

033

**FLIGHT PLANNING
& MONITORING**

**INSTRUMENT RATING (A)
(FLIGHT PERFORMANCE AND PLANNING)**

JAR-FCL REF NO	LEARNING OBJECTIVES	REMARKS
033 00 00 00	<u>FLIGHT PLANNING AND FLIGHT MONITORING - AIRCRAFT</u>	
033 01 00 00	<u>FLIGHT PLANS FOR CROSS-COUNTRY FLIGHTS FOR VFR FLIGHTS</u>	
033 01 01 00	<u>Completing a navigation plan</u>	Given:
033 01 01 01	Selection of routes, speeds, heights (altitudes) and alternate airfield <ul style="list-style-type: none"> - Select a route and altitude taking the following criteria into account: <ul style="list-style-type: none"> - Classification of airspace A – G <ul style="list-style-type: none"> - Controlled airspace - Uncontrolled airspace - Prescribed outbound and inbound routes - Restricted areas - Weather situation - Minimum safe altitudes - Interpret, before every flight, the air traffic control information from AIP and NOTAMS obtained from AIS, for: <ul style="list-style-type: none"> - Departure - En route - Destination - Possible alternative fields - Select and/or calculate the route, true air speeds, heights and alternate fields, taking into account: <ul style="list-style-type: none"> - Prescribed outbound and inbound routes - Restricted areas 	a. VFR chart STUTTGART (NO 47/6) b. Performance data of BE-36 and Piper Seneca III or single/twin engine piston aircraft c. Navigation plan form (Flightlog)

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033 01 01 02	<ul style="list-style-type: none"> - Weather situation - Minimum safe altitudes - Nav. Aids - Conspicuous points - Semi circular rules - Calculate the minimum pressure altitude from MOCA, OAT and QNH - Calculate how many feet to climb after take off from an aerodrome to a given level - Find the frequency and ident of a nav. aid from the chart <p>Measurement of tracks and distances</p> <ul style="list-style-type: none"> - Find the checkpoints - Calculate, or obtain from the chart, courses (tracks) and distances to fly - Draw the intended route in the navigation chart considering: <ul style="list-style-type: none"> - Restricted areas - Danger areas - Prohibited areas - Other airspace restrictions - Find the highest obstacle within a given distance either side of the track - Derive the following data from the chart and transfer to the navigation plan form: <ul style="list-style-type: none"> - Check points and/or turning points - Distances in NM (using minutes of latitude along a meridian) - True courses (tracks) 	<p>Use protractor and ruler</p> <p>Use Aeronautical Information Publication (AIP)</p> <p>Use TAF, METAR and</p>

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033 01 01 03	<p>Obtaining wind velocity forecast for each leg</p> <ul style="list-style-type: none"> - Wind <ul style="list-style-type: none"> - At aerodromes - At cruising levels - Visibility - Clouds and cloudbase - Meteorological hazards 	Significant weatherchart (SWC)
033 01 01 04	<p>Computation of headings, ground speeds, and time en-route from tracks, true airspeed and wind velocities</p> <ul style="list-style-type: none"> - Apply the annual change to the charted value of the variation if applicable (not necessary if newest charts are used) - Transfer the calculated variation to the flight plan form - Calculate the true air speed at given: <ul style="list-style-type: none"> - Flight level - Temperature and instrument/position error of the airspeed indicator - Calculate the magnetic heading given: <ul style="list-style-type: none"> - The true course - TAS and wind vector - Calculate the ground speed given: <ul style="list-style-type: none"> - The true airspeed - Course 	Use Pocket calculator And/or mechanical slide Computer e.g Jeppesen calculator Airtour Slide computer with aid of the pilots operating handbook

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033 01 01 05	<ul style="list-style-type: none"> – Wind speed and wind direction and/or (equivalent) wind component <p>Completion of pre-flight portion of navigation flight log</p> <ul style="list-style-type: none"> – Find departure and arrival routes to be flown – Calculate the position of the top of climb (TOC) and top of descent (TOD) by distance and time for given data – Calculate the individual leg times and the total time en route – Calculate the total time enroute for the trip – Identify the omitted course and distance elements for a partially completed flight log <ul style="list-style-type: none"> – Calculate or obtain from the chart those elements and insert them to complete the flight log entries 	
033 01 02 00	<p><u>Completing the Fuel Plan</u></p>	<p>Given a filled-in flight log With a few missing Parameters with the aid of pilots operating handbook of the appropriate</p>
033 01 02 01	<p>Computation of planned fuel usage for each leg and total fuel usage for the flight</p> <ul style="list-style-type: none"> – Compute the planned total fuel usage for the flight by consulting the fuel usage tables and/or graphs from the pilots operating handbook in addition to the navigation plan for times enroute – Find the maximum distance to fly given appropriate data 	<p>aircraft and a completed navigation log of the flight</p>
033 01 02 02	<p>Fuel for holding or diversion to alternate airfield</p> <ul style="list-style-type: none"> – State the definition of the alternate and final reserve fuel and the requirements for aeroplanes with reciprocating and turbine engines – Define final reserve fuel – Obtain and calculate the final reserve fuel for holding – Obtain the fuel for flying from the destination to the alternate from the appropriate fuel table or graph 	<p>In accordance with JAR- OPS 1</p>
033 01 02 03	<p>Reserves</p> <ul style="list-style-type: none"> – Define the unforeseen items for which contingency fuel is to be carried 	

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033 01 03 00	<u>Carry out flight monitoring and in-flight replanning</u>	Indications of fuelmeters given
033 01 03 01	In-flight fuel computations <ul style="list-style-type: none"> – Calculate, in flight, the fuel quantities used and remaining at navigational checkpoints 	
033 01 03 02	Calculation of actual consumption rate <ul style="list-style-type: none"> – Calculate the actual consumption rate given: <ul style="list-style-type: none"> – The fuel used – The flight time – Compare the actual and the planned fuel consumption by means of calculation or flight progress chart – Compare the remaining fuel with the actual fuel to be used 	
033 01 03 03	Revision of fuel reserves estimates <ul style="list-style-type: none"> – Calculate the remaining fuel at a nav checkpoint taking into account the actual fuel flow and the fuel used 	
033 01 03 04	In-flight replanning incase of problems <ul style="list-style-type: none"> – Perform in flight revision of the fuel plan, if necessary, by: <ul style="list-style-type: none"> – Selecting a new destination – Selection of power settings to the old or a new destination – Calculating a new time to a new destination with a new ground speed to be calculated with given wind, TAS (true air speed) and course – Check the current fuel state, fuel requirements and fuel reserves – Explain that, in the case of a flight revision, the commander has to check the traffic and the condition of the new destination airfield and its designated alternate. The commander must also check the meteorological conditions at new destination and designated alternate airfield before the decision to continue the flight to the new destination or alternate. The aircraft must be able to land with the final 	

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033 01 04 00	<p>reserve fuel</p> <p><u>Radio communication and navigation aids</u></p> <ul style="list-style-type: none"> – State the frequencies of the various means of Communication and Navigational aids 	Use Jeppesen chart or AIP
033 01 04 01	<p>Communication frequencies and call signs for appropriate control agencies and in-flight service facilities such as weather stations</p> <ul style="list-style-type: none"> – Find communication frequencies and call signs for appropriate control agencies and in-flight service facilities, flight information services, weather information stations, Automatic Terminal Information Service stations 	
033 01 04 02	<p>Radio navigation and approach aids</p> <ul style="list-style-type: none"> – On a route facility chart, locate the radio navigation aids and , from the symbols and other data shown, determine: <ul style="list-style-type: none"> – The type of facility/ service provided – Frequency – Identification – Modulation (as appropriate) 	
033 02 00 00	<p><u>ICAO ATC FLIGHT PLAN</u></p>	
033 02 01 00	<p><u>Types of flight plan</u></p> <ul style="list-style-type: none"> – Indicate the difference between the types of Flight Plan <ul style="list-style-type: none"> – Individual flight plan – Repetitive flight plan (RPL) 	
033 02 01 01	<p>ICAO flight plan</p> <ul style="list-style-type: none"> – Interpret the fixed format of an ICAO flight plan – State the reasons for a fixed format of an ICAO flightplan 	Use ICAO flight plan form According DOC 4444

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	<ul style="list-style-type: none"> – Interpret the information to be given on the flight plan: <ul style="list-style-type: none"> – Aircraft identification <ul style="list-style-type: none"> – ICAO airline ident plus flight number – Aircraft registration – Flight rules – Type of flight – Number of aircraft ; wake turbulence category – Communication- and nav equipment on board – Departure aerodrome with 4 letter ident or ZZZZ and name in “other information” – Estimate Off Block Time (EOBT) – Cruising speed – Cruising level VFR or flight level – Route with checkpoints, ATS routes, coordinates and/or bearing and range of a nav.aid and FIR boundary crossing points – Destination aerodrome, EET, alternate aerodromes – Other information REG/, SEL/, OPR/, STS/, TYP/, PER/, COM/, NAV/., DEP/, DEST/, ALTN/ and RMK/ DAT – Endurance – Persons on board – Emergency equipment – Aircraft colour and markings – Define the concept of the repetitive flight plan 	

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033 02 02 00	<u>Completing the flight plan</u>	
033 02 02 01	Information for flight plan <ul style="list-style-type: none"> – Complete the Flight Plan using information from: <ul style="list-style-type: none"> – Navigation plan – Fuel plan – Operator’s records for basic aircraft information – Mass and balance records 	According to PANS RAC (DOC 4444) forms to be used as information for the flight plan should contain all relevant information
033 02 03 00	<u>Filing the flight plan</u>	According ICAO DOC
033 02 03 01	Procedures for filing <ul style="list-style-type: none"> – State the earliest and the latest time, prior to the estimated off block time , that a flight plan should be filed with ATC for onward transmission on the Aeronautical Fixed Telecommunications Network (AFTN) – State the procedure, regarding the flight plan, if take-off is delayed 	4444
033 02 03 02	Agency responsible for processing the flight plan <ul style="list-style-type: none"> – Name which ATC unit is responsible for: <ul style="list-style-type: none"> – Checking compliance with the format and data conventions – Checking for completeness and accuracy – Taking action, if necessary, to make it acceptable for ATC – Indicate acceptance and/or changes to the operator 	
033 02 03 03	Requirements of the state concerning when a flight plan must be filed <ul style="list-style-type: none"> – State and explain that there are circumstances in which the flight plan must be filed earlier 	
033 02 04 00	<u>Closing the flight plan</u>	

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033 02 04 01	<p>Responsibilities and procedures</p> <ul style="list-style-type: none"> – Define the responsibility in respect to closing the flight plan – Indicate the time limit within which the flight plan should be closed 	
033 02 04 02	<p>Processing agency</p> <ul style="list-style-type: none"> – Name the agency responsible for processing the flight plan 	
033 02 04 03	<p>Checking slot time</p> <ul style="list-style-type: none"> – Define the concept slot time/ calculated take off time delivered by the Central Flow Management Unit (CFMU) 	
033 02 05 00	<u>Adherence to flight plan</u>	
033 02 05 01	<p>Tolerances allowed by the state for various types of flight plans</p> <ul style="list-style-type: none"> – State that there are differences between national regulations and practices and the international standards for rules of the air (candidates are not expected to know these differences) – List the publications where the differences can be found – List the subjects on which differences can occur 	
033 02 05 02	<p>In-flight amendment of flight plan</p> <ul style="list-style-type: none"> – List the items of the flight plan which, if necessary, can be changed or amended in the air: <ul style="list-style-type: none"> – State who is responsible for filing an amendment – State to which ATC unit that amendment should be communicated – Name the maximum divergence of time and/or speed from those given in the filed flight plan before an in-flight amendment should be made 	
033 03 00 00	<u>PRACTICAL FLIGHT PLANNING VFR</u>	Use navigation chart
033 03 01 00	<u>Chart preparation</u>	Stuttgart, ruler and

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033 03 01 01	<p>Plot tracks and measure directions and distances</p> <ul style="list-style-type: none"> – Find the checkpoints – Draw the intended route in the navigation chart taking into account: <ul style="list-style-type: none"> – Restricted areas – Danger areas – Prohibited areas – Other airspace restrictions – Find the highest obstacle for 5 NM either side of the track – Derive the following data from the chart and transfer to the navigation plan form: <ul style="list-style-type: none"> – Check points and/or turning points – Distances in NM by measuring with meridian minutes – Courses 	<p>protractor</p> <p>Use Aeronautical Information Publication</p>
033 03 02 00	<u>Navigation plan</u>	Use flight log
033 03 02 01	<p>Completing the navigation plan</p> <ul style="list-style-type: none"> – Complete the flight log with the courses and distances as taken from a chart prepared with routes – Derive and calculate the headings using <ul style="list-style-type: none"> – Wind as provided – TAS – Course – Variation 	
033 03 03 00	<u>Simple fuel plans</u>	

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033 03 03 01	<p>Preparation of fuel logs showing planned values</p> <ul style="list-style-type: none"> – Prepare fuel log showing the planned values for: <ul style="list-style-type: none"> – Fuel used on each leg considering temperature, distance, flight level and wind – Fuel remaining at the end of a flight sector – Endurance based on fuel remaining and planned consumption rate at the end of a flight sector 	Use pilots operating handbook to obtain fuel
033 03 04 00	<u>Radio planning practice</u>	
033 03 04 01	<p>Communications</p> <ul style="list-style-type: none"> – Find the frequencies and call signs of air traffic control agencies and facilities for in-flight services such as weather information 	Use navigation chart, appropriate pilots operating
033 03 04 02	<p>Navigation aids</p> <ul style="list-style-type: none"> – Find the frequencies and identifiers of en-route terminal navigation aids which can be used 	Handbook and AIP
033 04 00 00	<u>IFR (AIRWAYS) FLIGHT PLANNING</u>	Use Jeppesen chart E(HI) 4 and E(HI) 5 for
033 04 01 00	<u>Meteorological considerations</u>	CPL/ATPL examinations and E(LO) 1\2 and 5\6
033 04 01 01	<p>Analysis of existing patterns alongside possible routes</p> <ul style="list-style-type: none"> – Analyse the weather chart, locate and name the different weather systems on the route such as warm and cold fronts, occluded fronts, depressions, high pressure areas, hurricanes, thunderstorms 	Use charts for the airports: Amsterdam, Paris CDG,
033 04 01 02	<p>Analysis of winds aloft along prospective routes</p> <ul style="list-style-type: none"> – Analyse the wind/ temperature for the relevant flight level(s), derive the estimated winds and temperatures along the prospective route for each leg 	Madrid, London LHR, Zurich, Munich
033 04 01 03	<p>Analysis of existing and forecast weather conditions at destination and possible alternates</p> <ul style="list-style-type: none"> – Analyse the TAF's and METAR's and determine the weather at the departure aerodrome, the 	Use TAF and Metars

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<p>033 04 02 00</p> <p>033 04 02 01</p>	<p>destination and the alternates considering the following elements:</p> <ul style="list-style-type: none"> - Wind - Visibility - Runway visual range - Thunderstorms - Precipitation - Cloud base - Temperature <p><u>Selection of routes to destination and alternates</u></p> <p>Preferred airways routings</p> <ul style="list-style-type: none"> - Select the preferred airways using the following criteria: <ul style="list-style-type: none"> - Optimum altitude/ flight level - AIP standard routes - Wind - ATC restrictions - Shortest distance - Obstacles - North Atlantic Track system (NAT) <ul style="list-style-type: none"> - Westbound tracks A, B, C, D, E ,F. G or H - Eastbound tracks Z, Y, X, W, V, U, T or S - domestic routes 	<p>use :</p> <ul style="list-style-type: none"> - weather analysis, - weather depiction chart - wind charts for different levels <p>Use weather information</p> <p>e.g significant weather Charts, upper wind and upper temperature charts, AIP, Jeppesen charts</p>

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033 04 02 02	<ul style="list-style-type: none"> - Define the concepts: <ul style="list-style-type: none"> - Minimum Time Track (MTT) - Minimum Cost Track (MCT) <p>Extraction of tracks and distances from RAD/NAV chart</p> <ul style="list-style-type: none"> - Extract the courses and distances from the radio-navigation chart 	Use Jeppesen charts
033 04 02 03	<p>Frequencies and identifiers of en-route radio navigation aids</p> <ul style="list-style-type: none"> - Find frequencies and identifiers of en-route radio-navigation aids from the navigation chart 	
033 04 02 04	<p>Minimum en-route altitudes, minimum crossing and reception altitudes</p> <ul style="list-style-type: none"> - Derive from the charts and explain the following minimum altitudes <ul style="list-style-type: none"> - The Minimum safe En-route IFR Altitude (MEA) - The Minimum Obstacle Clearance Altitude (MOCA) - The Minimum Off Route Altitude (MORA) - The Minimum Sector Altitude (MSA) - The Maximum Authorized Altitude (MAA) - The Minimum Descent Altitude (MDA) - The Minimum Descent Height (MDH) - The Minimum Crossing Altitude (MCA) - The Minimum Holding Altitude (MHA) 	
033 04 02 05	<p>Standard instrument departures (SIDs) and Standard arrival routes (STARs)</p> <ul style="list-style-type: none"> - State the reasons why the SID and STAR charts show procedures only in a pictorial presentation style which is not to scale - Derive from the SID and STAR charts the following data: 	

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033 04 03 00	<ul style="list-style-type: none"> - Distances - Courses - Radials - DME distances - Frequencies and idents of nav aids and frequencies and call signs for communications 	
033 04 03 01	<p><u>General flight planning tasks</u></p> <p>Checking of AIP and NOTAM for latest airfield and en-route status information</p> <ul style="list-style-type: none"> - Find information from NOTAM's and AIP for: <ul style="list-style-type: none"> - Latest status at the airfield of <ul style="list-style-type: none"> - Nav. Aids - Obstructions - Special procedures due to maintenance, construction of new buildings - Opening hours - Changed frequencies - En-route status <ul style="list-style-type: none"> - Nav. Aids - Changed frequencies - Closed airways - Activity of restricted, danger- and prohibited areas 	
033 04 03 02	<p>Selection of altitudes or flight levels for each leg of the flight</p> <ul style="list-style-type: none"> - Select altitudes and FL for each leg of the flight 	

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033 04 03 03	<ul style="list-style-type: none"> - Determine the altitude/FL at which the existent wind component gives the best fuel mileage when mass, TAS and air distance are given - Find the fuel mileage penalty when deviation occurs from optimum altitude - Select flight levels for each leg of the flight - Calculate true altitudes to ensure statutory minimum clearance is attained - Calculate minimum safe altitude for flight <p>Application of wind velocity on each leg to obtain heading and ground speeds</p> <ul style="list-style-type: none"> - Obtain heading (T) and ground speed from: <ul style="list-style-type: none"> - Wind vector - Course on the chart - True air speed 	<p>Use mechanical sliding computer or programmed electronic calculator</p>
033 04 03 04	<p>Calculation of en-route times for each leg to the destination and to the alternate and determination of total time en-route</p> <ul style="list-style-type: none"> - Calculate the en-route time for each leg to the destination and to the alternate - Calculate the total enroute time: <ul style="list-style-type: none"> - Using time per leg - Using the total air distance 	
033 04 03 05	<p>Completion of fuel plan</p> <ul style="list-style-type: none"> - Complete the fuel plan by calculating the following: <ul style="list-style-type: none"> - Taxi fuel - Tripfuel - Contingency fuel 	

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033 04 03 06	<ul style="list-style-type: none"> – Alternate fuel – Final reserve fuel – Extra fuel <p>Preliminary study of instrument approach procedures and minima at destination and alternate</p> <ul style="list-style-type: none"> – Explain the reasons for studying the instrument departure procedures, the available approach procedures and associated minima for both destination and alternate – Find a standard instrument arrival route which can be expected for the wind at the destination – Find a standard instrument arrival route which can be expected for the wind at the alternate 	
033 04 03 07	<p>Filling out and filing air traffic flight plan</p> <ul style="list-style-type: none"> – Included in 033 02 00 00 	
033 06 00 00	<u>PRACTICAL COMPLETION OF A FLIGHT PLAN (navigation plan/ flight log)</u>	
033 06 01 00	<u>Extraction of data</u>	
033 06 01 01	Extraction of navigational data	
	<ul style="list-style-type: none"> – Obtain the following navigation data from the planning charts, SID charts, STAR charts, instrument approach and landing charts <ul style="list-style-type: none"> – Courses – Distances – Waypoints <ul style="list-style-type: none"> – Bearings and ranges from beacons – Co-ordinates – Variation 	

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033 06 01 02	<ul style="list-style-type: none"> - Obstacle heights and elevations - Classification of airspace <p>Extraction of meteorological data</p> <ul style="list-style-type: none"> - Obtain and decode the following meteorological data <ul style="list-style-type: none"> - Wind at different and appropriate levels and position of the jetstream - The presence of thunderstorms - Cloud base and thickness of cloud layers - Precipitation - Temperatures at different levels - Icing conditions - Areas of CAT and other turbulence 	<p>London LHR Zurich Munich</p> <p>Use</p> <ul style="list-style-type: none"> - weather analysis, - weather depiction chart - wind charts for different levels
033 06 01 03	<p>Extraction of performance data</p> <ul style="list-style-type: none"> - From the performance data for the aircraft, determine <ul style="list-style-type: none"> - Top of climb - Top of descent - Fuel flow - True air speed - Time/ fuel/ distance for climb and descent - Final reserve fuel - Alternate fuel 	

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033 06 01 04	<ul style="list-style-type: none"> – Find the short distance cruise altitude, given appropriate data <p>Completion of navigation flight plan</p> <ul style="list-style-type: none"> – Calculate the following parameters to complete the flight plan (navigation plan) <ul style="list-style-type: none"> – The block fuel – Total ground distance – TAS given appropriate data – Identify the time system in which time entries have to be made in operational flightplan forms – Define the time of departure – Define the arrival time 	
033 06 01 05	<p>Completion of fuel plan</p> <ul style="list-style-type: none"> – Obtain the following data <ul style="list-style-type: none"> – Time, distance and fuel to top of climb – Time, distance and fuel at cruise altitude – Time, distance and fuel to top of descent – Time, distance and fuel for descent – Total time, distance and fuel to destination – Fuel required from destination to alternate for missed approach, climb to en-route altitude, cruise descent, approach and landing – Final reserve fuel – Compute the TAS for en-route at a certain flight level with the aid of a graph or table – Calculate traffic load, estimated landing mass at alternate and maximum additional load 	<p>Use the fuel consumption tables and graphs of the B 737-400, A330 or appropriate aircraft type</p>

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033 06 01 07	Completion of air traffic flight plan – Complete an air traffic flight plan for a given aircraft and flight, using the instructions contained in the latest AIC, together with the nominated airways charts.	