

List of Key Terms

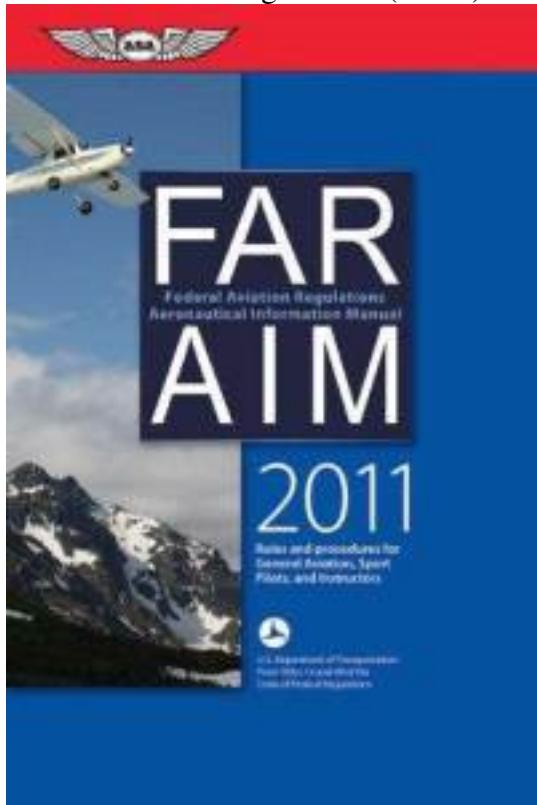
Section 1

Part 1

Federal Aviation Administration (FAA)



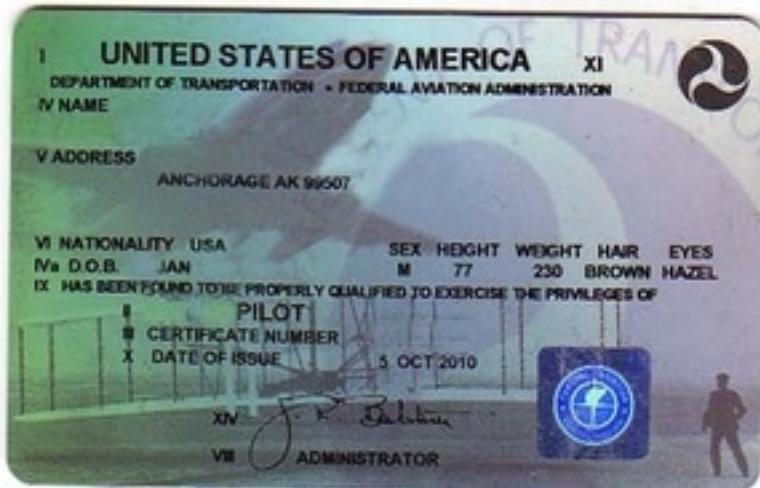
Federal Aviation Regulations (FARs)



Fixed Base Operator (FBO)



FAA Certificated Flight Instructor (CFI)



Syllabus

Student Pilot Certificate

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION		CERTIFICATE NO. BB-654987			
STUDENT PILOT CERTIFICATE					
THIS CERTIFIES THAT (<i>Full name and address</i>)					
HANNA MARIE JASON 7206 YORK ROAD TOWSON, MD 21212					
BIRTH DATE 7/2/73		HEIGHT 63 IN	WEIGHT 130 lbs	HAIR BROWN	EYES HAZEL
Has met the standards prescribed in Part 61 of the Federal Aviation Regulations for a Student Pilot Certificate.					
LIMITATIONS					
ISSUANCE DATE 1/7/2006		EXPIRATION DATE 1/31/2008			
ISSUED BY	SIGNATURE OF EXAMINER OR INSPECTOR David P. Cooper DAVID P. COOPER			EXAM. DESIG. NO. OR INSPECTOR'S REG. NO. EA 04-8853	
DATE EXAMINER'S DESIG. EXPIRES: 5/31/07					
STUDENT PILOT'S SIGNATURE Hanna M. Jason					
FAA Form 8710-2 (2-77) FORMERLY FAA FORM 8420-1					

Medical Certificate

Copy of FAA Form 8500-9
(Medical Certificate) or FAA
Form 8420-2 Medical Student
Pilot Certificate) issued.

FF-

**MEDICAL CERTIFICATE 3RD CLASS
AND STUDENT PILOT CERTIFICATE**

This certifies that (*Full name and address*):

JOHN DOE
123 STREETNAME DR.
ANYTOWN, TN 37130

12/17/03 70 170 BR BR M

Date of Birth	Height	Weight	Hair	Eyes	Sex
---------------	--------	--------	------	------	-----

has met the medical standards prescribed in part 67,
Federal Aviation Regulations, for this class of
Medical Certificate.

Limitations	MUST WEAR CORRECTIVE LENSES				
Examiner	Date of Examination 10/17/42	Examiner's Designation No 1013-2			
	Signature				
	Typed Name JOE DOCTOR, D.O.				
Airman's Signature					

Pilot in Command (PIC)



Flight Review



Part 2

Refresher Training



Mountain Flying



Aerobatic Fight Training



Aircraft Owners and Pilots Association (AOPA)



Experimental Aircraft Association (EAA)



The Ninety-Nines, Inc.



Civil Air Patrol (CAP)



Aircraft Checkout



High Performance Airplane



Complex Airplane



Homebuilt Aircraft



Instrument Rating

A photograph of a "TEMPORARY AIRMAN CERTIFICATE" issued by the Federal Aviation Administration (FAA). The certificate is dated 10-10-2006 and is valid until 10-31-2006. It is issued to Matthew Christopher Burch, born 08-08-1973, with a height of 73 inches and a weight of 185 pounds. He has brown hair and blue eyes, and is male (M). His nationality is U.S.A. The certificate grants him a "PRIVATE PILOT" rating with an "AIRPLANE SINGLE ENGINE LAND" rating. The "INSTRUMENT-AIRPLANE" rating is also listed. The certificate includes fields for "EXAMINER'S SIGNATURE" and "INSPECTOR'S REG. NO.", which are filled out with handwritten signatures and numbers. A large, dark signature is visible on the left side of the document.

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION
TEMPORARY AIRMAN CERTIFICATE

THIS CERTIFIES THAT
IV. MATTHEW CHRISTOPHER BURCH
V. [REDACTED]

DATE OF BIRTH: 08-08-1973 HEIGHT: 73 in WEIGHT: 185 HAIR: BROWN EYES: BLUE SEX: M NATIONALITY: U.S.A.

II. Has been found to be properly qualified and is hereby authorized in accordance with the conditions of issuance on the reverse of this certificate to exercise the privileges of:

PRIVATE PILOT

RATINGS AND LIMITATIONS

III. AIRPLANE SINGLE ENGINE LAND

INSTRUMENT-AIRPLANE

IV. EXAMINER'S SIGNATURE

V. DATE OF ISSUANCE: 10-10-2006

VI. EXAMINER'S SIGNATURE: [Signature]

VII. EXAMINER'S DESIGNATION NO. OR
INSPECTOR'S REG. NO.: CEB05016-1691538

VIII. DATE CERTIFICATE ISSUED: 10-31-2006

FAA FORM 8080-4 (10-91) USE PREVIOUS EDITION

Multi-Engine Rating



Single-Engine Sea Rating



Multi-Engine Sea Rating



Helicopter



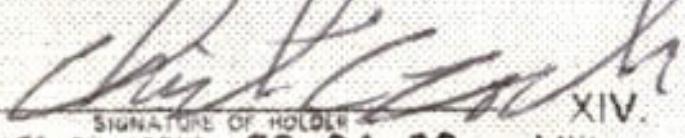
Glider Rating



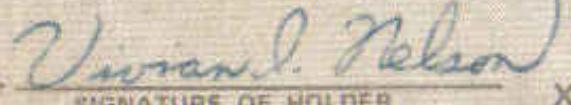
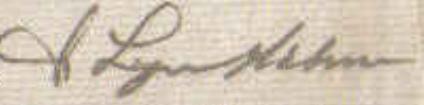
Hot Air Balloon



Commercial Pilot Certificate

I. UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION						XI.	
THIS CERTIFIES THAT		IV. CHRISTIAN CHARLES COUCH V. 12823 98TH PL NE KIRKLAND WA 98034					
DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX	NATIONALITY	VI.
06-23-58	68 ⁱⁿ	170	BROWN	BROWN	M	USA	
IX. HAS BEEN FOUND TO BE PROPERLY QUALIFIED TO EXERCISE THE PRIVILEGES OF							
II. COMMERCIAL PILOT				III. CERT. NO.			
RATINGS AND LIMITATIONS							
XII. AIRPLANE SINGLE & MULTIEGINE LAND							
INSTRUMENT AIRPLANE							
PRIVATE PRIVILEGES							
XIII. AIRPLANE SINGLE ENGINE SEA							
VII.					XIV.		
SIGNATURE OF HOLDER				ADMINISTRATOR			
X. DATE OF ISSUE		03-24-93		VIII.		Administrator	

Airline Transport Pilot Certificate (ATP)

I. UNITED STATES OF AMERICA Department of Transportation - FEDERAL AVIATION ADMINISTRATION						XII.	
THIS CERTIFIES THAT		IV. VIVIAN IRENE NELSON V. 322 EAST 1ST AVE CHEYENNE WY				82001	
DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX	NATIONALITY	VI.
06-06-59	67 ⁱⁿ	103	BROWN	BROWN	F	USA	
IX. HAS BEEN FOUND TO BE PROPERLY QUALIFIED TO EXERCISE THE PRIVILEGES OF							
II. AIRLINE TRANSPORT PILOT				III. CERT. NO. 520847022			
RATINGS AND LIMITATIONS							
XII. AIRPLANE SINGLE & MULTIEGINE LAND							
CE-500							
COMMERCIAL PRIVILEGES							
XIII. AIRPLANE SINGLE ENGINE SEA							
VII.					X.		
SIGNATURE OF HOLDER				ADMINISTRATOR			
X. DATE OF ISSUE		10-08-82		VIII.			

Recreational Pilot Certificate



Regional Airline



Major Airline



Corporate Flying

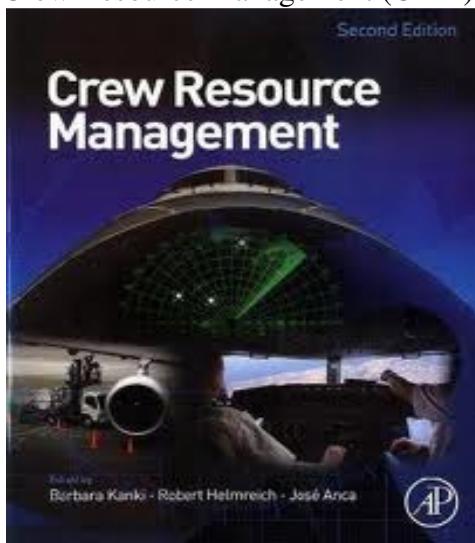


Aerial Application

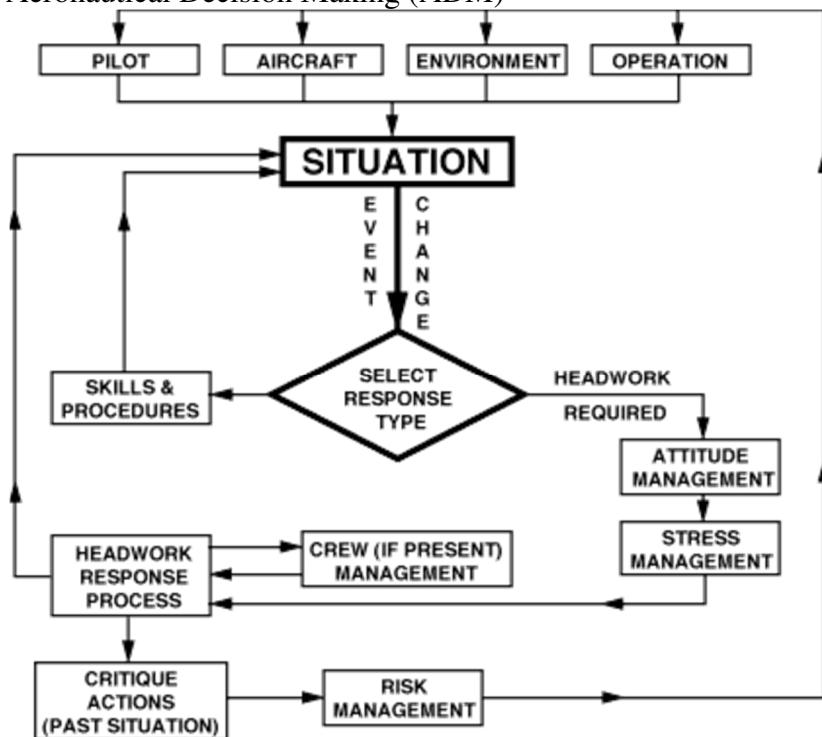


Part 3

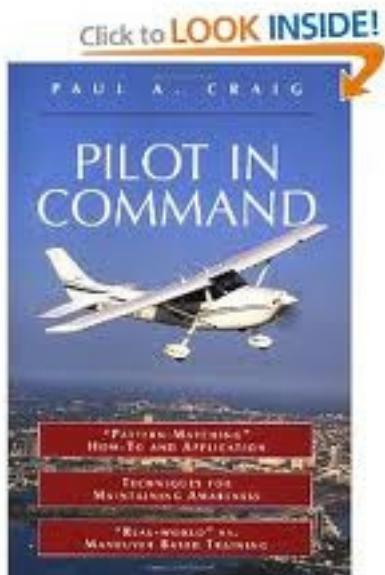
Crew Resource Management (CRM)



Aeronautical Decision Making (ADM)



Pilot-In-Command Responsibility



Communication



Resource Use



Workload Management



SITUATIONAL AWARENESS

Hey, what's a mountain goat doing up here?

motifake.com

Motion Sickness



Stress

Fatigue



Depressants



Alcohol



Stimulants



Section 2

Part 1

Fuselage



Open Truss

Stressed Skin

Monocoque

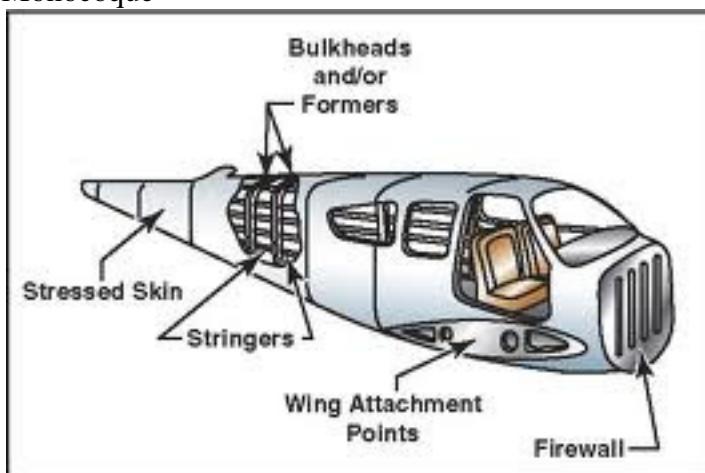


Figure 1-4. Semi-monocoque construction.

Semi-Monocoque



Wings



Monoplanes



Biplanes



Ailerons

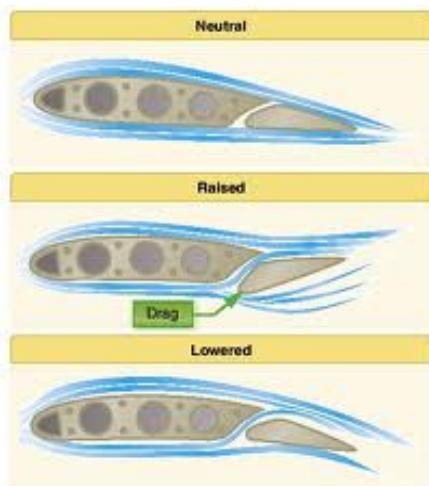


Figure 5-7. Frise-type ailerons.

Flaps



Empennage



Vertical Stabilizer (see figure below)
Horizontal Stabilizer (see figure below)
Rudder (see figure below)
Trim Tab (see figure below)
Elevator (see figure below)

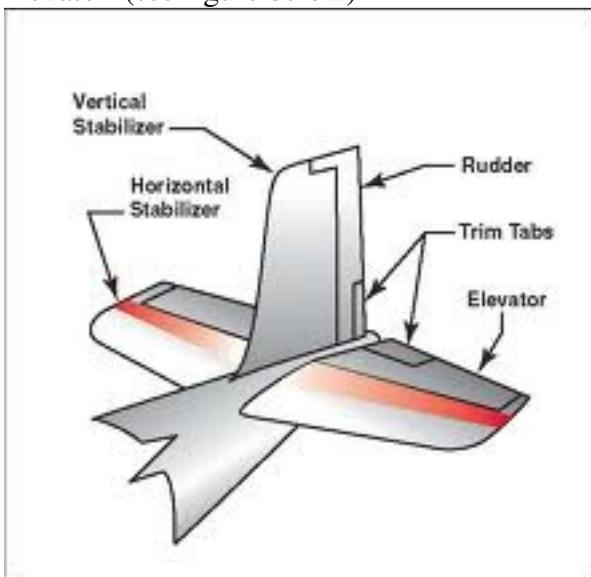


Figure 1-7. Empennage components.

Stabilator



Anti-Servo Tab



Main Wheels



Conventional Landing Gear



Figure 6-37. The landing gear supports the airplane during the takeoff run, landing, taxiing, and when parked.

Tailwheel



Nosewheel



Tricycle Gear



Fixed Gear



Retractable Gear



Oleo Strut

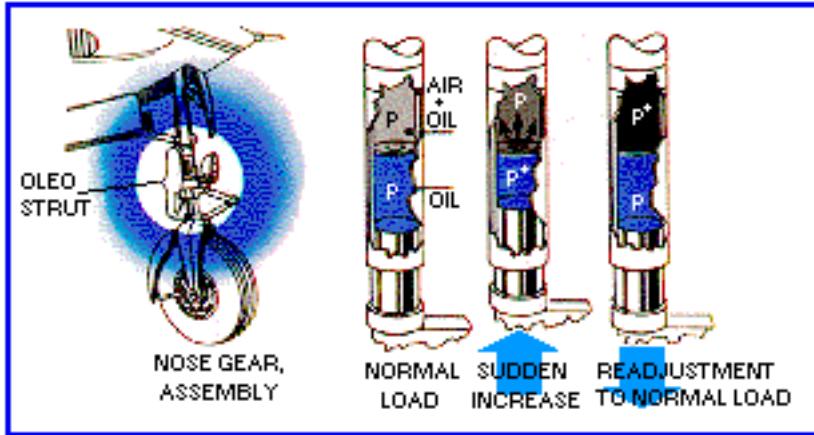
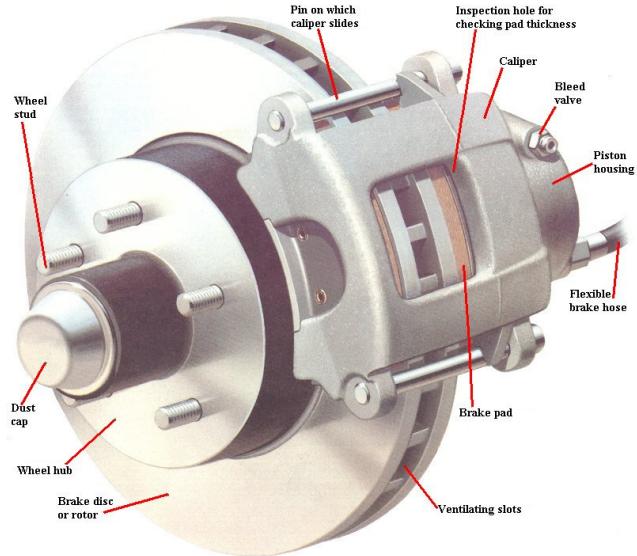


Figure 1-9 The function of an oleo strut.

Disc Brakes



Differential Braking



Powerplant

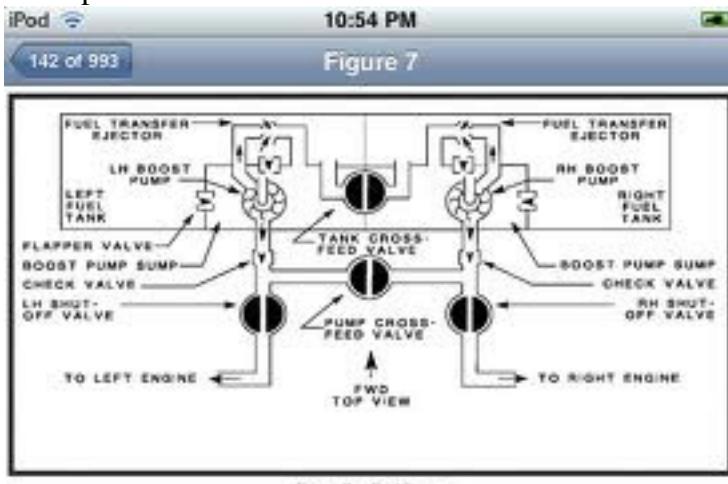


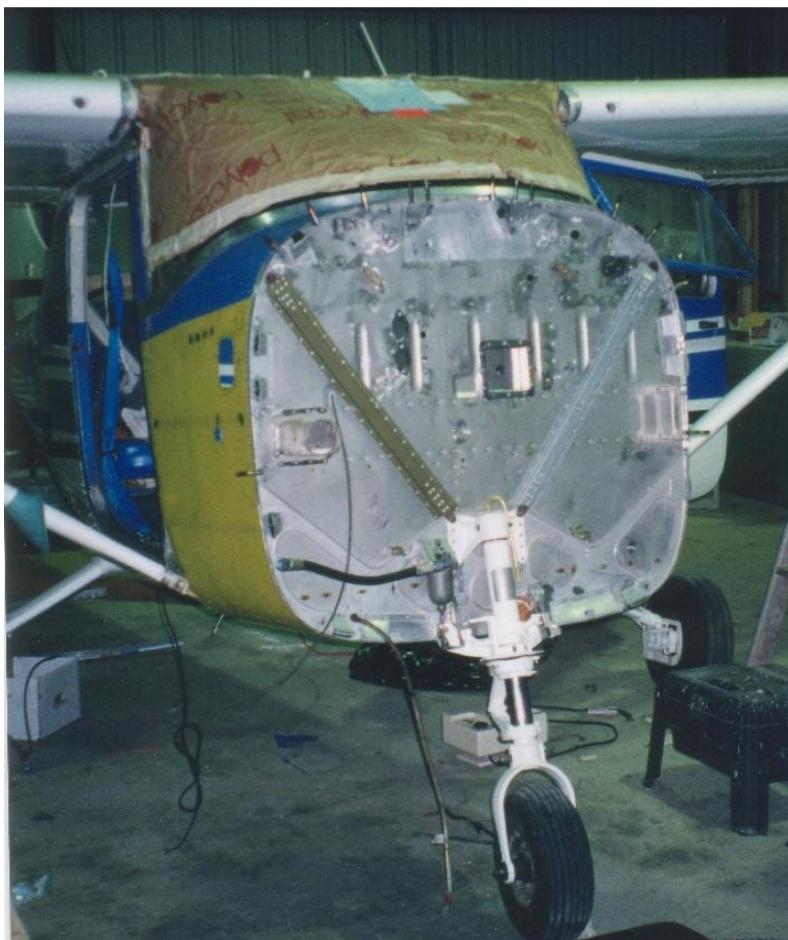
FIGURE 7.—Fuel System.

Engine

Courtesy of www.berro.com



Firewall



Propeller



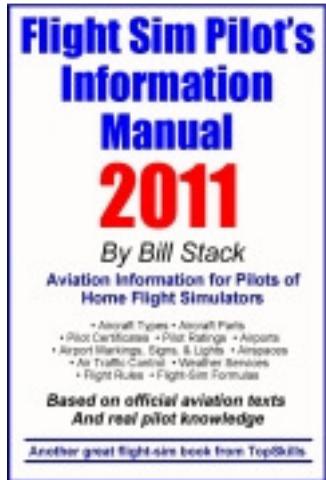
Pilot's Operating Handbook (POH)



FAA Approved Airplane Flight Manual (AFM)

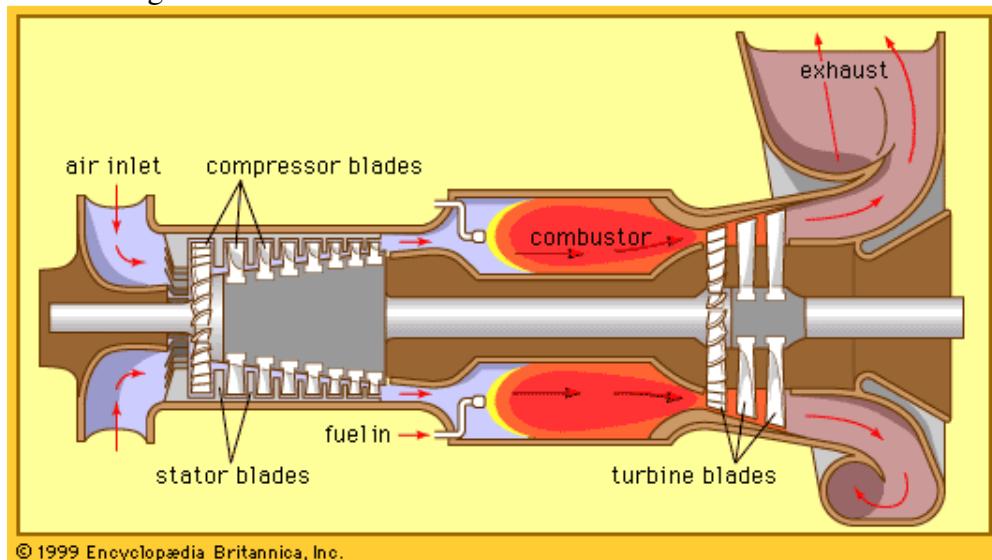


Pilot's Information Manual (PIM)



Part 2

Turbine Engine



Reciprocating Engine

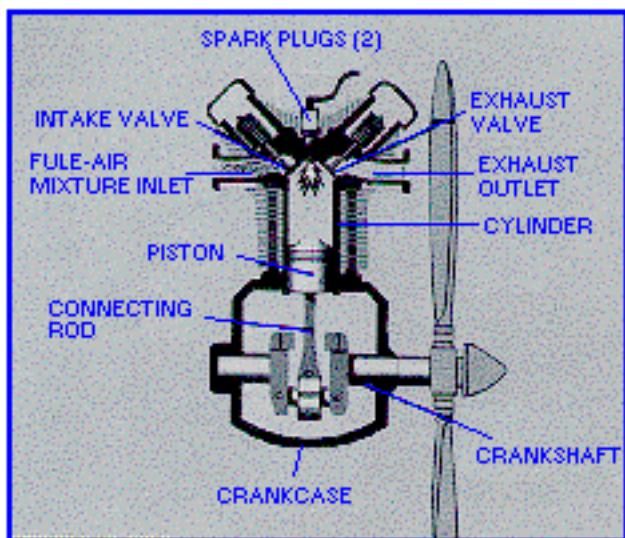
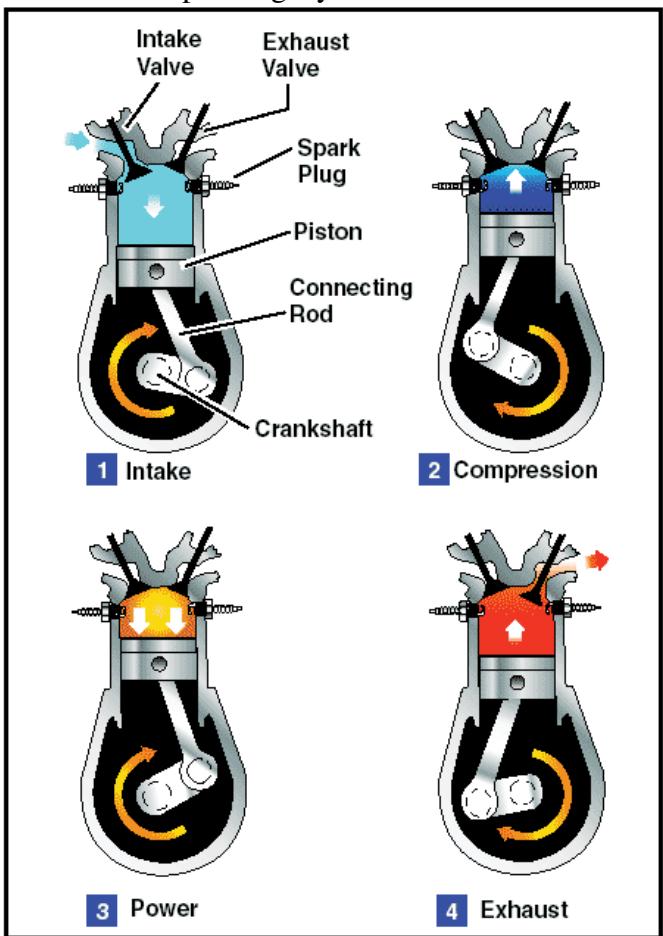


Figure 6-2 Parts of the reciprocating engine

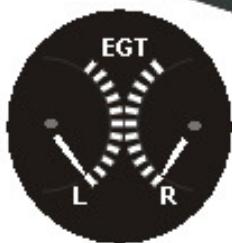
Four-Stroke Operating Cycle



Throttle



Mixture



The Mixture
Controls

The Basic EGT

Intake Port



Carburetor



Carburetor Ice

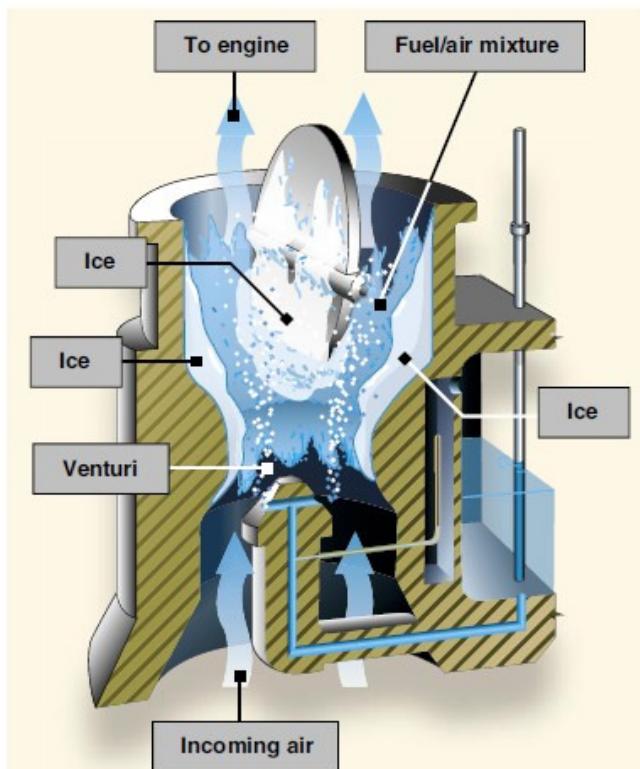
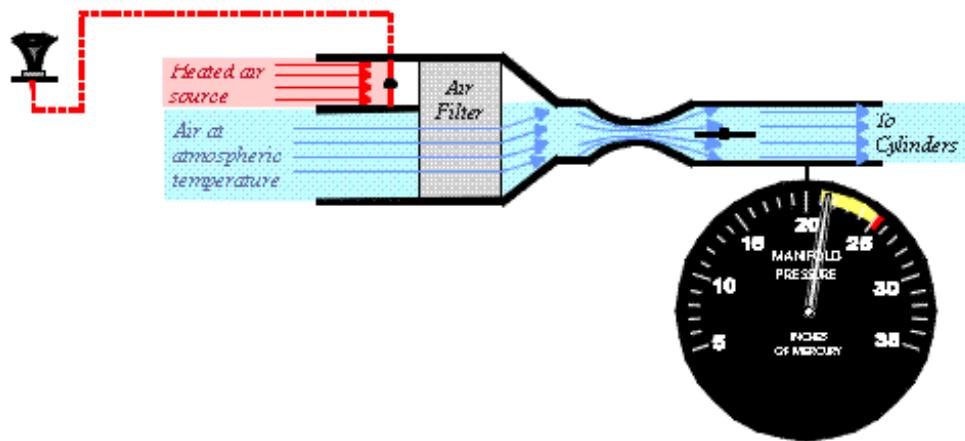
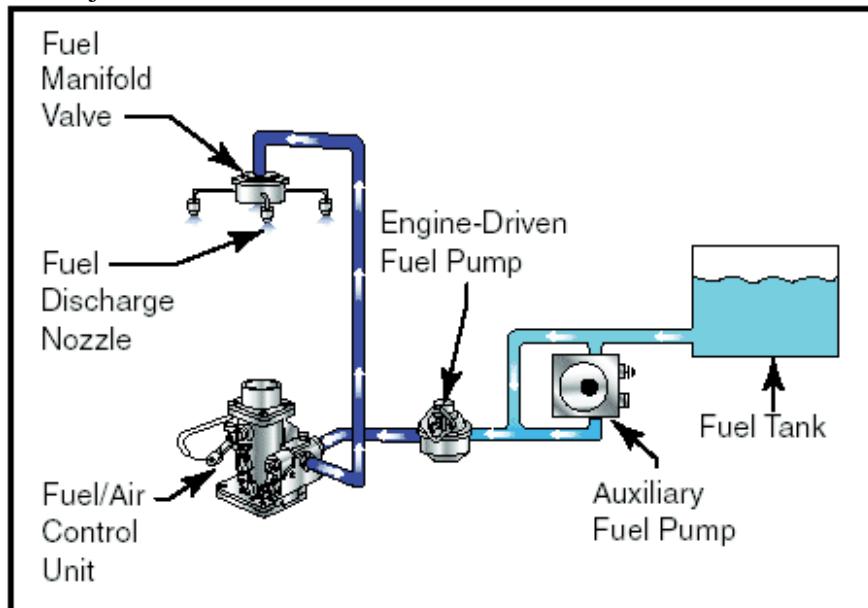


Figure 6-11. The formation of carburetor ice may reduce or block fuel/air flow to the engine.

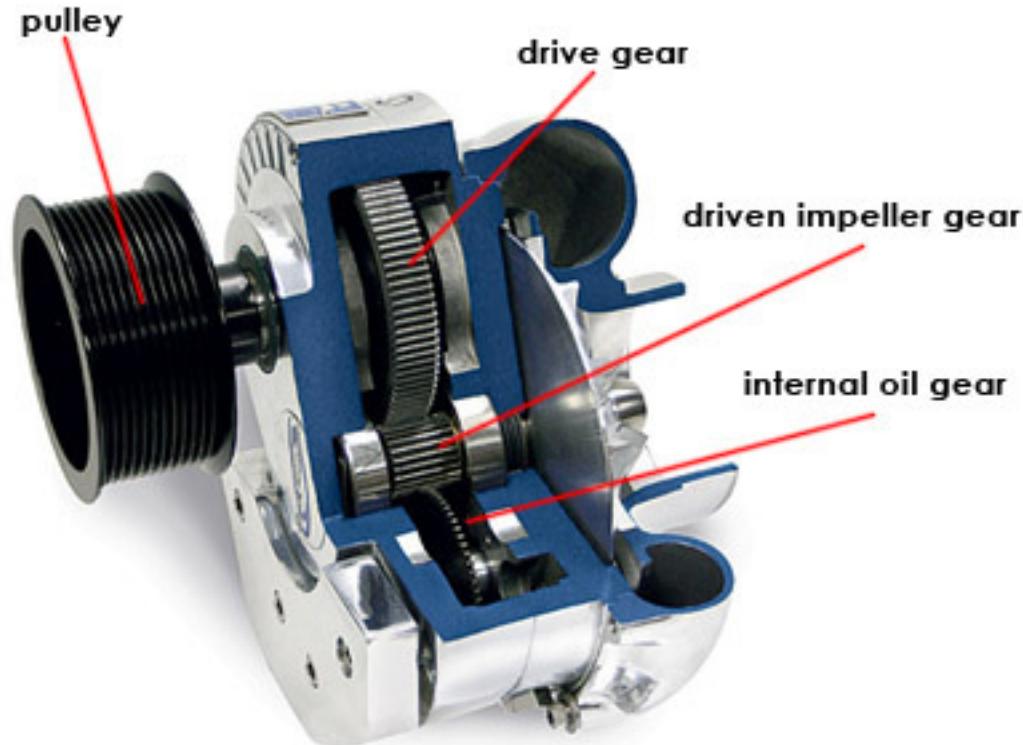
Carburetor Heat



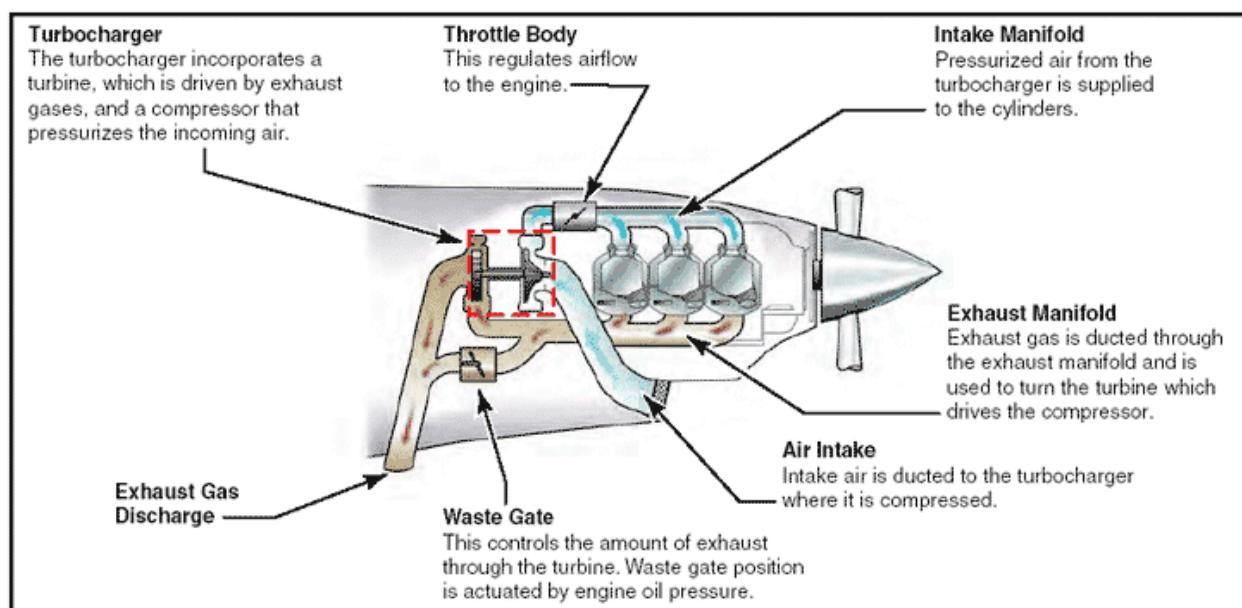
Fuel Injection



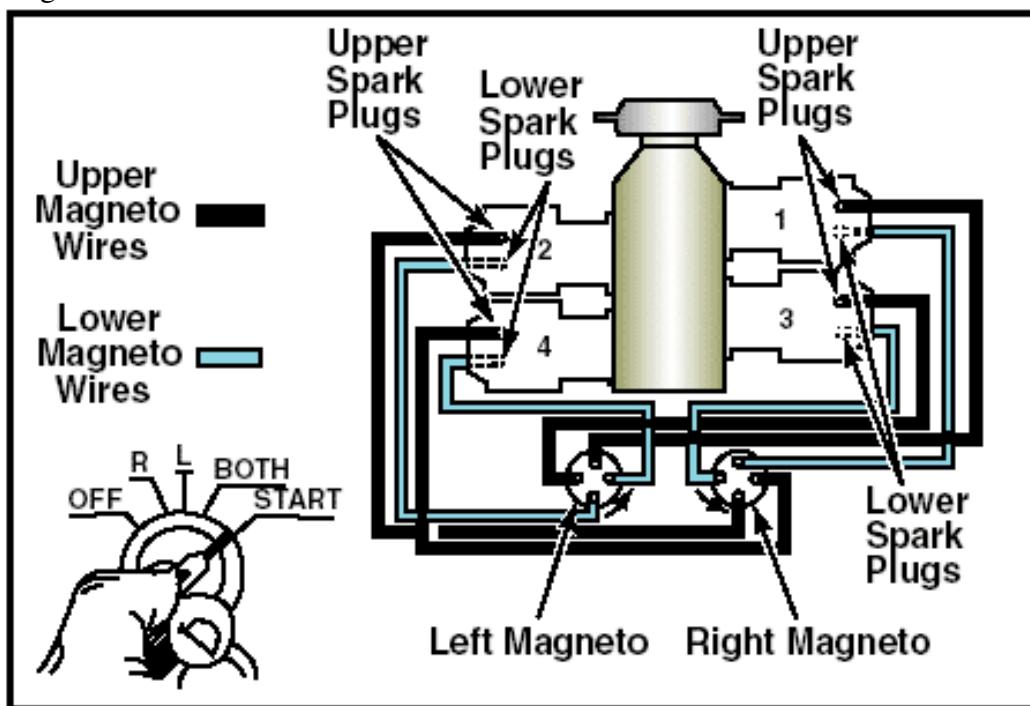
Supercharger



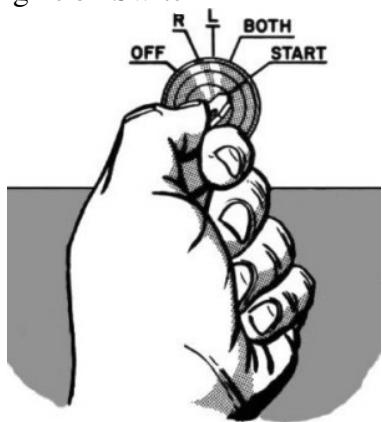
Turbocharger



Magneto



Ignition Switch

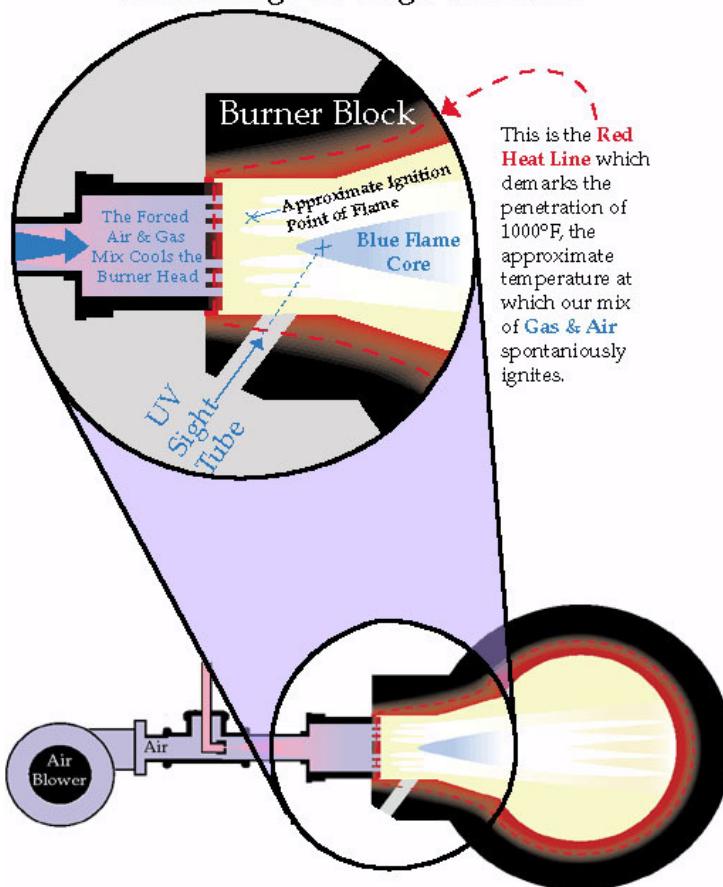


Detonation

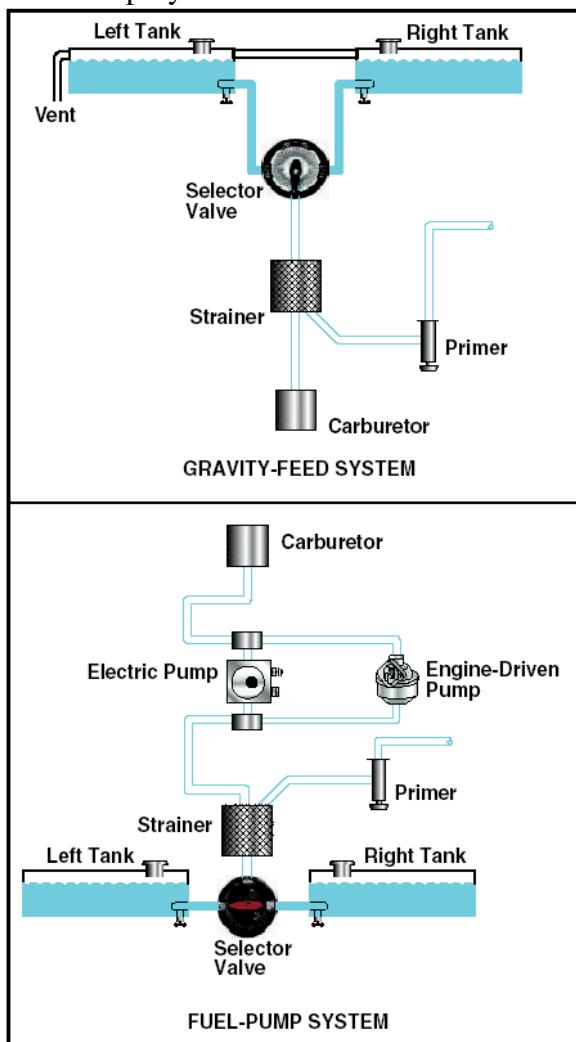


Preignition

**Image Portrays Normal Operation
of Giberson Ceramic Burner Head
Under Regular High Heat Use**



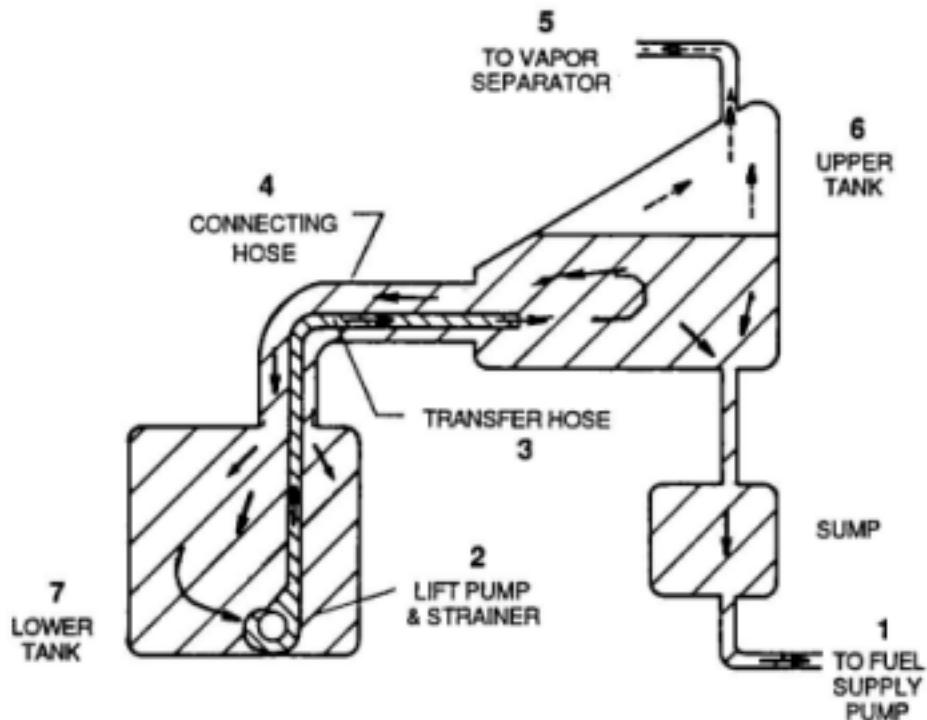
Fuel-Pump System



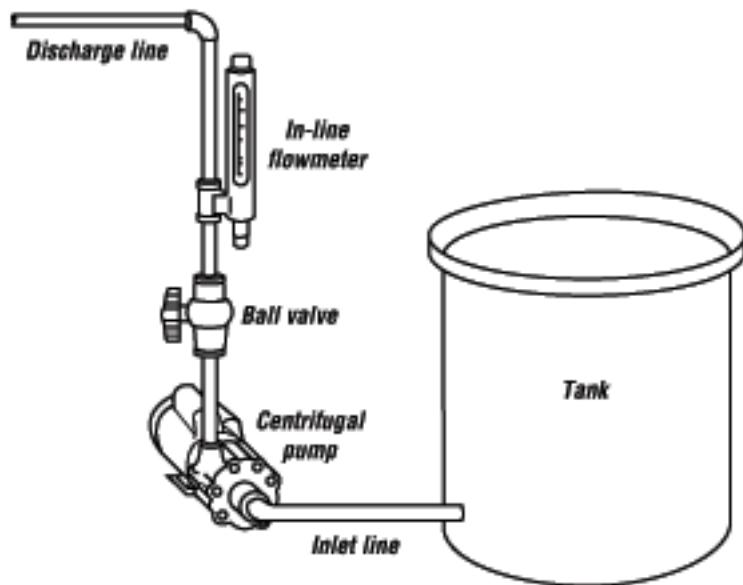
Fuel Pressure Gauge



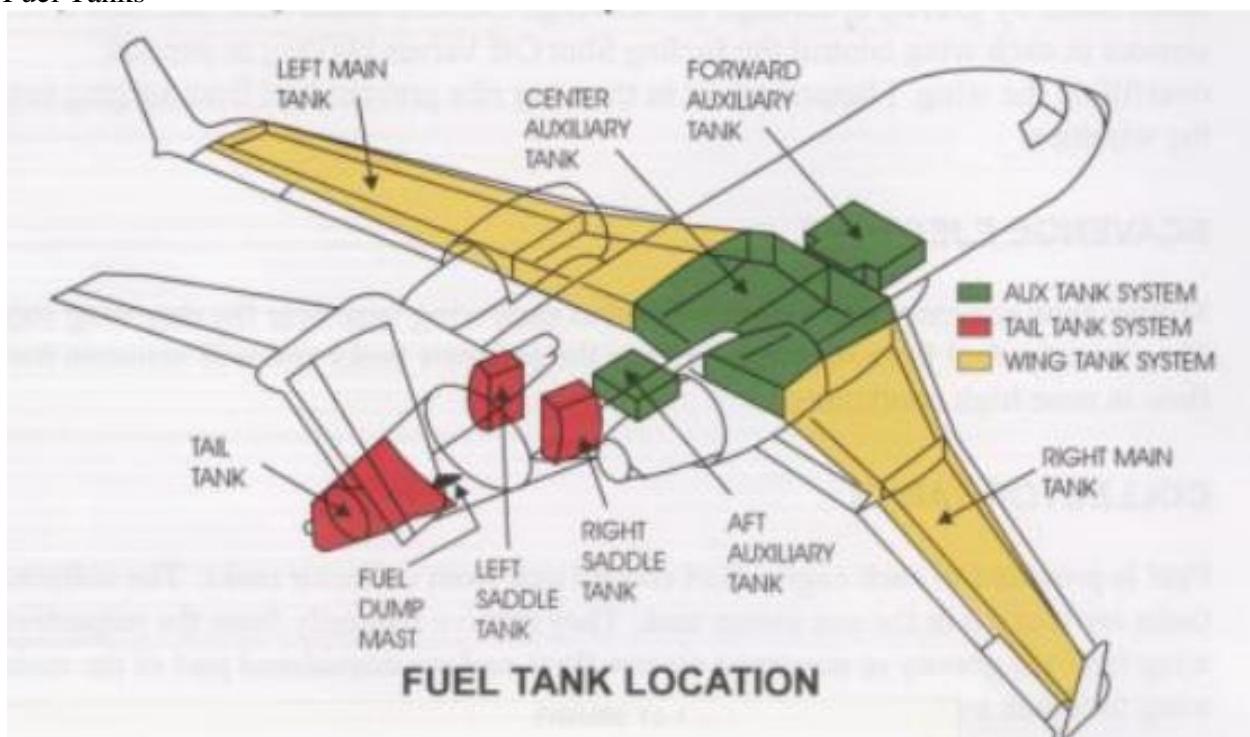
Vapor Lock



Gravity-Feed System



Fuel Tanks



Fuel Quantity Gauges



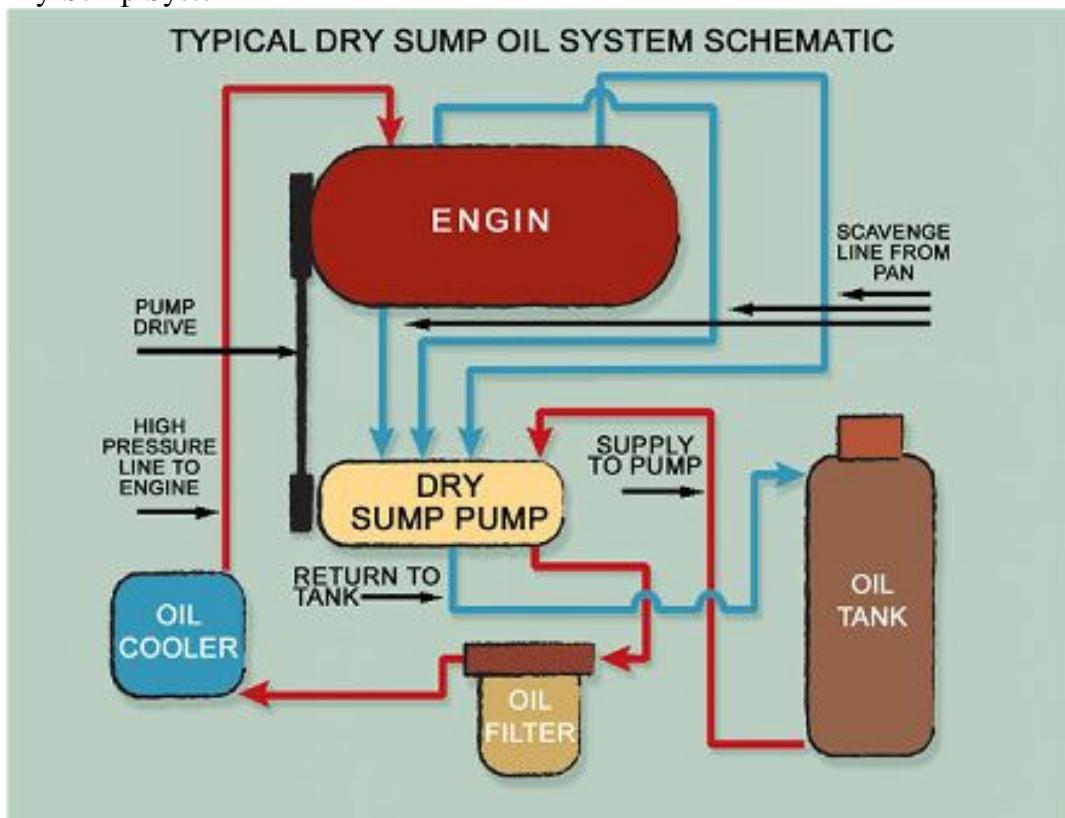
Fuel Selector Valve



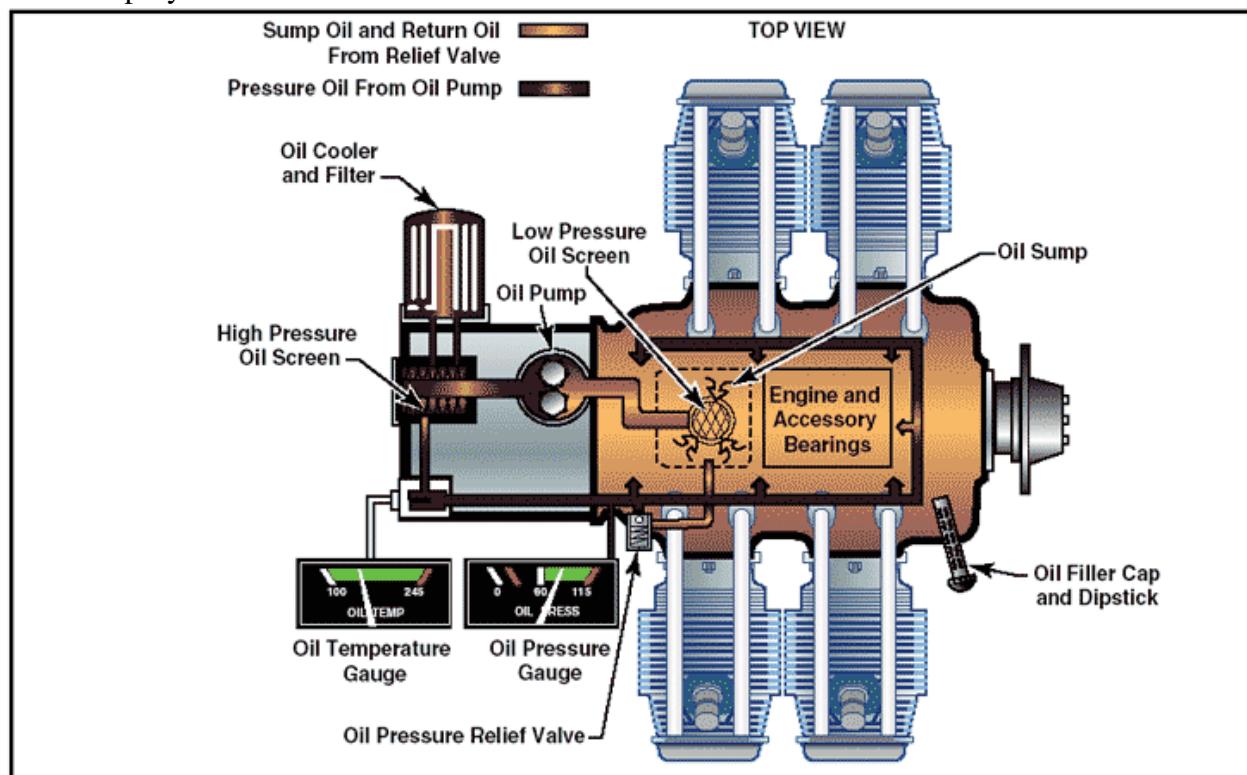
Fuel Strainer



Dry-Sump System



Wet-Sump System



Oil Pressure Gauge



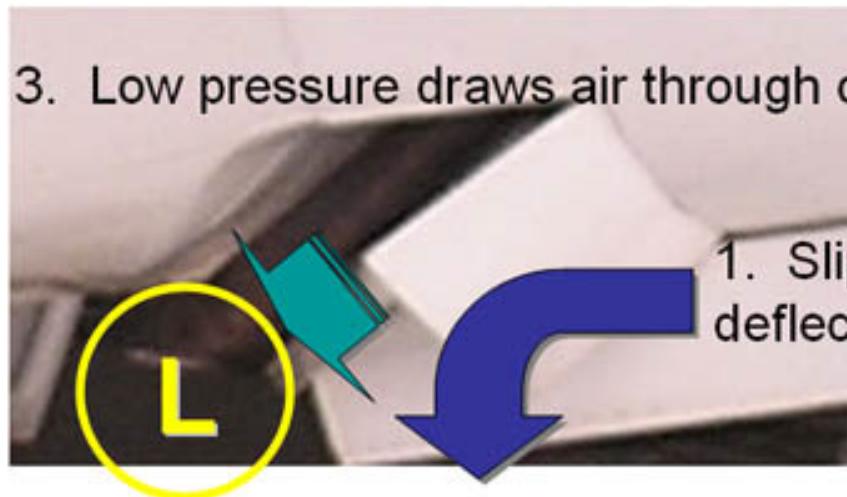
Oil Temperature Gauge



AircraftSpruce.com

PN 3070-62

Cowl Flaps



2. Low pressure created

Cylinder Head Temperature Gauge



Climb Propeller



Cruise Propeller



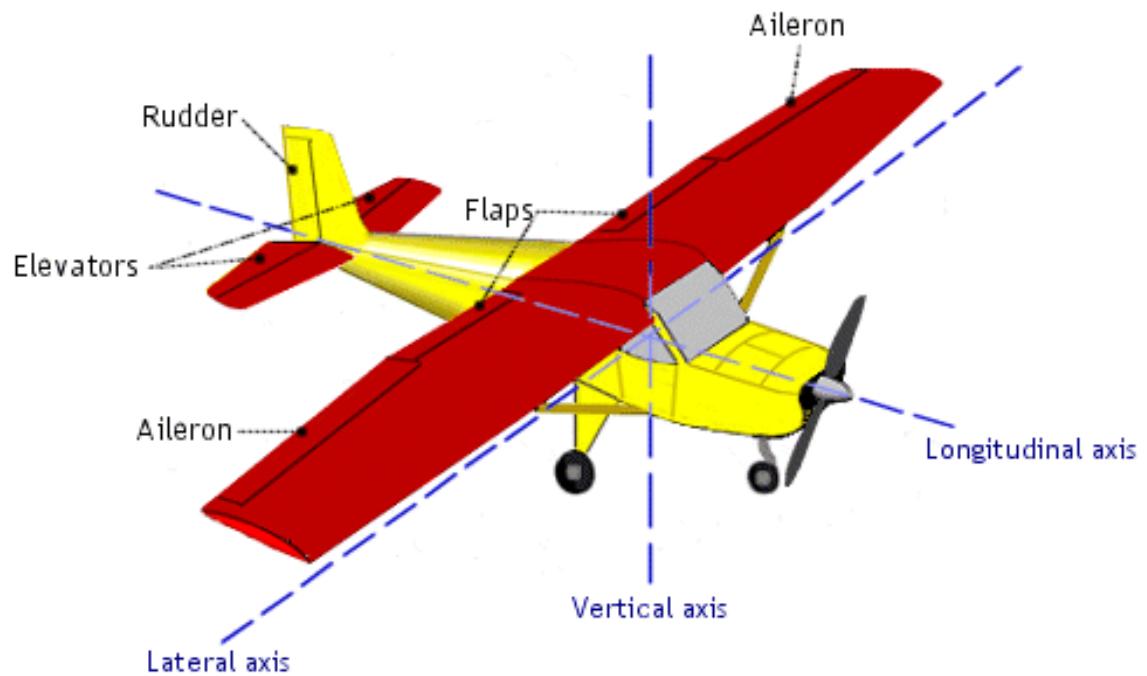
Fixed-Pitch Propeller



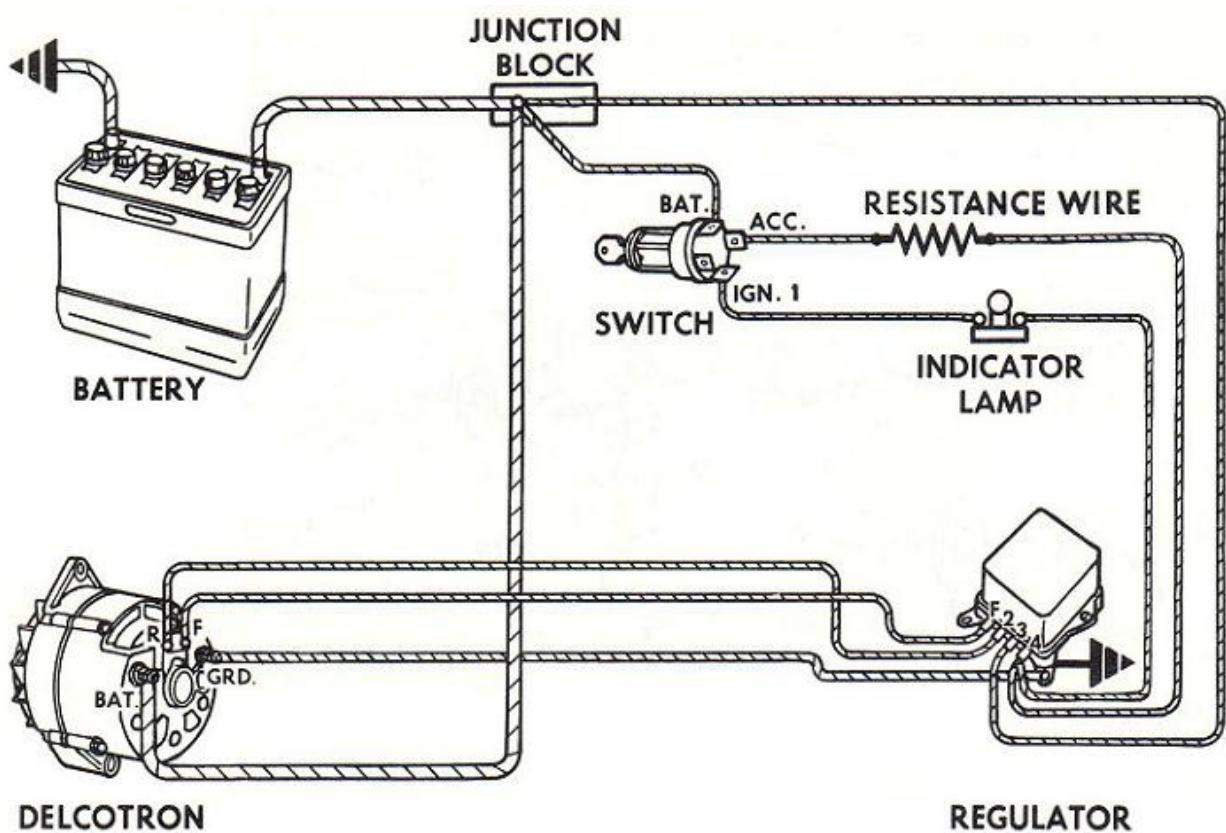
Constant-Speed Propeller



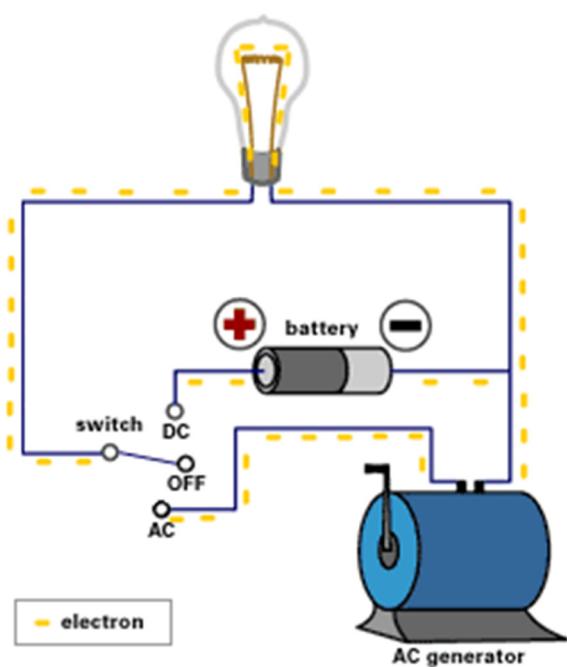
Propeller Control



Alternator

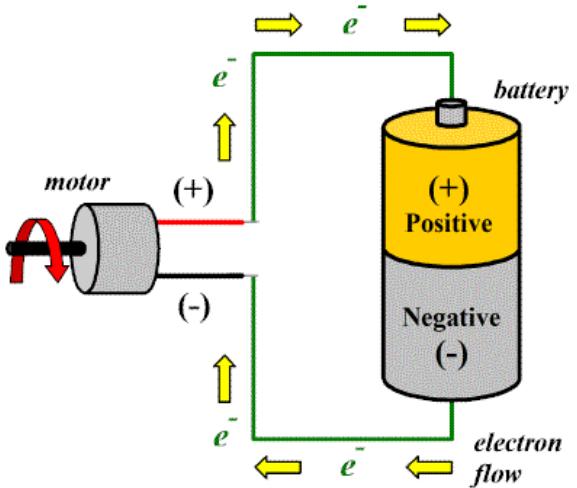


Alternating Current (AC)



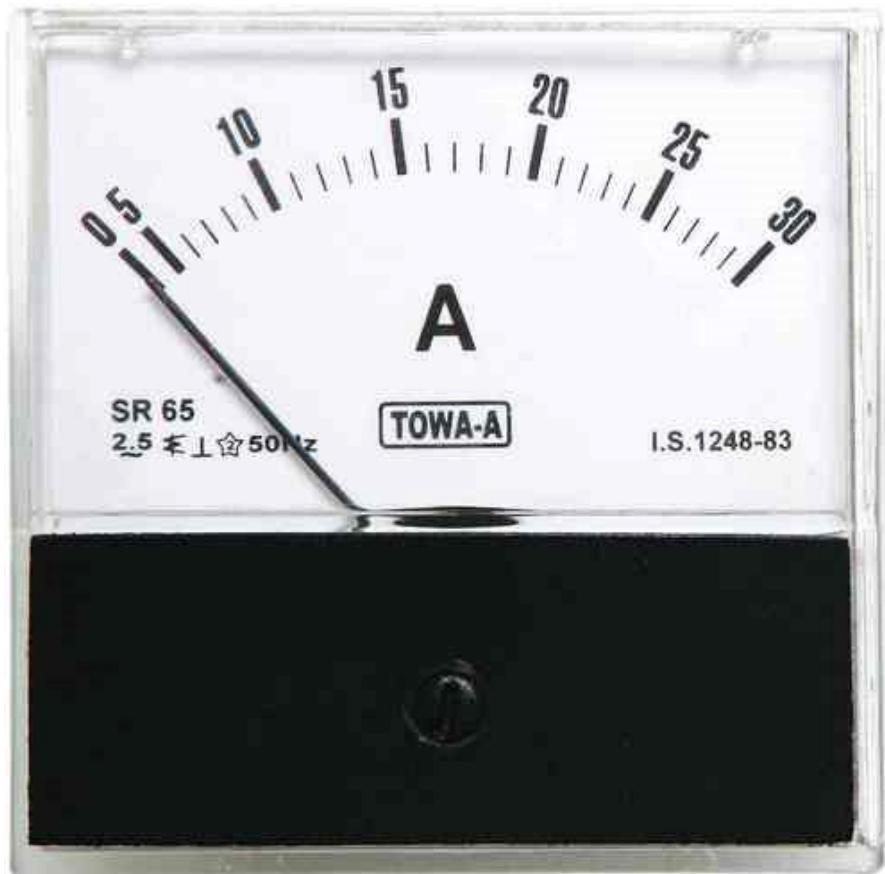
Direct Current (DC)

Battery Circuit

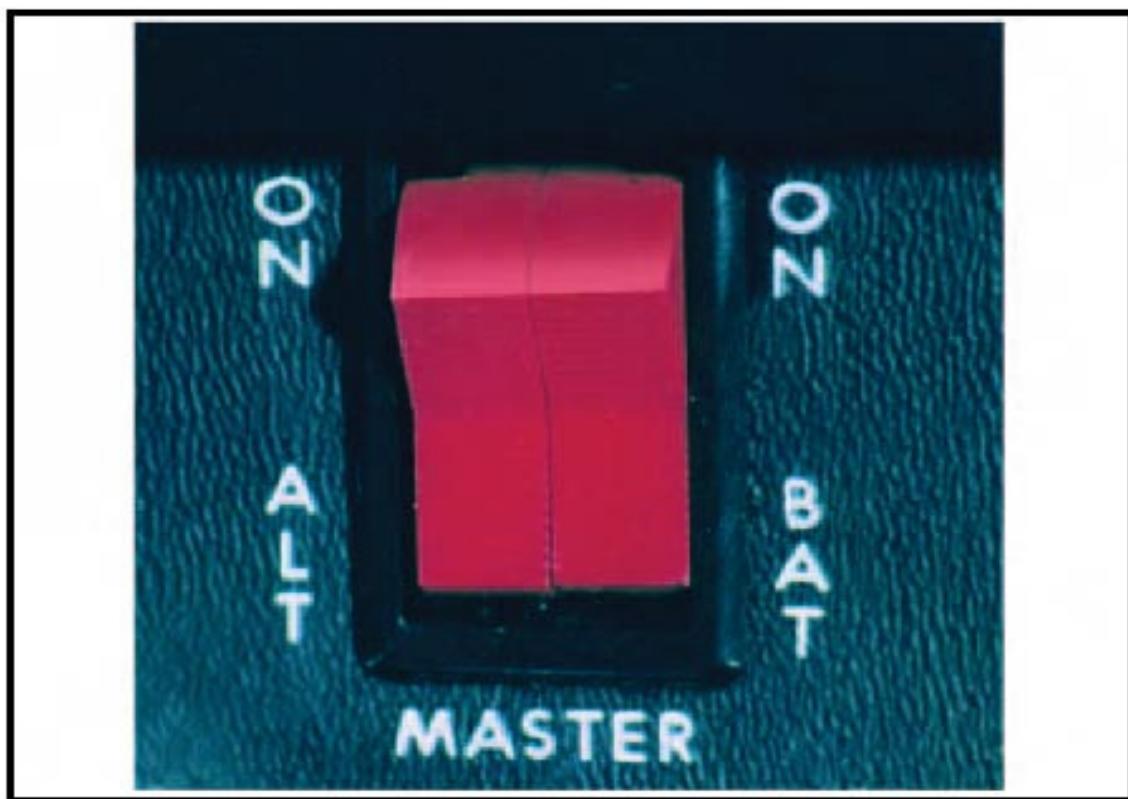


Copyright © 2004 www.makitsolar.com All rights reserved.

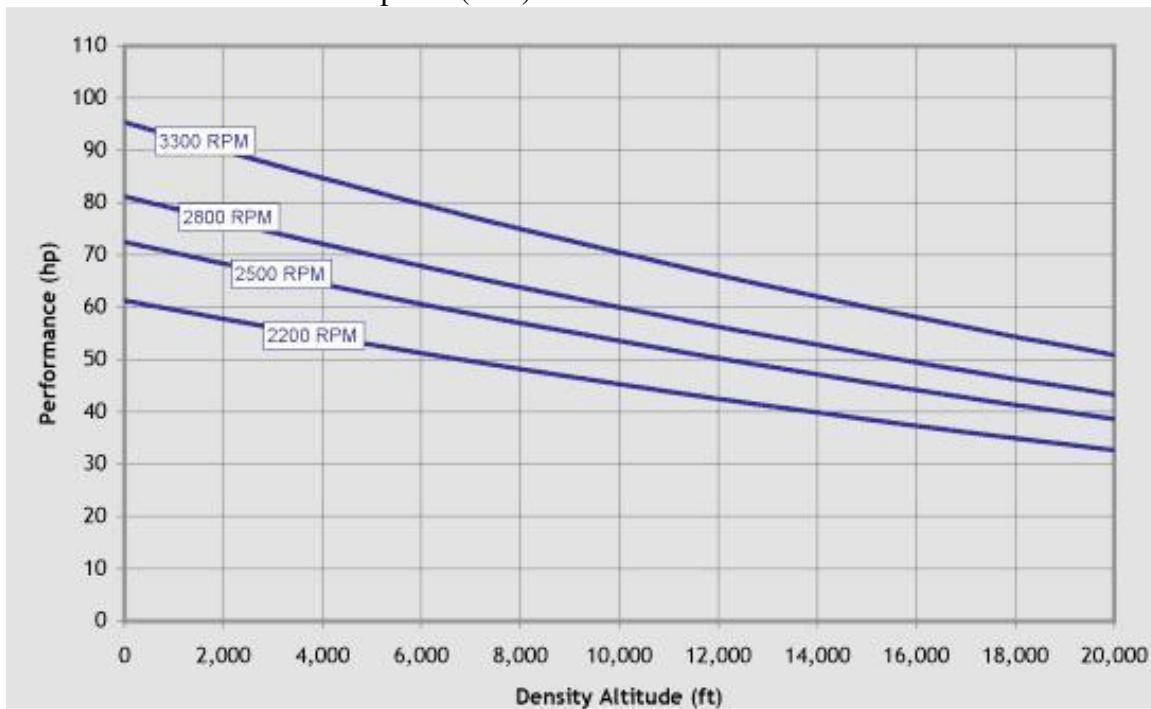
Ammeter



Master Switch

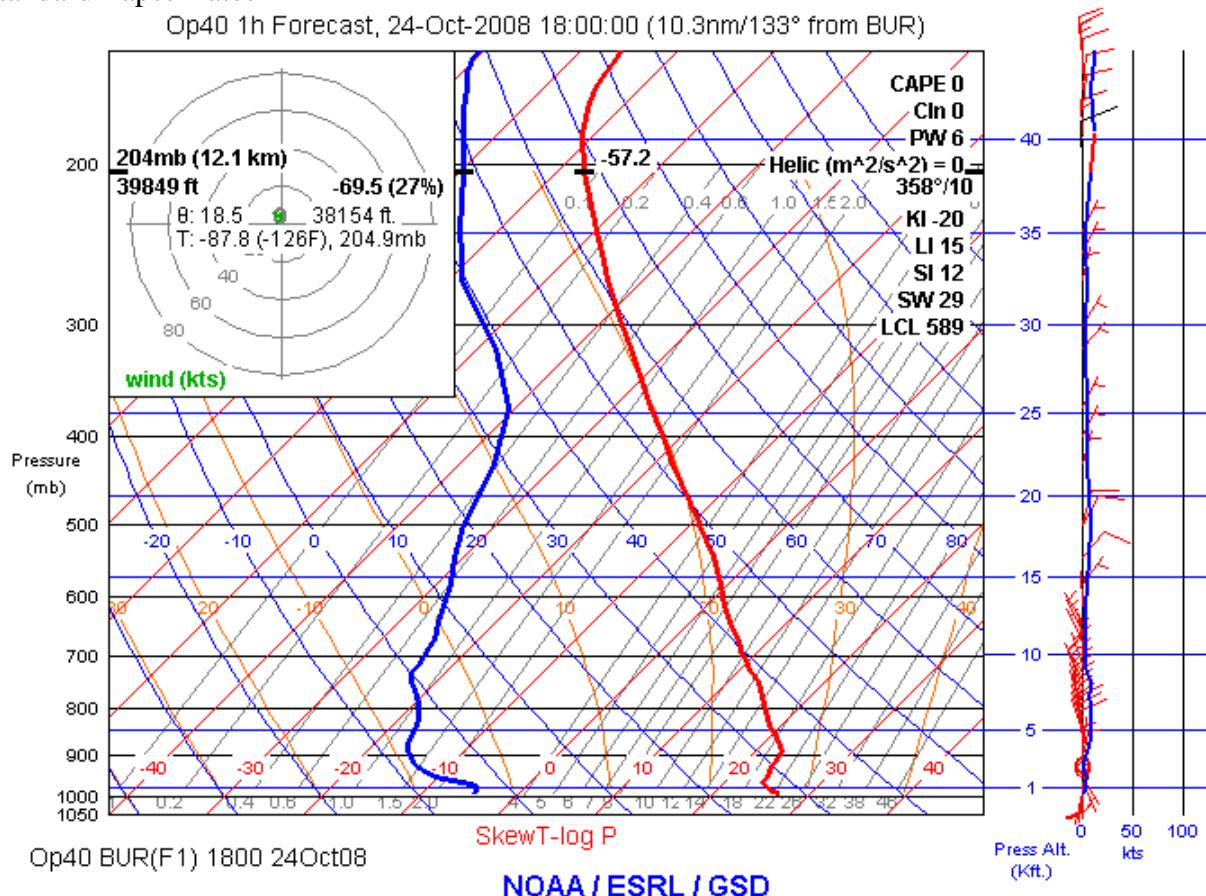


Part 3
International Standard Atmosphere (ISA)



Standard Lapse Rates

Op40 1h Forecast, 24-Oct-2008 18:00:00 (10.3nm/133° from BUR)



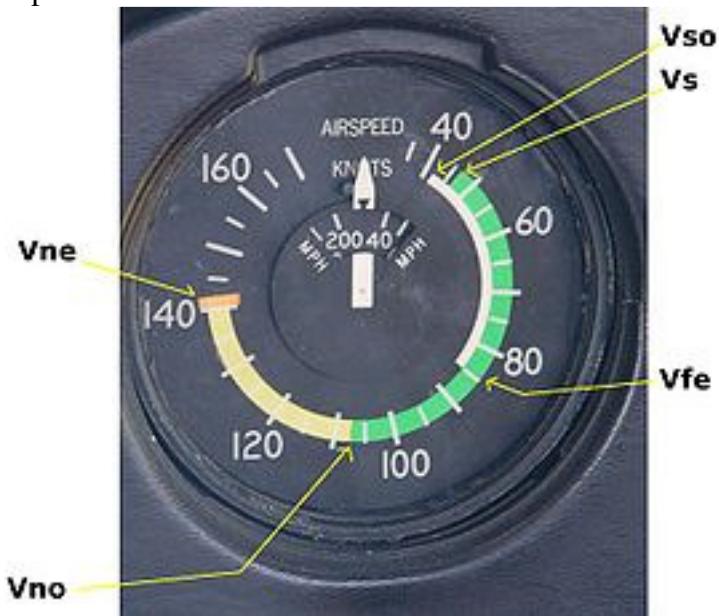
Pitot Tube



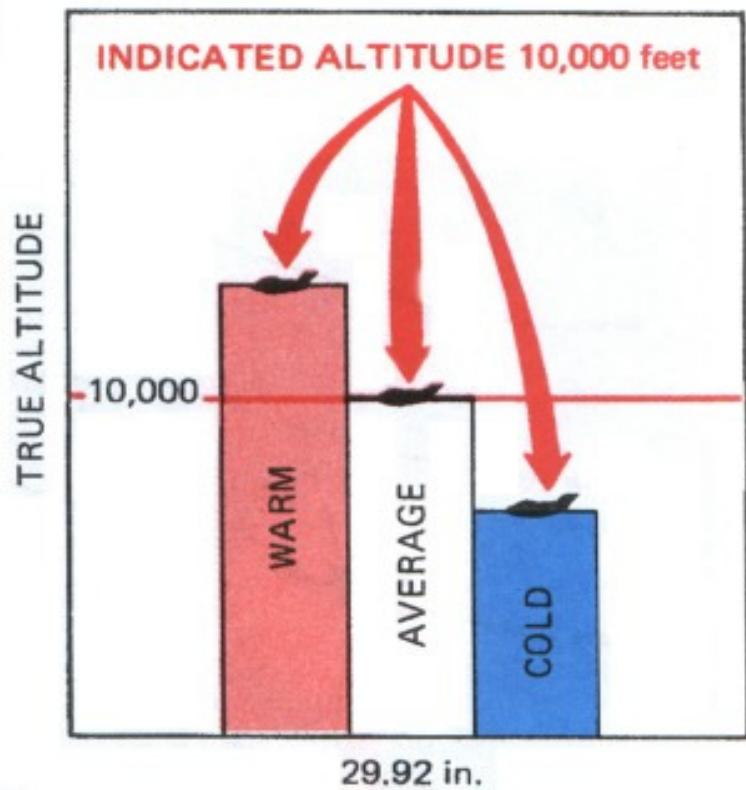
Static Port



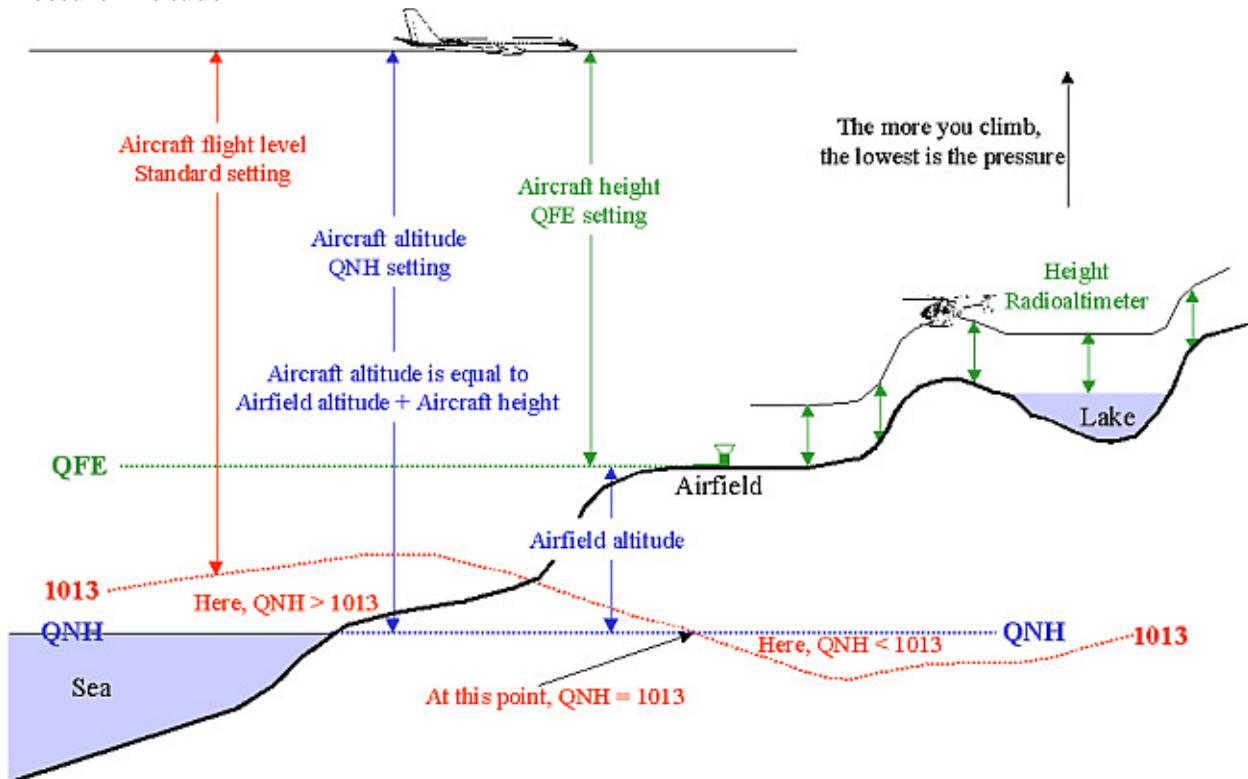
V-Speeds



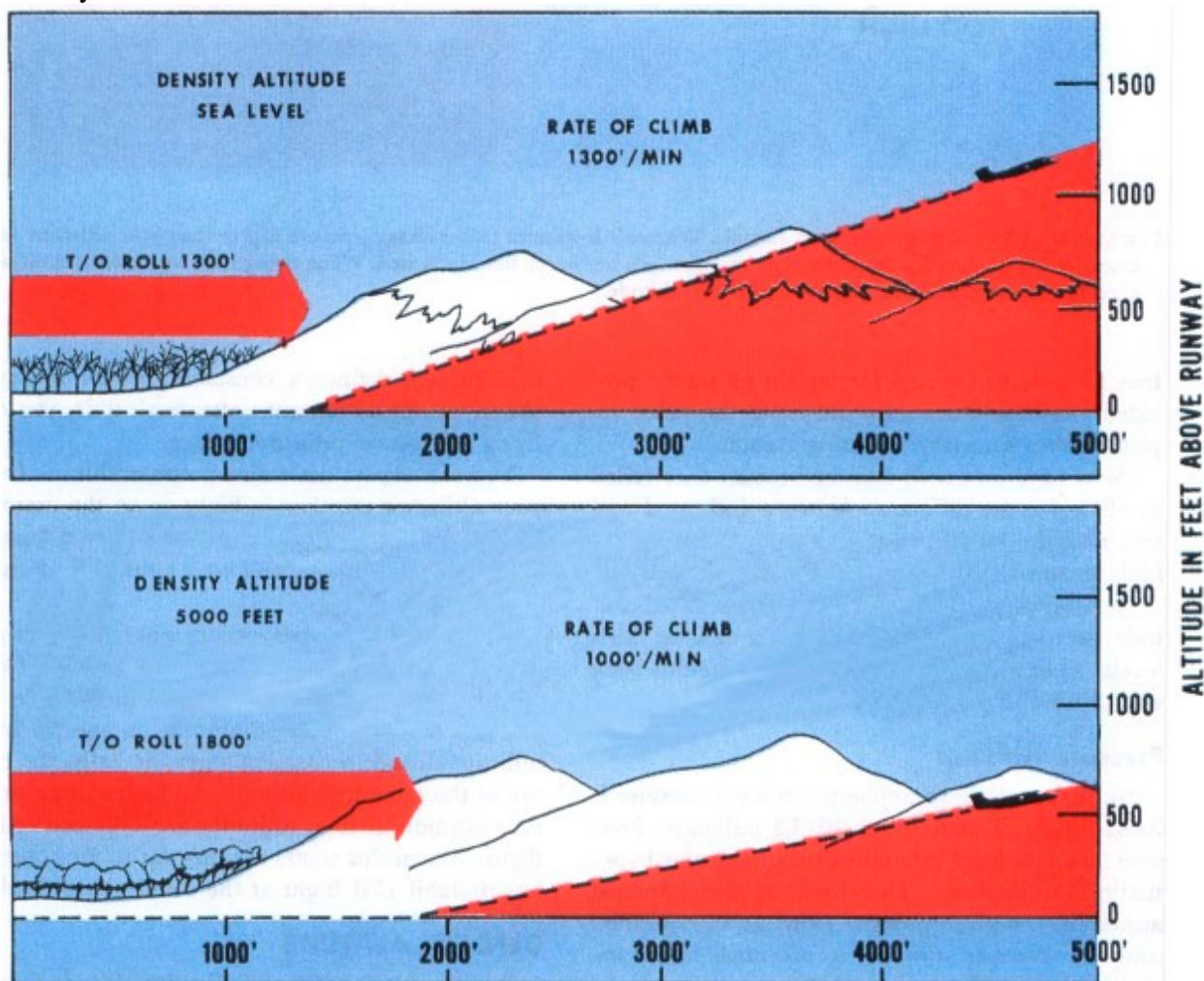
Indicated Altitude



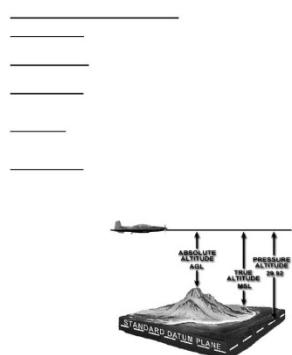
Pressure Altitude



Density Altitude



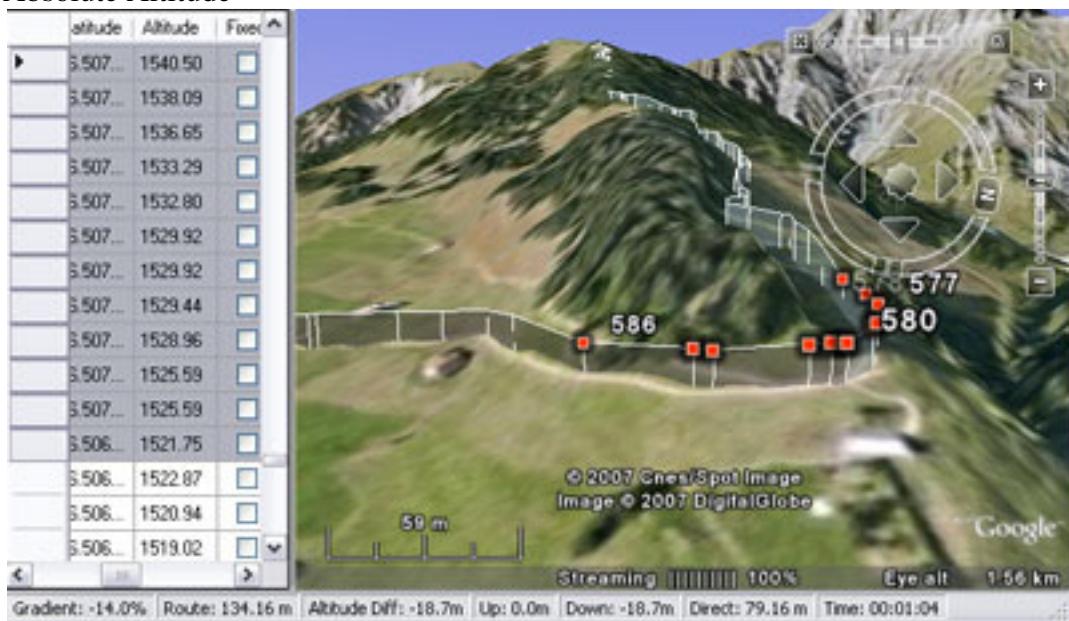
Calibrated Altitude



True Altitude

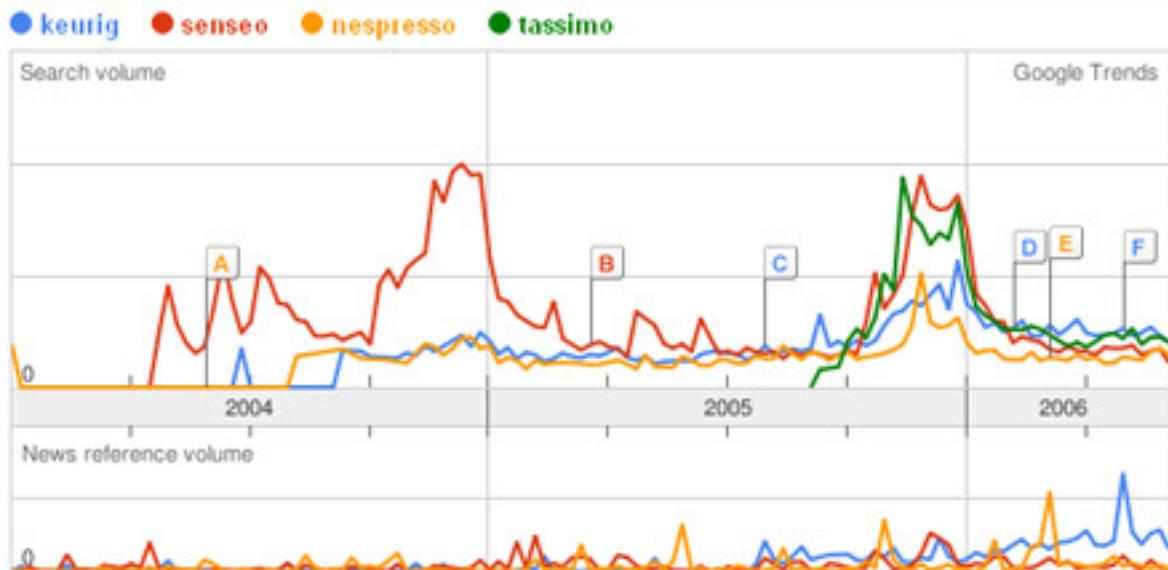


Absolute Altitude



Trend Information

Trend history



Rate Information

5 year survival rates

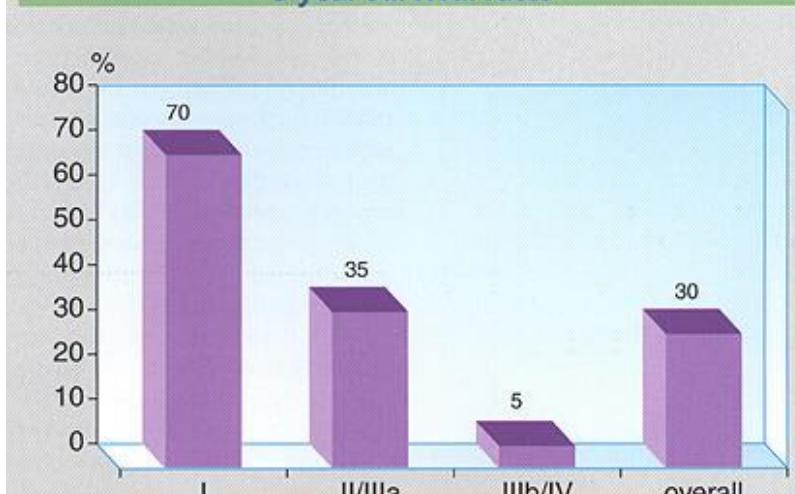
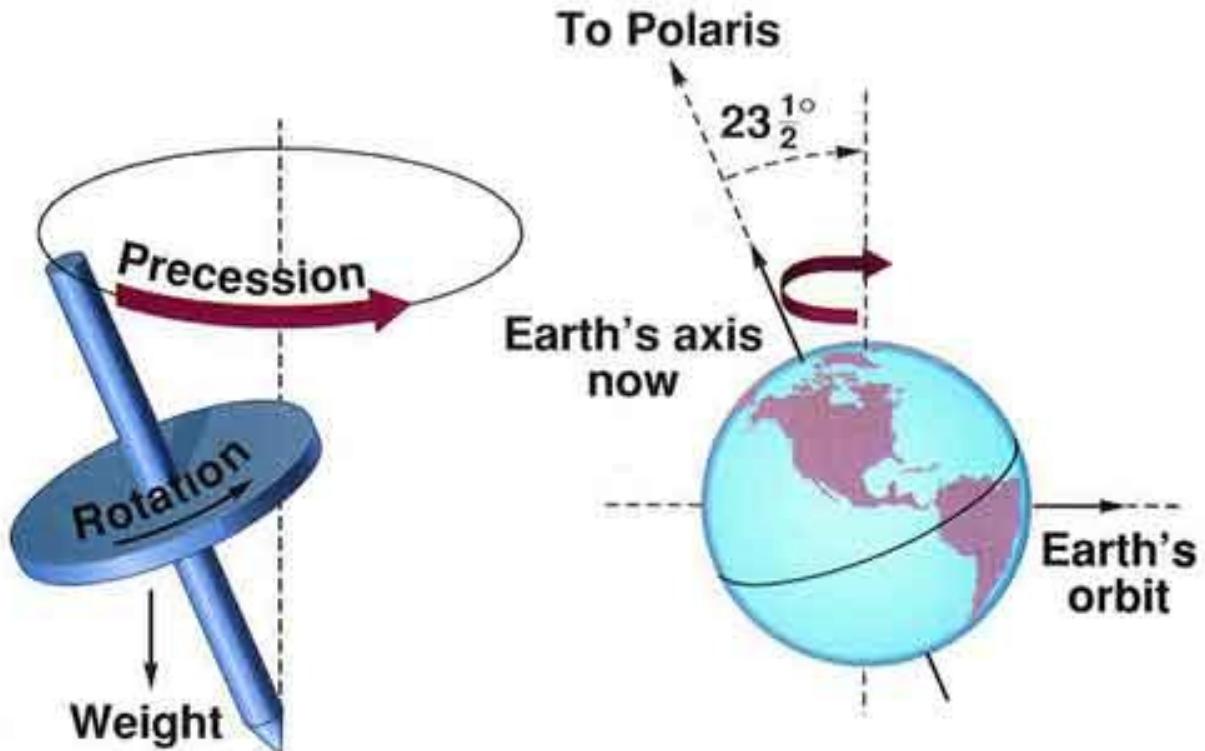


Fig. 1: 5 year survival rates in patients with lung cancer ($n = 2.347$) depending on the stage of disease

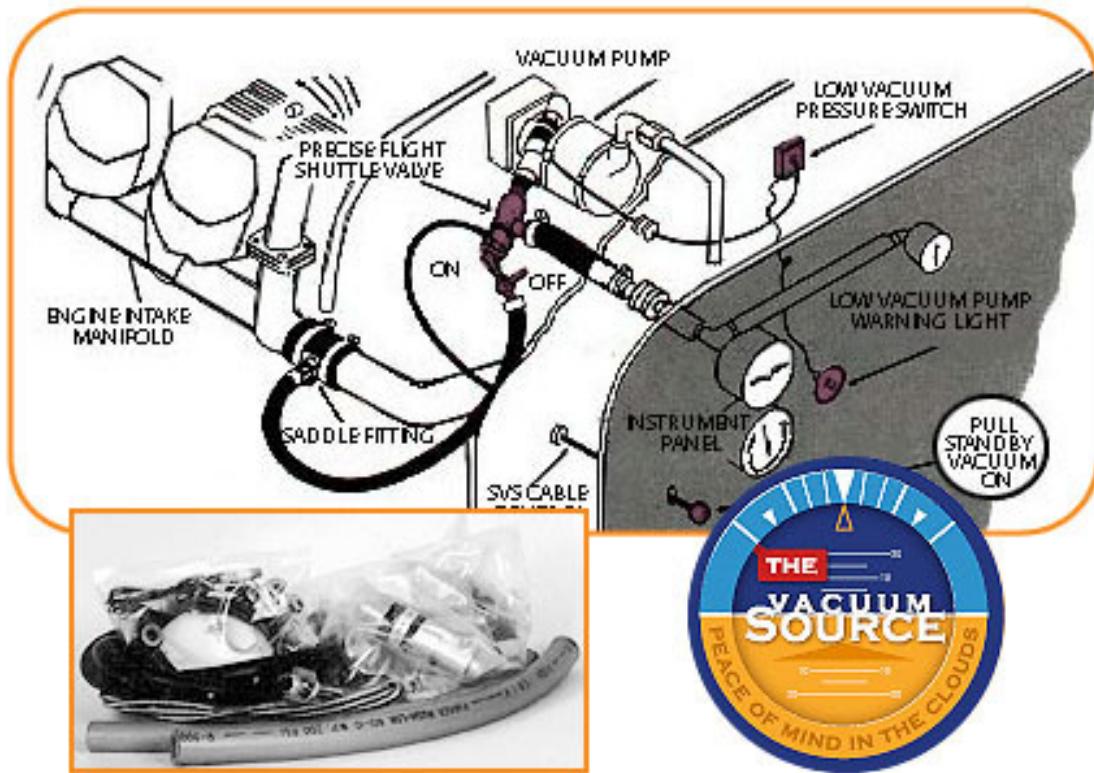
Rigidity in Space



Precession



Vacuum (Suction) System

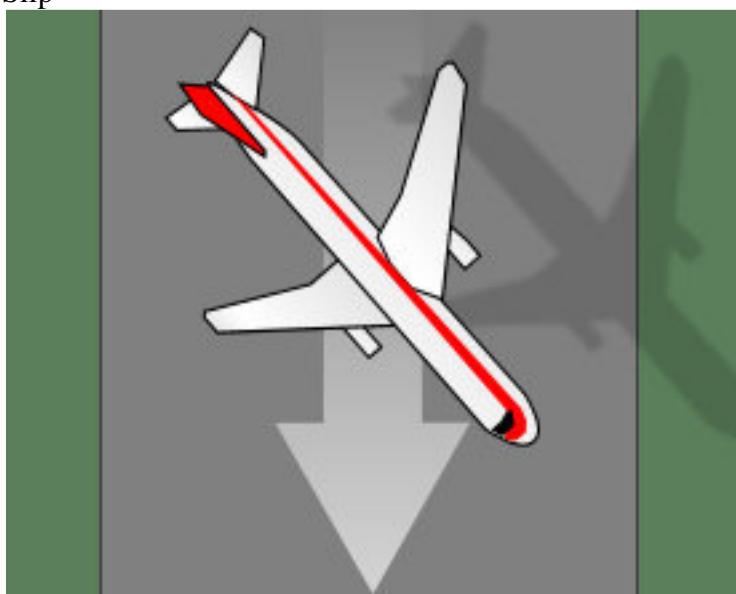


Standard-Rate Turn



Coordinated Turn

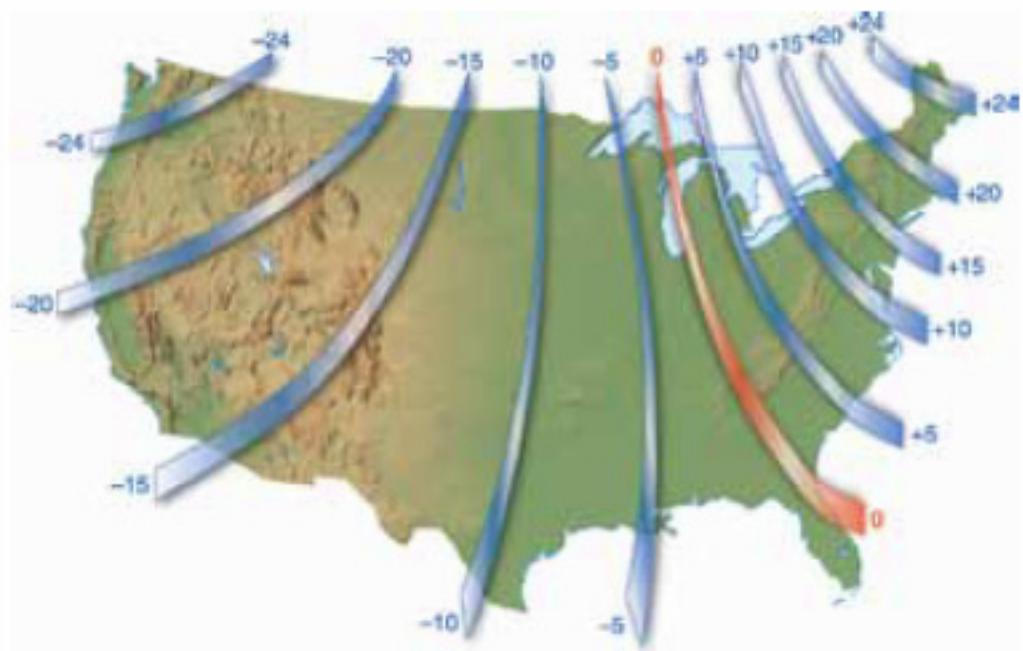
Slip



Skid



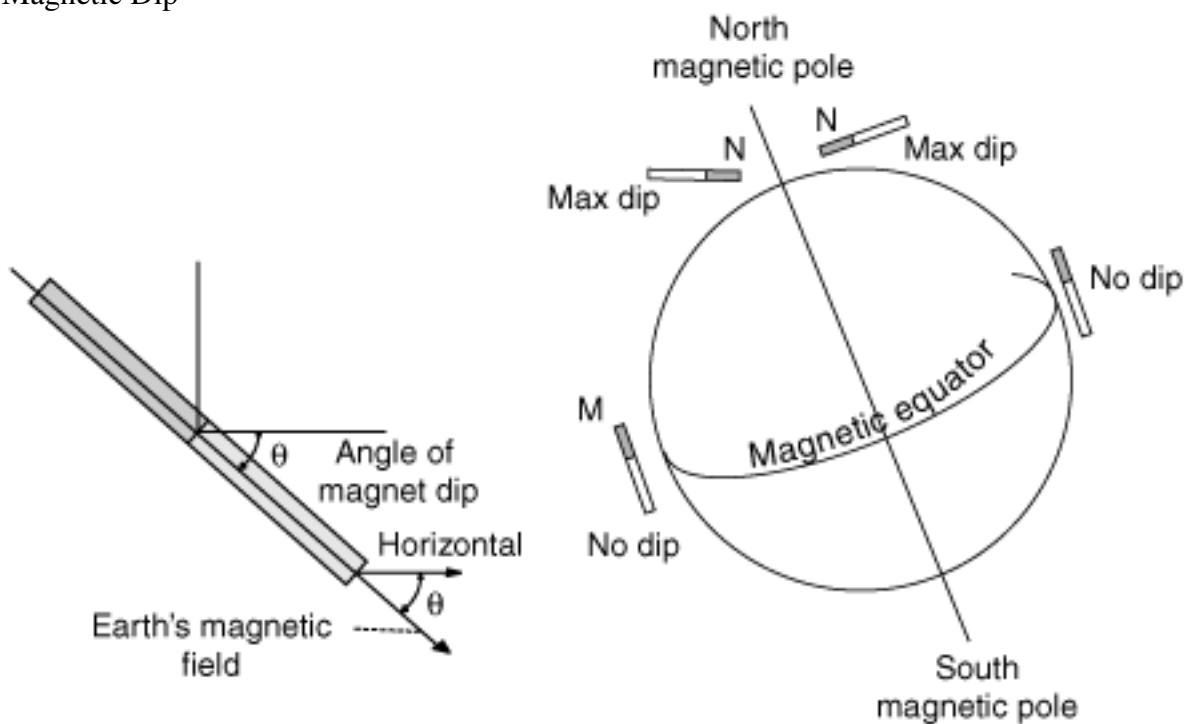
Variation



Deviation



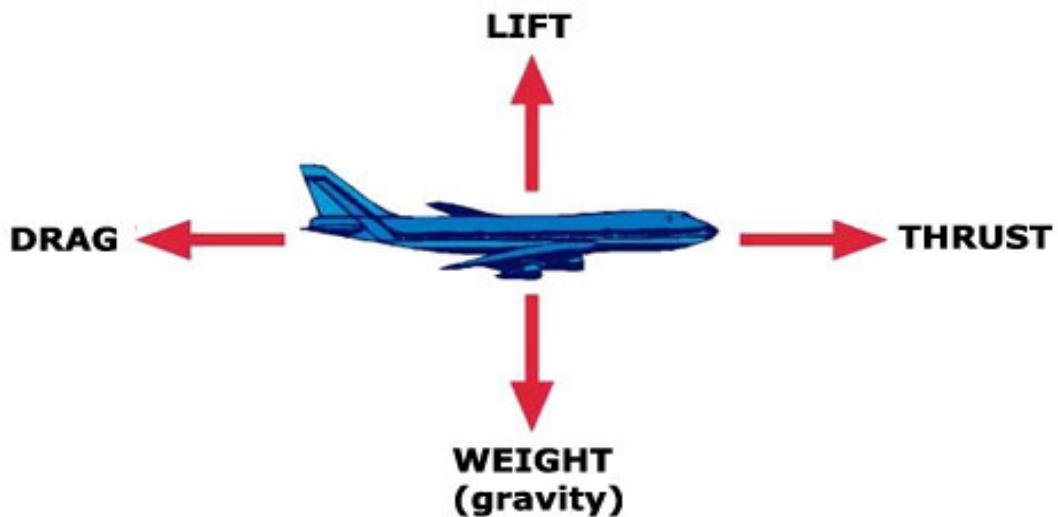
Magnetic Dip



Section 3

Part 1

Lift
Weight
Thrust
Drag

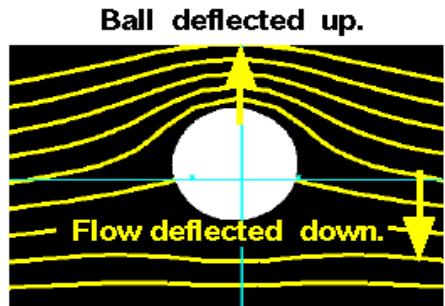
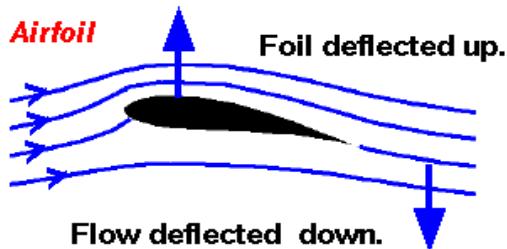




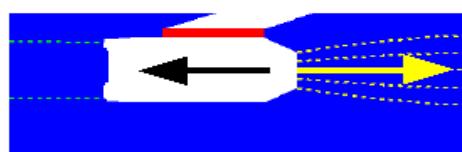
Newton's Third Law Applied to Aerodynamics

Glenn
Research
Center

For every action, there is an equal and opposite re-action.



Engine pushed forward.

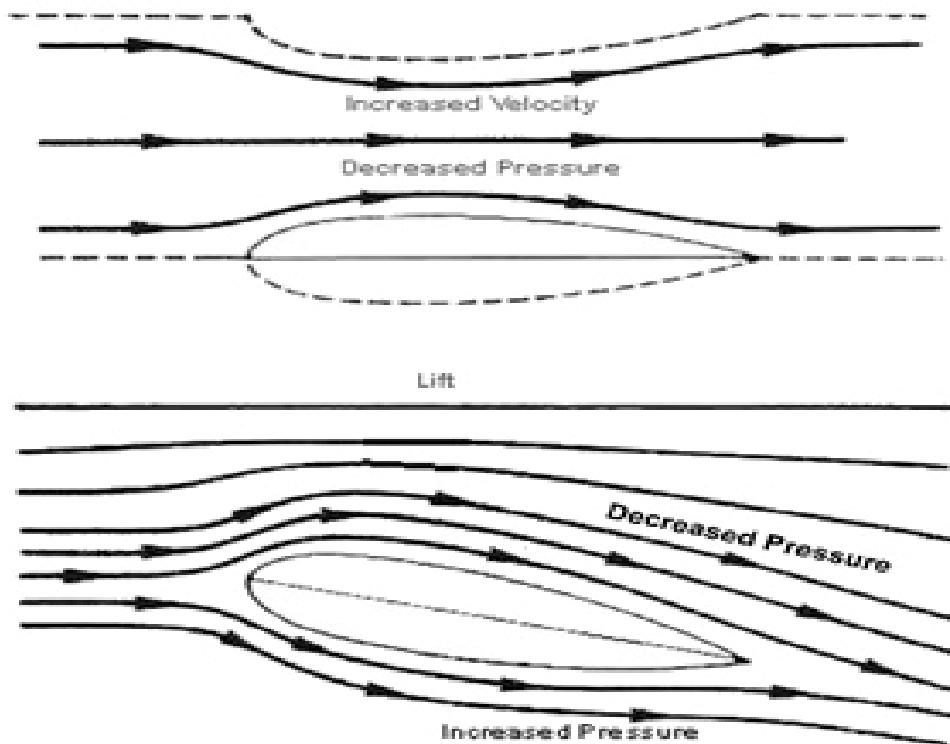


Flow pushed backward.

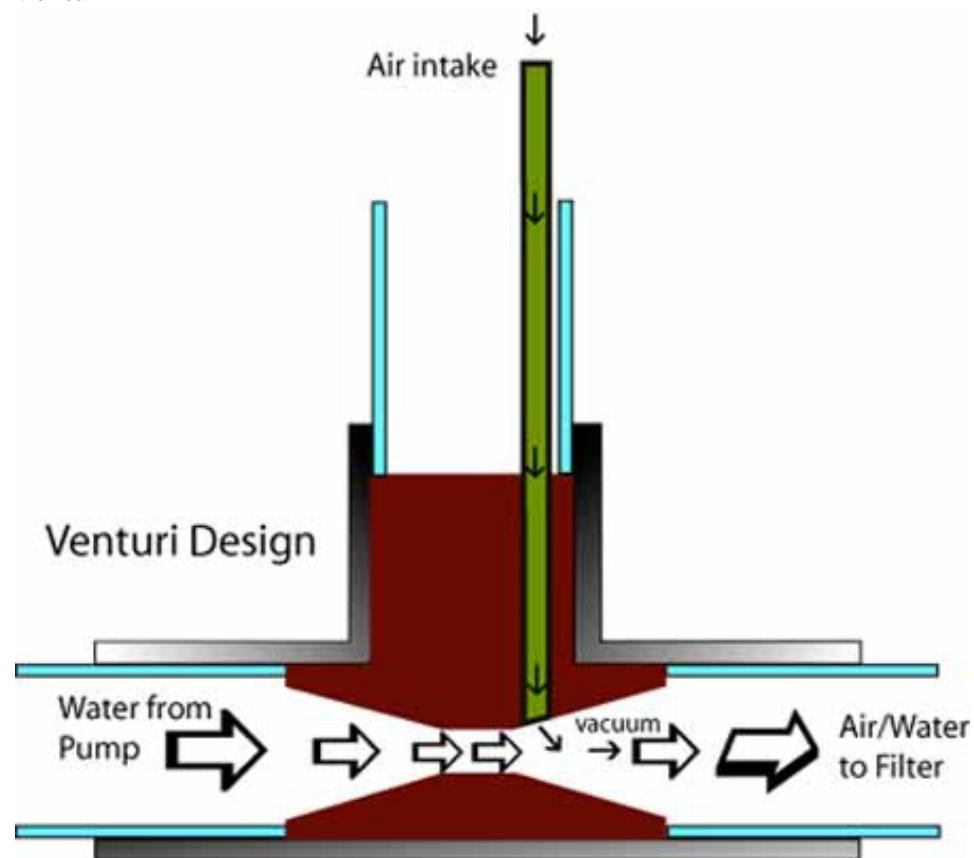
Jet Engine

Spinning Ball

Bernoulli's Principle



Venturi



Airfoil



FLAT BOTTOM AIRFOIL

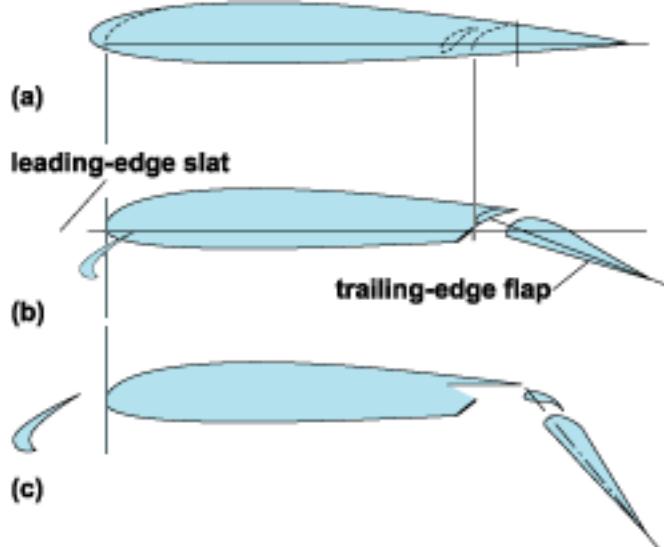


SEMI-SYMMETRICAL AIRFOIL

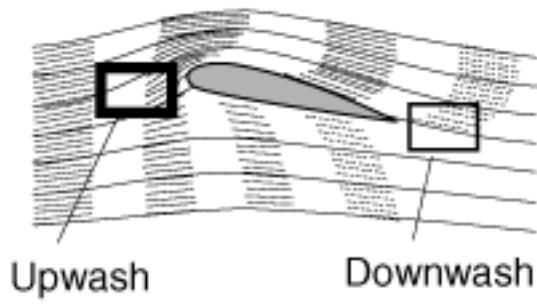


SYMMETRICAL AIRFOIL

Leading Edge
Trailing Edge

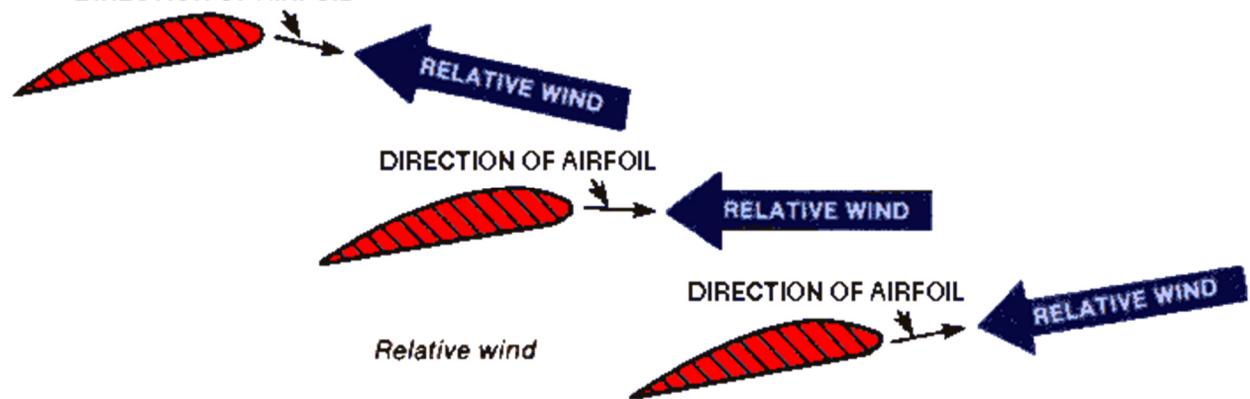


Upwash
Downwash

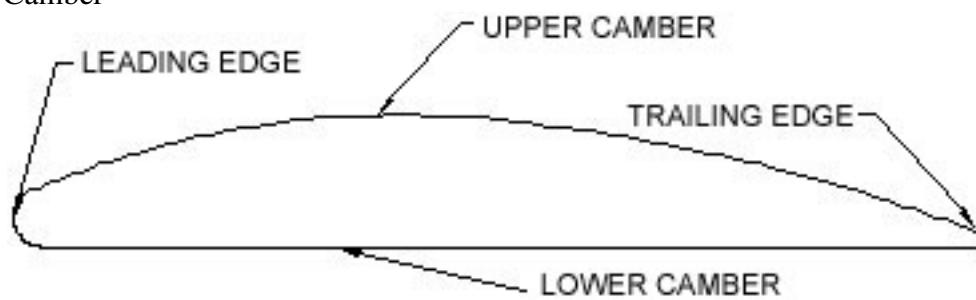


Relative Wind

DIRECTION OF AIRFOIL



Camber



Chord Line

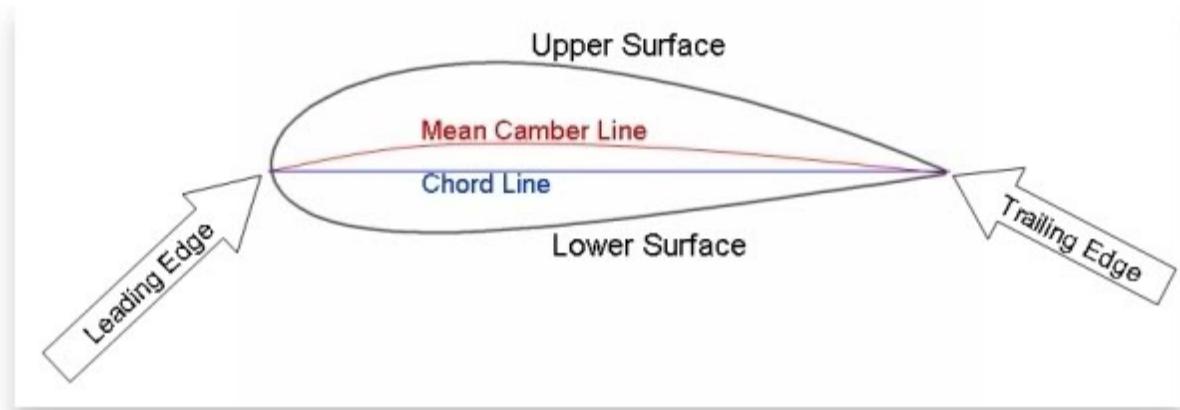
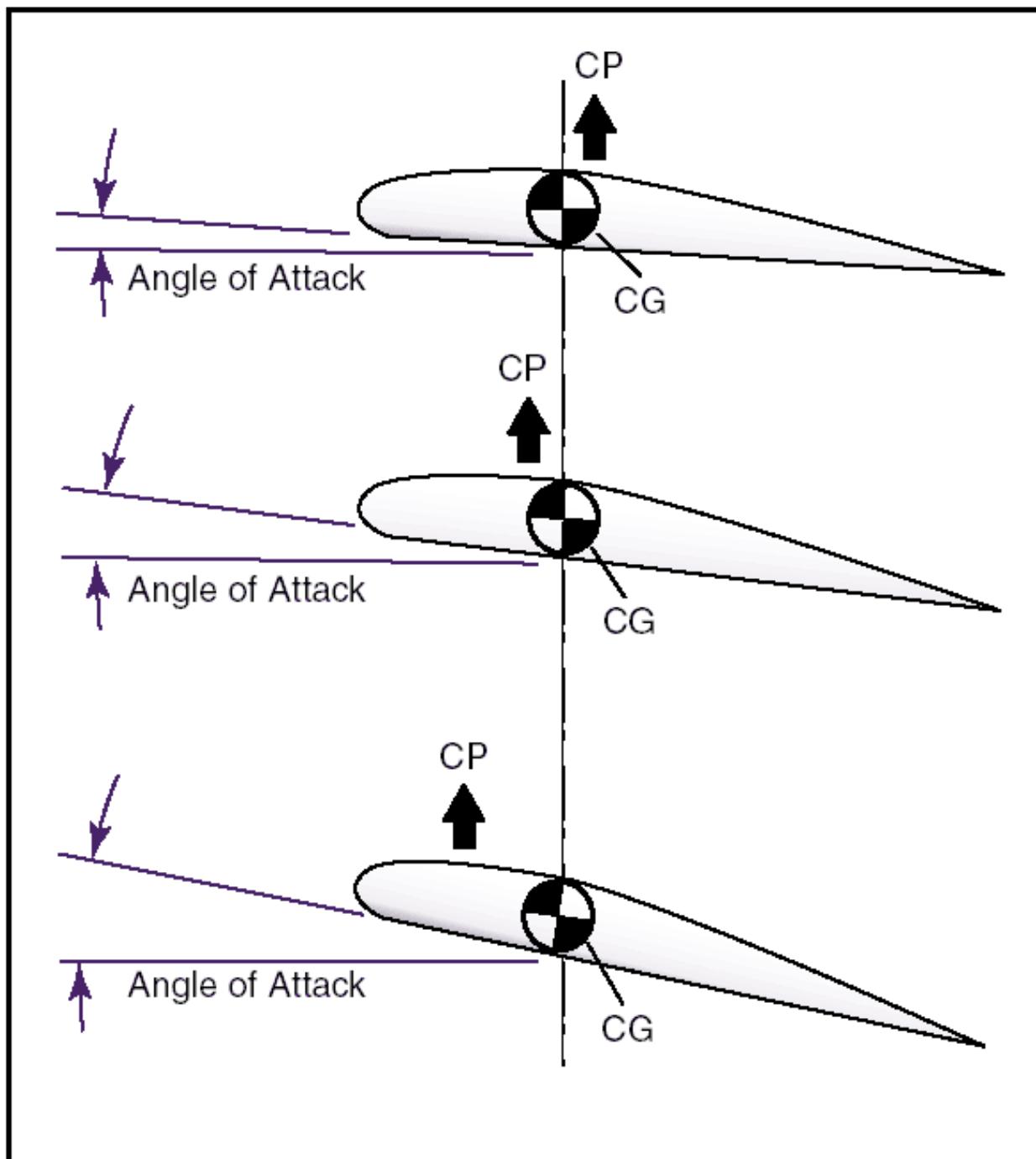


FIGURE 3

Angle of Attack



Coefficient of Lift



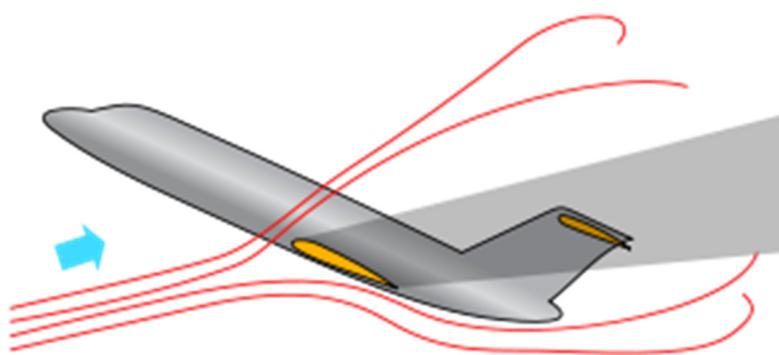
The Lift Coefficient



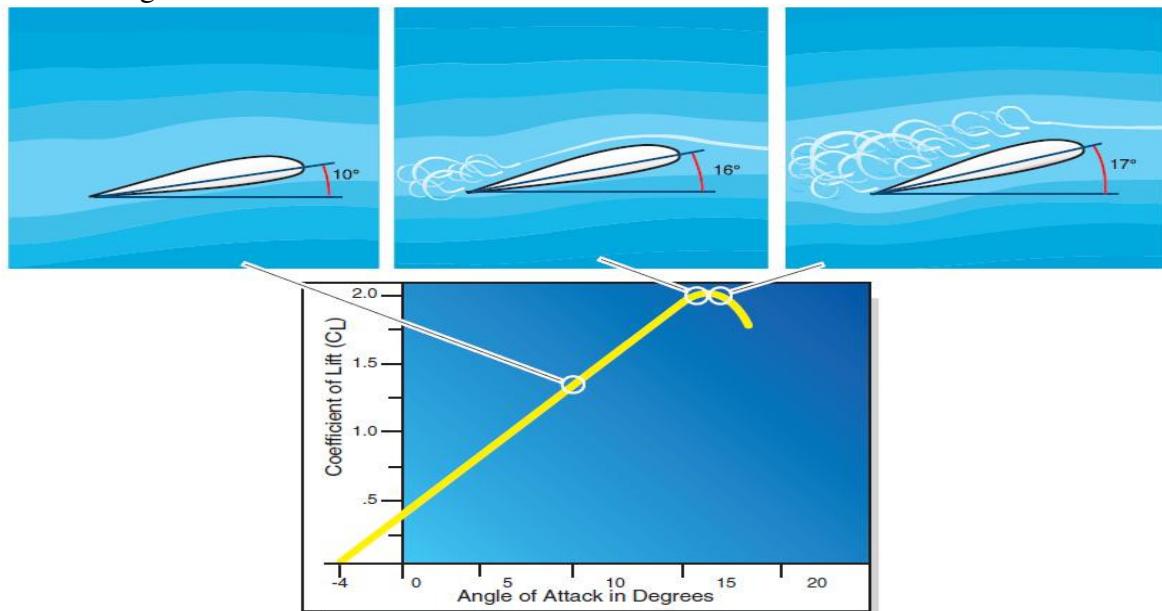
$$C_L = \frac{L}{\rho V^2 A / 2}$$

**CL contains all the complex dependencies
and is usually determined experimentally.**

Stall

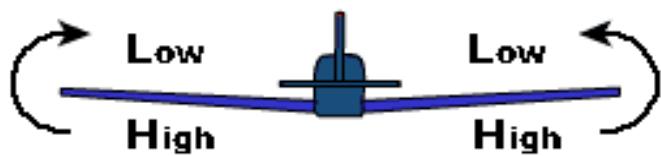


Critical Angle of Attack



Aspect Ratio

Low Aspect Ratio Wing



High Aspect Ratio Wing

Wing Area

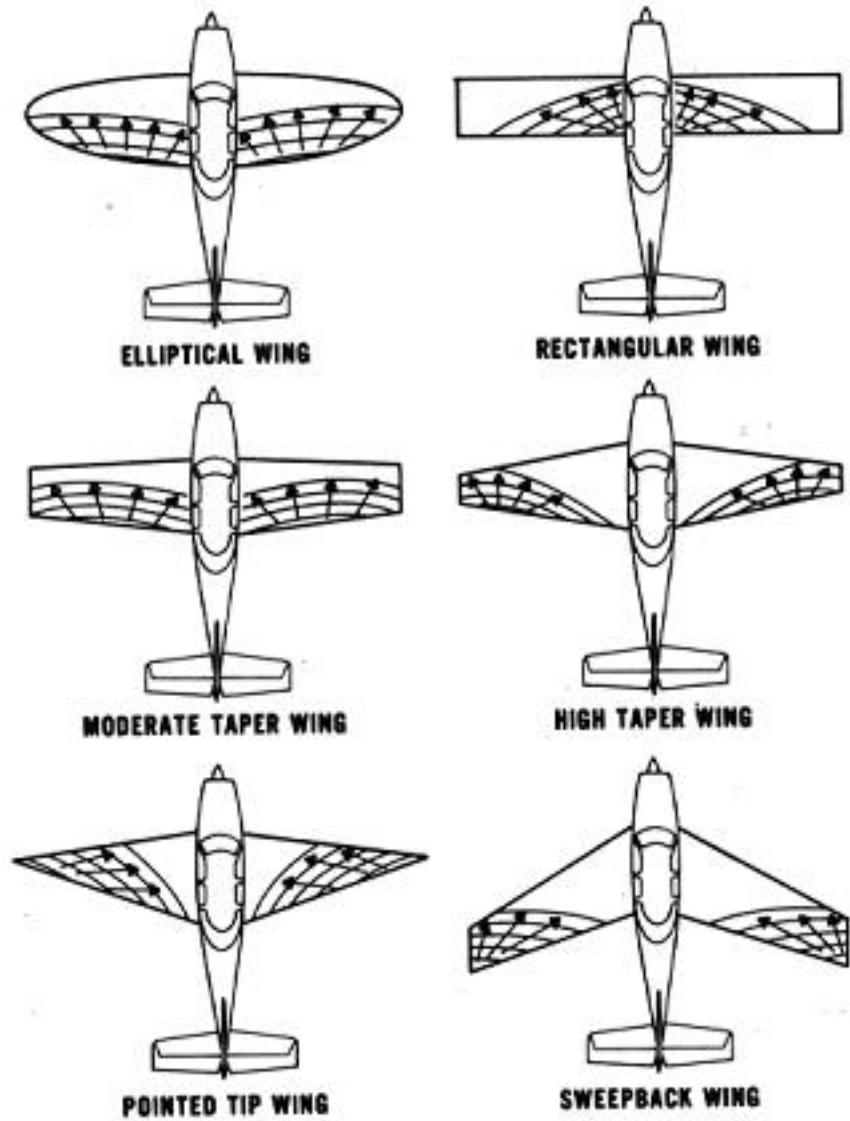
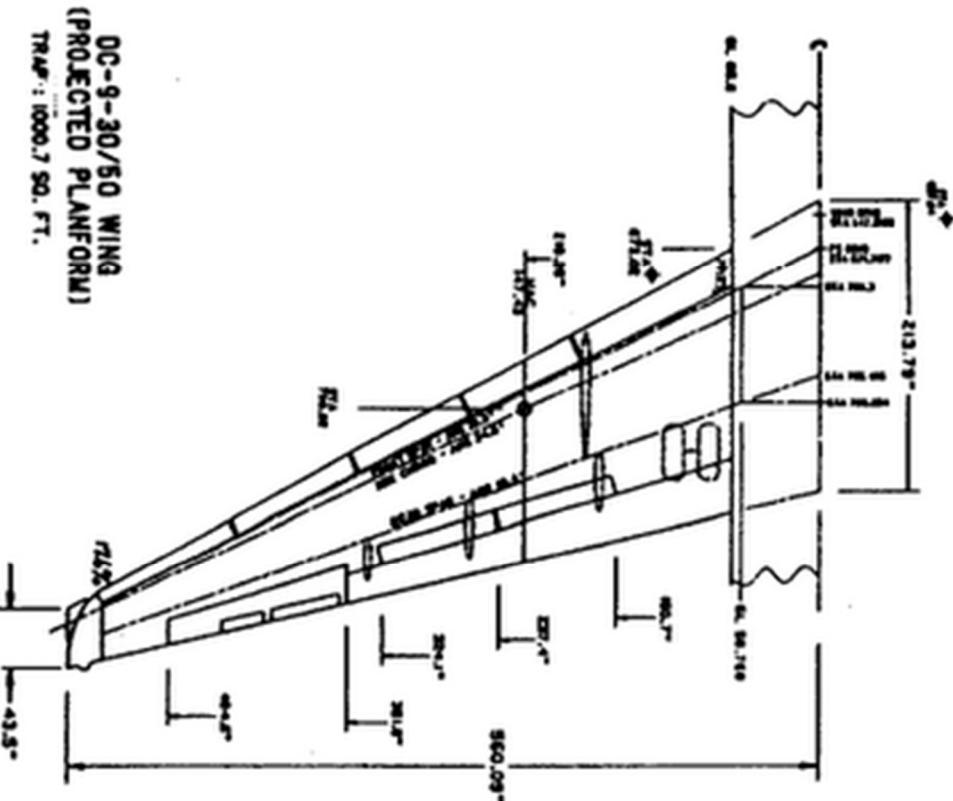


Figure 17-13 Wing Planforms (Exaggerated)

Planform



Angle of Incidence

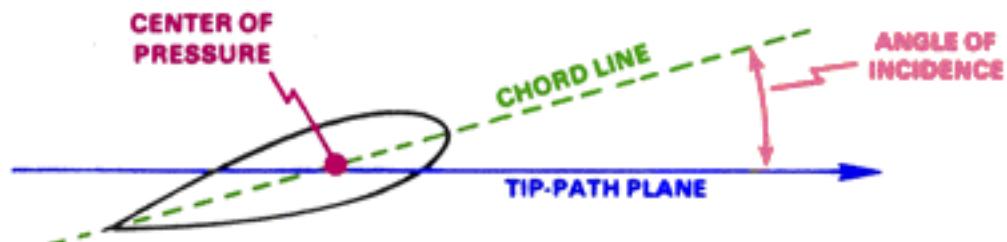
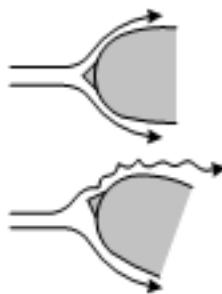


FIGURE 2-17. ANGLE OF INCIDENCE.

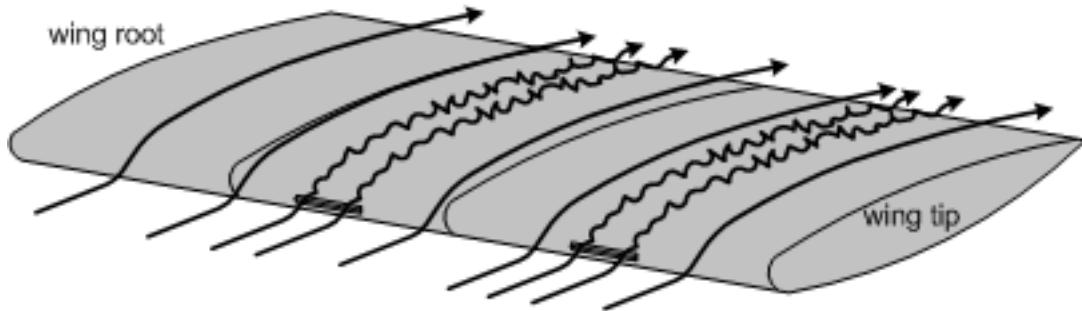
Stall Strips

Stall strips serve to pacify the stall characteristics of an air foil. As the stall is approached, early warning of the stalled condition is produced by the appearance of turbulent flow downwind of the stall strip. This avoids the situation where the entire upper surface of the wing stalls simultaneously and with little warning.

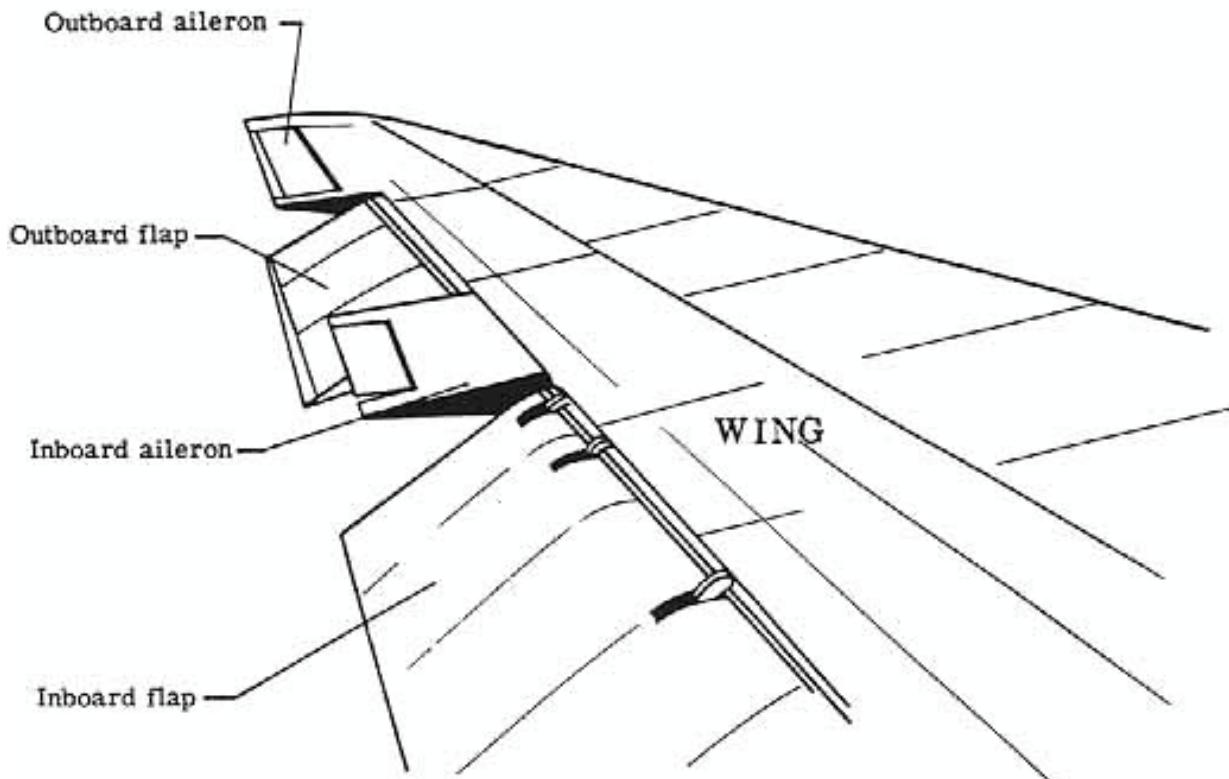


During normal flight, the flow of air above and below the wing is unaffected by the stall strip.

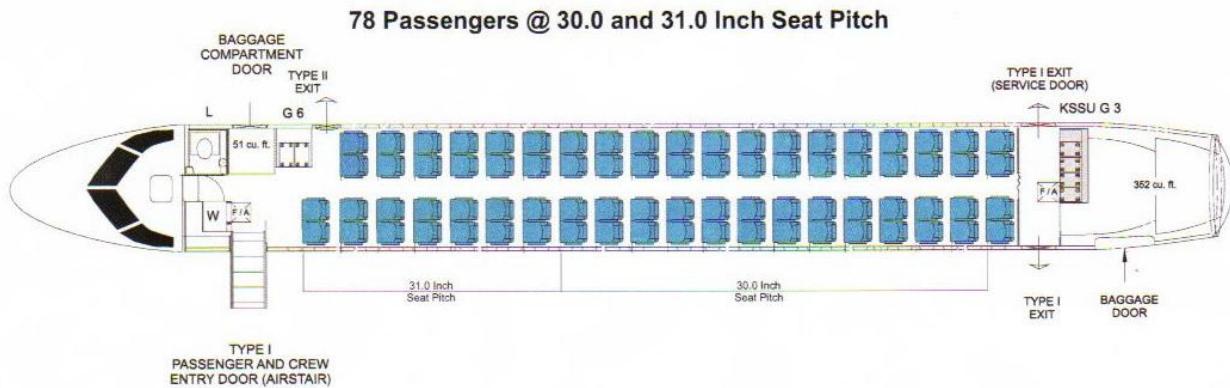
As the critical stall angle is approached, the flow of above the stall strip is prematurely converted to turbulent flow.



Flaps



Configuration



Plain Flap
Split Flap
Slotted Flap
Fowler Flap

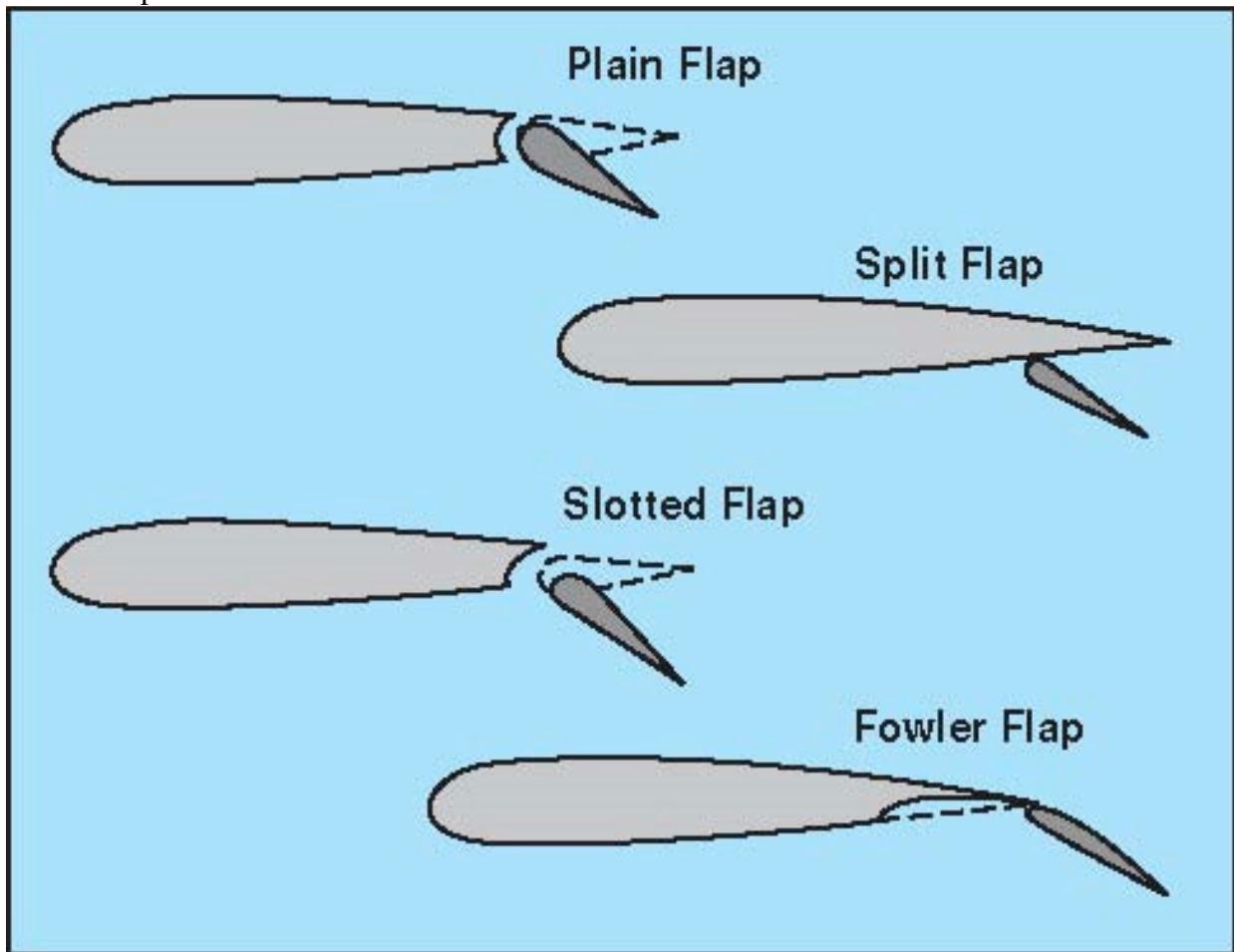


Figure 4-13. Four common types of flaps



Form Drag
Skin Friction Drag

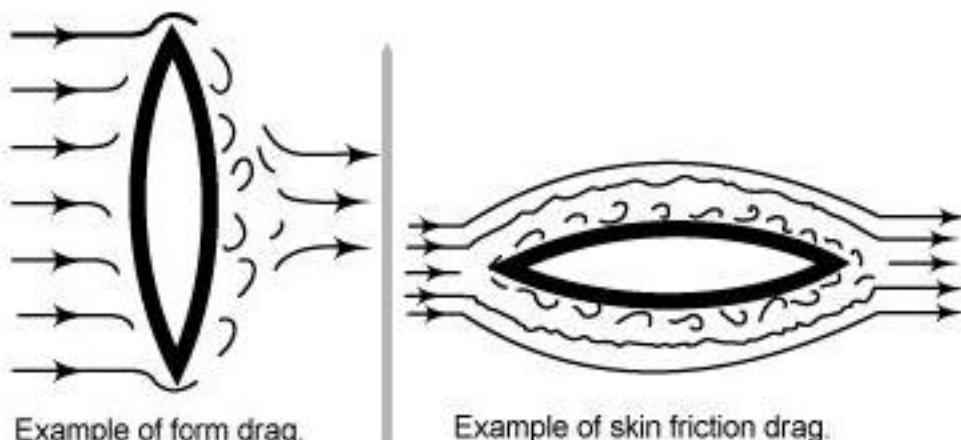
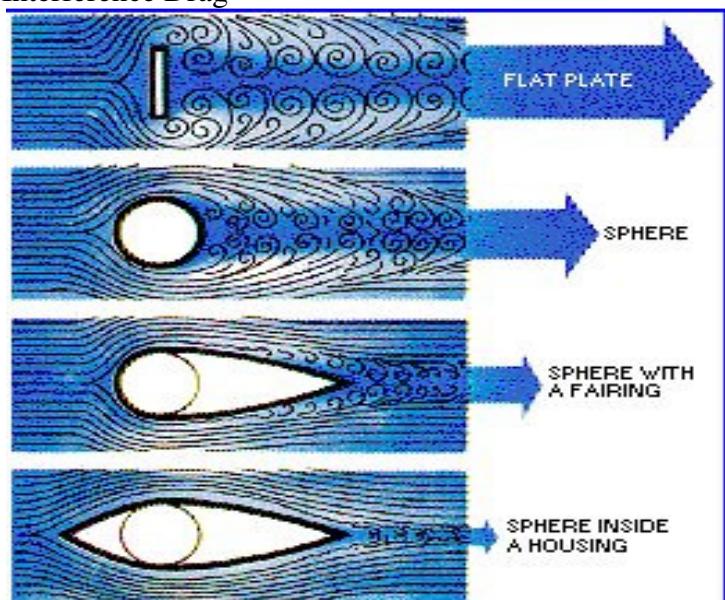
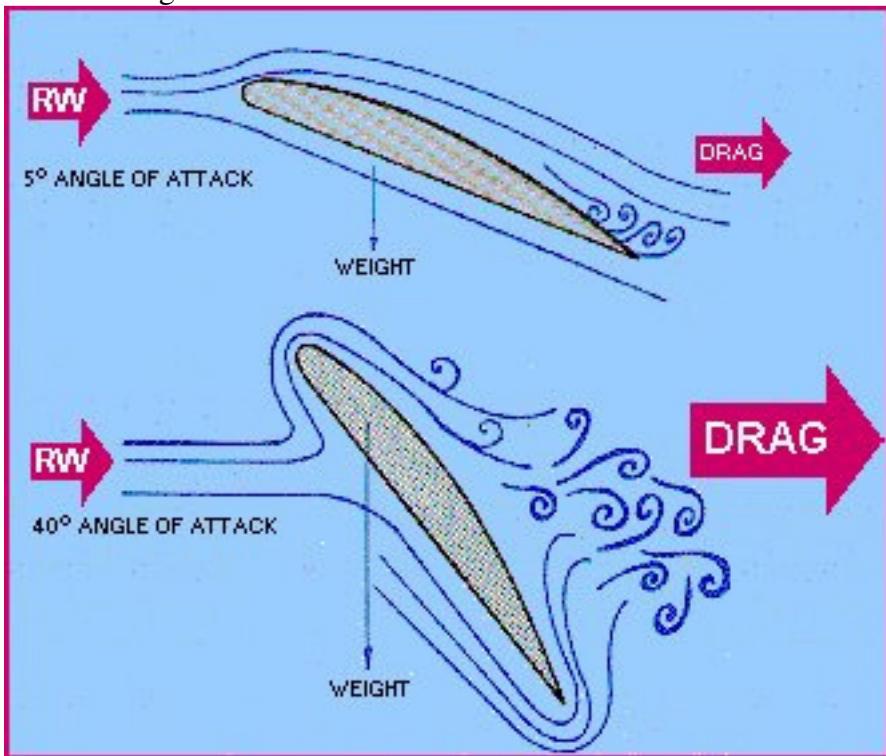


Figure 1-14.—Form drag and skin friction drag.

Interference Drag



Induced Drag



Wingtip Vortices



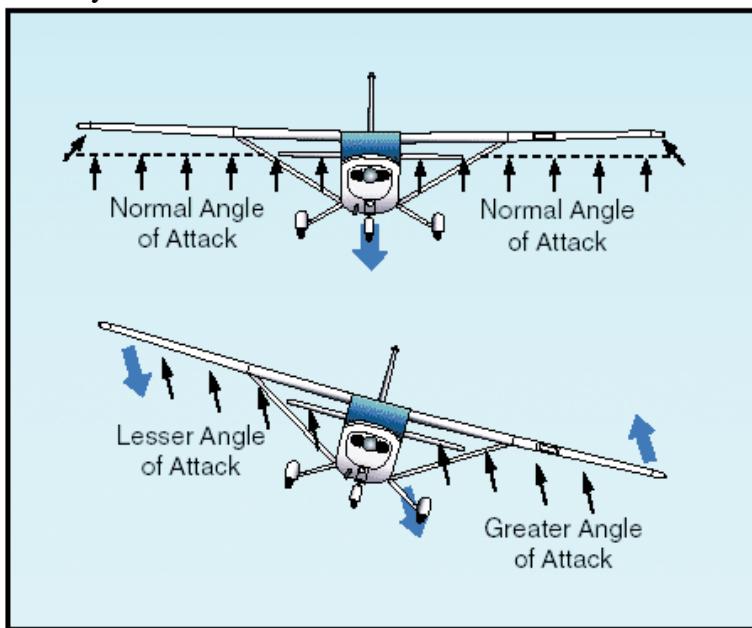
Ground Effect



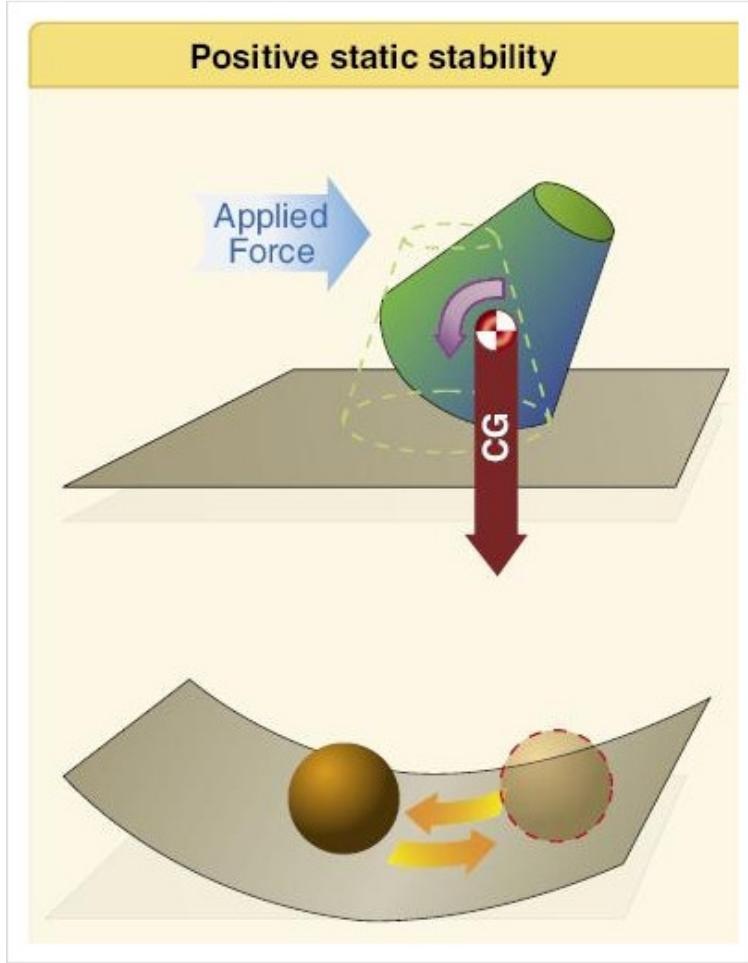
Figure 4-13. Ground effect changes airflow.

Part 2

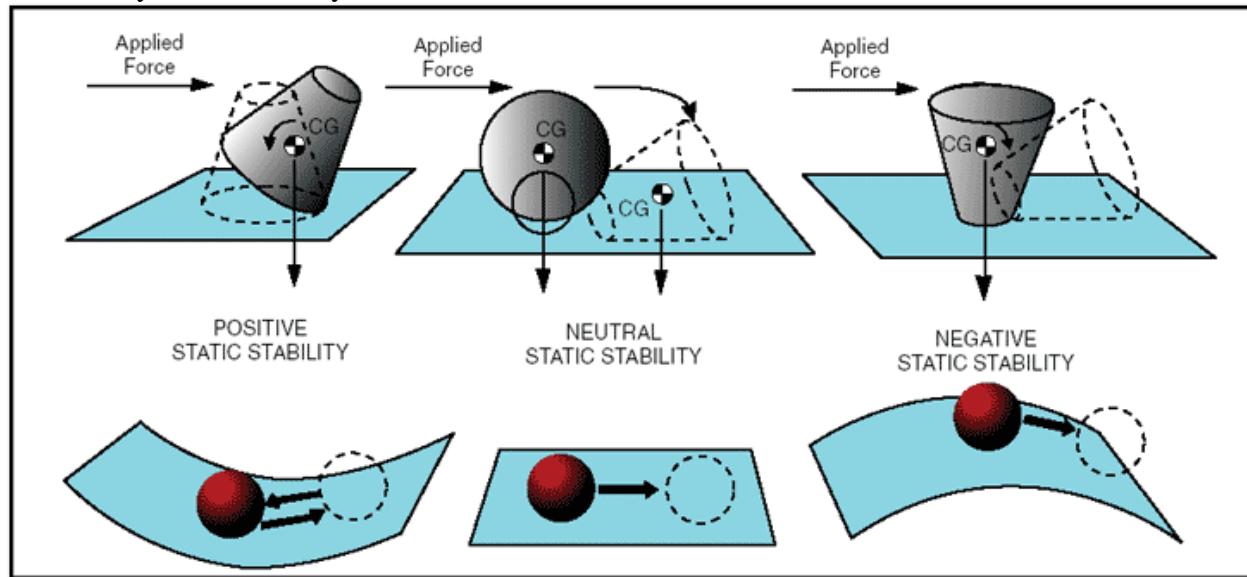
Stability



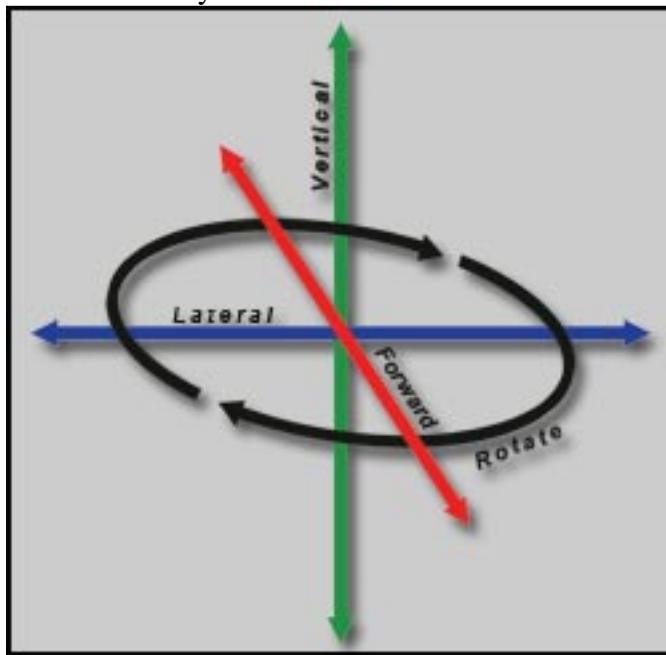
Positive Static Stability



Positive Dynamic Stability



Maneuverability

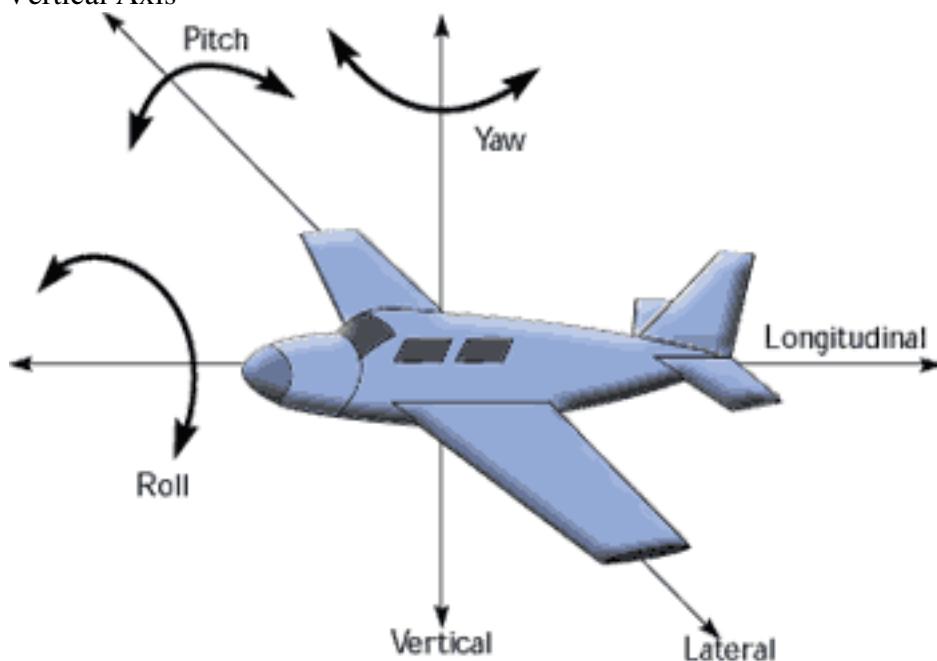


Controllability

Longitudinal Axis

Lateral Axis

Vertical Axis

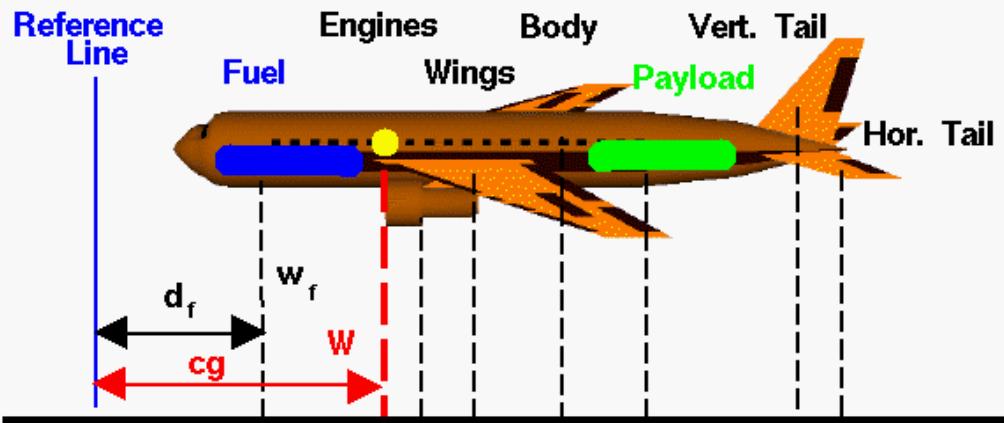




Center of Gravity - cg

Aircraft Application

Glenn
Research
Center



Each component has some weight w_i
located some distance d_i from reference line.

Distance cg times the weight W equals the sum of the
component distance times weight.

$$cg \cdot W = d_f w_f + d_e w_e + d_w w_w + d_p w_p + \dots$$

$$cg \cdot W = \sum_{i=1}^n (wd)_i$$

Longitudinal Stability

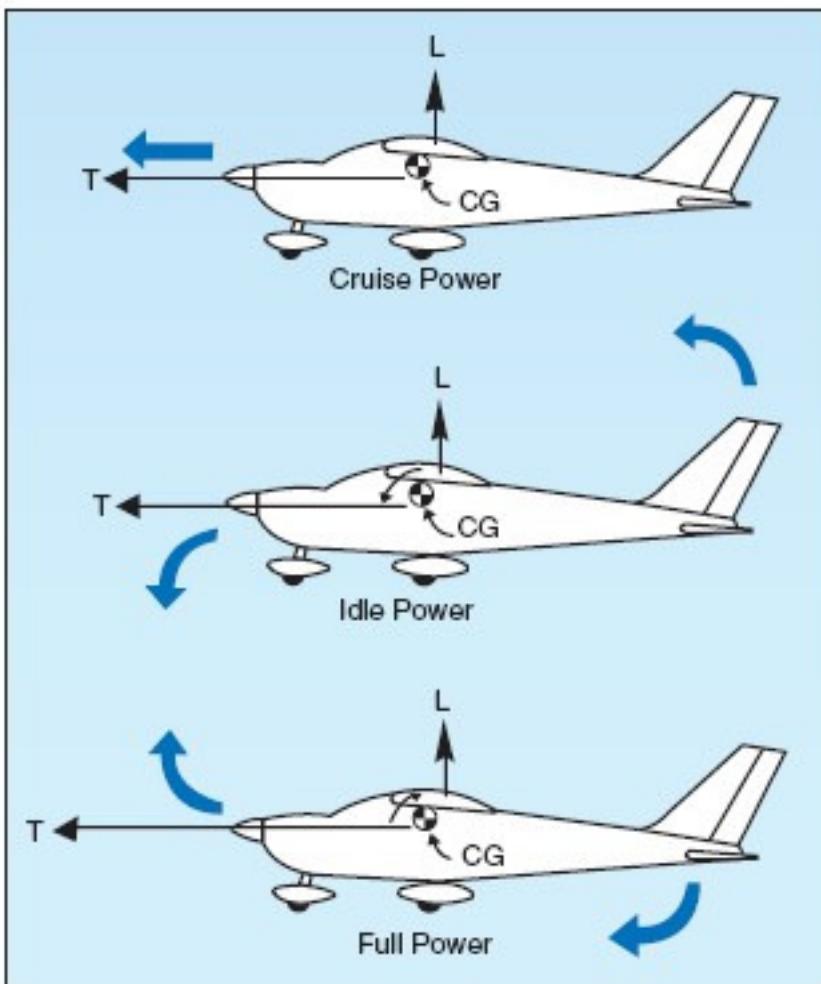
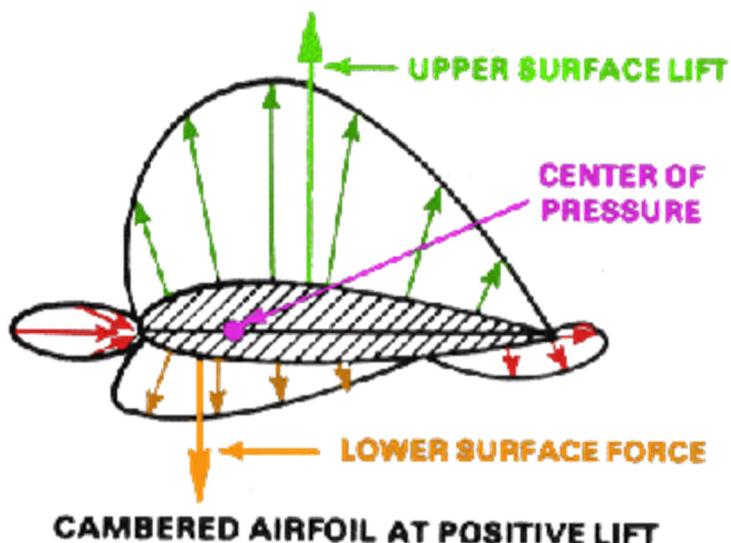


Figure 3-16. Power changes affect longitudinal stability.

Center of Pressure



Center of Lift

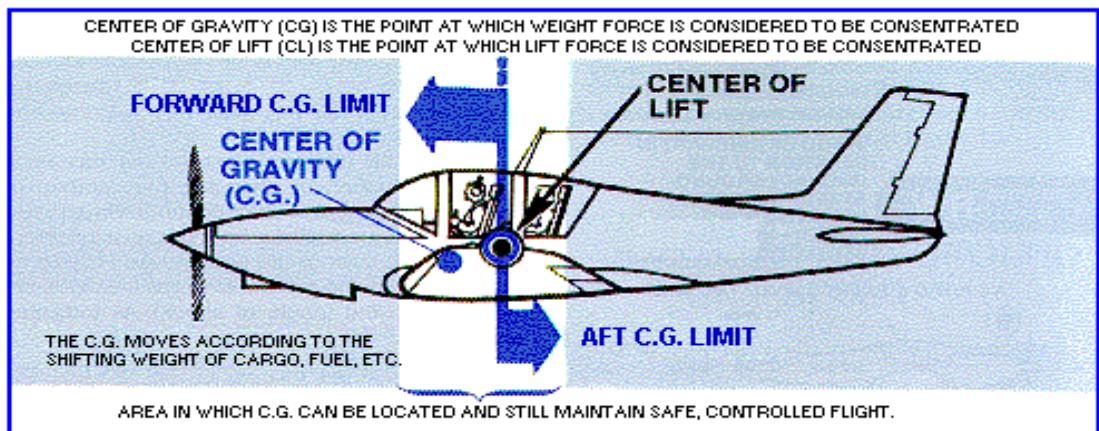
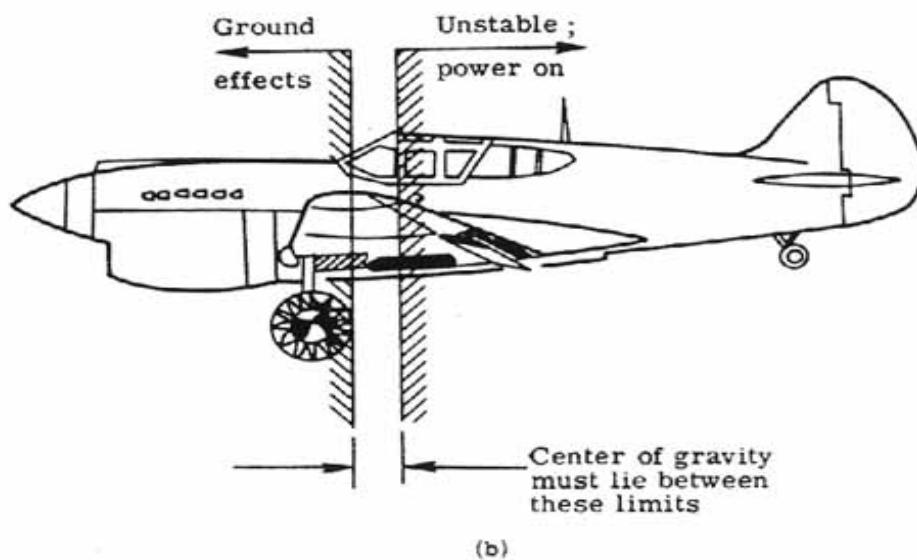
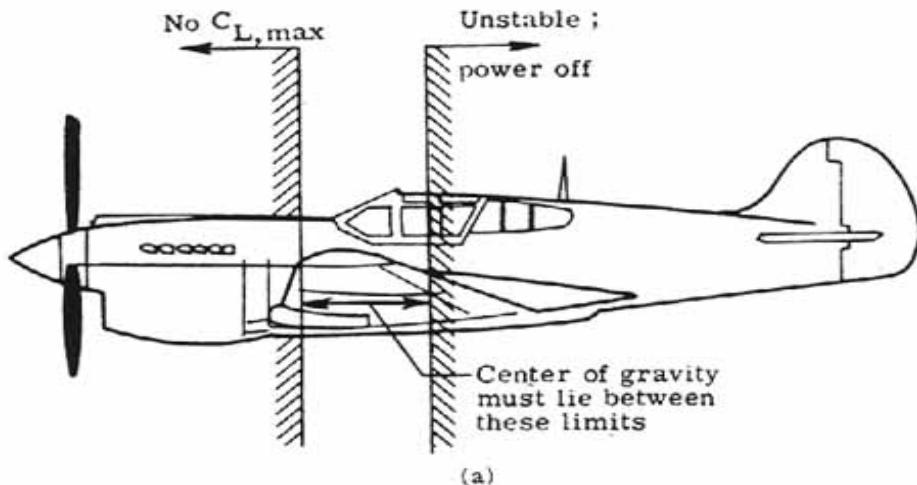
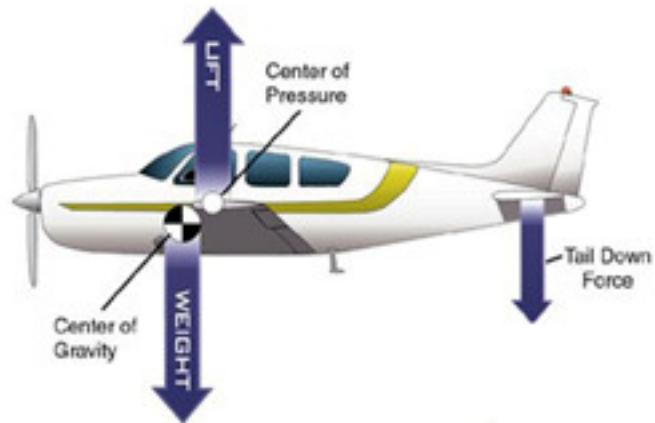


Figure 4-6 Center of gravity and center of lift.

CG Range



Tail-Down Force



© Jeppesen Sanderson, Inc. 2002 All Rights Reserved
Guided Flight Discovery Private Pilot Manual

Thrustline

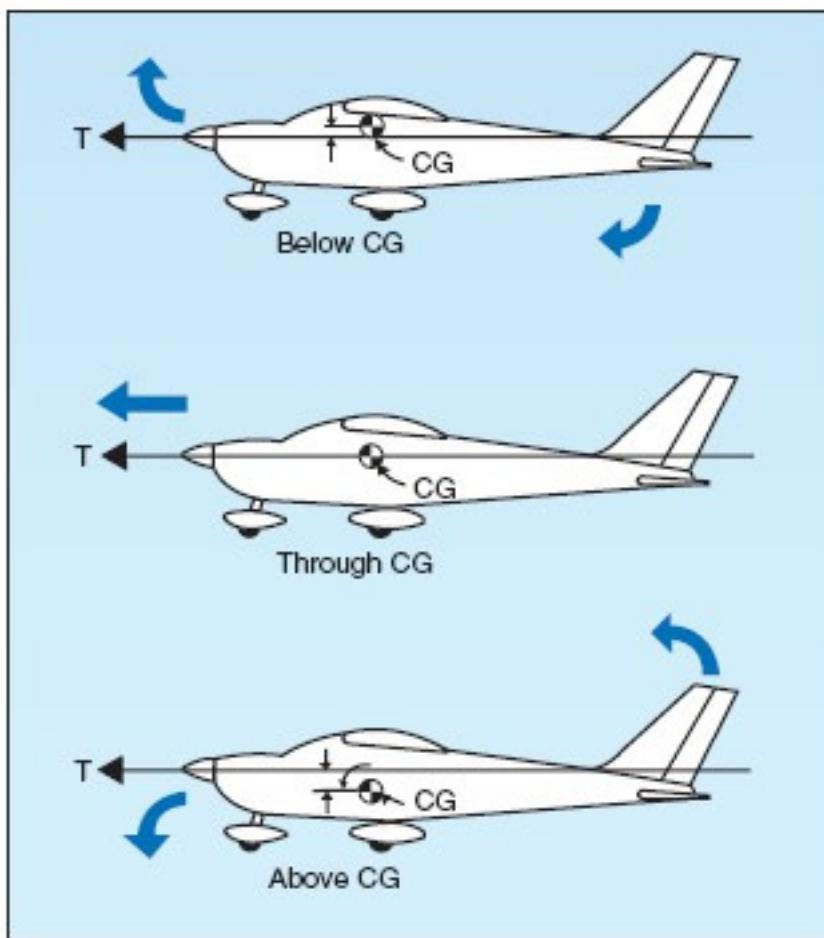
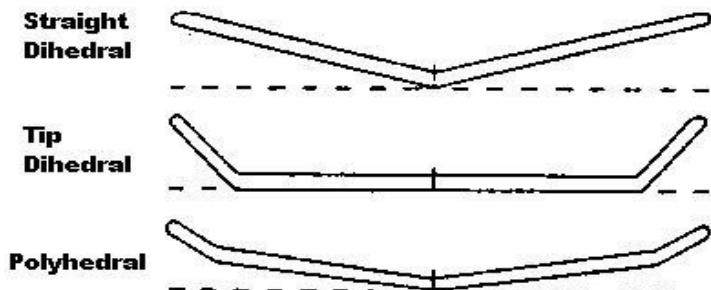
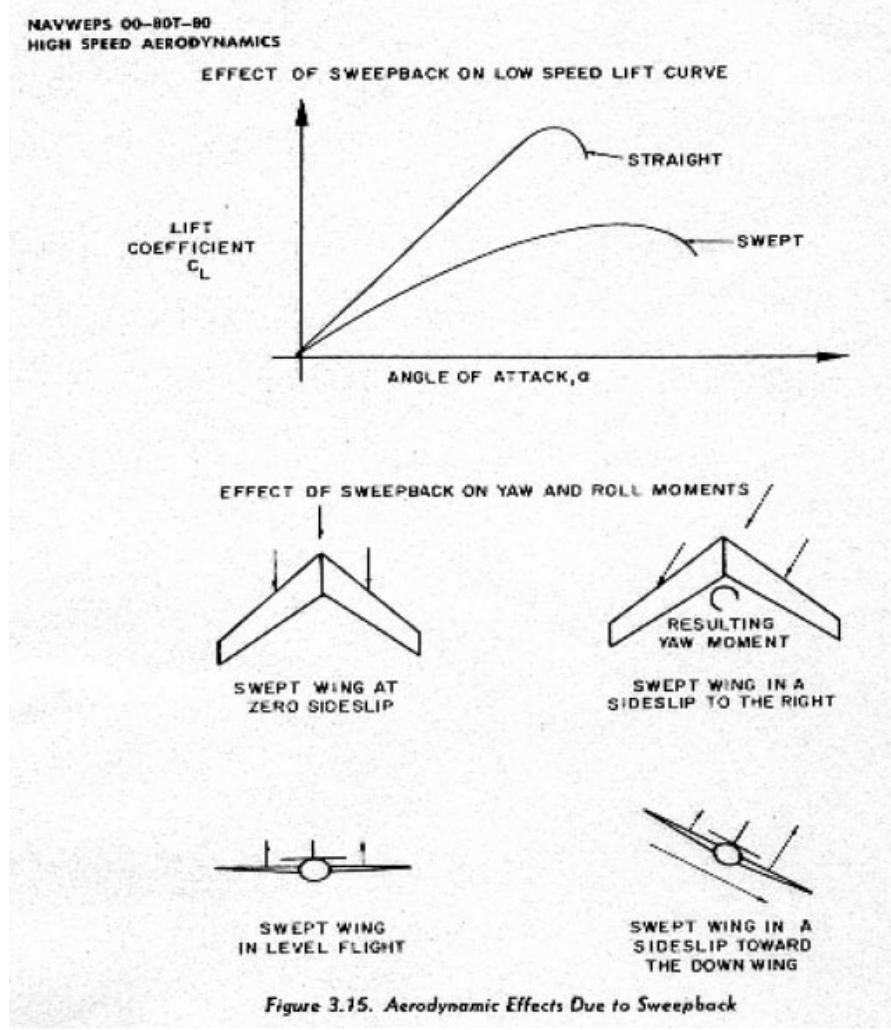


Figure 3-15. Thrust line affects longitudinal stability.

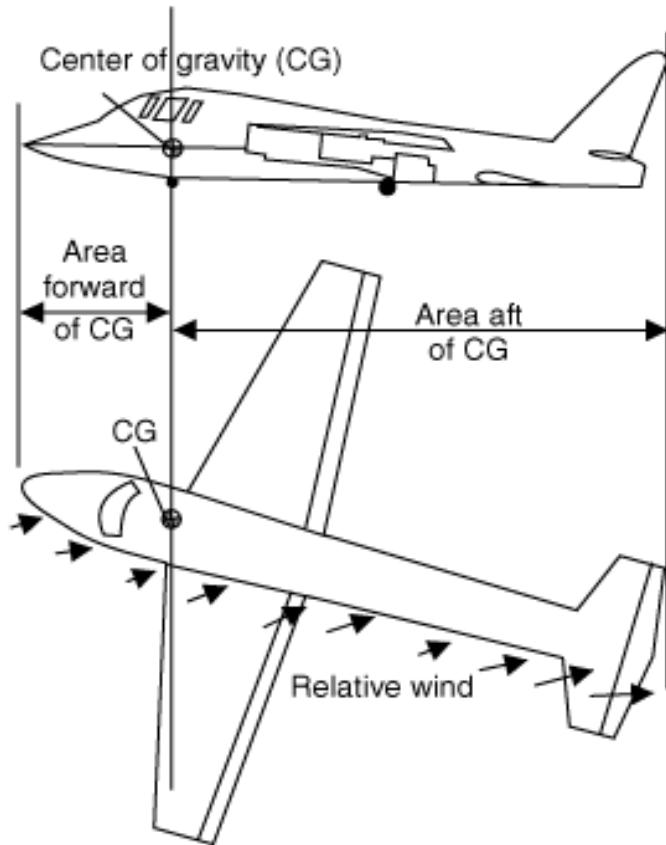
Dihedral



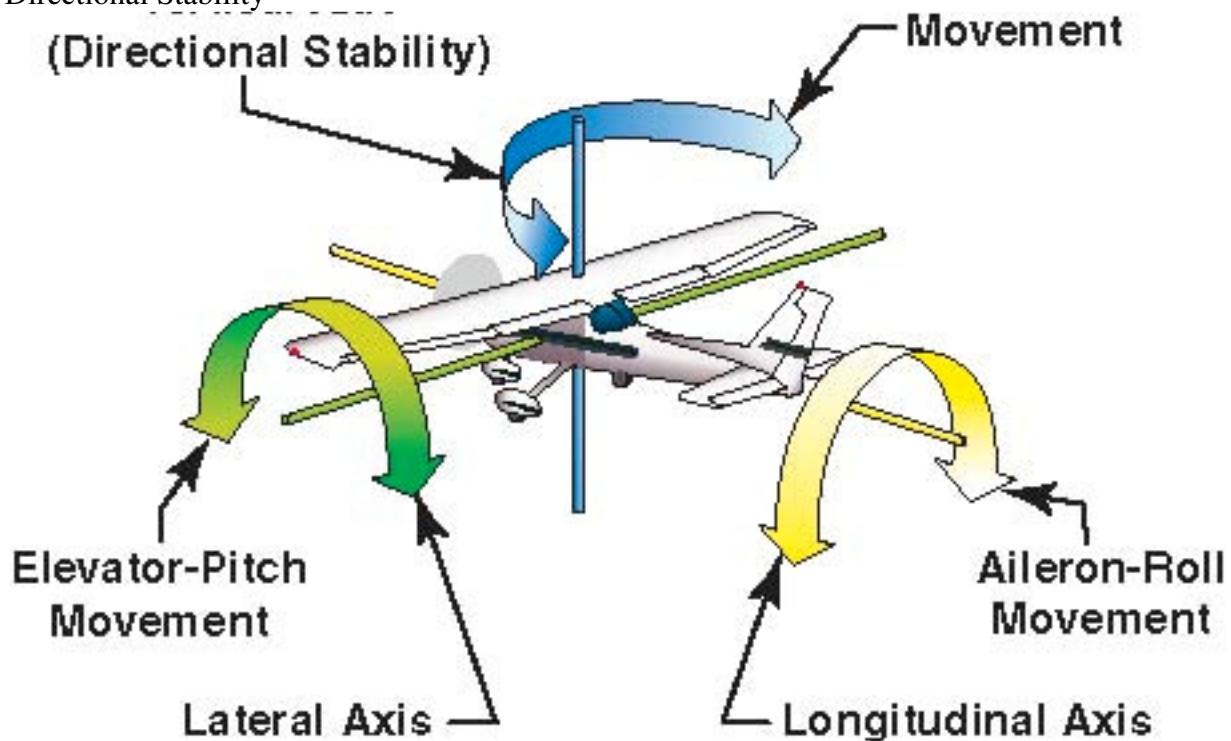
Sweepback



Keel Effect



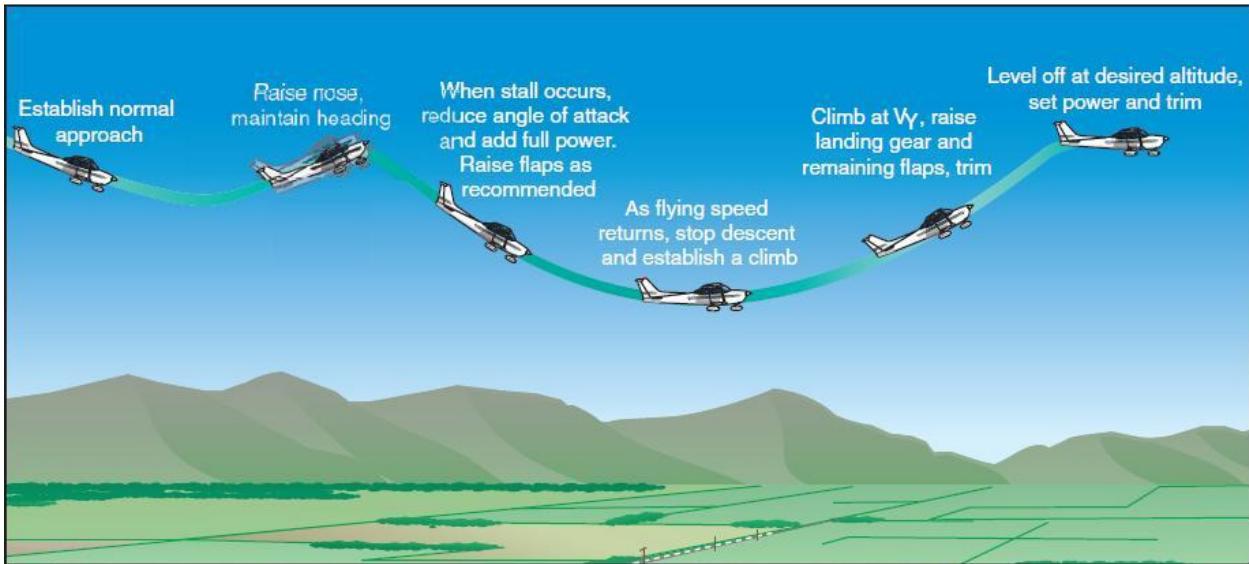
Directional Stability



Dutch Roll

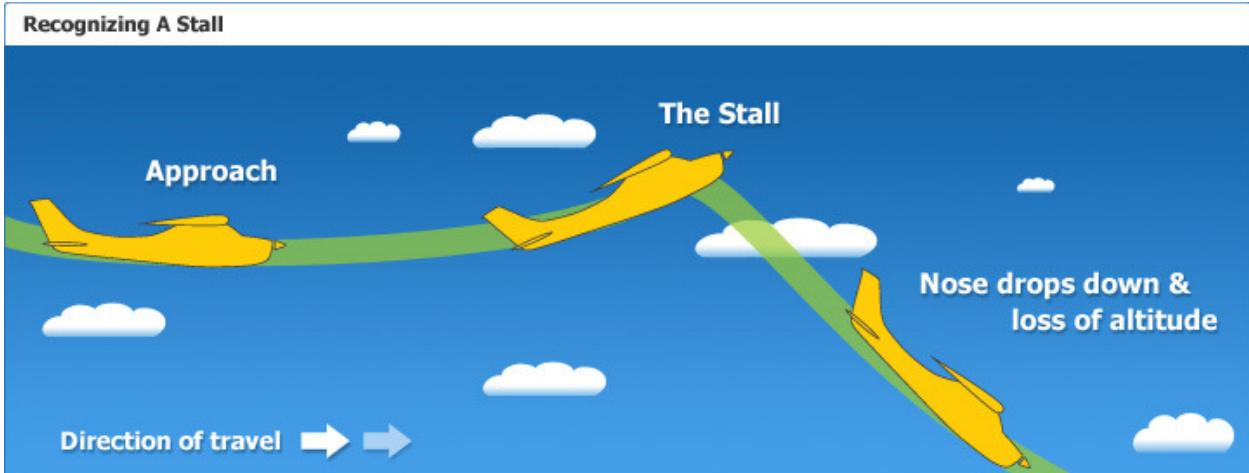


Spiral Instability Power-Off Stalls



Power-On Stalls

Recognizing A Stall



Accelerated Stalls

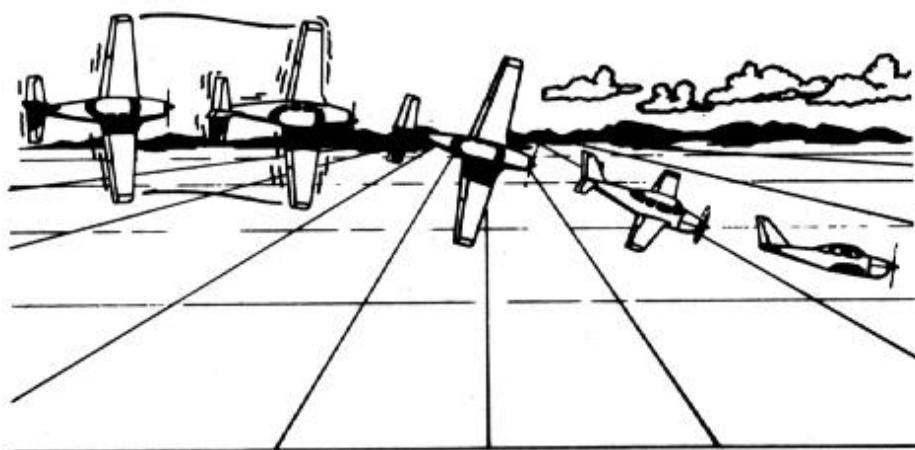


Figure 11-24 Accelerated (High Speed) Stall

Crossed-Control Stall



Figure 11-25 Crossed Controls Stall

Secondary Stall

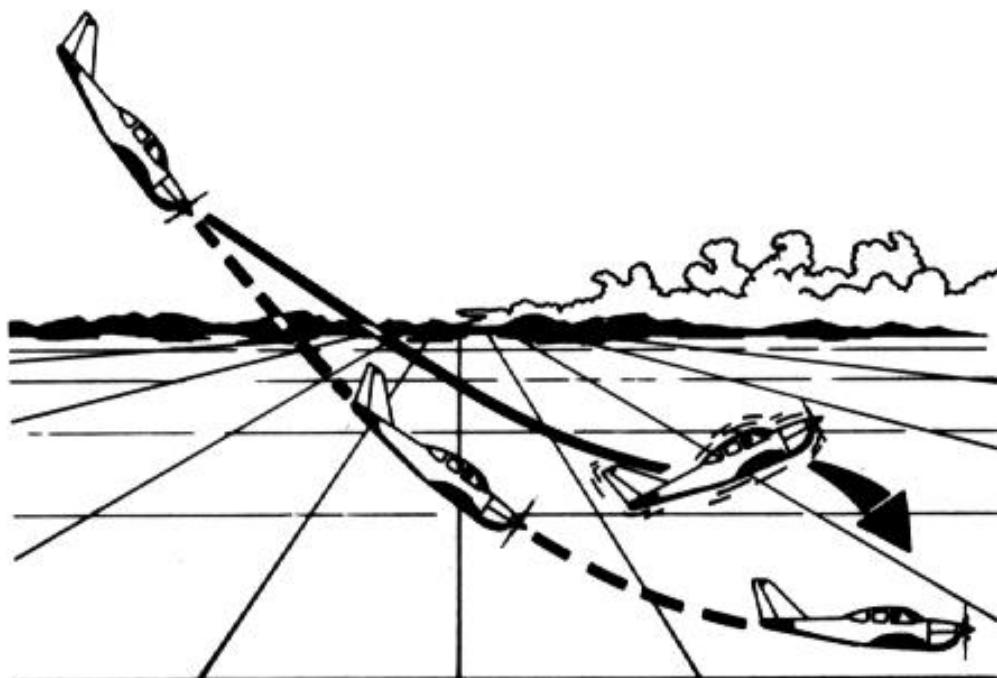
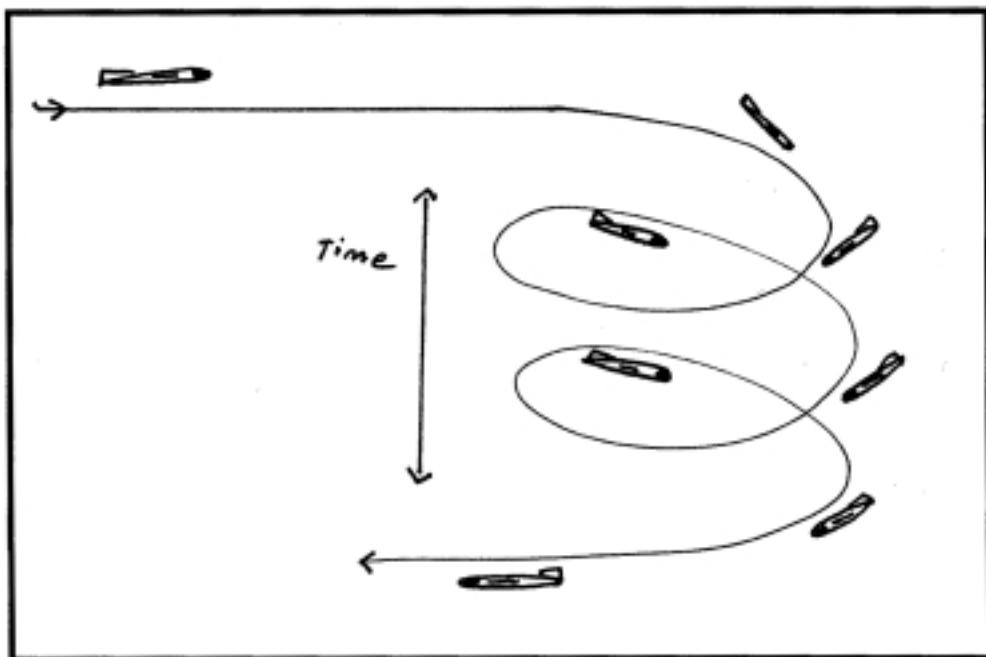
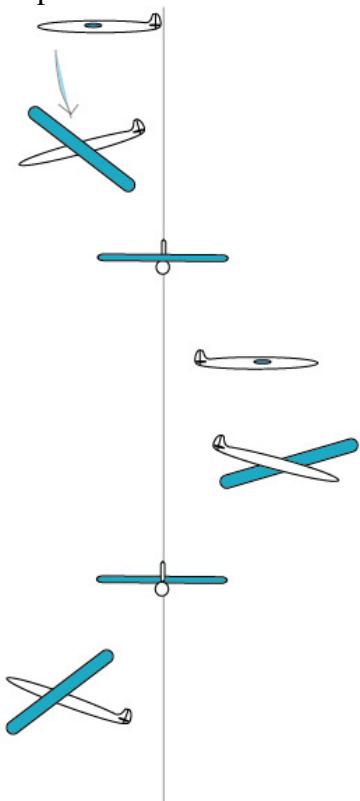


Figure 11-20 Recovering too Abruptly Causes Secondary Stall

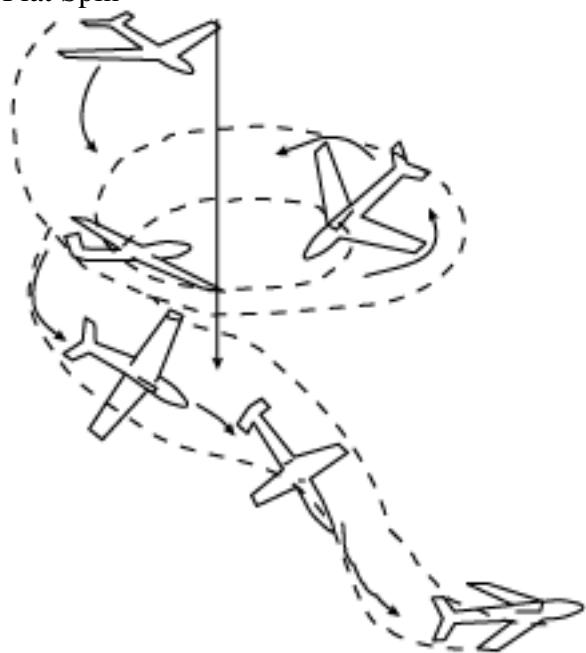
Spin



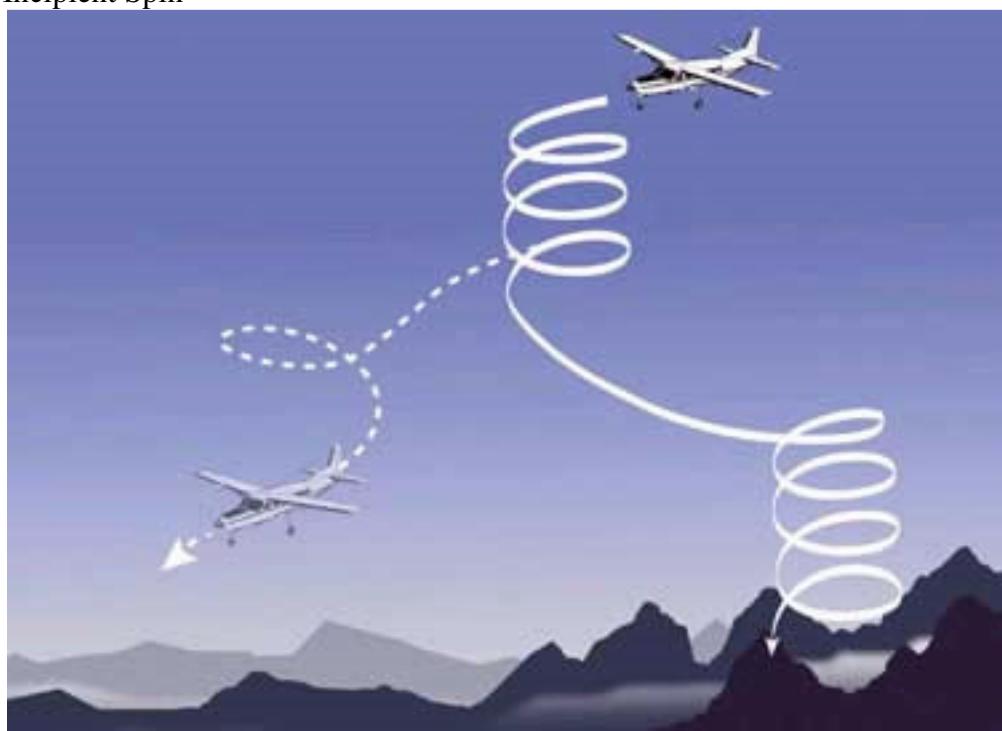
Inverted Spin



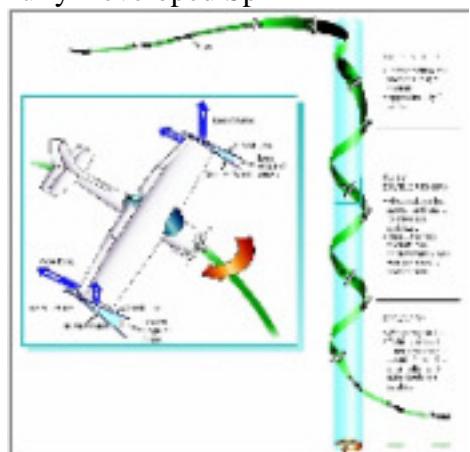
Flat Spin



Incipient Spin



Fully Developed Spin



Part 3

Torque

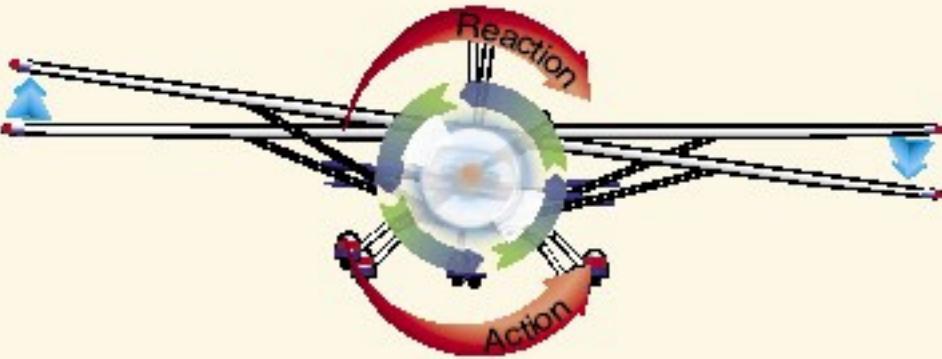
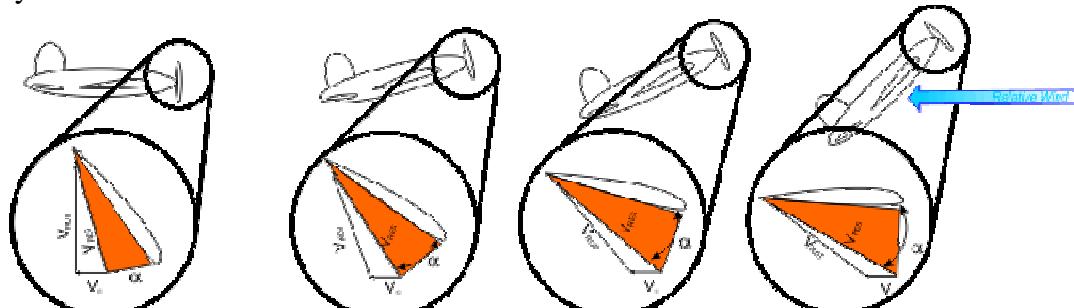


Figure 4-39. Torque reaction.

Gyroscopic Precession



Asymmetrical Thrust



The relative wind is perpendicular to the rotational velocity, causing the airflow seen by the blade to appear to come from more ahead of the airplane. This reduces the angle of attack on the blade.

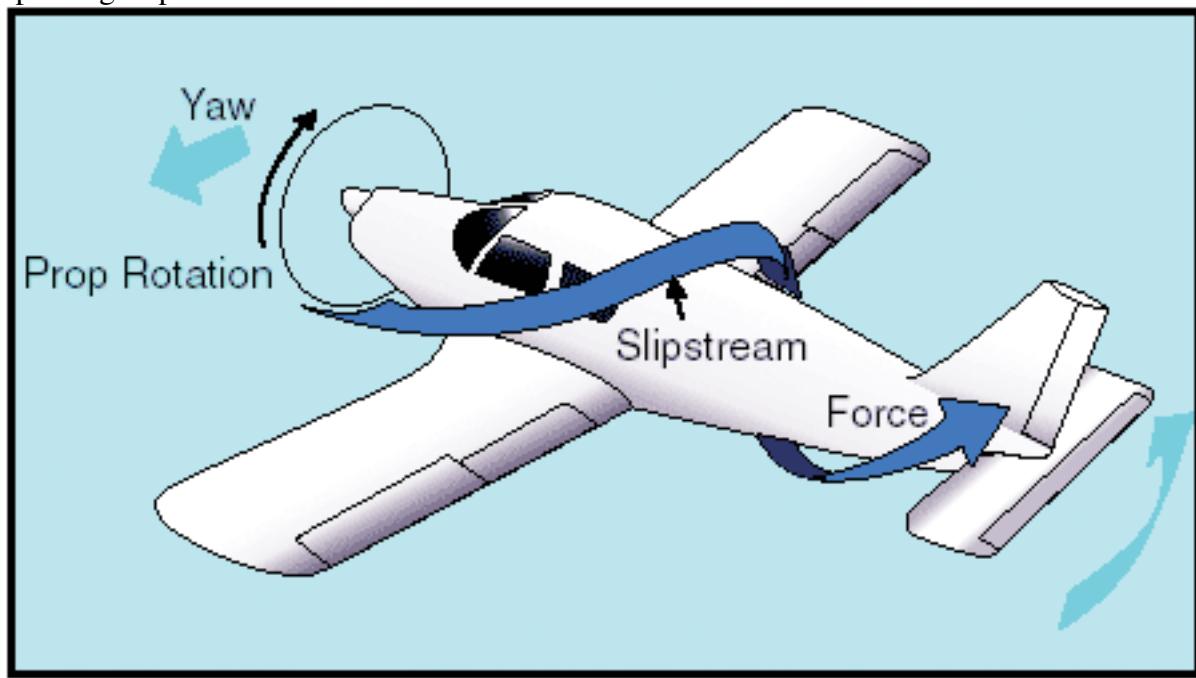
The relative wind also slightly increases the velocity of the airflow seen by the blade, slightly increases

As the angle of attack increases, the relative wind affects the propeller angle of attack less and less, because it is no longer perpendicular to the direction of rotation of the propeller. This produces two effects:

- The angle of attack on the descending blade increases, and
- The relative wind increasingly adds to the rotational velocity of the air flow seen by the descending propeller blade.

Both of these effects increase the thrust on the descending blade.

Spiraling Slipstream



Maximum Lift-to-Drag Ratio



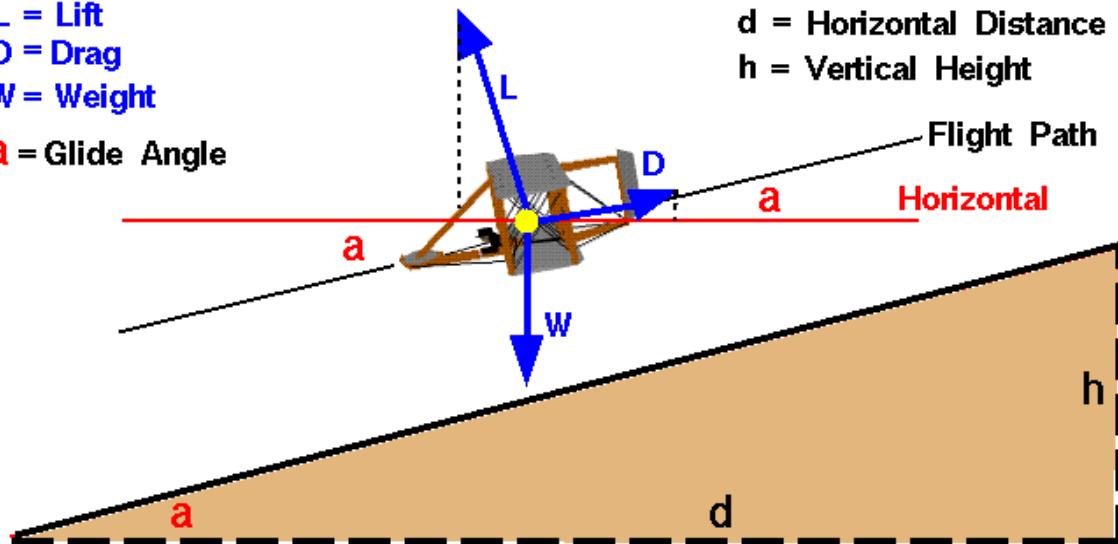
Lift to Drag Ratio (L/D Ratio)

Glenn
Research
Center

L = Lift
D = Drag
W = Weight

a = Glide Angle

d = Horizontal Distance
h = Vertical Height



Horizontal Force Equation: $L \sin(a) = D \cos(a)$

$$\text{ratio} = \frac{\text{Lift}}{\text{Drag}} = \frac{L}{D} = \frac{c_l}{c_d} = \frac{1}{\tan(a)} = \frac{d}{h} = \frac{\text{distance}}{\text{height}}$$

Best Glide Speed

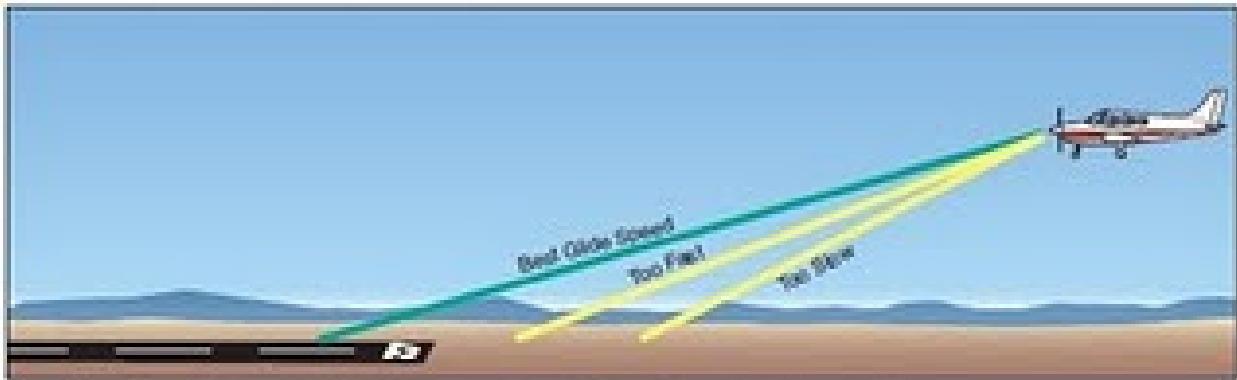


Figure 3-18. Best glide speed provides the greatest forward distance for a given loss of altitude.

Glide Ratio
Glide Angle

NASA

Glide Angle

Glenn Research Center

h = Vertical Height

d = Horizontal Distance

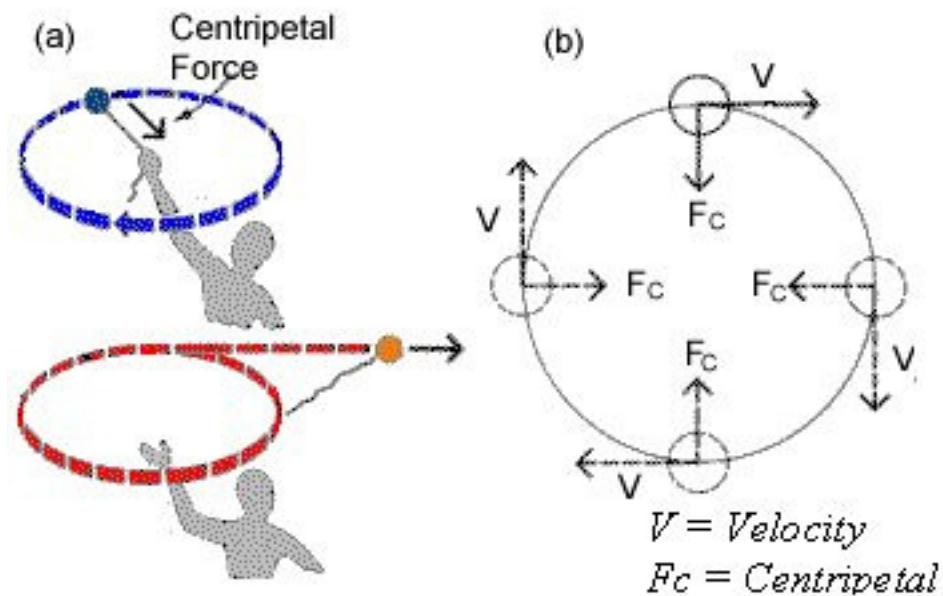
s = Surface Distance

a = Glide Angle

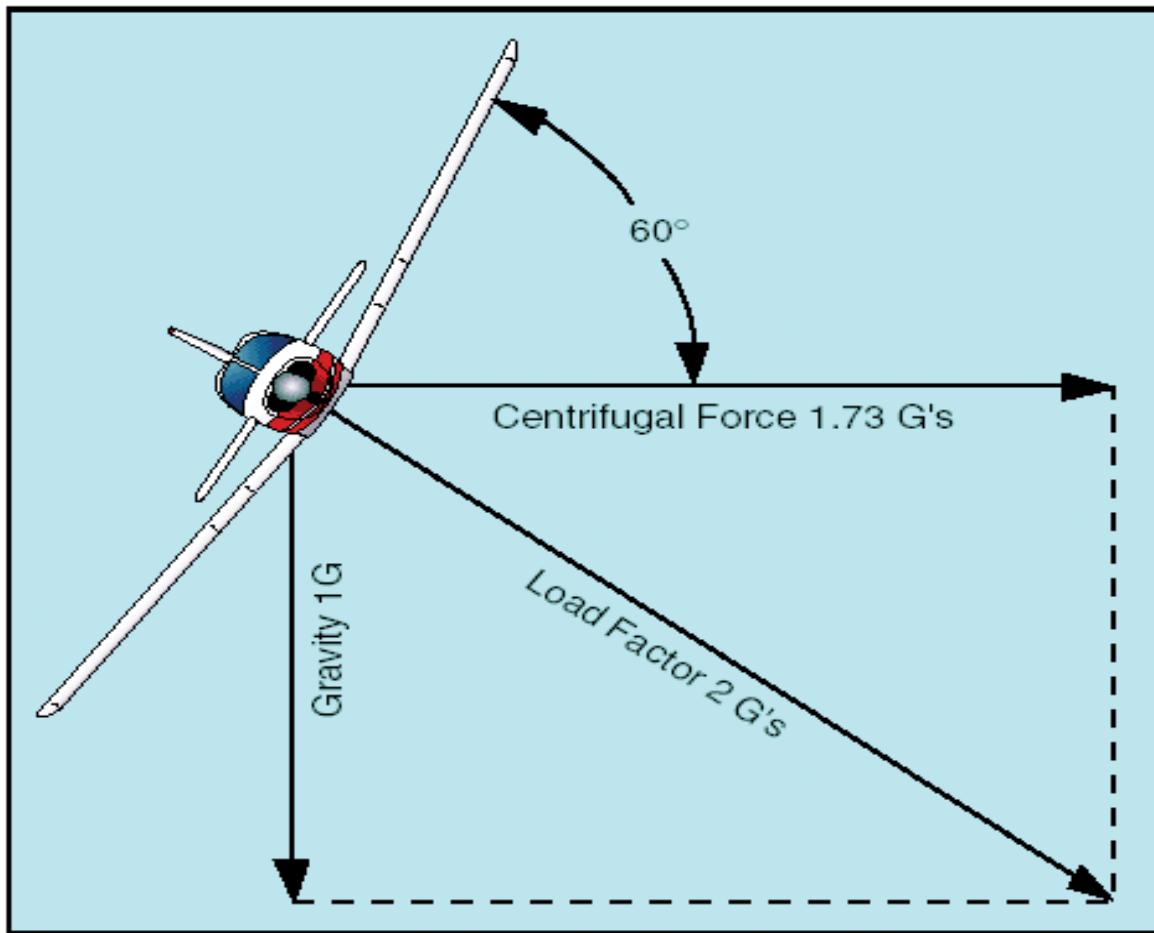
A diagram showing a gliding aircraft on a slope. A red line labeled 'Flight Path' extends from the aircraft. A horizontal dashed line labeled 'Horizontal' is shown above the slope. The vertical height of the slope is labeled 'h'. The horizontal distance from the base of the slope to the point where the flight path meets the horizontal is labeled 'd'. The angle between the horizontal and the flight path is labeled 'a'. The surface distance from the base to the aircraft is labeled 's'.

From trigonometry : $\tan(a) = \frac{h}{d}$ $\sin(a) = \frac{h}{s}$

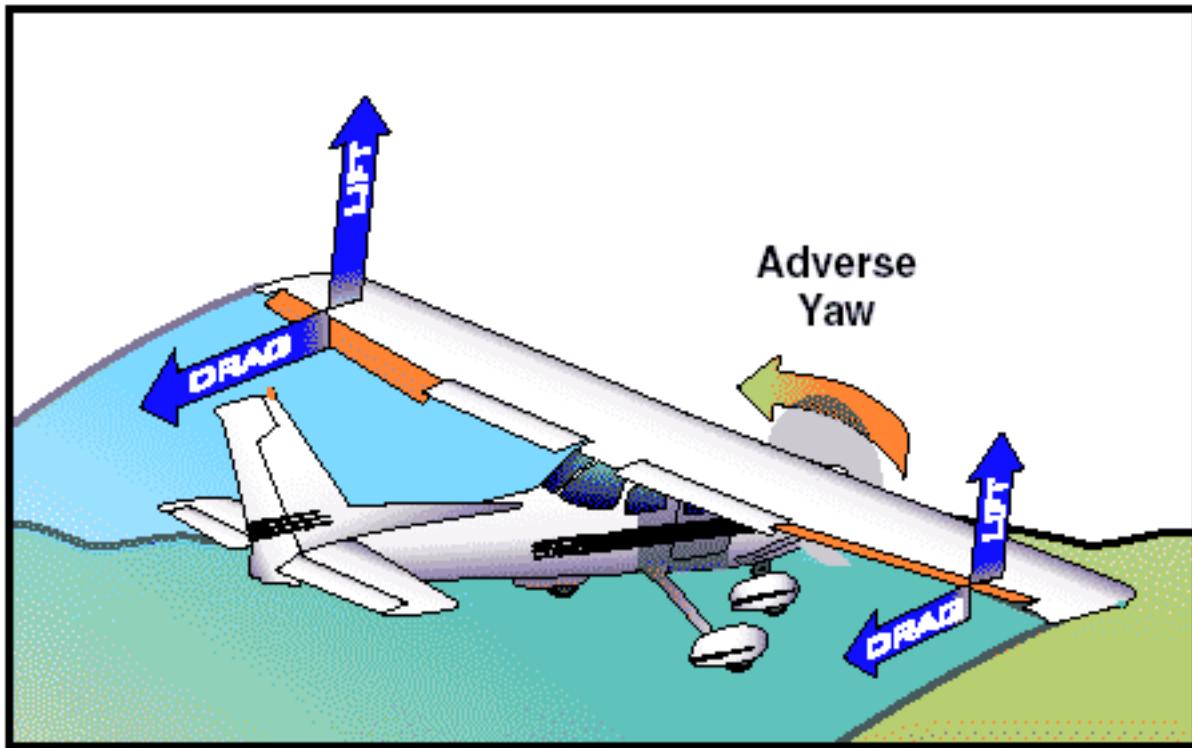
Centripetal Force



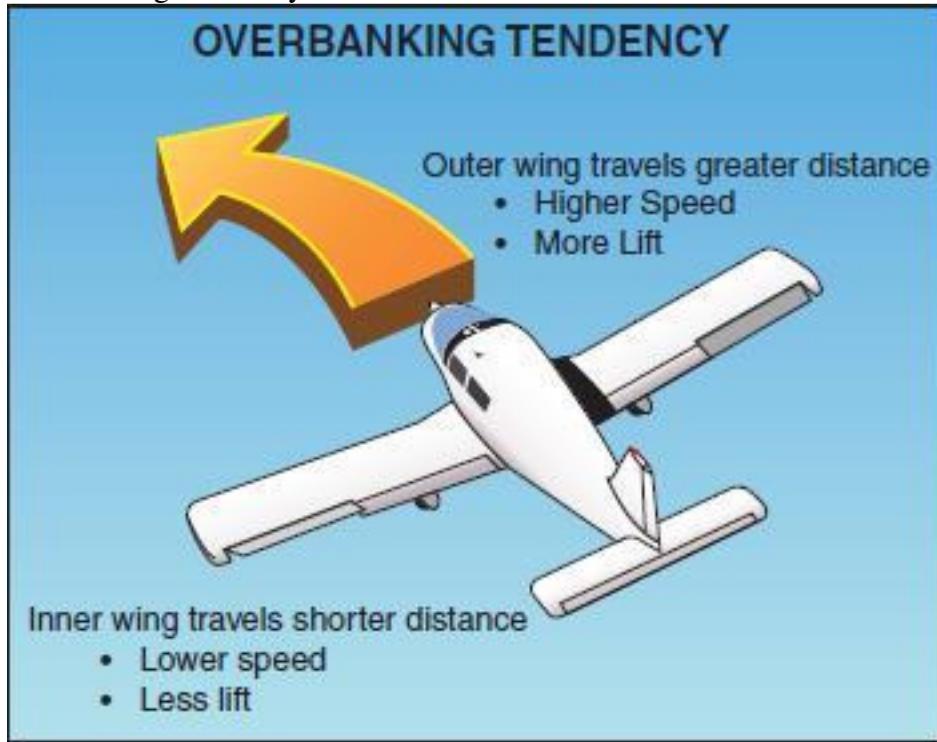
Centrifugal Force



Adverse Yaw



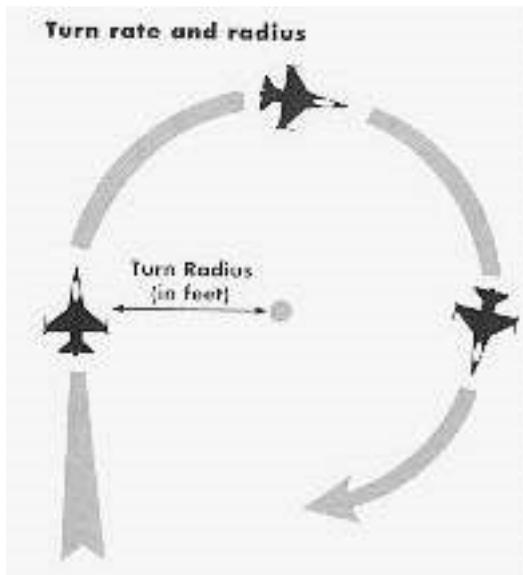
Overbanking Tendency



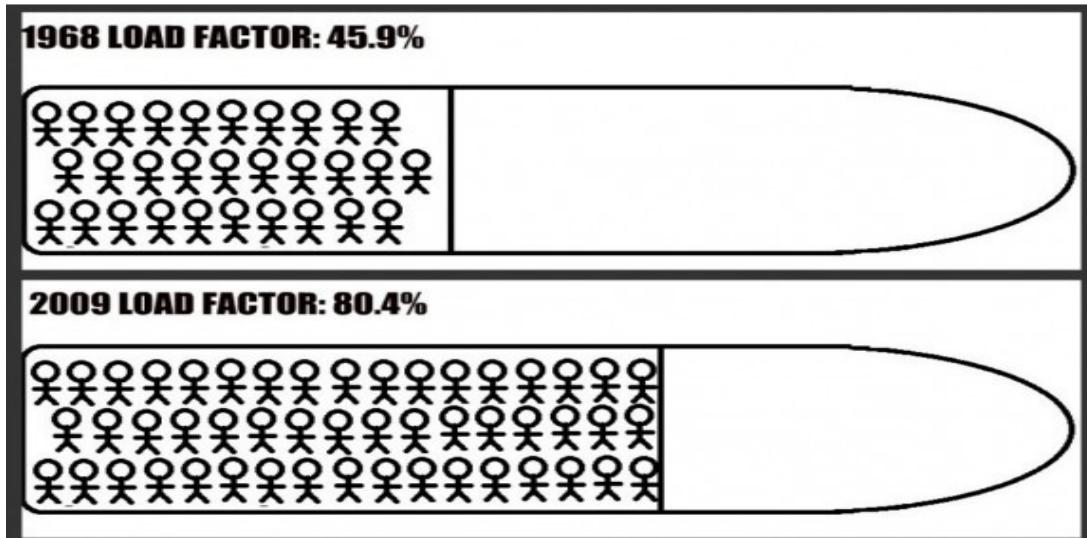
Rate of Turn



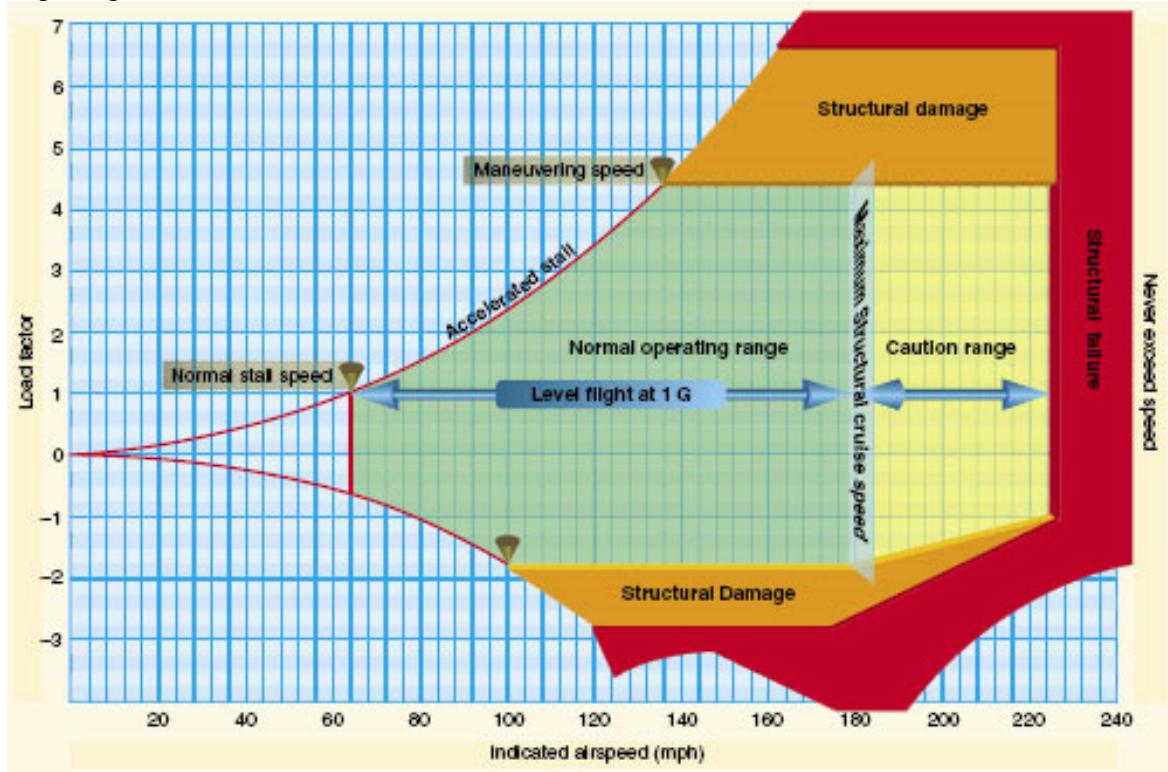
Radius of Turn



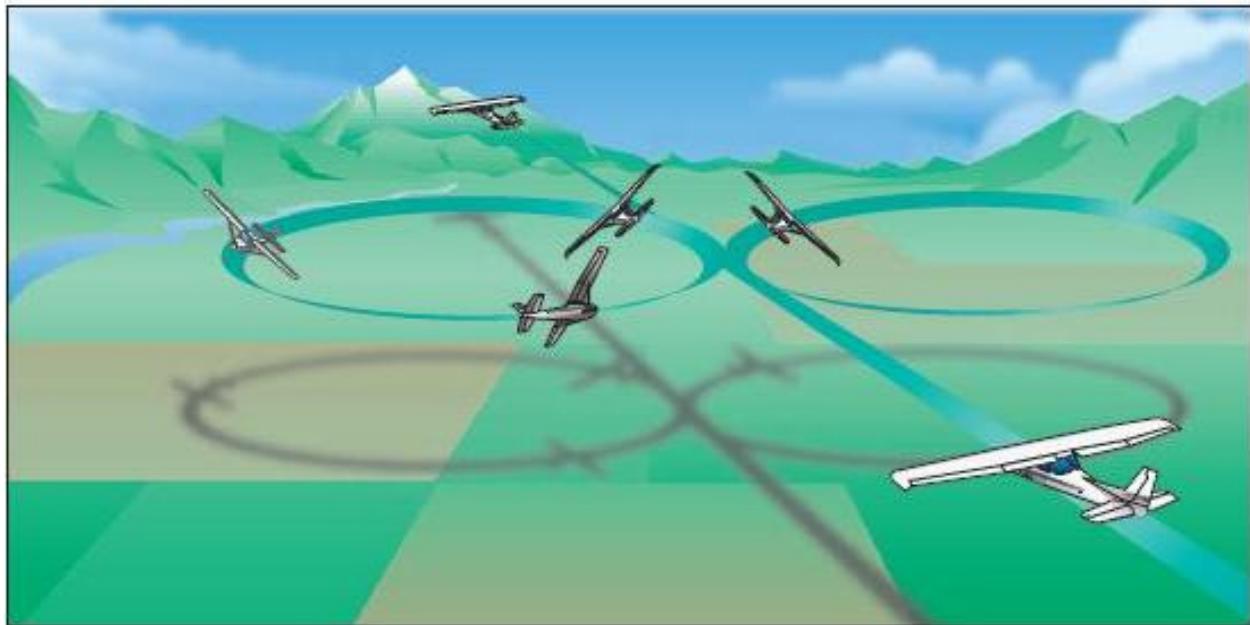
Load Factor



V-g Diagram



Design Maneuvering Speed (V_A)



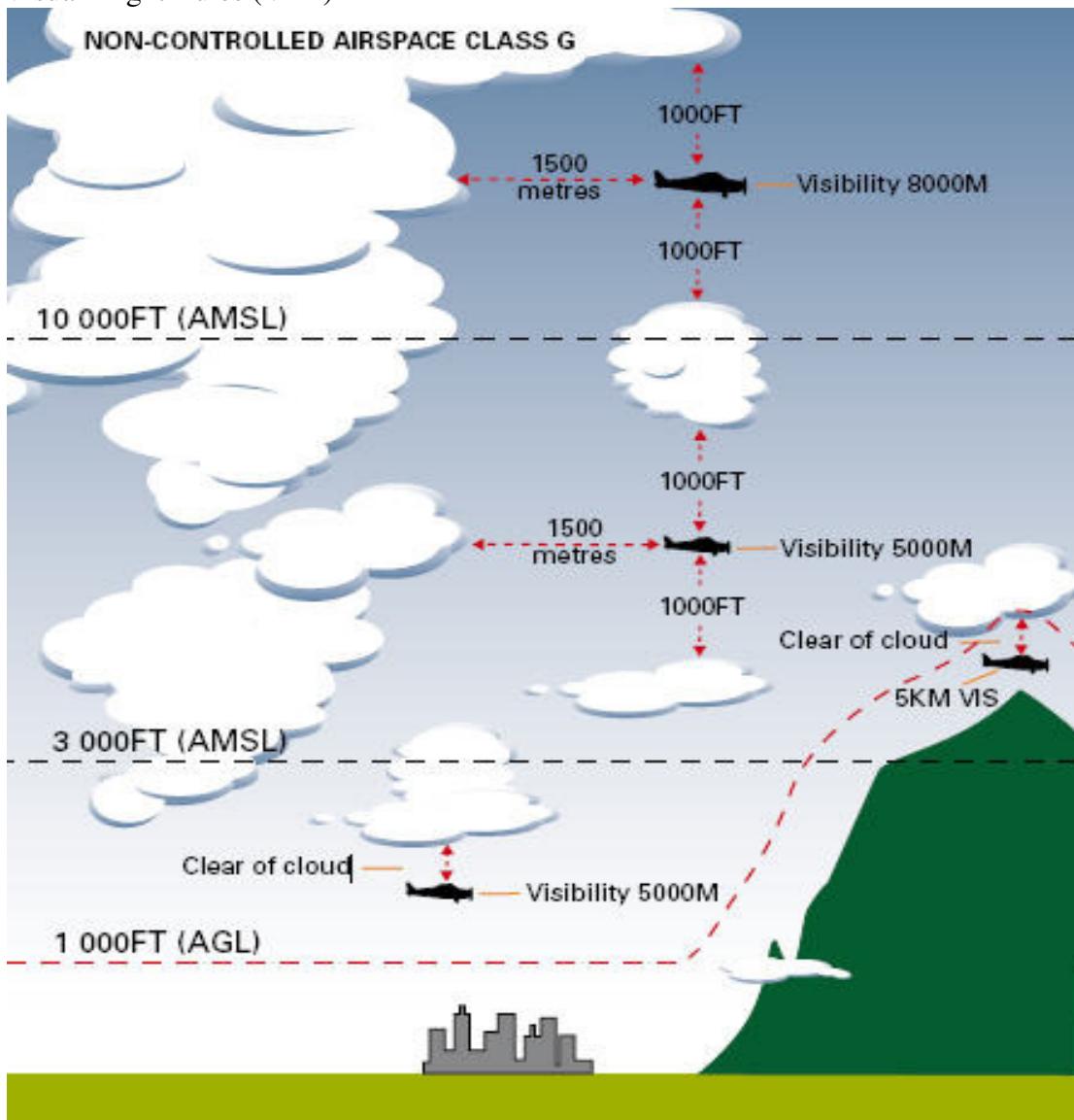
Section 4

Part 1

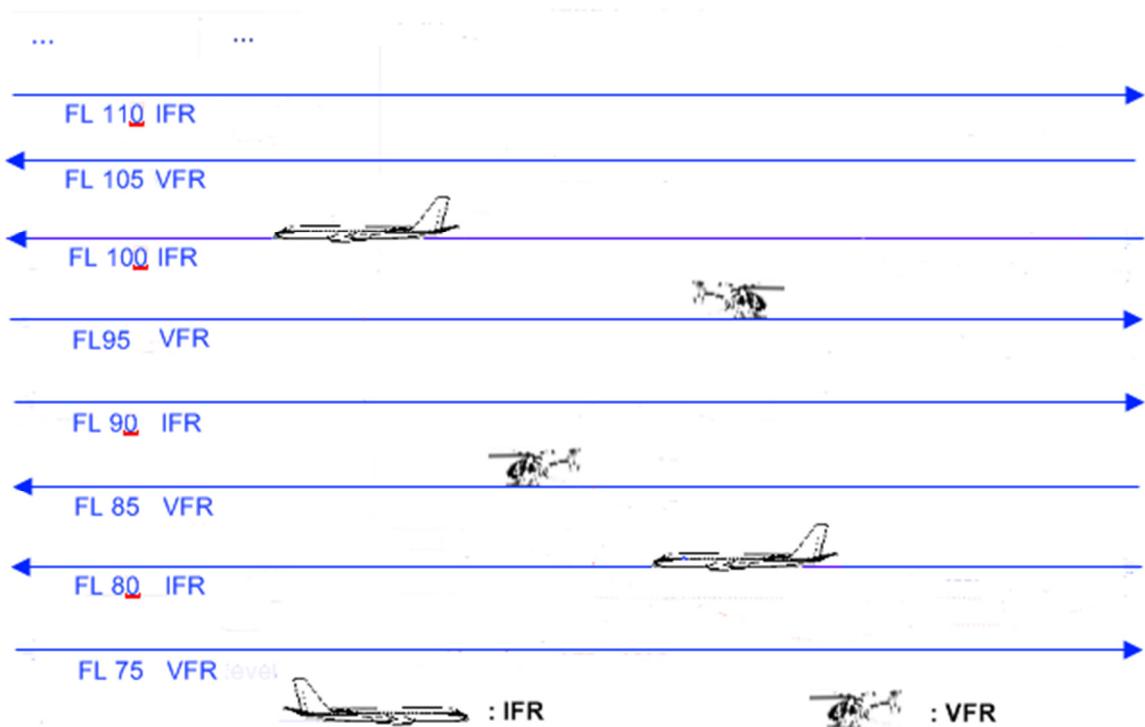
Collision Avoidance



Visual Flight Rules (VFR)



Instrument Flight Rules (IFR)



Visual Scanning

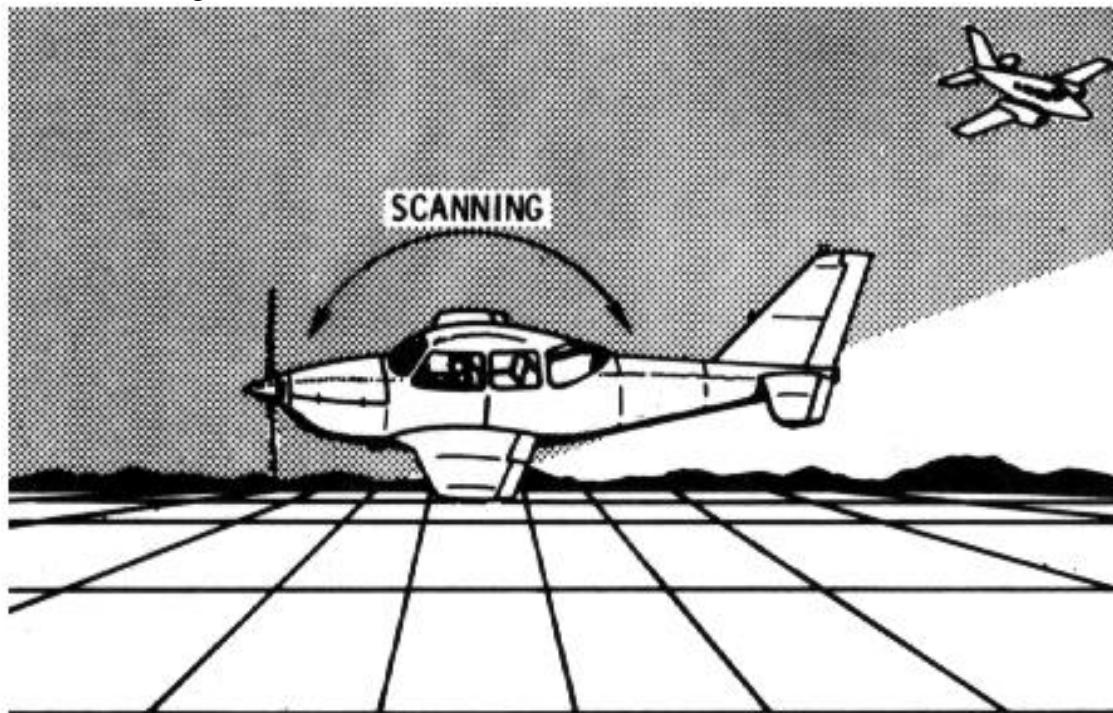


Figure 6–3 Visual Scanning While Checking Airplane's Attitude

Empty Field Myopia

**Approximate
Distance**

**Approximate
Time to Impact**

View

1NM



14 sec.

1/2 NM



7 sec.

1/4 NM



4 sec.

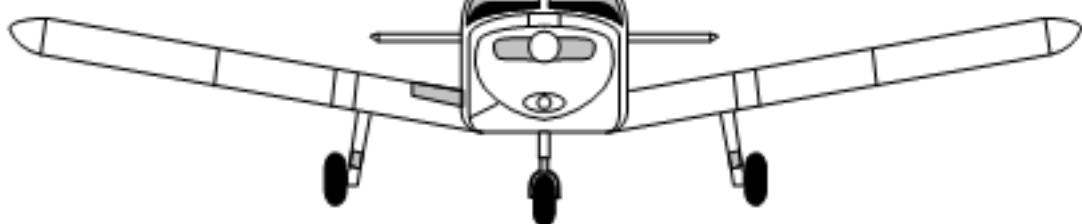
1/8 NM



2 sec.

1/16 NM

1 sec.

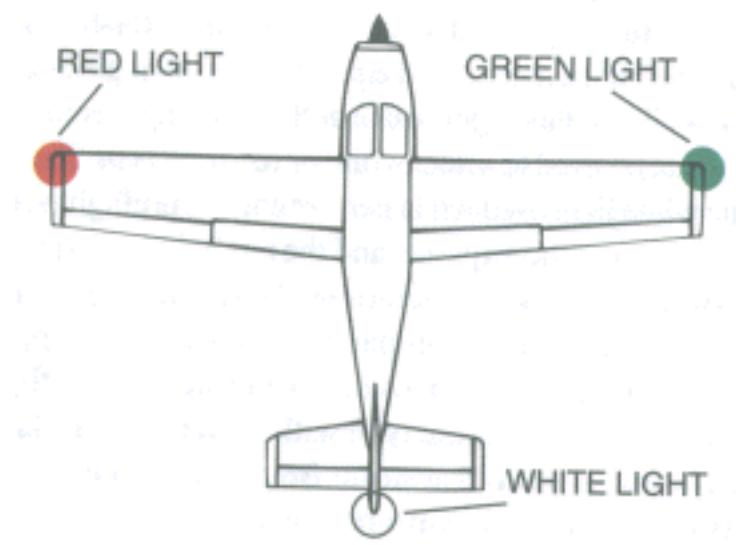


Measurements are approximate, based on Transport Canada's *Human Factors for Aviation—Basic Handbook*, P. 79.

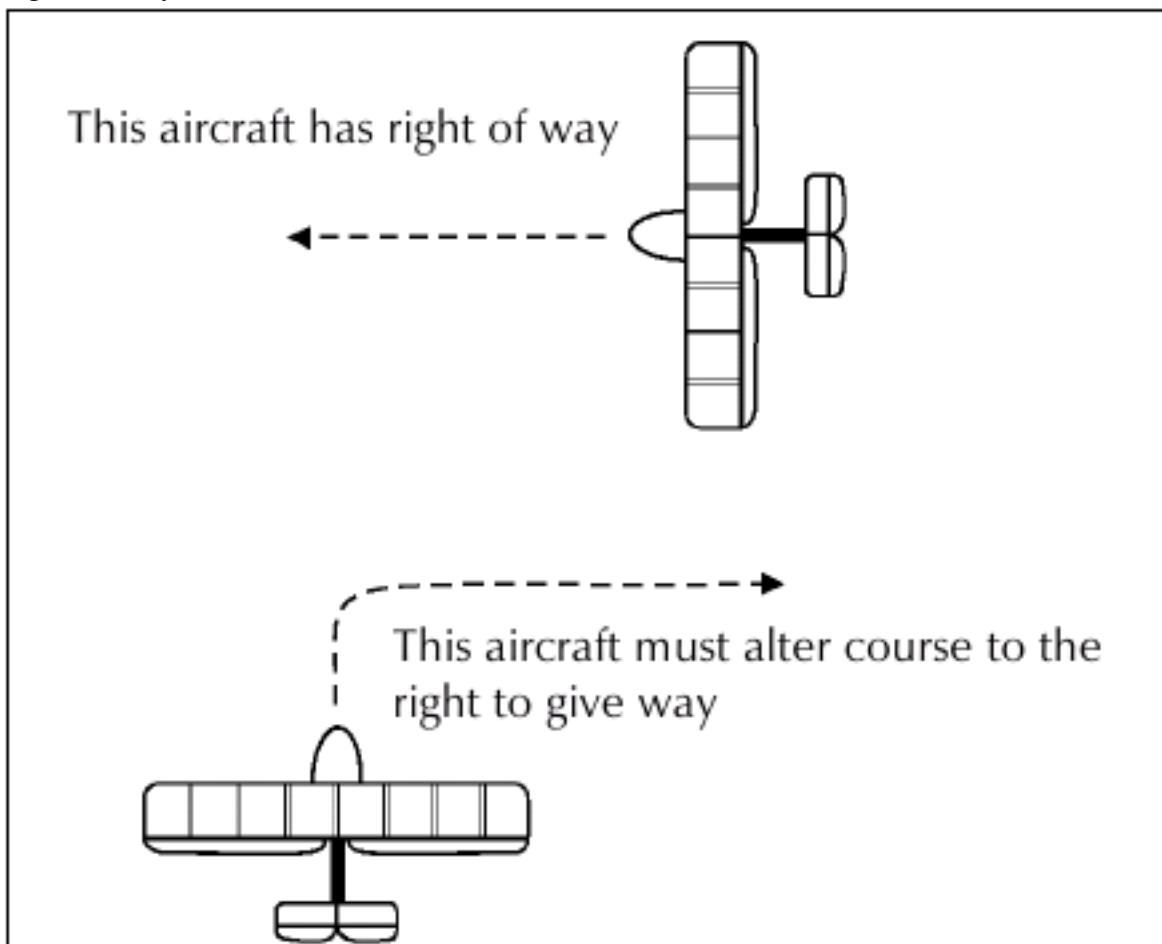
Blind Spots



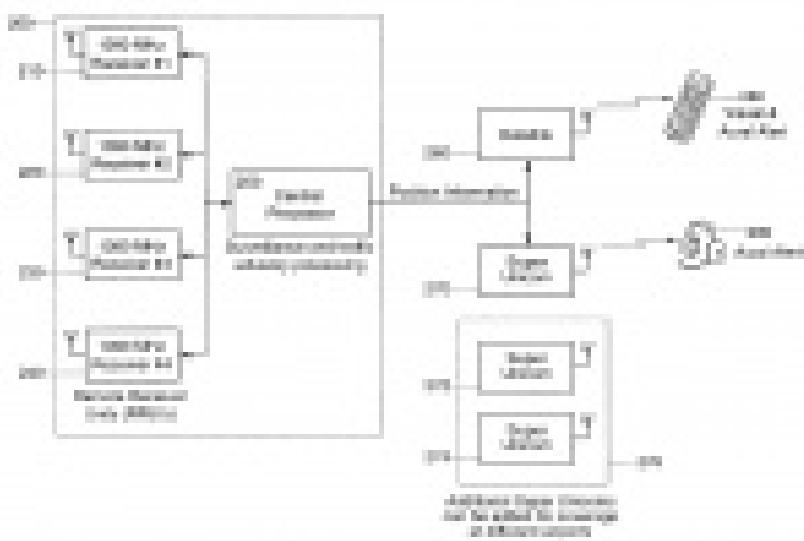
Operation Lights On



Clearing Turns Right-of-Way Rules



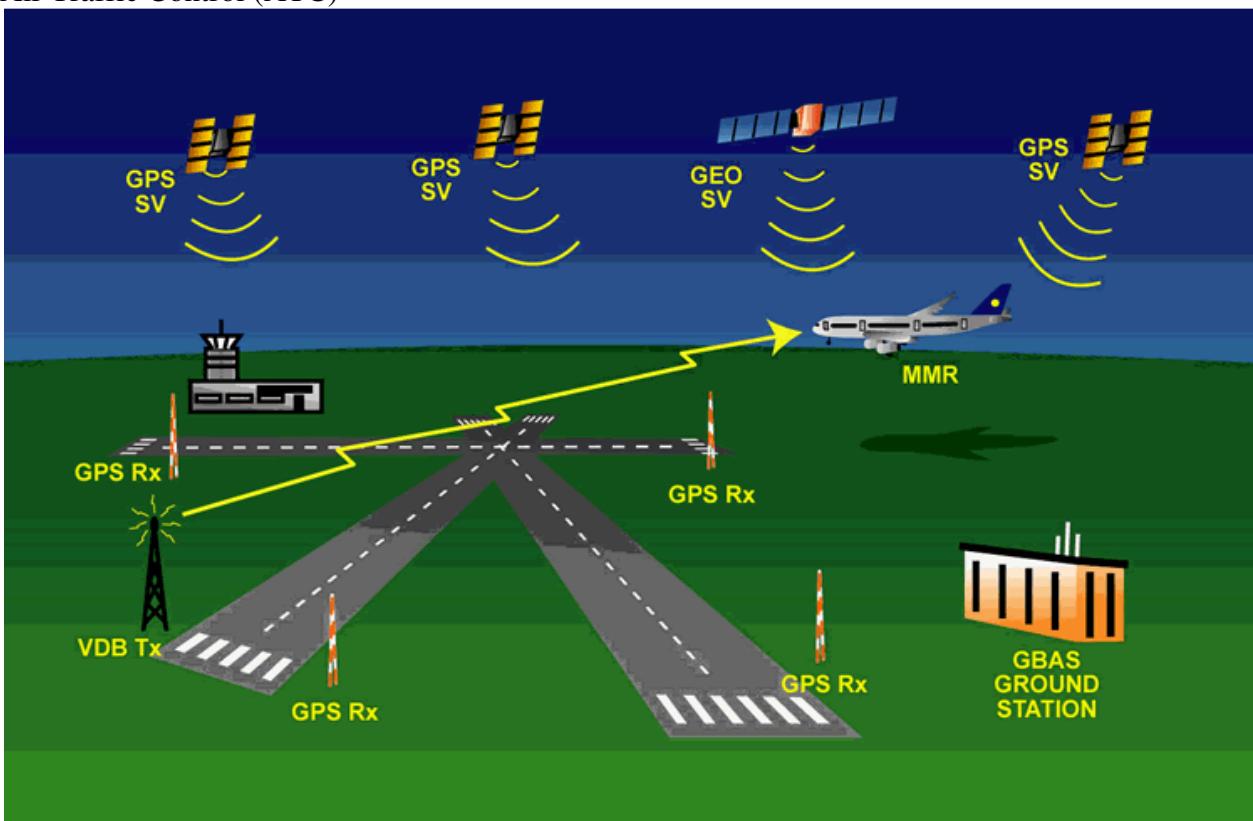
Minimum Safe Altitudes



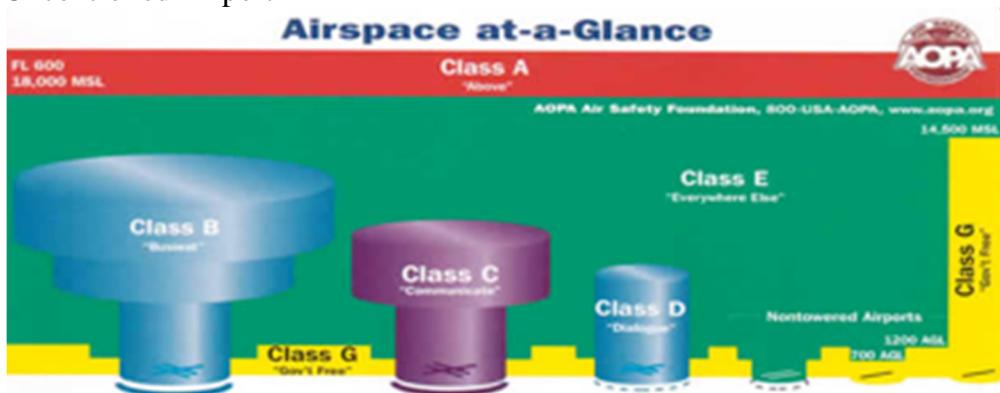
Part 2
Controlled Airport



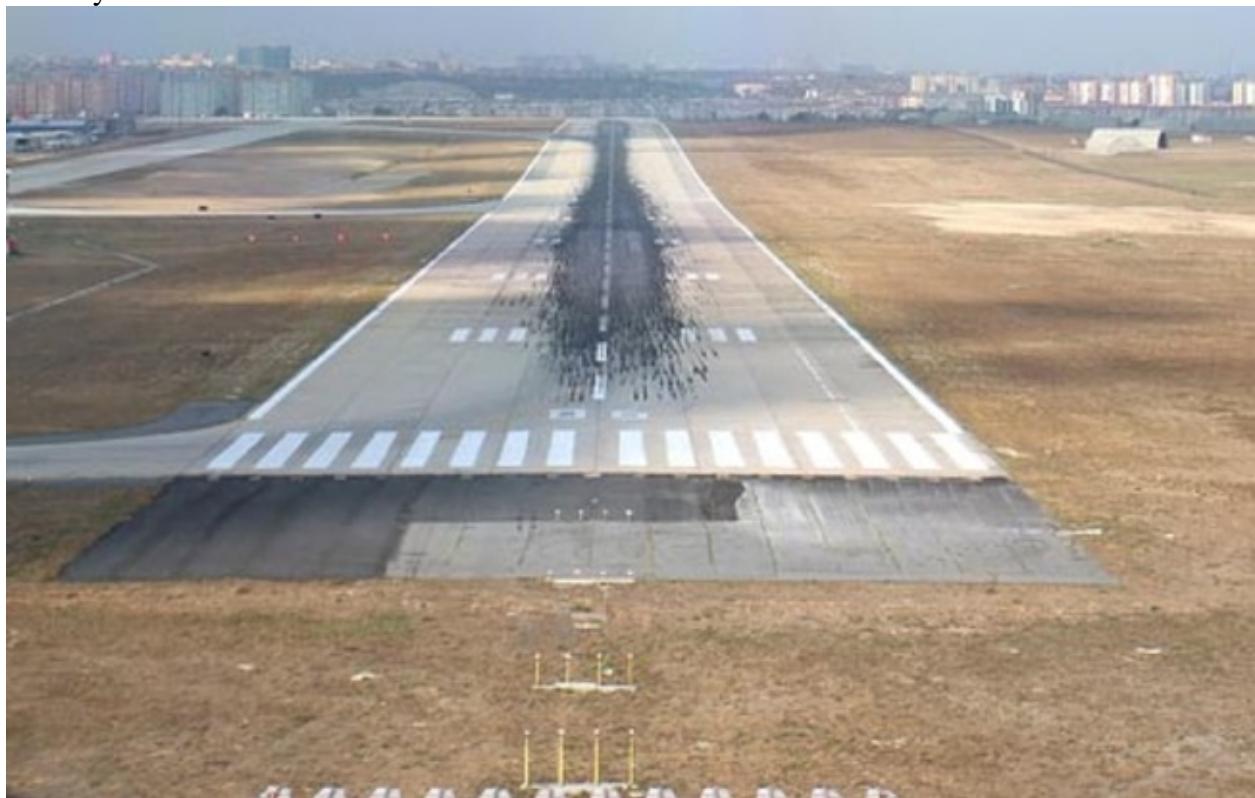
Air Traffic Control (ATC)



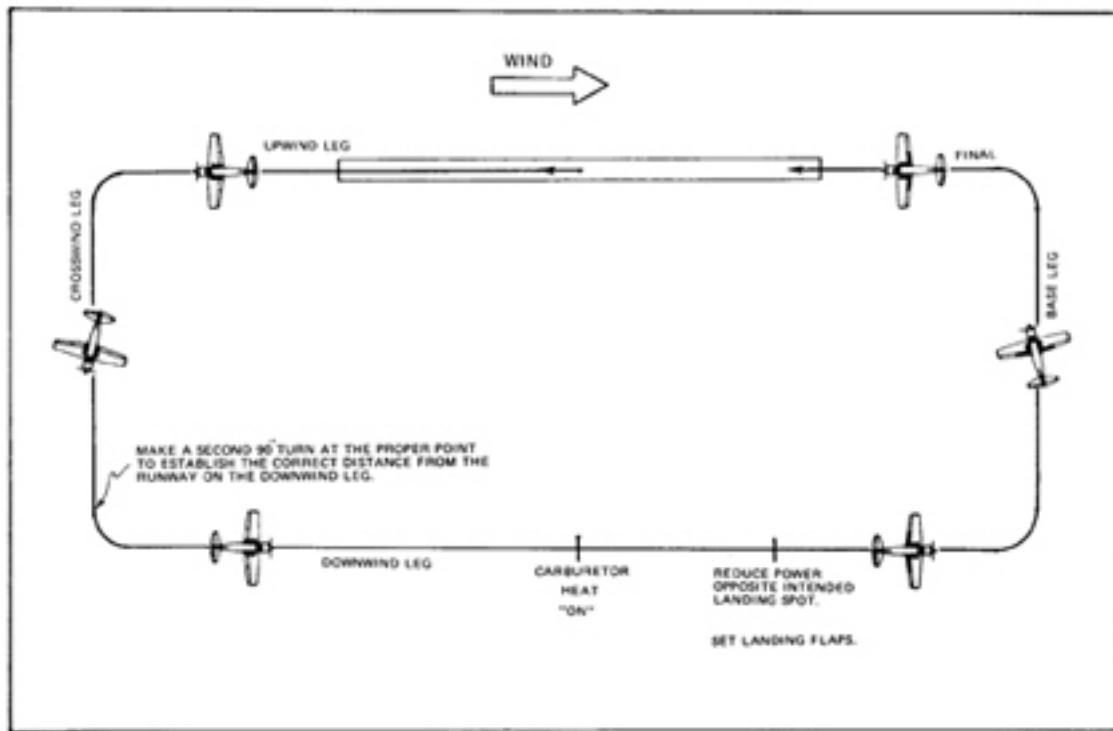
Uncontrolled Airport



Runways



Traffic Patterns



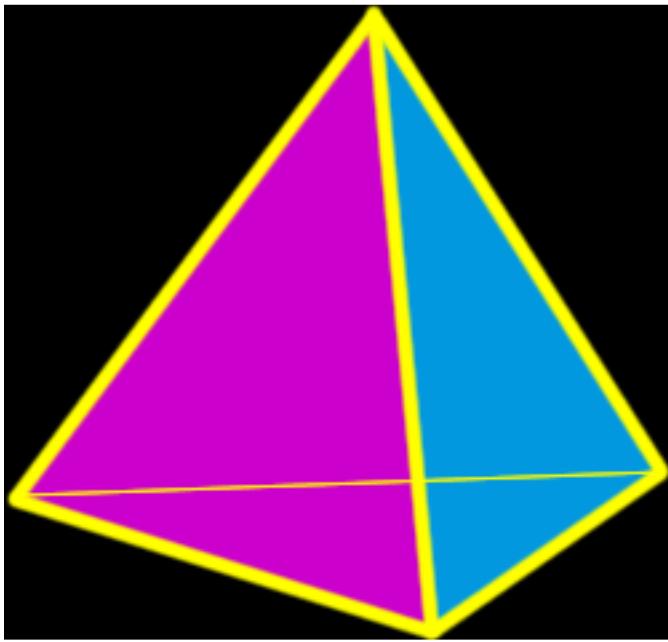
Wind Sock



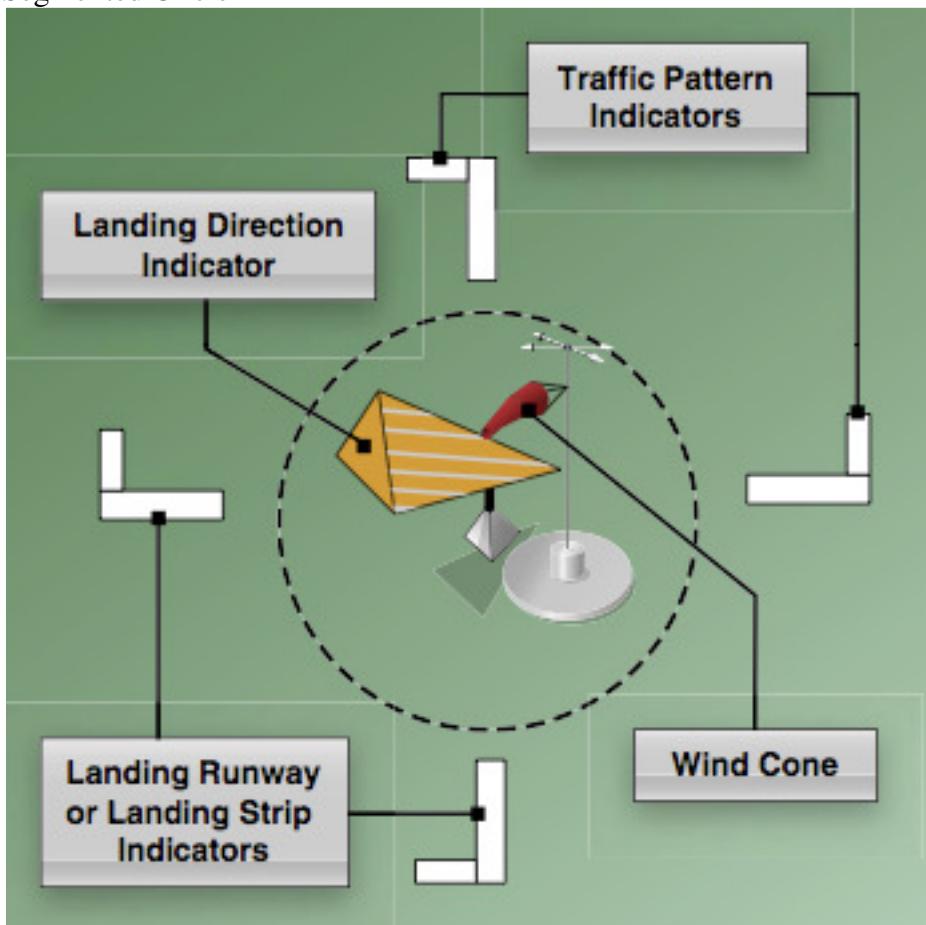
Wind Tee



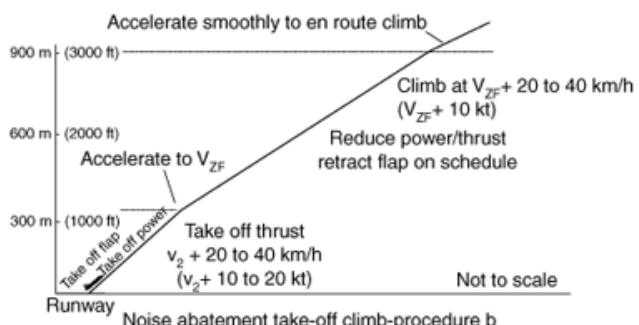
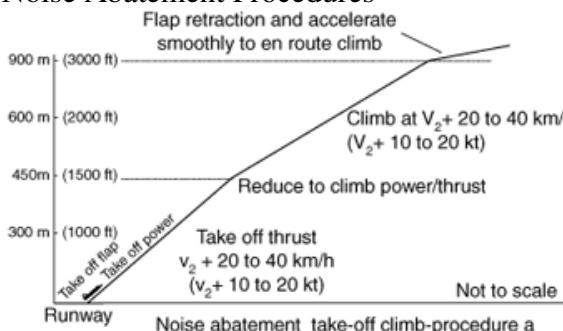
Tetrahedron



Segmented Circle



Noise Abatement Procedures



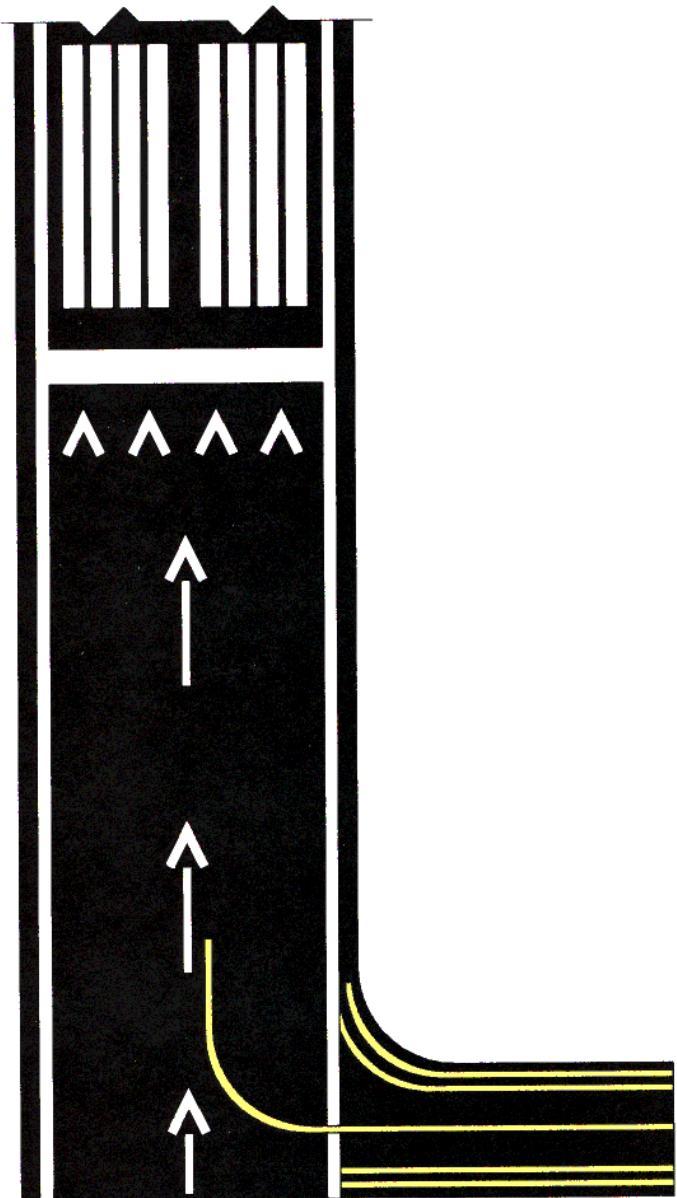
Notes :1. For purposes of these procedures the heights given in meters and feet, and speeds

given in kilometers/hour and knots, are considered to be operationally acceptable equivalents.

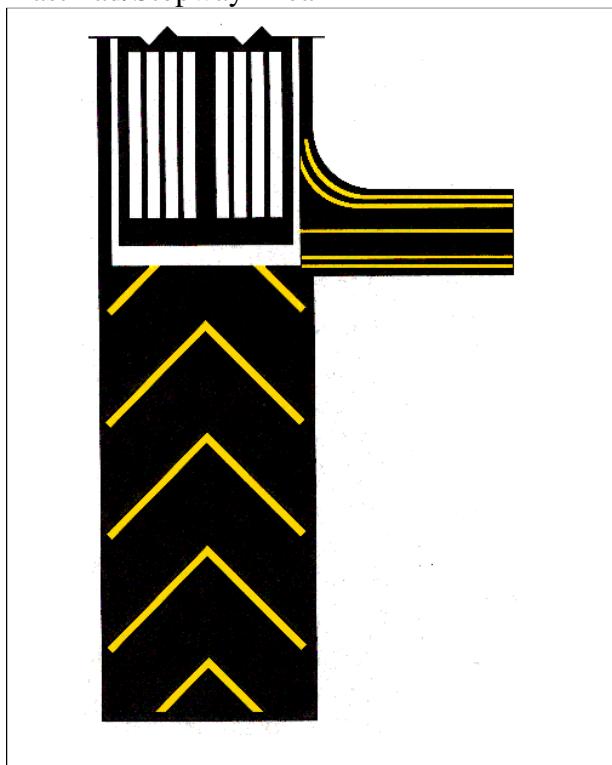
2. V_{ZF} stands for zero flap speed.

(Courtesy ICAO)

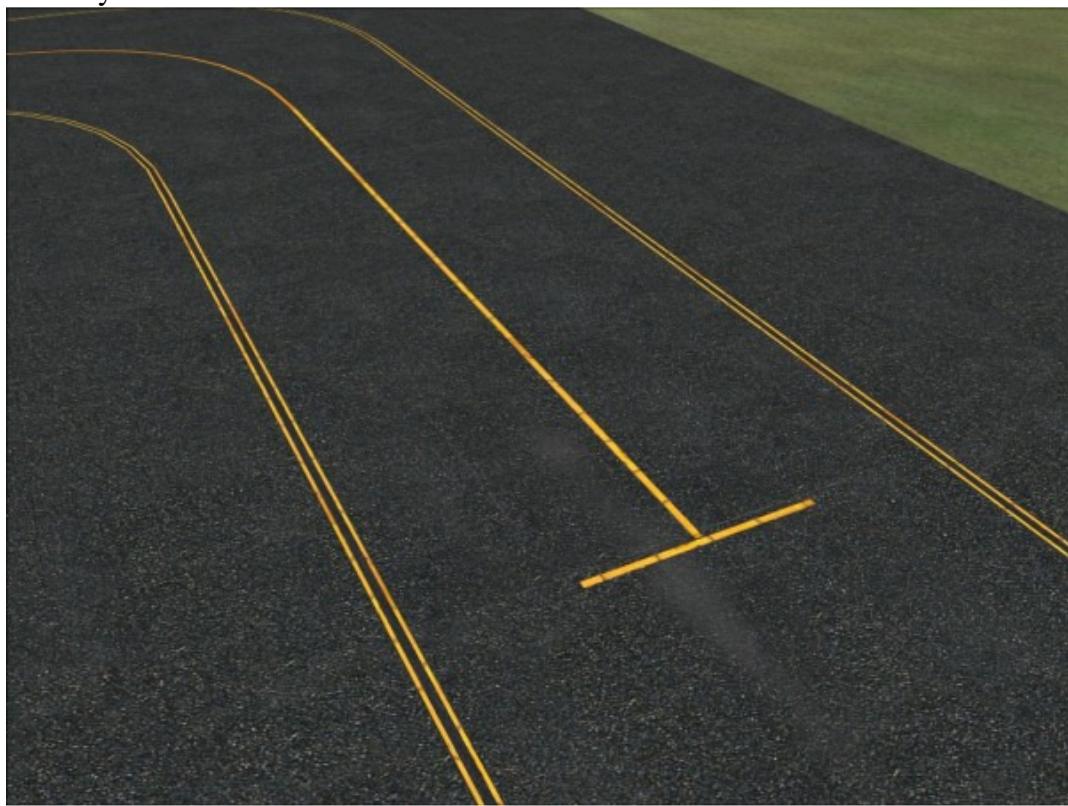
Displaced Threshold



Blast Pad/Stopway Area



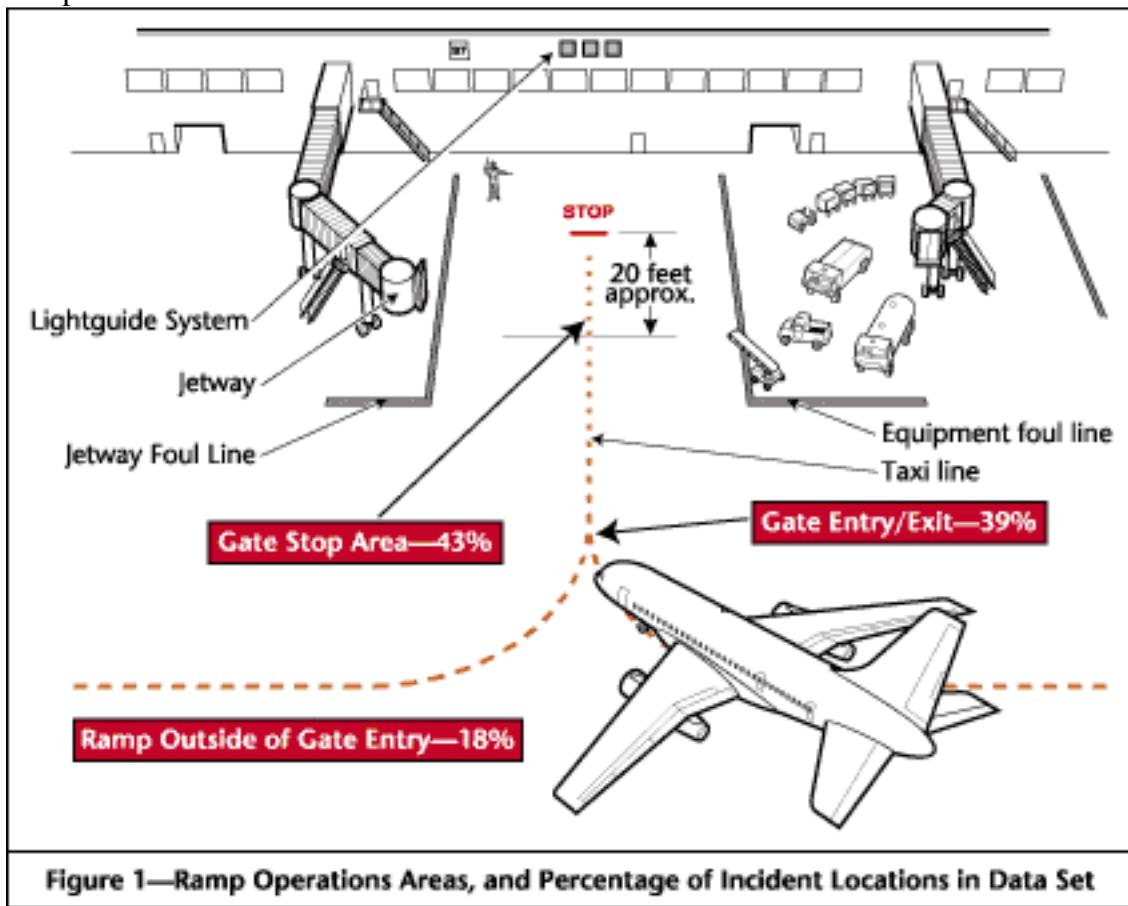
Taxiways



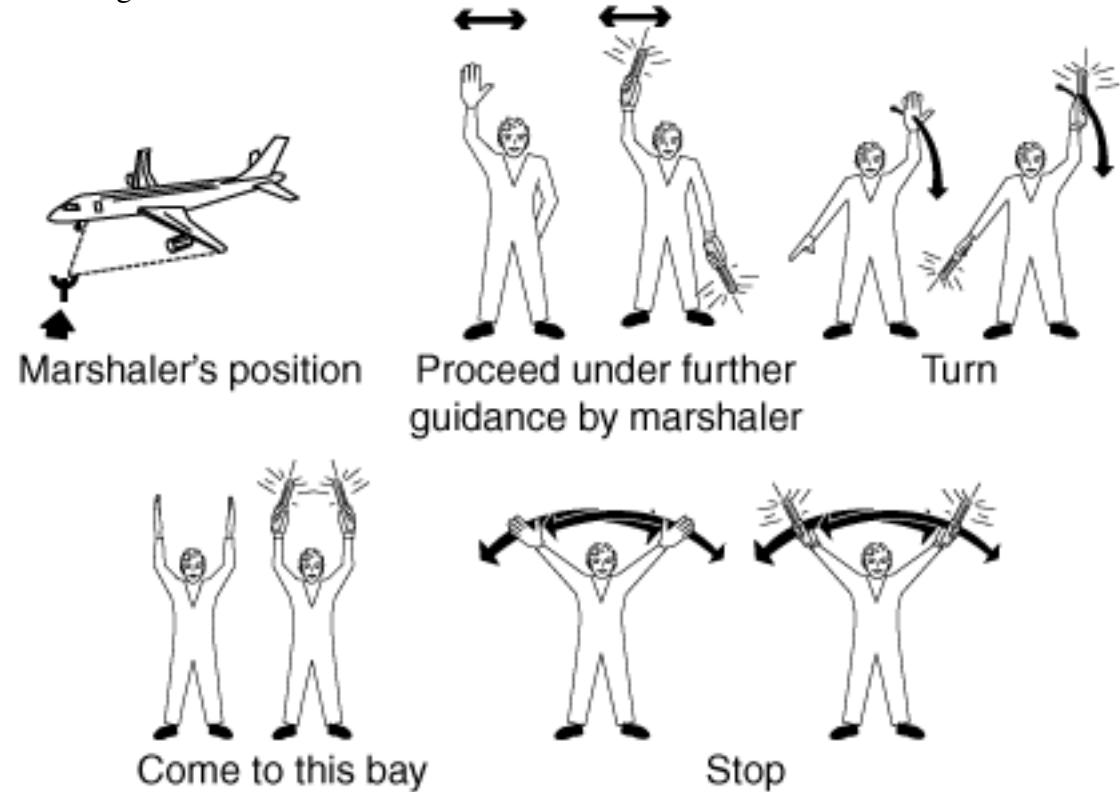
Hold Lines



Ramp Area



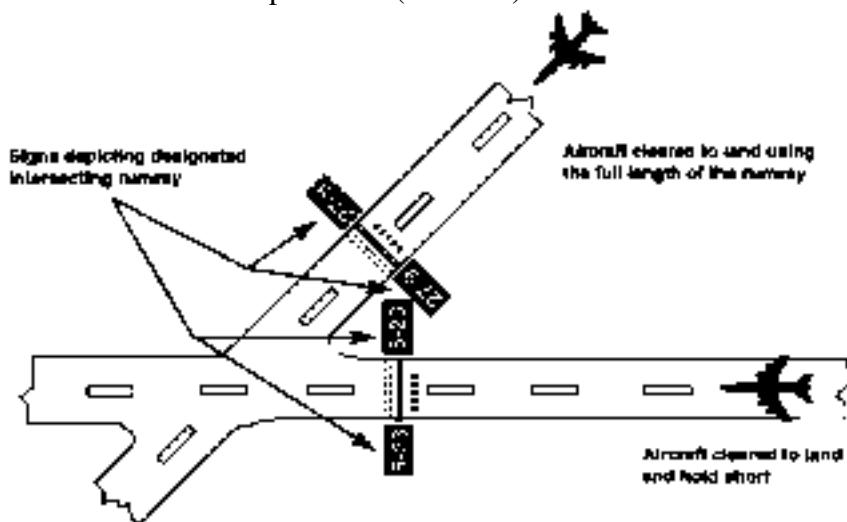
Hand Signals



International Civil Aviation Organization (ICAO)



Land and Hold Short Operations (LAHSO)



Airport Beacons

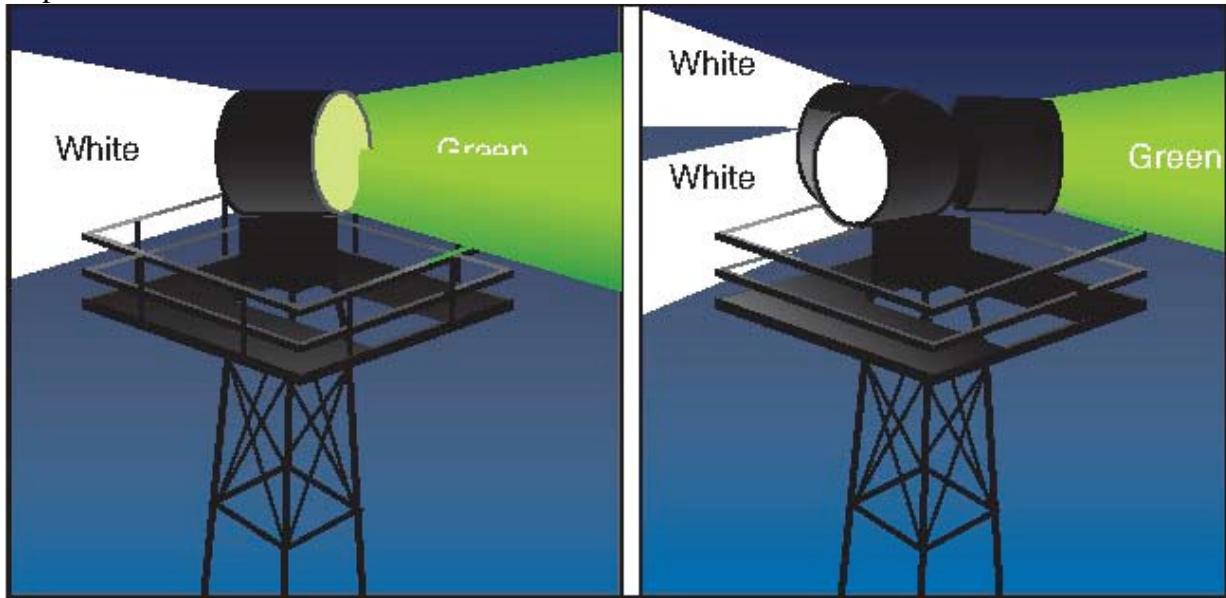


Figure 12-5. Airport rotating beacons.

Visual Approach Slope Indicator (VASI)

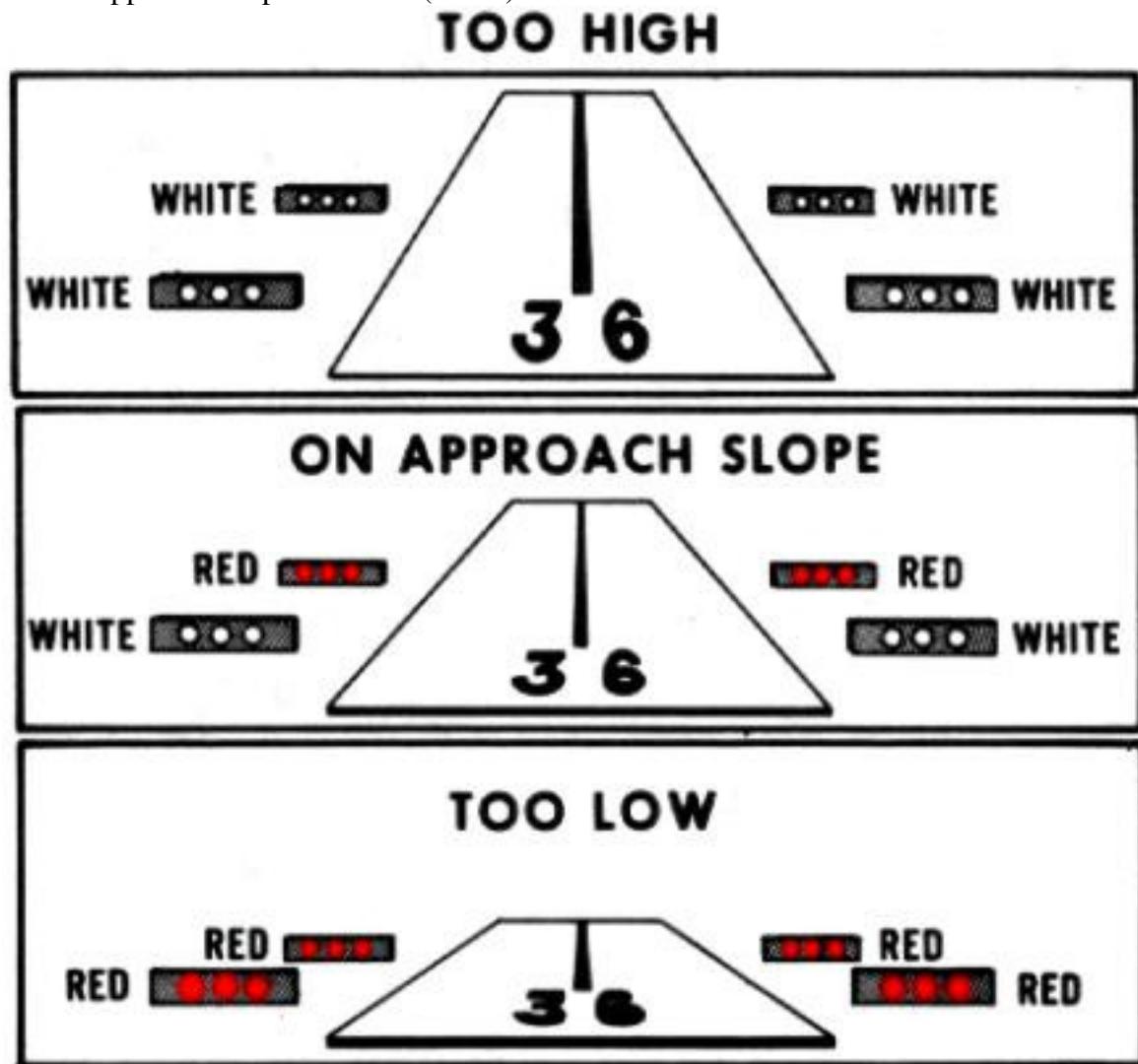
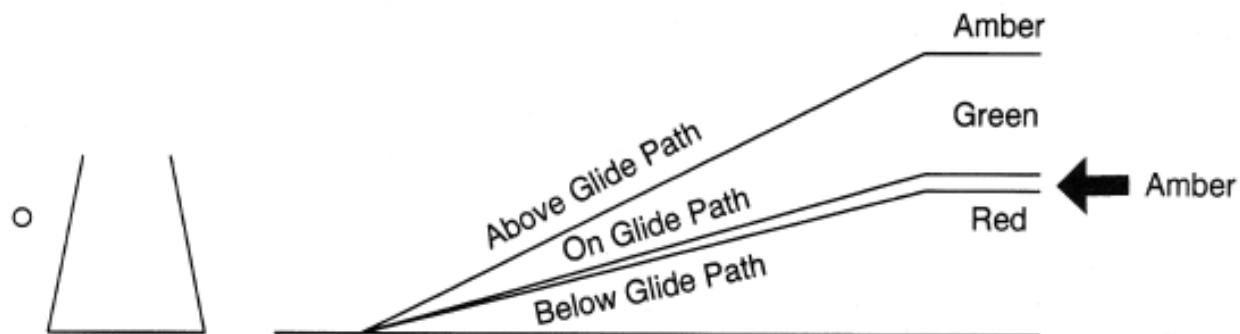


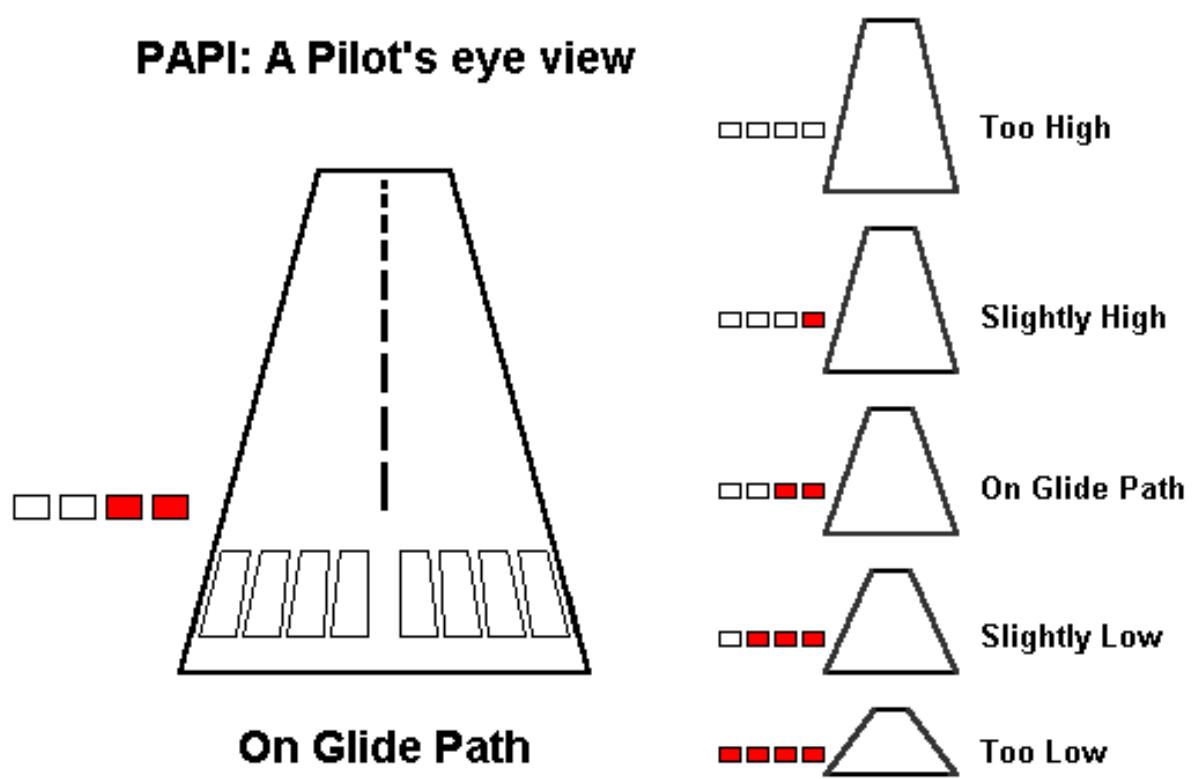
Figure 7-9 Using VASI on Landing Approach

Tri-Color VASI



Pulsating Visual Approach Slope Indicator (PVASI)

Precision Approach Path Indicator (PAPI)



Approach Lighting Systems (ALS)



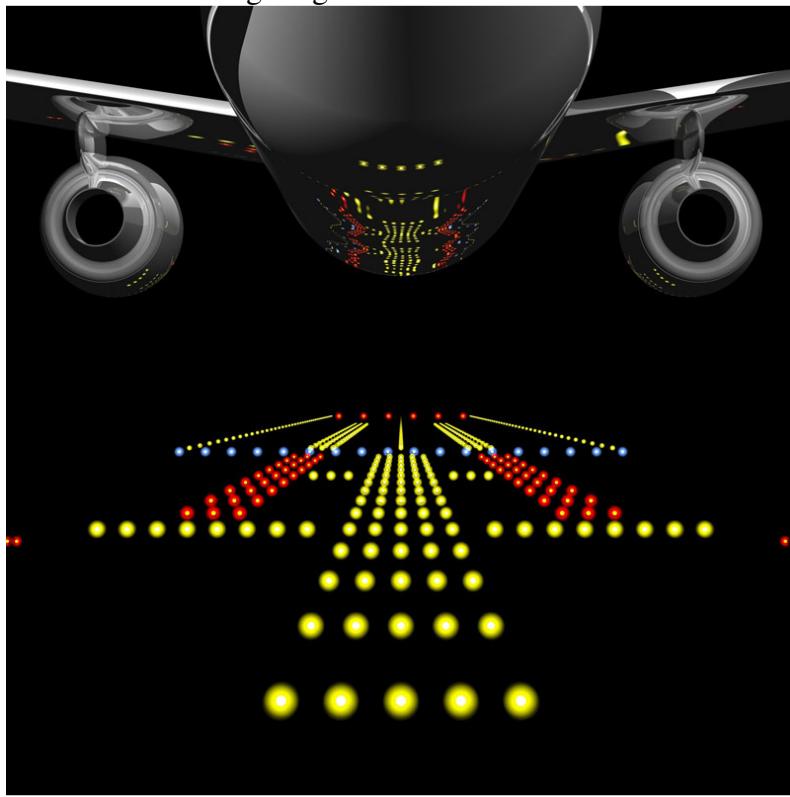
Runway Edge Lights



Runway End Identifier Lights (REILs)



Pilot-Controlled Lighting

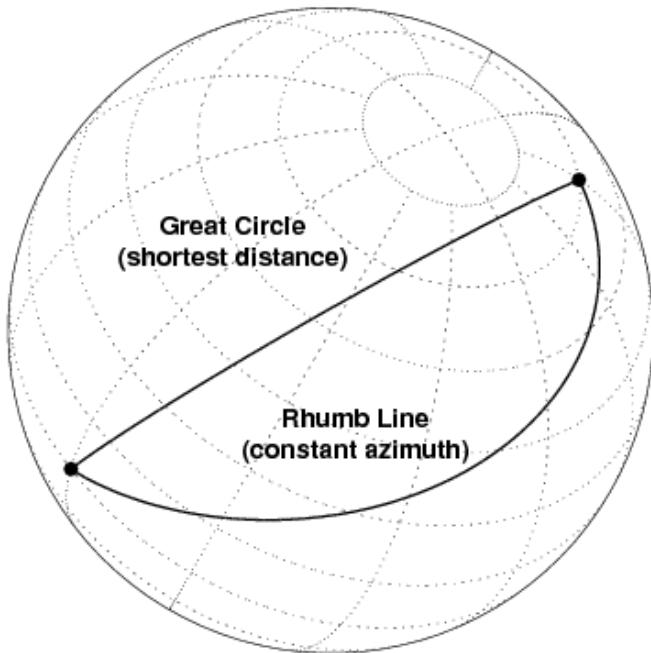


Part 3 Aeronautical charts

AERONAUTICAL CHARTS



Great Circle

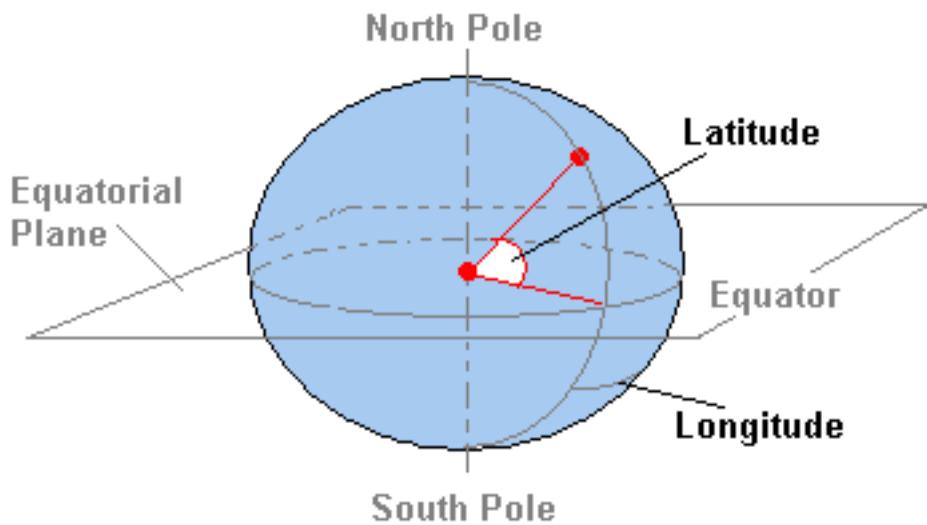


Small Circle

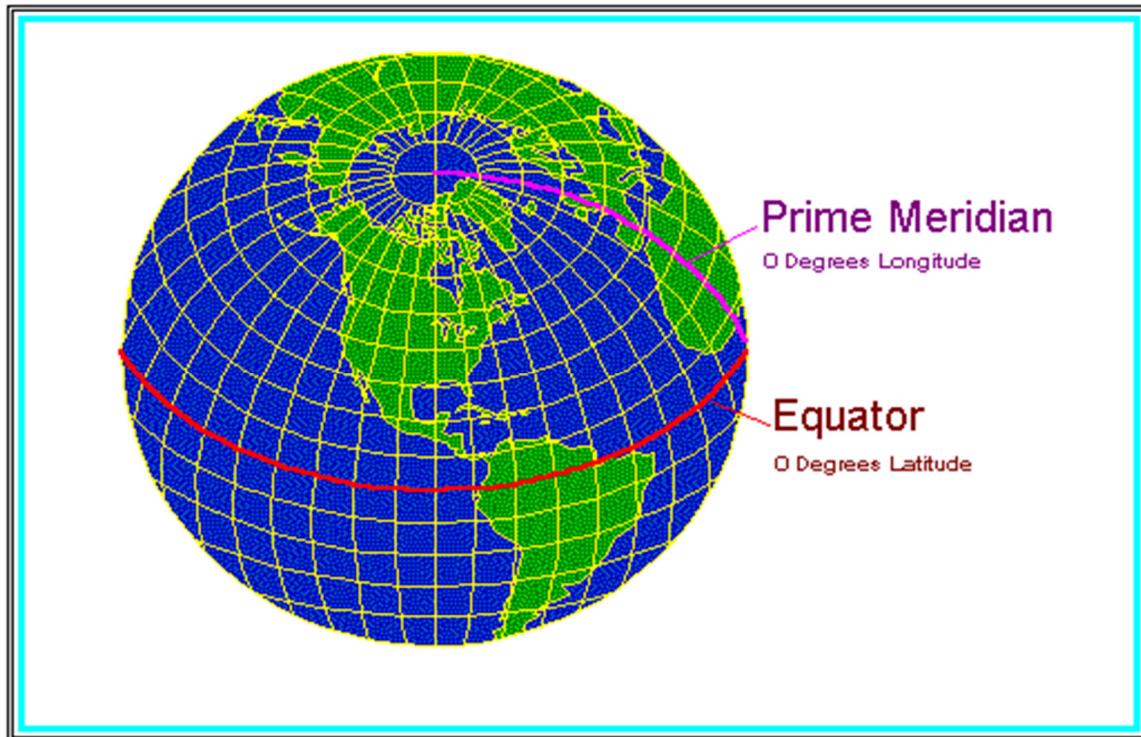
Parallels

Latitude

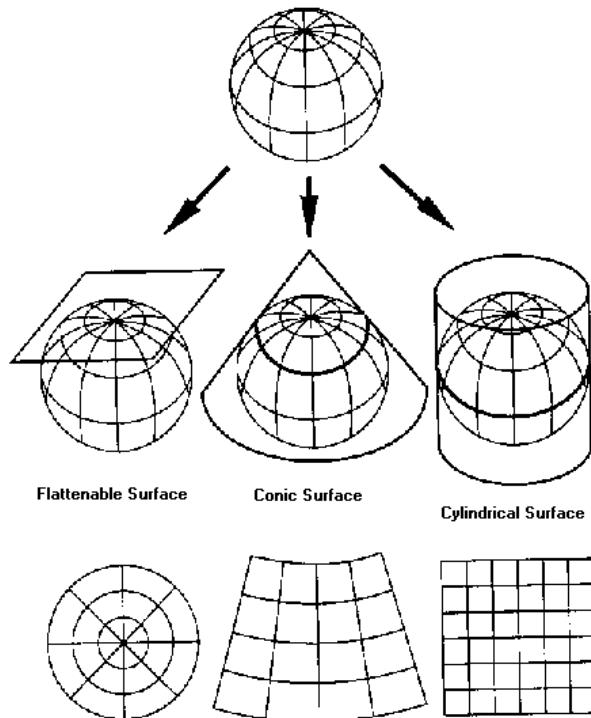
Longitude



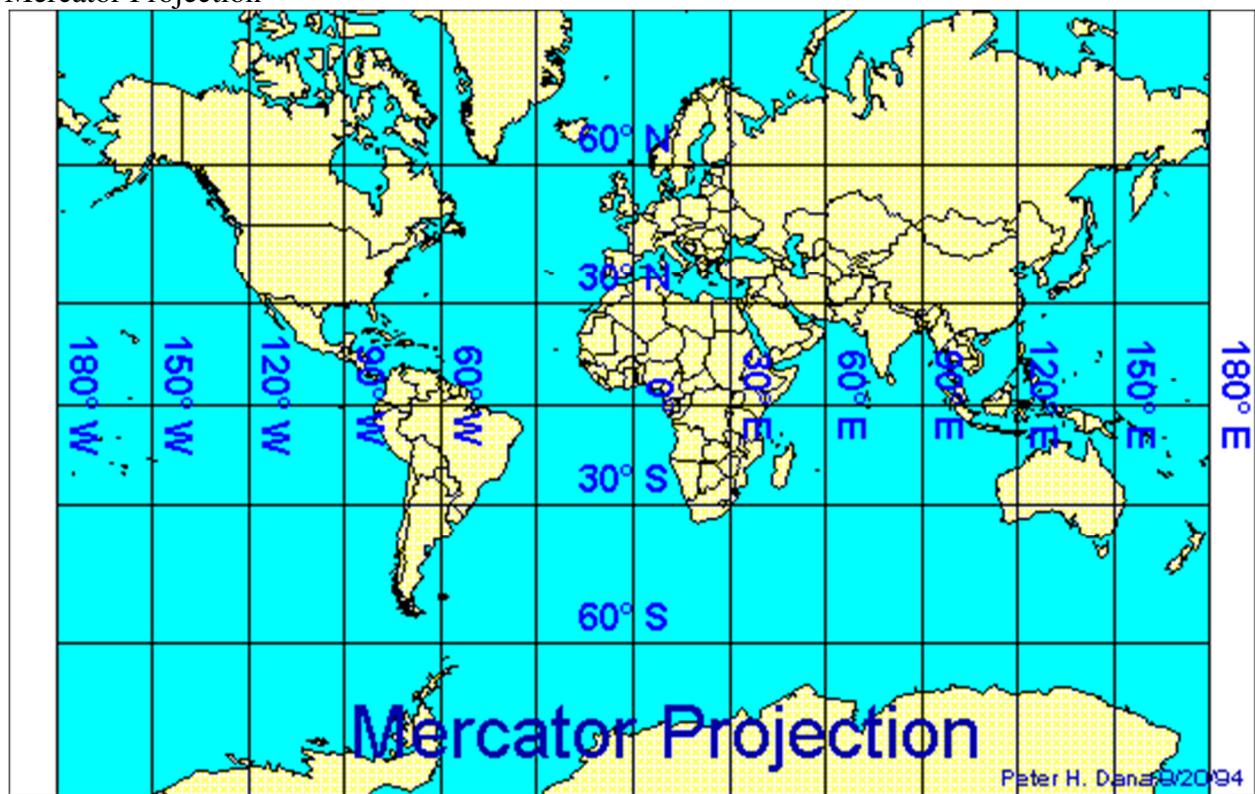
Meridians
Prime Meridian



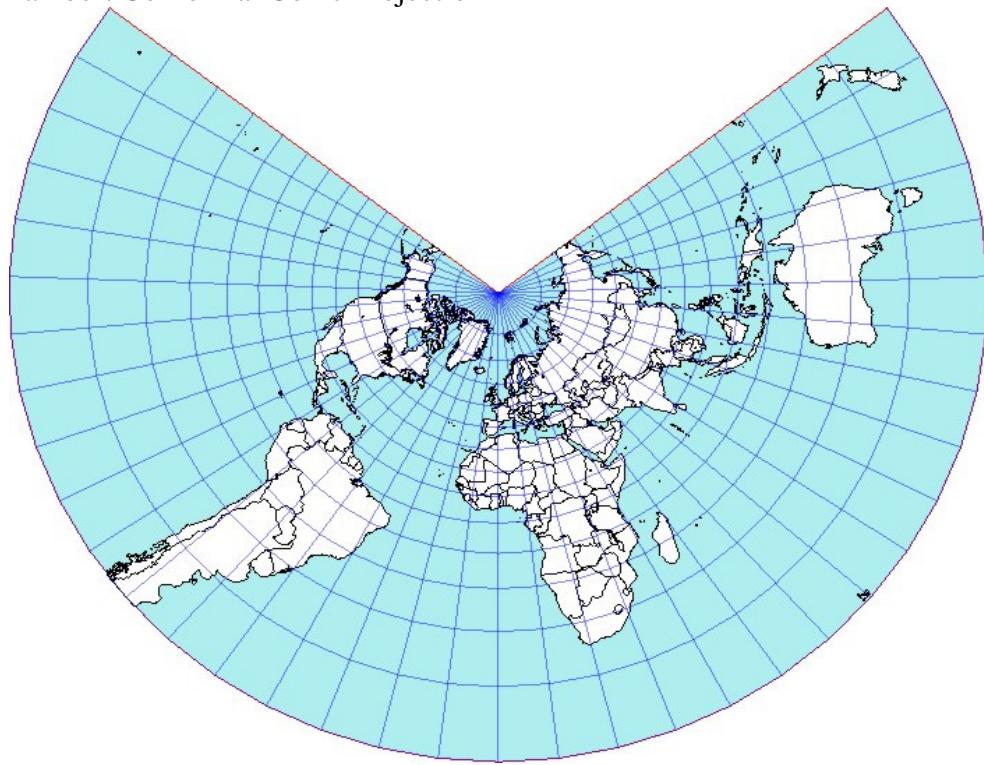
Projections



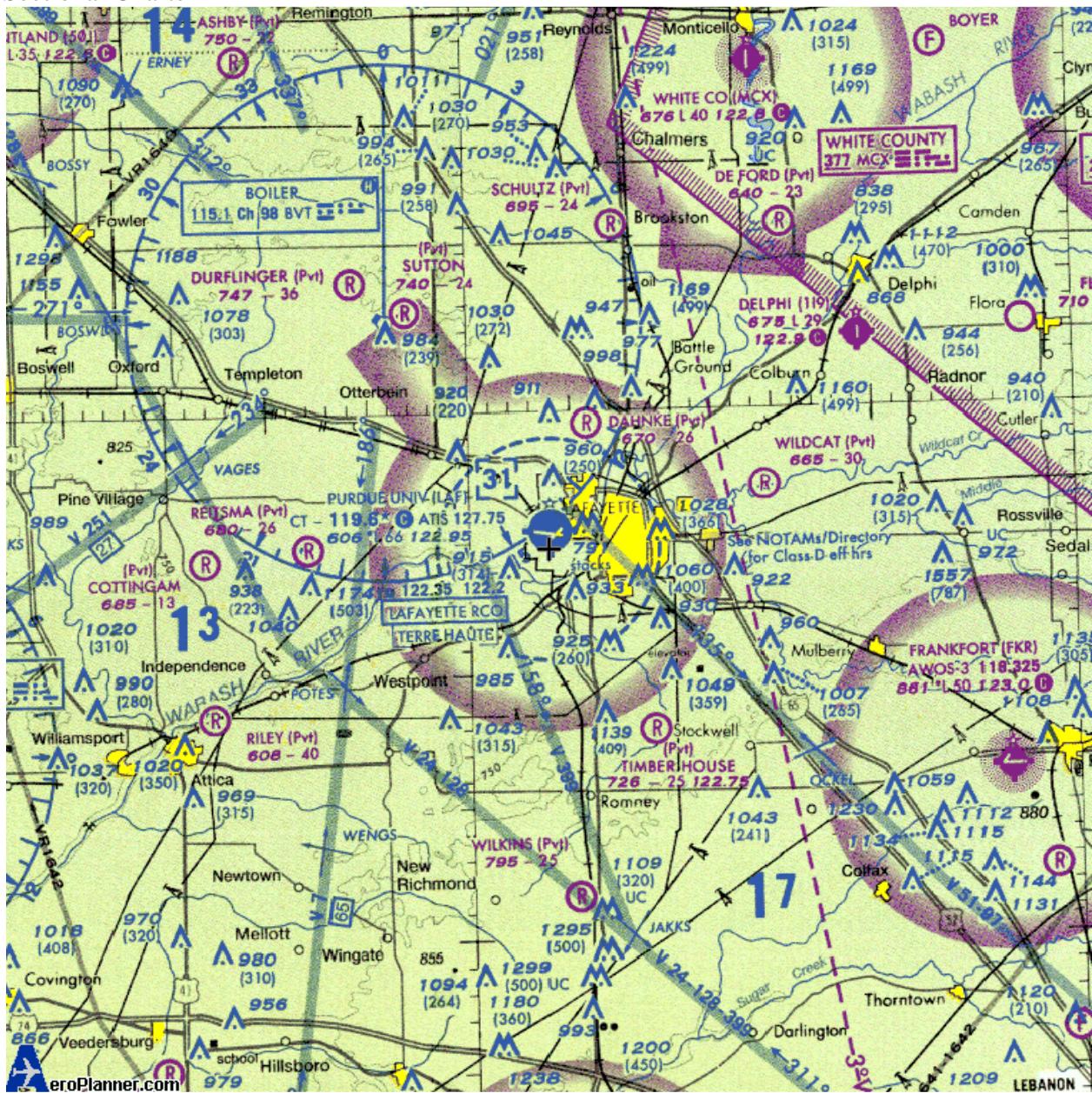
Mercator Projection



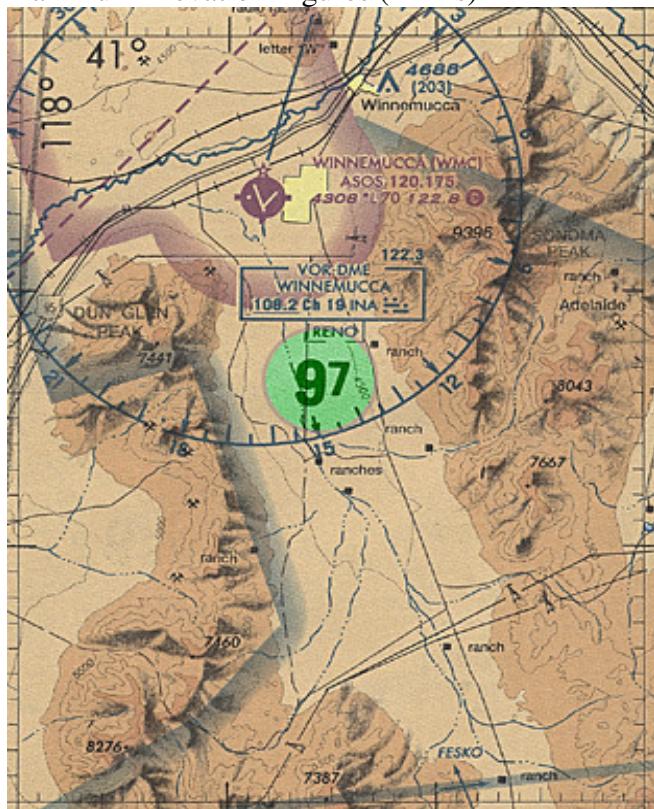
Lambert Conformal Conic Projection



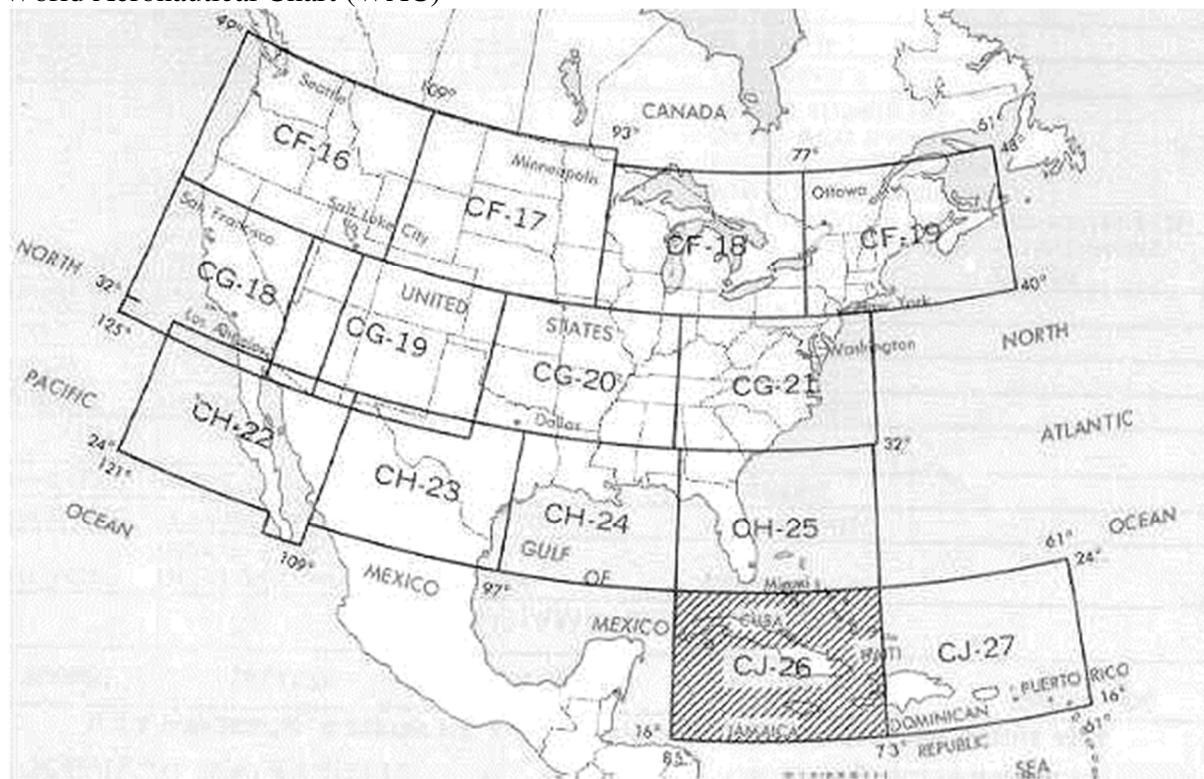
Sectional Charts



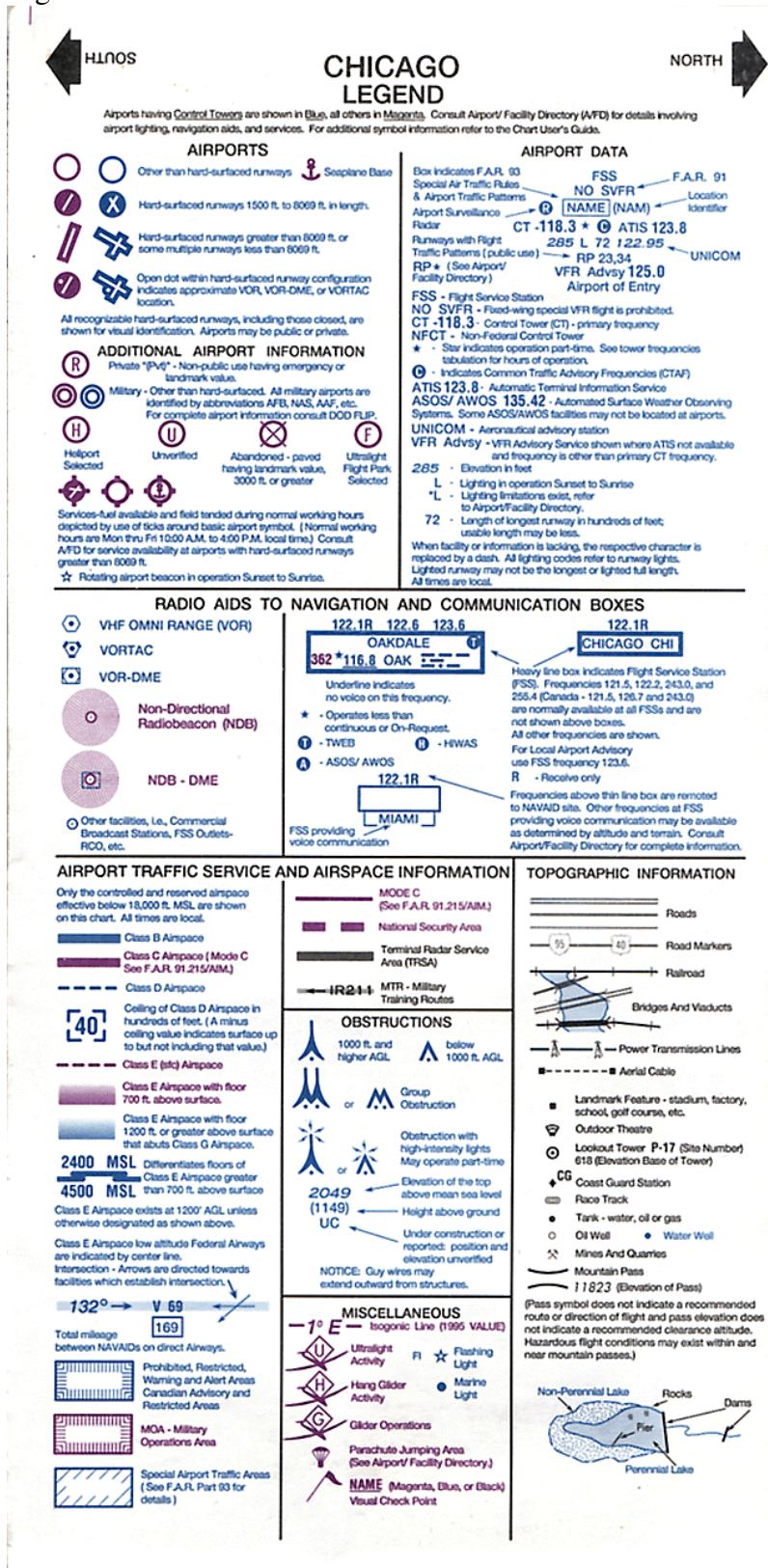
Maximum Elevation Figures (MEFs)



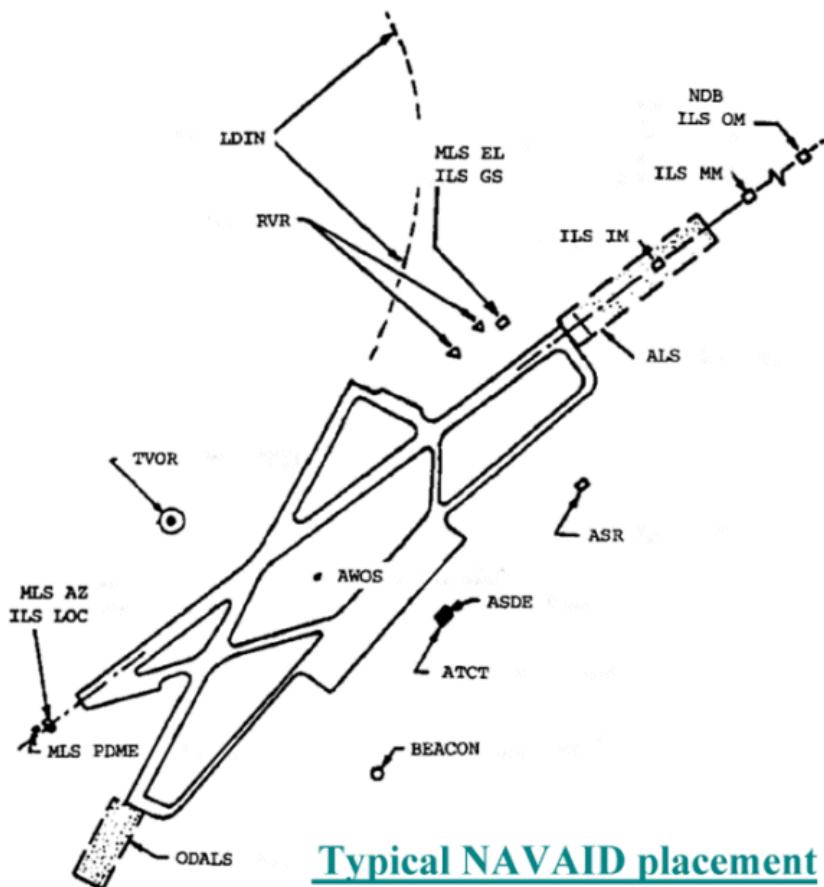
World Aeronautical Chart (WAC)



Legend

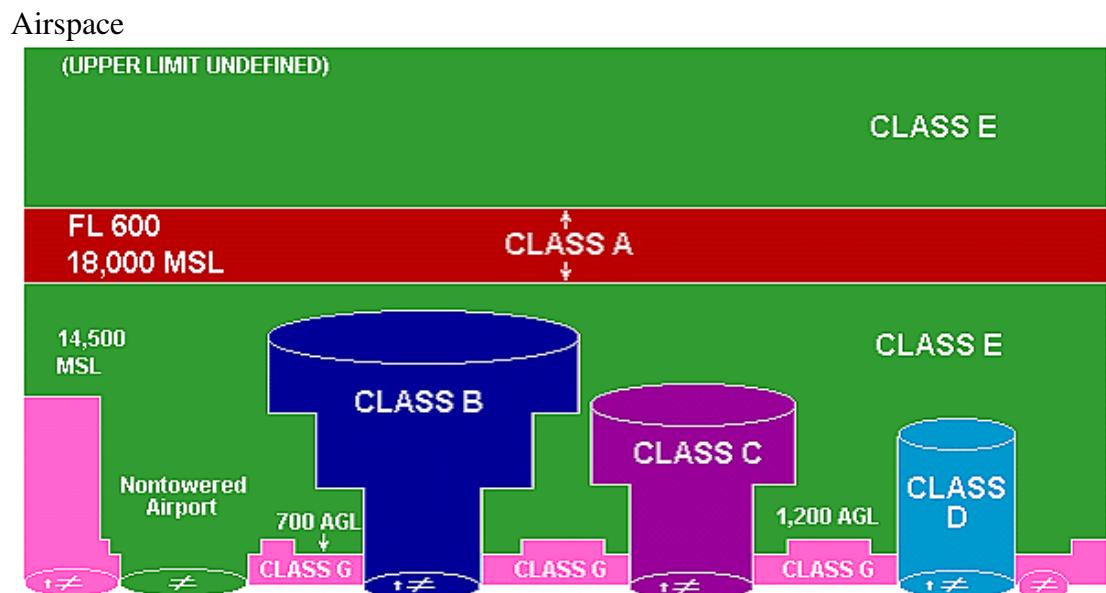


Navaids



Typical NAVAID placement

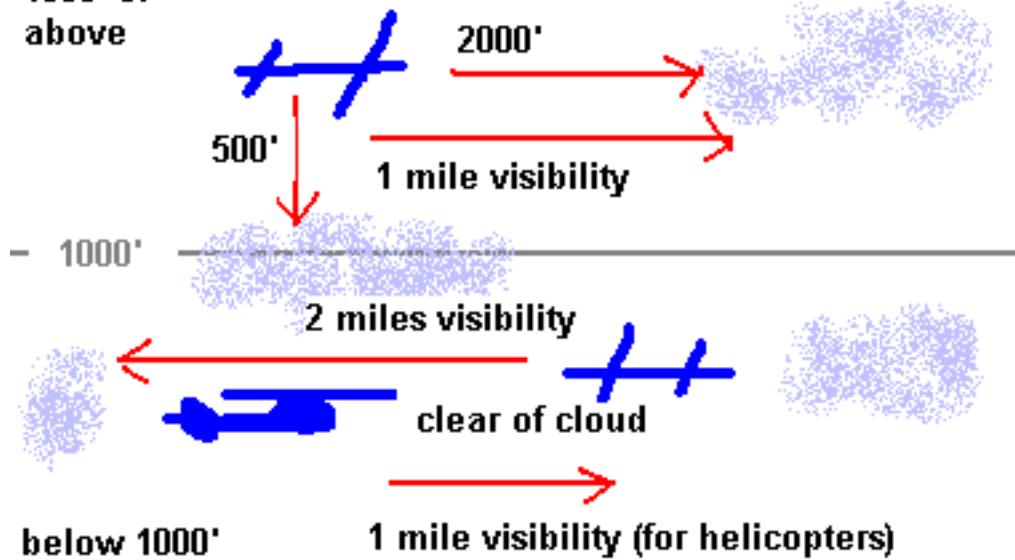
Airspace



Part 4

VFR Weather Minimums

1000' or
above



below 1000'

1 mile visibility (for helicopters)

Transponder

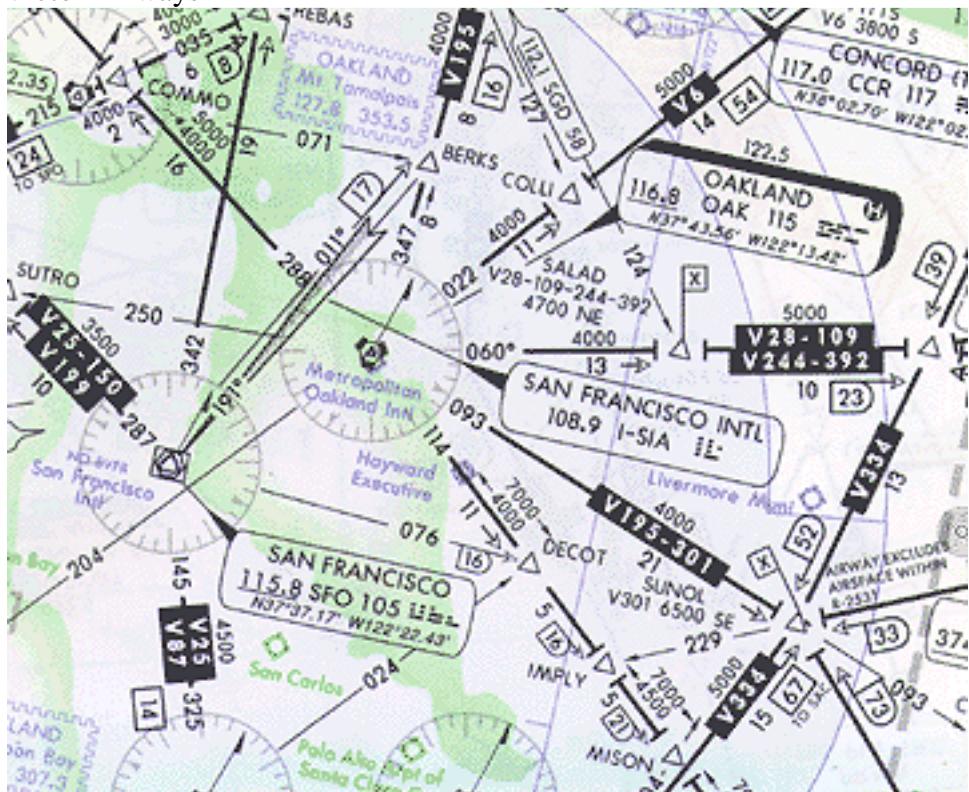


Federal Airways

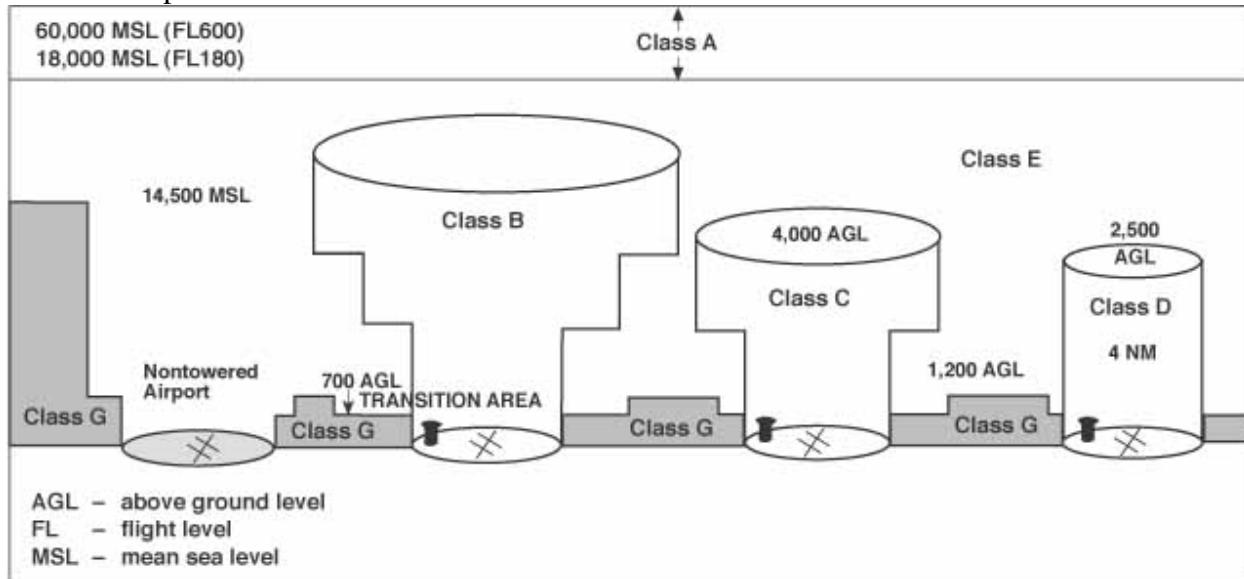


Federal Airways & Airspace®

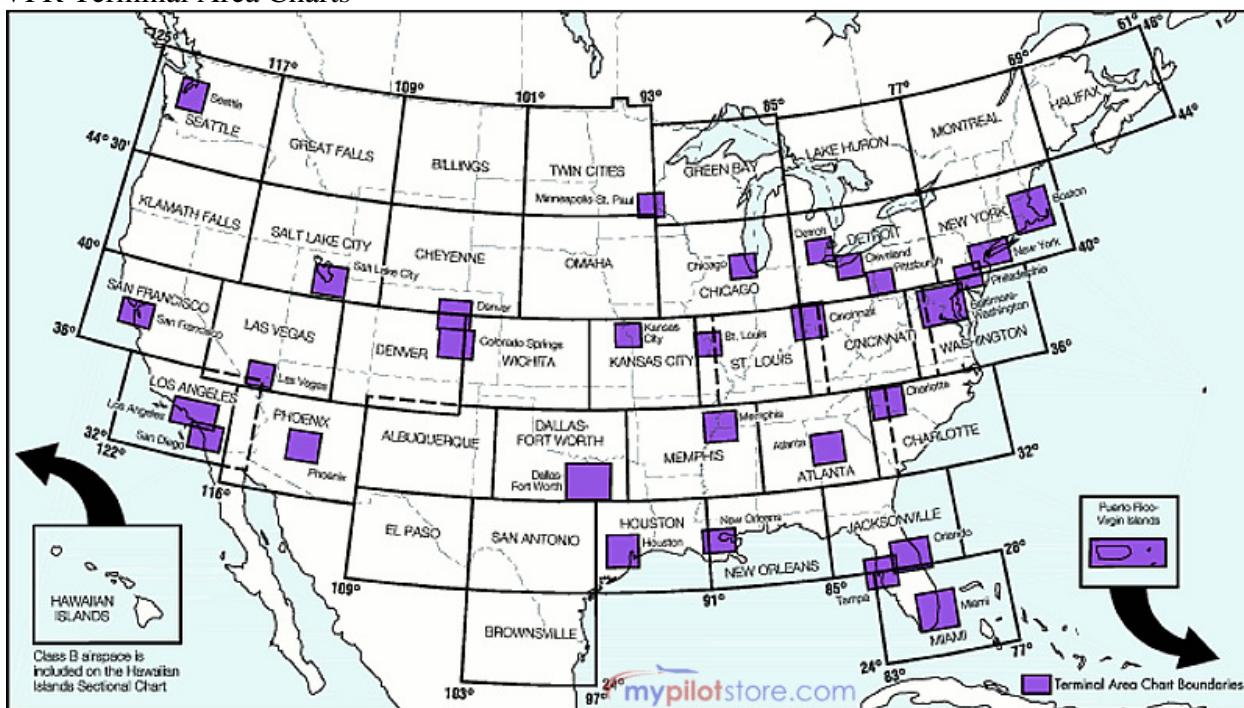
Victor Airways



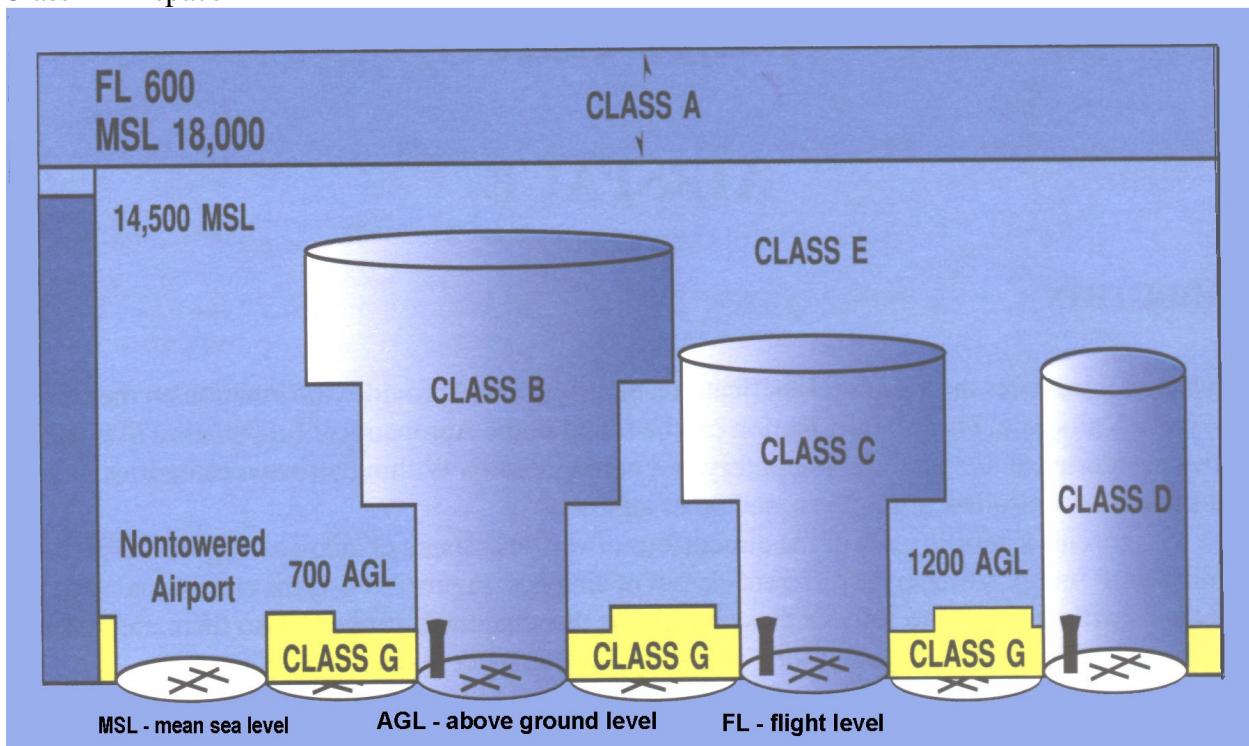
Class G Airspace
 Class E Airspace
 Class D Airspace
 Class C Airspace
 Class B Airspace



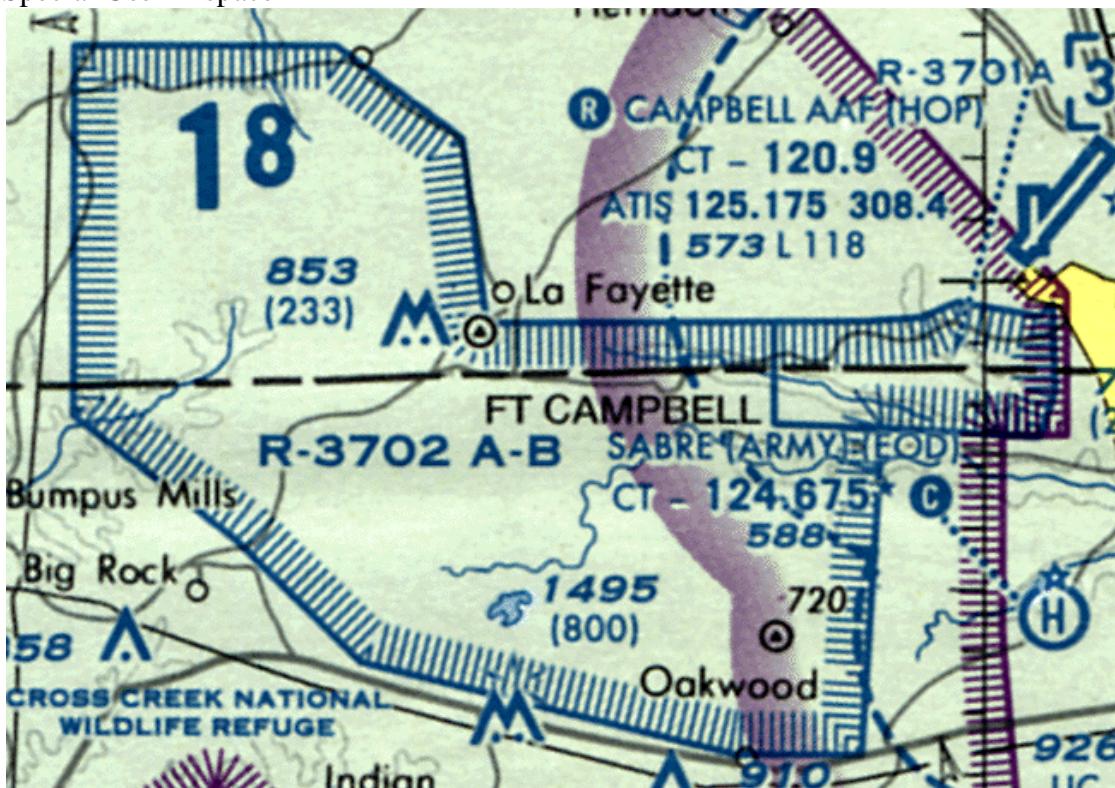
VFR Terminal Area Charts



Class A Airspace



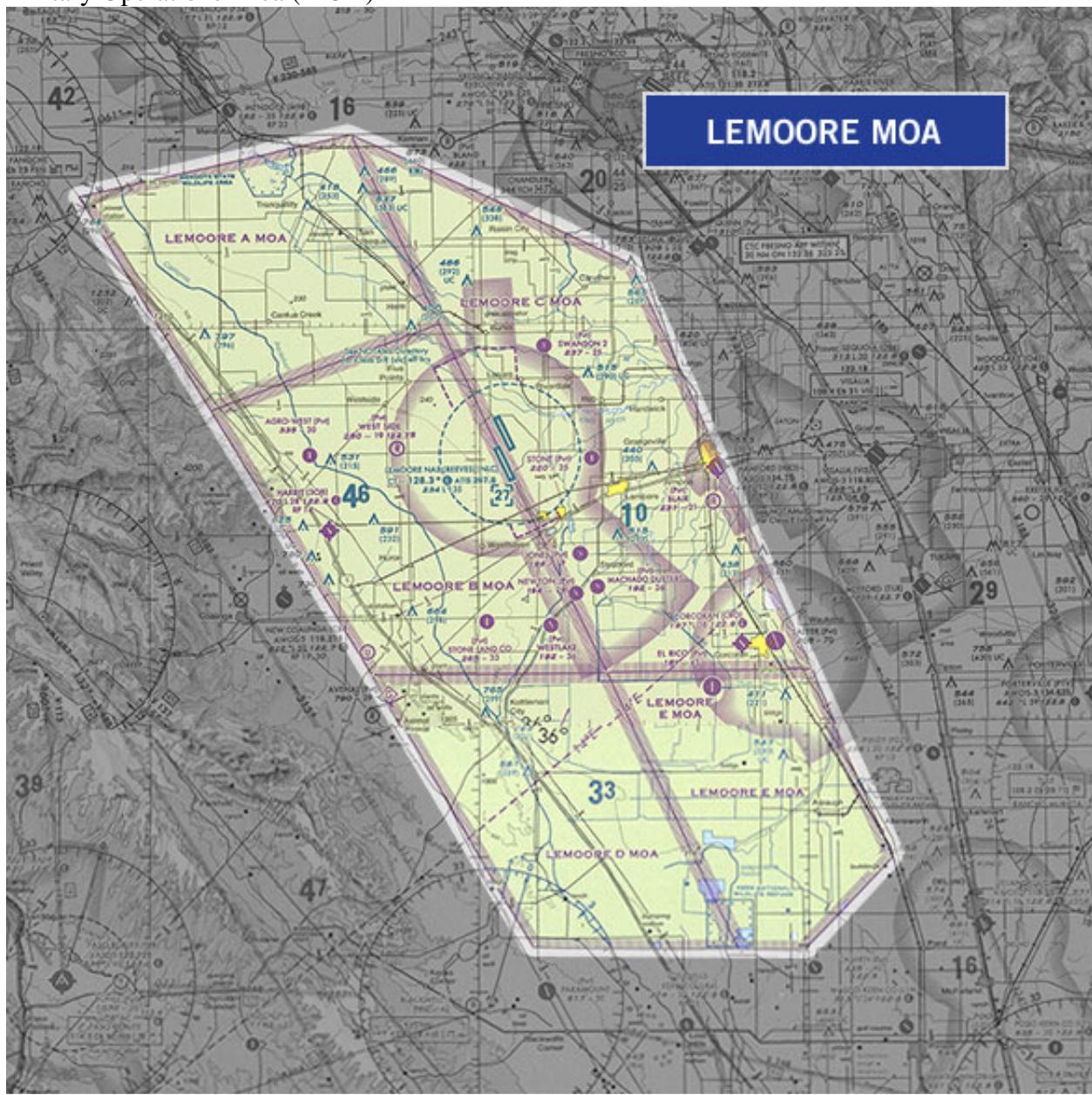
Special Use Airspace



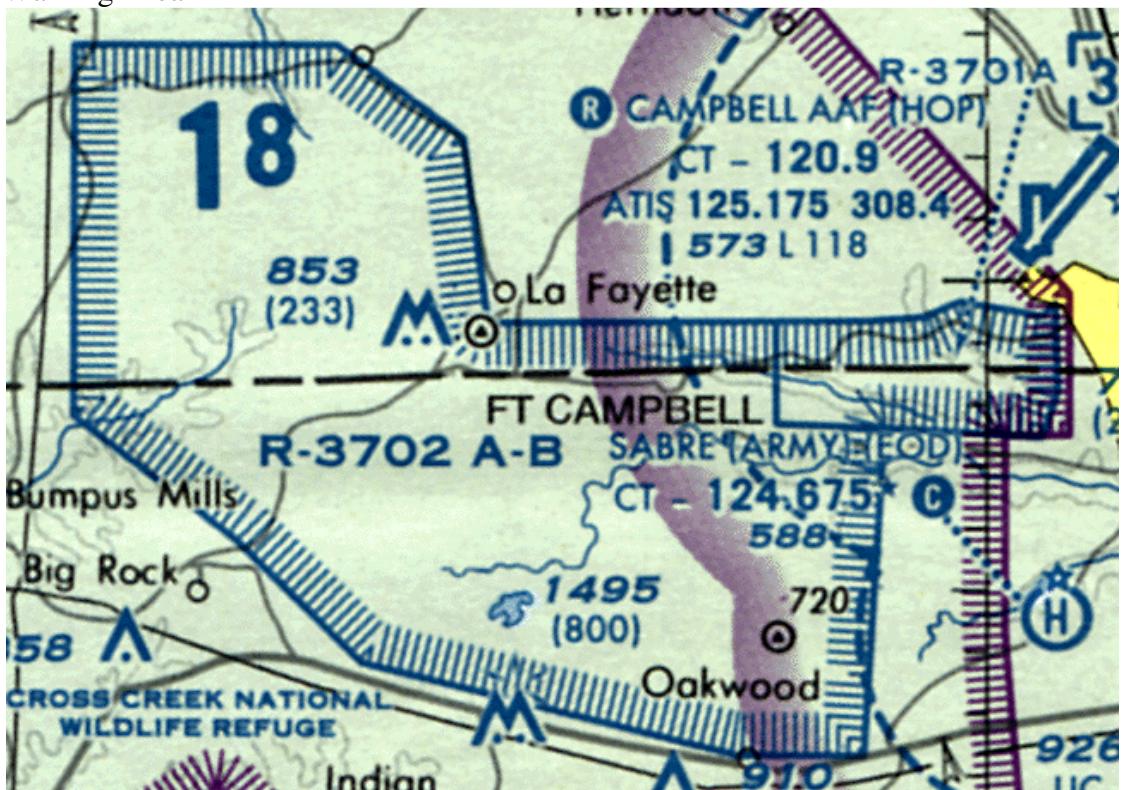
Alert Area



Military Operations Area (MOA)



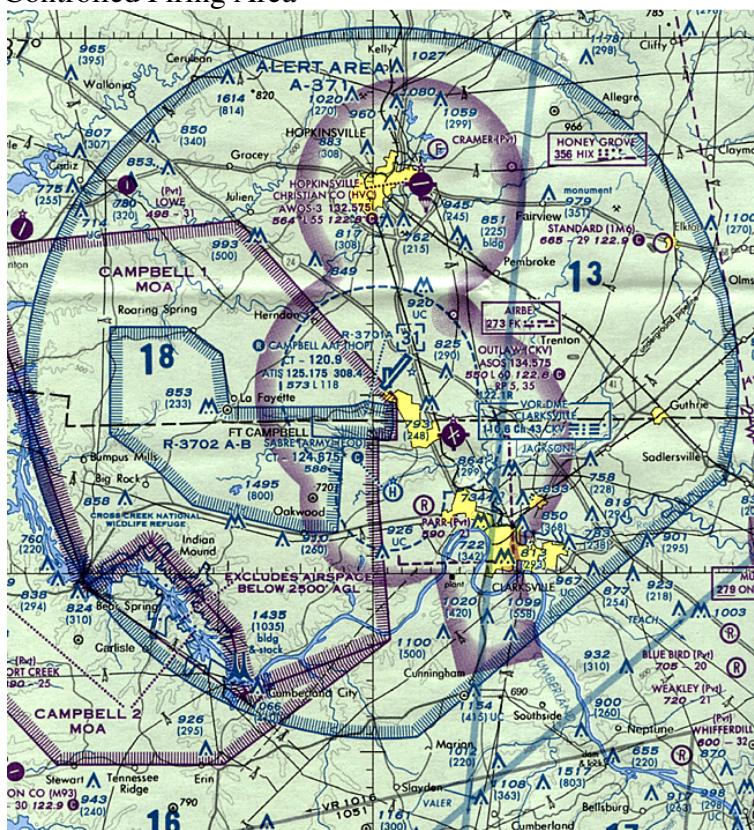
Warning Area



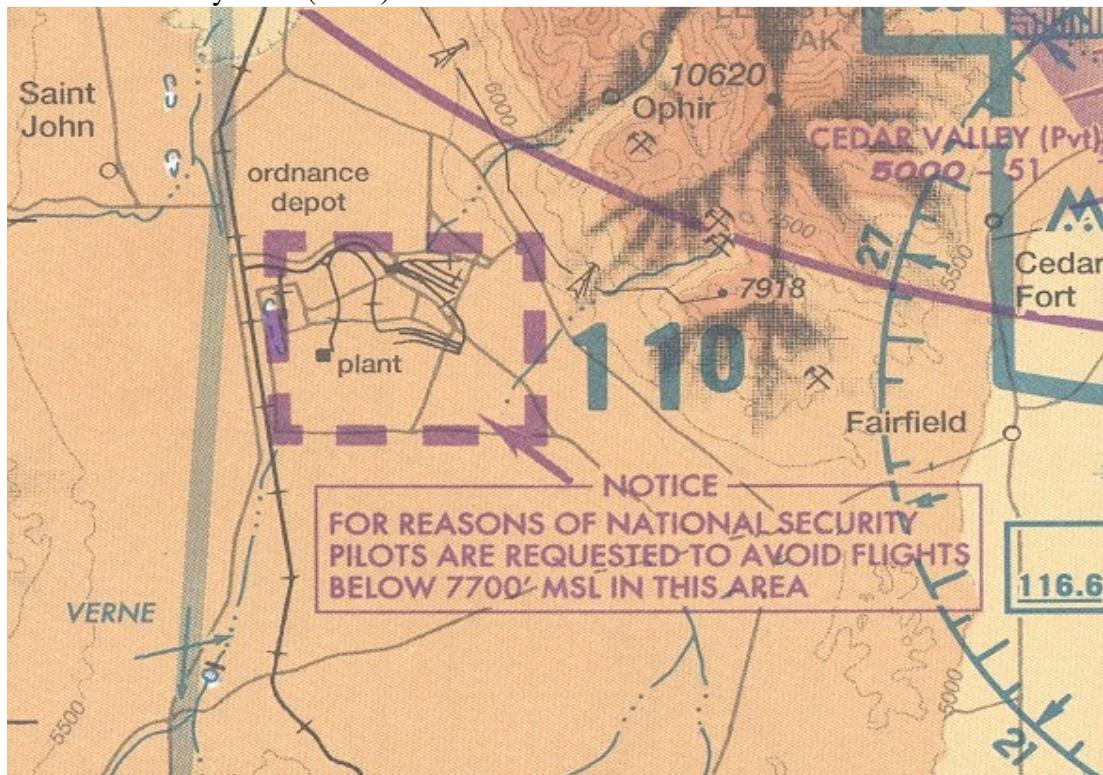
Restricted Area



Controlled Firing Area



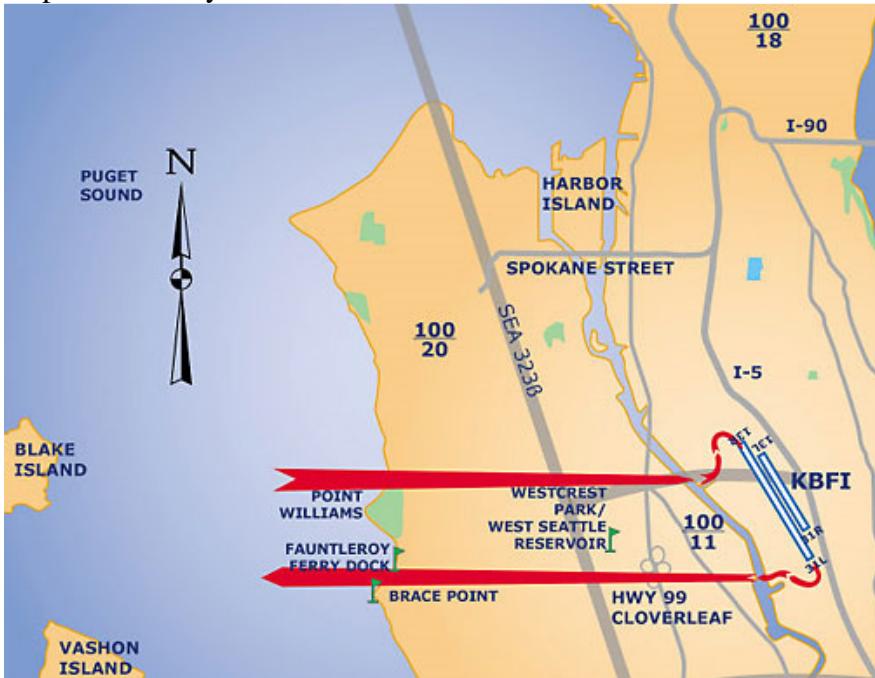
National Security Area (NSA)



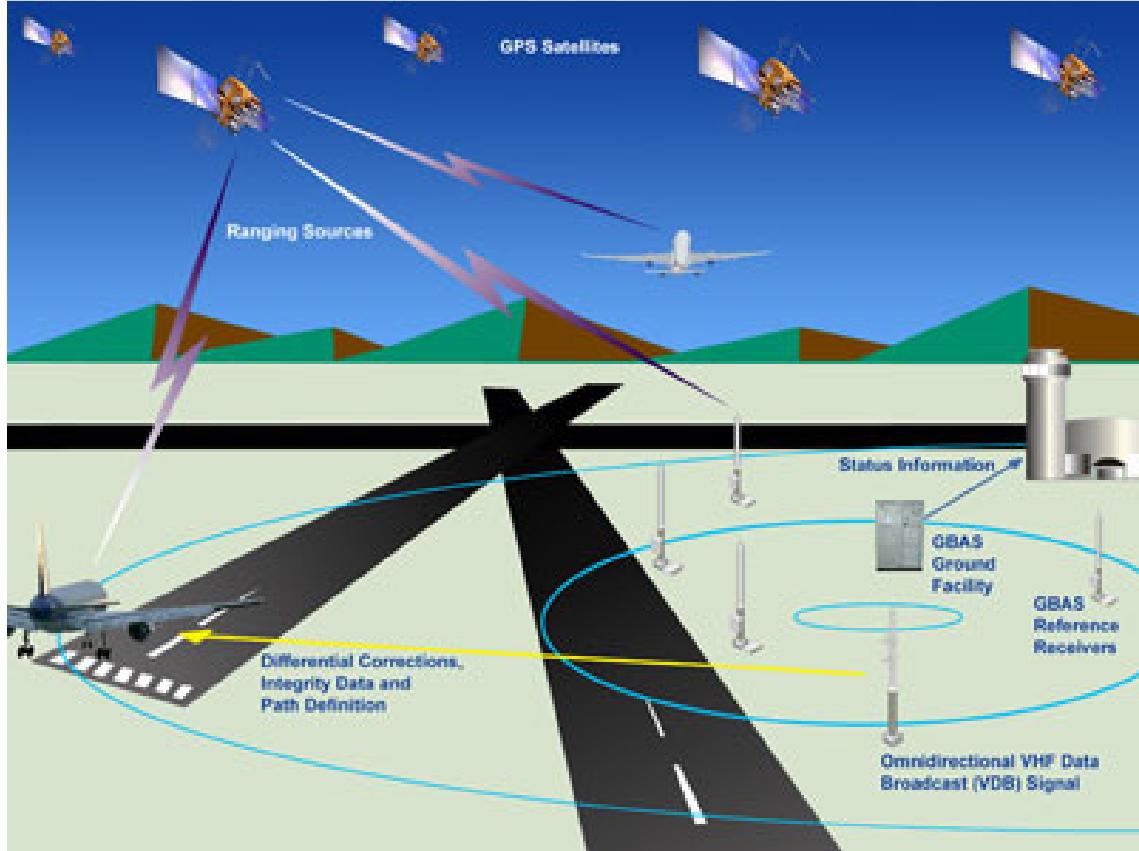
Other Airspace Areas



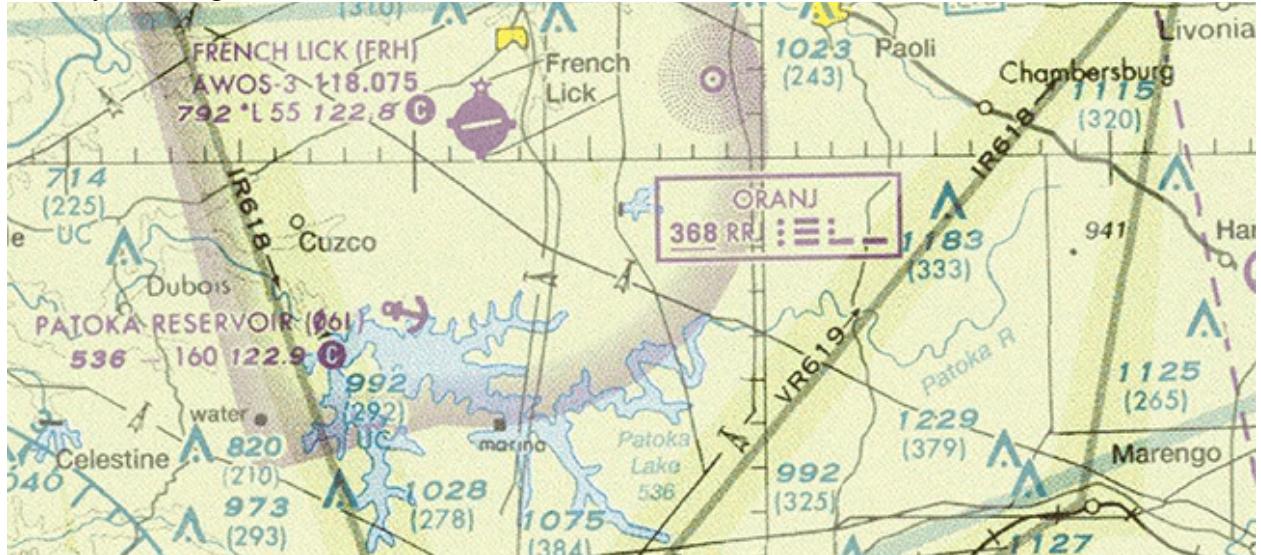
Airport Advisory Area



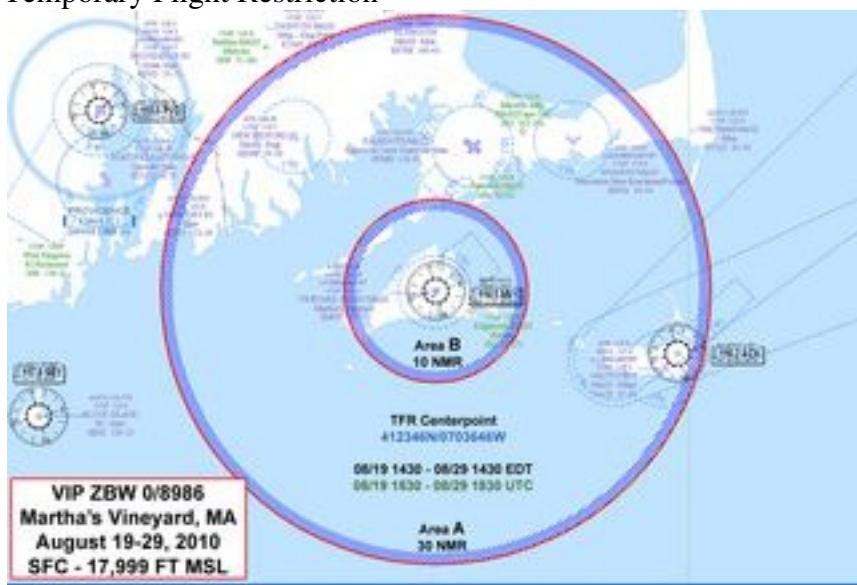
Local Airport Advisory Service (LAA)



Military Training Route (MTR)



Temporary Flight Restriction



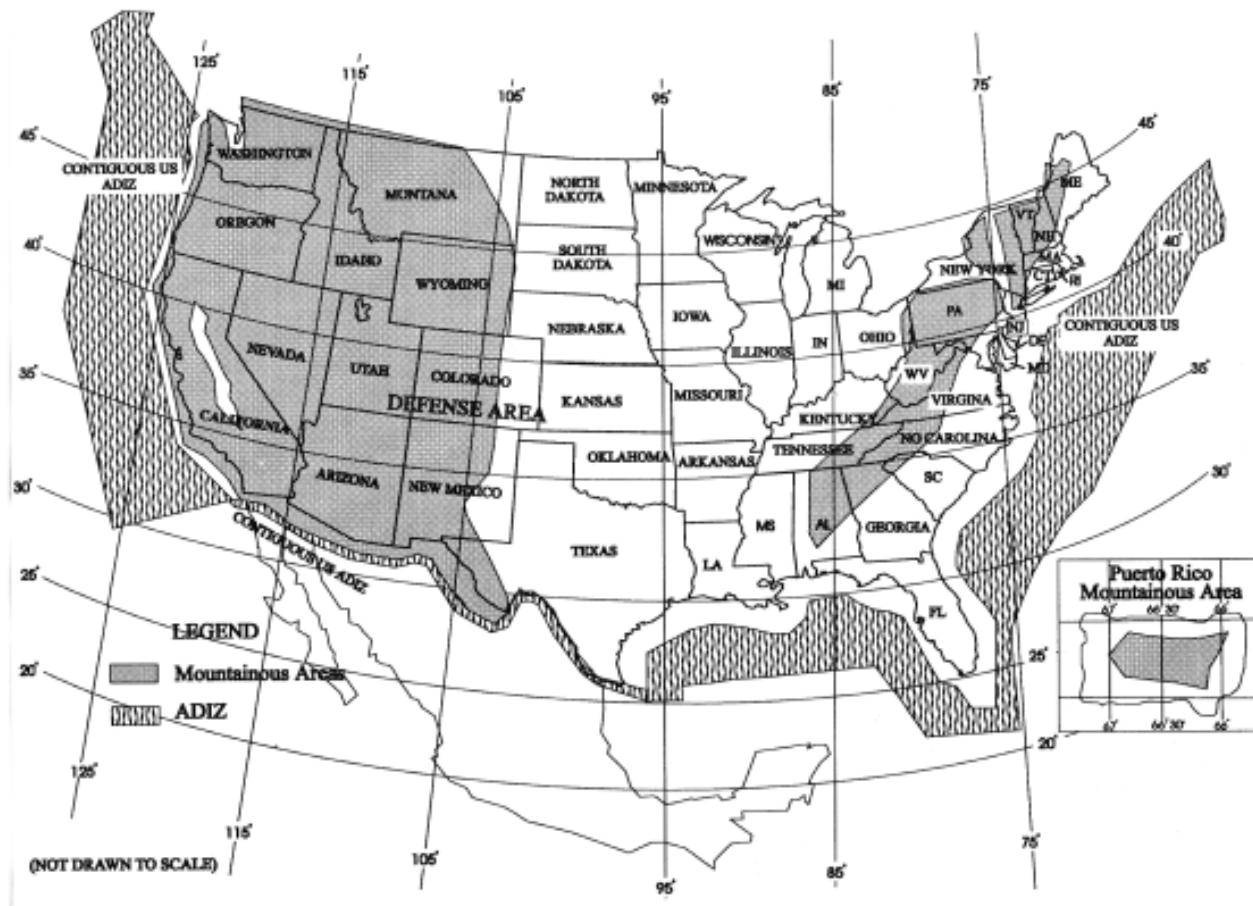
Parachute Jump Aircraft Area



Terminal Radar Service Area (TRSA)

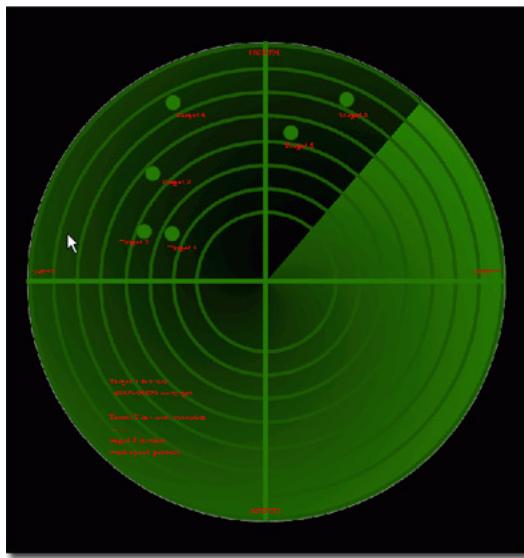


Air Defense Identification Zone (ADIZ)

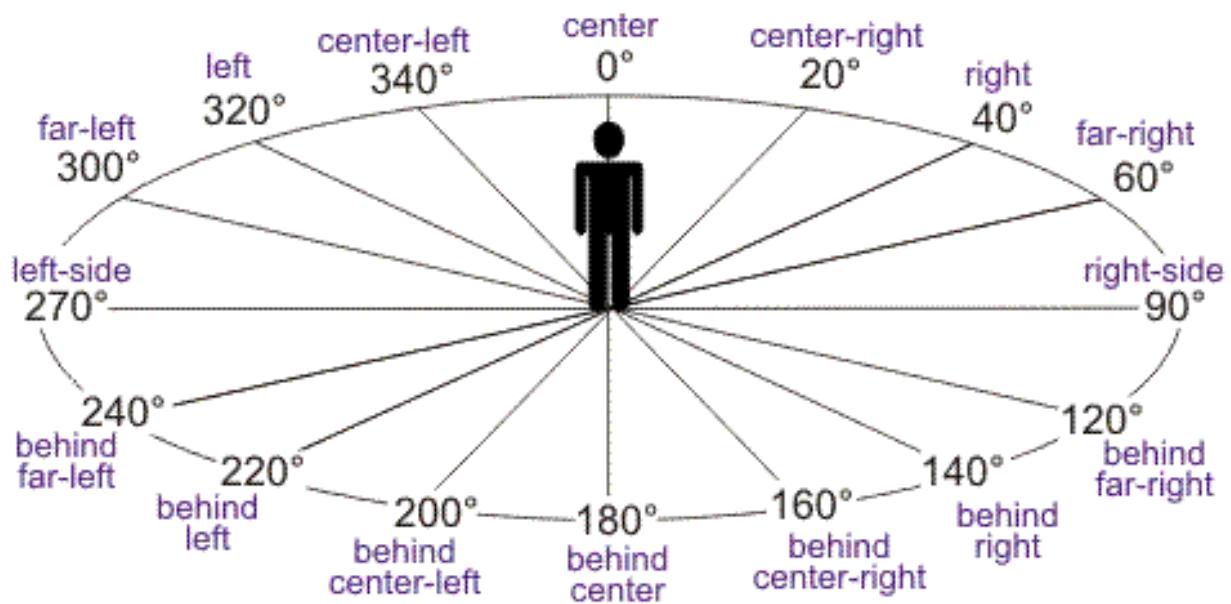


Section 5

Part 1
Radar



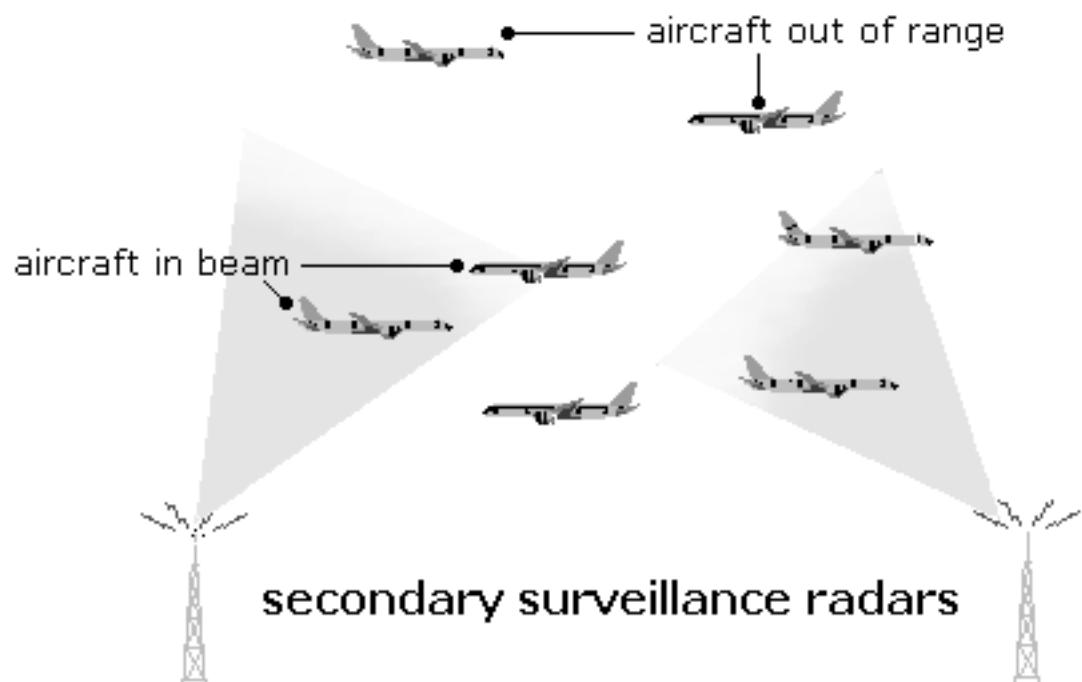
Range
Azimuth



Air Traffic Control Radar Beacon System (ATCRBS)



Secondary Surveillance Radar



Squawk



Airport Surveillance Radar (ASR)



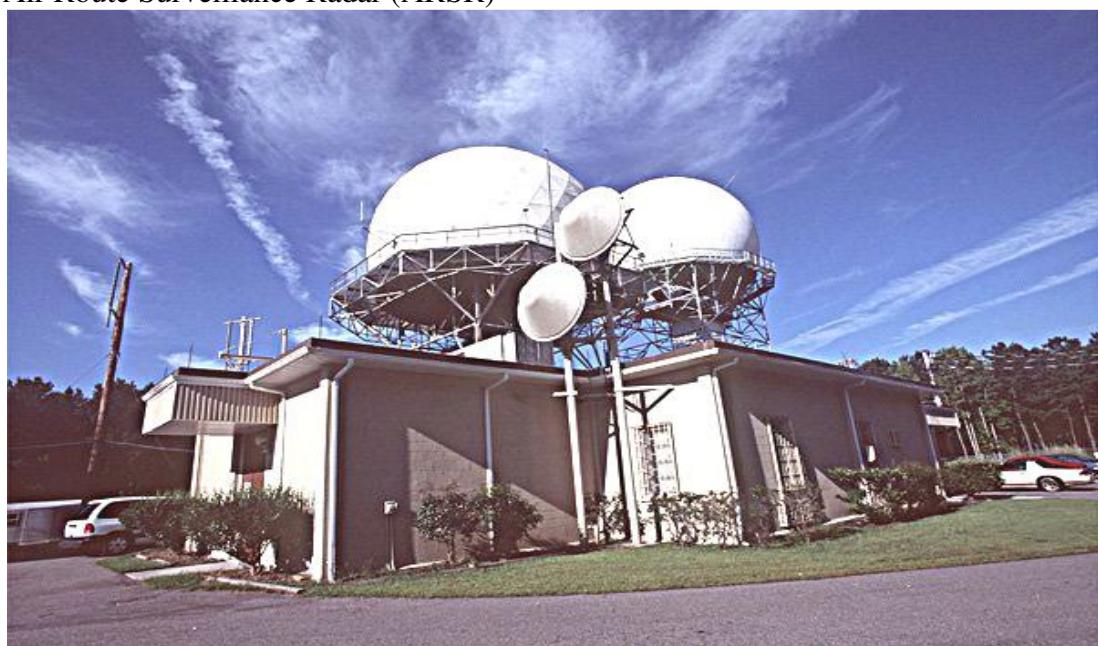
Terminal Radar Approach Control (TRACON)



Automated Radar Terminal System (ARTS)

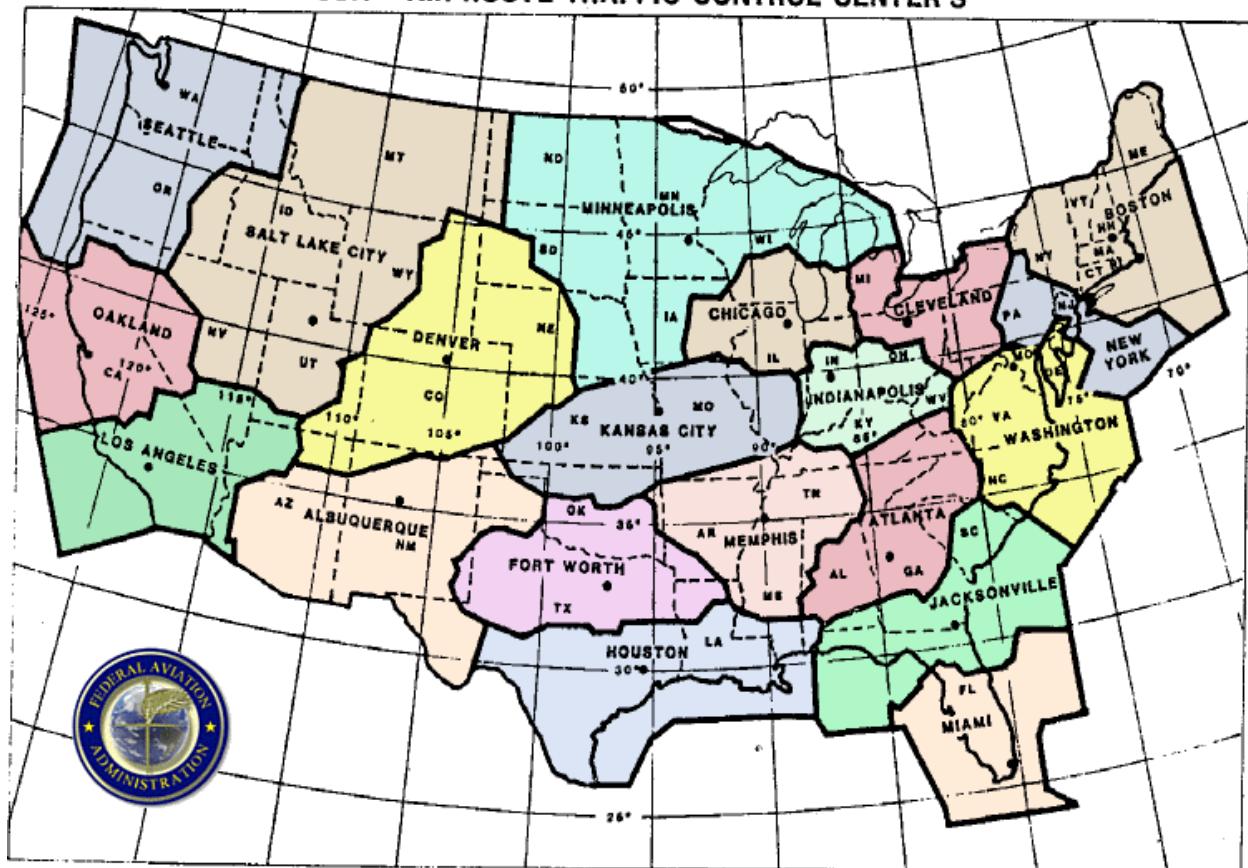


Air Route Surveillance Radar (ARSR)



Air Route Traffic Control Centers (ARTCCs)

USA - AIR ROUTE TRAFFIC CONTROL CENTER'S



Radar Traffic Information Service



VFR Radar Advisory Service

Flight Following



Safety Alert

Interagency Aviation Safety Alert



No. JA-06-01

July 12, 2006

page 1 of 2

Subject: The SAFECOM System – Your chance to speak out!

Area of Concern: Aviation Operations

Distribution: All Fire and Aviation Personnel

Discussion: The Department of the Interior (DOI) and the U.S. Forest Service (FS), maintain one of the most powerful accident prevention tools in the industry, the SAFECOM!

SAFECOM Home Page

The Aviation Safety Reporting System (ASRS) is a database of the Federal Aviation Administration's Information System (FAIS) requirements for voluntary reporting by the aviation industry. This system is used to collect information on categories of operational incidents, hazards, anomalies, and improvements. The system uses two levels of reporting: [ASRS](#) (Aviation Safety Reporting System) and [SAFECOM](#) (Safety Communication). The ASRS is used to collect information on all types of operational incidents, while the SAFECOM is used to collect information on specific areas of concern. The ASRS is used to identify trends and report safety-related issues. A user's access does not replace the official service for reporting an incident to the ASRS.

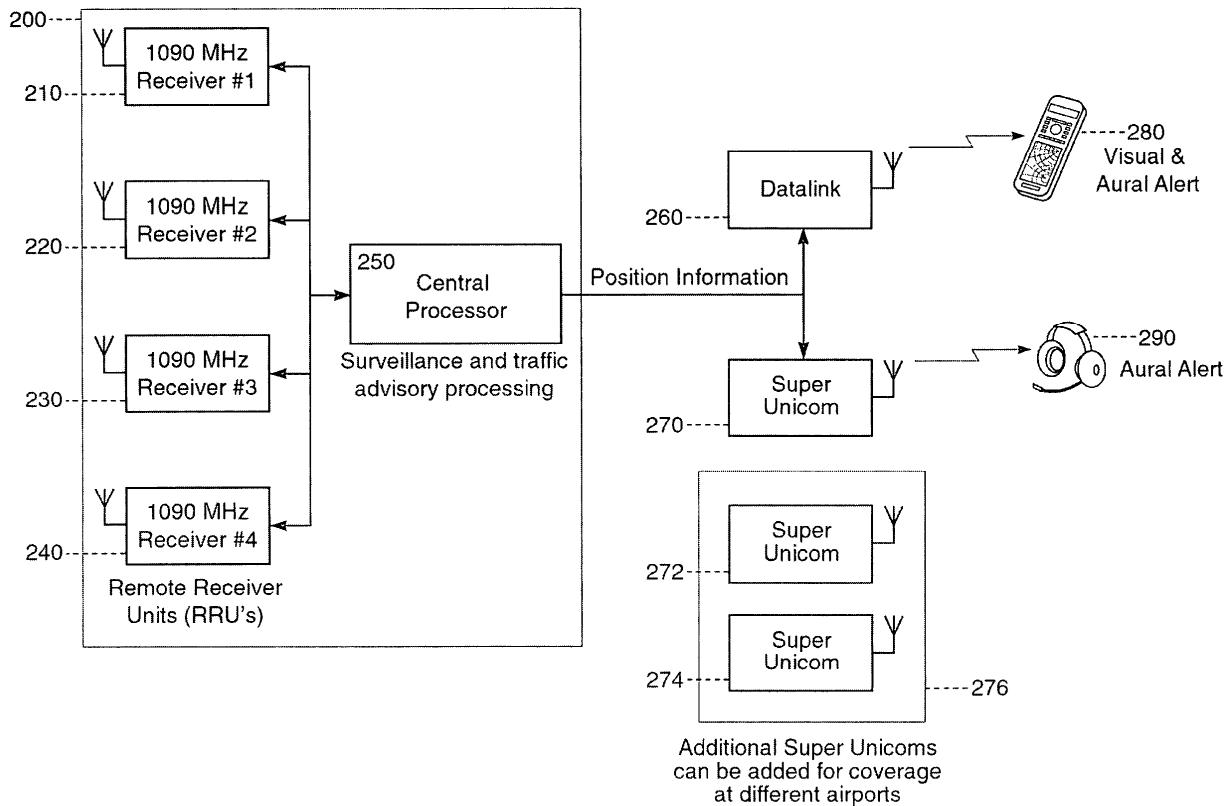
Please contact DOA or DOI for more information on ASRS or ASRS related problems with the SAFECOM database.

The SAFECOM is similar to the FAA's Aviation Safety Reporting System (ASRS - FAR 91.13) in that it is a voluntary reporting system for aviation hazards. However, as opposed to the ASRS that depends on the usage of hundreds of experts that identify a similar problem and then publishing a report for corrective action purposes, the SAFECOM system provides immediate information to reduce all levels of the organization that make them to take corrective action in real time.

The SAFECOM website (<http://www.safecom.gov>) provides excellent guidance on how and when to submit a SAFECOM. However, as often the SAFECOM system is misinterpreted and misunderstood. Failure to understand and use the SAFECOM system can prolong an unresolution, increase costs, and in a worst-case scenario cost lives due to it.

SAFECOM
An aviation Safety Communique

Minimum Safe Altitude Warning (MSAW)

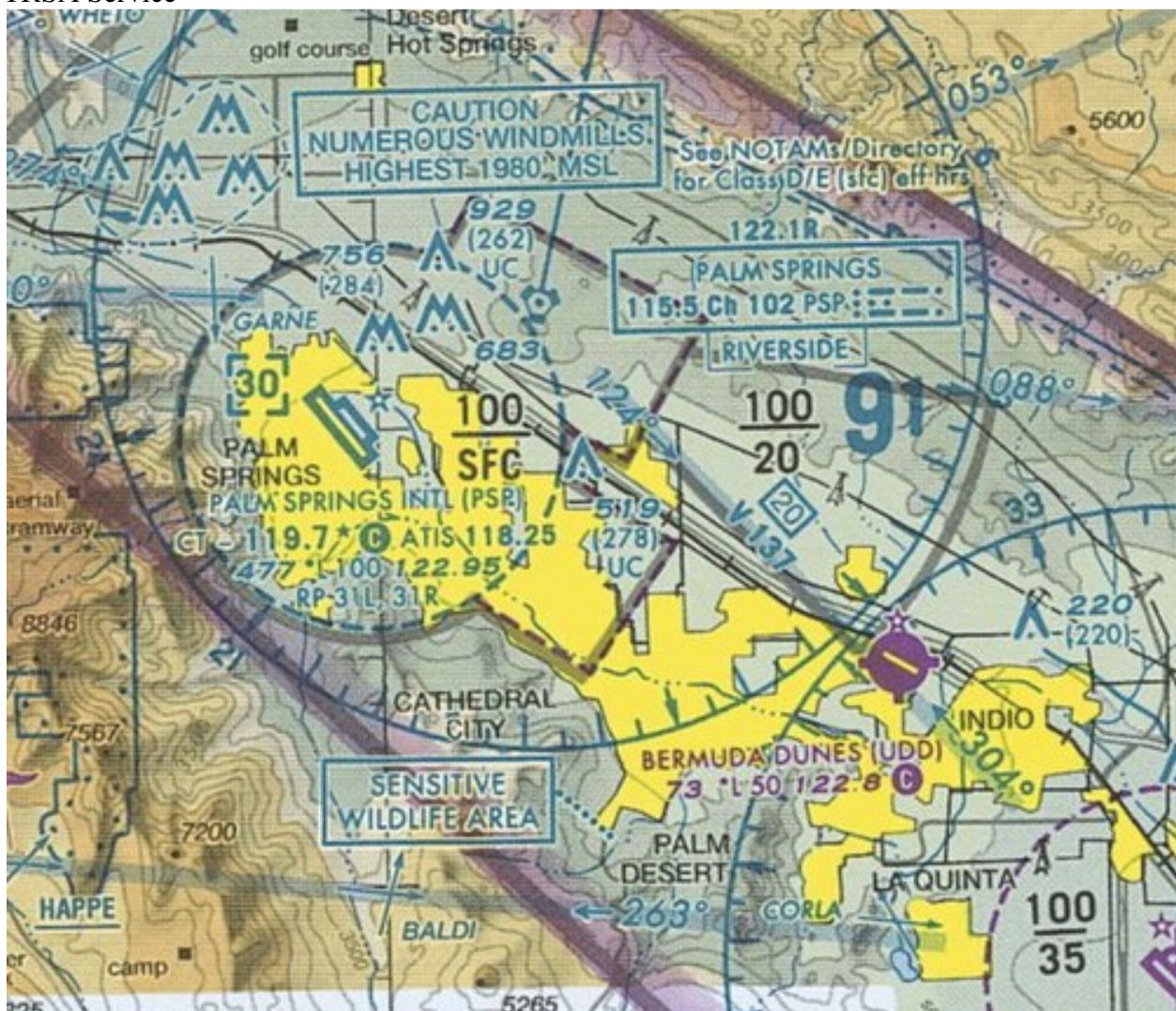


Terminal VFR Radar Service



Basic Radar Service

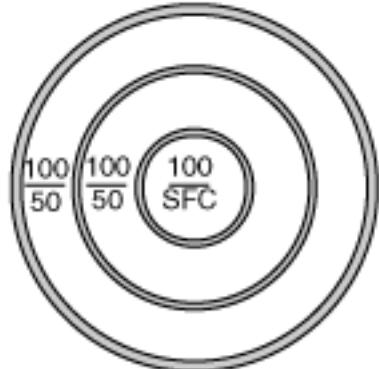
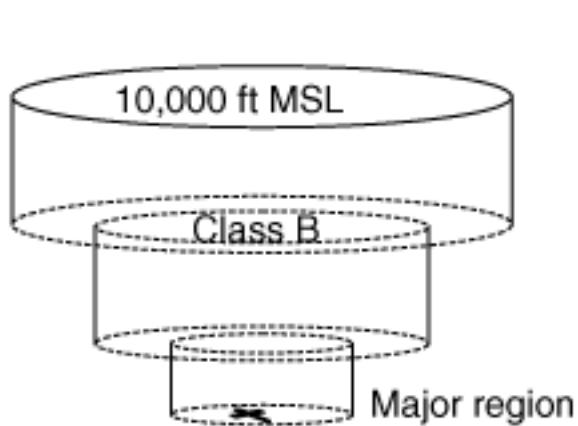
TRSA Service



Class C Service



Class B Service



Class B airspace is depicted in blue on a sectional chart

Automatic Terminal Information Service (ATIS)

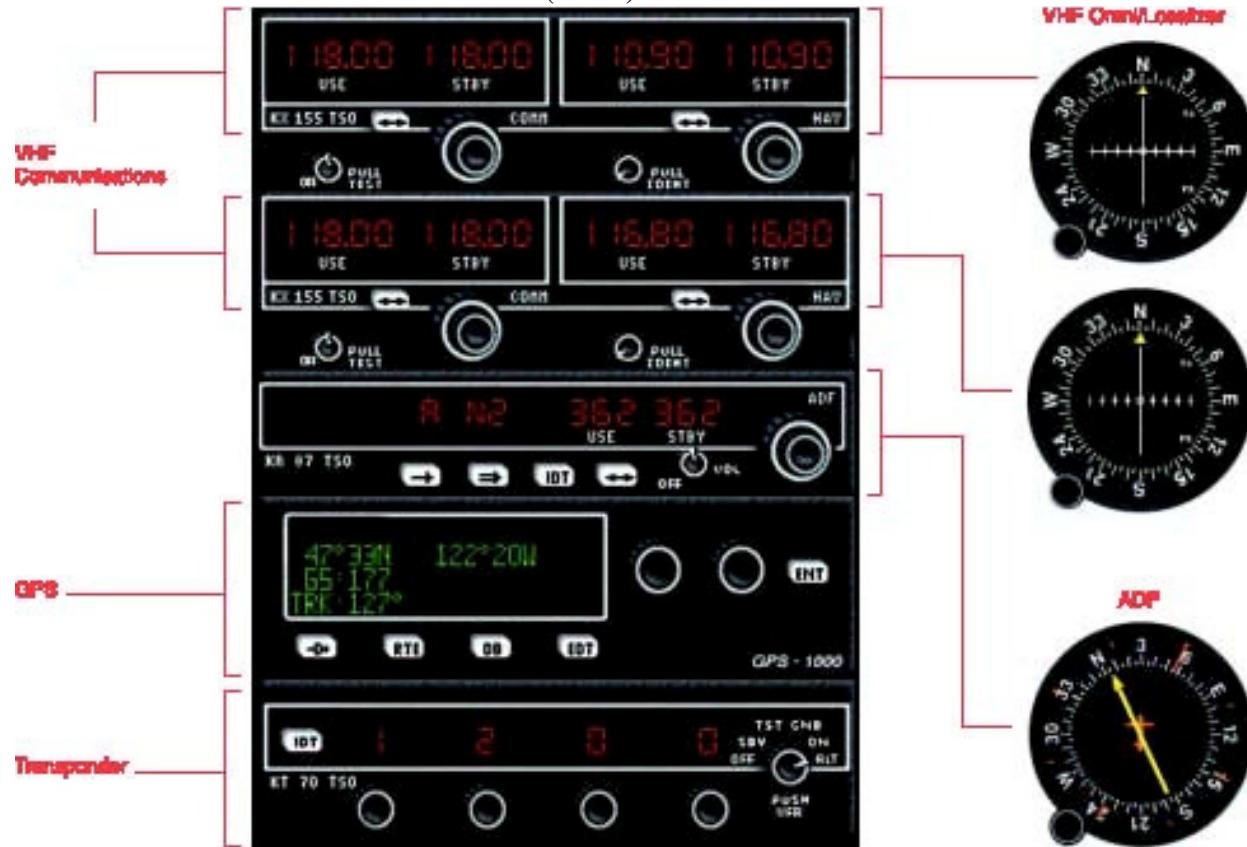


Figure 9-1. Typical NAV/COM installation.

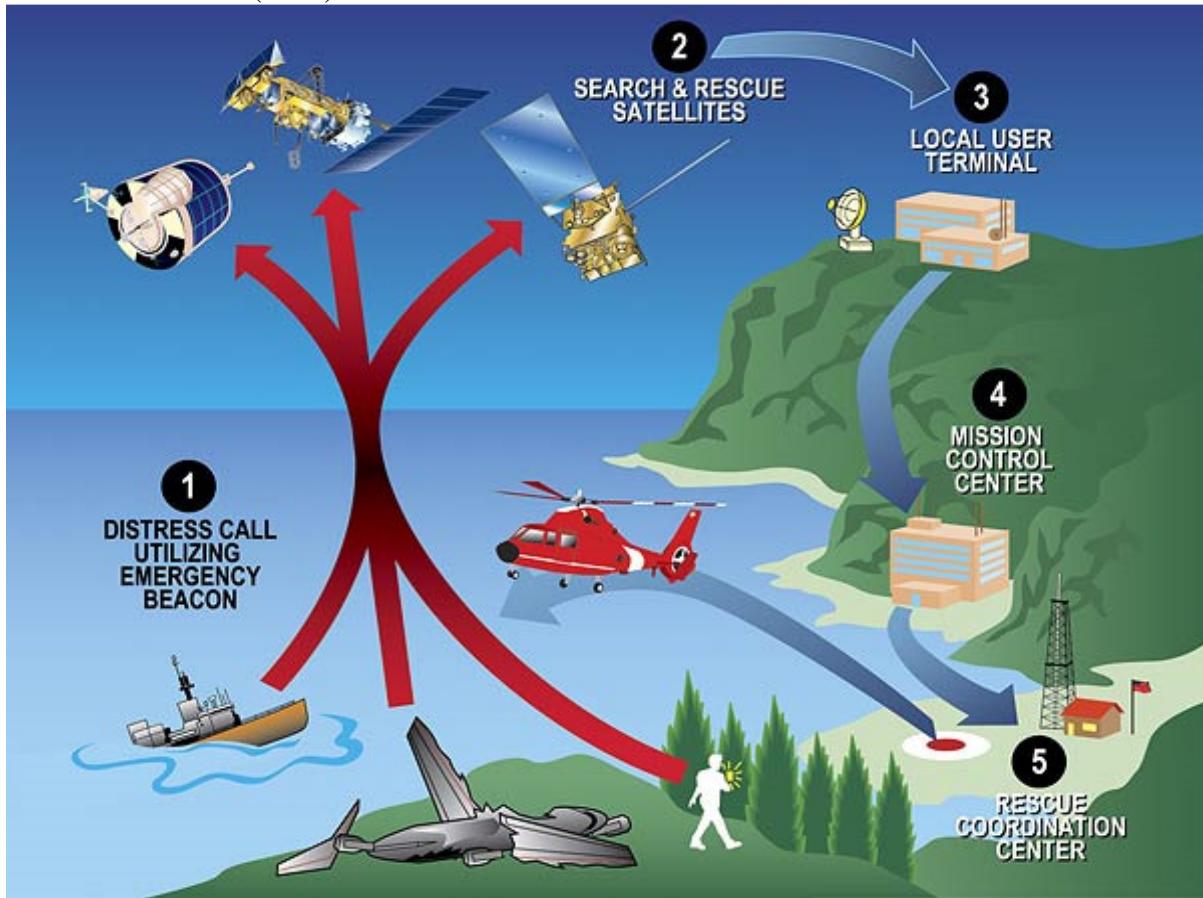
Flight Service Station (FSS)



Flight Plan

FLIGHT PLAN								
1. TYPE <input checked="" type="checkbox"/> VFR <input type="checkbox"/> IFR <input type="checkbox"/> DVFR	2. AIRCRAFT IDENTIFICATION N123DB	3. AIRCRAFT TYPE/SPECIAL EQUIPMENT C150/X	4. TRUE AIRSPEED 115 KTS	5. DEPARTURE POINT CHICKASHA AIRPORT	6. DEPARTURE TIME		7. CRUISING ALTITUDE 5500	
					PROPOSED (Z)	ACTUAL (Z)		
					1400Z			
8. ROUTE OF FLIGHT Chickasha direct Guthrie								
9. DESTINATION (Name of airport and city) Guthrie Airport Guthrie, OK		10. EST. TIME ENROUTE HOURS 35	11. REMARKS					
12. FUEL ON BOARD HOURS 4		13. ALTERNATE AIRPORT(S) MINUTES 45		14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE Jane Smith Aero Air Oklahoma City, OK (405) 555-4149			15. NUMBER ABOARD 1	
16. COLOR OF AIRCRAFT Red/White		CLOSE VFR FLIGHT PLAN WITH <u>McAlester</u> FSS ON ARRIVAL						

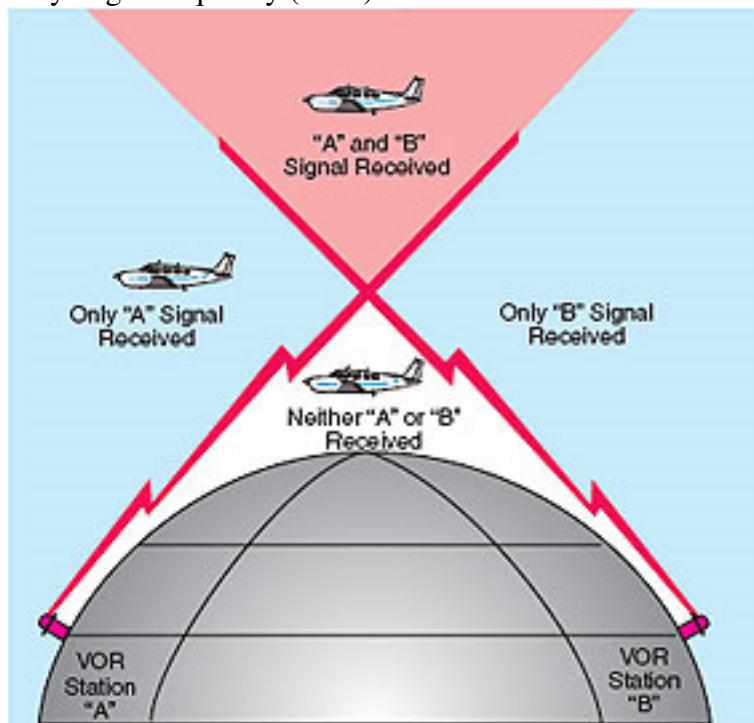
Search and Rescue (SAR)



VHF Direction Finder (VHF/DF)



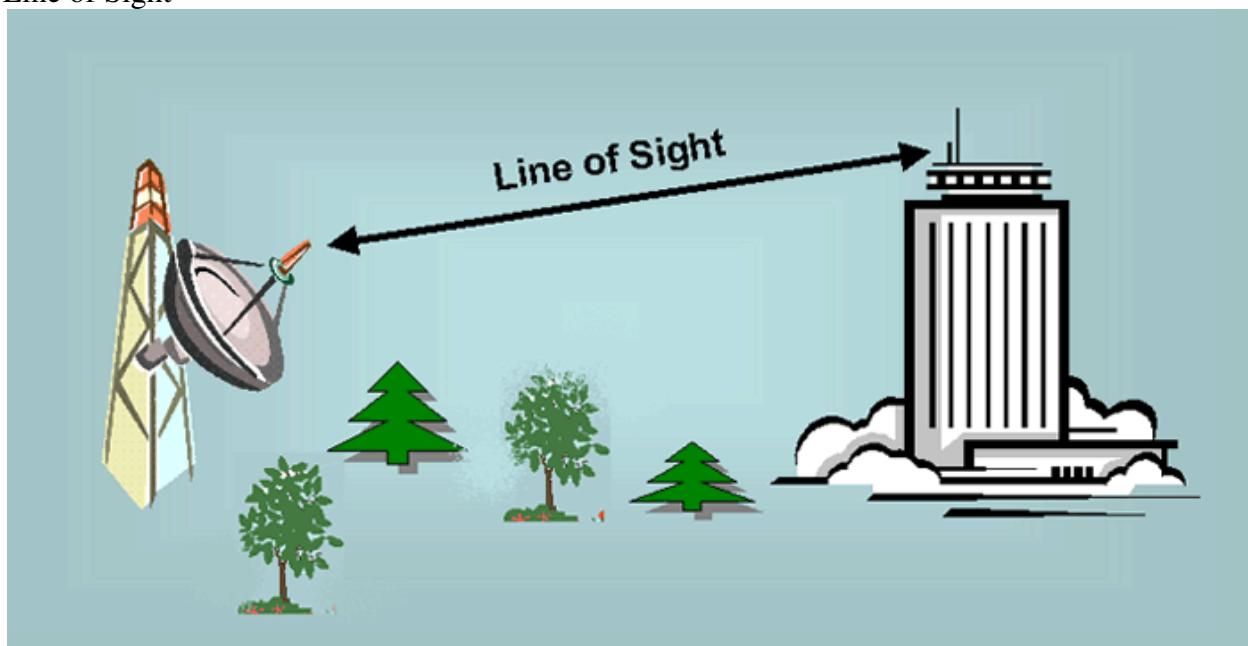
Part 2
Very High Frequency (VHF)



Transceivers



Line of Sight



Phonetic Alphabet

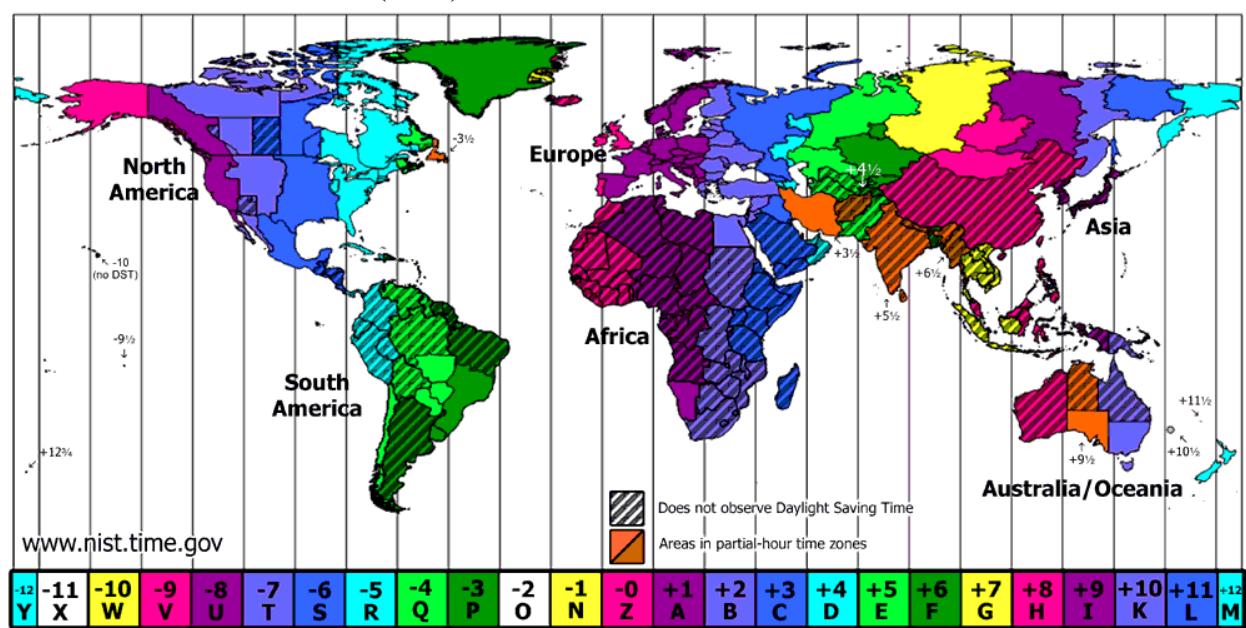
International Phonetic Alphabet

A	--	Alpha	N	--	November
B	----	Bravo	O	---	Oscar
C	----	Charlie	P	----	Papa
D	-..	Delta	Q	----	Quebec
E	.	Echo	R	-..	Romeo
F	----	Foxtrot	S	-..	Sierra
G	-..	Golf	T	-	Tango
H	----	Hotel	U	-..	Uniform
I	..	India	V	----	Victor
J	----	Juliet	W	-..	Whiskey
K	-..	Kilo	X	----	X-ray
L	----	Lima	Y	----	Yankee
M	-..	Mike	Z	----	Zulu

N-Number



Coordinated Universal Time (UTC)



Zulu Time



Common Traffic Advisory Frequency (CTAF)



UNICOM



MULTICOM



Self-Announce Procedure
Air Traffic Control Clearance



Clearance Delivery



Ground Control



Progressive Taxi



Departure Control



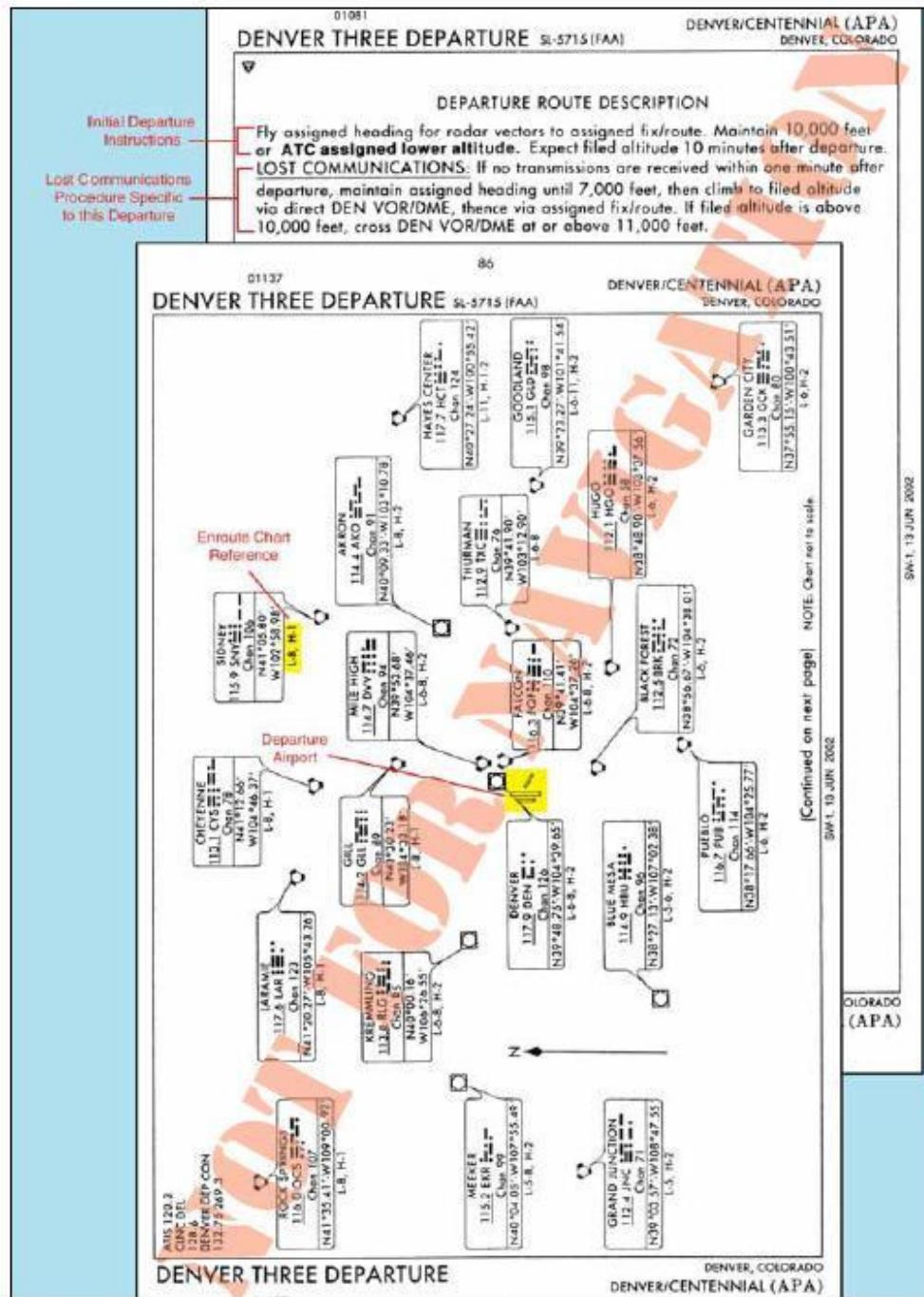
Radar Contact



Approach Control



Lost Communication Procedures



Distress

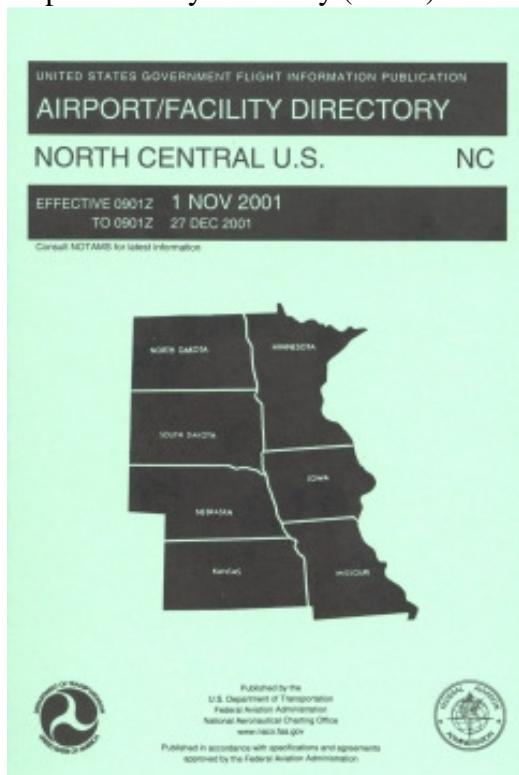
Urgency



Emergency Locator Transmitter (ELT)



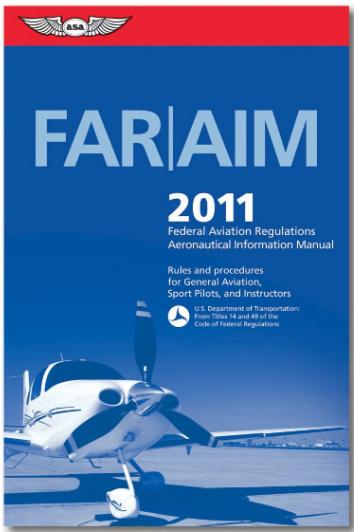
Part 3
Airport/Facility Directory (A/FD)



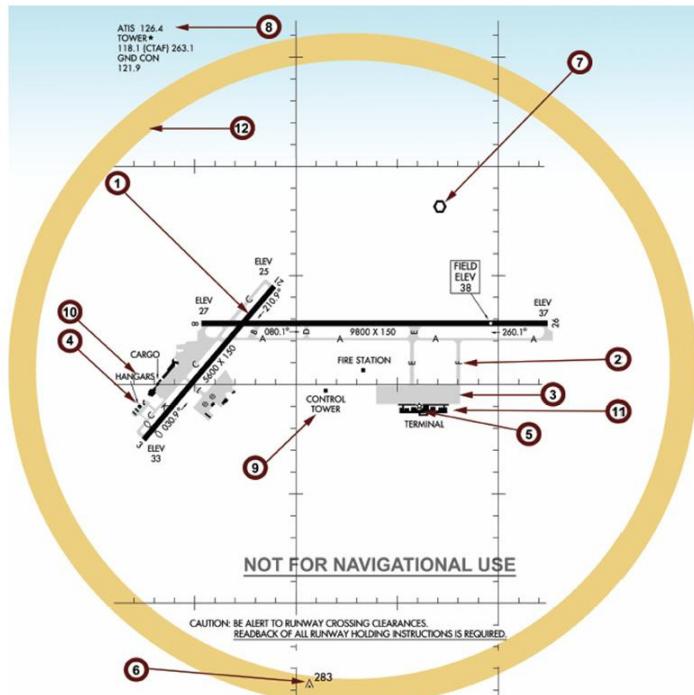
Federal Register



Notice of Proposed Rulemaking (NPRM) Aeronautical Information Manual (AIM)



NOTAM(D)



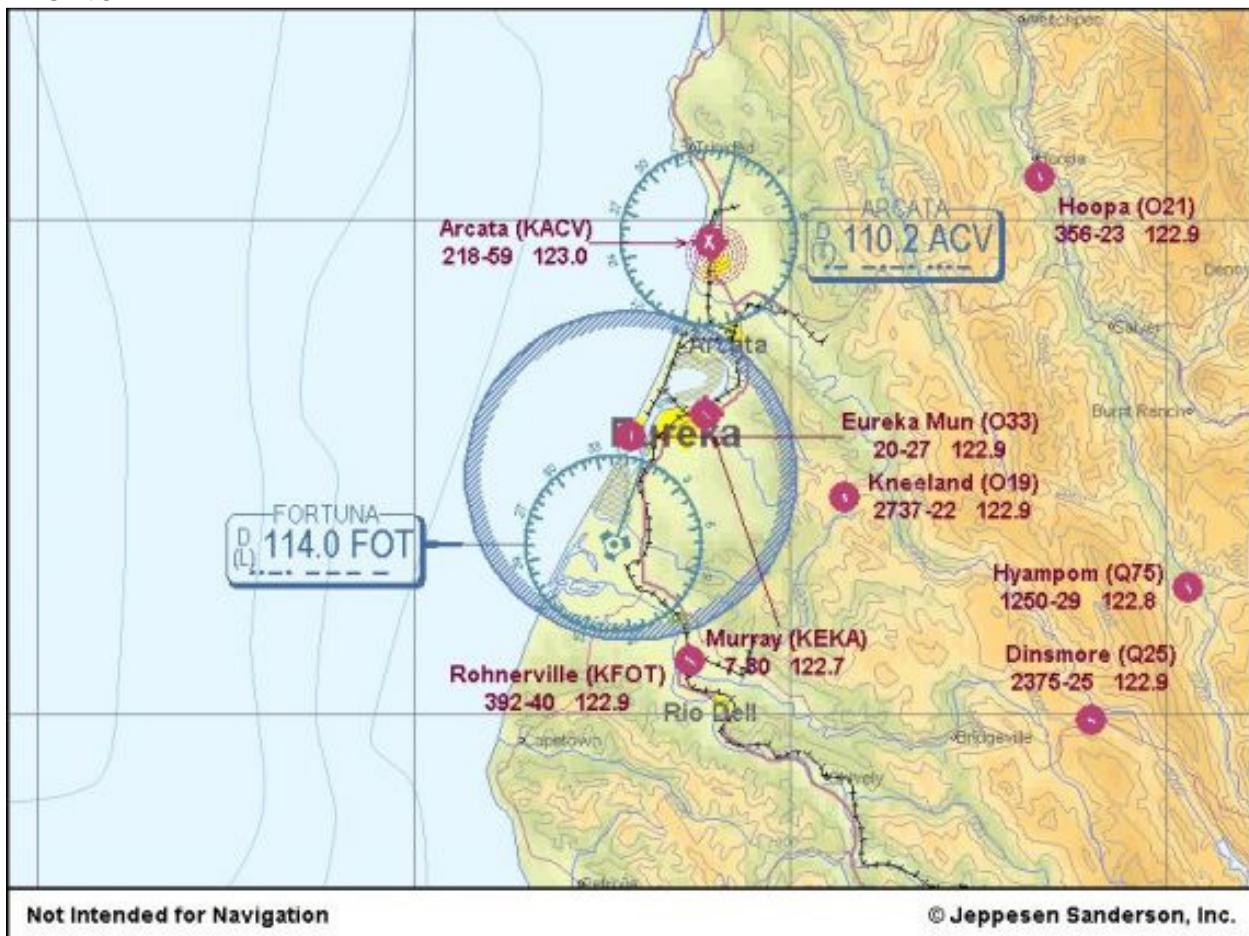
Keywords

	NOTAM Examples
RWY	1 RWY 3/21 CLSD Runways 3 and 21 are closed to aircraft.
TWY	2 TWY F LGTS OTS Taxiway F lights are out of service.
RAMP	3 RAMP TERMINAL EAST SIDE CONSTRUCTION The ramp in front of the east side of the terminal has ongoing construction.
APRON	4 APRON SW TWY C NEAR HANGARS CLSD The apron near the southwest taxiway C in front of the hangars is closed.
AD	5 AD ABN OTS Aerodrome airport beacon is out of service.
OBST	6 OBST TOWER 283 (246 AGL) 2.2 S LGTS OTS (ASR 1065881) TIL 070727Z300 Service: The lights on the tower that is 283 feet above mean sea level (MSL) or 246 feet above ground level (AGL) 2.2 statute miles south of the field. The FCC antenna structure registration (ASR) number is 1065881. The lights will be returned to service 2300 UTC (Coordinated Universal Time) on July 27, 2007.
NAV	7 NAV VOR OTS Navigation: The VOR located on this airport is out of service.
COM	8 COM ATIS OTS Communications: The Automatic Terminal Information Service (ATIS) is out of service.
SVC	9 SVC TUE 1215-0330 MCN-FRT/1430-2300 SAT/1600-0100 SUN TIL 0707300100 Service: The control tower has new operating hours, 1215-0330 UTC Monday thru Friday, 1430-2300 UTC on Saturday, and 1600-0100 UTC on Sunday until 0100 UTC on July 30, 2007.
AIRSPACE	10 SVC FUEL UNAVBL TIL 0707291600 Service: All fuel for this airport is unavailable until July 29, 2007 at 1600 UTC. 11 SVC CUSTOMS UNAVBL TIL 0708150800 Service: United States Customs service for this airport will not be available until August 15, 2007 at 0800 UTC. 12 AIRSPACE AIRSHOW ACFT 5000ftBLW 5 NM AIRPORT AVOIDANCE A2D WEF TIL 0707152009-0707152200 Airspace: There is an airshow being held at this airport with aircraft flying 5000 feet and below within a 5 nautical mile radius. Avoidance is advised from 2000 UTC on July 15, 2007 until 2200 UTC on July 15, 2007.

NOTE: All "D" NOTAMs will have a keyword at the beginning of the text of each NOTAM.
Effective: 28 JAN 2008 thru AUG 2009
FAA RDU AIR RDU/307

The “D” NOTAM

FDC NOTAM



Notices to Airmen Publication (NTAP)
Advisory Circulars (ACs)
Jeppesen Information Services

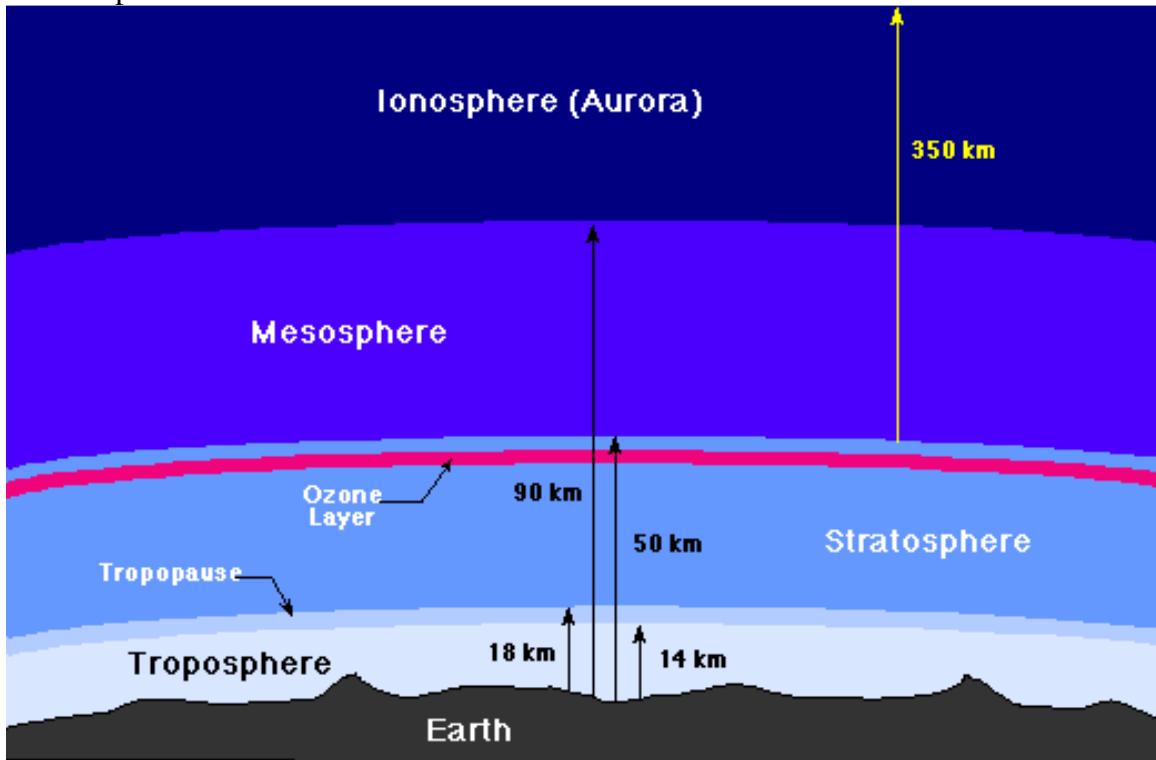


Section 6 Part 1

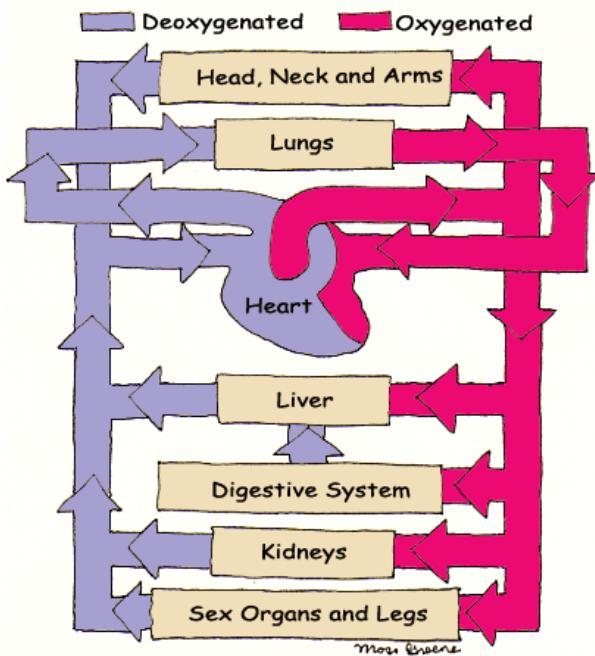
Atmosphere



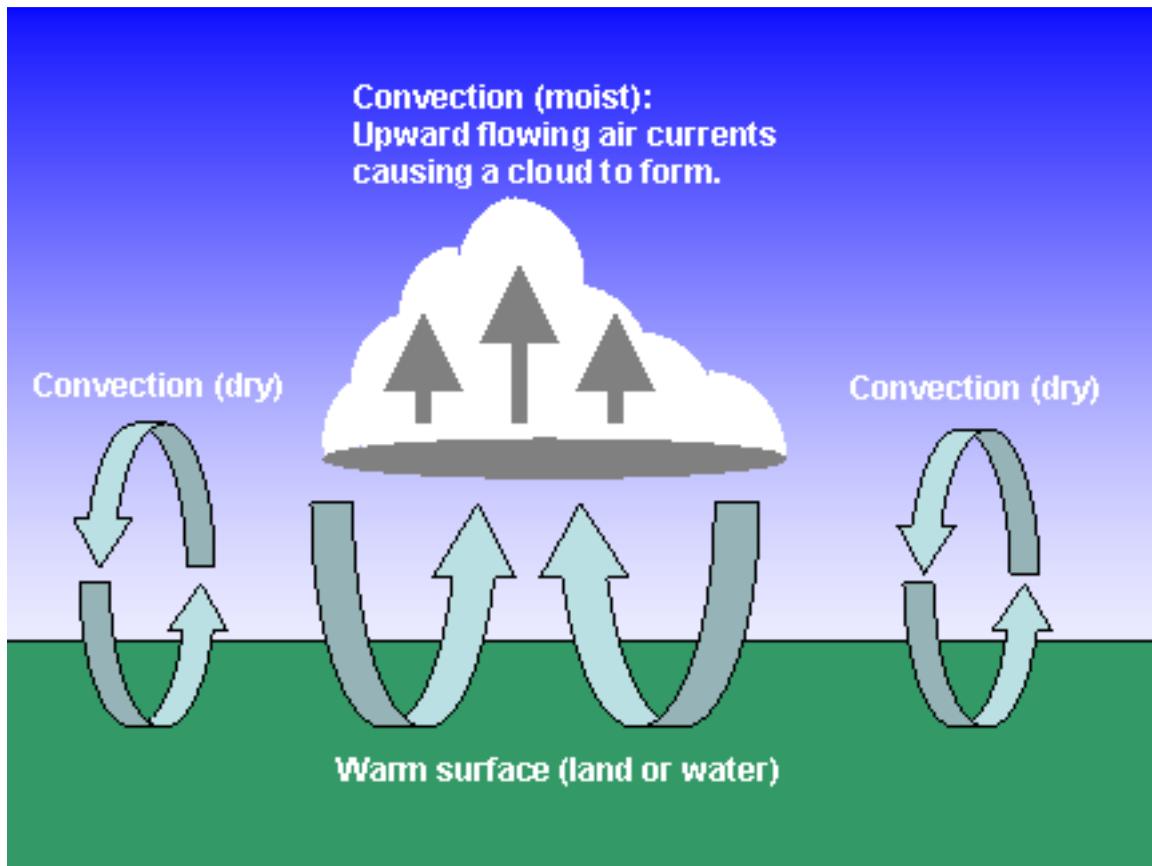
Troposphere
Tropopause
Stratosphere
Mesosphere
Thermosphere



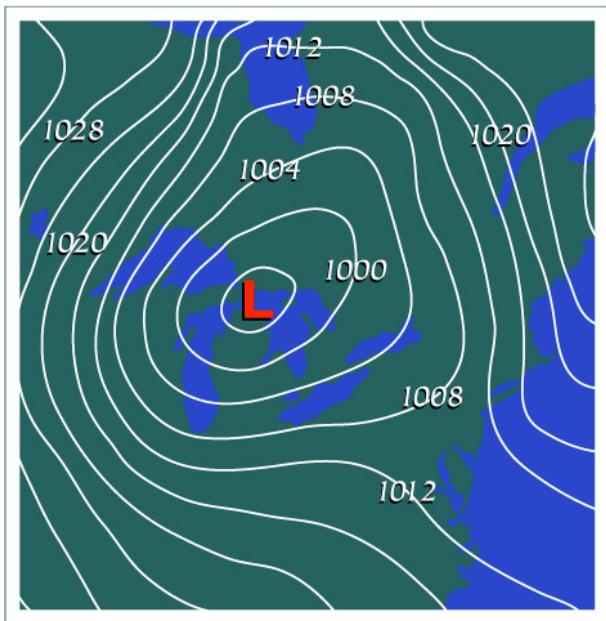
Circulation



Convection



Isobars



Pressure Gradient

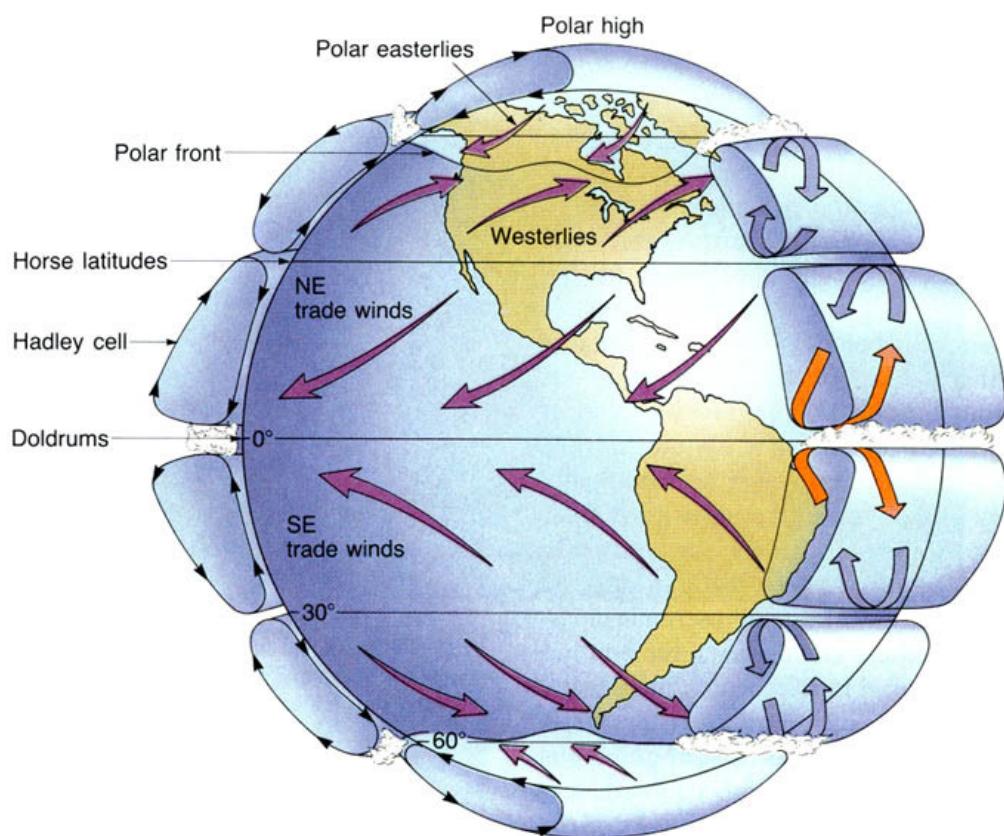
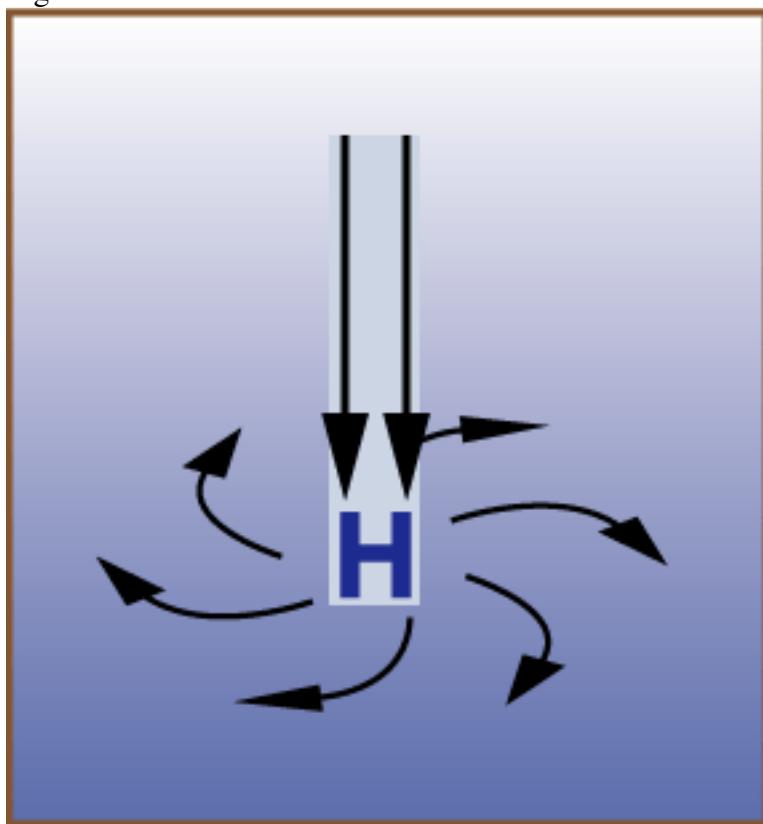
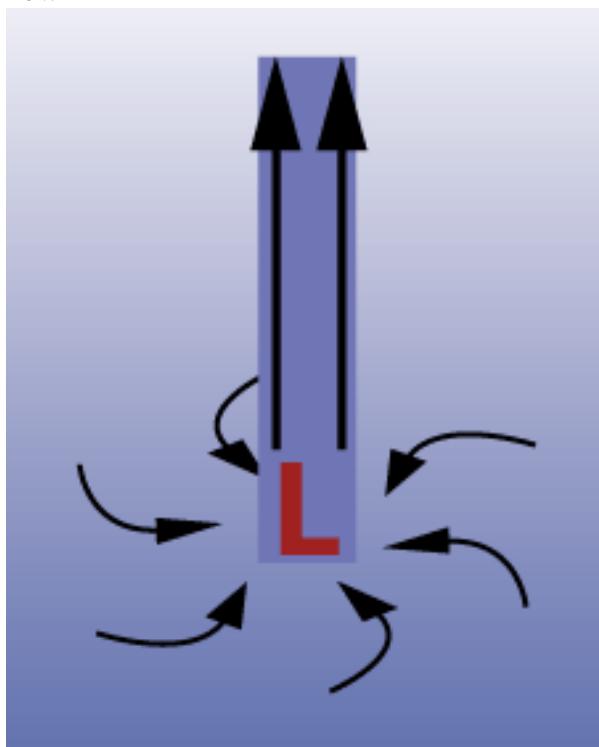


Figure 8•3 Idealized global circulation proposed for the three-cell circulation model.

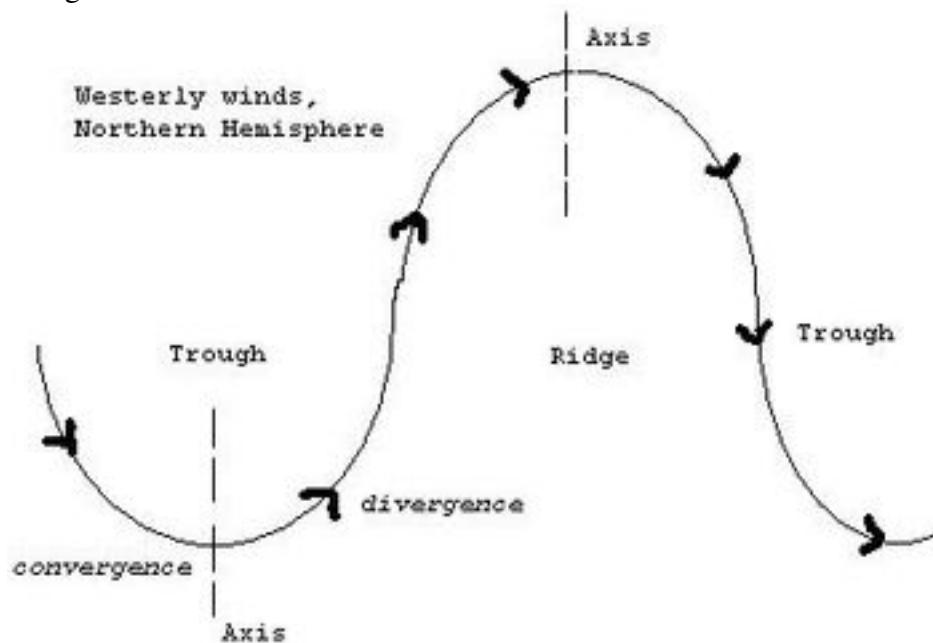
High



Low



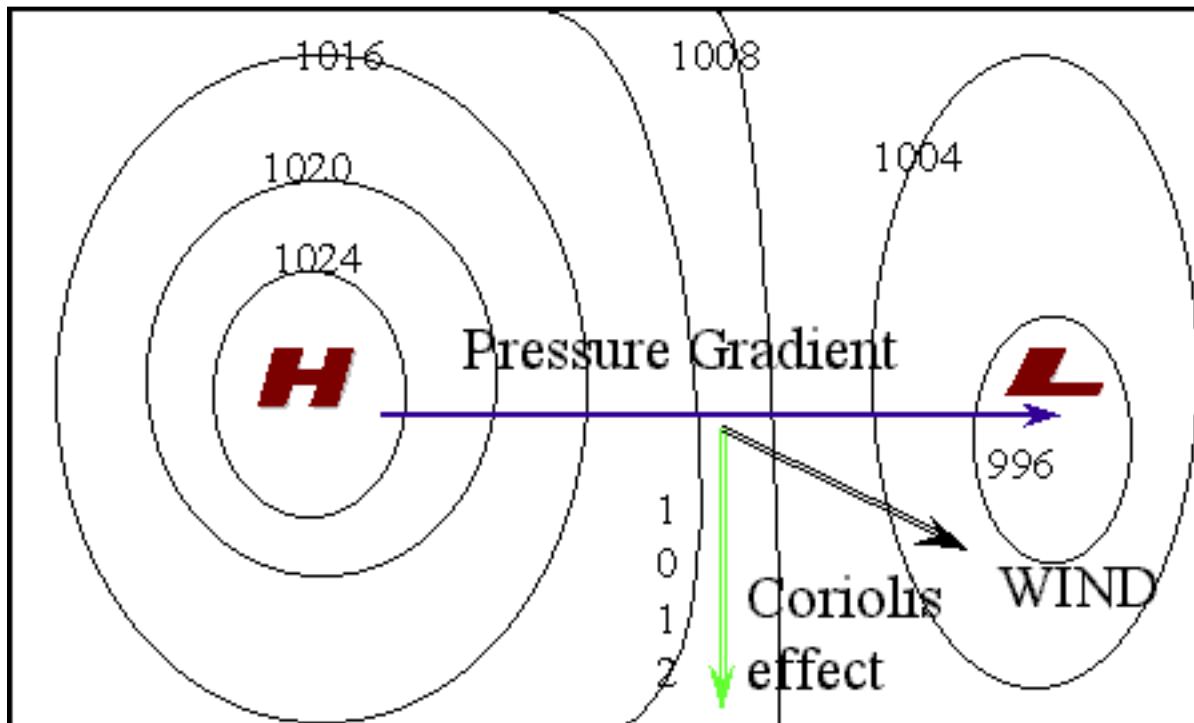
Trough



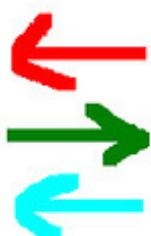
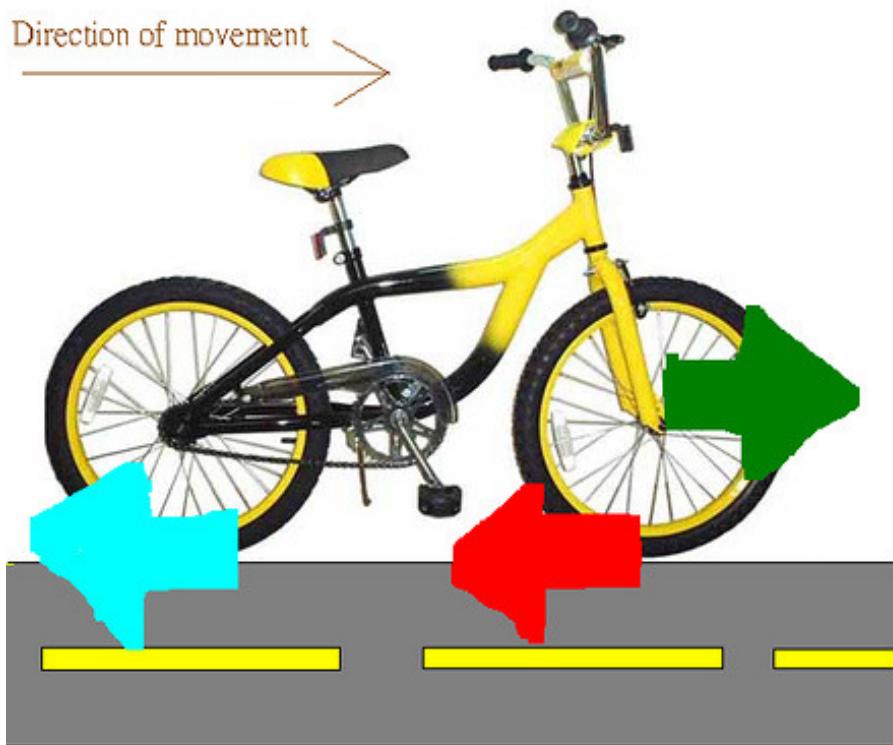
Col

Pressure Gradient Force

Coriolis Force



Frictional Force

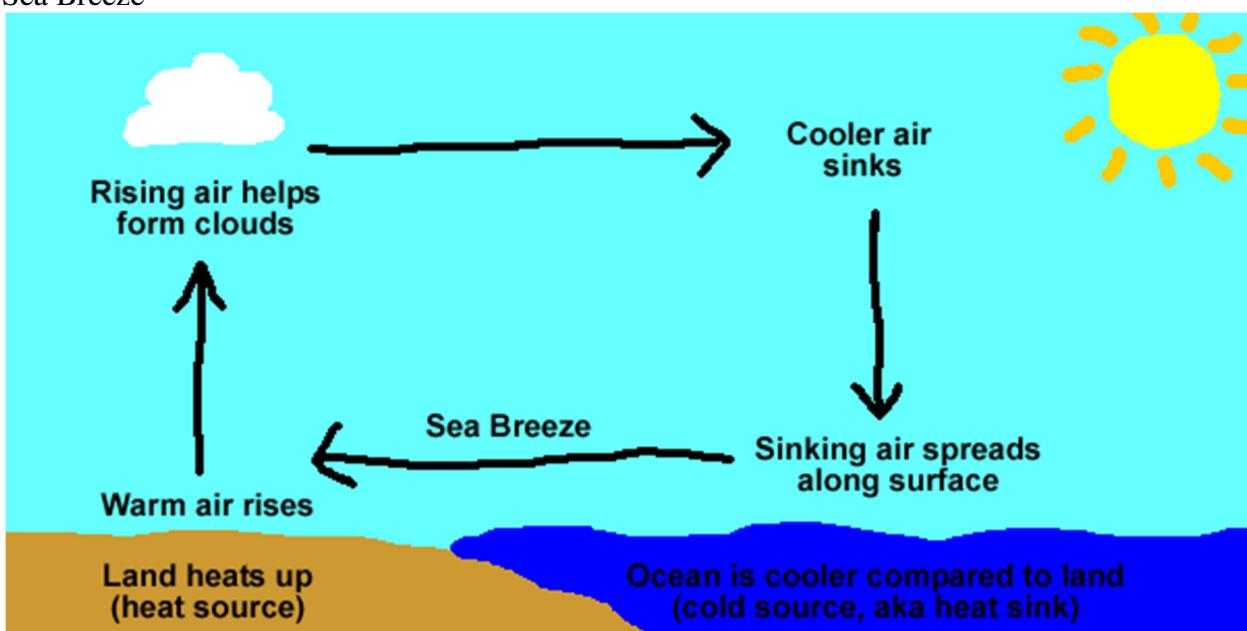


Force acting on the road by the bicycle

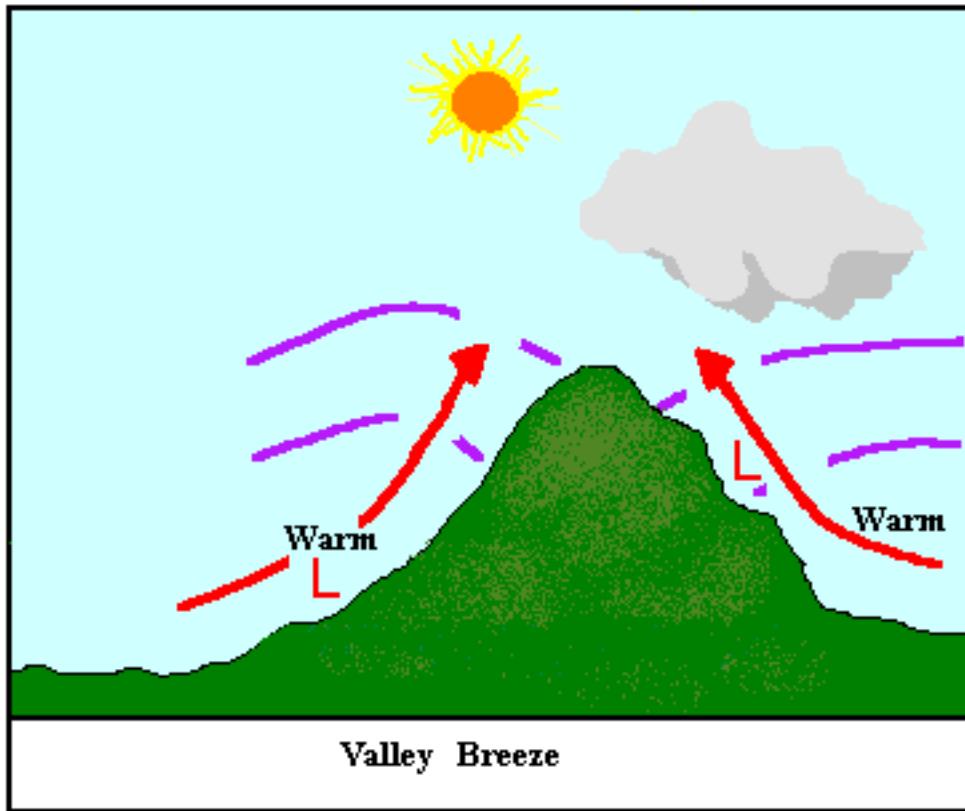
Reaction force acting on the bicycle
by the road, it is called friction too

Friction acting on the bicycle to oppose its motion

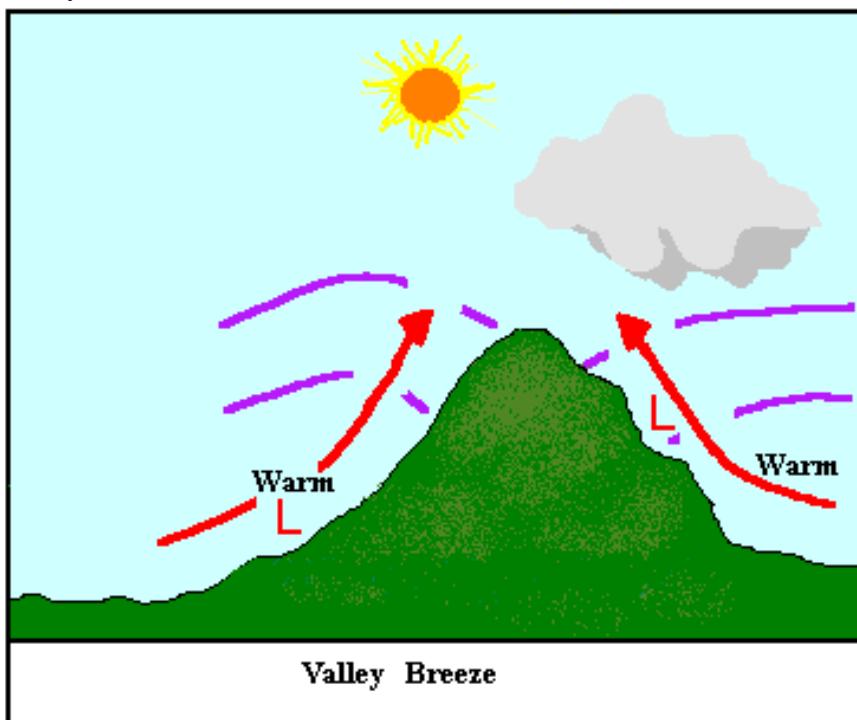
Sea Breeze



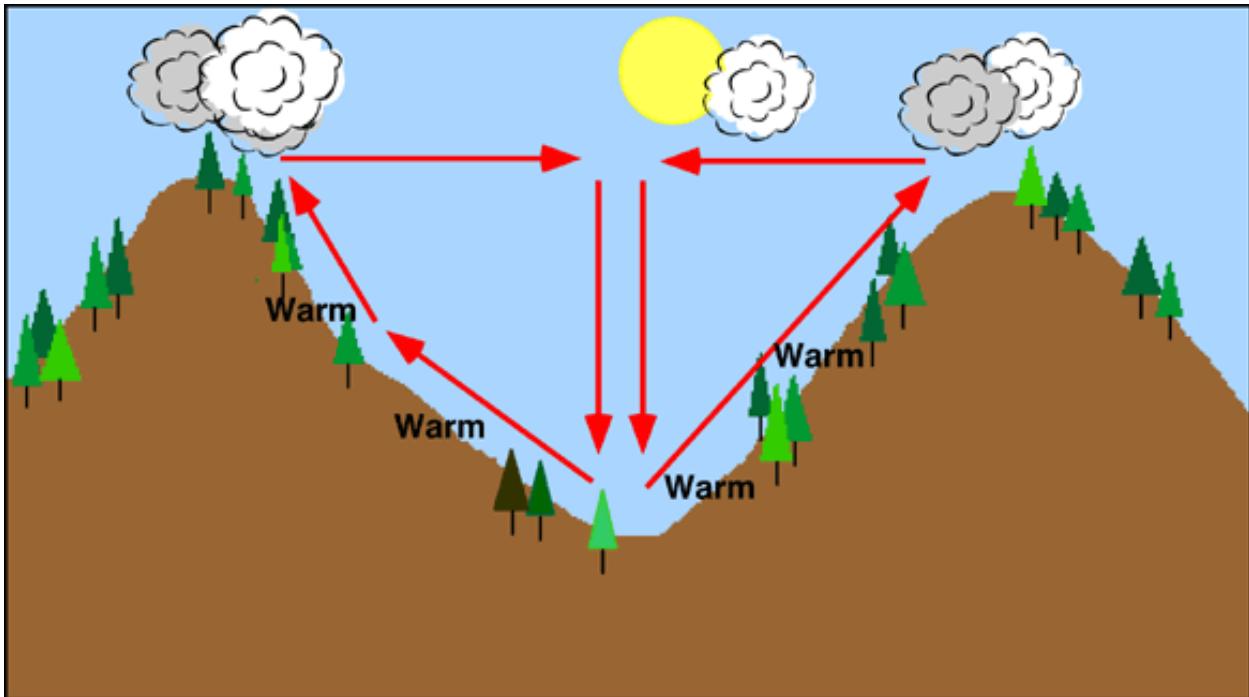
Land Breeze



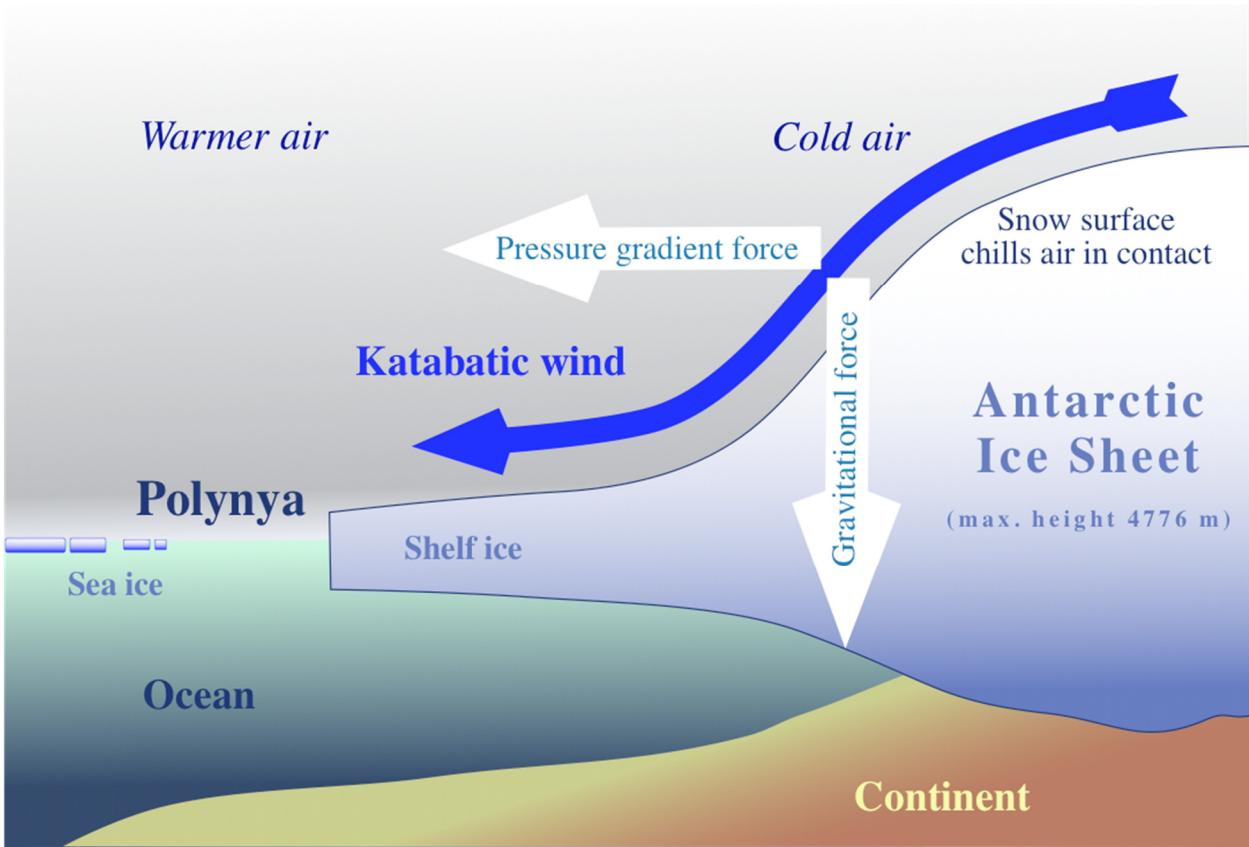
Valley Breeze



Mountain Breeze



Katabatic Wind



Part 2
Stability

Equilibrium types

Stable



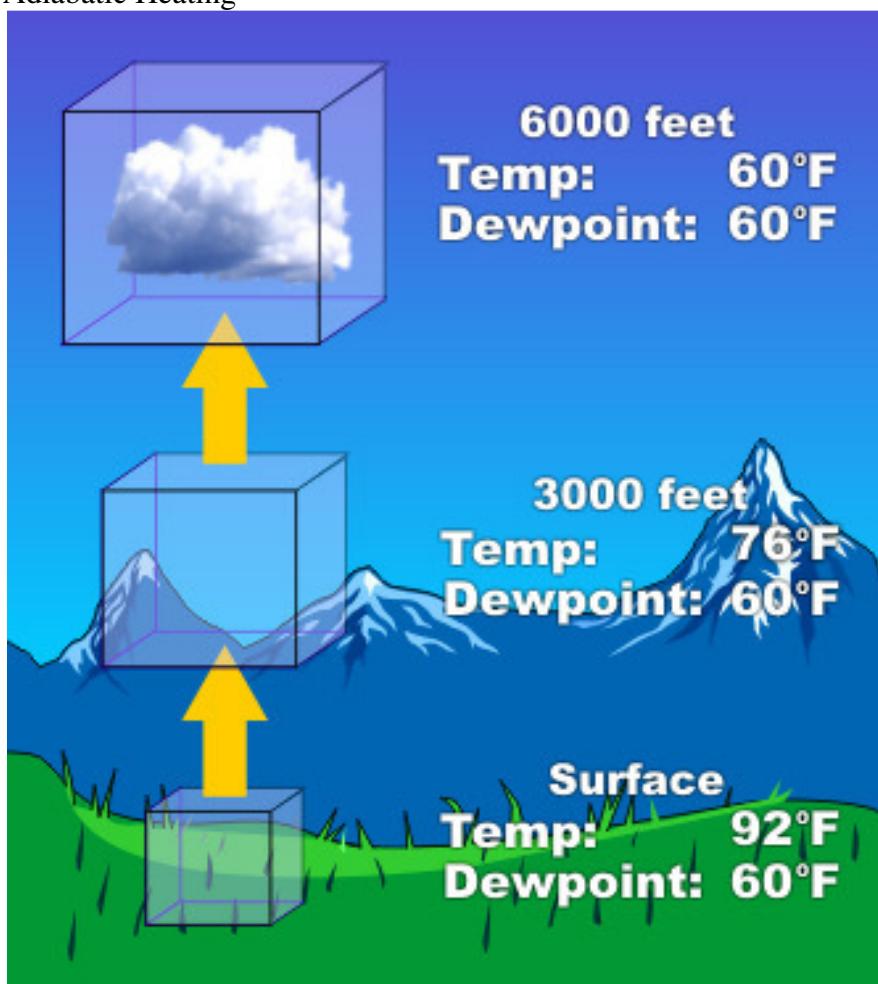
Unstable



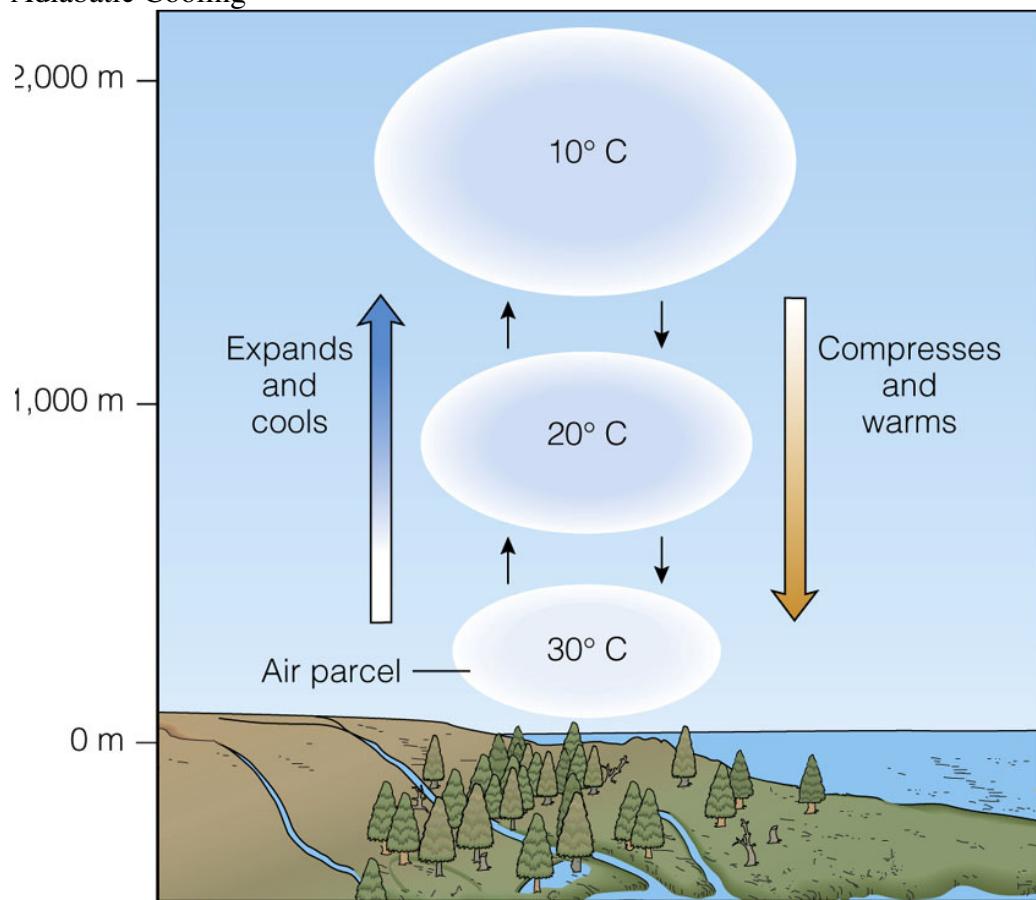
Neutral



Adiabatic Heating

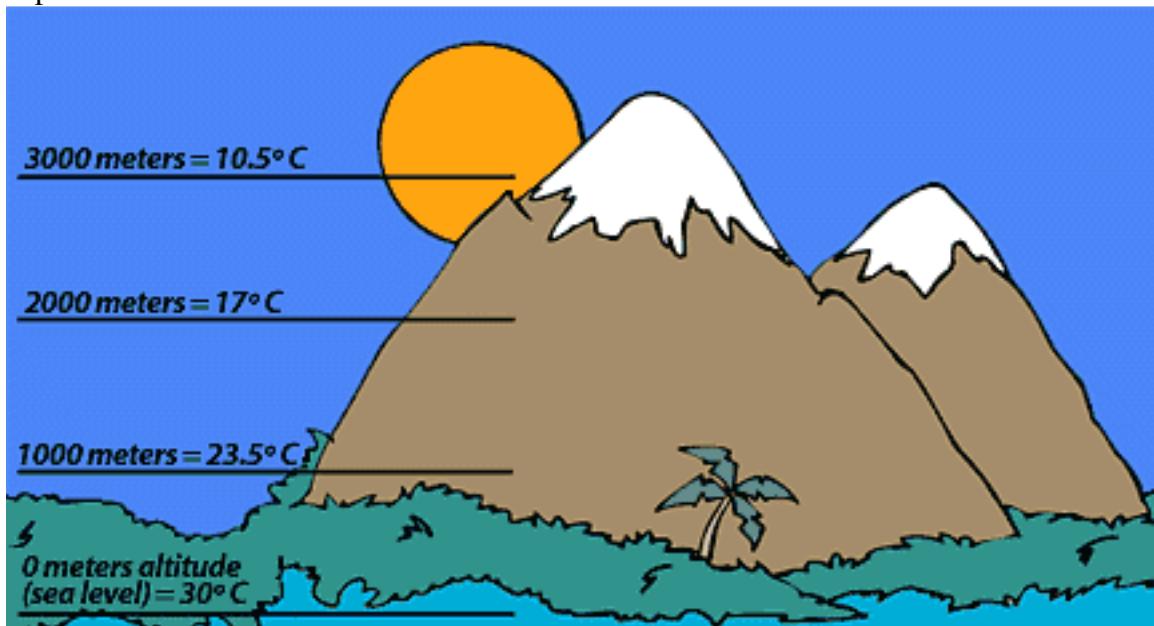


Adiabatic Cooling

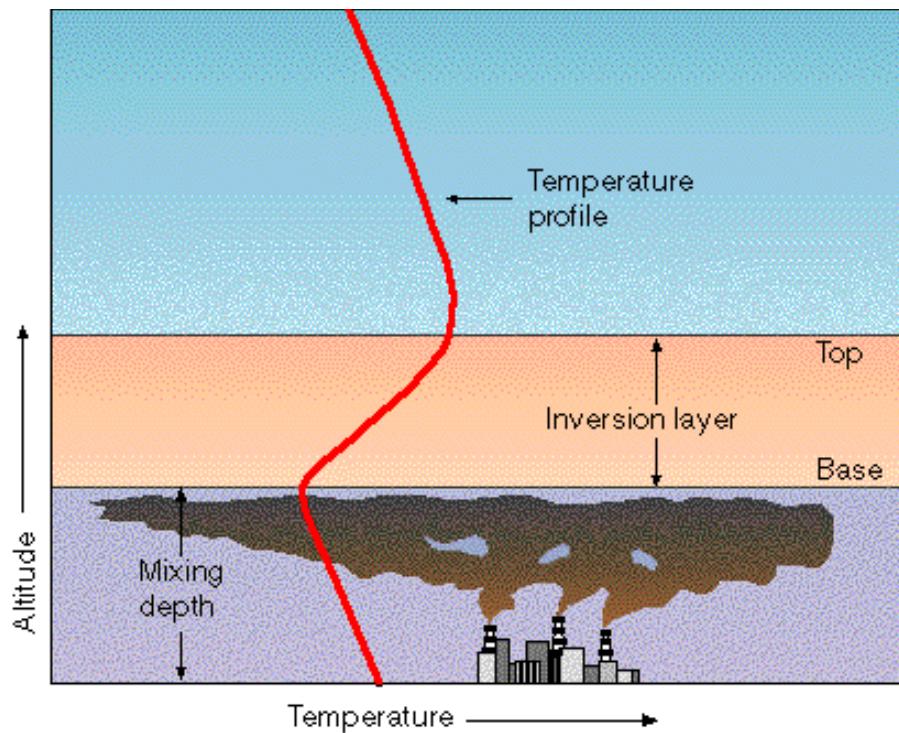


© 2006 Brooks/Cole - Thomson

Lapse Rate

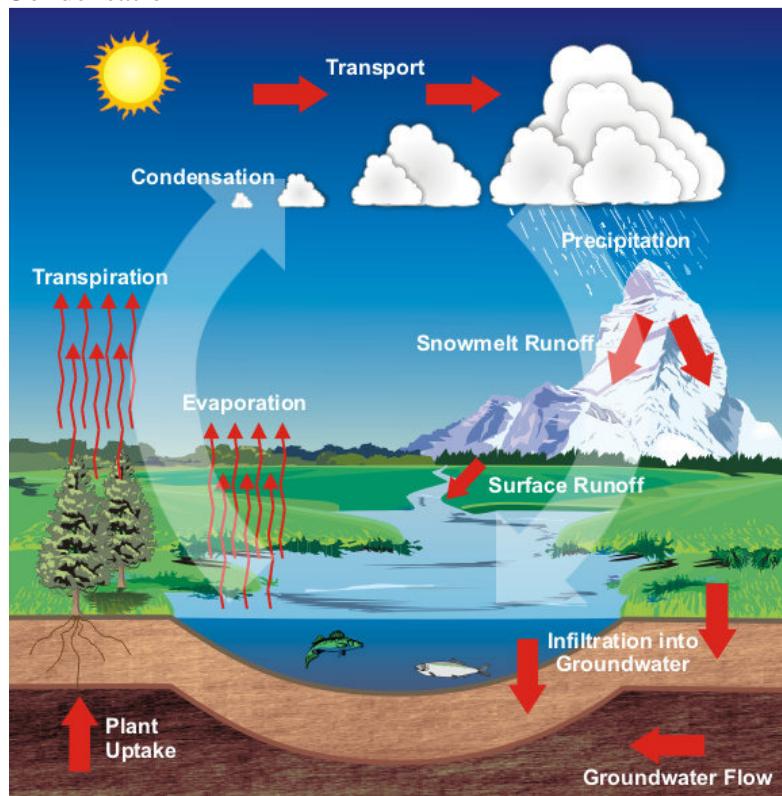


Temperature Inversion

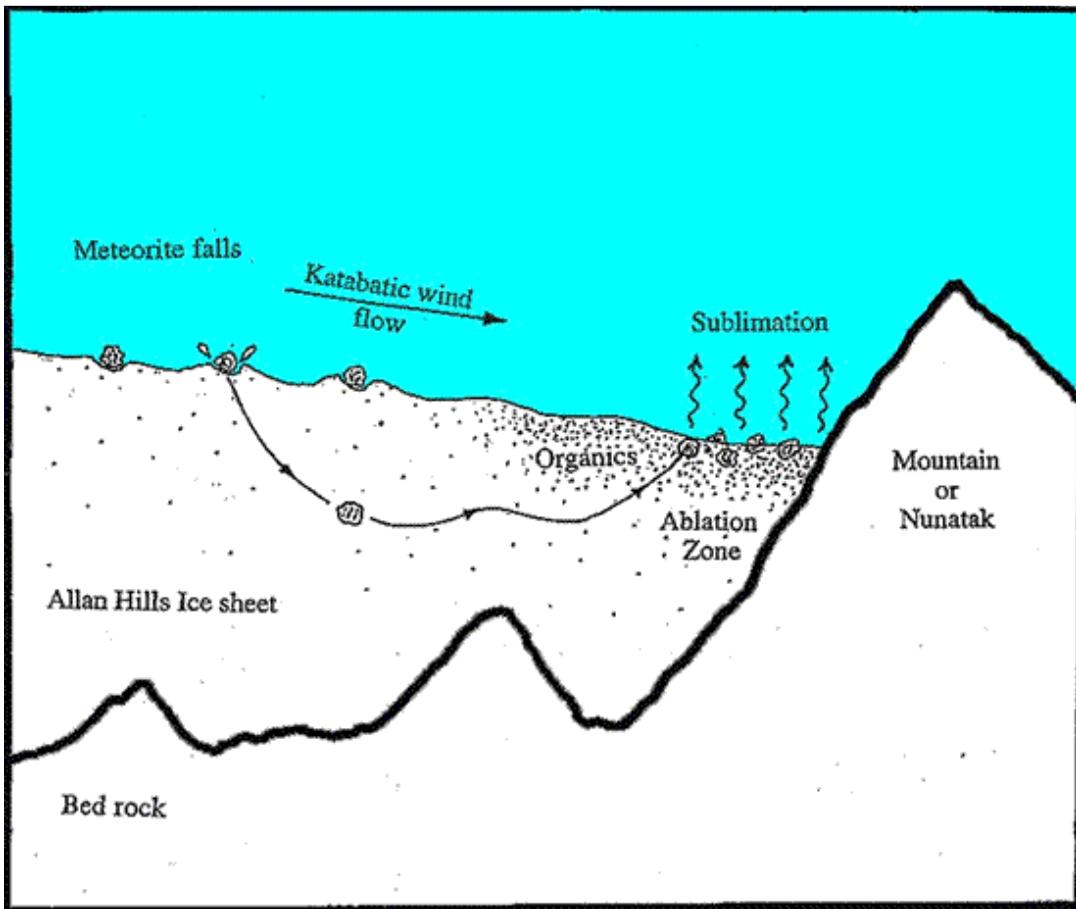


© 1998 Wadsworth Publishing Company/ITP

Evaporation Condensation



Sublimation



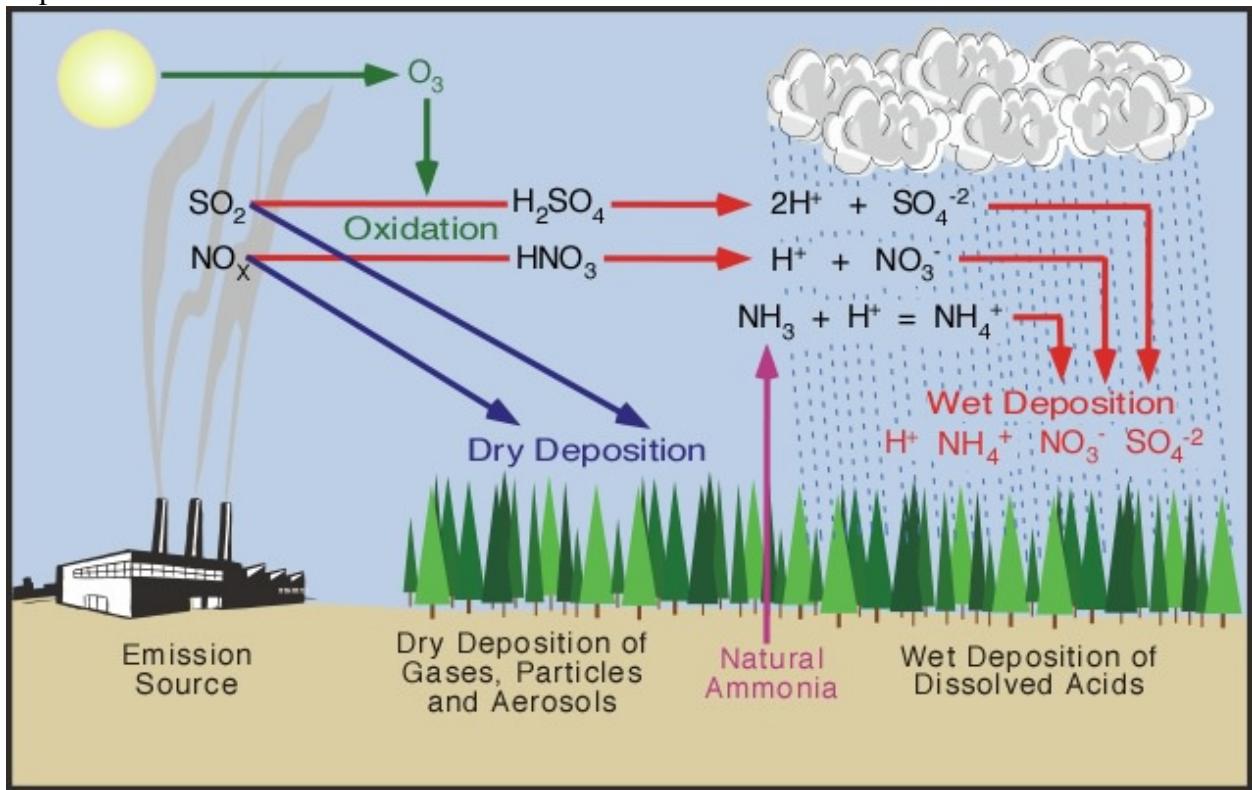
Melting



Freezing



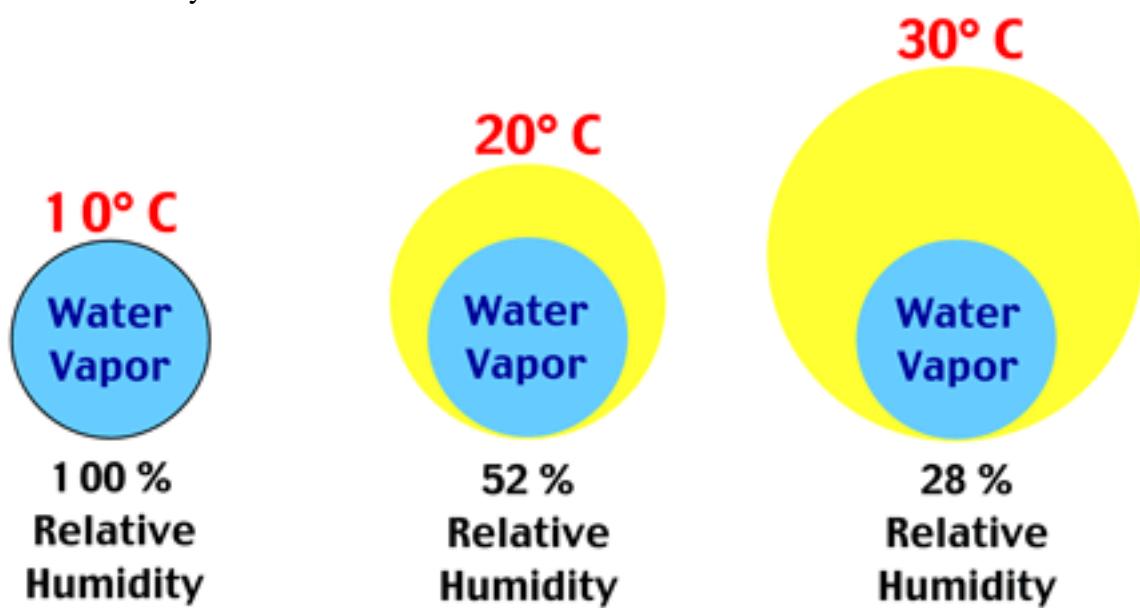
Deposition



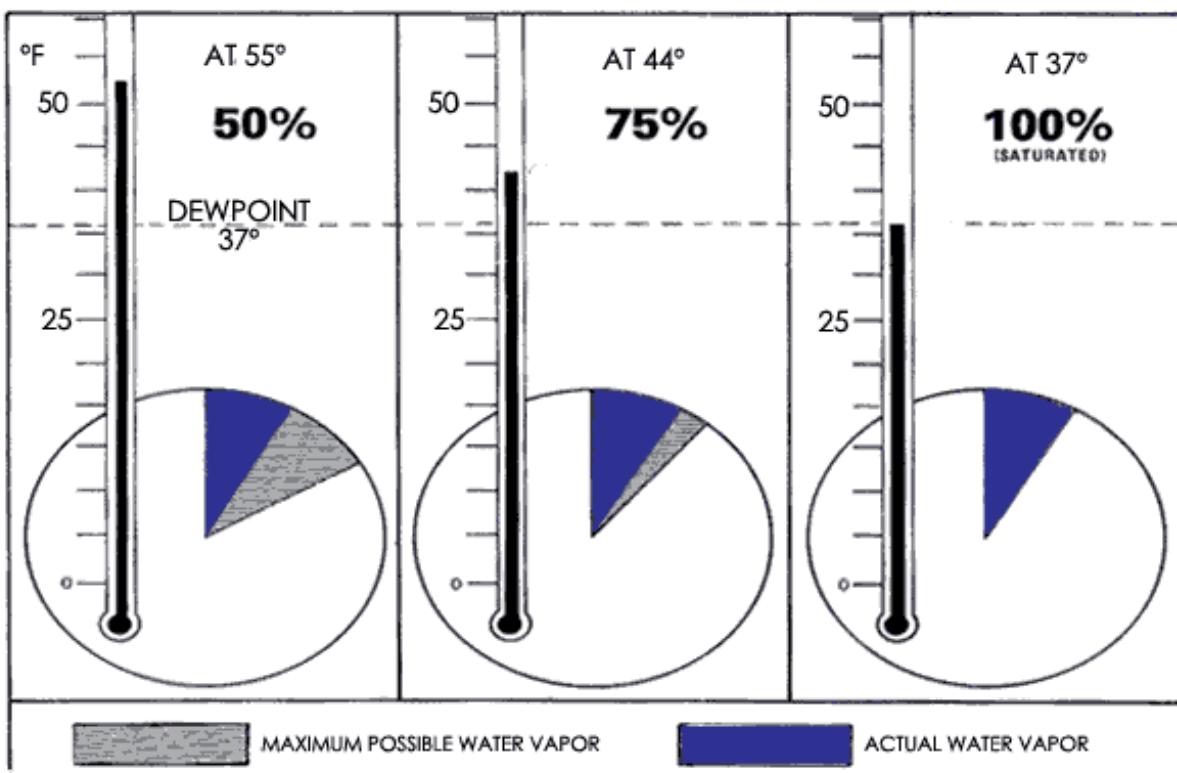
Humidity



Relative Humidity



Dewpoint



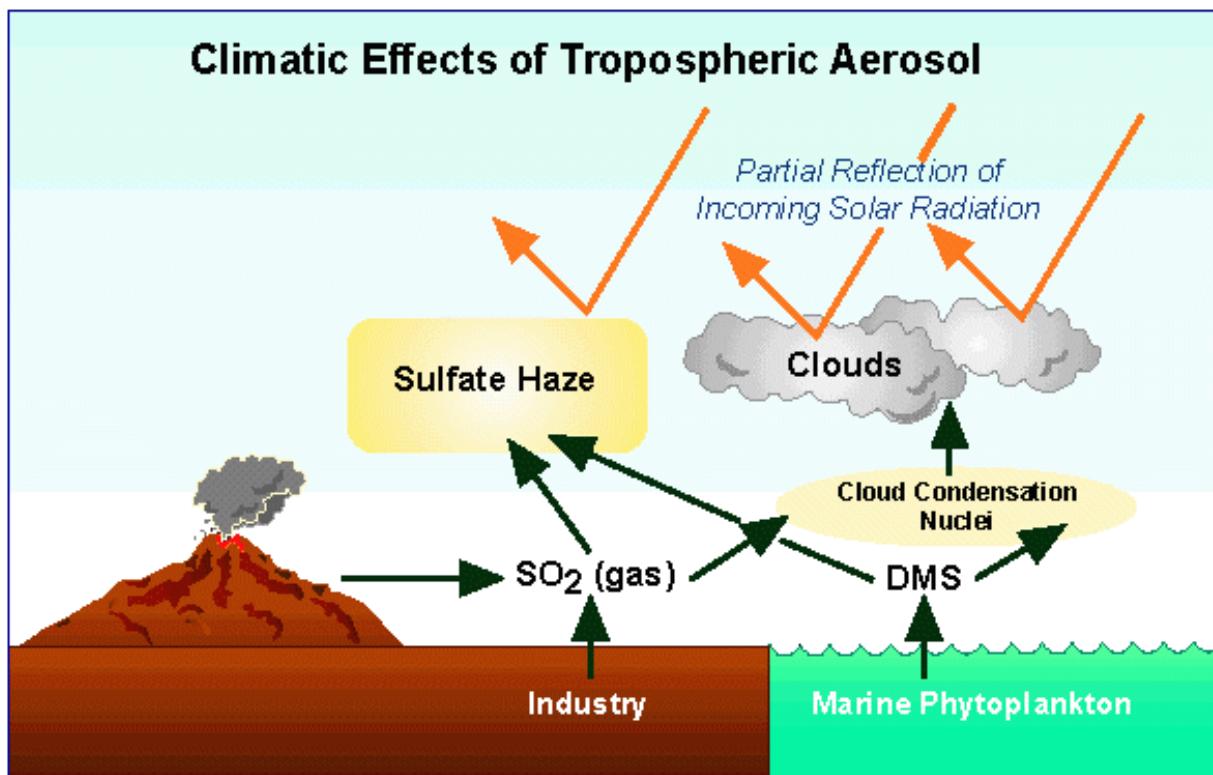
Saturated
Dew



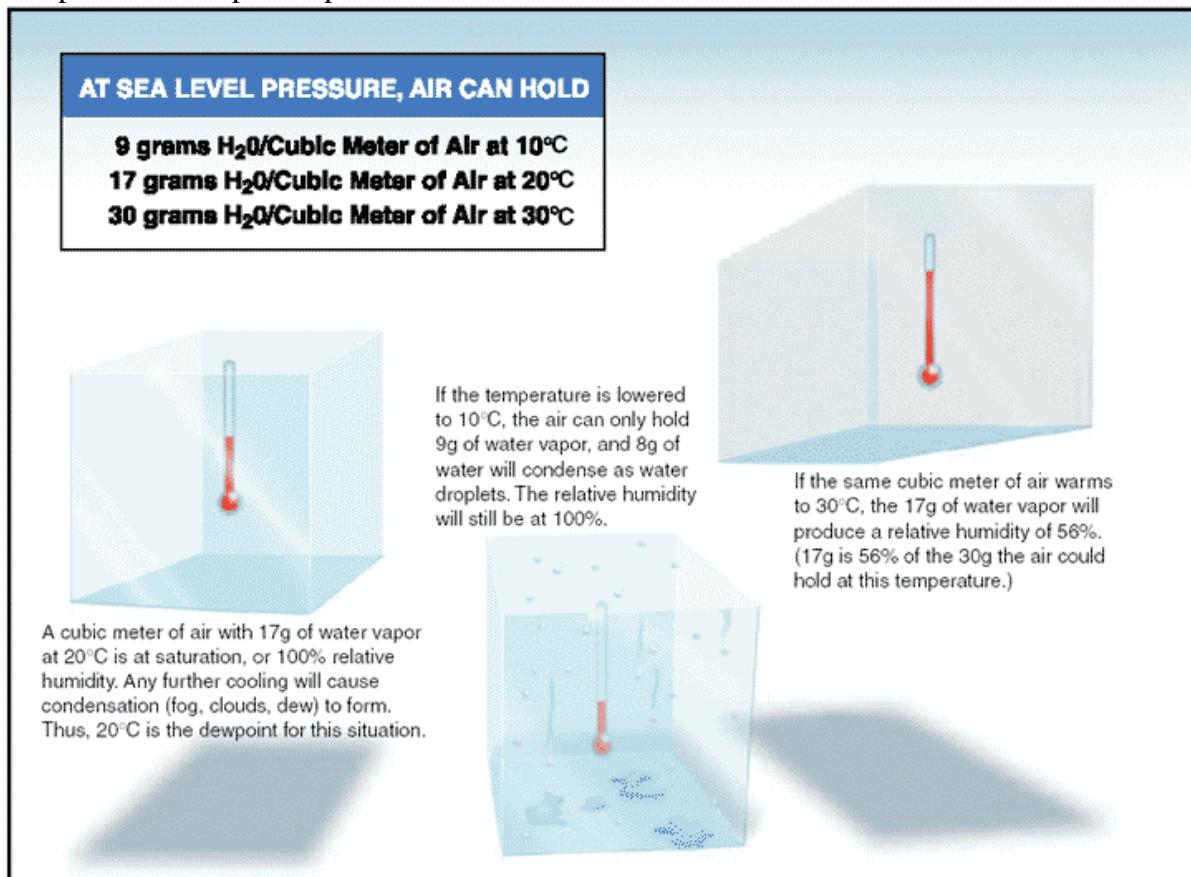
Frost



Condensation Nuclei



Temperature/Dewpoint Spread



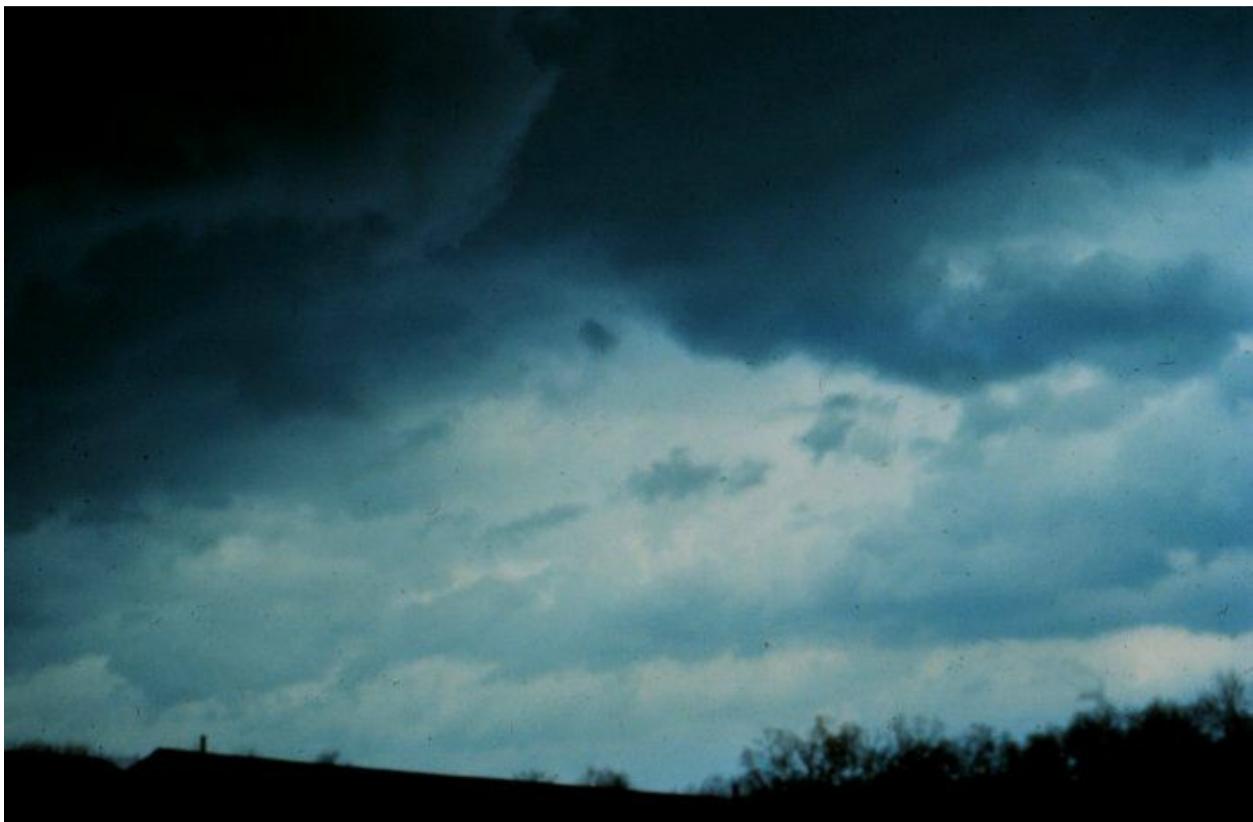
Stratus



Stratocumulus



Nimbostratus



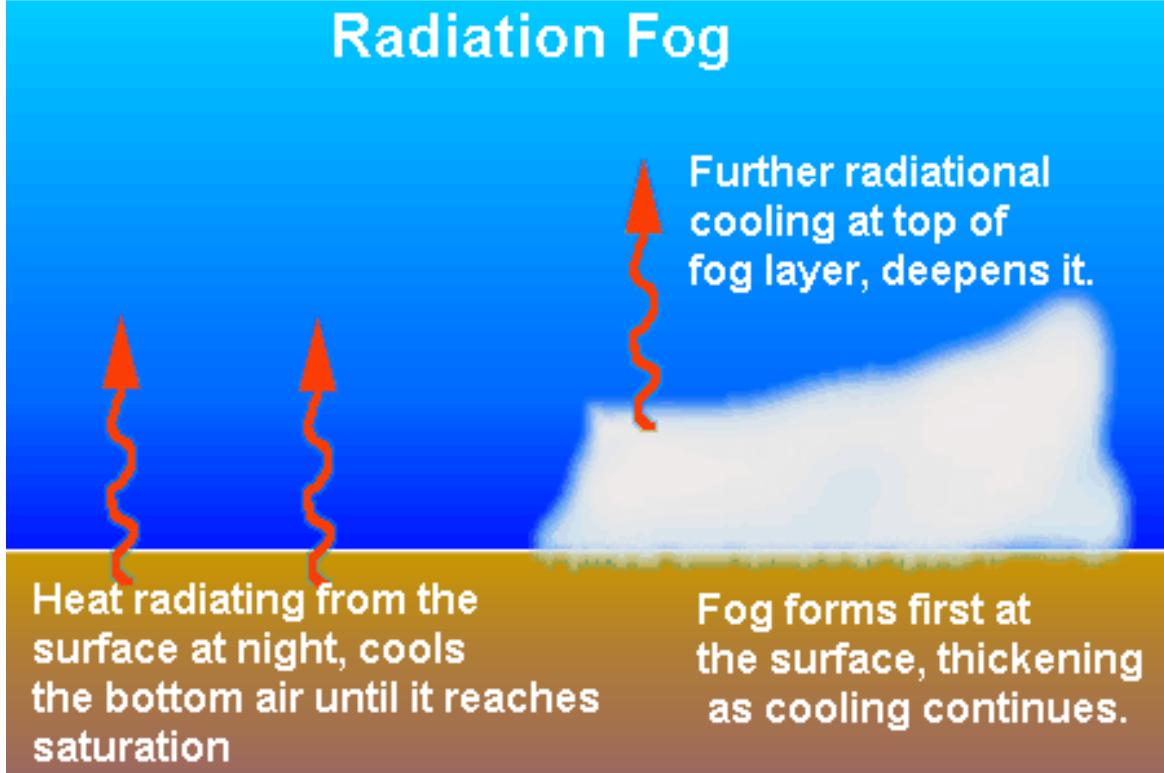
Fog



Chronicle / Frederic Larson

Radiation Fog

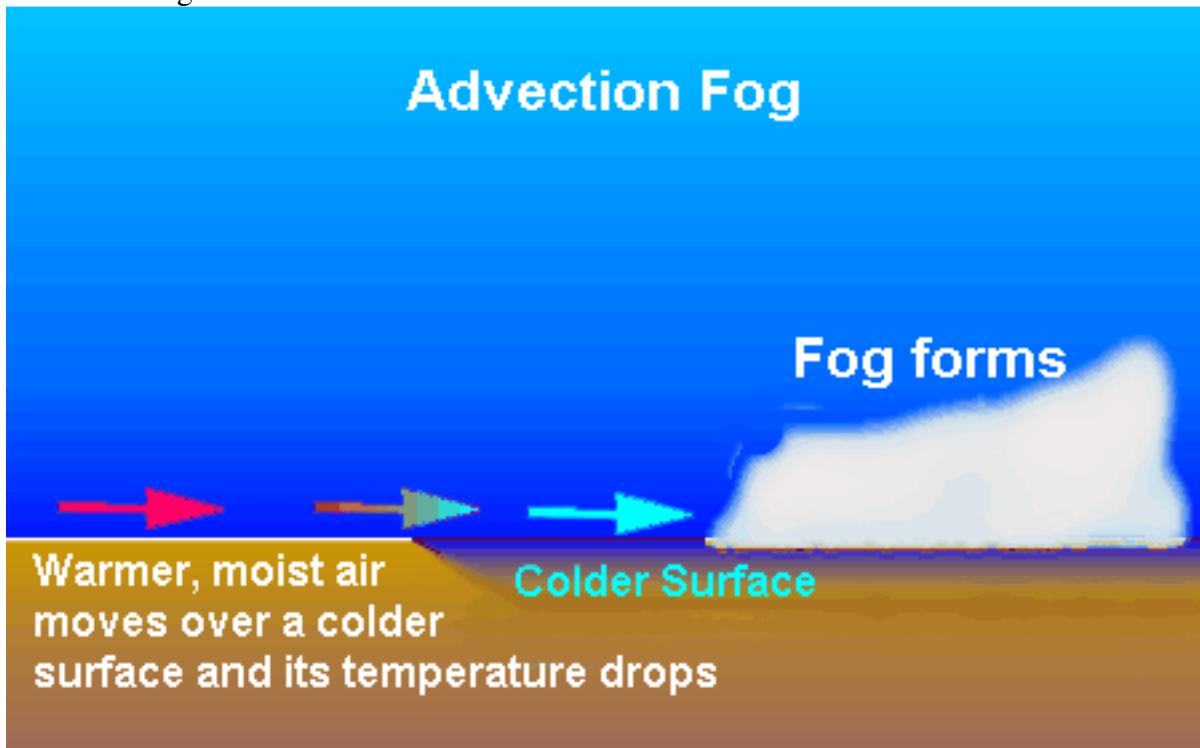
Radiation Fog



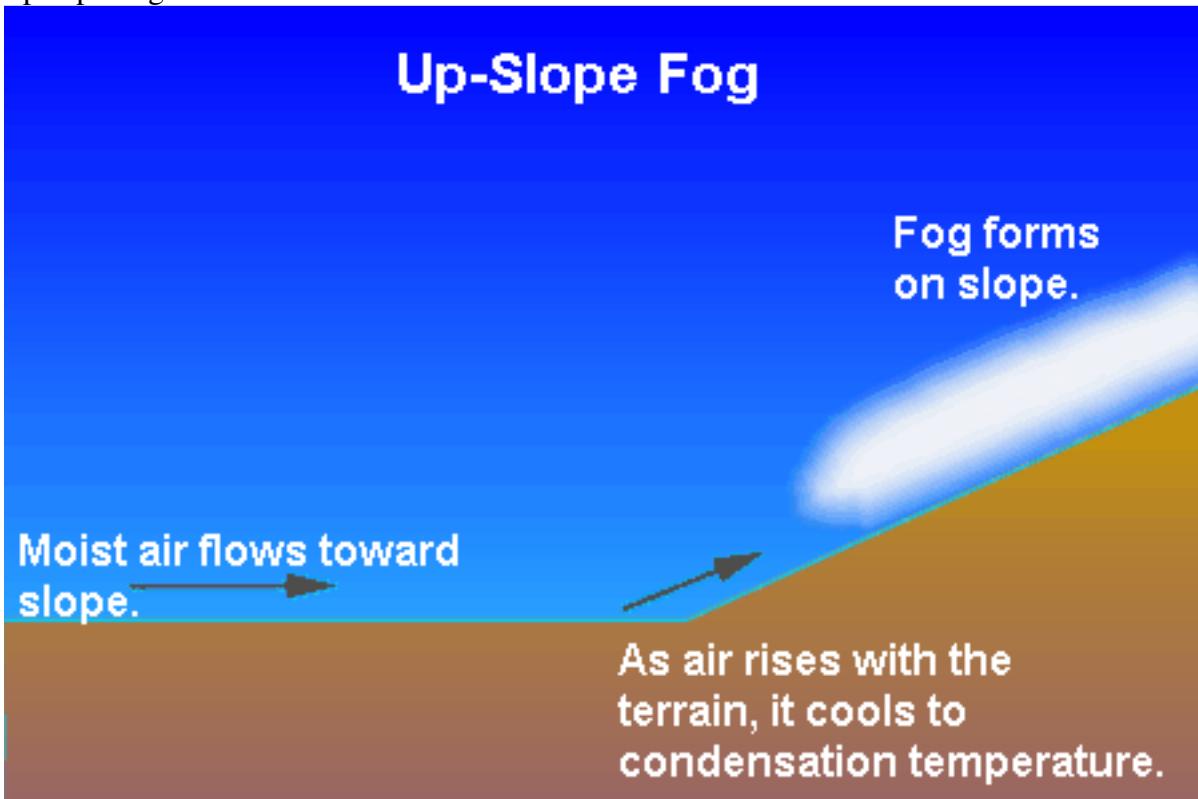
Ground Fog



Advection Fog



Upslope Fog



Steam Fog



Altostatus



Altocumulus



Cirrus



Cirrostratus



Cirrocumulus



Embedded

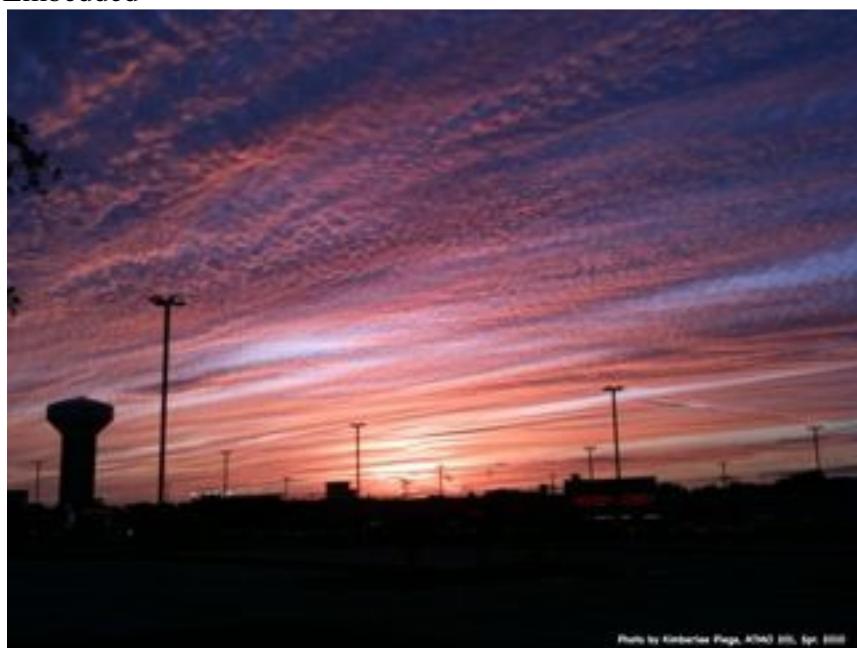


Photo by Kimberly Plaza, AFMCI Hill, Apr. 2002

Cumulus



Towering Cumulus



Cumulonimbus

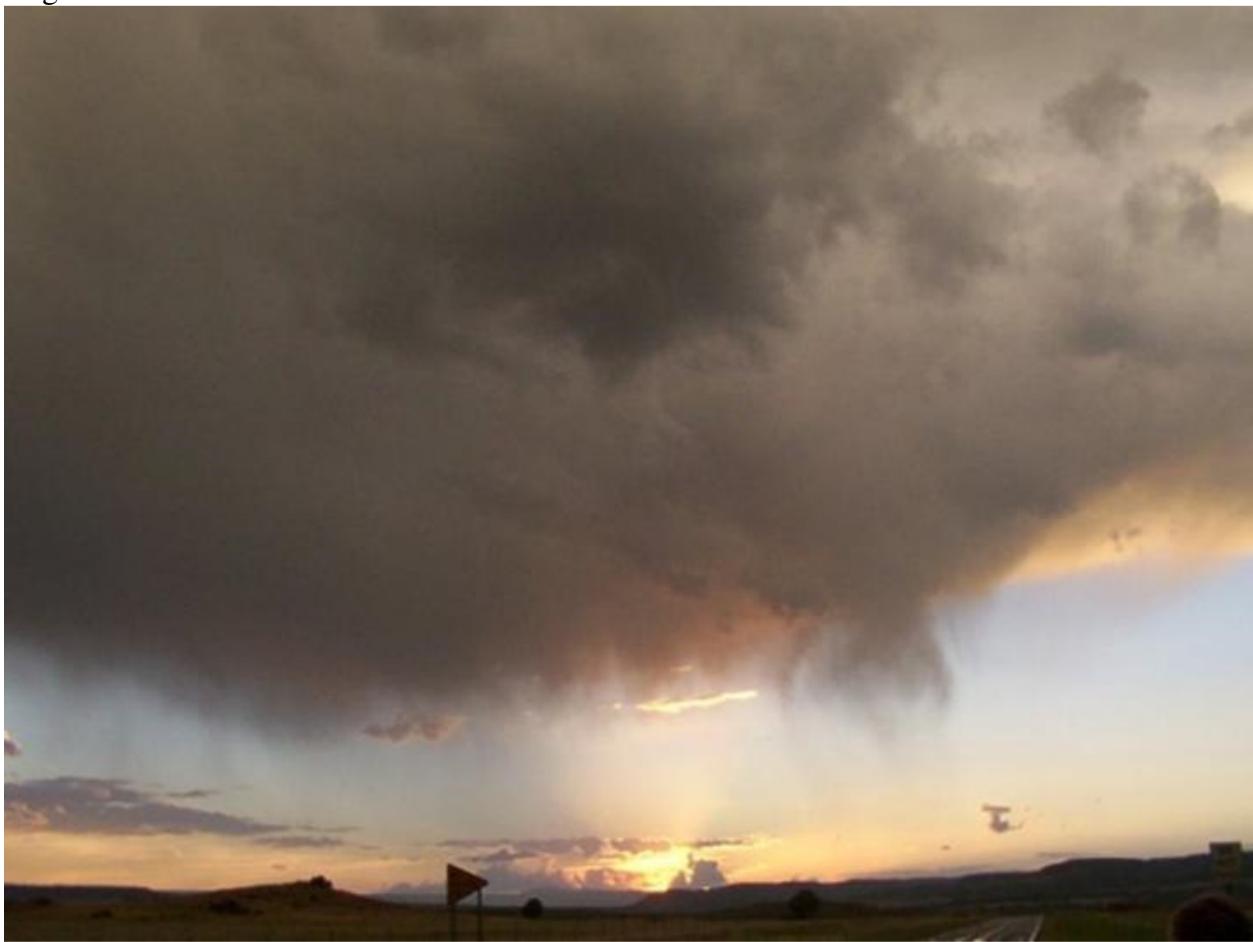


Precipitation

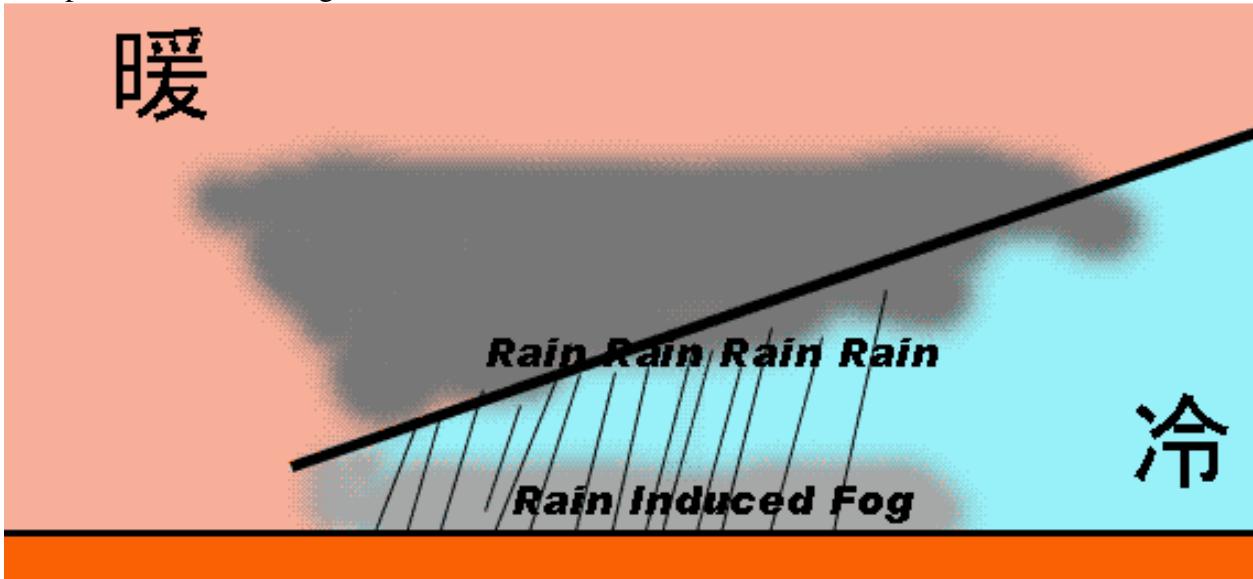


Supercooled Water Droplets

Virga



Precipitation-Induced Fog



Ice Pellets



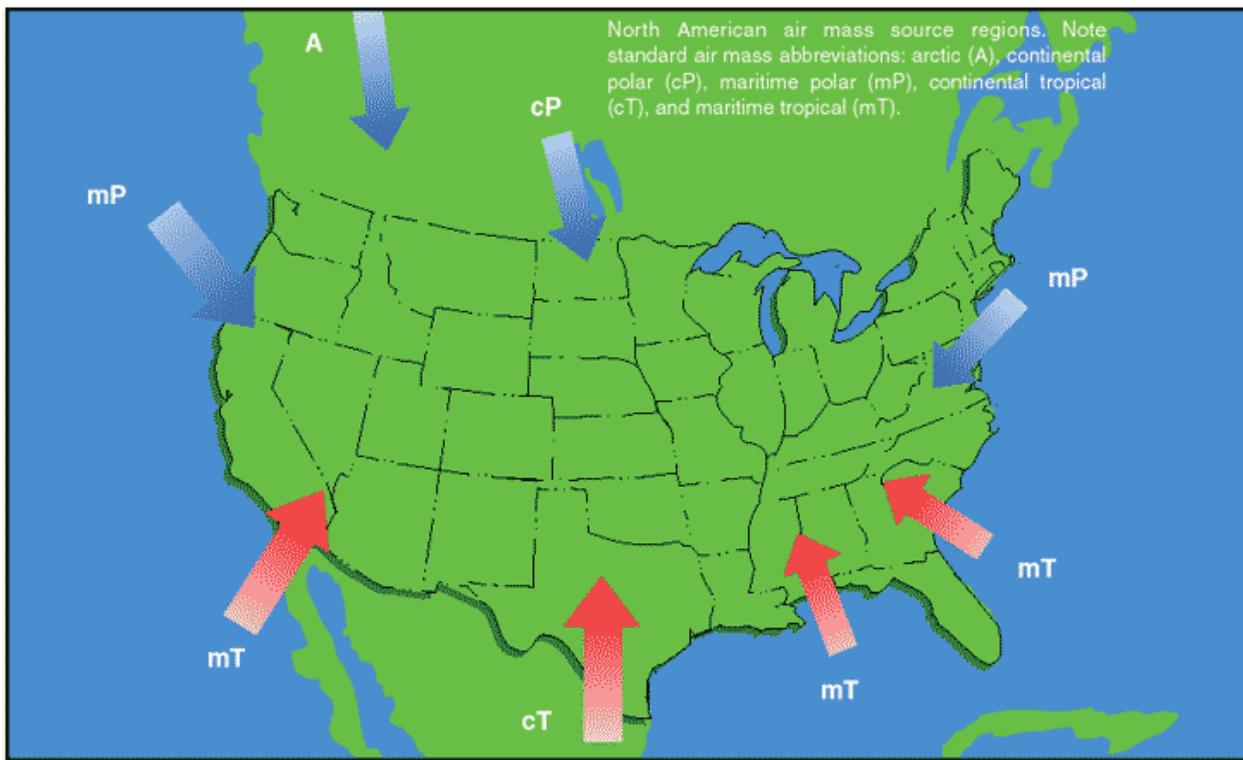
Hail



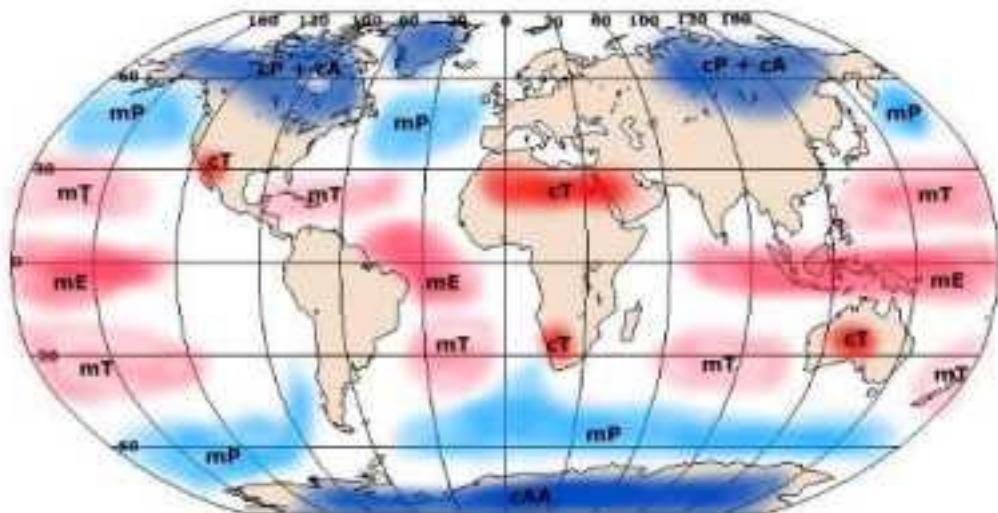
Fallstreaks



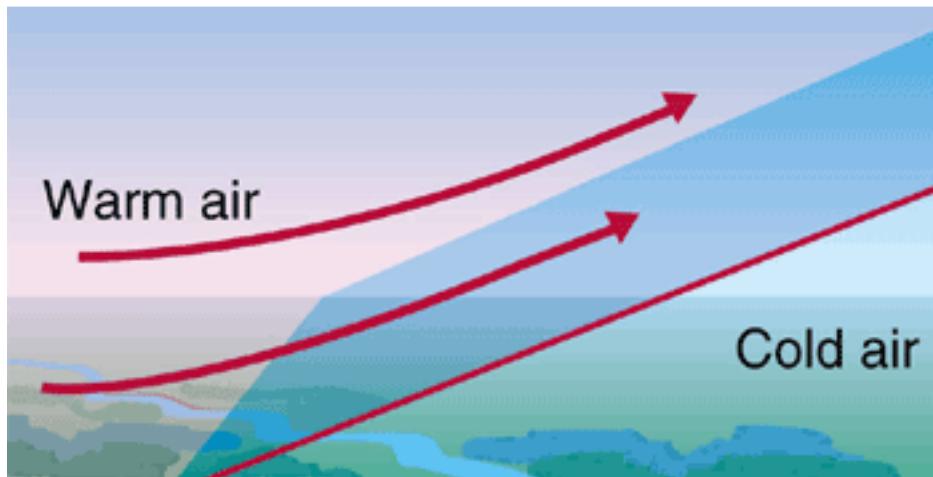
Airmass



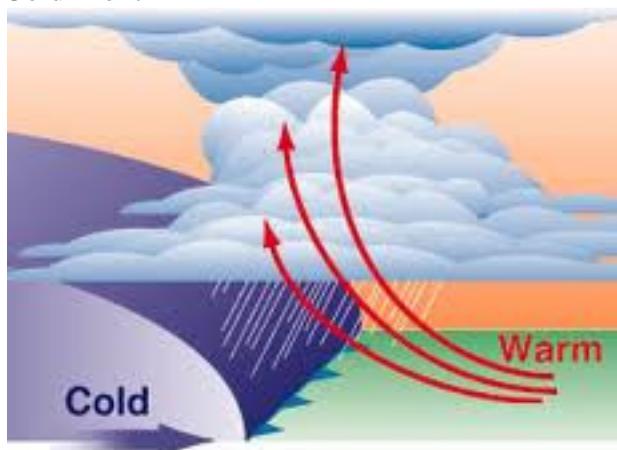
Source Region



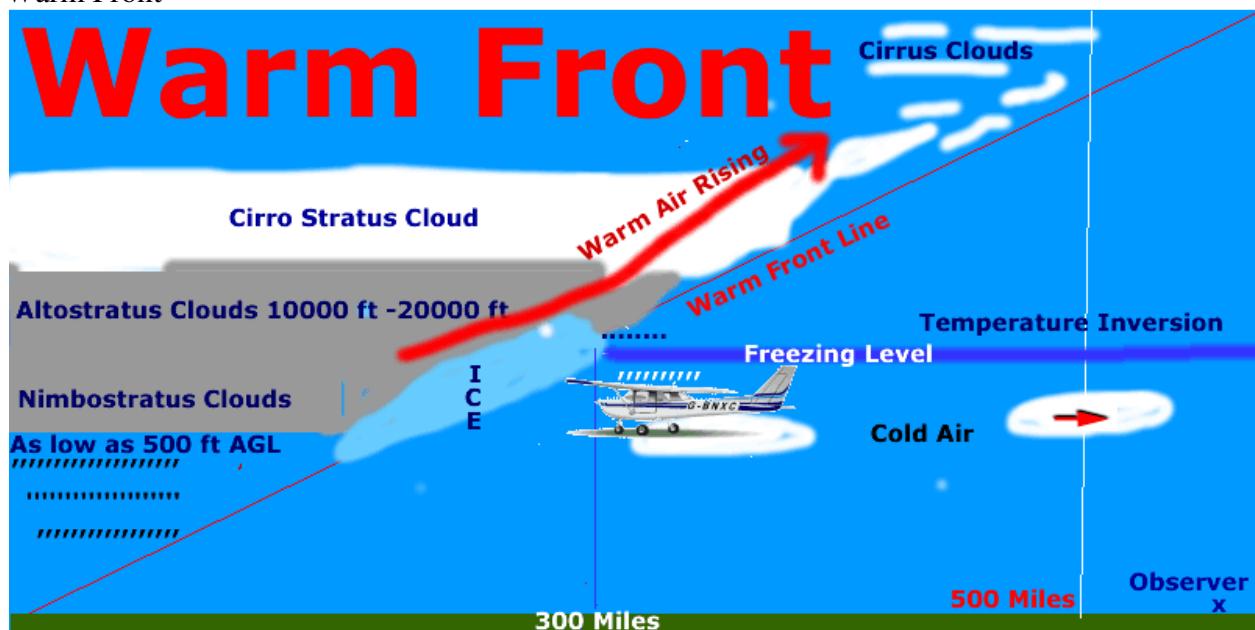
Front



Cold Front



Warm Front



Stationary Front

The Stationary Front

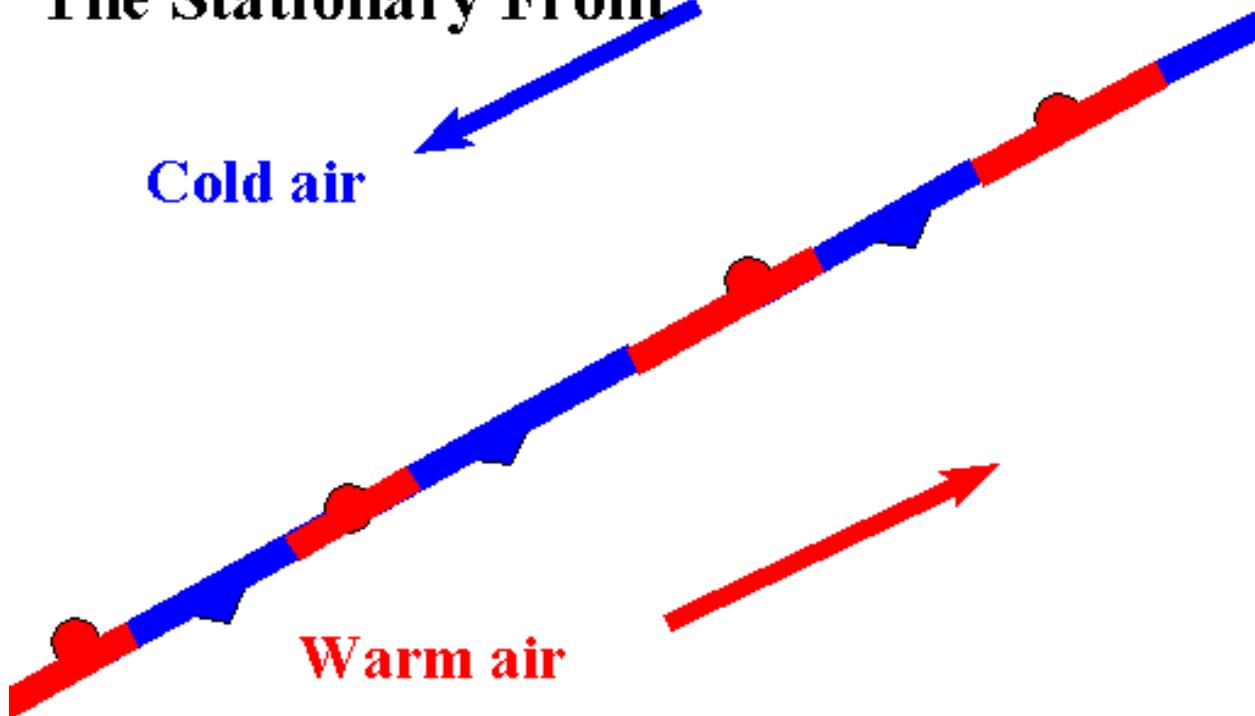
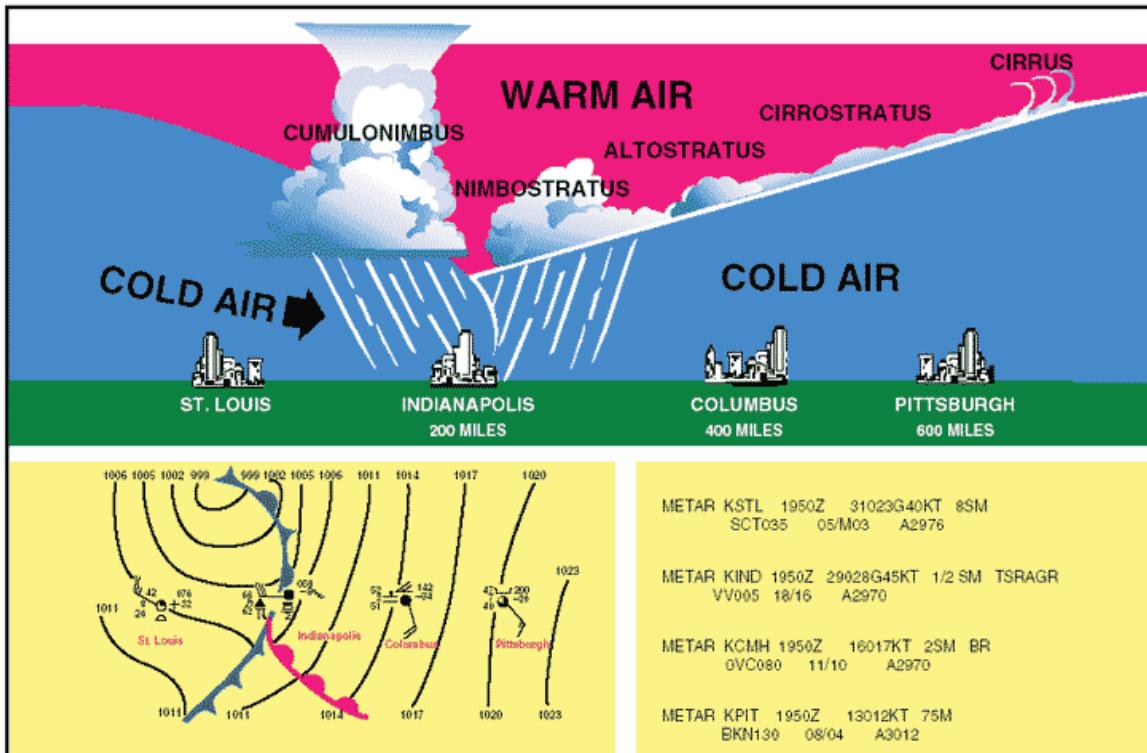
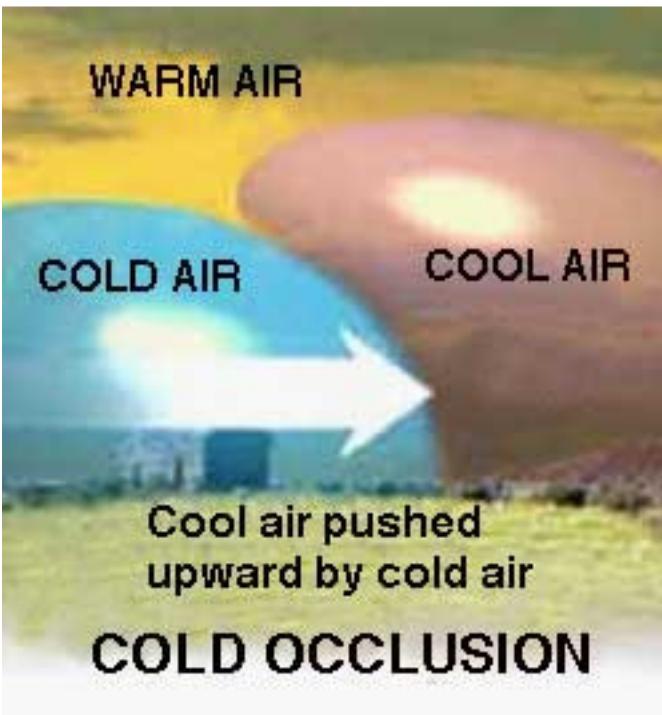


Fig 56

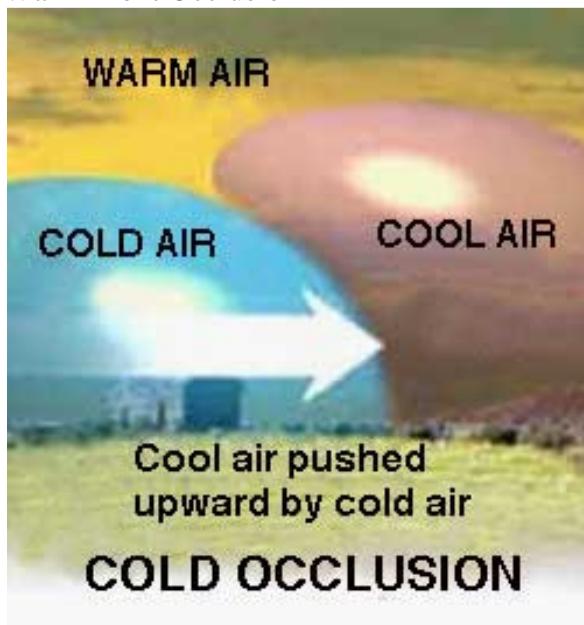
Occluded Front



Cold Front Occlusion



Warm Front Occlusion



Part 3 Airmass Thunderstorms



Severe Thunderstorms



Single-Cell

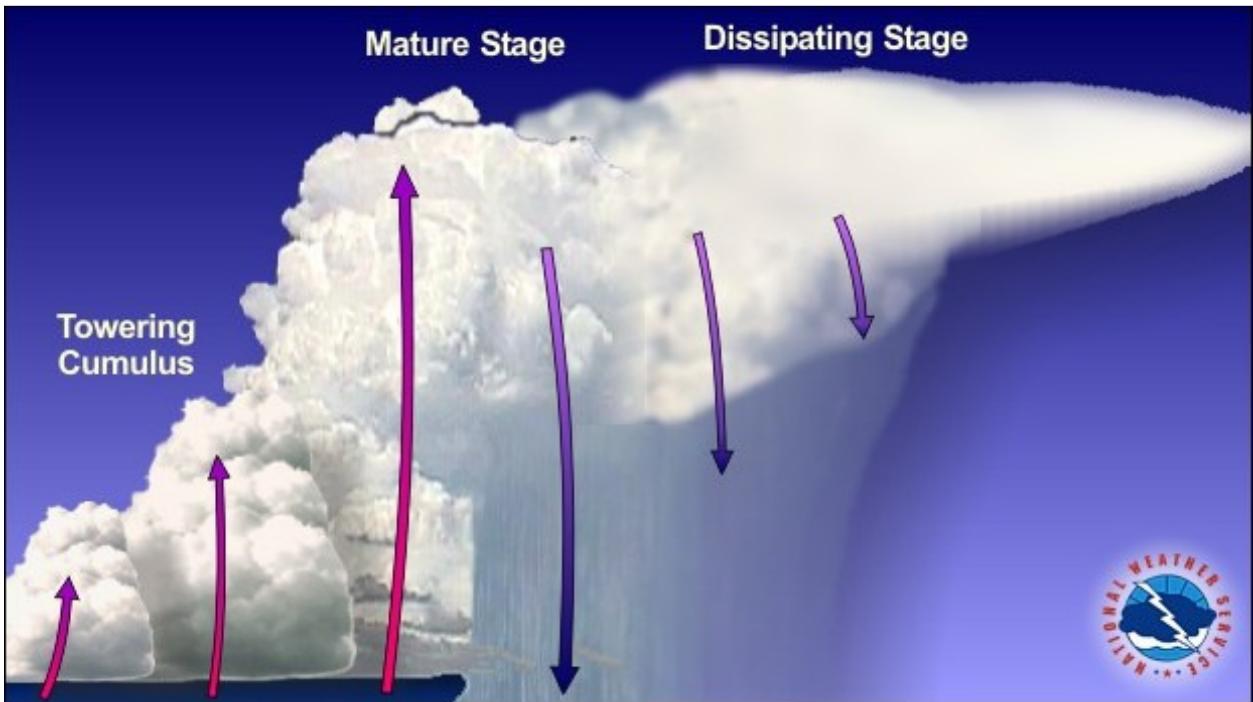


Copyright Rachel Humphrey

Supercell



Multicell



Squall Line



Frontal Thunderstorms

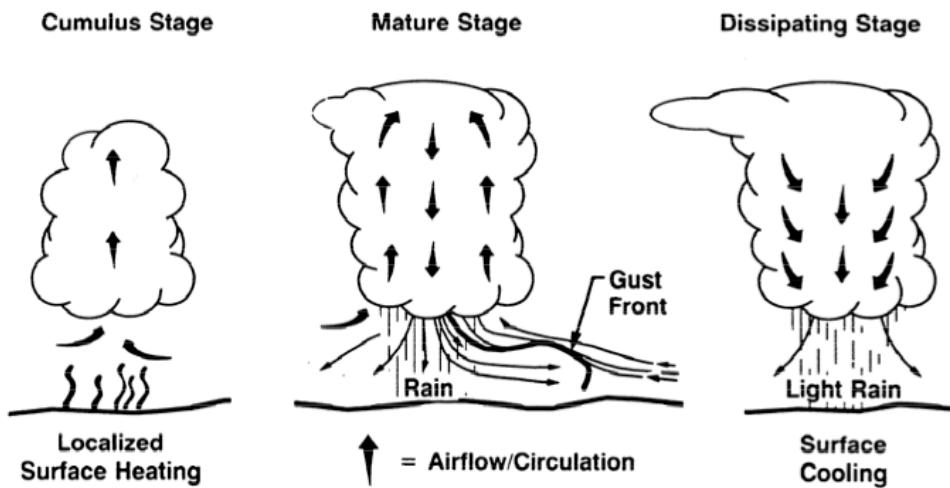
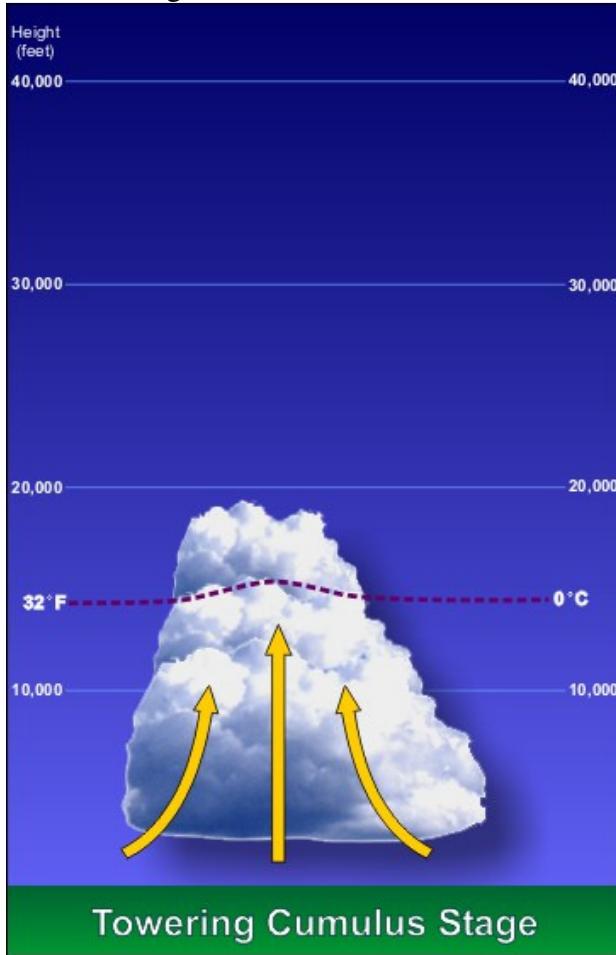
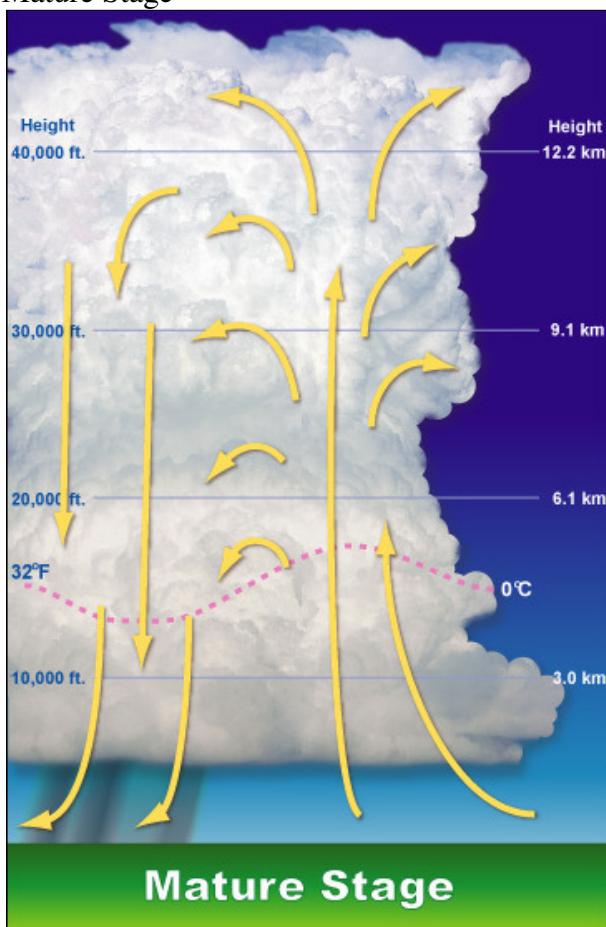


Figure 2. Airmass thunderstorm life cycle.

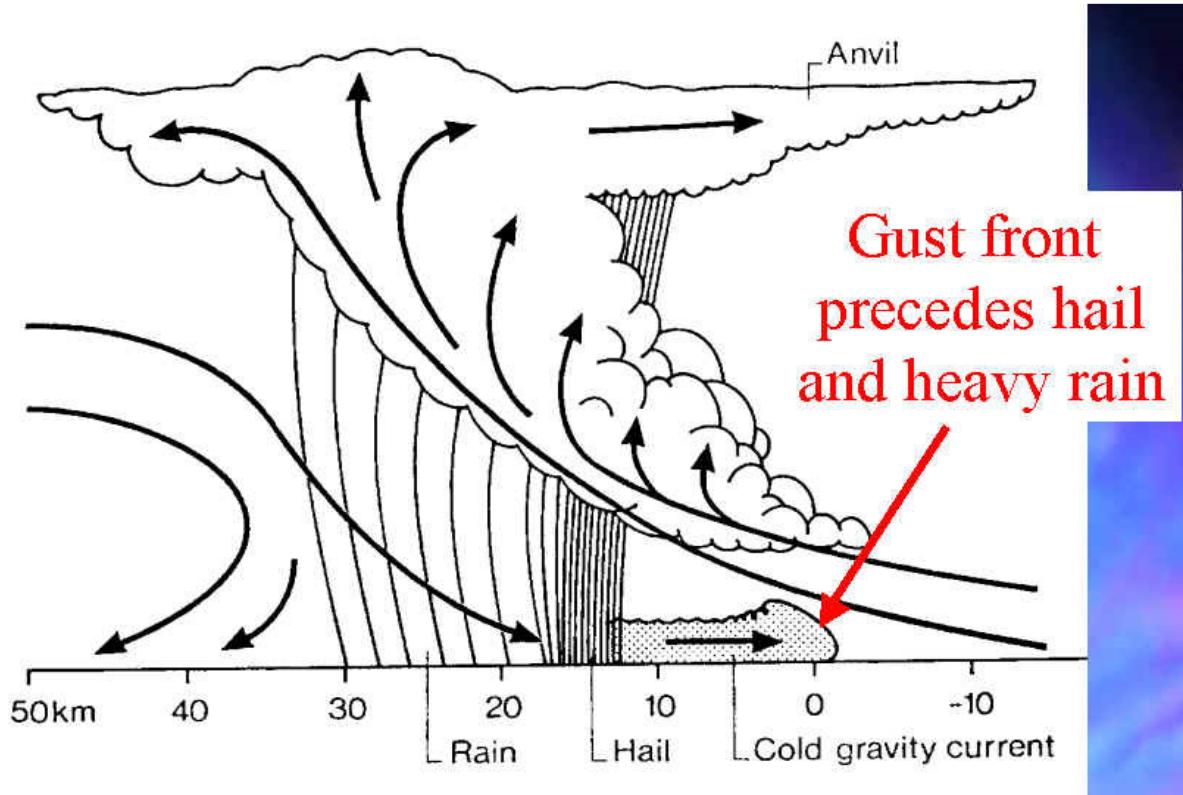
Cumulus Stage



Mature Stage



Gust Front

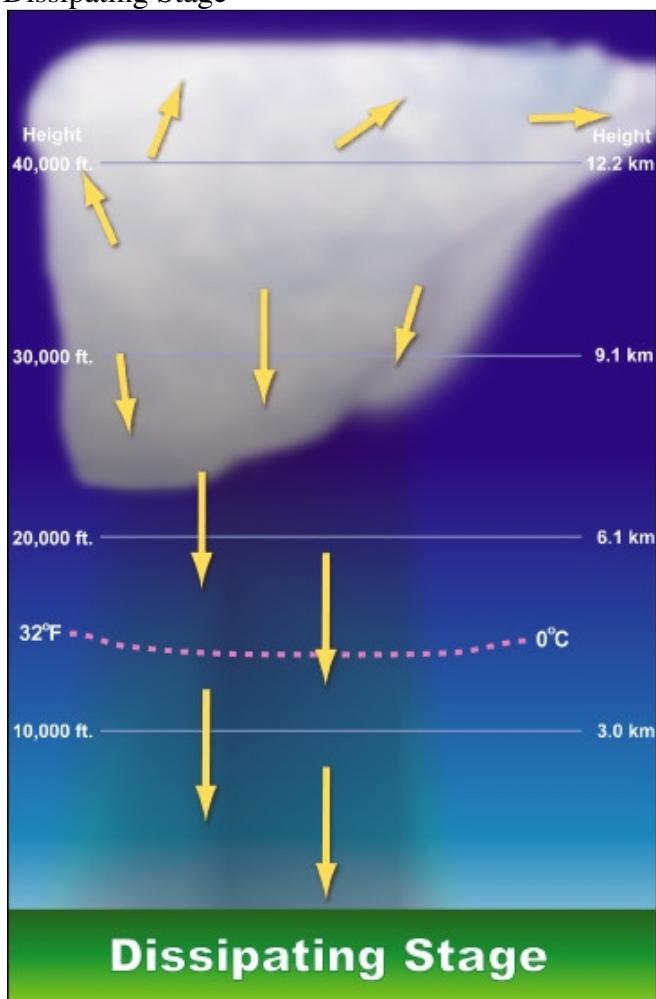


Gust front
precedes hail
and heavy rain

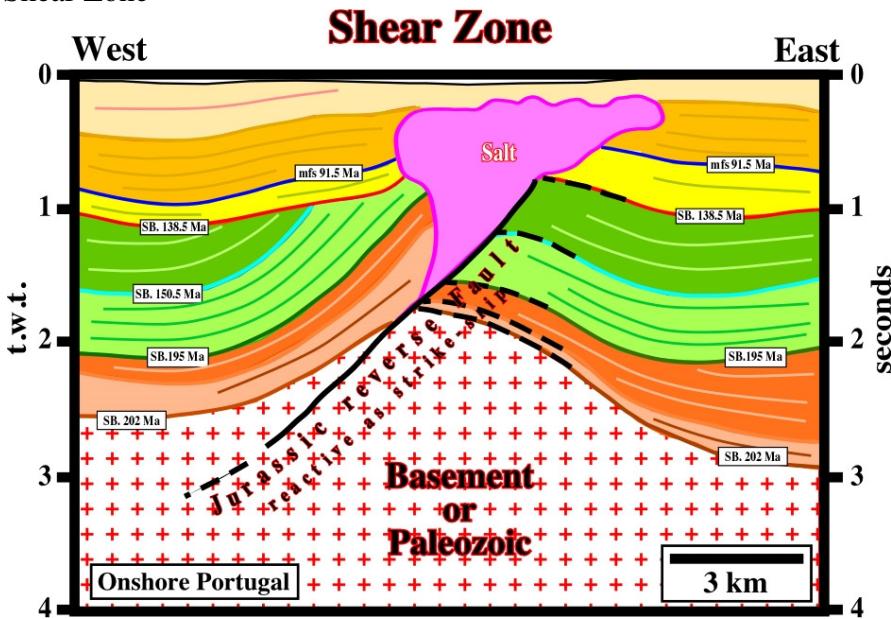
Roll Cloud



Dissipating Stage



Shear Zone



Tornado



Waterspout

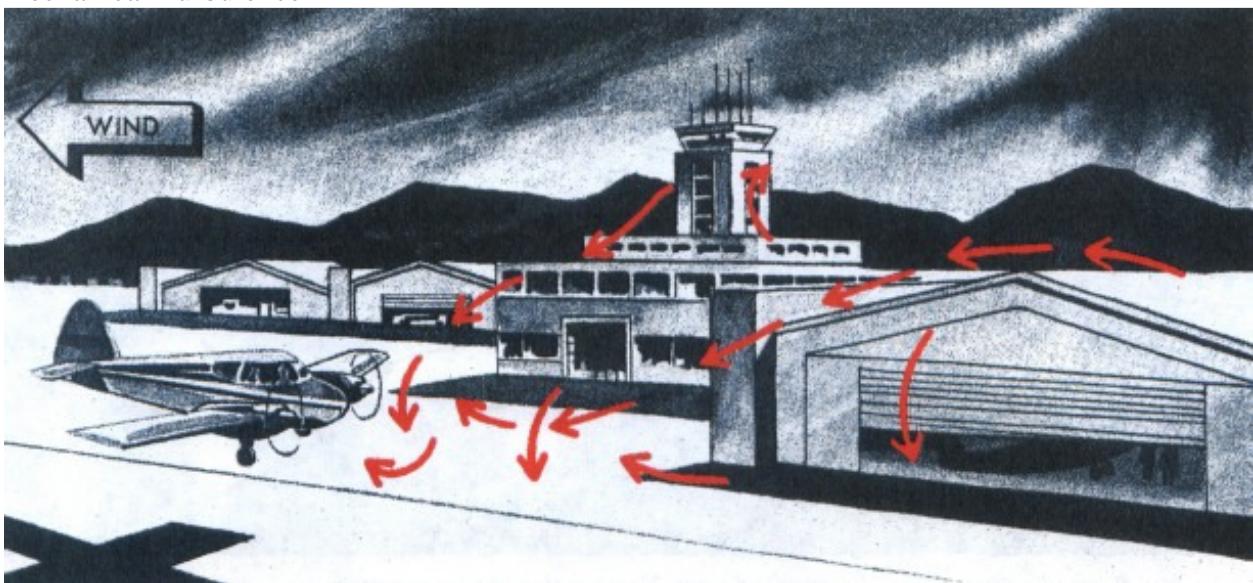


Low-Level Turbulence (LLT)

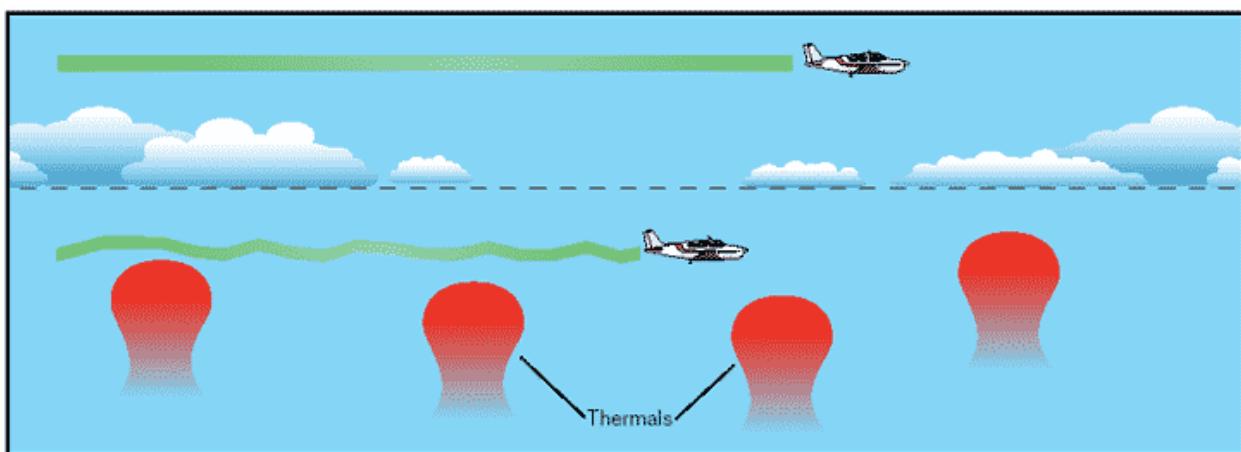


(C) Webbfeat Productions

Mechanical Turbulence



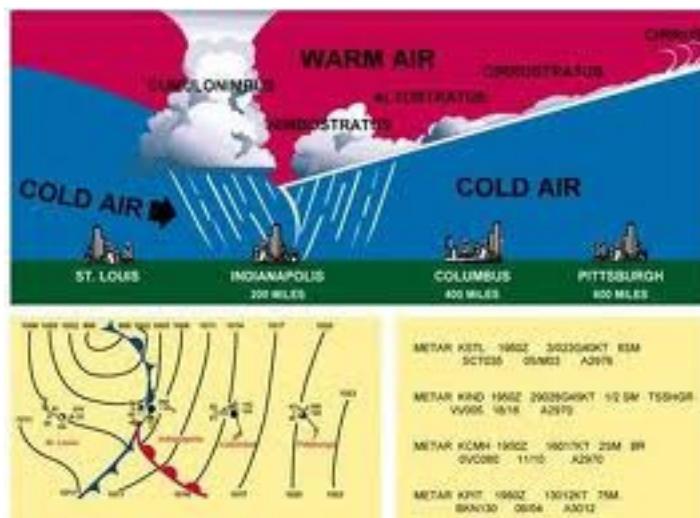
Convective Turbulence



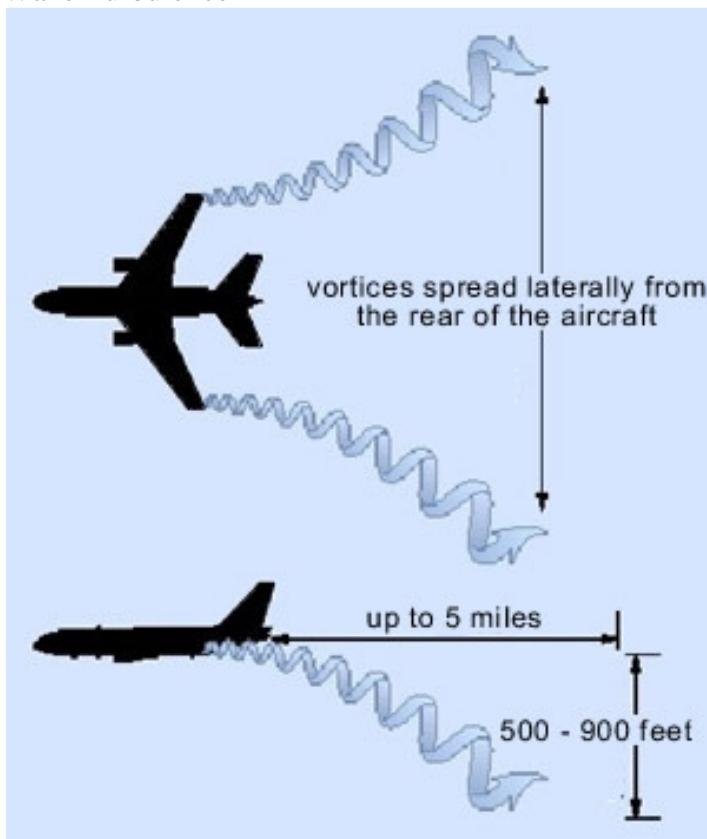
Capping Stable Layer



Frontal Turbulence



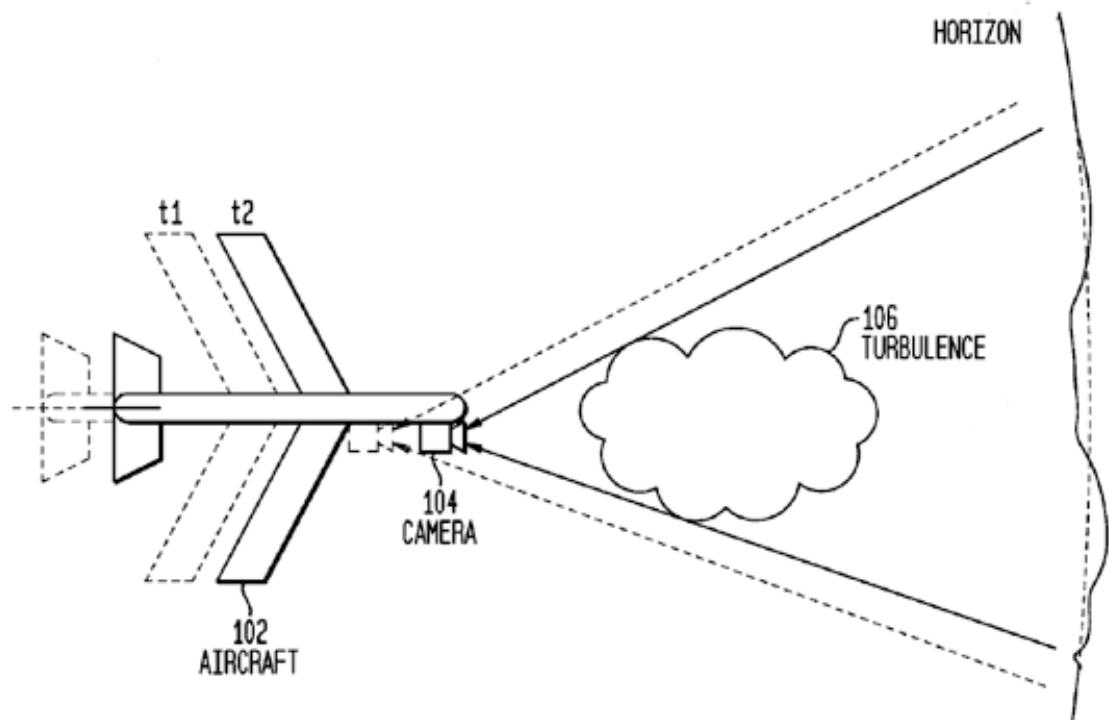
Wake Turbulence



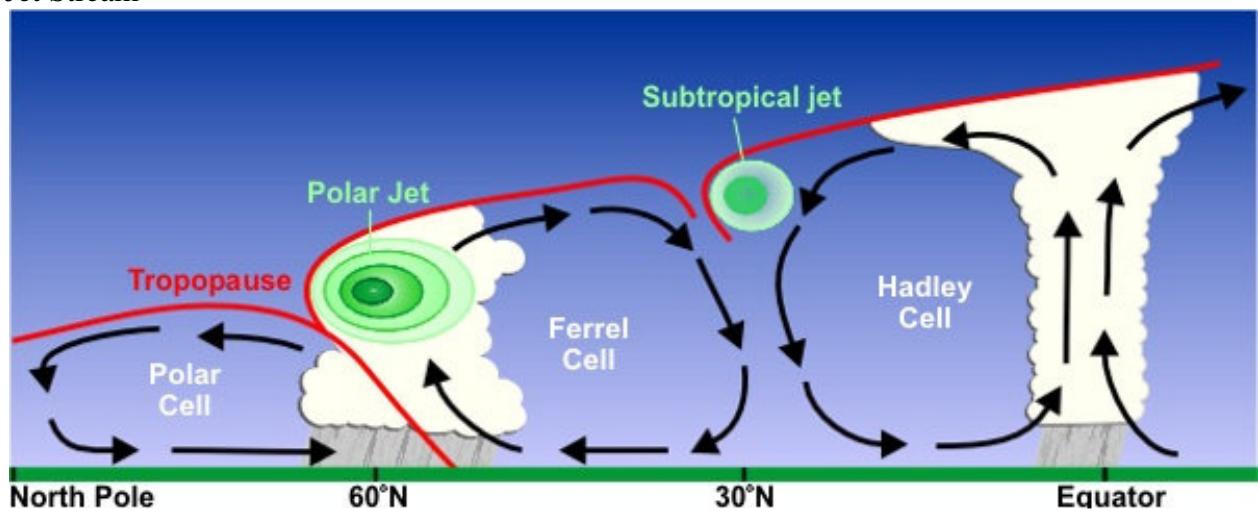
Jet Engine Blast



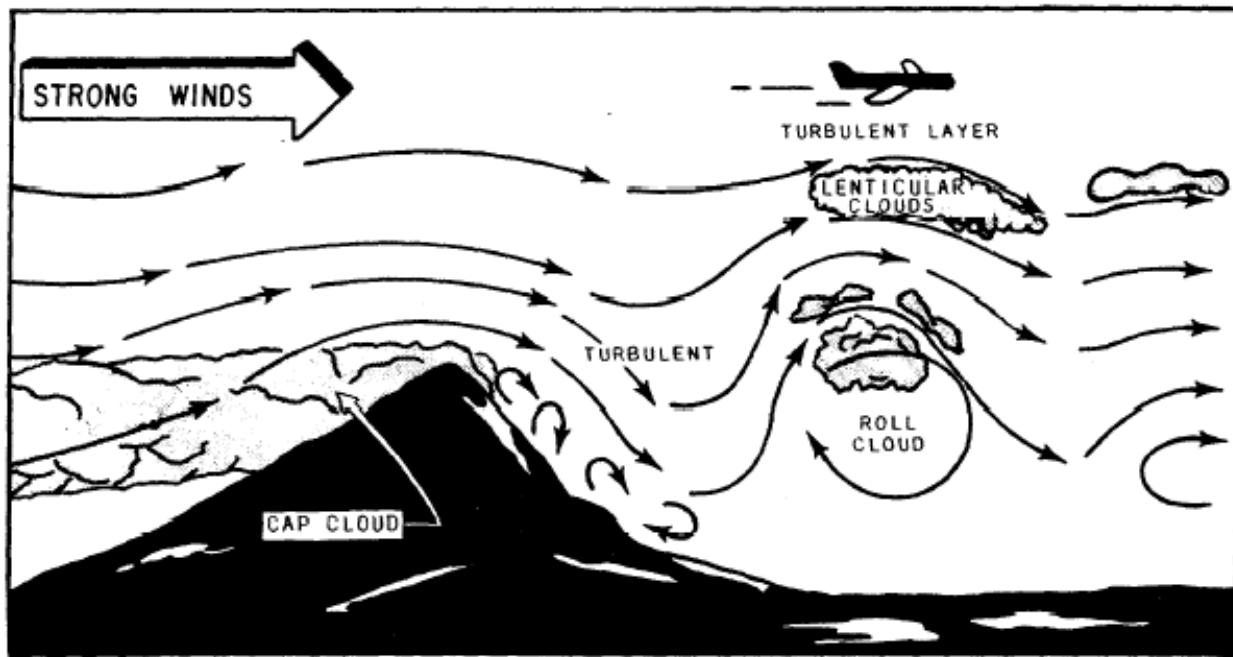
Clear Air Turbulence (CAT)



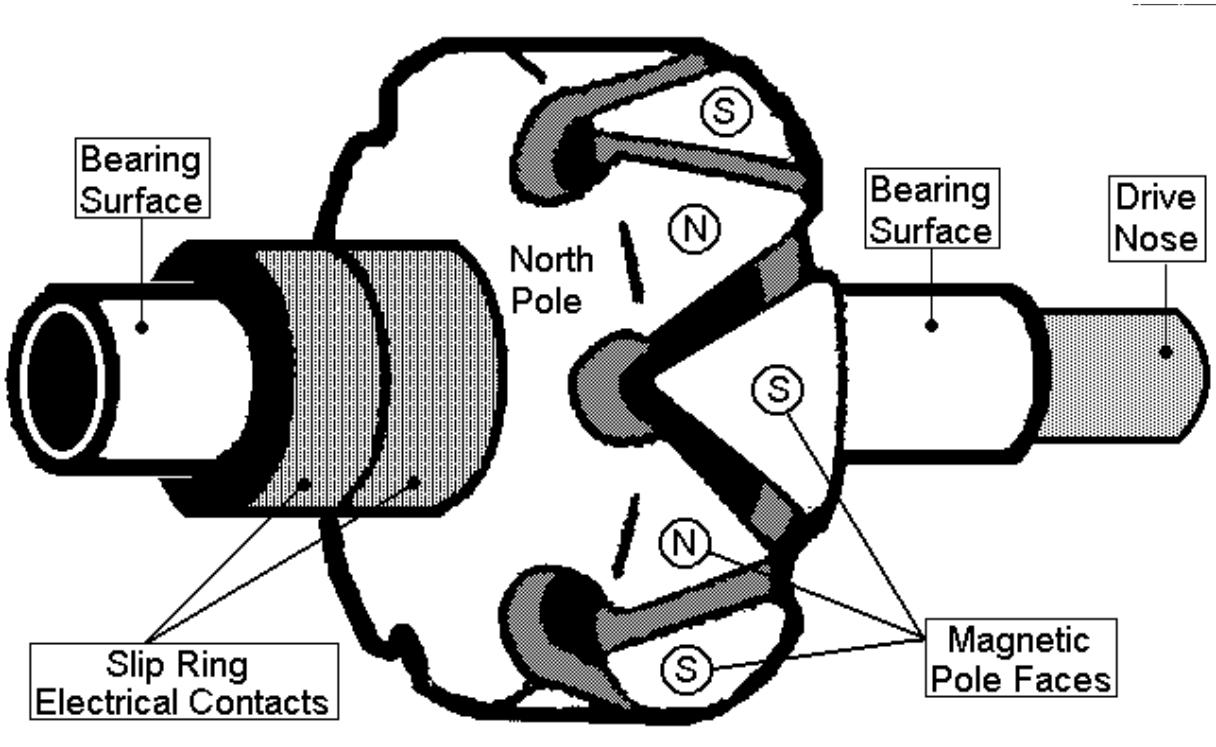
Jet Stream



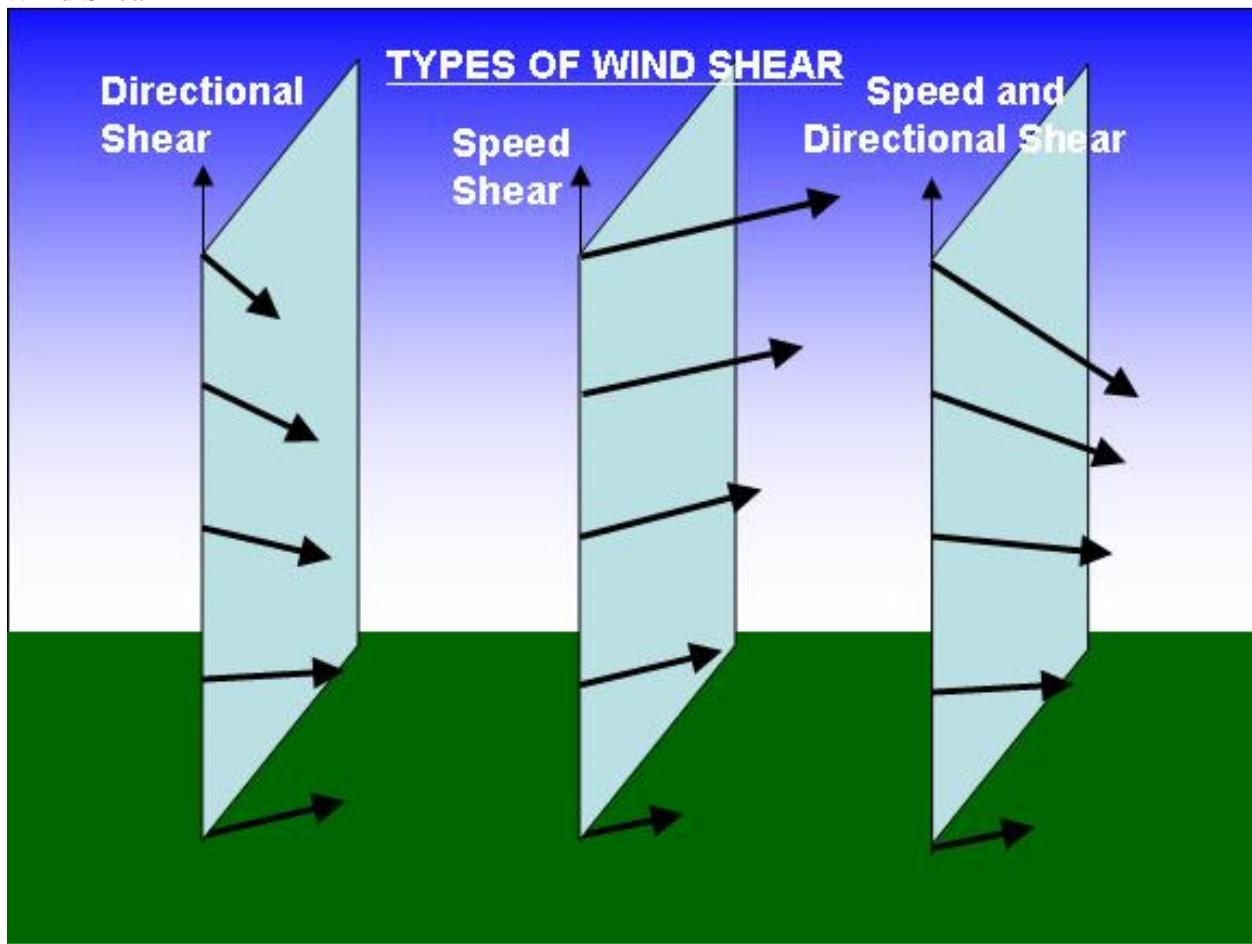
Mountain Waves



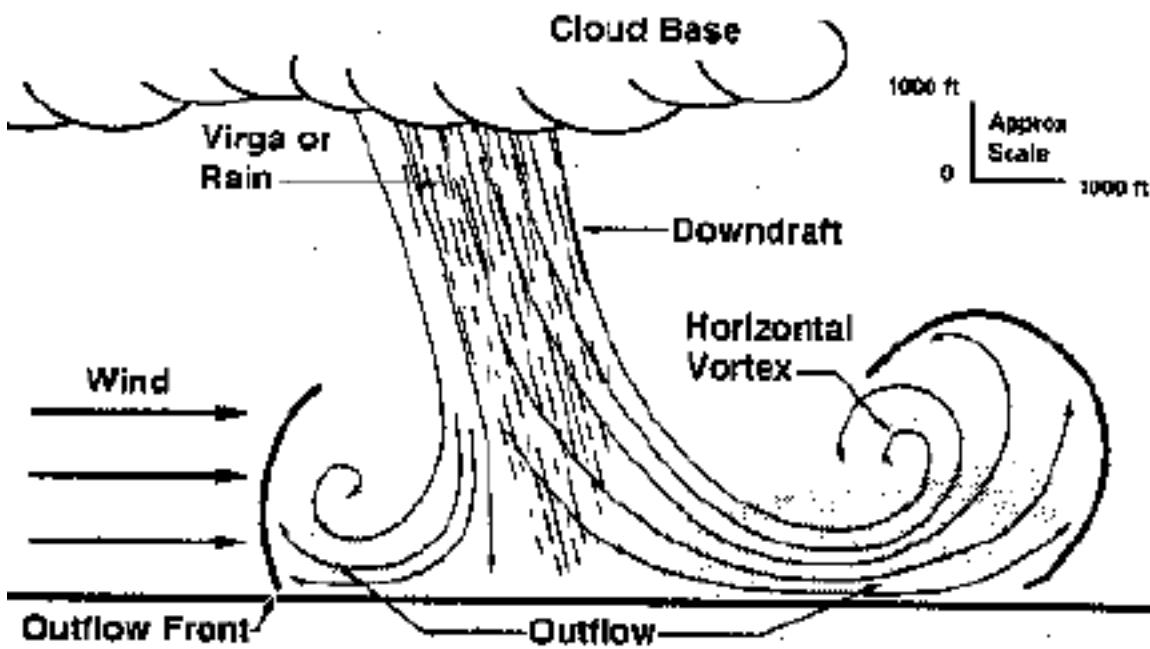
Rotor



Wind Shear



Microburst



Low-Level Wind Shear Alert Systems (LLWAS)

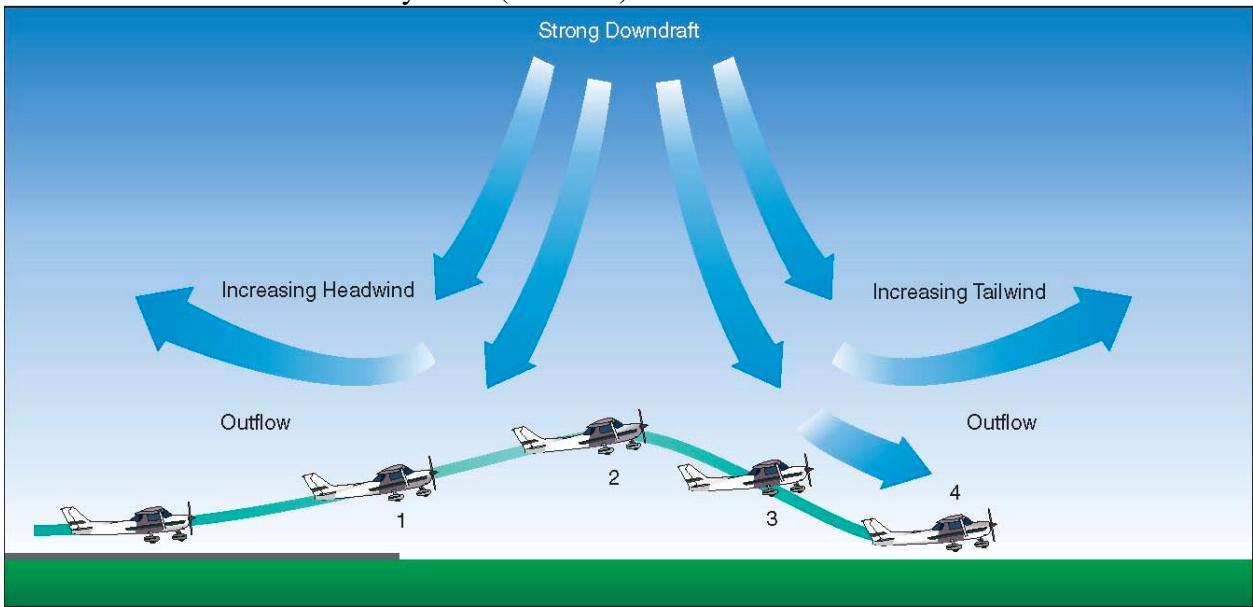
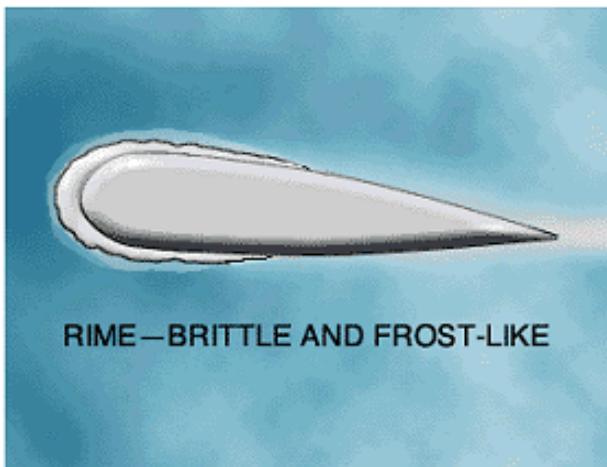


Figure 10-17. Effect of a microburst wind.

Terminal Doppler Weather Radar (TDWR)



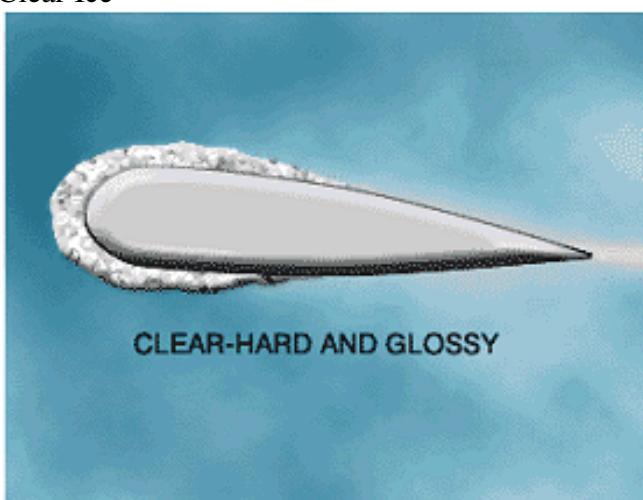
Rime Ice



RIME—BRITTLE AND FROST-LIKE

Sideview of wing with rime.

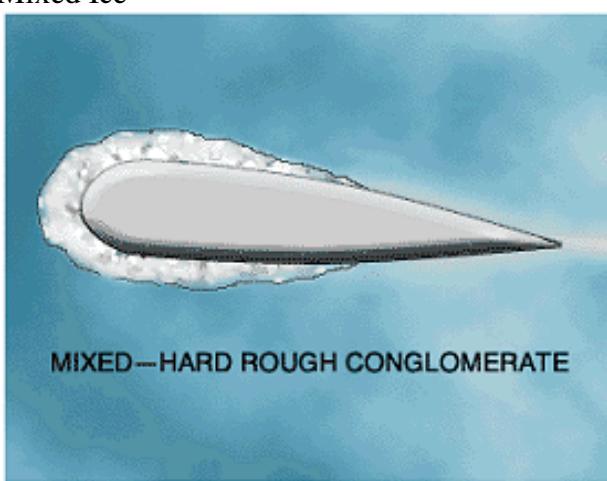
Clear Ice



CLEAR-HARD AND GLOSSY

Sideview of wing with clear ice

Mixed Ice



MIXED—HARD ROUGH CONGLOMERATE

Sideview of wing with mixed ice

Haze



Smoke



Smog



Dust



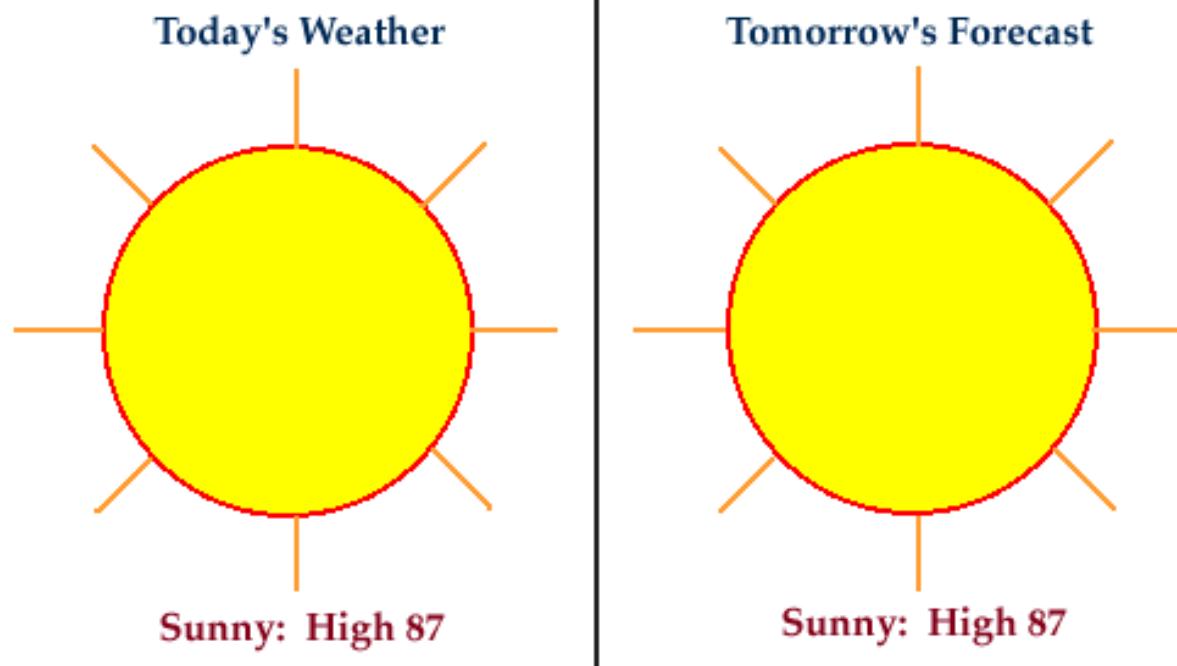
Volcanic Ash



Section 7

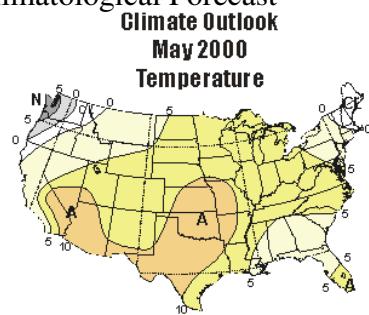
Part 1

Persistence Method



Trend Forecast

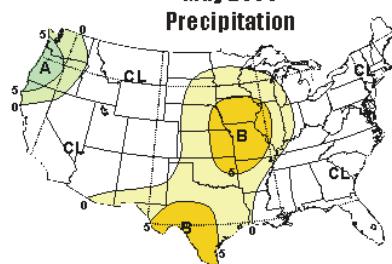
Climatological Forecast



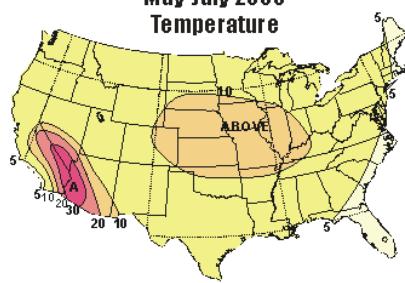
Climate Outlook

May 2000

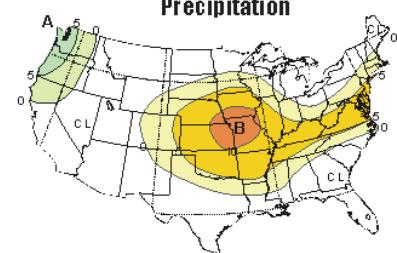
Precipitation



**Climate Outlook
May-July 2000
Temperature**



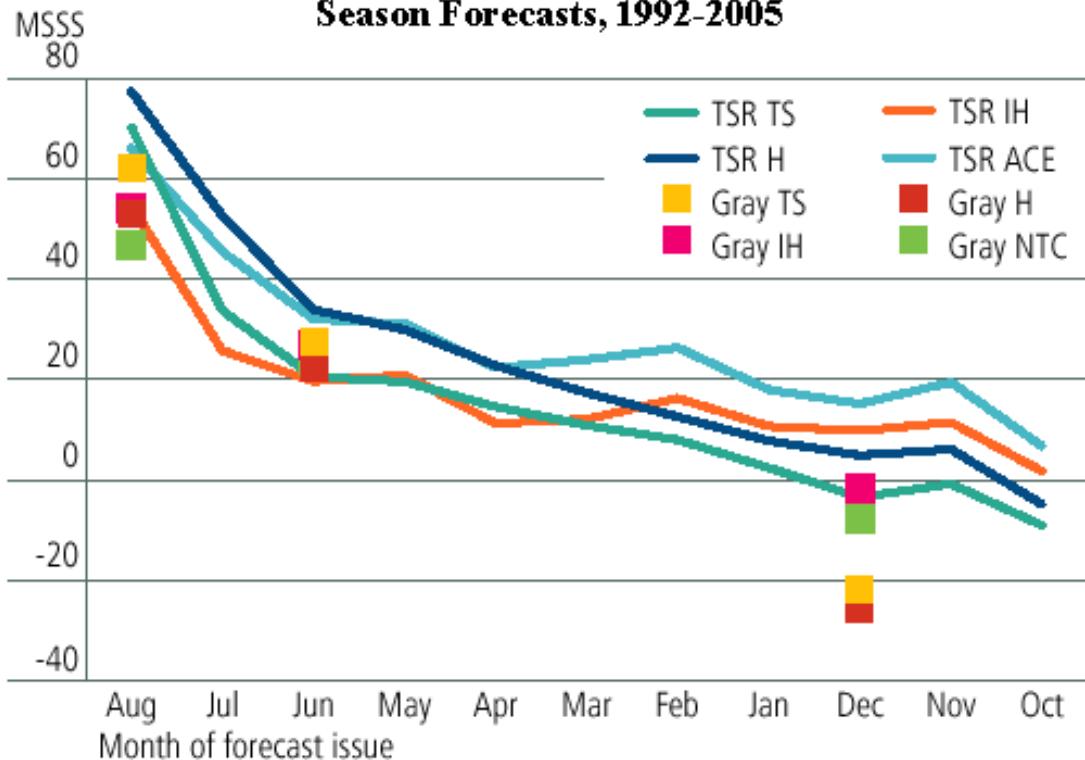
**Climate Outlook
May-July 2000
Precipitation**



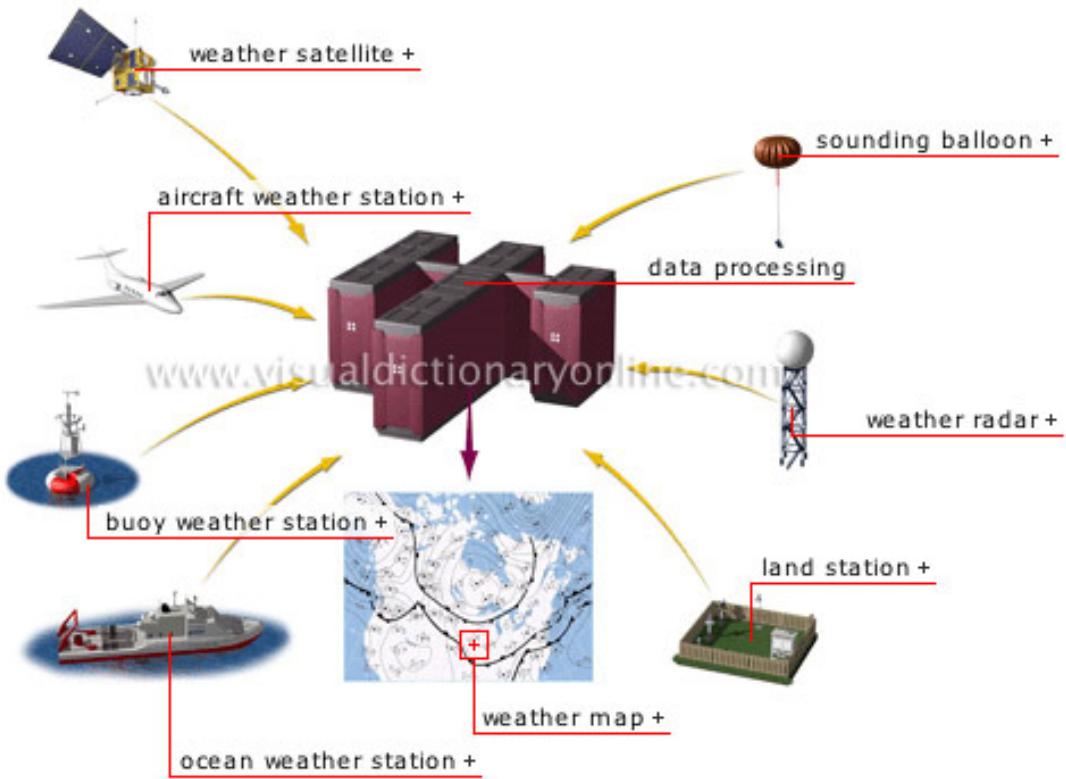
Release Date: April 13, 2000

Analogue Forecast

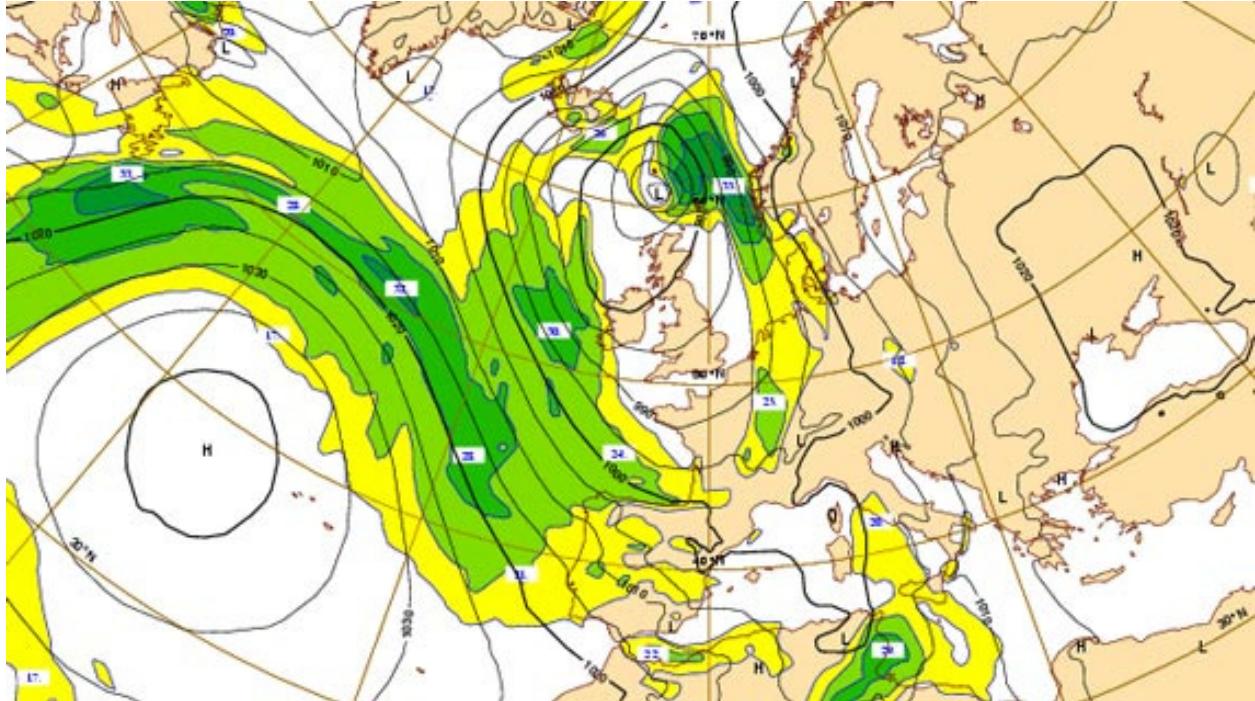
Accuracy of Atlantic Hurricane Season Forecasts, 1992-2005



Meteorological forecast



Numerical Weather Prediction



Part 2

Aviation Routine Weather Report (METAR)

SA REPORT

REC	SA	1000	MHD DPC	SATURATE		
LOCID	REPORT TYPE	MODIFIER	TIME	SKY CONDITIONS	VISIBILITY	WEATHER & OBSCURATIONS
102/	04/06/	2200Z25/ 982	/	INTLWNS TS25 OVRD HNGR E LTBC		
PRESSURE	TEMP/DEW PT	WIND	ALTIMETER		REMARKS	

METAR REPORT

METAR	KHNC	0100Z	2200Z25SAT	3/4SM	INTL/2500FT	TSA NR
REPORT TYPE	LOCID	DATE/TIME	MODIFIER	WIND	VISIBILITY	EVR.
DVCHRS	10/15	A2992	/	RME LTBC TS25 TS END HNGR E SLPD2		
SKY CONDITIONS	TEMP/DEW PT	ALTIMETER		REMARKS		

Prevailing Visibility



Runway Visual Range (RVR)



Ceiling



Radar Weather Report (SD)

Pilot Weather Report (PIREP)

ENCODING PILOT WEATHER REPORTS (PIREPS)		
1. UA	Routine PIREP, UUA-Urgent PIREP.	
2. /OV	Location:	Use 3-letter NAVAID ident only. a. Fix: /OV ABC, /OV ABC 090025. b. Fix: /OV ABC 045020-DEF, /OV ABC-DEF-GHI.
3. /TM	Time:	4 digits in UTC: /TM 0915.
4. /FL	Altitude/Flight Level:	3 digits for hundreds of feet. If not known use UNKN: /FL095, /FL310, /FLUNKN.
5. /TP	Type Aircraft:	4 digits maximum, if not known use UNKN: /TP L329, /TP B727, /TP UNKN.
6. /SK	Cloud Layers:	Describe as follows: a. Height of cloud base in hundreds of feet. If unknown, use UNKN. b. Cloud cover symbol. c. Height of cloud tops in hundreds of feet.
7. /WX	Weather:	Flight visibility reported first: Use standard weather symbols, Intensity is not reported: /WX FV02 R H, /WX FV01 TRW.
8. /TA	Air Temperature in Celsius:	If below zero, prefix with a hyphen: /TA 15, /TA -06.
9. /WV	Wind:	Direction and speed in six digits: /WV 270045, /WV 280110.
10. /TB	Turbulence:	Use standard contractions for intensity and type (use CAT or CHOP when appropriate). Include altitude only if different from /FL, /TB EXTREME, /TB LGT-MDT BLO 090.
11. /IC	Icing:	Describe using standard intensity and type contractions. Include altitude only if different than /FL: /IC LGT-MDT RIME, /IC SVR CLR 028-045.
12. /RM	Remarks:	Use free form to clarify the report and type hazardous elements first: /RM LLWS -15 KT SFC-030 DURC RNWY 22 JFK.

Terminal Aerodrome Forecast (TAF)



Aviation Area Forecast (FA)

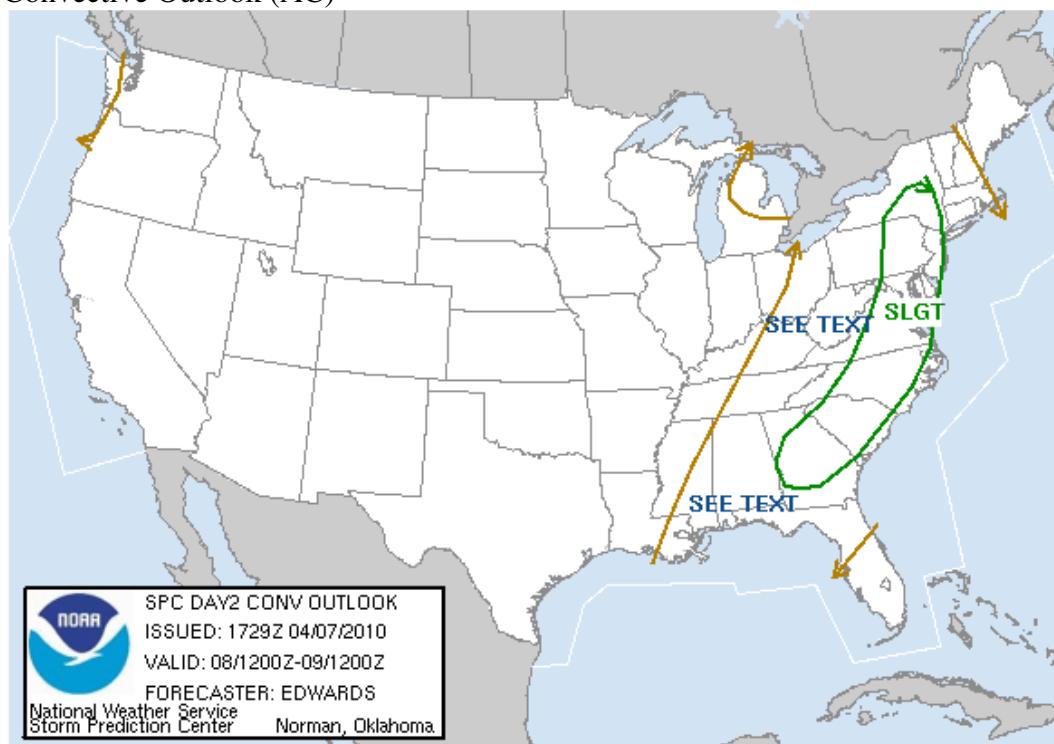


Winds And Temperatures Aloft Forecast (FD)

FD KWBC 151640						
BASED ON 151200Z DATA						
VALID 151800Z FOR USE 1700-2100Z						
TEMPS NEGATIVE ABV 24000						
FD	3000	6000	9000	12000	18000	24000
AMA	2714	2725+00	2625-04	2531-15	2542-27	265842
DEN	2321-04	2532-08	2434-19	2441-31	235347	

Hurricane Advisory (WH)

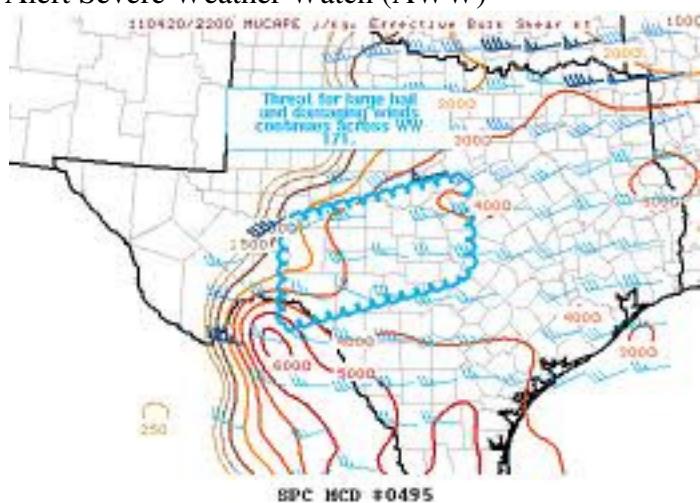
Convective Outlook (AC)



Severe Weather Watch Bulletin (WW)



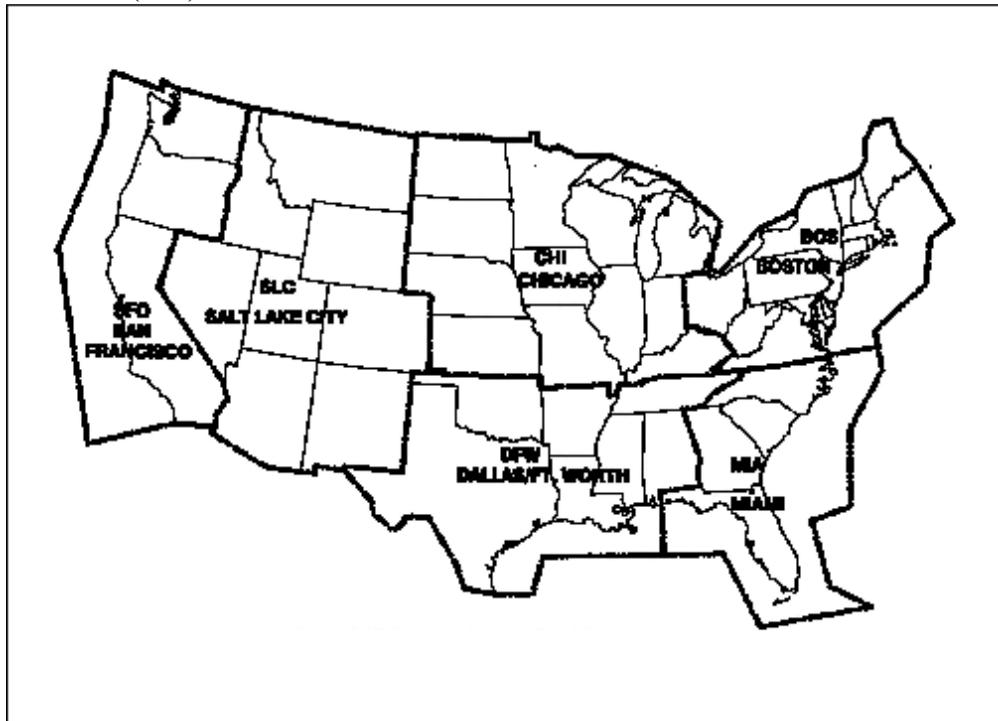
Alert Severe Weather Watch (AWW)



AIRMET (WA)



SIGMET (WS)



Convective SIGMET (WST)

AIR/SIGMETs Java Tool

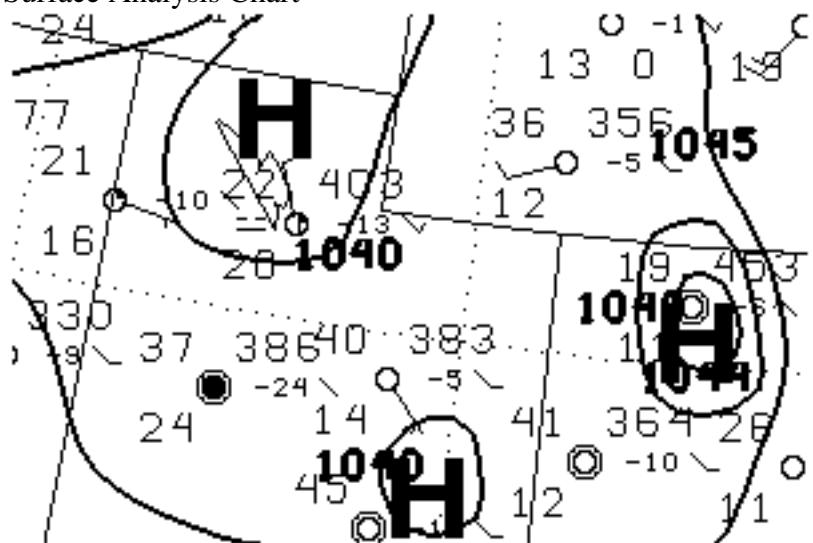


AIRMETs Valid Until: 04/05/11 0300Z

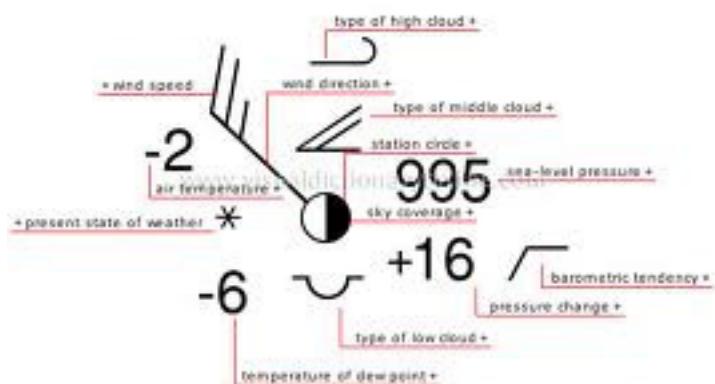
SIGMETs Valid Until: 04/05/11 0355Z

Part 3

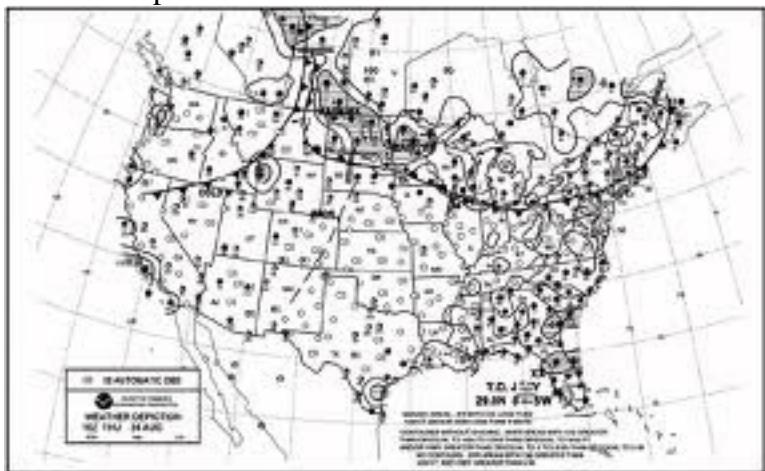
Surface Analysis Chart



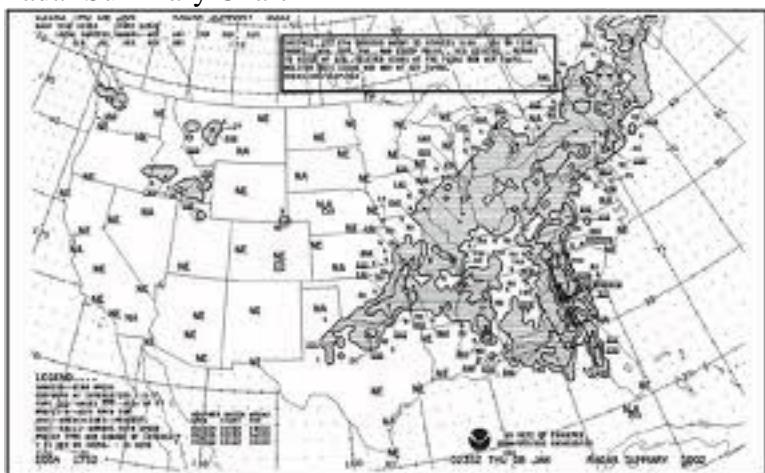
Station Model



Weather Depiction Chart



Radar Summary Chart



U.S. Low-Level Significant Weather Prog Chart

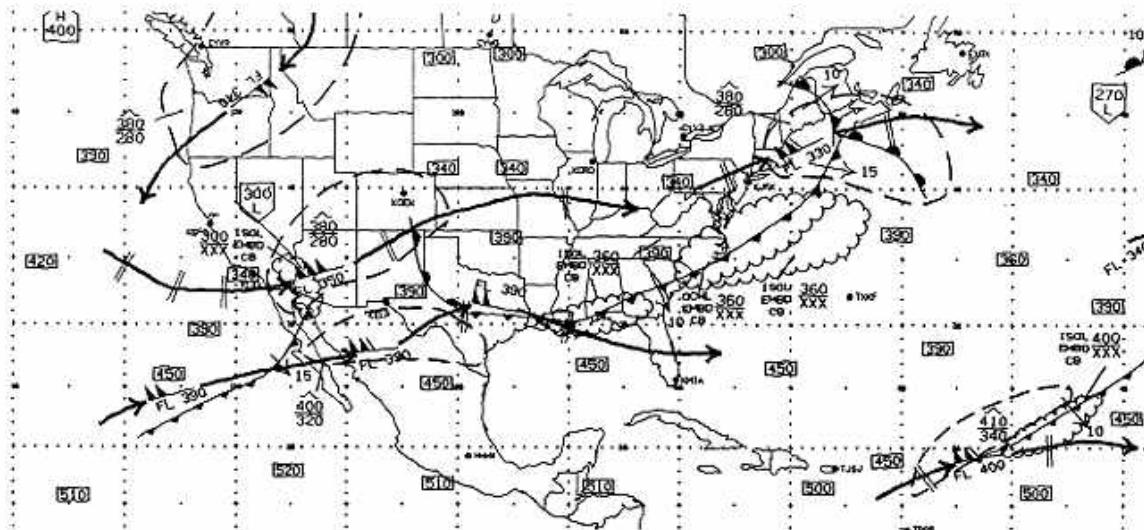
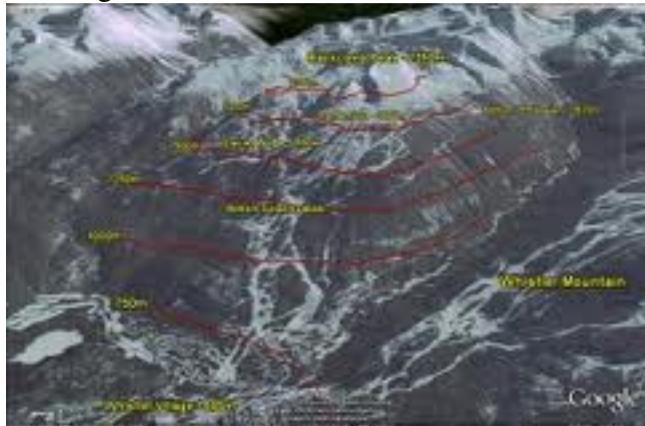
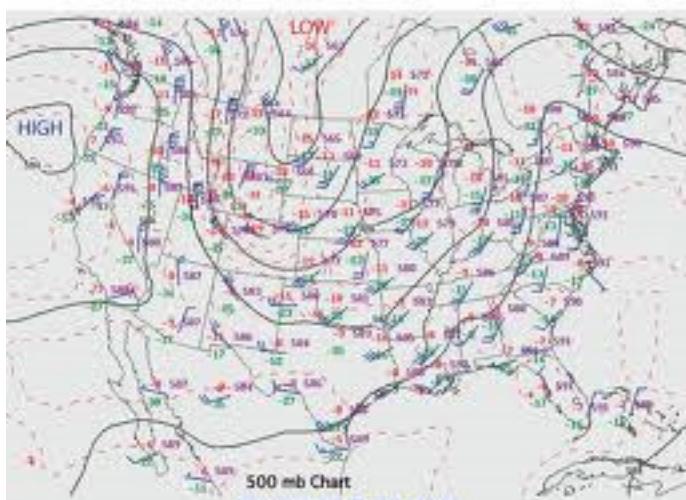


FIGURE B-3. U.S. High-Level Significant Weather Prog

Freezing Levels



Convective Outlook Chart



Forecast Winds And Temperatures Aloft Chart (FD)



Volcanic Ash Forecast Transport And Dispersion Chart (VAFTAD)



Preflight Weather Briefing

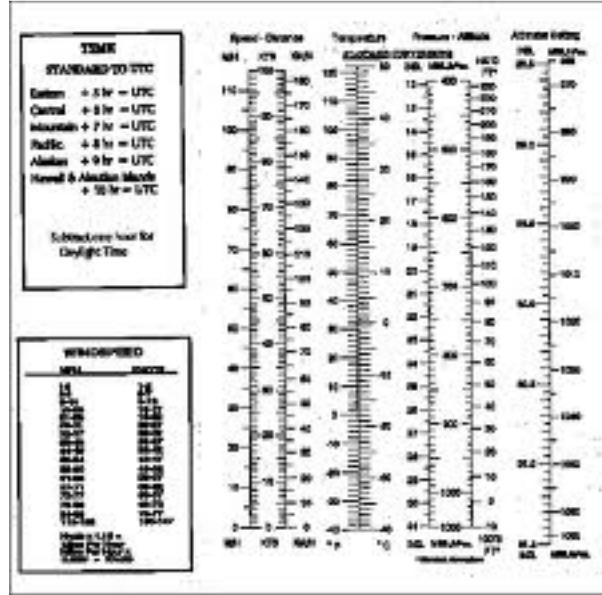
WEATHER BRIEFING					
For flight from <u>RANKINIAE</u> to <u>CHICAGO</u>					
EN-ROUTE WX AND ADVISORIES:					
CEILING 10,000 FEET DOWN SHOWERS					
DESTINATION WX:					
airport	clouds:	12,000 FEET	FEW SCAT		
O'HARE	vis:	20	barom: 30.04	surf w:	300°/5°
ALTERNATE WX:					
airport	clouds:	12,000 FEET	FEW SCAT		
MIDWAY	vis:	20	barom: 30.04	surf w:	310°/6°
TERMINAL FORECASTS:					
airport	clouds:	CEILING GOOD	SHOWERS		
BIRMINGHAM	vis:	15	barom: 29.50	surf w:	300°/20
airport	clouds:	CEILING GOOD	SHOWERS		
O'HARE	vis:	10	barom: 29.90	surf w:	330°/15
FORECAST WINDS ALONE: 3000 - 5000 - 10,000					
CHICAGO		270°/10	280°/20	295°/40	
SIGNIFICANT WEATHER REPORTS, NOTARIES, AIRSPACE RESTRICTIONS:					
NARROW POINT FROM 2000, IN THE BIRMINGHAM AREA. LOCAL TFR GROUNDS					

Standard Briefing

Abbreviated Briefing

Outlook Briefing

Telephone Information Briefing Service (TIBS)



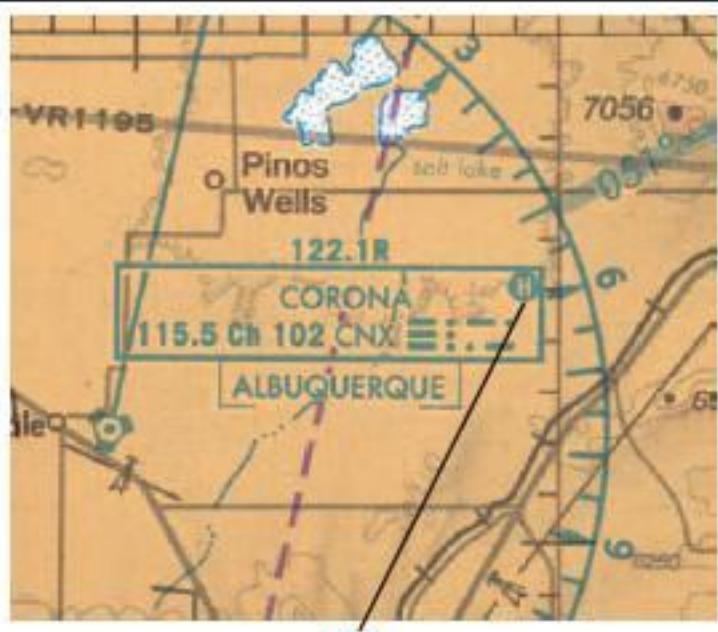
Direct User Access Terminal System (DUATS)

Transcribed Weather Broadcast (TWEB)



Symbol Indicates HIWAS

Hazardous In-Flight Weather Advisory Service (HIWAS)



Symbol Indicates HIWAS

Center Weather Advisory (CWA)



Enroute Flight Advisory Service (EFAS)

Flight Watch



Automated Weather Observing System (AWOS)



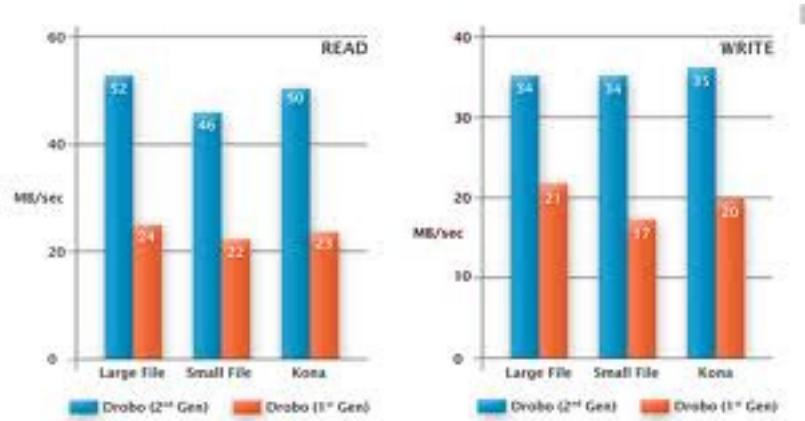
Automated Surface Observing System (ASOS)



Section 8
Part 1
Performance

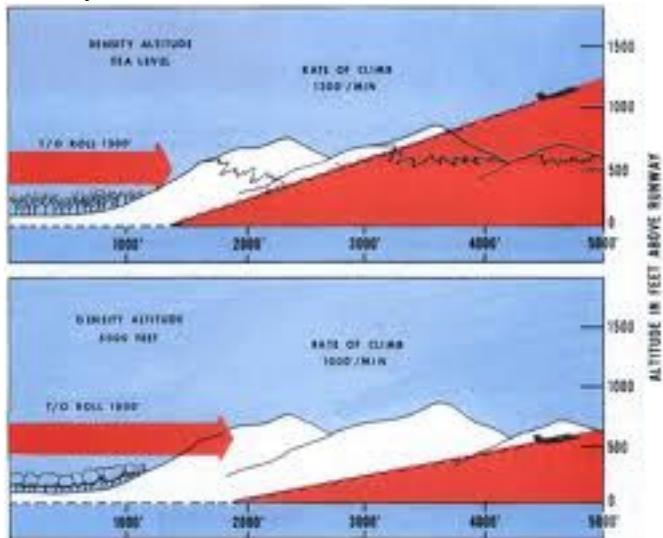


Performance Charts

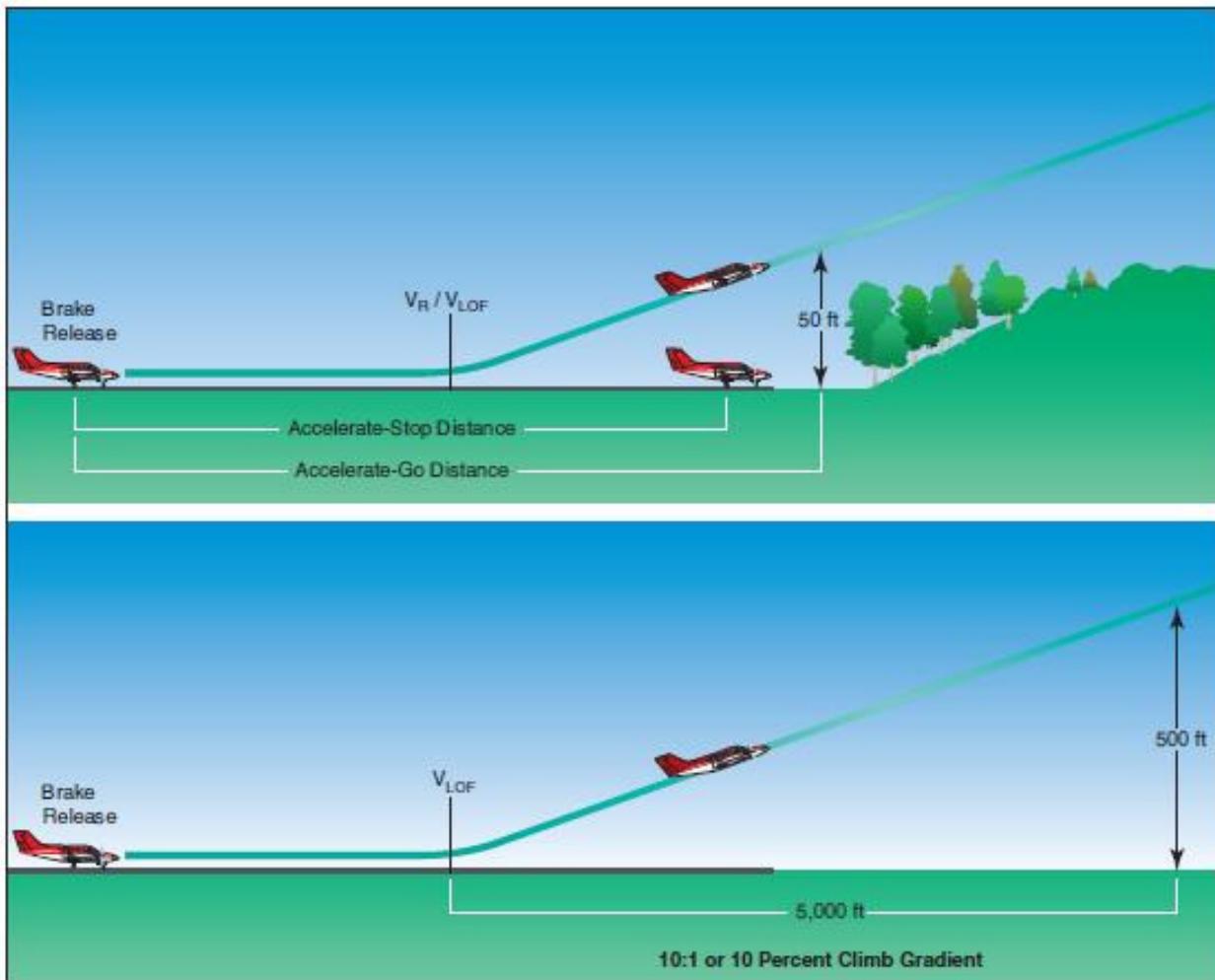


Interpolation

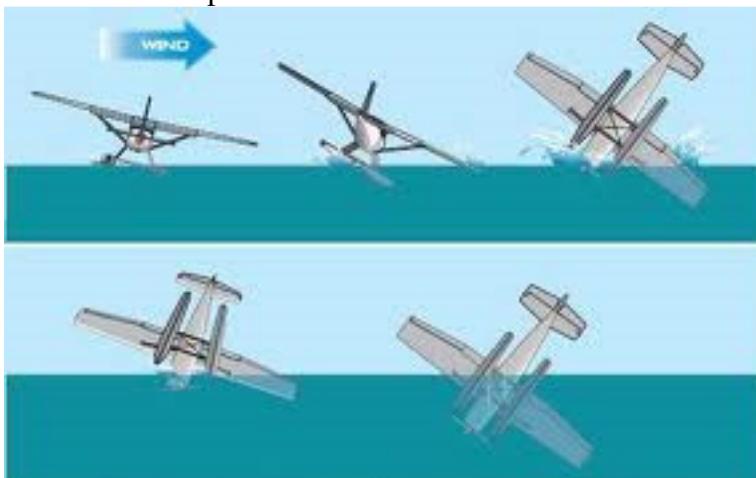
Density Altitude



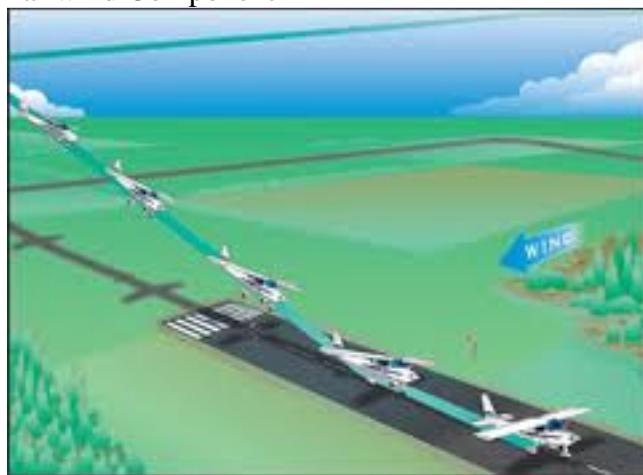
Headwind Component



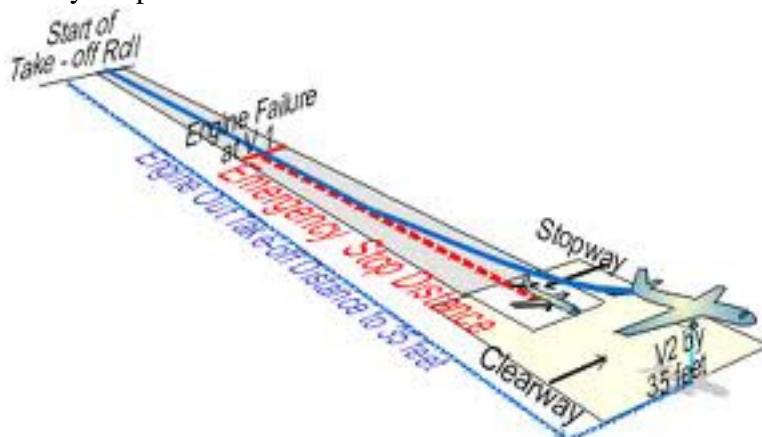
Crosswind Component



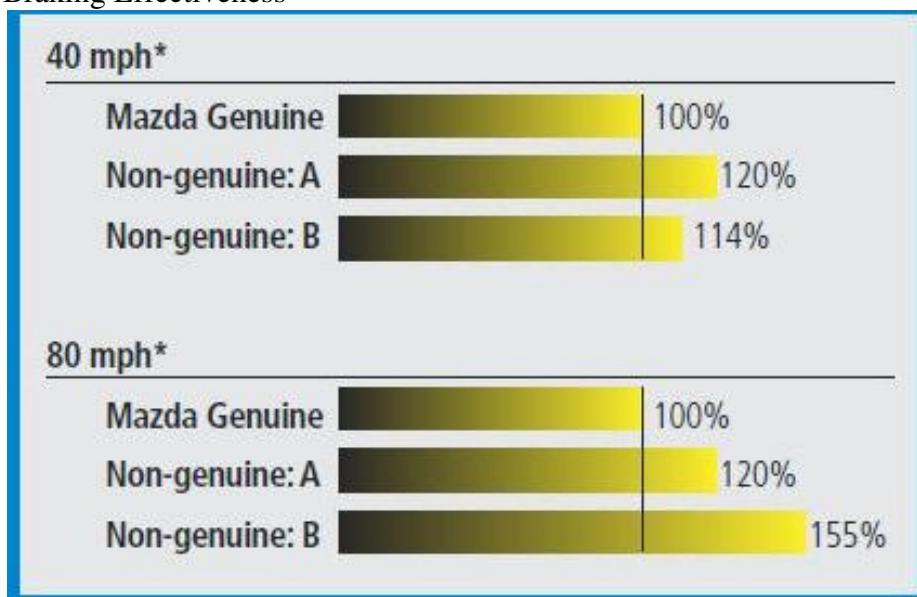
Tailwind Component



Runway Slope



Braking Effectiveness



Hydroplaning



Approach Airspeeds



Figure 10-4. Steep approach to a hover.

Best Angle-of-Climb Airspeed (V_x)

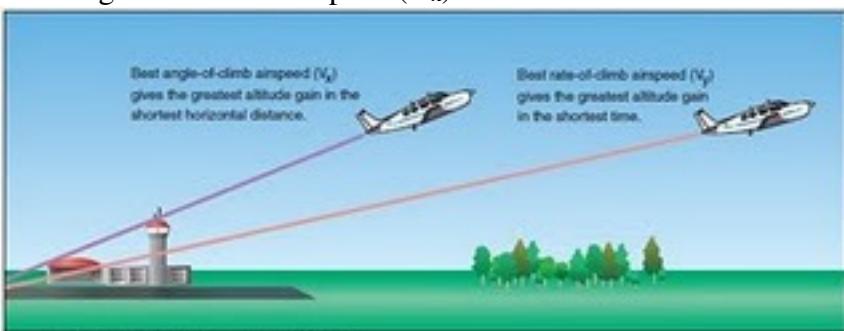
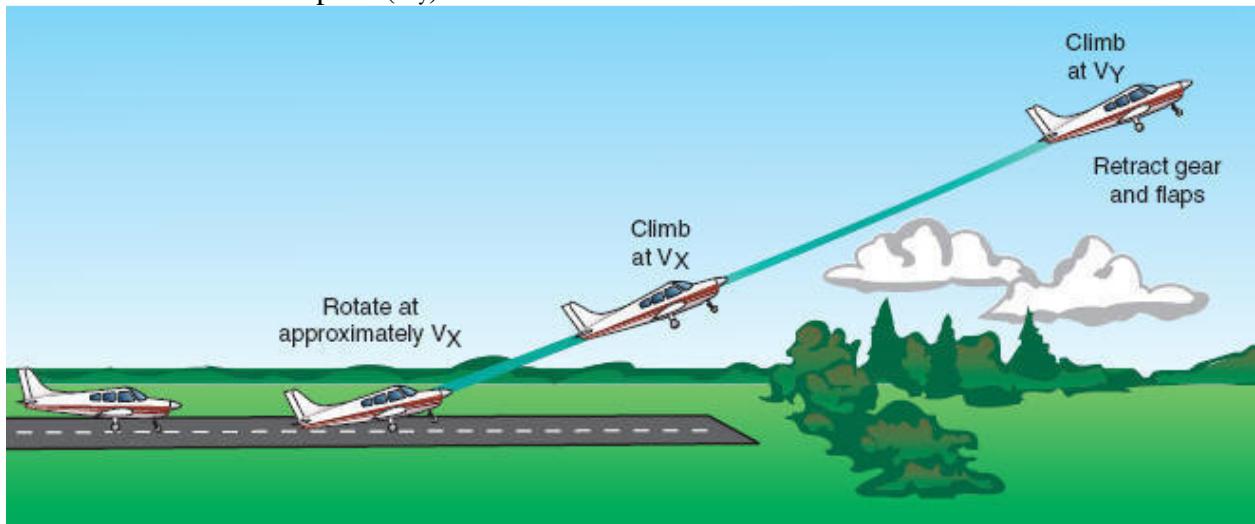


Figure 3-14. Best angle of climb vs. best rate of climb.

Best Rate-of-Climb Airspeed (V_y)



Service Ceiling



Cruising Speed



Maximum Level Flight Speed

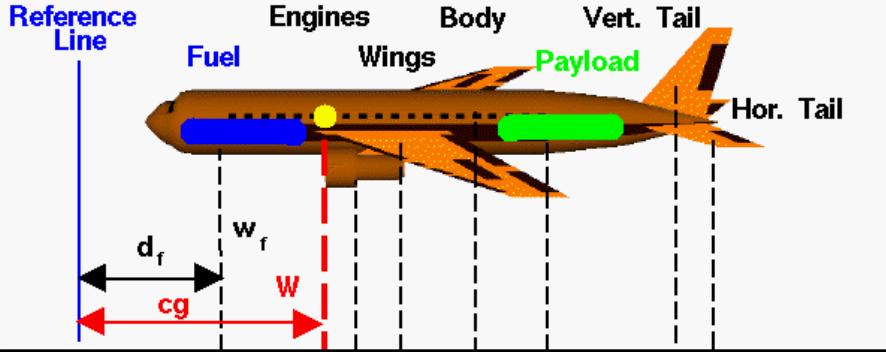
Maximum Range Speed

Maximum Endurance Speed

Part 2

Center of Gravity (CG)

 **Center of Gravity - cg**
Aircraft Application Glenn Research Center



The diagram illustrates the center of gravity (cg) of an aircraft relative to a vertical Reference Line. The aircraft is shown in a side profile with various components labeled: Engines, Body, Vert. Tail, Hor. Tail, Wings, and Fuel. A green bar labeled "Payload" is located in the rear fuselage. A red arrow labeled "cg" indicates the position of the center of gravity. The distance from the Reference Line to the cg is labeled d_f . The weight of the fuel is labeled w_f , and the total weight of the aircraft is labeled W .

Each component has some weight w_i located some distance d_i from reference line.

Distance cg times the weight W equals the sum of the component distance times weight.

$$cg \cdot W = d_f w_f + d_e w_e + d_w w_w + d_p w_p + \dots$$
$$cg \cdot W = \sum_{i=1}^n (w_i d_i)$$

CG Limits

11:58 AM

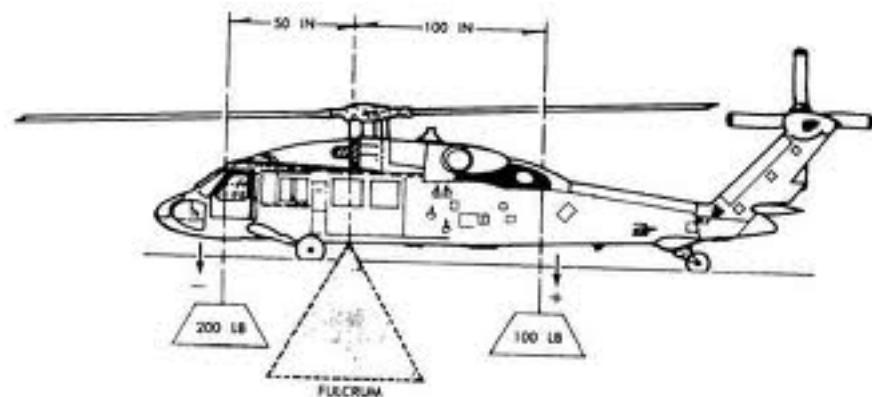
Cessna 172N Metric W&B (info only!)

Position	Weight	Arm	Moment
Your AC	646.8	892.4	577204.3
Front Left	77	939.8	72364.6
Front Right	62.5	939.8	58737.5
Back Left	43	1854.2	79730.6
Back Right	35.3	1854.2	65453.26
Cargo	23	2413.0	55499
Shelf	10	3124.2	31242
Fuel()	150		
Fuel kg	108.15	1219.2	131856.5
Totals	1005.75	1065.9	1072088
FwdCG	956.92	AftCG	1201

CG - **NORMAL OK** [Clear](#)

[Weight & Balance](#) [Information](#) [Disclaimer](#)

Reference Datum



Basic Empty Weight



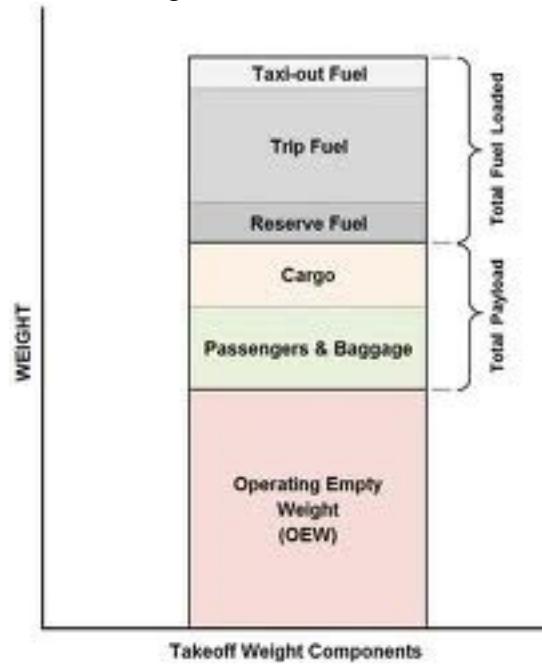
Unusable Fuel

Licensed Empty Weight

SAMPLE LOADING PROBLEM		SAMPLE AIRPLANE		YOUR AIRPLANE	
		Weight (lbs.)	Moment (lb.-in. /1000)	Weight (lbs.)	Moment (lb.-in. /1000)
1.	Licensed Empty Weight (Sample Airplane)	1400	34.8		
2.	Cab (6 qts. - Full oil may be assumed for all flights)	31	-6.1	11	-6.1
3.	Fuel (Standard - 22.8 gal. at 6 lbs./gallon) - Fuel (Long Range - 35 gal. at 6 lbs./gal)	135	5.3		
4.	Pilot and Passenger (Obs. 38 to 41)	140	13.3		
5.	Baggage - Area 1 (for passenger on cabin floor) (30 lbs. 10 to 18)	45	2.0		
6.	Baggage - Area 2 (Obs. 18 to 34)				
T.	TOTAL WEIGHT AND MOMENT	1400	56.7		
8. Locate this point (1400 at 56.7) on the center of gravity moment envelope, and since this point falls within the envelope, the loading is acceptable.					

Ramp Weight

Takeoff Weight



Landing Weight



Useful Load



Payload

Maximum Ramp Weight
Maximum Takeoff Weight
Maximum Landing Weight
Usable fuel
Arm
Moment
Moment Table
Moment Limits Table

Loading Graph

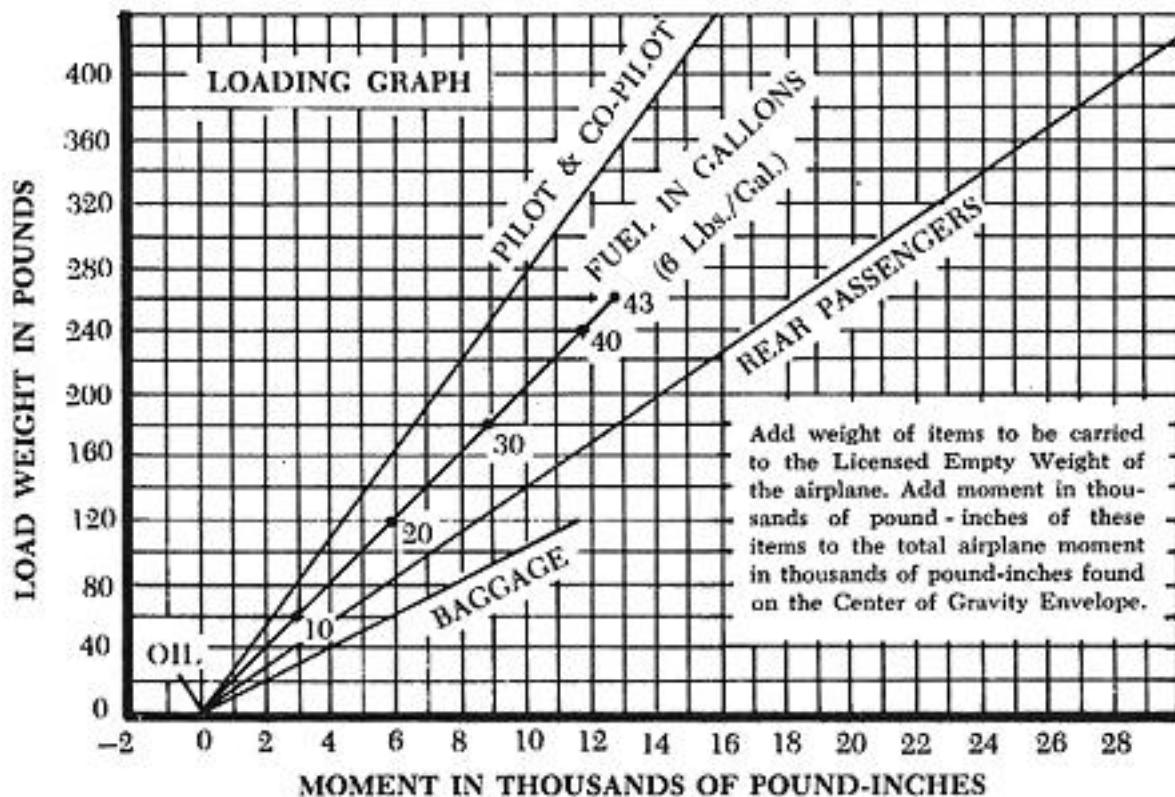
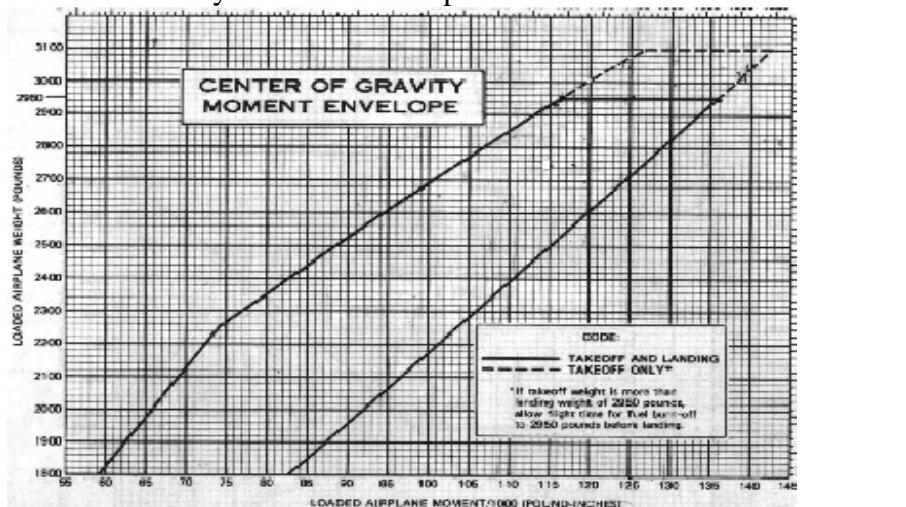


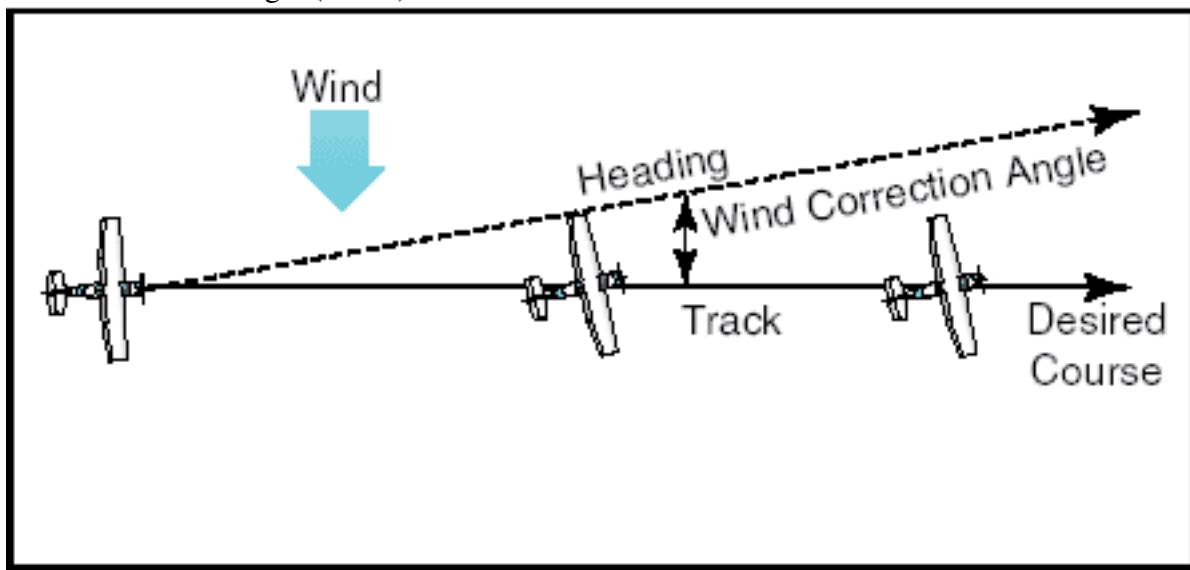
FIGURE 3-13. Typical loading graph.

Center of Gravity Moment Envelope



Part 3

Computer Side
Wind Side
Speed Index
60 Index
A Scale
B Scale
Unit Index
10 Index
C Scale
Hours Scale
Wind Correction Angle (WCA)



Crosswind Component

EXAMPLE: 20K WIND, 60° ANGLE

- A. 60 ANGLE BETWEEN WIND AND NOSE
- B. 20K WIND SPEED
- C. 10K HEADWIND COMPONENT
- D. 18K CROSSWIND COMPONENT

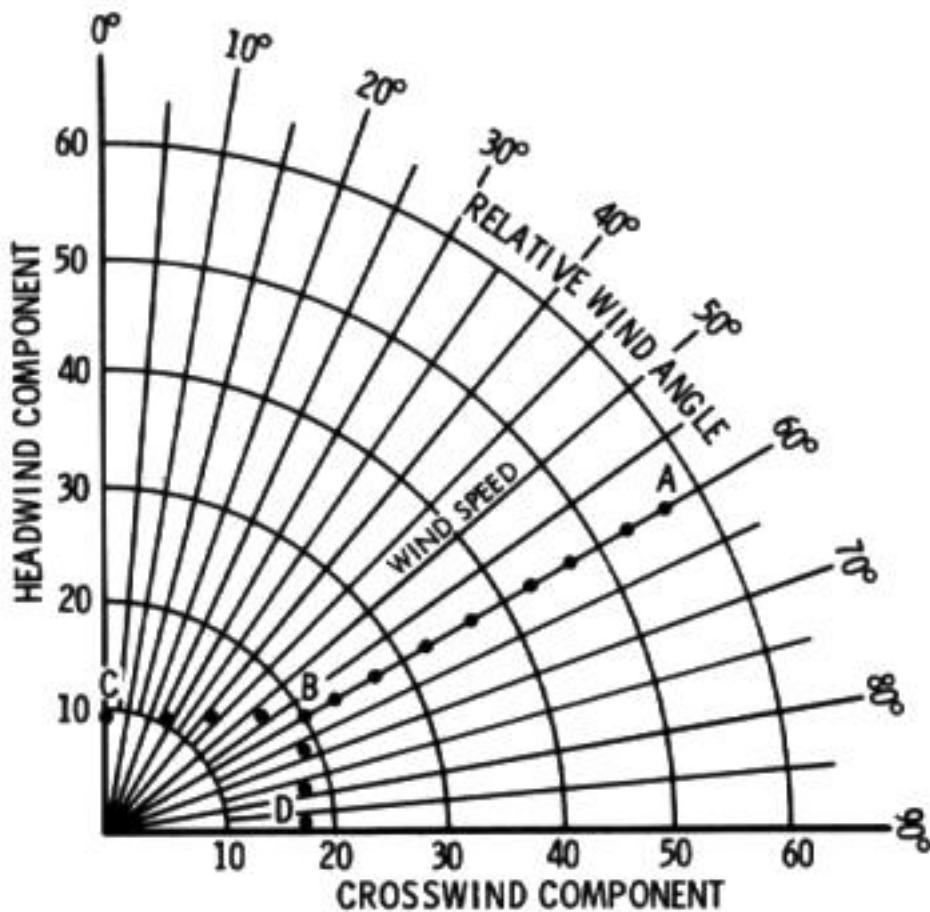
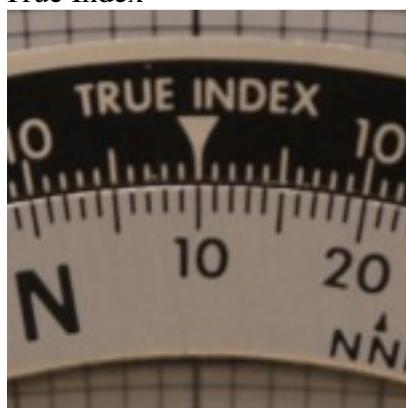


Figure 9-14 Crosswind Component Chart

Azimuth Plate

True Index

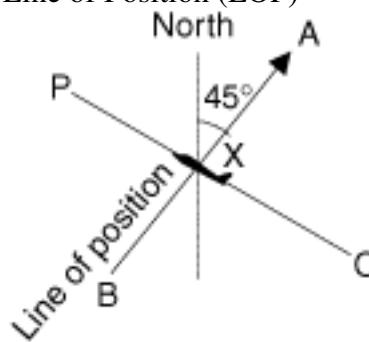


Wind Dot
Electronic Computer Modes

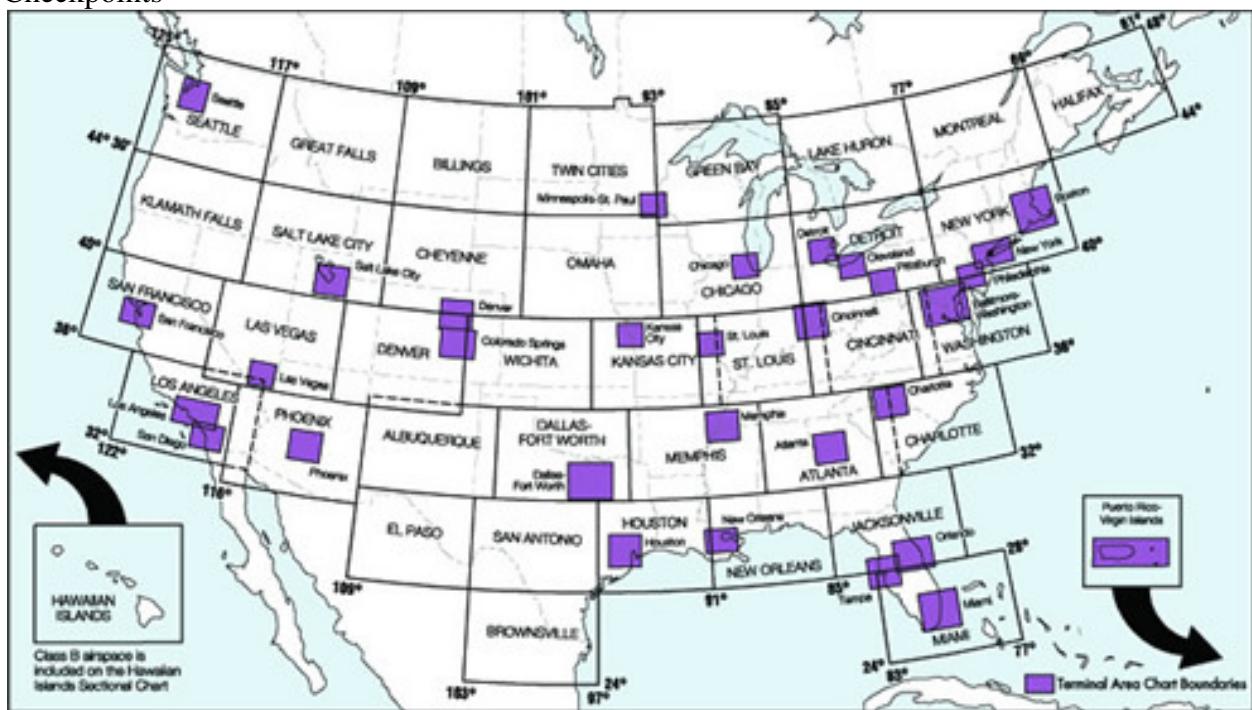
Section 9

Part 1

Line of Position (LOP)



Checkpoints



Dead Reckoning



Navigation Plotter



True Course

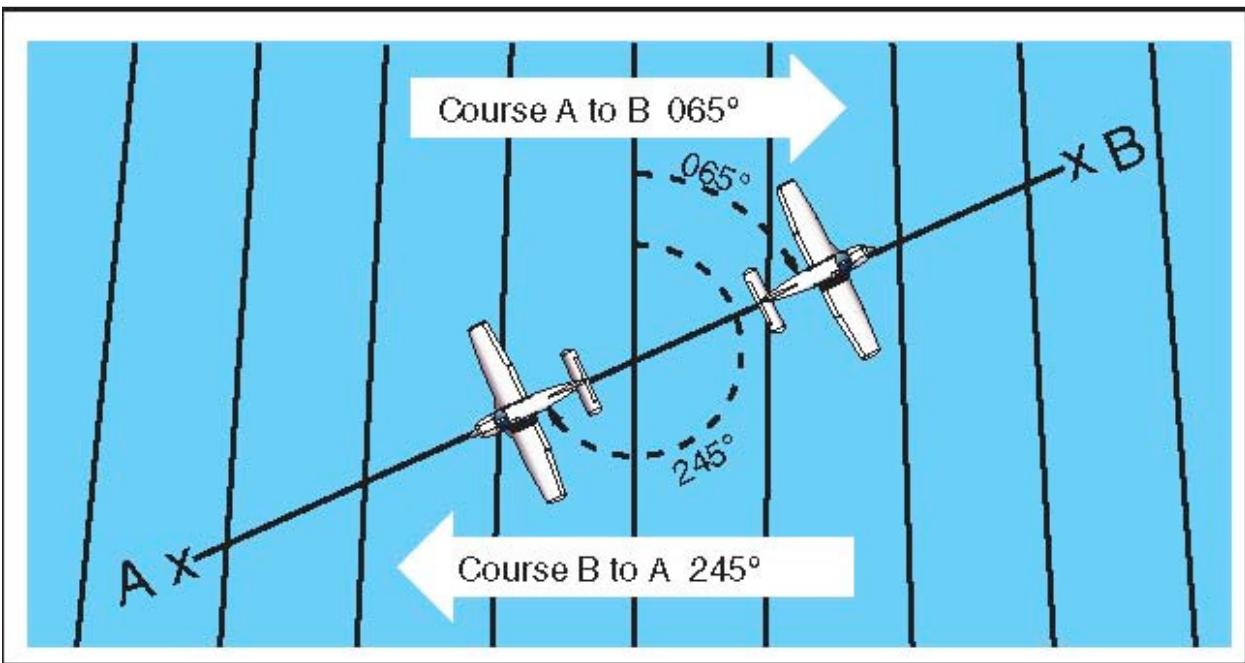


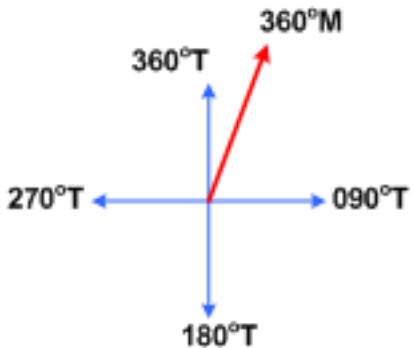
Figure 14-5. Courses are determined by reference to meridians on aeronautical charts.

Navigation Log

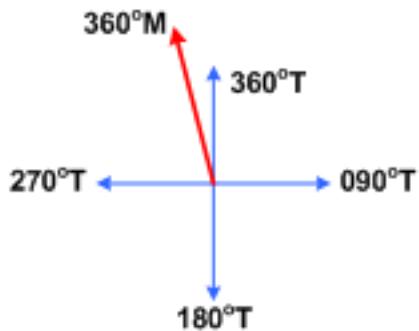
NAVIGATION LOG

Leg

True Heading

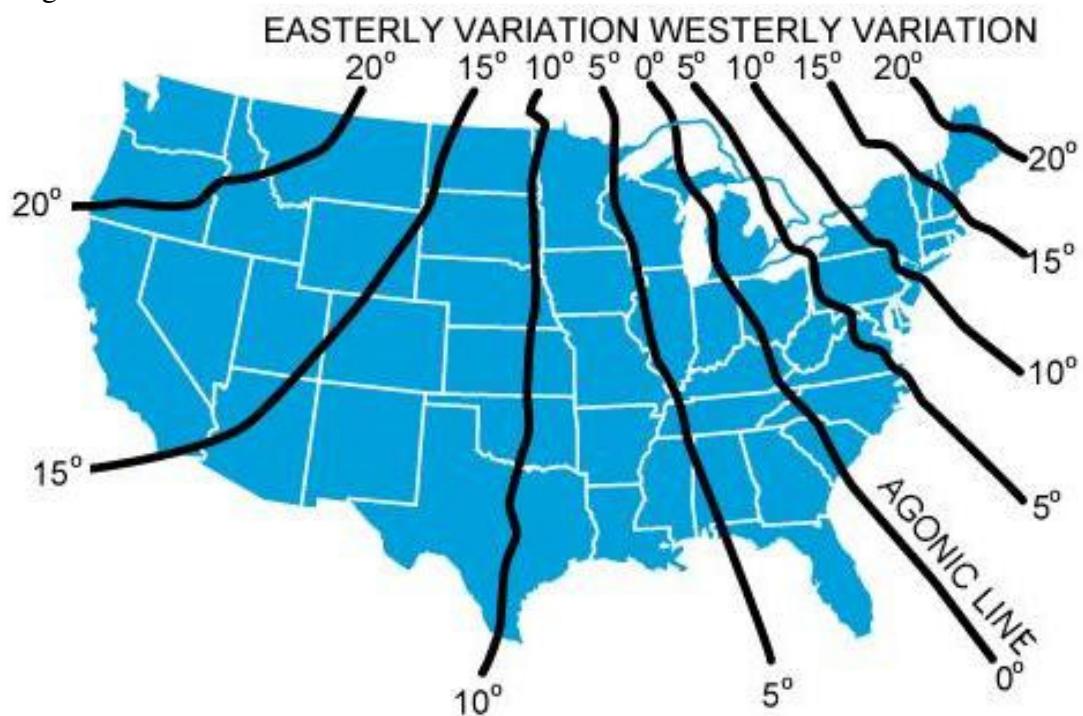


With 20° east variation, magnetic north is
 20° east of true north.



With 20° west variation, magnetic north is
 20° west of true north.

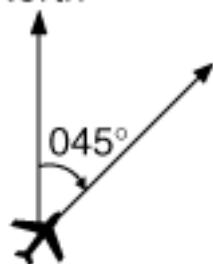
Isogonic Line



Magnetic Course

Magnetic

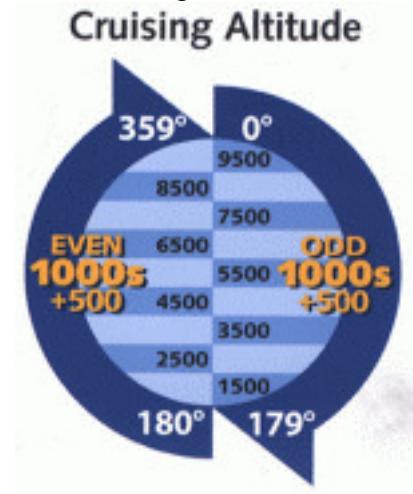
North



Compass Heading



VFR Cruising Altitudes



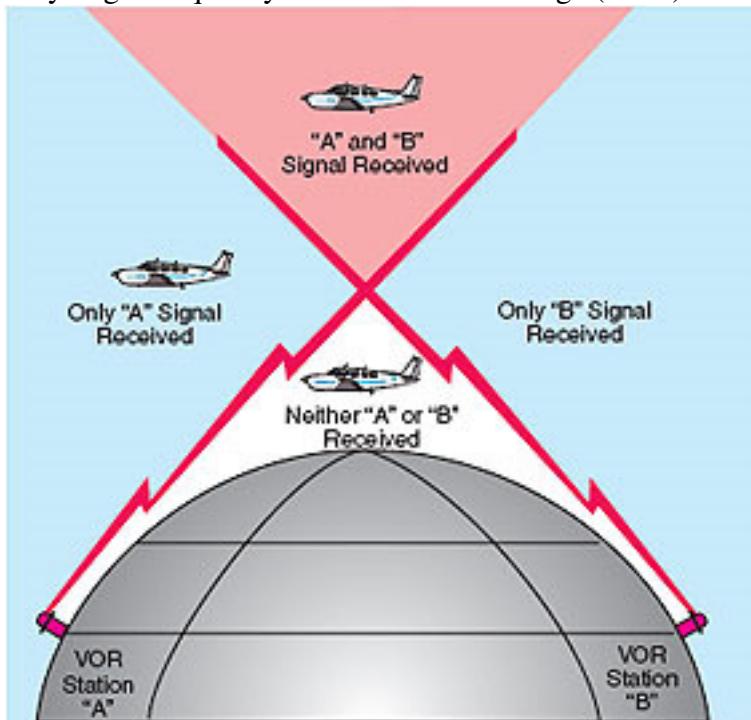
Fuel Reserve



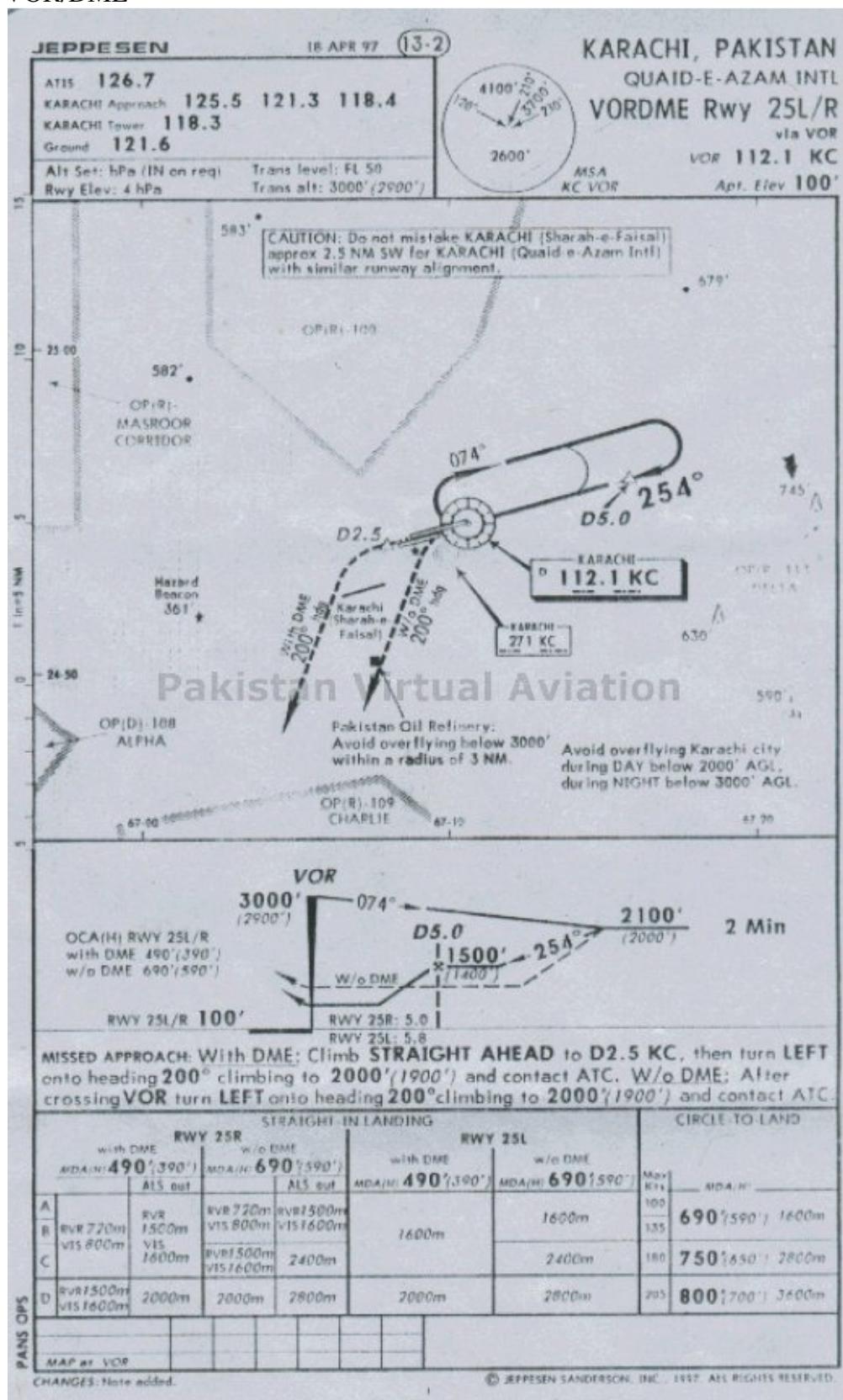
Flight Plan

NAY CANADA		GROUPE PLATEAU ET PLATEAU PLEIN AIR PLATEAU DES GRANDS LACS ET PLATEAU DES MONTAGNAIS		GROUPE PLATEAU PLATEAU DES GRANDS LACS	
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox			

Part 2 Very High Frequency Omnidirectional Range (VOR)



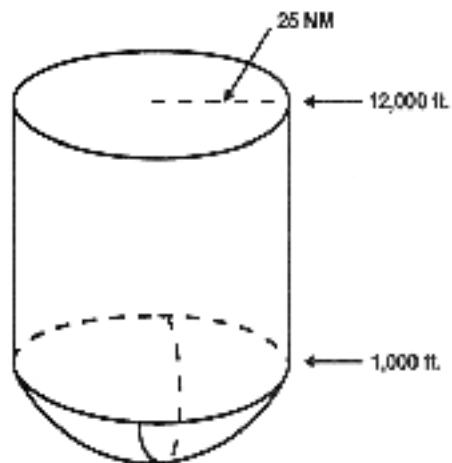
VOR/DME



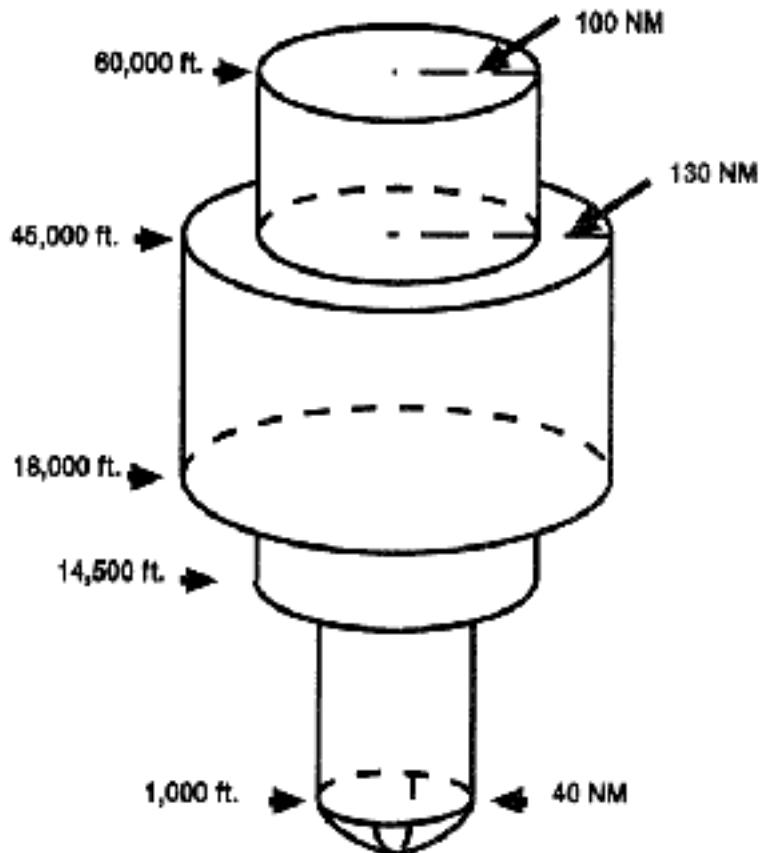
VORTAC



Terminal VOR (TVOR)



High Altitude VOR (HVOR)



Radial



Compass Rose



Omnibearing Selector (OBS)



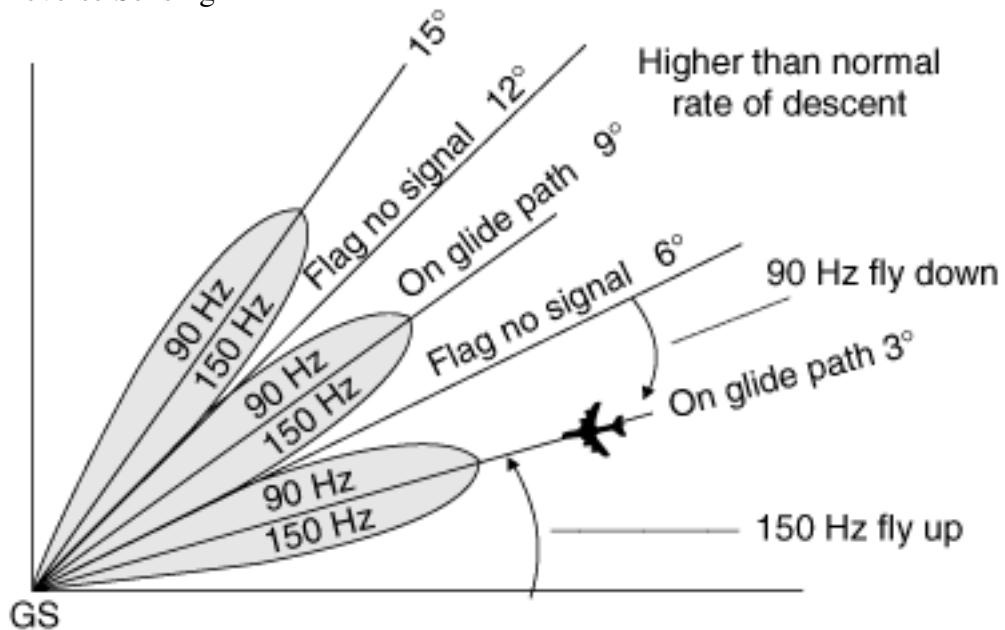
Course Deviation Indicator (CDI)



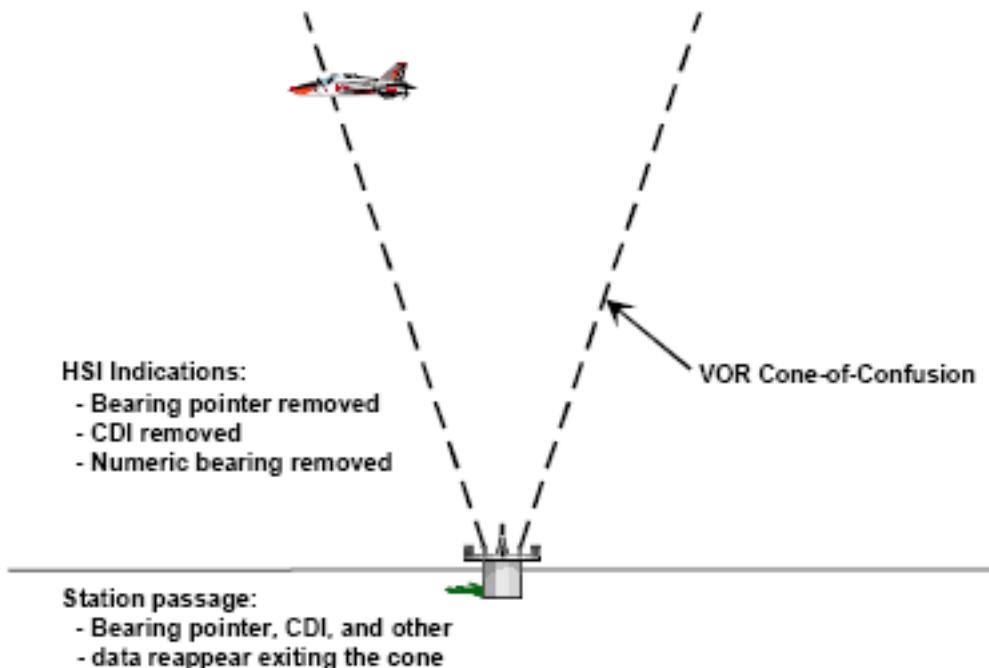
TO-FROM Indicator



Reverse Sensing

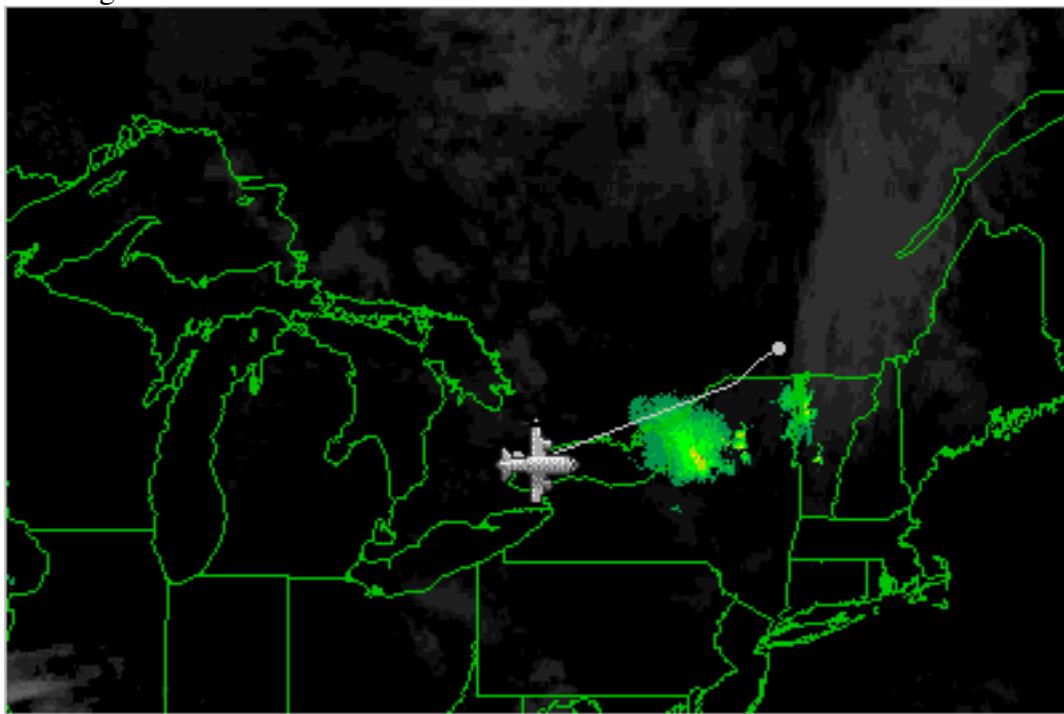


Cone of Confusion

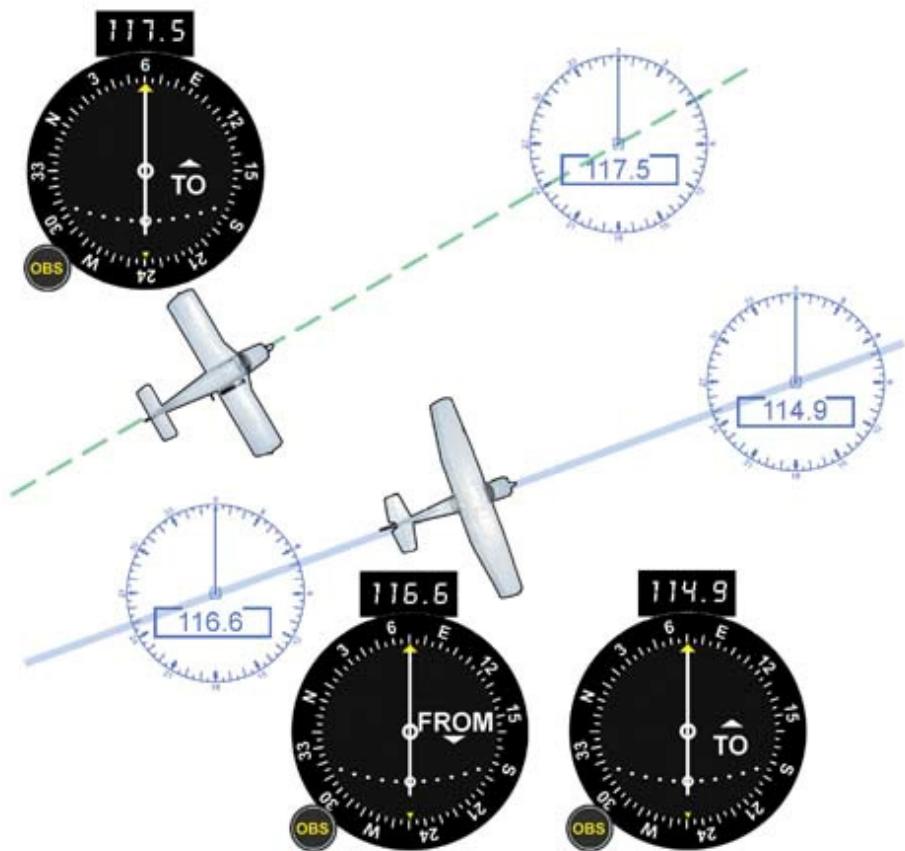


VOR CONE-OF-CONFUSION

Tracking

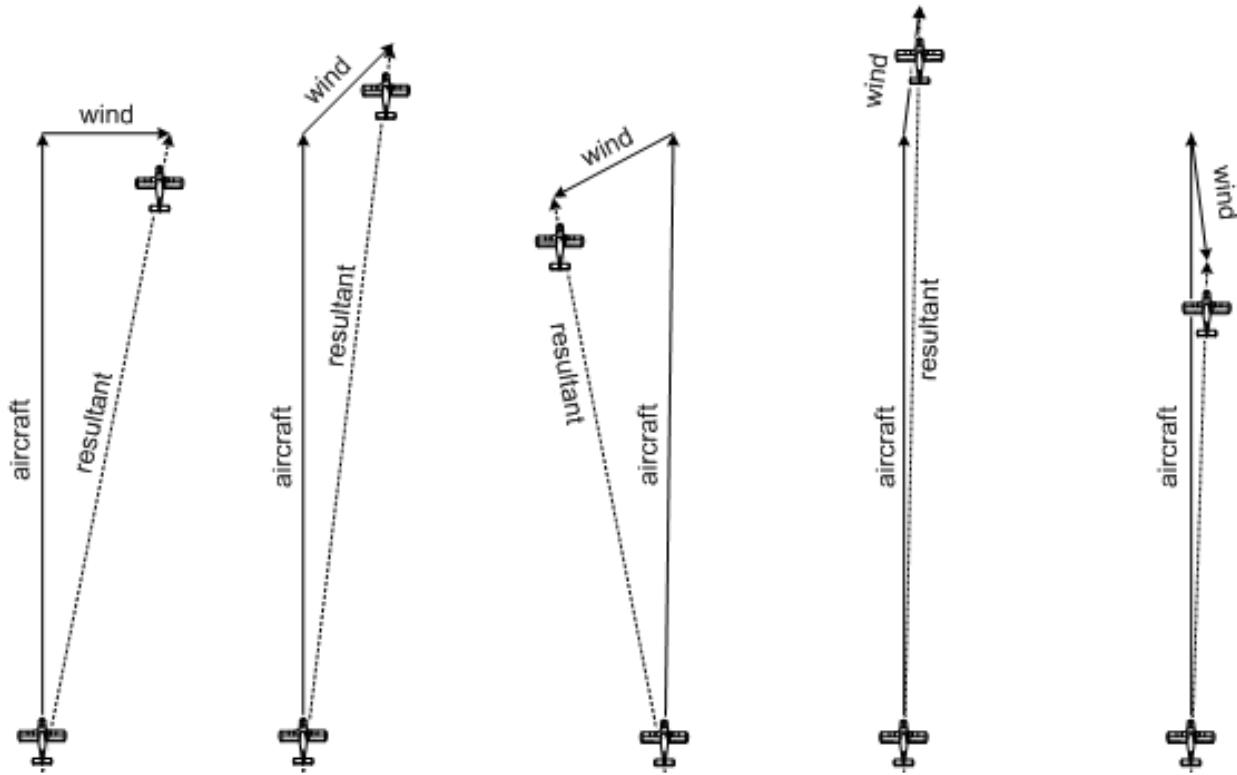


Bracketing



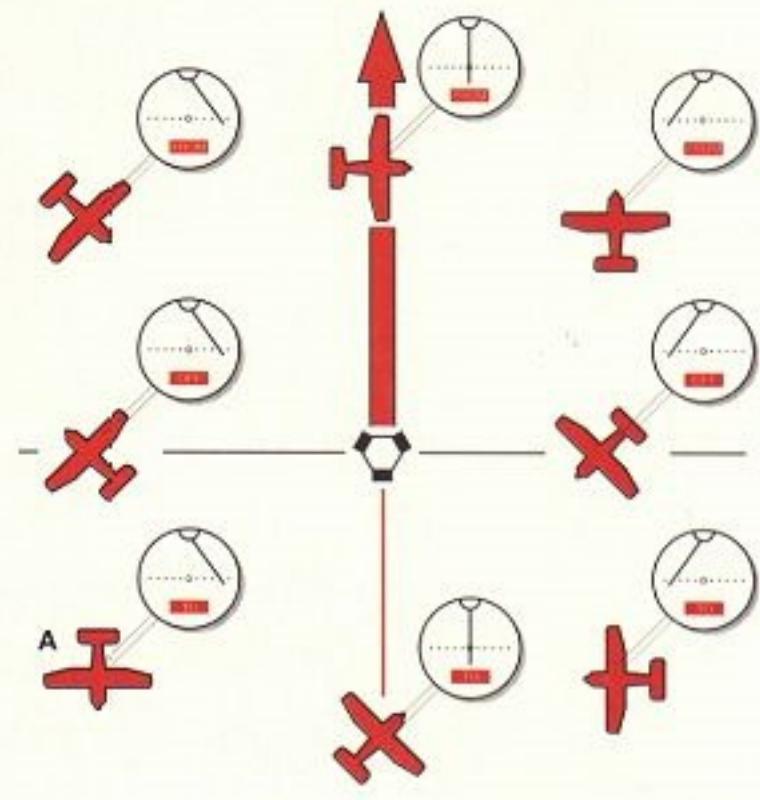
Triangulation

The following show the varying effects of a 20 KT wind on an aircraft traveling on a northbound heading for one hour at a speed of 100 KTS; the resultant marks the achieved position of the aircraft above the earth.

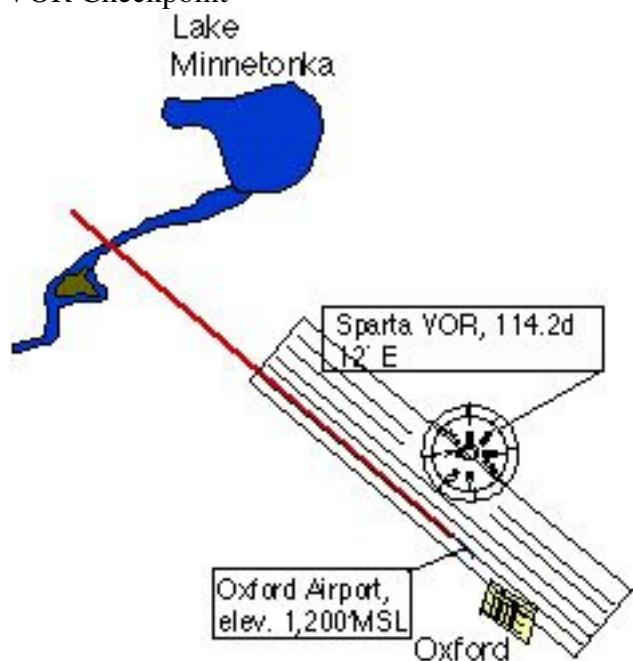


VOR Orientation

Figure 3

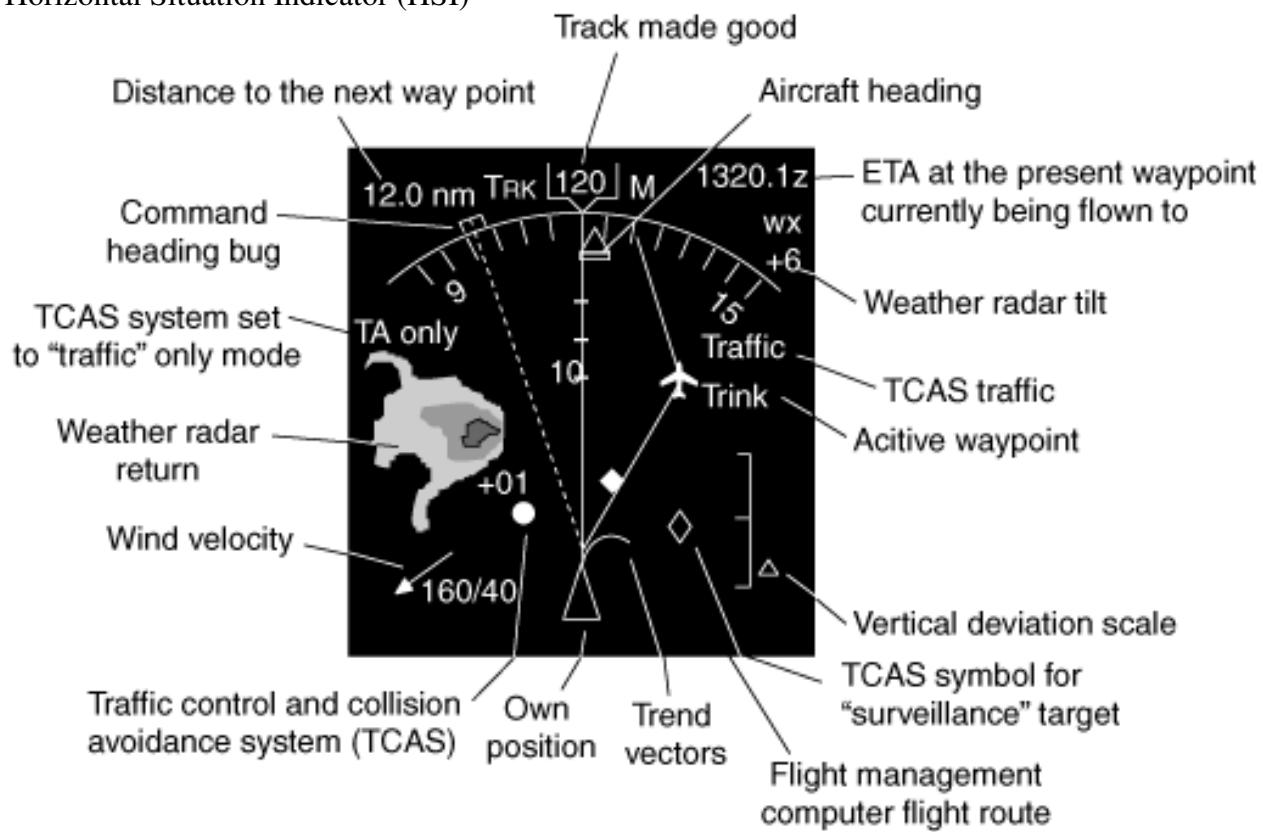


VOR Checkpoint



VOR Test Facilities (VOT)

Horizontal Situation Indicator (HSI)



Distance Measuring Equipment (DME)

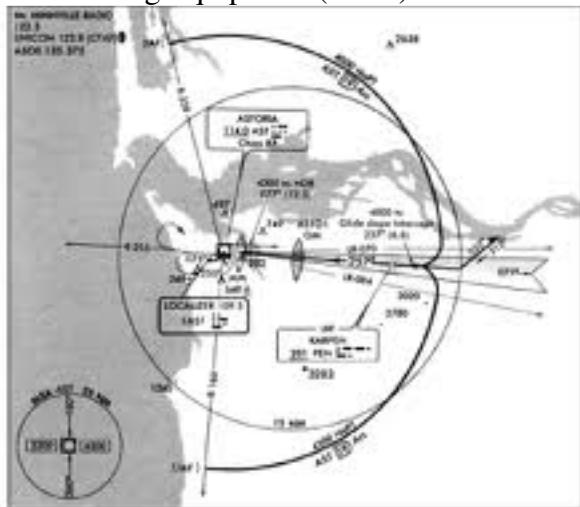
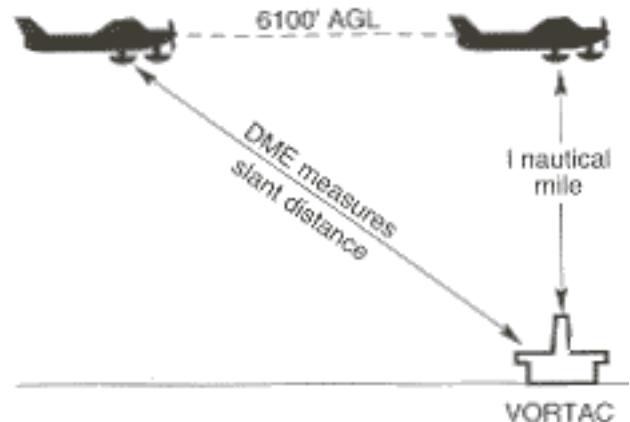


Figure 7-16. Localizer interception from DME arc.

Slant Range Distance



SLANT RANGE MEASUREMENTS

Part 3
Automatic Direction Finder (ADF)



Figure 3-25. The compass card in this RMI is driven by signals from a flux valve and it indicates the heading of the aircraft opposite the upper center index mark.

Nondirectional Radio Beacon (NDB)



Directional Antenna

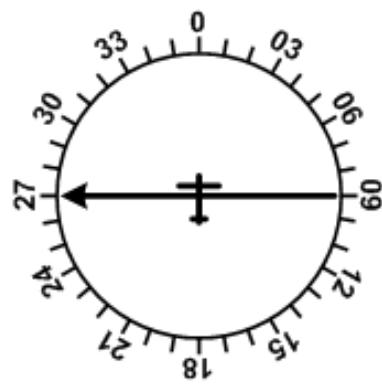


Sense Antenna



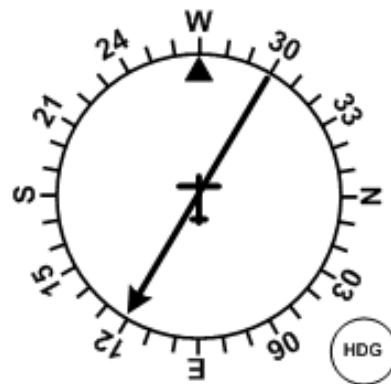
Fixed-Card Bearing Indicator

Fixed-Card
ADF



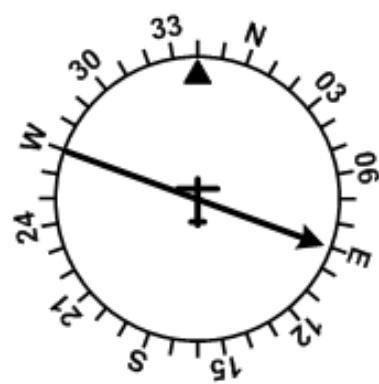
Needle displays relative bearing. In this case the station has a relative bearing of 270° (directly off the left wing of the aircraft).

Variable-Card
ADF



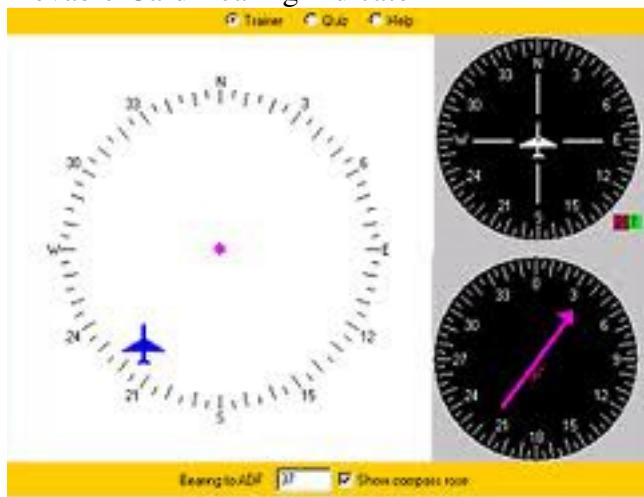
The pilot manually sets the aircraft magnetic heading at the top of the azimuth. When this is done, the magnetic bearing to the station is displayed. In the above example, the magnetic bearing to the station is 122°.

ADF equipped
with RMI



Identical to the variable-card display, except the pilot does not have to manually set the aircraft heading. Instead, the azimuth is rotated just like the heading indicator, except it is powered by a remote slaved compass.

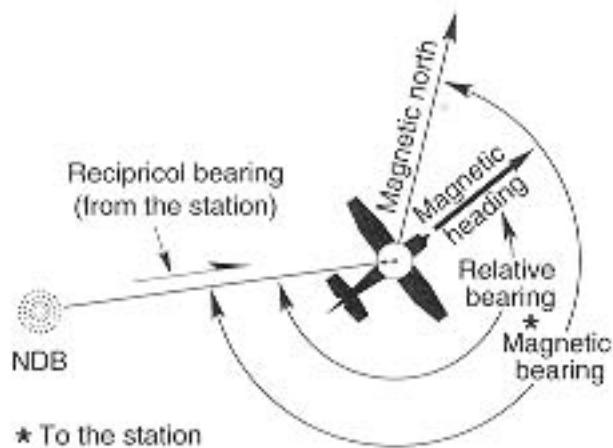
Movable-Card Bearing Indicator



Radio Magnetic Indicator (RMI)

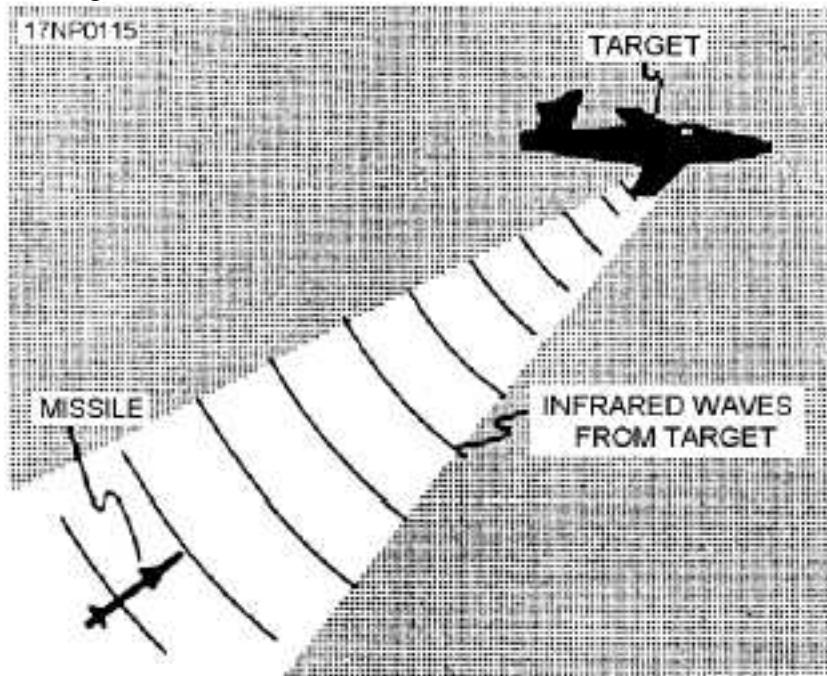


Relative Bearing
Magnetic Bearing



NDB BEARINGS

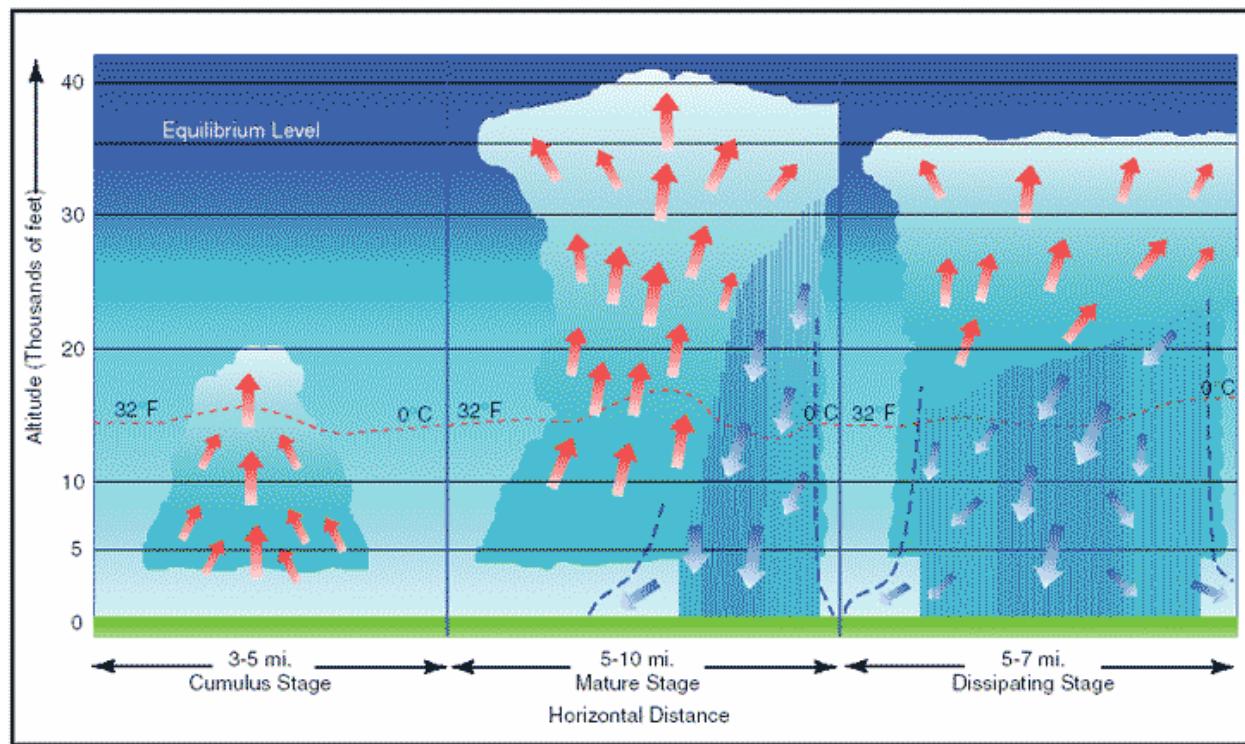
Homing



Night Effect

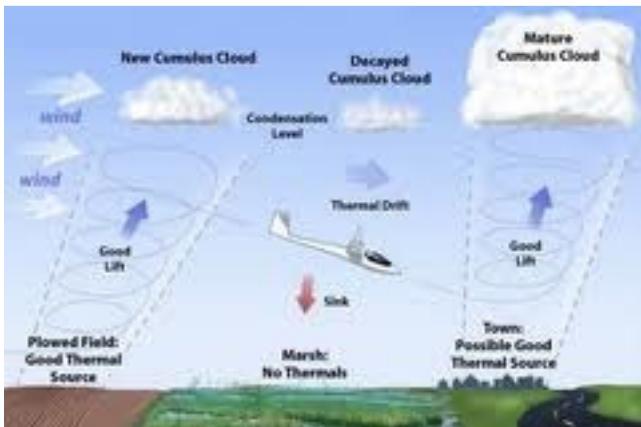


Thunderstorm Effect

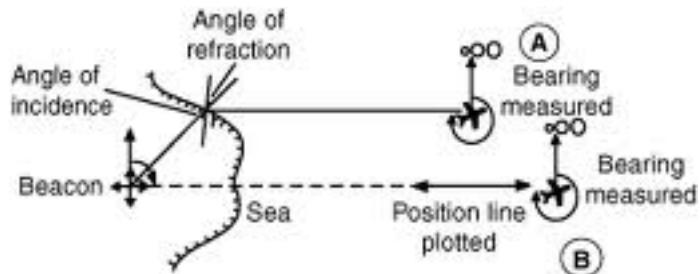


Precipitation Static

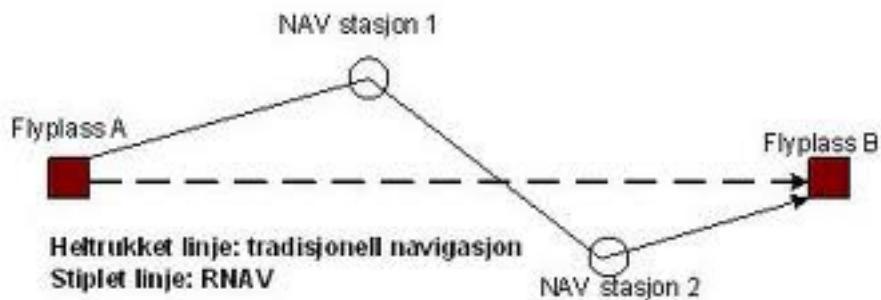
Terrain Effect



Shoreline Effect

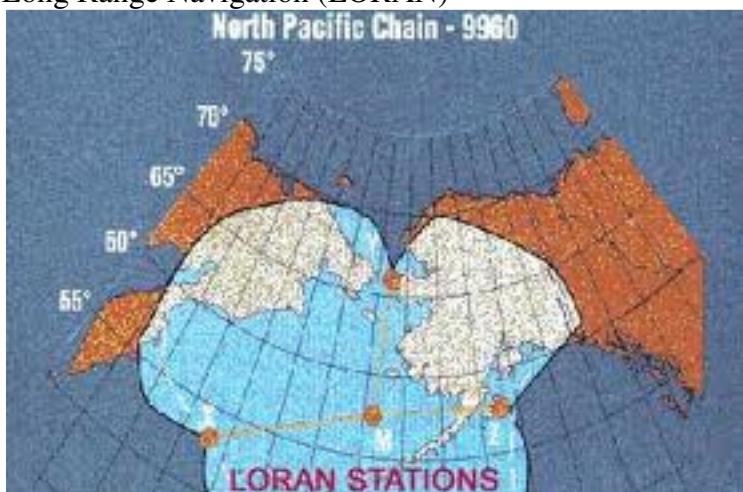


Part 4 Area Navigation (RNAV)



Figur 1

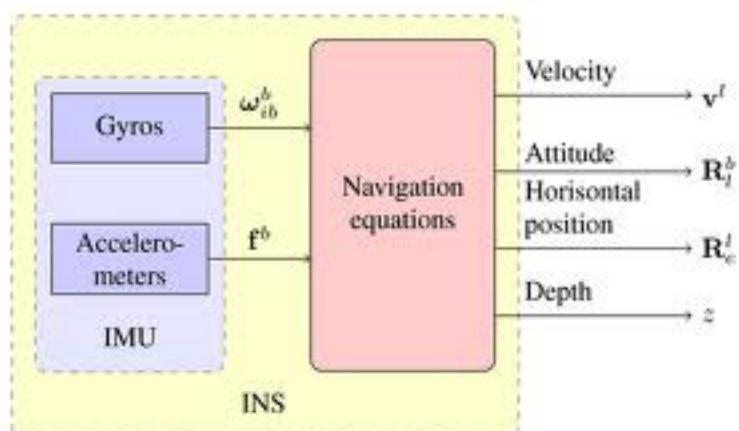
Long Range Navigation (LORAN)



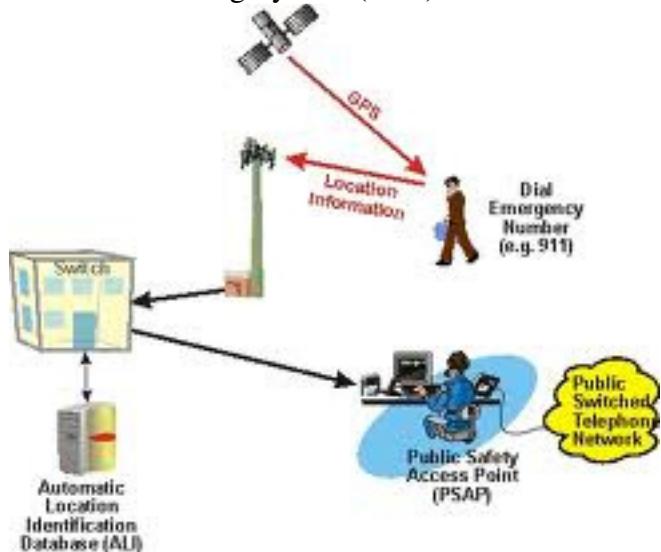
Time Difference (TD)



Inertial Navigation System (INS)



Global Positioning System (GPS)



Standard Positioning System (SPS)



Fig. 2 GPS Today

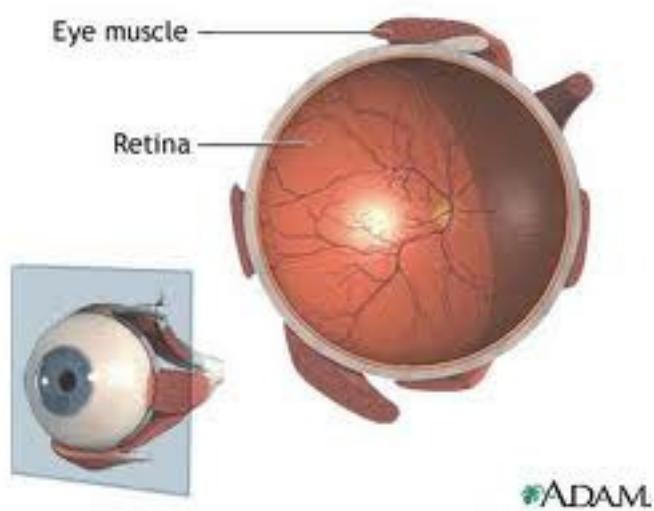
Precise Positioning System (PPS)



Section 10

Part 1

Retina



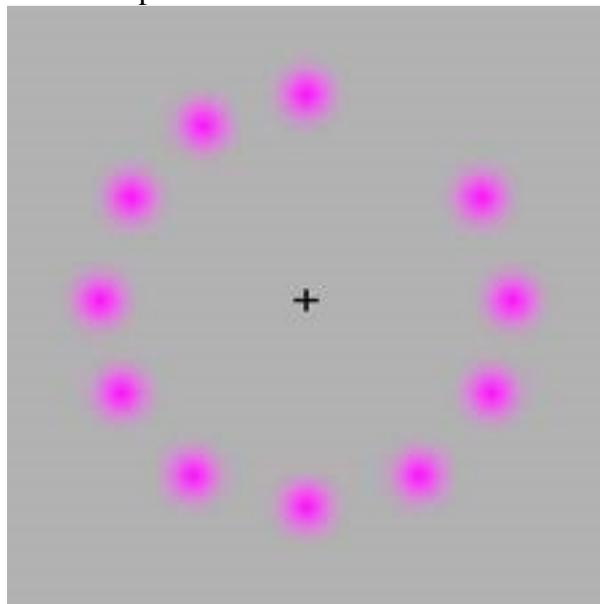
©ADAM

Cones



Rods

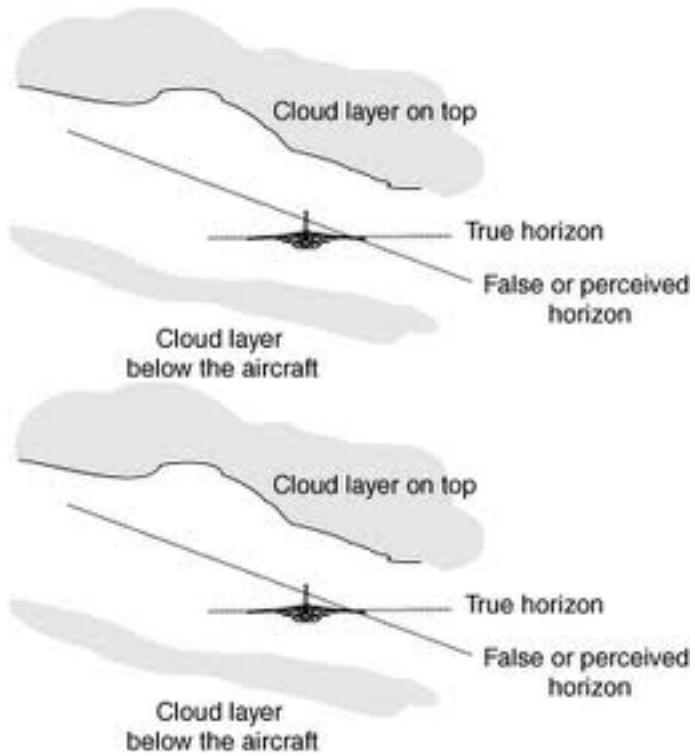
Visual Purple



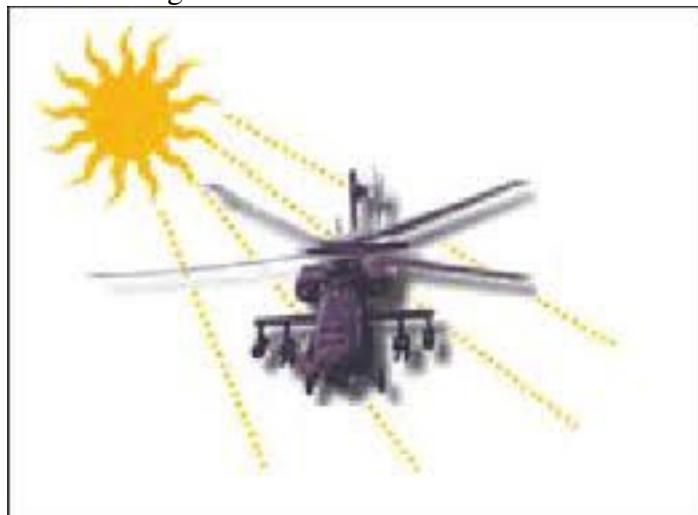
Autokinesis

Wider runway.	Usual runway width.	Thinner runway.
 Day	 Day	 Day
 Night	 Night	 Night
Pilot incorrectly perceives approach is low.	Pilot correctly perceives approach is accurate.	Pilot incorrectly perceives approach is high.

False Horizon

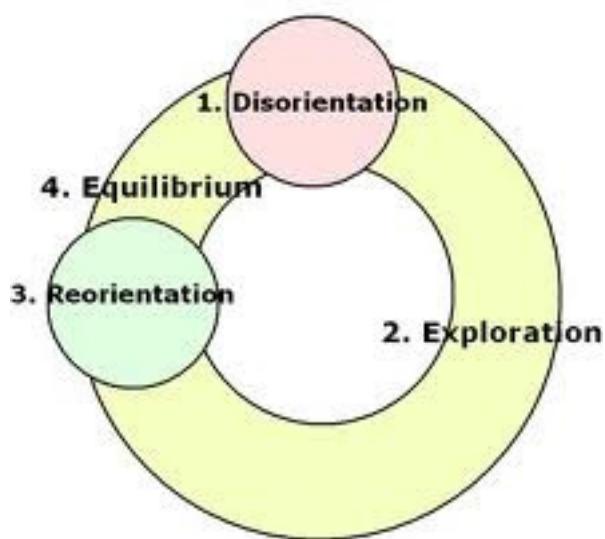


Flicker Vertigo

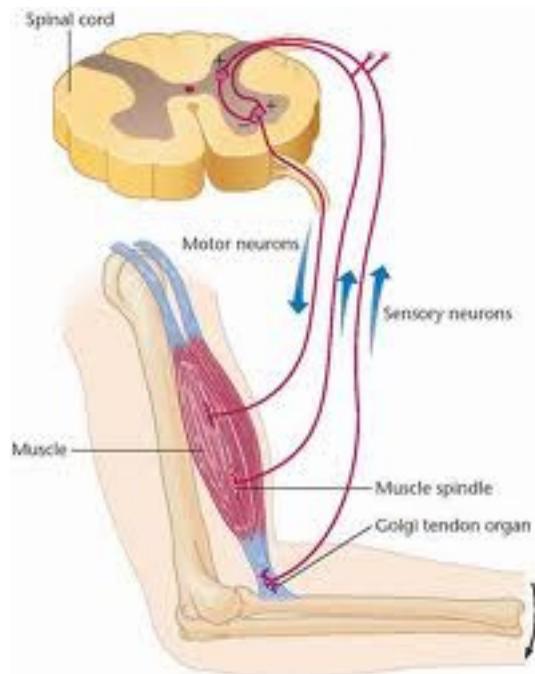


Disorientation

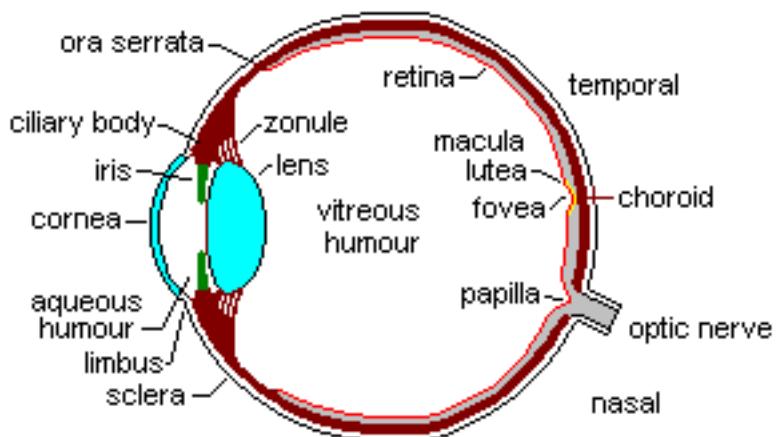
Today's Reality:
Life in Beta



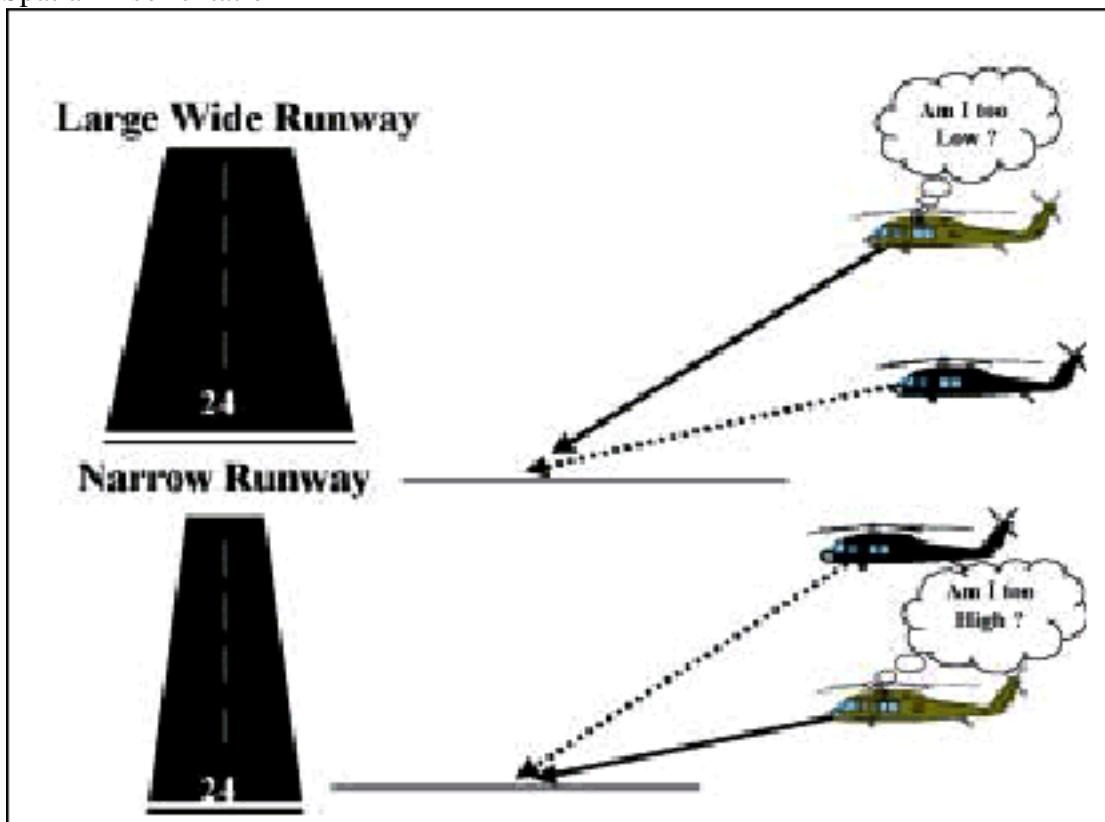
Kinesthetic Sense



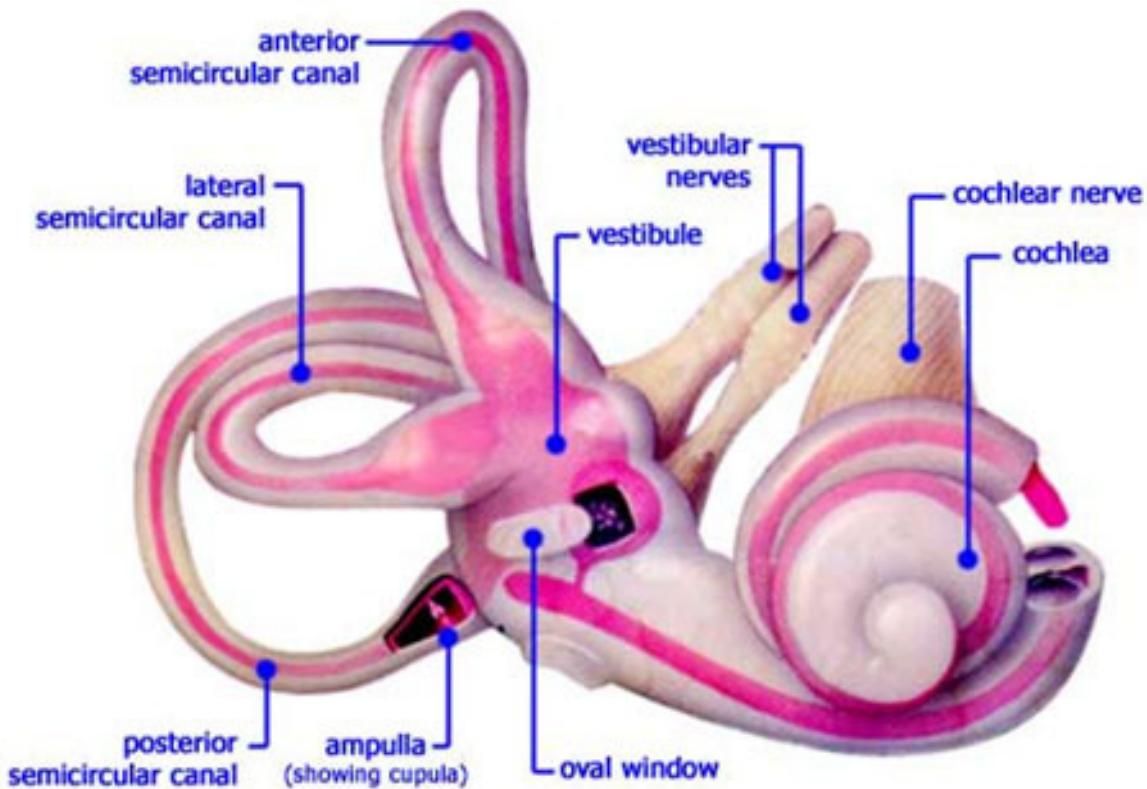
Visual Sense



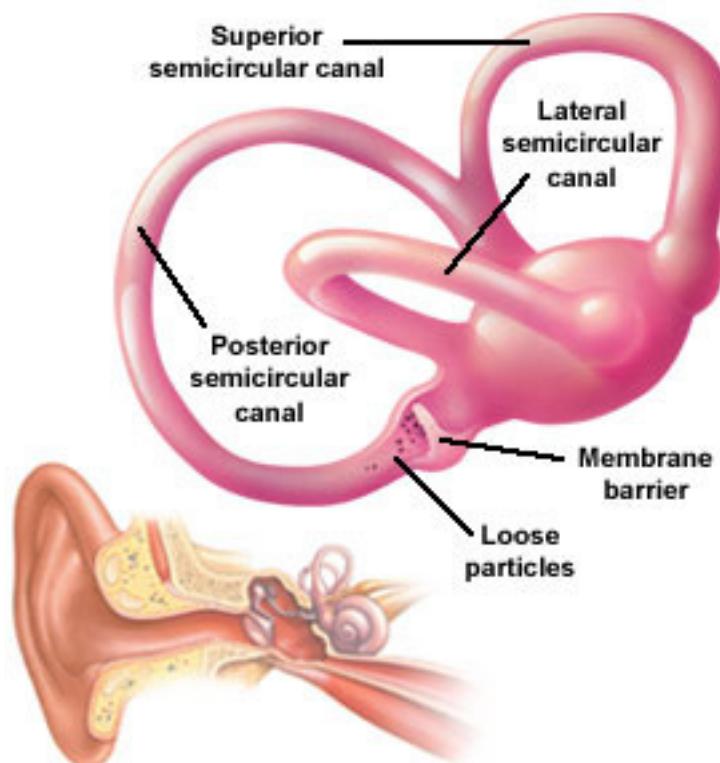
Spatial Disorientation



Vestibular System

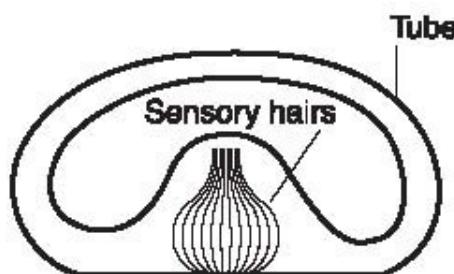
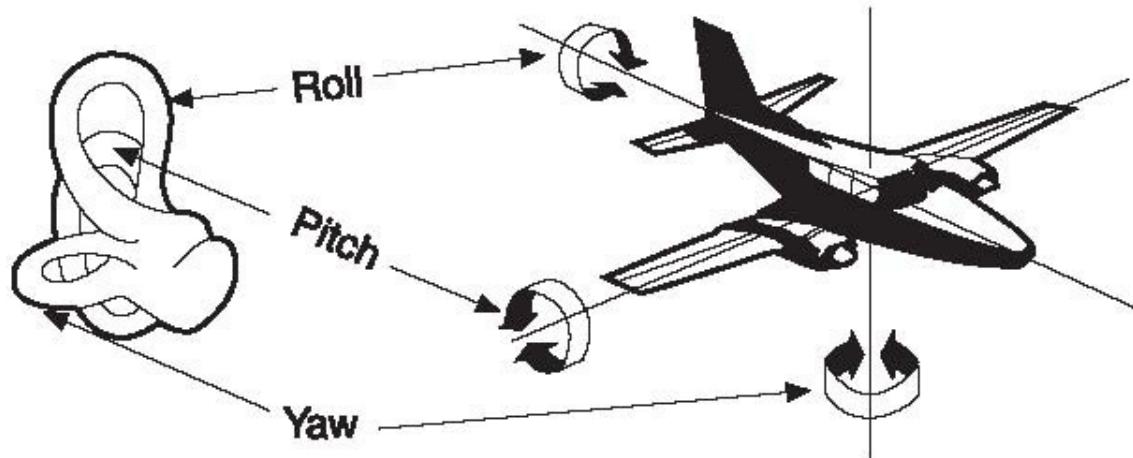


Semicircular Canals



Vestibular Disorientation

The semicircular tubes are arranged at approximately right angles to each other, in the roll, pitch, and yaw axes.

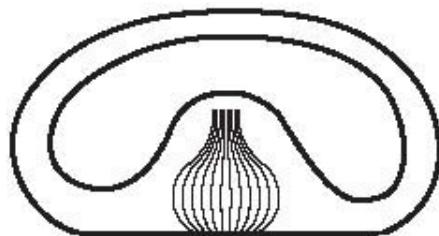


No turning

No sensation.

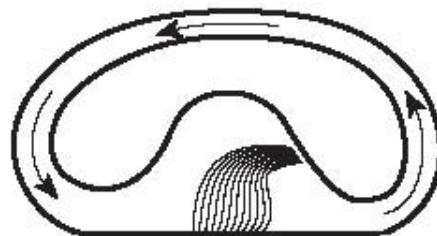
Start of turn

Sensation of turning as moving fluid deflects hairs.



Constant rate turn

No sensation after fluid accelerates to same speed as tube wall.



Turn stopped

Sensation of turning in opposite direction as moving fluid deflects hairs in opposite direction.

Hypoxia

LACK OF OXYGEN!

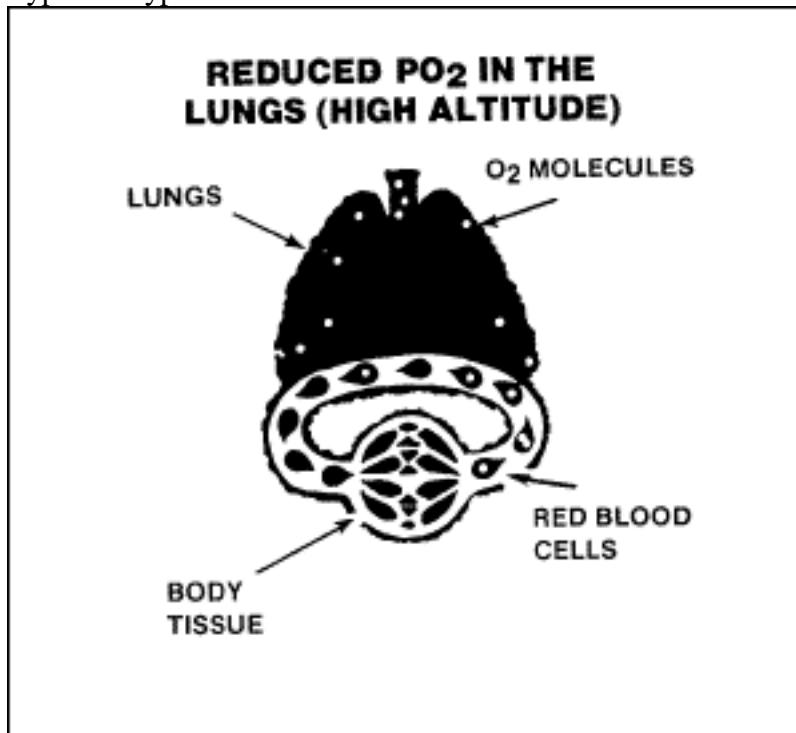


Can cause the same
effect as a couple
of Martinis

OVERCONFIDENCE...In CoOrDiNaTiOn

USE OXYGEN OVER 12,000 FEET

Hypoxic Hypoxia



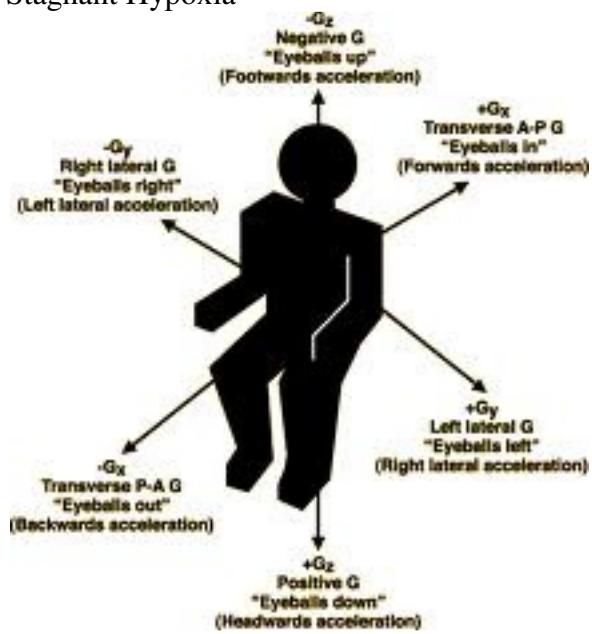
Time of Useful Consciousness

Altitude	Time of Useful Consciousness
45,000 feet MSL	9 to 15 seconds
40,000 feet MSL	15 to 20 seconds
35,000 feet MSL	30 to 60 seconds
30,000 feet MSL	1 to 2 minutes
28,000 feet MSL	2 1/2 to 3 minutes
25,000 feet MSL	3 to 5 minutes
22,000 feet MSL	5 to 10 minutes
20,000 feet MSL	30 minutes or more

Hypemic Hypoxia
Carbon Monoxide Poisoning



Stagnant Hypoxia



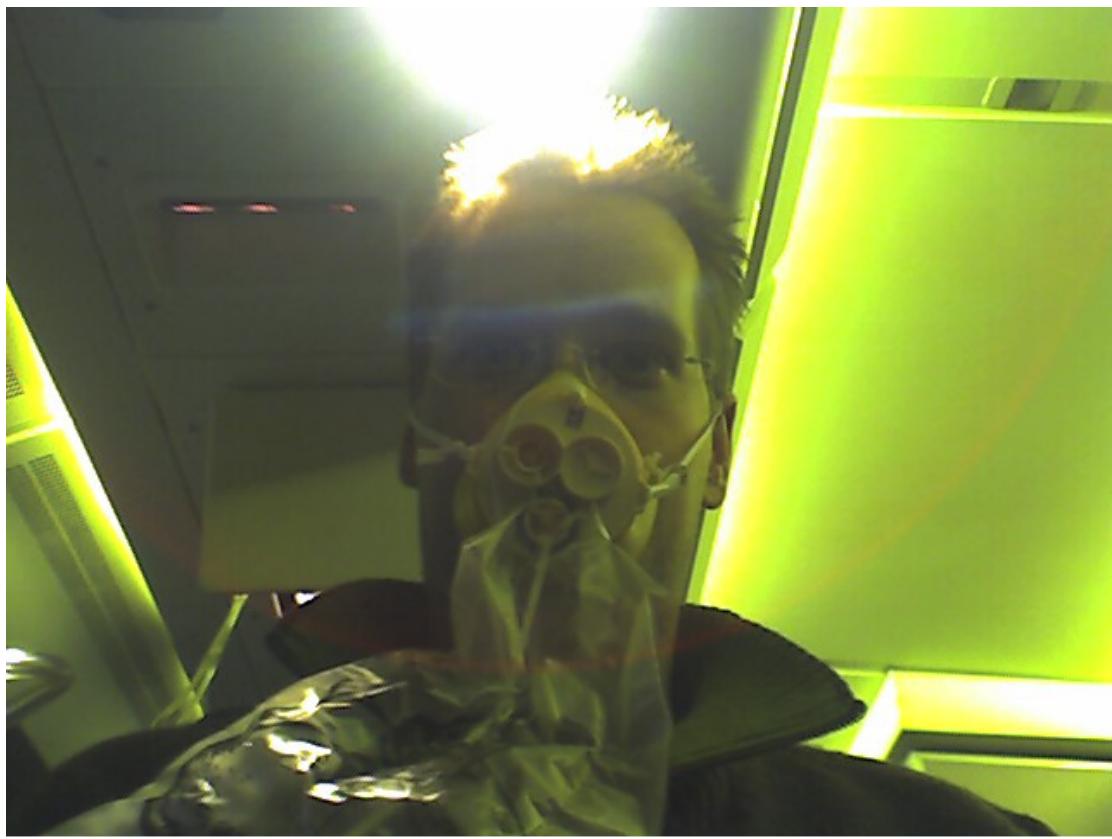
Histotoxic Hypoxia



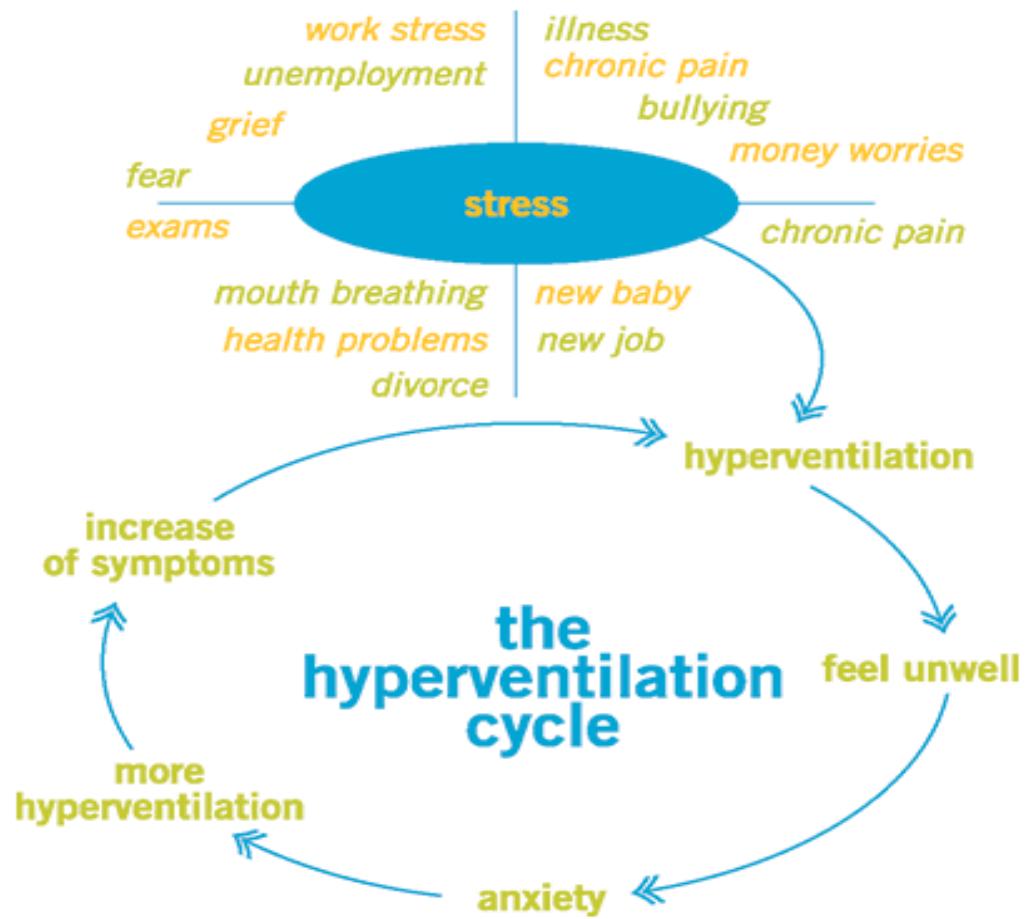
Supplemental Oxygen



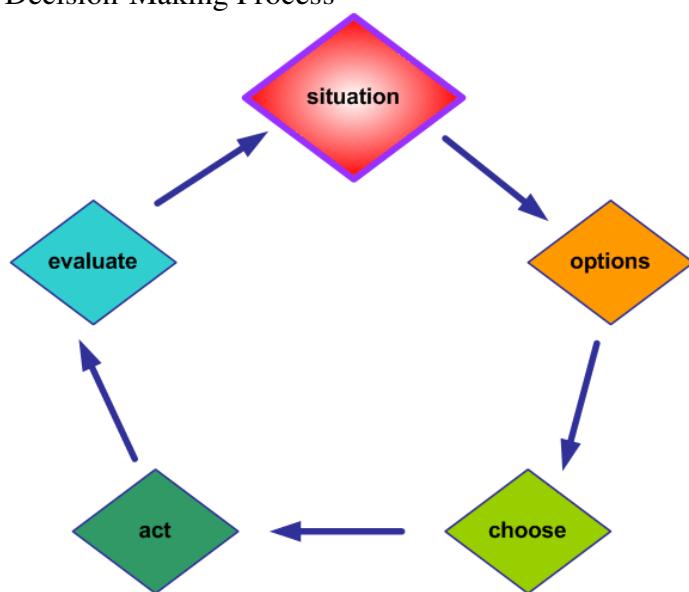
Pressurization



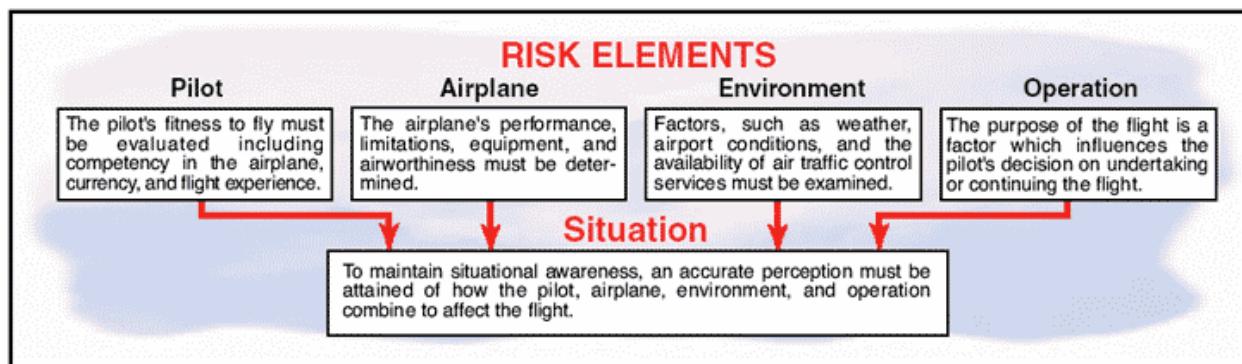
Hyperventilation



Part 2 Decision-Making Process



Risk Elements



Accident



Incident



National Transportation Safety Board (NTSB



Poor Judgment Chain
Stressors

Personal Checklist

Daily Check List - Personal	
Greet each day with Mantra "What a glorious day, filled with love, opportunity and promise!"	
Morning yoga	
Cardiovascular activity (bike, walk, gym)	
Morning Affirmation	
Make bed	
Clean bathroom(s)	
One load of laundry	
Load dishwasher	
Deal with mail	
Plan tomorrow's activities	
Night yoga	
Evening Affirmation	
Walk 10,000 steps	
Breakfast w/ Vitamin	
Snack	
Lunch	
Snack	
Dinner	
Water	
Fruit	
Fruit	
Fruit	
Vegetable	
Vegetable	
Vegetable	
Dairy	
Dairy	
Dairy	

I'm Safe Checklist

 ✓ **I'M SAFE CHECKLIST**

Illness—Do I have any symptoms?

Medication—Have I been taking prescription or over-the-counter drugs?

Stress—Am I under psychological pressure from the job? Worried about financial matters, health problems, or family discord?

Alcohol—Have I been drinking within 8 hours?
Within 24 hours?

Fatigue—Am I tired and not adequately rested?

Eating—Am I adequately nourished?

Hazardous Attitudes

Feedback
Internal Resources
External Resources
Section 11

Part 1

Flight Planning Process



Airworthiness Certificate

UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION—FEDERAL AVIATION ADMINISTRATION STANDARD AIRWORTHINESS CERTIFICATE			
1 NATIONALITY AND REGISTRATION MARKS	2 MANUFACTURER AND MODEL	3 AIRCRAFT SERIAL NUMBER	4 CATEGORY
N2631A	PIPER PA-22-135	22-903	NORMAL
5. AUTHORITY AND BASIS FOR ISSUANCE This airworthiness certificate is issued pursuant to the Federal Aviation Act of 1958 and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code as provided by Annex 8 to the Convention on International Civil Aviation, except as noted herein. Exceptions:			
NONE			
6. TERMS AND CONDITIONS Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator, this airworthiness certificate is effective as long as the maintenance, preventative maintenance, and alterations are performed in accordance with Parts 21, 43, and 91 of the Federal Aviation Regulations, as appropriate, and the aircraft is registered in the United States.			
DATE OF ISSUANCE 08-10-95	FAA REPRESENTATIVE <i>Marion W. Williams</i> MARION W. WILLIAMS	DESIGNATION NUMBER SW-FSDO-OKC	
Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding \$1,000, or imprisonment not exceeding 3 years, or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS			
FAA Form 8100-2 (8-82)			
GPO 892-804			