

Infraestructuras del Transport Aeri (ITA) -- Midterm Exam QP2018 Spring semester 2018

Short Questions (6 exam points)

Q1 [0.25 points] Figure 1 shows the radar tracks during a given period of time in Frankfurt airport. Which two trajectory synchronisation strategies (sequencing and merging strategies) can be seen in the image? Just name them.

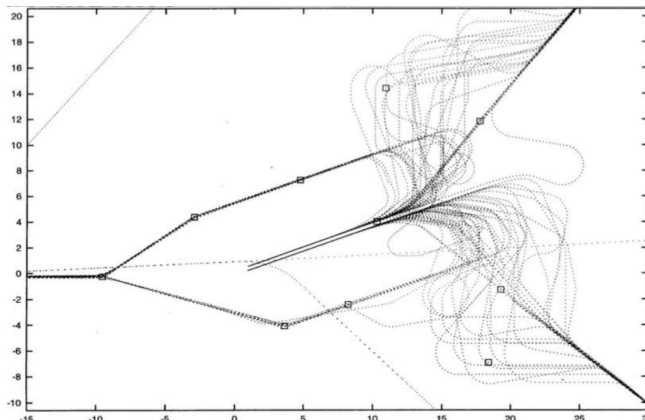


Figure 1: Arrival radar tracks in Frankfurt Airport

Q2 [1.25 points] In San Francisco Airport, two parallel approach runways can be used simultaneously for landings under visual meteorological conditions (VMC). Under instrument meteorological conditions (IMC), however, only one of these runways can be used for landings. Briefly discuss how these operations are related with the trade-offs existing between safety, capacity and efficiency in ATM.

Q3 [1.25 points] Imagine a FIR that has 3 different sector configurations, as shown in Figure 2. For a given day, the traffic and capacity forecast for all elementary and collapsed sectors is given in Figures 2 and 3, respectively.

- a) What would be the optimal sector opening scheme for the period of time depicted in the figures, considering the following operational constraints?
- A sector configuration change can be done every 30 minutes
 - CONF-1C can only transition to CONF-2N.
 - CONF-3B can only transition to CONF-2N.
 - If a given sector configuration is active and a transition is made, you cannot go back to the original configuration unless 1h or more time has been elapsed from this transition.
- b) Would any ATFM measure be needed? Why? In what period of time?

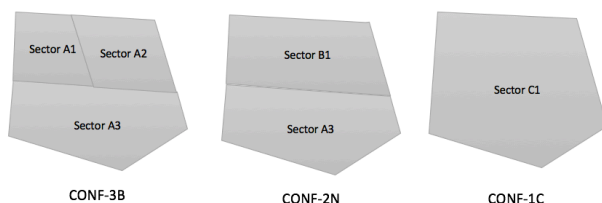


Figure 2: Available sector configurations for the FIR

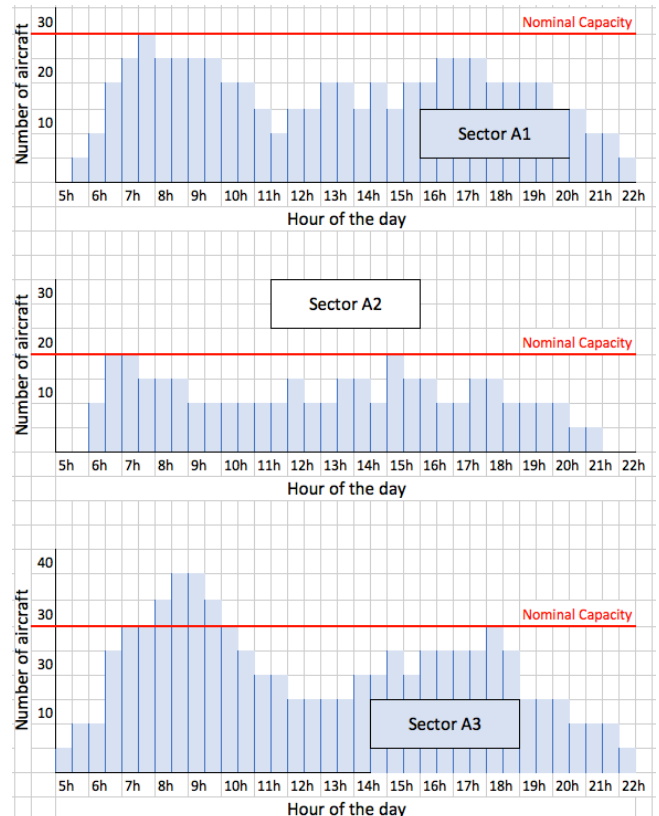


Figure 2: Demand and capacity forecast for the elementary sectors.

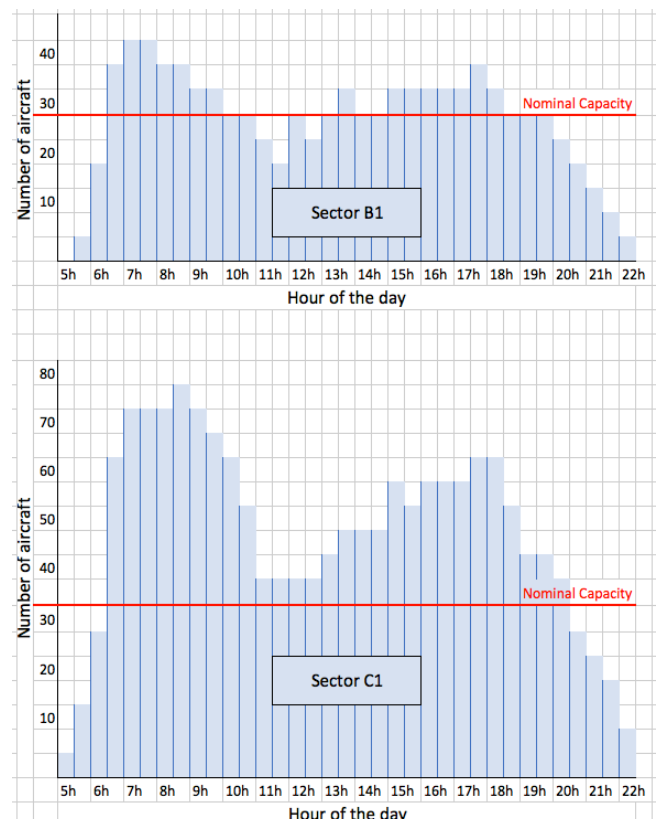


Figure 3: Demand and capacity forecast for the collapsed sectors.

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Q4 [1.25 points] Briefly explain the difference between the OCA (obstacle clearance altitude), MDA (Minimum descent altitude) and DA (decision altitude). Who is responsible to compute them? Where these values shall be published?

Q5 [0.5 points] Name 3 advantages of instrument flight procedures and 1 eventual drawback.

Q6 [0.5 points] Briefly explain why GPS stand-alone cannot be used for civil aviation?

Q7 [0.25 points] When executing an instrumental approach procedure, the pilot must verify two basic criteria in order to decide whether the landing can be performed safely or not: the so-called **landing minima**. Name these two criteria (not need to explain them).

Q8 [0.75 points] A VFR aeroplane is flying towards Montpellier airport. The ATC has instructed the pilot to report over N, NE, NC and then to integrate the downwind leg for runway 31R. (See charts in Figures 4 and 5).

- a) How the pilot will know (s)he is over these reporting points? What radio navigation means are necessary to guide the pilot?
- b) How the pilot will know (s)he is on the downwind leg of the traffic pattern? What radio navigation means are necessary to guide the pilot?
- c) Is the traffic pattern for runway 31R a standard traffic pattern? Why?

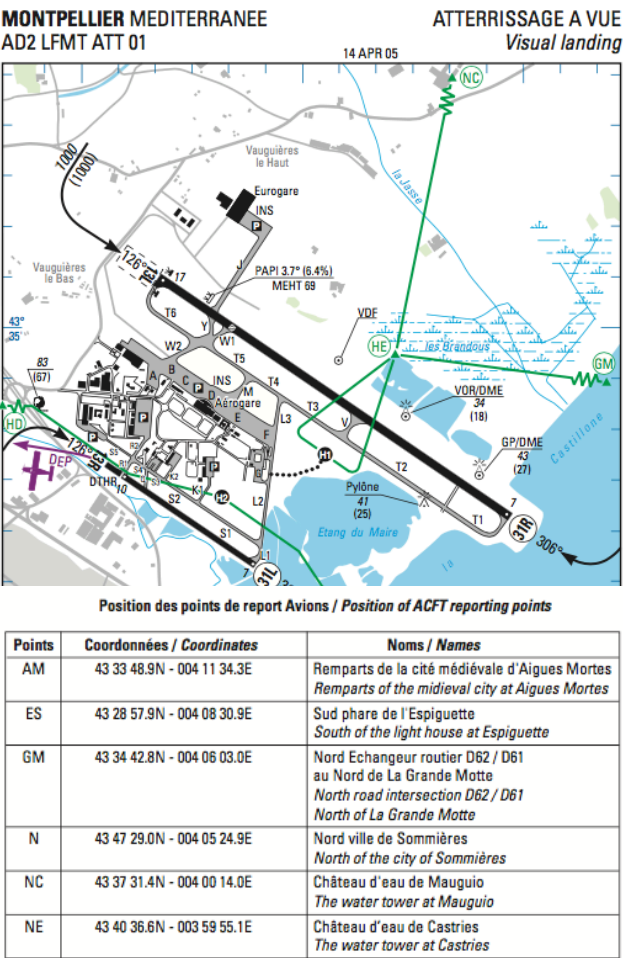
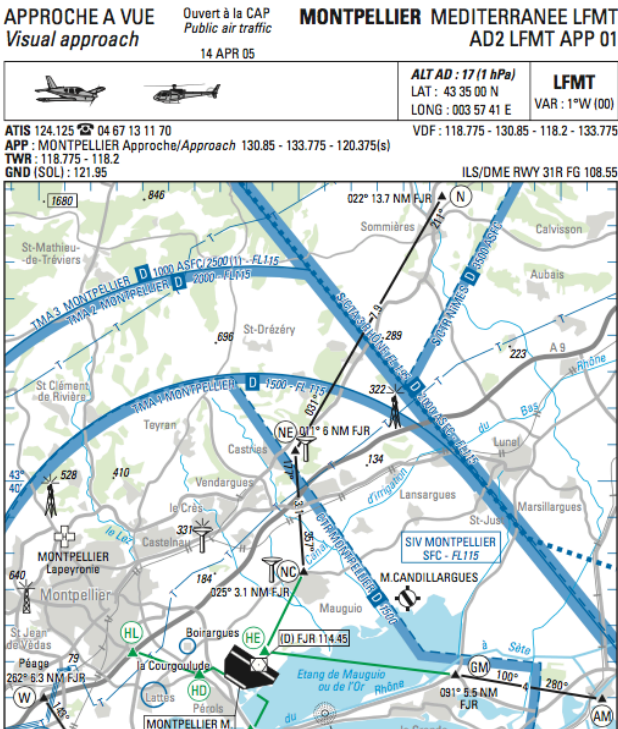


Figure 5: Excerpt of Montpellier visual landing chart



INFRASTRUCTURES DEL TRANSPORT AERI (ITA)

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Test [4 exam points]

You have Permutation CODE 0 – GROUP 00

For each question **only one** answer is correct: Correct: +1 test point - Incorrect: -1/3 test points - No answer: 0 points

1. According to the ICAO standards, how ATS routes contribute to provide strategic vertical separation between aircraft?
 - (a) IFR cruising altitudes are, in general, vertically separated by 1,000 ft from each other. Consecutive flight levels are used to fly in the opposite direction.
 - (b) VFR cruising altitudes are, in general, vertically separated by 1,000 ft from each other. Consecutive flight levels are used to fly in the opposite direction.
 - (c) IFR and VFR cruising altitudes are, in general, vertically separated by 500 ft from each other.
 - (d) all other answers are correct.
2. An IFR aircraft is cruising with heading 130°. According to the ICAO flight level allocation scheme (*odd-even* rule), a possible flight level for this flight could be:
 - (a) FL130
 - (b) FL135
 - (c) FL140
 - (d) IFR flights do not fly using flight levels, but using Altitudes.
3. Regarding transition level/altitude, which is the correct statement?
 - (a) When climbing, pilots must change the altimeter setting from STD to QNH.
 - (b) STD = QNH if and only if pressure at sea level equals to 1013.25 hPa at the specific region/airport.
 - (c) When descending, pilots must change the altimeter setting from STD to QNH at the specific transition altitude.
 - (d) None of the other answers are correct.
4. Which of the following controlled airspace zones is sized to accommodate, approximately, the intermediate and final segments of an instrumental approach procedure?
 - (a) The ATZ.
 - (b) The CTR.
 - (c) The TMA.
 - (d) The CTA.
5. Which of the following controlled airspace zones is sized to accommodate all the aircraft flying in an aerodrome traffic pattern (downwind, base, final)?
 - (a) The ATZ.
 - (b) The CTR.
 - (c) The TMA.
 - (d) The CTA.
6. European airports are...
 - (a) typically regulated by *schedule* (or IATA) slots that suppose a rather worst case IMC scenario.
 - (b) are not regulated at all.
 - (c) are only regulated if the demand exceeds the capacity.
 - (d) are only regulated in certain ECAC countries.
7. Pre-tactical ATFM should:
 - (a) Balance flights next day with available ATC Capacity.
 - (b) Match long-term demand and needed ATC capacity.
 - (c) Manage current flights with existing ATC capacity.
 - (d) Define the national airspace policy and predetermined airspace structures.
8. Tactical ATFM should:
 - (a) Balance flights next day with available ATC Capacity.
 - (b) Match long-term demand and needed ATC capacity.
 - (c) Manage current flights with existing ATC capacity.
 - (d) Define the national airspace policy and predetermined airspace structures.
9. Nowadays, what is the principal communications method in continental Europe to link pilots with air traffic controllers?
 - (a) VHF voice communications.
 - (b) HF voice communications.
 - (c) Data-link communications.
 - (d) Satellite based communications.
10. Which of the following surveillance systems can detect an aircraft that is not willing to "cooperate"?
 - (a) The primary surveillance radar.
 - (b) The secondary surveillance radar.
 - (c) The ADS.
 - (d) The TCAS
11. What does *broadcast* mean, in the context of ADS-B?
 - (a) that all ADS-B messages are automatically stored in a database.
 - (b) that the ADS-B messages are automatically computed without the active action of the pilot.
 - (c) that the ADS-B messages are continuously transmitted.
 - (d) that the ADS-B messages are continuously requested by ground ATC facilities.
12. ICAO regulations classify the aircraft according to their speed at the threshold as:
 - (a) Heavy, Medium and Light.
 - (b) A, B, C, D, E and H.
 - (c) CAT-I, CAT-II, CAT-IIIa, CAT-IIIb and CAT IIIc.
 - (d) APV-I and APV-II.
13. A circling to approach...
 - (a) is the same than a non precision approach.
 - (b) is the same than an APV approach.
 - (c) is an approach that cannot be considered as a straight-in approach.
 - (d) is only for approaches where the final approach segment has a miss-alignment of 15 degrees or more.

14. An approach procedure using a Locator as principal guidance system in the final approach segment is...
 - (a) a precision approach.
 - (b) a non-precision approach.
 - (c) an APV approach.
 - (d) a Locator cannot be used as principal guidance system in the final approach segment.
15. An approach procedure only using a Localiser as principal guidance system in the final approach segment is...
 - (a) a precision approach.
 - (b) a non-precision approach.
 - (c) an APV approach.
 - (d) a Localiser cannot be used as principal guidance system in the final approach segment.
16. The MAPt can be defined...
 - (a) above a VOR.
 - (b) at the intersection of an NDB course and a DME arc.
 - (c) at a given time after overflying the FAF.
 - (d) all answers are correct.
17. The minimum decision height for an ILS CAT-III approach is:
 - (a) 300ft.
 - (b) 200ft.
 - (c) 100ft.
 - (d) 0ft.
18. In navigation, the track angle is defined as:
 - (a) the azimuthal angle between the wind and the aircraft heading.
 - (b) the azimuthal angle of the ground speed vector.
 - (c) the azimuthal angle of the true airspeed vector.
 - (d) None of the other answers is correct.
19. In case of no wind...
 - (a) heading and track angles are the same.
 - (b) the true airspeed and de ground speed are not the same.
 - (c) The course and bearing angles are the same.
 - (d) All answers are correct.
20. Imagine an twin engine aircraft departing in IMC from a controlled airport. Few seconds after take-off, it hits birds, which cause a fire in one of the engines and loosing all of its power. In this situation, the **aviate** function of the aircraft crew would be:
 - (a) to safely control the aircraft trajectory with the loss of power and to manage to extinguish the fire and shut down the engine.
 - (b) to check if there is a contingency departure published for that airport and execute it.
 - (c) to send a distress message to the air traffic control.
 - (d) to revert to manual control and visual flight to safely land as soon as possible.
21. Imagine an twin engine aircraft departing in IMC from a controlled airport. Few seconds after take-off, it hits birds, which cause a fire in one of the engines and loosing all of its power. In this situation, the **navigate** function of the aircraft crew would be:
 - (a) to check if there is a contingency departure published for that airport and execute it.
 - (b) to safely control the aircraft trajectory with the loss of power and to manage to extinguish the fire and shut down the engine.
 - (c) to revert to manual control and visual flight to safely land as soon as possible.
 - (d) to send a distress message to the air traffic control.
22. If the visibility is **not good** enough for visual flight, then...
 - (a) we are in VMC and must fly according to IFR.
 - (b) we are in VMC and must fly according to VFR.
 - (c) we are in IMC and must fly according to VFR.
 - (d) we are in IMC and must fly according to IFR.
23. What is the en-route phase?
 - (a) The phase of the flight where the aircraft is at a constant cruise altitude.
 - (b) The phase of the flight that follows the departure procedure.
 - (c) The phase of the flight that precedes the descent.
 - (d) All answers are correct.
24. Who is the responsible to publish the standard operational procedures for an aircraft, such as the best moment to retract flaps/slats, deploy the landing gear, etc.
 - (a) the ANSP.
 - (b) the aircraft operator.
 - (c) the aircraft manufacturer.
 - (d) The national safety agency.
25. Which of the following institutions is NOT an aircraft operator?
 - (a) Airbus.
 - (b) Lufthansa.
 - (c) Ryanair.
 - (d) Grup Airmed.
26. Aeronautical Information Services (AIS) are composed by:
 - (a) CNS, ATM, Search and Rescue, AIS, and Meteorology services.
 - (b) Alert services, flight information services and air traffic control.
 - (c) ASM, ATFM and ATS.
 - (d) AIP, NOTAM and CIRC.
27. In ATM, several processes or functionalities have strategic, pre-tactical and tactical phases. Which of the following statements is correct?
 - (a) None of them are correct.
 - (b) *strategic* refers to a plan, procedure, or expedient for promoting a desired short-term end.
 - (c) *tactical* can be defined as a plan of action designed to achieve a long-term or overall aim.
 - (d) *strategic* can be defined as a plan of action designed to achieve a long-term or overall aim.
28. ICAO regulations classify the aircraft according to their wake turbulence as:
 - (a) Heavy, Medium and Light.
 - (b) A, B, C, D, E and H.
 - (c) CAT-I, CAT-II, CAT-IIIa, CAT-IIIb and CAT IIIc.
 - (d) APV-I and APV-II.
29. The TCAS I (Traffic Collision Avoidance System 1) provides:
 - (a) traffic advisories (TA).
 - (b) horizontal resolution (RA: Resolution Advisory)
 - (c) Vertical resolution (RA: Resolution Advisory)
 - (d) Ground proximity warning
30. Which of the following statements is true regarding TCAS?
 - (a) TCAS provides separation provision between aircraft.
 - (b) TCAS is a non-cooperative collision avoidance systems.
 - (c) TCAS is a cooperative collision avoidance system.
 - (d) None of other answers is correct.

INFRAESTRUCTURES DEL TRANSPORT AERI (ITA)

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Correct answers

Pregunta	CODE 0	CODE 1	CODE 2	CODE 3
P 01	d	b	d	a
P 02	a	c	b	b
P 03	b	a	a	b
P 04	b	d	c	b
P 05	a	d	a	c
P 06	a	c	c	c
P 07	a	a	c	a
P 08	c	b	a	a
P 09	a	b	c	c
P 10	a	a	d	d
P 11	c	c	b	c
P 12	b	a	c	c
P 13	c	d	a	d
P 14	b	b	b	a
P 15	b	c	c	a
P 16	d	a	a	a
P 17	d	e	a	c
P 18	b	c	b	d
P 19	a	d	c	c
P 20	a	a	b	b
P 21	a	c	a	a
P 22	d	a	a	d
P 23	b	d	b	b
P 24	c	d	d	b
P 25	a	a	c	b
P 26	d	c	c	d
P 27	d	d	c	d
P 28	a	c	c	c
P 29	a	c	b	a
P 30	c	b	b	a