Statens haverikommission
Swedish Accident Investigation Board

ISSN 1400-5719

Report RL 2011:01e

Aircraft incident to SE-DSO over Sjöbo, Skåne County, Sweden on 13 October 2009

Case L-16/09

The report is also available on our web site: www.havkom.se

In case of discrepancies between the English and the Swedish texts, the Swedish text is to be considered the authoritative version.

Statens haverikommission (SHK) Swedish Accident Investigation Board

Postadress	*Besöksadress*	*Telefon*	*Fax*	*E-post*	*Internet*
P.O. Box 12538 102 29 Stockholm	Teknologgatan 8 C Stockholm	08-508 862 00	08-508 862 90	info@havkom.se	www.havkom.se

Statens haverikommission
Swedish Accident Investigation Board

2011-01-10 L-16/09

Swedish Transport Agency/
Aviation Department

601 73 NORRKÖPING

Report RL 2011:01e

The Swedish Accident Investigation Board (Statens haverikommission, SHK) has investigated an aircraft incident that occurred on 13 October 2010 at Skåne County, involving an aircraft with registration SE-DSO.

The Board hereby submits under the Regulation (EU) No. 996/2010 on the investigation and prevention of accidents and incidents in civil aviation, a report on the investigation.

The Board will be grateful to receive, by 15 April 2011 at the latest, particulars of how the recommendations included in this report are being followed up.

Göran Rosvall Roland Karlsson

General

The Swedish Accident Investigation Board (Statens haverikommission – SHK) is a state authority with the task of investigating accidents and incidents with the aim of improving safety. SHK accident investigations are intended so far as possible to determine both the sequence of events and the cause of the events, along with the damage and effects in general. An investigation shall provide the basis for decisions which are aimed at preventing similar events from happening again, or to limit the effects of such an event. At the same time the investigation provides a basis for an assessment of the operations performed by the public emergency services in respect of the event and, if there is a need for them, improvements to the emergency services.

SHK accident investigations try to come to conclusions in respect of three questions: *What happened? Why did it happen? How can a similar event be avoided in future?*

SHK does not have any inspection remit, nor is it any part of its task to apportion blame or liability concerning damages. This means that issues concerning liability are neither investigated nor described in association with its investigations. Issues concerning blame, responsibility and damages are dealt with by the judicial system or, for example, by insurance companies.

The task of SHK does not either include as a side issue of the investigation that concerns emergency actions an investigation into how people transported to hospital have been treated there. Nor are included public actions in the form of social care or crisis management after the event.

The investigation of this aviation incident is taking place in accordance with Regulation (EU) No. 996/2010 concerning the investigation and prevention of accidents and incidents in civil aviation. The application and procedures in respect of the performance of such investigations are also in accordance with Annex 13 of the Chicago convention.

The investigation

The Swedish Accident Investigation Board (SHK) was notified on 13 October 2009 that an Avro 146 Series RJ 100 aircraft with registration SE-DSO had an incident at 18:04 hrs on that day over Sjöbo, Skåne County.

The incident has been investigated by SHK represented by Göran Rosvall, Chairperson, and Roland Karlsson, Chief investigator flight operations.
The Board was assisted by Lars Hedlund as ATC[1]-expert.

The investigation was followed by Susanne Westman, Swedish Transport Agency/Aviation Department.

[1] ATC – Air Traffic Control

Report RL 2011:01e

L-16/09
Report finalised 2011-01-10

Aircraft; registration and type	SE-DSO, Avro 146 Series RJ100
Class/Airworthiness	Normal and valid Airworthiness Review Certificate (ARC)[2]
Owner/Operator	Trident Jet (Jersey) Limited / Malmö Aviation
Time of occurrence	13 October 2009, 18:04 hours, in daylight Note: All times are given in Swedish daylight saving time (UTC + 2 hrs)
Location	About 4 km south-southwest of Sjöbo, Skåne County (pos. 55 35.9N 13 40.6E; approximate 610 m above sea level)
Type of flight	Scheduled flight
Weather	According to SMHI[3]´s analysis: Wind North 12-15 kts, visibility >10 km, 1-4/8 with the cloud base at 3 500 – 4 000 ft, temp./dp 7/-1 °C, QNH[4] 1024 hPa.
Persons on board:	
crew members	5
passengers	80
Injuries to persons	None
Damage to aircraft	No damage
Other damage	None
Commander:	
Age, license:	
Total flying time	47, ATPL (A)
Flying hours previous 90 days	7 318 hours, of which 5 000 hours on type
Number of landings previous 90 days	102, all on type 87
Co-pilot:	
Age, license	49 years, D-license
Total flying time	10 591 hours, of which 9 465 hours on type
Flying hours previous 90 days	160 hours
Number of landings previous 90 days	136
Cabin crew members	3

Summary

The flight was a scheduled passenger flight under instrument flight rules between Stockholm/Bromma and Malmö airports. The approach to Malmö airport was performed with visual references.

The incident occurred when the aircraft came too close to another aircraft for about one minute during visual approach in uncontrolled airspace.

The traffic collision avoidance system on the aircraft alerted about risk for collision, and the pilots adhered to its instructions.

[2] ARC – Airworthiness Review Certificate

[3] SMHI – Swedish Meteorological and Hydrological Institute

[4] QNH – barometric pressure measured at sea level, corrected for the elevation of an airport

The pilots were unaware that they were in uncontrolled airspace since information on the limits of controlled airspace was missing on the pilots´ navigation charts.

The incident was caused due to altitude limitations for visual approach under IFR traffic was not established for flight in the sector in question.

Recommendations

The Swedish Transportation Agency is recommended to:

- consider introduction of altitude limitations for visual approach under IFR to Malmö Airport, (RL 2011:01 R1).

1 FACTUAL INFORMATION

1.1 History of the flight

A four-engine jet aircraft of the type Avro RJ100 Series 146, with registration SE-DSO, was on a scheduled flight between the airports Stockholm /Bromma and Malmö. The aircraft, which was operated by Malmö Aviation, had call sign SCW117.

During a visual approach to Malmö Airport a warning onboard was obtained from the automatic aircraft anti-collision warning system, TCAS[5]. The warning indicated that there was risk of collision with another aircraft in the vicinity of SCW117.

The incident occurred at position 55 35.9 N 13 40.6 E, approximately 610 m above sea level in daylight.

1.1.1 The approach to Malmö airport

SHK has interviewed the pilots about the incident.

Runway 35 was in use at Malmö Airport and the aircraft was cleared initially to Alma VOR[6], which is a common procedure for traffic from Stockholm to landing on runway 35. The aircraft was in descent and was cleared to 3 000 feet. Near Ringsjöarna, about 38 km north-northeast of Malmö Airport, SCW117 received radar vectoring and information that a right hand visual approach to runway 35 could be expected. The Commander announced that the field was in sight and requested to perform a visual approach. The altitude was approximately 3 600 feet.

SCW117 was cleared for a visual approach to runway 35 via right downwind, which was confirmed by the aircraft which then was instructed to change frequency to the control tower at the airport. The aircraft continued the descent to 2 000 feet. The pilots were not aware that the altitude limit of controlled airspace was 2 500 feet in this area.

In the vicinity of Sjöbo, about 23 km east-northeast of Malmö Airport, the aircraft´s TCAS gave two warnings in quick succession. First a Traffic Advisory, TA[7], was received, and shortly thereafter a Preventive Resolution Advisory, RA[8]. SCW117 was flying in level flight at 2 000 ft QNH and TCAS RA recommended that the vertical speed should be maintained, and SCW117 continued the flight at the same altitude. The collision warning system at the air traffic control was not activated at the incident.

The unknown aircraft

Before the incident, the unknown aircraft was located to the east of the incident site. The aircraft´s transponder was on with the code 7000, used for VFR[9] flights outside controlled airspace. Based on recorded radar data at the air traffic control it is apparent that the aircraft a few minutes before the incident turned to the west and descended to 1 200 feet, which was maintained during the course of events.

---

[5] TCAS – Traffic Collision Avoidance System – airborne system for collision prevention

[6] VOR – Very high frequency Omni Range – radio navigation facility

[7] TA – Traffic Advisory – warning of other aircraft in vicinity

[8] RA – Preventive Resolution Advisory – warning and avoidance instruction

[9] VFR – Visual Flight Rules

1.2 Injuries to persons

	Crewmembers	*Passengers*	*Others*	*Total*
Fatal	–	–	–	–
Serious	–	–	–	–
Minor	–	–	–	–
None	5	80	–	85
Total	5	80	–	85

1.3 Damage to the aircraft

No damage.

1.4 Other damage

None.

1.5 Personnel information

1.5.1 Commander

The commander was 47 years old at the time and had a valid ATPL (A).

Flying hours			
previous	*24 hours*	*90 days*	*Total*
All types	2	102	7 318
This type	2	102	5 020

Number of landings this class/type previous 90 days: 87.
Flight training on type concluded in 1997.
Latest Proficiency Check (PC) was carried out on 25 March 2009 on AVRORJ.

1.5.2 Co-pilot

The co-pilot was 49 years old at the time and had a valid D-license.

Flying hours			
previous	*24 hours*	*90 days*	*Total*
All types	4.3	160	10 591
This type	4.3	160	9465

Number of landings this class/type previous 90 days: 136.
Flight training on type concluded on 15 March 1989.
Latest PC was carried out on 20 February 2009 on AVRORJ.

1.5.3 Cabin crew members

3 cabin crew members.

1.5.4 The crew members´ duty schedule

The duty and rest periods of the crew were within required limits.

1.6 Aircraft information

Fig. 1. SE-DSO. Photo by Love Öborn.

AIRCRAFT	
TC-holder	BAE Systems
Type	Avro 146 Series RJ 100
Serial number	E3221
Year of manufacture	1992
Gross mass	44 225 kg

The aircraft, Fig. 1, had valid Certificate of Airworthiness and no remarks relevant to the incident.

1.7 Meteorological information

According to SMHI´s analysis:
Wind North 12-15 kts, visibility >10 k m, 1-4/8 with the cloud base at 3 500 – 4 000 ft, temp. /dp 7/-1 °C, QNH 1024 hPa.

Daylight prevailed during the occurrence.

1.8 Aids to navigation

Visual references.

1.9 Communications

The radio communication between the aircraft and the air traffic control was recorded and safeguarded.

1.10 Aerodrome information

Malmö Airport had operational status as an instrument aerodrome with reference code 4E, according to AIP[10]-Sverige/Sweden.

1.11 Flight recorders

1.11.1 Flight Data Recorder (FDR[11], QAR[12], GPS[13])

Were fitted but not safeguarded by SHK.

1.11.2 Cockpit Voice Recorder (CVR[14])

Was fitted but not safeguarded by SHK.

1.11.3 Radar Data

Recorded information from the radar of the air traffic control was safeguarded (Appendix 1).

1.12 Site of occurrence

The incident occurred at approximately 610 m above sea level at position 55 35.9 N 13 40.6 E, approximately 4 km south-southwest of Sjöbo community in Skåne County, (Fig. 2). The red line in Fig. 2, marks the border between airspace with different altitude restrictions. In the area around Malmö Airport there are several small private airfields.

[10] AIP Sverige/Sweden – Aeronautical Information Publication – information material published by LFV

[11] FDR – Flight Data Recorder- crash resistant device for recording of flight and technical parameters

[12] QAR – Quick Access Recorder – non crash resistant device for recording of flight and technical parameters

[13] GPS – Global Positioning System - satellite based navigation system which may include data storage

[14] CVR – Cockpit Voice Recorder –device for recording of voice communication in cockpit

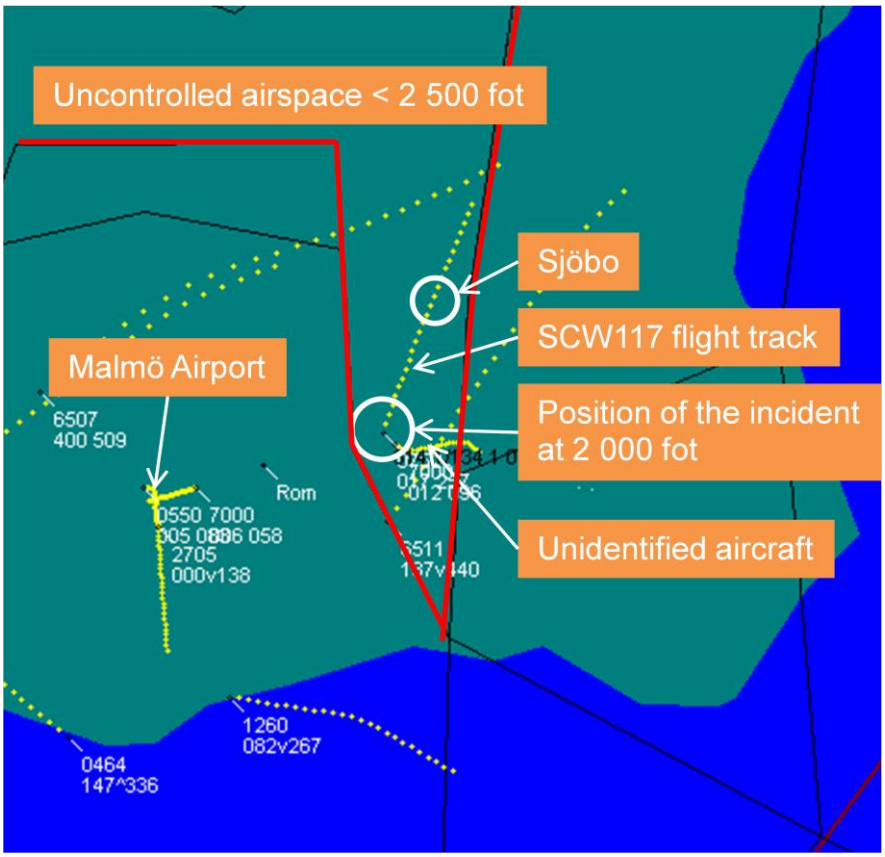


Fig. 2. Zoomed image of the LFV[15] ATC-radar image of the incident area. The text on amber background was added by SHK.

1.13 Medical information

Nothing indicates that the mental and physical condition of the crew members was impaired before or during the flight.

1.14 Fire

There was no fire.

1.15 Survival aspects

Not applicable.

1.16 Tests and research

1.16.1 Classification of the airspace

The airspace is divided into controlled and uncontrolled airspace. The Swedish airspace is generally controlled at altitudes between flight level 95 and flight level 460, i.e. between 9 500 and 46 000 feet above sea level. In the vicinity of controlled airports, areas with lower altitude limits of the controlled airspace are established, and in the immediate vicinity of the airport airspace is controlled at all altitudes. Surface and altitude limits between controlled and uncontrolled airspace are published on maps in the LFV AIP, Sweden.

[15] LFV – Swedish provider of air navigation services

1.16.2 Flight Rules

In controlled airspace air traffic control is established and clearance from an air traffic control unit is required for flight in the controlled airspace. A clearance is basically an agreement between commanders and air traffic control to follow a specific procedure as regards to the choice of route, altitude and speed. An aircraft commander has the right to request a new clearance, which shall be met if possible. When a clearance is confirmed by the commander, deviation from the clearance is not allowed, except in emergency.

Air traffic is separated in controlled airspace by the air traffic control to prevent collisions with other known aircraft. In uncontrolled airspace, the pilots themselves are responsible for avoiding collision according to the principle - see and be seen.

A controlled flight arriving at a controlled airport may be given clearance so that the flight temporarily enters uncontrolled airspace in order to later pass into the TMA[16], which is controlled airspace. Traffic information shall be provided in such a case, see LFV DHB ANS[17] Part 3 Section 2, Chapter 2, para. 12, Appendix 2. The ATC shall, if time permits, give traffic information about known traffic in uncontrolled airspace, which may affect the flight. The ATC´s primary task is however to manage controlled air traffic. Traffic information in uncontrolled airspace is however provided only when it can be done without restricting the management of the controlled traffic.

1.16.3 Radar vectoring

During the flight, circumstances frequently occur where ATC has reason to request an aircraft to change the route, altitude or speed, to maintain separation or achieve a smoother traffic flow. This can be done by radar vectoring of aircraft. The commander and air traffic control share in such cases the responsibility for the clearance to the terrain and monitoring of navigation. Clearance may not be given to an aircraft so that the required altitude margin or terrain clearance is violated.

1.16.4 Instrument flight rules

Instrument Flight Rules, IFR, are rules for flights conducted without external visual reference, but only with instruments on board. Malmö Aviation's scheduled traffic should be conducted under IFR.

1.16.5 Visual approach

Under certain circumstances, an aircraft, flying under IFR, may request to make a visual approach. The ATC may also suggest a visual approach to shorten the route and expedite traffic. If clearance for a visual approach is accepted the ATC is responsible for separation between aircraft in the controlled airspace, while the terrain clearance is the responsibility of the commander.

Malmö Aviation adheres to the so called stabilized approach concept for both instrument- and visual approaches. This implies that basic flight parameters shall be within prescribed limits latest at a given minimum altitude. Consequently, a visual approach to an instrument runway should in the final stages be performed by the same flight profile as an instrument approach.

---

[16] TMA – Terminal Area – controlled airspace around one or more airports

[17] LFV Dhb ANS – Operation Manual for air traffic control, published by LFV

1.16.6 Air Traffic Control radar images

The radar images, Appendix 1, show that an aircraft passed below and near SCW117 at the incident. SCW117 was at 2 000 feet on a near southerly heading and the other aircraft at 1 200 feet on a near north-westerly heading. The minimum distance between the aircraft was about 1.5 km horizontally and approximately 245 m in height. SCW117 was in uncontrolled airspace during approximately one minute.

1.16.7 The airborne Traffic Collision Avoidance System

Installation of Collision Avoidance System, ACASII[18]/TCAS[19]II, is required on certain aircraft. TCAS II is required on aircraft with more than 15 000 kg take-off mass and more than 30 passenger seats. The system is intended to reduce the risk of collision between aircraft by monitoring the airspace in the vicinity and to warn pilots if distance or closure rate to another aircraft may cause a collision.

TCAS is based on automatic communication between the aircraft transponders[20], which exchange information several times per second about the distance and position of other transponder-equipped aircraft within range. The TCAS information is displayed on instruments in the aircraft and may help the pilots to mentally visualize a three dimensional picture of the traffic around the aircraft.

The TCAS II incorporates warnings of which two are, Traffic Advisory, TA, and Resolution Advisory, RA. A TA warns the pilot with a voice message, "Traffic, Traffic", if another aircraft is in the vicinity. TCAS II can also provide an approximate altitude and direction of the aircraft that caused the warning. The intention is that pilots should pay increased attention to the area and be prepared to initiate an avoidance action if the risk of collision increases. When the risk no longer exists, a call "Clear of Conflict" is given.

If the risk of conflict however increases, the system calculates how the situation should be avoided and communicates this to the respective aircraft. A Resolution Advisory is an avoidance action shown on the flight instruments in the cockpit together with a voice message. An RA provides an instruction to, descend, climb, or adjust the vertical speed according to an indication of the instrument for vertical speed, or in another flight instrument. The voice message is, "Descend, Descend", "Climb, Climb" or "Adjust Vertical Speed, Adjust" for each evasion manoeuvre. TCAS II can also provide a Preventive RA, which urges the pilots to monitor, or maintain the vertical speed: "Monitor Vertical Speed" or, "Maintain Vertical Speed".

Warnings from TCAS have high priority; only stall warning and terrain warnings have higher priority. Pilots are trained regularly in flight simulators on various scenarios of TCAS warnings and on avoidance manoeuvres. If an avoidance manoeuvre indicated by TCAS would lead to deviation from an altitude clearance, there is established radio phraseology to be applied in connection with breaking the clearance. TCAS II coordinates the manoeuvres between the involved aircraft so that they do not lead to the aircraft heading towards each other.

SCW117 first received a Traffic Advisory and shortly thereafter a Preventive

---

[18] ACAS – Airborne Collision Avoidance System

[19] TCAS – Traffic Collision Avoidance System – airborne automatic collision avoidance system

[20] Transponder – device for sending, receiving and processing signals between own aircraft and other aircraft in the vicinity

Resolution Advisory. The latter warning stated that it should maintain the vertical speed, which was zero at the time.

1.16.8 *Short- Term-Conflict-Alert system in ATC*

The air traffic management system, System 2000, incorporates an automatic conflict warning system, Short-Term Conflict Alert, STCA. The system is permanently inhibited in some areas and can be manually inhibited in some other areas, in the event of too many undesirable STCA alarm at low altitude. Manual inhibition may in such cases be performed by the supervisor at the air traffic control centre. In the area of the incident, STCA was permanently inhibited from ground level to 1 700 ft QNH, fig. 3. To trigger an STCA it is required that both aircraft are within the area for active STCA.

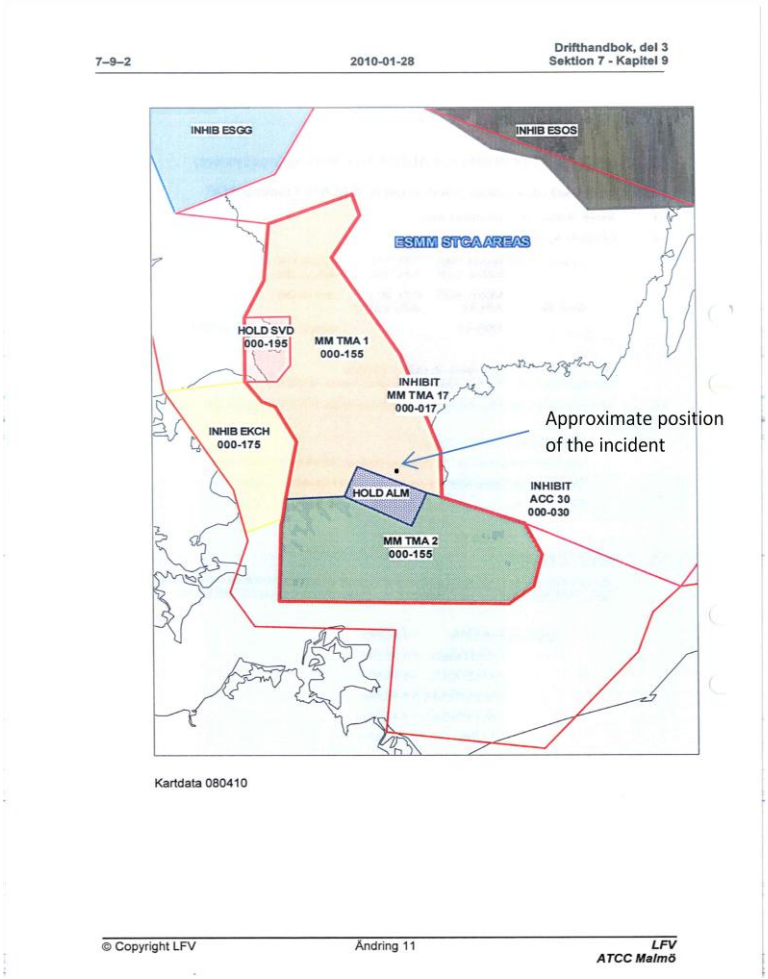


Fig.3. Chart over areas in Malmö TMA where STCA warnings are permanently inhibited.

1.16.9 *LFV navigation support material*

LFV publishes maps and other information relating to air navigation. Special charts are available for en-route flight, standard routes for arrival and departure at airports, instrument approach procedures, as well as for ground manoeuvring at airports. Charts for visual approach are provided for instrument airports. The information, which is in A4 format, is published in the LFV AIP and is revised when changes occur.

For Malmö terminal area LFV publishes an area chart that shows, among other things, airspace subdivision with altitude limits, restricted areas, airways, etc, see Appendix 3. Fig. 4 shows an excerpt from LFV area chart marking the site of the incident, which among other things, shows that Malmö TMA c) is established between 2 500 feet and flight level (FL) 65.

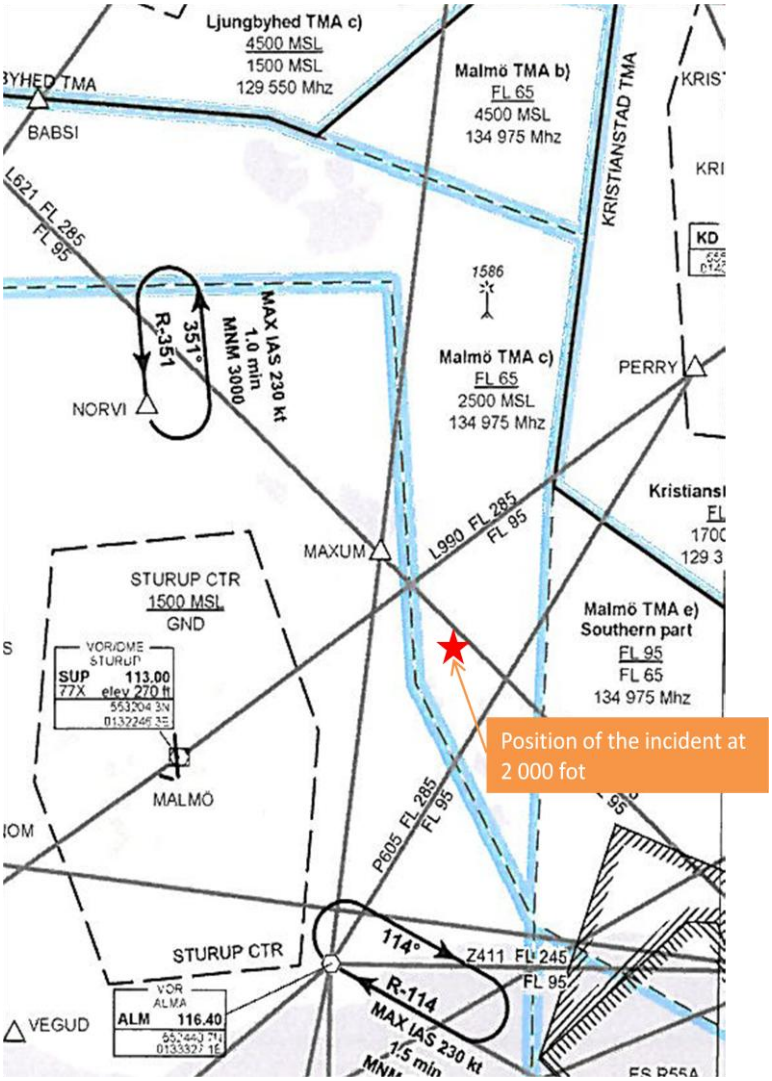


Fig. 4. Enlarged part of LFV AIP Sweden area map for Malmö TMA. The site of the incident has been marked by SHK.

LFV AIP Sweden´s map for ILS[21] approach to runway 35 at Malmö Airport is shown below in fig. 5. Neither airspace class nor its borders are shown in the map.

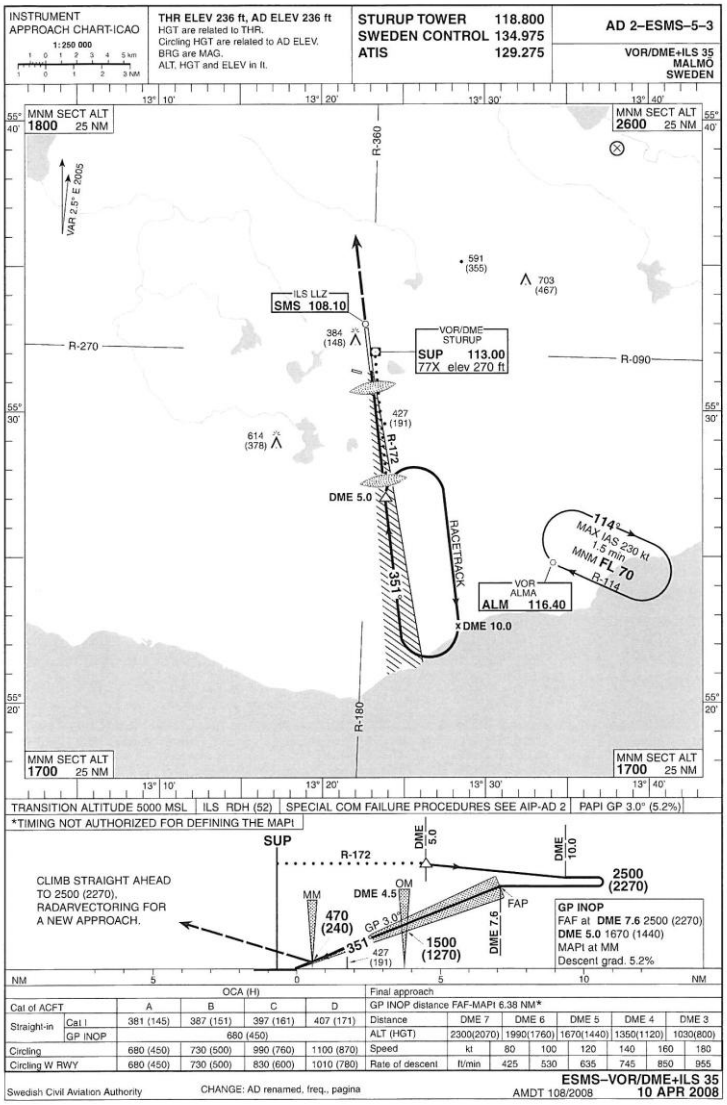


Fig. 5. Instrument approach chart to runway 35 at Malmö Airport. LFV AIP Sweden.

1.16.10 External suppliers' navigation support for flight under IFR

External suppliers produce, with LFV AIP Sweden as a basis, navigation materials and other documentation that is adapted for use on board aircraft. The material is usually in a smaller format, A5 or equivalent. For space and readability reasons, the information content in some respects is limited compared with LFV AIP Sweden. This applies to among other things, information on surface and altitude restrictions of the controlled airspace.

The operator in the incident used the documentation from the company Navtech (Sweden) AB. The pilots´ information was available partly on the en route navigation chart of North Europe, Appendix 4, and partly enlarged in fig. 6, as well as on the instrument approach map for runway 35 at Malmö Airport,

[21] ILS – Instrument Landing System

fig. 7. Neither an area map of Malmö TMA, nor a visual approach map for Malmö airport was published by the company.

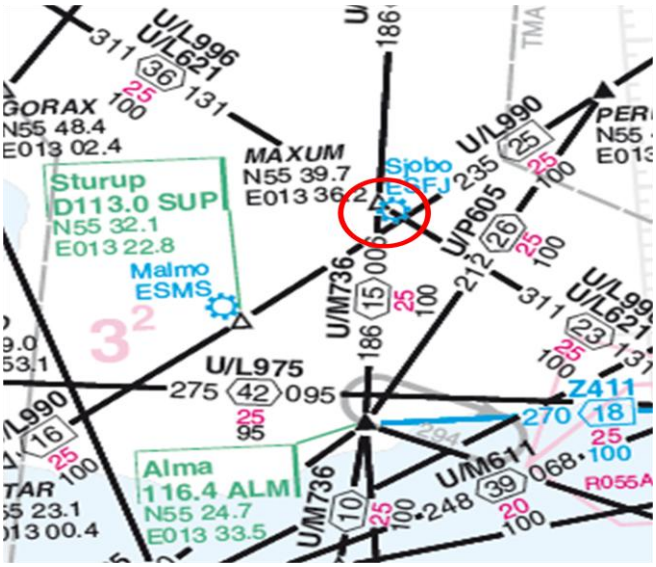


Fig. 6. Enlarged part of the enroute chart. The incident occurred at Sjöbo, ESFJ, marked with red circle. Black lines indicate routes for air traffic.

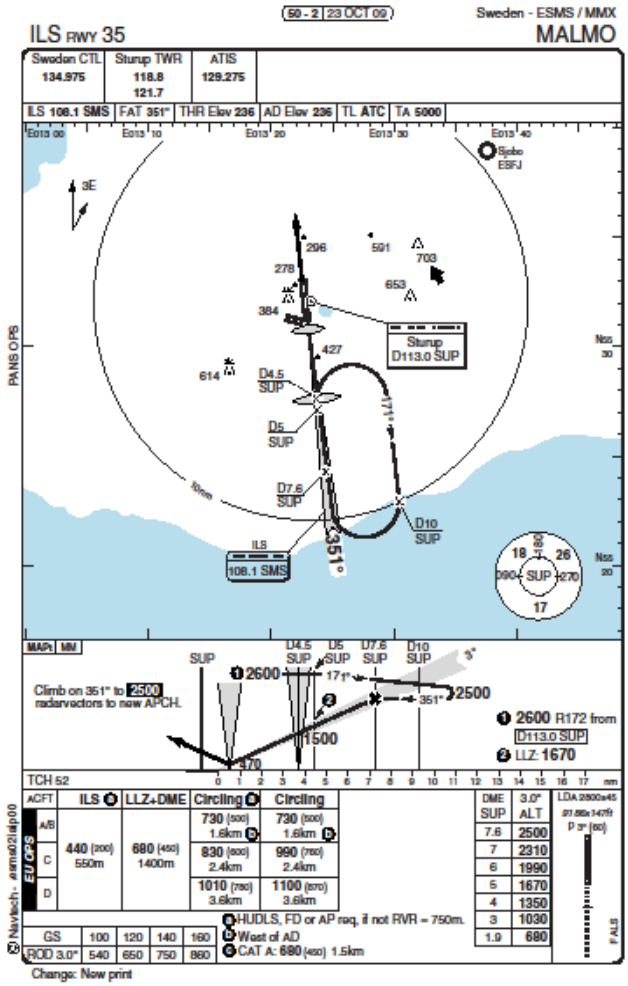


Fig. 7. Chart for ILS approach to runway 35 at Malmö Airport. Map by Navtech (Sweden) AB.

Both the surface and altitude limits for the controlled airspace are missing on the maps for IFR-flights.

1.16.11 Use of aeronautical charts onboard on IFR-flights

Pilots usually use aeronautical charts from external suppliers. The charts are tailored to the different phases of instrument flight and clearances, ground manoeuvring, departure, en route and approach, with information that is considered relevant to the current flight phase.

SCW117 was initially cleared to Alma VOR, which meant that the pilots´ chart in this phase was the en route map, Appendix 4. Once clearance was obtained for the visual approach the instrument approach chart to runway 35 fig. 7, was the pilot's available navigation information.

1.17 Organisational and management information

The company Malmö Aviation ran at the time of the incident a regular service for passengers with nine Avro 146 aircraft. The business has been focused on the Stockholm/Bromma airport, among other things because this type of aircraft is one of the few that meets the specific noise restrictions that apply to Stockholm/Bromma Airport. The company's head office, technical and operational bases are located in Malmö. The crews are stationed in Malmö, Gothenburg and Stockholm.

1.18 Additional information

1.18.1 Equal opportunities

Not applicable.

1.18.2 Environmental aspects

Not applicable

2 ANALYSIS

2.1 The flight

The flight was at approximately 3 600 feet in controlled airspace when it was cleared for visual approach. During the continued approach the airplane descended to 2000 feet and was flying in uncontrolled airspace for about one minute, which the pilots were unaware of. There was no means for the pilots to determine if the flight was in controlled or uncontrolled airspace, as such information was missing on the charts that were available on board. Neither did the radio communication reveal that the airplane was entering uncontrolled airspace.

The airborne collision avoidance system, TCAS, functioned as intended and the pilots followed its instructions.

2.2 Air traffic Control

The air traffic controller was surprised by the SCW117 descending to a lower altitude at Sjöbo than was usual in that position. There was no radio communication between the air traffic control and the unknown aircraft, which not was required in the uncontrolled airspace. It is understandable that the controller did not have time to provide traffic information about the unknown aircraft to SCW117, since the time of flight in uncontrolled airspace was very short.

According to LFV Operations manual for Malmö the conflict alert system, STCA, in the ATC was permanently inhibited up to 1 700 feet. Since the system design requires that both aircraft are within the STCA-area, there was no conflict alert by the system.

2.3 Air navigation charts

The navigation charts for IFR by the external provider lack information on borders of the controlled airspace. Neither were charts for visual approach provided with the package of charts for IFR-flights. Given the more limited space on the charts used on aircraft, it is however reasonable that the information content is optimized to controlled flights. Additional information about uncontrolled airspace would likely result in both less readability and adaptation to the main purpose - flight under IFR.

2.4 Altitude restrictions

LFV's regulation about controlled flights in uncontrolled airspace is considered normally to be sufficient to avoid the increased risk of collision of flights coming into uncontrolled airspace.

In areas with complex airspace near controlled airports, altitude restrictions may however be a method to ensure that IFR-traffic under visual approach would not penetrate uncontrolled airspace. For example, altitude restrictions at different bearings and distances from the controlled airport could be established, a procedure which for different reasons is used at many airports.

3 CONCLUSIONS

3.1 Findings

a) The pilots were qualified to perform the flight.
b) The aircraft had a valid airworthiness review.
c) The flight was conducted under instrument flight rules, but with visual references on the approach.
d) The aircraft was in uncontrolled airspace.
e) The pilots were unaware that the aircraft was in uncontrolled airspace.
f) Information was lacking on borders and altitude limits for controlled airspace on the charts that were available to the pilots.
g) The aircraft TCAS gave warnings about risk for collision.
h) The pilots adhered to the TCAS instructions.
i) The ATC Short Term Conflict Alert system gave no alert of conflict.

3.2 Causes of the incident

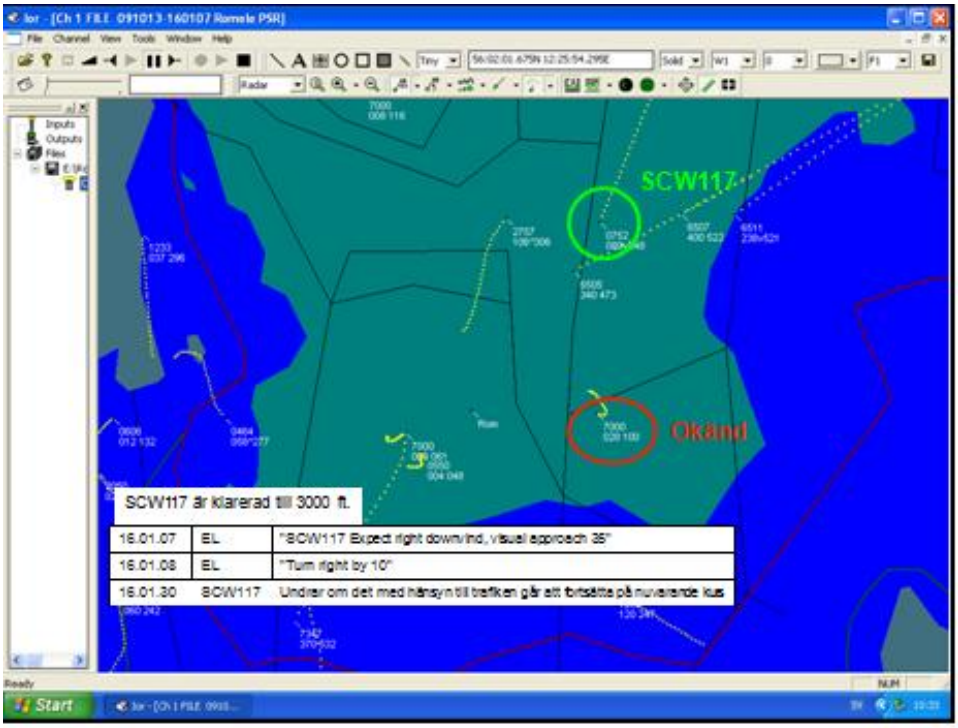
The incident was caused due to altitude limitations for visual approach under IFR traffic was not established for flight in the sector in question.

4 RECOMMENDATION

The Swedish Transportation Agency is recommended to:

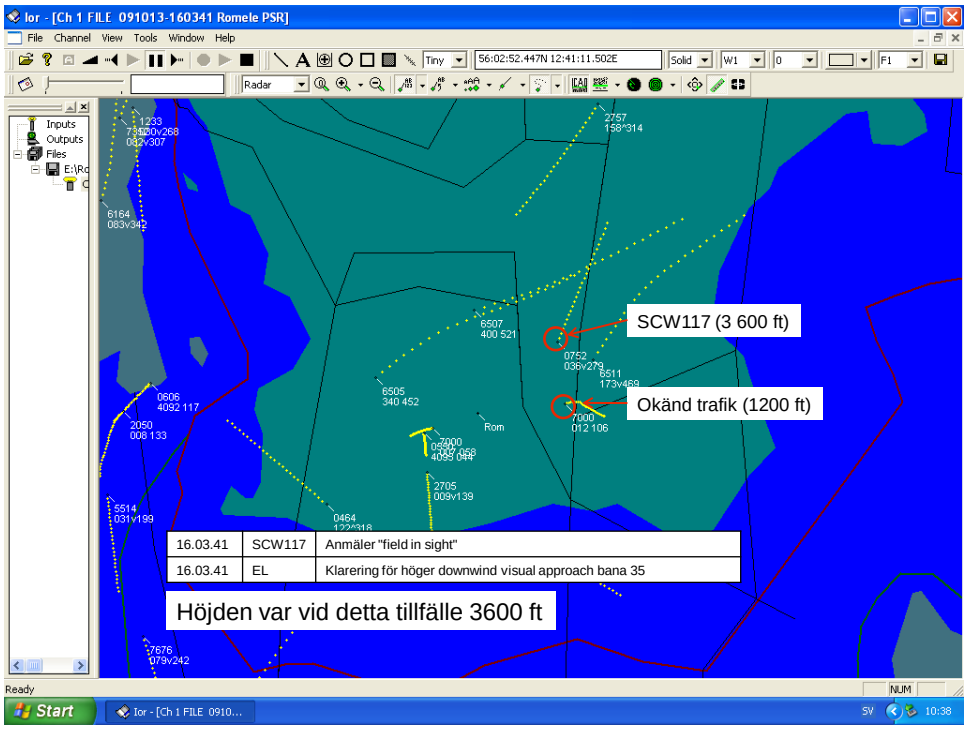
- consider introduction of altitude limitations for visual approach under IFR to Malmö Airport, (RL 2011:01 R1).

APPENDICES 1 - 4



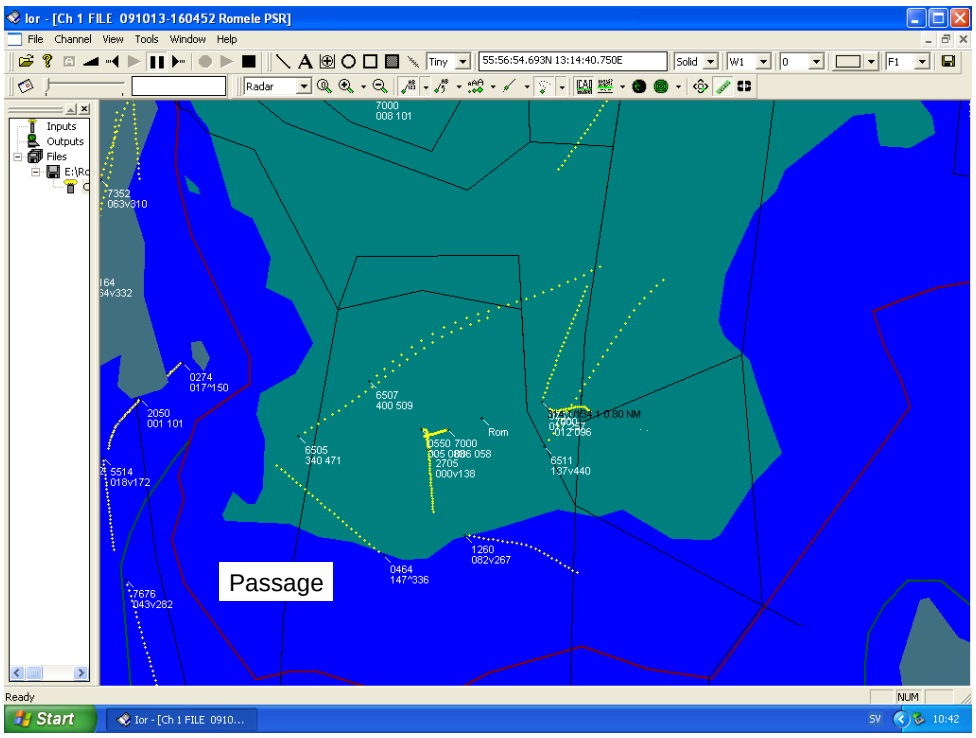
Radar picture 1

Text translation
Unknown (marked by red ellipse)
SCW117 is cleared to 3000 ft
16.01.30 SCW117 Wonder if, taking other traffic into account, it's possible to continue of the present course



Radar picture 2

Text translation
Unknown traffic (1200 ft)
16.03.41 SCW117 Report "field in sight"
At this time the altitude was 3600 ft



Radar picture 3

Extract from LFV Dhb ANS[22] Part 3 Section 2 Chapter 2, Item 12

12 [S] Flying that temporarily affects or can affect uncontrolled airspace

In the case of a flight at cruising altitude within SUECIA CTA/UTA, the following is applicable, if the development of traffic is thereby facilitated or if it means a reduction in the flight route and on condition that the pilot has not, by means of a flight plan or via RTF requested differently.

a) a departing flight from a controlled airport, with a route-planned cruising altitude within SUECIA CTA/UTA, may be given clearance which means that the aircraft may briefly be flown in uncontrolled airspace before climbing up into SUECIA CTA

Note: This can be in respect of continuous climbing through uncontrolled airspace up into SUECIA CTA or temporary level flight in uncontrolled airspace for a limited period when the aircraft due to other traffic is not yet able to be cleared to climb up into SUECIA CTA.

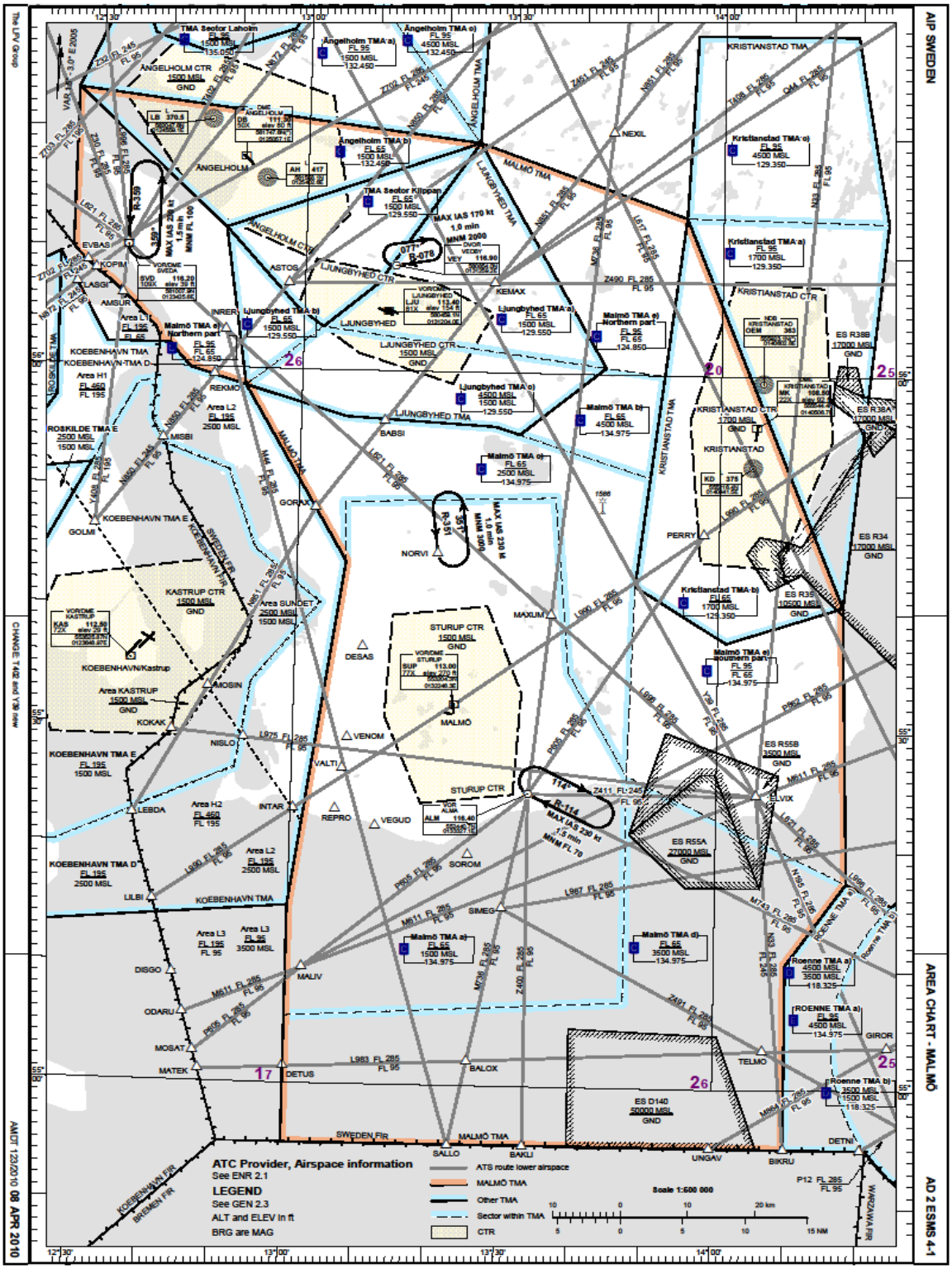
b) a flight arriving at a controlled airport may be given a clearance which means that the aircraft temporarily passes through controlled airspace (descends below SUECIA CTA) in order later to enter the TMA.

c) traffic information must be provided. When ATC is not aware of any traffic outside the controlled airspace that could affect the flight, the traffic information is to be provided in the form of the following phrase:

NO REPORTED TRAFFIC OUTSIDE CONTROLLED AIRSPACE

Mm. Radar guidance of incoming aircraft may commence outside controlled airspace.

Malmö Area Chart, LFV AIP/sweden Appendix 3



Appendix 4

En-route navigation chart Europe High/Low, Navtech (Sweden) AB. 20 % of natural size.