

CHAPTER 10

STANDARD MISSION PROFILES

CHAPTER 10

STANDARD MISSION PROFILES

	<u>PAGE</u>
10.1 INTRODUCTION	10.1
10.2 PURPOSE OF TEST	10.2
10.3 THEORY	10.2
10.4 MISSION PROFILES	10.5
10.4.1 BACKGROUND	10.5
10.4.2 GENERAL NAVY OPERATIONAL MISSIONS (REF 7)	10.8
10.4.2.1 HI-HI-HI (HIGH ALTITUDE SUBSONIC)	10.8
10.4.2.2 FIGHTER ESCORT	10.10
10.4.2.3 ALTERNATE FIGHTER ESCORT	10.12
10.4.2.4 DECK LAUNCHED INTERCEPT	10.14
10.4.2.5 COMBAT AIR PATROL	10.16
10.4.2.6 CLOSE SUPPORT	10.18
10.4.2.7 FERRY/CROSS COUNTRY NAVIGATION	10.20
10.4.2.8 INTERDICTION	10.22
10.4.2.9 ALTERNATE INTERDICTION	10.24
10.4.2.10 HI-LO-HI	10.26
10.4.2.11 LO-LO-LO	10.28
10.4.2.12 LO-LO-LO-HI	10.30
10.4.3 SPECIAL NAVY OPERATIONAL MISSIONS (REF 7)	10.32
10.4.3.1 CARGO AND TRANSPORT	10.32
10.4.3.2 ASW SEARCH	10.34
10.4.3.3 AEW SEARCH	10.36
10.4.3.4 ASW	10.38
10.4.3.5 RECONNAISSANCE	10.40
10.4.3.6 MINELAYING	10.42
10.4.3.7 REFUEL/BUDDY TANKER	10.44
10.4.3.8 FAMILIARIZATION	10.46
10.4.3.9 CARRIER QUALIFICATION	10.48
10.4.3.10 AIR COMBAT MANEUVERING TRAINING	10.50
10.4.3.11 TACTICAL NAVIGATION	10.52
10.4.3.12 WEAPONS DELIVERY/GUNNERY	10.54

FIXED WING PERFORMANCE

10.4.4	NAVY PILOT TRAINER MISSIONS (REF 6)	10.56
10.4.4.1	FAMILIARIZATION	10.56
10.4.4.2	NIGHT FAMILIARIZATION	10.58
10.4.4.3	BASIC INSTRUMENTS	10.60
10.4.4.4	RADIO INSTRUMENTS	10.62
10.4.4.5	AIRWAYS NAVIGATION - 1	10.64
10.4.4.6	AIRWAYS NAVIGATION - 2	10.66
10.4.4.7	FORMATION	10.68
10.4.4.8	NIGHT FORMATION	10.70
10.4.4.9	TACTICAL FORMATION	10.72
10.4.4.10	AIR-TO-AIR GUNNERY	10.74
10.4.4.11	WEAPON DELIVERY	10.76
10.4.4.12	WEAPONS DELIVERY - TAC NAV	10.78
10.4.4.13	AIR COMBAT MANEUVERING	10.80
10.4.4.14	FIELD CARRIER LANDING PRACTICE (FCLP)	10.82
10.4.4.15	CARRIER QUALIFICATION	10.84
10.4.5	NAVAL FLIGHT OFFICER TRAINER MISSIONS (REF 2)	10.86
10.4.5.1	LOW LEVEL NAVIGATION - 1	10.86
10.4.5.2	LOW LEVEL NAVIGATION - 2	10.88
10.4.5.3	LOW LEVEL NAVIGATION - 3	10.90
10.4.5.4	LOW LEVEL NAVIGATION - 4	10.92
10.4.5.5	INSTRUMENT NAVIGATION - 1	10.94
10.4.5.6	INSTRUMENT NAVIGATION - 2	10.96
10.4.5.7	RADAR NAVIGATION - 1	10.98
10.4.5.8	RADAR NAVIGATION - 2	10.100
10.4.5.9	LOCAL RADAR - 1	10.102
10.4.5.10	LOCAL RADAR - 2	10.104
10.4.5.11	RIO PATTERN - INTERCEPTS - 1	10.106
10.4.5.12	RIO PATTERN - INTERCEPTS - 2	10.108
10.5	CONCLUSION	10.110
10.6	GLOSSARY	10.110
10.6.1	NOTATIONS	10.110
10.7	REFERENCES	10.111

STANDARD MISSION PROFILES

CHAPTER 10

FIGURES

	<u>PAGE</u>
10.1 GENERIC MISSION PROFILE	10.1
10.2 MISSION REQUIREMENTS WHICH DEFINE PERFORMANCE	10.3
10.3 AIRCRAFT PERFORMANCE PROGRAM	10.4
10.4 HI-HI-HI	10.8
10.5 FIGHTER ESCORT	10.10
10.6 ALTERNATE FIGHTER ESCORT	10.12
10.7 DECK LAUNCHED INTERCEPT	10.14
10.8 COMBAT AIR PATROL	10.16
10.9 CLOSE SUPPORT	10.18
10.10 FERRY/CROSS COUNTRY NAVIGATION	10.20
10.11 INTERDICTION	10.22
10.12 ALTERNATE INTERDICTION	10.24
10.13 HI-LO-HI	10.26
10.14 LO-LO-LO	10.28
10.15 LO-LO-LO-HI	10.30
10.16 CARGO AND TRANSPORT	10.32
10.17 ASW SEARCH	10.34
10.18 AEW SEARCH	10.36
10.19 ASW	10.38
10.20 RECONNAISSANCE	10.40
10.21 MINELAYING	10.42
10.22 REFUEL/BUDDY TANKER	10.44
10.23 FAMILIARIZATION	10.46

FIXED WING PERFORMANCE

10.24	CARRIER QUALIFICATION	10.48
10.25	AIR COMBAT MANEUVERING TRAINING	10.50
10.26	TACTICAL NAVIGATION	10.52
10.27	WEAPON DELIVERY/GUNNERY	10.54
10.28	FAMILIARIZATION	10.56
10.29	NIGHT FAMILIARIZATION	10.58
10.30	BASIC INSTRUMENTS	10.60
10.31	RADIO INSTRUMENTS	10.62
10.32	AIRWAYS NAVIGATION - 1	10.64
10.33	AIRWAYS NAVIGATION - 2	10.66
10.34	FORMATION	10.68
10.35	NIGHT FORMATION	10.70
10.36	TACTICAL FORMATION	10.72
10.37	AIR-TO-AIR GUNNERY	10.74
10.38	WEAPON DELIVERY	10.76
10.39	WEAPONS DELIVERY - TAC NAV	10.78
10.40	AIR COMBAT MANEUVERING	10.80
10.41	FIELD CARRIER LANDING PRACTICE (FCLP)	10.82
10.42	CARRIER QUALIFICATION	10.84
10.43	LOW LEVEL NAVIGATION - 1	10.86
10.44	LOW LEVEL NAVIGATION - 2	10.88
10.45	LOW LEVEL NAVIGATION - 3	10.90
10.46	LOW LEVEL NAVIGATION - 4	10.92
10.47	INSTRUMENT NAVIGATION - 1	10.94
10.48	INSTRUMENT NAVIGATION - 2	10.96
10.49	RADAR NAVIGATION - 1	10.98
10.50	RADAR NAVIGATION - 2	10.100

STANDARD MISSION PROFILES

10.51 LOCAL RADAR - 1	10.102
10.52 LOCAL RADAR - 2	10.104
10.53 RIO PATTERN - INTERCEPTS - 1	10.106
10.54 RIO PATTERN - INTERCEPTS - 2	10.108

CHAPTER 10

STANDARD MISSION PROFILES

10.1 INTRODUCTION

From the beginning to the end of the flight test process, the flight test team must have a working knowledge of the mission and mission profiles against which the aircraft is to be evaluated. This knowledge at the start of the program enables the team to design the test program to concentrate on the mission specific altitudes, airspeeds, loadings, or other requirements which are representative of the mission(s).

The preceding chapters discuss in detail the testing required to evaluate specific performance characteristics. The final step for the flight test team is to assimilate all the performance data and determine if the aircraft can perform the required mission(s). This chapter looks at putting all of the performance characteristics together to enable the flight test team to evaluate an aircraft against a given mission profile (Figure 10.1).

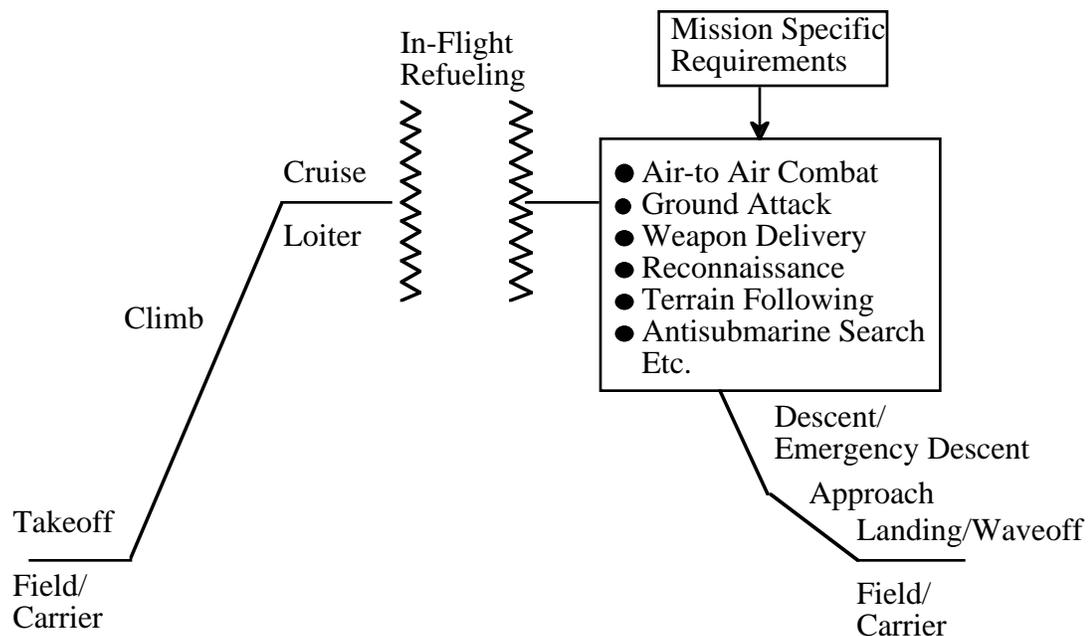


Figure 10.1
GENERIC MISSION PROFILE

FIXED WING PERFORMANCE

10.2 PURPOSE OF TEST

The purpose of this chapter is to present standard mission profiles for:

1. General Navy Operational Missions.
2. Special Navy Operational Missions.
3. Naval Pilot Trainer Missions.
4. Naval Flight Officer Trainer Missions.

10.3 THEORY

Once the Navy has determined specific operational requirements, an aircraft design team takes this information to develop the aerodynamic, propulsion, and weight elements that ultimately give the flight test team an aircraft with certain performance characteristics (Figure 10.2).

STANDARD MISSION PROFILES

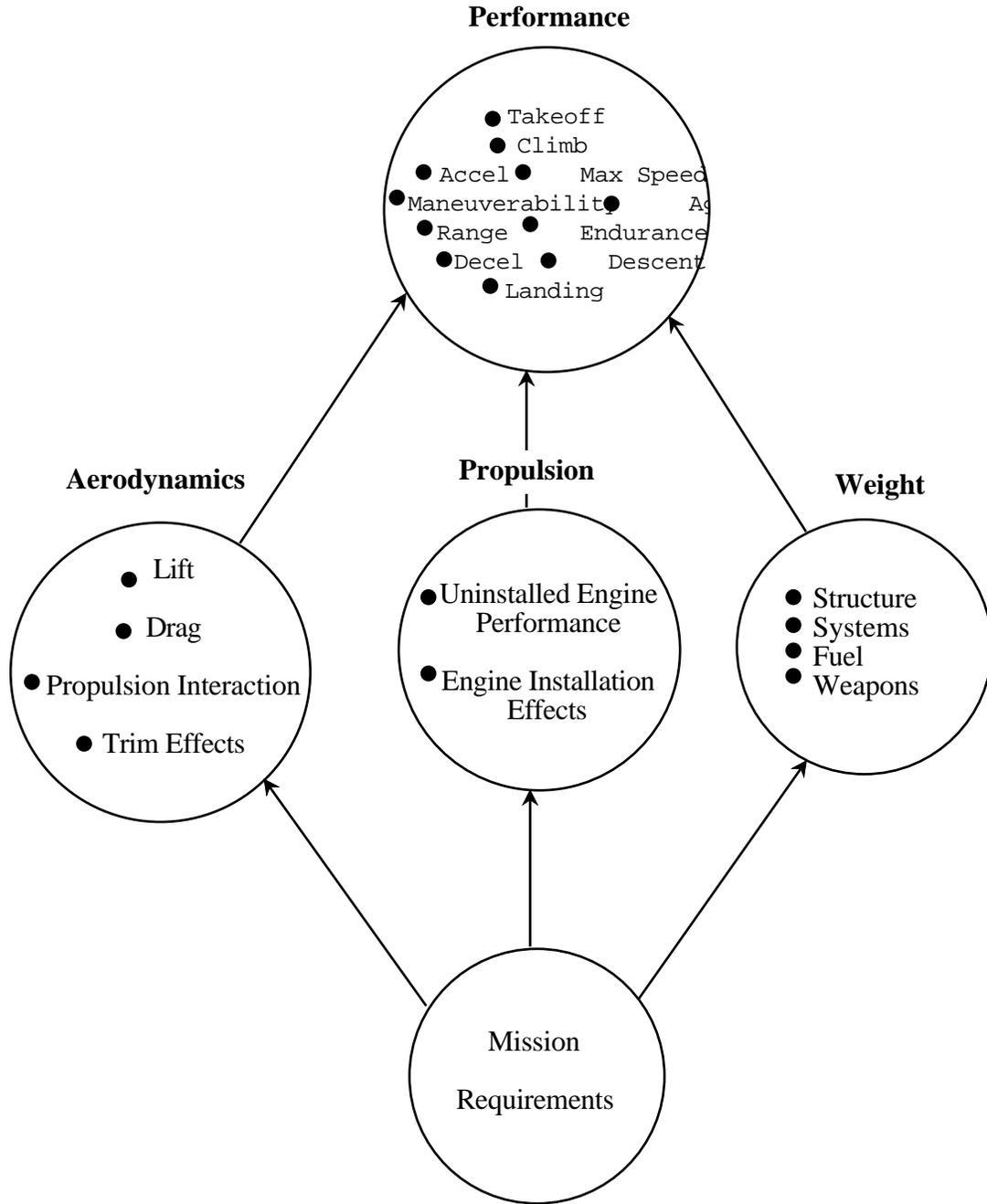


Figure 10.2
MISSION REQUIREMENTS WHICH DEFINE PERFORMANCE

Two important performance results determined by the flight test team are:

1. Performance guarantees.
2. Mission suitability.

FIXED WING PERFORMANCE

Figure 10.3 illustrates the relationship of three key specifications dealing with an aircraft's performance test and evaluation program.

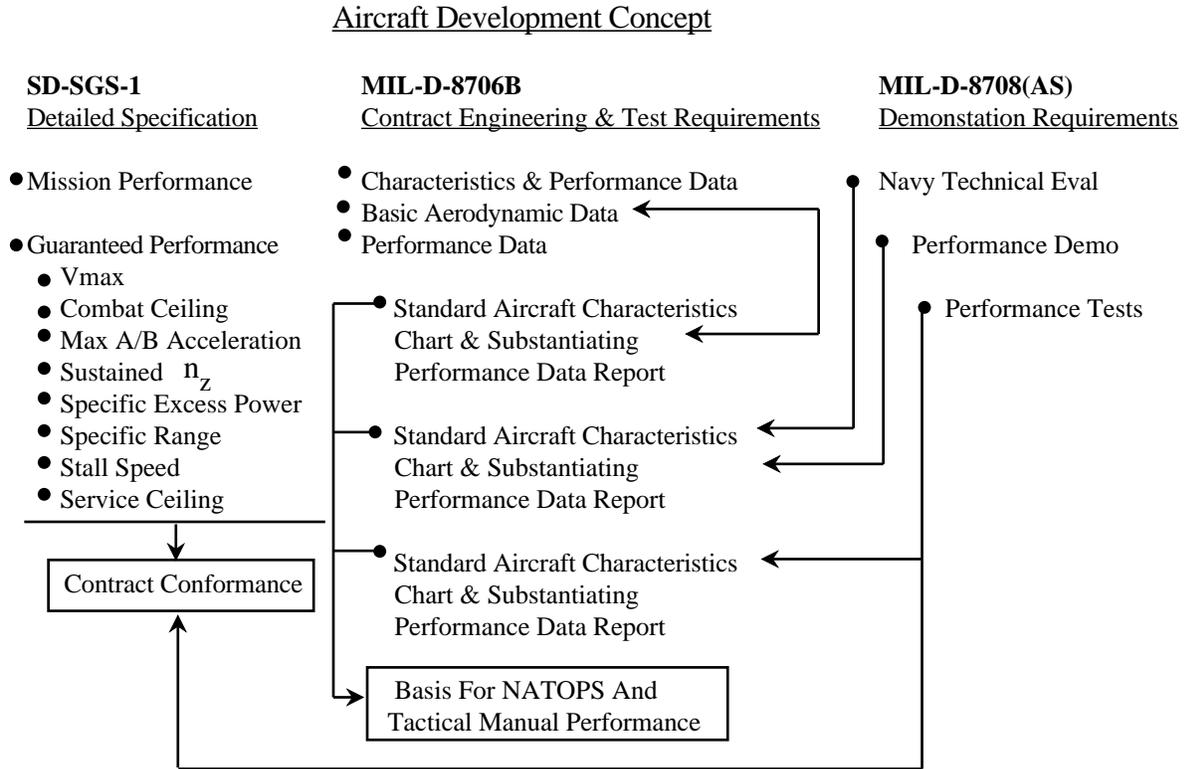


Figure 10.3

AIRCRAFT PERFORMANCE PROGRAM

As shown in figure 10.3, the data from the flight test program is used to develop the standard aircraft characteristics (SAC) charts, which in turn are used as the basis for NATOPS and Tactical Manual performance data. Also, through testing specific performance characteristics, the flight data verifies the contract performance guarantees.

While some data presented in flight manuals is based on flight test results, much of the data is calculated (estimated). It should be noted that the confidence level of these performance calculations is based on five sources. Since aircraft performance data are obtained from the marriage of aerodynamic, propulsion, and weight information, the confidence in the validity of the calculated results is dependent on the accuracy and validity of the individual components. The confidence level in the validity of the components is in turn dependent on a number of factors including the degree of development of the aircraft

STANDARD MISSION PROFILES

or weapons system, the availability of instrumented flight test data and/or the source of the data used for the calculations. For the most part, NAVAIRSYSCOM performance calculations are based on the best available data source in the following order of preference:

1. Formal government demonstration data used for showing conformance with contractual guarantees.
2. Government flight test data (Navy/Air Force evaluations).
3. Contractor flight test data.
4. Wind tunnel data.
5. Empirical estimates and state-of-the-art calculations.

Most performance calculations, especially mission calculation, are based on inputs from as many of the above sources as possible. It is impractical to obtain flight and wind tunnel data for all combinations of mission loadings (external stores) throughout the total aircraft flight envelope. However, the degree of confidence in the results can usually be assessed from the source of baseline aerodynamic, propulsion, and weight information used in the calculations.

While much of the performance planning data still exists only as paper charts, with the introduction of the Tactical Air Mission Planning System (TAMPS) each aircrew will soon have available computer access to the performance data base for their aircraft. During the transition from the paper charts to computer software the aircrew needs to know the source of the performance data and the assumptions made in establishing the computer data base.

10.4 MISSION PROFILES

10.4.1 BACKGROUND

For each aircraft the Navy flies, SAC charts are developed for at least four (4) mission types. The SAC charts are intended to provide a concise compilation of physical characteristics and performance capabilities of an aircraft or weapons system. The first SAC charts are developed for the clean mission which is intended to show the maximum capabilities of the aircraft (usually a high-high-profile). The second mission described is the ferry mission, where the greatest distance attainable on a practicable one-way mission with maximum authorized fuel and payload (external fuel tanks may be carried and must be

FIXED WING PERFORMANCE

retained for the duration of the flight). The third mission described by the SAC charts is the basic mission which takes the performance capabilities of the aircraft and applies the specific criteria of the mission profiles in AS-5263 (examples presented as sections 10.4.2 and 10.4.3 of this chapter). Finally, the fourth type of mission(s) described are the design mission(s), defined as the primary missions for which the aircraft was specifically procured (examples presented as sections 10.4.4 and 10.4.5). These missions are defined in procurement documents, such as the statement of work, and include the flight profiles, allowances, fuel (clean or external tanks) and payload. The mission profiles presented in sections 10.4.2, 10.4.3, 10.4.4, and 10.4.5 are extracted from the reference cited for each section.

STANDARD MISSION PROFILES

THIS PAGE INTENTIONALLY LEFT BLANK

FIXED WING PERFORMANCE

10.4.2 GENERAL NAVY OPERATIONAL MISSIONS (REF 7)

10.4.2.1 HI-HI-HI (HIGH ALTITUDE SUBSONIC)

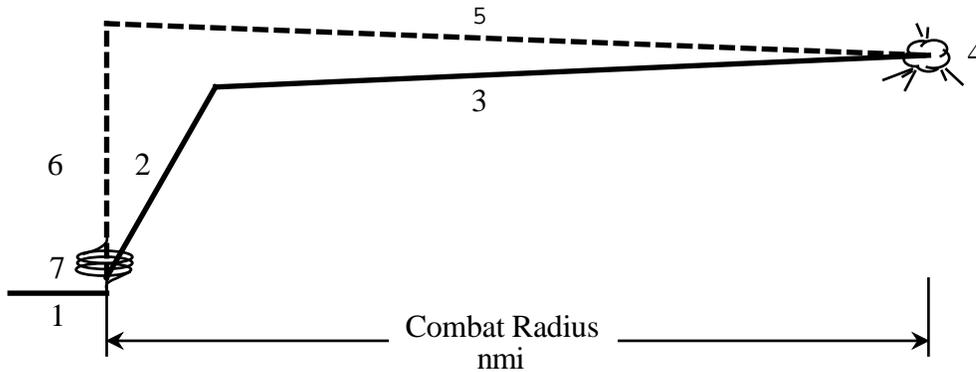


Figure 10.4
HI-HI-HI

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate power to best cruise altitude (not to exceed cruise ceiling).
3. Cruise Out: to target at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
4. Combat: fuel allowance equal to 5 min at maximum speed with intermediate thrust at best cruise altitude. No distance is credited (drop bombs, retain mounting hardware and missiles after combat).
5. Cruise Back: to base at speed and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
6. Descent: descend to sea level (no fuel used, no distance gained).

STANDARD MISSION PROFILES

7. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 6.
- b. Cycle Time: Items 2 through 7.

FIXED WING PERFORMANCE

10.4.2.2 FIGHTER ESCORT

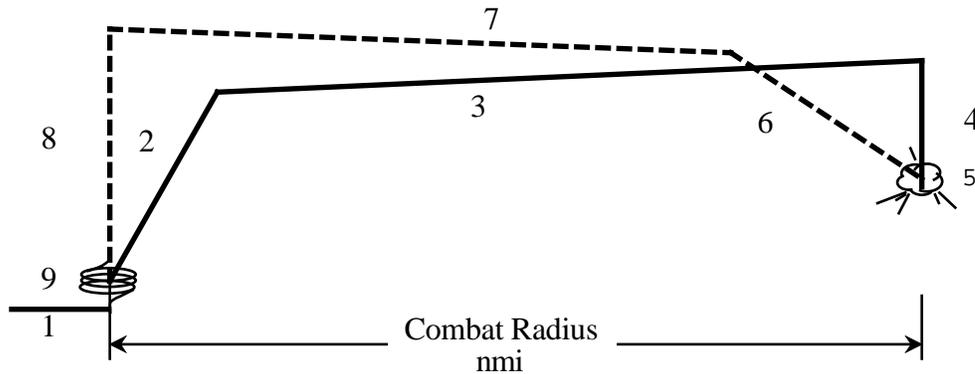


Figure 10.5
FIGHTER ESCORT

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrusts if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust to best cruise altitude (not to exceed cruise ceiling).
3. Cruise Out: to target at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
4. Descent: descend to 10,000 ft (no fuel used, no distance gained).
5. Combat: fuel allowance equal to 2 min at maximum thrust, Mach 1.0 at 10,000 ft (no distance is credited, missiles are retained).
6. Climb: on course at best climb speed at intermediate thrust from 10,000 ft to best cruise altitude (not to exceed cruise ceiling).
7. Cruise Back: to base at speed and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
8. Descent: descend to sea level (no fuel used, no distance gained).

STANDARD MISSION PROFILES

9. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 8.
- b. Cycle Time: Items 2 through 9.

FIXED WING PERFORMANCE

10.4.2.3 ALTERNATE FIGHTER ESCORT

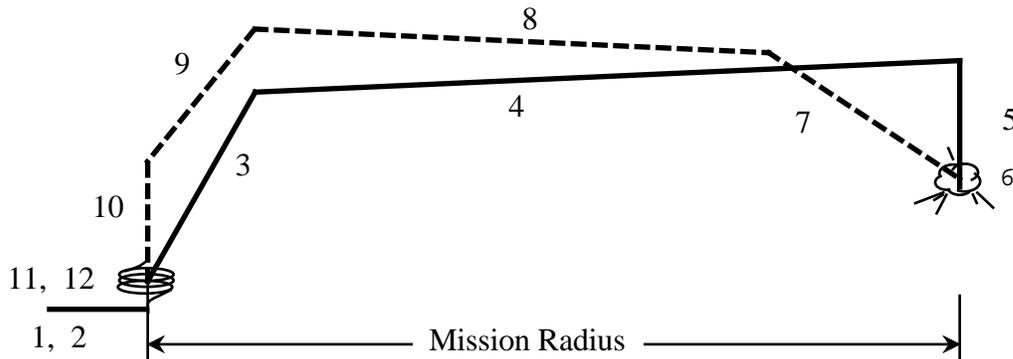


Figure 10.6
ALTERNATE FIGHTER ESCORT

1. Takeoff: start engines and takeoff allowance equal to 20 min at idle power and 30 seconds at intermediate power, sea level static.
2. Acceleration: intermediate power acceleration from 150 KCAS to best climb speed at sea level.
3. Climb: intermediate power climb from sea level to best cruise altitude.
4. Cruise Out: cruise climb at best conditions.
5. Descent: idle power descent to 20,000 ft at Mach 0.8 (credit time, fuel, and distance).
6. Combat: fuel allowance equal to 4 intermediate power sustained turns at Mach 0.9 at 20,000 ft and 3 maximum power sustained turns at Mach 0.9 at 20,000 ft.
7. Climb: intermediate power climb from 20,000 ft to best cruise altitude.
8. Cruise Back: cruise climb at best conditions.
9. Descent: idle power descent to 20,000 ft at 250 KCAS (credit time, fuel and distance).

STANDARD MISSION PROFILES

10. Descent: idle power descent to 1,200 ft at 250 KCAS (credit time and fuel; no credit for distance).

11. Carrier Approach: cruise at 150 KCAS for a distance of 12 nmi at 1,200 ft (credit time and fuel; no credit for distance).

12. Reserve: 100 nmi bingo (no credit for distance). Intermediate power acceleration from 150 KCAS to best climb speed at sea level.

- a. Intermediate power climb from sea level to best profile altitude.
- b. Cruise at best profile altitude(s) at best conditions.
- c. Idle power descent to 10,000 ft at 250 KCAS (credit time, fuel, and distance).
- d. 10 min at 10,000 ft loiter at maximum endurance speed.
- e. Mission Time: Items 3 through 11.
- f. Cycle Time: Items 3 through 12.

FIXED WING PERFORMANCE

10.4.2.4 DECK LAUNCHED INTERCEPT

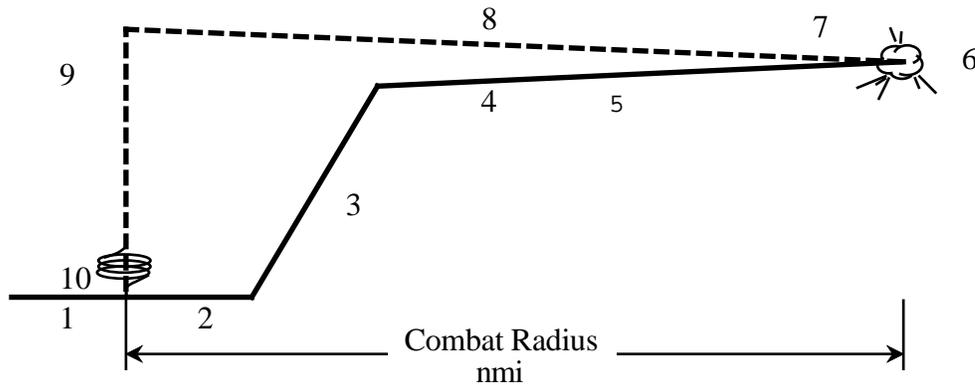


Figure 10.7
DECK LAUNCHED INTERCEPT

1. Taxi, warm-up, takeoff, and acceleration to Mach 0.3: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Acceleration: maximum power acceleration from Mach 0.3 to Mach 0.9 at sea level.
3. Climb: on course at Mach 0.9 at maximum power to 35,000 ft.
4. Acceleration: maximum power acceleration from Mach 0.9 to Mach 1.35 at 35,000 ft.
5. Dash Out: Mach 1.35 dash at 35,000 ft.
6. Combat: fuel allowance equal to 1 min at maximum power, Mach 1.35 at 35,000 ft (no distance is credited, missiles are retained).
7. Climb: on course at best climb speed at intermediate power to best cruise altitude (not to exceed cruise ceiling).
8. Cruise Back: to base at speed and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

STANDARD MISSION PROFILES

9. Descent: descend to sea level (no fuel used, no distance gained).

10. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 9.
- b. Cycle Time: Items 2 through 10.

Note: Dash Mach number and altitude variations should be considered for this mission.

FIXED WING PERFORMANCE

10.4.2.5 COMBAT AIR PATROL

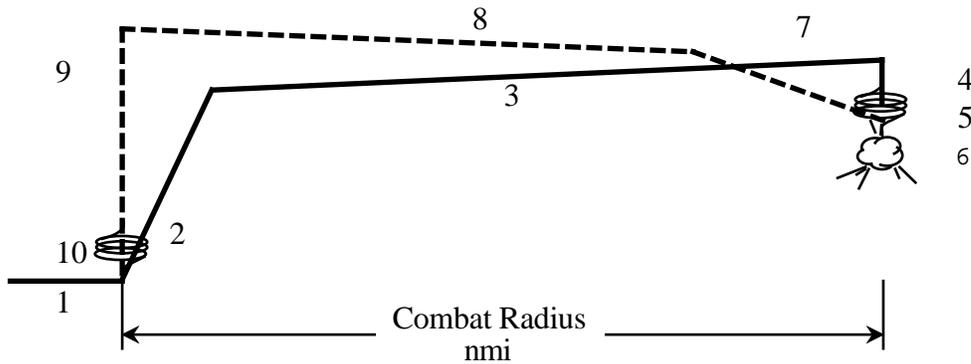


Figure 10.8
COMBAT AIR PATROL

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust to best cruise altitudes (not to exceed cruise ceiling).
3. Cruise Out: to 150 nmi at speeds and altitudes for best range, using a climb flight path (not to exceed cruise ceiling).
4. Descent: descend to 35,000 ft (no fuel used, no distance gained).
5. Loiter: loiter at speed for maximum endurance at 35,000 ft (no distance is credited).
6. Combat: fuel allowance equal that used to accelerate from loiter speed at 35,000 ft to Mach 1.2 plus 2 min at maximum power, Mach 1.2 at 35,000 ft (no distance is credited, missiles are retained).
7. Climb: on course at best climb speed at intermediate power to best cruise altitude (not to exceed cruise ceiling).

STANDARD MISSION PROFILES

8. Cruise Back: to base at speed and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

9. Descent: descend to sea level (no fuel used, no distance gained).

10. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 9.
- b. Cycle Time: Items 2 through 10.

Note: Loiter altitude and combat variations should be considered for this mission.

FIXED WING PERFORMANCE

10.4.2.6 CLOSE SUPPORT

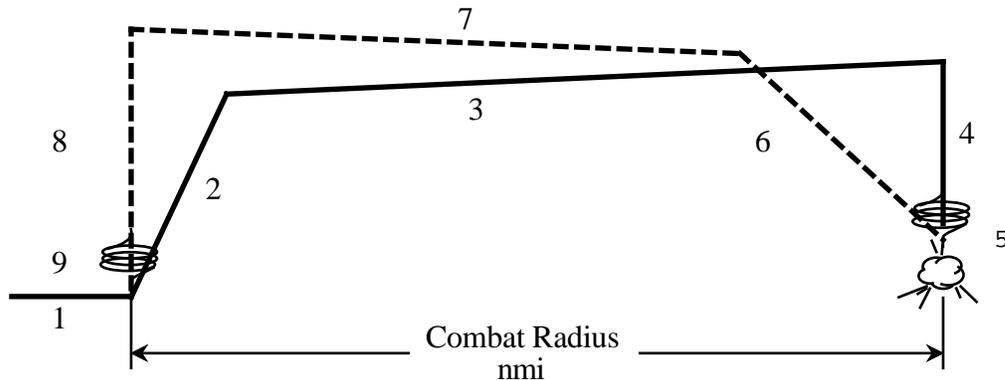


Figure 10.9
CLOSE SUPPORT

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust to best cruise altitudes (not to exceed cruise ceiling).
3. Cruise Out: to target at speeds and altitudes for best range, using a climb flight path (not to exceed cruise ceiling).
4. Descent: descend to 5,000 ft (no fuel used, no distance gained).
5. Loiter: loiter for 1 hour at speed for maximum endurance at 5,000 ft (no distance is credited, drop bombs after loiter, retain mounting hardware and missiles).
6. Climb: on course at best climb speed at intermediate power from 5,000 ft to best cruise altitude (not to exceed cruise ceiling).
7. Cruise Back: to base at speed and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
8. Descent: descend to sea level (no fuel used, no distance gained).

STANDARD MISSION PROFILES

9. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 8.
- b. Cycle Time: Items 2 through 9.

FIXED WING PERFORMANCE

10.4.2.7 FERRY/CROSS COUNTRY NAVIGATION

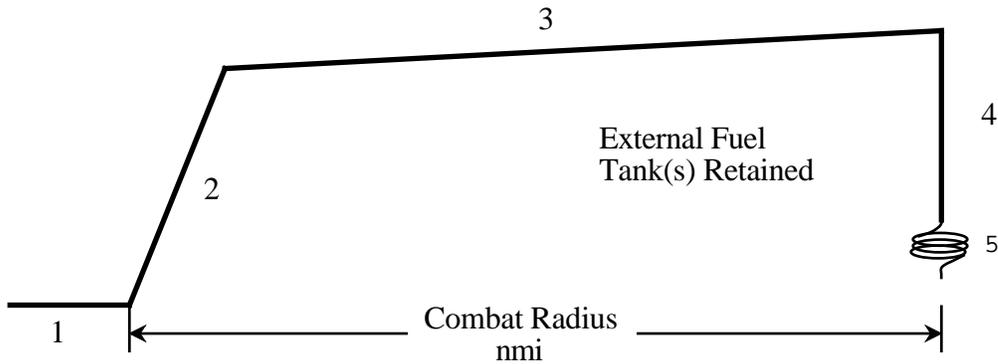


Figure 10.10

FERRY/CROSS COUNTRY NAVIGATION

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.

2. Climb: on course at best climb speed at intermediate thrust to best cruise altitude (not to exceed cruise ceiling).

3. Cruise Out: to combat range at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

4. Descent: descend to sea level (no fuel used, no distance gained).

5. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 4.
- b. Cycle Time: Items 2 through 5.

STANDARD MISSION PROFILES

THIS PAGE INTENTIONALLY LEFT BLANK

STANDARD MISSION PROFILES

8. Climb: on course at best climb speed at intermediate thrust from sea level to best cruise altitude (not to exceed cruise ceiling).

9. Cruise Back: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

10. Descent: descend to sea level (no fuel used, no distance gained).

11. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 10.
- b. Cycle Time: Items 2 through 11.

FIXED WING PERFORMANCE

10.4.2.9 ALTERNATE INTERDICTION

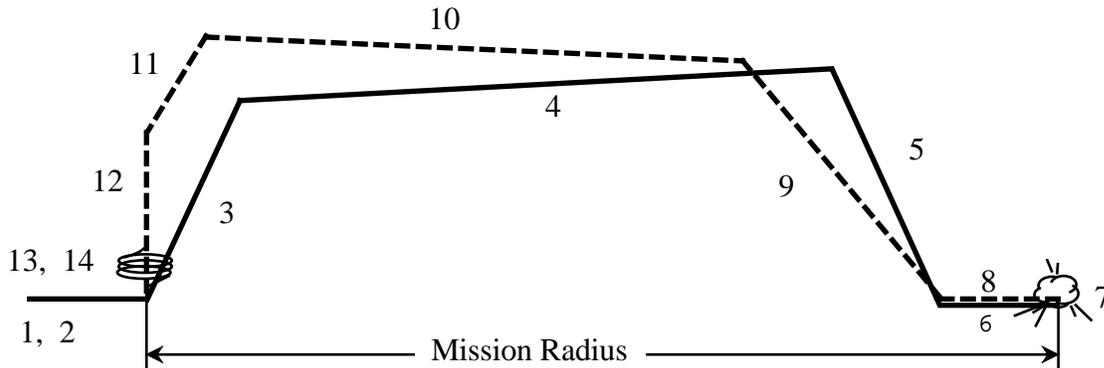


Figure 10.12
ALTERNATE INTERDICTION

1. Takeoff: start engines and takeoff allowance equal to 20 min idle power and 30 seconds intermediate power, sea level static.
2. Acceleration: intermediate power acceleration from 150 KCAS to best climb speed at sea level.
3. Climb: intermediate power climb from sea level to best cruise altitude.
4. Cruise Out: cruise climb at best conditions.
5. Descent: idle power descent to sea level at Mach 0.8 (credit time, fuel, and distance).
6. Dash Out: 50 nmi Mach 0.8 dash at sea level.
7. Combat: fuel allowance equal to 3 (4 g) sustained turns at Mach 0.8 at 5,000 ft (drop bombs; retain mounting hardware and missiles) and 1 maximum power (structural limit) sustained turn at Mach 0.8 at 5,000 ft.
8. Dash Back: 50 nmi Mach 0.8 dash at sea level.
9. Climb: intermediate power climb from sea level to best cruise altitude.

STANDARD MISSION PROFILES

10. Cruise Back: cruise climb at best conditions.
11. Descent: idle power descent to 20,000 ft at 250 KCAS (credit time, fuel and distance).
12. Descent: idle power descent to 1,200 ft at 250 KCAS (credit time and fuel, no credit for distance).
13. Carrier Approach: cruise at 150 KCAS for a distance of 12 nmi at 1,200 ft (credit time and fuel; no credit for distance).
14. Reserve: 100 nmi bingo (no credit for distance). Intermediate power acceleration from 150 KCAS to best climb speed at sea level.
 - a. Intermediate power climb from sea level to best profile altitude.
 - b. Cruise at best profile altitude(s) at best conditions.
 - c. Idle power descent to 10,000 ft at 250 KCAS (credit time, fuel, and distance).
 - d. 10 min at 10,000 ft loiter at maximum endurance speed.
 - e. Mission Time: Items 3 through 13.
 - f. Cycle Time: Items 3 through 14.

FIXED WING PERFORMANCE

10.4.2.10 HI-LO-HI

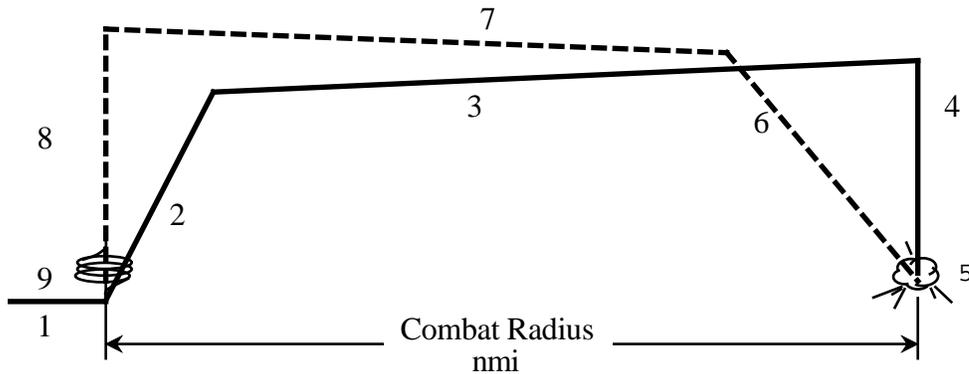


Figure 10.13
HI-LO-HI

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust to best cruise altitude (not to exceed cruise ceiling).
3. Cruise Out: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
4. Descent: descend to sea level (no fuel used, no distance gained).
5. Combat: fuel allowance equal to 5 min at maximum speed with intermediate thrust at sea level. No distance is credited (drop bombs, retain mounting hardware and missiles after combat).
6. Climb: on course at best climb speed at intermediate thrust from sea level to best cruise altitude (not to exceed cruise ceiling).
7. Cruise Back: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

STANDARD MISSION PROFILES

8. Descent: descend to sea level (no fuel used, no distance gained).
9. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).
 - a. Mission Time: Items 2 through 8.
 - b. Cycle Time: Items 2 through 9.

FIXED WING PERFORMANCE

10.4.2.11 LO-LO-LO

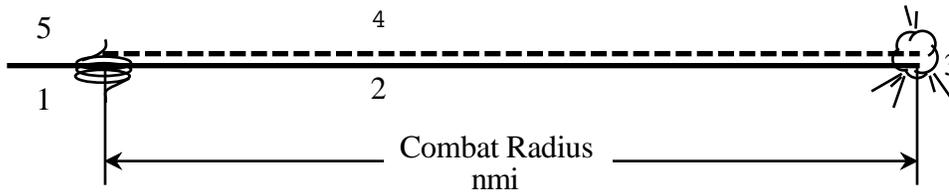


Figure 10.14

LO-LO-LO

1. Taxi, warm-up, takeoff, and acceleration to best cruise speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.

2. Cruise Out: at speed for best range at sea level.

3. Combat: fuel allowance equal to 5 min at maximum speed with intermediate thrust at sea level. No distance is credited (drop bombs, retain mounting hardware and missiles after combat).

4. Cruise Back: at speed for best range at sea level.

5. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial fuel (internal plus external).

a. Mission Time: Items 2 through 4.

b. Cycle Time: Items 2 through 5.

Note: An alternate LO-LO-LO mission would include a 50 nmi sea level dash to and from target at Mach 0.8 (or maximum speed at intermediate thrust if less than Mach 0.8).

STANDARD MISSION PROFILES

THIS PAGE INTENTIONALLY LEFT BLANK

FIXED WING PERFORMANCE

10.4.2.12 LO-LO-LO-HI

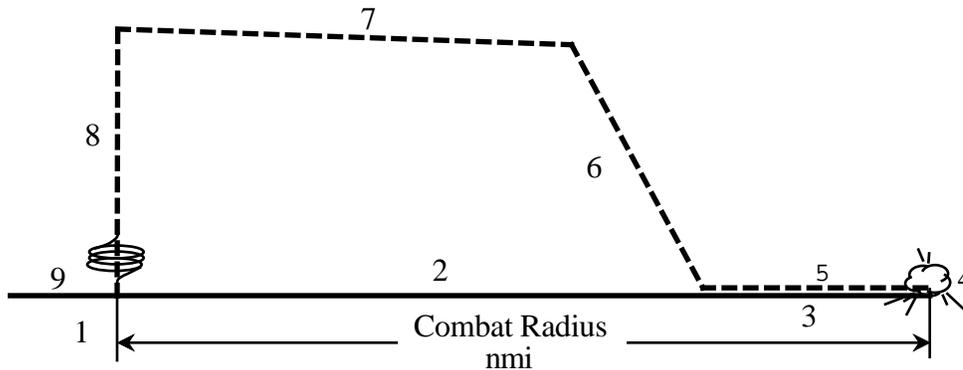


Figure 10.15
LO-LO-LO-HI

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Cruise Out: at speed for best range at sea level.
3. Run-in to target: sea level dash for 50 nmi at Mach 0.8 (or maximum speed at intermediate thrust if less than Mach 0.8).
4. Combat: fuel allowance equal to 5 min at maximum speed with intermediate thrust at sea level. No distance is credited (drop bombs, retain mounting hardware and missiles after combat).
5. Run-out from target: sea level dash for 50 nmi at Mach 0.8 (or maximum speed at intermediate thrust if less than Mach 0.8).
6. Climb: on course at best climb speed at intermediate thrust from sea level to best cruise altitude (not to exceed cruise ceiling).
7. Cruise Back: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

STANDARD MISSION PROFILES

8. Descent: descent to sea level (no fuel used, no distance gained).
9. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).
 - a. Mission Time: Items 2 through 8.
 - b. Cycle Time: Items 2 through 9.

FIXED WING PERFORMANCE

10.4.3 SPECIAL NAVY OPERATIONAL MISSIONS (REF 7)

10.4.3.1 CARGO AND TRANSPORT

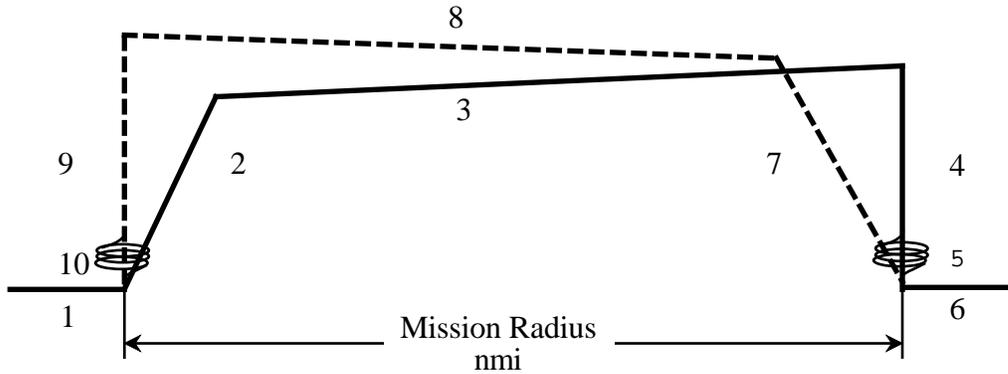


Figure 10.16
CARGO AND TRANSPORT

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust (10 min for propeller aircraft at normal power) plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust (normal power for props) to best cruise altitude (not to exceed cruise ceiling).
3. Cruise Out: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
4. Descent: descend to sea level (no fuel used, no distance gained).
5. Land at remote base and unload passengers/cargo or pick-up passengers/cargo (specified by NAVAIRSYSCOM for the particular aircraft).
6. Repeat Step 1.
7. Repeat Step 2.

STANDARD MISSION PROFILES

8. Cruise Back: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

9. Descent: descend to sea level (no fuel used, no distance gained).

10. Reserve: fuel allowance equal to 20 min (30 min for props) loiter at sea level at speeds for maximum endurance (maximum range for props) with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 9.
- b. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.3.2 ASW SEARCH

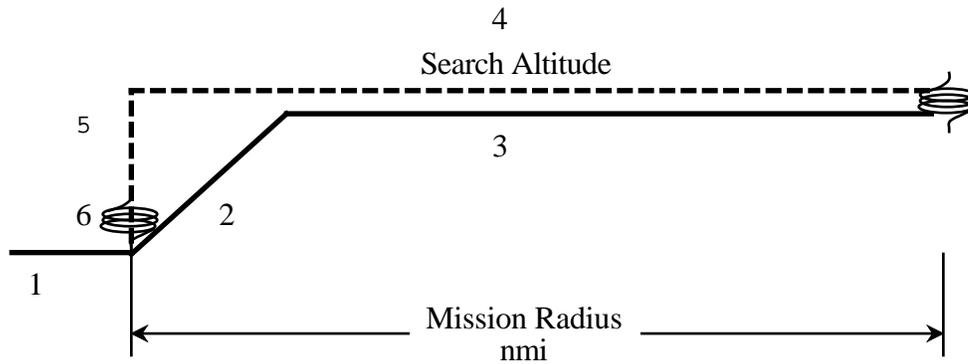


Figure 10.17
ASW SEARCH

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust (10 min for propeller aircraft at normal power) plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust (normal power for props) to search altitude (not to exceed cruise ceiling).
3. Cruise Out: at search altitude at speed for maximum endurance (unless otherwise limited by handling qualities).
4. Cruise Back: at search altitude at speed for maximum endurance (unless otherwise limited by handling qualities).
5. Descent: descend to sea level (no fuel used, no distance gained).
6. Reserve: fuel allowance equal to 20 min (30 min for props) loiter at sea level at speeds for maximum endurance (maximum range for props) with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 5.
- b. Cycle Time: Items 2 through 6.

STANDARD MISSION PROFILES

THIS PAGE INTENTIONALLY LEFT BLANK

FIXED WING PERFORMANCE

10.4.3.3 AEW SEARCH

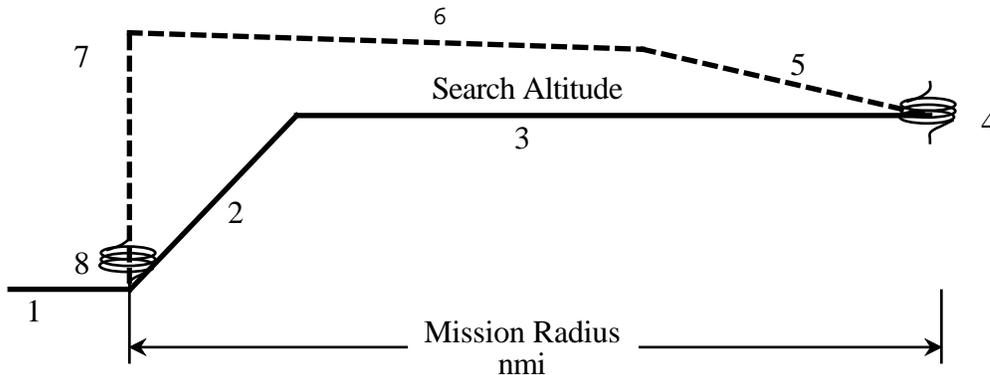


Figure 10.18
AEW SEARCH

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust (10 min for propeller aircraft at normal power) plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust (normal power for props) to search altitude (not to exceed cruise ceiling).
3. Cruise Out: at speeds for best range at search altitude (not to exceed cruise ceiling) to distance specified by NAVAIRSYSCOM.
4. Loiter: loiter for 4 hours at speed for maximum endurance at search altitude (no distance is gained).
5. Climb: on course at best climb speed at intermediate thrust (normal power for props) to best cruise altitude (if higher than search altitude, but not to exceed cruise ceiling).
6. Cruise Back: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
7. Descent: descend to sea level (no fuel used, no distance gained).

STANDARD MISSION PROFILES

8. Reserve: fuel allowance equal to 20 min (30 min for props) loiter at sea level at speeds for maximum endurance (maximum range for props) with all engines operating plus 5% initial total fuel internal plus external).

- a. Mission Time: Items 2 through 7.
- b. Cycle Time: Items 2 through 8.

FIXED WING PERFORMANCE

10.4.3.4 ASW

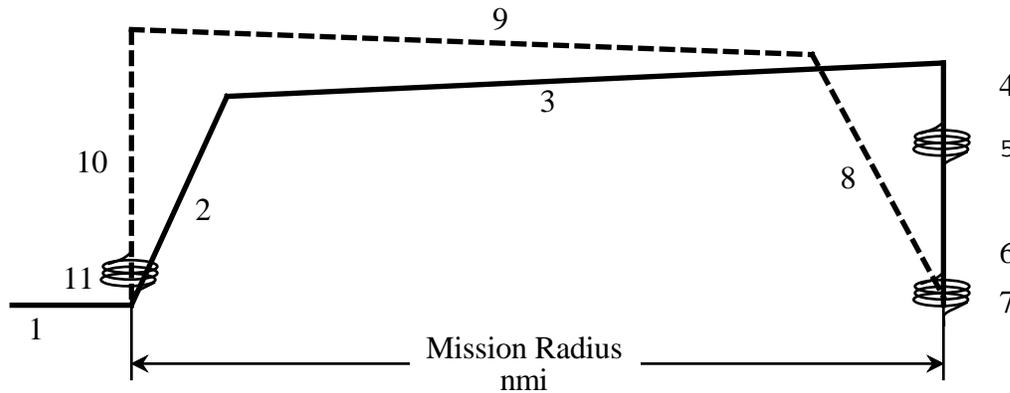


Figure 10.19
ASW

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust (10 min for propeller aircraft at normal power) plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust (normal power for props) to best cruise altitude (not to exceed cruise ceiling).
3. Cruise Out: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
4. Descent: descend to 20,000 ft (no fuel used, no distance gained).
5. Search: search for 3 hours at speed for maximum endurance at 20,000 ft.
6. Descent: descend to 200 ft (no fuel used, no distance gained).
7. Search: search for 1 hour at speed for maximum endurance at 200 ft.
8. Climb: on course at best climb speed at intermediate thrust (normal power for props) to best cruise altitude (not to exceed cruise ceiling).

STANDARD MISSION PROFILES

9. Cruise Back: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

10. Descent: descend to sea level (no fuel used, no distance gained).

11. Reserve: fuel allowance equal to 20 min (30 min for props) loiter at sea level at speeds for maximum endurance (maximum range for props) with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 10.
- b. Cycle Time: Items 2 through 11.

FIXED WING PERFORMANCE

10.4.3.5 RECONNAISSANCE

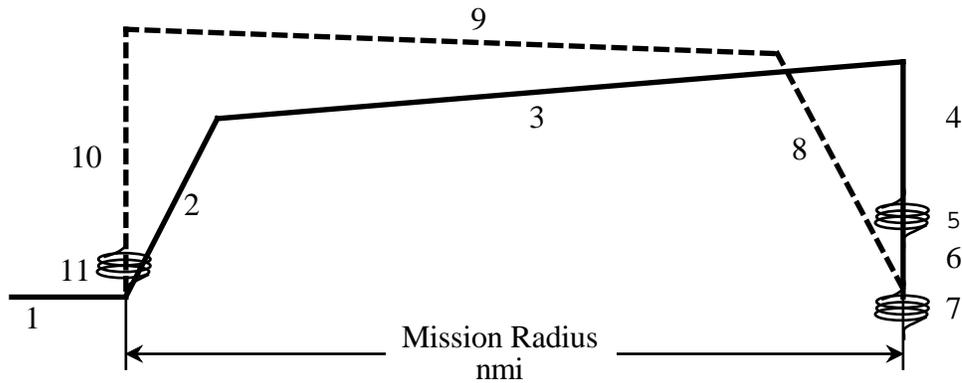


Figure 10.20
RECONNAISSANCE

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust (10 min for propeller aircraft at normal power) plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust (normal power for props) to best cruise altitude (not to exceed cruise ceiling).
3. Cruise Out: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
4. Descent: descend to 5,000 ft (no fuel used, no distance gained).
5. Search: search for 3 hours at speed for maximum endurance at 5,000 ft.
6. Descent: descend to 200 ft (no fuel used, no distance gained).
7. Search: search for 1 hour at speed for maximum endurance at 200 ft.
8. Climb: on course at best climb speed at intermediate thrust (normal power for props) from 200 ft to best cruise altitude (not to exceed cruise ceiling).

STANDARD MISSION PROFILES

9. Cruise Back: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

10. Descent: descend to sea level (no fuel used, no distance gained).

11. Reserve: fuel allowance equal to 20 min (30 min for props) loiter at sea level at speeds for maximum endurance (maximum range for props) with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 10.
- b. Cycle Time: Items 2 through 11.

FIXED WING PERFORMANCE

10.4.3.6 MINELAYING

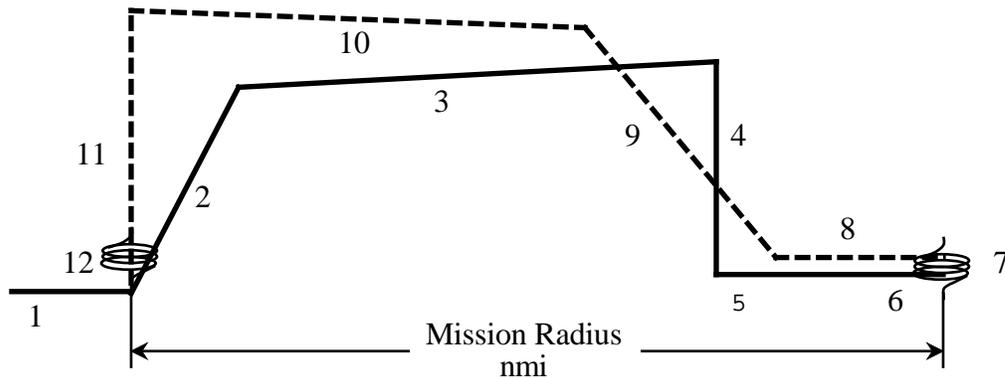


Figure 10.21
MINELAYING

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust (10 min for propeller aircraft at normal power) plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust (normal power for props) to best cruise altitude (not to exceed cruise ceiling).
3. Cruise Out: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).
4. Descent: descend to 200 ft (no fuel used, no distance gained).
5. Penetrate: at maximum continuous power for 300 nmi at 200 ft.
6. Attack: at maximum continuous power for 100 nmi at 200 ft.
7. Release Mines.
8. Escape: on course at maximum continuous power for 300 nmi.
9. Climb: on course at best climb speed at intermediate thrust (normal power for props) from 200 ft to best cruise altitude (not to exceed cruise ceiling).

STANDARD MISSION PROFILES

10. Cruise Back: at speeds and altitudes for best range, using a cruise climb flight path (not to exceed cruise ceiling).

11. Descent: descend to sea level (no fuel used, no distance gained).

12. Reserve: fuel allowance equal to 20 min (30 min for props) loiter at sea level at speeds for maximum endurance (maximum range for props) with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 11.
- b. Cycle Time: Items 2 through 12.

FIXED WING PERFORMANCE

10.4.3.7 REFUEL/BUDDY TANKER

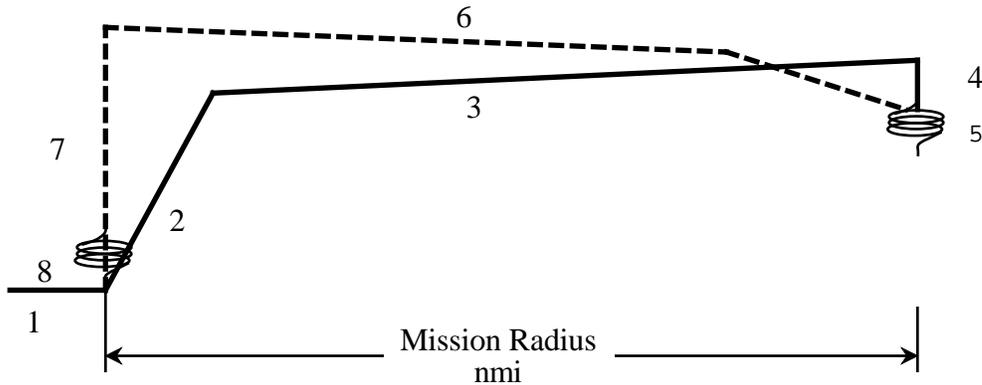


Figure 10.22
REFUEL/BUDDY TANKER

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust (10 min for propeller aircraft at normal power) plus 30 seconds afterburner thrust if afterburner is used on takeoff.
2. Climb: on course at best climb speed at intermediate thrust (normal power for props) to best cruise altitude (not to exceed cruise ceiling).
3. Cruise Out: at speeds and altitudes for best range, using cruise climb flight path (not to exceed cruise ceiling) to point of rendezvous specified by NAVAIRSYSCOM.
4. Descent: descend to 20,000 ft (no fuel used, no distance gained).
5. Loiter: loiter for 1 hour at speed for maximum endurance to allow for rendezvous, hookup, and fuel transfer (no distance gained).
6. Climb: on course at best climb speed intermediate thrust (normal power for props) to best cruise altitude (not to exceed cruise ceiling).
7. Descent: descend to sea level (no fuel used, no distance gained).

STANDARD MISSION PROFILES

8. Reserve: fuel allowance equal to 20 min (30 min for props) at sea level at speeds for maximum endurance (maximum range for props) with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 7.
- b. Cycle Time: Items 2 through 8.

FIXED WING PERFORMANCE

10.4.3.8 FAMILIARIZATION

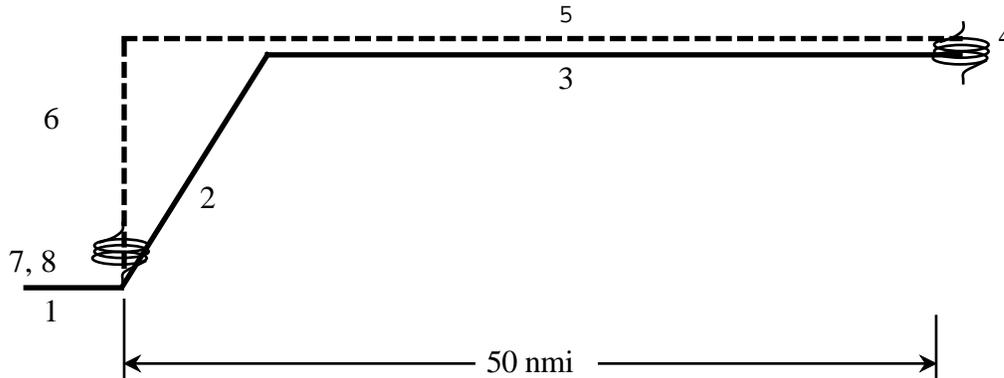


Figure 10.23
FAMILIARIZATION

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate climb point at speed for best range at 20,000 ft.
3. Cruise Out: 50 nmi from initial climb point at speed for best range at 20,000 ft.
4. Air work at 20,000 ft: time for air work shall be allocated as follows: 35% at intermediate thrust (Mach equals corner speed), 45% at speed for maximum range, and 20% at flight idle (no distance gained).
5. Cruise Back: 50 nmi at speed for maximum range at 20,000 ft.
6. Descent: descend to sea level (no fuel used, no distance gained).
7. Six touch and go landings: fuel allowance equal to 30 min at approach airspeed in landing configuration and 2 min at intermediate thrust (sea level static).
- 8.

STANDARD MISSION PROFILES

8. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time Items 2 through 7.
- b. Cycle Time: Items 2 through 8.

FIXED WING PERFORMANCE

10.4.3.9 CARRIER QUALIFICATION

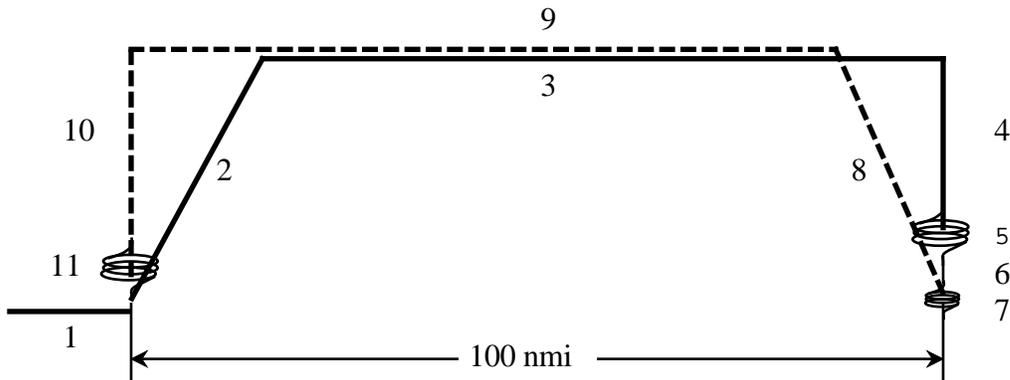


Figure 10.24
CARRIER QUALIFICATION

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used to takeoff.
2. Climb: on course at best climb speed at intermediate thrust to 20,000 ft.
3. Cruise Out: 100 nmi from initial climb point at speed for best range at 20,000 ft.
4. Descent: descend to 5,000 ft (no fuel used, no distance gained).
5. Loiter: loiter for 15 min at speed for maximum endurance at 5,000 ft.
6. Descent: descend to sea level (no fuel used, no distance gained).
7. Carrier Work: fuel allowance (for each catapult launch and arrested landing cycle) equals 4.5 min at approach speed in landing configuration and 30 seconds at intermediate thrust (sea level static).
8. Climb: on course at best climb speed at intermediate thrust from sea level to 20,000 ft.

STANDARD MISSION PROFILES

9. Cruise Back: 100 nmi at speed for maximum range at 20,000 ft.
10. Descent: descend to sea level (no fuel used, no distance gained).
11. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).
 - a. Mission time: Items 2 through 10.
 - b. Cycle Time: Items 2 through 11.

FIXED WING PERFORMANCE

10.4.3.10 AIR COMBAT MANEUVERING TRAINING

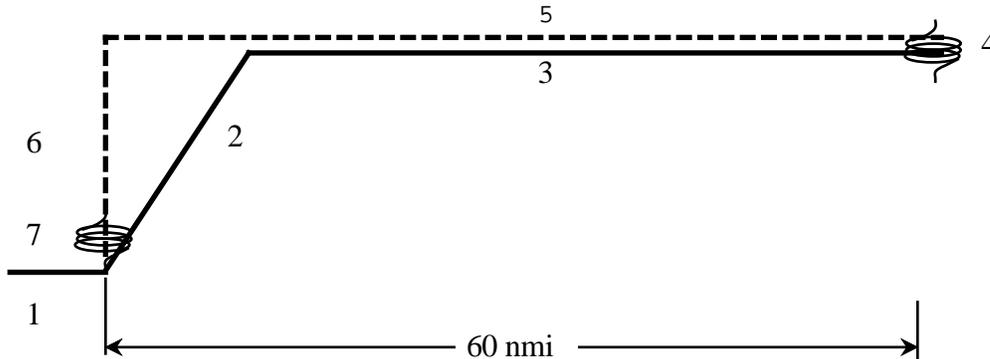


Figure 10.25

AIR COMBAT MANEUVERING TRAINING

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust to 25,000 ft.
3. Cruise Out: 60 nmi from initial climb point at speed for best range at 25,000 ft.
4. Air work at 25,000 ft: time for air work shall be allocated as follows: 55% at intermediate thrust (Mach equals corner speed), 30% at 80% intermediate thrust fuel flow (Mach equals corner speed), and 15% at speed for best range (no distance gained).
5. Cruise Back: 60 nmi at speed for best range.
6. Descent: descend to sea level (no fuel used, no distance gained).

STANDARD MISSION PROFILES

7. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 6.
- b. Cycle Time: Items 2 through 7.

FIXED WING PERFORMANCE

10.4.3.11 TACTICAL NAVIGATION

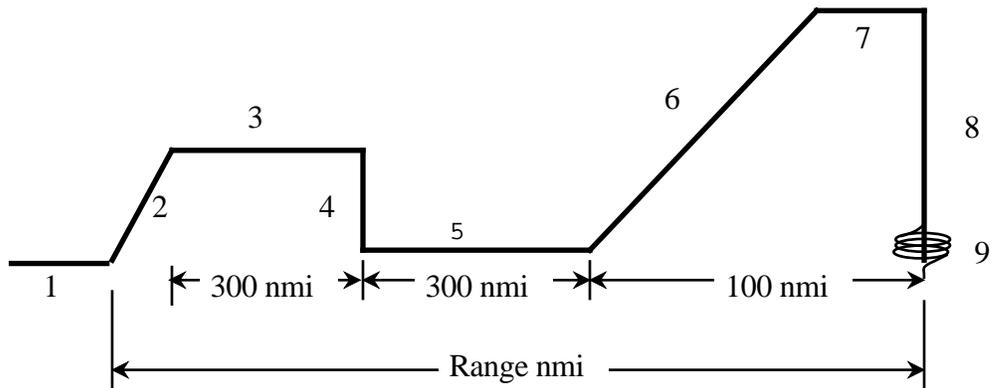


Figure 10.26

TACTICAL NAVIGATION

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.
2. Climb: on course at best climb speed at intermediate thrust to 2,500 ft.
3. Cruise: 300 nmi at 300 KTAS at 2,500 ft.
4. Descent: descend to 500 ft (no fuel used, no distance gained).
5. Cruise: 300 nmi at 300 KTAS at 500 ft.
6. Climb: on course at best climb speed at intermediate thrust from 500 ft to 20,000 ft.
7. Cruise: 100 nmi from climb point at speed for best range at 20,000 ft.
8. Descent: descend to sea level (no fuel used, no distance gained).

STANDARD MISSION PROFILES

9. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

- a. Mission Time: Items 2 through 8.
- b. Cycle Time: Items 2 through 9.

FIXED WING PERFORMANCE

10.4.3.12 WEAPONS DELIVERY/GUNNERY

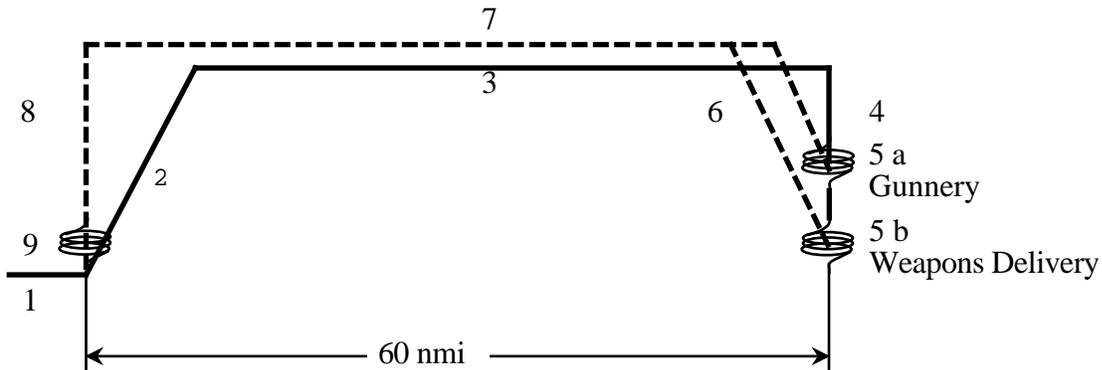


Figure 10.27

WEAPON DELIVERY/GUNNERY

1. Taxi, warm-up, takeoff, and acceleration to best climb speed: fuel allowance at sea level static equal to 4.6 min at intermediate thrust plus 30 seconds afterburner thrust if afterburner is used for takeoff.

2. Climb: on course at best climb speed at intermediate climb point at speed for best range at 20,000 ft.

3. Cruise Out: 60 nmi from initial climb point at speed for best range at 20,000 ft.

4. Descent: descend to gunnery altitude (10,000 ft) or weapons delivery altitude (sea level) (no fuel used, no distance gained).

5 a. Gunnery Option: time for gunnery shall be allocated as follows: 60% at intermediate thrust (Mach to be designated by NAVAIRSYSCOM), 25% at 80% intermediate thrust fuel flow (Mach to be designated by NAVAIRSYSCOM), and 15% at speed for best range (no distance gained).

5 b. Weapons Delivery Option: time for weapons delivery shall be allocated as follows: 50% at intermediate thrust (Mach to be designated by NAVAIRSYSCOM) and 50% at 80% intermediate thrust fuel flow (Mach to be designated by NAVAIRSYSCOM) (no distance gained).

STANDARD MISSION PROFILES

6. Climb: on course at best climb speed at intermediate thrust from gunnery (10,000 ft) or weapons delivery (sea level) altitude.

7. Cruise Back: 60 nmi from climb point at speed for best range at 20,000 ft.

8. Descent: descend to sea level (no fuel used, no distance gained).

9. Reserve: fuel allowance equal to 20 min loiter at sea level at speeds for maximum endurance with all engines operating plus 5% of initial total fuel (internal plus external).

a. Mission Time Items 2 through 8.

b. Cycle Time: Items 2 through 9.

FIXED WING PERFORMANCE

10.4.4 NAVY PILOT TRAINER MISSIONS (REF 6)

10.4.4.1 FAMILIARIZATION

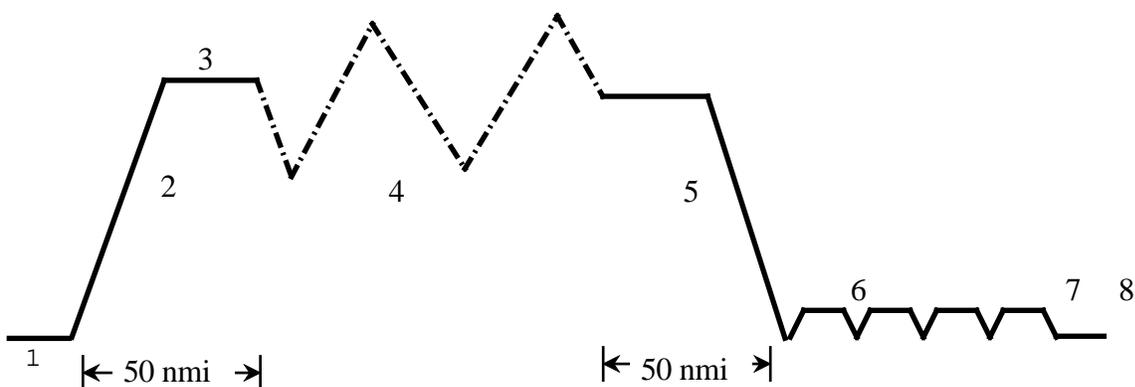


Figure 10.28
FAMILIARIZATION

1. Engine start, taxi, and takeoff: 15 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 20,000 ft with intermediate thrust.
3. Cruise to 50 nmi from initial climb point at 20,000 ft at airspeed for maximum specific range.
4. Basic Familiarization (FAM) Stage air work (at 20,000 ft):
 - a. 10 min at maximum thrust (0.7 Mach).
 - b. 8.7 min at airspeed for maximum specific range.
 - c. 5.5 min at flight idle.
 - d. Aerobatics.
 - e. Stalls.
 - f. Spins.
 - g. Slow flight.
 - h. Unusual attitude recoveries.

STANDARD MISSION PROFILES

5. Cruise back at 20,000 ft at speed for maximum specific range and descend to field elevation (cruise back and descent distance 50 nmi).

6. Six touch and go landings with one full stop landing: 30 min at approach airspeed in landing configuration, 1.6 min at maximum thrust.

7. Taxi/shutdown: 3 min at sea level static idle.

8. Reserve: 20 min at sea level at airspeed for maximum specific endurance.

a. Mission Time Items 2 through 6.

b. Cycle Time: Items 2 through 8.

FIXED WING PERFORMANCE

10.4.4.2 NIGHT FAMILIARIZATION

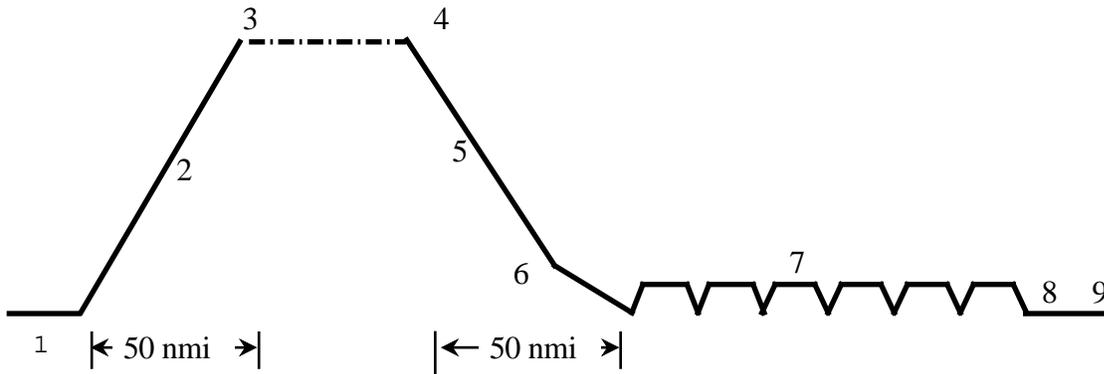


Figure 10.29
NIGHT FAMILIARIZATION

1. Engine start, taxi, and takeoff: 15 min as idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 20,000 ft with maximum thrust.
3. Cruise to 50 nmi from initial climb point at 20,000 ft at airspeed for maximum specific range.
4. Night FAM training: 40.2 min at airspeed for maximum specific range at 20,000 ft, 2 min at maximum thrust at 20,000 ft (0.7 Mach).
5. Cruise back at 20,000 ft at airspeed for maximum specific range and descend to 3,000 ft (cruise and descent distance 50 nmi).
6. Precision approach (ground controlled approach/instrument landing system (GCA/ILS)) to touch and go: 2 min (flaps and gear-up) at airspeed for maximum specific endurance at 3,000 ft, 6 min at approach airspeed in landing configuration.
7. 6 visual flight rules (VFR) patterns; 5 touch and go, 1 full stop landing: 1.5 min at maximum thrust, 25.5 min at approach airspeed (all in landing configuration).
8. Taxi/shutdown: 3 min at sea level idle thrust.

STANDARD MISSION PROFILES

9. Reserve Fuel: 20 min at sea level at airspeed for maximum specific endurance.

- a. Mission Time Items 2 through 7.
- b. Cycle Time: Items 2 through 9.

FIXED WING PERFORMANCE

10.4.4.3 BASIC INSTRUMENTS

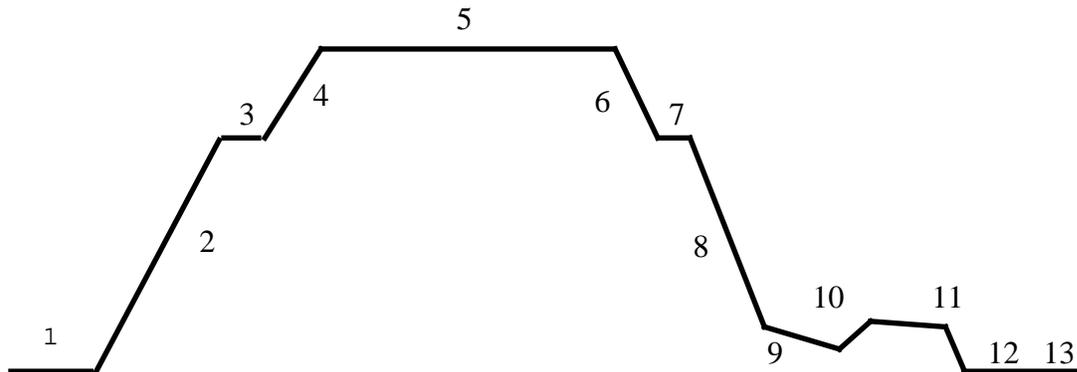


Figure 10.30
BASIC INSTRUMENTS

1. Engine start, taxi, and takeoff: 11 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 20,000 ft with maximum thrust.
3. 5 min at 20,000 ft at airspeed for maximum specific range.
4. Climb from 20,000 ft to 30,000 ft with maximum thrust.
5. Basic air work: 4 min at maximum thrust (0.7 Mach) plus 36.5 min at 30,000 ft at airspeed for maximum specific range.
6. Descend from 30,000 ft to 20,000 ft at 250 KCAS.
7. 6 min at 20,000 ft at airspeed for maximum specific endurance.
8. Descend from 20,000 to 1,500 ft at 250 KCAS.
9. Non-precision approach: 4 min at approach airspeed in landing configuration.
10. Missed approach: climb to 3,000 ft with maximum thrust.

STANDARD MISSION PROFILES

11. GCA to touchdown: 2 min at airspeed for maximum specific range (gear and flaps up), 6 min at approach airspeed in landing configuration.

12. Taxi/shutdown: 3 min at sea level static idle.

13. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

- a. Mission Time Items 2 through 11.
- b. Cycle Time: Items 2 through 13.

FIXED WING PERFORMANCE

10.4.4.4 RADIO INSTRUMENTS

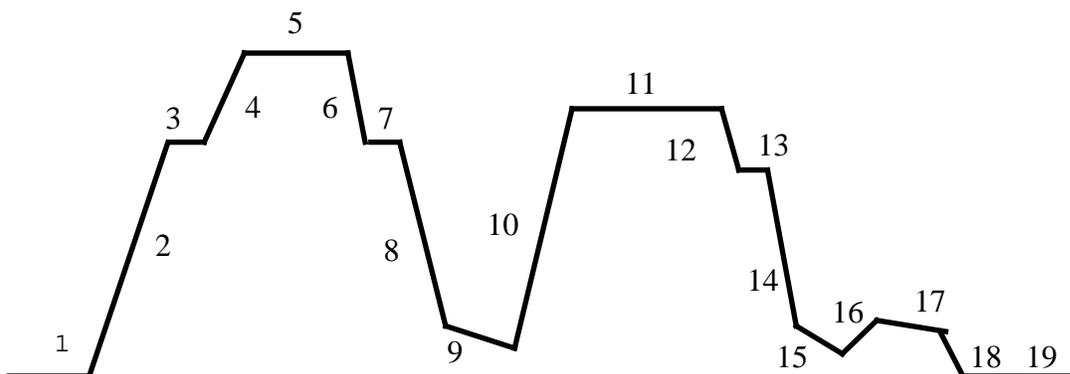


Figure 10.31
RADIO INSTRUMENTS

1. Engine start, taxi, and takeoff: 11 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 20,000 ft with maximum thrust.
3. 10 min at 20,000 ft at airspeed for maximum specific range.
4. Climb from 20,000 ft to 30,000 ft with intermediate thrust.
5. 19.3 min at 30,000 ft at airspeed for maximum specific range.
6. Descend from 30,000 ft to 20,000 ft at 250 KCAS.
7. 5 min at 20,000 ft at airspeed for maximum specific endurance.
8. High altitude (tactical air navigation/automatic direction finder (TACAN/ADF)) penetration to 1,500 ft.
9. Precision approach (GCA/ILS) in landing configuration: 4 min at approach airspeed.
10. Missed approach: climb to 25,000 ft.

STANDARD MISSION PROFILES

11. 13 min at maximum specific range airspeed (enroute alternate).
12. Descend to 20,000 ft at 250 KCAS.
13. 5 min at 20,000 ft at maximum specific endurance airspeed.
14. High altitude penetration (TACAN/ADF) to 1,500 ft (250 KCAS).
15. Non-Precision final approach: 4 min at approach airspeed in landing configuration.
16. Missed approach: climb to 3,000 ft with maximum thrust.
17. GCA pattern to touchdown: 2 min at airspeed for maximum specific range (gear and flaps up), 6 min at approach airspeed in landing configuration.
18. Taxi/shutdown: 3 min at sea level static idle.
19. Reserve fuel: 20 min at seal level at airspeed for maximum specific endurance.
 - a. Mission Time Items 2 through 17.
 - b. Cycle Time: Items 2 through 19.

FIXED WING PERFORMANCE

10.4.4.5 AIRWAYS NAVIGATION - 1

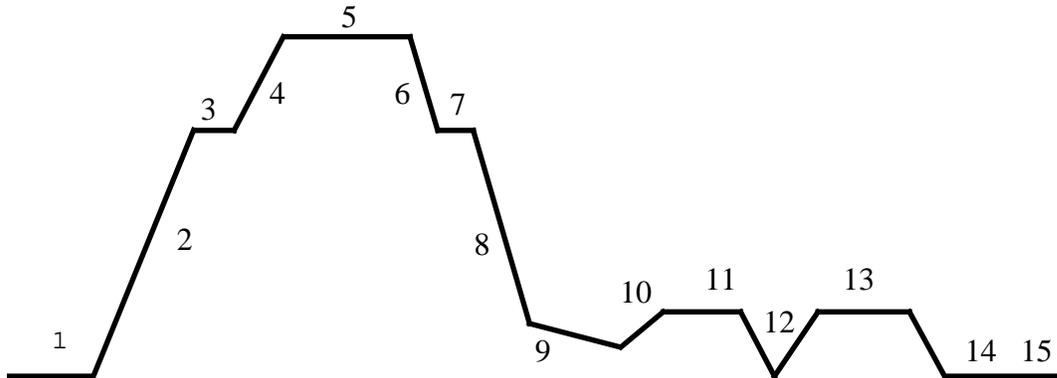


Figure 10.32
AIRWAYS NAVIGATION - 1

1. Engine start, taxi, and takeoff: 11 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 20,000 ft with maximum thrust.
3. 5 min at 20,000 ft at airspeed for maximum specific range.
4. Climb to 30,000 ft with maximum thrust.
5. Cruise at 30,000 ft at airspeed for maximum specific range.
6. Descend to 20,000 ft.
7. Hold at 20,000 ft for 6 min at airspeed for maximum specific endurance.
8. High altitude instrument penetration (TACAN/ADF) to 1,500 ft at 250 KCAS.
9. Non-precision final approach (TACAN): 4 min at approach speed in landing configuration.
10. Missed approach: climb to 3,000 ft with maximum thrust.

STANDARD MISSION PROFILES

11. GCA pattern/precision approach (GCA/ILS) to low approach: 2 min at 3,000 ft (gear and flaps up), 6 min at approach speed in landing configuration.

12. Missed approach: climb to 3,000 ft with maximum thrust.

13. GCA pattern/precision approach (GCA/ILS) to full stop landing: 2 min at 3,000 ft (gear and flaps up), 6 min at approach speed in landing configuration.

14. Taxi/shutdown: 3 min at sea level static idle.

15. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

a. Mission Time Items 2 through 13.

b. Cycle Time: Items 2 through 15.

FIXED WING PERFORMANCE

10.4.4.6 AIRWAYS NAVIGATION - 2

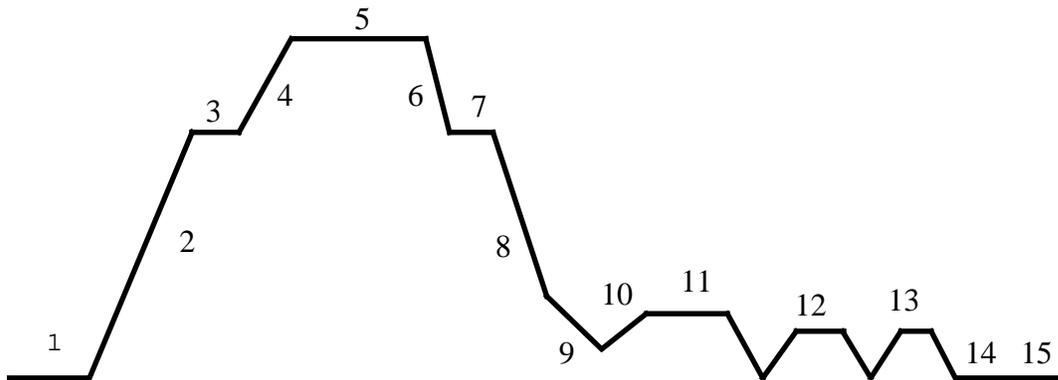


Figure 10.33
AIRWAYS NAVIGATION - 2

1. Engine start, taxi, and takeoff: 11 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 20,000 ft with maximum thrust.
3. Cruise for 10 min at 20,000 ft at airspeed for maximum specific range.
4. Climb from 20,000 to 35,000 ft with maximum thrust.
5. Cruise at 35,000 ft at airspeed for maximum specific range.
6. Descend from 35,000 to 20,000 ft.
7. Hold at 20,000 ft for one min at airspeed for maximum endurance.
8. High altitude penetration (TACAN/Radar Enroute Descent) 250 KCAS from 20,000 to 3,000 ft.
9. Non-precision final approach (TACAN): 4 min approach airspeed in landing configuration from 3,000 ft to minimum descent altitude (MDA).
10. Missed approach: climb to 3,000 ft with maximum thrust.

STANDARD MISSION PROFILES

11. GCA Pattern, GCA approach to touch and go: 2 min at 3,000 ft (gear and flaps up), 6 min at approach speed in landing configuration.

12. VFR pattern to touch and go: 15 seconds at maximum thrust, 4.25 min at approach airspeed in landing configuration.

13. VFR pattern to full stop: 15 seconds at maximum thrust, 4.25 min at approach airspeed in landing configuration.

14. Taxi/shutdown: 3 min sea level static idle.

15. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

a. Mission Time Items 2 through 13.

b. Cycle Time: Items 2 through 15.

FIXED WING PERFORMANCE

10.4.4.7 FORMATION

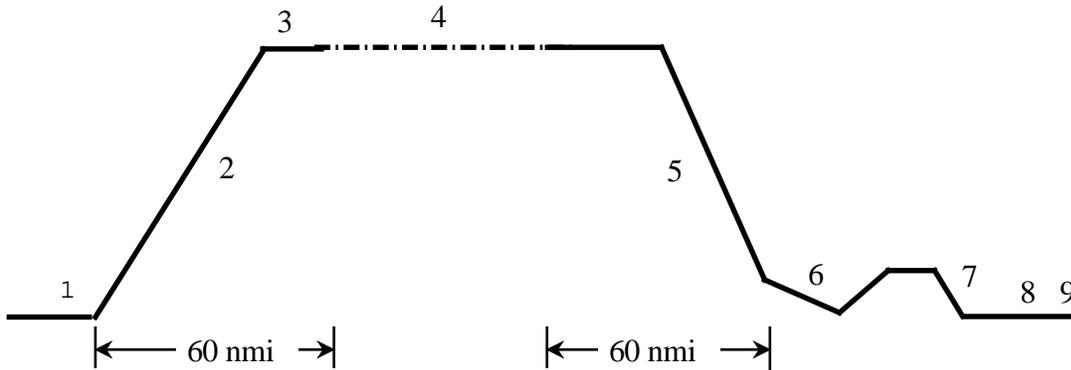


Figure 10.34
FORMATION

1. Engine start, taxi, and takeoff: 13 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 25,000 ft with maximum thrust.
3. Cruise to 60 nmi from initial climb point at 25,000 ft at airspeed for maximum specific range.
4. Formation Training: 8 min at maximum thrust, 14.8 min at maximum continuous thrust, 33.2 min at airspeed for maximum specific range:
 - a. Break-up and rendezvous.
 - b. Parade.
 - c. Lead changes.
 - d. Cruise.
 - e. Column.
5. Cruise back at airspeed for maximum specific range at 25,000 ft and descend to 1,500 ft (cruise back & descent distance totals 60 nmi).
6. VFR field entry to touch and go landing: 4 min at 1,500 ft. 300 KCAS (gear and flaps up), 1 min at approach airspeed in landing configuration.

STANDARD MISSION PROFILES

7. VFR landing pattern to full stop landing: 15 seconds at maximum thrust, 4.25 min at approach airspeed in landing configuration.

8. Taxi/shutdown: 3 min at sea level idle thrust.

9. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

a. Mission Time Items 2 through 7.

b. Cycle Time: Items 2 through 9.

FIXED WING PERFORMANCE

10.4.4.8 NIGHT FORMATION

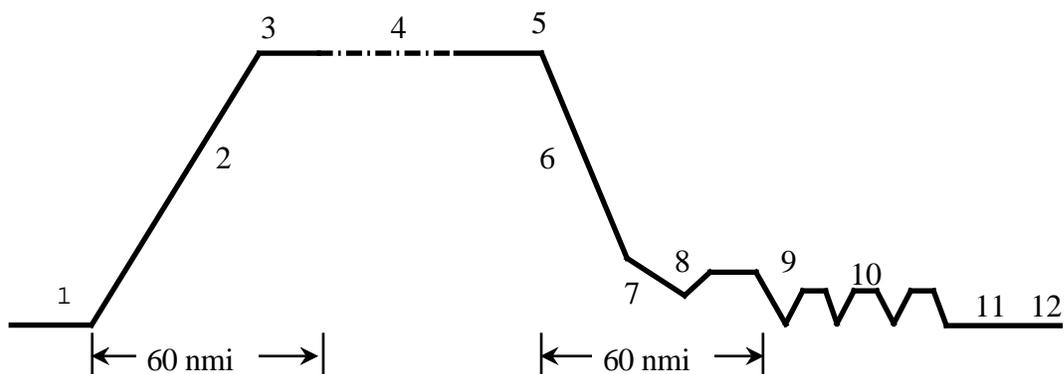


Figure 10.35
NIGHT FORMATION

1. Engine start, taxi, and takeoff: 15 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 25,000 ft with maximum thrust.
3. Cruise to 60 nmi from initial climb point at 25,000 ft at airspeed for maximum specific range.
4. Formation Maneuvers at 25,000 ft: 1.5 min at maximum thrust, 5.5 min at maximum continuous thrust, 30.9 min at maximum specific range airspeed.
5. Cruise back at 25,000 ft for return to field at airspeed for maximum specific range.
6. Section TACAN penetration from 25,000 ft to 1,500 ft at 250 KCAS (cruise back and TACAN penetration distance total 60 nmi).
7. Section non-precision final approach: 4 min at approach airspeed in landing configuration.
8. Missed approach: climb to 3,000 ft with maximum thrust.

STANDARD MISSION PROFILES

9. GCA pattern/precision approach (GCA/ILS) to touch and go: 2 min at airspeed for maximum specific range (gear and flaps up), 6 min at approach airspeed in landing configuration.

10. 3 VFR landing patterns (2 touch and go's, 1 full stop): 12.75 min at approach airspeed in landing configuration, 45 seconds in landing configuration at maximum thrust.

11. Taxi/shutdown: 3 min at sea level static idle.

12. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

- a. Mission Time Items 2 through 10.
- b. Cycle Time: Items 2 through 12.

FIXED WING PERFORMANCE

10.4.4.9 TACTICAL FORMATION

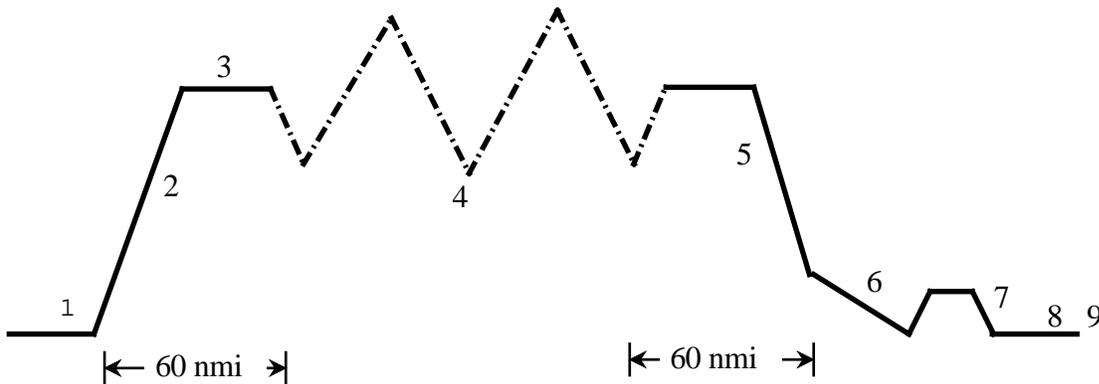


Figure 10.36

TACTICAL FORMATION

1. Engine start, taxi, ground marshal, and takeoff: 13 min at idle thrust plus 1 min at intermediate thrust (both at sea level static).
2. Climb to 25,000 ft with maximum thrust.
3. Cruise to 60 nmi from initial climb point at airspeed for maximum specific range.
4. Tactical Formation Maneuvers, 20,000 to 30,000 ft: 17 min at maximum thrust, 15 min at maximum continuous thrust, 22.1 min at airspeed for maximum specific range.
 - a. Combat Spread/Loose Duece, called and uncalled turns, break turns, hard turns.
 - b. Tactical wing.
 - c. Vertical maneuvers, vertical reversals, high and lo and Yo-Yo's.
5. Cruise back at 25,000 ft at airspeed for maximum specific range and descend to 1,500 ft (cruise back and descent distance total 60 nmi).

STANDARD MISSION PROFILES

6. VFR field entry, break, and landing pattern to touch and go landing: 4 min at 1,500 ft 300 KCAS (gear and flaps up), 1 min at approach airspeed in landing configuration.

7. VFR pattern to full stop landing: 15 seconds at maximum thrust, 4.25 min to approach airspeed in landing configuration.

8. Taxi/shutdown: 3 min at sea level static idle.

9. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

- a. Mission Time Items 2 through 7.
- b. Cycle Time: Items 2 through 9.

FIXED WING PERFORMANCE

10.4.4.10 AIR-TO-AIR GUNNERY

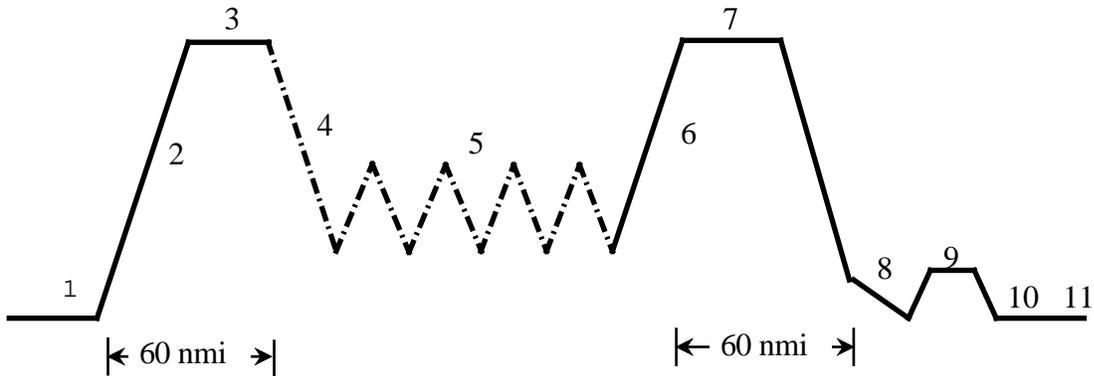


Figure 10.37
AIR-TO-AIR GUNNERY

1. Engine start, taxi, ground marshalling, and takeoff: 25 min at idle thrust plus 1 min at intermediate thrust (both at sea level static).
2. Climb to 20,000 ft with maximum thrust.
3. Cruise to 60 nmi from initial climb point to gunnery range at airspeed for maximum specific range.
4. Descend from 20,000 ft to 10,000 ft (tractor altitude) at 325 KCAS.
5. Gunnery training; flatside gunnery, maneuvering target gunnery: 16.5 min at maximum thrust, 6 min at maximum continuous thrust, 9.7 min speed for maximum specific range.
6. Climb from 10,000 ft to 20,000 ft with maximum thrust.
7. Cruise back at 20,000 ft at airspeed for maximum specific range and descend to 1,500 ft (climb, cruise, and descent distance totals 60 nmi).
8. VFR field entry, break, and landing pattern to touch and go landing: 4 min at 1,500 ft 300 KCAS (gear and flaps up), 1 min at approach airspeed and landing configuration.

STANDARD MISSION PROFILES

9. VFR pattern to full stop landing: 15 seconds at maximum thrust, 4.25 min at approach airspeed in landing configuration.

10. Taxi/Shutdown: 3 min at sea level static idle.

11. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

- a. Mission Time Items 2 through 9.
- b. Cycle Time: Items 2 through 11.

FIXED WING PERFORMANCE

10.4.4.11 WEAPON DELIVERY

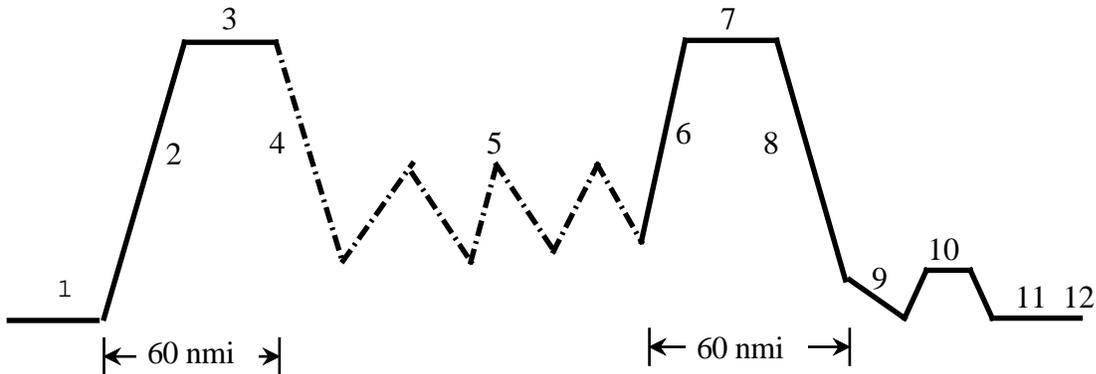


Figure 10.38
WEAPON DELIVERY

1. Engine start, taxi, ground marshalling, and takeoff: 15 min at idle thrust plus 1 min at intermediate thrust (both at sea level static).
2. Climb to 20,000 ft with maximum thrust.
3. Cruise to 60 nmi from initial climb point to area at 20,000 ft at airspeed for maximum specific range.
4. Descend from 20,000 ft to 5,000 ft (release altitude) at 400 KCAS.
5. Bombing pattern maneuvers, 13,500 ft to 1,500 ft release speed 400 KCAS, pattern speed 250 KCAS, climb from 5,000 ft to 8,500 ft: 14 min at maximum thrust (0.45 Mach), 11.5 min at speed for maximum specific range, 5 min at in-flight idle thrust.
6. Climb from 4,000 ft to 20,000 ft with maximum thrust.
7. Cruise back at 20,000 ft at airspeed for maximum specific range.
8. Descend to 1,500 ft (climb, cruise, and descent distance total 60 nmi).

STANDARD MISSION PROFILES

9. VFR field entry, break, and pattern to touch and go landing: 4 min at 1,500 ft 300 KCAS (gear and flaps up), 1 min at approach airspeed in landing configuration.

10. VFR pattern to full stop landing: 15 seconds at maximum thrust, 4.25 min at approach airspeed in landing configuration.

11. Taxi/shutdown: 3 min at sea level static idle.

12. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

- a. Mission Time Items 2 through 10.
- b. Cycle Time: Items 2 through 12.

FIXED WING PERFORMANCE

10.4.4.12 WEAPONS DELIVERY - TAC NAV

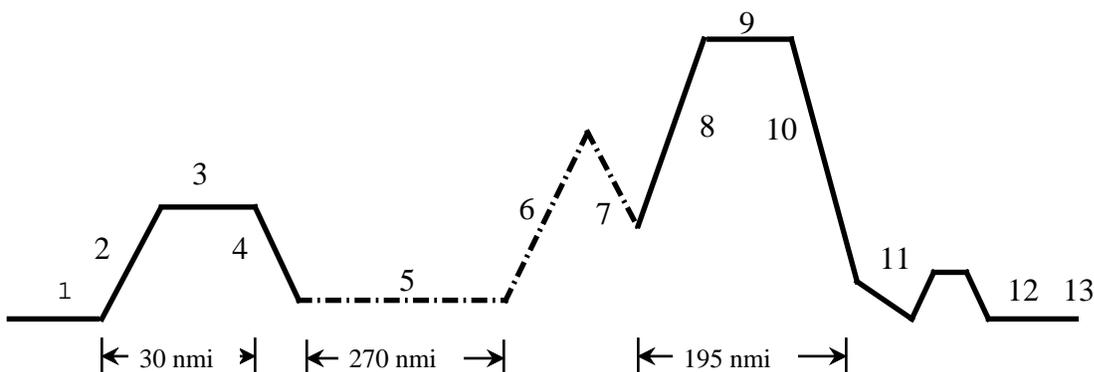


Figure 10.39

WEAPONS DELIVERY - TAC NAV

1. Engine start, taxi, ground marshalling, and takeoff: 10 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 1,500 ft with maximum thrust.
3. Cruise at airspeed for maximum specific range.
4. Descend to 500 ft at 300 KCAS (climb, cruise, descent distance equal to 30 nmi).
5. Low Level Navigation (dead reckoning (D.R.) navigation) at 500 ft and 300 kn for 270 nmi.
6. "Pop-up Attack", climb to 8,000 ft with maximum thrust.
7. "Roll-in Attack", descend to 4,000 ft with maximum thrust.
8. Climb from 4,000 ft to 35,000 ft with maximum thrust.
9. Cruise back at 35,000 ft at airspeed for maximum specific range.

STANDARD MISSION PROFILES

10. Radar descent to 3,000 ft at 250 KCAS (climb, cruise back and descent distance totals 195 nmi).

11. Precision Final Approach (GCA/ILS) to touch and go: 2 min at 3,000 ft (gear and flaps up) at airspeed for maximum specific endurance, 6 min at 1,500 ft (gear and flaps down) at airspeed for maximum specific endurance.

12. Taxi/shutdown: 3 min at sea level static idle.

13. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

- a. Mission Time Items 2 through 11.
- b. Cycle Time: Items 2 through 13.

FIXED WING PERFORMANCE

10.4.4.13 AIR COMBAT MANEUVERING

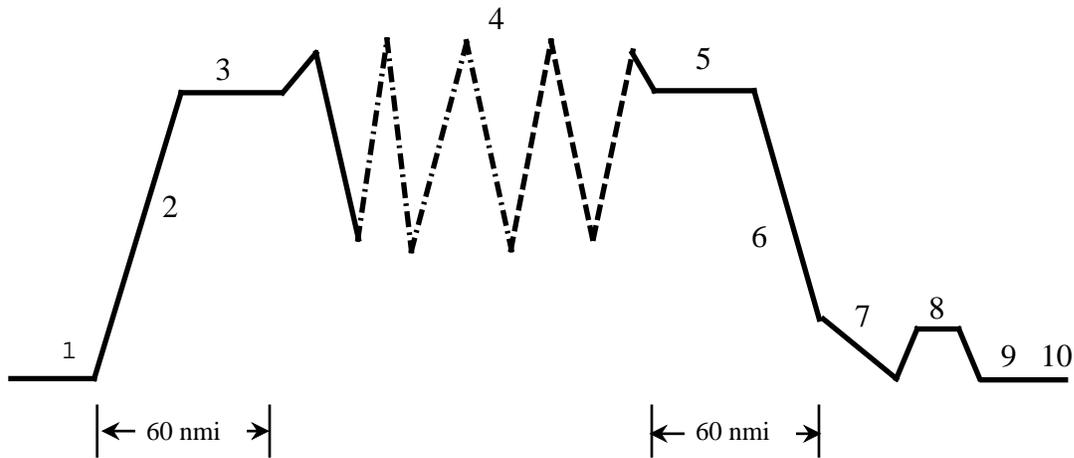


Figure 10.40
AIR COMBAT MANEUVERING

1. Engine start, taxi, ground marshalling, and takeoff: 11 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 25,000 ft with maximum thrust.
3. Cruise to 60 nmi from initial climb point at 25,000 ft at airspeed for maximum specific range.
4. Air Combat Maneuvering, 10,000 ft to 30,000 ft:
 - a. Gunsight tracking/high G maneuvering.
 - b. Loose Duece/tactical wing maneuvering.
 - c. Offensive ACM maneuvering.
 - d. Defensive ACM maneuvering.
 - e. Neutral ACM maneuvering.
 - f. 19.8 min at maximum thrust (0.65 Mach).
 - g. 10.1 min at maximum continuous thrust.
 - h. 9.4 min at airspeed for maximum specific range.
5. Cruise back at 25,000 at airspeed for maximum specific range.

STANDARD MISSION PROFILES

6. Descend from 25,000 to 1,500 ft at maximum specific range airspeed (cruise back and descent distance totals 60 nmi).

7. VFR field entry, break, and landing pattern to touch and go: 4 min at 1,500 ft. 300 KCAS (gear and flaps up), 1 min at approach airspeed in landing configuration.

8. VFR pattern to full stop landing: 15 seconds at maximum thrust, 4.25 min at approach airspeed in landing configuration.

9. Taxi/shutdown: 3 min at sea level static idle.

10. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

- a. Mission Time Items 2 through 8.
- b. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.4.14 FIELD CARRIER LANDING PRACTICE (FCLP)

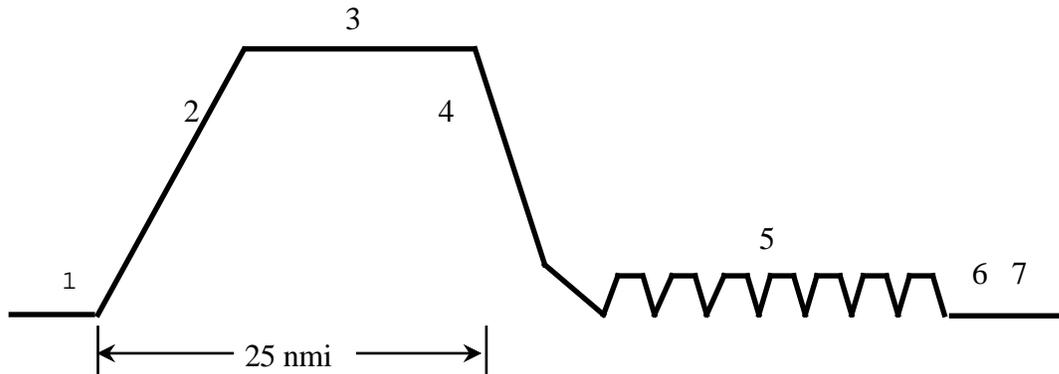


Figure 10.41

FIELD CARRIER LANDING PRACTICE (FCLP)

1. Engine start, taxi, and takeoff: 10 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 20,000 ft with maximum thrust.
3. Cruise to 25 nmi from initial climb point at 15,000 ft at airspeed for maximum specific range.
4. Descend from 15,000 ft to 1,500 ft at 250 KCAS.
5. FCLP: 34.8 min at approach airspeed in landing configuration at sea level, 2 min in landing configuration at sea level maximum thrust (final FCLP to full stop landing).
 - a. 6 FCLPs to touchdown.
 - b. 2 FCLPs to waveoffs.
6. Taxi/shutdown: 3 min at sea level idle thrust.

STANDARD MISSION PROFILES

7. Reserve fuel: 20 min at sea level airspeed for maximum specific endurance.
 - a. Mission Time Items 2 through 5.
 - b. Cycle Time: Items 2 through 7.

FIXED WING PERFORMANCE

10.4.4.15 CARRIER QUALIFICATION

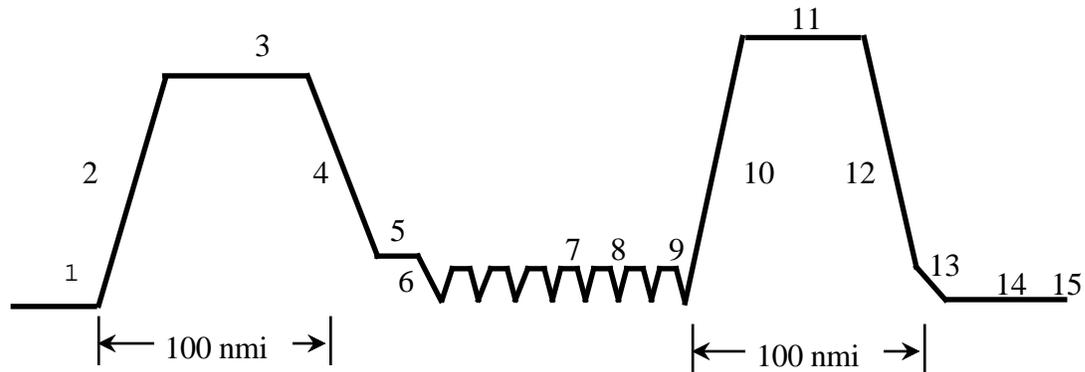


Figure 10.42
CARRIER QUALIFICATION

1. Engine start, taxi, and takeoff: 10 min at idle thrust plus 1 min at maximum thrust (both at sea level static).
2. Climb to 20,000 ft with maximum thrust.
3. Cruise at 20,000 ft at airspeed for maximum specific range.
4. Descend from 20,000 ft to 5,000 ft (climb, cruise and descent distance equals 100 nmi).
5. Hold at 5,000 ft at airspeed for maximum specific endurance for 15 min.
6. Descend from 5,000 ft to sea level at 250 KCAS.
7. 2 carrier (CV) touch and go landings: 10 min at approach airspeed in landing configuration, 5 min at maximum thrust in landing configuration (sea level).

STANDARD MISSION PROFILES

8. 40 min at approach airspeed in landing configuration (sea level), 5.5 min at maximum thrust in landing configuration (sea level), 25 min at idle thrust (sea level). Refuel, add 1640 lb after 2 touch and go, 2 CV arrested landings, 1 CV bolter.

- a. 6 CV arrested landings.
- b. 5 CV catapult launches.
- c. 2 CV bolters/waveoffs.

9. Final CV catapult launch.

10. Climb to 27,000 ft with maximum thrust.

11. Cruise at 27,000 ft at airspeed for maximum specific range.

12. Descend from 27,000 ft to 1,500 ft at maximum specific range airspeed (climb, cruise back and descent distance totals 100 nmi).

13. VFR field entry, break, and landing: 2 min at sea level, 300 kn clean, 0.5 min at approach airspeed in landing configuration.

14. Taxi/shutdown: 3 min at sea level.

15. Reserve fuel: 20 min at sea level at airspeed for maximum specific endurance.

- a. Mission Time Items 2 through 13.
- b. Cycle Time: Items 2 through 15.

FIXED WING PERFORMANCE

10.4.5 NAVAL FLIGHT OFFICER TRAINER MISSIONS (REF 2)

10.4.5.1 LOW LEVEL NAVIGATION - 1

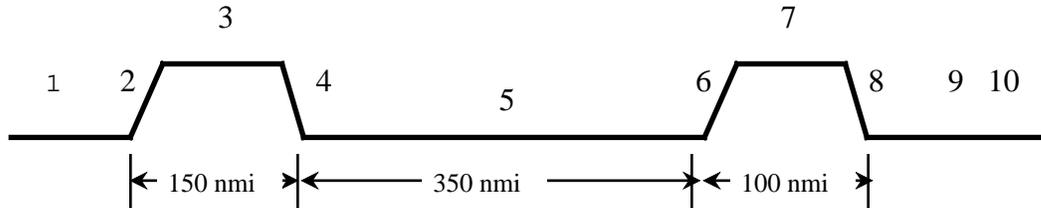


Figure 10.43

LOW LEVEL NAVIGATION - 1

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 10,000 ft altitude.
3. Cruise at 10,000 ft altitude at 250 KIAS.
4. Perform a 250 KIAS descent from 10,000 ft to 500 ft altitude (total distance traveled in 2, 3, and 4 shall be at least 150 nmi).
5. Cruise at 500 ft altitude at 300 KTAS for a distance of at least 350 nmi.
6. Climb at climb power from 500 ft to 8,000 ft altitude.
7. Cruise at 8,000 ft altitude at 250 KIAS.
8. Perform a 250 KIAS descent from 8,000 ft to sea level (total distance covered in segments 6, 7, and 8 shall be at least 100 nmi).
9. Instrument approach allowance: fuel equivalent to 8 min at approach power, approach configuration.

STANDARD MISSION PROFILES

10. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:

- a. Climb at climb power from sea level to 10,000 ft.
- b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
- c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
- d. Mission Time Items 2 through 9.
- e. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.5.2 LOW LEVEL NAVIGATION - 2

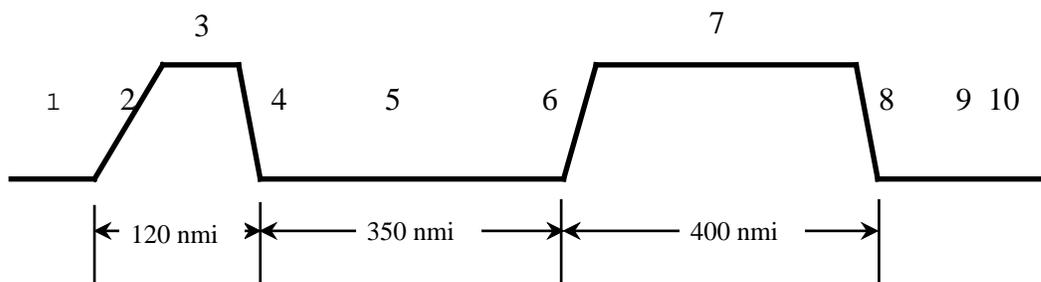


Figure 10.44

LOW LEVEL NAVIGATION - 2

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 10,000 ft altitude.
3. Cruise at 10,000 ft altitude at 250 KIAS.
4. Perform a 250 KIAS descent from 10,000 ft to 500 ft altitude (total distance traveled in segments 2, 3, and 4 shall be at least 120 nmi).
5. Cruise at 500 ft altitude at 300 KTAS for a distance of at least 350 nmi.
6. Climb at climb power from 500 ft to 40,000 ft altitude.
7. Cruise at 40,000 ft altitude at 400 KTAS.
8. Perform a 250 KIAS descent from 40,000 ft to sea level (total distance covered in segments 6, 7 and 8 shall be at least 400 nmi, cruise configuration).
9. Instrument approach allowance: fuel equivalent to 8 min at approach power, approach configuration.

STANDARD MISSION PROFILES

10. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:

- a. Climb at climb power from sea level to 10,000 ft.
- b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
- c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
- d. Mission Time Items 2 through 9.
- e. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.5.3 LOW LEVEL NAVIGATION - 3

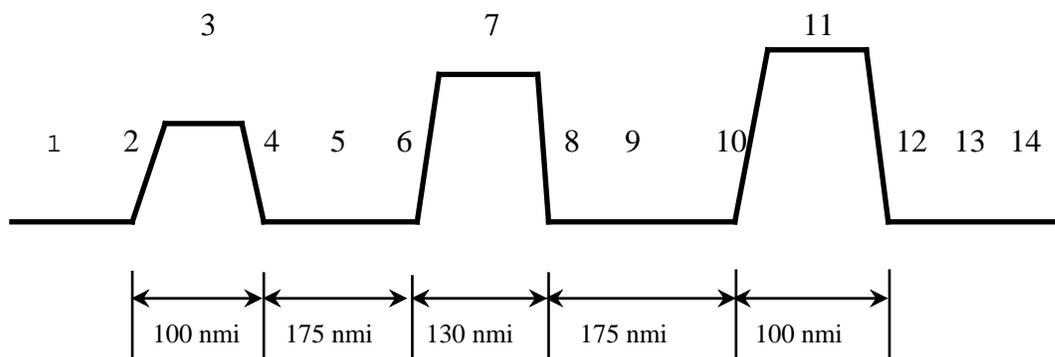


Figure 10.45
LOW LEVEL NAVIGATION - 3

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 10,000 ft altitude.
3. Cruise at 10,000 ft altitude at 250 KIAS.
4. Perform a 250 KIAS descent from 10,000 ft to 500 ft altitude (total distance traveled in segments 2, 3, and 4 shall be at least 100 nmi).
5. Cruise at 500 ft altitude at 300 KTAS for a distance of at least 175 nmi.
6. Climb at climb power from 500 ft to 16,500 ft altitude.
7. Cruise at 16,500 ft altitude at 350 KTAS.
8. Perform a 250 KIAS descent from 16,500 ft to 500 ft altitude.
9. Cruise at 500 ft altitude at 300 KTAS for a distance of at least 175 nmi.
10. Climb at climb power from 500 ft to 20,000 ft altitude.

STANDARD MISSION PROFILES

11. Cruise at 20,000 ft at 360 KTAS.

12. Perform a 250 KIAS descent from 20,000 ft altitude to sea level (total distance traveled in segments 10, 11 and 12 shall be at least 100 nmi).

13. TACAN approach allowance: fuel equivalent to 8 min at approach power, approach configuration.

14. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:
 - a. Climb at climb power from sea level to 10,000 ft.
 - b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
 - c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
 - d. Mission Time Items 2 through 13.
 - e. Cycle Time: Items 2 through 14.

FIXED WING PERFORMANCE

10.4.5.4 LOW LEVEL NAVIGATION - 4

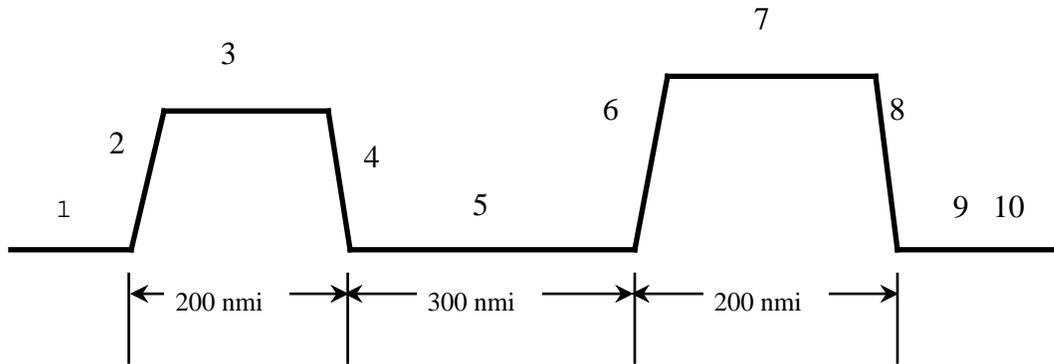


Figure 10.46

LOW LEVEL NAVIGATION - 4

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 18,000 ft altitude.
3. Cruise at 18,000 ft altitude at 330 KTAS.
4. Perform a 250 KIAS descent from 18,000 ft to 500 ft altitude (total distance traveled in segments 2, 3, and 4 shall be at least 200 nmi).
5. Cruise at 500 ft altitude at 300 KTAS for a distance of at least 300 nmi.
6. Climb at climb power from 500 ft to 18,000 ft altitude.
7. Cruise at 18,000 ft altitude at 360 KTAS.
8. Perform a 250 KIAS descent from 18,000 ft to sea level (total distance covered in segments 6, 7 and 8 shall be least 200 nmi).
9. TACAN approach allowance: fuel equivalent to 8 min at approach power, approach configuration.

STANDARD MISSION PROFILES

10. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:

- a. Climb at climb power from sea level to 10,000 ft.
- b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
- c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
- d. Mission Time Items 2 through 9.
- e. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.5.5 INSTRUMENT NAVIGATION - 1

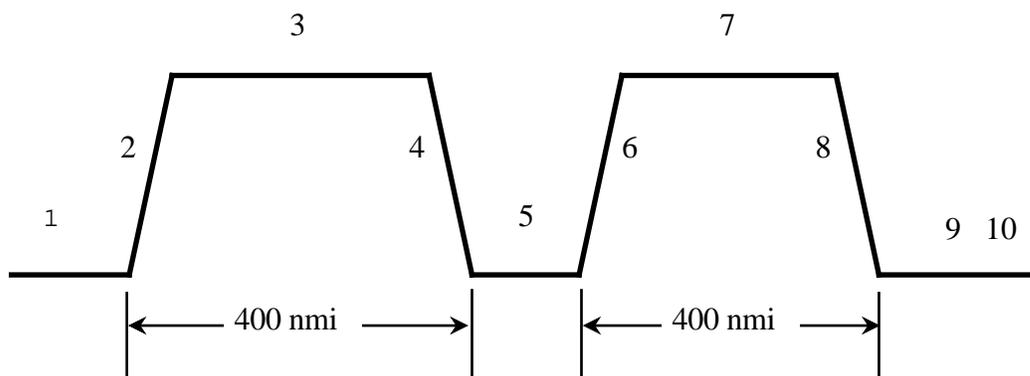


Figure 10.47

INSTRUMENT NAVIGATION - 1

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 40,000 ft altitude.
3. Cruise at 40,000 ft altitude at 400 KTAS.
4. Perform a 250 KIAS descent from 40,000 ft to sea level (total distance traveled in segments 2, 3, and 4 shall be at least 400 nmi).
5. TACAN approach allowance: fuel equivalent to 8 min at approach power, approach configuration.
6. Climb at climb power from sea level to 40,000 ft altitude.
7. Cruise at 40,000 ft altitude at 400 KTAS.
8. Perform a 250 KIAS descent from 40,000 ft to sea level (total distance covered in segments 6, 7 and 8 shall be at least 400 nmi).

STANDARD MISSION PROFILES

9. TACAN approach allowance: fuel equivalent to 8 min at approach power, approach configuration.

10. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:

- a. Climb at climb power from sea level to 10,000 ft.
- b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
- c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
- d. Mission Time Items 2 through 9.
- e. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.5.6 INSTRUMENT NAVIGATION - 2

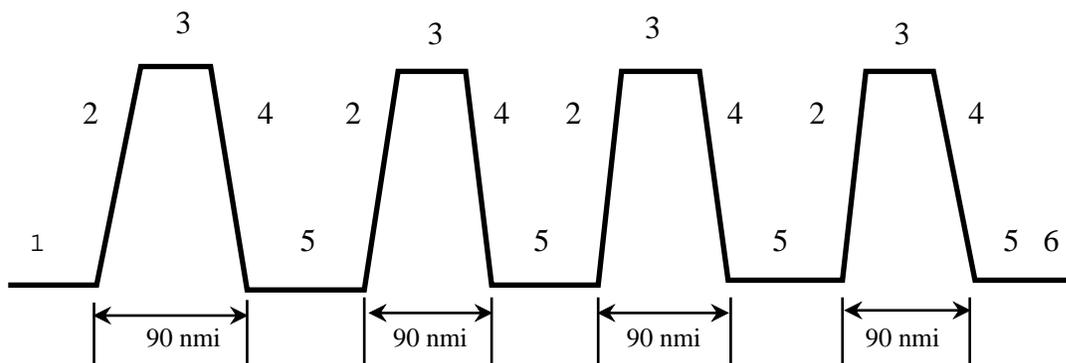


Figure 10.48

INSTRUMENT NAVIGATION - 2

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 18,000 ft altitude.
3. Cruise at 18,000 ft altitude at 360 KTAS.
4. Perform a 250 KIAS descent from 18,000 ft to sea level (total distance traveled in segments 2, 3, and 4 shall be at least 90 nmi).
5. TACAN approach allowance: fuel equivalent to 8 min at approach power, approach configuration.

STANDARD MISSION PROFILES

6. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:

- a. Climb at climb power from sea level to 10,000 ft.
- b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
- c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
- d. Mission Time Items 2 through 5.
- e. Cycle Time: Items 2 through 6.

FIXED WING PERFORMANCE

10.4.5.7 RADAR NAVIGATION - 1

Out (First Leg Of Out And In)

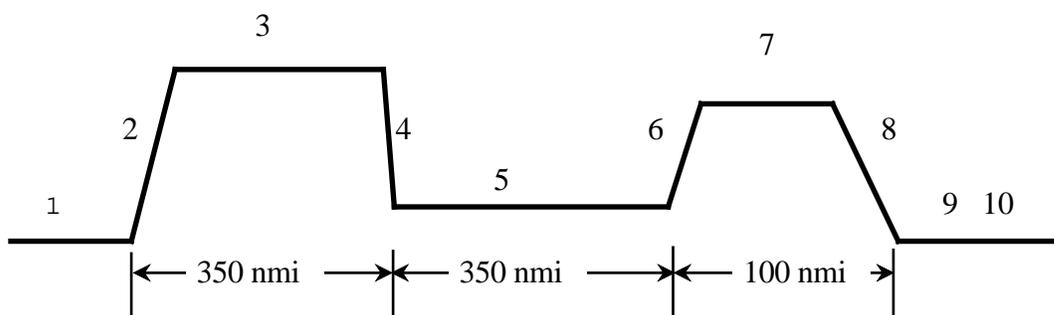


Figure 10.49

RADAR NAVIGATION - 1

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 35,000 ft altitude.
3. Cruise at 35,000 ft altitude at 360 KTAS.
4. Perform a 250 KIAS descent from 35,000 ft to 5,000 ft (total distance traveled in segments 2, 3, and 4 shall be at least 350 nmi).
5. Cruise at 5,000 ft altitude at 300 KTAS for a distance of at least 350 nmi.
6. Climb at climb power from 5,000 ft altitude to 18,000 ft altitude.
7. Cruise at 18,000 ft altitude at 360 KTAS.
8. Perform a 250 KIAS descent from 18,000 ft to sea level (total distance covered in segments 6, 7 and 8 shall be at least 100 nmi).
9. TACAN approach allowance: fuel equivalent to 8 min at approach power approach configuration.

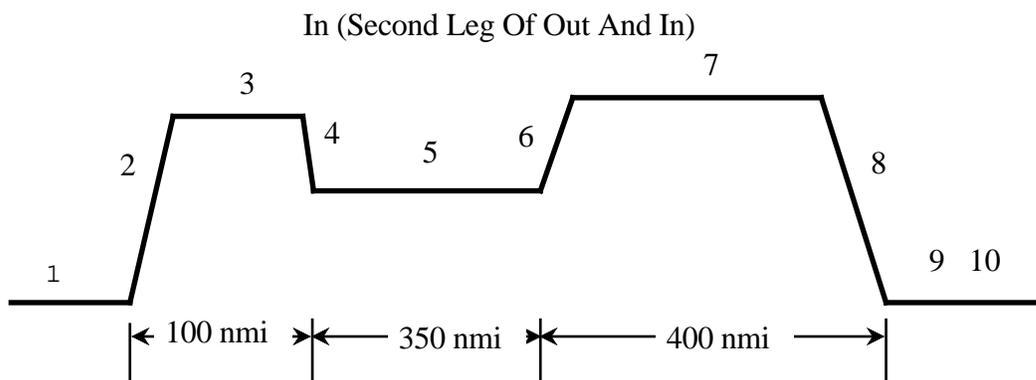
STANDARD MISSION PROFILES

10. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:

- a. Climb at climb power from sea level to 10,000 ft.
- b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
- c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
- d. Mission Time Items 2 through 9.
- e. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.5.8 RADAR NAVIGATION - 2



1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 18,000 ft altitude.
3. Cruise at 18,000 ft altitude at 360 KTAS.
4. Perform a 250 KIAS descent from 18,000 ft to 5,000 ft altitude (total distance traveled in segments 2, 3, and 4 shall be at least 100 nmi).
5. Cruise at 5,000 ft altitude at 300 KTAS for a distance of at least 350 nmi.
6. Climb at climb power from 5,000 ft altitude to 35,000 ft altitude.
7. Cruise at 35,000 ft altitude at 360 KTAS.
8. Perform a 250 KIAS descent from 35,000 ft to sea level (total distance covered in segments 6, 7 and 8 shall be at least 400 nmi).
9. TACAN approach allowance: fuel equivalent to 8 min at approach power approach configuration.

STANDARD MISSION PROFILES

10. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:

- a. Climb at climb power from sea level to 10,000 ft.
- b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
- c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
- d. Mission Time Items 2 through 9.
- e. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.5.9 LOCAL RADAR - 1

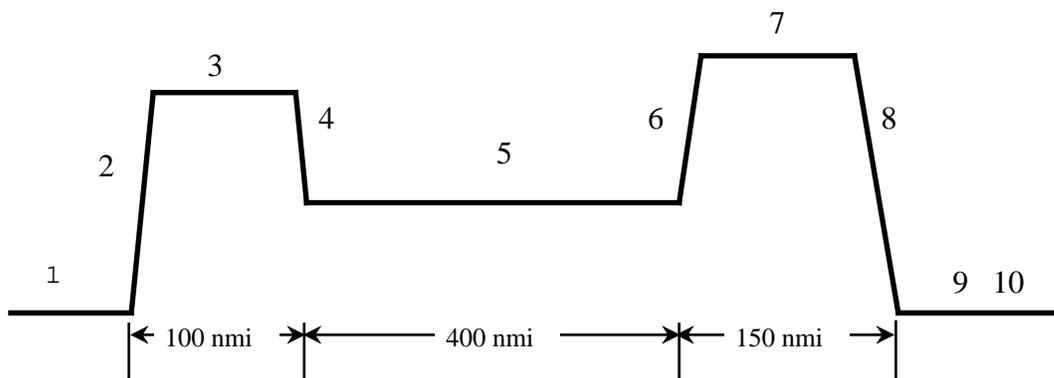


Figure 10.51
LOCAL RADAR - 1

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 10,000 ft altitude.
3. Cruise at 10,000 ft altitude at 250 KIAS.
4. Perform a 250 KIAS descent from 10,000 ft to 5,000 ft altitude (total distance traveled in segments 2, 3, and 4 shall be at least 100 nmi).
5. Cruise at 5,000 ft altitude at 300 KTAS for a distance of at least 400 nmi.
6. Climb at climb power from 5,000 ft altitude to 10,000 ft altitude.
7. Cruise at 10,000 ft altitude at 250 KIAS.
8. Perform a 250 KIAS descent from 10,000 ft to sea level (total distance covered in segments 6, 7 and 8 shall be at least 150 nmi).
9. Instrument approach allowance: fuel equivalent to 8 min at approach power approach configuration.

STANDARD MISSION PROFILES

10. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:

- a. Climb at climb power from sea level to 10,000 ft.
- b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
- c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
- d. Mission Time Items 2 through 9.
- e. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.5.10 LOCAL RADAR - 2

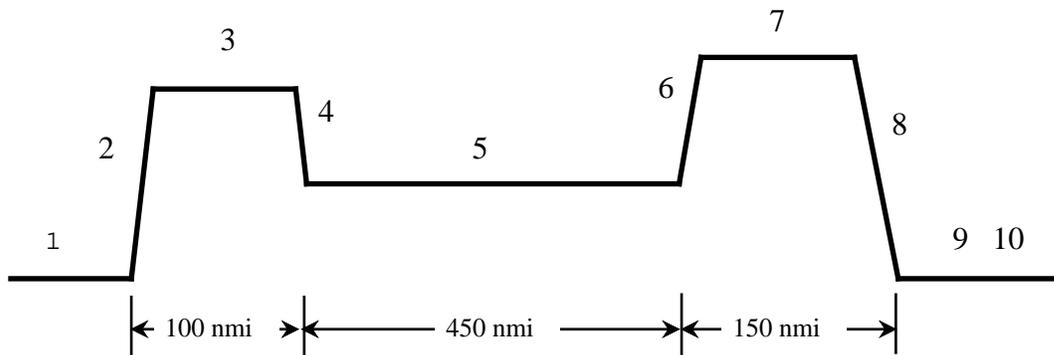


Figure 10.52
LOCAL RADAR - 2

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel consumed for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.
2. Climb at climb power from sea level to 10,000 ft altitude.
3. Cruise at 10,000 ft altitude at 250 KIAS.
4. Perform a 250 KIAS descent from 10,000 ft to 2,000 ft altitude (total distance traveled in segments 2, 3, and 4 shall be at least 100 nmi).
5. Cruise at 2,000 ft altitude at 300 KTAS for a distance of at least 450 nmi.
6. Climb at climb power from 2,000 ft altitude to 10,000 ft altitude.
7. Cruise at 10,000 ft altitude at 250 KIAS.
8. Perform a 250 KIAS descent from 10,000 ft to sea level (total distance covered in segments 6, 7 and 8 shall be at least 150 nmi).
9. Instrument approach allowance: fuel equivalent to 8 min at approach power, approach configuration.

STANDARD MISSION PROFILES

10. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:

- a. Climb at climb power from sea level to 10,000 ft.
- b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
- c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
- d. Mission Time Items 2 through 9.
- e. Cycle Time: Items 2 through 10.

FIXED WING PERFORMANCE

10.4.5.11 RIO PATTERN - INTERCEPTS - 1

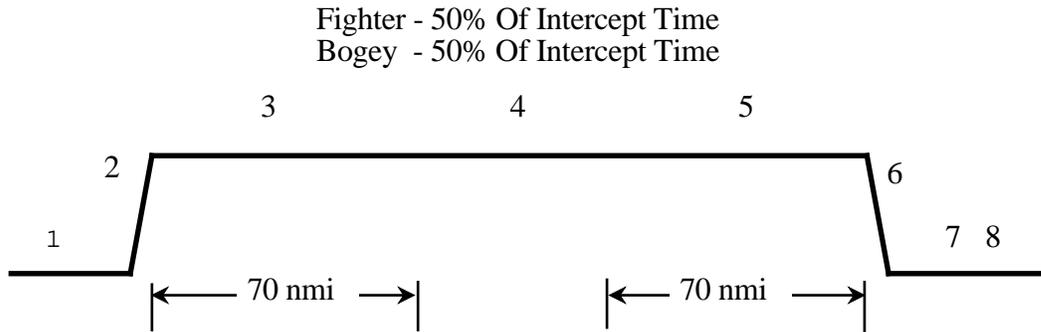


Figure 10.53

RIO PATTERN - INTERCEPTS - 1

INTERCEPT ALTITUDE/MACH NUMBER REQUIREMENTS

Block 1:	7,000 ft - 11,000 ft/0.45 Mach
Block 2:	13,000 ft - 17,000 ft/0.50 Mach
Block 3:	18,000 ft - 22,000 ft/0.55 Mach
15 intercepts for Block 1 only	
20 intercepts for Blocks 2 and 3	
Average flight duration:	2.3 hour for Block 1
	2.6 hour for Blocks 2 and 3
Capability to dash an additional 0.1 Mach for 15% of the profile	

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel considered for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.

2. Climb at climb power from sea level to 13,000 ft.

3. Cruise 70 nmi at 13,000 ft.

4. Perform 15 intercepts at intercept altitude for Block 1 and 20 intercepts at intercept altitude for Blocks 2 and 3: fuel allowance per intercept equivalent to 6 min at maximum airspeed. No distance gained during the intercepts.

STANDARD MISSION PROFILES

5. Cruise back at 18,000 ft.
6. Perform a 250 KIAS descent from 18,000 ft to sea level.
7. TACAN approach allowance: fuel equivalent to 8 min at approach power approach configuration.
8. Reserve fuel requirement: the fuel required for a 150 nmi divert capability is defined as follows:
 - a. Climb at climb power from sea level to 10,000 ft.
 - b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
 - c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
 - d. Mission Time Items 2 through 7.
 - e. Cycle Time: Items 2 through 8.

FIXED WING PERFORMANCE

10.4.5.12 RIO PATTERN - INTERCEPTS - 2

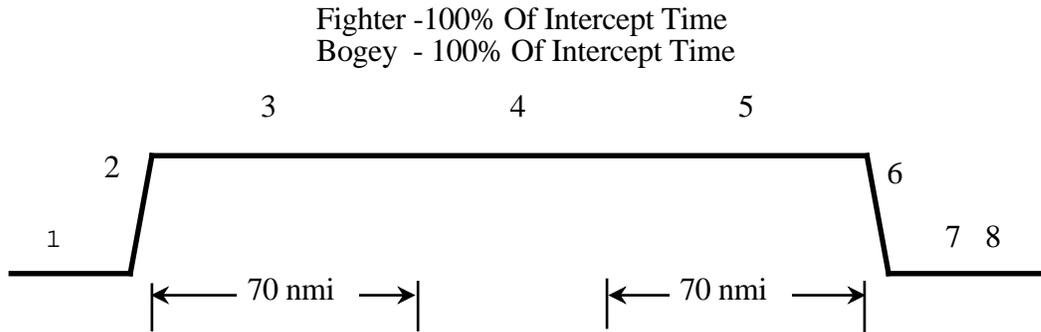


Figure 10.54

RIO PATTERN - INTERCEPTS - 2

INTERCEPT ALTITUDE/MACH NUMBER REQUIREMENTS

Block 1:	7,000 ft - 11,000 ft/0.45 Mach
Block 2:	13,000 ft - 17,000 ft/0.50 Mach
Block 3:	18,000 ft - 22,000 ft/0.55 Mach
15 intercepts for Block 1 only	
20 intercepts for Blocks 2 and 3	
Average flight duration:	2.3 hour for Block 1 2.6 hour for Blocks 2 and 3
Capability to dash an additional 0.1 Mach for 15% of the profile	

1. Takeoff allowance for engine start, taxi, takeoff, and acceleration to climb speed: fuel considered for 15 min at idle power, plus 1 min at takeoff power, sea level static conditions, all engines operating.

2. Climb at climb power from sea level to 13,000 ft.

3. Cruise 70 nmi at 13,000 ft.

4. Perform 15 intercepts at intercept altitude for Block 1 and 20 intercepts at intercept altitude for Blocks 2 and 3: fuel allowance per intercept equivalent to 6 min at maximum airspeed. No distance gained during the intercepts.

STANDARD MISSION PROFILES

5. Cruise back at 18,000 ft.
6. Perform a 250 KIAS descent from 18,000 ft to sea level.
7. TACAN approach allowance: fuel equivalent to 8 min at approach power approach configuration.
8. Reserve fuel requirements: the fuel required for a 150 nmi divert capability is defined as follows:
 - a. Climb at climb power from sea level to 10,000 ft.
 - b. Cruise 150 nmi from initial climb point at 10,000 ft altitude at speed for maximum range.
 - c. Loiter for 20 min at 10,000 ft at airspeed for maximum endurance (all engines operating).
 - d. Mission Time Items 2 through 7.
 - e. Cycle Time: Items 2 through 8.

FIXED WING PERFORMANCE

10.5 CONCLUSION

Keep in mind the development of mission profiles is an evolutionary process. Advances in technology giving rise to high thrust to weight, low observables, smart weapons etc., all lead to changes in the way Navy aircraft missions will be defined and in a broader sense what the role of Naval aviation will be in the future.

10.6 GLOSSARY

10.6.1 NOTATIONS

ACM	Air combat maneuvering	
ADF	Automatic direction finder	
AEW	Airborne Early Warning	
ASW	Antisubmarine aircraft	
CV	Carrier	
Cycle time	Time of flight from the start of enroute climb (omitting takeoff time) to stopping engines after landing	
D.R.	Dead reckoning	
FAM	Familiarization	
FCLP	Field carrier landing pattern	
GCA	Ground controlled approach	
ILS	Instrument landing system	
MDA	Minimum descent altitude	
Mission time	Time in air (excluding time before start of initial climb and reserve)	
NATOPS	Naval Air Training and Operating Procedures Standardization Program	
NAVAIRSYSCOM	Naval Air System Command	
n_z	Normal acceleration	g
SAC	Standard aircraft characteristics	
TACAN	Tactical air navigation	
TAMPS	Tactical Air Mission Planning System	
VFR	Visual flight rules	

STANDARD MISSION PROFILES

10.7 REFERENCES

1. “Aircraft Conceptual Design”, Course Notes (#Y0606), Lockheed Technical Institute, Fall 1991.
2. “Functional Description For Training Services”, Undergraduate Naval Flight Officer Training System Program, NASC, PMA 200, 3 April 1989.
3. Luter, M., NAVAIRSYSCOM (AIR-53012) Course Notes, (undated).
4. Military Specification (MIL-D-8708(AS)), “Demonstration Requirements for Airplanes”, 31 January 1969.
5. Military Standard, MIL-STD-1797A, “Flying Qualities of Piloted Aircraft”, 30 January 1990.
6. “Mission Profiles for Navy Pilot Trainer”, (date unknown).
7. NAVAIRSYSCOM Specification, AS-5263, “Guidelines for Preparation of Standard Aircraft Characteristics Charts and Performance Data, Piloted Aircraft (Fixed Wing)”, 23 October 1986.
8. Nicolai, L.M., *Fundamentals of Aircraft Design*, Fairborn, Ohio, E.P. Domicone Printing Services, 1975.
9. Raymer, D.P., *Aircraft Design: A Conceptual Approach*, Washington, D.C., American Institute of Aeronautics and Astronautics, Inc., 1989.
10. Roskam, J., *Airplane Design* (Part I, II and VII), Ottawa, Kansas, Roskam Aviation and Engineering Corporation, 1988.