



## **Instrument Rating Instructor Rating (Airplane) (IRI (A)) Course**

### **Course Objective**

1. The IRI (A) course should give particular stress to the role of the individual in relation to the importance of human factors in the man-machine environment. Special attention should be paid to the applicant's levels of maturity and judgement including an understanding of adults, their behavioural attitudes and variable levels of education.
2. With the exception of the section on Teaching and Learning, all the subject detail contained in the theoretical and Flight Training Syllabus is complementary to the Instrument Rating Pilot Course Syllabus which should already be known by the applicant. Therefore the objective of the course is to:
  - (a) Refresh and bring up to date the technical knowledge of the student instructor;
  - (b) Train pilots in accordance with the requirements of the modular instrument flying training course (Appendix 1 to JCAR-FCL 1.210);
  - (c) Enable the applicant to develop the necessary instructional techniques required for teaching of instrument flying, radio navigation and instrument procedures to the level required for the issue of an instrument rating; and
  - (d) Ensure that the student instrument rating instructor's flying is of a sufficiently high standard.
3. During the course, the applicants should be made aware of their own attitudes to the important aspect of flight safety. Improving safety awareness should be a fundamental objective throughout the course. It will be of major importance for the course of training to aim at giving applicants the knowledge, skills and attitudes relevant to an instructor's task and to achieve this, the course curriculum, in terms of objectives should comprise at least the following areas.



## JCAR FCL 1 Requirements

### 4. **Pre-request**

- (a) Completed at least 800 Hrs flight time under IFR, of which at least 400 Hrs shall be in airplanes, and
- (b) For multi engine Completed at least (500) Hrs flight time as a pilot of airplanes and Completed at least (30) Hrs as PIC on the applicable type or class of airplane

### 5. **Theoretical training.** Complete Teaching & Learning course shall comprise not less than 25 Hrs, or having held one of the following ratings FI (A), CRI (A), TRI (A), SFI (A), STI (A), MCCI (A),FI (H), TRI (H), SFI (H)

### 6. **Flight training.** Complete at least (10) Hrs or (5) Hrs in the case of a FI (A) of flight training on an airplane, flight simulator or FPNT II

### 7. **skill test**



## PART I

### Teaching and Learning

#### Item No.

1. **The Learning Process.**
  - Motivation.
  - Perception and understanding.
  - Memory and its application.
  - Habits and transfer.
  - Obstacles to learning.
  - Incentives to learning.
  - Learning methods.
  - Rates of learning.
  
2. **The Teaching Process.**
  - Elements of effective teaching.
  - Planning of instructional activity.
  - Teaching methods.
  - Teaching from the known' to the unknown'.
  - Use of lesson plans'.
  
3. **Training Philosophies.**
  - Value of a structured (approved) course of training.
  - Importance of a planned syllabus.
  - Integration of theoretical knowledge and flight instruction.
  
4. **Techniques of Applied Instruction.**
  - a. **Theoretical knowledge** - Classroom instruction techniques.
    - Use of training aids.
    - Group lectures.
    - Individual briefings.
    - Student participation/discussion.
  
  - b. **Flight - Airborne instruction techniques.**
    - The flight/cockpit environment.
    - Techniques of applied instruction.
    - Post-flight and in flight judgment and decision making.

**5. Student Evaluation and Testing.**

- a. **Assessment of student performance.**
- The function of progress tests.
  - Recall of knowledge.
  - Translation of knowledge into understanding.
  - Development of understanding into actions.
  - The need to evaluate rate of progress.
- b. **Analysis of student errors.**
- Establish the reason for errors.
  - Tackle major faults first, minor faults second.
  - Avoidance of over criticism.
  - The need for clear concise communication.

**6. Training Program Development.**

- Lesson planning.
- Preparation.
- Explanation and demonstration.
- Student participation and practice.
- Evaluation.

**7. Human Performance and Limitations Relevant To Flight Instruction.**

- Physiological factors.
- Psychological factors.
- Human information processing.
- Behavioral attitudes.
- Development of judgment and decision making.

**8. Hazards Involved In Simulating Systems Failures and Malfunctions in the Airplane during Flight.**

- Selection of a safe altitude.
- Importance of touch drills'.
- Situational awareness.
- Adherence to correct procedures.



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**9. Training Administration.**

- Flight theoretical knowledge instruction records.
- Pilot's personal flying log book.
- The flight/ground curriculum.
- Study material.
- Official forms.
- Aircraft Flight/Owner's Manuals/Pilot's Operating Handbooks.
- Flight authorization papers.
- Aircraft documents.
- The private pilot's license regulations.

Note: A suggested breakdown of hours for this part is found in the Flight Instructor Course, AMC JCAR-FCL 1.340.



## PART 2

### Theoretical Knowledge Instruction Syllabus

The theoretical subjects covered below should be used to develop the instructor's teaching skills. The items selected should relate to the student's background and should be applied to training for an IR(A).

#### General Subjects

##### Physiological/Psychological Factors

- The Senses.
- Spatial Disorientation.
- Sensory Illusions.
- Stress.

##### Flight Instruments

- Airspeed Indicator.
- Altimeter.
- Vertical Speed Indicator.
- Attitude Indicator.
- Heading Indicator.
- Turn and Slip Indicator.
- Magnetic Compass.

In relation to the above instruments the following items should be covered:

- Principles of Operation.
- Errors and in-flight Serviceability Checks.
- System Failures.

#### Radio Navigation Aids

- Basic Radio Principles.
- Use of VHF RTF Channels.
- The Morse code.
- Basic Principles of Radio Aids.
- VHF Omni Range (VOR).
- Ground and Airplane Equipment.
- Non Directional Beacons (NDB/ADF).
- Ground and Airplane Equipment.
- VHF Direction Finding (VHF/DF).
- Radio Detection and Ranging (RADAR).
- Ground Equipment.
- Primary Radar.
- Secondary Surveillance Radar.



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- Airplane Equipment.
- Transponders.
- Precision Approach System.
- Other Navigational Systems (as applicable) in current Operational use.
- Ground and Airplane Equipment.
- Distance Measuring Equipment (DME).
- Ground and Airplane Equipment.
- Marker Beacons.
- Ground and Airplane Equipment.
- Pre-flight Serviceability Checks.
- Range, Accuracy and Limitations of Equipment.

### **Flight Planning Considerations**

#### **Aeronautical Information Publications**

The course of training should cover the items listed below, but the applicant's aptitude and previous aviation experience should be taken into account when determining the amount of instructional time allotted.

Although a number of items contained under this heading are complementary to those contained in the PPL/CPL/IR syllabi, the instructor should ensure that they have been covered during the applicant's training and due allowance should be made for the time needed to revise these items as necessary.

#### **The Aeronautical Information Publication**

- NOTAM Class 1 and 2.
- Aeronautical Information Circulars.
- Information of an Operational Nature.

#### **The Rules of the Air and Air Traffic Services (RAC)**

- Visual Flight Rules and Instrument Flight Rules.
- Flight Plans and ATS Messages.
- Use of Radar in Air Traffic Services.
- Radio Failure.

#### **Classification of Airspace**

- Airspace Restrictions and Hazards.



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### Holding and Approach to Land Procedures

- Precision Approaches/Non Precision Approaches.
- Radar Approach Procedures.
- Missed Approach Procedures.
- Visual Maneuvering after an Instrument Approach.
- Conflict Hazards in Uncontrolled Airspace.

### Communications

- Types of Services.
- Extraction of AIP Data Relating to Radio Aids.

### Charts Available

- En-route.
- Departure and Arrival.
- Instrument Approach and Landing.
- Amendments, Corrections and Revision Service.

### Flight Planning General

- The Objectives of Flight Planning.
- Factors Affecting Airplane and Engine Performance.
- Selection of Alternate(s).
- Obtaining Meteorological Information.
- Services Available.
- Met Briefing.
- Telephone or Electronic Data Processing.
- Actual Weather Reports (TAFs, METARs and SIGMET Messages).
- The Route Forecast.
- The Operational Significance of the Meteorological Information Obtained (including Icing, Turbulence and Visibility).
- Altimeter Considerations.
- Definitions of.
  - Transition Altitude Transition Level Flight Level.
  - QNH.
  - Regional QNH.
  - Standard Pressure Setting.
  - QFE.
- Altimeter Setting Procedures.
- Pre-flight Altimeter Checks.
- Take off and Climb.
- En-Route.
- Approach and Landing.





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- Missed Approach Terrain Clearance.
- Selection of a Minimum Safe En-Route Altitude.
- Instrument Flight Rules.
- Preparation of Charts.
- Choice of Routes and Flight Levels.
- Compilation of Flight Plan/Log Sheet.
- Log Sheet Entries.
- Navigation Ground Aids to be used.
- Frequencies/Identification.
- Radials and Bearings.
- Tracks and Fixes.
- Safety Altitude(s).
- Fuel Calculations.
- ATC Frequencies (VHF).
- Tower, Approach, En-Route, Radar, FIS, ATIS, and Weather Reports.
- Minimum Sector Altitudes at Destination and Alternate Aerodromes.
- Determination of Minimum Safe Descent Heights/Altitudes (Decision Heights) at Destination and Alternate Aerodromes.

### **The Privileges of the Instrument Rating**

Outside Controlled Airspace

Within Controlled Airspace

Period of Validity and Renewal Procedures



## **PART 3**

### **Flight Training Syllabus**

#### **Long Briefings and Air Exercises**

1. Instrument Flying (For revision as deemed necessary by the Course Instructor).
2. Instrument Flying (Advanced).
3. Radio Navigation (Applied Procedures) - use of VOR.
4. Radio Navigation (Applied Procedures) - use of NDB.
5. Radio Navigation (Applied Procedures) - use of VHF/DF.
6. Radio Navigation (Applied Procedures) - use of DME.
7. Radio Navigation (Applied Procedures) - use of Transponders.
8. Radio Navigation (Applied Procedures) - use of En-Route Radar Services.
9. Pre-flight and Aerodrome Departure and Arrival Procedures.
10. Instrument Approach - ILS Approaches to Specified Minima – Missed Approach Procedures.
11. Instrument Approach - NDB Approaches to Specified Minima - Missed Approach Procedures.
12. Radio Navigation (applied procedures) use of GPS (to be developed).



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## **LONG BRIEFING I**

### **Instrument Flying (Basic)**

- Flight Instruments.
- Physiological Considerations.
- Instrument Appreciation.
  - Attitude Instrument Flight.
  - Pitch Indications.
  - Bank Indications.
  - Different Instrument Presentations.
  - Introduction to the Use of the Attitude Indicator.
  - Pitch Attitude.
  - Bank Attitude.
  - Maintenance of Heading and Balanced flight.
  - Instrument Limitations (inc. System Failures).

### **Attitude, Power & Performance**

#### **Attitude Instrument Flight**

- Control Instruments.
- Performance Instruments.
- Effect of Changing Power and configuration.
- Cross Checking the Instrument Indications.
- Instrument Interpretation.
- Direct and Indirect Indications (Performance Instruments).
- Instrument Lag.
- Selective Radial Scan.

### **The Basic Flight Maneuvers (Full Panel)**

- Straight and Level Flight at Various Airspeeds and Airplane Configurations.
  - Climbing.
  - Descending.
  - Standard Rate Turns.
- Level, Climbing and Descending On to Pre-Selected Headings.

### **Air Exercise 1**

#### **Instrument Flying (Basic)**

- Physiological Sensations.
- Instrument Appreciation.
- Attitude Instrument Flight.
- Pitch Attitude.
- Bank Attitude.
- Maintenance of Heading and Balanced Flight.
- Attitude Instrument Flight.



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- Effect of Changing Power and configuration.
- Cross Checking the Instruments.
- Selective Radial Scan.

**The Basic Flight Maneuvers (Full Panel)**

- Straight and Level Flight at various Airspeeds and Airplane Configurations.
  - Climbing.
  - Descending.
  - Standard Rate Turns.
- Level, Climbing and Descending on to Pre-Selected Headings.



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## **Long Briefing 2**

### Instrument Flying (Advanced)

- Full Panel.
- 30 degrees Level Turns.
- Unusual Attitudes – Recoveries.
- Transference to Instruments after Take-off.
- Limited Panel.
- Basic Flight Maneuvers.
- Unusual Attitudes – Recoveries.

### Air Exercise 2

- Full Panel.
- 30 degrees Level Turns.
- Unusual Attitudes – Recoveries.
- Limited Panel.
- Repeat of the Above Exercises.



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### **Long Briefing 3**

#### **RADIO NAVIGATION (APPLIED PROCEDURES)**

##### **USE OF VOR (VHF OMNI RANGE)**

- Availability of VOR Stations En-Route.
- Station Frequencies and Identification.
- Signal Reception Range.
- Effect of Altitude.
- VOR Radials.
- Use of Omni Bearing Selector.
- To/From Indicator.
- Orientation.
- Selecting Radials.
- Intercepting a Pre-Selected Radial.
- Assessment of Distance to Interception.
- Effects of Wind.
- Maintaining a Radial.
- Tracking To/From a VOR Station.
- Procedure Turns.
- Station Passage.
- Use of Two Stations for Obtaining a Fix.
- Pre-Selecting Fixes Along a Track.
- Assessment of Ground Speed and Timing.
- Holding Procedures.
- Various Entries.
- Communication (R/T Procedures and ATC Liaison).

#### **Air Exercise 3**

##### **Radio Navigation (Applied Procedures)**

##### **Use of VOR (VHF Omni Range)**

- Station Selection and Identification.
- Orientation.
- Intercepting a Pre-Selected Radial.
- R/T Procedures and ATC Liaison.
- Maintaining a Radial Inbound.
- Recognition of Station Passage.
- Maintaining a Radial Outbound.
- Procedure Turns.
- Use of Two Stations to Obtain a Fix Along the Track.
- Assessment of Ground Speed and Timing.
- Holding Procedures/Entries.
- Holding at a Pre-Selected Fix.
- Holding at a VOR Station.



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## **Long Briefing 4**

### Radio Navigation (Applied Procedures)

#### Use of ADF (Automatic Direction Finding Equipment)

- Availability of NDB (Non Directional Beacons) Facilities En-Route.
- Location, Frequencies, Tuning (as applicable) and Identification Codes.
- Signal Reception Range.
- Static Interference.
- Night Effect.
- Station Interference.
- Mountain Effect.
- Coastal Refraction.
- Orientation in Relation to a NDB.
- Homing.
- Intercepting a Pre-Selected Magnetic Bearing and Tracking Inbound.
- Station Passage.
- Tracking Outbound.
- Time/Distance Checks.
- Use of Two NDBs to Obtain a Fix or alternatively use of One NDB and One other Nav. aid.
- Holding Procedures/Various Approved Entries.
- Communication (R/T Procedures and ATC Liaison).

### Air Exercise 4

### Radio Navigation (Applied Procedures)

#### Use of ADF (Automatic Direction Finding Equipment)

- Selecting, Tuning and Identifying a NDB.
- ADF Orientation.
- Communication (R/T Procedures and ATC Liaison).
- Homing.
- Tracking Inbound.
- Station Passage.
- Tracking Outbound.
- Time/Distance Checks.
- Intercepting a Pre-Selected Magnetic Bearing.
  
- Determining the Airplane's position from Two NDBs or alternatively from One NDB and One Other Nav. aid.
- ADF Holding Procedures/Various Approved Entries.

## Long Briefing 5

### Radio Navigation (Applied Procedures)

#### Use of VHF/DF (Very High Frequency/Direction Finding)

- Availability of VHF/DF Facilities En-Route.
- Location, Frequencies, Station Call Signs and Hours of Operation.
- Signal and Reception Range.
- Effect of Altitude.
- Communication (R/T Procedures and ATC Liaison).
- Obtaining and Using Types of Bearings, e.g. QTE, QDM, QDR.
- Homing to a Station.
- Effect of Wind.
- Use of Two VHF/DF Stations to Obtain a Fix (or alternatively One VHF/DF Station and One other Nav.aid).
- Assessment of Groundspeed and Timing.

## Air Exercise 5

### Radio Navigation (Applied Procedures)

#### Use of VHF/DF (Very High Frequency/Direction Finding)

- Establishing Contact with a VHF/DF Station.
- R/T Procedures and ATC Liaison.
- Obtaining and Using a QDR and QTE.
- Homing to a Station.
- Effect of Wind.
- Use of Two VHF/DF Stations to Obtain a Fix (or alternatively One VHF/DF Station and One other Nav.aid).
- Assessment of Groundspeed and Timing.

## Long Briefing 6

### Use of DME (Distance Measuring Equipment)

- Availability of DME Facilities.
- Location, Frequencies and Identification Codes.
- Signal Reception Range.
- Slant Range.
- Use of DME to obtain Distance, Groundspeed and Timing.
- Use of DME to obtain a Fix.





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## **AIR EXERCISE 6**

Use of DME (Distance Measuring Equipment)

- Station Selection and Identification.
- Use of Equipment Functions.
- Distance.
- Groundspeed.
- Timing.
- DME Arc Approach.
- DME Holding.



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## **Long Briefing 7**

### Use of Transponders (SSR)

- Operation of Transponders.
- Code Selection Procedure.
- Emergency Codes.
- Precautions when using Airborne Equipment.

### Air Exercise 7

### Use of Transponders (SSR)

- Operation of Transponders.
- Types of Transponders.
- Code Selection Procedure.
- Emergency Codes.
- Precautions when Selecting the Required Code.



## **Long Briefing 8**

### Use of En-Route Radar

- Availability of Radar Services.
- Location, Station Frequencies, Call Signs and Hours of Operation.
- AIP and NOTAMs.
- Provision of Service.
- Communication (R/T, Procedures and ATC Liaison).
- Airspace Radar Advisory Service.
- Emergency Service.
- Aircraft Separation Standards.

### Air Exercise 8

#### USE OF EN-ROUTE RADAR

- Communication (R/T Procedures and ATC Liaison).
- Establishing the Service Required and Position Reporting.
- Method of Reporting Conflicting Traffic.
- Terrain Clearance.



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## **Long Briefing 9**

### **Pre-Flight and Aerodrome Departure**

- Determining the Serviceability of the Airplane Radio.
- Navigation Equipment.
- Obtaining the Departure Clearance.
- Setting up Radio Nav. aids prior to Take-off e.g. VOR Frequencies, Required Radials, etc.
- Aerodrome Departure Procedures, Frequency Changes.
- Altitude and Position Reporting as Required.
- Standard Instrument Departure Procedures (SIDs).
- Obstacle Clearance Considerations.

### **Air Exercise 9**

#### **Pre-Flight and Aerodrome Departure**

- Radio Equipment Serviceability Checks.
- Departure Clearance.
- Nav. aid Selection.
- Frequencies, Radials, etc.
- Aerodrome Departure Checks, Frequency Changes, Altitude and Position Reports.
- Standard Instrument Departure Procedures (SIDs).

## Long Briefing 10

### Initial/Intermediate/Final Approach Procedures

- Precision Approach Charts.
  - Approach to the Initial Approach Fix and Minimum Sector Altitude.
  - Nav. aid Requirements, e.g. Radar, ADF, etc.
  - Communication (ATC Liaison and R/T Phraseology).
  
- Review:
  - Holding Procedure.
  - The Final Approach Track.
  - Forming a Mental Picture of the Approach.
  - Completion of Aerodrome Approach Checks.
  - Initial Approach Procedure.
  - Selection of the ILS Frequency and Identification.
  - Obstacle Clearance Altitude/Height.
  - Operating Minima.
  - Achieving the Horizontal and Vertical Patterns.
  - Assessment of Distance, Groundspeed Time, and Rate of Descent from the Final Approach Fix to the aerodrome.
  - Use of DME (as applicable).
  - Go Around and Missed Approach Procedure.
  - Review of the Published Instructions.
  - Transition from Instrument to Visual Flight (Sensory Illusions).

### Visual Maneuvering After an Instrument Approach

- Circling Approach.
- Visual Approach to Landing.

## Air Exercise 10

### Precision Approach Procedure

- Initial Approach to the ILS.
- Completion of Approach Planning.
- Holding Procedure.
- Frequency Selection and Identification of ILS.
- Review of the Published Procedure and Minimum Sector Altitude.
- Communication (ATC Liaison and R/T Phraseology).
- Determination of Operating Minima and Altimeter Setting.
- Weather Consideration, e.g. Cloud Base and Visibility.
- Availability of Runway Lighting.
- ILS Entry Methods.
- Radar Vectors.



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- Procedural Method.
- Assessment of Approach Time from the Final Approach Fix to the aerodrome.
- Determination of:
  - The Descent Rate on Final Approach.
  - The Wind Velocity at the Surface and the Length of the Landing Runway.
  - The Obstruction Heights to be borne in mind during visual maneuvering after an Instrument Approach.
  - Circling approach.
- The Approach:
  - At the Final Approach Fix.
  - Use of DME (as applicable).
  - ATC liaison.
  - Note Time and establish Airspeed and Descent Rate.
  - Maintaining the Localizer and Glide Path.
  - Anticipation in Change of Wind Velocity and its Effect on Drift.
  - Decision Height.
  - Runway Direction.
  - Overshoot and Missed Approach Procedure.
  - Transition from Instrument to Visual Flight.
  - Circling Approach.
  - Visual Approach to Landing.

## Long Briefing 11

### Non-Precision Approach Procedure

- Non-Precision Approach Charts.
- Initial Approach to the Initial Approach Fix and Minimum Sector Altitude.
- ATC Liaison.
- Communication (ATC Procedures and R/T Phraseology).
- Approach Planning:
  - Holding Procedure.
  - The Approach Track.
  - Forming a Mental Picture of the Approach.
  - Initial Approach Procedure.
  - Operating Minima.
  - Completion of Approach Planning.
  - Achieving the Horizontal and Vertical Patterns.
  - Assessment of Distance, Groundspeed Time, and Rate of Descent from the Final Approach Fix (FAF) to the Aerodrome.
  - Use of DME (as applicable).
  - Go around and Missed Approach Procedure.
  - Review of the Published Instructions.
  - Transition from Instrument to Visual Flight (Sensory Illusions).
  - Visual Maneuvering after an Instrument Approach.
  - Circling Approach.
  - Visual Approach to Landing.

### Air Exercise 11

### Non-Precision Approach Procedure

#### Completion of Approach Planning including:

- Determination of:
  - Descent Rate from the Final Approach Fix.
  - The Wind Velocity at the Surface and Length of the Landing Runway.
  - The Obstruction Heights to be Borne in Mind During Visual Manoeuvring after an Instrument Approach.
  - Circling Approach.
  - Go Around and Missed Approach Procedure.
- Initial Approach.
- Frequency Selection and Identification.
- Review of the Published Procedure and Minimum Safe Sector Altitude.
- ATC liaison and R/T Phraseology.



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- Determination of Decision Height and Altimeter Setting.
- Weather Considerations, e.g. Cloud Base and Visibility.
- Availability of Runway Lighting.
- Determination of Inbound Track.
- Assessment of Time from Final Approach Fix to the Missed Approach Point.
- ATC Liaison.
- The Outbound Procedure (incl. Completion of Pre-Landing Checks).
- The Inbound Procedure.
- Re-Check of Identification Code.
- Altimeter Setting Re-Checked.
- The Final Approach.
- Note Time and Establish Airspeed and Descent Rate.
- Maintaining the Final Approach Track.
- Anticipation of Change in Wind Velocity and its Effect on the Drift.
- Minimum Descent Altitude/Height.
- Runway Direction.
- Go around and Missed Approach Procedure.
- Transition from Instrument to Visual Flight (Sensory Illusions).
- Visual Approach.





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**Long Briefing 12**

AIR EXERCISES

Use of GPS