECTION III

DEVELOPMENT OF THE SUBROUTINES

This section discusses the development of the subroutines for calculating the fuel and distance required to climb and the fuel consumption rate, given the aircraft type, altitude, gross weight, and drag index.

The F-4E and A-7D aircraft climb and cruise parameters are displayed in figures contained in the aircraft flight manuals (References 1 and 2). These figures define the fuel consumption rate for optimum cruise, fuel required to climb, and distance required to climb. These figures are set up in a parametric format and are a function of aircraft gross weight, altitude, drag index, and a parametric variable (designated as T in this report). Each figure is divided into two charts with the first chart being a family of curves that are a function of gross weight and altitude which define the dependent variable T. The second chart has a family of curves with independent variables of T and aircraft drag index and with a dependent variable of either fuel for climb, distance for climb, or fuel consumption rate for optimum cruise depending upon which figure is being used. Although no equations define the families of curves, a method was developed to define the families for computer applications. The first chart contains discrete curves which are a function of gross weight, for altitudes of 0, 5000, 1000, . . ., and 40,000 feet. Similarly, the second chart contains discrete curves for drag indicies of zero to the maximum in specified increments that are a function of T. The problem then was to find equations of lines for any condition other than those discretely defined. The method used was a Newtonian interpretation technique (Reference 6) that defines an nth order polynomial for n discrete points. The development of the Newtonian equation by this method forces the polynominal to satisfy the n discrete points by definition. The equation then can be used to calculate a value between any of the discrete points.

It was hypothesized that if a family of straight parametric lines was only defined at discrete values, the slope and intercept of any line lying between two defined lines could be determined by interpolation of the defined values. Although the family of curves did not consist of straight lines, the values were approximated by decomposing the curves into a number of straight lines. In the first chart, the curves that are a function of gross weight and altitude are drawn as straight lines between certain gross weights. Similarly in the second chart, the curves that are a function of T and drag index are drawn as straight lines between certain values of T. Now using the Newtonian method, two equations are defined to give the slope and intercept for any altitude line in the first chart. Similarly, two equations are defined that provide the slope and intercept for any drag index line in the second chart. Thus, when the altitude is defined, a linear equation which has gross weight as the independent variable and T as the dependent variable, is constructed with a calculated slope and intercept. When a drag index is defined, another linear equation, which has T as the independent variable and either fuel for climb, distance for climb, or fuel for cruise as the dependent variable, is constructed with a calculated slope and intercept.

Three computer subroutines were constructed to incorporate the method just described. One subroutine will construct the equations for determining the fuel for climb, a second subroutine will give the equation for distance to climb, and a third subroutine is concerned with the fuel consumption rate for optimum cruise.

Appendixes IV and V contain the main programs and two additional subroutines for utilizing the three radius-of-action subroutines to obtain tabular data for the following independent variables:

a. F-4E (see Appendix VI)

(1) Altitude (5000 to 40000 feet in increments of 2500 feet).

(2) Weight (30000 to 58000 pounds in increments of 1000 pounds).

(3) Drag index (0 to 140 in increments of 10).

b. A-7D

(1) Altitude (5000 to 40000 feet in increments of 2500 feet).

(2) Weight (20000 to 42000 pounds in increments of 1000 pounds).

(3) Drag index (0 to 300 in increments of 20).

SECTION IV

APPLICATION OF THE TECHNIQUE

As an example, assume that the radius of action for an F-4E aircraft is to be determined for a high-low-high mission at altitudes of 20000 feet outbound, 5000 feet in the target area (loiter), and 30,000 feet returning. Further, assume some realistic values for the mission segments (Figure 1) as follows:

	Fuel, lb	Distance, N. M.
Start and Taxi	440	0.5
Takeoff	925	1.5
Descent going to target	300	10.0
Descent returning from target	200	15.0
Landing and taxi	100	2.0
Loiter	N/A	0.0

Also, assume that the payload is six 800-pound weapons; all of which are to be dropped from the triple ejector rack on the inboard armament stations. A typical fuel reserve at the end of a mission is 2000 pounds.

The aircraft incremental drag as a result of weapon carriage (weapon drag index) is largely dependent upon weapon shape and diameter and can conceivably vary from a total weapon drag index of 30 to 60. Figure 2 shows the radius of action as a function of loiter fuel for two weapon drag indicies and three fuel loadings. Note that when fuel was carried on the centerline and outboard stations with the large payload, 1198 pounds had to be downloaded so as not to exceed the maximum gross weight of 58000 pounds. This makes the increase in the radius of action based on outboard and centerline fuel somewhat less than if the payload was less.

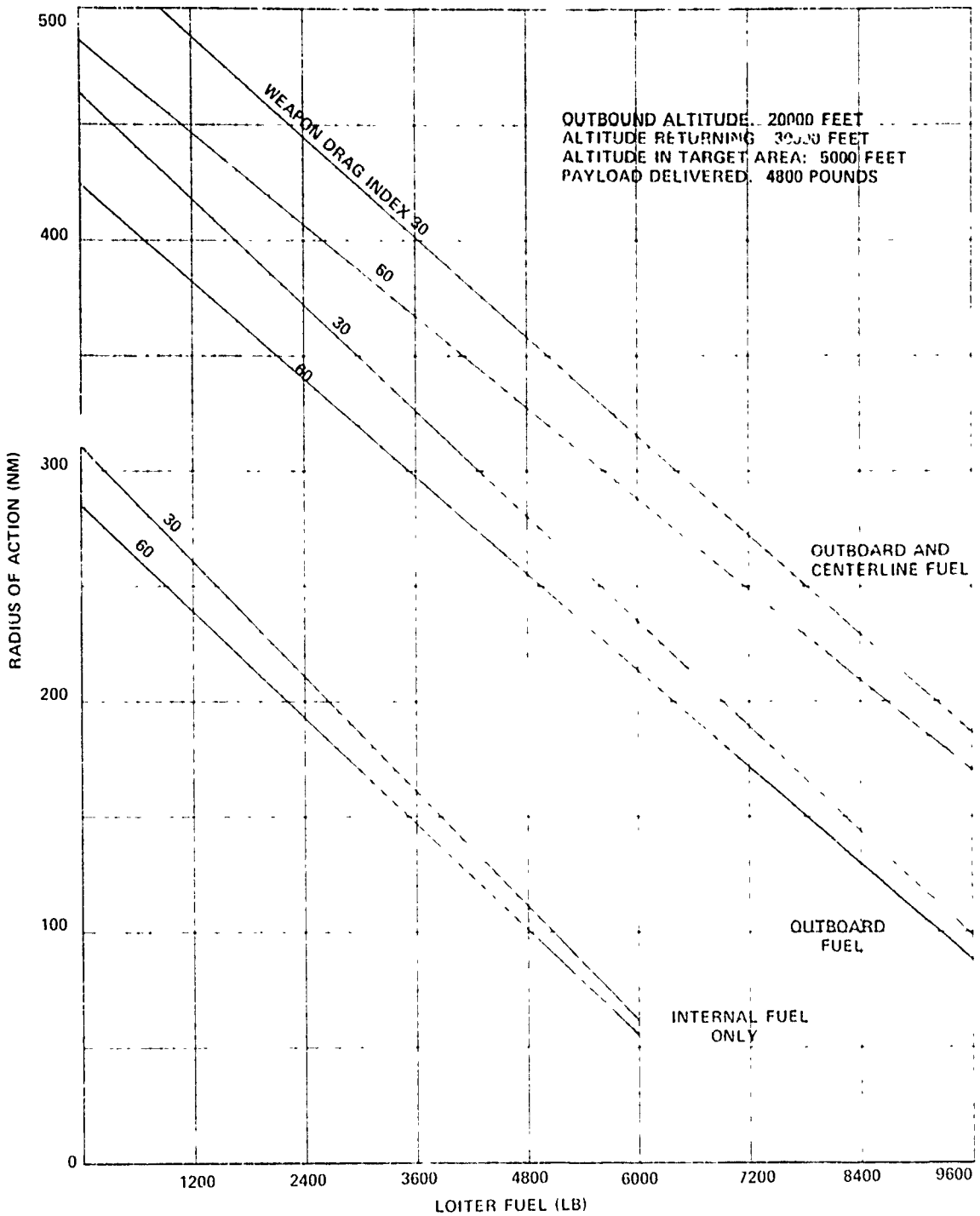

Figure 2. Radius of Action Versus Loiter Fuel for Two Weapon Drag Indices and Three Fuel Loadings

APPENDIX I

RADIUS OF ACTION PROGRAM LISTING

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```
      PROGRAM P3700(INPUT,OUTPUT,TAPE5=INPUT)
      DIMENSION DACR(100),DTT(100)
      INTEGER BAW,F,FAS,FFCL,FFCR,FFDG,FFDR,FFL,FFLAT,FFSAT,FFTO,FTBR,P,
     1PE,PR,W,WACR(100),WAEOCR,XFFCR,WALBCR,XF,FFCL1,FFCL2,C
801   FORMAT(A10,3F5.0,54X,I1)
      COMMON/CACFT/F4E,A7D
802   FORMAT(8A10)
803   FORMAT(3I4,4X,4I4,2F3.0,2X,2I5,I6,6F4.0)
901   FORMAT(31X,2(I6,4X),3X, I3,  5X,6( F6.1,4X),/,1X,5(I6,4X),3X, I3
     1,5X,7(I6,4X),/)
902   FORMAT(1H1,42X,4HFUEL,/,32X,7HPAYLOAD,2X,8HRETURNED,5X,4HDRAG,5X,5
     1HSTART,2(13X,7HDESCENT),4X,7HLANDING,/,2X,5HBASIC,5X,5HTOTAL,14X,8
     2HRETURNED,1X,10HPROGRAMMED,3X,5HINDEX,3X,8HAND TAXI,2X,8HTAKE-OFF,
     33X,5HGOING,5X,6HLOITER,2X,9HRETURNING,2X,8HAND TAXI,4X,6HRADIUS,/,
     42X,4HACFT,6X,4HFUEL,5X,7HPAYLOAD,3X,8HEXPENDED,3X,6HACTUAL,3X,9HRE
     5TURNING,4X,2HNM,5(8X,2HNM),5X,9HOF ACTION,/,1X,2(6HWT(LB),4X),1X,3
     6(6HWT(LB),4X),1X,5HGOING,6(4X,6HWT(LB)),7X,2HNM,/)
903   FORMAT(51X,*CHECK THE INPUT DATA FOR THIS CASE.*,/)
904   FORMAT(///,24X,*THIS PROGRAM DOES NOT PRESENTLY HAVE REQUIRED INFO
     1RMATICN FOR THE *,A10,* AIRCRAFT.*)
905   FORMAT(///,47X,*ALL ALTITUDES MUST BE SEA LEVEL OR ABOVE.*)
906   FORMAT(///,31X,*AN ALTITUDE OF *, I5  ,* FEET EXCEEDS THE TABLES F
     1OR THE *,A10,* AIRCRAFT.*)
907   FORMAT(29X,*A GROSS WEIGHT OF *,I5,* POUNDS EXCEEDS THE TABLES FCR
     1 THE *,A10,* AIRCRAFT.*,/)
908   FORMAT(34X,*A DRAG INDEX OF *, I4  ,* EXCEEDS THE TABLES FOR THE *
     1,A10,* AIRCRAFT.*,/)
909   FORMAT(1H1,55X,*RADIUS OF ACTION FOR THE*,//,59X,A10,*AIRCRAFT*,//
     1,49X,*ALTITUDE GOING TO THE TARGET-*, I5,  * FEET*,//,46X,*ALTITUD
     2E RETURNING FROM THE TARGET-*,I5,  * FEET*,//,50X,*ALTITUDE AT THE
     3 TARGET-*,I5,  * FEET*)
910   FORMAT(1X,*A GROSS WEIGHT OF *,I6,* POUNDS AND A DRAG INDEX OF *,
     1I3,* AND AN ALTITUDE OF *,I5,* FEET EXCEED THE TABLES FOR THE *,
     2A10,* AIRCRAFT.*,/)
911   FORMAT(31X,2(I6,4X),2X, F4.0,5X,6( F6.1,4X),/,1X,5(I6,4X),2X, F4.0
     1,5X,6(I6,4X))
912   FORMAT(31X,2(I6,4X),3X, I3,  5X,6( F6.1,4X),/,1X,5(I6,4X),3X, I3
     1,5X,7(I6,4X),/,1H1)
913   FORMAT(1X, 42X,4HFUEL,/,32X,7HPAYLOAD,2X,8HRETURNED,5X,4HDRAG,5X,5
     1HSTART,2(13X,7HDESCENT),4X,7HLANDING,/,2X,5HBASIC,5X,5HTOTAL,14X,8
     2HRETURNED,1X,10HPROGRAMMED,3X,5HINDEX,3X,8HAND TAXI,2X,8HTAKE-OFF,
     33X,5HGOING,5X,6HLOITER,2X,9HRETURNING,2X,8HAND TAXI,4X,6HRADIUS,/,
     42X,4HACFT,6X,4HFUEL,5X,7HPAYLOAD,3X,8HEXPENDED,3X,6HACTUAL,3X,9HRE
     5TURNING,4X,2HNM,5(8X,2HNM),5X,9HOF ACTION,/,1X,2(6HWT(LB),4X),1X,3
     6(6HWT(LB),4X),1X,5HGOING,6(4X,6HWT(LB)),7X,2HNM,/)
914   FORMAT(1H1,*ALL WEIGHTS ARE IN POUNDS.  ALL DISTANCES ARE IN NAUTI
     1CAL MILES.  ALL FUEL CONSUMPTION RATES EXCEPT THE AVERAGES ARE NAU
     2TICAL MILES PER*,/,
     31X,*POUND.  AVERAGES ARE POUNDS PER NAUTICAL MILE.*,//////,
     41X,*WEIGHT AT THE END OF RETURN CRUISE=*,I6,*  FUEL RATE=*,F5.4,//
     5/)
915   FORMAT(1X,*FOR CLIMB GOING TO THE TARGET     WEIGHT=*,I6,*  FUEL=*
     1,I4,*  DISTANCE=*,F7.4,/)
916   FORMAT(1X,*FOR CRUISE NUMBER*,I3,* GOING TO THE TARGET     WEIGHT=
     1*,I6,/,
```

```
     11X,*FUEL RATE=*,F5.4,*  TOTAL DISTANCE TRAVELED AFTER THIS CRUISE=
     2*,F8.4,/)
917   FORMAT(1X,*FOR CLIMB RETURNING FROM THE TARGET     WEIGHT=*,I6,/,
     16X*FROM 0 FEET TO RETURN ALTITUDE    FUEL=*I4*  DISTANCE=*,F7.4/
     16X*FROM 0 FEET TO TARGET ALTITUDE    FUEL=*I4*  DISTANCE=*,F7.4/
     16X*FROM TARGET TO RETURN ALTITUDE    FUEL=*I4*  DISTANCE=*,F7.4/
     1)
918   FORMAT (1X,*WEIGHT AT BEGINNING OF RETURN CRUISE=*,I6,*  FUEL RATE
     1 AT THIS POINT=*,F5.4,*  AVERAGE RATE=*,F8.4,/;
     21X,*DISTANCE FOR RETURN CRUISE=*,F8.4,*  FUEL AT END OF MISSION=*,
     3I5,*  EXTRA FUEL AT END OF MISSION=*,I5,////)
919   FORMAT(1X,*FOR CRUISE NUMBER*,I3,* GOING TO THE TARGET     WEIGHT=
     1*,I6,/,
     11X,*FUEL RATE=*,F5.4,*  EXTRA FUEL FOR CRUISE GOING=*,I5,*  TOTAL
     2DISTANCE TRAVELED AFTER THIS CRUISE=*,F8.4,/)
 10   ASSIGN 212 TO IEOF
      CALLECF(IEOF)
      F4E=10HF4E
      A7D=10HA7D
      READ(5,801) ACFT,ALTG,ALTR,ALTAT,C
      IF(ALTAT.LE.2500..AND.ALTAT.GT.   0.) ALTAT=0.
      IF(ALTAT.LT.5000..AND.ALTAT.GT.2500.) ALTAT=5000.
      ILTG=ALTG
      ILTR=ALTR
      ILTA=ALTAT
      PRINT 909, ACFT,ILTG,ILTR,ILTA
      IF(ALTG.LT.0..OR.ALTR.LT.0..OR.ALTAT.LT.0.) GO TO 202
      ILT=ALTG
      IF(ALTG.LT.5000.) GO TO 203
      ILT=ALTR
      IF(ALTR.LT.5000.) GO TO 203
      ILT=ALTG
      IF(ALTR.GT.ILT ) ILT=ALTR
      IF(ACFT.EQ.F4E.AND.ILT.GT.40000.) GO TO 203
      IF(ACFT.EQ.A7D.AND.(ILT.GT.40000.OR.ILT.LT.5000)) GO TO 203
      IF(ACFT.EQ.F4E.OR.ACFT.EQ.A7D) GO TO 40
 20   PRINT 904,ACFT
 21   ASSIGN 211 TO IEOF
      DO 30 I=1,10000
 30   READ(5,802) A
      GO TO 212
 40   ASSIGN 211 TO IEOF
 50   IF(C.NE.1) PRINT 902
      DO 200 IP=1,2
      READ(5,803) FFSAT,FFTO,FFDG,    FFDR,FFLAT,FTBR,PR,DIG,DIR,
     1FAS,P,BAW,DFSAT,DFTO,DFDG,DFL,DFDR,DFLAT
      IDR=DIR
      IDG=DIG
      FFL=9600
      W=BAW+FAS+P
      IF(ACFT.EQ.F4E.AND.W.GT.58000) FAS=58000-BAW-P
      IF(ACFT.EQ.A7D.AND.W.GT.42000) FAS=42000-BAW-P
      IF(FFSAT .LT.0) GO TO 201
      IF(FFTO  .LT.0) GO TO 201
      IF(FFDG  .LT.0) GO TO 201
```

```
      IF(FFDR  .LT.0) GO TO 201
      IF(FFLAT .LT.0) GO TO 201
      IF(FTBR  .LT.0) GO TO 201
      IF(FAS   .LE.0) GO TO 201
      IF(PR    .LT.0) GO TO 201
      IF(P     .LT.0) GO TO 201
      IF(BAW   .LE.0) GO TO 201
      IF(FAS.LE.(FFSAT+FFTO+FFDG+FFDR+FFLAT+FTBR)) GO TO 201
      IF(PR.GT.P) GO TO 201
      PE=P-PR
      J=2
      ID=DIG
      IF(DIR.LT.ID) ID=DIR
      IF(ID.LT.0.) GO TO 205
      ID=DIG
      IF(DIR.GT.ID) ID=DIR
      IF(ACFT.EQ.F4E.AND.ID.GT.140 ) GO TO 205
      IF(ACFT.EQ.A7D.AND.ID.GT.300 ) GO TO 205
      IF(DIR.GT.DIG) J=3
      XJ=J
      JBM=J*1000
      WAEOCR=BAW+PR+FTBR+FFLAT+FFDR
      IF(ACFT.EQ.F4E.AND.WAEOCR.LT.30000) GO TO 210
      IF(ACFT.EQ.A7D.AND.WAEOCR.LT.20000) GO TO 210
      W=BAW+FAS+P
      W=W-FFSAT-FFTO
      ILT=ALTR
      ID=DIR
      CALL CLD(ACFT,ALTR,WAEOCR,DIR,FRE), RETURNS(207)
      ILT=ALTG
      ID=DIG
      CALL CRD(ACFT,ALTG,WAEOCR,DIR,FRE)
      IF(C.EQ.1) PRINT 914, WAEOCR,FRE
      D=DFSAT+DFTO
      CALL CLF(ACFT,ALTG,W,DIG,FFCL)
      CALL CLD(ACFT,ALTG,W,DIG,DFCL ), RETURNS(207)
      IFFCL=FFCL
      IF(C.EQ.1) PRINT 915, W,FFCL ,DFCL
      W=W-FFCL
      D=D+DFCL
      I=2
      IMO=I-1
      WACR(1)=W
      DACR(1)=D
      IA=I
      NXFFCR=3001
      NOI=9
      DO 199 IFFL=1,NOI
      IF((FAS-FFSAT-FFTO-2*IFFCL-FFDG-FFL-FFDR-FFLAT-FTBR).LT.JBM ) GO T
     10 101
      IF(NXFFCR.LT.1000) GO TO 101
      I=IA
      IMO=I-1
100   CALL CRD(ACFT,ALTG,WACR(IMO),DIG,DFCR)
      WACR(I)=WACR(IMO)-1000
```

```
      DACR(I)=DACR(IMO)+DFCR*1000.
      IF(C.EQ.1) PRINT 916, IMO,WACR(IMO),DFCR,DACR(I)
      WALRCR=WACR(I)
      DALBCR=DACR(I)
      I=I+1
      IA=I
      IMO=I-1
101   W=WACR(IMO)-FFDG-FFL-PE
      DTT(IMC)=DACR(IMO)+DFDG+DFL
      CALL CLF(ACFT,ALTR,W,DIR,FFCL2)
      CALL CLF(ACFT,ALTAT,W,DIR,FFCL1)
      CALL CLD(ACFT,ALTR,W,DIR,DFCL2), RETURNS(207)
      CALL CLD(ACFT,ALTAT,W,DIR,DFCL1),RETURNS(207)
      FFCL=FFCL2-FFCL1
      DFCL=DFCL2-DFCL1
      IF(C.EQ.1) PRINT 917, W,FFCL2,DFCL2,FFCL1,DFCL1,FFCL,DFCL
      W=W-FFCL
      DFCR=DTT(IMO)-DFCL-DFDR-DFLAT
      CALL CRD(ACFT,ALTR,W,DIR,FRB)
      FRFCR=2./(FRE+FRB)
      FFCR=FRFCR*DFCR+.5
      F=W-BAW-PR-FFCR-FFDR-FFLAT
      XF=F-FTBR
      IF(C.EQ.1) PRINT 918, W,FRB,FRFCR,DFCR,F,XF
      XFFCR=XF/XJ+.5
      IF(XFFCR.GE.1000) GO TO 100
      IF(XFFCR.LT.-1) FFL=FFL-1200
      IF(FFL.LT.0) GO TO 200
      IF(XFFCR.LT.-1) GO TO 101
      IF(XFFCR.LT.1) GO TO 198
      NXFFCR=XFFCR+1200/J
102   CALL CRD(ACFT,ALTG,WACR(IMO),DIG,FR)
      WACR(I)=WACR(IMO)-XFFCR
      DACR(I)=DACR(IMO)+FR*XFFCR
      IF(C.EQ.1) PRINT 919, IMO,WACR(IMO),FR,XFFCR,DACR(I)
      I=I+1
      IMO=I-1
      W=WACR(IMO)-FFDG-FFL-PE
      DTT(IMC)=DACR(IMC)+DFDG+DFL
      CALL CLF(ACFT,ALTR,W,DIR,FFCL2)
      CALL CLF(ACFT,ALTAT,W,DIR,FFCL1)
      CALL CLD(ACFT,ALTR,W,DIR,DFCL2), RETURNS(207)
      CALL CLD(ACFT,ALTAT,W,DIR,DFCL1), RETURNS(207)
      FFCL=FFCL2-FFCL1
      DFCL=DFCL2-DFCL1
      IF(C.EQ.1) PRINT 917, W,FFCL2,DFCL2,FFCL1,DFCL1,FFCL,DFCL
      W=W-FFCL
      DFCR=DTT(IMO)-DFCL-DFDR-DFLAT
      CALL CRD(ACFT,ALTR,W,DIR,FRB)
      FRFCR=2./(FRE+FRB)
      FFCR=FRFCR*DFCR+.5
      F=W-BAW-PR-FFCR-FFDR-FFLAT
      XF=F-FTBR
      IF(C.EQ.1) PRINT 918, W,FRB,FRFCR,DFCR,F,XF
      XFFCR=XF/XJ+.5
```

```
      IF(XFFCR.GT.0) GO TO 102
198   IDT=DTT(IMO)+.5
      IF(C.EQ.1) PRINT 913
      IF(C.NE.1) PRINT 901, PR,FTBR,IDR,DFSAT,DFTO,DFDG,DFL,DFDR,DFLAT,B
     1AW,FAS,P,PE,F,IDG,FFSAT,FFTO,FFDG,FFL,FFDR,FFLAT,IDT
      IF(C.EQ.1) PRINT 912, PR,FTBR,IDR,DFSAT,DFTO,DFDG,DFL,DFDR,DFLAT,B
     1AW,FAS,P,PE,F,IDG,FFSAT,FFTO,FFDG,FFL,FFDR,FFLAT,IDT
      FFL=FFL-1200
      IF(FFL.LT.0) GO TO 200
      I=IA
      IMO=I-1
199   CONTINUE
200   CONTINUE
      GO TO 50
201   CONTINUE
      PRINT 911, PR,FTBR,DIR,DFSAT,DFTO,DFDG,DFL,DFDR,DFLAT,BAW,FAS,P,PE
     1,F,DIG,FFSAT,FFTO,FFDG,FFL,FFDR,FFLAT
      PRINT 903
      GO TO 200
202   PRINT 905
      GO TO 21
203   PRINT 906, ILT,  ACFT
      GO TO 21
204   H=4HFFCL
      PRINT 907, ALT,W,H,ACFT
      GO TO 200
205   PRINT 908, ID,  ACFT
      GO TO 200
207   PRINT 910, W,ID,ILT,ACFT
      GO TO 200
210   PRINT 907, W,ACFT
      GO TO 200
211   GO TO 10
212   CALL EXIT
      END
```

```
      SUBROUTINE CLD(ACFT,ALT, W,DI,DIS),       RETURNS(A)
      DIMENSION DY5(10),DY6(10),DY7(10),DY8(10),DY9(10),DY10(10),DY11(10
     1),DY12(10),DY13(10),DY14(10),DY15(10),CY11(10),CY12(10),CY13(10),C
     2Y14(10),CY15(10),DY16(10),CY16(10),DY17(10),CY17(10)
      COMMON/CACFT/F4E,A7D
      INTEGER W
      GW=W/1000.
      DIS=0.
      IF(ACFT.EQ.F4E ) GO TO 1
      IF(ACFT.EQ.A7D ) GO TO 2
1     DGW=30.
      DY11(1)=.013
      DY11(2)=.001
      DY11(3)=.008
      DY11(4)=-.023
      DY11(5)=.061
      DY11(6)=-.121
      DY11(7)=.179
      DY11(8)=-.18
      DY12(1)=.013
      DY12(2)=.001
      DY12(3)=.008
      DY12(4)=-.023
      DY12(5)=.061
      DY12(6)=-.121
      DY12(7)=.179
      DY12(8)=-.0
      DY13(1)=.013
      DY13(2)=.001
      DY13(3)=.008
      DY13(4)=-.023
      DY13(5)=.061
      DY13(6)=-.121
      DY13(7)=.222
      DY13(8)=-.051
      DY14(1)=.02
      DY14(2)=.012
      DY14(3)=-.027
      DY14(4)=.037
      DY14(5)=-.005
      DY14(6)=-.090
      DY14(7)=.293
      DY14(8)=-.195
      DY15(1)=.02
      DY15(2)=.012
      DY15(3)=-.027
      DY15(4)=.037
      DY15(5)=-.005
      DY15(6)=-.090
      DY15(7)=.495
      DY15(8)=-1.81
      DY16(1)=.035
      DY16(2)=-.008
      DY16(3)=-.001
      DY16(4)=.005
```

```
DY16(5)=.045
DY16(6)=-.175
DY16(7)=.881
DY16(8)=-4.095
DY17(1)=.046
DY17(2)=-.03
DY17(3)=.032
DY17(4)=-.039
DY17(5)=.1
DY17(6)=-.141
DY17(7)=.258
DY17(8)=-1.383
CY11(1)=.4
CY11(2)=.05
CY11(3)=.05
CY11(4)=-.01
CY11(5)=-.36
CY11(6)=1.310
CY11(7)=-2.76
CY11(8)=4.710
CY12(1)=.4
CY12(2)=.05
CY12(3)=.05
CY12(4)=-.01
CY12(5)=-.36
CY12(6)=1.31
CY12(7)=-2.76
CY12(8)=4.01
CY13(1)=.4
CY13(2)=.05
CY13(3)=.05
CY13(4)=-.01
CY13(5)=-.36
CY13(6)=1.31
CY13(7)=-3.18
CY13(8)=4.72
CY14(1)=.35
CY14(2)=.05
CY14(3)=-.01
CY14(4)=.24
CY14(5)=-1.06
CY14(6)=2.51
CY14(7)=-3.98
CY14(8)=.03
CY15(1)=.210
CY15(2)=.330
CY15(3)=-.43
CY15(4)=.8
CY15(5)=-1.76
CY15(6)=3.35
CY15(7)=-8.54
CY15(8)=29.79
CY16(1)=-.2
CY16(2)=.7
CY16(3)=-.85
```

```
      CY16(4)=1.35
      CY16(5)=-2.75
      CY16(6)=5.15
      CY16(7)=-17.9
      CY16(8)=87.65
      CY17(1)=-.4
      CY17(2)=1.1
      CY17(3)=-1.45
      CY17(4)=2.15
      CY17(5)=-3.75
      CY17(6)=3.17
      CY17(7)=2.36
      CY17(8)=.21
      DY7(1)=0.0
      DY7(2)=0.0
      DY7(3)=1.
      DY7(4)=-3.
      DY7(5)=6.5
      DY7(6)=-12.
      DY7(7)=20.5
      DY8(1)=1.
      DY8(2)=0.0
      DY8(3)=-1.
      DY8(4)=4.
      DY8(5)=-10.
      DY8(6)=21.
      DY8(7)=-41.
      DY9(1)=1.
      DY9(2)=0.0
      DY9(3)=1.5
      DY9(4)=-2.5
      DY9(5)=1.5
      DY9(6)=2.5
      DY9(7)=-6.
      DY10(1)=1.
      DY10(2)=2.
      DY10(3)=- 2.
      DY10(4)=2.
      DY10(5)=-3.
      DY10(6)=5.
      DY10(7)=-4.
      SL1=0.0
      CONST1=0.0
      SL2=4.
      SL3=4.
      SL4=5.
      SL5=5.
      KK1=8
      KK2=7
      DX1=2.
      DX2=4.
      DX3=6.
      DDT=20.
      GO TO 200
2     DGW=20.
```

```
      DY5(1)=.02
      DY5(2)=0.0
      DY5(3)=0.0
      DY5(4)=0.0
      DY5(5)=.04
      DY5(6)=-.17
      DY5(7)=.54
      DY5(8)=-1.53
      DY6(1)=.25
      DY6(2)=.15
      DY6(3)=-.30
      DY6(4)=.55
      DY6(5)=-.85
      DY6(6)=1.45
      DY6(7)=-2.5
      DY6(8)=4.25
      DY7(1)=2.0
      DY7(2)=0.0
      DY7(3)=-1.5
      DY7(4)=3.5
      DY7(5)=-5.75
      DY7(6)=8.
      DY8(1)=2.0
      DY8(2)=1.5
      DY8(3)=-1.
      DY8(4)=4.5
      DY8(5)=-5.
      DY8(6)=-4.5
      DY9(1)=2.
      DY9(2)=3.5
      DY9(3)=5.
      DY9(4)=-13.5
      DY9(5)=44.
      DY9(6)=-118.5
      DY10(1)=2.
      DY10(2)=11.5
      DY10(3)=-13.
      DY10(4)=18.5
      DY10(5)=44.
      DY10(6)=-118.5
      CONST1=.15
      SL1=.01
      SL2=12.5
      SL3=12.5
      SL4=12.5
      SL5=12.5
      KK1=8
      KK2=6
      DX1=2.
      DX2=2.5
      DX3=3.
      DDI=50.
      GO TO 13
  200 IF(GW.GT.35.   ) GO TO 3
      KK1=8
```

```
      DO 100 I=1,KK1
      DY5(I)=DY11(I)
  100 DY6(I)=CY11(I)
      GO TO 13
    3 IF(GW.GT.40.  ) GO TO 4
      KK1=8
      DO 101 I=1,KK1
      DY5(I)=DY12(I)
  101 DY6(I)=CY12(I)
      GO TO 13
    4 IF(GW.GT.45.  ) GO TO 5
      KK1=8
      DO 102 I=1,KK1
      DY5(I)=DY13(I)
  102 DY6(I)=CY13(I)
      GO TO 13
    5 IF(GW.GT.50.  ) GO TO 6
      KK1=8
      DO 103 I=1,KK1
      DY5(I)=DY14(I)
  103 DY6(I)=CY14(I)
      GO TO 13
    6 IF(GW.GT.55.) GO TO 7
      KK1=8
      DO 104 I=1,KK1
      DY5(I)=DY15(I)
  104 DY6(I)=CY15(I)
      GO TO 13
    7 IF(GW.GT.60.) GO TO 8
      KK1=8
      DO 105 I=1,KK1
      DY5(I)=DY16(I)
  105 DY6(I)=CY16(I)
      GO TO 13
    8 KK1=8
      DO 106 I=1,KK1
      DY5(I)=DY17(I)
  106 DY6(I)=CY17(I)
   13 CO=1.
      U=ALT/5000.
      IF(ACFT.EQ.A7D) U=U-1.
      DO 700 I=1,KK1
      CO=CO*U/FLOAT(I)
      U=U-1.
      SL1=DY5(I)*CO+SL1
  700 CONST1=DY6(I)*CO +CONST1
      T=SL1*(GW-DGW) +CONST1
      IF(ACFT.EQ.F4E.AND.(T.LT.0..OR.T.GT.12.4)) RETURN A
      IF(ACFT.EQ.A7D.AND.(T.LT.0..OR.T.GT.5.75)) RETURN A
      CO =1.
      U=DI/DDI
      DO 701 I=1,KK2
      CO=U*CC/FLOAT(I)
      U=U-1.
  701 SL2=DY7(I)*CO +SL2
```

```
      R=T*SL2
      IF(T.LE.DX1) GO TO 801
      CO =1.
      U=DI/DDI
      DO 702 I=1,KK2
      CO=CO*U/FLOAT(I)
      U=U-1.
 702  SL3=DY8(I)*CO+SL3
      R=SL2*DX1+SL3*(T-DX1)
      IF(T.LE.DX2) GO TO 801
      CO=1.
      U=DI/DDI
      DO 703 I=1,KK2
      CO=CO*U/FLOAT(I)
      U=U-1.
 703  SL4=DY9(I)*CO+SL4
      R=SL2*DX1 +SL3*(DX2-DX1) +SL4*(  T-DX2)
      IF(T.LE.DX3) GO TO 801
      CO=1.
      U=DI/DDI
      DO 708 I=1,KK2
      CO=CO*U/FLOAT(I)
      U=U-1.
708   SL5=DY10(I)*CO + SL5
      R=SL2*DX1 +SL3*(DX2-DX1) +SL4*(DX3 -DX2) +SL5*(T-DX3)
  801 IF(ACFT.EQ.F4E.AND.R.GT.74.) RETURN A
      IF(ACFT.EQ.F4E.AND.R.GT.(-7.27*T+148.2)) RETURN A
      IF(ACFT.EQ.A7D.AND.R.GT.100.) RETURN A
  803 DIS=R
      GW=GW*1000.
300   RETURN
      END
```

```
      SUBROUTINE DLF(ACFT,ALT, W,DI,FUEL)
      DIMENSION DY5(10),DY6(10),DY7(10),DY8(10),DY9(10),DY11(10),DY12(10
     1),DY13(10),DY14(10),DY15(10),CY11(10),CY12(10),CY13(10),CY14(10),C
     2Y15(10),DY16(10),CY16(10),DY17(10),CY17(10)
      COMMON/CACFT/F4E,A7D
      INTEGER W,FUEL
      GW=W/1000.
      FUEL=0.
      IF(ACFT.EQ.F4E ) GO TO 1
      IF(ACFT.EQ.A7D ) GO TO 2
1     DGW=30.
      DY11(1)=.013
      DY11(2)=.002
      DY11(3)=-.005
      DY11(4)=.021
      DY11(5)=-.06
      DY11(6)=.137
      DY11(7)=-.267
      DY11(8)=.466
      DY12(1)=.013
      DY12(2)=.002
      DY12(3)=-.005
      DY12(4)=.021
      DY12(5)=-.06
      DY12(6)=.137
      DY12(7)=-.267
      DY12(8)=.505
      DY13(1)=.013
      DY13(2)=.002
      DY13(3)=.007
      DY13(4)=-.027
      DY13(5)=.072
      DY13(6)=-.154
      DY13(7)=.287
      DY13(8)=-.338
      DY14(1)=.020
      DY14(2)=-.002
      DY14(3)=-.002
      DY14(4)=.014
      DY14(5)=-.038
      DY14(6)=.089
      DY14(7)=-.173
      DY14(8)=.388
      DY15(1)=.02
      DY15(2)=-.002
      DY15(3)=.009
      DY15(4)=-.030
      DY15(5)=.094
      DY15(6)=-.242
      DY15(7)=.601
      DY15(8)=-1.46
      DY16(1)=.022
      DY16(2)=.001
      DY16(3)=-.006
      DY16(4)=.016
```

```
DY16(5)=-.026
DY16(6)=.059
DY16(7)=-.148
DY16(8)=.340
DY17(1)=.022
DY17(2)=.001
DY17(3)=.005
DY17(4)=-.028
DY17(5)=.1000
DY17(6)=-.197
DY17(7)=.153
DY17(8)=.508
CY11(1)=.530
CY11(2)=-.08
CY11(3)=.04
CY11(4)=.08
CY11(5)=-.45
CY11(6)=1.32
CY11(7)=-2.94
CY11(8)=5.42
CY12(1)=.53
CY12(2)=-.08
CY12(3)=.04
CY12(4)=.08
CY12(5)=-.45
CY12(6)=1.32
CY12(7)=-2.94
CY12(8)=5.27
CY13(1)=.530
CY13(2)=-.08
CY13(3)=-.07
CY13(4)=.52
CY13(5)=-1.67
CY13(6)=4.04
CY13(7)=-8.13
CY13(8)=12.83
CY14(1)=.45
CY14(2)=-.04
CY14(3)=.05
CY14(4)=-.03
CY14(5)=-.12
CY14(6)=.47
CY14(7)=-1.38
CY14(8)=3.29
CY15(1)=.45
CY15(2)=-.04
CY15(3)=-.22
CY15(4)=1.05
CY15(5)=-3.15
CY15(6)=7.45
CY15(7)=-16.26
CY15(8)=36.09
CY16(1)=.32
CY16(2)=.01
CY16(3)=.02
```

```
      CY16(4)=-.22
      CY16(5)=.95
      CY16(6)=-3.6
      CY16(7)=10.9
      CY16(8)=-26.29
      CY17(1)=.32
      CY17(2)=.01
      CY17(3)=-.24
      CY17(4)=.82
      CY17(5)=-2.35
      CY17(6)=3.88
      CY17(7)=.54
      CY17(8)=-26.29
      DY7(1)=.45
      DY7(2)=-.25
      DY7(3)=.25
      DY7(4)=-.05
      DY7(5)=-.35
      DY7(6)=.65
      DY7(7)=.05
      DY8(1)=.5
      DY8(2)=.25
      DY8(3)=-.5
      DY8(4)=.75
      DY8(5)=-1.
      DY8(6)=1.75
      DY8(7)=-3.7
      DY9(1)=1.25
      DY9(2)=-1.
      DY9(3)=2.
      DY9(4)=-3.25
      DY9(5)=4.75
      DY9(6)=-3.
      DY9(7)=-4.5
      SL1=0.0
      CONST1=0.0
      SL2=1.75
      SL3=1.75
      SL4=1.75
      DX1= 2.5
      DX2= 4.
      KK1=8
      KK2=7
      DDI=20.
      GO TO 200
2     DGW=20.
      DY5(1)=.02
      DY5(2)=.01
      DY5(3)=-.02
      DY5(4)=.04
      DY5(5)=-.08
      DY5(6)=.2
      DY5(7)=-.51
      DY5(8)=1.20
      DY6(1)=.45
```

```
      DY6(2)=.1
      DY6(3)=-.2
      DY6(4)=.3
      DY6(5)=-.6
      DY6(6)=1.55
      DY6(7)=-3.9
      DY6(8)=9.1
      DY7(1)=.16
      DY7(2)=.08
      DY7(3)=-.18
      DY7(4)=.28
      DY7(5)=-.360
      DY7(6)=.4
      DY8(1)=.16
      DY8(2)=.24
      DY8(3)=-.29
      DY8(4)=1.34
      DY8(5)=-4.59
      DY8(6)=11.24
      DY9(1)=.46
      DY9(2)=.04
      DY9(3)=.36
      DY9(4)=-.76
      DY9(5)=2.66
      DY9(6)=-7.56
      CONST1=.4
      SL1=.04
      SL2=1.44
      SL3=1.44
      SL4=1.44
      DX1=2.5
      DX2=3.5
      KK1=8
      KK2=6
      DDI=50.
      GO TO 13
  200 IF(GW.GT.35.   ) GO TO 3
```

```
      KK1=8
      DO 100 I=1,KK1
      DY5(I)=DY11(I)
  100 DY6(I)=CY11(I)
      GO TO 13
    3 IF(GW.GT.40.   ) GO TO 4
      KK1=8
      DO 101 I=1,KK1
      DY5(I)=DY12(I)
  101 DY6(I)=CY12(I)
      GO TO 13
    4 IF(GW.GT.45.   ) GO TO 5
      KK1=8
      DO 102 I=1,KK1
      DY5(I)=DY13(I)
  102 DY6(I)=CY13(I)
      GO TO 13
    5 IF(GW.GT.50.   ) GO TO 6
```

```
      KK1=8
      DO 103 I=1,KK1
      DY5(I)=DY14(I)
  103 DY6(I)=CY14(I)
      GO TO 13
    6 IF(GW.GT.55.) GO TO 7
      KK1=8
      DO 104 I=1,KK1
      DY5(I)=DY15(I)
  104 DY6(I)=CY15(I)
      GO TO 13
    7 IF(GW.GT.60.) GO TO 8
      KK1=8
      DO 105 I=1,KK1
      DY5(I)=DY16(I)
  105 DY6(I)=CY16(I)
      GO TO 13
    8 KK1=8
      DO 106 I=1,KK1
      DY5(I)=DY17(I)
  106 DY6(I)=CY17(I)
 13   CO=1.
      U=ALT/5000.
      IF(ACFT.EQ.A7D) U=U-1
      DO 700 I=1,KK1
      CO=CO*U/FLOAT(I)
      U=U-1.
      SL1=DY5(I)*CO+SL1
 700  CONST1=CY6(I)*CO +CONST1
      T=SL1*(GW-DGW) +CONST1
      CO =1.
      U=DI/DDI
      DO 701 I=1,KK2
      CO=CO*U/I
      U=U-1.
 701  SL2=DY7(I)*CO +SL2
      R=T*SL2
      IF(T.LE.DX1) GO TO 801
      CO =1.
      U=DI/DDI
      DO 702 I=1,KK2
      CO=U*CO/FLOAT(I)
      U=U-1.
 702  SL3=DY8(I)*CO+SL3
      R=SL2*DX1+SL3*(T-DX1)
      IF(T.LE.DX2) GO TO 801
      CO=1.
      U=DI/DDI
      DO 703 I=1,KK2
      CO=CO*U/FLOAT(I)
      U=U-1.
 703  SL4=DY9(I)*CO+SL4
      R=SL2*DX1+SL3*(DX2-DX1) +SL4*(T-DX2)
801   CONTINUE
      FUEL=R*100. +.5
```

```
      GW=GW*1000.
300   RETURN
      END
```

```
      SUBROUTINE CRD(ACFT,ALT, W,DI,TNMPPF)
      DIMENSION DY1(10),DY2(10), DY3(10),DY4(10)
      COMMON/CACFT/F4E,A7D
      INTEGER W
      GW=W/1000.
      TNMPPF=0.
      IF(ACFT.EQ.F4E ) GO TO 1
      IF(ACFT.EQ.A7D ) GO TO 2
    1 DGW=30.
      DY1(1)=-.01
      DY1(2)=0.0
      DY1(3)=0.0
      DY1(4)=-.01
      DY1(5)=.03
      DY1(6)=-.06
      DY1(7)=.08
      DY1(8)=-.06
      DY2(1)=.47
      DY2(2)=.23
      DY2(3)=-.2
      DY2(4)=.09
      DY2(5)=.2
      DY2(6)=-.72
      DY2(7)=1.27
      DY2(8)=-1.2
      DY3(1)=-.002
      DY3(2)=.001
      DY3(3)=-.001
      DY3(4)=.0005
      DY3(5)=.0013
      DY3(6)=-.0053
      DY3(7)=.0123
      DY4(1)=-.002
      DY4(2)=0.0
      DY4(3)=.001
      DY4(4)=-.002
      DY4(5)=.002
      DY4(6)=.001
      DY4(7)=-.01
      SL1=-.02
      CONST1=2.
      SL2=.016
      CONST2=.028
      KK1=8
      KK2=7
      DDI=20.
      GO TO 13
    2 DGW=15.
      DY1(1)=0.0
      DY1(2)=-.01
      DY1(3)=.02
      DY1(4)=-.04
      DY1(5)=.06
      DY1(6)=-.06
      DY1(7)=-.01
```

```
      DY1(8)=.22
      DY1(9)=-.65
      DY2(1)=.38
      DY2(2)=.02
      DY2(3)=-.02
      DY2(4)=.12
      DY2(5)=-.32
      DY2(6)=.67
      DY2(7)=-1.22
      DY2(8)= 1.97
      DY2(9)=-3.17
      DY3(1)=-.01
      DY3(2)=.0045
      DY3(3)=-.0005
      DY3(4)=-.0056
      DY3(5)=.0167
      DY3(6)=-.0357
      DY4(1)=0.0
      DY4(2)=-.01
      DY4(3)=.02
      DY4(4)=-.035
      DY4(5)=.058
      DY4(6)=-.093
      CONST1=1.12
      SL1=-.02
      CONST2=.05
      SL2=.05
      DDI=50.
      KK1=9
      KK2=6
 13   CO=1.
      CO1= 1.
      U=ALT/5000.
      DO 700 I=1,KK1
      CO=CO*U/FLOAT(I)
      CO1=CO1*U/FLOAT(I)
      SL1=DY1(I)*CO+SL1
      CONST1=DY2(I)*CO1+CONST1
      U=U-1.
 700  CONTINUE
      CO=1.
      CO1=1.
      U=DI/DDI
      DO 701 I=1,KK2
      CO=CO*U/FLOAT(I)
      CO1=CO1*U/FLOAT(I)
      SL2=DY3(I)*CO +SL2
      CONST2=DY4(I)*CO1+CONST2
      U=U-1.
 701  CONTINUE
      T=(SL1*(GW-DGW)+CONST1)
      TNMPPF= SL2*(SL1*(GW-DGW) +CONST1) + CONST2
      GW=GW*1000.
300   RETURN
      END
```

APPENDIX II

PROGRAM INPUT LIST

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INPUT LIST

COLUMN	VARIABLE	FORMAT	
TYPE ONE CARD:			
1-10	ACFT	A	Aircraft: Left-hand justify
11-15	ALTG	F	Outbound altitude: feet
16-20	ALTR	F	Altitude returning: feet
21-25	ALTAT	F	Altitude in target area: feet
30	C	I	If C equals one, values of parameters are printed out after each segment of the mission for each iteration to permit checkout of the program.
TYPE TWO CARDS:			
1-4	FFSAT	I	Fuel for start and taxi: pounds
5-8	FFTO	I	Fuel for takeoff: pounds
9-12	FFDG	I	Fuel for outbound descent: pounds
17-20	FFDG	I	Fuel for descent returning: pounds
21-24	FFLAT	I	Fuel for landing and taxi: pounds
25-28	FTBR	I	Fuel to be returned: pounds
29-32	PR	I	Payload returned: pounds
33-35	DIG	F	Drag index outbound
36-38	DIR	F	Drag index returning
41-45	FAS	I	Fuel at engine start: pounds
46-50	P	I	Payload (any item capable of being dropped, ejected or jettisoned): pounds
51-56	BAW	I	Basic aircraft weight (gross weight at engine start less fuel and payload): pounds
57-60	DFSAT	F	Distance for start and taxi: NM

COLUMN	VARIABLE	FORMAT	
61-64	DFTO	F	Distance for takeoff: NM
65-68	DFDG	F	Distance for outbound descent: NM
69-72	DFL	F	Distance during loiter in target area: NM
73-76	DFDR	F	Distance for descent returning: NM
77-80	DFLAT	F	Distance for landing and taxi: NM

TYPE THREE CARD - An EOR (7/8/9) card follows the last Type Two card of a set of data

Any number of sets of data may be used.

APPENDIX III

PROGRAM LIMITATIONS

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PROGRAM LIMITATIONS

F-4E and A-7D Aircraft

All climbs are at military thrust.

All cruises are at optimum Mach numbers.

Outbound and returning altitudes: 5,000 to 40,000 feet

Altitude in target area: 0 or 5,000 to 40,000 feet

F-4E restrictions:

Gross weight: 30,000 to 58,000 pounds

Drag indicies: 0 to 140

A-7D restrictions:

Gross weight: 20,000 to 42,000 pounds

Drag indicies: 0 to 300

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APPENDIX IV

F-4E DRIVER FOR RADIUS OF ACTION SUBROUTINES LISTING

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PROGRAM P3700 TRACE

```
      PROGRAM P3700 (OUTPUT,TAPE6=OUTPUT)
      DIMENSION IF(36,15),ID(36,15),IR(36,15)
      COMMON/CACFT/F4E,A7D
      INTEGER W,FFCL
      DATA F4E,A7D,FFCLT,DFCLT,FRCRT/3HF4E,3HA7D,4HFFCL,4HDFCL,4HFRCR/
      DATA ACFT/3HF4E/
      DO 40 J=1,36
      DO 40 L=1,15
      IF(J,L)=1HX
      ID(J,L)=1HX
      IR(J,L)=1HX
   40 CONTINUE
      ALT=5000.
      DO 10 IA=1,15
      W=30000
      DO 20 IW=1,36
      DI=0.
      DO 30 IDI=1,15
      CALL CLD(ACFT,ALT,W,DI,DFCL),      RETURNS(31)
      CALL CLF(ACFT,ALT,W,DI,FFCL)
      CALL CRD(ACFT,ALT,W,DI,FRCR)
      IF(IW,IDI)=FFCL
      ID(IW,IDI)=DFCL*10.+.5
      IR(IW,IDI)=FRCR*10000.+.5
   31 DI=DI+10.
   30 CONTINUE
      W=W+1000
   20 CONTINUE
      CALL H(DFCLT,ACFT,ALT)
      CALL D(ID)
      CALL H(FFCLT,ACFT,ALT)
      CALL D(IF)
      CALL H(FRCRT,ACFT,ALT)
      CALL D(IR)
      ALT=ALT+2500.
   10 CONTINUE
      STOP
      END
```

SUBROUTINE H TRACE

```
      SUBROUTINE H(TABLE,ACFT,ALT)
      COMMON/CACFT/F4E,A7D
      DATA CD,CF,CR/4HDFCL,4HFFCL,4HFRCR/
  901 FORMAT(1H1,61X,A3,9H AIRCRAFT,/,58X,9HALTITUDE-,F6.0,5H FEET)
  903 FORMAT(1X,/,76X,10HDRAG INDEX,/,1X,6HWEIGHT,23X, 99H0      10      2
     10      30      40      50      60      70      80      90     100     110
     2  120     130     140)
  904 FORMAT(56X,24HDISTANCE FOR CLIMB TABLE,/,43X,49HDISTANCES ARE IN N
     1AUTICAL MILES MULTIPLIED BY 10.)
  905 FORMAT(55X,27HFUEL CONSUMPTION RATE TABLE,/,43X, 50HRATES ARE IN N
     1AUTICAL MILES PER 10000 POUNDS FUEL.)
  906 FORMAT(58X,20HFUEL FOR CLIMB TABLE,/,58X,20HFUELS ARE IN POUNDS.)
      WRITE(6,901) ACFT,ALT
      IF(TABLE.EQ.CD) WRITE(6,904)
      IF(TABLE.EQ.CR) WRITE(6,905)
      IF(TABLE.EQ.CF) WRITE(6,906)
      WRITE(6,903)
      RETURN
      END
```

SUBROUTINE D TRACE

```
      SUBROUTINE D(N)
      DIMENSION N(36,15)
 901  FORMAT(I7,17X,15I7)
 902  FORMAT(1X)
      I=1
      IW=30000
      WRITE(6,902)
      WRITE(6,901) IW,(N(I,L),L=1,15)
      WRITE(6,902)
      DO 10 J=1,5
      DO  9 K=1,5
      I=I+1
      IW=IW+1000
      WRITE(6,901) IW,(N(I,L),L=1,15)
    9 CONTINUE
      WRITE(6,902)
   10 CONTINUE
      WRITE(6,902)
      DO 15 K=1,3
      I=I+1
      IW=IW+1000
      WRITE(6,901) IW,(N(I,L),L=1,15)
   15 CONTINUE
      DO 20 J=1,36
      DO 20 L=1,15
      N(J,L)=1HX
   20 CONTINUE
      RETURN
      END
```


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APPENDIX V

A-7D DRIVER FOR RADIUS OF ACTION SUBROUTINES LISTING

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PROGRAM P3700 TRACE

```
      PROGRAM P3700 (OUTPUT,TAPE6=OUTPUT)
      DIMENSION IF(35,16),ID(35,16),IR(35,16)
      COMMON/CACFT/F4E,A7D
      INTEGER W,FFCL
      DATA F4E,A7D,FFCLT,DFCLT,FRCRT/3HF4E,3HA7D,4HFFCL,4HDFCL,4HFRCR/
      DATA ACFT/3HA7D/
      DO 40 J=1,36
      DO 40 L=1,15
      IF(J,L)=1HX
      ID(J,L)=1HX
      IR(J,L)=1HX
   40 CONTINUE
      ALT=5000.
      DO 10 IA=1,15
      W=20000
      DO 20 IW=1,23
      DI=0.
      DO 30 IDI=1,16
      CALL CLD(ACFT,ALT,W,DI,DFCL),      RETURNS(31)
      CALL CLF(ACFT,ALT,W,DI,FFCL)
      CALL CRD(ACFT,ALT,W,DI,FRCR)
      IF(IW,IDI)=FFCL
      ID(IW,IDI)=DFCL*10.+.5
      IR(IW,IDI)=FRCR*10000.+.5
   31 DI=DI+10.
   30 CONTINUE
      W=W+1000
   20 CONTINUE
      CALL H(DFCLT,ACFT,ALT)
      CALL D(ID)
      CALL H(FFCLT,ACFT,ALT)
      CALL D(IF)
      CALL H(FRCRT,ACFT,ALT)
      CALL D(IR)
      ALT=ALT+2500.
   10 CONTINUE
      STOP
      END
```

SUBROUTINE H TRACE

```
      SUBROUTINE H(TABLE,ACFT,ALT)
      COMMON/CACFT/F4E,A7D
      DATA CD,CF,CR/4HDFCL,4HFFCL,4HFRCR/
  901 FORMAT(1H1,61X,A3,9H AIRCRAFT,/,58X,9HALTITUDE-,F6.0,5H FEET)
  903 FORMAT(1X,/,76X,10HDRAG INDEX,/,1X,6HWEIGHT,23X,106H0      20      4
     10      60      80     100     120     140     160     180     200     220
     2  240     260     280     300)
  904 FORMAT(56X,24HDISTANCE FOR CLIMB TABLE,/,43X,49HDISTANCES ARE IN N
     1AUTICAL MILES MULTIPLIED BY 10.)
  905 FORMAT(55X,27HFUEL CONSUMPTION RATE TABLE,/,43X, 50HRATES ARE IN N
     1AUTICAL MILES PER 10000 POUNDS FUEL.)
  906 FORMAT(58X,20HFUEL FOR CLIMB TABLE,/,58X,20HFUELS ARE IN POUNDS.)
      WRITE(6,901) ACFT,ALT
      IF(TABLE.EQ.CD) WRITE(6,904)
      IF(TABLE.EQ.CR) WRITE(6,905)
      IF(TABLE.EQ.CF) WRITE(6,906)
      WRITE(6,903)
      RETURN
      END
```

SUBROUTINE D TRACE

```
      SUBROUTINE D(N)
      DIMENSION N(35,16)
  901 FORMAT(I7,17X,16I7)
  902 FORMAT(1X)
      I=1
      IW=20000
      WRITE(6,902)
      WRITE(6,901) IW,(N(I,L),L=1,16)
      WRITE(6,902)
      DO 10 J=1,4
      DO  9 K=1,5
      I=I+1
      IW=IW+1000
      WRITE(6,901) IW,(N(I,L),L=1,16)
    9 CONTINUE
      WRITE(6,902)
   10 CONTINUE
      WRITE(6,902)
      DO 15 K=1,2
      I=I+1
      IW=IW+1000
      WRITE(6,901) IW,(N(I,L),L=1,16)
   15 CONTINUE
      DO 20 J=1,35
      DO 20 L=1,16
      N(J,L)=1HX
   20 CONTINUE
      RETURN
      END
```


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APPENDIX VI

TABULAR DATA FOR THE F-4E AIRCRAFT

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F4E AIRCRAFT
ALTITUDE- 5000. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

	DRAG INDEX														
WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	16	20	16	14	16	18	20	20	20	20	22	24	24	23	28
31000	17	20	17	15	17	19	21	21	21	21	23	24	25	24	29
32000	17	21	17	15	17	20	21	22	21	22	23	25	25	25	30
33000	18	22	18	16	18	20	22	22	22	22	24	26	26	25	31
34000	18	22	18	16	18	21	23	23	23	23	25	27	27	26	32
35000	19	23	19	17	19	21	23	24	23	24	26	28	28	27	33
36000	19	24	19	17	19	22	24	24	24	24	26	28	29	28	33
37000	20	24	20	18	20	23	25	25	25	25	27	29	29	28	34
38000	20	25	20	18	20	23	25	25	25	26	28	30	30	29	35
39000	21	26	21	19	21	24	26	26	26	26	28	31	31	30	36
40000	21	26	21	19	21	24	26	27	26	27	29	31	32	31	37
41000	22	27	22	20	22	25	27	27	27	28	30	32	33	31	38
42000	22	27	22	20	22	26	28	28	28	28	31	33	33	32	39
43000	23	28	23	21	23	26	28	29	28	29	31	34	34	33	40
44000	23	29	23	21	23	27	29	29	29	30	32	34	35	34	41
45000	24	29	24	22	24	27	30	30	30	30	33	35	35	34	42
46000	27	33	27	24	27	31	33	34	33	34	37	40	40	39	47
47000	28	34	28	25	28	32	34	35	34	35	38	41	41	40	48
48000	28	35	28	26	28	33	35	36	35	36	39	42	43	41	50
49000	29	36	29	26	29	34	36	37	36	37	40	43	44	42	51
50000	30	37	30	27	30	35	37	38	37	38	41	44	45	43	52
51000	25	31	25	23	25	29	31	32	31	32	35	37	38	36	44
52000	26	32	26	24	26	30	32	33	32	33	36	39	39	38	45
53000	27	33	27	24	27	31	33	34	33	34	37	40	40	39	47
54000	28	34	28	25	28	32	34	35	34	35	38	41	41	40	48
55000	28	35	28	26	28	33	35	36	35	36	39	42	43	41	50
56000	28	35	28	26	28	33	35	36	35	36	39	42	43	41	50
57000	30	37	30	27	30	34	37	38	37	38	41	44	45	43	52
58000	31	38	31	28	31	36	39	39	39	40	43	46	47	45	55

F4E AIRCRAFT
ALTITUDE- 5000. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	93	106	117	123	127	131	138	147	159	171	180	185	185	188	207
31000	95	109	119	126	130	135	141	151	163	175	185	189	190	193	212
32000	97	111	122	129	133	138	145	154	167	179	189	194	195	197	217
33000	100	114	125	132	137	141	148	158	171	183	193	198	199	202	222
34000	102	117	128	135	140	144	151	162	175	188	198	203	204	206	227
35000	104	119	131	138	143	148	155	165	178	192	202	208	208	211	232
36000	106	122	134	141	146	151	158	169	182	196	207	212	213	216	237
37000	109	124	137	144	149	154	161	173	186	200	211	217	217	220	242
38000	111	127	139	147	152	157	165	176	190	204	216	221	222	225	247
39000	113	130	142	150	155	160	168	180	194	209	220	226	226	230	252
40000	115	132	145	153	158	164	172	183	198	213	224	230	231	234	257
41000	118	135	148	156	162	167	175	187	202	217	229	235	236	239	262
42000	120	137	151	159	165	170	178	191	206	221	233	239	240	243	268
43000	122	140	154	162	168	173	182	194	210	225	238	244	245	248	273
44000	125	143	157	165	171	177	185	198	214	230	242	248	249	253	278
45000	127	145	159	168	174	180	188	201	217	234	246	253	254	257	283
46000	135	154	169	179	185	191	200	214	231	248	262	269	269	273	300
47000	138	158	174	183	190	196	205	219	237	255	269	276	276	280	308
48000	142	162	178	188	194	201	211	225	243	261	275	283	283	287	316
49000	145	166	183	193	199	206	216	231	249	268	282	289	290	294	324
50000	149	170	187	197	204	211	221	236	255	274	289	296	297	302	331
51000	152	174	191	202	209	216	226	242	261	281	296	303	304	309	339
52000	156	178	196	207	214	221	231	247	267	287	303	310	311	316	347
53000	159	182	200	211	218	226	237	253	273	293	309	317	318	323	355
54000	163	186	205	216	223	231	242	258	279	300	316	324	325	330	363
55000	166	190	209	221	228	236	247	264	285	306	323	331	332	337	370
56000	156	179	195	207	214	221	232	243	268	288	303	311	312	316	348
57000	160	183	201	212	219	227	238	254	274	295	311	319	320	324	356
58000	164	187	206	217	225	232	243	260	281	302	318	326	328	332	365

F4E AIRCRAFT
ALTITUDE- 5000. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	675	644	606	579	561	545	526	503	479	458	442	428	412	391	378
31000	670	639	602	575	557	542	523	500	476	455	439	426	410	389	375
32000	666	635	597	571	553	538	519	497	473	452	436	423	407	387	373
33000	661	630	593	567	549	534	516	493	470	449	433	420	404	384	370
34000	656	626	589	563	545	530	512	490	467	446	430	417	401	382	368
35000	651	621	585	559	542	526	508	487	464	443	427	414	399	379	366
36000	646	617	581	555	538	523	505	483	460	440	424	411	396	377	363
37000	642	612	576	551	534	519	501	480	457	437	421	408	393	374	361
38000	637	608	572	547	530	515	498	476	454	434	419	405	391	372	358
39000	632	603	568	543	526	511	494	473	451	431	416	403	388	370	356
40000	627	599	564	539	522	508	490	470	448	428	413	400	385	367	354
41000	622	594	560	535	518	504	487	466	445	425	410	397	383	365	351
42000	618	589	555	531	514	500	483	463	442	422	407	394	380	362	349
43000	613	585	551	527	510	496	480	460	438	419	404	391	377	360	346
44000	608	580	547	523	506	492	476	456	435	416	401	388	374	357	344
45000	603	576	543	519	503	489	472	453	432	413	398	385	372	355	342
46000	598	571	539	515	499	485	469	449	429	410	395	382	369	353	339
47000	594	567	534	511	495	481	465	446	426	407	392	380	366	350	337
48000	589	562	530	507	491	477	462	443	423	404	389	377	364	348	334
49000	584	558	526	503	487	474	458	439	419	401	386	374	361	345	332
50000	579	553	522	499	483	470	454	436	416	398	383	371	358	343	330
51000	574	549	518	495	479	466	451	433	413	395	380	368	355	340	327
52000	570	544	513	491	475	462	447	429	410	392	377	365	353	338	325
53000	565	540	509	487	471	458	444	426	407	389	374	362	350	336	322
54000	560	535	505	483	467	455	440	423	404	386	371	359	347	333	320
55000	555	530	501	479	464	451	436	419	401	383	369	357	345	331	318
56000	550	526	497	475	460	447	433	416	397	380	366	354	342	328	315
57000	546	521	492	471	456	443	429	412	394	377	363	351	339	326	313
58000	541	517	488	467	452	439	426	409	391	374	360	348	337	324	310

F4E AIRCRAFT
ALTITUDE- 7500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

	DRAG INDEX														
WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	26	32	26	24	25	30	33	33	33	34	36	39	39	38	46
31000	27	33	27	24	27	31	34	34	34	34	37	40	40	39	47
32000	27	34	27	25	27	32	34	35	34	35	38	41	41	40	48
33000	28	35	28	25	28	32	35	36	35	36	39	42	42	41	49
34000	29	35	29	26	29	33	36	36	36	37	40	43	43	42	50
35000	29	36	29	27	29	34	37	37	37	38	40	44	44	42	51
36000	30	37	30	27	30	35	38	38	38	38	41	45	45	43	53
37000	31	38	31	28	31	35	38	39	38	39	42	46	46	44	54
38000	31	39	31	28	31	36	39	40	39	40	43	47	47	45	55
39000	32	40	32	29	32	37	40	41	40	41	44	47	48	46	56
40000	33	40	33	30	33	38	41	41	41	42	45	48	49	47	57
41000	33	41	33	30	33	39	42	42	42	43	46	49	50	48	58
42000	34	42	34	31	34	39	43	43	43	44	47	50	51	49	60
43000	35	43	35	31	35	40	43	44	43	44	48	51	52	50	61
44000	35	44	35	32	35	41	44	45	44	45	49	52	53	51	62
45000	36	44	36	33	36	41	45	45	45	46	49	53	54	52	63
46000	46	57	45	42	46	53	58	58	58	59	63	68	69	67	81
47000	47	59	47	43	47	55	59	60	59	61	65	70	71	69	83
48000	49	60	49	44	49	56	61	62	61	62	67	72	73	71	85
49000	50	62	50	45	50	58	63	63	63	64	69	74	75	73	88
50000	52	64	52	47	52	60	64	65	64	66	71	76	77	75	90
51000	50	62	50	46	50	58	63	64	63	65	69	75	76	73	88
52000	52	64	52	47	52	60	65	65	65	66	71	76	77	75	90
53000	53	65	53	48	53	61	66	67	66	67	73	78	79	76	92
54000	54	67	54	49	54	62	67	68	67	69	74	80	81	78	94
55000	55	68	55	50	55	64	69	70	69	70	76	82	83	80	96
56000	51	63	51	46	51	59	64	65	64	66	71	76	77	74	90
57000	53	65	53	48	53	61	66	66	66	67	72	78	79	76	92
58000	54	66	54	49	54	62	67	68	67	69	74	80	81	78	94

F4E AIRCRAFT
ALTITUDE- 7500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

	DRAG INDEX														
WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	141	162	178	188	194	200	210	224	242	261	275	282	283	287	315
31000	146	167	183	194	200	207	217	232	250	269	283	291	292	296	325
32000	150	172	189	199	206	213	223	239	258	277	292	299	300	305	335
33000	155	177	194	205	212	219	230	246	265	285	300	308	309	314	345
34000	159	182	200	211	218	225	236	253	273	293	309	317	318	322	355
35000	164	187	206	217	224	232	243	260	280	301	318	326	327	331	364
36000	168	192	211	223	230	238	250	267	288	310	326	335	336	340	374
37000	172	197	217	229	236	244	256	274	296	318	335	344	345	350	384
38000	177	202	222	235	243	251	263	281	303	326	344	353	354	359	394
39000	181	207	228	241	249	257	269	288	311	334	352	361	363	368	404
40000	186	212	234	247	255	263	276	295	318	342	361	370	372	377	414
41000	187	214	235	248	256	265	278	297	320	[illegible]	363	373	374	379	417
42000	190	217	238	252	260	269	282	301	325	349	368	378	379	384	422
43000	192	220	242	255	264	272	286	305	329	354	373	383	384	390	428
44000	195	223	245	259	267	276	289	309	334	359	378	388	389	395	434
45000	197	226	248	262	271	280	293	313	338	364	384	394	395	400	440
46000	210	240	264	279	288	297	312	333	360	387	408	418	420	426	468
47000	216	247	271	286	296	306	320	342	370	397	419	430	431	437	481
48000	221	253	278	294	304	314	329	352	380	408	430	441	443	449	493
49000	227	260	286	301	311	322	337	361	389	419	441	453	454	460	506
50000	233	266	293	309	319	330	346	370	399	429	452	464	466	472	519
51000	236	270	297	313	324	334	351	375	405	435	458	470	472	478	526
52000	239	274	301	317	328	339	355	380	410	441	465	477	478	485	533
53000	242	277	305	322	332	343	360	385	415	447	471	483	485	491	540
54000	246	281	309	326	337	348	365	390	421	452	477	489	491	498	547
55000	249	284	313	330	341	352	369	395	426	458	483	496	497	504	554
56000	221	253	278	293	303	313	329	351	379	407	430	441	442	448	493
57000	228	260	286	302	312	322	338	361	390	419	442	453	455	461	507
58000	234	268	294	310	321	331	348	371	401	431	454	466	468	474	521

F4E AIRCRAFT
ALTITUDE- 7500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	726	692	651	621	603	586	565	539	513	490	473	459	441	417	403
31000	720	687	645	617	598	581	560	535	509	487	470	455	438	414	400
32000	715	681	640	612	593	576	556	531	505	483	466	452	434	411	397
33000	709	676	635	607	588	572	552	527	501	479	463	448	431	408	394
34000	703	670	630	602	584	567	547	523	498	476	459	445	428	405	391
35000	697	665	625	597	579	563	543	519	494	472	455	441	425	402	389
36000	691	659	620	592	574	558	538	515	490	468	452	438	421	399	386
37000	685	654	615	587	569	553	534	511	486	465	448	435	418	397	383
38000	680	648	610	582	565	549	530	506	482	461	445	431	415	394	380
39000	674	643	604	578	560	544	525	502	478	457	441	428	411	391	377
40000	668	637	599	573	555	540	521	498	475	454	438	424	408	388	374
41000	662	632	594	568	550	535	517	494	471	450	434	421	405	385	371
42000	656	626	589	563	546	530	512	490	467	446	430	417	402	382	368
43000	650	620	584	558	541	526	508	486	463	443	427	414	398	379	365
44000	644	615	579	553	536	521	503	482	459	439	423	410	395	376	362
45000	639	609	574	548	531	517	499	478	455	435	420	407	392	373	359
46000	633	604	569	543	527	512	495	474	452	432	416	403	388	370	356
47000	627	598	564	539	522	507	490	470	448	428	413	400	385	367	353
48000	621	592	558	534	517	503	486	465	444	424	409	396	382	364	351
49000	615	587	553	529	512	498	481	461	440	421	405	393	379	361	348
50000	609	582	548	524	508	494	477	457	436	417	402	389	375	358	345
51000	604	576	543	519	503	489	473	453	432	413	398	386	372	355	342
52000	598	571	538	514	498	484	468	449	429	410	395	382	369	352	339
53000	592	565	533	509	493	480	464	445	425	406	391	379	365	349	336
54000	586	560	528	504	489	475	460	441	421	402	387	375	362	346	333
55000	580	554	523	500	484	471	455	437	417	399	384	372	359	343	330
56000	574	549	518	495	479	466	451	433	413	395	380	368	355	340	327
57000	568	543	512	490	474	461	446	429	409	391	377	365	352	338	324
58000	563	538	507	485	470	457	442	424	405	388	373	361	349	335	321

F4E AIRCRAFT
ALTITUDE-10000. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

	DPAG INDEX														
WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	34	42	34	31	34	39	42	43	42	43	47	50	51	49	59
31000	35	43	35	32	35	40	44	44	44	45	48	52	53	51	61
32000	36	45	36	33	36	42	45	46	45	46	50	54	54	52	63
33000	37	46	37	34	37	43	47	47	47	48	51	55	56	54	65
34000	38	47	38	35	38	44	48	48	48	49	53	57	57	55	67
35000	39	49	39	36	38	45	49	50	49	50	54	58	59	57	69
36000	40	50	40	37	40	47	51	51	51	52	56	60	61	58	71
37000	42	51	42	38	42	48	52	53	52	53	57	62	62	60	73
38000	43	53	43	39	43	49	53	54	53	55	59	63	64	62	75
39000	44	54	44	40	44	50	55	55	55	56	60	65	66	63	77
40000	45	55	45	41	45	52	56	57	56	57	62	66	67	65	78
41000	46	57	46	42	46	53	57	58	57	59	63	68	69	66	80
42000	47	58	47	42	47	54	59	59	59	60	65	70	70	68	82
43000	48	59	48	43	48	55	60	61	60	61	66	71	72	69	84
44000	49	61	49	44	49	57	61	62	61	63	68	73	74	71	86
45000	50	62	50	45	50	58	63	63	63	64	69	74	75	73	88
46000	63	78	63	57	63	73	79	80	79	81	87	94	95	91	111
47000	65	81	65	59	65	75	82	83	82	84	90	97	98	94	114
48000	67	83	67	61	67	78	84	85	84	86	93	100	101	97	118
49000	70	86	70	63	70	80	87	88	87	89	96	103	104	100	122
50000	72	88	72	65	72	83	89	91	89	92	98	106	107	103	125
51000	74	91	74	67	74	85	92	93	92	94	101	109	111	106	129
52000	76	93	76	69	76	87	95	96	95	97	104	112	114	109	133
53000	78	96	78	70	78	90	97	98	97	100	107	115	117	112	136
54000	80	99	80	72	80	92	100	101	100	102	110	118	120	115	140
55000	82	100	82	75	83	95	103	105	104	107	114	123	125	122	146
56000	76	94	76	69	76	88	96	97	96	98	105	113	115	111	134
57000	79	97	79	71	79	91	99	100	99	101	109	117	118	114	138
58000	81	100	82	75	82	94	102	104	103	105	113	122	124	120	144

F4E AIRCRAFT
ALTITUDE-10000. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	171	196	216	228	235	243	255	272	294	316	333	342	343	348	382
31000	176	202	222	234	242	250	262	280	302	325	343	352	353	358	393
32000	181	207	228	241	249	257	269	288	311	334	352	361	363	368	404
33000	186	213	234	247	255	264	277	296	319	343	362	371	372	377	415
34000	191	219	240	254	262	271	284	303	328	352	371	381	382	387	426
35000	196	224	246	260	269	278	291	311	336	361	381	391	392	397	437
36000	201	230	253	267	276	285	298	319	344	370	390	400	402	407	448
37000	206	235	259	273	282	292	306	327	353	379	400	410	412	417	459
38000	211	241	265	280	289	298	313	335	361	388	409	420	421	427	470
39000	216	247	271	286	296	305	320	342	370	397	419	430	431	437	480
40000	220	252	277	293	302	312	328	350	378	406	428	439	441	447	491
41000	225	258	283	299	309	319	335	358	386	415	438	449	451	457	502
42000	230	263	290	306	316	326	342	366	395	424	447	459	461	467	513
43000	235	269	296	312	323	333	349	373	403	433	457	469	471	477	524
44000	240	275	302	319	329	340	357	381	412	442	466	479	480	487	535
45000	245	280	308	325	336	347	364	389	420	451	476	488	490	497	546
46000	257	294	323	341	352	364	382	408	440	473	499	512	514	521	573
47000	264	301	331	350	361	373	392	418	452	486	512	525	527	534	587
48000	270	309	340	359	371	383	401	429	463	498	525	539	540	548	602
49000	277	317	348	367	380	392	411	440	475	510	538	552	554	561	617
50000	283	324	356	376	389	402	421	450	486	522	551	565	567	575	632
51000	290	332	365	385	398	411	431	461	497	535	564	578	580	588	647
52000	297	339	373	394	407	420	441	471	509	547	577	592	594	602	661
53000	303	347	381	403	416	430	451	482	520	559	590	605	607	615	676
54000	310	355	390	412	425	439	461	492	532	571	602	618	621	629	691
55000	317	362	398	421	434	449	471	503	543	584	615	631	633	642	706
56000	318	364	400	423	437	451	473	506	546	587	619	635	637	646	710
57000	326	373	410	433	448	462	485	518	559	602	634	651	653	662	727
58000	334	382	420	444	458	474	497	531	573	616	649	666	668	678	745

F4E AIRCRAFT
ALTITUDE-10000. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	787	750	704	672	652	634	610	582	553	528	511	495	475	448	434
31000	781	744	698	667	647	629	606	577	549	524	507	492	472	445	430
32000	774	738	693	662	642	624	601	573	544	520	503	488	468	441	427
33000	768	732	687	656	636	619	596	568	540	516	499	484	464	438	424
34000	762	726	681	651	631	614	591	564	536	512	495	481	461	435	421
35000	755	720	676	645	625	608	586	559	532	508	491	476	457	432	418
36000	749	714	670	640	621	603	582	555	528	504	487	472	454	429	414
37000	742	708	665	635	616	598	577	550	523	500	483	469	450	425	411
38000	736	701	659	629	611	593	572	546	519	496	479	465	446	422	408
39000	730	695	653	624	605	588	567	542	515	492	475	461	443	419	405
40000	723	689	648	619	600	583	562	537	511	488	471	457	439	416	402
41000	717	683	642	613	595	578	558	533	507	484	468	453	436	412	398
42000	710	677	637	608	590	573	553	528	502	480	464	449	432	409	395
43000	704	671	631	603	584	568	548	524	498	476	460	446	428	406	392
44000	698	665	625	597	579	563	543	519	494	472	456	442	425	403	389
45000	691	659	620	592	574	558	538	515	490	468	452	438	421	399	386
46000	685	653	614	587	569	553	534	510	486	464	448	434	418	396	382
47000	678	647	609	581	564	548	529	506	481	460	444	430	414	393	379
48000	672	641	603	576	558	543	524	501	477	456	440	426	410	390	376
49000	666	635	597	571	553	538	519	497	473	452	436	423	407	387	373
50000	659	629	592	565	548	533	514	492	469	448	432	419	403	383	370
51000	653	623	586	560	543	528	510	488	465	444	428	415	400	380	366
52000	646	617	581	555	538	523	505	483	460	440	424	411	396	377	363
53000	640	611	575	549	532	518	500	479	456	436	420	407	392	374	360
54000	634	605	569	544	527	513	495	474	452	432	417	404	389	370	357
55000	627	599	564	539	522	508	490	470	448	428	413	400	385	367	354
56000	621	593	558	533	517	503	486	465	444	424	409	396	382	364	350
57000	614	586	553	528	512	497	481	461	439	420	405	392	378	361	347
58000	608	580	547	523	506	492	476	456	435	416	401	388	374	357	344

F4E AIRCRAFT
ALTITUDE-12500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	43	54	43	39	43	50	54	55	54	56	60	64	65	63	76
31000	45	56	45	41	45	52	56	57	56	58	62	67	68	65	79
32000	47	58	47	42	47	54	58	59	58	60	64	69	70	67	82
33000	48	59	48	44	48	56	60	61	60	62	66	71	72	70	84
34000	50	61	50	45	50	57	62	63	62	64	68	74	75	72	87
35000	51	63	51	46	51	59	64	65	64	66	71	76	77	74	90
36000	53	65	53	48	53	61	66	67	66	68	73	78	79	77	93
37000	55	67	55	49	55	63	68	69	68	70	75	81	82	79	95
38000	56	69	56	51	56	65	70	71	70	72	77	83	84	81	98
39000	58	71	58	52	58	67	72	73	72	74	79	85	87	83	101
40000	59	73	59	54	59	68	74	75	74	76	82	88	89	85	104
41000	61	75	61	55	61	70	76	77	76	78	84	90	91	88	107
42000	62	77	62	56	62	72	78	79	78	80	86	93	94	90	109
43000	64	79	64	58	64	74	80	81	80	82	88	95	96	93	112
44000	66	81	66	59	66	76	82	83	82	84	90	97	98	95	115
45000	67	83	67	61	67	78	84	85	84	86	92	100	101	97	118
46000	78	96	78	70	78	90	97	98	97	100	107	115	117	112	136
47000	80	99	80	73	81	93	101	102	101	103	111	119	121	117	141
48000	83	101	84	77	84	96	104	105	106	109	117	125	128	125	149
49000	85	103	87	81	88	100	108	111	111	114	122	132	135	134	156
50000	88	105	90	85	92	104	112	115	116	120	128	138	142	142	164
51000	91	107	94	89	97	108	117	121	122	127	135	145	151	153	174
52000	94	109	97	94	101	112	121	125	128	132	141	151	158	161	162
53000	97	111	101	98	105	116	125	130	133	138	147	158	165	170	190
54000	99	113	104	102	109	120	129	134	138	144	153	164	173	179	198
55000	102	115	107	106	113	124	133	139	144	150	159	170	180	188	206
56000	95	110	99	96	103	114	123	128	131	136	144	155	162	166	186
57000	99	112	103	101	108	119	128	133	137	143	152	162	171	177	196
58000	102	115	107	106	113	123	133	139	144	150	159	170	180	188	205

F4E AIRCRAFT
ALTITUDE-12500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	203	232	255	269	279	287	301	322	347	373	394	404	405	411	452
31000	208	238	262	276	285	295	309	330	357	383	404	415	415	422	464
32000	214	244	268	283	293	303	317	339	366	394	415	426	427	433	476
33000	219	251	275	291	300	310	325	348	375	404	426	437	438	444	488
34000	224	257	282	298	308	318	334	356	385	414	436	447	449	455	500
35000	230	263	289	305	315	326	342	365	394	424	447	458	460	466	512
36000	235	269	296	312	323	333	350	374	404	434	457	469	471	477	525
37000	241	276	303	320	330	341	358	382	413	444	468	480	482	488	537
38000	246	282	310	327	338	349	366	391	422	454	479	491	493	499	549
39000	252	288	316	334	345	357	374	400	432	464	489	502	504	510	561
40000	257	294	323	341	353	364	382	408	441	474	500	513	514	521	573
41000	266	304	335	353	365	377	395	423	456	490	517	530	532	539	593
42000	274	313	344	363	375	388	406	434	469	504	531	545	547	554	610
43000	281	321	353	373	385	398	417	446	482	518	546	560	562	569	626
44000	288	330	362	383	395	408	428	458	494	531	560	575	577	584	643
45000	296	338	372	393	406	419	439	469	507	545	575	589	591	599	659
46000	306	350	384	406	419	433	454	485	524	563	594	609	611	620	681
47000	313	358	394	416	430	444	465	497	537	577	609	624	627	635	698
48000	321	367	403	426	440	455	477	509	550	591	623	640	642	650	715
49000	328	376	413	436	450	465	488	521	563	605	638	655	657	666	732
50000	336	384	422	446	461	476	499	533	576	619	653	670	672	681	749
51000	342	391	430	454	469	484	508	543	586	630	664	681	684	693	762
52000	352	402	442	467	482	498	522	558	603	648	683	701	703	713	784
53000	361	413	454	480	496	512	537	574	620	666	702	720	723	733	806
54000	371	424	467	493	509	526	552	589	636	684	721	740	743	753	827
55000	381	436	479	506	523	540	566	605	653	702	740	759	762	772	849
56000	403	461	506	535	552	571	598	640	691	742	783	803	806	817	898
57000	412	471	518	547	565	584	612	654	706	759	801	821	824	835	918
58000	421	482	530	559	578	597	626	669	722	776	819	840	843	854	939

F4E AIRCRAFT
ALTITUDE-12500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	848	808	757	723	702	682	656	625	593	567	548	532	513	479	464
31000	841	801	751	717	690	676	651	620	588	562	544	528	506	475	461
32000	834	794	745	711	690	671	646	615	584	558	539	524	502	472	457
33000	827	788	739	705	685	665	640	610	579	554	535	519	498	468	454
34000	820	781	733	700	679	660	635	605	574	549	531	515	494	465	450
35000	813	775	727	694	673	654	630	600	570	545	527	511	490	461	447
36000	806	768	720	688	668	649	625	595	565	540	522	507	485	457	443
37000	799	761	714	682	662	643	619	590	561	536	518	503	482	454	440
38000	792	755	708	676	656	638	614	585	556	532	514	498	478	450	436
39000	785	748	702	671	650	632	609	581	552	527	509	494	474	447	433
40000	778	741	696	665	645	627	604	576	547	523	505	490	470	443	429
41000	771	735	690	659	639	621	598	571	542	518	501	486	466	440	426
42000	764	728	684	653	633	616	593	566	538	514	497	482	462	436	422
43000	757	722	678	647	628	610	588	561	533	510	492	478	458	433	419
44000	750	715	671	641	622	605	583	556	529	505	488	473	455	429	415
45000	743	708	665	636	616	599	577	551	524	501	484	469	451	426	412
46000	736	702	659	630	611	594	572	546	519	497	479	465	447	422	408
47000	729	695	653	624	605	588	567	541	515	492	475	461	443	419	405
48000	722	689	647	618	599	583	562	536	510	488	471	457	439	415	401
49000	715	682	641	612	594	577	556	532	506	483	467	452	435	412	398
50000	708	675	635	606	588	572	551	527	501	479	462	448	431	408	394
51000	701	669	629	601	582	566	546	522	497	475	458	444	427	405	391
52000	694	662	623	595	577	561	541	517	492	470	454	440	423	401	387
53000	687	655	616	589	571	555	536	512	487	466	450	436	419	398	384
54000	680	649	610	583	565	549	530	507	483	462	445	432	415	394	380
55000	673	642	604	577	560	544	525	502	478	457	441	427	411	390	377
56000	666	636	598	571	554	538	520	497	474	453	437	423	407	387	373
57000	659	629	592	566	549	533	515	492	469	448	432	419	403	383	370
58000	652	622	586	560	543	527	509	487	464	444	428	415	399	380	366

F4E AIRCRAFT
ALTITUDE-15000. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

	DRAG INDEX														
WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	56	69	56	51	56	65	70	71	70	72	77	83	84	81	98
31000	58	72	58	52	58	67	72	73	72	74	80	86	87	84	101
32000	60	74	60	54	60	69	75	76	75	77	82	89	90	87	105
33000	62	76	62	56	62	72	77	78	77	79	85	92	93	90	108
34000	64	79	64	58	64	74	80	81	80	82	88	95	95	92	112
35000	66	81	66	60	66	76	82	83	82	84	91	98	99	95	115
36000	68	84	68	62	68	78	85	86	85	87	93	101	102	98	119
37000	70	86	70	63	70	81	87	89	87	90	96	104	105	101	122
38000	72	89	72	65	72	83	90	91	90	92	99	107	108	104	126
39000	74	91	74	67	74	85	92	94	92	95	102	110	111	107	129
40000	76	94	76	69	76	88	95	96	95	97	104	113	114	110	133
41000	78	96	78	71	73	90	97	99	97	100	107	116	117	113	136
42000	80	99	80	72	80	92	100	101	100	102	110	119	120	116	140
43000	82	100	82	75	83	95	103	105	104	107	114	123	125	122	146
44000	84	102	85	78	86	98	106	108	108	111	119	128	131	129	152
45000	86	103	87	82	89	101	109	112	112	115	123	133	136	135	158
46000	92	107	95	90	98	109	118	122	124	128	136	146	152	154	175
47000	95	109	98	95	102	113	122	126	129	134	143	153	160	164	184
48000	97	111	102	99	106	117	126	131	135	140	149	159	168	173	192
49000	100	113	105	103	110	121	130	136	140	146	155	166	175	182	200
50000	103	115	108	107	114	125	134	141	146	152	161	173	183	191	208
51000	106	117	112	111	118	129	138	145	151	158	168	179	190	200	217
52000	108	119	115	116	122	133	142	150	157	164	174	186	198	209	225
53000	111	121	119	120	127	137	147	155	162	170	180	192	205	218	233
54000	114	123	122	124	131	141	151	160	168	176	186	199	213	227	242
55000	117	125	126	128	135	145	155	164	173	182	192	205	221	237	250
56000	109	120	116	117	124	134	144	152	158	166	176	188	200	212	228
57000	112	122	120	122	129	139	149	157	165	173	183	195	209	223	237
58000	116	125	124	127	133	143	153	163	171	180	190	203	218	233	247

F4E AIRCRAFT
ALTITUDE-15000. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	243	278	305	323	334	345	361	386	417	448	473	485	485	493	542
31000	250	286	315	332	343	355	372	397	429	461	486	499	500	507	558
32000	257	294	323	341	353	364	382	408	441	474	500	513	514	521	573
33000	264	302	332	351	362	374	393	420	453	487	513	527	528	536	589
34000	271	310	341	360	372	384	403	431	465	500	527	541	542	551	604
35000	278	318	350	369	382	394	413	442	477	513	541	555	556	564	620
36000	285	326	359	379	391	404	424	453	489	526	554	569	570	578	636
37000	292	334	367	388	401	414	434	464	501	539	568	582	584	592	651
38000	299	342	376	397	410	424	445	475	513	551	581	596	598	607	667
39000	306	350	385	406	420	434	455	486	525	564	595	610	612	621	682
40000	313	358	394	416	430	444	465	497	537	577	609	624	626	635	698
41000	324	371	407	430	444	459	482	515	556	597	630	640	648	657	722
42000	333	381	419	442	457	472	495	529	571	614	647	664	666	675	743
43000	342	392	430	454	469	485	509	543	587	631	665	682	685	694	763
44000	351	402	442	466	482	498	522	558	602	647	683	700	703	712	783
45000	360	412	453	478	494	511	536	572	618	664	700	718	721	731	803
46000	370	423	465	491	507	524	549	587	634	681	718	737	739	749	824
47000	379	433	476	503	519	536	563	601	649	698	736	755	757	768	844
48000	388	444	488	515	532	549	576	615	665	715	753	773	775	786	864
49000	397	454	499	527	544	562	590	630	680	731	771	791	794	805	885
50000	406	464	510	539	557	575	603	645	695	748	789	809	812	823	905
51000	408	467	513	542	560	578	607	648	700	752	793	814	817	828	910
52000	419	480	527	557	575	594	623	666	719	773	815	836	839	850	934
53000	430	492	541	571	590	610	639	683	738	793	836	858	861	872	959
54000	441	504	555	587	607	627	658	703	759	815	860	883	887	901	990
55000	452	516	569	603	625	647	680	726	784	842	888	914	922	940	1033
56000	463	527	583	620	644	668	702	750	809	869	917	944	955	980	1076
57000	474	538	597	637	663	688	724	774	834	896	945	975	991	1019	1118
58000	485	549	612	654	682	709	746	797	860	922	973	1006	1026	1059	1161

F4E AIRCRAFT
ALTITUDE-15000. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DPAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	904	860	806	770	747	726	698	664	629	602	582	565	541	507	492
31000	896	853	799	763	740	719	692	658	624	597	577	551	536	503	488
32000	888	845	792	756	734	713	686	653	619	592	572	556	532	499	484
33000	880	838	785	750	727	707	680	647	614	587	567	551	527	495	480
34000	872	830	778	743	721	701	674	641	608	582	563	546	523	491	476
35000	864	823	771	736	714	694	668	636	603	577	558	541	518	487	472
36000	856	815	764	730	708	688	662	630	598	572	553	537	514	483	468
37000	848	807	757	723	701	682	656	625	593	567	548	532	509	479	464
38000	840	800	750	716	695	675	650	619	587	562	543	527	505	475	460
39000	832	792	743	710	688	669	644	613	582	557	538	522	500	471	456
40000	824	785	736	703	682	663	638	608	577	552	533	517	496	466	452
41000	816	777	729	696	675	656	632	602	572	547	528	513	491	462	448
42000	808	770	722	690	669	650	626	597	566	542	523	508	487	458	444
43000	800	762	715	683	662	644	620	591	561	537	518	503	482	454	440
44000	792	754	708	676	656	637	614	585	556	532	514	498	478	450	436
45000	784	747	701	670	649	631	608	580	551	526	509	494	473	446	432
46000	776	739	694	663	643	625	602	574	545	521	504	489	469	442	428
47000	768	732	687	656	636	619	596	568	540	516	499	484	464	438	424
48000	760	724	680	649	630	612	590	563	535	511	494	479	460	434	420
49000	752	717	673	643	623	606	584	557	530	506	489	474	455	430	416
50000	744	709	666	636	617	600	578	552	524	501	484	470	451	426	412
51000	736	701	659	629	610	593	572	546	519	496	479	465	446	422	408
52000	728	694	652	623	604	587	566	540	514	491	474	460	442	418	404
53000	720	686	645	616	597	581	560	535	509	486	469	455	437	414	400
54000	712	679	638	609	591	574	554	529	503	481	465	450	433	410	396
55000	704	671	631	603	584	568	548	524	498	476	460	446	428	406	392
56000	696	664	624	596	578	562	542	518	493	471	455	441	424	402	388
57000	688	656	617	589	571	556	536	512	488	466	450	436	419	398	384
58000	680	649	610	583	565	549	530	507	482	462	445	431	415	394	380

F4E AIRCRAFT
ALTITUDE-17500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

	DRAG INDEX														
WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	70	87	70	64	70	81	88	89	89	90	97	104	105	102	123
31000	73	89	73	66	73	84	91	92	94	93	100	107	109	105	127
32000	75	92	75	68	75	86	94	95	94	96	103	111	112	108	131
33000	77	95	77	70	77	89	96	98	96	99	106	114	115	112	135
34000	80	98	80	72	80	92	99	101	99	102	109	118	119	115	139
35000	82	100	82	75	83	95	103	104	104	106	114	123	125	122	145
36000	84	102	85	79	86	98	106	108	108	111	119	128	131	129	152
37000	86	103	88	82	90	102	110	112	113	116	125	134	138	137	159
38000	89	105	91	86	93	105	113	116	118	122	130	139	144	145	166
39000	91	107	94	89	97	108	117	120	122	127	135	145	151	152	173
40000	93	108	97	93	100	112	120	124	127	132	140	150	157	160	180
41000	96	110	100	96	104	115	124	128	132	137	146	156	163	168	187
42000	98	112	103	100	107	118	127	133	136	142	151	161	170	176	194
43000	100	114	106	104	111	121	131	137	141	147	156	167	176	183	201
44000	103	115	108	107	114	125	134	141	146	152	161	172	183	191	208
45000	105	117	111	111	118	128	138	145	150	157	166	178	189	199	215
46000	108	119	115	115	122	132	142	149	156	163	173	185	197	208	224
47000	111	121	118	119	126	136	146	154	162	169	179	192	205	217	232
48000	114	123	122	124	131	140	151	159	167	176	186	198	213	227	241
49000	117	125	126	128	135	145	155	164	173	182	192	205	221	237	250
50000	119	127	129	133	139	149	159	169	179	188	199	212	229	246	258
51000	122	129	132	136	143	152	163	174	184	194	204	218	235	254	266
52000	125	131	136	141	147	156	167	179	190	200	211	225	243	264	274
53000	128	133	139	145	151	160	171	183	195	206	217	231	251	273	283
54000	130	135	143	149	156	164	176	188	201	212	223	238	258	282	291
55000	133	137	146	153	160	168	180	193	206	218	230	245	265	291	299
56000	126	132	137	142	148	157	168	180	191	202	213	227	246	266	277
57000	129	134	141	147	153	162	173	186	197	208	220	234	254	277	286
58000	132	136	145	151	159	166	178	191	204	215	227	241	263	287	296

F4E AIRCRAFT
ALTITUDE-17500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	289	330	363	383	396	409	429	458	495	532	561	575	577	585	643
31000	298	341	374	395	408	422	442	473	510	549	578	593	596	604	664
32000	307	351	386	407	421	435	456	487	526	566	596	612	614	622	684
33000	316	362	398	420	434	448	470	502	542	583	614	630	32	641	705
34000	325	372	409	432	446	461	484	517	558	600	632	649	651	660	725
35000	335	383	421	444	459	474	497	531	574	617	650	667	669	678	746
36000	344	393	432	457	472	487	511	546	590	634	668	686	688	697	767
37000	353	404	444	469	484	500	525	561	605	651	686	704	706	716	787
38000	362	415	456	481	497	513	538	575	621	668	704	722	725	735	808
39000	372	425	467	493	510	527	552	590	637	685	722	741	743	753	828
40000	381	436	479	506	522	540	566	605	653	702	740	759	762	772	849
41000	392	448	493	520	538	555	582	622	672	722	762	781	784	795	874
42000	402	460	506	534	552	570	597	638	689	741	781	802	804	815	896
43000	412	472	518	547	565	584	613	655	707	760	801	822	825	836	919
44000	422	483	531	561	579	599	628	671	724	778	821	842	845	856	942
45000	433	495	544	574	593	613	643	687	742	797	841	862	865	877	964
46000	442	505	556	586	608	628	659	704	760	817	861	884	889	903	992
47000	453	516	570	604	627	649	681	728	785	844	890	915	924	943	1035
48000	464	528	584	621	646	669	703	752	811	870	918	940	959	982	1078
49000	475	539	598	638	665	690	725	775	836	897	947	977	993	1022	1121
50000	486	550	613	655	683	710	747	799	861	924	975	1008	1028	1062	1164
51000	489	553	617	660	689	716	754	806	869	932	983	1017	1038	1073	1176
52000	501	565	631	678	709	738	777	830	895	959	1013	1049	1074	1114	1221
53000	512	577	645	695	728	759	800	855	921	987	1042	1081	1110	1155	1266
54000	524	588	661	713	743	780	822	880	947	1015	1072	1113	1146	1197	1310
55000	535	600	676	730	767	801	845	904	973	1043	1101	1145	1182	1238	1355
56000	521	586	658	709	743	775	817	874	941	1009	1065	1106	1138	1187	1300
57000	534	599	674	729	766	808	843	902	971	1040	1099	1142	1179	1234	1351
58000	547	612	691	749	788	824	869	930	1001	1072	1132	1179	1224	1281	1461

F4E AIRCRAFT
ALTITUDE-17500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 1000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	956	909	851	813	789	767	737	700	663	634	614	596	570	533	518
31000	946	900	843	805	781	759	730	694	657	628	608	591	565	528	513
32000	937	891	835	797	774	752	723	687	651	622	602	585	559	523	508
33000	927	883	826	789	766	744	716	680	645	616	596	579	554	519	504
34000	918	874	818	781	758	737	708	674	639	610	591	574	549	514	499
35000	908	865	810	773	751	729	701	667	632	604	585	568	543	509	494
36000	899	856	802	765	743	722	694	660	626	598	579	562	538	504	489
37000	889	847	793	757	735	714	687	654	620	593	573	557	533	500	485
38000	880	838	785	750	727	707	680	647	614	587	567	551	527	495	480
39000	870	829	777	742	720	699	673	640	608	581	562	545	522	490	475
40000	861	820	768	734	712	692	666	634	601	575	556	540	517	485	471
41000	852	811	760	726	704	684	659	627	595	569	550	534	511	480	466
42000	842	802	752	718	697	677	652	620	589	563	544	528	505	476	461
43000	833	793	744	710	689	669	644	614	583	557	538	523	501	471	456
44000	823	784	735	702	681	662	637	607	576	551	533	517	496	466	452
45000	814	775	727	694	674	655	630	600	570	545	527	511	490	461	447
46000	804	766	719	686	666	647	623	594	564	539	521	506	485	455	442
47000	795	757	710	678	658	640	616	587	558	533	515	500	480	452	437
48000	785	748	702	671	651	632	609	581	552	527	509	494	474	447	433
49000	776	739	694	663	643	625	602	574	545	521	504	489	469	442	428
50000	766	730	685	655	635	617	595	567	539	515	498	483	464	437	423
51000	757	721	677	647	627	610	588	561	533	509	492	477	458	433	418
52000	747	712	669	639	620	602	580	554	527	503	486	472	453	428	414
53000	738	703	661	631	612	595	573	547	520	498	480	466	448	423	409
54000	728	694	652	623	604	587	566	541	514	492	475	460	442	418	404
55000	719	685	644	615	597	580	559	534	508	486	469	455	437	413	399
56000	709	676	636	607	589	572	552	527	502	480	463	449	432	409	395
57000	700	667	627	599	581	565	545	521	496	474	457	443	426	404	390
58000	690	658	619	591	573	557	538	514	489	468	451	438	421	399	385

F4E AIRCRAFT
ALTITUDE-20000. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	84	101	84	78	85	97	105	107	107	110	118	127	130	128	151
31000	86	103	88	82	89	101	109	112	113	116	124	133	137	136	159
32000	89	105	91	86	93	105	113	117	118	122	130	140	145	145	167
33000	92	107	95	90	97	109	117	121	123	128	136	146	152	154	175
34000	94	109	98	94	101	113	121	126	129	133	142	152	159	163	183
35000	97	111	101	98	105	117	125	131	134	139	148	159	167	172	191
36000	100	113	105	102	110	120	130	135	139	145	154	165	174	181	199
37000	102	115	108	106	114	124	134	140	145	151	160	172	181	190	207
38000	105	117	111	111	118	128	138	144	150	157	166	178	189	198	215
39000	108	119	115	115	122	132	142	149	155	163	172	184	196	207	223
40000	110	121	118	119	126	136	146	154	161	169	178	191	204	216	231
41000	113	123	121	123	130	140	150	158	166	174	184	197	211	225	239
42000	116	125	125	127	134	143	154	163	172	180	190	203	218	234	247
43000	118	127	128	131	138	147	158	168	177	186	196	210	226	243	255
44000	121	129	131	135	142	151	162	172	182	192	203	216	233	252	263
45000	124	131	135	139	146	155	166	177	188	198	209	222	240	260	271
46000	128	134	140	145	152	161	172	184	196	206	218	232	256	274	284
47000	131	136	144	150	157	165	177	190	202	214	225	240	260	284	293
48000	134	138	148	155	161	170	181	195	209	221	232	247	269	295	303
49000	138	141	152	160	165	174	186	201	215	228	240	255	278	306	313
50000	141	143	156	165	171	179	191	206	222	235	247	263	287	317	322
51000	144	145	160	170	176	184	196	212	228	242	254	270	295	327	332
52000	147	148	164	175	181	188	201	218	235	249	261	278	305	338	342
53000	151	150	168	180	186	193	206	223	241	256	269	286	314	349	352
54000	154	152	172	185	191	198	211	229	248	263	276	293	323	359	361
55000	157	155	176	190	195	202	215	234	254	270	283	301	332	370	371
56000	161	158	168	180	186	193	206	224	241	256	269	286	314	349	352
57000	164	163	173	186	192	199	212	233	249	264	277	295	325	362	363
58000	168	166	178	192	197	204	217	236	256	272	286	304	335	374	374

F4E AIRCRAFT
ALTITUDE-20000. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	329	376	414	437	451	466	489	522	564	606	639	656	658	667	733
31000	340	389	428	452	467	482	506	543	583	627	661	678	681	690	759
32000	352	402	442	467	482	498	523	558	603	648	683	701	703	713	784
33000	363	415	456	482	498	514	539	577	622	669	705	724	726	736	809
34000	374	428	471	497	514	531	556	595	642	690	728	746	749	759	835
35000	386	441	485	512	529	547	573	613	661	711	750	769	772	782	860
36000	397	454	499	527	545	563	590	631	681	732	772	792	794	805	885
37000	409	467	514	542	560	579	607	649	700	753	794	814	817	828	911
38000	420	430	528	557	576	595	624	667	720	774	816	837	840	851	936
39000	431	493	542	573	592	611	641	685	739	795	838	860	863	874	961
40000	443	506	557	589	609	630	660	706	762	819	863	887	891	906	995
41000	454	517	571	606	628	651	683	730	788	846	893	918	927	947	1040
42000	465	529	586	624	648	672	706	755	814	874	922	953	963	987	1084
43000	477	541	601	641	667	693	729	779	840	901	951	982	999	1028	1128
44000	488	552	615	658	687	714	751	803	866	929	980	1014	1034	1069	1172
45000	500	564	630	676	706	735	774	828	892	956	1010	1046	1070	1110	1216
46000	510	574	643	692	724	755	795	850	916	981	1036	1074	1103	1147	1257
47000	523	588	660	712	740	779	821	878	945	1013	1070	1111	1143	1194	1307
48000	536	601	676	731	769	803	847	906	975	1044	1103	1147	1184	1240	1357
49000	549	614	693	751	791	827	873	933	1004	1075	1136	1183	1225	1287	1407
50000	562	627	710	771	813	851	898	961	1034	1107	1169	1219	1265	1333	1458
51000	575	640	726	791	835	875	924	989	1064	1138	1203	1255	1306	1380	1508
52000	588	654	743	811	857	899	950	1017	1093	1170	1236	1292	1347	1426	1558
53000	601	667	760	831	880	923	976	1044	1123	1201	1269	1328	1388	1473	1609
54000	614	680	776	851	902	947	1002	1072	1152	1232	1303	1364	1428	1519	1659
55000	626	693	793	870	924	971	1028	1100	1182	1264	1336	1400	1469	1566	1709
56000	601	668	761	832	884	924	978	1046	1124	1203	1271	1330	1390	1475	1611
57000	616	683	780	855	907	952	1006	1078	1159	1239	1310	1372	1437	1529	1670
58000	631	698	799	878	932	980	1038	1110	1193	1275	1349	1414	1484	1583	1728

F4E AIRCRAFT
ALTITUDE-20000. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1008	959	897	856	831	808	776	737	698	667	646	628	599	559	544
31000	997	948	887	847	822	799	768	729	690	660	639	621	593	554	538
32000	986	938	877	838	813	790	759	721	683	653	632	614	587	548	533
33000	974	927	868	828	804	781	751	713	676	646	625	607	581	542	527
34000	963	916	858	819	795	772	742	705	663	639	618	601	574	537	522
35000	952	906	848	810	785	764	734	698	661	632	612	594	568	531	516
36000	941	895	838	800	777	755	726	690	654	625	605	587	562	525	510
37000	930	885	828	791	768	746	717	682	646	618	598	581	555	520	505
38000	918	874	819	782	759	737	709	674	639	611	591	574	549	514	499
39000	907	863	809	772	750	728	700	666	632	604	584	567	543	508	494
40000	896	853	799	763	740	719	692	658	624	597	577	552	535	503	488
41000	885	842	789	754	731	711	684	650	617	590	570	554	530	497	482
42000	874	832	779	744	722	702	675	643	610	583	564	547	524	492	477
43000	862	821	770	735	713	693	667	635	602	576	557	540	518	486	471
44000	851	810	760	726	704	684	658	627	595	569	550	534	511	480	456
45000	840	800	750	716	695	675	650	619	587	562	543	527	505	475	460
46000	829	789	740	707	686	667	642	611	580	555	536	520	499	469	454
47000	818	779	730	698	677	658	633	603	573	548	529	514	492	463	449
48000	806	768	721	688	668	649	625	595	565	541	522	507	486	458	443
49000	795	757	711	679	659	640	616	588	558	534	516	500	480	452	438
50000	784	747	701	670	649	631	608	580	551	526	509	494	473	446	432
51000	773	736	691	660	640	622	600	572	543	519	502	487	467	441	426
52000	762	726	681	651	631	614	591	564	536	512	495	480	461	435	421
53000	750	715	672	641	622	605	583	556	529	505	488	473	455	429	415
54000	739	705	662	632	613	596	574	548	521	498	481	467	448	424	410
55000	728	694	652	623	604	587	566	540	514	491	474	460	442	418	404
56000	717	683	642	613	595	578	558	533	507	484	468	453	436	412	398
57000	706	673	632	604	585	569	549	525	499	477	461	447	429	407	393
58000	694	662	623	595	577	561	541	517	492	470	454	440	423	401	387

F4E AIRCRAFT
ALTITUDE-22500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

	DRAG INDEX														
WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	95	109	98	95	102	113	122	126	129	134	143	153	160	164	184
31000	98	112	102	99	107	118	127	132	136	141	150	161	169	174	193
32000	101	114	105	104	111	122	131	137	142	148	157	168	178	185	203
33000	104	116	110	109	116	127	136	143	148	155	165	176	187	196	213
34000	107	119	114	114	121	131	141	149	155	162	172	184	196	206	222
35000	111	121	118	119	126	136	146	154	161	169	179	191	204	217	232
36000	114	123	122	124	131	141	151	160	168	176	186	199	213	228	242
37000	117	126	126	129	136	145	156	165	174	183	194	207	222	238	251
38000	120	128	130	134	141	150	161	171	181	190	201	214	231	249	261
39000	124	130	134	139	145	154	165	177	187	197	208	222	240	260	271
40000	127	133	138	144	150	159	170	182	194	204	215	229	249	270	280
41000	130	135	143	149	155	164	175	188	200	211	223	237	258	281	290
42000	133	137	147	154	160	168	180	193	206	218	230	245	266	292	300
43000	136	140	151	158	165	173	185	199	213	225	237	252	275	302	309
44000	140	142	155	163	170	178	190	204	219	232	244	260	284	313	319
45000	143	145	159	168	174	182	194	210	225	239	252	268	293	324	329
46000	151	150	169	180	186	194	206	224	242	257	270	287	325	350	353
47000	155	153	174	187	192	199	212	231	250	265	279	296	325	363	365
48000	159	156	179	193	198	205	218	238	258	274	288	306	337	377	377
49000	164	161	184	199	205	212	227	248	269	286	300	319	351	392	395
50000	169	167	190	205	212	221	237	259	282	300	314	333	366	409	415
51000	174	173	197	213	220	230	247	271	296	315	330	349	383	428	437
52000	180	179	203	219	227	238	257	283	309	329	345	364	399	445	458
53000	185	185	210	226	235	246	267	294	322	343	359	379	414	463	479
54000	190	190	216	232	242	255	277	306	335	357	374	394	430	480	500
55000	195	196	222	239	249	263	287	317	348	371	388	409	445	497	520
56000	190	191	217	233	243	256	278	307	336	359	375	395	431	482	502
57000	197	198	224	241	251	266	290	321	352	375	393	413	450	503	527
58000	203	205	232	249	260	276	302	335	367	392	410	431	469	524	552

F4E AIRCRAFT
ALTITUDE-22500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	360	412	452	478	493	510	535	571	617	663	699	717	720	729	802
31000	373	426	469	495	511	528	554	592	639	687	724	743	745	756	831
32000	386	441	485	512	529	546	573	612	661	711	749	769	771	782	859
33000	399	456	501	529	547	565	592	633	683	734	774	794	797	808	888
34000	411	471	517	546	564	583	611	653	705	758	799	820	823	834	917
35000	424	485	533	563	582	601	630	674	727	782	824	846	849	860	946
36000	437	500	550	580	600	619	650	694	750	806	849	871	874	886	974
37000	450	513	566	600	622	643	675	722	779	837	882	907	915	932	1024
38000	463	526	583	620	644	667	701	749	808	868	916	943	955	978	1074
39000	476	540	599	640	666	691	727	777	838	899	949	979	996	1025	1124
40000	489	553	616	659	688	715	753	805	867	930	982	1015	1036	1071	1174
41000	502	566	633	679	710	740	779	833	897	962	1016	1052	1077	1118	1225
42000	515	580	650	700	733	764	805	861	928	994	1050	1089	1119	1166	1277
43000	529	593	667	720	756	789	832	890	958	1027	1084	1127	1161	1214	1329
44000	542	607	684	741	779	814	859	919	989	1059	1119	1164	1203	1262	1381
45000	555	621	701	761	802	839	886	947	1019	1091	1153	1201	1245	1310	1433
46000	568	633	717	780	823	862	910	974	1048	1121	1185	1236	1284	1355	1481
47000	582	648	736	803	845	889	940	1005	1081	1157	1222	1277	1330	1407	1538
48000	597	663	755	825	873	916	969	1036	1114	1192	1260	1317	1376	1459	1594
49000	611	678	774	847	898	943	998	1068	1147	1227	1297	1358	1421	1511	1651
50000	626	693	792	870	923	970	1027	1099	1181	1262	1335	1398	1467	1564	1707
51000	654	721	829	913	971	1023	1083	1159	1245	1330	1407	1477	1556	1665	1817
52000	670	738	849	938	999	1053	1116	1194	1282	1369	1449	1522	1607	1723	1880
53000	686	754	870	962	1027	1083	1148	1228	1319	1409	1490	1568	1657	1781	1942
54000	703	772	892	987	1055	1113	1182	1265	1358	1450	1535	1617	1716	1852	2024
55000	719	799	920	1015	1085	1149	1223	1312	1409	1504	1594	1692	1818	1994	2209
56000	709	783	903	999	1067	1128	1198	1284	1379	1472	1559	1647	1757	1910	2099
57000	726	811	933	1028	1099	1165	1243	1334	1433	1529	1623	1726	1865	2060	2295
58000	743	840	962	1057	1131	1203	1287	1384	1487	1586	1686	1805	1973	2211	2492

F4E AIRCRAFT
ALTITUDE-22500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 1,000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1065	1013	947	904	878	853	819	777	735	703	681	662	632	588	573
31000	1052	1001	936	893	867	843	809	768	727	695	673	654	624	582	566
32000	1039	988	924	882	857	832	799	759	718	686	665	646	617	575	560
33000	1026	976	913	872	846	822	790	750	710	678	657	639	610	569	553
34000	1013	964	902	861	836	812	780	741	701	670	649	631	603	562	547
35000	1001	952	891	850	825	802	770	732	693	662	641	623	595	556	540
36000	988	940	879	839	815	792	761	723	684	654	633	615	588	549	534
37000	975	927	868	829	805	782	751	714	676	646	626	608	581	543	527
38000	962	915	857	818	794	771	741	704	668	638	618	600	574	536	521
39000	949	903	845	807	784	761	732	695	659	630	610	592	566	530	515
40000	936	891	834	796	773	751	722	686	651	622	602	585	559	523	508
41000	923	879	823	785	763	741	712	677	642	614	594	577	552	517	502
42000	910	866	812	775	752	731	703	668	634	606	586	569	545	510	495
43000	897	854	800	764	742	721	693	659	625	598	578	561	537	504	489
44000	885	842	789	753	731	710	683	650	617	590	570	554	530	497	482
45000	872	830	778	743	721	700	674	641	608	581	562	546	523	491	476
46000	859	818	766	732	710	690	664	632	600	573	555	538	515	484	469
47000	846	805	755	721	700	680	654	623	591	565	547	531	508	478	463
48000	833	793	744	710	689	670	645	614	583	557	539	523	501	471	457
49000	820	781	733	700	679	660	635	605	574	549	531	515	494	465	450
50000	807	769	721	689	668	650	625	596	566	541	523	507	487	458	444
51000	794	757	710	678	658	639	616	587	558	533	515	500	479	452	437
52000	781	744	699	667	647	629	606	578	549	525	507	492	472	445	431
53000	769	732	687	657	637	619	596	569	541	517	499	484	465	439	424
54000	756	720	676	646	626	609	587	560	532	509	491	477	458	432	418
55000	743	708	665	635	616	599	577	551	524	501	483	469	450	425	411
56000	730	696	654	624	605	589	567	542	515	493	476	461	443	419	405
57000	717	684	642	614	595	578	558	533	507	485	468	455	436	412	399
58000	704	671	631	603	585	568	548	524	498	476	460	446	429	406	392

F4E AIRCRAFT
ALTITUDE-25000. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

	DRAG INDEX														
WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	104	116	109	108	115	126	135	142	147	154	163	174	185	194	211
31000	108	119	115	115	121	132	141	149	155	162	172	184	195	207	223
32000	112	122	120	121	128	138	148	156	163	171	181	194	207	220	235
33000	116	125	125	127	134	143	154	163	171	180	190	203	218	234	247
34000	120	128	130	133	140	149	160	170	180	189	199	213	229	247	259
35000	124	131	135	139	146	155	166	177	188	198	209	222	242	261	271
36000	128	134	140	145	152	161	172	184	196	206	218	232	252	274	284
37000	132	137	145	151	158	166	178	191	204	215	227	242	263	287	296
38000	136	139	150	158	164	172	184	198	212	224	236	251	274	300	308
39000	140	142	155	164	171	178	190	205	221	233	245	261	285	314	320
40000	144	145	160	170	176	184	196	212	228	242	254	270	296	327	332
41000	148	148	165	176	182	189	202	219	236	250	263	280	307	341	344
42000	152	151	170	182	188	195	208	226	244	259	272	289	318	354	356
43000	156	154	175	188	194	201	214	233	252	268	281	299	329	367	368
44000	160	157	180	195	200	207	220	240	260	277	291	309	341	381	381
45000	165	163	186	201	207	215	230	251	273	291	305	323	356	398	401
46000	178	178	202	218	226	236	255	281	306	326	342	361	395	442	454
47000	185	185	210	226	235	247	267	295	322	344	360	380	415	464	480
48000	191	192	218	234	244	257	280	309	339	361	378	398	434	486	506
49000	198	199	226	243	253	268	292	324	355	379	396	417	454	507	532
50000	204	207	233	251	262	278	305	338	371	396	415	436	473	529	558
51000	211	214	241	259	271	289	317	353	387	414	433	454	493	551	584
52000	217	221	249	268	280	299	329	367	404	432	451	473	512	573	610
53000	224	228	257	276	290	310	342	382	420	449	469	491	532	594	636
54000	230	236	265	284	299	320	354	396	436	467	487	510	551	616	662
55000	237	243	272	292	308	331	366	410	452	484	506	529	571	638	688
56000	236	242	272	292	307	330	365	409	451	483	504	527	569	636	686
57000	244	251	281	302	318	342	380	426	471	504	526	549	593	662	717
58000	252	260	290	312	329	355	395	444	490	525	548	572	615	688	X

F4E AIRCRAFT
ALTITUDE-25000. FEET
FUEL FOR CLIMB TABLE
:UELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	385	440	484	511	528	545	572	611	660	709	748	767	770	780	58
31000	399	456	502	530	547	565	593	633	684	735	775	795	798	809	889
32000	413	472	519	548	566	585	614	656	708	761	802	823	826	837	920
33000	427	488	537	567	586	605	634	678	732	787	830	851	854	866	952
34000	441	504	554	586	606	626	657	702	758	815	859	882	886	899	989
35000	455	528	572	608	630	652	685	732	790	848	895	921	930	950	1043
36000	469	533	590	629	654	678	713	762	822	882	931	960	974	1000	1097
37000	483	547	608	650	678	704	741	792	854	916	967	999	1018	1050	1152
38000	497	561	626	672	702	730	769	822	886	950	1003	1038	1062	1101	1206
39000	511	575	644	693	726	756	797	852	918	984	1039	1077	1106	1151	1261
40000	525	590	662	715	750	782	825	882	950	1018	1075	1116	1150	1201	1315
41000	541	606	683	739	778	812	857	917	987	1.57	1116	1161	1201	1259	1378
42000	557	623	704	764	805	842	889	951	1024	1096	1158	1206	1251	1317	1440
43000	573	639	725	789	833	872	922	986	1060	1135	1199	1251	1302	1375	1503
44000	589	655	745	814	860	902	954	1020	1097	1174	1241	1296	1352	1432	1565
45000	605	672	766	838	888	932	986	1055	1134	1213	1282	1341	1403	1490	1628
46000	622	688	787	863	916	962	1018	1089	1171	1252	1323	1386	1454	1548	1690
47000	638	705	807	888	943	992	1050	1124	1208	1291	1365	1431	1504	1606	1753
48000	654	721	828	912	971	1022	1083	1159	1244	1330	1406	1476	1555	1664	1815
49000	670	738	849	937	998	1052	1115	1193	1281	1369	1448	1521	1605	1721	1878
50000	686	754	869	962	1026	1082	1147	1228	1318	1408	1489	1566	1656	1779	1941
51000	725	810	931	1026	1097	1163	1240	1331	1429	1525	1619	1721	1858	2051	2283
52000	745	842	965	1060	1134	1206	1291	1389	1492	1592	1693	1813	1984	2226	2511
53000	765	875	999	1094	1171	1250	1342	1447	1555	1659	1767	1905	2109	2401	2739
54000	785	908	1033	1129	1208	1293	1394	1505	1617	1725	1841	1997	2235	2576	2967
55000	805	940	1067	1163	1245	1337	1445	1563	1680	1792	1915	2089	2360	2751	3195
56000	825	973	1102	1197	1282	1380	1496	1622	1743	1858	1989	2180	2485	2926	3423
57000	845	1006	1136	1231	1319	1423	1548	1680	1805	1925	2063	2272	2611	3101	3651
58000	865	1039	1170	1265	1356	1467	1599	1738	1868	1991	2137	2364	2736	3276	X

F4E AIRCRAFT
ALTITUDE-25000. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 1000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1128	1072	1002	956	929	902	866	821	776	742	719	699	667	620	604
31000	1114	1059	989	944	917	891	855	811	767	733	711	691	659	613	597
32000	1099	1045	977	932	906	880	844	801	758	724	702	682	651	605	590
33000	1085	1031	964	920	894	868	834	791	748	715	693	674	643	598	582
34000	1070	1018	952	908	882	857	823	781	739	706	684	665	635	591	575
35000	1056	1004	939	896	870	846	812	770	729	697	675	656	625	584	568
36000	1042	991	926	884	859	834	801	760	720	688	666	648	618	576	561
37000	1027	977	914	872	847	823	790	750	710	679	658	639	610	569	554
38000	1013	963	901	860	835	812	780	740	701	670	649	630	602	562	546
39000	998	950	889	848	824	800	769	730	691	661	640	622	594	555	539
40000	984	936	876	836	812	789	758	720	682	652	631	613	586	547	532
41000	970	922	863	824	800	778	747	710	673	643	622	605	578	540	525
42000	955	909	851	812	789	766	736	700	663	634	614	596	570	533	518
43000	941	895	838	800	777	755	726	690	654	625	605	587	562	525	510
44000	926	882	826	788	765	743	715	680	644	616	596	579	554	518	503
45000	912	868	813	776	753	732	704	669	635	607	587	570	545	511	496
46000	898	854	800	764	742	721	693	659	625	598	578	561	537	504	489
47000	883	841	788	752	730	709	682	649	616	589	569	553	529	496	482
48000	869	827	775	740	718	698	672	639	606	580	561	544	521	489	474
49000	854	813	763	728	707	687	661	629	597	571	552	536	513	482	467
50000	840	800	750	716	695	675	650	619	587	562	543	527	505	475	460
51000	826	786	737	704	683	664	639	609	578	553	534	518	497	467	453
52000	811	773	725	692	672	653	628	599	569	544	525	510	489	460	446
53000	797	759	712	680	660	641	618	589	559	535	517	501	481	453	438
54000	782	745	700	668	648	630	607	579	550	525	508	493	473	445	431
55000	768	732	687	656	635	619	596	568	540	516	499	484	464	438	424
56000	754	718	674	644	625	607	585	558	531	507	490	475	455	431	417
57000	739	705	662	632	613	596	574	548	521	498	481	467	448	424	410
58000	725	691	649	620	601	585	564	538	512	489	472	458	440	416	X

F4E AIRCRAFT
ALTITUDE-27500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	113	123	122	123	139	140	150	159	166	175	185	197	211	225	240
31000	118	127	128	131	137	147	157	167	177	186	196	209	225	242	255
32000	123	130	134	138	145	154	165	176	187	197	207	221	239	259	270
33000	128	134	140	146	153	161	173	185	197	208	219	233	253	275	285
34000	133	138	147	154	160	169	180	194	207	219	230	245	267	292	300
35000	138	141	153	161	168	176	188	202	217	230	242	257	281	309	315
36000	144	145	159	169	175	183	195	211	227	241	253	269	295	326	331
37000	149	149	166	177	183	190	203	220	237	252	264	281	309	342	346
38000	154	152	172	185	191	198	211	229	247	263	276	293	323	359	361
39000	159	156	178	192	198	205	218	237	258	274	287	305	337	370	376
40000	165	162	186	200	207	214	229	250	272	289	303	322	354	395	399
41000	171	169	195	208	216	224	241	264	288	306	321	340	373	417	424
42000	177	176	201	217	224	235	253	278	304	323	339	358	392	438	45[illegible]
43000	184	183	208	225	233	245	265	292	319	340	356	376	411	459	475
44000	190	191	216	233	242	255	277	306	335	357	374	394	430	480	500
45000	196	198	224	241	251	265	289	320	351	374	392	412	449	502	525
46000	207	210	236	254	266	282	309	344	378	403	422	443	481	537	563
47000	215	219	246	265	277	295	325	362	398	425	445	466	506	565	601
48000	223	228	256	275	289	309	340	380	418	447	467	490	530	592	633
49000	232	237	266	286	301	322	356	398	439	469	490	513	555	620	666
50000	240	246	276	296	312	335	371	416	459	491	513	536	579	647	699
51000	246	254	284	305	321	346	384	431	476	510	532	556	599	669	726
52000	254	262	293	314	332	358	399	449	496	531	554	578	623	695	X
53000	262	271	302	325	344	372	415	467	516	553	577	601	647	722	X
54000	270	278	312	336	358	388	433	488	539	578	603	629	675	X	X
55000	278	285	321	348	372	404	452	509	563	603	630	656	703	X	X
56000	281	289	325	353	378	412	461	519	573	614	642	668	716	X	X
57000	290	298	336	367	394	431	482	543	600	644	672	700	X	X	X
58000	299	306	347	380	410	450	504	567	627	673	703	731	X	X	X

F4E AIRCRAFT
ALTITUDE-27500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	414	474	521	550	563	587	616	658	710	763	805	826	829	843	923
31000	430	492	540	570	589	609	638	682	737	792	835	850	859	871	958
32000	445	508	560	592	613	634	665	711	767	824	869	893	899	914	1004
33000	460	524	579	616	639	662	696	744	802	862	909	936	947	969	1064
34000	476	539	599	639	666	691	727	777	837	899	948	979	995	1024	1124
35000	491	555	619	663	692	720	757	810	873	936	988	1022	1044	1079	1183
36000	507	571	639	687	718	748	788	843	908	973	1028	1065	1092	1135	1243
37000	522	587	659	710	745	777	819	876	943	1010	1067	1108	1140	1190	1303
38000	537	602	678	734	771	805	850	909	978	1048	1107	1151	1189	1245	1363
39000	553	618	698	757	797	834	880	942	1013	1085	1146	1194	1237	1300	1422
40000	568	634	718	781	824	863	911	975	1048	1122	1186	1237	1285	1356	1482
41000	588	653	743	811	857	899	950	1016	1093	1169	1236	1291	1345	1426	1558
42000	606	673	767	840	890	934	988	1057	1136	1215	1284	1344	1406	1494	1631
43000	625	692	792	869	922	969	1026	1098	1179	1261	1333	1397	1465	1562	1705
44000	644	711	816	898	955	1004	1064	1138	1223	1307	1382	1450	1525	1630	1779
45000	663	731	840	927	987	1040	1101	1179	1266	1352	1430	1503	1584	1698	1852
46000	684	752	866	958	1022	1077	1142	1223	1313	1402	1483	1560	1649	1771	1931
47000	702	771	891	986	1053	1112	1180	1263	1356	1447	1532	1614	1711	1845	2016
48000	720	801	922	1017	1087	1151	1226	1316	1413	1508	1599	1697	1826	2005	2223
49000	738	831	953	1048	1121	1191	1273	1369	1470	1569	1667	1781	1940	2164	2431
50000	756	861	984	1079	1155	1231	1320	1422	1527	1629	1734	1865	2054	2324	2639
51000	794	923	1049	1144	1225	1313	1417	1532	1646	1756	1875	2009	2292	2650	3072
52000	817	960	1088	1183	1267	1363	1476	1598	1718	1832	1960	2144	2435	2856	X
53000	840	998	1127	1222	1310	1412	1534	1665	1789	1908	2044	2249	2579	3056	X
54000	863	1035	1166	1261	1352	1462	1593	1731	1861	1984	2129	2354	2722	X	X
55000	885	1072	1205	1300	1394	1512	1652	1798	1933	2060	2214	2459	2865	X	X
56000	922	1132	1267	1362	1461	1590	1745	1903	2046	2180	2348	2625	3092	X	X
57000	946	1171	1309	1403	1506	1643	1807	1973	2122	2261	2437	2736	X	X	X
58000	970	1211	1350	1444	1551	1695	1868	2043	2197	2341	2527	2846	X	X	X

F4E AIRCRAFT
ALTITUDE-27500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1194	1134	1060	1011	982	954	915	867	820	783	760	739	704	653	637
31000	1178	1119	1046	998	970	942	903	856	809	773	750	729	695	645	629
32000	1162	1105	1032	985	957	929	892	845	799	763	740	720	686	637	621
33000	1146	1090	1018	972	944	917	880	834	788	753	731	710	677	629	613
34000	1130	1075	1004	958	931	904	868	823	778	744	721	701	668	621	605
35000	1114	1060	990	945	918	892	856	811	768	734	711	691	659	613	597
36000	1099	1045	976	932	905	879	844	800	757	724	701	682	650	605	589
37000	1083	1030	962	919	892	867	832	789	747	714	692	672	642	597	581
38000	1067	1015	949	905	879	854	820	778	736	704	682	663	633	589	573
39000	1051	1000	935	892	867	842	808	767	726	694	672	653	624	581	566
40000	1035	985	921	879	854	829	796	756	716	684	663	644	615	573	558
41000	1019	970	907	866	841	817	785	745	705	674	653	634	606	565	550
42000	1004	955	893	853	828	804	773	734	695	664	643	625	597	557	542
43000	988	940	879	839	815	792	761	723	684	654	633	615	588	549	534
44000	972	925	865	826	802	779	749	711	674	644	624	606	579	541	526
45000	956	910	852	813	789	767	737	700	664	634	614	596	570	533	518
46000	940	895	838	800	776	754	725	689	653	624	604	587	561	525	510
47000	924	880	824	787	764	742	713	678	643	614	595	578	552	517	502
48000	909	865	810	773	751	729	701	667	632	605	585	568	544	509	494
49000	893	850	796	760	738	717	690	656	622	595	575	559	535	501	486
50000	877	835	782	747	725	704	678	645	612	585	566	549	525	493	478
51000	861	820	768	734	712	692	666	634	601	575	556	540	517	485	470
52000	845	805	754	720	699	679	654	623	591	565	546	530	508	477	X
53000	829	790	741	707	686	667	642	611	580	555	536	521	499	469	X
54000	813	775	727	694	673	654	630	600	570	545	527	511	490	X	X
55000	798	760	713	681	661	642	618	589	560	535	517	502	481	X	X
56000	782	745	699	668	648	629	606	578	549	525	507	492	472	X	X
57000	766	730	685	654	635	617	594	567	539	515	498	483	X	X	X
58000	750	715	671	641	622	604	583	556	528	505	488	473	X	X	X

F4E AIRCRAFT
ALTITUDE-30000. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	126	132	137	142	149	158	169	181	192	202	213	228	245	268	278
31000	132	137	145	152	158	167	178	191	204	216	227	242	263	288	296
32000	138	141	153	161	167	175	187	202	216	229	241	257	280	308	315
33000	144	146	160	170	177	184	197	213	229	242	255	271	297	328	333
34000	150	150	168	180	186	193	206	223	241	256	269	286	314	349	351
35000	157	155	176	189	195	202	215	234	253	269	282	300	331	369	370
36000	163	161	184	199	205	212	226	247	268	286	300	318	350	391	394
37000	171	169	193	208	215	224	241	264	288	306	321	340	373	417	424
38000	179	178	202	218	226	237	256	281	307	327	342	362	396	443	455
39000	186	186	212	228	237	249	270	298	326	348	364	384	419	468	485
40000	194	195	221	238	248	261	285	315	345	368	385	406	442	494	516
41000	202	204	230	247	258	274	299	332	364	389	407	427	465	519	547
42000	209	212	239	257	269	286	314	349	383	409	428	449	488	545	577
43000	217	221	248	267	280	298	328	366	402	430	449	471	511	571	608
44000	225	229	258	277	290	311	343	383	421	451	471	493	534	596	638
45000	232	238	267	286	301	323	357	400	441	471	492	515	557	622	669
46000	236	242	271	291	306	329	364	408	450	481	503	526	568	634	684
47000	246	253	283	304	320	345	383	430	474	508	530	554	597	667	723
48000	255	264	295	316	334	360	401	451	499	534	557	582	626	700	X
49000	265	274	308	330	349	379	423	476	526	563	588	613	659	735	X
50000	275	283	318	344	367	399	446	502	555	595	621	647	694	X	X
51000	285	292	330	359	385	420	469	528	584	626	654	681	729	X	X
52000	294	302	341	374	402	440	493	555	613	658	687	715	X	X	X
53000	304	311	353	388	420	460	516	581	643	689	720	X	X	X	X
54000	314	321	365	403	437	481	540	608	672	721	X	X	X	X	X
55000	324	330	376	418	455	501	563	634	701	X	X	X	X	X	X
56000	332	338	386	430	470	519	583	656	726	X	X	X	X	X	X
57000	344	349	401	448	491	544	612	689	X	X	X	X	X	X	X
58000	356	361	415	466	513	569	640	722	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-30000. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	455	518	572	608	630	652	685	732	790	848	895	921	93.	950	1.43
31000	472	536	595	634	660	685	720	770	830	891	940	970	985	1013	1111
32000	490	554	617	661	690	717	755	807	870	933	985	1019	1040	1075	1179
33000	507	572	640	688	720	750	790	845	910	976	1030	1068	1095	1138	1247
34000	525	590	662	715	750	782	825	882	950	1.18	1075	1116	1150	1201	1315
35000	542	608	685	742	780	815	860	920	990	1060	1120	1165	1205	1264	1383
36000	560	625	707	768	810	848	895	957	1030	1103	1165	1214	1260	1327	1451
37000	577	643	730	795	840	880	930	995	1070	1145	1210	1263	1315	139.	1519
38000	595	661	752	822	870	913	965	1032	1110	1187	1255	1312	1370	1452	1587
39000	612	679	775	849	900	945	1000	1070	1150	1230	1300	1361	1425	1515	1655
40000	630	697	797	876	930	978	1035	1107	1190	1272	1345	1410	1480	1578	1723
41000	653	720	827	911	969	1020	1081	1157	1242	1327	1404	1474	1552	1660	1812
42000	674	742	854	943	1006	1060	1123	1202	1291	1379	1458	1533	1619	1737	1894
43000	695	763	881	976	1042	1099	1166	1247	1339	1430	1513	1592	1685	1813	1977
44000	716	795	915	1011	1081	1144	1217	1306	1402	1496	1580	1681	1803	1974	2183
45000	738	830	952	1047	1120	1190	1272	1367	1468	1567	1665	1779	1936	2160	2425
46000	759	865	988	1084	1159	1236	1326	1429	1535	1638	1743	1876	2070	2346	2667
47000	780	899	1025	1120	1199	1282	1381	1491	1601	1708	1822	1973	2203	2531	2909
48000	801	934	1061	1156	1238	1328	1435	1552	1668	1779	1901	2071	2330	2717	X
49000	822	969	1097	1192	1277	1374	1490	1614	1734	1849	1979	2168	2469	2903	X
50000	843	1004	1133	1228	1316	1420	1544	1676	1801	1920	2058	2266	2602	X	X
51000	872	1050	1182	1277	1369	1482	1617	1758	1890	2015	2163	2396	2780	X	X
52000	897	1091	1225	1319	1415	1536	1681	183.	1968	2098	2256	2511	X	X	X
53000	922	1132	1267	1362	1461	1590	1745	1903	2046	2180	2348	X	X	X	X
54000	946	1172	1310	1404	1508	1645	1809	1975	2124	2263	X	X	X	X	X
55000	971	1213	1352	1447	1554	1699	1872	2048	2202	X	X	X	X	X	X
56000	996	1253	1394	1489	1599	1752	1935	2119	2279	X	X	X	X	X	X
57000	1025	1302	1445	1540	1654	1817	2012	2206	X	X	X	X	X	X	X
58000	1055	1351	1496	1591	1710	1882	2088	2292	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-30000. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1256	1193	1114	1063	1033	1003	962	911	860	822	798	776	739	685	668
31000	1238	1177	1099	1048	1013	989	949	898	849	811	787	765	729	676	659
32000	1221	1160	1083	1034	1004	976	936	886	837	800	776	755	719	667	650
33000	1203	1143	1068	1019	990	962	922	874	826	789	765	744	709	658	642
34000	1186	1127	1052	1004	975	948	909	861	814	778	755	734	699	649	633
35000	1168	1110	1037	990	961	934	896	849	803	767	744	723	689	640	624
36000	1150	1094	1022	975	947	920	883	837	791	756	733	713	680	631	615
37000	1133	1077	1006	960	933	906	870	824	780	745	722	702	670	622	606
38000	1115	1060	991	946	919	892	856	812	768	734	712	692	660	613	598
39000	1098	1044	975	931	904	878	843	800	757	723	701	681	650	605	589
40000	1080	1027	960	916	890	865	830	787	745	712	690	671	640	596	580
41000	1062	1010	945	902	876	851	817	775	733	701	679	660	630	587	571
42000	1045	994	929	887	861	837	804	763	722	690	668	650	620	578	562
43000	1027	977	914	872	847	823	790	750	710	679	658	639	610	569	554
44000	1010	960	898	858	833	809	777	738	699	668	647	629	600	560	545
45000	992	944	883	843	818	795	764	726	687	657	636	618	590	551	536
46000	974	927	868	828	804	781	751	713	676	646	625	607	581	542	527
47000	957	910	852	814	790	767	738	701	664	635	615	597	571	534	518
48000	939	894	837	799	775	754	724	689	653	624	604	586	561	525	X
49000	922	877	821	784	761	740	711	676	641	613	593	576	551	516	X
50000	904	860	806	770	747	726	698	664	629	602	582	565	541	X	X
51000	886	844	791	755	733	712	685	652	618	591	571	555	531	X	X
52000	869	827	775	740	719	698	672	639	606	580	561	544	X	X	X
53000	851	810	760	726	704	684	658	627	595	569	550	X	X	X	X
54000	834	794	744	711	690	670	645	614	583	558	X	X	X	X	X
55000	816	777	729	696	675	656	632	602	572	X	X	X	X	X	X
56000	798	761	714	682	661	643	619	590	560	X	X	X	X	X	X
57000	781	744	698	667	647	629	606	577	X	X	X	X	X	X	X
58000	763	727	683	652	633	615	592	565	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-32500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	143	145	159	169	175	182	195	210	226	240	252	268	294	324	329
31000	150	150	168	179	185	193	205	223	241	255	268	285	313	348	351
32000	157	155	177	190	196	203	216	235	255	271	284	302	333	371	372
33000	166	163	187	201	208	216	231	252	274	292	306	324	357	399	402
34000	175	173	197	213	220	230	248	272	296	316	331	350	384	429	438
35000	183	183	208	224	233	244	264	291	318	340	356	375	410	458	474
36000	192	193	218	235	245	258	281	311	340	363	380	400	436	487	508
37000	201	203	229	246	257	272	298	330	362	387	404	425	462	517	543
38000	210	212	240	258	269	286	314	350	384	410	429	450	489	546	578
39000	218	222	250	269	282	301	331	369	406	434	453	475	515	575	613
40000	227	232	261	280	294	315	348	388	428	458	478	500	541	605	649
41000	236	242	272	292	307	330	365	409	451	482	504	527	569	636	685
42000	246	253	283	303	320	344	383	430	474	507	530	553	597	667	722
43000	255	263	294	315	333	359	400	450	497	532	556	580	625	698	X
44000	264	273	305	328	347	376	420	473	522	560	584	609	653	731	X
45000	273	282	316	342	364	396	442	498	550	590	616	641	688	X	X
46000	275	283	318	345	367	399	446	502	555	595	622	648	695	X	X
47000	287	294	332	362	388	424	474	534	590	632	661	688	736	X	X
48000	298	305	346	379	409	448	502	565	624	670	700	728	X	X	X
49000	310	316	360	396	429	472	529	596	659	707	739	X	X	X	X
50000	321	327	373	414	450	496	557	627	693	X	X	X	X	X	X
51000	343	349	400	447	490	542	610	687	X	X	X	X	X	X	X
52000	358	363	417	469	510	573	645	727	X	X	X	X	X	X	X
53000	373	377	435	491	543	604	680	X	X	X	X	X	X	X	X
54000	387	391	453	513	569	634	715	X	X	X	X	X	X	X	X
55000	402	405	470	535	595	665	X	X	X	X	X	X	X	X	X
56000	418	421	490	559	625	699	X	X	X	X	X	X	X	X	X
57000	440	441	516	592	663	X	X	X	X	X	X	X	X	X	X
58000	461	462	541	624	702	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-32500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	502	566	633	680	711	740	779	833	898	963	1016	1053	1078	1119	1227
31000	522	587	659	711	745	778	820	877	944	1011	1068	1109	1142	1191	1305
32000	542	607	685	742	783	815	860	920	993	1063	1120	1165	1205	1264	1383
33000	562	628	711	772	814	852	900	963	1036	1109	1171	1221	1268	1336	1461
34000	583	648	737	803	849	890	940	1006	1082	1157	1223	1277	1331	1408	1539
35000	603	669	762	834	883	927	980	1049	1128	1206	1275	1333	1394	1480	1617
36000	623	689	788	864	917	964	1020	1092	1173	1254	1326	1389	1457	1551	1694
37000	643	710	814	895	952	1001	1060	1134	1219	1302	1377	1445	1519	1623	1772
38000	663	730	839	926	986	1038	1100	1177	1264	1351	1429	1501	1582	1695	1849
39000	683	750	865	956	1020	1075	1140	1220	1310	1399	1480	1557	1645	1767	1927
40000	703	772	892	987	1055	1113	1182	1265	1358	1450	1534	1617	1716	1852	2024
41000	731	819	941	1036	1107	1175	1255	1348	1447	1545	1640	1748	1894	2101	2349
42000	754	857	980	1075	1153	1226	1314	1415	1520	1622	1726	1854	2040	2304	2613
43000	777	895	1020	1115	1193	1276	1373	1482	1592	1699	1812	1960	2185	2500	X
44000	800	933	1059	1154	1230	1326	1433	1550	1665	1776	1897	2067	2330	2709	X
45000	823	971	1099	1194	1279	1377	1492	1617	1738	1853	1983	2173	2475	X	X
46000	845	990	1120	1215	1301	1403	1523	1652	1775	1893	2028	2228	2551	X	X
47000	860	1031	1162	1257	1346	1457	1587	1725	1854	1976	2121	2343	2708	X	X
48000	885	1072	1205	1300	1394	1512	1652	1798	1933	2060	2214	2459	X	X	X
49000	910	1113	1248	1343	1441	1566	1716	1870	2011	2143	2307	X	X	X	X
50000	935	1154	1291	1386	1487	1621	1780	1943	2090	X	X	X	X	X	X
51000	967	1207	1346	1440	1547	1690	1862	2036	X	X	X	X	X	X	X
52000	997	1256	1397	1491	1602	1755	1939	2123	X	X	X	X	X	X	X
53000	1027	1304	1448	1542	1657	1819	2015	X	X	X	X	X	X	X	X
54000	1056	1353	1499	1593	1712	1884	2092	X	X	X	X	X	X	X	X
55000	1086	1402	1549	1643	1767	1949	X	X	X	X	X	X	X	X	X
56000	1095	1415	1564	1658	1783	1967	X	X	X	X	X	X	X	X	X
57000	1131	1475	1626	1720	1850	X	X	X	X	X	X	X	X	X	X
58000	1167	1535	1689	1782	1918	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-32500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1309	1244	1160	1107	1076	1045	1002	948	895	855	830	838	769	711	695
31000	1289	1224	1143	1091	1060	1029	987	934	882	843	818	796	757	701	684
32000	1269	1205	1125	1074	1043	1013	972	920	869	830	806	784	746	691	674
33000	1249	1186	1107	1057	1027	997	956	905	856	818	793	771	735	681	664
34000	1228	1167	1090	1040	1011	982	942	891	842	805	781	759	723	671	654
35000	1208	1148	1072	1023	994	966	926	877	829	792	769	747	712	660	644
36000	1188	1129	1054	1005	97	950	911	863	816	780	756	735	701	650	634
37000	1168	1110	1037	990	961	934	896	849	803	767	744	723	689	640	624
38000	1148	1091	1019	973	945	918	881	835	789	754	731	711	678	630	614
39000	1127	1072	1002	956	929	902	866	821	776	742	719	699	667	620	604
40000	1107	1053	984	939	912	886	850	806	763	729	707	687	655	609	594
41000	1087	1034	966	922	896	870	835	792	750	716	694	675	644	599	584
42000	1067	1015	949	905	879	854	820	778	736	704	682	663	633	589	573
43000	1047	995	931	889	863	838	805	764	723	691	670	651	621	579	X
44000	1027	976	913	872	847	822	790	750	710	678	657	639	610	569	X
45000	1006	957	896	855	830	807	775	735	697	666	645	627	599	X	X
46000	986	938	878	838	814	791	760	722	683	653	633	615	587	X	X
47000	966	919	860	821	797	775	745	707	670	641	620	602	576	X	X
48000	946	900	843	804	781	759	729	693	657	628	608	590	X	X	X
49000	926	881	825	788	765	743	714	679	644	615	595	X	X	X	X
50000	906	862	807	771	748	727	699	665	630	X	X	X	X	X	X
51000	885	843	790	754	732	711	684	651	X	X	X	X	X	X	X
52000	865	824	772	737	715	695	669	637	X	X	X	X	X	X	X
53000	845	805	754	720	699	679	654	X	X	X	X	X	X	X	X
54000	825	785	737	704	683	663	639	X	X	X	X	X	X	X	X
55000	805	766	719	687	666	647	X	X	X	X	X	X	X	X	X
56000	784	747	701	670	650	632	X	X	X	X	X	X	X	X	X
57000	764	728	684	653	633	X	X	X	X	X	X	X	X	X	X
58000	744	709	666	636	617	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-35000. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	165	163	186	201	207	215	229	251	272	290	304	323	355	397	400
31000	175	174	198	213	221	231	248	273	297	317	332	351	385	430	440
32000	185	185	210	226	235	247	267	295	322	344	360	380	415	464	480
33000	195	196	222	239	249	263	286	317	347	371	388	408	445	497	520
34000	205	207	234	252	263	279	305	339	372	398	416	437	475	531	560
35000	215	218	245	264	277	295	324	362	397	425	444	466	505	564	600
36000	225	230	258	277	291	311	343	384	422	452	472	494	535	598	640
37000	235	241	270	290	305	327	362	406	447	479	500	523	565	631	680
38000	245	252	282	303	319	343	381	428	472	506	528	552	595	665	720
39000	255	263	294	315	333	360	400	450	497	533	556	580	625	698	X
40000	265	273	306	329	349	378	422	475	525	562	587	612	658	734	X
41000	278	286	321	348	372	405	452	509	563	603	630	656	704	X	X
42000	290	297	336	367	394	430	482	542	599	643	671	699	X	X	X
43000	302	309	350	385	416	456	511	575	636	682	713	X	X	X	X
44000	314	321	365	403	437	481	540	608	672	721	X	X	X	X	X
45000	326	332	379	421	459	506	569	641	709	X	X	X	X	X	X
46000	344	349	401	448	491	544	612	689	X	X	X	X	X	X	X
47000	359	364	419	470	518	575	648	730	X	X	X	X	X	X	X
48000	374	378	437	493	545	607	684	X	X	X	X	X	X	X	X
49000	389	392	455	516	572	638	720	X	X	X	X	X	X	X	X
50000	404	407	473	538	599	669	X	X	X	X	X	X	X	X	X
51000	452	453	531	610	686	X	X	X	X	X	X	X	X	X	X
52000	477	477	561	648	X	X	X	X	X	X	X	X	X	X	X
53000	502	501	591	686	X	X	X	X	X	X	X	X	X	X	X
54000	527	525	621	X	X	X	X	X	X	X	X	X	X	X	X
55000	552	549	X	X	X	X	X	X	X	X	X	X	X	X	X
56000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
57000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
58000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-35000. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DPAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	539	604	680	736	774	809	853	912	982	1052	1111	1156	1194	1251	1369
31000	561	626	709	770	811	849	897	959	1032	1105	1167	1217	1263	1330	1454
32000	583	649	737	803	849	890	940	1006	1082	1158	1223	1278	1331	1408	1539
33000	605	671	765	837	886	931	984	1053	1132	1211	1280	1339	1400	1487	1624
34000	626	693	793	870	924	971	1028	1100	1182	1264	1336	1400	1469	1566	1709
35000	648	716	821	904	961	1012	1072	1147	1232	1316	1392	1461	1538	1644	1794
36000	670	738	849	937	999	1053	1115	1194	1282	1369	1448	1522	1606	1723	1879
37000	692	761	877	971	1036	1093	1159	1241	1332	1422	1505	1583	1675	1801	1964
38000	714	791	911	1007	1076	1138	1211	1298	1394	1488	1577	1670	1788	1952	2155
39000	736	827	949	1044	1117	1186	1267	1362	1463	1561	1658	1771	1925	2144	X
40000	758	863	986	1082	1157	1234	1323	1426	1531	1634	1739	1871	2063	2336	X
41000	797	927	1054	1149	1230	1319	1424	1540	1655	1765	1885	2052	2309	X	X
42000	824	971	1100	1195	1280	1378	1494	1618	1739	1855	1985	2176	X	X	X
43000	851	1016	1146	1241	1330	1436	1563	1697	1824	1945	2085	X	X	X	X
44000	878	1060	1192	1287	1380	1495	1632	1775	1909	2034	X	X	X	X	X
45000	905	1104	1238	1333	1430	1554	1701	1854	1993	X	X	X	X	X	X
46000	896	1090	1223	1318	1414	1535	1679	1828	X	X	X	X	X	X	X
47000	926	1139	1274	1369	1469	1600	1755	1915	X	X	X	X	X	X	X
48000	955	1187	1325	1420	1524	1664	1832	X	X	X	X	X	X	X	X
49000	985	1236	1376	1471	1580	1729	1908	X	X	X	X	X	X	X	X
50000	1015	1285	1427	1522	1635	1794	X	X	X	X	X	X	X	X	X
51000	1089	1407	1555	1649	1773	X	X	X	X	X	X	X	X	X	X
52000	1132	1477	1628	1722	X	X	X	X	X	X	X	X	X	X	X
53000	1175	1547	1701	1795	X	X	X	X	X	X	X	X	X	X	X
54000	1217	1617	1774	X	X	X	X	X	X	X	X	X	X	X	X
55000	1260	1687	X	X	X	X	X	X	X	X	X	X	X	X	X
56000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
57000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
58000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-35000. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

	DRAG INDEX														
WEIGHT	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1352	1284	1198	1143	1111	1079	1034	978	923	882	857	833	793	733	716
31000	1328	1262	1177	1123	1091	1060	1016	961	908	867	842	819	779	721	704
32000	1304	1239	1156	1103	1072	1041	998	944	892	852	827	805	766	709	693
33000	1280	1216	1135	1083	1052	1022	980	928	876	837	812	790	752	697	680
34000	1256	1193	1114	1063	1033	1003	962	911	861	822	798	776	739	685	668
35000	1232	1171	1093	1043	1013	984	944	894	845	807	783	762	725	672	656
36000	1208	1148	1072	1023	994	965	926	877	829	792	768	747	712	660	644
37000	1184	1125	1051	1003	974	947	908	860	813	777	754	733	698	648	632
38000	1160	1103	1030	983	955	928	890	843	797	762	739	719	685	636	620
39000	1136	1080	1009	963	935	909	872	827	782	747	724	704	671	624	X
40000	1112	1057	988	943	915	890	854	810	766	732	710	690	658	612	X
41000	1088	1034	967	923	895	871	836	793	750	717	695	675	644	X	X
42000	1064	1012	946	903	877	852	818	776	734	702	680	661	X	X	X
43000	1040	989	925	883	857	833	800	759	719	687	665	X	X	X	X
44000	1016	966	904	863	838	814	782	742	703	672	X	X	X	X	X
45000	992	944	883	843	818	795	764	726	687	X	X	X	X	X	X
46000	968	921	862	823	799	776	746	709	X	X	X	X	X	X	X
47000	944	898	841	803	779	757	728	692	X	X	X	X	X	X	X
48000	920	876	820	783	760	738	710	X	X	X	X	X	X	X	X
49000	896	853	799	763	740	719	692	X	X	X	X	X	X	X	X
50000	872	830	778	743	721	701	X	X	X	X	X	X	X	X	X
51000	848	807	757	723	701	X	X	X	X	X	X	X	X	X	X
52000	824	785	736	703	X	X	X	X	X	X	X	X	X	X	X
53000	800	762	715	683	X	X	X	X	X	X	X	X	X	X	X
54000	776	739	694	X	X	X	X	X	X	X	X	X	X	X	X
55000	752	717	X	X	X	X	X	X	X	X	X	X	X	X	X
56000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
57000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
58000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-37500. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	197	198	225	242	252	266	291	322	353	377	394	415	451	504	529
31000	208	211	238	256	268	284	312	347	381	407	425	446	485	542	573
32000	219	223	251	270	283	302	333	371	409	437	456	478	518	579	618
33000	231	236	265	284	299	320	354	396	436	467	488	510	552	616	662
34000	242	248	278	298	314	338	375	421	464	497	519	542	585	653	707
35000	253	261	291	313	330	356	396	445	492	527	550	574	618	691	X
36000	268	276	309	333	354	384	428	482	533	571	596	621	668	X	X
37000	281	288	325	353	377	411	459	517	572	613	640	666	714	X	X
38000	293	301	340	372	400	438	490	552	610	654	684	712	X	X	X
39000	306	313	356	391	423	465	521	587	649	696	728	X	X	X	X
40000	319	326	371	411	447	492	552	622	688	738	X	X	X	X	X
41000	342	347	398	445	487	539	607	683	X	X	X	X	X	X	X
42000	361	366	421	474	522	580	653	735	X	X	X	X	X	X	X
43000	380	384	444	502	556	620	699	X	X	X	X	X	X	X	X
44000	399	402	467	531	591	660	X	X	X	X	X	X	X	X	X
45000	419	421	490	560	625	700	X	X	X	X	X	X	X	X	X
46000	469	470	551	636	717	X	X	X	X	X	X	X	X	X	X
47000	494	493	580	673	X	X	X	X	X	X	X	X	X	X	X
48000	518	516	609	X	X	X	X	X	X	X	X	X	X	X	X
49000	542	539	X	X	X	X	X	X	X	X	X	X	X	X	X
50000	566	562	X	X	X	X	X	X	X	X	X	X	X	X	X
51000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
52000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
53000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
54000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
55000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
56000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
57000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
58000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-37500. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	557	622	703	763	804	841	888	950	1022	1094	1156	1205	1249	1314	1438
31000	579	645	732	798	843	883	933	998	1073	1149	1214	1267	1320	1395	1525
32000	601	668	761	832	881	925	978	1046	1125	1203	1272	1330	1390	1476	1612
33000	624	691	790	867	920	967	1023	1095	1176	1257	1330	1393	1461	1557	1700
34000	646	714	819	901	958	1008	1068	1143	1228	1312	1387	1456	1532	1637	1787
35000	669	737	848	935	997	1050	1113	1191	1279	1366	1445	1519	1602	1718	X
36000	694	762	880	974	1040	1097	1164	1245	1337	1428	1510	1590	1682	X	X
37000	718	798	919	1014	1084	1147	1222	1310	1407	1502	1592	1689	1814	X	X
38000	742	837	959	1055	1128	1199	1283	1380	1482	1581	1681	1799	X	X	X
39000	766	876	1000	1096	1172	1251	1344	1449	1557	1661	1769	X	X	X	X
40000	790	915	1041	1136	1216	1303	1405	1519	1632	1740	X	X	X	X	X
41000	844	1004	1134	1229	1317	1422	1545	1677	X	X	X	X	X	X	X
42000	881	1066	1198	1293	1387	1503	1641	1785	X	X	X	X	X	X	X
43000	918	1127	1262	1357	1456	1584	1737	X	X	X	X	X	X	X	X
44000	956	1188	1326	1420	1525	1665	X	X	X	X	X	X	X	X	X
45000	993	1249	1390	1484	1594	1746	X	X	X	X	X	X	X	X	X
46000	973	1217	1356	1450	1558	X	X	X	X	X	X	X	X	X	X
47000	1011	1279	1421	1515	X	X	X	X	X	X	X	X	X	X	X
48000	1049	1341	1486	X	X	X	X	X	X	X	X	X	X	X	X
49000	1087	1403	X	X	X	X	X	X	X	X	X	X	X	X	X
50000	1125	1465	X	X	X	X	X	X	X	X	X	X	X	X	X
51000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
52000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
53000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
54000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
55000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
56000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
57000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
58000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-37500. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1393	1323	1234	1177	1141	1111	1064	1007	950	908	881	858	816	754	736
31000	1363	1295	1208	1153	1120	1088	1043	985	931	890	864	840	799	739	722
32000	1334	1268	1183	1128	1097	1065	1021	966	912	871	846	823	783	724	707
33000	1305	1240	1157	1104	1073	1042	999	945	893	853	828	805	767	709	693
34000	1276	1212	1132	1080	1049	1019	977	925	874	835	810	788	750	695	678
35000	1247	1185	1106	1056	1026	996	955	904	855	817	792	771	734	680	X
36000	1218	1157	1081	1031	1002	973	933	884	835	798	774	753	717	X	X
37000	1189	1130	1055	1007	978	950	911	863	816	780	757	736	701	X	X
38000	1159	1102	1030	983	955	927	890	843	797	762	739	718	X	X	X
39000	1130	1074	1004	958	931	904	868	823	778	743	721	X	X	X	X
40000	1101	1047	978	934	907	881	846	802	759	725	X	X	X	X	X
41000	1072	1019	953	910	883	858	824	782	X	X	X	X	X	X	X
42000	1043	992	927	885	860	835	802	761	X	X	X	X	X	X	X
43000	1014	964	902	861	836	812	780	X	X	X	X	X	X	X	X
44000	985	937	876	837	812	789	X	X	X	X	X	X	X	X	X
45000	955	909	851	812	789	766	X	X	X	X	X	X	X	X	X
46000	926	881	825	788	765	X	X	X	X	X	X	X	X	X	X
47000	897	854	800	764	X	X	X	X	X	X	X	X	X	X	X
48000	868	826	774	X	X	X	X	X	X	X	X	X	X	X	X
49000	839	799	X	X	X	X	X	X	X	X	X	X	X	X	X
50000	810	771	X	X	X	X	X	X	X	X	X	X	X	X	X
51000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
52000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
53000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
54000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
55000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
56000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
57000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
58000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-40000. FEET
DISTANCE FOR CLIMB TABLE
DISTANCES ARE IN NAUTICAL MILES MULTIPLIED BY 10.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	252	260	291	312	329	356	396	445	491	526	549	573	617	690	X
31000	265	273	306	329	349	378	422	475	525	562	587	612	658	734	X
32000	277	285	321	348	371	404	452	509	562	603	629	656	703	X	X
33000	290	297	336	367	394	431	482	543	600	643	672	700	X	X	X
34000	302	309	351	386	416	457	512	577	637	684	714	X	X	X	X
35000	315	321	366	404	439	483	542	610	675	724	X	X	X	X	X
36000	346	352	404	452	495	549	618	696	X	X	X	X	X	X	X
37000	368	372	430	484	534	594	669	X	X	X	X	X	X	X	X
38000	389	393	455	516	573	639	721	X	X	X	X	X	X	X	X
39000	411	414	481	549	612	684	X	X	X	X	X	X	X	X	X
40000	432	434	507	581	650	729	X	X	X	X	X	X	X	X	X
41000	483	482	567	656	X	X	X	X	X	X	X	X	X	X	X
42000	519	517	611	X	X	X	X	X	X	X	X	X	X	X	X
43000	555	552	X	X	X	X	X	X	X	X	X	X	X	X	X
44000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
45000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
46000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
47000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
48000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
49000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
50000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
51000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
52000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
53000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
54000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
55000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
56000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
57000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
58000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-40000. FEET
FUEL FOR CLIMB TABLE
FUELS ARE IN POUNDS.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	612	679	775	849	900	945	1000	1070	1150	1230	1300	1361	1425	1515	X
31000	640	707	810	891	947	996	1055	1128	1212	1296	1370	1437	1511	1613	X
32000	667	735	845	933	994	1047	1109	1187	1275	1362	1440	1514	1597	X	X
33000	694	763	880	974	1040	1097	1164	1246	1337	1428	1511	1590	X	X	X
34000	722	804	925	1020	1090	1155	1231	1321	1418	1514	1606	X	X	X	X
35000	749	849	971	1067	1141	1215	1301	1400	1504	1605	X	X	X	X	X
36000	791	918	1043	1139	1219	1306	1409	1523	X	X	X	X	X	X	X
37000	825	974	1102	1197	1282	1380	1497	X	X	X	X	X	X	X	X
38000	859	1029	1160	1255	1346	1455	1584	X	X	X	X	X	X	X	X
39000	893	1085	1219	1314	1409	1529	X	X	X	X	X	X	X	X	X
40000	927	1141	1277	1372	1472	1603	X	X	X	X	X	X	X	X	X
41000	982	1230	1370	1465	X	X	X	X	X	X	X	X	X	X	X
42000	1041	1328	1472	X	X	X	X	X	X	X	X	X	X	X	X
43000	1101	1426	X	X	X	X	X	X	X	X	X	X	X	X	X
44000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
45000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
46000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
47000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
48000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
49000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
50000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
51000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
52000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
53000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
54000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
55000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
56000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
57000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
58000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

F4E AIRCRAFT
ALTITUDE-40000. FEET
FUEL CONSUMPTION RATE TABLE
RATES ARE IN NAUTICAL MILES PER 10000 POUNDS FUEL.

WEIGHT	DRAG INDEX 0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
30000	1448	1375	1282	1223	1189	1155	1106	1045	986	943	915	891	847	781	X
31000	1413	1342	1251	1194	1160	1127	1080	1021	963	920	894	870	827	764	X
32000	1378	1308	1220	1165	1132	1099	1053	995	940	898	872	849	807	X	X
33000	1342	1275	1190	1135	1103	1071	1027	971	917	876	851	828	X	X	X
34000	1307	1242	1159	1106	1075	1044	1000	947	894	854	829	X	X	X	X
35000	1272	1209	1128	1076	1046	1016	974	922	871	832	X	X	X	X	X
36000	1237	1175	1097	1047	1017	988	948	897	X	X	X	X	X	X	X
37000	1202	1142	1066	1018	989	961	921	X	X	X	X	X	X	X	X
38000	1166	1109	1036	988	960	933	895	X	X	X	X	X	X	X	X
39000	1131	1075	1005	959	932	905	X	X	X	X	X	X	X	X	X
40000	1096	1042	974	930	903	877	X	X	X	X	X	X	X	X	X
41000	1061	1009	943	900	X	X	X	X	X	X	X	X	X	X	X
42000	1026	975	912	X	X	X	X	X	X	X	X	X	X	X	X
43000	990	942	X	X	X	X	X	X	X	X	X	X	X	X	X
44000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
45000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
46000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
47000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
48000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
49000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
50000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
51000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
52000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
53000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
54000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
55000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
56000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
57000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
58000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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AFATL (DLW)	1		
AFATL (DLR)	1		
AFATL (DLU)	1		
AFATL (DLX)	1		
AFATL (DLY)	1		
AFATL (DLG)	1		
AFATL (DLGC)	10		
AFATL (DLK)	1		
AFATL (DLJ)	1		
AFATL (DLOSL)	2		
ADTC (TGW)	1		

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UNCLASSIFIED
Security Classification

DOCUMENT CONTROL DATA - R & D

Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Product Assurance Division Air Force Armament Laboratory Eglin Air Force Base, Florida 32542	2a. REPORT SECURITY CLASSIFICATION Unclassified 2b. GROUP

3. REPORT TITLE
A TECHNIQUE FOR DETERMINING THE RADIUS OF ACTION FOR A TACTICAL FIGHTER AIRCRAFT

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)
Final Report (January 1971 - January 1972)

5. AUTHOR(S) (First name, middle initial, last name)
William A. Miller, Major, USAF
Stephen C. Korn, Captain, USAF

6. REPORT DATE January 1973	7a. TOTAL NO. OF PAGES 96	7b. NO. OF REFS 6
8a. CONTRACT OR GRANT NO b. PROJECT NO 2567 c. d.	9a. ORIGINATOR'S REPORT NUMBER(S) AFATL-TR-73-5 9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	

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11. SUPPLEMENTARY NOTES Available in DDC	12. SPONSORING MILITARY ACTIVITY Air Force Armament Laboratory Air Force Systems Command Eglin Air Force Base, Florida 32542

13. ABSTRACT

A computer program using an iterative technique was developed for determining the radius of action of F-4E and A-7D aircraft with any configuration of external stores. The program uses performance data from the aircraft flight manuals to calculate fuel and distance required to achieve military power climbs and optimum cruise fuel consumption. Required inputs to the program include the initial amount of fuel onboard and aircraft gross weight, the cruise and loiter altitudes, and the outbound and returning drag indicies due to aerodynamic drag of the external stores. Optional inputs that provide increased accuracy include fuel for angine start and taxi, and fuel and distance for takeoff and descent. The program calculates sequential increments of the outbound cruise portion of the mission profile until the fuel reserve desired at the end of mission (return to home base) is obtained; thus the radius of action is determined.

DD FORM 1473

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14 KEY WORDS	LINK A ROLE	LINK A WT	LINK B ROLE	LINK B WT	LINK C ROLE	LINK C WT
Computer Simulation						
Radius of Action						
F-4E Aircraft						
A-7D Aircraft						
External Stores						
Mission Profile						

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