



Recommended format for the instrument rating ground evaluation

(Initial skills test and revalidation check)

1. General

- 1.1. A ground evaluation is conducted in order to ascertain whether the candidate possesses sufficient theoretical knowledge and whether he/she can apply this knowledge when planning to conduct a flight in accordance with instrument flight rules (IFR) and in instrument meteorological conditions (IMC).
- 1.2. DFEs are encouraged to follow the ground evaluation format presented in this document in order to achieve and maintain a uniform standard.
- 1.3. The applicant should prepare himself or herself according to the ground evaluation format presented in this document while using the recommended and any other applicable reference material.
- 1.4. The ground evaluation for a revalidation check does not differ from the ground evaluation for a skills test except that navigation planning is not required for the revalidation check.
- 1.5. For an initial instrument rating skills test a candidate is also required to prepare for an IFR navigation flight. The scenario for this flight (time of departure, number of passengers, route, destination, weather report, etc) is supplied by the DFE prior to the ground evaluation.
- 1.6. The DFE may allow the candidate to consult any of the reference material during the ground evaluation.
- 1.7. Questions must be applicable to the type of operation which the candidate plans to conduct (e.g. RVSM is not applicable to an initial COM/IR on a Piper Seneca).
- 1.8. In order to fully and thoroughly evaluate the candidate, the SACAA recommends that the duration of a ground evaluation should not be less than:
 - 1 hour for an initial skills test; and
 - 40 minutes for a revalidation check.

2. Relevant documentation and reference material

- 2.1. The following documentation and material must be available during the examination:
 - Up-to-date and relevant en-route and area charts (Jeppesen or Aerad)
 - Up-to-date and relevant SID and STAR charts (Jeppesen, Aerad or AIP)
 - Up-to-date and relevant approach charts (Jeppesen, Aerad or AIP)
 - AIP volumes GEN & ENR
 - AIP volume AD
 - PARTS 61, 67, 91, 121 and 135 of the SACAR and SA-CATS

- AIP SUPP and AIC
- NOTAMS relevant to the route intended to be flown
- TAFs and METARS for the day of the flight (Synoptic chart and SIGWC as required by DFE)
- All documentation relevant to the navigation flight (initial skills test only or as required by DFE)
- Licence and up-to-date logbook
- Training portfolio (initial skills test only)
- Pilot Operating Handbook (POH).

3. Specific areas of knowledge

3.1. The DFE must assess the knowledge and the practical application of the aspects listed in section 1 of form CA61-15.4:

Section 1: Ground evaluation

Aspects
CAR/CATS, AIP, SUPPLEMENTS, AICs, NOTAMS and completion of ATS flight plan
Interpretation of weather reports, forecasts and charts
Flight planning, aircraft performance and charts (SID,STAR, APP and en-route)
All weather operations
Technical knowledge of aircraft (POH, AFM as applicable)
En-route navigation preparation and preparation of IFR navigation log

3.2. The areas within an aspect from which practical questions may derive are listed and discussed below.

4. SACAR and SACATS

4.1. The candidate must demonstrate general knowledge of the South African Civil Aviation Regulations and also the ability to navigate through the publications.

4.2. The DFE may evaluate the candidate in any of the areas listed below:

4.2.1. SACAR Part 61

Instrument rating

Revalidation check ----- 61.01.5 (2)(b)

Logging of instrument flight time ----- 61.01.08 (11)

Skills test for an instrument rating ----- 61.15.4

Privileges and limitations of an instrument rating ----- 61.15.5

Period of validity of an instrument rating ----- 61.15.6

Revalidation of an instrument rating----- 61.15.7

In case of CPL maintenance of competency

Skills test for a commercial pilot licence----- 61.05.4 / 61.06.4

Privileges and limitations of a commercial pilot licence----- 61.05.5 / 61.06.5

Period of validity of a commercial pilot licence----- 61.05.6 / 61.06.6

Maintenance of competency for a commercial pilot licence ----- 61.05.7 / 61.06.7

In case of ATPL maintenance of competency

Skills test for a airline transport pilot licence -----	61.07.4 / 61.08.4
Privileges and limitations of a airline transport pilot licence -----	61.07.5 / 61.08.5
Period of validity of a airline transport pilot licence -----	61.07.6 / 61.08.6
Maintenance of competency for a airline transport pilot licence -----	61.07.7 / 61.08.7

4.2.2. SACAR Part 91

Recency.....	91.02.4
Duties of pilot-in-command regarding flight preparation-----	91.02.7
Duties of pilot-in-command regarding flight operations -----	91.02.8
Equipment for aircraft operated under IFR -----	91.04.5
Additional equipment for single-pilot operation under IMC or at night----	91.04.6
Supplemental oxygen in the case of pressurised aircraft -----	91.04.18
Supplemental oxygen in the case of non-pressurised aircraft -----	91.04.19
Mandatory radio communication in controlled airspace -----	91.06.16
Compliance with air traffic control clearance and instructions -----	91.06.18
Compliance with IFR -----	91.06.24
Aircraft equipment -----	91.06.25
Change from IFR flight to VFR flight -----	91.06.26
IFR procedures-----	91.06.27
Minimum heights-----	91.06.32
Semi-circular rule -----	91.06.33
Standard instrument approach to and departure from aerodrome -----	91.06.34
Aerodrome operating minima -----	91.07.5
Pre-flight selection of aerodromes-----	91.07.7
Planning minima for IFR flights -----	91.07.8
Meteorological conditions-----	91.07.9
Mass and balance -----	91.07.11
Fuel and oil supply-----	91.07.12
Instrument approach and departure procedures -----	91.07.15
Commencement and continuation of approach (approach ban)-----	91.07.25
Reduced Vertical Separation Minima (RVSM) Operations-----	91.07.31
Low-visibility operations -----	91.08
Performance operating limitations -----	91.09
Global navigation satellite system -----	91.11

4.2.3. SA-CATS-OPS 91

Supplemental oxygen in the case of pressurised aircraft -----	91.04.18
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Supplemental oxygen in the case of non-pressurised aircraft -----	91.04.19
Semi-circular rule -----	91.06.33
Minimum flight altitude-----	91.07.2
Aerodrome operating minima -----	91.07.5
Planning minima for IFR flight -----	91.07.8
Mass and balance -----	91.07.11
Fuel and oil supply-----	91.07.12
Reduced vertical separation minima (RVSM)-----	91.07.31
GNSS as a primary means navigation system-----	91.07.33

4.2.4. SACAR 135

Pilot-in-command holding a commercial pilot rating -----	135.03.6
Recurrent training and checking -----	135.03.7
Equipment for aeroplanes operated under IFR-----	135.05.3
Aeroplane performance operating limitation-----	135.08

4.2.5. SACAR 121

Recurrent training and checking -----	121.03.6
Equipment for aeroplanes operated under IFR-----	121.05.3
Aeroplane performance operating limitation-----	121.08

5. **Aeronautical Information Publication (AIP) and Supplements**

- 5.1. The AIP contains useful information for the preparation of all weather operations. The publication used for the evaluation must be up-to-date.
- 5.2. The DFE must ascertain whether the candidate has consulted the relevant AIP supplements.
- 5.3. The candidate must demonstrate a thorough knowledge of the AIP sections listed below:

Aeronautical information services-----	GEN 3.1
General rules -----	ENR 1.1
Visual flight rules-----	ENR 1.2
Instrument flight rules-----	ENR 1.3
Approach and departure procedures-----	ENR 1.5
Radar services procedures -----	ENR 1.6
Altimeter setting procedures -----	ENR 1.7
All weather operations & low visibility procedures -----	ENR 1.8
Flight planning -----	ENR 1.10

6. **ATS flight plan**

- 6.1. For an initial skills test the candidate must complete an ATS flight plan using the scenario given by the DFE.

- 6.2. For a revalidation check, the DFE may evaluate the candidate in any aspect of an ATS flight plan with emphasis on:
- Field 10 (equipment)
 - Field 15 (cruising speed, level and route)
 - Field 18 (search & rescue)
- 6.3. The DFE may allow the candidate to use **AIC 40.2** (Search and Rescue procedures), **AIC 42.1** (Filing of flight plans and wake turbulence separation data) and any other reliable reference publication if needed.

7. Interpretation of weather reports, forecasts and charts

- 7.1. The DFE shall require all candidates to read and interpret a complex aviation routine weather report (METAR) and a terminal aerodrome forecast (TAF).
- 7.2. The candidate may also be required to interpret a significant weather chart as well as the upper wind/temperature charts.
- 7.3. Emphasis should be placed on typical South African climatology.
- 7.4. The DFE may allow the candidate to use **AIC 43.1** (meteorological aviation codes) or any other reliable publication as reference.

8. SID, STAR, APP and en-route charts

- 8.1. The candidate may use any of the following publications:
- South African AIP
 - Jeppesen
 - Aerad
 - Any other approved publication
- 8.2. The candidate must demonstrate the ability to:
- Read and understand SID, STAR, APP and en-route charts; and
 - Interpret the symbols depicted on any of the above charts.

9. Aircraft performance

- 9.1. The evaluation of this aspect is based on the performance class of the aircraft usually flown by the candidate.
- 9.2. The candidate must be familiar with the performance of his/her aircraft and show the ability to navigate through the Pilot Operating Handbook.
- 9.3. DFEs and candidates are encouraged to familiarise themselves with the performance sections of the certification regulations FAR 23 / FAR 25 as well as the relevant information in ICAO document 8168.

9.4. The DFE may ask questions on any of the following topics:

- Take-off distance
- Take-off run
- Accelerate stop distance
- Climb performance all engines operative (rate of climb and climb gradients)
- Climb performance one engine inoperative (rate of climb and climb gradient)
- Service ceiling with one engine inoperative
- Power setting and fuel consumption
- Cruise performance (endurance and range)
- Performance affected by temperature/density/rain/icing
- Landing distance including wet or contaminated runway
- Go-around and missed approach.

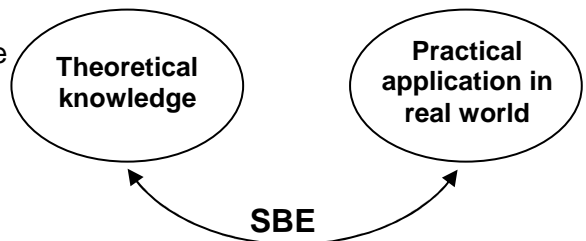
10. Scenario based evaluation (SBE)

10.1. General concept

10.1.1. Scenario-based evaluation is an effective means to bridge pure theory with real world situations and is a tool which enables the DFE to evaluate not only the pure theory (knowledge) but also, and more importantly, the application of the theory in real world situations.

Furthermore, SBE is most effective when evaluating the Higher Order Thinking Skills (HOTS). These skills are aeronautical decision making, risk management, automation management, situational awareness, and Controlled Flight into Terrain (CFIT) awareness.

SBEs must be designed to match the field of aviation in which the candidate operates (i.e. charter, airline, private, executive) or the training of the candidate in case of an initial skills test.



10.1.2. There are two types of scenarios for the purpose of this document:

a. Full flight scenario

A scenario given to the candidate either in advance (for an initial skills test) or during the evaluation (for a revalidation check).

b. Micro-scenario

A short scenario taken from any phase of a flight, given to the candidate during the evaluation (initial and revalidation).

Usually this type of scenario serves to assess the management of in-flight threats and errors, aeronautical decision making, etc. It also provides the opportunity for questions not applicable to the full flight scenario.

10.1.3. Design of a scenario based evaluation

Each phase/element of the scenario has to accommodate questions which derive from the areas listed in paragraphs 4 to 9 above.

A scenario should include the entire flight profile as well as non-normal procedures (icing, engine failures, radio failure, etc).

A flight profile could consist of:

- Take-off
- Take-off alternate
- SID
- Climb
- En-route
- Descent
- STAR
- Approach
- Missed approach
- Destination alternate
- Landing.

A question requires either a straight answer, an explanation or a discussion between DFE and candidate. When aeronautical decision making (ADM) is part of a question, discussion might be necessary and the DFE is encouraged to provide adequate input.

When the correct answer to a question means that a flight cannot take place, the DFE will remove/change the limitation which causes the situation and allow the ground evaluation to continue.

Take-off:

What is the minimum Visibility required for take-off from FAWB (AIP 1.8.3, SACATS 91.07.5)
What would the visibility and ceiling requirements be to land back at FAWB (AIP-AD)
Explain your action if you were compelled to return to FAWB shortly after take-off while experiencing complete radio failure (ADM discussion)

En-Route:

What is the lowest en-route flight level/altitude permitted and motivate your selection (CAR 91.06.32 and ADM)
What does "E>" along an airway mean on an en-route chart?
Name the airspaces, their class and vertical boundaries entered during this flight (chart and AIP ENR 2).
Explain your action in case of a complete radio failure 40 nm from FAMM

Approach:

What is the system minima for a VOR app (SACATS 91.07.5 and AIP ENR 1.8.3)?
Can you request or elect a procedure turn approach on a direct track from HBV to MMV track (AIP-AD)?
Will a landing on runway 04 at your ETA be advisable? If not, what will your action be? (AIP ENR 1.8.1 and ENR 1.8.3)
Is it more likely that a visual approach will be possible? Motivate your answer (AIP ENR 1.8.3)
What is your rate of descent on the final approach leg in order to maintain the published constant descent gradient of 4.67% (2.7°) at 100 kts (IAS)
While maintaining the published MDA for VOR app 04 you have sufficient visual references approximately 1 dme from MMV. Will a safe landing be ensured should you decide to continue (AIP-AD and ADM)?

Pre-flight consideration:

Is your aircraft suitable for a Part 135 operation in IMC (135.05.3)?
Name the destination alternate(s) and motivate your choice(s) (91.07.7 and ADM).
What would you insert in field 10 (equipment) of your ATS FP form if your aircraft is equipped with a VHF radio, VOR, ADF, DME, ILS and a GPS?
Explain how to calculate the minimum amount of fuel required for this flight.
Can you legally undertake this flight with the fuel on board (SACATS 91.07.12)
Can you legally undertake this flight with the fuel on board (SACATS 91.07.12)
Explain recency requirements relevant to this flight (CAR 91.02.4)
What should the planning & en-route minima be at your destination alternates (SACATS 91.07.8)?
The flight folio of your aircraft indicates that the ALT mode of your autopilot deactivates occasionally. Can you legally undertake the flight (CAR 135.05.3)?

EXAMPLE SCENARIO I for an IR revalidation check (CPL)

Operation: Part 135 (single pilot)
Aircraft: Single engine Piston (cruising speed 135 kts)
Fuel: Quantity & consumption: 125 l at 50 l/hr
Route: FAWB-FAMM (distance 145nm and track 283M)
ETD: Required to land at FAMM at latest 0400Z on 15/02/11
Passengers: 2 (one passenger has heart problems)
Weather TAF:
TAF FAWB 150200Z 1503/1509 24010KT 2000 OVC004 FEW030CB BKN070
TAF FALA 150200Z 1503/1509 20015KT 7000 BKN008 FEW030CB TEMPO 1505/1507 18015G25KT 2000 TSRA BKN005
TAF FAMM 150200Z 1503/1509 19010KT 7000 OVC006 BKN030CB TEMPO 1504/1506 22015G25KT 1400 TSRA BKN006 BECMG 1506/1509 7000 BKN015
Metar:
METAR FAMM 150200Z 20015KT 7000 OVC005 FEW///CB 11/08 Q1014 NOSIG=
ENR weather: OVC F0140/1000 with embedded thunderstorms WIND 300/25 and temp +4 at FL 100
Notams:
FAPN: AD CLSD due to WIP
FALA: ILS and DME U/S
FAMM: SALS rwy 04/22 U/S

Micro-scenarios:

During the missed approach at FAMM, one of your passengers is showing symptoms of a heart attack. What will your actions be (ADM)?
En-route from FAPB to FATZ what minimum altitude should you initially be overhead "TZ"? Is it advisable to conduct a procedure turn approach with a non-pressurized aircraft (AIP-AD and ADM)?
While established on an ILS approach, ATC advises you that the RVR has reduced to 400 m. May you continue with the approach if you have passed the OM (91.05.25)?

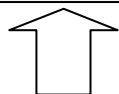
Take-off, climb and SID:

What is the accelerate / stop distance of your aircraft if the OAT at FAJS is 25°C with a dry rwy (POH)?

What is the aeroplane's expected single engine climb gradient in a clean configuration shortly after take-off from FAJS (POH)?

Is the climb gradient of 4.4% on the SID RAGUL 1A plate a one engine inoperative requirement? Motivate your answer

While on the SID RAGUL 1A you experience a radio failure and one of your engines shows an abnormal ITT rise. What will your actions be (ADM)



Pre-flight considerations:

Is a take-off alternate required and available and discuss (91.07.7 and ADM)?

Explain and motivate your planned routing (ADM)

What would you insert in fields 15 (route) and 18 (other info) of your ATS FP form?

Explain how to calculate the minimum amount of fuel required for this flight (SACATS 91.07.12)

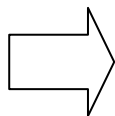
Explain recency relevant to this flight (CAR 91.02.4)

What are the considerations regarding your passengers (ADM)

What typical weather pattern are you expecting en-route and at destination (SA climatology)?

Give the destination alternate and discuss expected scenarios (CAR 91.07.7 and 91.07.8)

Any a/c limitation for landing at FAEL (POH)?



En-Route:

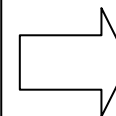
Would the drift-down level allow you to route direct to FAEL (POH, CAR 91.06.32 and 91.07.8(3))?

What type of route is the W94F and what is the service provided?

Explain "10900T" indicated below the designator of the route W94F

Explain the term "MEA" and give the MEAs for your flight

Explain the term "MAA" above route indicator A402 from FAEL to FAPE



EXAMPLE SCENARIO II for an IR revalidation check (CPL)

Operation: Part 135

Aircraft: Multi-engine turbo-prop. B1900 D

Fuel: Quantity & consumption: 3500 lbs at 1300lbs/hr

SID RAGUL 1A (rwy 03L)

Route: FAJS-FAEL

ETD: 0430Z on the 15th of July

Passengers: 5 (2 passengers on wheelchairs)

Weather TAF:

TAF FAJS 150300Z 1504/1516 06010KT 0500 OVC003 BKN050 FM0600 9999 SCT070

TAF FALA 150300Z 1504/1516 07015KT 1500 OVC007 FM0600 9999 SCT070

TAF FABL 150300Z 1504/1516 29025KT 9999 BKN010 BCMG 1014 8000 OVC007

TAF FAPE 150300Z 1504/1516 1500 28030KT 0VC005 -RA

TAF FAEL 150300Z 1504/1516 0500 22035KT BKN006 BCMG 0711 OVC003 RA

Weather METAR:

FAJS 150400Z 06008KT R03L/0500 OVC003 10/09 Q1028 NOSIG

ENR weather: OVC F240/3000 with embedded thunderstorms WIND 200/40 and temp minus 15° at FL 210

Notams:

FAEL: RWY 24 CLSD DUE TO WIP
ELV DME U/S

FAPE: ILS /DME PDI U/S

FALA: ILS and DME U/S

Approach:

While under Radar control and 20 nm inbound to ELV from MZV, ATC clears you to 3000 feet. Explain your actions (AIP-AD and ENR 1.6.1)

An EAT has been given to you. At 20 nm inbound, you experience a radio failure while maintaining flight level 100 (last cleared) explain your actions. (AIP 1.5.2)

While established on ILS Rwy 29 at 5 dme the RVR is reported as 400 m. explain your actions (AIP-AD)

Why will you check the crossing altitude at 3.5 dme? (AIP-AD)

Your co-pilot has become incapacitated due to food poisoning about 30 nm inbound to ELV. Explain your action and consideration regarding minima (SACATS 91.07.5 and ADM).

Micro-scenarios:

During your preparation for a flight to FACT you are given an RVR of 600 m and a ceiling of 150 feet. Can you legally go, provided you have selected the appropriate alternate aerodromes (AIP-AD and CAR 91.07.8)?

En-route to George, you are given a visibility of 400 m for ILS Z Rwy 29 (AD Rwy has full facility). May you attempt the approach (AIP-AD and AIP ENR 1.8.3)?

While on Wolseley 4D STAR and under radar vectors, CT approach gives you an early right turn to heading 010° at 18 nm CTV due to TS activity NE of the AD. You are also cleared to 6000 feet. Explain your actions should you then experience a total radio failure (ADM and AIP-AD).