



eGAFOR Project

Stjepko Jančijev, CCL
Project Manager

Challenges in Meteorology 6
Zagreb, November 16th 2018.



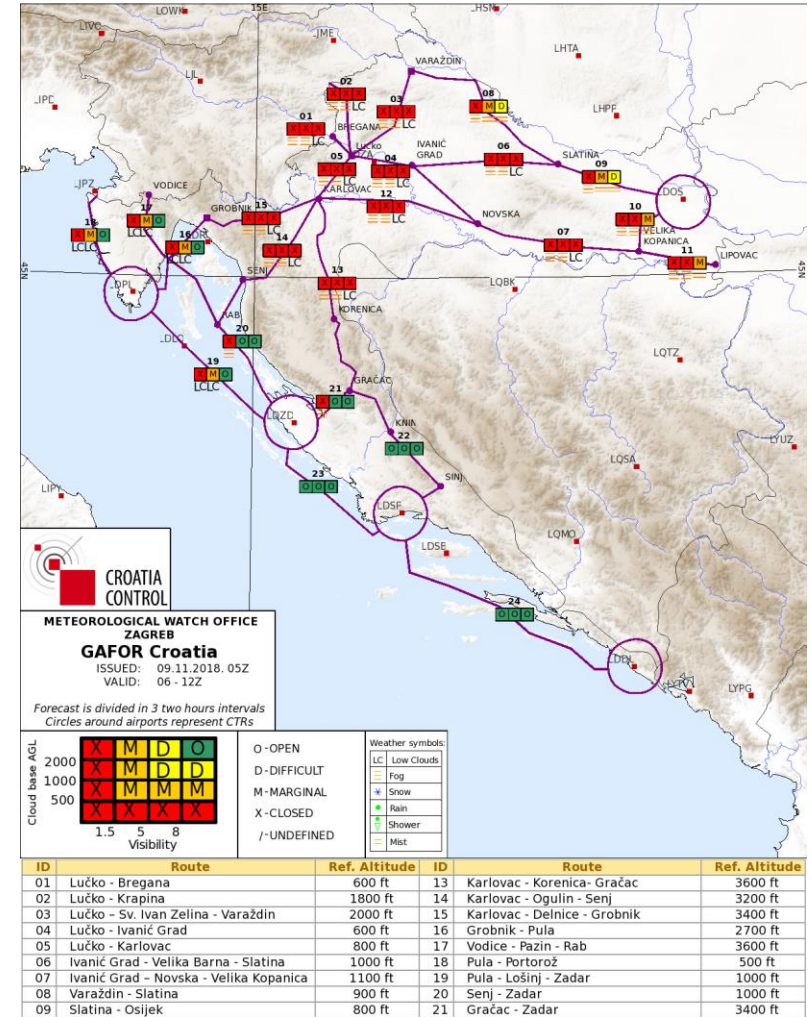
Co-financed by the European Union
Connecting Europe Facility

What is eGAFOR?

GAFOR (General Aviation FOREcast) is a forecast of the state of previously defined routes for general aviation depending on horizontal visibility and low BKN/OVC cloud base.

CCL introduced GAFOR 2015.

eGAFOR will be an upgraded GAFOR.

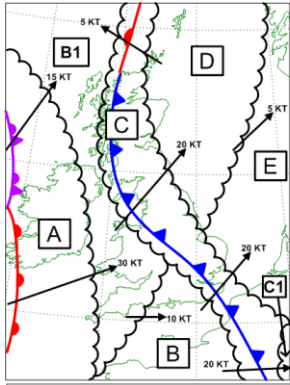


What is general aviation?

General aviation (GA) are all civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire.

General aviation flights range from gliders and powered parachutes to rotorcraft and corporate business jets.

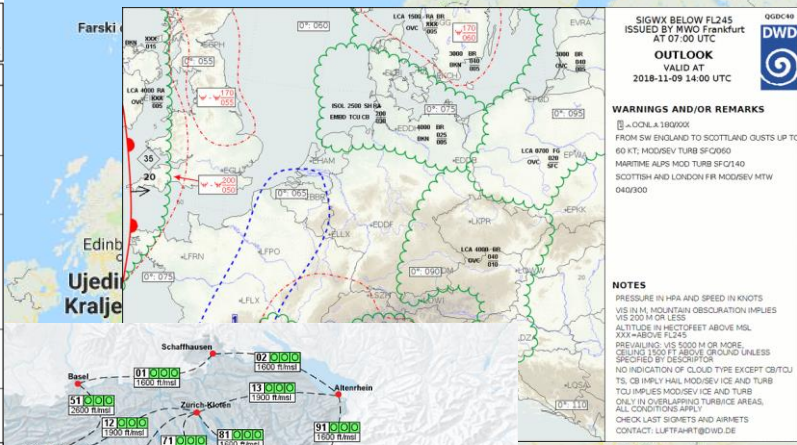




All heights in 100s of feet above mean sea level
 XXX means above chart upper limit
 Speed of movement in KT
 Cloud amount (Obs) TS / CB implies CR / W/L
 HB FG implies VIS < 200 M
 MOD / SEV ICE
 MOD / SEV TURB
 TS / CB implies CR / W/L
 FZ precipitation implies S
 F 2-15
 This forecast may be amended at any time.
 Issued by Met Office Exeter
 Contact telephone 0370 960 0100
 Forecaster: Duty Forecaster
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AREA	SURFACE VIS AND WX	FRONTS/CLOUD	0 C
A	20 KM NIL-RA OCNL 0 KM RA (SHRA W FM 14 Z) MTW MAX VSP 700 FPM AT 080 A (OCNL A) OCNL HILL FG	BKN/OVC (SCT W FM 14 Z) AC AS ... -W A 080 / XXX SCT/BKN CU SC -W A 015-030 / 080-XXX OCNL CB 015-025 / XXX W FM 14 Z SCT/BN (FEW LEE MON) AND OCNL W ... -FM 14 Z) ST 006-012 / 015	040-070 N 080-XXX S
B	30 KM NIL ISOL 200 M FG FRANCE TL 11 Z MTW MAX VSP 700 FPM B1 OCNL A, B1 ISOL HILL FG	SCT/BKN CU SC (-W B1) A ... -015-030 / 090-090 NW B1 ISOL SCT/BKN ST 010 / 015 UPSLOPES ... - (BASE 000 FG)	040-060 ... - B1 060-080
C	20 KM NIL ISOL (OCNL N OF 54 N AND C1) 7 KM ... - RA / RADZ ISOL 3500 M RADZ UPSLOPES ISOL 3000 M -RA/+TSRA C1 ISOL 200 M FG CONTINENT TL 11 Z MTW MAX VSP 600 FPM AT 080 N ... - OF 53 N A/N OF 53 N OCNL HILL FG	AREAS BKN/OVC AC -W A 080 / XXX ISOL EMBD CB 090-090 / XXX C1 SCT/BN (FEW LEE MON) CU SC ... -W A 015-030 / 060-080 SCT/BN (NIL/FEW LEE MON) ST ... -005-010 / 015	040-060 N 060-080 S
D	25 KM NIL ISOL 4 KM -RADZ/SHRA UPSLOPES MTW MAX VSP 600 FPM AT 080 A (ISOL A, W) ISOL HILL FG	ISOL SCT/BKN CU SC A ... -015-020 / 040-090 ISOL SCT/BKN ST 007-012 / 015 ... - UPSLOPES	060
E	30 KM NIL ISOL 200 M FG (FZFG NORWAY) LAN ... - TL 11 Z ISOL HILL FG	ISOL SCT/BKN SC AC -W A 080 / XXX W ISOL SCT CU A 015 / 050 SEA COE N ISOL SCT/BKN ST 005-010 / 015 ... - MAINLY CONTINENT ... - BASE 000 FG	050-070

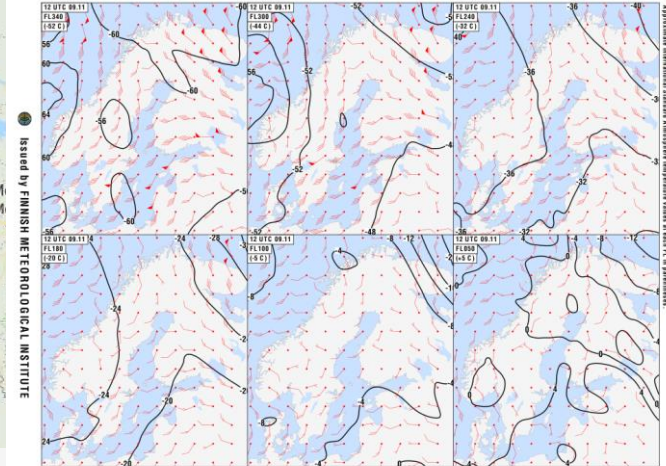
Outlook Until 100000 Z: FRONTAL SYSTEM IN AREA A REACHING A LINE FM W SCOTLAND TO CENTRAL S ENGLAND WITH AN UNSTABLE SW FLOW TO FOLLOW.



SIGWX BELOW FL245
 ISSUED BY WMO Frankfurt
 AT 07:00 UTC
OUTLOOK
 VALID AT
 2018-11-09 14:00 UTC

WARNINGS AND/OR REMARKS
 [E] - OCNL A 100000
 FROM SW ENGLAND TO SCOTLAND OUTS UP TO
 60 KT; MODISEV TURB SF0600
 MARITIME ALPS MOD TURB SF0140
 SCOTIEN AND LONDON FIR MODISEV MTW
 040300

NOTES
 PRESSURE IN HPA AND SPEED IN KNOTS
 VIS IN M, MOUNTAIN OBSCURATION IMPLIES
 VIS 200 M OR LESS
 ALTITUDE IN HECTOFEET ABOVE MSL
 XXX=ABOVE FL245
 REPEARLING: VIS 5000 M OR MORE
 CEILING 1500 FT ABOVE GROUND UNLESS
 SPECIFIED BY DESCRIPTOR
 NO INDICATION OF CLOUD TYPE EXCEPT CB/TU
 TS, CB IMPLY HAIL, MODISEV ICE AND TURB
 TO IMPLIES MODISEV ICE AND TURB
 ONLY IN OVERLAPPING TURBULENCE AREAS,
 ALL CONDITIONS APPLY
 CHECK LAST SIGRITS AND AIRMETS
 CONTACT: LUFTFAHRT@WDW.DE



Upper Wind and Temperature Chart - VALID 12 UTC 09 11 2018
 Issued by FINNISH METEOROLOGICAL INSTITUTE

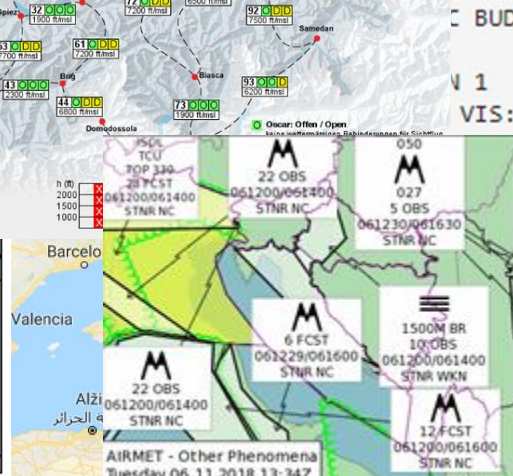
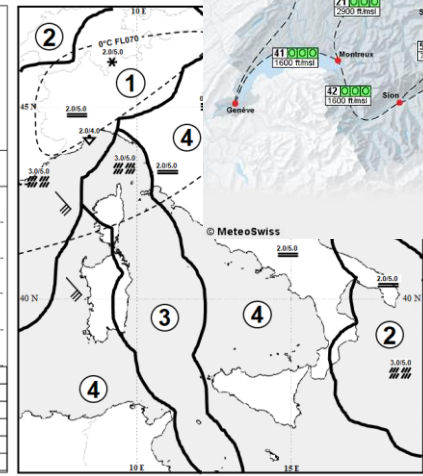
SERVIZIO METEOROLOGICO A.M.
 LOW LEVEL SIGWX CHART
 SFC / FL100
 ISSUED BY M.W.O POGGIO RENATICO
 VALID 09/11/2018 06:00 UTC

Symbols used: Clouds imply moderate or severe turbulence and hail
 Speed in knots, Vis in m or km, Altitude in hectofeet
 Check Signs for Volcano Ash

a) Refer Cloudiness b) Refer Phenomena

1: BKN/OVC CuSc; 020/050 - AcAe 050/XXX
 ISOL TCU 025/XXX
 2: SCT/BKN CuSc; 025/050 - As 070/XXX
 3: SCT Cu 020/050 - FEW Ac 050/XXX
 4: ISOL Cu 020/050 - Ac 050/XXX
 5: SKC/FEW Cu 020/050 - Ac 050/XXX

Moderate icing, Severe icing, Moderate turbulence, Severe turbulence, Mountain waves, Snow, Volcano, Thunderstorm, Shower, Mountain obscuration, Rain, Fog

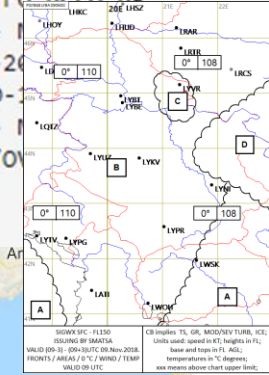


J41 LHBM 061100
 GAMET VALID 061200/061800 LHBP-
 BUDAPEST FIR BLW FL100

V 1
 VIS: W OF E01630 0800-5000M FG BCFG BR

E02150 - N4710 E02109 -
 2252 - N4711 E02150 200-20
 W OF E01630 BKN/OVC 500-
 E02150 - N4710 E02109 -
 2252 - N4711 E02150 BKN/O

APPLICABLE: NIL=

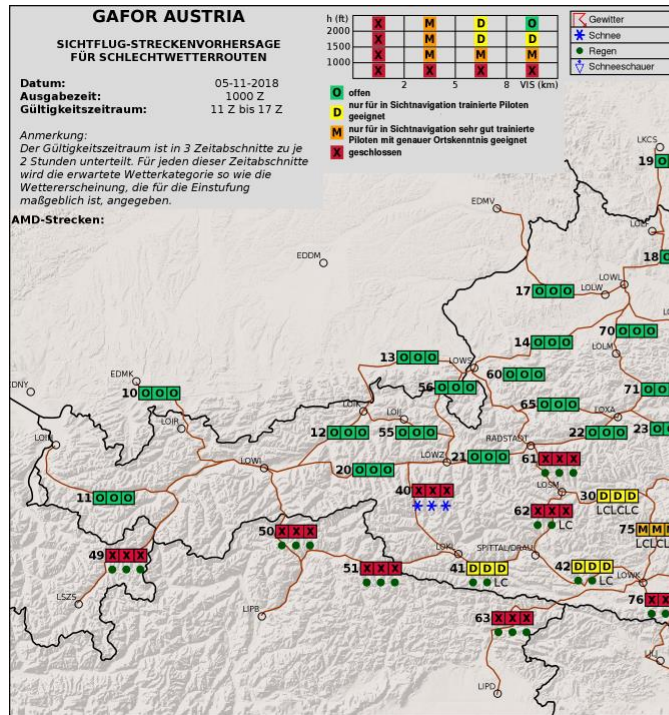


TIME (UTC)	SFC WSPD (KT)	SFC VIS (M)	WX	MT OBSC (FL)	CLOUD (FT AGL)	TURB (FL)	ICE (FL)
06:00	04:08	0000/10000			SCT/LCA BKN SC 3000/5000	(FL)	(FL)
06:12	04:08	ABV 10000			FEW/SCT SC 4000/5000		
06:30	04:10	ABV 10000	LCA/TG BR		FEW/SCT SC 3000/5000		
06:12	04:12	ABV 10000					
06:12	04:10	ABV 10000				FLSMOD	SFCOCS
06:12	02:05	0000/10000		LCA 030000	BKN/OVC SC 3000/5000		

WIND/TEMP (FT)	WIND (DEG KT)	TEMP (°C)	WIND (DEG KT)	TEMP (°C)	WIND (DEG KT)	TEMP (°C)	WIND (DEG KT)	TEMP (°C)
15000	20005	-10	20005	-10	07005	-10	08005	-08
10000	17005	+01	16005	-01	11010	+01	08005	-01
5000	12010	+08	12010	+07	17005	+08	22005	+08
2000	13015	+09	13010	+09	08005	+08	22005	+15

Units used: speed in KT, heights in Ft, base and tops in Ft, AGL, temperatures in °C, degrees, see notes above chart upper limit.

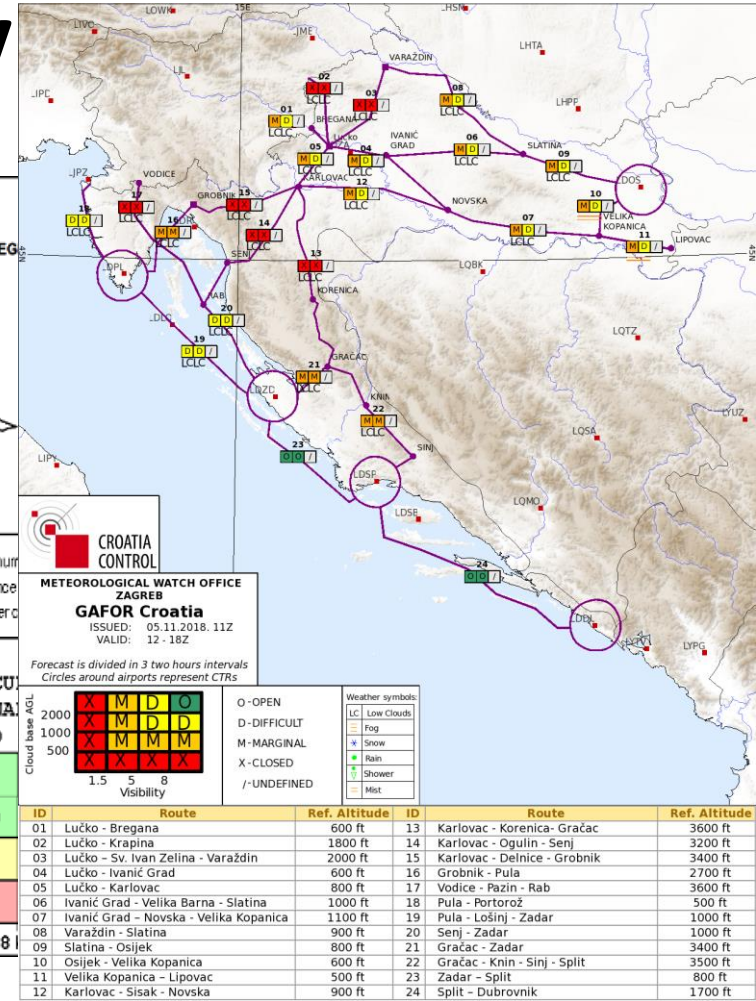
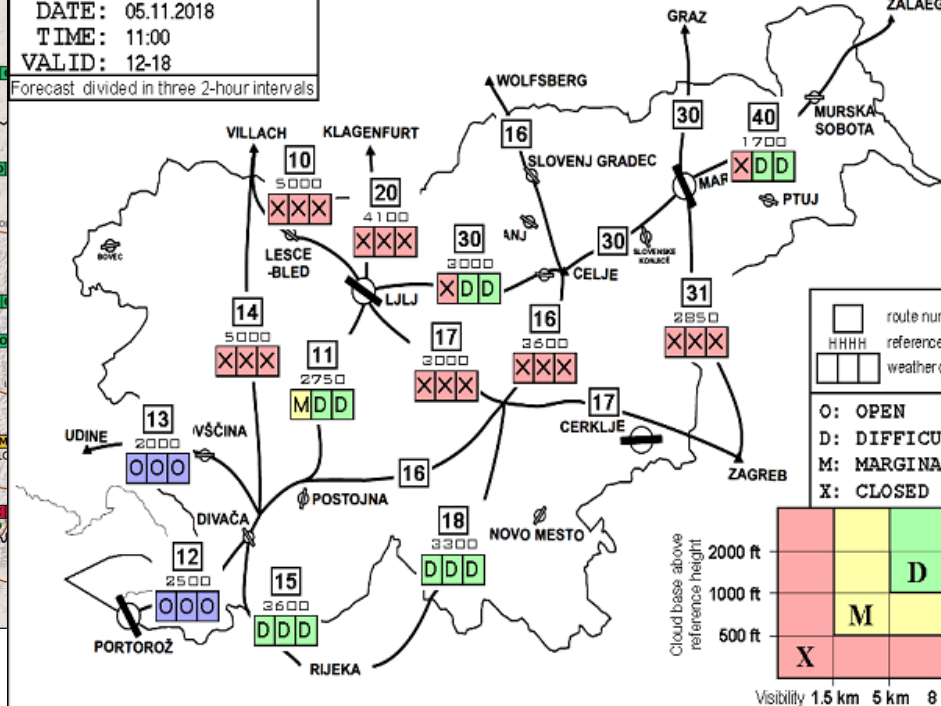
Problem of (no)practicality



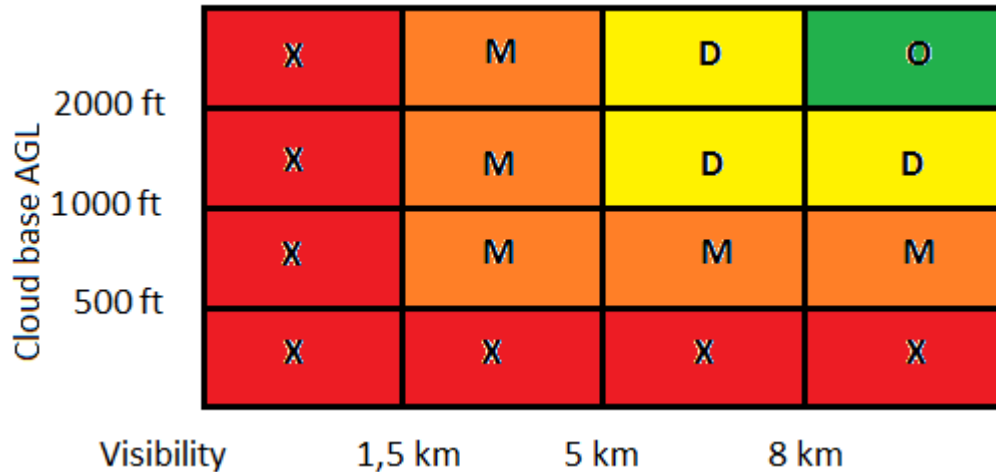
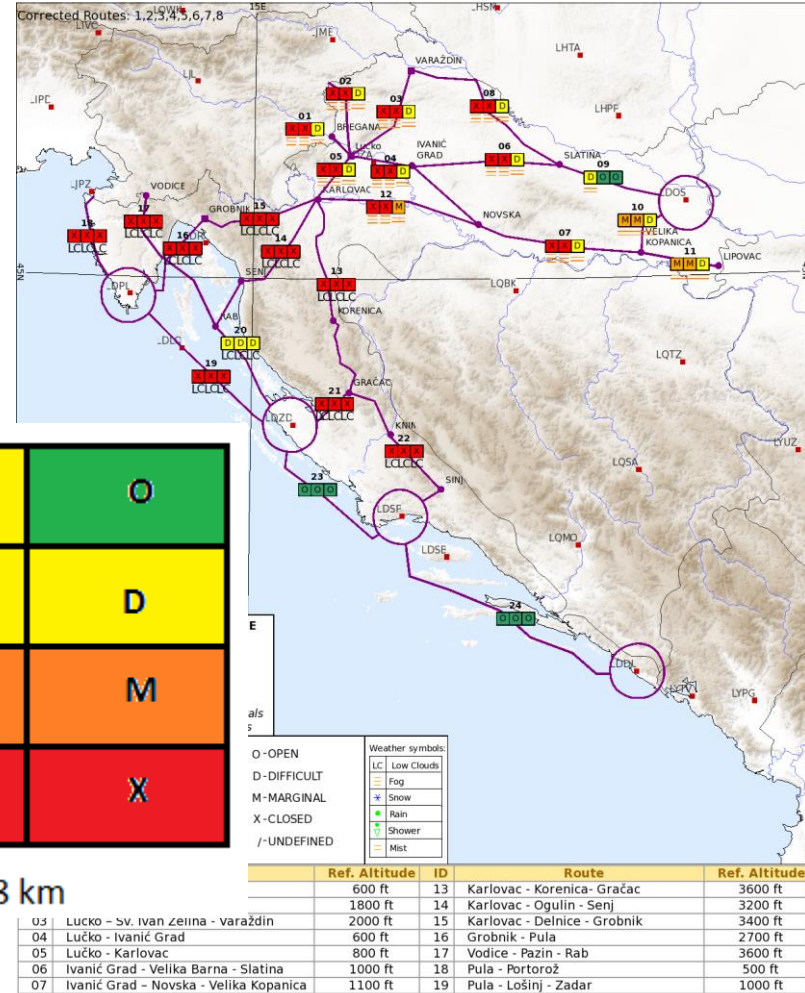
GAFOR SLOVENIA
ISSUED BY MWO LJLA

DATE: 05.11.2018
TIME: 11:00
VALID: 12-18

Forecast divided in three 2-hour intervals



GAFOR – meteorological problems



Initial idea

- The users like GAFOR - offer them a similar, but upgraded product
- Harmonizing forecasts and criteria over a larger area, and creating a single product for multiple countries
- Introducing probability forecasts to the product
- Harmonizing of forecasting and product generation between different METSPs
- Use the obtained information for other products in the future

The Project

- Project idea reported to INEA through CEF Transport Call 2016
- The Project is approved and co-financed with 85% of the EU
- The Project started on 03.07.2017 and will end on 31.12.2020

The Partners

CCL (Croatia) - the initiator and the lead partner

ARSO (Slovenia)

BHANSA (BiH)

OMSZ (Hungary)

ROMATSA (Romania)

SHMU (Slovakia)

SMATSA (Serbia and Montenegro)

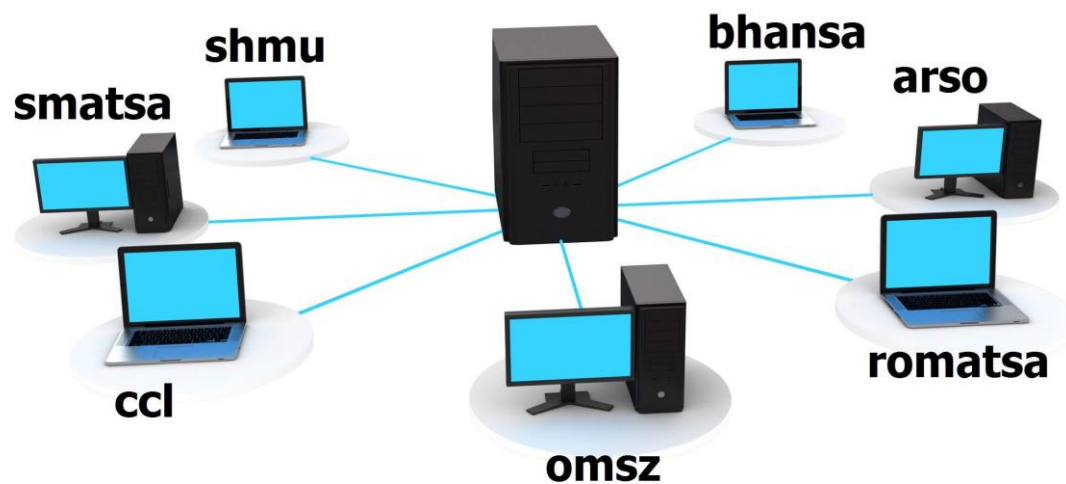
IBL (Slovakia) - an industrial partner

MET phenomena in eGAFOR

It was decided that the following weather phenomena hazardous for aviation would be forecast in eGAFOR:

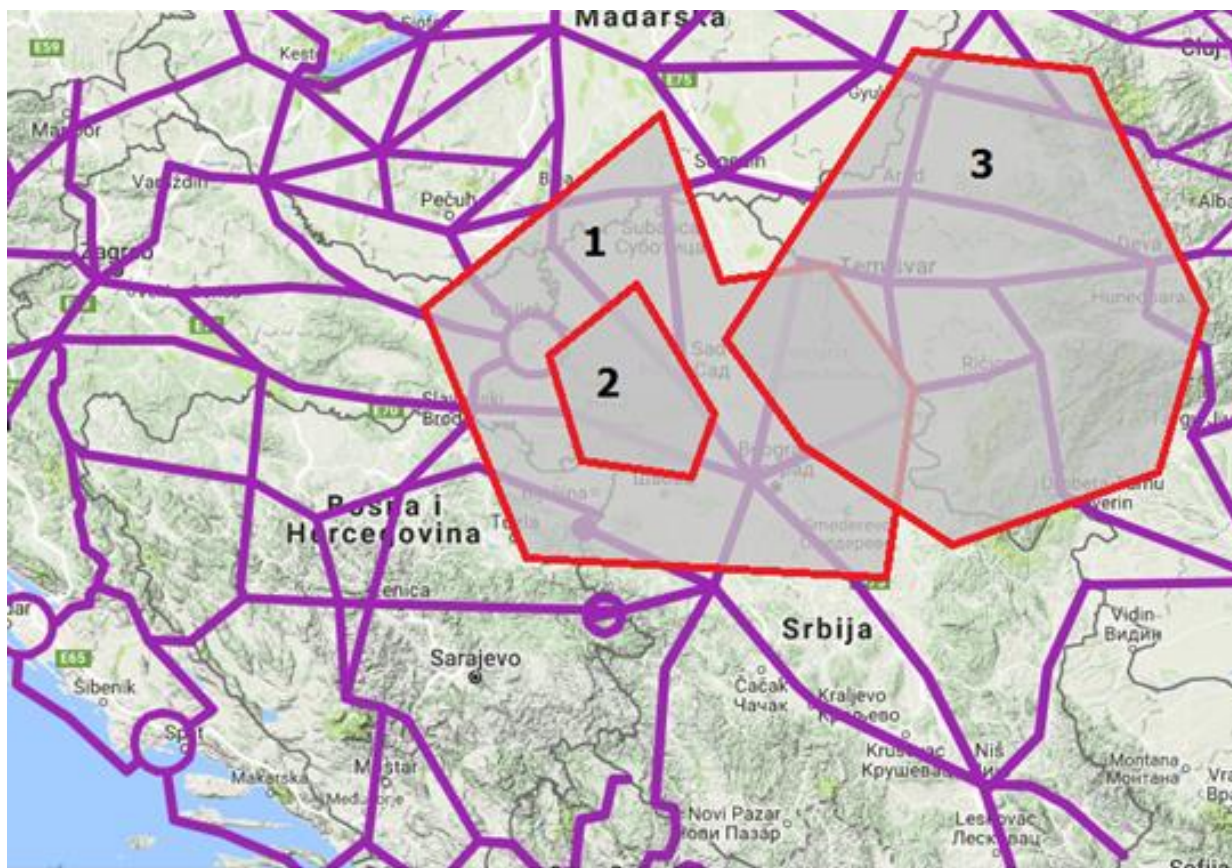
- Low BKN/OVC ($\geq \frac{5}{8}$) cloudiness
- Visibility
- Turbulence
- CB cloudiness
- Freezing precipitation

Collaborative forecasting



- Simultaneous
- Harmonized
- Seamless on borders

How will all this be forecasted?



Polygons defined by:

- time interval
- severity of phenomenon (thresholds)
- probability of occurrence

Phenomena forecast → impact

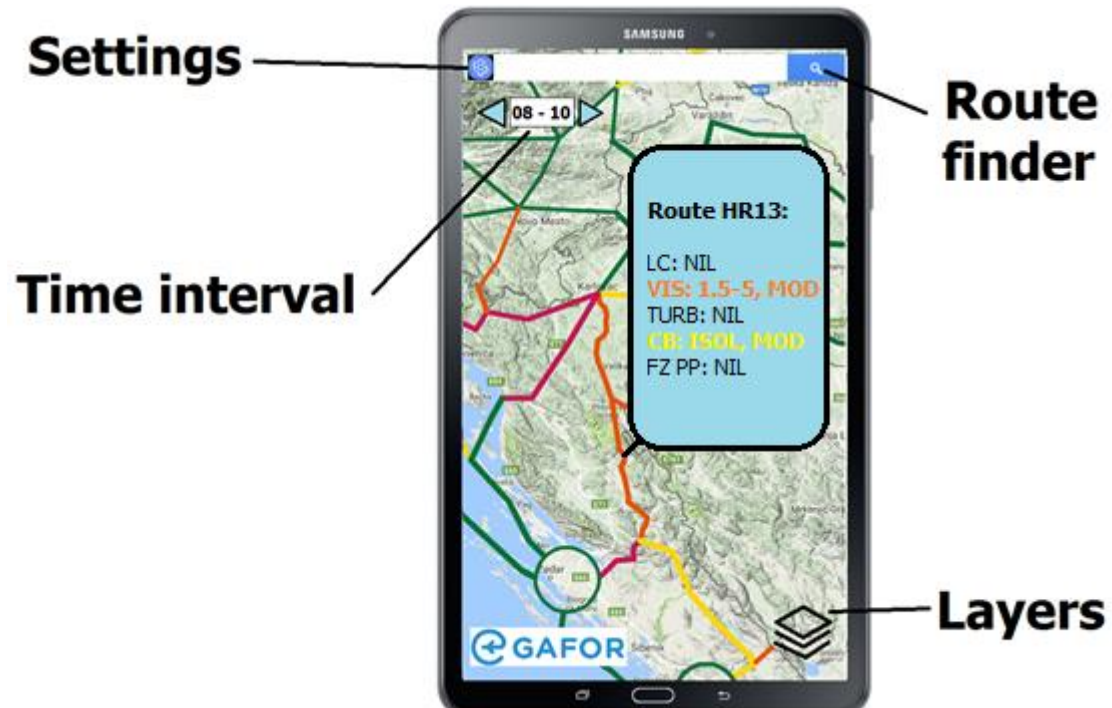
To make a forecast understandable to the pilots, it must be adjusted to them.

That means, the meteorological forecast will be translated into the impact (state of the route) shown in „traffic-light" colors.

Probability of occurrence	Severity of phenomenon		
	FRQ	OCNL	ISOL
Low	Orange	Yellow	Green
Medium	Red	Orange	Yellow
High	Red	Red	Orange

How will the user see the forecast?

Interactive web based product intended primarily for use on mobile devices



www.egafor.eu

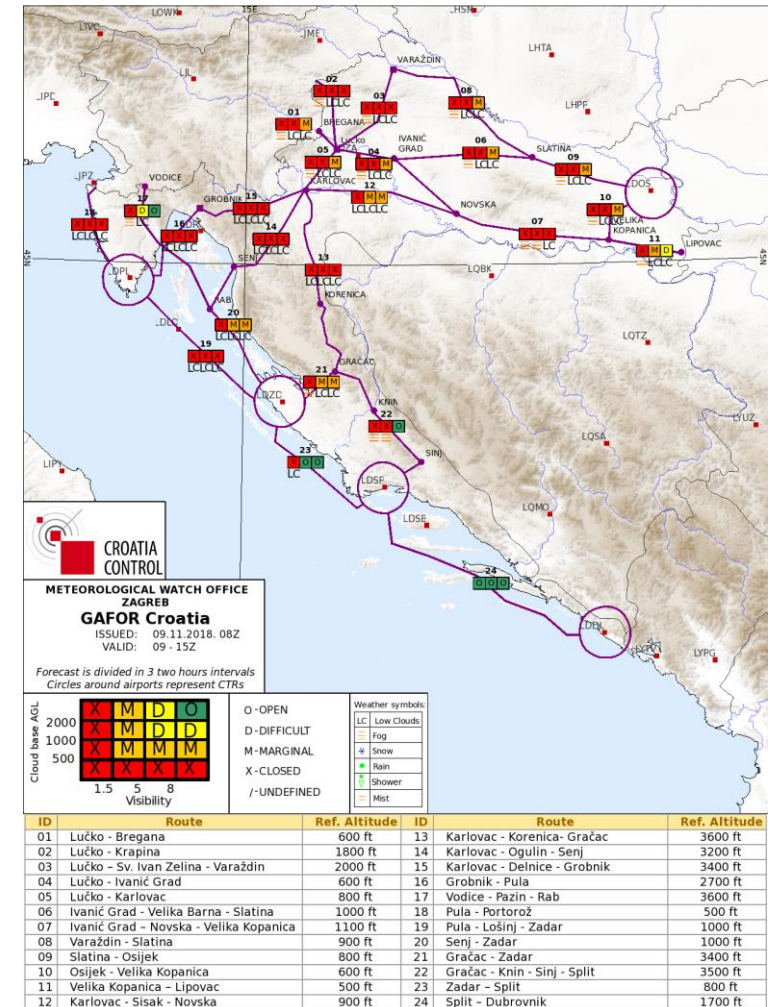
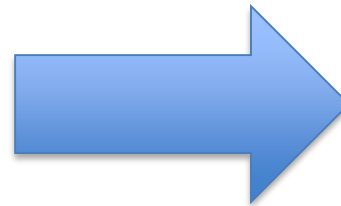
Why stop here?

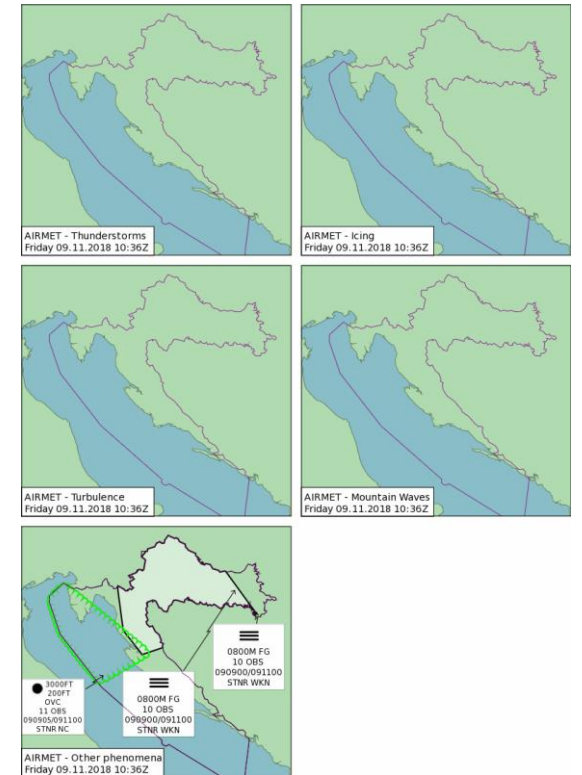
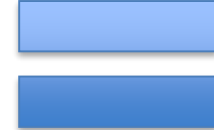
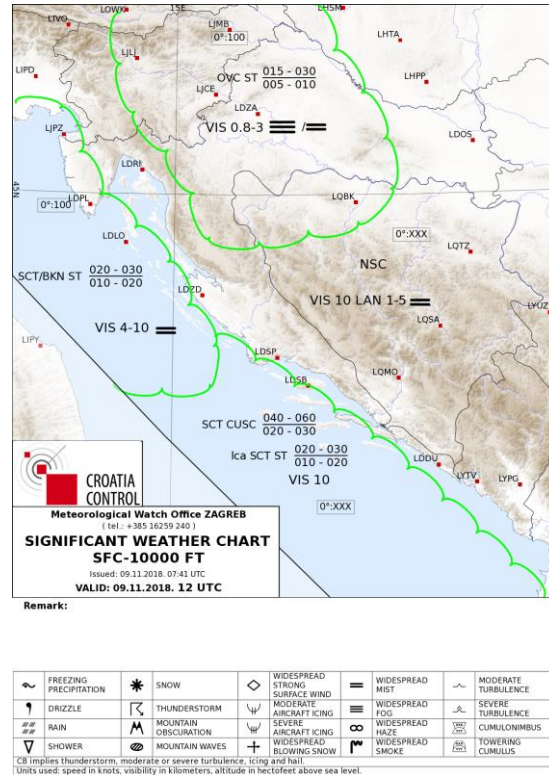
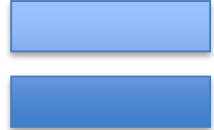
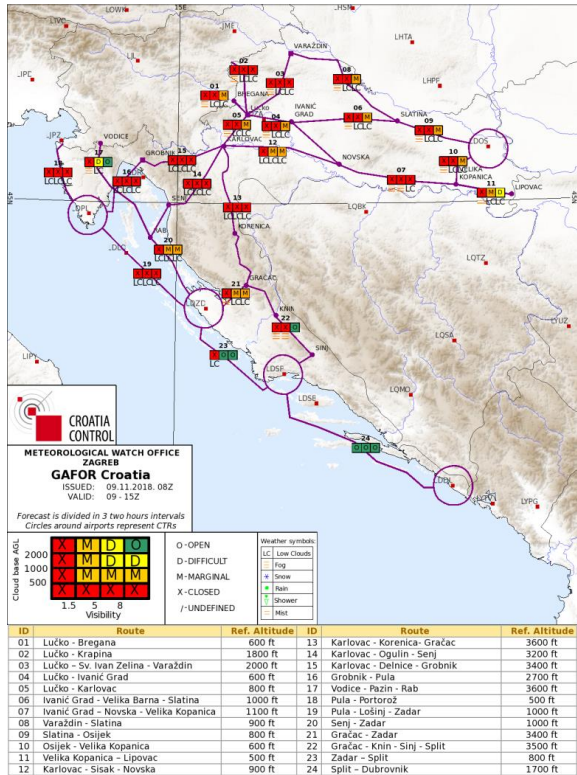
Message Editor: Gafor with weather (2018-11-09 08:30, revision 0) - Message Editor

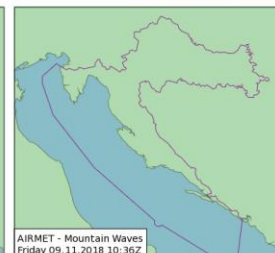
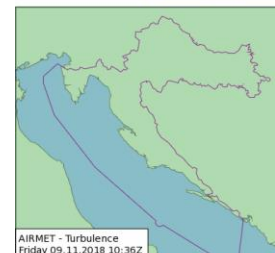
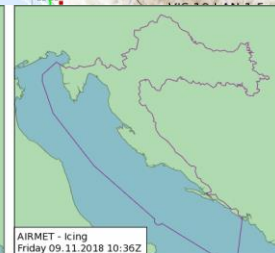
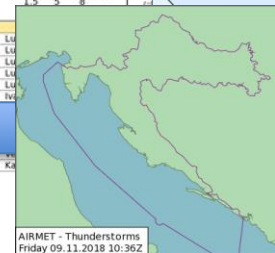
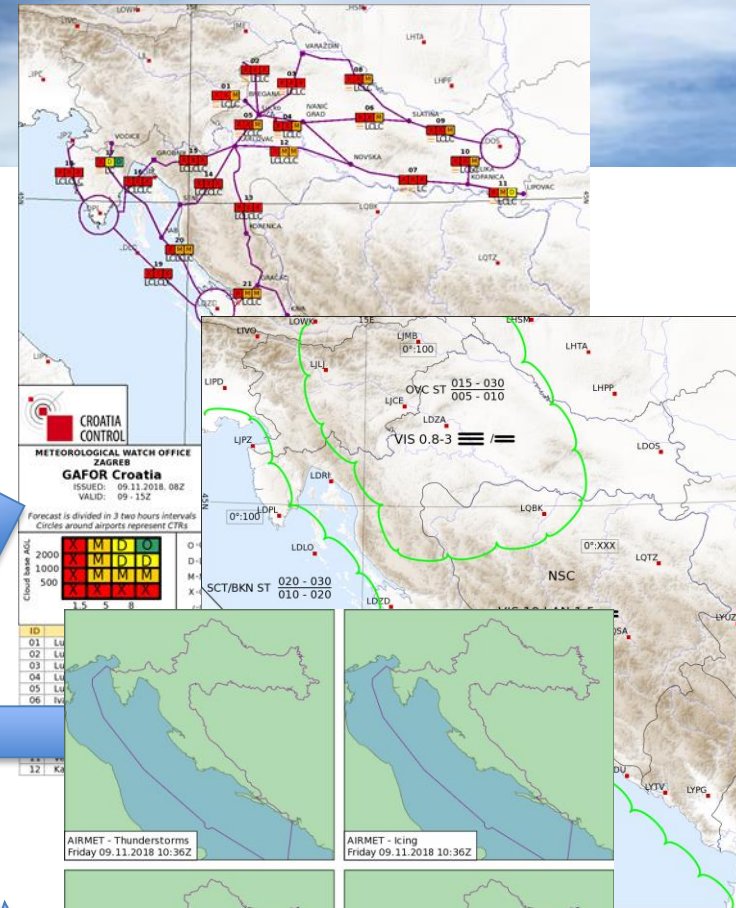
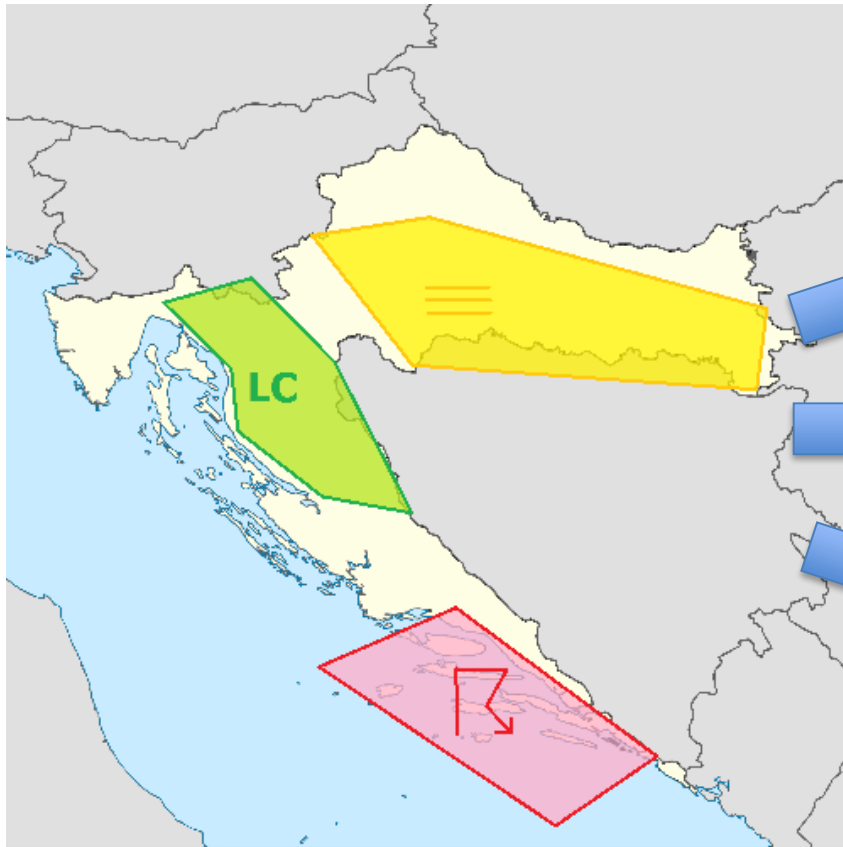
Start -> Direct xml -> Append WMO header -> gafor.png

LDZA 09/11/2018 09:00 09/11/2018 15:00

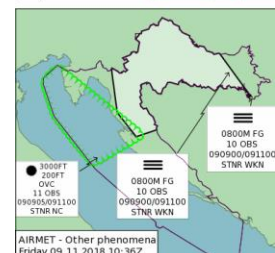
Route ID	Reference Height	1.Cat.	1.Phen.	2.Cat.	2.Phen.	3.Cat.	3.Phen.	Route
1	600	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	M - Marginal	LC - Low Clou...	Lučko - Brega...
2	1800	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	Lučko - Krapl...
3	2000	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	Lučko - Sv. I...
4	600	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	M - Marginal	LC - Low Clou...	Lučko - Ivani...
5	800	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	M - Marginal	LC - Low Clou...	Lučko - Karlo...
6	1000	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	M - Marginal	LC - Low Clou...	Ivančić Grad - ...
7	1100	X - Closed	FG - Fog	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	Ivančić Grad - ...
8	900	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	M - Marginal	LC - Low Clou...	Varaždin - Sl...
9	800	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	M - Marginal	LC - Low Clou...	Slatina - Osi...
10	600	X - Closed	FG - Fog	X - Closed	LC - Low Clou...	M - Marginal	LC - Low Clou...	Osiijek - Veli...
11	500	X - Closed	BR - Mist	M - Marginal	LC - Low Clou...	D - Difficult	LC - Low Clou...	Velika Kopani...
12	900	X - Closed	LC - Low Clou...	M - Marginal	LC - Low Clou...	M - Marginal	LC - Low Clou...	Karlovac - Si...
13	3600	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	Karlovac - Ko...
14	3200	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	Karlovac - Og...
15	3400	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	Karlovac - De...
16	2700	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	Grobnik - Pula...
17	3600	X - Closed	FG - Fog	D - Difficult	LC - Low Clou...	O - Open		Vodice - Pazi...
18	500	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	Pula - Portor...
19	1000	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	X - Closed	LC - Low Clou...	Pula - Lošinj...
20	1000	X - Closed	LC - Low Clou...	M - Marginal	LC - Low Clou...	M - Marginal	LC - Low Clou...	Senj - Zadar
21	3400	X - Closed	FG - Fog	M - Marginal	LC - Low Clou...	M - Marginal	LC - Low Clou...	Gračac - Zadar
22	3500	X - Closed	FG - Fog	X - Closed	FG - Fog	O - Open		Gračac - Knin...
23	800	X - Closed	LC - Low Clou...	O - Open		O - Open		Zadar - Split
24	1700	O - Open		O - Open		O - Open		Split - Dubrov...







	MODERATE TURBULENCE
	SEVERE TURBULENCE
	CUMULONIMBUS
	TOWERING CUMULUS



Thank you for attention