FINAL ACCIDENT REPORT

No ACC 6/1-01-008/2007-8/32

Aircraft: ROBIN DR 400-180

Aircraft registration marks: F-GTPB

Operator: Annemasse Aeroclub (France)

Owner: Annemasse Aeroclub (France)

Place of accident: Near Krivi Vir, Republic of Serbia

Date of accident: 15.07.2006

Time of accident: 08.59 UTC

Belgrade, April 2007

CAD
Civil Aviation Directorate
Direktorat civilnog vazduhoplovstva
Republika Srbija

AIR ACCIDENT INVESTIGATION COMMISSION

This document is an English translation of the Final Report on the accident on 15 July 2006 near Krivi Vir, Republic of Serbia, to the Robin DR 400-180 registered F-GTPB.

The use of this translation for any purpose other than for the prevention of future accidents could lead to erroneous interpretations

As accurate as the translation may be, the original text in Serbian issued by the Serbian Civil Aviation Directorate Air Accident Investigation Commission is the work of reference

Ce document est une traduction en langue anglaise du rapport final sur l'accident survenu le 15 juillet 2006 près de Krivi Vir, République Serbe, au Robin DR 400-180 immatriculé F-GTPB.

L'utilisation de cette traduction à d'autres fins que la prévention de futurs accidents pourrait conduire à des interprétations erronées.

Aussi précise que puisse être la traduction, le rapport original en serbe établi par la Commission d'Enquête de la Direction Générale de l'Aviation Civile de la République Serbe fait référence.

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Synopsis

On 15 July 2006, a ROBIN DR 400 -180, registered F- GTPB, with one pilot and three passengers, departed Gorna Orahovica (Bulgaria) on a private flight to Osijek (Croatia). After crossing the border between Bulgaria and Serbia, at approximately 08.50 (UTC), the air traffic control lost contact with the plane. The wreckage was found two days later. This investigation was carried out in accordance with the provisions of Annex 13 to the Chicago Convention.

The cause of the accident was investigated by Civil Aviation Directorate AAI Commission comprising:

Investigator in charge:	Zoran B. Petrovic, M.Sc.A. Eng.
Members:	Zlatko Veres, Pilot
	Petar Kosutic, B.Sc.A. Eng.
	Goran Stevanovic, SAR Inspector
	Nedeljko Popovic, Pilot
	Milan Rankovic, Air Traffic Controller
	Nikola Jankov, B.Sc. Meteorologist

CONTENTS

I – FACTUAL INFORMATION

1.1 History of the flight

On 15 July 2006, a group of airplanes took off from the airport Gorna Orahovica in Bulgaria (hereinafter referred to as Gorna) heading towards the Osijek Airport, Croatia. The group was composed of airplanes with Swiss and French registration marks and various other types of airplanes. In the previous days they were operating in Croatian airspace and thereafter they arrived in Bulgaria where they operated several group flights and on the critical day they took off to Osijek. ROBIN 400-180, registration marks F-GTPB, was a member of the group and it took off from Gorna at 06.07 UTC (if not specified, the timings hereinafter are presented in UTC).

The pilot and three passengers were on board. One of them also held a pilot license and was seated on the right front seat. The spouses of the pilot and the passenger-pilot were on the back passenger seats of the airplane.

Up to the border with the Republic of Serbia the flight was operated normally. After crossing the border, the group of airplanes encountered a gradual increase of cloudiness, occasionally spreading to the ground. For the reason thereof the pilots of four airplanes reported to the Belgrade Approach Control that they were climbing to higher level in order to remain above the layer of clouds in VMC. But the pilots of the F-GTPB and HB-EMR airplanes reported to the ATC that they were descending. The pilot of the HB-EMR airplane explicitly stated that he *"must descend due to clouds"*. This message was received at 08.51.53. At 08.58.35 the pilot of the airplane reported that he "*must climb to 5500 feet*", thus all the airplanes were at higher levels except for the F-GTPB airplane who continued the descent and its last record on the radar screen was at 08.57.15, at the altitude of 3000 feet. Thereafter, neither the ATC nor other airplanes of the group were able to establish radio contact with the subject airplane.

As soon as radio communication with the airplane was lost, the Approach Control Belgrade initiated a Search and Rescue procedure (SAR).
The airplane wreckage and the bodies of the pilots and passengers were found after two days of searching, on the almost impassable terrain covered with a thick forest.

1.2 Injuries to persons

The pilot of the airplane and the three passengers lost their lives in the accident.

1.3 Damage to aircraft

The airplane was completely destroyed in the accident.

1.4 Other damage

There was no damage to third party.

1.5 Personnel information

The pilot was born on 08 June 1945 occupied the left seat. He was a holder of the private pilot license (PPL) No. 02 06 0106 80 valid until 31.05.2008. The last check for the purpose of license revalidation was made on 01.06.2006 and he was found fit for the conduct of a single engine airplane according to visual flight rules (VFR).

He also held an FAA license No.999795947 issued on 24 November 1987 with restrictions for VFR flights during day time operations on a single engine airplane.

The last medical check was made on 03 April 2006 when he classified as class 2.

Until the critical flight, he had flown, as a pilot-in-command, a total of 1142, 50 hrs and, on the second seat, he has flown a total of 85,40hrs. As the Pilot-In-Command, the pilot had flown:

- Previous three months:	30, 50	flying hours
- Previous month:	21, 30	hrs.
- Previous 15 days:	12, 15	hrs.
- Previous 78 hours:	0, 40	hrs.

Note 1: The above mentioned flying hours do not incorporate the flight on the route Primorsko- Gorna (Bulgaria) as the duration and the critical flight were not inscribed in the log book until the accident.

Note 2: The passenger in the right seat held a valid PPL. He had 491 flying hours experience, was used to flying outside France and was said to be fluent in English.

1.6 Aircraft information

1.6.1 Airplane maintenance

The ROBIN DR 400-180 airplane was the property of Annemasse Aeroclub, France. It was manufactured in 1999. Its serial number was 2406. It held a Certificate on the inscription into the Register No.B 25469, issued on 23 February 1999 by the Ministry of Transport of the Republic of France. The airplane held an Airworthiness

Certificate No.118692 valid until 11 February 2008 and also Noise Certificate N45 in accordance with the ICAO Annex 16.

The last periodical 50hrs check of the airplane was performed on 05 July 2006 when the airplane had flown 2098, 35 hours.

By 13 July 2006 inclusive, the airplane had flown 2107, 25 flight hours (not counting the flight on the route Primorsko – Gorna, which was not inscribed in the log book and the critical flight).

The airplane was equipped with an engine Lycoming, type 0-360-A3A, Serial No. L-36180-36A and a propeller Sensenic, type 76EM8 S5-0-64. By the time of the accident, the engine had operated a total of 2107, 25 hrs. (Not counting the flight on the route Primorsko-Gorna, which was not inscribed into the log book and the critical flight.

1.6.2 Performance

The ROBIN-400 Flight Manual establishes the following speeds:

- Max. speed (never exceed) 166 KTS
- Max. cruising speed 140 KTS
- Max. maneuvering speed 116 KTS
- Final approach speed 68 KTS

Specially mentioned: minimum (stalling) speed: 51 KTS.

1.6.3 Aircraft weight and fuel quantity

The Commission paid special attention to the calculation of the airplane weight and the quantity of fuel therein, on take-off and at the moment of the accident. As a receipt was found among the pilot belongings in the airplane wreckage, showing that prior to take-off to Osijek, 140 liters of fuel were taken at Gorna airport, the Commission made the calculation as follows:

- Maximum quantity of fuel in the airplane (wings and main tank) amounts to 129 kg.

- Taking 140 liters of fuel meant that the airplane was full of fuel

The Commission also made a calculation of the take-off weight and obtained the results, as follows:

- 4 persons per 77 kg;
- Luggage 60 kg;
- Fuel 129 kg.

Or, the total of 1100 kg which is the maximum take off weight (MTOW) for ROBIN airplane in the category Normal.

The flight from Gorna to the site of the accident lasted approximately 01, 20 hrs thus the Commission established that at the moment of the accident the airplane endurance was more than 03.00 flight hours.

1.7 Meteorological conditions

1.7.1 Synoptic situation

A field of high air pressure (1035 mbar) was spread above Central, West and North-West Europe while in the East, the low pressure (1005 mbar) prevailed with a centre in the region of the Black Sea.

The Northern stream, at the same altitude, at the back of the cyclonic circulation, as well as the penetration of cold air in the area of North and Central Serbia conditioned a field of increased pressure on the ground with a tendency of growth.

1.7.2 Weather

Such synoptic situation conditioned the weather in the region of Central and North-East Serbia: the wind from 340-010 up to 29 kt, visibility over 10 km, decreasing in showers to 5-8 km. During the morning there were 3-4/8 St., 600/450m and 5-7/8 CuSc 3000/1000m. In the North-East part of Serbia there were substantially less clouds, 2-3/8 type Cu on a standard altitude (ceiling approximately 1000m). It was partly foggy in the ravines and in some areas the fog remained during major part of the morning. A slight front was to the South of Belgrade.

A local development of 1-2/8 Cb 8000/900 m occurred during the mid day and in the afternoon, visibility was reducing to 5-8 km in showers. Prevailing cloud 3-4/8 Sc 3000/1500m. The wind on the altitude in the layer up to 3000 m was from the direction of 340-010 degrees, velocity was 20-40 km/h and in the layer of 3-5 km from the direction of 010 degrees, velocity was 40 km/h. The zero isotherm was at the altitude of approximately 3500 m, -10 isotherm at the altitude of 5300m. The tropopause was at the altitude of approximately 10500m.

1.7.3 Weather in the area of the site of the accident (Krivi Vir)

At the time of the accident the weather was as follows:
Clouds of 2/8 Cu with ceiling of 1000-1300 m with possible retention of fog in the ravines.

The observed wind was 10 m/s from the North-West.
The temperature was approximately 29°C.
Horizontal meteo visibility was about 20 km.

1.8 Aids to navigation

In the interest of complete investigation of the causes of accident to the F-GTPB airplane the Commission has submitted to the French Authorities the GPS, models GPS150XL and GPSMAP195 which were found at the site of the accident. The conclusions of the French Authorities were as follows:

- From the GPSMAP 196, no data could be recovered. A chip which was certainly the volatile memory containing the user data such as waypoints, track points and routes tore off from the main board.

- From the Garmin GPS150XL, the last recorded position and 27 waypoints were recorded into the GPS receiver. The last recorded positions, corresponding to the site of the accident ,were:

  Latitude: 43 51.924 North
  Longitude: 21 45.295 East
  Altitude: 2712 feet (Geometric height above mean sea level)

  (Note: The above data refer to the WGS84 geodetic system).

1.9 Communications

The F-GTPB airplane established contact with Terminal Air Traffic Control Belgrade at 08.48.59 (UTC) at the altitude of 4000 feet and at a distance of 29 nautical miles (NM) from the point NEPOS. The radar identification was made by Alpha mode, code 1771. The pilot reported “ground contact”.

At 08.51.53 the pilot reported descent to the altitude of 3000 feet, QNH 1020 mbar.
At 08.53.11 the pilot reported again that he was descending to 3000 feet, and the controller instructed the pilot to *“Squawk ident*” and the pilot responded: *“Squawk 1771”*

At 08.59.16 the controller called the pilot again and he responded unintelligibly.

The air traffic controller repeatedly called the pilot, at 08.59.16, 08.59.37 and at 09.00.40 but did not get any response.

Being unable to establish radio contact with the pilot of the F-GTPB airplane, the controller required other pilots in the group to try to establish contact but, they also failed.

The Commission, however, paid attention to the fact that previously, only at 08.51.53 the pilot of the HB-EMR airplane, who was flying as second in the group, in front of the F-GTPB airplane had informed the air traffic controller that he had to descend to the altitude of 3000 feet, due to clouds.

"Belgrade, HB-EMR, we have to descend to 3000 feet due to clouds".

After the pilot reported "ground contact", the controller approved the descent.

But, at 08.58.51, the same pilot requested to climb to 5500 feet and he got the clearance to do so.
The Commission noted that the HB-EUX airplane, who was the first in the group, already requested at 08.49.58, to climb to 4000 feet.

Communications transcripts are shown in appendix 1.

1.10 Aerodrome information

Not applicable

1.11 Flight recorders

Onboard flight recorders are not required for this category of aircraft.

1.12 Wreckage and impact information

The airplane struck the terrain at a very steep angle, on heading 340° approximately, in clockwise rotation which caused the turn of the airplane to the right, into the heading of 045° approximately. Immediately after the impact, both wings separated from the fuselage and the fuselage disintegrated in the next 7-8 meters.
Marks on the propeller indicate that the propeller was rotating at a low speed.

The total area of the scattered wreckage from the point of the first contact was within the radius of approximately 10 meters.

1.13 Medical and pathological information

On the basis of current regulations of the Republic of Serbia, the competent inquiry body has ordered the autopsy of the persons who had lost their lives in the accident.

The Commission report on the autopsy, its Section “Findings of pesticides, narcotics and alcohol”, revealed the factual condition, as follows:

- Per Milles of alcohol in the tissue of the pilot 0, 84

The Commission could not establish whether or not the pilot had absorbed any alcohol absorption prior flying.

However, such quantity of alcohol could have influenced the pilot’s decisions.

1.14 Fire

Due to severe impact with the ground and total destruction of the airplane, no fire broke out.

1.15 Survival aspects

The impact of the airplane with the ground was so severe that the pilot and the passengers could have not survived.

1.16 Tests and research

Not applicable.

1.17 Organizational and management information

Not applicable.

1.18 Additional information

1.18.1 Search and rescue

In accordance with the provisions and standards of ICAO Annex 12 and ICAO Doc.7333-An/859, the Search and Rescue Service of Civil Aviation of the Republic of Serbia and the Rescue Coordination Centre of the Civil Aviation Directorate of the Republic of Serbia, organized the search and rescue action as soon as they were informed about the accident. Such action was carried out within their possibilities and according to the circumstances and terrain configuration at the presumed site of the accident.
On 15 July 2006 the Rescue Coordination Centre (RCC) having received the information, from ATC Belgrade, on the accident of the accident airplane and having taken necessary action stipulated in the *Plan and Programme for Organization of*

Search and Rescue in Civil Aviation of the Republic of Serbia, started an RCC SA 341 type helicopter with registration marks YU-HCS.
On the basis of the information available to the Rescue Coordination Centre, that the probable area in which the accident occurred was on the slopes of Kucaj mountains 10 km to the North from the village Krivi Vir, i.e. that the last radar position registered was 43 51 46 N and 21 45 26 E, the search mission lasted until dusk and the helicopter landed at Belgrade airport at 20.50 (LT) with a minimum fuel supply, having operated 02.35 flight hours.

The search that day did not produce any results because of hilly mountain terrain with extremely thick and high forest. As it was not possible to continue further search during the night it was continued the next day i.e. on 16.07.2006.

We would like to point out that on 15 July 2006, one military helicopter, type MI-8, took part in the search. It took-off at 15.14 (LT) and was searching the terrain on the coordinates Trupale-Aleksinac- Mali Izvor, a village near Boljevac (starting coordinates of the search were 43 50 41N and 21 55 32 E- Veliki Malinik). The search of the terrain was carried out by the method of parallel headings towards the West. The final line of the search was on the coordinates Pasuljanske Livade – Eastern side. After the search on those coordinates the crew was directed to search the region of Rtanj Mountain, the line Rtanj-Cestobrodica. On this flight, the helicopter had operated a total of 02.05 flight hours.

On 16 July 2006, the first take-off was at 09.30 (LT) and the last landing at Belgrade airport was at 20.25 (LT). On that day, two RCC helicopters type SA 342, registration marks YU—HEC, and SA 341, registration marks YU-HCS, were engaged. They had operated a total of 07.20 flight hours.

Having in view that many hours of flight operations did not give any results due to extremely difficult and impassable terrain; the necessary number of trained ground teams was engaged on 17 July 2006, with the aim to search the terrain.

To that end, two RCC helicopters type SA 342, registration marks YU-HEC and SA 341, registration marks YU-HCS found the site of the accident on 17 July 2006 at 12.00 hours (LT), in a joint operation with the ground teams and established that the airplane was completely destroyed and that the crew and the passengers were dead. Thereafter, the Aircraft Accident Investigation Commission continued with its work.

The RCC helicopters had operated a total of 15.5 flight hours during the search and rendering assistance to the Aircraft Accident Investigation Commission.

1.18.2 Radar records

Radar trajectories of the group aircraft were recorded.

After crossing the border, the pilots were gradually encountering an increased cloudiness. This was evident from the statements of several pilots and particularly of the pilot of the second airplane in the group.

At the moment when four airplanes from the group were operating on higher altitudes (5000 feet and over) the pilot of the critical airplane and the pilot of the second airplane in the group were requesting the descent to 3000 feet. After they have reported “ground contact”, the controller approved the descent. Until that moment the critical airplane was flying with a speed of 111 knots (KTS). Immediately prior reaching 3000 feet the radar contact with the critical airplane was lost but, after two minutes, the target reappeared on the altitude of 3200 feet and the speed of only 48 knots (KTS). Thereafter the target made a “jump” to the altitude of 3400 feet and still with a speed of only 48 knots (KTS) during the next scan of the radar antenna, the target appeared only with a speed of 48 knots without altitude identification and after that it disappeared completely from the radar display.

Radar trajectory is shown in appendix 2.

1.18.3 Documentation

The documentation (navigation charts, airfield information and schemes) given by the organizing party was neither accurate nor up to date. According to the organizer’s testimony and to the documentation found by the Commission, the organizer did not check if the participating pilots received the complete updated documentation before departure from France. As this is a commercial activity for the organizer, no civil aviation authorities were either officially informed of this activity or checked the accuracy of the documentation.

1.18.4 Procedures

The Commission analyzed a flight of the DR400 airplane from Dubrovnik to Plovdiv a few days before the accident. During this flight there was an incident with the Bulgarian Control in the Sofia control area. In order to establish lateral separation between the airplane F-GTPB and an Austrian Airlines airplane, the radar controller instructed the pilot of F-GTPB airplane, as follows:

“Turn left, heading 095!”

The pilot responded:

“Roger, runway in use 09!”

The pilot continued to fly at the heading of 110 degrees. Only after the instruction and the intervention of another pilot of the group had been repeated several times, the subject pilot intercepted the instructed heading. However, this resulted in the

disturbed lateral separation with the Austrian Airlines airplane in which the system of TCAS had activated.
In addition, during this flight, the pilot overflew a prohibited area (Kosovo and Metohija) as the other airplanes avoided the prohibited zone.

1.18.5 Pilot behavior

The pilot was not familiar with procedures in the English language and not at ease to answer the Bulgarian controller correctly. The Commission could not establish if the pilot asked his passenger, who was said to be fluent in the English language, to help him. However, no argument between the Bulgarian controller and the pilot was noticed. After the incident in Sofia airspace, and the landing in Plovdiv, the subject pilot showed strong resistance to accepting the remarks of other pilots and the leader of the group and rejected them.

II - ANALYSIS

On the basis of traces at the site of the accident the Commission established that the engine was operating and the propeller was rotating with rather low rotations (RPM). On the basis of the submitted documents it was established that the engine and the propeller were maintained according to the regulations.

On the basis of the aforementioned, the Commission established that, at the moment of the accident, the airplane was in operational condition.

On its route from the border of the Republic of Serbia to the NEPOS point, the group of airplanes encountered an area of low clouds. The majority of airplanes from the group requested to climb to higher altitudes except the critical airplane.

The flight from the border of the Republic of Serbia up to the accident site lasted about 37 minutes. During the flight there was no misunderstanding with the ATC.

From the trajectories, it appears that the accident airplane was constantly flying for the last few minutes, at a speed lower than the minimum speed according to the provisions of the Flight Manual. On the basis of this information the Commission concluded that the pilot was not able to continue the flight at the altitude of 3000 feet due to clouds. The Commission made a conclusion that at that moment the airplane stalled and went into a spin. The site of the accident clearly indicated that at the moment of impact, the rotation started due to which the dispersion of the wreckage deviated from the heading for approximately 40 degrees to the right.

III – CONCLUSIONS

3.1 Findings

1. At the moment of the accident, the aircraft was in operational condition, the engine was operating and the propeller was rotating.

2. The pilot was formally qualified to perform the flight task.

3. The pilot's knowledge of phraseology in the English language was poor.

4. During the flight towards the NEPOS point the group of aircraft encountered an area of low clouds.

5. The pilot of the accident aircraft made the wrong decision to descend instead of climbing.

6. The impact with the terrain was under the steep angle after a complete loss of speed during the flight.

7. The search and rescue operation was carried out in extremely difficult conditions on the terrain.

3.2 Cause of the accident

3.2.1 Direct cause

The direct cause of the accident was the impact with terrain at a steep angle due to the total loss of control of the airplane by the pilot.

3.2.2 Indirect causes

The indirect causes of the accident were

- Worsening of weather conditions during the flight of the group of aircraft from Gorna to Osijek;

- The incorrect decision by the pilot to descend below the clouds rather than climbing out;

- The lack of adequate documentation supplied to the pilots in the group and the lack of proper flight preparation by the organizer.

IV – SAFETY RECOMMENDATIONS

In order to avoid the recurrence of the accident for the same or similar causes the Commission recommends:

1. To inform all pilots of aircraft in the sport and private aviation organizations of the Republic of Serbia and the Republic of France about the cause of this accident.

2. The French DGAC inform organizers of air rallies of the causes of this accident and establish a system to check the general organization of such rallies, the documentation provided to participants and the skills of participating pilots.

Appendix 1

Communications transcripts

TRANSCRIPTION OF AUDIO RECORD FREQUENCY 119.100 OF 15 JULY 2006

Legend:

A/C – aircraft
KL – APP/EC TMA BELGRADE

Note: the transcript contains only the conversations with and in relation to FGTPB, HBEMR, HBEUX, FBVVA, FGKLT, FGMPH.

08:37:52

A/C: BELGRADE APPROACH GOOD AFTERNOON HBEUX CALLING ZAGREB... BELGRADE.
KL: STATION CALLING BELGRADE RADAR SAY AGAIN.
A/C: BELGRADE RADAR GOOD MORNING HBEUX CALLING BELGRADE.
KL: ROGER HBEUX BELGRADE RADAR REPORT POSITION SIR.
A/C: WE ARE DOWN TO NEPOS, NEPOS POINT. WE HAVE 37 TO GO NEPOS 3500 FEET 1015.
A/C: YNF FULLY ESTABLISHED RUNWAY 30.
KL: YNF CONTACT TOWER 118.1.
A/C: 118.1 UNTILL NEXT TIME, HAVE A NICE DAY.
KL: HBEUX ROGER REPORT ESTIMATE TIME FOR NEPOS.
A/C: NEPOS ESTIMATE AT 44.
KL: HBEUX ROGER QNH1020, VISIBILITY ABOVE 10 KILOMETERS, TEMPERATURE 24, DEWPOINT 17, AFTER NEPOS EXPECT DIRECT TO TUVAR AND FOR INFORMATION CLOUDS BROKEN AT 2300 FEET. DO YOU HAVE GROUND CONTACT SIR?
A/C: AFFIRMATIVE GROUND CONTACT AND I MAKE A CORRECTION, ESTIMATING NEPOS AT TIME ...ZERO... 1000.
KL: HBEUX CORRECT TIME 0840. CONFIRM AT 1000 UTC ESTIMATING NEPOS.
A/C: NEGATIVE... IN THAT CASE IS 0800.
KL: SIR HBEUX PRESENTLY CORRECT TIME 0840. REPORT ESTIMATE FOR NEPOS.
A/C: OK, SORRY SIR, MY MISTAKE IT'S 0900 ESTIMATING NEPOS.
KL: HBEUX ROGER MAINTAIN 3500 FEET.
A/C: ROGER AND WE HAVE GROUND CONTACT.

08:41:33

KL: HBEUX CONFIRM SQUAWK 1773 IS ON.
A/C: (CRACKING NOISE)...

08:41:48

KL: HBEUX DO YOU READ BELGRADE RADAR?

08:42:15

KL: HBEUX DO YOU READ BELGRADE RADAR?

08:42:26

KL: HBEUX BELGRADE RADAR DO YOU READ?

08:43:36

KL: HBEUX BELGRADE RADAR DO YOU READ?

08:43:54

KL: HBEUX BELGRADE RADAR DO YOU READ?

08:44:49

KL: HBEUX IF YOU READ BELGRADE RADAR SQUAWK IDENT.

08:46:05

KL: HBEUX BELGRADE RADAR DO YOU READ?
A/C: LOUD AND CLEAR.
KL: HBEUX REPORT RADIAL AND DISTANCE FROM TPL VOR.
A/C: STAND BY ONE.

08:46:46

KL: HBEUX SIR DO YOU FLY IN GROUP?
A/C: NEGATIVE SIR, WE ARE SIX AIRCRAFT, SPACED BY 5 TO 10 TO 15 MINUTES AND WE ARE PROCEEDING TO NEPOS ACTUALY ON THE RADIAL 120NTO NEPOS AND 22 MILES TO NEPOS.

KL: ROGER HBEUX THANK YOU SIR, AND DO YOU HAVE GROUND CONTACT?
A/C: AFFIRMATIVE WE ARE AT 3000 FEET, GROUND CONTACT.
KL: ROGER HBEUX, MAINTAIN 3000 FEET WITH GROUND CONTACT AND JUST CONFIRM SIR, DO YOU HAVE TRANSPONDER?
A/C: AFFIRMATIVE, I SQUAWK 1773 IDENT.
KL: ROGER HUX NEGATIVE RADAR CONTACT.

08:47:55

A/C: HELLO, HBEMR.
KL: HBEMR BELGRADE RADAR REPRT POSITION AND ALTITUDE.
A/C: ALTITUDE FOR THE TIME MAINTAINING FLIGHT LEVEL 55 POSITION IS 32 MILES TO GO TO POSITION NEPOS.
KL: HBEMR CONFIRM SQUAWK 1772.
A/C: AFFIRM 1772 IS MY SQUAWK.
KL: ROGER HBEMR DO YOU HAVE GROUND CONTACT?
A/C: AFFIRM GROUND CONTACT.

08:48:59

A/C: BELGRAD FPB.
KL: FGTPB GOOD DAY BELGRADE RADAR, CONFIRM SQUAWK 1771.
A/C: AFFIRMATIVE 1771 ACTUALLY 29 NAUTICAL OF NEPOS, ALTITUDE 4000 FEET GROUND... (UNINTELLIGIBLE).
KL: FGTPB YOU ARE INDENTIFIED, CONFIRM GROUND CONTACT.
A/C: AFFIRMATIVE, GROUND CONTACT.
KL: FGTPB ROGER MAINTAIN 4000 FEET BY QNH 1020.
A/C: QNH 1020.

08:49:58

A/C: BELGRAD HUX IS CLIMBING TO 4000 FEET.
KL: HBEUX ROGER CLIMB TO 4000 FEET.
KL: HBEMR MAINTAIN 5500 FEET BY QNH 1020.
A/C: QNH 1020 MAINTAINING 5500 FEET HMR.
KL: ROGER.

08:50:33

A/C: AND FOR BELGRADE APPROACH HUX FOR ALL... (UNINTELLIGIBLE)... AIRCRAFT BEHIND CAN YOU GIVE US WEATHER REPORT, MET REPORT OF THE BELGRADE.
KL: ROGER ALL STATIONS COPY WEATHER INFORMATION, WEATHER REPRT FOR BELGRADE WIND 350 DEGREES 14 KNOTS, VISIBILITY ABOVE 10

KILOMETERS, CLOUDS BROKEN 2300 FEET, TEMPERATURE 23 DEWPOINT 17.

A/C: THANK YOU VERY MUCH.

08:51:53

A/C: BELGRAD FPB DESCENDING 3000 FEET QNH 1020.
KL: CONFIRM FGTPB DESCENDING TO 3000 FEET.
A/C: AFFIRMATIVE, CONFIRM.
KL: ROGER , FPB QNH 1020.
A/C: OK, ROGER, WILCO.
A/C: BELGRADE HBEMR WE HAVE TO DESCENT TO 3000 FEET.
KL: JAT 361 TO POSITION YOU IN ILS TURN LEFT HEADING 085.
A/C: LEFT 085 JAT 361.
A/C: BELGRADE HBEMR WE HAVE TO DESCENT TO 3000 FEET DUE TO CLOUDS.
KL: HBEMR DESCENT TO 3000 FEET BY QNH 1020.
A/C: DESCENDING TO 3000 FEET HMR.
KL: HMR CONFIRM GROUND CONTACT.
A/C: YES, WE'VE GOT CONTACT.
KL: ROGER SIR.

08:53:11

KL: FGTPB, SQUAWK IDENT.
A/C: SQUAWK 1771.
KL: ROGER FPB, SQUAWK IDENT PLEASE.
A/C: SQUAWK...(UNINTELLIGIBLE).

08:55:10

KL: HBEMR PRECEEDING DR 40 TWO MILES AHEAD MAYBE IN SIGHT?
A/C: NOT IN SIGHT. WE ARE LOOKING OUT. THANK YOU FOR INFORMATION.

08:55:29

A/C: BELGRAD APPROACH FGMPF GOOD AFTERNOON.
KL: FGMPF GOOD DAY BELGRADE RADAR, REPRT POSITION AND ALTITUDE.
A/C: FPF IS FULL...(UNINTELLIGIBLE)... VFR FLIGHT FROM...(UNINTELLIGIBLE)... TO OSIJEK, WE ARE JUST NORTHWEST OF...(UNINTELLIGIBLE)... 42 MILES TO NEPOS AND WE HAVE 6500 FEET.
KL: FGMPF ROGER MAINTAIN 6500 FEET BY QNH 1020 REPORT ESTIMATE FOR NEPOS.
A/C: FPF ...(UNINTELLIGIBLE)... QNH 1020, WE ARE ESTIMATING NEPOS IN 20 MINUTES.

KL: JAT 361 CONTACT TOWER 118.1

08:57:15

A/C: BELGRAD APPROACH FGKLT GOOD DAY
KL: CONFIRM FGKLT CALLING BELGRADE RADAR.
A/C: FGKLT...DESTINATION OSIJEK...3000 FEET.
KL: FGKLT CONFIRM 3000 FEET.
A/C: I CONFIRM 3000 FEET FLT.
KL: FGKLT ROGER PROCEED TO NEPOS 3000 FEET QNH 1020 AND CONFIRM FULL GROUND CONTACT.
A/C: PROCEEDING NEPOS WITH QNH1022 FLT 1022.
KL: FGKLT QNH 1020 AND CONFIRM GROUND CONTACT.
A/C: QNH 1020 AND I CONFIRM GROUND CONTACT.
KL: ROGER FLT REPORT NEPOS.
A/C: WE'LL REPORT NEPOS FLT.

08:58:35

KL: FGTPB SQUAWK IDENT.

08:58:51

KL: HBEUX REPORT ALTITUDE.
A/C: AT 5500 FEET HUX.
KL: ROGER HUX.
A/C: BELGRADE HBEMR WE HAVE TO CLIMB 5500 FEET.
KL: ROGER HBEMR CLIMB TO 5500 FEET.
A/C: THANK YOU VERY MUCH

08:59:16

KL: FGTPB BELGRADE RADAR.
A/C: PAPA...(UNINTELLIGIBLE).

08:59:23

KL: FGTPB DO YOU READ BELGRADE RADAR?

08:59:37

KL: FGTPB IF YOU READ BELGRADE RADAR SQUAWK IDENT.

09:00:40

KL: FGTPB BELGRADE RADAR, DO YOU READ?

09:00:48

KL: FGTPB DO YOU READ BELGRADE RADAR?

09:00:55

KL: HBEMR PLEASE TRY TO CONTACT FGTPB AND ASK HIM FOR HIS POSITION SIR AND ALTITUDE.
A/C: ROGER HUX WE'LL DO IT. FPB GEORGE... (IN FRENCH).

09:01:24

A/C: BELGRADE FROM LT, DO YOU READ?
KL: FGTPB BELGRADE RADAR.
A/C: (IN FRENCH).

09:03:05

A/C: FLT BELGRAD HOW DO YOU READ?

09:03:25

KL: HBEUX REPORT ALTITUDE.
A/C: WE ARE AT 5300 FEET... (UNINTELLIGIBLE).
KL: ROGER HUX.

09:03:41

KL: FGTPB, BELGRADE RADAR.

09:03:50

KL: HREMR DO YOU READ FGTPB?
A/C: STAND BY PLEASE. PB DO YOU READ? PB, MR DO YOU READ? BELGRAD, NO CONTACT WITH PB.
KL: HMR CONFIRM YOU DON'T READ PB.
A/C: I DO NOT READ PB, HMR.
KL: HBEUX DO YOU READ MAYBE FGTPB?
A/C: STAND BY ONE, I WILL TRY ON INTERNAL FREQUENCY 130.0 I' LL COME BACK IN TWO MINUTES.

KL: ROGER.

09:04:47

A/C: BELGRADE RADAR FGMPF DO YOU READ ME?
KL: FGMPF BELGRADE RADAR CONFIRM SQUAWK 1770.
A/C: FPF WE ARE SQUAWKING 1770, WE ARE 5000 FEET CLIMBING TO 5500 FEET QNH 1020 AND WE ARE 28 MILES FROM NEPOS POINT.
KL: ROGER FGMPF REPRT REACHING 5500 FEET QNH 1020 AND CONFIRM GROUND CONTACT.
A/C: FPF QNH 1020 WE ARE JUST ARRIVING AT 5500 FEET AND WE HAVE GROUND CONTACT.
KL: ROGER FGMPF REPORT NEPOS.
A/C: FPF WE'LL REPORT NEPOS.
A/C: IN FRENCH).

09:05:40

KL: FGTPB BELGRADE RADAR DO YOU READ?
A/C: BELGRADE FROM HUX I HAVE NO CONTACT WITH PB.
KL: ROGER HUX.

09:05:58

A/C: FLT CLIMBING TO FLIGHT LEVEL 75 DUE TO CLOUDS.
KL: FGKLT CONFIRM CLIMBING TO 7000 FEET.
A/C: AFFIRM FLT.
KL: FGKLT CLIMB TO 7000 FEET BY QNH 1020.
A/C: CLIMBING 7000 FEET FLT.

09:06:18

KL: FGTPB IF YOU READ BELGRADE RADAR SQUAWK IDENT.

09:06:41

A/C: PB PB FROM MR DO YOU READ?

09:07:09

A/C: BELGRADE HBEMR.
KL: HMR GO AHEAD.
A/C: UNINTELLIGIBLE)... WEATHER INFORMATION OSIJEK.
KL: HMR STAND BY.

A/C: THANK YOU VERY MUCH.

09:07:30

A/C: BELGRAD IS...(UNINTELLIGIBLE)... ATIS BROKEN.
KL: ATIS IS UNSERVICEABLE SIR.

09:07:40

KL: FGTPB DO YOU READ BELGRADE RADAR?

09:08:15

A/C: HBEMR IS CLIMBING TO 7000 FEET.
KL: ROGER HMR CLIMB TO 7000 FEET.
A/C: THANK YOU VERY MUCH.

09:08:24

A/C: BELGRADE FROM VA.
KL: STATION CALLING BELGRADE RADAR, SAY AGAIN.
A/C: THIS IS FBVVA SIR, I AM IN CONTACT WITH NIŠ INFORMATION AND THEY ARE ...(UNINTELLIGIBLE)... YOU HAVE FGTPB IN CONTACT WITH YOU.
KL: AZA2SF CONFIRM ILS ESTABLISHED.
A/C: AFFIRM FULL ESTABLISHED NOW AZA2SF.
KL: AZA2SF TOWER 118.1.
A/C: 118.1 2SF BY.
KL: FBVVA SAY AGAIN TO BELGRADE RADAR.
A/C: YES SIR, I AM IN CONTACT WITH NIŠ INFORMATION THEY WANT TO KNOW IF YOU ARE FGTPB IN RADIO CONTACT.
KL: FVA CONFIRM NIŠ APPROACH HAVE CONTACT WITH FGTPB?
A/C: NO THEY DON'T HAVE CONTACT, THEY LOOKING FOR THEM.
KL: ROGER, THANK YOU SIR.

09:11:07

A/C: (IN FRENCH).

09:11:35

KL: FGTPB BELGRADE APPROACH DO YOU READ?

09:12:35
A/C: ZAGREB HUX ON COURSE TO OBR AT 2000 FEET...(UNINTELLIGIBLE).

A/C: YUDNF GROCKA 2000 FITA.
KL: BATAJNICA 124.775
KL: HBEUX CONFIRM DESCENDING TO 2000 FEET INBOUND OBR, CORRECTION 2000 FEET INBOUND OBR.

09:13:16

KL: FBVVA BELGRADE APPROACH DO YOU READ?

09:13:38

KL: FBVVA BELGRADE APPROACH.

09:14:40

A/C: BELGRADE FBF.
KL: JAT210 CONTACT BELGRADE RADAR 125.925
09:14:52

KL: JAT210 RADIO CHECK.
A/C: READ YOU FIVE 125.925 BY.
KL: I DO CONFIRM.
A/C: BY BY.
KL: HAVE A NICE DAY.

09:15:06

A/C: BELGRADE FPF.
KL: SAY AGAIN.
A/C: FPF IS 7 MILES FROM NEPOS CLIMBING TO 8500 FEET.
KL: FPF CONFIRM CLIMBING TO 8500.
A/C: FPF 8500 ON QNH 1020.
KL: ROGER YOU HAVE TRAFFIC IN FRONT OF YOU TWELVE O'CLOCK DISTANCE 17 MILES HMR AT 8800 FEET.
A/C. FPF THANK YOU...(UNINTELLIGIBLE)... THANK YOU.
A/C: BELGRAD HBEMR...(UNINTELLIGIBLE)... TO CLIMB TO ABOUT 9500 FEET.
KL: HBEMR 9500 OR 9200?
A/C: OK I CAN MAINTAIN 9200 FOR THE TIME AND IS IT POSSIBLE TO GET MET INFORMATION OF OSIJEK?
KL: CALL YOU FOR OSIJEK MET REPRT.
A/C: OK AND WHAT IS THE MET REPORT IN BELGRADE?
KL: PRESENTLY WIND 360 DEGREES 9 KNOTS, QNH 1020, VISIBILITY ABOVE 10 KILOMETERS, TEMPERATURE 25, DEWPOINT 18, YOU HAVE OVERCAST AT 2000 FEET, CORRECTION SCATTERED AT 2300 FEET.

09:16:46

A/C: AND ZAGREB APPROACH HUX.
KL: HUX GO AHEAD.
A/C: FOR INFORMATION WE ARE STEERING TO OBR THAN DIRECT TUVAR AT 15... 1500 FEET.
KL: ROGER OSCAR...HMR...HUX 1500 FEET INBOUND OBR TUVAR IS APPROVED.
A/C: THANK YOU VERY MUCH.

09:17:40

A/C: BELGRAD FROM FBV...(UNINTELLIGIBLE)... GOOD AFTERNOON.
KL: FBVVA CONFIRM.
A/C: FBVV SQUAWKING 1775 FLIGHT LEVEL 85 INBOUND NEPOS IN TWENTY MINUTES.
KL: FBVVA ROGER YOU HAVE TRAFFIC AT YOUR THREE O'CLOCK SAME ALTITUDE IT IS FLT.
A/C: OK WE...(UNINTELLIGIBLE)...
KL: AND FBVVA CONFIRM DO YOU HAVE CONTACT WITH FPB?
A/C: NEGATIVE SIR WE DO NOT HAVE CONTACT WITH...(UNINTELLIGIBLE).
KL: ROGER THANK YOU.

09:18:47

A/C: FLT REQUEST CLEARANCE TO CLIMB TO FLIGHT LEVEL 105.
KL: FLT CONFIRM REQUESTED CLIMB TO 10000 FEET.
A/C: 105 FLIGHT LEVEL 105 FLT.
KL: IS APPROVED 10500 FEET BY QNH 1020.
A/C: CLIMBING FLIGHT LEVEL 105 FLT.
A/C: FPF IS ...(UNINTELLIGIBLE)... CLIMBING TO 105.

09:19:36

A/C: BELGRAD FVA FOR INFORMATION WE HAVE LT IN SIGHT NOW.

09:19:58

KL: ROGER. HUX TRY TO CALL FGTPB AGAIN PLEASE.
A/C: ROGER I WILL TRY ON THIS FREQUENCY...FPB GEORGE, FPB GEORGE,...(UNINTELLIGIBLE)... 119.1...(UNINTELLIGIBLE).
A/C: FPB UX GEORGE...(IN FRENCH)..., OK I HAVE NO CONTACT ON 119.1 WITH PBUX.
09:20:39

KL: VVA YOU HAVE FLT IN SIGHT AT YOUR ONE O'CLOCK NOW TWO MILES?
A/C: (UNINTELLIGIBLE)...LT IN SIGHT.
KL: ROGER THANK YOU.

09:21:02

KL: FPB BELGRADE APPROACH DO YOU READ?
KL: FPB IF YOU READ BELGRADE APPROACH PRESS KEEPER TWICE.
A/C: FPB FPB DO YOU READ?
KL: FPB BELGRADE APPROACH READ YOU. GO AHEAD SIR, POSITION**?**

09:22:15

A/C: BELGRAD FPF.
KL: FPF GO AHEAD.
A/C: FPF WE JUST PASSED NEPOS POINT, WE ARE CLIMBING TO 10500 FEET PROCEEDING DIRECTLY TO TUVAR.
KL: ROGER.

09:25:04

KL: FGTPB BELGRADE APPROACH DO YOU READ?

09:25:26

A/C: ...(IN FRENCH).

09:25:46

A/C: ...(IN FRENCH).

09:27:38

A/C: BELGRADE HBEMR.
KL: HBEMR GO AHEAD.
A/C: OK FOR YOUR INFORMATION WE LIKE TO BEGIN SLIGHT DESCENT. FOR THE TIME I AM AT 9000 FEET DESCENDING SLOWLY. WE ARE BECOMING...(UNINTELLIGIBLE)... GROUND CONTACT.
KL: CONFIRM YOU HAVE GROUND CONTACT.
A/C: WE ARE ABOUT FIVE SIX OCTAS AND BEGINING SLIGHT DESCENT.
KL: HMR REPRT FULL GROUND CONTACT.
A/C: I'LL CALL YOU FULL GROUND CONTACT.

09:28:48

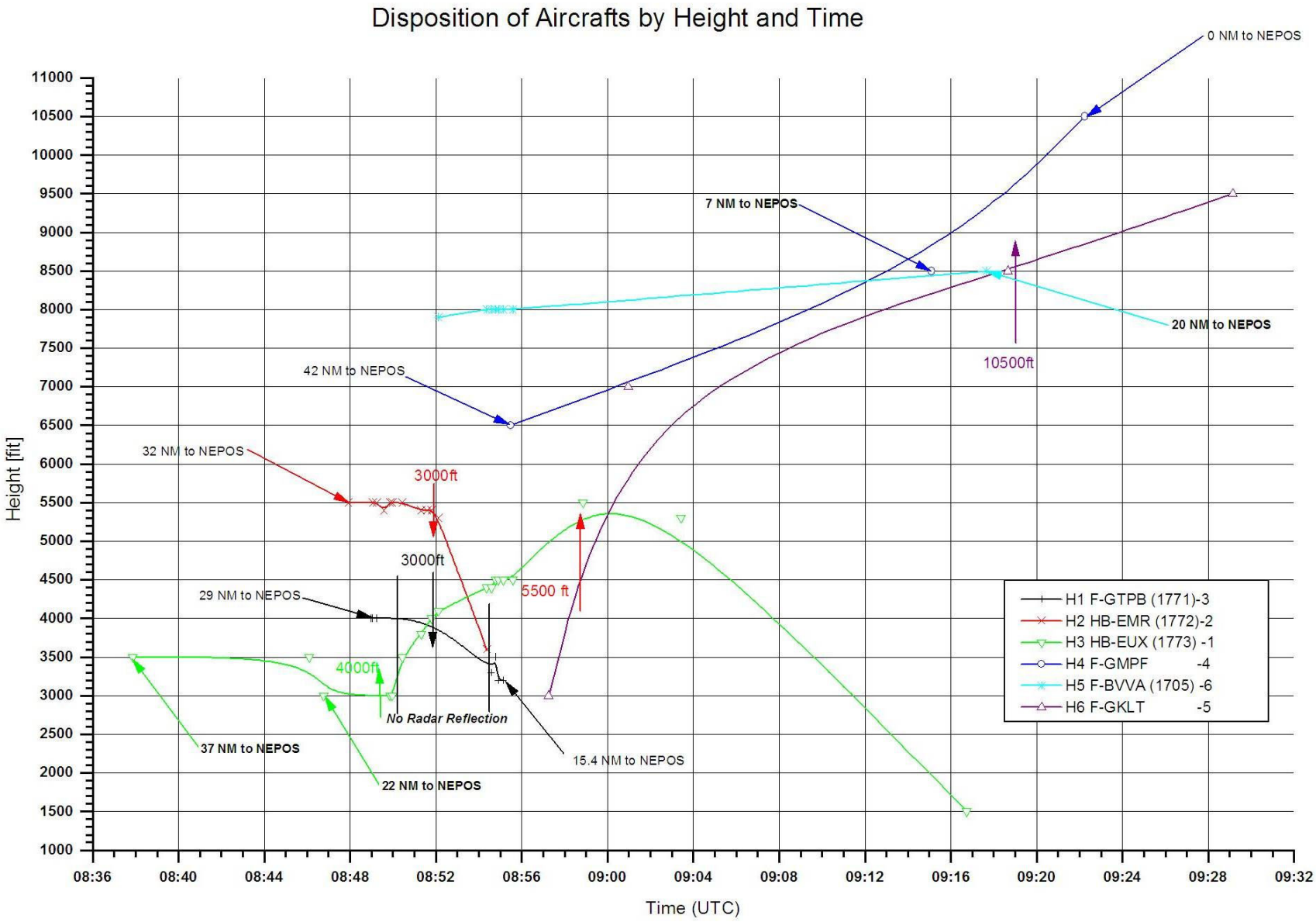
A/C: FLT...(UNINTELLIGIBLE)... FLIGHT LEVEL 105.

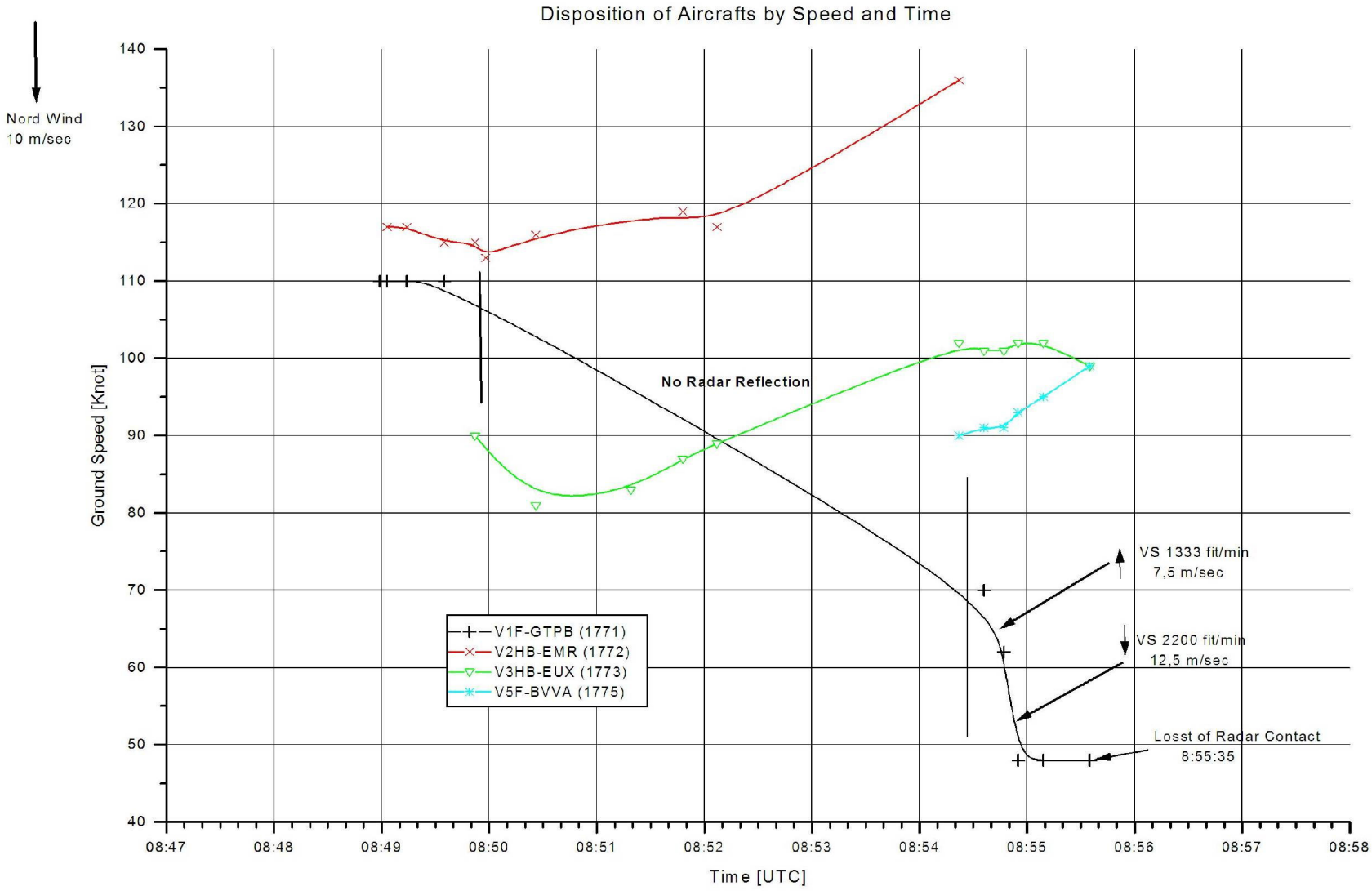
09:29:08

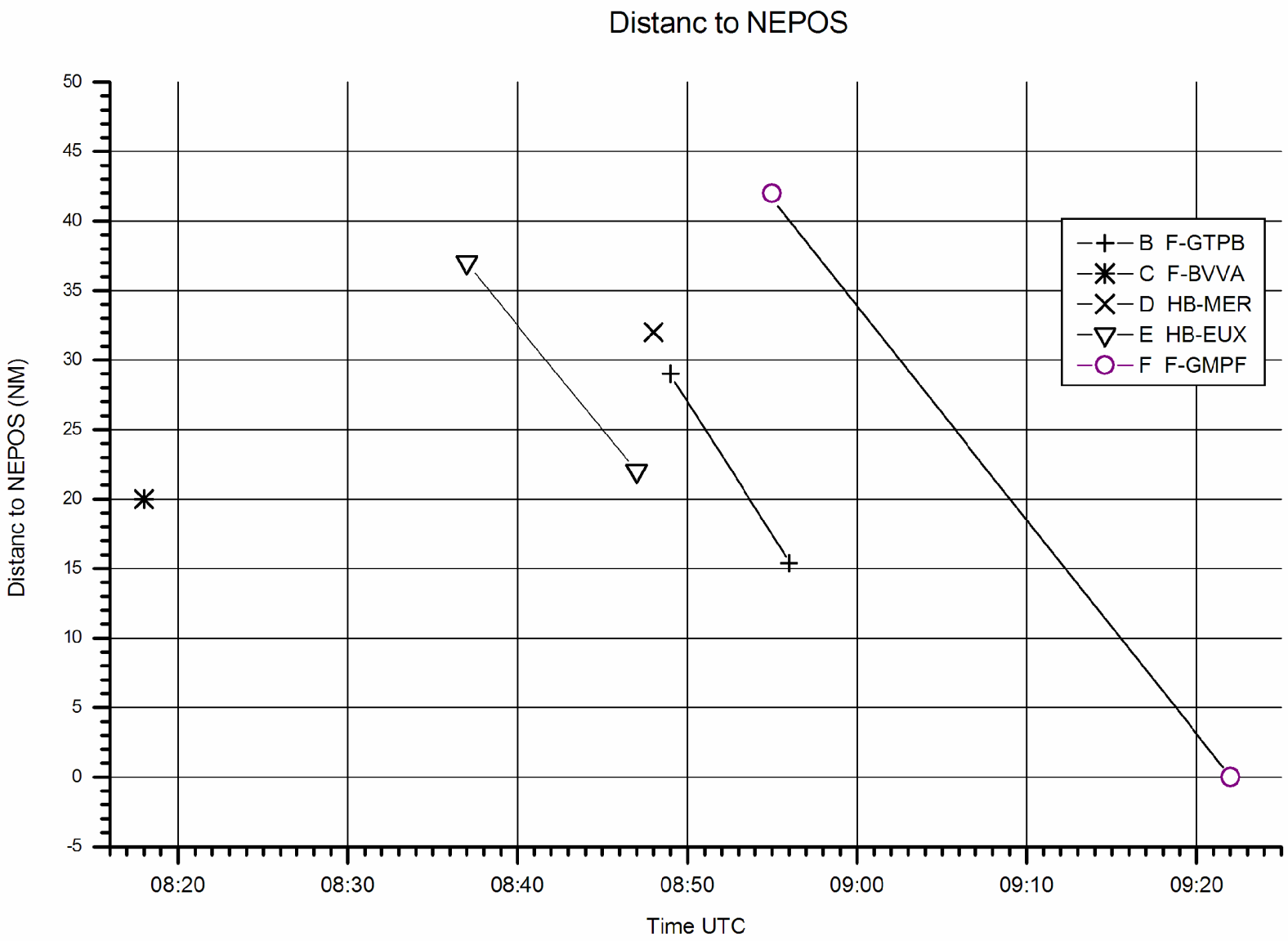
A/C: BELGRADE FROM VA WE ARE ABOVE NEPOS FLIGHT LEVEL 95 AND WE HAVE LT IN SIGHT.
KL: ROGER VFVA TRY AGAIN PLEASE TO CALL FGTPB.
A/C: OK... PB (IN FRENCH)

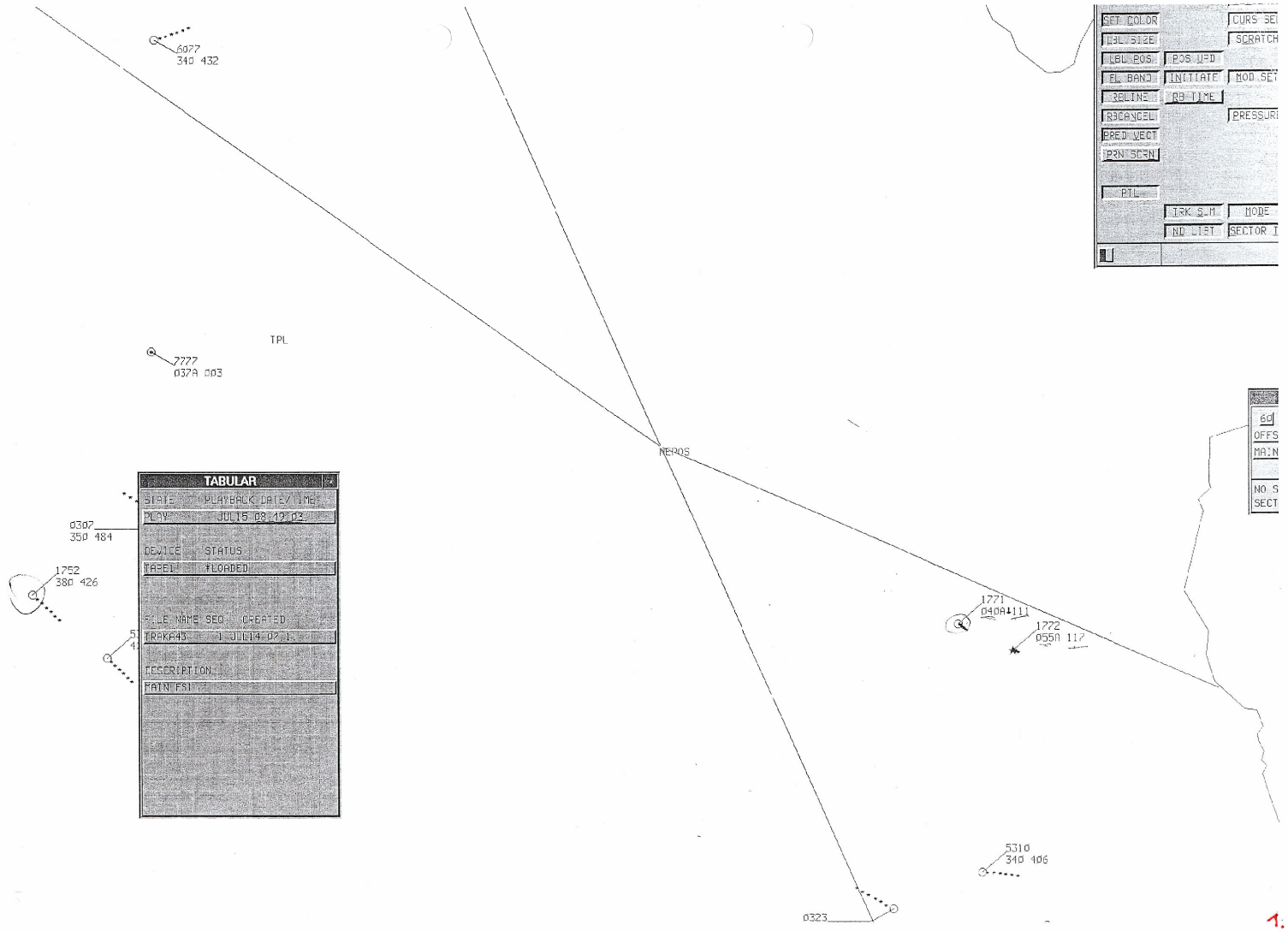
End 09:30:00

Appendix 2
Radar trajectory


Disposition of Aircrafts by Height and Time
Height [fit]
Time (UTC)
11000
10500
10000
9500
9000
8500
8000
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
08:36
08:40
08:44
08:48
08:52
08:56
09:00
09:04
09:08
09:12
09:16
09:20
09:24
09:28
09:32
0 NM to NEPOS
7 NM to NEPOS
20 NM to NEPOS
10500ft
42 NM to NEPOS
32 NM to NEPOS
3000ft
3000ft
5500 ft
29 NM to NEPOS
4000ft
No Radar Reflection
37 NM to NEPOS
22 NM to NEPOS
15.4 NM to NEPOS
H1 F-GTPB (1771)-3
H2 HB-EMR (1772)-2
H3 HB-EUX (1773) -1
H4 F-GMPF -4
H5 F-BVVA (1705) -6
H6 F-GKLT -5


Disposition of Aircrafts by Speed and Time
Nord Wind
10 m/sec
Ground Speed [Knot]
Time [UTC]
140
130
120
110
100
90
80
70
60
50
40
08:47
08:48
08:49
08:50
08:51
08:52
08:53
08:54
08:55
08:56
08:57
08:58
No Radar Reflection
V1F-GTPB (1771)
V2HB-EMR (1772)
V3HB-EUX (1773)
V5F-BVVA (1775)
VS 1333 fit/min
7,5 m/sec
VS 2200 fit/min
12,5 m/sec
Losst of Radar Contact
8:55:35


Distanc to NEPOS
Distanc to NEPOS (NM)
50
45
40
35
30
25
20
15
10
5
0
-5
08:20
08:30
08:40
08:50
09:00
09:10
09:20
Time UTC
B F-GTPB
C F-BVVA
D HB-MER
E HB-EUX
F F-GMPF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TPL
7777
037A 003
NERDS
0307
350 484
1752
380 426
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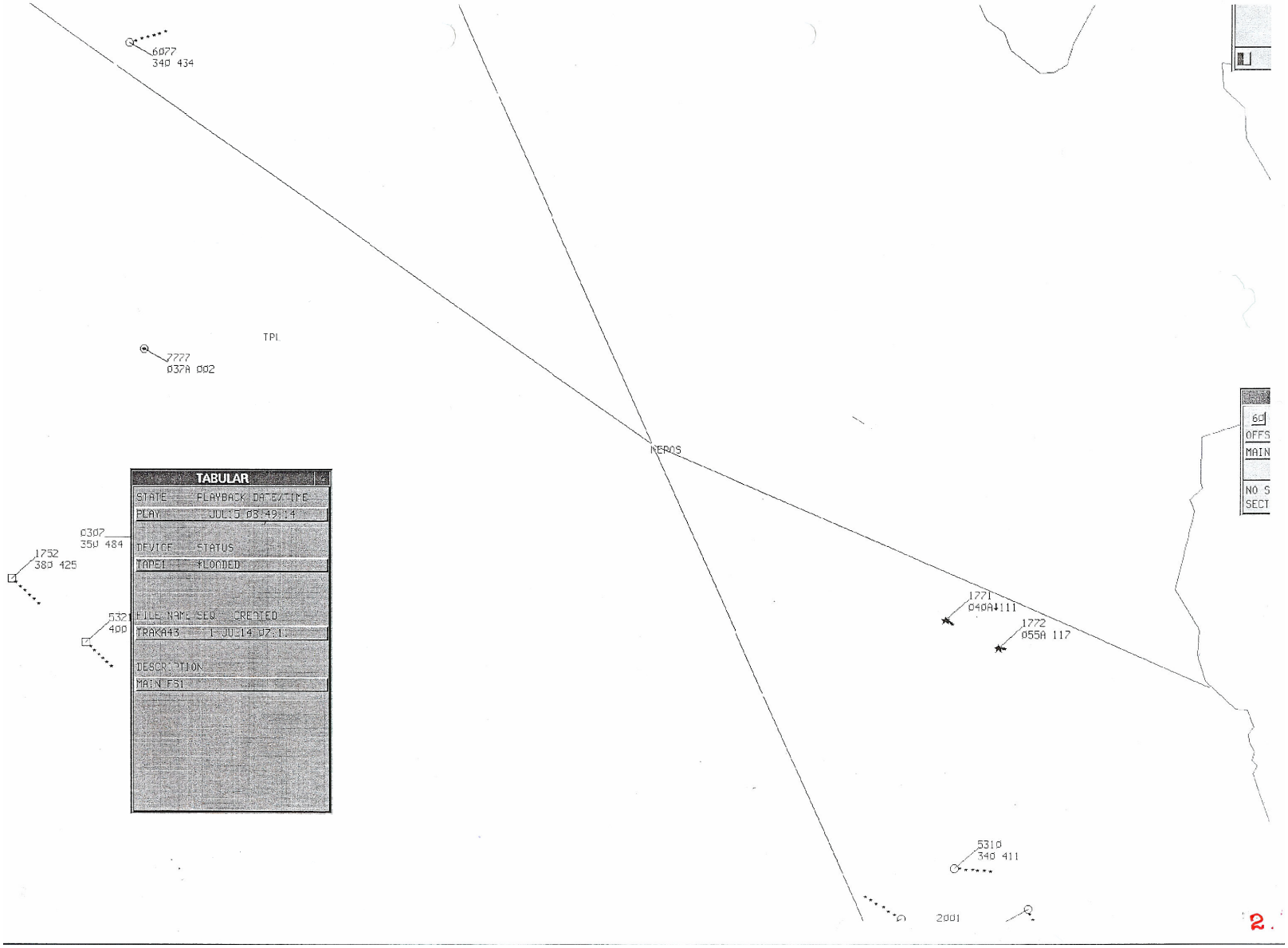
SET COLOR
LBL SIZE
LBL POS
FL BAND
RBLINE
RBCANCEL
BRED VECT
PRN SCRN
PTL
INITIATE
RB TIME
TRK SUM
ND LIST
MODE
1771
040A 111
1772
055A 117
5310
340 406
0323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TAPE1 LOADED
FILE NAME/SEQ CREATED
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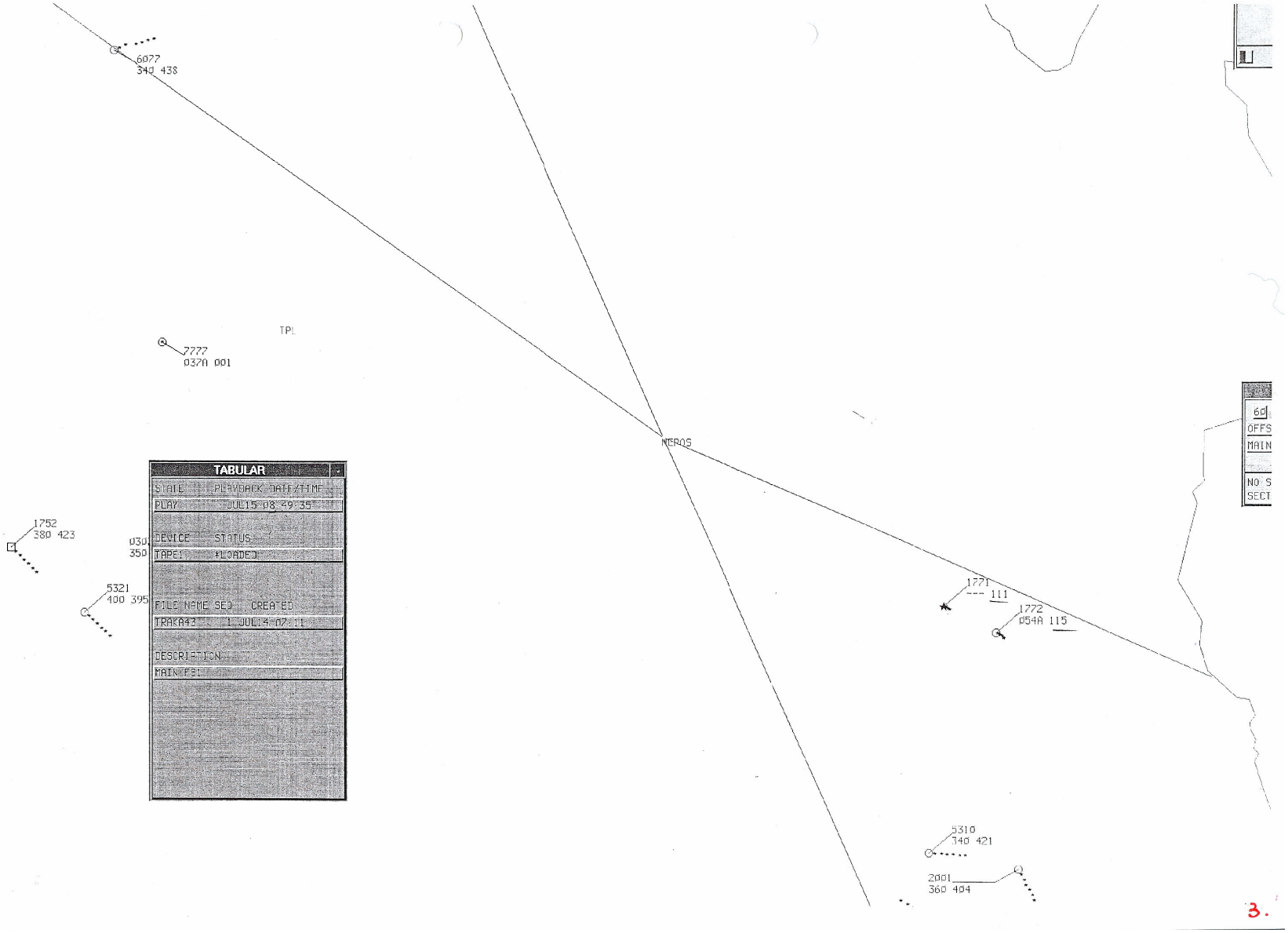
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--- 111
1772
054A 115
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2001
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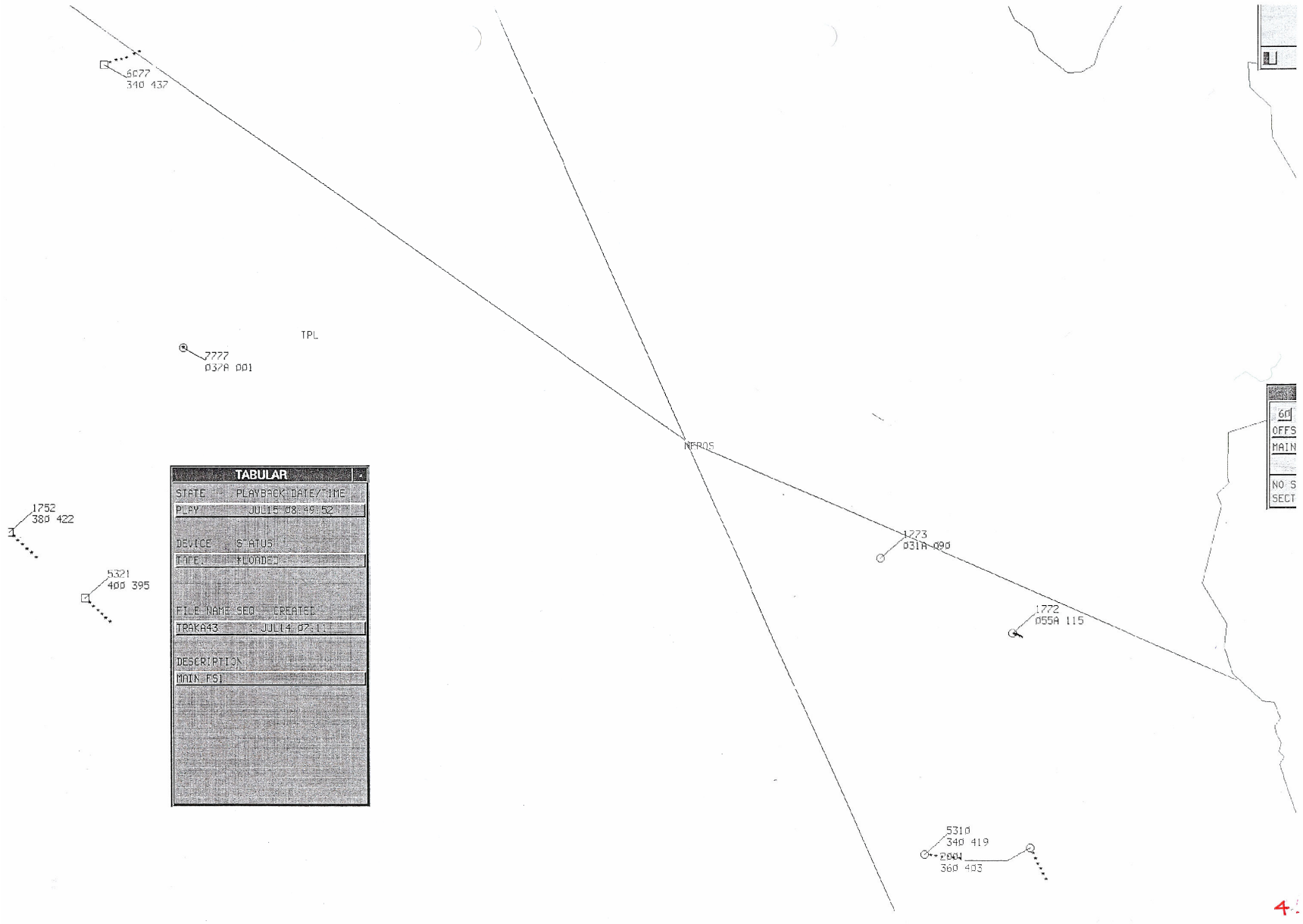
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NERQS
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031A 090
1772
055A 115
5310
340 419
2004
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1752
380 422
5321
400 395
TABULAR
STATE PLAYBACK DATE/TIME
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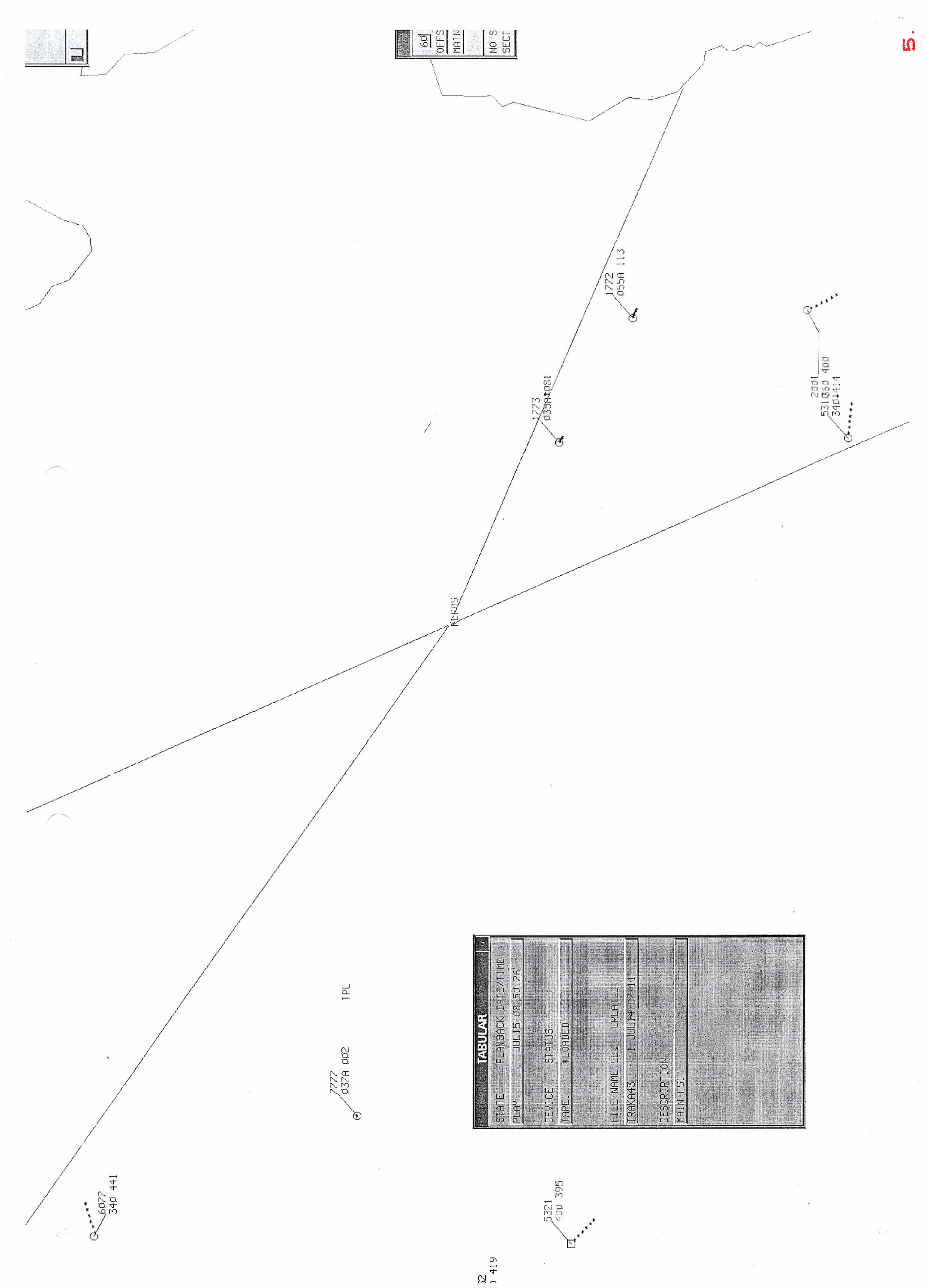
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055A 113
2001
OFFS
MAIN
SECT
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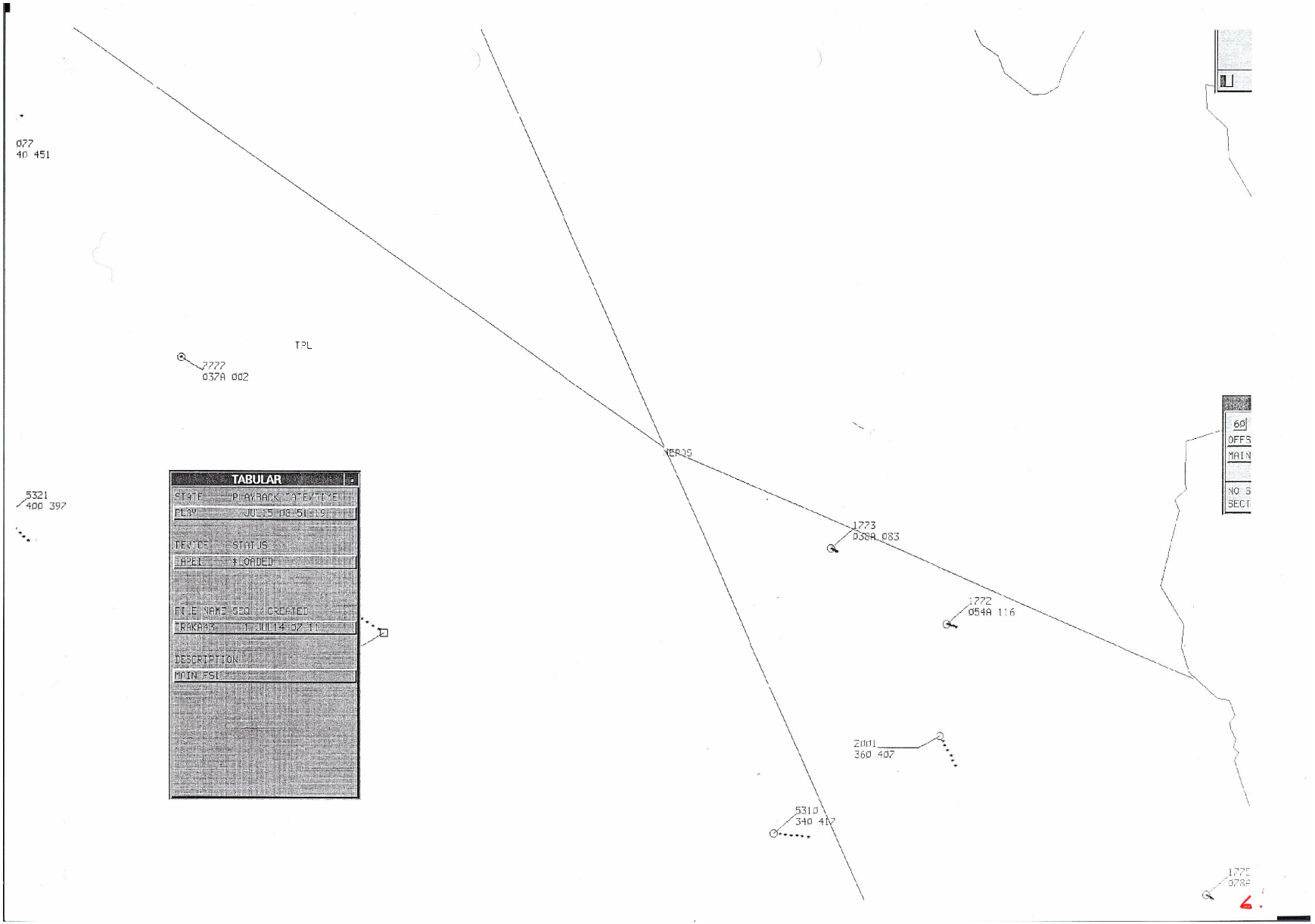
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400 397
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*RAKAMS 1 JUL14 07:11
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2001
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5310
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60
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MAIN
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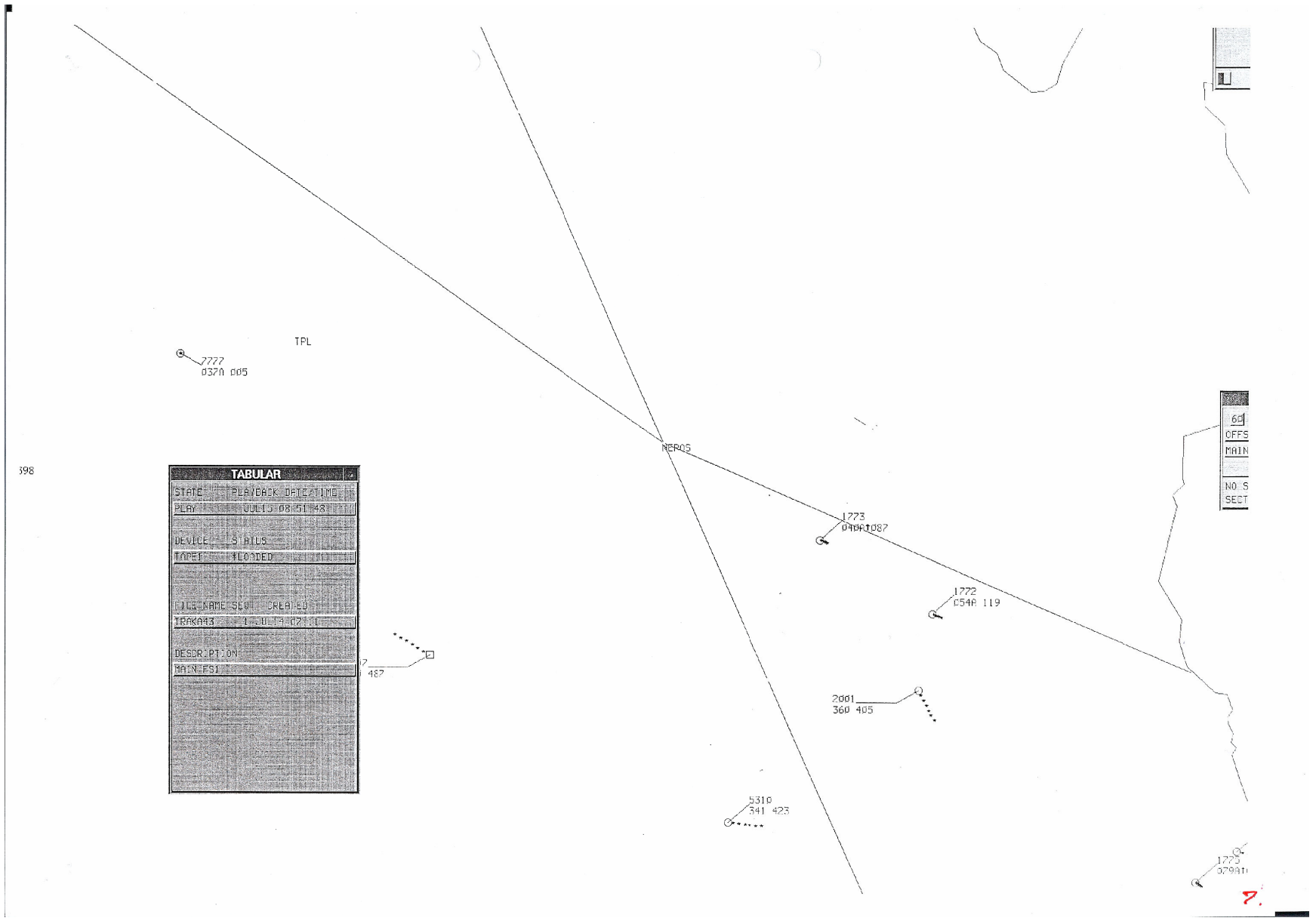
SECT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1772
054A 119
2001
360 405
5310
341 423
1775
079A11
398
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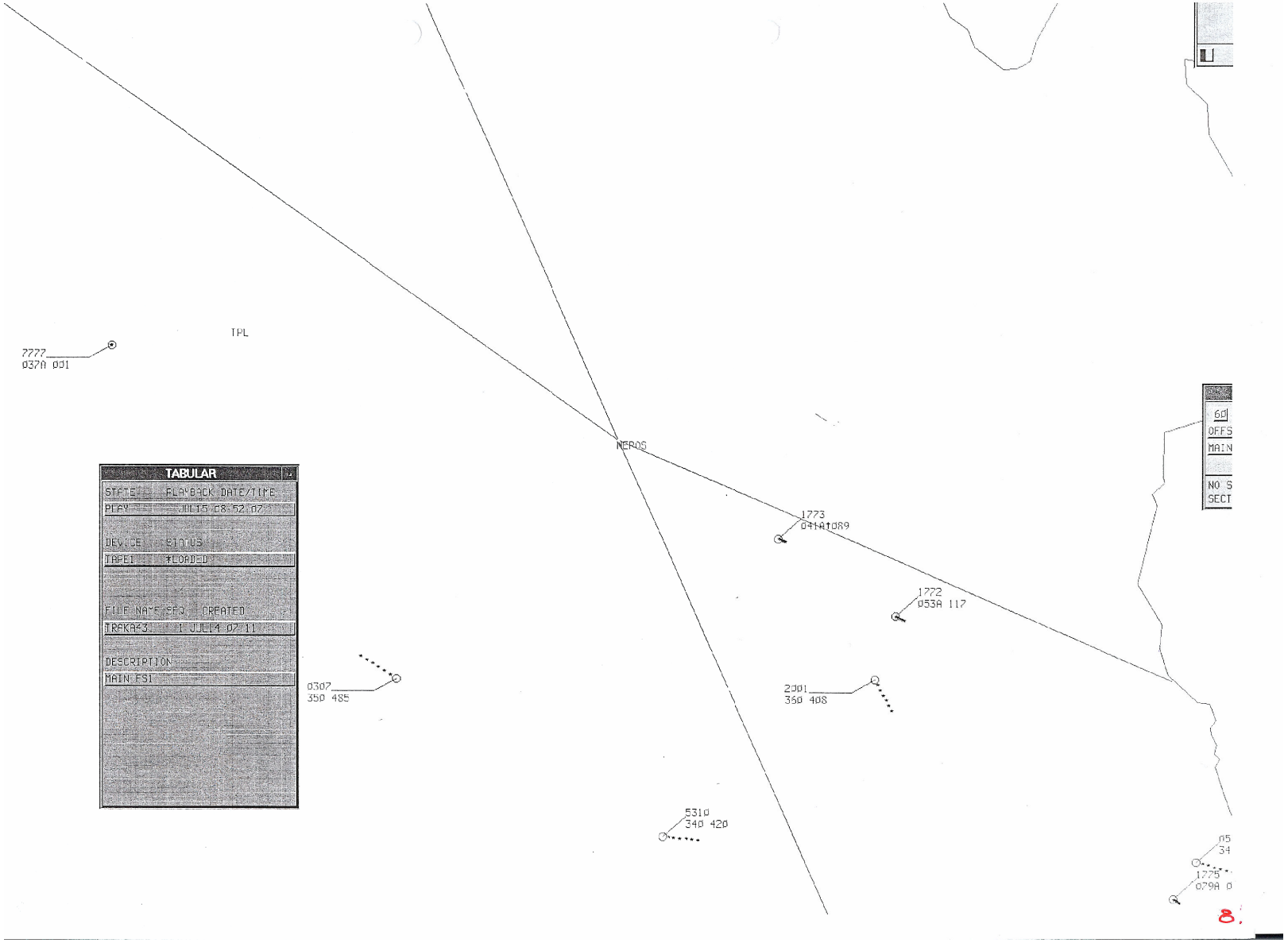
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053A 117
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0307
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079A 0
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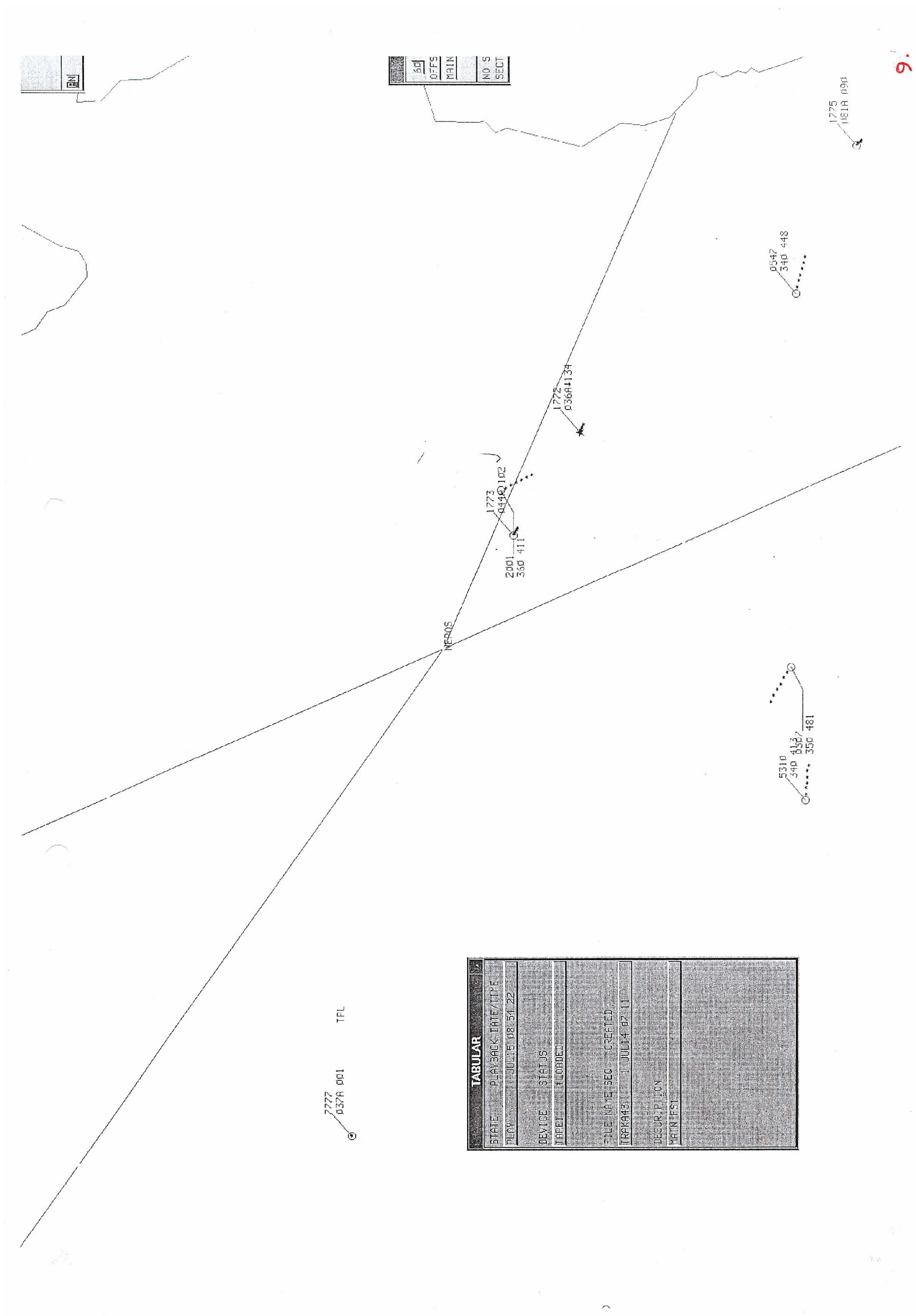

9.
1775
181A 090
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1772
036A↑134
1773
044Q102
2001
330 411
NEROS
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037A 001
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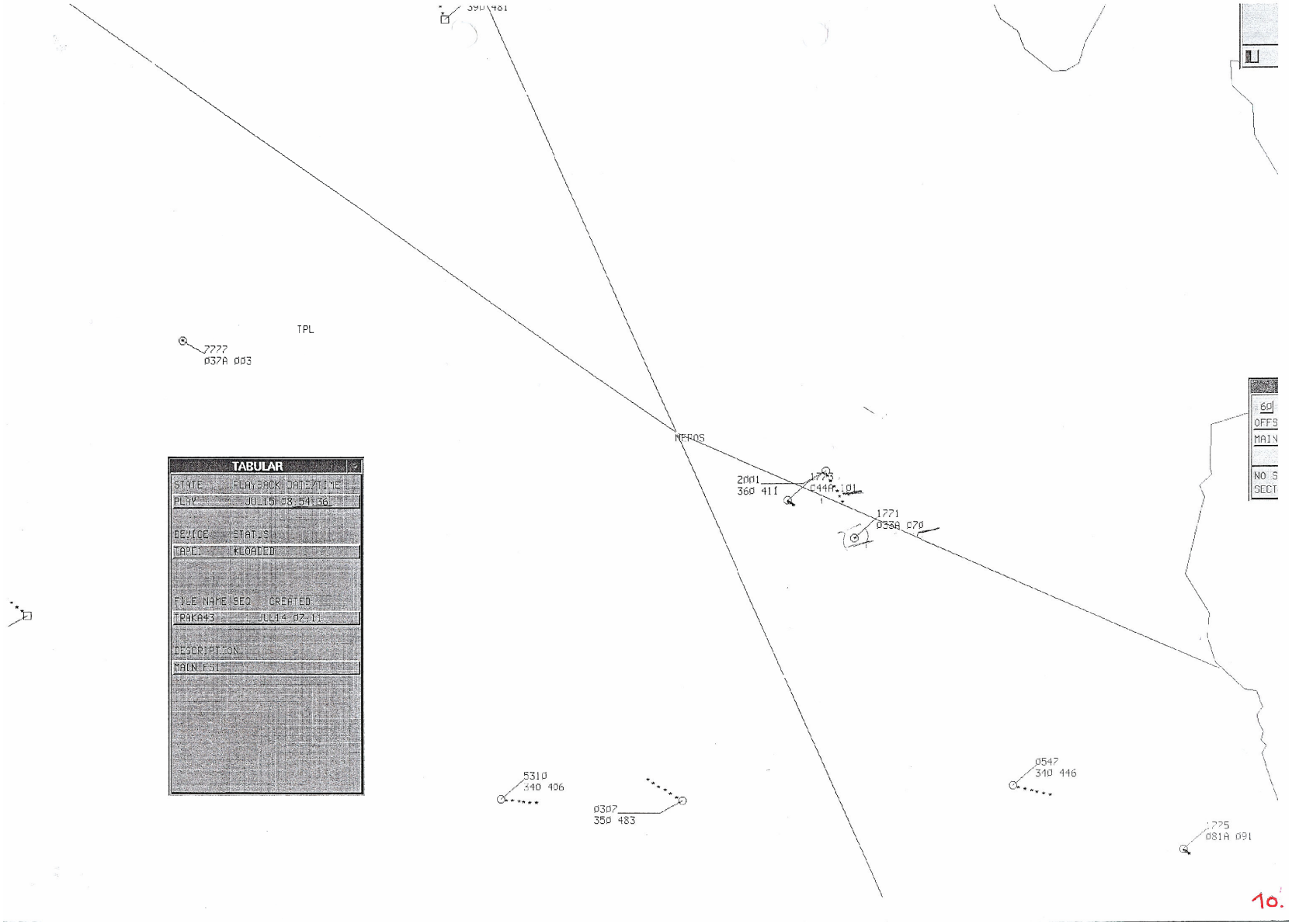
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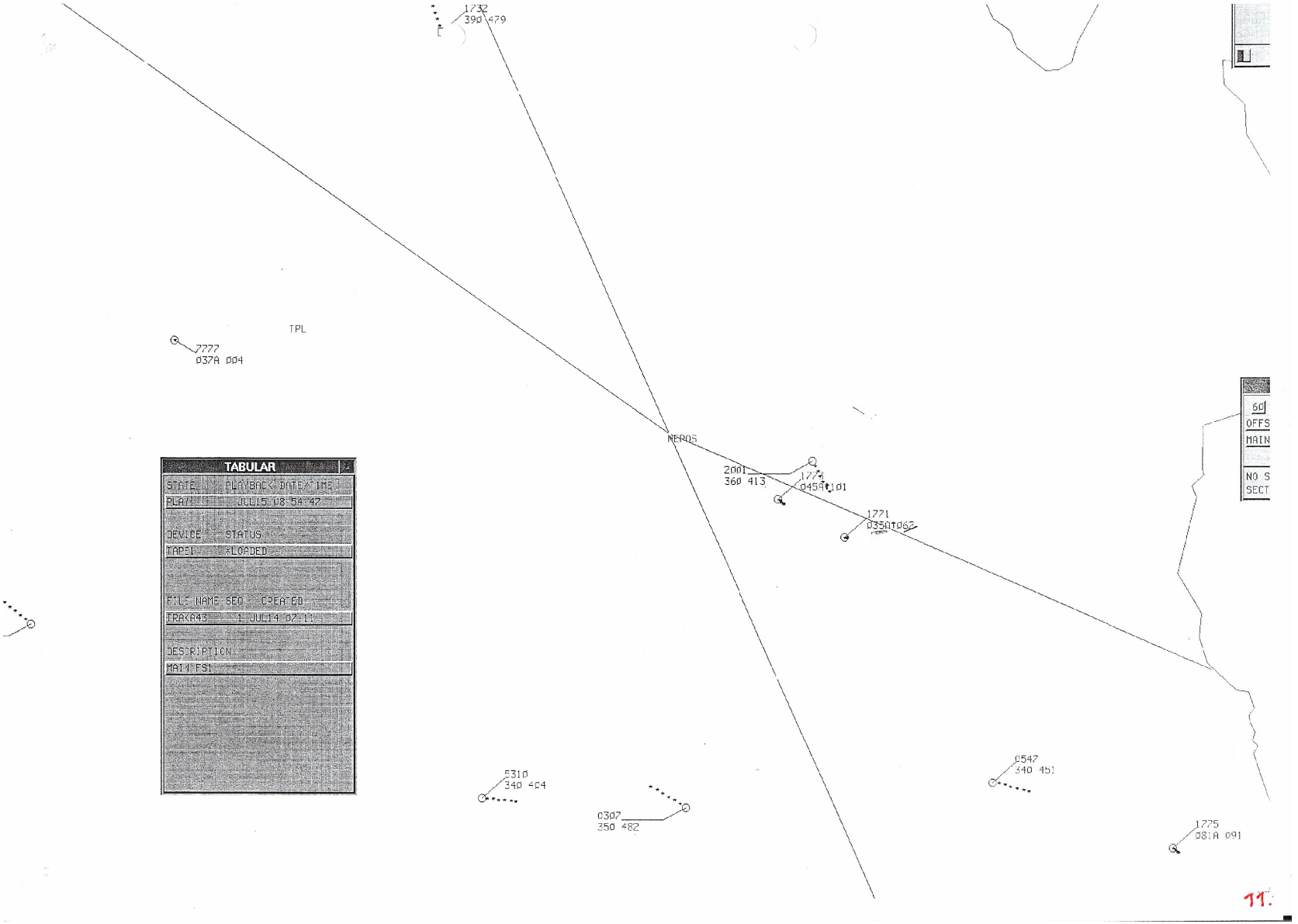
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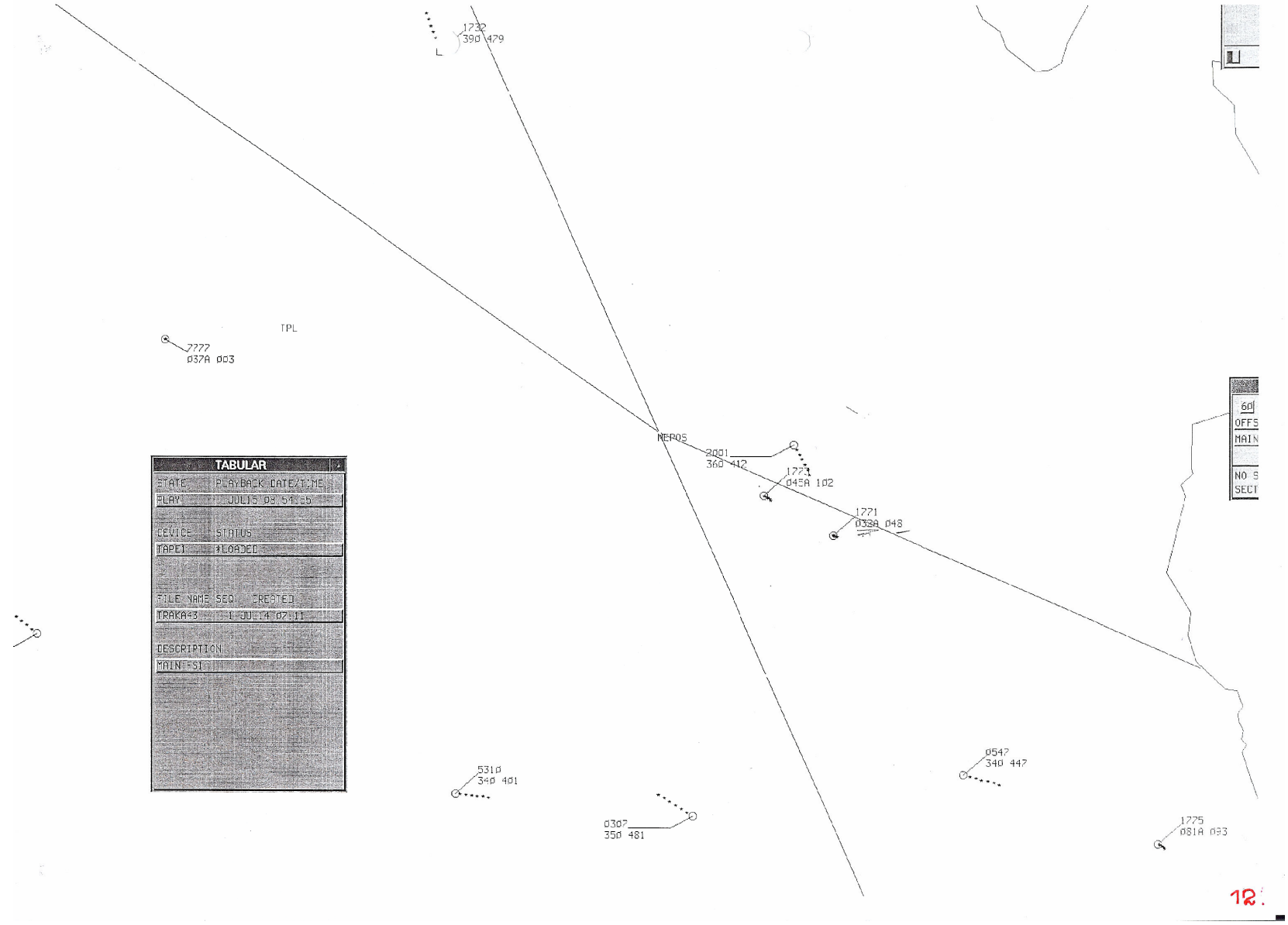
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2001
360 412
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045A 102
1771
032A 048
TABULAR
STATE PLAYBACK DATE/TIME
PLAY JUL15 08 51:55
DEVICE STATUS
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FILE NAME SEQ CREATED
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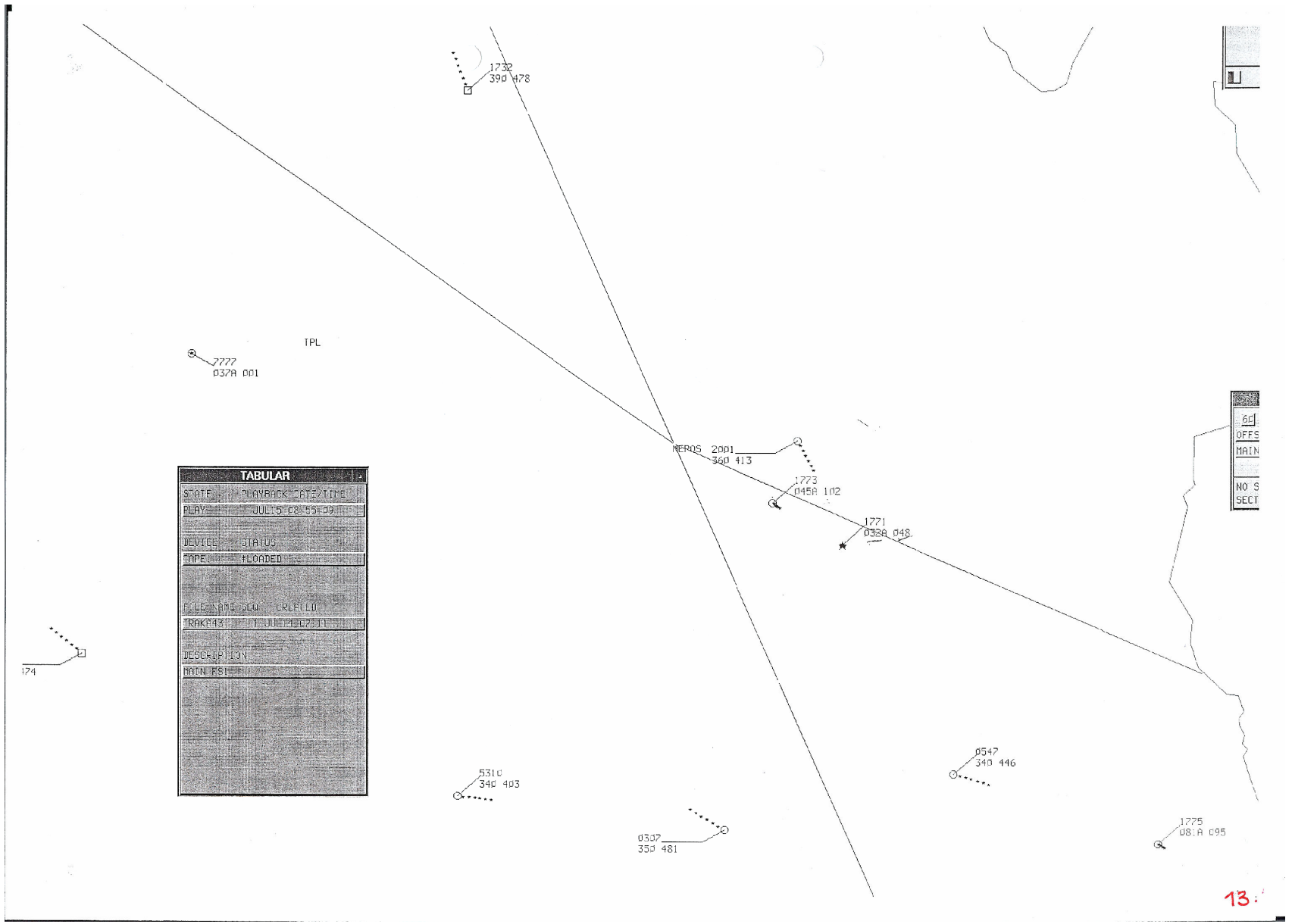
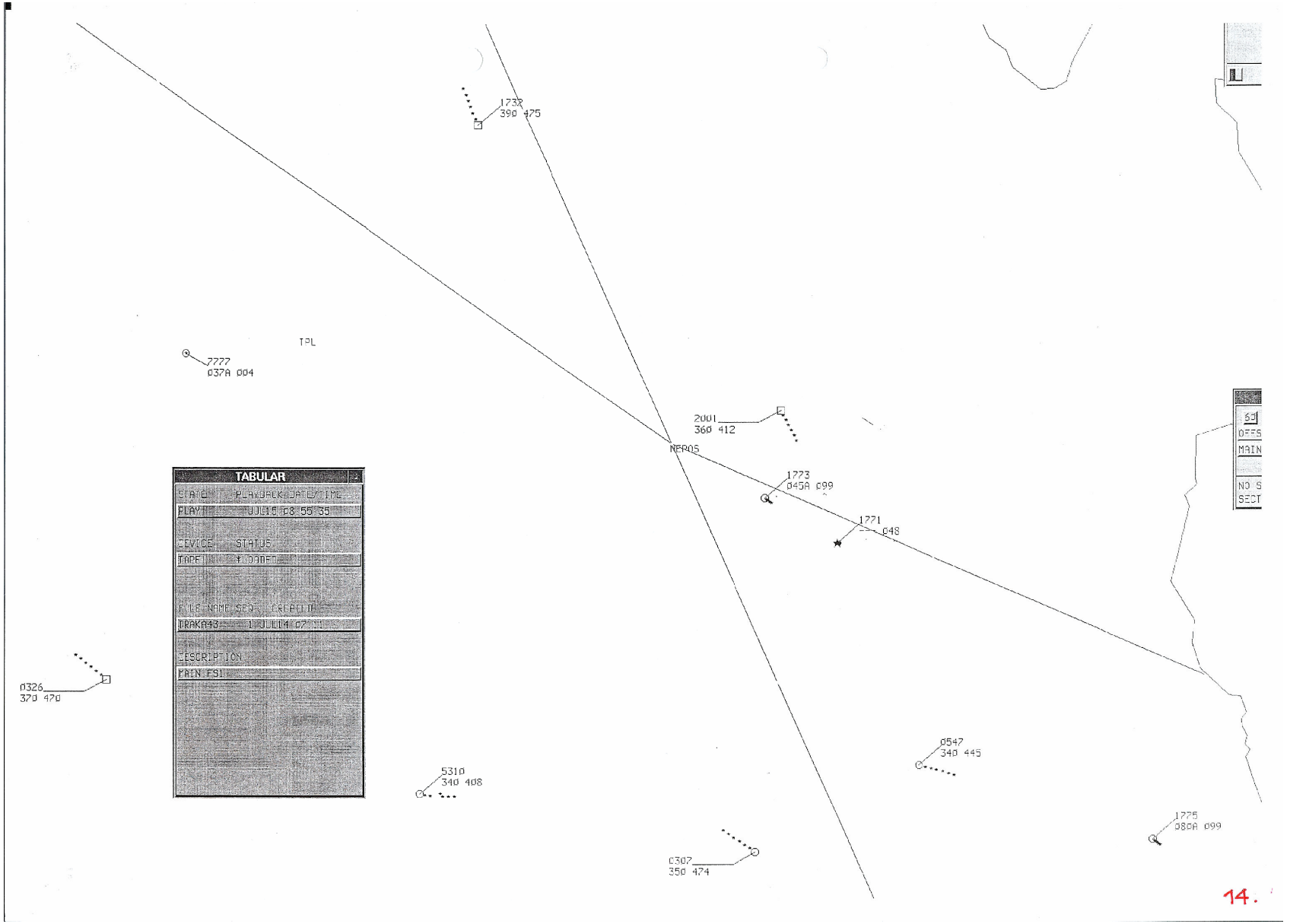
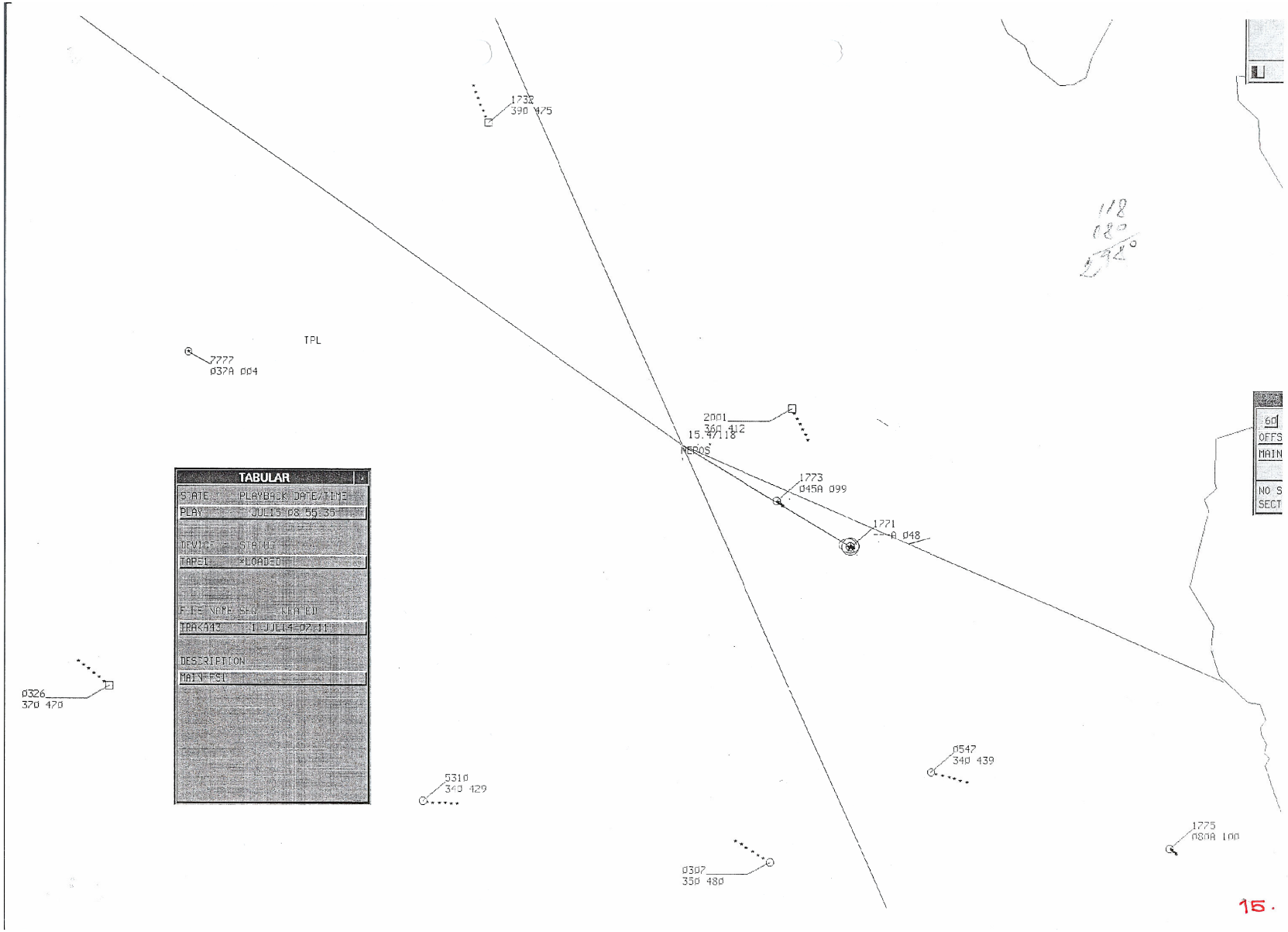
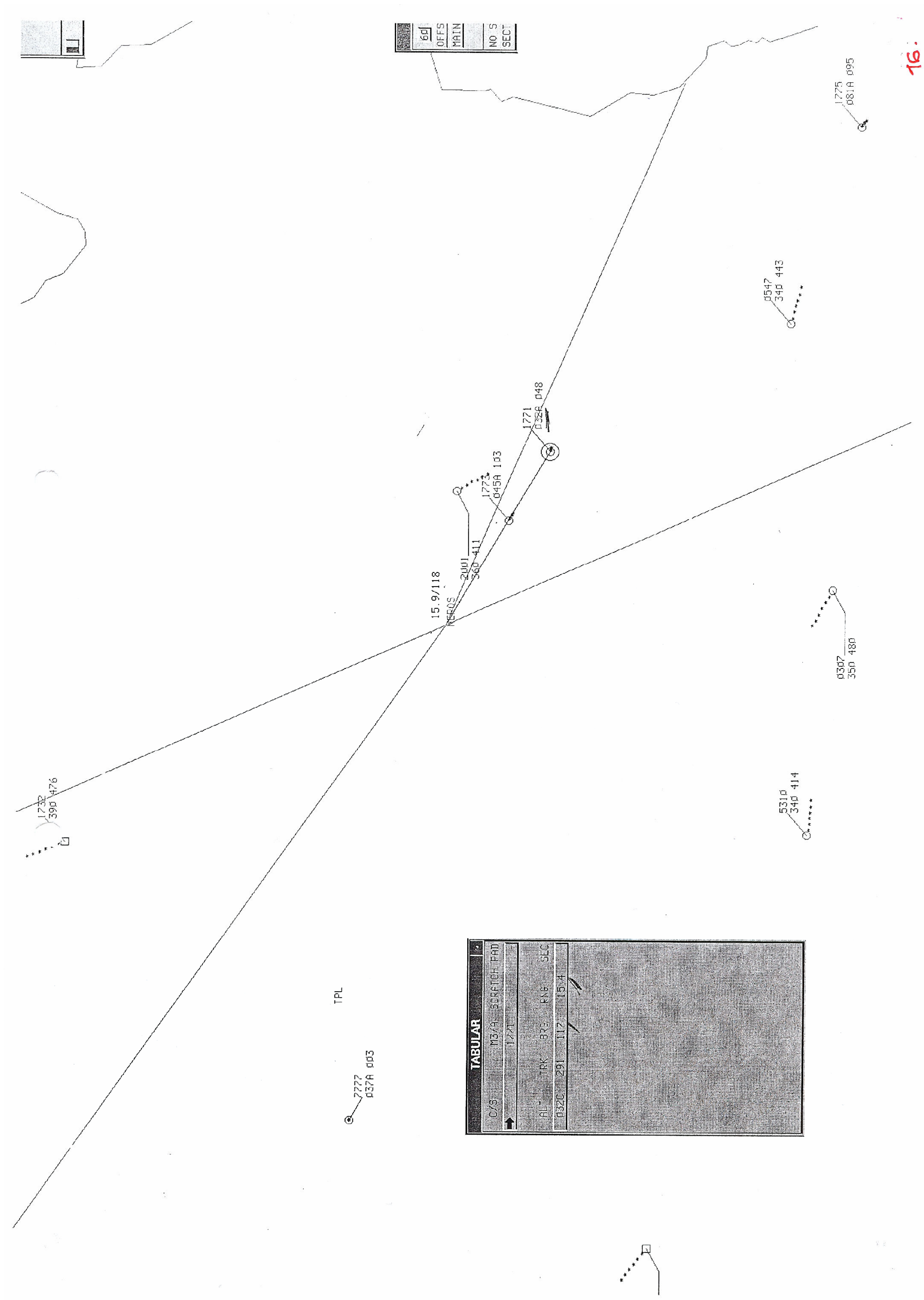
DESCRIPTION
MAINFST
5310
340 401
0307
350 481
0547
340 447
1775
081A 033
60
OFFS
MAIN
NO S
SECT
12.


1732
390 478
TPL
7777
037A 001
NEROS 2001
360 413
1773
045A 102
1771
032A 048
TABULAR
STATE PLAYBACK DATE/TIME
PLAY JUL 5 08:55:09
DEVICE STATUS
TAPE1 LOADED
FILE NAME SCO CREATED
TRAKA43 1 JUL 5 07:11
DESCRIPTION
MAIN FSI
174
5310
340 403
0337
350 481
0547
340 446
1775
081A 095
OFFS
MAIN
NO S
SECT
13:


1732
390 475
TPL
7777
037A 004
2001
360 412
NEROS
1773
045A 099
1771
048
TABULAR
STAND PLAYBACK DATE/TIME
PLAY1 JUL16 08:55:35
DEVICE STATUS
TAPE1 LOADED
FILE NAME SEQ CREATED
TRAKA43 1 JUL14 07:11
DESCRIPTION
MAIN FSI
0326
370 470
5310
340 408
0547
340 445
1775
080A 099
0307
350 474
OFFS
MAIN
NO S
SECT
14.


TABULAR
STATE PLAYBACK DATE/TIME
PLAY JUL15 08:55:35
DEVICE STATUS
TAPE1 *LOADED*
FILE NAME SEQ CRA'ED
TRACK43 1 JUL14 07:11
DESCRIPTION
MAINFS1
TPL
7777
037A 004
1732
390 475
2001
36A 412
15.4/118
REROS
1773
045A 099
1771
A 048
0326
370 470
5310
340 429
0547
340 439
0307
350 480
1775
080A 100
60
OFFS
MAIN
NO S
SECT


TABULAR
C/S
M3/A
SCRATCH PAD
ALT
TRK
BRG
RNG
SEC
15.9/118
TPL
16