Mead

180 SHEETS
WIDE RULED
10½x8in/26.6x20.3cm
5 SUBJECT NOTEBOOK

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Chapter 1 - Instrument / Comm.
Section B.

- Sum Checklist

- When referring to weather conditions, the terms IFR and IMC (instrument meteorological condition) are often used interchangeably. The terms VFR and VMC (visual meteorological conditions).
  Also IFR and VFR can define the type of flight plan.

- PCATD - Personnel computer based aviation training device (PBS

Chap 1 Sec B Aden Human factors

Aeronautical decision making (ADM) is a systematic approach to the mental process used by aircraft pilot to consistently determine the best course of action in response to a given set of circumstance.

Pilot Error

Crew Resource Management (CRM) => effective use of human resources, hardware, & info.

Human Resources: include group working with the cockpit crew or pilot & => Despatcher, cabin crewmembers, maintenance personnel & air traffic controller

CRM principle such as a workload management situational awareness, communication, the leadership role of the captain and aircrew member coordination have direct application to the general aviation cockpit.

DECIDE

Detect the fact that a change has occurred

Estimate the need to counter or react to a change

Choose a desirable outcome for the success of the flight

Identify actions which could successfully control the change.

Do the necessary action to cope with the change

Evaluate the effect of the action.

Pilot in Command is the final authority in flying.

PIC establish an atmosphere of open communication in cockpit.

Hazardous Attitude

Anti Authority => do not like to be told, one follows procedure, rules.

Impulsivity : 1st thing that comes, no consideration for best solution

Invulnerability : accident not for me.

Macho - I am better than others

- Resignation.

Communication

- Use correct radio procedure
- Never assume that ATC heard you read back
- Use a headset
- Use your full call sign
- Read back all clearances
- Delegate communication responsibility in the cockpit
- Be alert for visual cues signs
- If you are in doubt verify
- Keep communication simple
- Use standardized radio techniques

Situational Awareness is difficult
to know a solid mental picture of the flight
your future and passengers, completion of the
plan, weather trend and ATC instructions
Fatigue, stress, emergency etc can cause you to
focus on one aspect of the flight + omit others.

Controlled flight into terrain (CFIT) occurs
when an aircraft is flown into terrain or
water with no prior awareness on the part
of the crew that the crash is imminent.

CFIT → power misinterpretation of chart
misleading decrease.

Lack of a good mental picture can be dangerous
Looking at the appropriate Low altitude
enroute chart may not give you the full picture
A VFR Chart, such as a WAC or sectional
may give you the best terrain info & obstacle
awareness

CFIT ⇒ 5 accident a year 75 commuter airline
but declined with installation of Ground
Proximity Warning System (GPWS)

GPWS - fault alarm
EGPWS - Enhanced GPWS

EGPWS scan 30° L & R infront
60° second warning

To prevent spatial

Aviation Physiology

To prevent special disorientation, any IFR
condition you must rely & precisely interpret
instrument. Do not use body signal

Spatial disorientation occurs when there is a conflict between the signal relayed by your central vision and info provided by your peripheral vision. In IFR condition, peripheral vision has practically none of the references needed to establish orientation.
The misalignment of brain sensors with the reindeer by your peripheral vision may lead to an misunderstanding of your aircraft movement and position in space.
Side aircraft movements that you are not aware of.

Vestibular disorientation

When subjected to the different forces of flight during instrument maneuvers, the vestibular system may send misleading signal to the brain resulting in vestibular disorientation
It is located in the inner ear.
The ~~Utricle~~ saccule organ inside are responsible for the perception of gravity and linear acceleration.

Motion Sickness

Nausea, sweating, dizziness and vomiting are the symptoms of motion sickness often caused by vestibular disorientation

In VFR you overcome MS by focusing to outside horizon.
In IFR, you have to focus on the instrument panel (no outside visual ref)

Hypoxia
occurs when the tissue do not receive enough oxygen.
Hypoxic hypoxia => not enough molecules of oxygen
at 45 000 - 9 to 15 Useful conscious
40 000 15 to 20
35000 30 to 60
30000 1 to 2 mins
28 000 2,5 to 3 min
25 000 ft 3 to 25 min
22 000 5 to 10
20000 30 min or More
Hypoxic hypoxia most lethal
Hypemic hypoxia : blood don't carry oxygen
Stagnant Hypoxia bad circulation of oxygen
Histotoxic Hypoxia. cell don't use ox

Chap 7 - Sc A - Flight instrument systems

Gyroscopic instrument
Attitude indicator }
heading indicator } vacuum system on small plane
Turn coordinator ⇒ electric power
(Turn coord serve as backup if vacuum system fail.)

Gyro work on 2 principle
Rigidity in space & precession.

precession: when a force (including friction) act to tilt a spinning gyro, the effect of that force is felt in the direction of rotation 90° from where the force is applied.

Regardless of the position of its base, a gyro tend to remain rigid in space, with its axis of rotation pointed in a constant direction.

Attitude indicator also called artificial horizon give immediate and direct indication of the airplane pitch.
Errors
During coordinated turn the gyro precess toward the inside of the turn.

When rolling out of a steep 180° turn to the right the miniature aircraft on an attitude indicator will show a slight climb and turn to the left.

When rolling out from a 180° climbing turn to straight & level coordinated flight, the miniature aircraft shows a turn in the opposite direction.

When an aeroplane accelerates, some attitude indicators will precess and incorrectly indicate a climb. When the aeroplane decelerates, these attitude indicators will erroneously register acceleration

Turn Indicator — to maintain a constant rate turn. Standard rate of turn is 3° per sec 360° in 2 min.

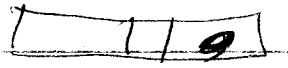
$$\text{Angle of Bank} = \frac{\text{TAS in knots}}{10} + 5$$

To avoid the need for excessive angle of bank the turn indicator on high speed aeroplane are calibrated for half standard rate turns

Therefore aircraft often dive & must be given indication to avoid steep turns.

During a constant bank level turn, an increase in airspeed result in a decreased rate of turn and an increased turn radius.

Step = Because of insufficient weight underlier pressure, the aeroplane is not turning fast for the angle of bank.
The horizontal component of lift exceed the centrifugal forces



Passenger fall against the weight side of pilot

Stid. Excessive weight underlier pressure forces the aeroplane to turn faster than required for the angle of bank

Passenger push down the leg

Coordinated turn.
Correct weight underlier turn the aeroplane at the appropriate rate for the established bank

Magnetic Compass:
Heading indicator will be regularly checked with compass.
In flight turbulence will cause erroneous reading.

Variation = Difference between True & Magnetic North
As an IFR pilot do not concern yourself with variation as much as VFR pilots because all courses on IFR charts are published as magnetic.
However you do need to convert the True wind aloft direction to magnetic before factoring winds into your flight planning.

Subtract easterly variation and add westerly variation to get magnetic direction.

So add easterly variation to magnetic direction to get true heading.
Subtract westerly variation to magnetic direction to get true heading.

Deviation is error due to magnetic interference with metal components as well magnetic fields.

Magnetic Dip: most significant compass error on a north or south heading.

The compass tries to point three dimensionally towards the earth magnetic north pole. which is at a point deep under the earth.

The Magnetic dip pronounced near the poles and negligible near the equator.

On a North or South heading in North Hemisphere turning W or E the compass needle first a little in opposite direction then lags behind until reads W or E heading.

When turning from S to E or W the compass passed the turn, then it adjust when reading E or W.

~~Turn~~

Turn from E or W to N -> compass first on time then lag.

When performing a compass turn to a northerly heading, you must roll out of the turn before compass reaches the desired heading.

When turning to a southerly heading you must delay the roll out until the compass card is passing the desired heading.

OSVN: Overshoot North
Undershoot South

Magnetic dip causes the compass reading toward the north during acceleration and toward south during deceleration especially on E and West heading.

ANDS Accelerate North
Decelerate South

Acceleration errors not frequent as turning error.

Pitot Static. Airspeed indicator, altimeter and vertical speed. Rely on air pressure differences to measure speed & altitude.

Pitot pressure also called Ram, dynamic pressure connected to the airspeed indicator only.

Static pressure or ambient pressure to all 3

Airspeed

Calibrated AS for instalation and instrument

At high angle of attack (low speed) the relative wind does not strike the pitot tube straight on, This result in lower than normal indicated airspeed.

Equivalent Airspeed (EAS) is calibrated airspeed corrected for incalibrate compressible flow at a particular altitude

At airspeed above 200 KIAS and altitude above 20000 ft, air is compressed in front of an aircraft as it passes through the air.

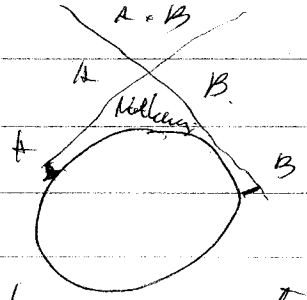
Compressibility cause abnormally high airspeed indications so EAS is lower than CAS. Electronic & mechanical flight computer are designed to compensate for this error. It is required to pilot of high speed aircraft not to exit plan

VFR - VOR Navigation.

VOR - Very high frequency omnidirectional range.

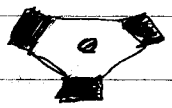
Very high frequency. 108.00 MHz Hertz
117.95 MHz. Relatively interference free navigation.

Strictly line of sight.
Limit reliable signal range at lower altitudes or over mountainous terrain.



Range limited by curvature of the earth.

 VHF OMNI Range (VOR)

 VORTAC

 VOR DME.

Basic VOR system only provide course guidance while VOR/DME or VORTAC provide distance info to aircraft equipped with distance measuring equipment (DME).

A VORTAC is a collocated VOR and military navigational aid called TACAN

Civil application are the portion of the TACAN system which provide distance info.

VOR - Station transmit encoded bearings or Radial, on ufente number total 360° radial are used because accuracy within one th degree.

360 Radial is one degree increment, numbered clockwise from magnetic north.

VOR on sectional chart → Compass Roses.

Many VOR stations are connected by specific radial which form routes called Victor airways.

In event if VOR is accepted, its synthesis is accepted by accepted separately

VOR operational status 2 classes.

Terminal VOR (TVOR): is accepted and designed to be used within 25 n.m and between 12000 ft AGL.

Lower altitude VOR (LVOR): available up to 40 nm from station at altitude between 1000 and 18000 ft AGL
At altitude above 18000 ft AGL you may experience interference from other LVOR sharing the same frequency.

A High Altitude VOR (HVOR) offers a reception range of 40 KM up to 14,500 ft and 100 nm between 14,500 ft and 18000 ft.
The HVOR maximum range of 130 nm is available between 18000 feet on FL 45000,
Between FL 450 and FL 60000 the reception range decrease to 100 nm.
Class
Class designation of a VOR facility in the A/FD

The VOR system transmitts two navigation signal component. One of these signal is a constant pulse at all point around the VOR. The other signal, the reference signal is a constant pulse at all point around the VOR. The other signal is electronically rotated at 1800 rpm. The VOR receiver measures the phase difference ~~point around the VOR~~ between these two signal and calculate its direction from the station.

Equipment.

VOR antenna & antenna, receiver and indicator.

The VOR indicator consist of the course deviation indicator (CDI) the TO-FROM indicator Omnibearing selector (OBS) or course selector.

The VOR frequency selector allow you to tune a VOR frequency in the STBY (Standby) window. This VOR receiver has 50 kHz spacing which provides 200 navigation channel.

You can adjust the volume of the VOR receiver using the volume control (ident knob). By pulling the knob you can ident feature.

which permit you to identify the station displayed in the new window

The To-From indicator indicates whether your selected course will take you to or from the station.

The Course Deviation Indicator (CDI) needle indicates whether you are on your selected course. When the needle is centered, you are on your selected course. If the needle veering to either side, you are off your selected course

You use the Omnibearing selector (OBS) also called the course selector to choose a course are radial by setting it next to the course index

Course Index ▲
Reciprocal Course Index ●

Navigation Procedure
Tuning & identifying a station
interpreting VOR indications, tracking
intercepting a course & cross check your position

ADF Navigation

NDB: non-directional Radio Beacon is used with,

ADF: automatic direction finder (ADF)

Non-directional radio Beacons (NDB) transmit low / medium frequency (L/M) signal in the range of 190 kHz to 535 kHz

NDB are not limited to the legs of airl

Identifying a Station

Tune VOR receiver and identify the station to ensure the right frequency.

Select the Ident feature and turn up the volume. You will hear VOR. Morse code identifier or voice identification.

Station should be TEST (— ... —) audibly

Interpreting VOR indications

To determine your present direction from a VOR station, tune in the station and the OBS knob until CDI needle centers with a from indication

To determine the course from your present position to a VOR station, tune in the station and turn the OBS knob until the CDI needle centers with a TO indication

When the CDI is centered with a TO indication, the radial you are on is the reciprocal of the course set by the OBS.

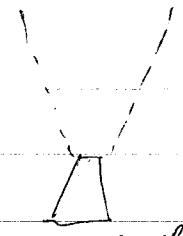
When you are off course the scale immediately the needle shows how far, each dot on the scale represents a course deviation of 2 degrees

CDI Two dot to the left your desired course is
4 degrees to the left (this means that your
course 4 degrees to the right of your course

Reverse Sensing.
VOR indicator displays course info as dependent
of aircraft heading.

To avoid reverse sensing always set the OBS
indicator to approximately agree with the
your intended course.

Off indication.
area known of during from TO - FROM is
called the cone of confusion
Fine second at low altitude, several minute
at high



☒ When the VOR indicator displays an OFF flag
or similar indication, the aircraft is either
directly over the station or 90° to
either side of the course set in your VOR
indicator. An OFF flag (or similar indication)
also can mean that the tuned VOR station
is unreliable

Tracking is to maintain the selected course by keeping the CDI centered.

To stay on course in a crosswind, you use a technique called Bracketing, which involves making a series of corrections to keep on and maintain the course.