REPUBLIC OF SLOVENIA
MINISTRY OF INFRASTRUCTURE

AIRCRAFT ACCIDENT AND INCIDENT INVESTIGATION SERVICE

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Number: 37200-3/2012/132-00121171
Date: 23 October 2014

FINAL REPORT

ON THE INVESTIGATION OF THE AIRCRAFT ACCIDENT INVOLVING HOT AIR BALLOON LINDSTRAND LBL 600C REGISTRATION MARK S5-OLO, WHICH OCCURED ON 23 AUGUST 2012 OVER THE LJUBLJANA MARSHES

"2012"

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INTRODUCTION

This final aircraft accident investigation report contains facts, analysis, causes, and safety recommendations established by the Aircraft Accident Investigation Commission, given the circumstances in which the accident occurred.

In accordance with Article 3.1 of Chapter 3 of the tenth issue of Annex 13 to the Chicago Convention on International Civil Aviation, and pursuant to Article 1 of EU Regulation 996/2010 of European Parliament and Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC, paragraph 4 of Article 137 of the Aviation Act (Official Gazette RS No. 81/10), and Article 2 of the Decree on the investigation of aircraft accidents, serious incidents and incidents (Official Gazette RS No. 72/03 and 110/05), the purpose of the final aircraft accident investigation report is not to determine guilt, or individual or collective responsibility. The fundamental objective of the final aircraft accident investigation report is to prevent aircraft accidents and reduce future risks.

Without a doubt, the final aircraft accident investigation report must contribute to aviation safety.

It is important for the final aircraft accident investigation report to be used to prevent further aircraft accidents. Using the final aircraft accident investigation report for other purposes can lead to misinterpretations.

In case of any divergence of interpretation of the final aircraft accident investigation report, the Slovenian version shall prevail.

COMPOSITION OF THE AIRCRAFT ACCIDENT INVESTIGATION COMMISSSION

Pursuant to Article 5 of EU Regulation 996/2010 of European Parliament and Council on the investigation and prevention of accidents and incidents in civil aviation, Article 138 of the Aviation Act (Official Gazette RS No. 81/10), and Article 7 of the Decree on the Investigation of Aircraft Accidents, Serious Incidents and Incidents (Official Gazette RS No. 72/03 and 110/05), the head of the Aircraft Accident Investigation Service at the Ministry of Infrastructure and Spatial Planning has appointed, by Decision no. 37200-3/2012/12-003 of 11 September 2012, a commission for the investigation the accident involving hot air balloon type LBL 600C, registration mark S5-OLO, by manufacturer LINDSTRAND HOT AIR BALLOONS LTD, which occurred on 23 August 2012 in the area of the Ljubljana marshes, with the purpose of investigating the circumstances in which the accident occurred, establishing the reasons for the aircraft accident, and producing safety recommendations for the prevention of aircraft accidents in the future.

Composition of the Commission:

1. **Roman ROVANŠEK**, Ministry of Infrastructure and Spatial Planning, Aircraft Accident and Incident Investigation Service, Head of Service, Undersecretary – Aircraft Accident and Incident Investigator,

Investigator-in-Charge;

2. **Toni STOJČEVSKI**, Ministry of Infrastructure and Spatial Planning, Aircraft Accident and Incident Investigation Service, Service Director, Undersecretary – Aircraft Accident and Incident Investigator,

Deputy Investigator-in-Charge

3. **mag. Mihael KLAVŽAR**, Colonel, aviation engineer, Ministry of Defence, Service for the Investigation of Aircraft Accidents and Military Aircraft Accidents, Head of Service,

Member of the Commission;

4. **Miloš FILIMONOVIČ**, air traffic controller – free balloon instructor,

Member of the Commission;

5. **Andrej HRABAR**, Head of Operational Meteorological Forecasts Division,
   Member of the Commission;

6. **mag. Frenk KRIŠTOFELC**, Authorized medical doctor for inspecting aviation and other professional personnel,
   Member of the Commission.

In accordance with Article 5.18 of Chapter 5 of tenth issue of Annex 13 to the Chicago Convention on International Civil Aviation, on 29 August 2012 the Director of the United Kingdom Air Accidents Investigation named accredited representative Marko Jervis as chief inspector of aircraft accidents.

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SUMMARY

1. Date and time of the accident: 23 August 2012 at 05:53:25 a.m. UTC (*)

2. Aircraft: Hot air balloon

3. Type: LBL 600C

4. Registration mark: S5-OLO

5. Serial number: 1252

6. Manufacturer: LINDSTRAND HOT AIR BALLOONS LTD., United Kingdom

7. Site of accident: Ljubljana marshes, Republic of Ljubljana

8. Geographic coordinates of the site of the accident: N 45° 59' 324'', E 014° 31' 625''

9. Type of flight: Commercial passenger transport

10. Balloon owner: Društvo balonarski center Slovenija, Gornji trg 7, 1000 Ljubljana

11. Operator: Balonarski center d.o.o., Linhartova cesta 8, 1000 Ljubljana

12. Consequences:

12.1 Injuries:

Injuries	*Crew*	*Passengers*	*Other*
Fatal	-	6	-
Serious	1	11	-
Minor/None	-	14 / 0	

12.2 Damage to the envelope, burner, basket, tank, and equipment: 100% destroyed

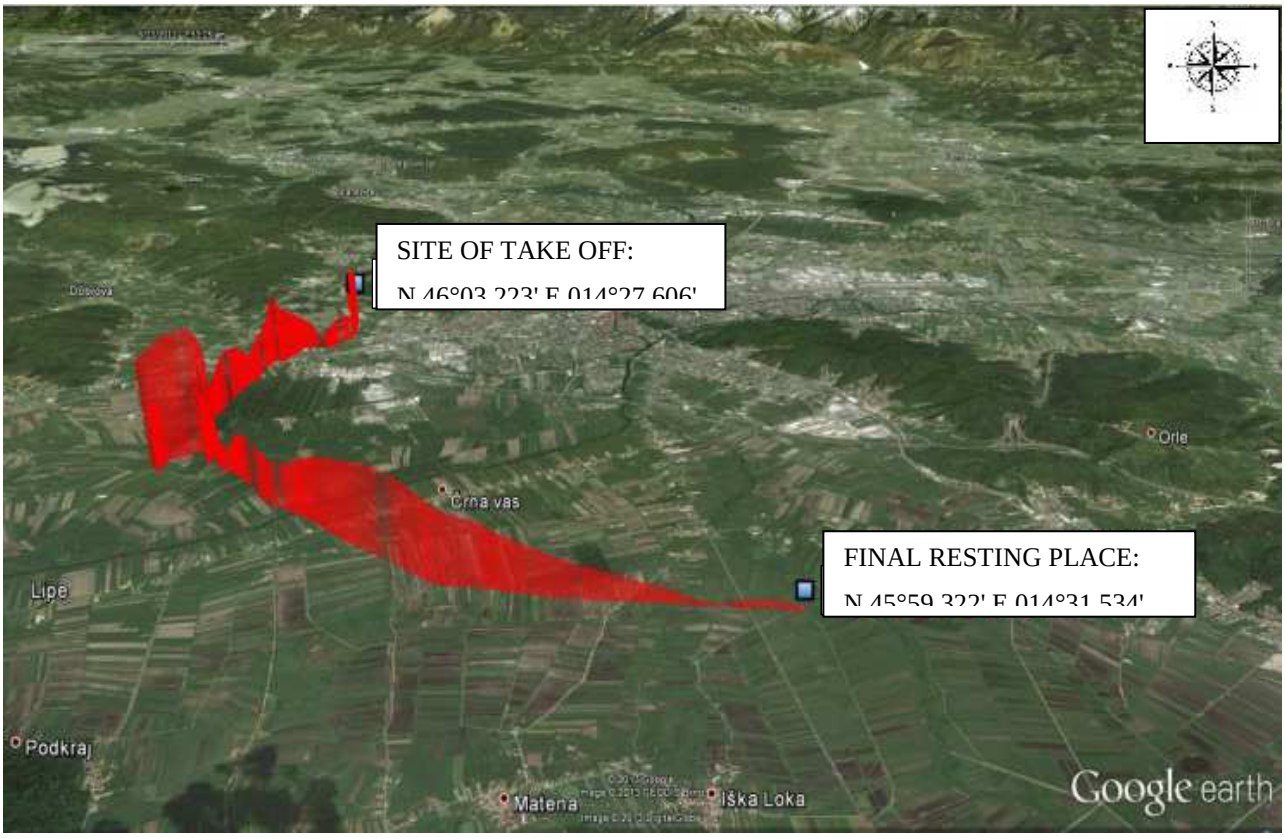
(*) *The time referred to in this report is the Coordinated Universal Time (UTC).*

On the day of the accident, two hours must be added on account of Slovenian local time (UTC + 2).

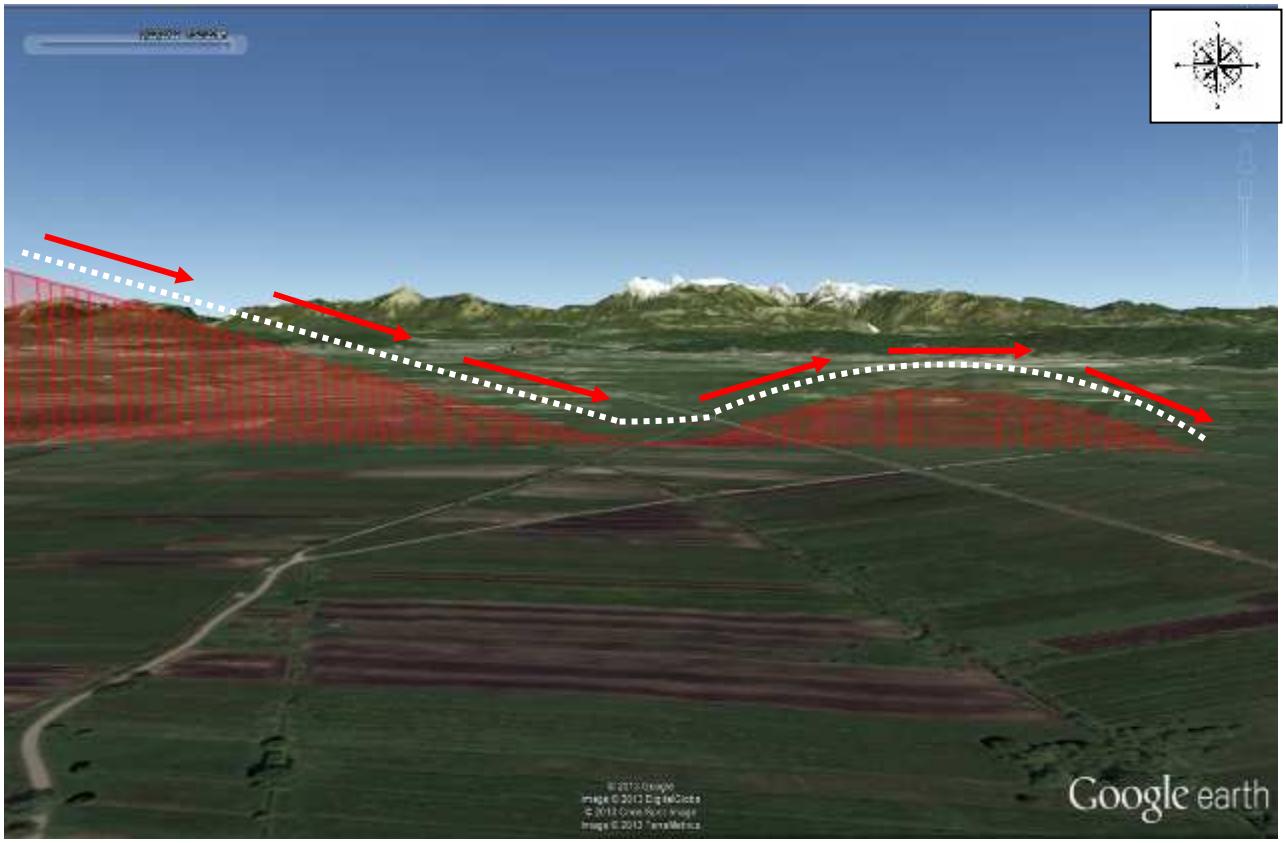
1. FACTUAL INFORMATION

1.1 History of the flight

On 22 August 2012, the operator informed the passengers that their balloon flight would take place on 23 August 2012. The meeting place was at Merkur in Ljubljana Rudnik shopping area. On 23 August 2012 at 03:45:00 a.m. UTC, the passengers convened at the meeting place and they were driven by bus to Ljubljana – Brdo. After arrival at Ljubljana – Brdo the operator began preparing the hot air balloon with registration mark S5-OLO for flight. At 04:54:18 a.m. UTC, the hot air balloon pilot took off with 31 passengers in the basket. After take-off, the balloon started moving towards the south, carried by winds with ground speed of less than 20 km/h, which is a light northern wind. After 05:28:36 a.m. UTC, the balloon reached its highest altitude of the day of 1,371 metres above mean sea level (AMSL), followed by a rapid descent. At 05:45:56 a.m. UTC, the balloon began its final ascent, reaching 956 metres AMSL at 05:48:59 a.m. UTC. During the final ascent, wind speeds increased significantly, exceeding 40 km/h for the first time. During the descent after the final ascent, the direction of the wind changed from the north to north-west, followed by a phase of the balloon's rapid descent, all the way to the ground. The average speed of the balloon's descent from 05:49:16 a.m. UTC to 05:52:05 a.m. UTC, when the balloon first struck the ground, was 3.7 m/s. The balloon's average ground speed at this point was 48 km/h. The highest ground speed at this point was recorded at 05:51:17 a.m. UTC, 180 metres above ground, and reached 63 km/h. Ground speeds of more than 50 km/h were measured from a height of 661 metres AMSL or 374 AGL (above ground level) all the way to first contact with the ground, which occurred at 05:52:05 a.m. UTC at N45°59.367' E014°30.960', 320 metres west of the main road from Ljubljana to Ig. The measured speed of the balloon's basket was 43 km/h. From the recorded flight parameters, it was measured that the balloon's basket dragged along the ground for 27 seconds, a total of 240 metres until 05:52:32 a.m. UTC, at an average speed of 32 km/h, which leads to the conclusion that the speed of the wind pushing it was significantly greater. Afterwards, the balloon once again rose, flew over the main road, and was airborne for the next 43 seconds. The balloon reached the highest measured altitude of 41 metres AGL until at 05:53:15 a.m. UTC at N 45°59.330' E 014°31.479' its basket once again struck the ground. At this point, the highest recorded speed was 42 km/h. The basket's second collision with the ground occurred 340 metres east of the main road, at a recorded ground speed of 37 km/h. After the second collision the basket hit the treetops. In this collision, the pipes in the gas equipment in the balloon's basket were damaged, and gas started leaking. The balloon finally came to rest at 05:53:25 a.m. UTC at N 45°59.322' E 014°31.534'. A fire ensued.



Picture 1: Map of the entire flight of S5-OLO hot air balloon on 23 August 2012



Picture 2: Display of the flight of balloon S5-OLO over the road linking Ljubljana and Ig after the first collision

1.2 Injuries to Persons

Injuries	*Crew*	*Passengers*	*Other*
Fatal	-	6	-
Serious	1	11	-
Minor/None	-	14 / 0	

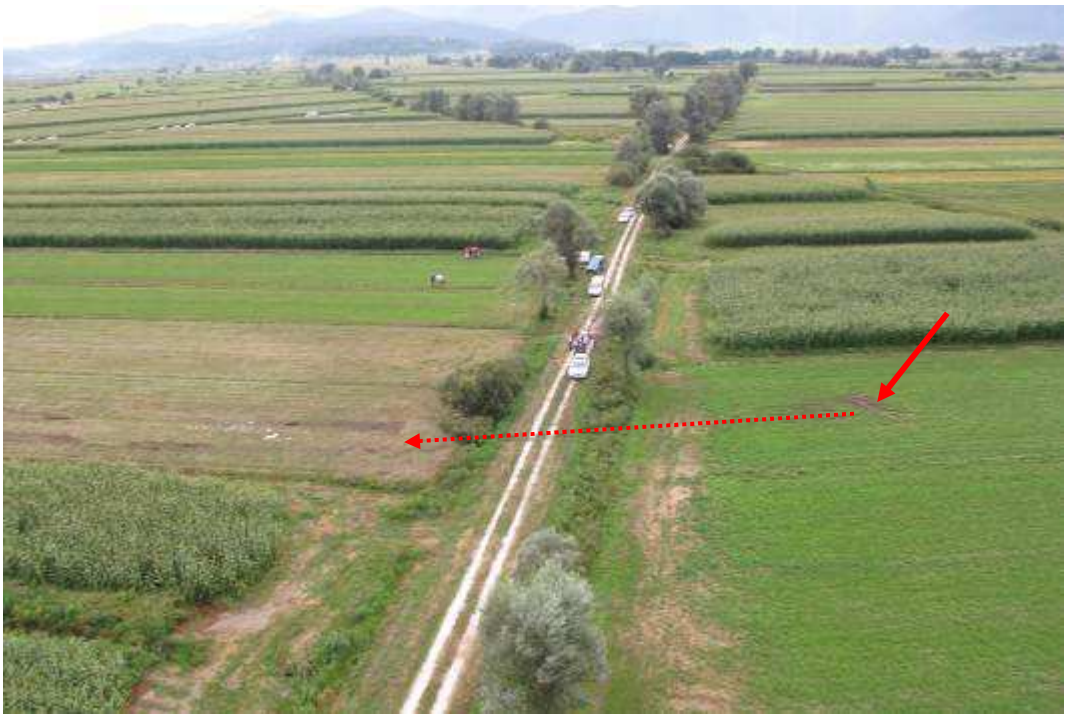
1.3 Damage to aircraft

In the collisions with the ground and the canopy, and later in the fire, the envelope, basket, burner, tank, and equipment were 100% destroyed.

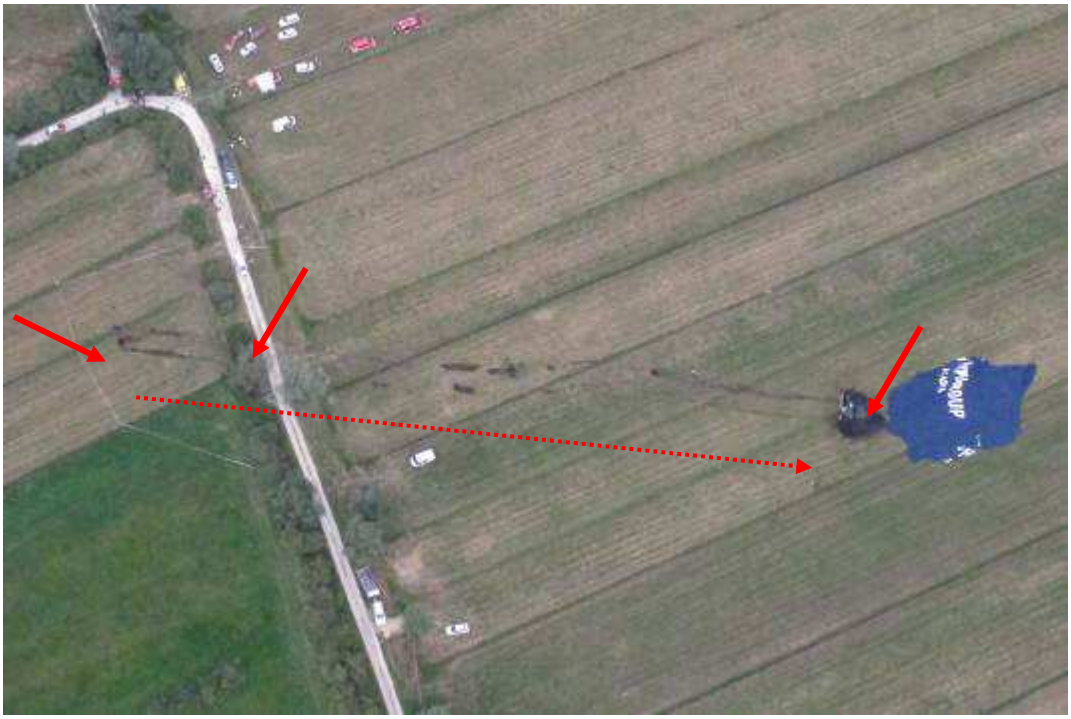
Picture 3: Damage to balloon S5-OLO at the final resting place

1.4 Other damage

In the collisions with the ground and the canopy, and later in the fire, a small area of grass and canopy were damaged. There was no other damage.



Picture 4: Display of the damage after the first collision



Picture 5: Display of the damage after the second collision

1.5 Personnel information

Personnel information was obtained from the Republic of Slovenia Civil Aviation Agency.

1.5.1 Pilot

On the day of the accident, the pilot, a male, 43 years of age, a citizen of the Republic of Slovenia, , was a holder of a valid Free Balloon Pilot Licence. The pilot validated the privileges of the Free Balloon Pilot Licence with a valid Medical Certificate Class 2.

1.5.2 Data from the pilot's license

Type of pilot's licence:	Free Balloon Pilot Licence
Country issuing the licence:	The Republic of Slovenia
Issuing office:	The Civil Aviation Agency
Licence no.:	0140/5810
Date of issue:	12 July 2011
Valid until:	12 July 2013
Special authorizations/Ratings:	N/A

1.5.3 Data from the pilot's medical certificate

Type of medical certificate:	Medical Certificate Class 2
Country of issue:	The Republic of Slovenia
Date of issue:	28 February 2011
Valid until:	28 February 2013
Additional information:	Data of examination: 28 February 2011 Expiration date of previous medical certificate: / Date of general medical examination: 28 February 2011 EKG: Last: 28 February 2011 Next: 28 February 2013 AUDIO/EXTENDED ORL: Last: / Next / OPTHAMALMIC TEST: Last: / Next /

1.5.4 Information on the pilot's total flight time

The Commission did not succeed in acquiring information on the pilot's total flight time with hot air balloons and with the balloon type LBL 600C. The pilot's logbook was destroyed in the fire.

1.6 Information on the hot air balloon

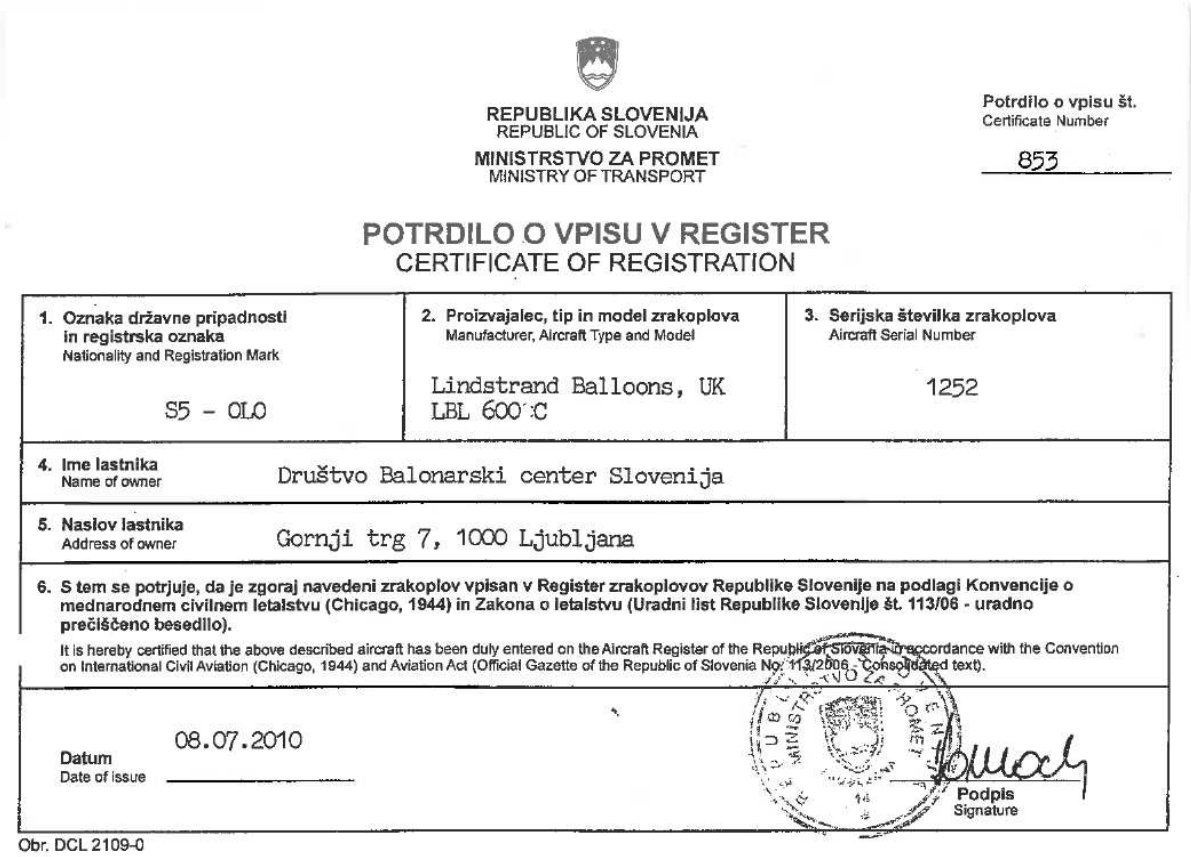
Information on the hot air balloon type LBL 600C with registration mark S5-OLO was obtained from the Republic of Slovenia Civil Aviation Agency and from the hot air balloon manufacturer Lindstrand Hot Air Balloons Ltd, United Kingdom.

Picture 6: Hot air balloon LBL 600C with registration mark S5-OLO on 23 August 2012

1.6.1 Entry into the Aircraft Register

Information on the entry into the Aircraft Register was obtained from the Republic of Slovenia Civil Aviation Agency.

- Country of registration: The Republic of Slovenia
- Confirmation no. on entry into the Register. 853
- Date of entry: 08 July 2010
- Mark of nationality and registration mark: S5-OLO
- Manufacturer: LINDSTRAND HOT AIR BALLOONS LTD., United Kingdom
- Model: LBL 600C
- Serial number: 1252
- Owner name: Društvo balonarski center Slovenija, Gornji trg 7, 1000 Ljubljana



REPUBLIKA SLOVENIJA
REPUBLIC OF SLOVENIA
MINISTRSTVO ZA PROMET
MINISTRY OF TRANSPORT

Potrdilo o vpisu št.
Certificate Number
853

POTRDILO O VPISU V REGISTER
CERTIFICATE OF REGISTRATION

1. Oznaka državne pripadnosti in registrska oznaka Nationality and Registration Mark	2. Proizvajalec, tip in model zrakoplova Manufacturer, Aircraft Type and Model	3. Serijska številka zrakoplova Aircraft Serial Number
S5 - OLO	Lindstrand Balloons, UK LBL 600 C	1252

4. Ime lastnika Name of owner	Društvo Balonarski center Slovenija
5. Naslov lastnika Address of owner	Gornji trg 7, 1000 Ljubljana

6. S tem se potrjuje, da je zgoraj navedeni zrakoplov vpisan v Register zrakoplovov Republike Slovenije na podlagi Konvencije o mednarodnem civilnem letalstvu (Chicago, 1944) in Zakona o letalstvu (Uradni list Republike Slovenije št. 113/06 - uradno prečiščeno besedilo).
It is hereby certified that the above described aircraft has been duly entered on the Aircraft Register of the Republic of Slovenia in accordance with the Convention on International Civil Aviation (Chicago, 1944) and Aviation Act (Official Gazette of the Republic of Slovenia No. 113/2006 - Consolidated text).

Datum
Date of issue 08.07.2010

Podpis
Signature

Obr. DCL 2109-0

Picture 7: Certificate of entry into the Register

1.6.2 Airworthiness of the balloon

Information on airworthiness was obtained from the Republic of Slovenia Civil Aviation Agency. The hot air balloon type LBL 600C with registration mark S5-OLO was airworthy at the time of the accident.

REPUBLIKA SLOVENIJA
REPUBLIC OF SLOVENIA
Država članica Evropske unije
Member State of the European Union

POTRDILO O PREGLEDU PLOVNOSTI
AIRWORTHINESS REVIEW CERTIFICATE

Referenca PPP: **853**
ARC reference:

V skladu z Uredbo (ES) št. 216/2008 Evropskega parlamenta in Sveta, ki je zdaj v veljavi, JAVNA AGENCIJA ZA CIVILNO LETALSTVO REPUBLIKE SLOVENIJE potrjuje, da naslednji zrakoplov:

Pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council for the time being into force, the CIVIL AVIATION AGENCY OF SLOVENIA hereby certifies that the following aircraft :

Proizvajalec zrakoplova: *Aircraft manufacturer:*	**LINDSTRAND HOT AIR BALLOONS LTD**
Oznaka proizvajalca: *Manufacturer's designation:*	**LBL 600C**
Registracija zrakoplova: *Aircraft registration:*	**S5-OLO**
Serijska številka zrakoplova: *Aircraft serial number:*	**1252**

v času pregleda velja za plovnega.
is considered airworthy at the time of the review.

Datum izdaje: *Date of issue:*	**15.07.2012**	**Datum poteka veljavnosti:** *Date of expiry:*	**14.07.2013**
Podpis: *Signed:*		**Št. pooblastila:** *Authorisation No:*	**021-6/2011/1**

Prvo podaljšanje: zrakoplov je bil v zadnjem letu v nadzorovanem okolju v skladu s točko M.A.901 Priloge I k Uredbi Komisije (ES) št. 2042/2003. Ta zrakoplov v času izdaje velja za plovnega.

1st Extension: The aircraft has remained in a controlled environment in accordance with point M.A.901 of Annex I to Commission Regulation (EC) No 2042/2003 for the last year. The aircraft is considered to be airworthy at the time of the issue.

Datum izdaje: *Date of issue:*	**Datum poteka veljavnosti:** *Date of expiry:*
Podpis: *Signed:*	**Št. pooblastila:** *Authorisation No:*
Ime podjetja: *Company name:*	**Referenca odobritve:** *Approval reference:*

Drugo podaljšanje: zrakoplov je bil v zadnjem letu v nadzorovanem okolju v skladu s točko M.A.901 Priloge I k Uredbi Komisije (ES) št. 2042/2003. Ta zrakoplov v času izdaje velja za plovnega.

2nd Extension: The aircraft has remained in a controlled environment in accordance with point M.A.901 of Annex I to Commission Regulation (EC) No 2042/2003 for the last year. The aircraft is considered to be airworthy at the time of the issue.

Datum izdaje: *Date of issue:*	**Datum poteka veljavnosti:** *Date of expiry:*
Podpis: *Signed:*	**Št. pooblastila:** *Authorisation No:*
Ime podjetja: *Company name:*	**Referenca odobritve:** *Approval reference:*

EASA Form 15a – 3. izdaja / *Issue 3*

Picture 8: Airworthiness review certificate for hot air balloon S5-OLO

1.6.3 Type Certificate

Information on the type certificate was obtained from the manufacturer, Lindstrand Hot Air Balloons Ltd., Great Britain.

European Aviation Safety Agency

TYPE CERTIFICATE

EASA.BA.503

This certificate, established in accordance with Regulations (EC) No 1592/2002 and (EC) No 1702/2003 and issued to

LINDSTRAND HOT AIR BALLOONS Ltd.

Oswestry
United Kingdom

certifies that the aircraft type design listed below complies with the applicable Type Certification Basis and environmental protection requirements when operated within the conditions and limitations specified on the associated Type Certificate Data Sheet N° BA.503

Model	Date of issue
Lindstrand C Type	16 April, 2007

This certificate and its associated type-certificate data sheet, which is a part thereof, shall remain valid unless otherwise surrendered or revoked.

For the European Aviation Safety Agency,

Massimo MAZZOLETTI
Certification Manager Rotorcraft, Balloons and Airships

Picture 9: Type certificate EASA.BA.503

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European Aviation Safety Agency

EASA

TYPE-CERTIFICATE DATA SHEET

LINDSTRAND C TYPE HOT AIR BALLOONS

-

Manned Free Hot Air Balloons

Type Certificate Holder: **LINDSTRAND HOT AIR BALLOONS LTD**
Maesbury Road
Oswestry
Shropshire
SY10 8ZZ
United Kingdom

Manufacturer: **LINDSTRAND HOT AIR BALLOONS LTD**
Maesbury Road
Oswestry
Shropshire
SY10 8ZZ
United Kingdom

For Variants: Lindstrand C Type

Issue 3, 9 February 2011
Issue 2, 12 July 2007
Issue 1, 16 April 2007

List of effective Pages:

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SECTION 1: GENERAL (ALL TYPES AND VARIANTS)

I. General

1.	Data Sheet No: EASA.BA.503	Issue Date: 9 February 2011
2.	Type / Variant or Model	
	(a) Type:	Lindstrand C Type
	(b) Variant or Model:	Refer to Section 2
3.	Airworthiness Category:	Standard
4.	Type Certificate Holder:	**LINDSTRAND HOT AIR BALLOONS LTD** Maesbury Road Oswestry Shropshire SY10 8ZZ United Kingdom
5.	Manufacturer:	**LINDSTRAND HOT AIR BALLOONS LTD** Maesbury Road Oswestry Shropshire SY10 8ZZ United Kingdom
6.	National approval date:	Various, refer to Section 2
7.	CAA Application date:	Various, refer to Section 2, Application Date
8.	CAA Recommendation date:	-
9.	EASA Certification date:	16 April 2007
10.	TCDS History:	This EASA TCDS replaces the British TCDS (see Certification Basis Section 2) issued by the UK CAA

II. Certification Basis

1.	Reference Date for determining the applicable requirements:	Various, see Application Date in Table 2, Section 2
2.	UKCAA Type Certificate Data Sheet No.: BB24	
3.	UKCAA Type Certification Basis:	Various, refer to Section 2, Table 2
4.	Airworthiness Requirements:	See Table 2 in Section 2 Aircraft certified in accordance with the British Civil Airworthiness Requirements, Part 31, issue dated 31/8/84 are indicated in Table 2 with ■ Aircraft certified in accordance with EASA CS 31HB (final CG9 draft 27 February 2003) are indicated in Table 2 with ♦ Aircraft certified in accordance with EASA CS 31HB (February 2009) are indicated in Table 2 with ♥
5.	Special Conditions:	None
6.	Reversion and Exemptions:	None

7. Equivalent Safety Findings: None

III. Technical Characteristics and Operational Limitations

1.	Type Design Drawing:	Refer to Section 2, Table 1 column headed "Dwg"
2.	Description:	Manned Free Hot Air Balloons of conventional shape (i.e.natural). Volumes range from 400 000 – 600 000 ft^3 (11 326 to 16 886 m^3). Envelopes are fitted with rip panel, parachute, combination rip panel and parachute, or rapid deflation systems. Envelope options include rotation vents (turning vents), pressure scoop, skirt and limited inflated artwork as required. The envelope is attached to the burner load frame/basket using stainless steel flying wires Burners (heaters) are specified in triple or quadruple configurations dependant on envelope size. Each unit incorporates a main burner, quiet burner and pilot light as a minimum. Baskets are generally of traditional woven cane construction in Double Tee Partition configurations. The stainless steel suspension cables of the basket attach to the burner load frame and envelope using carabiners. Pressurised fuel cylinders, manufactured from Titanium, Stainless Steel or Aluminium, are available in volumes of 47 to 90 litres. The cylinders have the facility to withdraw the fuel as liquid. Additional equipment is mounted in the basket as required.
3.	Equipment:	Equipment is listed in the Approved Lindstrand Balloons Flight Manual - Issue 1.35 or later approved EASA revision.
4.	Envelope:	Refer to Section 2 and Lindstrand Balloons Flight Manual and Supplements - Issue 1.35 or later approved EASA revision.
5.	Burner:	Refer to Section 2 and Lindstrand Balloons Flight Manual and Supplements - Issue 1.35 or later approved EASA revision.
6.	Basket:	Refer to Section 2 and Lindstrand Balloons Flight Manual and Supplements - Issue 1.35 or later approved EASA revision.
7.	Mass:	Refer to Section 2. Note: MTOM = Maximum Take-Off Mass, MLM =Minimum Landing Mass.
8.	Envelope Temperature:	The maximum continuous envelope temperature that is permitted is 125°C (257°F). The never exceed temperature for the envelope is 127°C (261°F).
9.	Minimum Crew:	One (Pilot).
10.	Maximum Occupants:	Not to exceed maximum take off mass and limitations. Refer to Approved Aircraft Flight Manual, Issue 1.35 or later approved EASA revision.

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11. Fuel: Water-free LPG. Propane is the preferred fuel but some content of other hydrocarbons is permissible provided that minimum recommended fuel pressures are maintained throughout the flight.

12. Other Limitations: A minimum of three independent cylinders with provision to supply pilot lights are required for a triple burner and four cylinders for a quadruple burner. Extra cylinders may be used.

IV. Operation and Service Instructions

1. Lindstrand Balloons Flight Manual and Supplements - Issue 1.35 or later approved EASA revision.

2. Lindstrand Balloons Maintenance Manual and Supplements - Issue 1.8 or later approved EASA revision.

3. Operation and Service Instructions specific to aircraft registration or serial number with an issue date prior to 28 September 2003 may continue to be used. Inspection shall be in accordance with the latest issue of the inspection schedule - Lindstrand Balloons Maintenance Manual and Supplements - Issue 1.8 or later approved EASA revision refers.

V. Notes

Note 1) For the purpose of maintenance and inspection a log book must be maintained with each hot air balloon envelope. If the burner, basket, instruments and/or cylinders are interchanged, they must be listed in the log book of each envelope with which they are used.

Note 2) The combination of a Lindstrand Balloons' envelope with approved parts or bottom ends from other manufacturers is described in the Flight Manual (see IV).

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SECTION 2: Lindstrand C Type (400,000 - 600,000 ft³)

CAA UK Type Certificate Data Sheet reference: BB24

Manned free hot air balloon of natural shape with 32 gores and 32 flying wires. The balloon general assembly is defined by drawing EC-001-A-001. The definition of all variants (models) is listed in Table1.

Table 1: Models, Definitions, Limitations and Eligible Equipment

Model	Vol (ft³)	Vol (m³)	Dwg	MTOM (kg)	MLM (kg)	Burner	Baskets	Approval Date
LBL 400C	400 000	11 326	EC400-A-001	3 400	1 700	05, 06, 12, 13	26, 27, 33, 50, 204	09.02.2011
LBL 500C	500 000	14 158	EC-500-A-001	4 250	2 125	05, 06, 12, 13	26, 27, 33, 50, 204	30.04.2002
LBL 600C	600 000	16 856	EC-600-A-001	5 100	2 550	06, 13	50	06.06.2003

Table 2: Lindstrand C Type Certification Basis

Model	Application Date	Approval Date	Airworthiness Requirement
LBL 400C	14.10.2010	09.02.2011	■, ♥
LBL 500C	28.03.2002	30.04.2002	■
LBL 600C	12.05.2003	28.05.2003	■

* * *

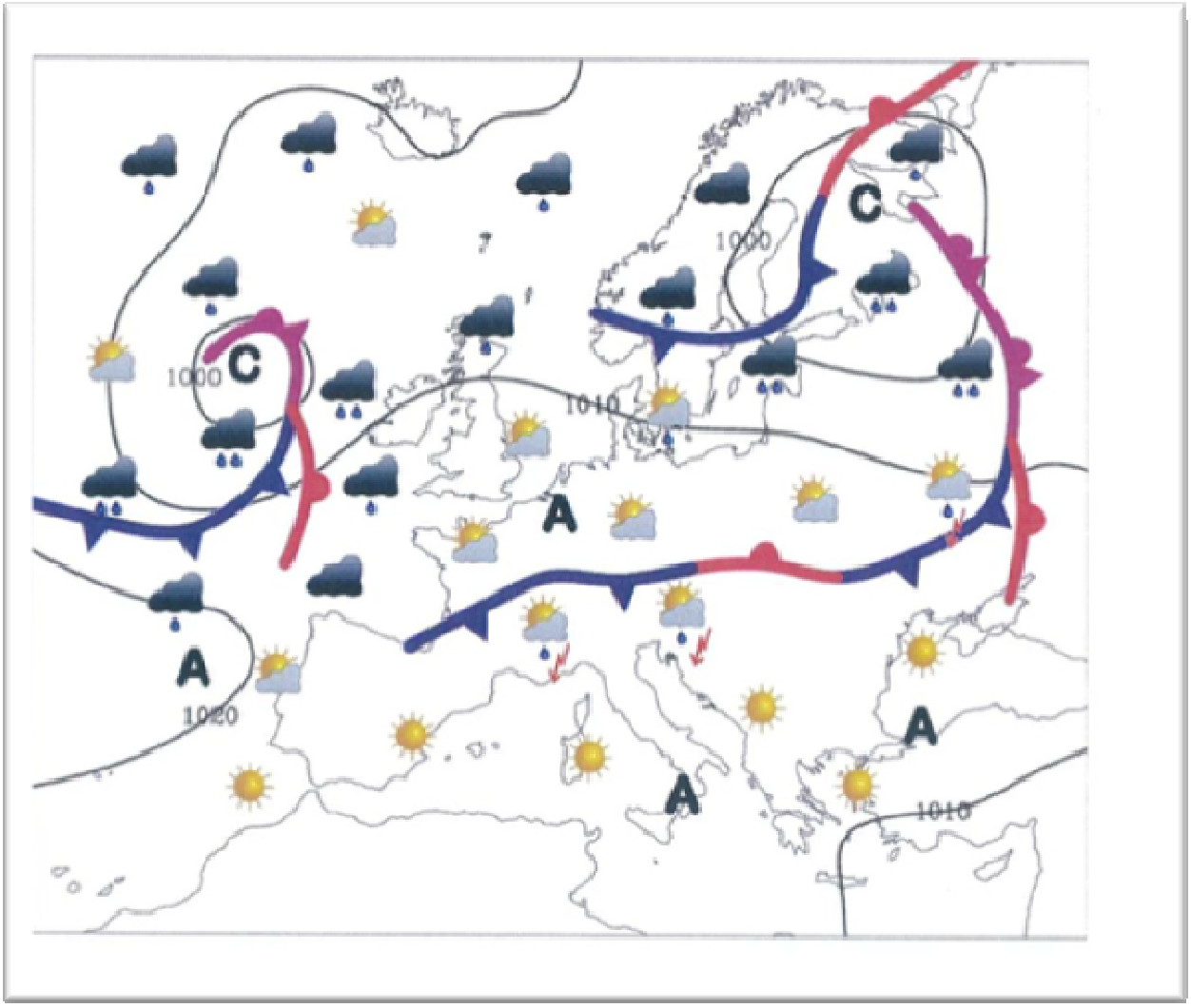
1.7 Meteorological information

The Commission obtained meteorological information on the weather conditions on the day of the accident from the Slovenian Environment Agency's Meteorology Office.

1.7.1 Weather Conditions

The Mediterranean and southern Europe were under the influence of a weak area of high pressure. Regions south of the Alps were inundated with very warm air.

A cold front approached the region of the Alps from the north-west on Wednesday, 22 August 2012, settling in over the Alps on Thursday, 23 August 2012. This cold front caused thunderstorms in Austria, Italy, and northern Slovenia (Picture 10).

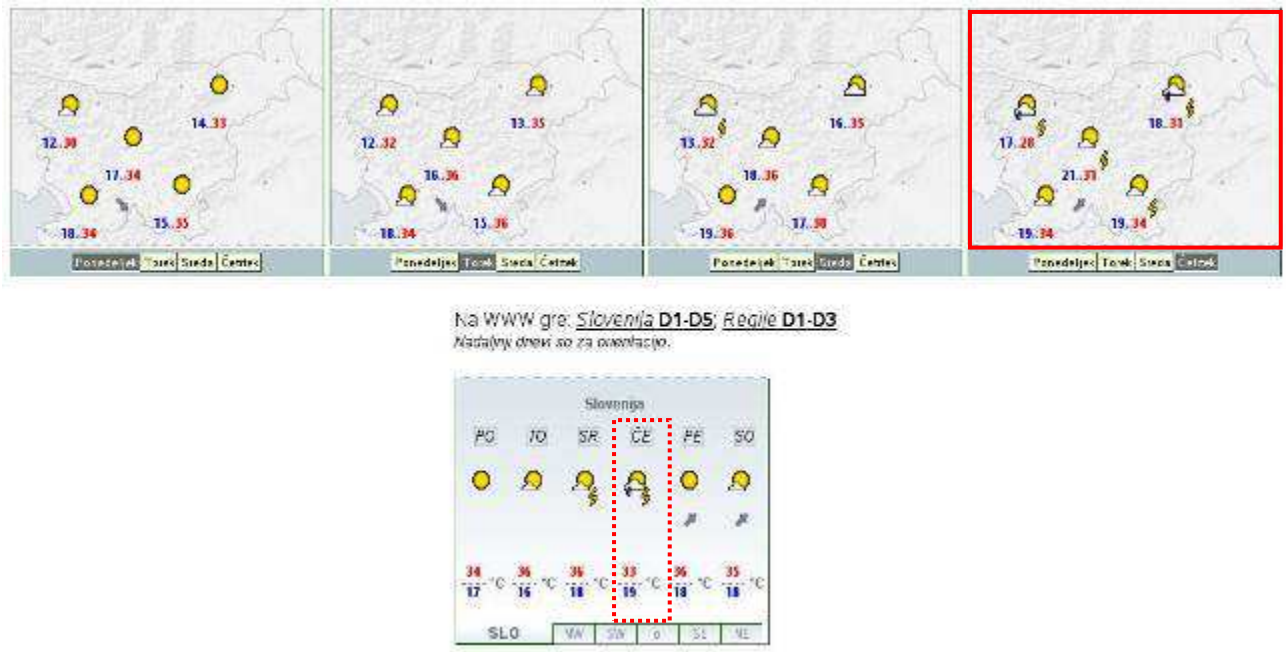


Picture 10: A lowlands map made on 22 August 2012 for 23 August 2012

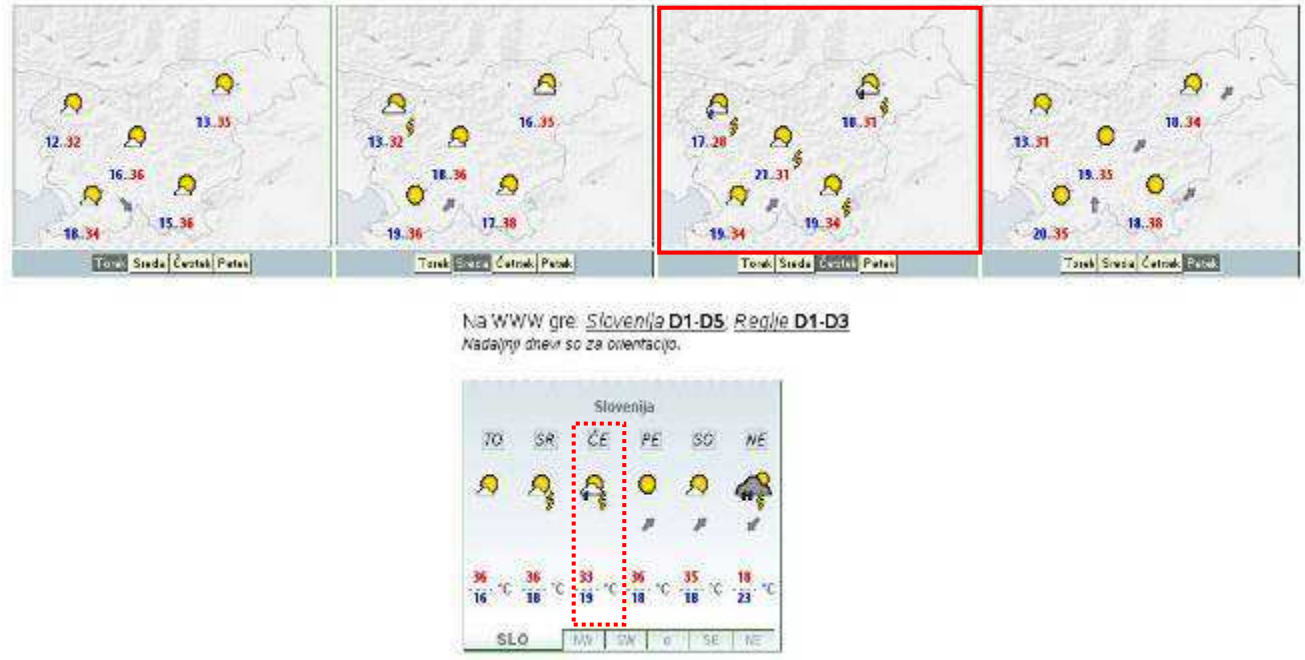
1.7.2 Weather Forecasts

General weather forecast:

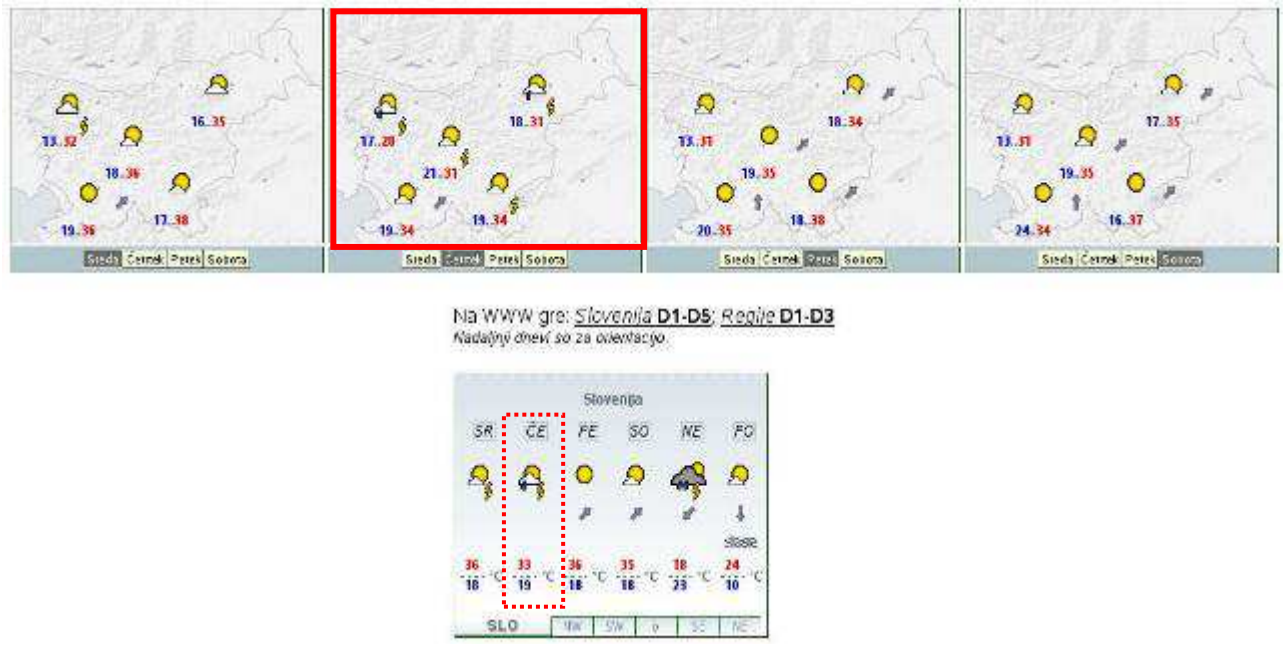
Already several days before Thursday, 23 August 2013, the National Meteorological Service of Slovenia (hereinafter DmetS for *Državna meteorološka služba*) forecast unstable weather conditions with the possibility of thunderstorms on the day of the accident (Pictures 11, 12 and 13).



Picture 11: Forecast for the period from 20 August 2012 to 23 August 2012 – The day of the accident was Thursday, 23 August 2012



Picture 12: Forecast for the period from 21 August 2012 to 24 August 2012 – The day of the accident was Thursday, 23 August 2012



Picture 13: Forecast for the period from 22 August 2012 to 25 August 2012 – The day of the accident was Thursday, 23 August 2012

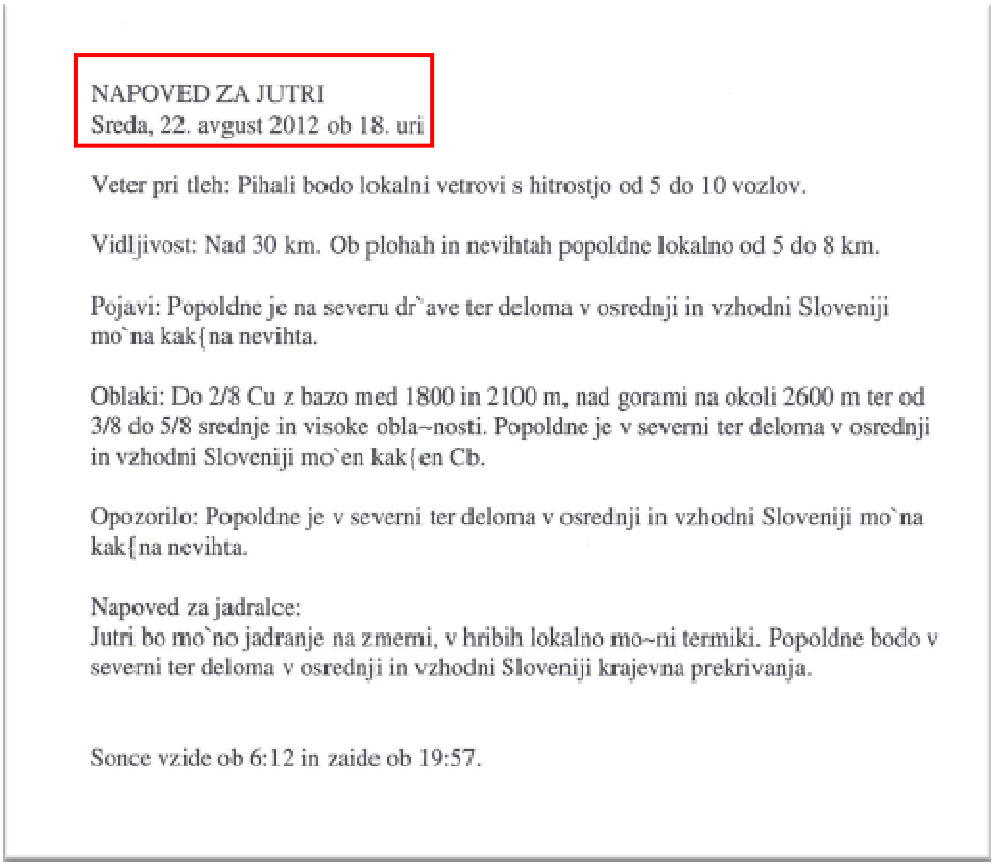
Special weather forecasts for aviation:

Weather forecasts for air navigation are issued by the National Meteorological Service - ARSO/Meteorological Office ex officio in the framework of exercising the tasks of the meteorological service.

Meteorological personnel, which performed operative tasks on 22 August 2012 and 23 August 2012 related to the preparation of meteorological forecasts and warnings for aviation had appropriate and valid licences and authorizations to work, i.e. valid License of Aviation Meteorological Personnel with written authorization as "Forecaster".

Text-based weather forecasts:

DmetS's forecast, issued on 22 August 2012, included a warning about the predicted occurrence of thunderstorms in the afternoon of 23 August 2013. The air navigation forecast issued on 23 August 2012 included a warning on the predicted occurrence of thunderstorms, without any time limits (Pictures 14 and 15). The forecast also mentioned the formation of storm clouds.



NAPOVED ZA JUTRI
Sreda, 22. avgust 2012 ob 18. uri

Veter pri tleh: Pihali bodo lokalni vetrovi s hitrostjo od 5 do 10 vozlov.

Vidljivost: Nad 30 km. Ob plohah in nevihtah popoldne lokalno od 5 do 8 km.

Pojavi: Popoldne je na severu dr`ave ter deloma v osrednji in vzhodni Sloveniji mo`na kak{na nevihta.

Oblaki: Do 2/8 Cu z bazo med 1800 in 2100 m, nad gorami na okoli 2600 m ter od 3/8 do 5/8 srednje in visoke obla~nosti. Popoldne je v severni ter deloma v osrednji in vzhodni Sloveniji mo`en kak{en Cb.

Opozorilo: Popoldne je v severni ter deloma v osrednji in vzhodni Sloveniji mo`na kak{na nevihta.

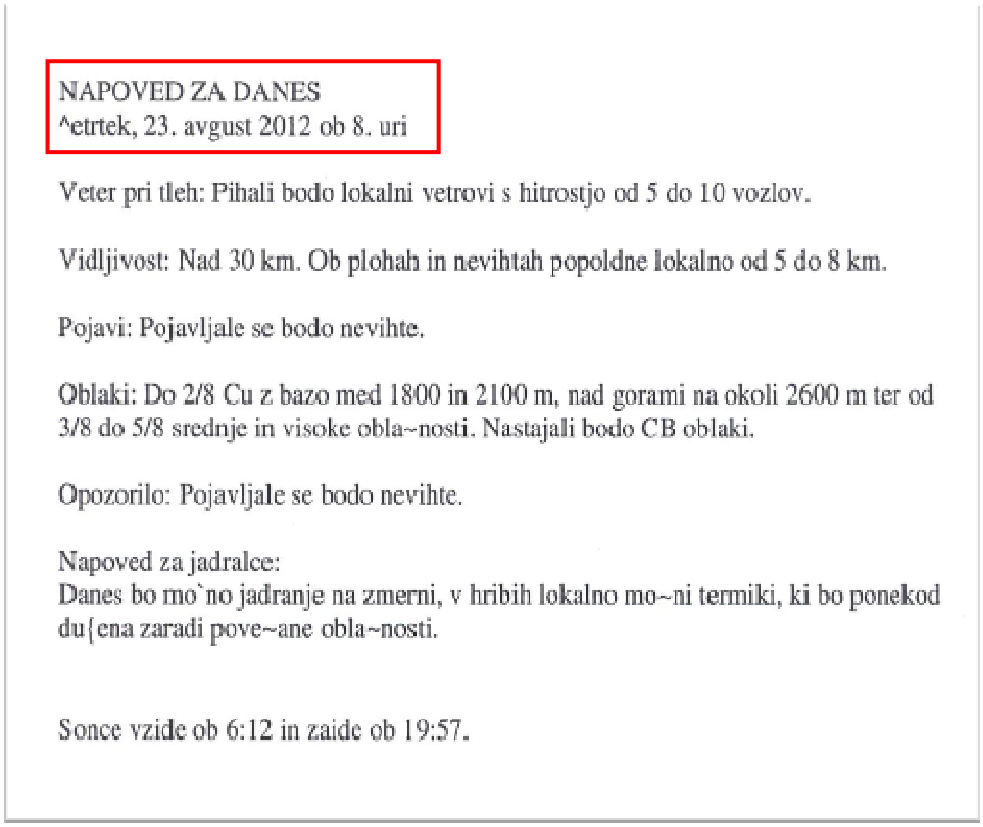
Napoved za jadralce:
Jutri bo mo`no jadranje na zmerni, v hribih lokalno mo~ni termiki. Popoldne bodo v severni ter deloma v osrednji in vzhodni Sloveniji krajevna prekrivanja.

Sonce vzide ob 6:12 in zaide ob 19:57.

Picture 14: Forecast for Aviation issued on 22 August 2012

TRANSLATION:

FORECAST FOR TOMORROW
Wednesday, 22 August 2012 at 6 p.m.
Wind at ground level: Local winds with a speed of 5 to 10 knots.
Visibility: Above 30 km. In cases of showers and thunderstorms in the afternoon locally from 5 to 8 km.
Events: Possibility of thunderstorms in the afternoon, in the north of the country, and partly in the central and eastern Slovenia.
Cloud cover: Up to 2/8 Cu with the base at between 1800 and 2100 m, above mountains at around 2600 m and from 3/8 to 5/8 of mid and high cloud cover. In the afternoon, there is a possibility of Cb in the northern and partly in the central and eastern Slovenia.
Warning: In the afternoon, there is a possibility of thunderstorms in the northern and partly in the central and eastern Slovenia.
Forecast for paragliders:
Tomorrow there is a possibility of paragliding at moderate, and strong thermals in the mountain areas. In the afternoon, there will be territorial overlaps in the northern and partly in central and eastern Slovenia.
The sun rises at 6:12 a.m. and sets at 7:57 p.m.



NAPOVED ZA DANES
^etrtek, 23. avgust 2012 ob 8. uri

Veter pri tleh: Pihali bodo lokalni vetrovi s hitrostjo od 5 do 10 vozlov.

Vidljivost: Nad 30 km. Ob plohah in nevihtah popoldne lokalno od 5 do 8 km.

Pojavi: Pojavljale se bodo nevihte.

Oblaki: Do 2/8 Cu z bazo med 1800 in 2100 m, nad gorami na okoli 2600 m ter od 3/8 do 5/8 srednje in visoke obla~nosti. Nastajali bodo CB oblaki.

Opozorilo: Pojavljale se bodo nevihte.

Napoved za jadralce:
Danes bo mo`no jadranje na zmerni, v hribih lokalno mo~ni termiki, ki bo ponekod du{ena zaradi pove~ane obla~nosti.

Sonce vzide ob 6:12 in zaide ob 19:57.

Picture 15: Air navigation forecast issued on 23 August 2012

TRANSLATION:

FORECAST FOR TODAY

Thursday, 23 August 2012 at 8 a.m.

Wind at ground level: Local winds with a speed of 5 to 10 knots.

Visibility: Above 30 km. In cases of showers and thunderstorms in the afternoon locally from 5 to 8 km.

Events: Occasional thunderstorms.

Cloud cover: Up to 2/8 Cu with the base at between 1800 and 2100 m, above mountains at around 2600 m and from 3/8 to 5/8 of mid and high cloud cover. Formation of CB clouds.

Warning: Occasional thunderstorms.

Forecast for paragliders:

Today there is a possibility of paragliding at moderate, and strong thermals in the mountains which will be occasionally hampered due to increased cloudiness.

The sun rises at 6:12 a.m. and sets at 7:57 p.m.

Forecasts for airports:

Aerodrome Forecasts (TAF) are made for the airport regions. The accident did not occur in the region of the international airports Jože Pučnik in Ljubljana or Edvard Rusjan in Maribor, but this information is nonetheless relevant in understanding the operations of the Meteorological Office during the accident.

FTLJ31 LJLJ 222300

TAF LJLJ 222300Z 2300/2324 VRB02KT CAVOK BECMG 2309/2312 13005KT FEW060 TEMPO 2313/2318 24007KT FEW060TCU **PROB30 TEMPO 2314/2318 FEW060CB** BECMG 2320/2322 VRB02KT CAVOK=

TAF LJMB 222300Z 2300/2324 01004KT CAVOK BECMG 2307/2310 FEW050 **PROB40 TEMPO 2312/2320 36012G30KT 4000 TSRA SCT035CB** BKN060 BECMG 2320/2322 VRB02KT CAVOK

TAF LJLJ 230200Z 2303/2403 VRB02KT CAVOK BECMG 2309/2312 13005KT FEW060 TEMPO 2313/2318 24007KT FEW060TCU **PROB30 TEMPO 2314/2318 FEW060CB** BECMG 2320/2322 VRB02KT CAVOK=

TAF LJMB 230200Z 2303/2403 01004KT CAVOK BECMG 2307/2310 FEW050 **PROB40 TEMPO 2312/2320 36012G30KT 4000 TSRA SCT035CB** BKN060 BECMG 2320/2322 VRB02KT CAVOK=

TAF LJLJ 230500Z 2306/2406 VRB02KT CAVOK TEMPO 2306/2309 VRB10KT 7000 TSRA SCT040CB BKN050 BECMG 2309/2312 24005KT FEW060 PROB40 TEMPO 2313/2320 VRB10G20KT 5000 TSRA SCT040CB BKN050 BECMG 2320/2322 VRB02KT CAVOK=

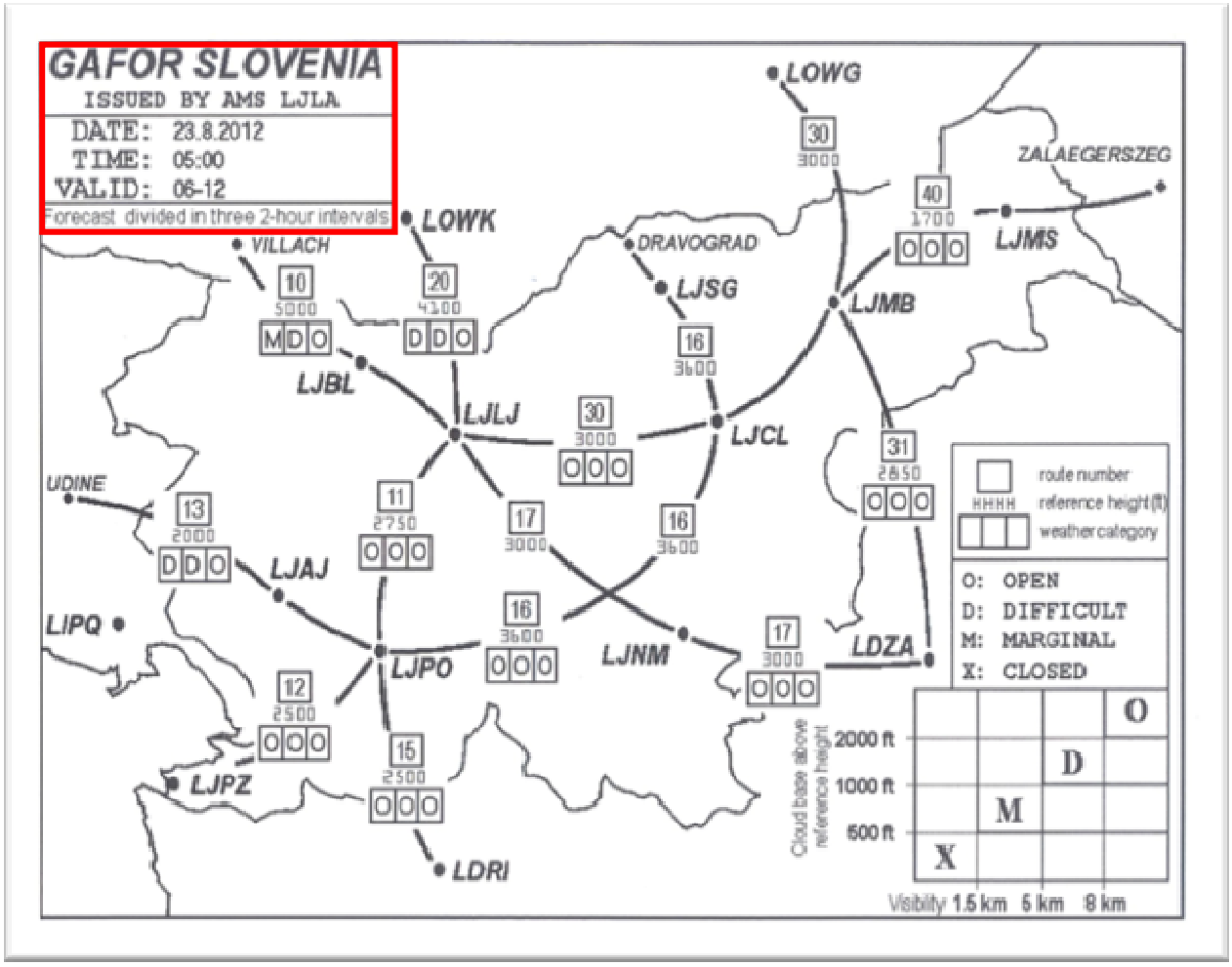
TAF LJMB 230500Z 2306/2406 01004KT CAVOK TEMPO 2307/2310 VRB10KT 7000 TSRA SCT040CB BKN050 BECMG 2307/2310 FEW050 PROB40 TEMPO 2312/2320 36012G30KT 5000 TSRA SCT035CB BKN060 BECMG 2320/2322 VRB02KT CAVOK=

Forecasts for airports are updated every 3 hours. At first they predicted a 30% to 40% chance for the formation of storm clouds or thunderstorms over the airports on 23 August 2012, specifically in the afternoon between 2:00 p.m. and 10:00 p.m. local time.

The first TAF Forecasts, which included forecasts for thunderstorms over the airports on 23 August 2012 in the morning hours as well as between 8:00 a.m. and 11:00 a.m. local time, were prepared between 6:00 a.m. and 7:00 a.m. local time and issued at 7:00 a.m. local time.

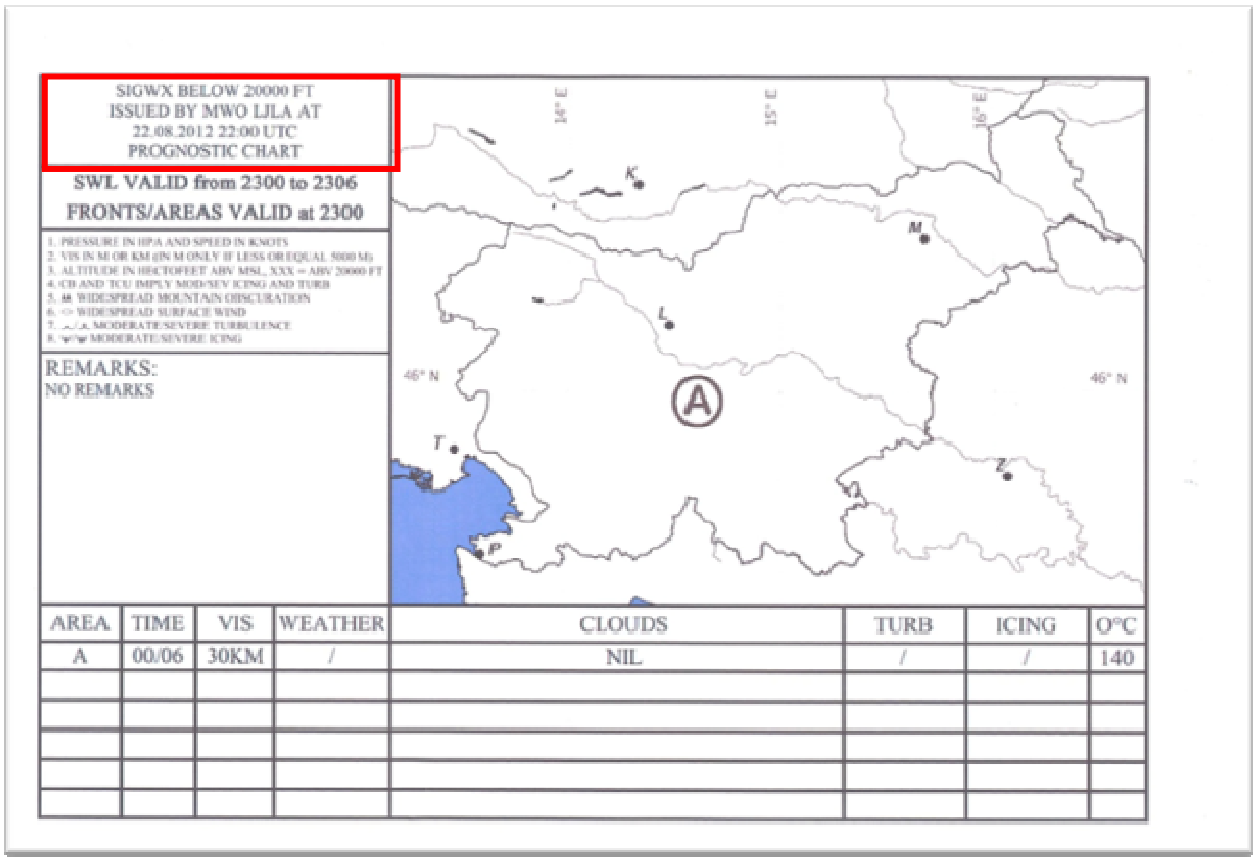
Forecasts in pictures:

Weather forecasts for air navigation in pictures are prepared for several types of users. DmetS issues General Aviation Forecasts (GAFOR) with a description of predicted conditions for visual flight (Picture 16), as well as SWL forecasts of characteristic weather for lower flight altitudes. World Area Forecast Center (WAFC), with headquarters in the United Kingdom, is authorised to issue weather forecasts for medium and higher flight altitudes.



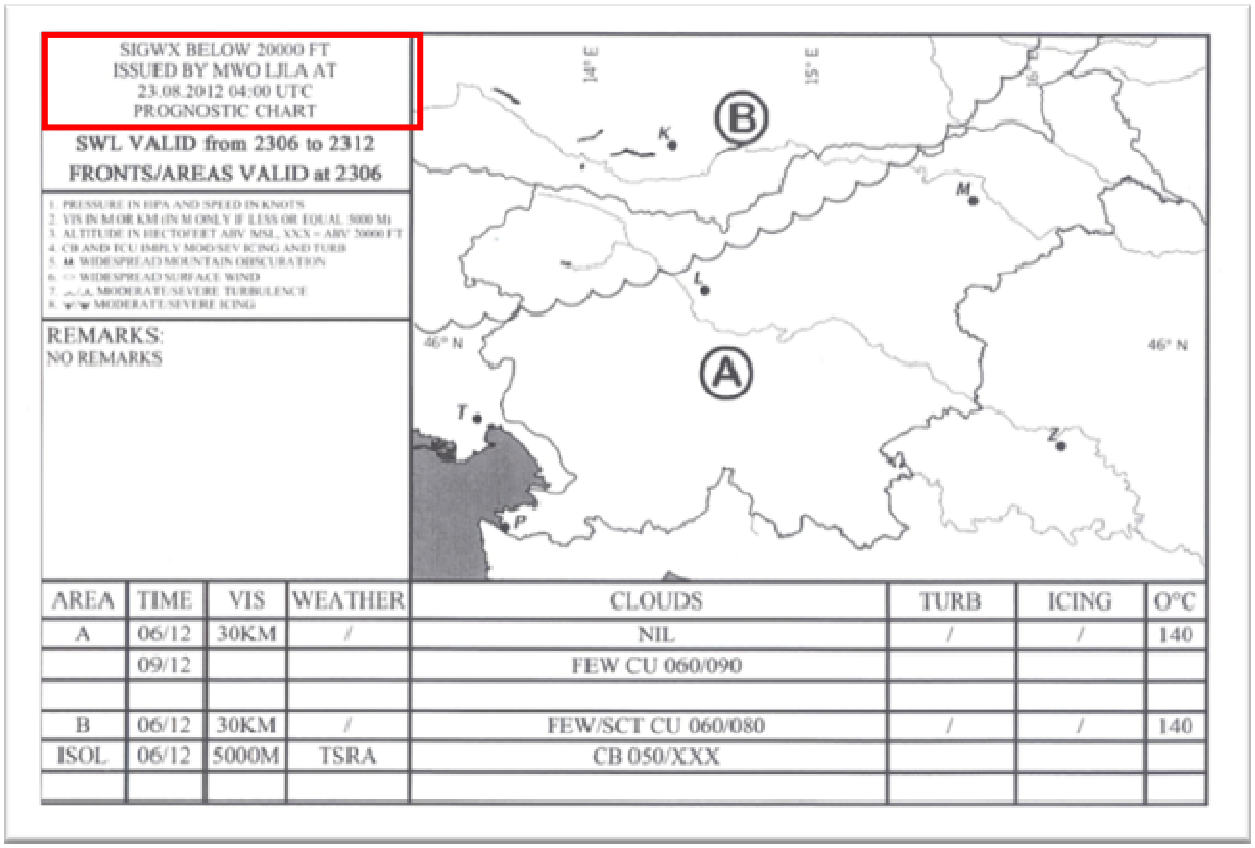
Picture 16: GAFOR forecast issued at 7:00 a.m. local time on 23 August 2012

Maps of characteristic weather conditions for the area of LJUBLJANA FIR, valid for the day of the accident (Picture 17, 18 and 19). The first SWL map, on which the area of the forecasted occurrence of thunderstorms in the morning hours on 23 August 2012 is marked, was issued at 06:00 a.m. local time (Picture 18).



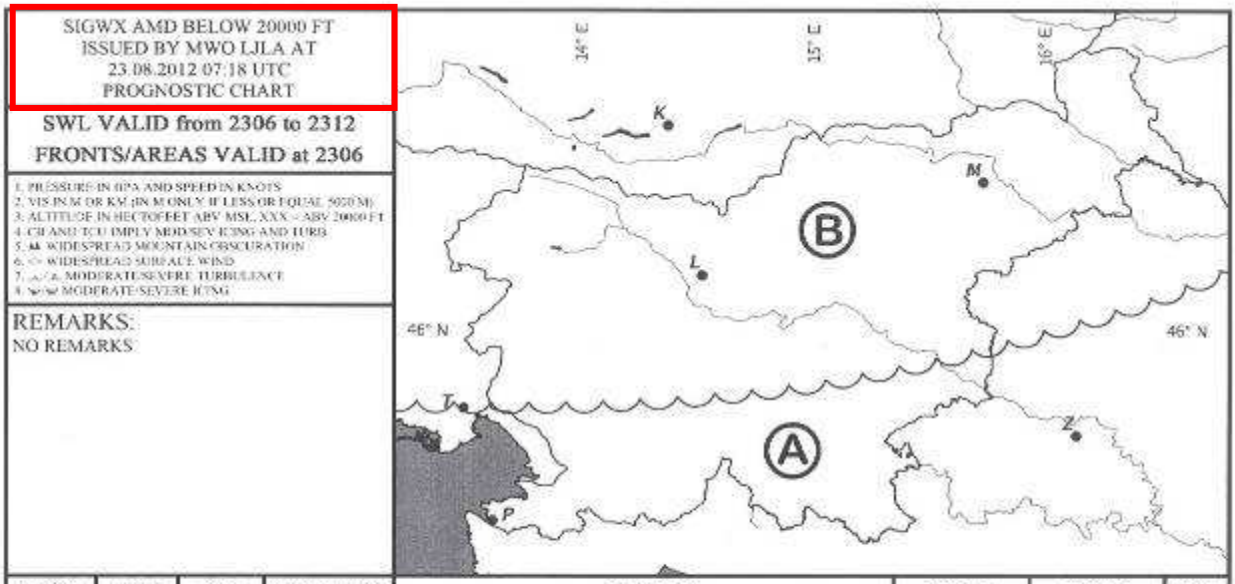
AREA	TIME	VIS	WEATHER	CLOUDS	TURB	ICING	0°C
A	00/06	30KM	/	NIL	/	/	140

Picture 17: Map of characteristic weather conditions for LJUBLJANA FIR at night on 23 August 2012



AREA	TIME	VIS	WEATHER	CLOUDS	TURB	ICING	0°C
A	06/12	30KM	/	NIL	/	/	140
	09/12			FEW CU 060/090			
B	06/12	30KM	/	FEW/SCT CU 060/080	/	/	140
ISOL	06/12	5000M	TSRA	CB 050/XXX			

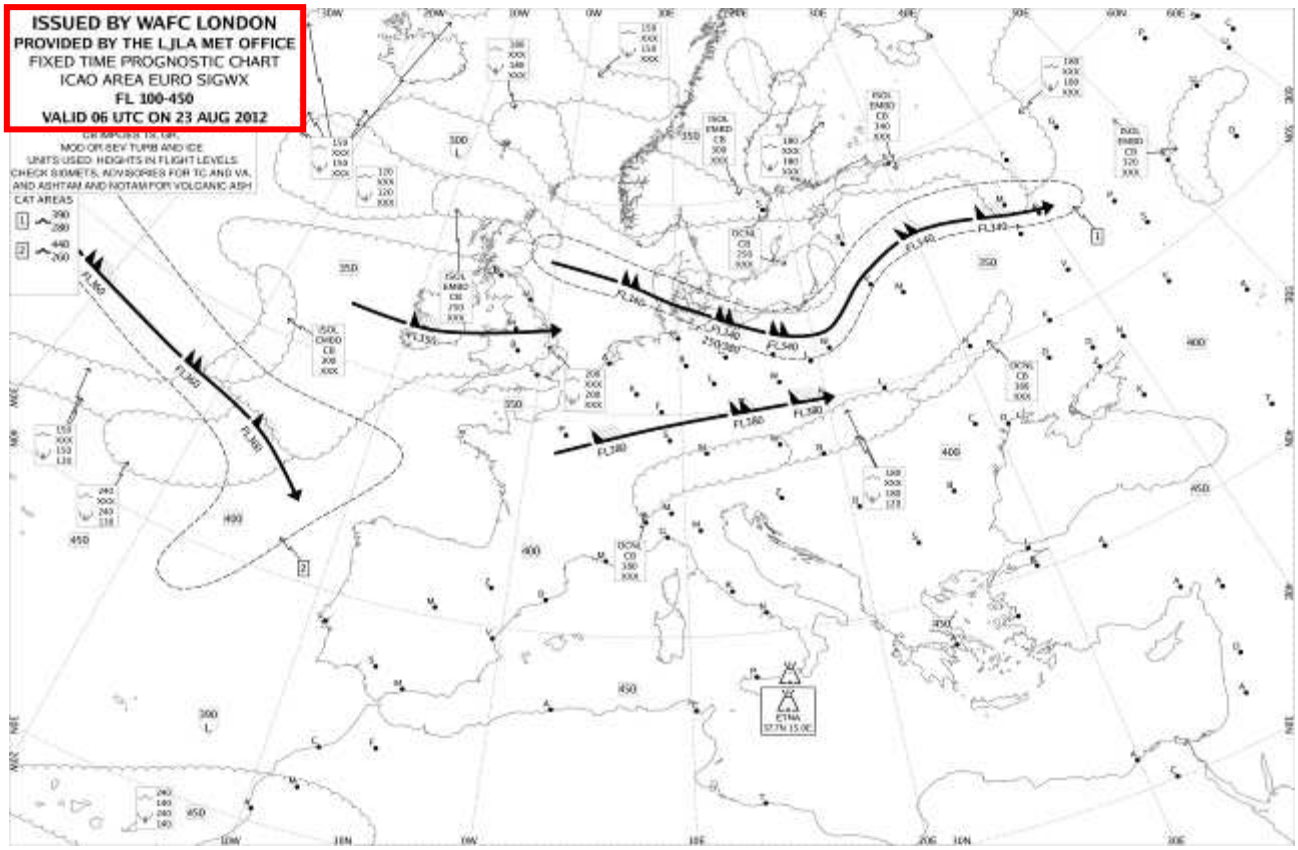
Picture 18: Map of characteristic weather conditions for Ljubljana FIR in the morning of 23 August 2012



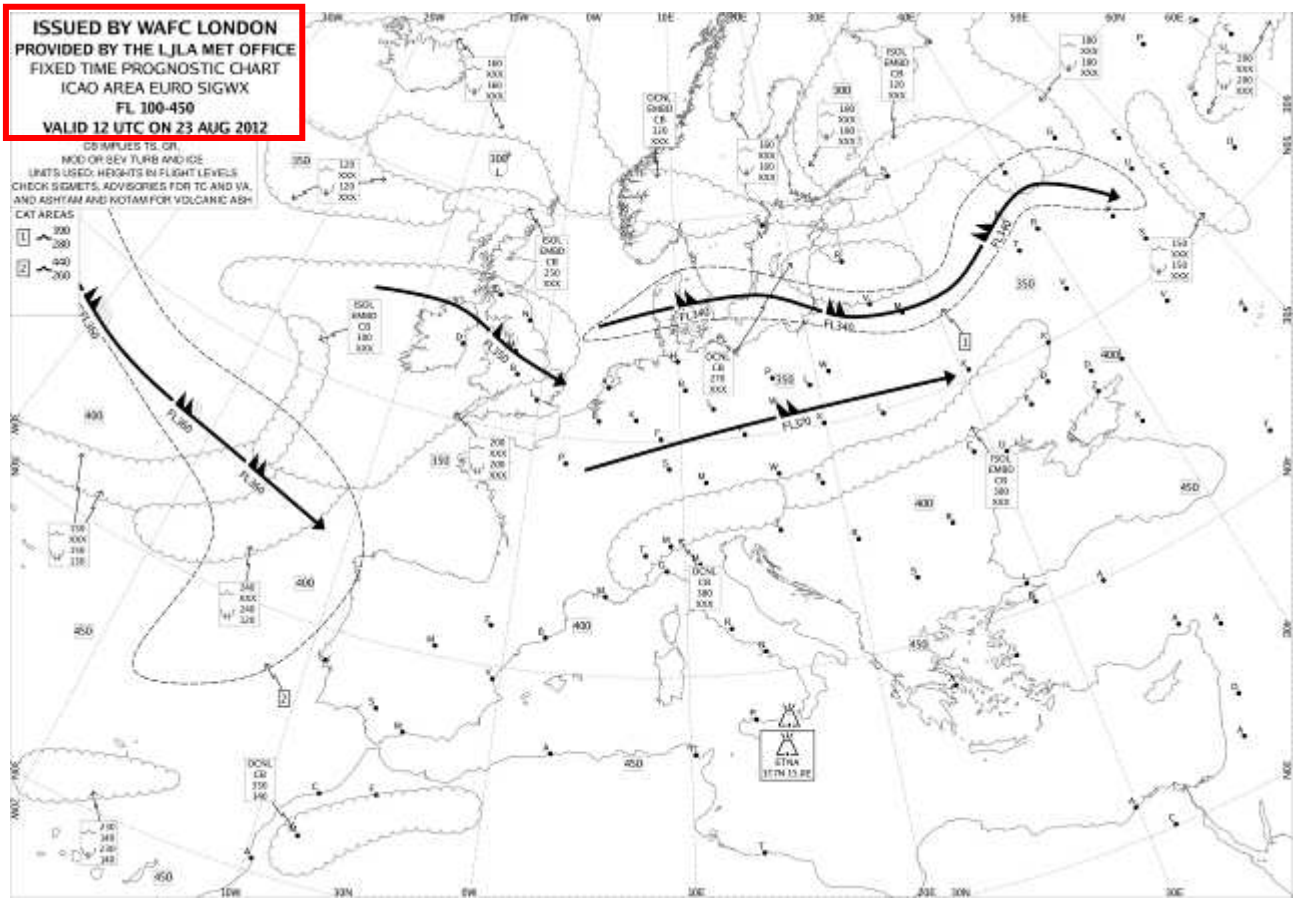
AREA	TIME	VIS	WEATHER	CLOUDS	TURB	ICING	0°C
A	06/12	30KM	/	NIL	/	/	140
				FEW CU 060/090			
B	06/12	30KM	/	SCT/BKN CU,AC LYR 060/150	/	/	140
ISOL	06/12	5000M	TSRA	CB 050/XXX			

Picture 19: Map of characteristic weather conditions for LJUBLJANA FIR with marked expanded region of expected occurrence of thunderstorms in the morning of

SIGWX forecasts in pictures issued by WAFC London valid for the morning (Picture 20) and late afternoon (Picture 21) hours, predicted the region of the occurrence of thunderstorm clouds somewhat to the north of Slovenia in the morning hours and the occurrence of thunderstorms in Slovenian territory in the afternoon.



Picture 20: SIGWX map valid for 23 August 2012 at 08:00 a.m. local time. Source: WAFC London

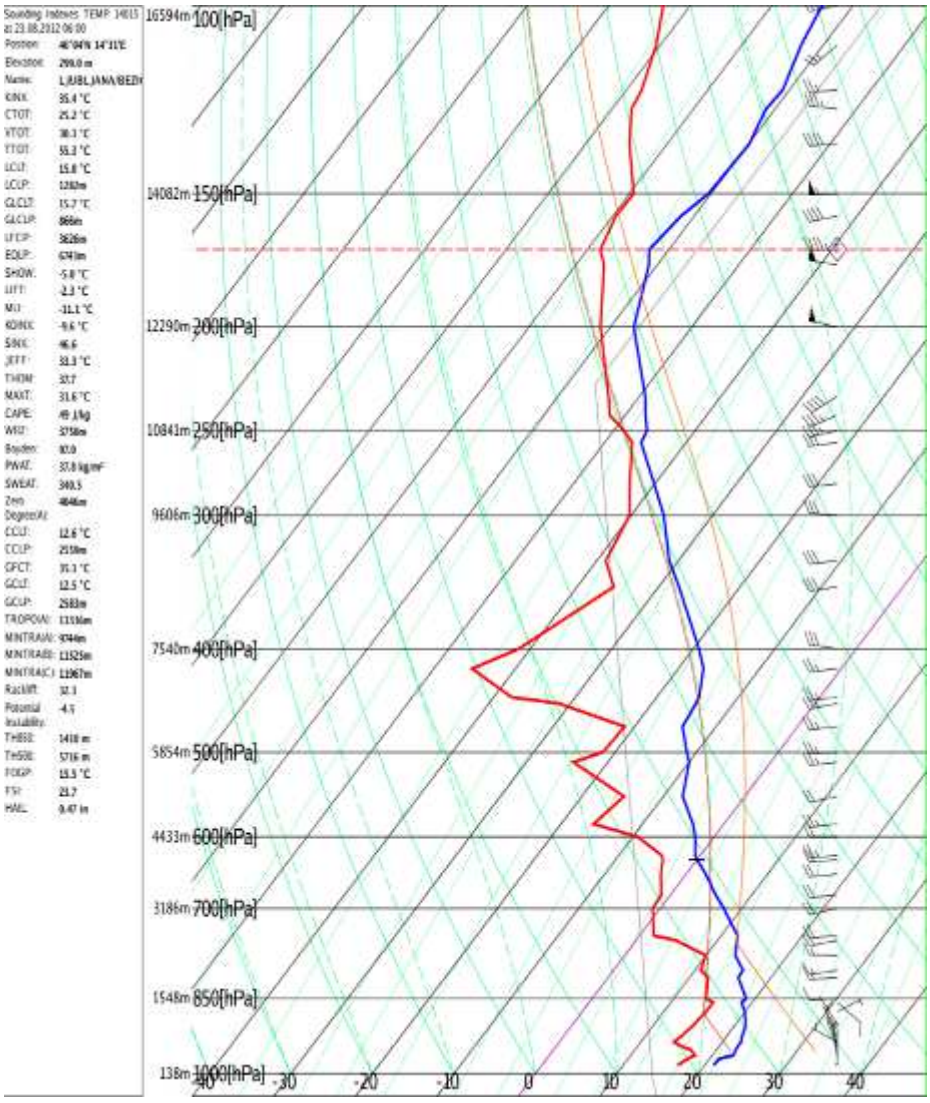


Picture 21: SIGWX map valid for 23 August 2012 at 2:00 p.m. local time. Source: WAFC London

1.7.3 Weather conditions at the time of accident

General weather conditions in the morning hours:

Between 05:00 a.m. and 07:00 a.m. local time, horizontal visibility was estimated in the Ljubljana basin at around 40 km, and there were some mid- and high-altitude clouds with a base at around 2,500 metres above the ground. During this time meteorological stations in this area did not show any precipitation or other meteorological phenomena. At about 05:30 a.m. local time, the staff at DmetS measured the atmosphere at Vojkova 1b, Ljubljana. A meteorological probe measured a temperature of around 20^0C to the altitude of around 1,300 metres. In the lower layers of the atmosphere, a north-west wind was blowing up to 10 knots. Above 1,300 metres the measured wind changed orientation to the western direction with a speed of 10 knots, intensifying as it got higher, reaching 15 knots at 1,700 metres, and 20 knots at an altitude of approximately 2,000 metres (Picture 22).



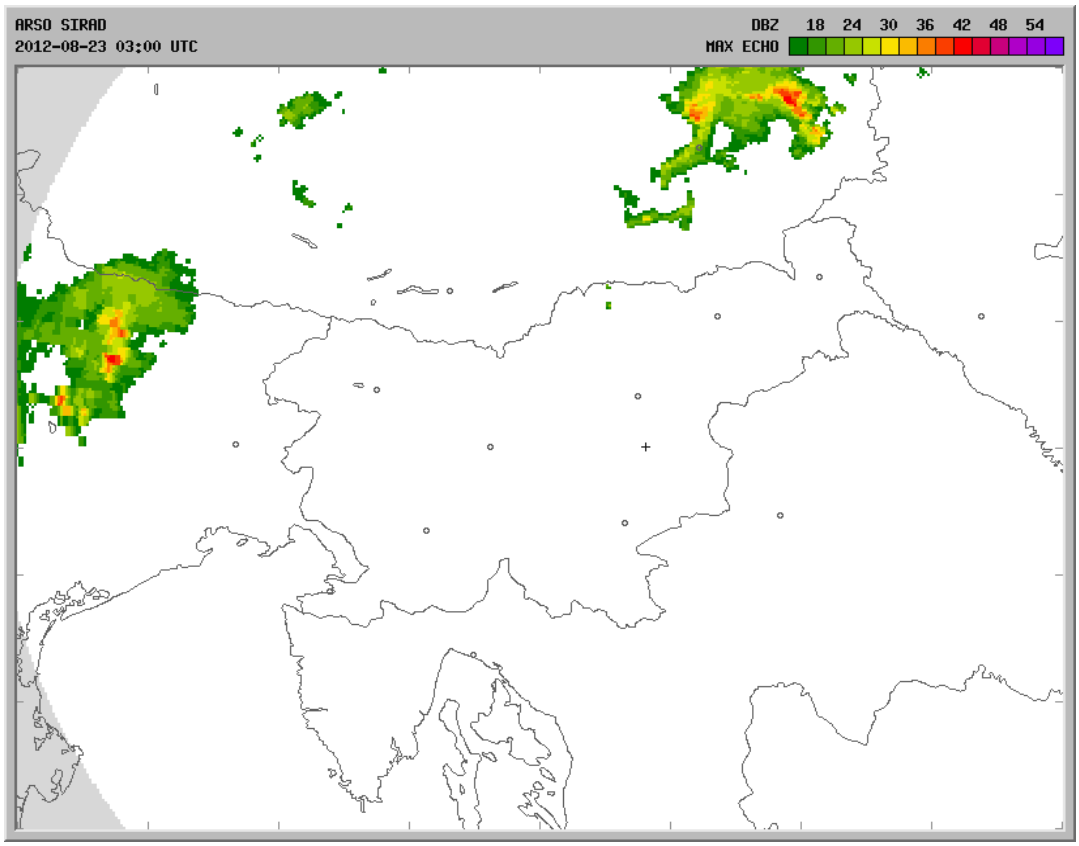
Picture 22: Atmospheric measurements in Ljubljana/Bežigrad on 23 August 2012

At 07:00 a.m. local time the Rateče meteorological station records a strong thunderstorm, and the Kredarica station recorded a thunderstorm an hour before. These data match with radar measurements and indicate a shift in the thunderstorms from the west part of Slovenia towards the east.

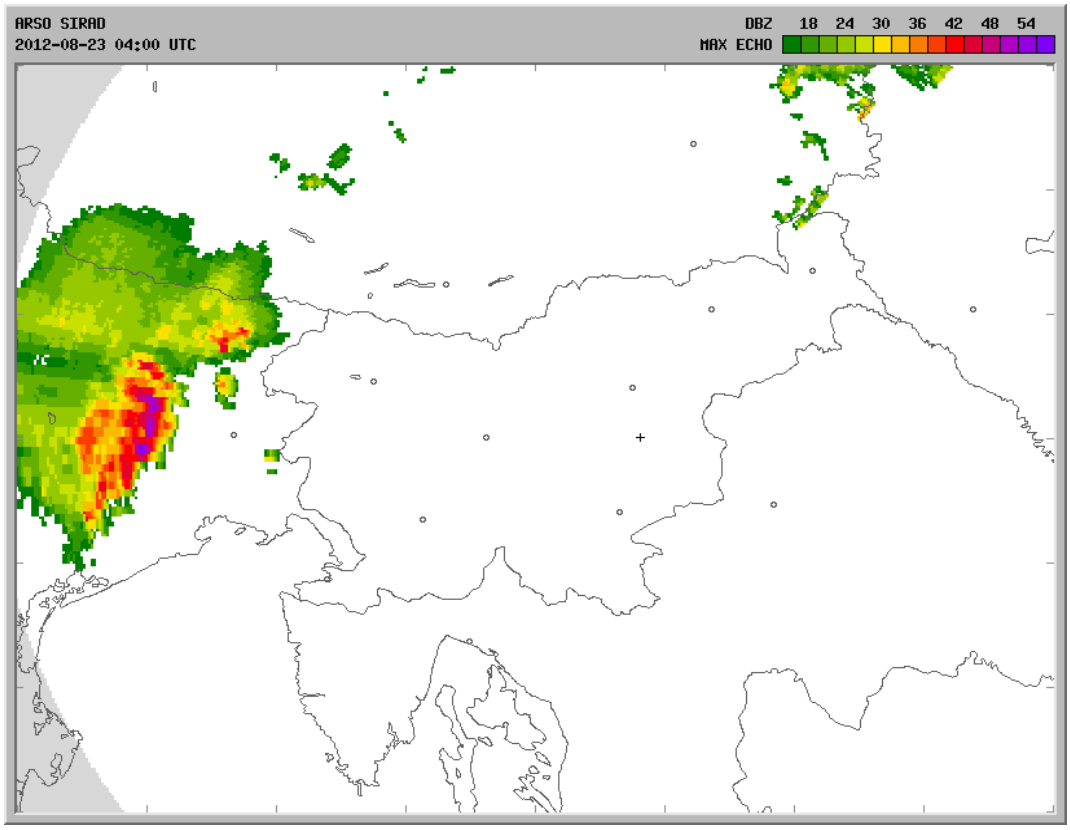
At 08:00 a.m. local time the Brnik, Ljubljana, Rateče, and Kredarica meteorological stations record thunderstorms, while Postojna records thunder. The Vojko station recorded a thunderstorm the previous hour, and it was raining at the Vogel station after the thunderstorm.

Radar measurements of precipitation:

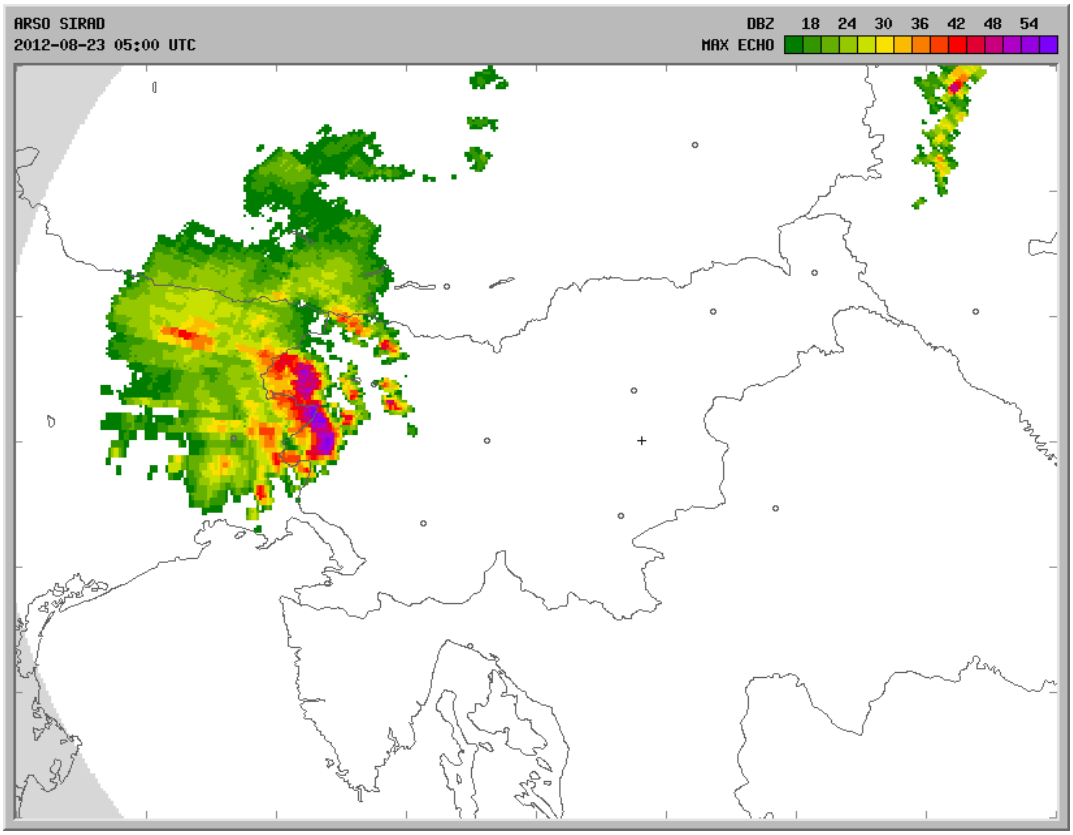
During the night, thunderstorms began to form over the Po plain, which in the morning hours spread from west to east with an estimated speed (on the basis of successive radar images) at between approximately 60 to 70 km/h or approximately 30 to 40 knots. A few minutes before 08:00 a.m. local time thunderstorms reached the area in the direct vicinity of Ljubljana. (Pictures 23, 24, 25, 26 and 27).



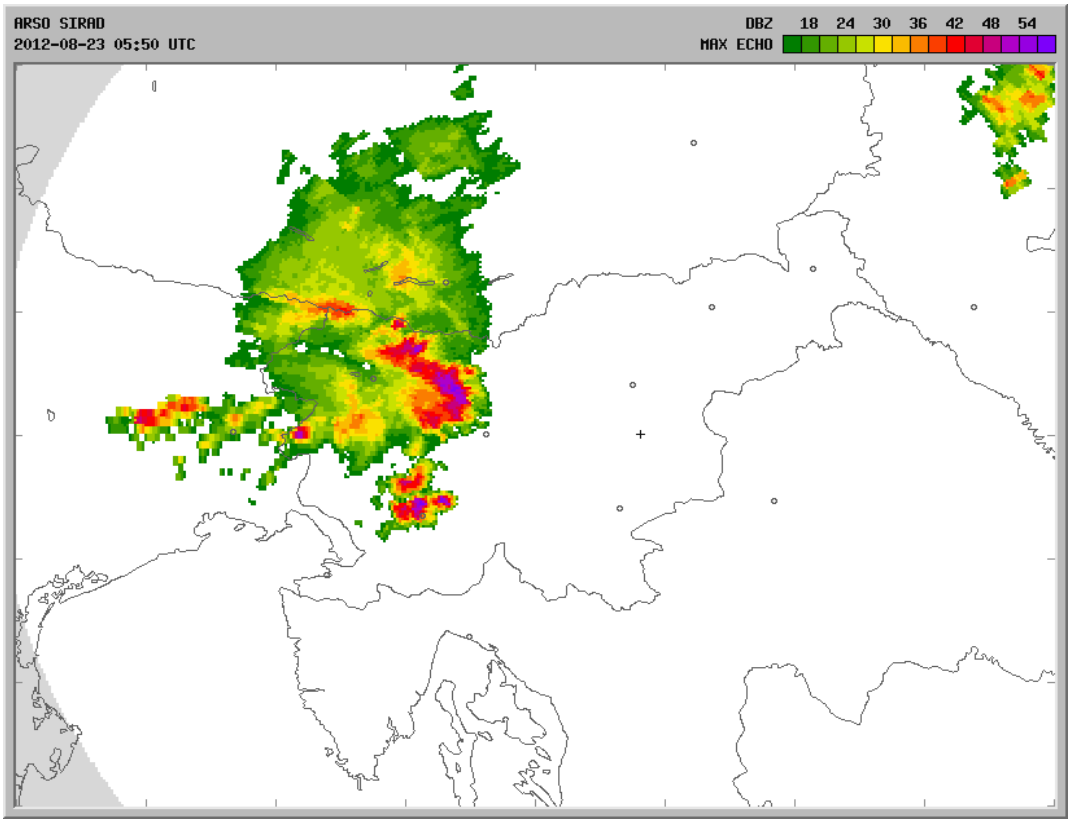
Picture 23: Radar image of maximum radar echoes – measured on 23 August 2012 at 05:00 a.m. local time



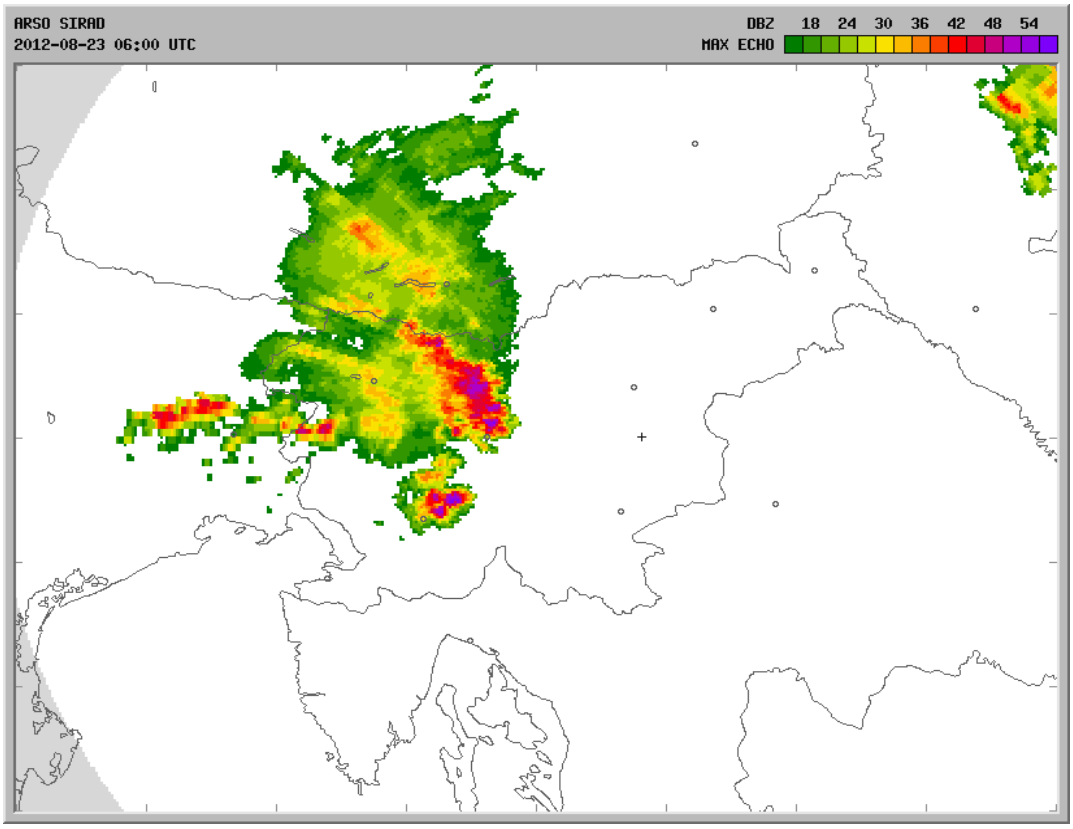
Picture 24: Radar image of maximum radar echoes – measured on 23 August 2012 at 06:00 a.m. local time



Picture 25: Radar image of maximum radar echoes – measured on 23 August 2012 at 07:00 a.m. local time



Picture 26: Radar image of maximum radar echoes – measured on 23 August 2012 at 07:50 a.m. local time



Picture 27: Radar image of maximum radar echoes – measured on 23 August 2012 at 08:00 a.m. local time

Weather warnings for air space:

Due to the occurrence of thunderstorms in the Po plain, an AIRMET warning was issued by MWO – the surveillance meteorological service competent for MILANO FIR – at 05:46 a.m. local time.

WAIY31 LIIB 230346
LIMM AIRMET 02 VALID 230400/230800 LIMM-
LIMM MILANO FIR ISOL TS OBS CENTRAL AND E ALPS AREAS MOV E NC=

The warning alerts to the formation of individual thunderstorms within MILANO FIR, specifically in the central and eastern Alps, and the thunderstorms were moving towards the east with their intensity set to remain the same. When the thunderstorms reached the western edge of Slovenia, or the boundary between MILANO FIR and LJUBLJANA FIR, the MWO competent for LJUBLJANA FIR (DmetS) prepared and issued an AIRMET warning at 06:58 a.m. local time:

WALJ31 LJLJ 230458
LJLA AIRMET 1 VALID 230445/230600 LJLJ-
LJLA LJUBLJANA FIR OCNL TS OBS N OF N4545 AND W OF E01350 TOP ABV FL200 MOV E 30KT NC=

The warning contained information about the approaching thunderstorms within LJUBLJANA FIR, specifically for the area to the north of 45'45" latitude and west of 13'50" longitude. The thunderstorms were moving east with a speed estimated at 30 knots, with their intensity set to remain the same. At 07:53 a.m. local time a new warning was issued:

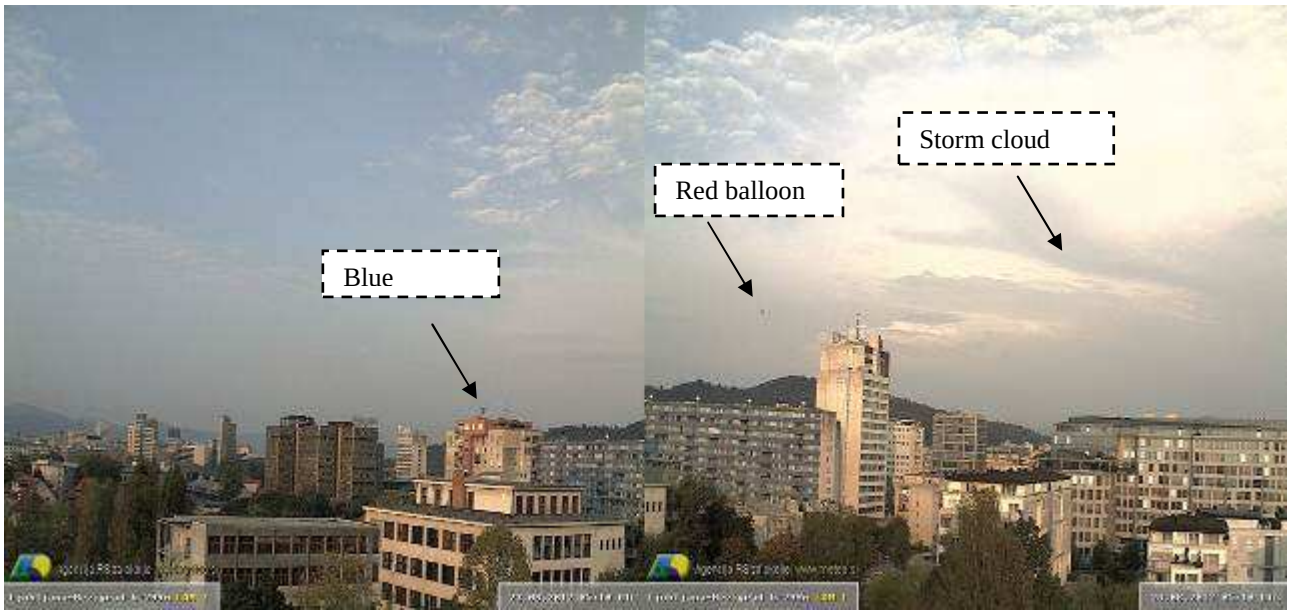
WALJ31 LJLJ 230553
LJLA AIRMET 2 VALID 230600/230700 LJLJ-
LJLA LJUBLJANA FIR OCNL TS OBS W OF E01430 TOP ABV FL200 MOV E 30KT NC=

It refers to the region of thunderstorms within LJUBLJANA FIR, specifically west of 14'30" longitude. The thunderstorms were moving east with a speed estimated at 30 knots.

Photographs from a panoramic camera:

A panoramic camera is affixed to the roof of Vojkova 1b in Ljubljana, which uses a turning mechanism to take a series of 360 degree pictures in 10-minute intervals. This footage shows both

balloons – blue S5-OLO and red S5-OLM – which took off on 23 August 20122, the day of the accident, from Ljubljana - Brdo, and started moving towards the Ljubljana marshes. This footage also clearly shows thunderstorm clouds which are approaching from the west (Pictures 28, 29, 30 and 31).



Picture 28: Photograph from panoramic camera taken at 07:10 a.m. local time

Picture 29: Photograph from panoramic camera taken at 07:20 a.m. local time

Picture 30: Photograph from panoramic camera taken at 07:30 a.m. local time; the blue balloon has gained altitude.

Picture 31: Photograph taken at 07:40 a.m. local time; the storm cloud has reached the western edge of the Ljubljana basin

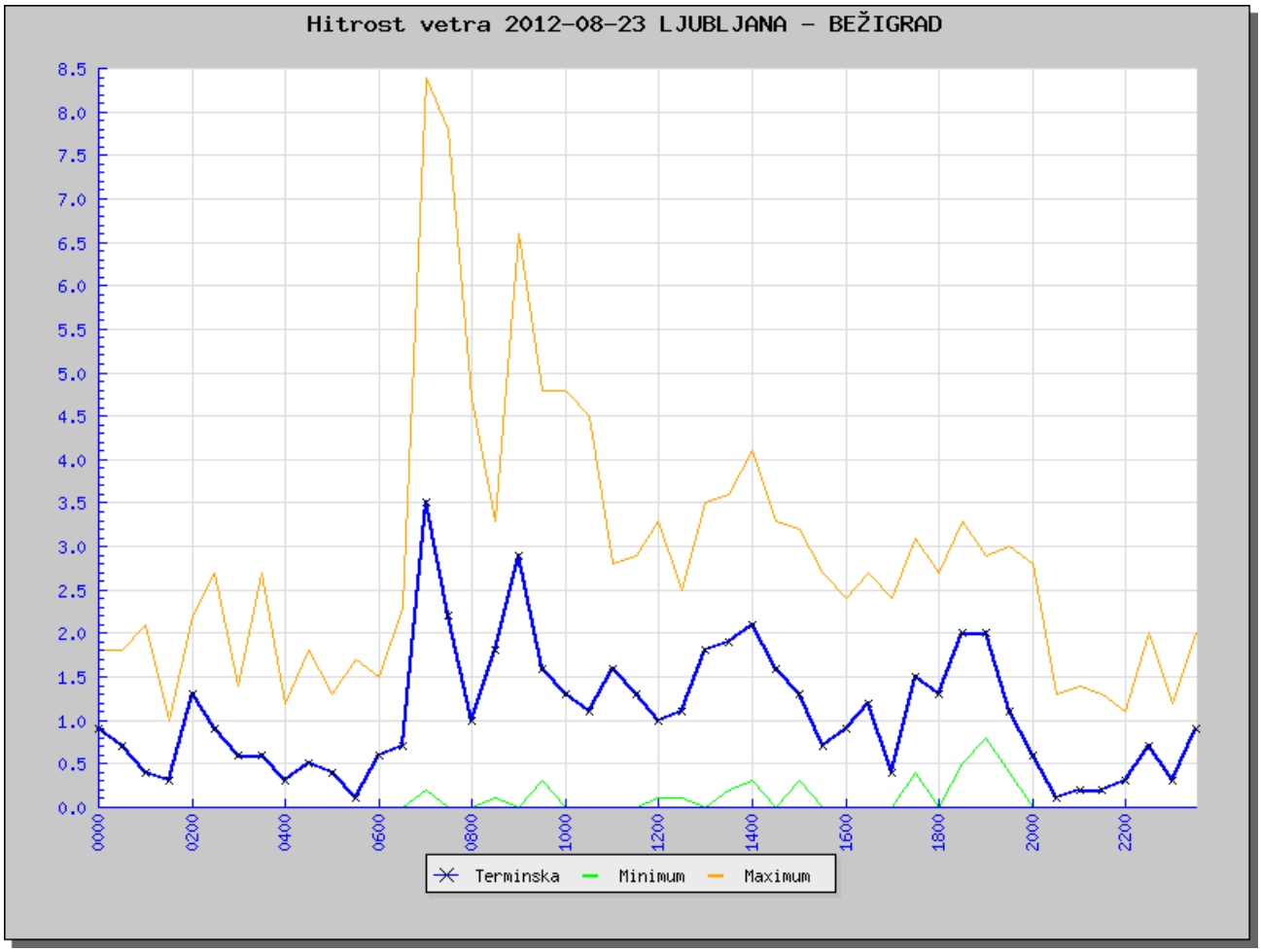
Picture 32: Photograph taken at 07:50 a.m. local time; the storm cloud has reached the Ljubljana basin, the blue balloon is descending in the direction behind the Ljubljana Castle

Measured values and observation at meteorological stations:

The closest meteorological stations and observations are located at Vojkova 1b, Ljubljana, where DmetS's main observation point is located, as well as at Barje landfill, where Snaga Javno podjetje, d.o.o. also takes measurements. DmetS also manages a network of meteorological observation points, from where measurements are taken and observations are made.

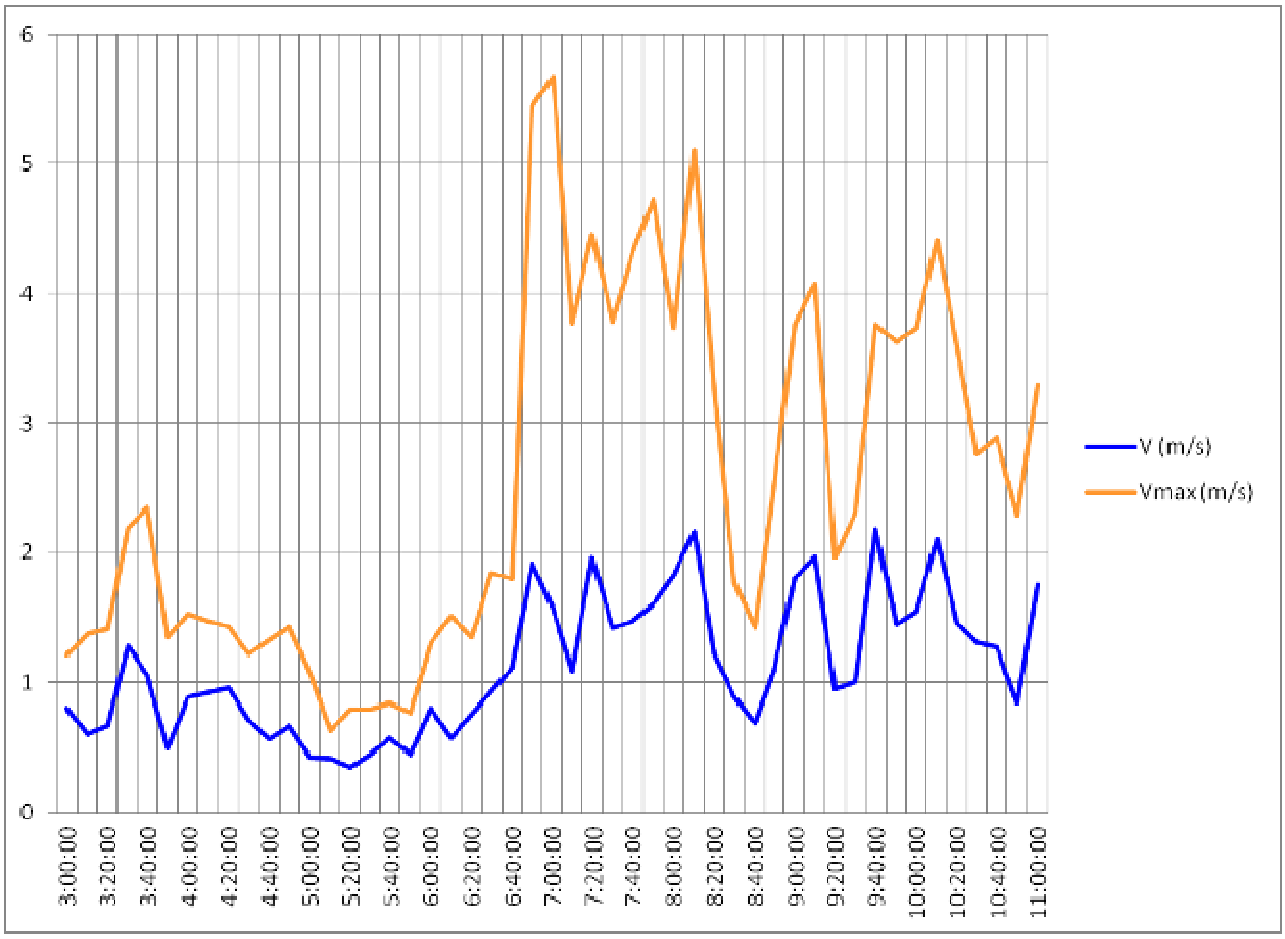
Wind measurements:

In addition to measurements taken before the accident (Picture 33) by radio probe, there are also relevant measurements from Ljubljana, Bežigrad and from the Barje landfill, at the standard height of 10 m. Snaga Javno podjetje, d.o.o. also measures the wind's vertical profile with Sonic Detection and Ranging (SODAR).



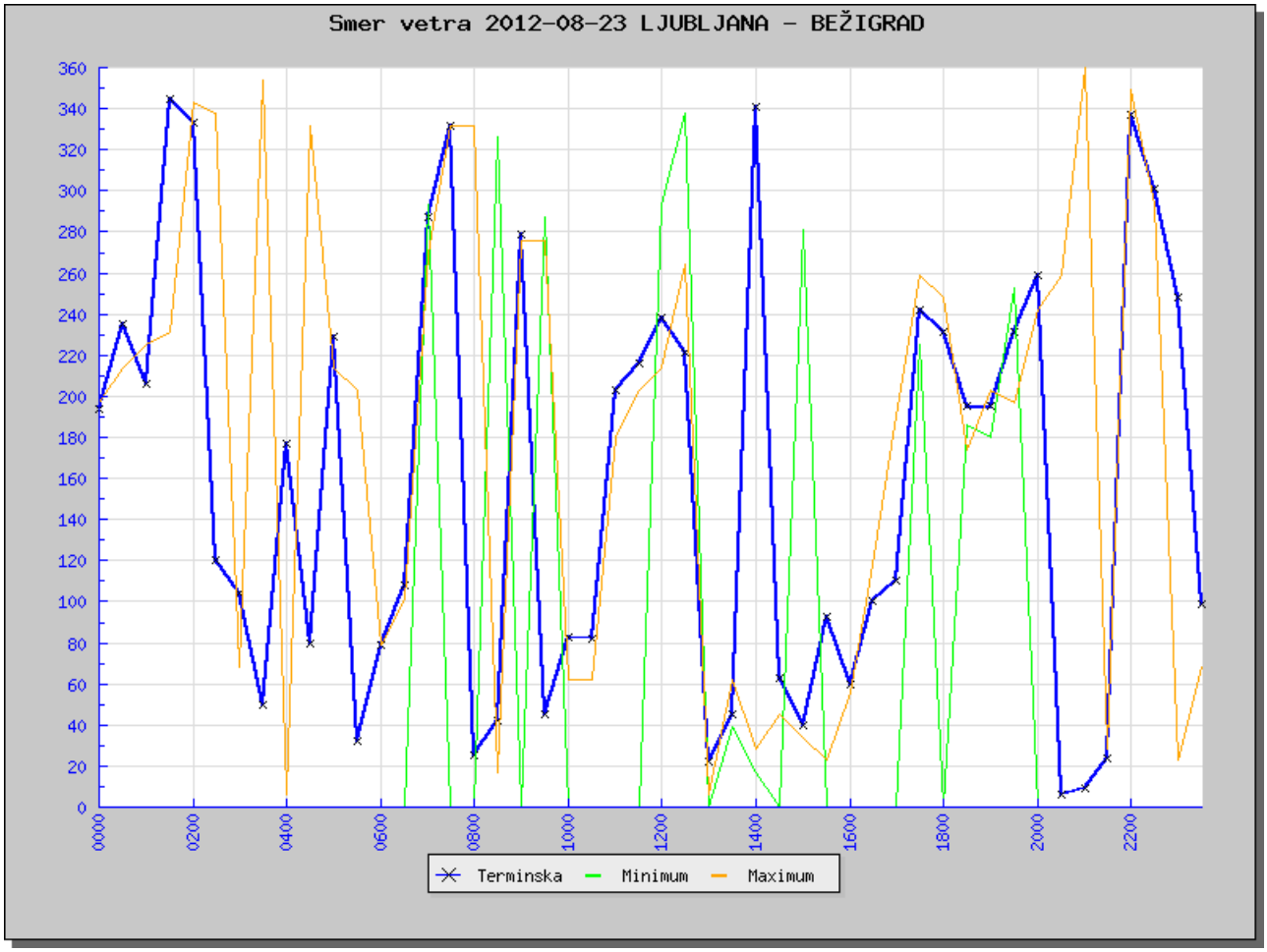
Picture 33: Wind speed measurements (m/s) on 23 August 2012 from Ljubljana, Bežigrad station

Time is expressed in local solar time (UTC+1). Half-hour averages for wind speed values are marked in blue, minimum speed in green, and the strongest gusts within the half-hour interval in orange.



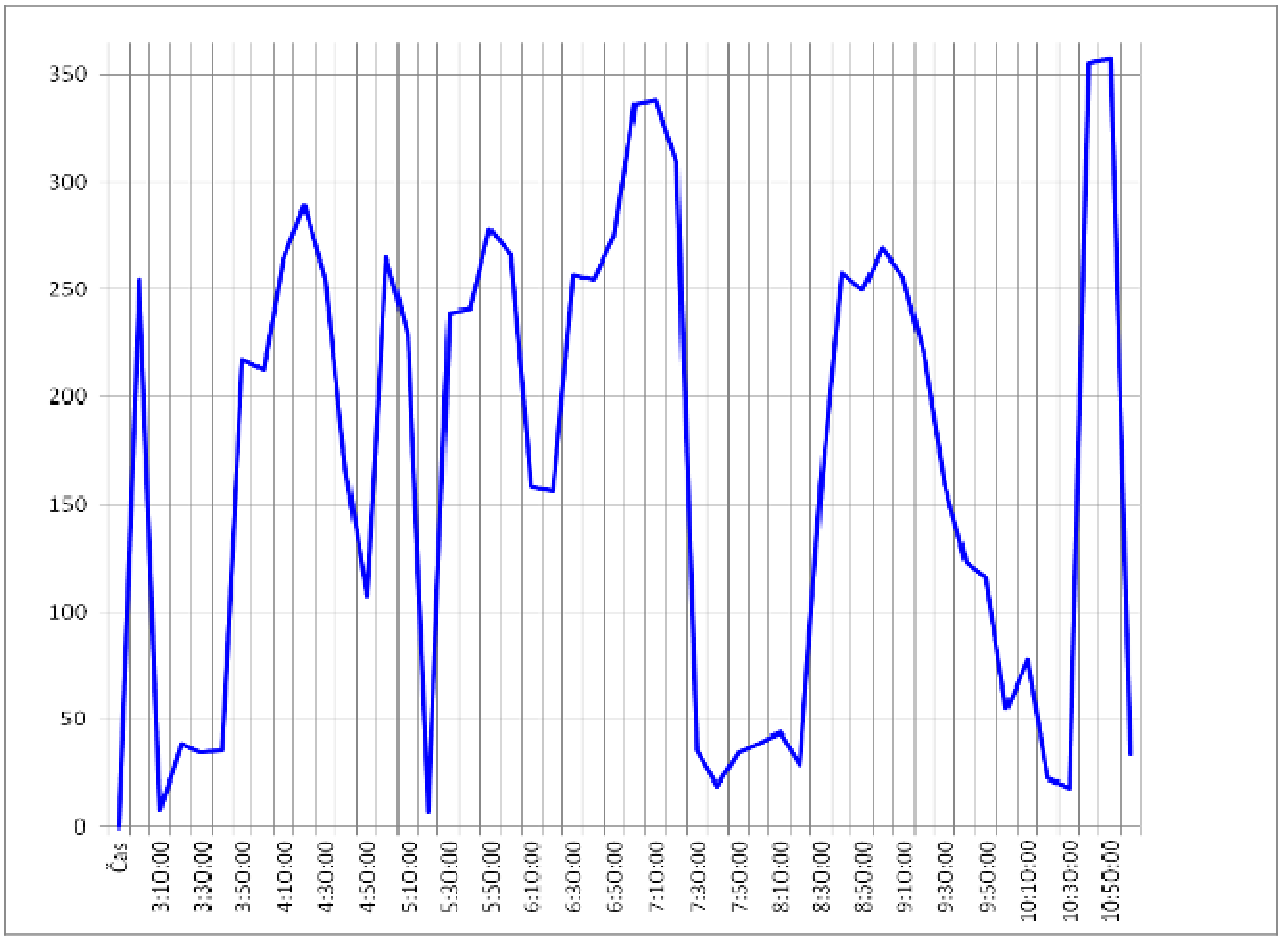
Picture 34: Wind speed measurements (m/s) on 23 August 2012 from Barje landfill station

Time is expressed in local solar time (UTC+1). 10-minute average wind speeds are marked in blue, the strongest gusts within the 10-minute measurement interval are marked in orange. Source: Snaga Javno podjetje, d.o.o..



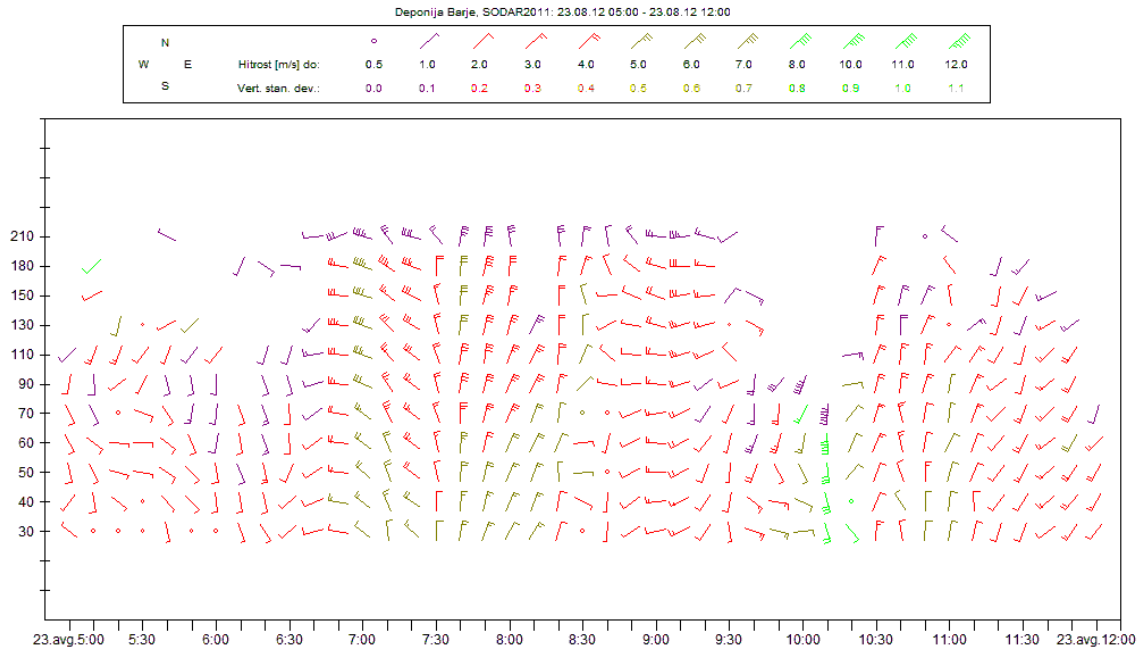
Picture 35: Wind direction measurements on 23 August 2012 from Ljubljana, Bežigrad station

Time is expressed in local solar time (UTC+1). Half-hour average wind directions are marked in blue, minimums are marked in green, and maximum wind directions within the half-hour measurement interval are marked in orange.



Picture 36: Wind direction measurements on 23 August 2012 from Barje landfill station

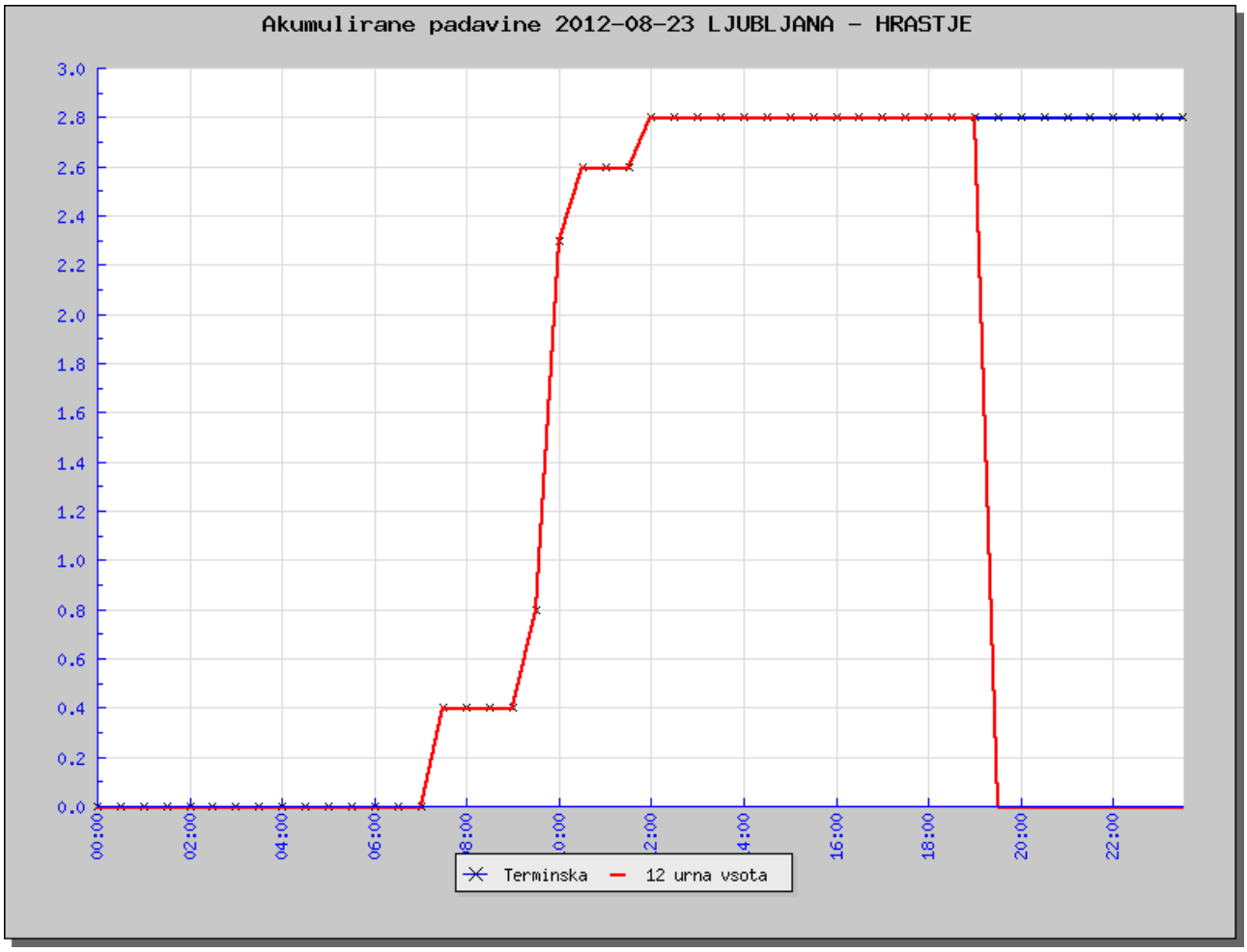
Time is expressed in local solar time (UTC+1). 10-minute average wind direction values.



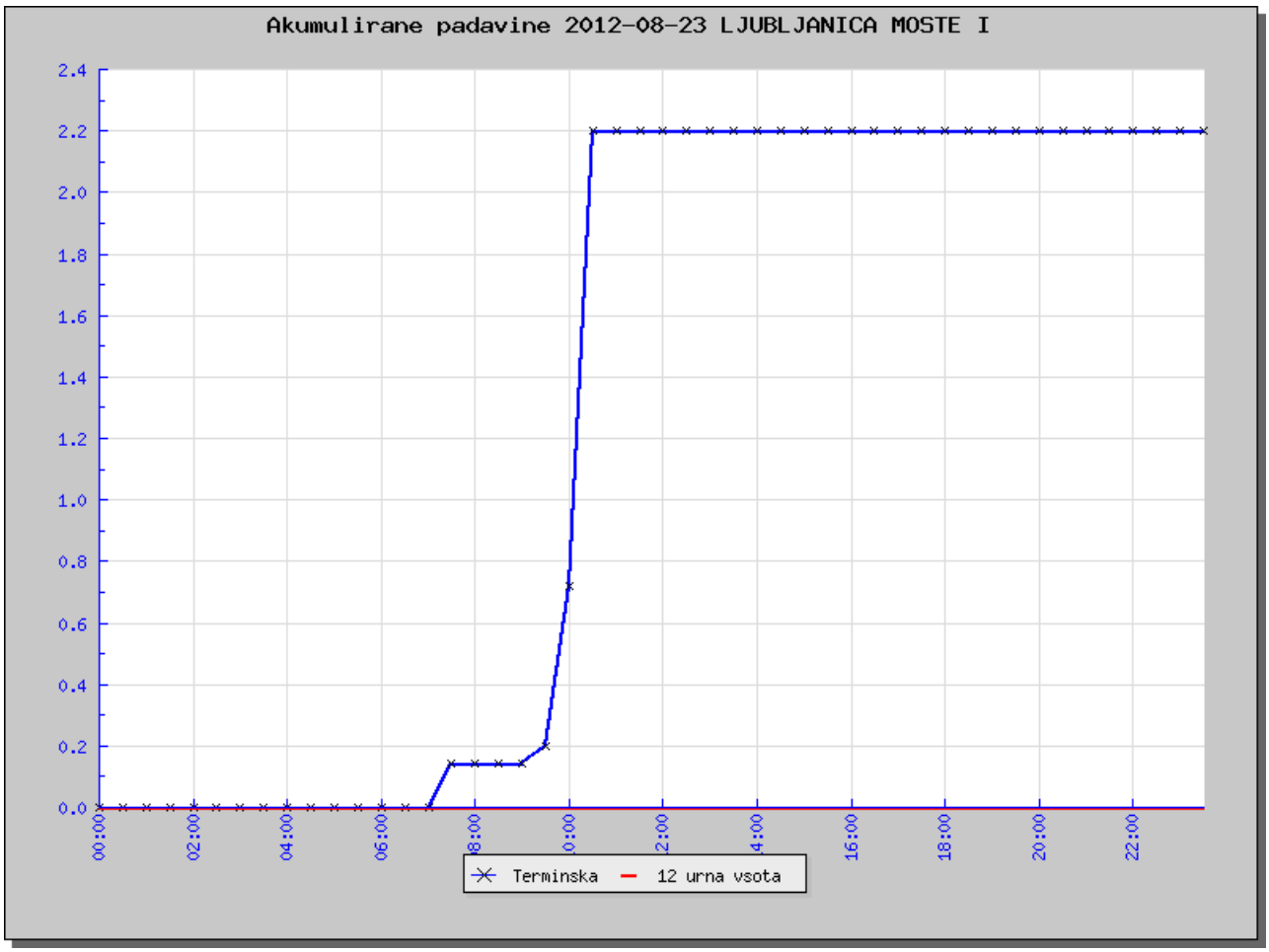
Picture 37: Wind measurements on 23 August 2012 at the Barje landfill measurement station taken with SODAR. Time is expressed in local solar time (UTC+1). 10-minute wind speed and directions up to 200 meters above the measurement point. Source: Snaga Javno podjetje

Precipitation measurements:

DmetS measures precipitation at several locations in Ljubljana and its surroundings. Precipitation measurements (Pictures 38 and 39) show that precipitation connected to the thunderstorm system passage began after the accident. Precipitation measurements corroborate radar images of precipitation particles (Pictures 23 and 24).



Picture 38: Precipitation measurements on 23 August 2012 at Ljubljana, Hrastje measurement point.



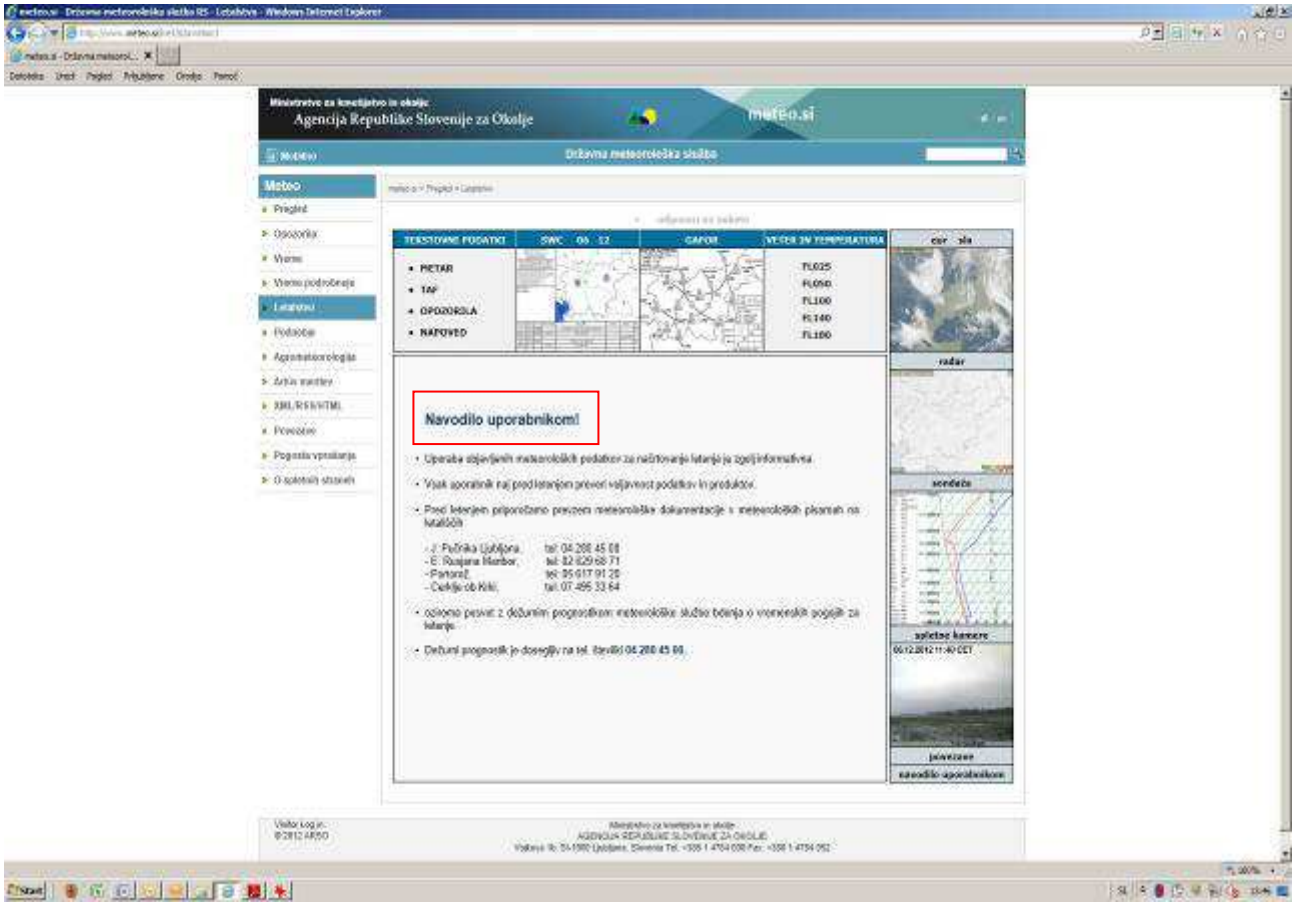
Picture 39: Precipitation measurements on 23 August 2012 at Ljubljana, Moste measurement point. Time is expressed in local solar time (UTC+1).

1.7.4 Availability of Meteorological Information

Available meteorological information:

The Aviation Meteorological Service, which is officially responsible and duly certified for the preparation of meteorological documentation for flights, as well as for consultancy for users, acts as part of the National Meteorological Service of the Slovenian Environment Agency. The scope of available meteorological information, contact points and telephone numbers, and the working hours of the Meteorological Service, are published in AIP Slovenia, chapter GEN 3.5. The Slovenian Environment Agency also publishes a set of meteorological information for aviation on its meteorological portal www.meteo.si. This website address is published in AIP Slovenia. The website http://www.meteo.si/met/sl/aviation/ offers meteorological information for aviation including instructions for information users, stating that before taking off the information users

should consult the on-call forecaster. It also lists the on-call forecaster's telephone number, which is identical to the one listed in AIP.



Picture 40: www.meteo.si - instructions for using meteorological information

Consultation on the weather conditions:

Two meteorological forecasters for aviation, who were working the night and day shifts on the day of the accident (23 August 2012) and who were available for consultancy with users in connection with weather conditions, submitted a written statement saying that on the day of the accident, they were not contacted by anyone who was planning to fly with a hot air balloon. In the morning on 23 August 2012 consultancy was provided to a pilot who was planning to fly around 07:00 a.m. local time from Jože Pučnik Airport in Ljubljana towards Novo mesto, ahead to Celje, with the final destination of Jože Pučnik Ljubljana. Given the thunderstorms, which were moving quickly, from west to east, the pilot stated that he would wait until the weather improved.

1.8 Aids to navigations

During the entire flight the pilot was using a GARMIN OREGON 550 portable GPS device, with serial number 1MW0002327. Flight analysis data have been acquired from the device.

1.9 Communications

During the flight the pilot did not establish radio contact with the competent air traffic controller.

1.10 Airport information

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1.11 Flight Recorders

Aviation regulations for hot air balloons do not require flight recorders.

1.12 Wreckage and impact information

When investigators from the Accident and Incident Investigation Service arrived at the scene of the accident, the balloon was located in a grassy field. EMTS, doctors, fire-fighters, and police officers were present at the scene of the accident, which had already been secured. The scene was observed and documented in photographs. After the inspection, the hot air balloon was removed from the scene of the accident.

Picture 41: Scene of the accident

1.13 Medical and Pathological Information

6 passengers were killed in the accident; 4 were declared dead at the scene of the accident and 2 later in the hospital. 11 passengers suffered serious bodily injury, and light injuries were suffered by 14 passengers. The balloon's pilot was seriously injured in the accident.

1.14 Fire

Upon the balloon's impact with the canopy, the gas pipes in the basket were damaged, gas leaked from the tanks, and a fire ensued.

1.15 Survival aspects

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1.16 Course of the investigation

- On 23 August 2012, the scene of the accident was inspected and the balloon removed.
- On 25 August 2012, on the basis of the finding that on the day of the accident, 23 August 2012, the operator did not have a permission to operate commercial balloon flights, as determined by Articles 76 and 77 of the Aviation Act (Uradni list RS, no. 81/2010 UPB-4), and the finding that such permission was not issued to any operator which performs such passenger flights in the Republic of Slovenia, the Republic of Slovenia Civil Aviation Agency was issued a recommendation on the prohibition of commercial passenger flights in the Republic of Slovenia until the acquisition of such permission in accordance with the provisions of Articles 76 and 77 of the Aviation Act (Uradni list RS, no. 81/2010 UPB-4).
- On 29 November 2012, a technical investigation of the balloon was carried out.
- On 8 July 2013, the pilot was interviewed.
- On 25 April 2014, the Final Report Draft was presented to the members of the Commission.
- On 23 october 2014, the Final Report was published.

1.17 Information on the Operator

On the day of the accident, 23 August 2012, the Operator did not have permission to operate commercial balloon flights as determined by Articles 76 and 77 of the Aviation Act (Uradni list RS, no. 81/2010). The operator did have an insurance policy concluded on the aircraft for responsibility

for injury to third parties, passengers, and personal property, which was valid from 16 June 2012 to 13 September 2012.

1.18 Other Information

/

1.19 Investigation techniques

Standard investigation techniques were used. The scene of the accident was inspected and documented with photographs. Data from the pilot's and balloon's documentation was analysed. Technical inspection followed on the balloon's envelope, basket, gas rigging, burner, and gas tanks. Meteorological data was analysed. Data acquired from the GPS device was analysed, along with voice communication between the pilot of balloon S5-OLM and the operator FIS KZPS, d.o.o.

2. ANALYSIS

2.1 Flight Analysis

The flight of hot air balloon with registration mark S5-OLO was analysed with the SeeYou program version 5.43, from Naviter, d.o.o., which also acted as the data analyst.

2.1.1 Source of information

Information on the flight of hot air balloon S5-OLO of 28 August 2012 was downloaded from the GPS device located in the balloon's basket during the flight. The balloon flight was recorded on a Garmin Oregon 550, serial no. 1MW002327. The device was fully functional and undamaged. It was possible to retrieve all data relevant for analysing the balloon's flight. The most important file for recreating the balloon's flight was found in the folder GPX, subfolder Current. The file name was Current.gpx, recorded in .gpx format. The file was converted to a format for reviewing flights, namely .igc. The file provided the following information on the balloon flight:

- Time (UTC),
- Latitude in degrees, minutes, and decimal minutes in the coordinate system WGS 84,
- Longitude in degrees, minutes, and decimal minutes in the coordinate system WGS 84
- GPS altitude in meters.

Data were recorded in regular 2-second intervals from 04:54:18 a.m. UTC to 05:53:25 a.m. UTC. Data in .icg format were analysed with SeeYou version 5.43 from Naviter, d.o.o. For the purposes of this report, the program was partially modified. The data acquired enabled the calculation of a range of other data on the flight, and the analysis of the aircraft's route in both 2D and 3D. We calculated the following parameters for each recorded point:

- Local time was UTC+2,
- Altitude AGL, data acquired from NASA,
- Wind,
- Speed above ground,
- Vertical speed (vario).

In addition to the record of the balloon S5-OLO, the flight record of S5-OLM was also acquired, which was recorded with a Garmin 76S. The following information on the flight of S5-OLM was acquired from the file:

- Time (UTC),
- Latitude in degrees, minutes, and decimal minutes in the coordinate system WGS 84,
- Longitude in degrees, minutes, and decimal minutes in the coordinate system WGS 84
- GPS altitude in meters.

Just as from the flight of balloon S5-OLO the original data enabled the calculation of the following, as well:

- Local time was UTC+2,
- Altitude AGL, data acquired from NASA,
- Wind,
- Speed above ground,
- Vertical speed (vario).

2.1.2 Possible sources of error in the measurements

- The digital relief model is to some extent imprecise, but the original data neither uncover nor provide an assessment of accuracy. Altitudes for regions where data is unavailable were calculated using linear interpolation. Consequently, the error in the altitude of points lying in a plain is typically smaller than 5 meters.
- Measurements of pressure altitude, GPS altitude, speed against air, and the true direction of flight all have their inaccuracies. Data on the position, altitude, and speed of flight obtained from the flight recorder on S5-OLO are very accurate, while the record of flight of S5-OLO shows significant inaccuracies in the measures of position and altitude. It can be confirmed that

the inaccuracy of the wind measurements from the record of balloon S5-OLO is less than 5 km/h, while the inaccuracy of wind measurements for S5-OLM is around 10 km/h.

- Due to the characteristics of balloon flight we can assume that the wind speed is more or less equal to the balloon's ground speed. This is true, as long as wind is the only factor affecting the balloon's direction and speed. As soon as the balloon hits the ground, the resistance caused is relatively large, and typically contributes to the balloon's deceleration. A part of the analysis of the flight of balloon S5-OLO is connected to the motion when the basket was dragging along the ground. Here we can be sure that the wind speed was significantly greater than the speed of the balloon S5-OLO's movement as recorded.
- For the part of the flight of balloon S5-OLO where the basket was touching the ground it is impossible to determine the position of the basket and balloon in this instant. It can be confirmed that at this part of the flight there were significant changes to the position of the basket and balloon in comparison to their normal positions.
- The inaccuracy of the record of the position in balloon S5-OLO is significant due to normal errors in recording positions with GPS.
- The accuracy of data recorded in balloon S5-OLO is much higher than those for balloon S5-OLM.
- Due to the nature of recorded and calculating data in GPS devices there can actually be discrepancies in the calculated positions of the first and second ground impacts of balloon S5-OLO. The estimated error in position is less than 8 meters.

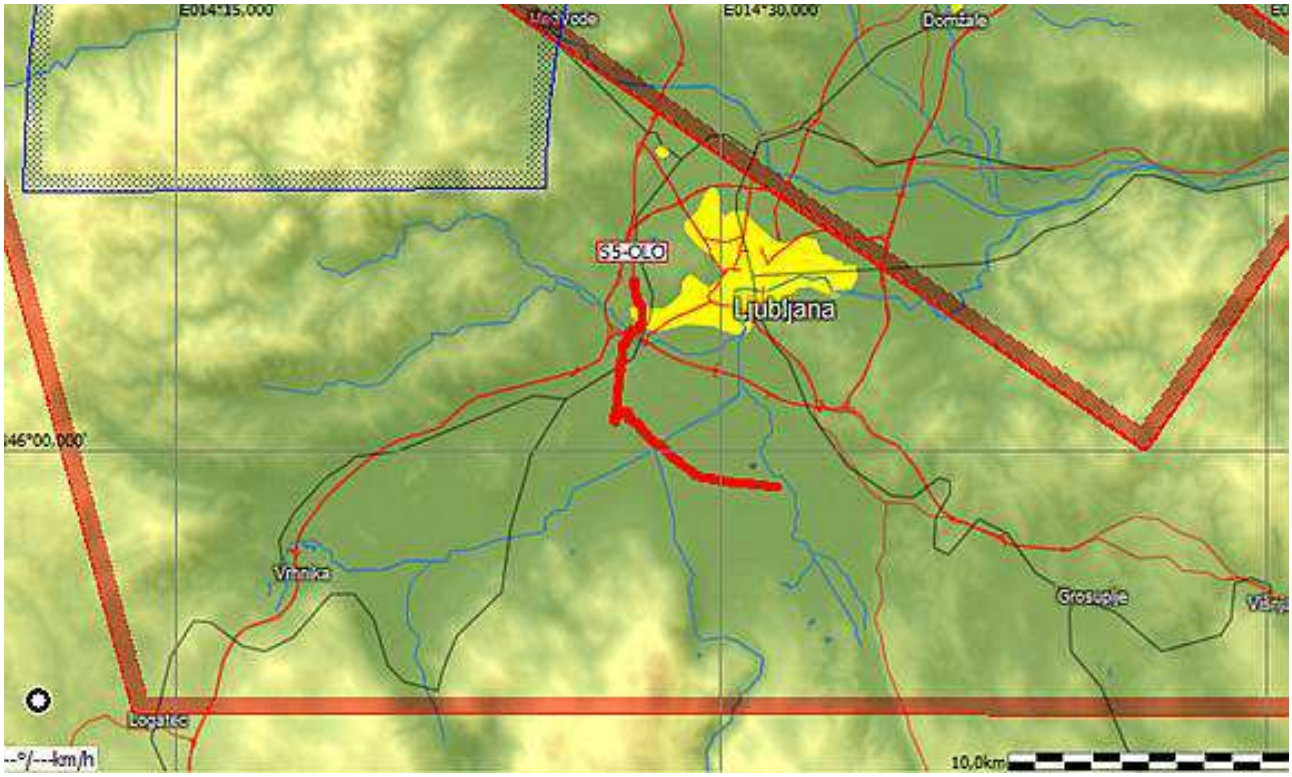
These inaccuracies can have a significant effect on the ability to calculate precise data for some parameters of balloon S5-OLO after the basket first hit the ground and from then on.

2.1.3 General description of the flight

Basic data on the flight, recorded with a GPS device on balloon S5-OLO:

- Take-off at 04:54:18 a.m. UTC from N46°03.223' E014°27.606', altitude 300 metres AMSL near Ljubljana – Brdo exit,
- The flight ended at 05:53:25 a.m. UTC at N45°59.322' E014°31.534', at an altitude of 287 metres AMSL halfway between Ljubljana-Rudnik and Ig,
- The difference between local time and UTC is +2 hours,
- Duration of flight: 59 minutes 07 seconds,
- Greatest altitude reached: 1,371 metres AMSL at 05:32:23 a.m. UTC,
- Distance from take-off: 8.8 km in a straight line,
- The total distance flown with diversions from a straight line between take-off and landing: 12.2 km,
- Average ground speed: 12.4 km/h.

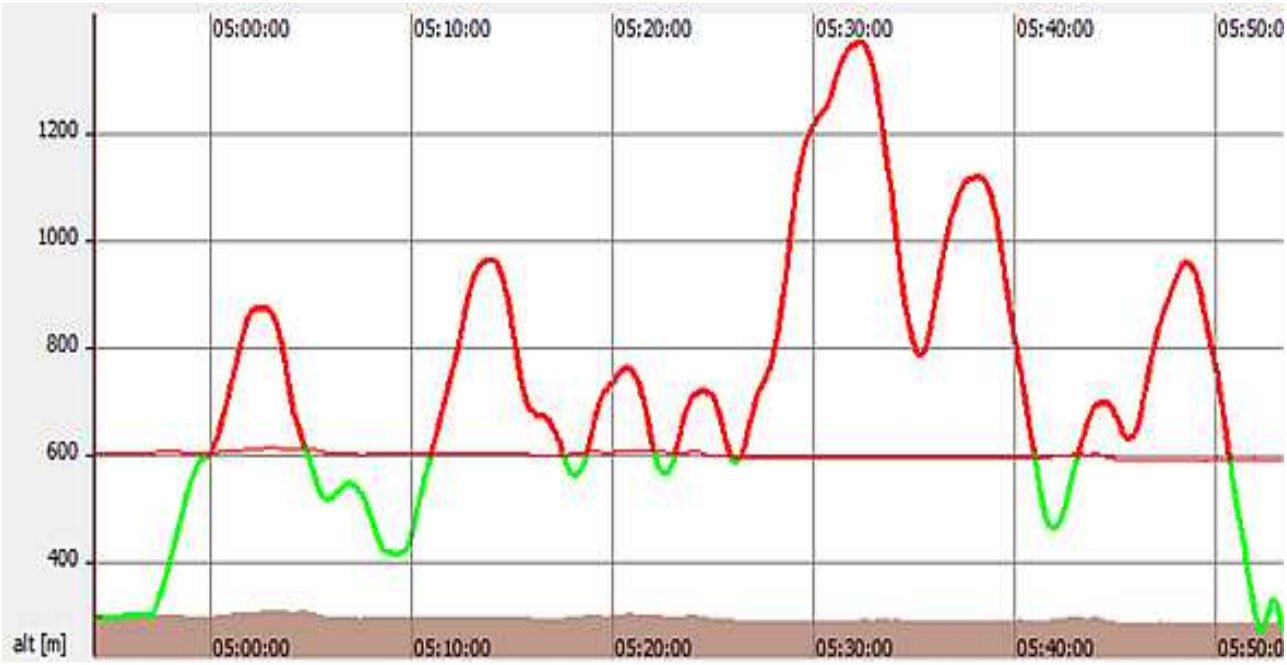
The flight of balloon S5-OLO was entirely within the air space of TMA Ljubljana 1. TMA Ljubljana 1 is a controlled class C airspace for all air craft which fly higher than 1,000 feet above the surface of the earth.



Picture 42: A description of the path of balloon S5-OLO (red) within TMA Ljubljana 1 (bordered red, border is shaded) and south of CTR Ljubljana (shaded red and surrounded with a thick red line).

From the flight recorded on balloon S5-OLO on 23 August 2012 it is evident that 28 minutes and 38 seconds of the flight was carried out within the controlled class C airspace of TMA Ljubljana 1. That is exactly 50% of the duration of the entire flight. Balloon S5-OLO entered and exited the controlled class C airspace TMA Ljubljana 1 at the following times and altitudes:

- 05:00:01 a.m.: Entry into the class C TMA LJUBLJANA 1 at an altitude of 604 m.
  05:04:46 a.m.: Exiting the class C TMA LJUBLJANA 1 at an altitude of 612 m.
- 05:11:01 a.m.: Entry into the class C TMA LJUBLJANA 1 at an altitude of 606m.
  05:17:37 a.m.: Exiting the class C TMA LJUBLJANA 1 at an altitude of 598m.
- 05:18:46 a.m.: Entry into the class C TMA LJUBLJANA 1 at an altitude of 608m.
  05:22:07 a.m.: Exiting the class C TMA LJUBLJANA 1 at an altitude of 604m.
- 05:23:10 a.m.: Entry into the class C TMA LJUBLJANA 1 at an altitude of 607m.
  05:25:56 a.m.: Exiting the class C TMA LJUBLJANA 1 at an altitude of 596m.
- 05:26:26 a.m.: Entry into the class C TMA LJUBLJANA 1 at an altitude of 598m.
  05:41:02 a.m.: Exiting the class C TMA LJUBLJANA 1 at an altitude of 596m.
- 05:43:11 a.m.: Entry into the class C TMA LJUBLJANA 1 at an altitude of 603m.
  05:50:45 a.m.: Exiting the class C TMA LJUBLJANA 1 at an altitude of 588m.



Picture 43: Barogrom of S5-OLO's flight. The green part of the path shows the flight below 1,000 feet AGL, the red part shows the flight above 1,000 feet AGL, i.e. within the TMA Ljubljana 1 air space.

The flight of S5-OLO went normally until 05:28:36 a.m. UTC. The balloon moved towards the south, as winds carried it with a ground speed lower than 20 km/h, which is a light northern wind. At 05:28:36 a.m. UTC balloon S5-OLO achieved its highest altitude of the day (1,371 m AMSL), followed by a rapid descent. During the descent, the wind direction changed from north to north-west. Later, after 05:49:39 a.m. UTC, during the final descent the wind changed to westerly, and wind speed increased to above 50 km/h, which continued up to the first contact with the ground at 05:52:05 a.m.UTC, at N45°59.367' E014°30.960' halfway between Ljubljana-Rudnik and Ig.2.1.4

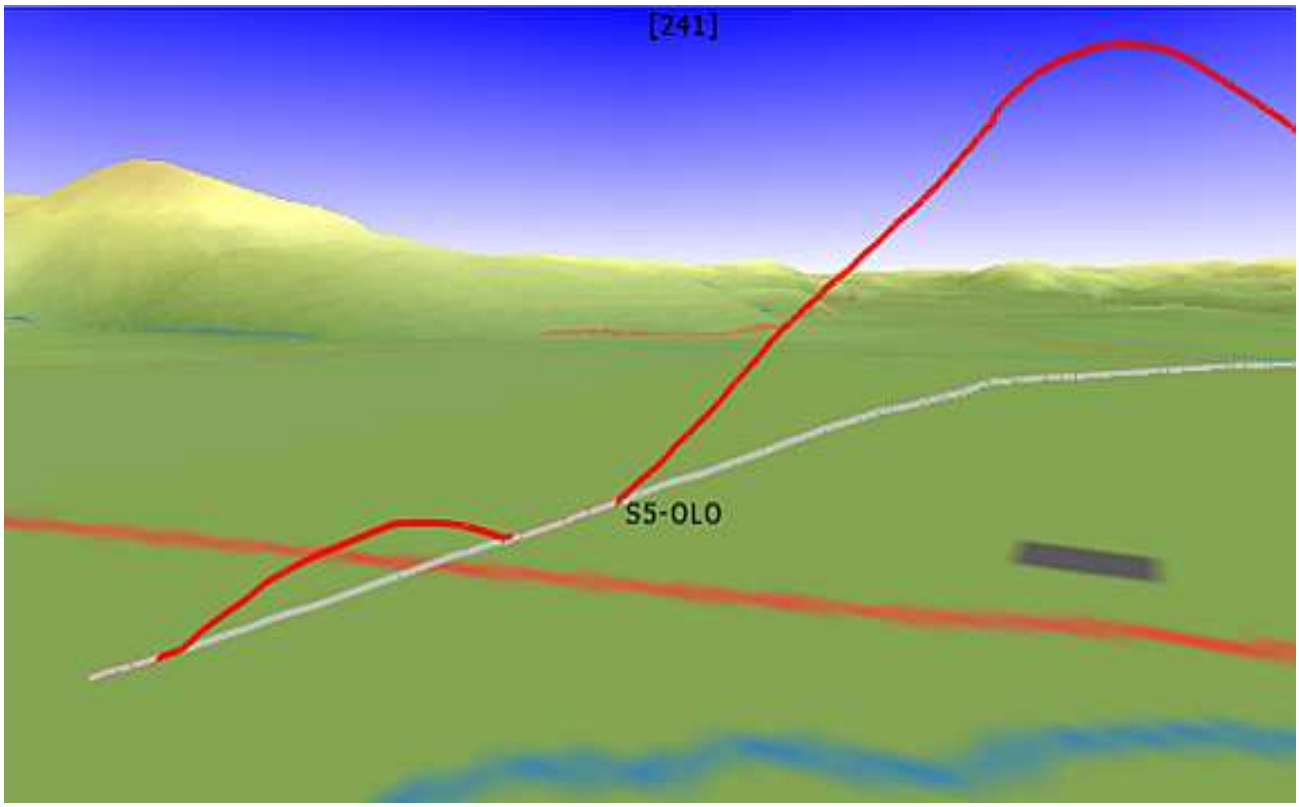
2.1.4 Analysis of the final 6 minutes of flight

Final ascent:

At 05:45:56 a.m. UTC, 6 minutes and 9 seconds before the first impact with the ground, balloon S5-OLO began an ascent and reached an altitude of 956 m AMSL at 05:48:59 a.m. UTC. During the final ascent, wind speeds increased significantly, exceeding 40 km/h for the first time.

Final descent:

The final ascent was followed by a rapid descent all the way to the ground. The average speed of descent between 05:49:16 a.m. UTC and 05:52:05 a.m., when the balloon first hit the ground, was -3.7 m/s. The average ground speed at this point was 48 km/h. The highest recorded ground speed at this point was recorded at 05:51:17 a.m. UTC, 180 metres above the ground at 63 km/h. Ground speeds of more than 50 km/h were recorded from the altitude of 661 m AMSL (374 AGL) all the way to the first contact with the ground at 05:52:05 a.m. UTC.



Picture 44: 3D view of the last part of the flight of balloon S5-OLO (moving from right to the left).
The figure clearly shows how the balloon hit the ground, how it dragged along the ground, how it flew over the road, and how it came to a stop.

First impact with the ground:

The first impact with the ground occurred at 05:52:05 a.m. UTC at N45°59.367' E014°30.960' halfway between Ljubljana-Rudnik and Ig. The first impact with the ground occurred 320 m west of

the main road which leads from Ljubljana to Ig. The measured speed upon contact with the ground was 43 km/h. The recorded parameters provide for the calculation that balloon S5-OLO dragged along the ground for 27 seconds/240 m until 05:52:32 a.m. UTC. The balloon's basket dragged along the ground at an average speed of 32 km/h, leading to the conclusion that the speed of the wind pushing it was significantly higher than that.

Balloon S5-OLO then once again lifted at 05:52:32 a.m., 240 m further east than when it first hit the ground, flying over the main road. It then flew an additional 43 seconds and reached the highest measured altitude of 41 m AGL until it hit the ground again at 05:53:15 a.m. UTC at N45°59.330' E014°31.479' at the altitude of 288 m. At this point of the flight the greatest ground speed was recorded at 42 km/h. Due to the balloon's momentum we can predict that the wind speed at this point was significantly higher than the recorded speed with which the balloon itself was moving.

Picture 45: Balloon S5-OLO's first impact with the ground

Second impact with the ground:

The second impact with the ground occurred 340 m east of the main road at a ground speed of 37 km/h. Balloon S5-OLO came to a halt 70 meters east of the impact site at 05:53:25 a.m. UTC at

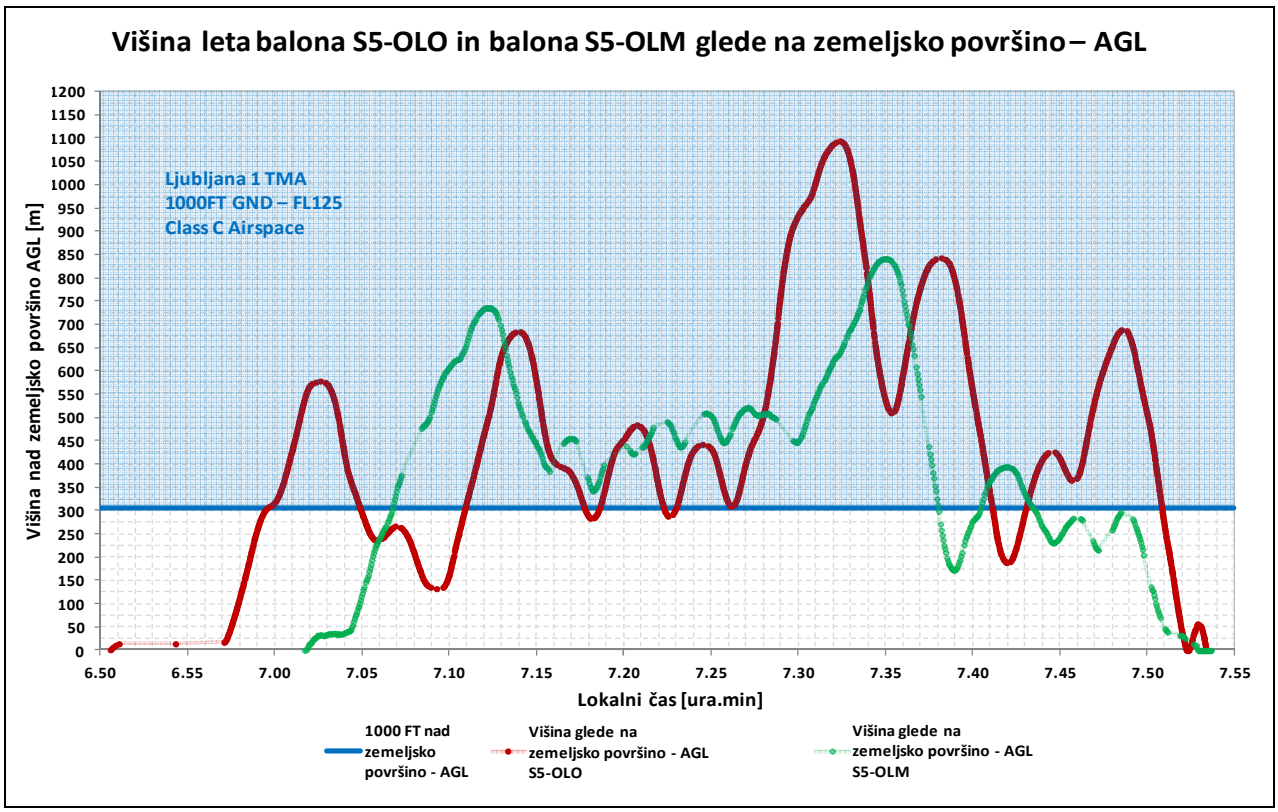
N45°59.322' E014°31.534'. The balloon's final resting spot was 740 meters east of the site of the first impact 1 minute and 20 seconds later.

Picture 46: Balloon S5-OLO's second impact with the ground

2.1.5 Comparison of flight of S5-OLO with the flight of balloon S5-OLM

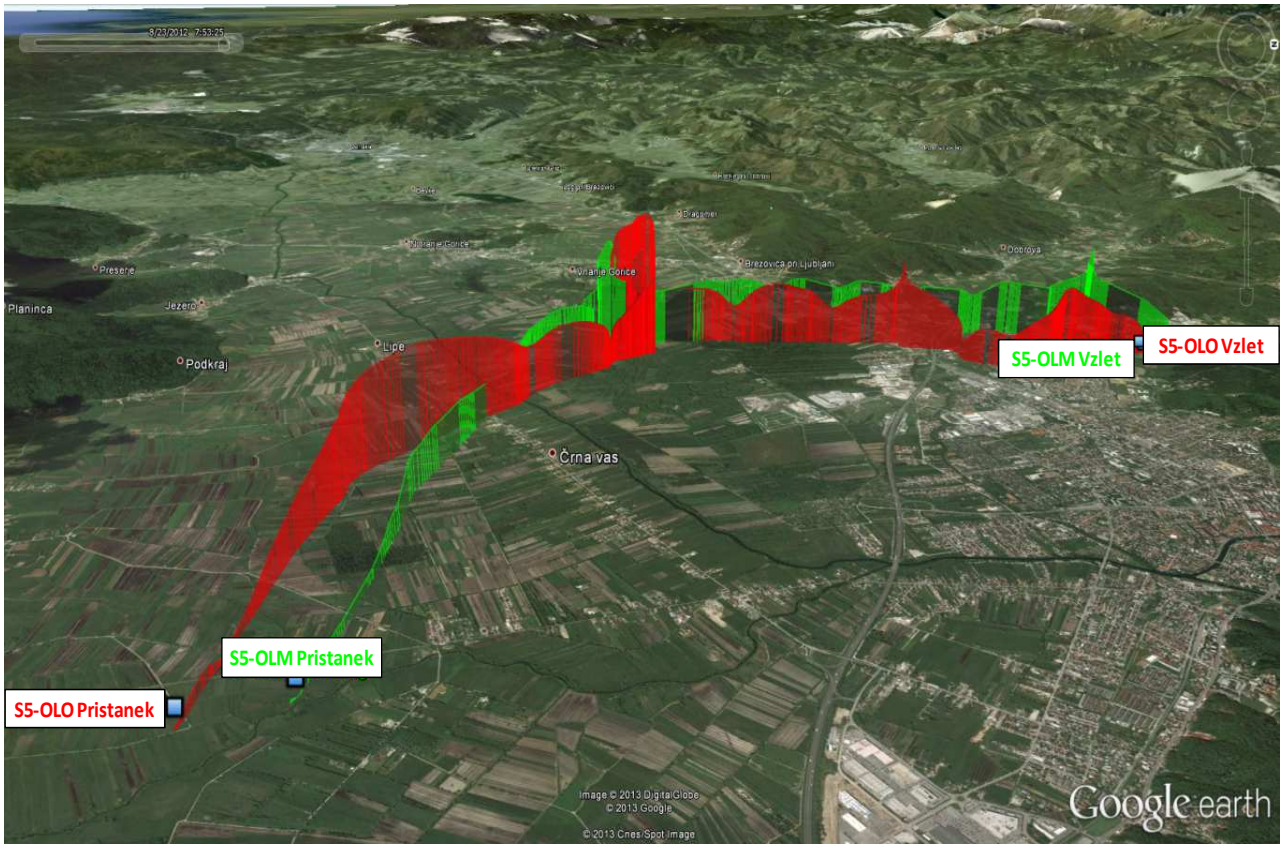
The same day, 23 August 2012, in the same region and in the vicinity of balloon S5-OLO, balloon S5-OLM was also active, taking off 45 m north-east of the take-off site of balloon S5-OLO. It took off at 05:01:45 a.m. UTC, 7 minutes and 27 seconds later than balloon S5-OLO. The flight path of balloon S5-OLM is in many respects very similar to that of balloon S5-OLO. Balloon S5-OLM landed at the same time as balloon S5-OLO, 560 meters north-west of where balloon S5-OLO came to a halt. In the final minutes balloon S5-OLM was flying lower than balloon S5-OLO. It was also flying more slowly, and it descended significantly slower than balloon S5-OLO. Its highest and lowest descent speeds in the final minutes were comparatively much lower. In the final 2 minutes before landing, balloon S5-OLM managed to maintain a constant altitude, measured at 70 m AGL.

Picture 47: Balloons S5-OLO and S5-OLM before take-off on 23.08.2012 at 06:35 a.m. local time



Picture 48: Altitudes of balloons S5-OLO and S5-OLM on 23 August 2012

EN	SL
Višina leta balona S5-OLO in balona S5-OLM glede na zemeljsko površino - AGL	Height of the balloon S5-OLO and balloon S5-OLM - AGL
Višina nad zemeljsko površino AGL [m]	Above ground level - AGL [m]
Lokalni čas [ura.min]	Local time [hour.min]
1000 FT nad zemeljsko površino - AGL	1000 FT above ground - AGL
Višina glede na zemeljsko površino - AGL S5-OLO	Above ground level - AGL S5-OLO
Višina glede na zemeljsko površino - AGL S5-OLM	Above ground level - AGL S5-OLM

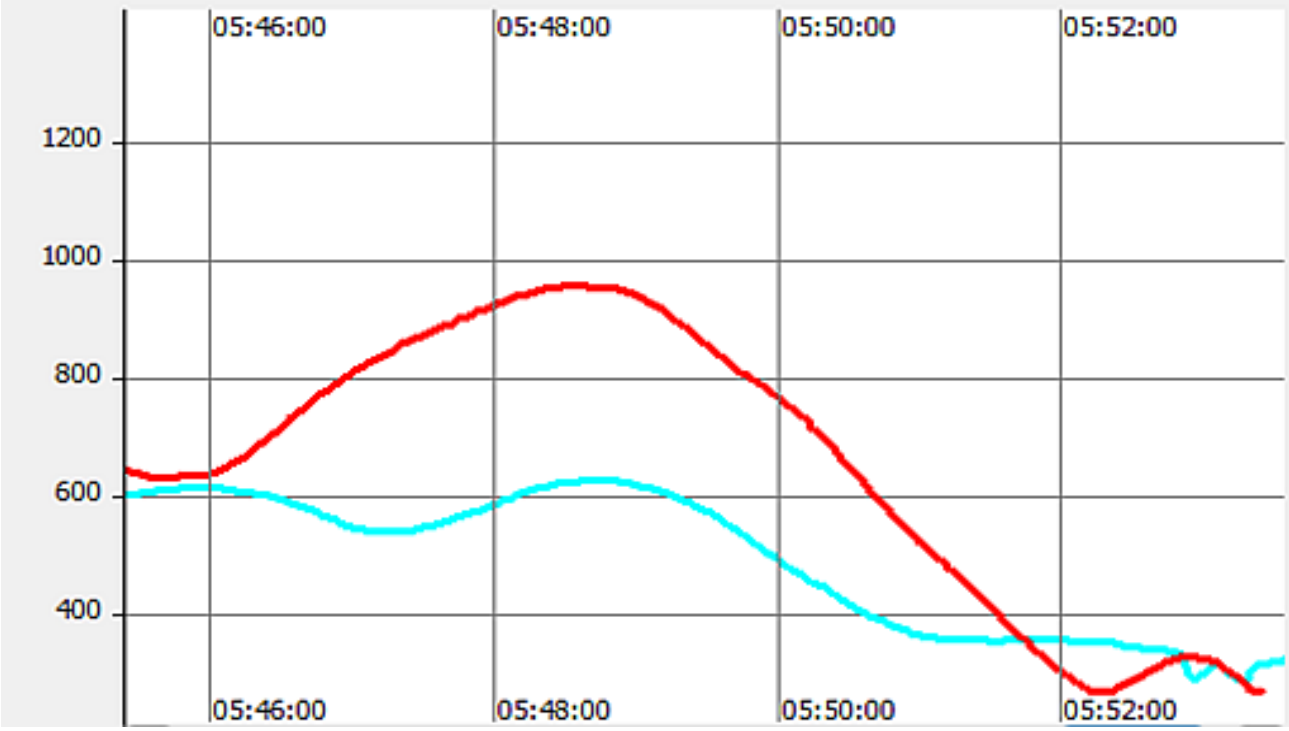


Picture 49: Display of the flights of balloon S5-OLO and S5-OLM on 23 August 2012

EN	SL
S5-OLO Pristanek	S5-OLO Landing
S5-OLM Pristanek	S5-OLM Landing
S5- OLM Vzlet	S5- OLM Take-off
S5-OLO Vzlet	S5-OLO Take-Off

The following table compares the flight parameters of both balloons from the moment they exceeded 200 m AGL until landing:

	S5-OLO	S5-OLM
Maximum descent speed	-5 m/s	-3,2 m/s
Minimum descent speed	-2,8 m/s	0,0 m/s (altitude hold)
Average (wind) speed	55,2 km/h	38,2 km/h
Time from reaching 200 m AGL until landing	55 sec	2 min 55 sec



Picture 50: Barogram of the final part of the flight of balloon S5-OLO (red) and S5-OLM (blue)

2.2 Analysis of pilot information

The documentation on the pilot obtained from the Republic of Slovenia Civil Aviation Agency shows that the Agency's air controller ordered the pilot on 6 June 2012 to undergo a special medical exam regarding the requirements of his eyesight, at the same time forbidding him from performing the functions of a hot air balloon pilot with a length of the ban until submission of the results of said special ophthalmology check-up.

The air controller ordered the pilot to immediately inform the Civil Aviation Agency upon fulfilment of this requirement, warning him that an appeal would not stay the execution of this decision.

The documentation showed that the pilot had not fulfilled the requirements of the air controller's decision of 6 June 2012 by the day of the accident.

On 7 August 2013, the pilot sent the Aircraft Accident and Incident Investigation Service a written statement through a legal intermediary, saying that he did not receive any mail from the Republic of Slovenia Civil Aviation Agency in 2012.

Documentation relating to the air controller's decision showed that the decision had been sent to the pilot's address and accepted.

The Commission therefore can neither confirm neither deny that the pilot was informed of the air controller's decision.

2.3 Analysis of information on the entry into the Aircraft Register

Data in the Aircraft Register of the Republic of Slovenia, which is kept by the Republic of Slovenia Civil Aviation Agency, show that the documentation of balloon S5-OLO does not include an agreement on the use of a hot air balloon between the Društvo balonarski center Slovenija, Gornji trg 7, 1000 Ljubljana and the operator Balonarski center d.o.o., Linhartova cesta 8, 1000 Ljubljana, as determined in the Aviation Act.

2.4 Analysis of weather

On the basis of the analysis of all information obtained, the following conclusions can be made:

The operations of the meteorological service:

- At the time of the accident the Slovenian Environment Agency had a valid ANS authorization, no. 37222-1/2010/12/slo,
- meteorological personnel, which on the day of the accident performed ex officio tasks connected with compiling meteorological forecasts and warnings for air traffic, had valid authorizations for work on the day of the accident,
- The description of the operations of meteorological systems and the Slovenian Environment Agency's meteorological service was properly published in AIP Slovenia together with valid contact points and telephone numbers for acquiring meteorological information for flights and for consultancy with users,
- All of the Environment Agency's meteorological systems were working normally on the day of the accident, so all current meteorological information was up-to-date, published, and accessible.

Weather forecasts:

- Unstable weather conditions with thunderstorms were predicted for 23 August 2012 several days before the accident.
- All available meteorological models and calculations the day before the accident predicted the development of thunderstorms in the afternoon of 23 August 2012. The Slovenian Environment Agency's weather forecasts predicted the occurrence of thunderstorms in the afternoon on 23 August 2012.
- At 06:00 a.m. local time on the day of the accident, 23 August 2012, the first special weather forecasts were issued for air traffic, predicting the occurrence of storms in LJUBLJANA FIR in the morning.
- All other forecasts for aviation made after 06:00 a.m. local time included thunderstorm warnings for the morning.
- An AIRMET warning was issued at 05:46 a.m. local time regarding the occurrence of thunderstorms in MILANO FIR. This warning included data on the storm system's movement towards the east with a speed of 30 knots.
- The AIRMET warning on the presence of storms within LJUBLJANA FIR was issued at 06:58 local time. The warning included a prediction on the movement of storms eastward at a speed of 40 knots.

The pilot's familiarity with the weather conditions:

- The balloon's pilot did not consult with the on-call meteorologist, who on the day of the accident was acting in the capacity of consultant for users.

- The balloon's pilot did not acquire meteorological documentation at one of the meteorological offices.
-

Weather conditions at the time of the accident:

- At the time of take-off at the Ljubljana marshes a light wind was blowing in various directions at speeds of less than 5 knots. Meteorological visibility was estimated at around 40 km, there was no precipitation or other meteorological phenomena, storm clouds in the direction towards the west were clearly visible from Ljubljana, thunderstorms were recorded at the Rateče and Kredarica meteorological stations. The thunderstorms which were formed in the Po valley were

moving towards central Slovenia from west to east with an estimated speed of between 30 and 40 knots.

- At around 20 minutes before 08:00 a.m. local time, the western half of the sky over Ljubljana was covered with clouds, among which storm clouds were clearly visible. Due to the passage of storm systems over the northern and central parts of Slovenia, the wind also began to pick up in the area of the Ljubljana marshes. The wind speed on the ground reached average speeds of around 5 knots and maximum speeds of around 12 to 16 knots at the time of the accident. The wind was blowing from west or north-west, at an angle of 250^{o} to 330^{o} facing north.
- At the time of the accident, the wind did not vary much in direction or speed at different altitudes, the wind speed gradually increased with altitude, the average wind speed at 50 meters AGL was between 6 and 8 knots, at 90 meters between 10 and 12. The wind direction up to 90 meters AGL did not change with respect to ground level.
- At the time of the accident no wind shear was detected as a result of the strengthened wind at ground level or due to a change in wind direction.
- Storm systems passed the area immediately to the north of Ljubljana marshes at 08:00 a.m. local time, as well as the area to the south. At the scene of the accident there was no precipitation nor storm cells.

Picture 51: Photograph from balloon S5-OLO's basket at 07:31 a.m. local time

Picture 52: Photograph from balloon S5-OLO's basket at 07:43 a.m. local time

Picture 53: Photograph from balloon S5-OLO's basket at 07:44 a.m. local time

Picture 54: Photograph from balloon S5-OLO's basket at 07:46 a.m. local time

2.5 Analysis of the communications

The pilot of balloon S5-OLO did not have a radio connection established with the competent air traffic control during the time of the flight. From the flight recorded on balloon S5-OLO on 23 August 2012 it is evident that 28 minutes and 38 seconds of the flight was carried out within the controlled class C airspace of TMA Ljubljana 1. This is exactly 50% of the duration of the entire flight. The pilot should have had a radio connection established with air traffic control and should have acquired permission from it for flying through class C airspace TMA Ljubljana 1.

The pilot of balloon S5-OLM did have a radio connection established with the competent air traffic control.

VOICE COMMUNICATION TRANSCRIPTION NO. 1

Frequency: 118.475 MHz
Date of hearing: 23 August 2012
Source: RSN RICOCHET
Time of hearing: from 11:40 a.m. to 2:30 p.m. UTC

TIME hh:mm:ss	SOURCE	TRANSCRIPTION	COMMENTS
05:07:40	S5OLM	Ljubljana S5-OLM from...	Audibility 1 a lot of interference
	FIC	S5-OLM Ljubljana good morning	
	S5OLM	Ljubljana OLM, I started towards Dob somewhere up to Barje... 500 feet above... QNH	Audibility 1 a lot of interference
	FIC	S5-OLM you got a transponder?	
	S5OLM	No, I don't have a transponder, so I will... Barje...	Audibility 1 a lot of interference
	FIC	Yeah, at 300 it's OK, but I don't know about higher, If it's possible without a transponder, well, we'll work it out	
	S5OLM	Yeah sure ... We'll call...	Audibility 1 a lot of interference
05:08:23	FIC	OK	

TIME hh:mm:ss	SOURCE	TRANSCRIPTION	COMMENTS
05:30:11	S5OLM	Ljubljana OLM	
	FIC	Yeah what's up?	
	S5OLM	I'd like to ask if we can go 3,000 feet above Barje for 15 minutes... I'm here right in the centre	
05:30:25	FIC	To 3,000 feet, just a second	

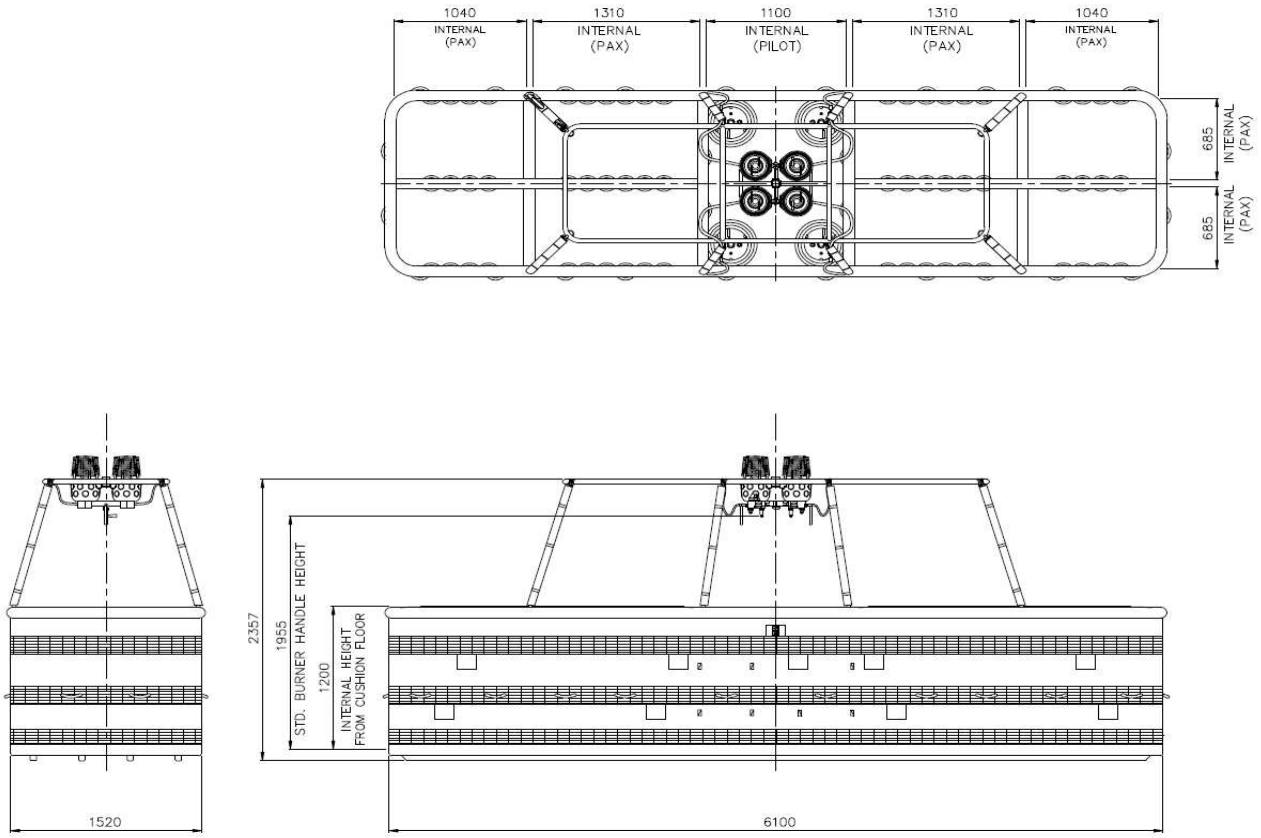
TIME hh:mm:ss	SOURCE	TRANSCRIPTION	COMMENTS
05:30:55	FIS	S5H... OLM, you have permission to go up to 3,000 for the moment	
05:31:05	S5OLM	Roger, I'll get at you when I'm back at 300... thanks	

TIME hh:mm:ss	SOURCE	TRANSCRIPTION	COMMENTS
05:41:31	S5OLM	Ljubljana OLM	
	FIS	Yeah what's up?	
	S5OLM	I'm back under 300 metres... for landing thanks	Audibility 1 a lot of interference
05:41:43	FIS	Thanks, bye	

Picture 55: Photograph of balloon S5-OLM from the basket of balloon S5-OLO on 23 August 2012

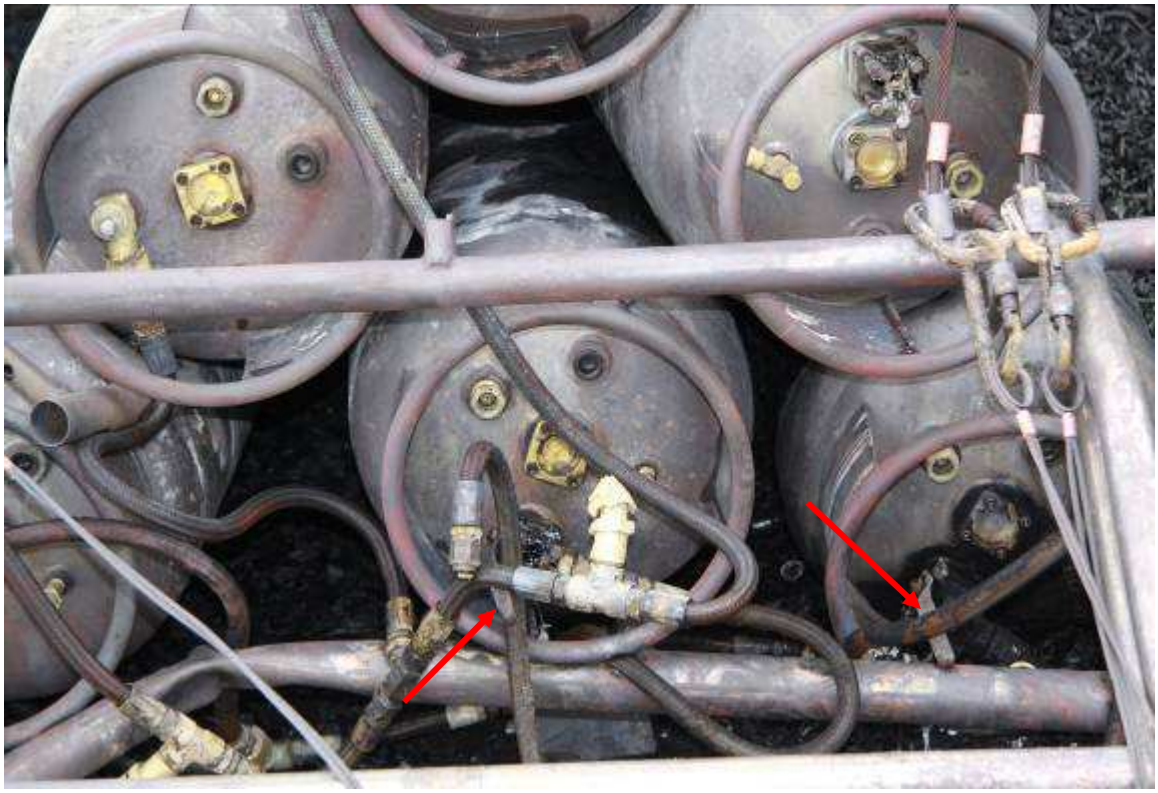
2.6 Analysis of the cause of the fire

It was determined when analyzing the cause of the fire that when the balloon's basket hit the canopy the pipes in the gas rigging in the basket were damaged and as a result there was a gas leak from 7 tanks, which had their valves open, all the way until the balloon came to a complete halt. The immediate cause of the fire were pipes damaged in the impact with the canopy, the indirect cause was the open shut-off valves on the tanks, which were not closed by the pilot before the impact.

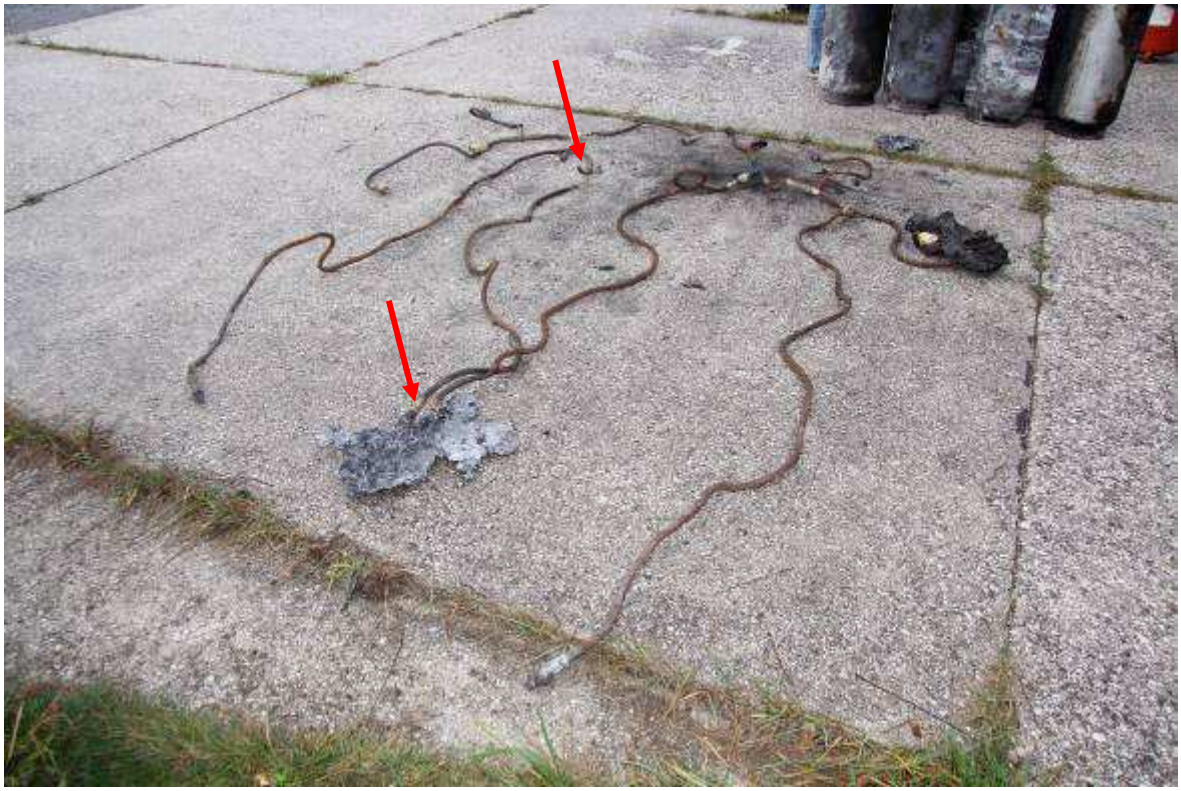


Picture 56: The basket of Lindstrand tip BA 050-A-001 with gas rigging, tanks, and burner

Picture 57: View of the gas rigging up to the burner in the basket – Source: Manufacturer



Picture 58: View of the open shut-off valves on the tanks at the scene of the accident



Picture 59: View of the damaged pipes in the gas rigging

Picture 60: View of the damaged pipes in the gas rigging near the burner

Picture 61: View of the damaged pipes in the gas rigging near the burner

2.7 Analysis of the information on the Operator

On 23 August 2012, the operator did not have permission to operate commercial balloon flights with as determined by Articles 76 and 77 of the Aviation Act (Uradni list RS, no. 81/2010), and therefore should not have been allowed to fly.

INTENTIONALLY BLANK

3. CONCLUSIONS

3.1 Findings

1. On the day of the accident, the pilot held a Free Balloon Pilot Licence. The pilot validated the privileges of the Free Balloon Pilot Licence with a valid Medical Certificate Class 2. The pilot's health status did not have an influence on the accident.
2. The Commission did not succeed in acquiring data on the pilot's total flight time with hot air balloons and with the balloon type LBL 600C. The pilot's logbook was destroyed in the fire.
3. The pilot's documentation shows that the pilot had not fulfilled the requirements of the air controller's decision of 6 June 2012 by the day of the accident. Documentation relating to the air controller's decision showed that the decision had been sent to the pilot's address and accepted. The Commission therefore can neither confirm neither deny that the pilot was informed
4. The hot air balloon type LBL 600C with registration mark S5-OLO was airworthy at the time of the accident.
5. Data from the Aircraft Register of the Republic of Slovenia kept by the Republic of Slovenia Civil Aviation Agency show that the documentation for balloon S5-OLO did not include an agreement on the use of a hot air balloon between the owner, Društvo balonarski center Slovenija, Gornji trg 7, 1000 Ljubljana, and the operator, Balonarski center d.o.o., Linhartova cesta 8, 1000 Ljubljana, as prescribed by the Aviation Act (Uradni list RS, no. 81/2010).
6. Meteorological conditions had an effect on the accident.
7. The pilot did not have a radio connection established with the competent air traffic control and conducted half of his flight at altitudes without approval from air traffic control.
8. On the day of the accident 23 August 2012, the operator did not have permission to operate commercial balloon flights as determined by Articles 76 and 77 of the Aviation Act (Uradni list RS, no. 81/2010). The operator did have an insurance policy concluded on the aircraft for responsibility for injury to third parties, passengers, and personal property, which was valid from 16 June 2012 to 13 September 2012.

3.2 Cause of the accident

Direct cause: Improper technique used in operating balloon type LBL 600C in the landing phase.

Indirect causes:

1. Lack of consideration of valid aviation regulations for flying with hot air balloons in the Republic of Slovenia,
2. Insufficient meteorological planning for the flight,
3. Lack of consideration of current weather conditions at the time of the flight.

Cause of the fire:

1. Open shut-off valves on the tanks, which the pilot failed to close when landing,
2. Impact with the tree canopy, damage to the gas rigging, and consequently the leaking of gas from open tanks.

4. SAFETY RECOMMENDATIONS

On the basis of the findings in the course of the investigation that no operator in the Republic of Slovenia operating commercial passenger flights with hot air balloons held permission for this sort of passenger flights, 2 days after the accident on 25 August 2012, the following safety recommendation was issued to the Civil Aviation Agency: **The Republic of Slovenia Civil Aviation Agency should immediately forbid commercial hot air balloon flights within the airspace of the Republic of Slovenia.**

SAFETY RECOMMENDATIONS:

- **The Republic of Slovenia Civil Aviation Agency and competent ministry should carry out a review of existing regulations of commercial hot air balloons and later on set out clear criteria and exceptions to the implementation of such air operations.**

- **Ministry of Infrastructure and the Republic of Slovenia Civil Aviation Agency should evaluate the actual capacity of the control and ensure a sufficient number of air supervisors for continuous control of the holders of licenses for commercial flights with hot air balloons.**

- **The Republic of Slovenia Civil Aviation Agency should prepare a plan for regular and irregular audits of operators and should establish a transparent list for the supervision of license holders for carry commercial flight with hot air balloon.**

- **Civil Aviation Agency of the Republic of Slovenia should determine the obligations, the time frame and content of the training in the form of safety lectures for aviation staff, which is engaged in flight operations with hot air balloons in the interest of ensuring compliance and aviation safety.**

APPENDIX 1

Due to organizational changes of the head of the AAIIS, the new head of service was appointed by the government of Republic of Slovenia on 1st of May 2014. He then continued investigation procedure until the issue of the final report. The appointment of the commission for investigating the aircraft accident No. 37200-3/2012/12 on 11th September 2012 remained unchanged so that all the procedural processes were conducted undisturbed and according to international standards and recommended practices.

The draft final report was issued based on national and international regulations on aircraft accidents and incidents investigation and was sent to concerned entities in accordance to Article 16 of EU Regulation 996/2010 on the investigation and prevention of accidents and incidents in civil aviation (on 16th of July 2014). The draft final report was sent to European aviation safety agency (EASA), hot air balloon manufacturer`s national investigation authority, aviation investigation authority of the states whose citizens were involved in the hot air balloon accident, the hot air balloon manufacturer, the hot air balloon operator/pilot, The Republic of Slovenia Civil aviation (CAA), Air traffic control of Slovenia (KZPS) and the competent ministry.

AAIIS received 4 suggestions and comments within the specified deadline by the European aviation safety agency (EASA), The Republic of Slovenia Civil aviation agency (CAA), competent ministry and the pilot/the operator.

The commission examined the received text of comments and suggestions and concluded that the comments of the concerned entities do not provide any new facts or circumstances in which the accident occurred and that the suggested extension of the investigation would not guarantee the acquisition of new insights concerning safety of the considered aircraft accident.

Comments and suggestion by EASA were examined and as they are not in conflict with the report draft they will not be added in the final report appendix.

The commission also examined and assessed that the comments and suggestions by the CAA and competent ministry were completely comprehensible and concluded that the investigating authority already published safety recommendations few years ago in a similar case. The entire content of the comments and suggestions by the CAA and competent ministry are therefore added in Appendix 2.

The commission also examined all the operator`s - pilot`s statements, stated by the proxy in the name of the operator/pilot. The full text is added in Appendix 3 as a conflicting opinion.

Toni Stojčevski, Head of AAIIS

APPENDIX 2

Comments received from the competent ministry.
AAIIS

REPUBLIKA SLOVENIJA
MINISTRSTVO ZA INFRASTRUKTURO IN PROSTOR

DIREKTORAT ZA INFRASTRUKTURO
SEKTOR ZA LETALSTVO

Langusova ulica 4, 1535 Ljubljana

T: 01 478 80 00
F: 01 478 81 39
E: gp.mzip@gov.si
www.mzip.gov.si

**SLUŽBA ZA PREISKOVANJE
LETALSKIH NESREČ IN INCIDENTOV**

Številka: 010-73/2014/99
Datum: 23. 7. 2014

Zadeva: Pripombe na osnutek končnega poročila o preiskavi letalske nesreče toplozračnega balona Lindstrand LBL 600C, reg. oznake S5-OLO

Spoštovani!

V zvezi z vašim dopisom, št. 37200-3/2012/104- 00121019 z dne 15. 7. 2014, ki se nanaša na osnutek končnega poročila o preiskavi letalske nesreče toplozračnega balona Lindstrand LBL 600C, reg. oznake S5-OLO, ki se je pripetila 23. 8. 2012 na Ljubljanskem barju, predlagamo določene v nadaljevanju navedene spremembe.

V redakcijskem smislu predlagamo, da se v celotnem besedilu dosledno uporablja celotno ime pristojnega nadzornega organa, torej Javna agencija za civilno letalstvo Republike Slovenije ali pa Agencija za civilno letalstvo.

Glede varnostnega priporočila pa predlagamo, da se oblikuje v dveh zahtevah in sicer:

1. Agencija za civilno letalstvo do vzpostavitve ustreznega upoštevanja predpisov o zračnih operacijah z baloni izvaja pogostejši (dvotedenski) nadzor nad izvajanjem letalskih predpisov o zračnih operacijah z baloni, vse s ciljem, da se prepreči izvajanje operacij komercialnega zračnega prevoza z baloni brez ustreznih dovoljenj;
2. Izvajalci operacij komercialnega zračnega prevoza z baloni ponovno preverijo ustreznost določb operativnih priročnikov, ki se nanašajo na meteorološke informacije in meteorološko pripravo leta, Agencija za civilno letalstvo pa v zvezi s tem vprašanjem opravi stalni nadzor pri operatorjih z ustreznim spričevalom.

Iz sklepov preiskave izhaja, da:

1. operator ni imel ustreznega dovoljenja, kar pomeni, da operator in pristojni organ nista preverila, če operator izpolnjuje vse varnostne zahteve za izvajanje operacij komercialnega zračnega prevoza z baloni in
2. pilot ni opravil ustrezne meteorološke priprave za let oziroma ni spremljal meteorološke situacije med letom in sprejemal pravočasnih ukrepov za zmanjšanje nevarnosti (meteoroloških pogojev).

V zvezi z varnostnim priporočilom, ki je navedeno v osnutku poročila, sicer menimo, da je bilo ustrezno in primerno takoj po nesreči, saj je bilo potrebno vzpostaviti pregled nad stanjem operacij komercialnega zračnega prevoza z baloni, med preiskavo pa so se pokazali dejanski vzroki za nesrečo, na katere se je treba odzvati z varnostnimi priporočili.

Lep pozdrav!

Comments received from the CAA.

AAIIS

AGENCIJA ZA CIVILNO LETALSTVO
CIVIL AVIATION AGENCY, SLOVENIA CAA

Številka: 3721-3/2014/15
Datum: 6. 8. 2014

MINISTRSTVO ZA INFRASTRUKTURO IN PROSTOR
Sektor za preiskovanje letalskih nesreč in incidentov
Langusova 4

1535 LJUBLJANA

Zadeva: Pripombe na osnutek končnega poročila o preiskavi letalske nesreče toplozračnega balona Lindstrand LBL 600C, reg. oznake S5-OLO

Spoštovani!

V zvezi z osnutkom končnega poročila o preiskavi letalske nesreče toplozračnega balona Lindstrand LBL 600C, reg. oznake S5-OLO (v nadaljevanju: osnutek končnega poročila), sporočamo, da je Javna agencija za civilno letalstvo RS omenjeni osnutek preučila in predlaga, da se spodnje ugotovitve ustrezno umestijo v končno poročilo ter v določenih segmentih razširi preiskava.

V zvezi z navedbami glede odločbe letalskega nadzornika in posledično veljavnosti licence pilota balona agencija pojasnjuje sledeče.

Zakon o splošnem upravnem postopku določa, da se morajo odločbe in sklepi ter drugi dokumenti, od katerih vročitve začne teči rok, vročiti osebno tistemu, kateremu so namenjeni. O vročitvi je treba obvestiti organ, ki je vročitev odredil, z vročilnico. Če se vročitev ne da opraviti na opisan način, pusti vročevalec, v hišnem predalčniku, na vratih stanovanja, poslovnega prostora ali delavnice pisno sporočilo. Upravni organ (CAA) je odredil osebno vročitev odločbe o napotitvi na izredni zdravniški pregled s prepovedjo letenja do predložitve dokazil v skladu z Zakonom o splošnem upravnem postopku. Podpisano vročilnico je prejel dne 7. 6. 2012 (podpis na mestu »podpis prejemnika«), iz katere pa ni v ničemer razvidno, da bi vročilnico prejel pooblaščenec, niti ni bilo zavedenih kakršnihkoli pripomb vročevalca o ugotavljanju istovetnosti pooblaščenca ali navedbi kraja, kjer je bilo puščeno pismo. Zato CAA v skladu z zakonsko domnevo šteje, da je bila osebna vročitev pravilno opravljena in o tem tudi nikoli ni bilo dvoma, kakor tudi ni bilo dvoma o izvedeni vročitvi naknadno poslanega vabila na ustno obravnavo, ki jo je letalski nadzornik izdal dne 22.8.2012.

Nadalje v zvezi z ugotovitvami, da operater ni imel dovoljenja za opravljanje komercialnih prevozov z baloni, kot to določa 76. in 77. člen Zakona o letalstvu (Uradni list RS, št. 81/2010), agencija poudarja, da ne agencija niti takratno ministrstvo za promet oziroma službe, ki so znotraj omenjenega ministrstva opravljale naloge, ki jih sedaj opravlja agencija, do nesreče, ki je predmet tega končnega poročila, ni izdalo niti enega dovoljenja, s katerim bi bilo dovoljeno opravljati komercialni prevoz potnikov s toplozračnimi baloni. Razlog je v dejstvu, da ni bil izdan ustrezen podzakonski akt, s katerim bi se natančno predpisale zahteve, način in postopki pridobitve in podaljšanja veljavnosti spričevala letalskega prevoznika oziroma dovoljenja za izvajanje letalske dejavnosti, kot to zahteva deveti odstavek 76. člena oziroma šesti odstavek 77. člena Zakona o letalstvu. Omenjeno dejstvo je bilo ugotovljeno že v končnem poročilu v zvezi z

nesrečo toplozračnega balona reg. oznake S5-OPM z dne 28.5.2006 in izdano temu ustrezno varnostno priporočilo. Hkrati pa je bil neobstoj omenjenega podzakonskega akta tudi glavni razlog, da je agencija po tragični nesreči takoj pristopila k izdaji Operativno tehnične zahteve za opravljanje zračnega prevoza z baloni (Uradni list RS, št. 70/2012), na podlagi katere je sploh bilo mogoče prvič izvesti certifikacijo zračnega prevoza z baloni.

Z vidika varnosti ter preprečevanja letalskih nesreč smo proučili osnutek končnega poročila in ocenjujemo, da bi bilo za razjasnitev tragične nesreče potrebna bolj podrobna analiza vseh okoliščin, ki so vplivale na njen nastanek (kot npr. analiziranje usposobljenosti in izkušenosti pilota, pripravljenost balona za letenje v skladu z navodili proizvajalca, skladnost opreme na balonu z vpisi v Knjigo balona, obremenitve balona, pravilnost postopkov letenja in izbranih procedur v sili, pričanja očividcev in vpletenih, itd), zato predlagamo, da se v teh delih preiskava razširi, hkrati pa naj končno poročilo upošteva časovno oddaljenost dogodka in vmesno izvedena dejstva.

S spoštovanjem,

APPENDIX 3

Comments received from the pilot - operator - proxy.
AAIIS

MINISTRSTVO ZA INFRASTRUKTURO IN PROSTOR
Služba za preiskovanje letalskih nesreč in incidentov
Langusova ulica 4

1535 LJUBLJANA

Opr. št.: **37200-3/2012/103-00121019**

Stranka: Miro KOLENC, Cesta I/7, 3320 Velenje

ca pisarna Zidar Klemenčič

IZJASNITEV NA OSNUTEK KONČNEGA POROČILA
o preiskavi letalske nesreče toplozračnega balona
Lindstrand LBL 600C registrske oznake S5-OLO, ki se je pripetila
23.8.2012 na Ljubljanskem barju z dne 25.4.2014
1x

- pooblastilo izkazano

stran 1 od 9

Stranka skladno s pozivom naslovnega organa opr. št.: 37200-3/2012/103-00121019 z dne 15.7.2014 in skladno z obvestilom naslovnega organa opr. št.: 37200-3/2012/111-00121171 z dne 7.8.2014, v odprtem roku podaja svoja stališča na izdelan Osnutek končnega poročila o preiskavi letalske nesreče toplozračnega balona Lindstrand LBL 600C registrske oznake S5-OLO, ki se je pripetila 23.8.2012 na Ljubljanskem barju - osnutek z dne 25.4.2014 (v nadaljevanju: Osnutek končnega poročila). Stranka uvodoma izpostavlja, da je Osnutek končnega poročila glede posameznih faktičnih dejstev nesreče napisan korektno, vendar je na določenih mestih bistveno pomanjkljiv, v določenih delih pa vsebuje tako bodisi napačna dejstva, bodisi napačne sklepe izpeljane iz njih, kar še posebej velja za njegov zaključni del, ko so navedeni vzroki nesreče in ugotovitve ter varnostna priporočila za prihodnost (več o tem spodaj).

1.

Uvodoma stranka opozarja na strani 20-29 Osnutka končnega poročila, ki se nanaša na vremenske razmere oz. napovedi glede teh v dnevih pred nesrečo. Stranka uvodoma pripominja, da navedeni podatki v zvezi z obravnavnim dogodkom irelevantni in nebistveni. Podatki, ki se jih uporablja v Osnutku končnega poročila so namreč podatki, ki ne upoštevajo 40. člena Zakona o letalstvu in sicer razvrstitev glede na vrsto, kategorijo, namen uporabe, težo in drugo oz. da v predmetnem primeru gre za nesrečo toplozračnega balona. Podatki, ki jih naslovni organ uporablja so podatki, ki se jih uporablja v letalstvu za letenje z zrakoplovi, ki pod razvrstitvijo spadajo v zrakoplove tipa: letalo (Aeroplane); helikopter (Helicopter) pa tudi jadralno letalo, jadralno letalo z motorjem; zmaj, motorni zmaj (Sailplane, Powered Sailplane, Hang Glider, Powered Hang Glider) - vse skladno s Pravilnikom o razvrščanju zrakoplovov.

Pri pilotiranju prosto letečih balonov se namreč skladno s predpisanim šolanjem pilot orientira za podatke o vremenu zgolj po podatkih produkta "Aladin", ki je objavljen na spletnih straneh Agencije RS za Okolje (ARSO) in po podatkih vertikalne sondaže. Piloti prosto letečih balonov nimajo znanja za branje letalskih napovedi, ki so navedene v poročilu na straneh 20-29, saj učenje takšnega znanja sploh ni predvideno v Programu praktičnega dela izpita za pridobitev dovoljenja pilota prosto letečega balona, kot tudi ne v Programu šolanja za dovoljenje pilota prosto letečega balona. V potrditev tega dejstva stranka tej izjasnitvi prilaga oba navedenega programa. So pa vsa navedeni podatki tako ali tako na razpolago naslovnemu organu.

Uporaba navedenih podatkov o vremenu in posledični zaključki o dolžnostnih ravnanjih, so tako pravno, dejansko in logično povsem zmotni.

V kontekstu navedenega je stranka torej stališča, da bi Osnutek končnega poročila moral vsebovati podatke produkta "Aladin" in vertikalne sondaže, saj se vsi piloti prosto letečih balonov orientirajo zgolj po slednjih in to tudi v današnjem času. Pravila letenja in izobraževanja pilotov toplozračnih balonov vezi hidrometeoroloških podatkov so tudi v času pisanja te vloge še vedno identična oz. enaka in ne vsebujejo izobraževanja vezi podatkov o katerih govori Osnutek končnega poročila.

To potrjujeta tudi zgoraj navedena in tej izjasnitvi priložena programa za praktično usposabljanje in teoretično izobraževanje.

Prav tako so po stališču stranke nerelevantna vsa poročila o vremenski napovedi in vremenskih podatkih, ki se časovno nanašajo na trenutek, ko je v predmetni zadevi balon že bil v zraku. Piloti prosto letečih balonov namreč **ne morejo** spremljati vremenskih razmer v zraku, ker v košari balona ni ustreznih instrumentov, ki bi prikazovali vremensko situacijo oz. podatke o vremenskih situacijah. Vso

zaznavanje sprememb vremena je vizualne in izkustvene narave z opazovanjem okolice in vremena v bližini.

V kontekstu konkretnega primera to velja še toliko bolj, saj v času, ko je stranka pilotirala balon in bila na višini, ki presega 200-300 metrov, ni mogla vedeti nobenega relevantnega podatka o vetru pri tleh, ker za to ni imela ustreznih instrumentov, prav tako pa ti podatki niso dostopni s prosto zaznavo oz. vizualnim ali drugim izkustvenim zaznavanjem.

Pred samim poletom je tako stranka ob 4:50 uri zjutraj, ko se je odpravila od doma, pregledala vse podatke v produktu "Aladin" (za kar je seveda potrebna ustrezna povezava z internetom in računalnik), kjer ni bilo moč zaznati nobene nevihte, vreme je bilo jasno, brez posebnosti in kakršnegakoli vetra, ki bi ga zaznale avtomatske postaje, zato je polet tudi izpeljala in odobrila. Podatke o tem potrjuje tudi izpis na 30. strani Osnutka končnega poročila, kjer je iz radarske slike padavin ob 05:00 uri razvidno, da prevladuje jasno vreme, brez vsakršnih posebnosti. V nadaljevanju, ko je stranka z balonom vzletela pa ji navedeni podatki niso več na voljo, saj balon nima internetne povezave in nobenih drugih instrumentov s katerimi bi bilo mogoče spremljati vremenske podatke. Stranka je tako lahko neposredno pred poletom zgolj opazovala in ocenila primernost vremenskih pogojev za letenje s sondažo s helijevimi balonom, klicala odzivnik na Krimu in opazovala zastavo na gradu na podlagi česar lahko pilot toplozračnega balona predvidi ali piha veter in v katero smer ter na tej osnovi napravi sklep o tem ali bo v Ljubljanski kotlini inverzija ali ne. To se počne na isti način s strani pilotov toplozračnih balonov še vedno tudi danes in ob pisanju te vloge.

Na podlagi navedenih orodij oz. razpoložljivih "instrumentov" stranka tekom poleta ni zaznala nobenih posebnosti, vse do kritičnega trenutka, ko je pri spuščanju šele na 200-300 m višine ugotovila, da pri tleh piha strižni veter. Med samim poletom torej stranka **nima nobenih podatkov o spremembi vremenske napovedi**. Slednji, ki se navajajo v Osnutku končnega poročila na straneh 20-29 in se nanašajo na čas, ko je stranka že vzletela z balonom so torej irelevantni in brezpredmetni, enako pa velja za pilotske napovedi (ki se pojavljajo tudi na strani 33 Osnutka končnega poročila), saj slednjih stranka ne zna brati. Učenje takšnih znanj ni predvideno na nobeni točki praktičnega in teoretičnega usposabljanja za licenco pilota prosto letečih balonov in je uporaba teh podatkov v Osnutku končnega poročila povsem irelevantna in celo zavajajoča. Uporaba le teh pa je mogoča zgolj v kontekstu morebitnih prihodnjih priporočil ali predlogov sprememb vezi izobraževanja pilotov prosto letečih balonov ali priporočil oz. regulatornih zakonskih sprememb na področju obveznih instrumentov prosto letečih balonov. Ne enega in ne drugega Osnutek končnega poročila ne vsebuje (teh priporočil).

Smiselno enako velja tudi za slike v Osnutku končnega poročila na straneh 34 in 35, ki se ponovno nanašajo na časovni trenutek, ko je stranka z balon že bila v zraku. V tej zvezi zato predlaga, da se v Osnutek končnega poročila vložijo posnetku pri samem sondiranju od 5:30 ure naprej in se časovno opredeli tudi vzlet balona s fotografijo. Takrat je namreč vreme bilo jasno in v zraku ni bilo vidno ničesar. Prav tako stranka izraža pomisleke glede verodostojnosti fotografij v odnosu na prikaz neba in domnevni videz nevihtnega oblaka, saj so slike zelo nizke kakovosti in že na podlagi samega kontrasta in barv fotografij lahko pride do videza nevihtnih oblakov ali jasnine, ki kaže popačeno in nerealno sliko slednjih.

V zvezi z meteorološki podatki, ki se v poročilu nahajajo do strani 42 stranka izraža stališče, da slednji v predmetnem primeru ponovno nimajo nobene relevantnosti, saj so od trenutka, ko balon vzleti pilotu, torej stranki neznani in jih ne more poznati, saj za to nima ustreznih instrumentov in (merilnih) naprav.

Dokaz:

- Program praktičnega dela izpita za pridobitev dovoljenja pilota prosto letečega balona;
- Program šolanja za dovoljenje pilota prosto letečega balona;
- kot doslej;

2.

Nadalje stranka nasprotuje ugotoviti v razdelku "Posvetovanje o vremenskih pogojih" oz. predlaga njeno dopolnitev.

Osnutek končnega poročila na tem mestu namreč navaja, da na dan poleta ni dežurnega vremenskega prognostika poklical noben pilot balona. Stranka opozarja, da sam kot tudi ostali piloti prosto letečih balonov, tega nikoli niso počeli, saj so piloti prosto letečih balonov in ne motornih letal, ki se obračajo po te informacije.

Osnutek končnega poročila tako nerazumno izenačuje dve neenaki situaciji, ko primerja stranko, torej pilote prosto letečih balonov, s piloti motornih letal, kar pa seveda ni in ne more biti isto. Občutek je, da je ugotovitve v Osnutku končnega poročila pisal pilot motornega letala oz. strokovnjak iz tega področja, ki je ob pisanju upošteval svoje znanje in predpise ter izobraževanje s področja letenja z letali oz. drugimi zrakoplovi, nikakor pa ni upošteval razlik, izjem in drugih specifik letenja z baloni.

Stranka zato v tej zvezi predlaga, da se glede komunikacije pilotov prosto letečih balonov s prognostiki pridobi podatke za relevantno obdobje, kolikokrat je dejansko prišlo do takšnih klicev (in to kadarkoli s strani kateregakoli pilota prosto letečega toplozračnega balona in to v obdobju 1 leta pred tragično nesrečo in za obdobje od tragične nesreče pa vse do danes oz. do podaje tega dokaznega predloga).

Stranka tudi kategorično zanika navedbo iz točke 1.9, na 43. strani Osnutka končnega poročila, da ni imela vzpostavljene radijske zveze s pristojno kontrolo zračnega prometa. Praksa pri poletih balonov je bila namreč takšna, da je najavo poleta balonov vedno opravil samo en pilot ker vsi baloni, ki vzletijo skupaj, letijo hkrati z vetrom v isto smer v formaciji, vendar je v predmetnem primeru pilot balona, ki je podal najavo, očitno pozabil navesti še balon S5-OLO. Takšna praksa, ki se je izoblikovala in bila izvajana, izhaja iz tega, da baloni, ki vzletajo na isti lokaciji letijo vedno v isti smeri in formaciji, saj to izhaja iz same fizike letenja s toplozračnimi baloni. Najava s strani zgolj enega pilota pa je v tem, da se nepotrebno in dodatno ne obremenjuje radijskih frekvenc, ki so namenjene letalstvu, saj te frekvence uporabljajo vsi piloti zrakoplovov (komercialnih in drugih), in slednje pomeni, da je v času najav ta frekvenca neuporabljiva za zrakoplove, ki pa pri svojem letu slednje nujno potrebujejo.

V kolikor je torej pilot balona, ki je podal najavo v tej pozabil navesti še balon S5-OLO pa to ne more pomeniti, da stranka ni imela zveze s pristojno kontrolo zračnega prometa. Stranka je imela prižgano postajo in je konstantno poslušala pristojno kontrolo zračnega prometa, vendar ni slišala ničesar o tem, da prihaja fronta in da je potrebno znižati višino. Teh informacij zračna kontrola NI sporočila nikomur, ne najavljenemu balonu in ne balonu S5-OLO.

Irelevantne so tudi navedbe v točki 1.17 na 45. strani poročila, kjer se navaja, da stranka na dan nesreče ni imela dovoljenja za opravljanje komercialnih prevozov z baloni, kot to določa 76. in 77. člen Zakona o letalstvu. Navedena člena se namreč nanašata na spričevalo letalskega prevoznika in ne določata nobene zahteve za posebno dovoljenje za opravljanje komercialnih prevozov z baloni. Stranka prav tako nikoli ni dobila nobenega dokumenta, v katerem bi pisalo, da ji je prepovedalo letenje v komercialne namene. Za slednje je bila potrebna zgolj registracija balona in ustrezno zavarovanje potnikov (zavarovalna premija za komercialno letenje).

Vse navedeno je stranka imela, prav tako pa je bilo vse to naslovnemu organu oz. Agenciji za letalstvo znano. V kolikor se kasneje in šele žal s tragično nesrečo ugotovi, da je zakonodaja predpisovala določene druge licence, ki bi bile potrebne, v času pred nesrečo pa jih noben organ oz. celo za to pristojen organ, ni zahteval, čeprav je vedel, da se je balon registriral za komercialno letenje, ter da je stranka plačala in predložila organu ustrezno zavarovanje, ki je eksplicitno namenjeno komercialnemu letenju - zavarovalna premija za komercialno letenje, pa slednje ni več v dometu stranke oz. vseh prevoznikov, ki so opravljali te lete, saj slednjega pri uporabi nikoli in nihče ni nikoli predvidel, zahteval, itd.

V povezavi s poglavjem 2.1.5 "Primerjava leta balona S5-OLO z letom balona S5-OLM na straneh 54-56, stranka dodaja, da je takšna primerjava neutemeljena, saj je balon S5-OLM prevažal bistveno manj potnikov in je bil težek med 4-6 ton, medtem ko je balon S5-OLO bil namenjen za večje število potnikov in je kritičnega dne bil težek med 12-15 ton. Zaradi navedenega je prišlo tudi do razlik v podatkih, ki so navedeni na strani 56 Osnutka končnega poročila. Stranka pri tem dodaja, da je največjo hitrost spuščanja, kot je opredeljena v priročniku prekoračila zgolj za 0,5 m/s, kar je edini bistveni podatek in ne hitrost, ki jo je imel balon S5-OLM. Poleg tega je potrebno še dodati, da so variometri, ki merijo hitrost nenatančni in slednje ne kažejo realno oz. realne hitrosti, točne na decimalko. Balon S5-OLM je poleg tega letel nižje, zato je prej našel linijo pristajanja in je posledično imel tudi nižjo hitrost. Stranka je morala to linijo poiskati in se nato spustiti, kajti v nasprotnem primeru bi balon pristal bodisi v okolici hriba Lavrica, naselja ali električne napeljave. Sam postopek pristajanja ni bil v ničemer drugače od vseh drugih postopkov pristajanja s tem balonom S5-OLO, z razliko, da je žel dne tragičnega nesreče, prišlo do t.i. strižnega vetra (in do t.i. aerodinamičnega srka), ki je na nizkih višinah toliko spremenil vremenske pogoje, da je v posledici prišlo do tragične nesreče.

V zvezi s poglavjem 2.2 "Analiza podatkov o pilotu" na strani 57 stranka dodaja, da nikoli ni prejela nobene pošte in tudi ne obstaja njen podpis o prejetju te pošte, vezi tega je stranka sprožila ustrezne postopke, kot vse razvidno iz dokumentna Pritožba zoper odločbo in Predlog za vrnitev v prejšnje stanje (vlogi z dne 19.10.2012), vendar zaradi poteka ne samo subjektivnih ampak objektivnih materialnih rokov vloga niti ni mogla biti obravnavana. Vsa zadeva nadaljnjega postopka pa je zaradi poškodbe stranke (zaradi predmetne nesreče) bila prolongirana.

Dokaz:

- Pritožba zoper odločbo Javne Agencije za civilno letalstvo - CAA0322 z dne 19.10.2012 naslovljena na Ministrstvo za infrastrukturo in prostor;
- Pritožba zoper odločbo Javne Agencije za civilno letalstvo - CAA0322 z dne 19.10.2012 naslovljena na Javno Agencijo za civilno letalstvo;
- kot doslej

3.

Kot že smiselno navedeno pod točko 1. te izjasnitve stranka še enkrat poudarja, da slednje drži tudi v odnosu na navedbe na 58. strani Osnutka končnega poročila v razdelku "Vremenske napovedi". Stranka se je namreč od doma odpravila ob 4:50 zjutraj in pri tem pregledala vse relevantne podatke v produktu "Aladin" (za kar je seveda potrebna ustrezna povezava z internetom in računalnik), kjer ni bilo moč zaznati nobene nevihte, vreme je bilo jasno, brez posebnosti in kakršnegakoli vetra, ki bi ga zaznale avtomatske postaje, zato je polet tudi izpeljala in odobrila.

Podatke o tem potrjuje tudi izpis na 30. strani Osnutka končnega poročila, kjer je iz radarske slike padavin ob 05:00 uri razvidno, da prevladuje jasno vreme, brez vsakršnih posebnosti. V nadaljevanju, ko je stranka z balonom vzletela pa ji navedeni podatki niso več na voljo, saj (kot rečeno že zgoraj) balon nima internetne povezave in nobenih drugih instrumentov s katerimi bi bilo mogoče spremljati vremenske podatke. Stranka je tako lahko zgolj tik pred poletom naredila vse potrebno kot predvideno v izobraževanju; še celo več opazovala in ocenila je primernost vremenskih pogojev s sondažo s kar šestimi helijevimi baloni, ki so kazali zgolj vertikalno dviganje, klicala odzivnik na Krimu in opazovala zastavo na gradu na podlagi česar lahko predvidi ali piha veter in v katero smer ter na tej osnovi napravi sklep o tem ali bo v Ljubljanski kotlini inverzija ali ne. Na podlagi navedenih orodij oz. "instrumentov" stranka tekom poleta ni zaznala nobenih posebnosti, vse do kritičnega trenutka, ko je pri spuščanju šele na 200-300m višine ugotovila, da pri tleh piha strižni veter.

Osnutek končnega poročila na strani 58 pa navaja kar se je dogajalo, ko je balon že bil v zraku, pri čemer stranka še enkrat poudarja, da ti podatki njej niso več med letom dostopni in jih ne more preveriti ali pridobiti, ko z balonom vzleti.

Prav tako so v predmetni zadevi irelevantne navedbe na 59. strani v razdelku "Seznanitev pilota balona z vremensko situacijo". Stranki namreč v času teoretičnega in praktičnega usposabljanja ni bilo nikoli predstavljeno, da se mora pilot posvetovati z dežurnim meteorologom in da mora prevzeti v dežurni pisarni meteorološko dokumentacijo. Tak način predpriprave na polet niti ni bil zahtevan s strani dveh inštruktorjev na dan praktičnega preizkusa za dodelitev licence za pilota balona. Stranka zato v tej zvezi ponovno predlaga, da se izdela poročilo za obdobje 12 mesecev iz katerega bo razvidno kolikokrat so se piloti posvetovali in bili v pisarni meteorologov in naproša, da se predoči kje naj bi slednje dolžnosti izhajale iz literature predvidene za izobraževanje toplozračnih prosto letečih balonov.

Nadalje so na isti strani izven konteksta predstavljene navedbe v razdelku "Vremenske razmere v času nesreče". V času postavitve balona in vzleta balona pri tleh, kjer je balon vzletal, ni bilo zaznati nobenega vetra do višine 300m, saj je v ta namen stranka spustila helijev balon (sodnaža s 6 helijevimi baloni), ki tega ni zaznal. Prav tako vetra ni bilo zaznati pri vzpenjanju, kot tudi kasneje tekom poleta. Veter se je pojavil šele v večjih višinah, in sicer iz severne smeri ter hitrosti maksimalno zgolj 10 km/h. Kot navaja samo poročilo je bila vidljivost 40km, kar pomeni, da v neposredni bližini ni bilo zaznati nobenih nevihtnih oblakov. Nadalje (kot že navedeno do sedaj), ob samem poletu balona nima stranka nobene možnosti seznanitve in ugotovitve relevantnih meteoroloških podatkov, prav tako nima nobenih instrumentov, ki bi jo opozorili na spremembo slednjih. Ob poletu lahko torej vsak pilot, tudi stranka, spremlja zgolj podatke iz GPS naprave, tj. smer, hitrost in spuščanje ter padanje balona. Z vidnim zaznavanjem in opazovanjem pa lahko spremlja hitrost vetra, ki ni kazal nobenih anomalij oz. približevanja nevihte. Še več stranka je napravo na Krimu klicala celo med poletom in slednja ni zaznavala večjih hitrosti vetra (ko je bila še na nižji višini). Stranka na višinah na katerih leti prav tako nima signala na mobilnih napravah, pri čemer je takšne klice možno izvajati zgolj s slednjimi.

Kot že poudarjeno pod točko 2. te izjasnitve je stranka imela vzpostavljeno radijsko zvezo s pristojno kontrolo zračnega prometa. Praksa pri poletih balonov je bila namreč takšna, da je najavo poleta balonov vedno opravil samo en pilot ker vsi baloni letijo hkrati z vetrom v isto smer v formaciji, vendar je v predmetnem primeru pilot balona, ki je podal najavo, očitno (kot že navedeno zgoraj) pozabil navesti še balon S5-OLO. Takšna praksa je nujno potrebna, da se nepotrebno dodatno ne obremenjuje radijskih frekvenc. V kolikor je torej pilot balona, ki je podal najavo v tej pozabil navesti še balon S5-OLO to ne more pomeniti, da stranka ni imela zveze s pristojno kontrolo zračnega prometa. Stranka je imela prižgano postajo in je konstantno poslušala pristojno kontrolo zračnega prometa, vendar ni slišala ničesar o tem, da prihaja fronta in da je potrebno znižati višino. Ne držijo torej navedbe v Osnutku

končnega poročila na strani 62 v poglavju "2.5 Analiza radijske zveze". Let balona v kontroliranem zračnem prostoru razreda "C" TMA Ljubljana 1 pa je posledica spremembe vremenskih pogojev.

Balon leti z vetrom in glede na smer vetra. V tem kontekstu je v predmetnem primeru bilo potrebno iskati primerno področje za pristanek, ki ni gosto naselje, kjer ni dreves, električne napeljave ipd., kar je stranka vse storila. V nasprotnem primeru, ko bi torej pričela pristajati prej, bi glede na takratno hitrost in smer vetra z balonom pristala nekje v središču Ljubljane.

Dokaz:

- kot doslej

4.

Stranka še enkrat nasprotuje navedbam v Osnutku končnega poročila na 67. strani, da ni imela dovoljenja, kot to določata 76. in 77. člen Zakona o letalstvu, saj je imela vse ustrezne licence in certifikate.

V zvezi s samimi vzroki požara na 64. strani Osnutka končnega poročila pa dodaja, da je glede na trenutne razmere in situacijo, ki jo je bilo zaznati šele na zgoraj navedenih višinah (cca 200-300 m) bila primorana pristati na dolgo stranico košare balona, saj bi v nasprotnem primeru tega prevrnilo in bi prišlo do neprimerno hujše nesreče. Stranka je tako poiskala travnik, kjer ni bilo gosto poseljenega naselja, dreves ali električne napeljave, in ki je bil po njeni oceni najbolj ustrezen za pristanek. Ob samem postopku pristajanja pa je nato izgubila zavest in več tudi ni mogla storiti.

V tem kontekstu stranka nasprotuje navedbam v Osnutku končnega poročila v razdelku "3.2 Vzrok nesreče" na strani 69. Cilj poročila je namreč preprečevanje letalskih nesreč in zmanjšanje tveganj v prihodnje, za kar je izjemno pomembno, da so temeljni vzroki na podlagi katerih je prišlo nesreče utemeljeni in imajo podlago v dejstvih. Le tako je namreč mogoče ustrezno opredeliti preventivne ukrepe za prihodnost, ki bodo lahko pripomogli k zmanjšanju verjetnosti nastanka takšnih in podobnih nesreč. V predmetnem primeru pa po stališču stranke zaključki Osnutka končnega poročila vsebujejo vzroke nesreče, ki **ne** temeljijo na dejanskem stanju, ki se navaja predhodno oz. nimajo podlage v slednjem.

Kot **neposredni** vzrok nesreče je namreč navedena "napačna tehnika pilotiranja balona v pristajalni fazi", pri čemer pa v poročilu ni nobenih podatkov o uporabljeni tehniki pilotiranja v konkretnem primeru, prav tako ni podatkov o tem, kakšna bi bila v konkretnem primeru pravilna tehnika pilotiranja balona. Oboje je ključno tako z vidika preprečevanja letalskih nesreč kot z vidika zmanjševanja tveganj v prihodnje, saj je za dosego teh ciljev nujna najmanj vključitev opozorila o konkretni napačni tehniki pilotiranja v šolanje pilotov, hkrati s poukom, kakšna bi bila pravilna tehnika pilotiranja v konkretnem primeru. V konkretnem primeru seveda zaključek, da je bila vzrok za nesrečo napačna tehnika pilotiranja balona v pristajalni fazi, ne more biti podkrepljena, saj **ni** bila napačna.

Podrobnejša obrazložitev tega segmenta je torej nujno potrebna tako zaradi zagotavljanja verodostojnosti sklepa o neposrednem vzroku nesreče, kot zaradi namena oziroma cilja, ki ga zasleduje končno poročilo.

Nadalje se kot **posredni** vzrok nesreče navaja:

- Nespoštovanje veljavnih letalskih predpisov s področja letenja s toplozračnimi baloni v Republiki Sloveniji;

- Pomanjkljiva meteorološka priprava za izvedbo leta;
- Neupoštevanje trenutnih vremenskih razmer v času poleta.

Glede prvega posrednega vzroka stranka dodaja, da je nekonkretiziran in splošen. V ničemer namreč ni pojasnjeno kateri predpisi naj bi bili kršeni in kako naj bi ta kršitev bila v vzročni zvezi z nastalo nesrečo.

Glede drugega posrednega vzroka se je stranka podrobneje opredelila tekom celotne izjasnitve. Kot je že navedla so ji v trenutku, ko se je pripravljala na izvedbo leta bili na voljo podatki iz produkta "Aladin", drugih podatkov ni nikoli preverjala, saj to ni bilo vključeno niti v praktično niti v teoretično usposabljanje. Prav tako je v tej zvezi potrebno dodati, da je na strani 58 Osnutka končnega poročila pojasnjeno, kateri vremenski podatki in pristojne službe so bile na dan nesreče na voljo, na strani 59 pa je navedena ugotovitev, da se pilot balona pred poletom ni posvetoval z dežurnim meteorologom in ni prevzel meteorološke dokumentacije v kateri od meteoroloških pisarn. Za utemeljen sklep, da je bila meteorološka priprava za izvedbo leta pomanjkljiva, bi moralo poročilo pojasniti, kaj bi v konkretnem primeru zajemala zadostna oziroma celovita meteorološka priprava na let oziroma kaj obsega obvezno dolžno ravnanje v okviru meteorološke priprave na izvedbo leta (poudarek mora biti na tem, kaj je dolžno in ne zgolj priporočeno ravnanje, ki je opisano na straneh 41 in 42 poročila). Tudi to je ključno tako z vidika preprečevanja letalskih nesreč kot z vidika zmanjševanja tveganj v prihodnje, saj je za dosego teh ciljev nujna najmanj vključitev opozorila o tem, kaj je v konkretnem primeru manjkalo v meteorološki pripravi na let v šolanje pilotov. Posledično je tudi podrobnejša obrazložitev tega segmenta potrebna tako zaradi zagotavljanja verodostojnosti sklepa o enem od posrednih vzrokov nesreče, kot zaradi namena oziroma cilja, ki ga zasleduje končno poročilo.

Glede tretjega posrednega vzroka pa se stranka prav tako sklicuje na vse navedeno v prejšnjih točkah te izjasnitve. Tekom leta oz. ko z balonom poleti ji namreč niso na voljo nobeni konkretni podatki o vremenskem stanju, spremembah v sunkih vetra itd., razen tistih, ki izhajajo iz GPS naprave, tj. smer, hitrost in spuščanje ter padanje balona. Z vidnim zaznavanjem in opazovanjem pa lahko spremlja hitrost vetra na avtomatski postaji, ki je na Krimu. To napravo je stranka med poletom tudi večkrat klicala in slednja ni zaznavala večjih hitrosti vetra. Stranka na večjih višinah na katerih leti (kot rečeno) nima signala na mobilnih napravah.

V odnosu na sam vzrok požara pa stranka pojasnjuje kot je že navedla, da je torej na podlagi trenutne situacije in danih razmer morala oceniti, kje je najbolj primeren kraj za pristanek na dolgo stranico košare balona, saj bi v nasprotnem primeru tega prevrnilo in bi prišlo do hujših posledic. Stranka je tako poiskala travnik, kjer ni bilo gosto poseljenega naselja, dreves ali električne napeljave, in ki je bil po njeni oceni najbolj ustrezen prostor za pristanek. Ob samem postopku pristajanja in situaciji v kateri se je znašel balon, po tem ko je stranka ob izvajanju predvidenih postopkov za pristajanje ob močnejšem vetru (predpisanem v Programu praktičnega dela izpita za pridobitev dovoljenja pilota prosto letečega balona (FBP) - e.g.: točka E.0002) v posledici dogodkov, ki so sledilo, nato izgubila zavest in več tudi ni mogla nič več storiti. Šlo je za rutinski pristanek, ki se je žal končal tragično zaradi nepredvidljivih in nestanovitnih vremenskih razmer pri tleh (t.i. strižni veter, kot vse opisano zgoraj).

Dokaz:

- Program praktičnega dela izpita za pridobitev dovoljenja pilota prosto letečega balona (FBP);
- kot doslej

Končno stranka izraža še stališče do predlaganih varnostnih priporočil in meni, da bi slednje bilo potrebno spremeniti v smeri, da mora pilot imeti ves čas na voljo podatke o vremenu (tudi med časom

poleta) in se ga mora o njih obveščati, če jih nima. V tej zvezi mu je potrebno zagotoviti tudi ustrezna orodja in načine ugotavljanja teh podatkov kot tudi njihove komunikacije s strani pristojne postaje oz. drugega ustreznega organa.

Ljubljana, 18. avgust 2014 Stranka po poobl.