

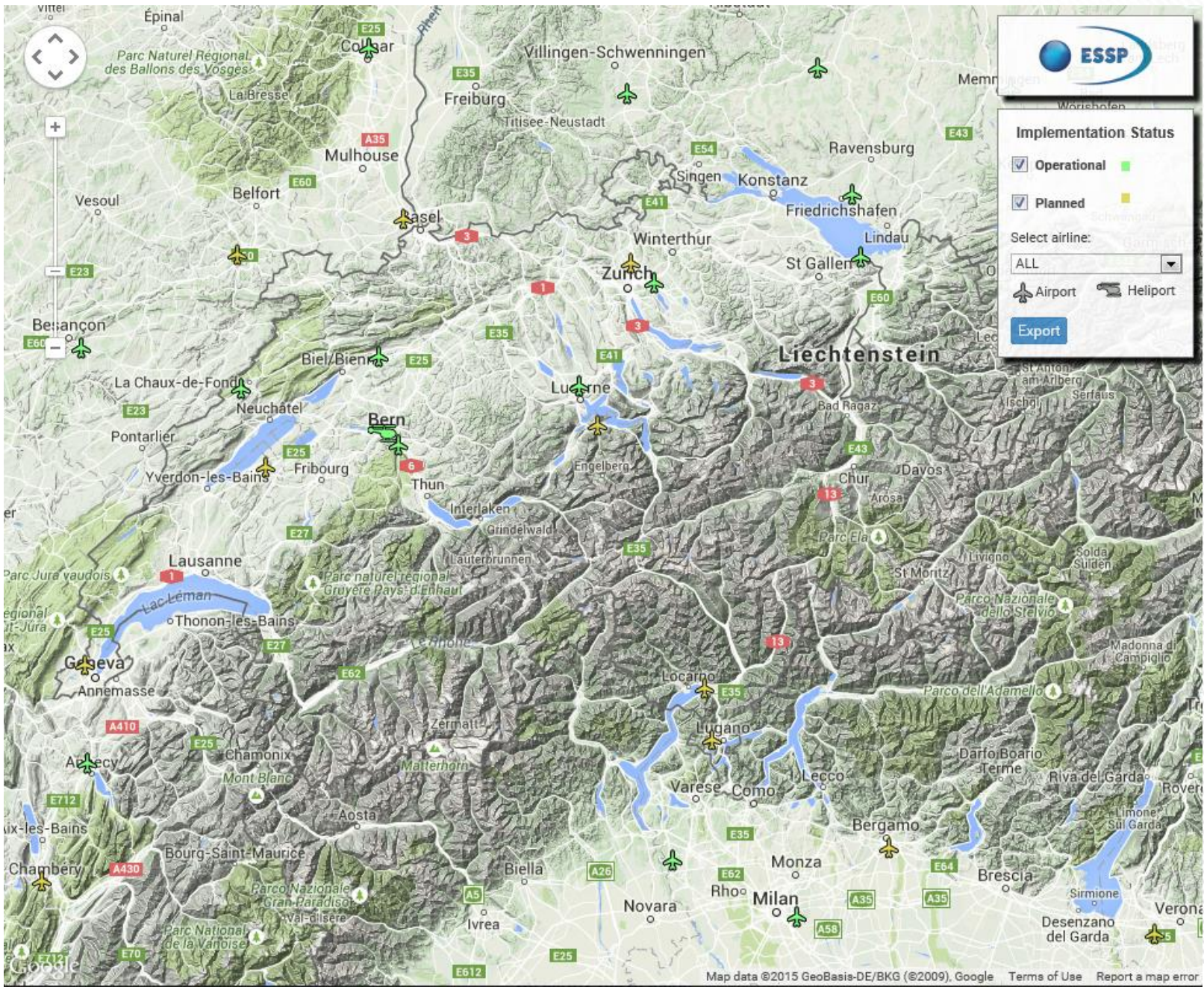
skyguide



New EGNOS based operations in Switzerland

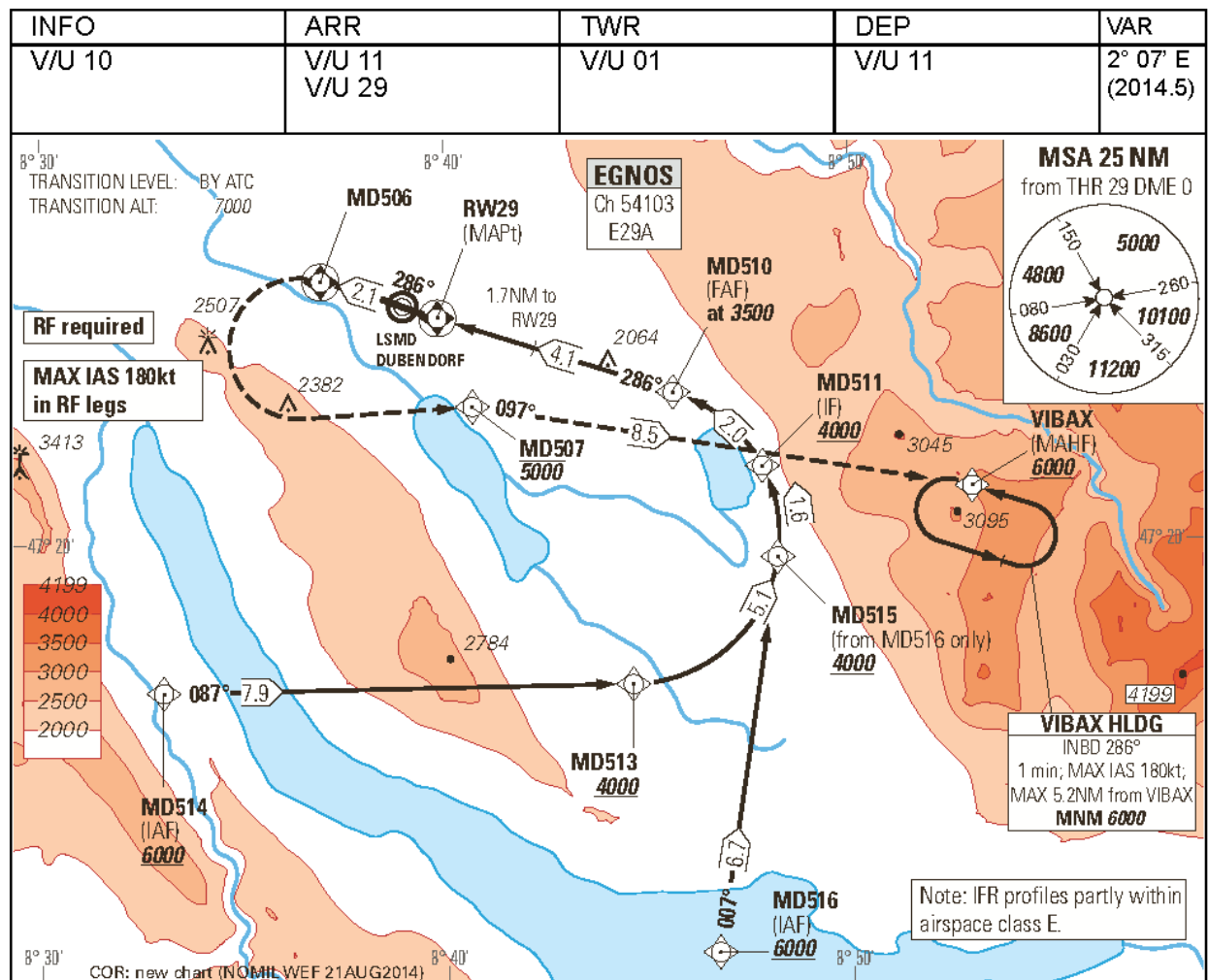
Marc Troller
CNS expert group





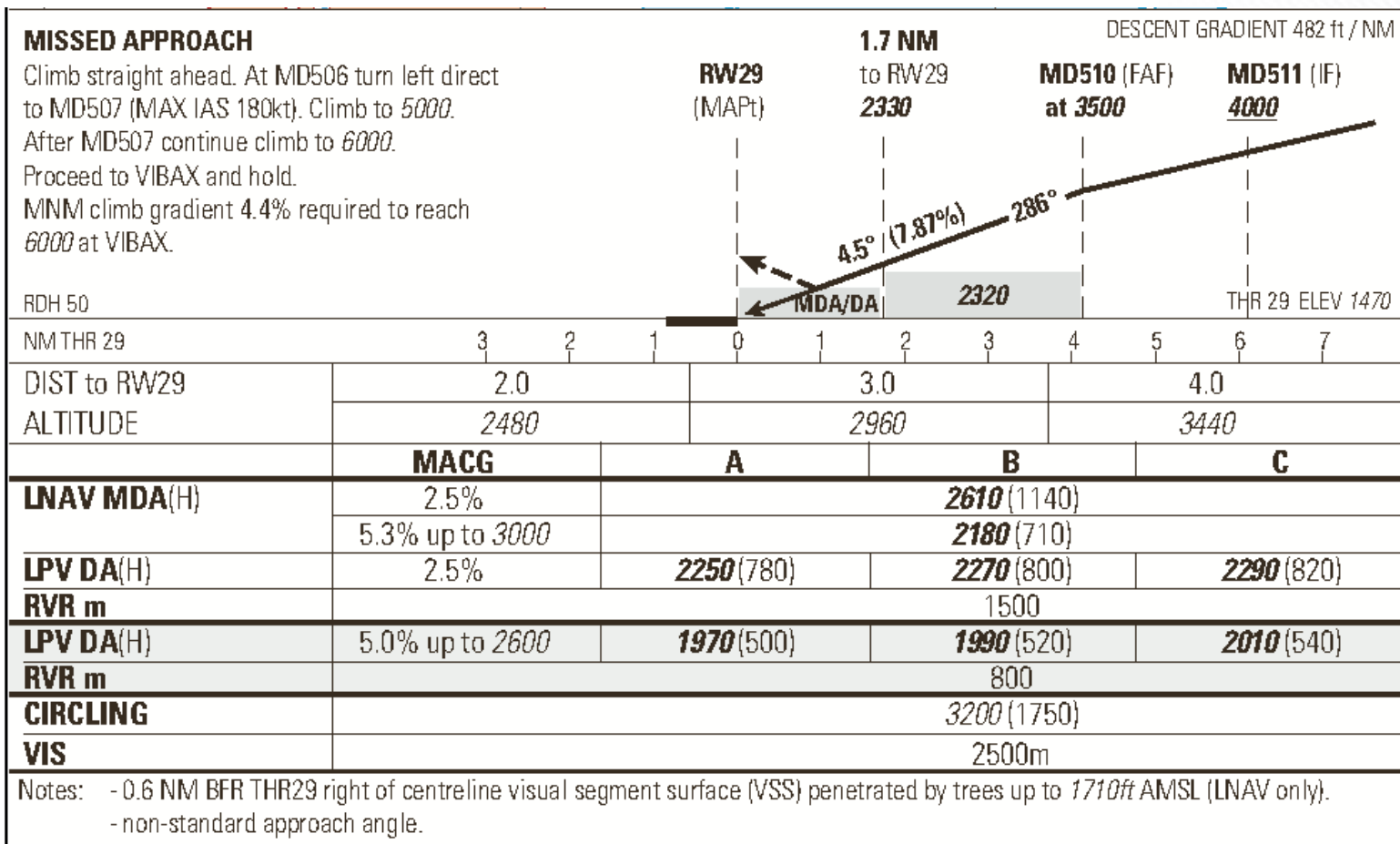
Instrument APCH Chart Dübendorf (1)

INSTRUMENT APCH CHART ELEV 442 m / 1450 ft RNAV (GNSS) Y RWY 29
DÜBENDORF (LSMD)



DUB

Instrument APCH Chart Dübendorf (2)



RNAV (GNSS) Y RWY 29

47° 23.9' N
 008° 38.9' E

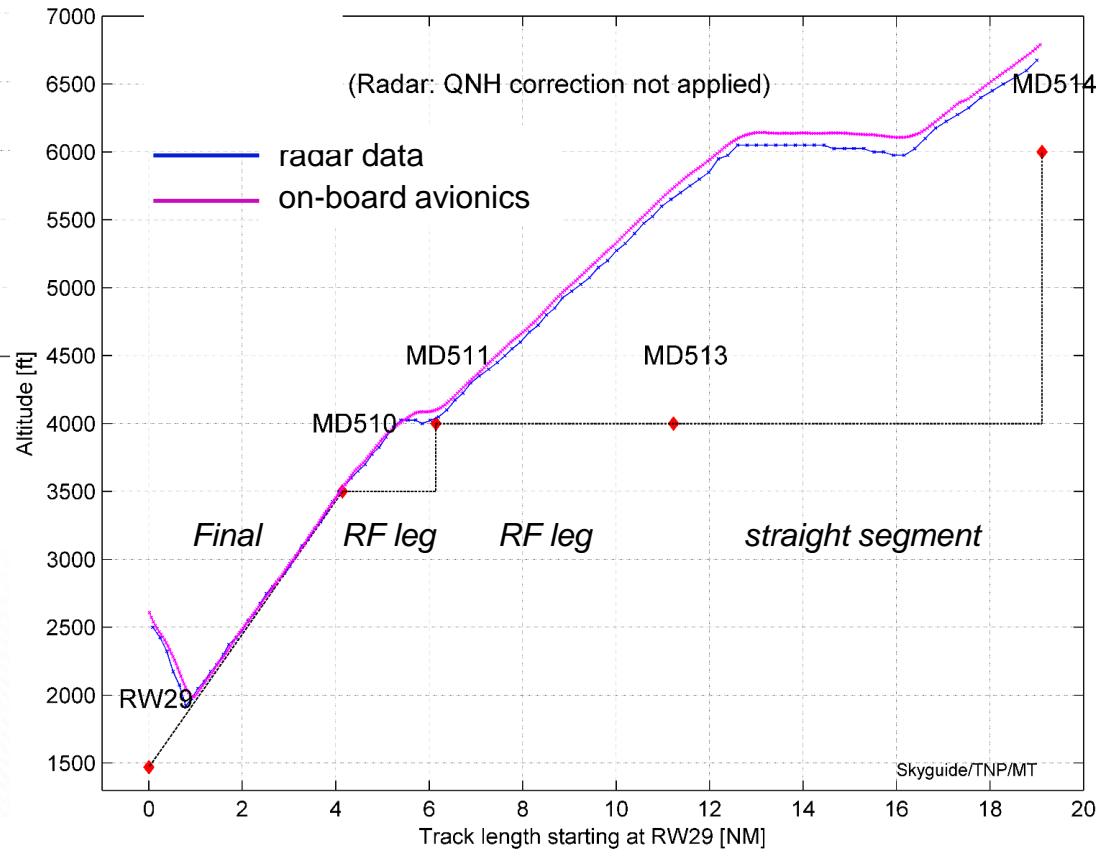
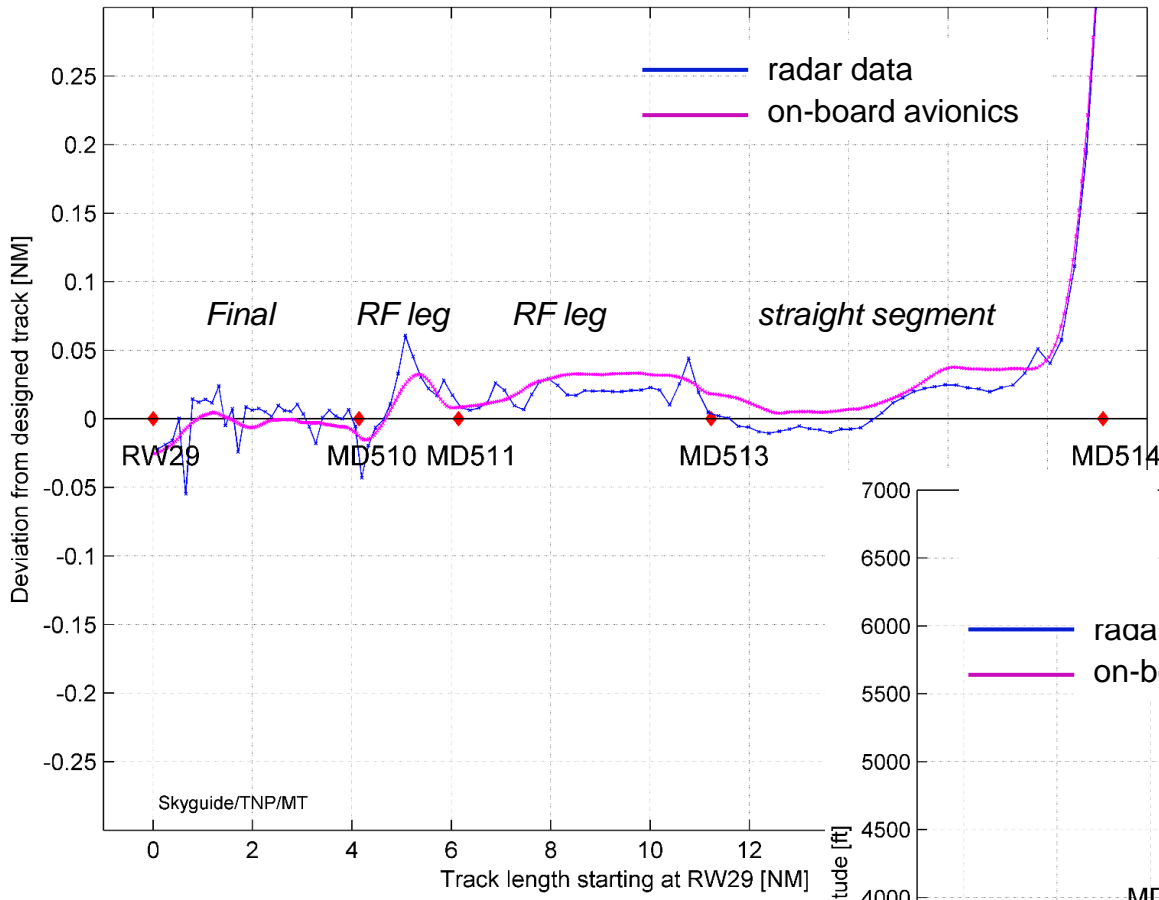
DÜBENDORF (LSMD)
 DUB

© Swiss Air Force NOMIL 21 AUG 2014

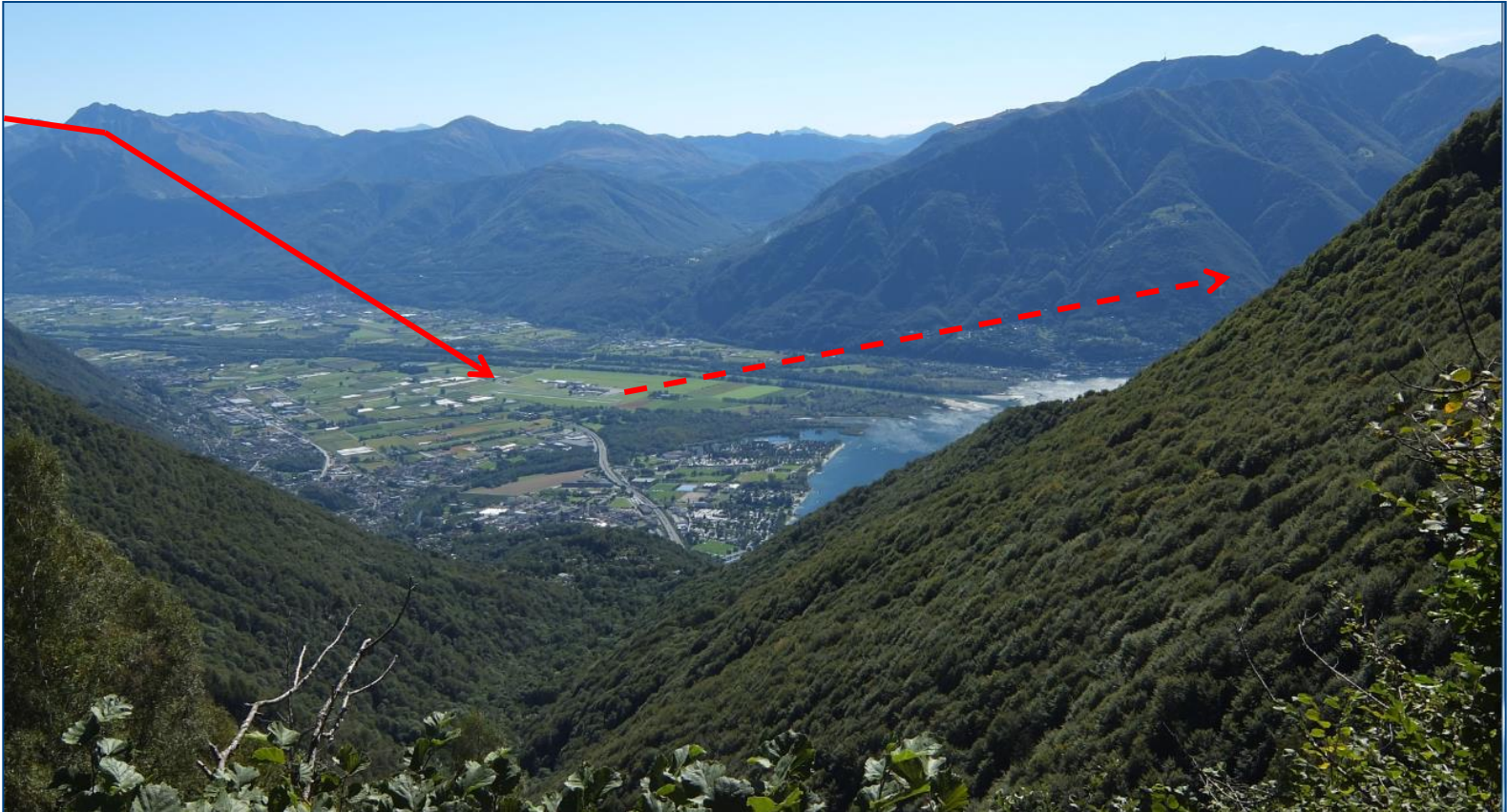
2 - 1

Implemented: 21 August 2014

LSMD Track Monitoring



LP APCH Locarno

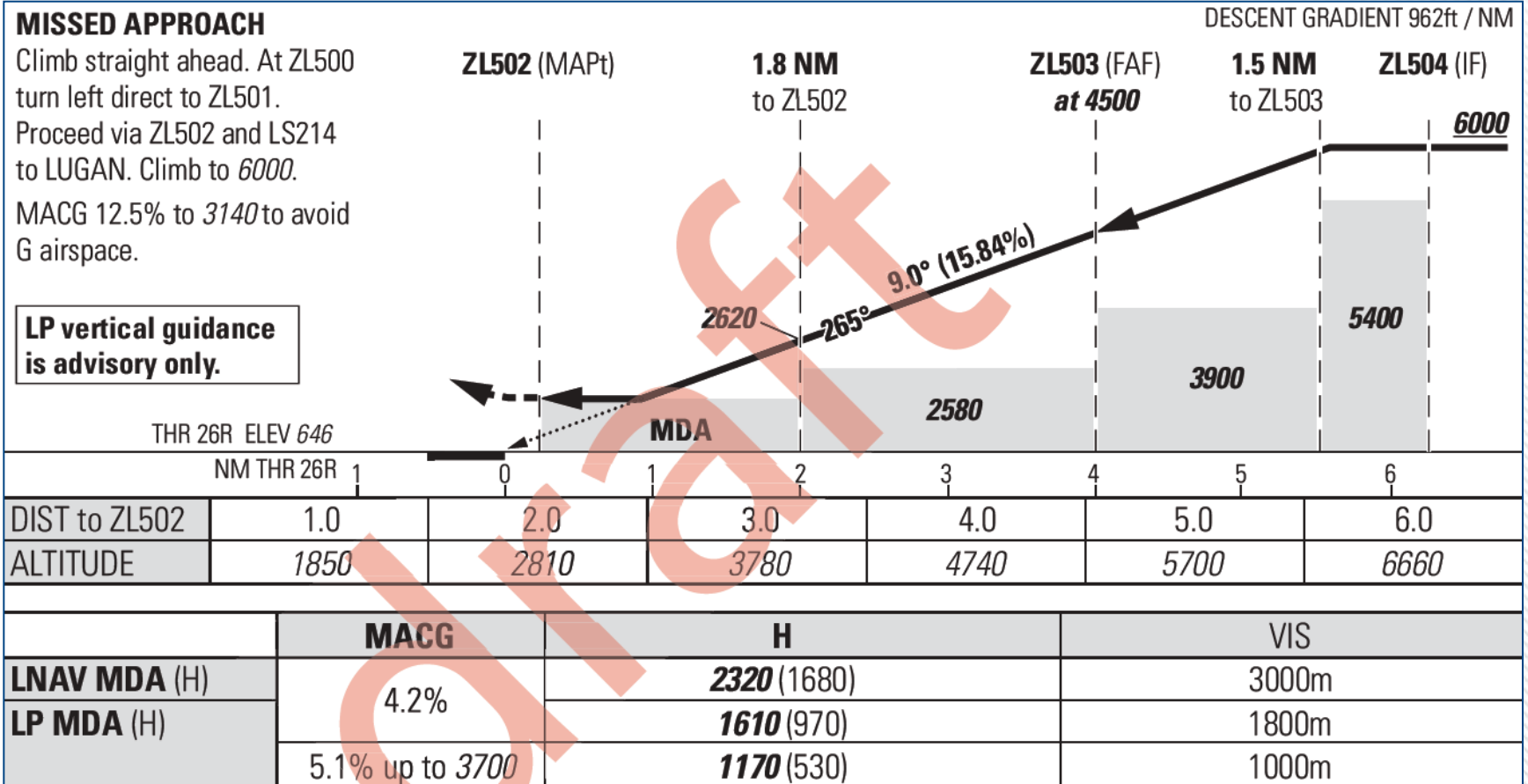


Mandate from Swiss Air Force

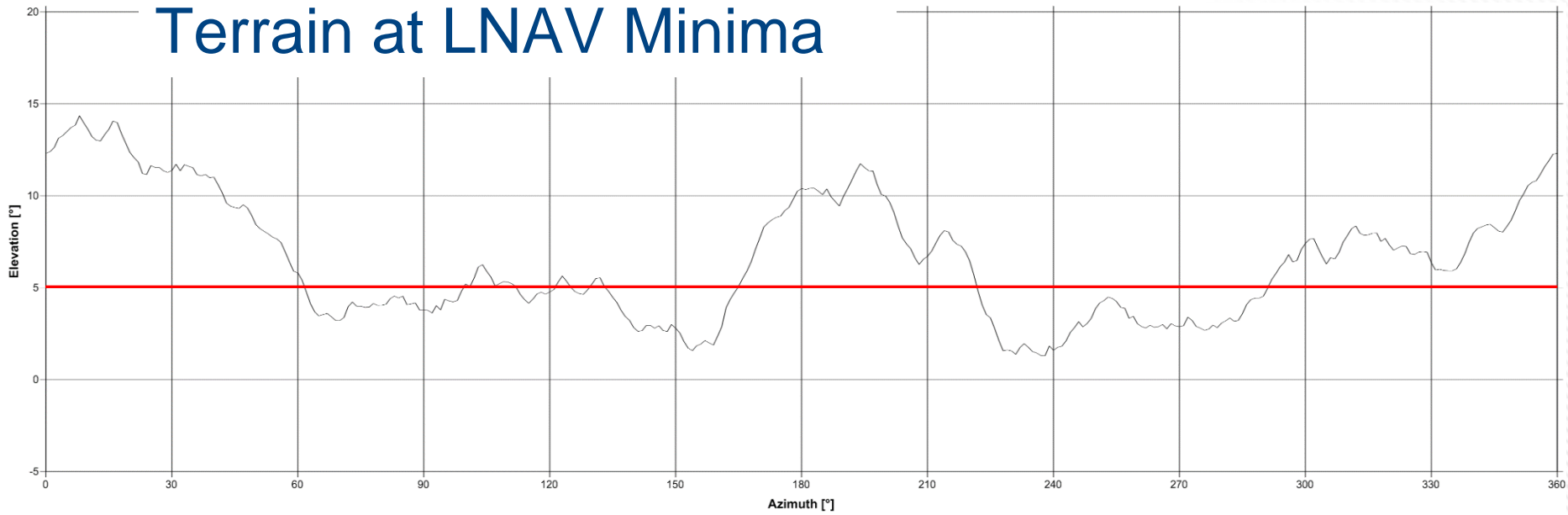
- › Steep RNP APCH to RWY 26R for CAT H aircraft
- › NAV SPEC: RNP 0.3, RF legs to be avoided
- › LNAV and LPV minima
- › Users:
 - Air Force EC635 and AS332
 - HEMS AW109 DaVinci



Approach Chart - Minima

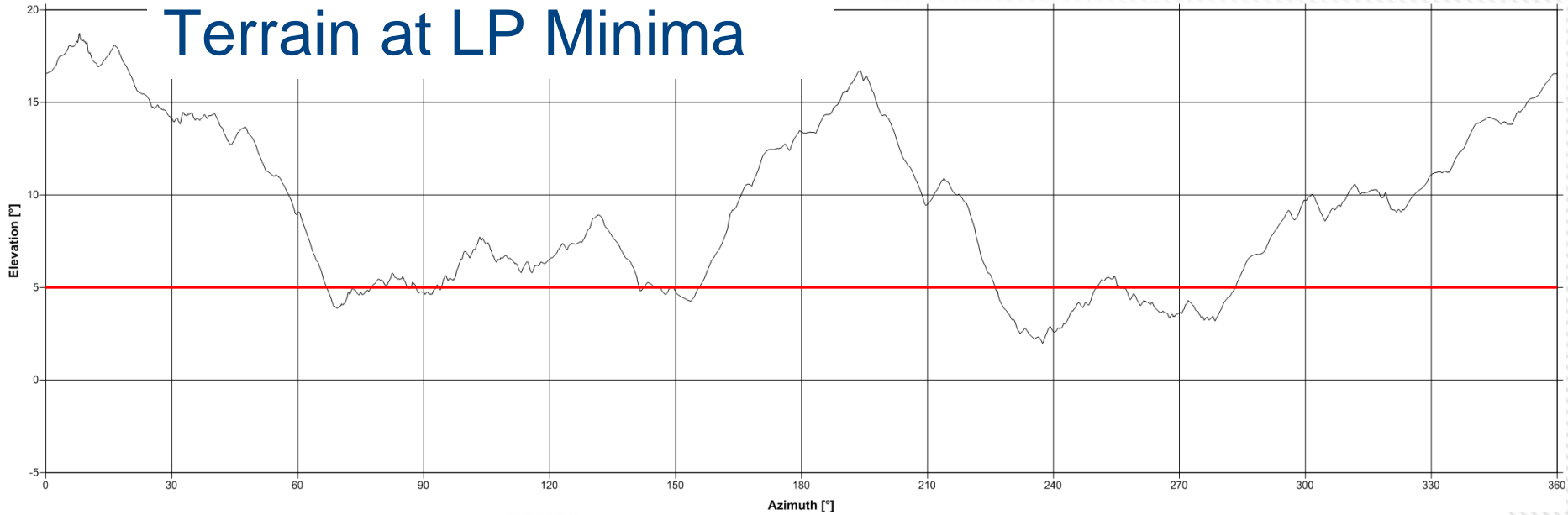


Terrain at LNAV Minima



created with GeoSTARS

Terrain at LP Minima



NOTAM RNAV APCH Locarno

- › NOTAM only available for 5° elevation angle
- › All helicopters are SBAS capable
- › Terrain-dependent RAIM / EGNOS predictions required
- › LNAV minima with EGNOS NOTAM?

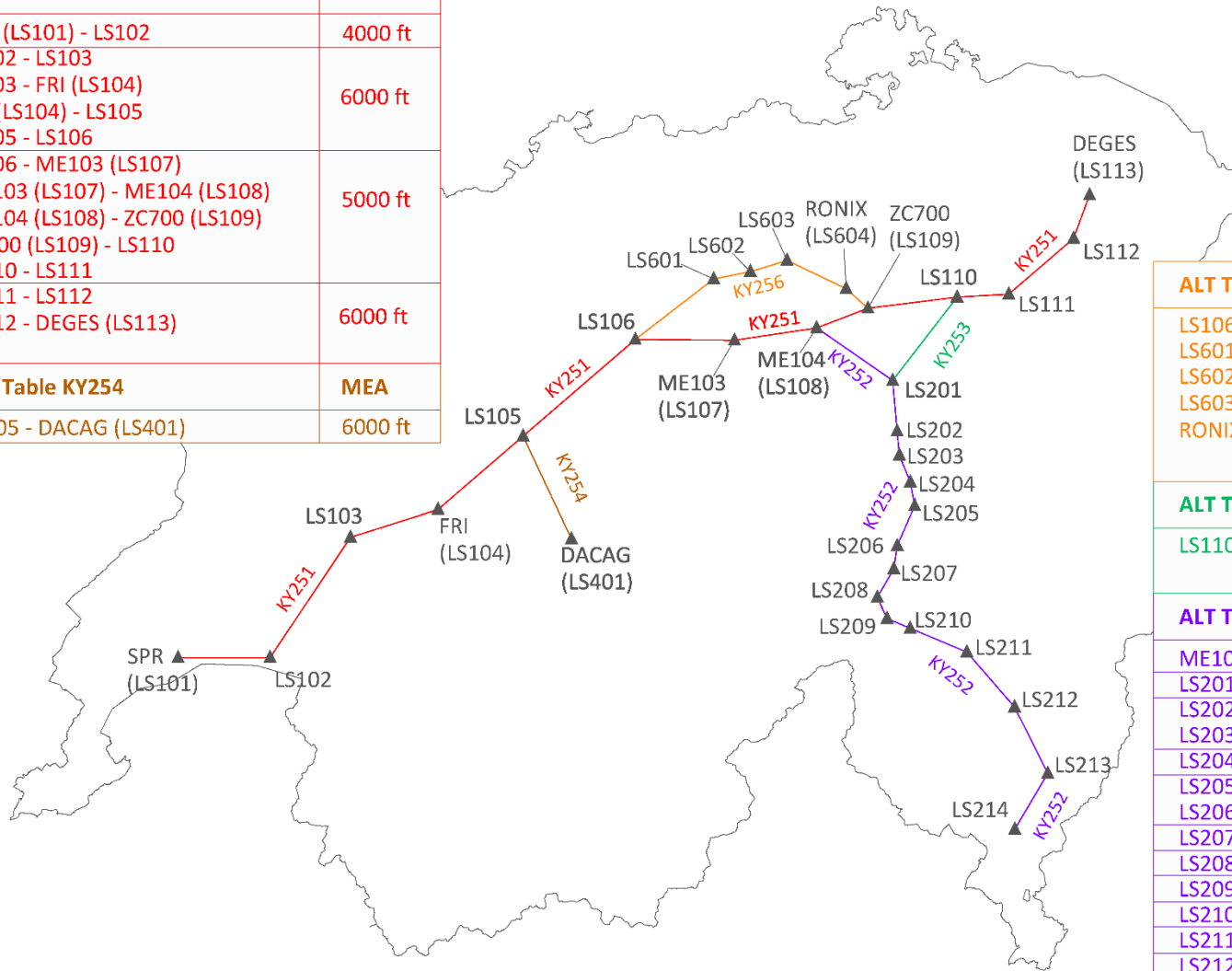
Swiss GNSS LFN (Low-Flight-Network)

Mandate from the Swiss Air Force and REGA

- › Development of low-flight route network
- › Goal is to allow helicopter flights independent of weather conditions
- › NAV SPEC: RNP 0.3
- › Users:
 - Air Force EC635 and AS332
 - HEMS AW109 DaVinci

GNSS LFN CH routes phase 1

ALT Table KY251	MEA
SPR (LS101) - LS102	4000 ft
LS102 - LS103	6000 ft
LS103 - FRI (LS104)	
FRI (LS104) - LS105	
LS105 - LS106	
LS106 - ME103 (LS107)	5000 ft
ME103 (LS107) - ME104 (LS108)	
ME104 (LS108) - ZC700 (LS109)	
ZC700 (LS109) - LS110	
LS110 - LS111	
LS111 - LS112	6000 ft
LS112 - DEGES (LS113)	
ALT Table KY254	MEA
LS105 - DACAG (LS401)	6000 ft



ALT Table KY256	MEA
LS106 - LS601	5000 ft
LS601 - LS602	
LS602 - LS603	
LS603 - RONIX (LS604)	
RONIX (LS604) - ZC700 (LS109)	
ALT Table KY253	MEA
LS110 - LS201	7000 ft
ALT Table KY252	MEA
ME104 (LS108) - LS201	6000 ft
LS201 - LS202	7000 ft
LS202 - LS203	8000 ft
LS203 - LS204	8000 ft
LS204 - LS205	9000 ft
LS205 - LS206	10000 ft
LS206 - LS207	10000 ft
LS207 - LS208	11000 ft
LS208 - LS209	12000 ft
LS209 - LS210	12000 ft
LS210 - LS211	11000 ft
LS211 - LS212	9000 ft
LS212 - LS213	7000 ft
LS213 - LS214	7000 ft

GNSS LFN Summary

- › Navigation Specification: RNP 0.3

- › Airspace: mainly E, C, D

- › Aircraft Used: Helicopter with
 - CMA-5024 GPS/SBAS receivers
 - Chelton GPS/SBAS receivers

- › Implemented: 25.06.2015 (operational trial phase)

GNSS LFN Infrastructure Requirements

7.2 IMPLEMENTATION CONSIDERATIONS

7.2.1 NAVAID infrastructure considerations

The RNP 0.3 specification is based upon GNSS; its implementation is not dependent on the availability of SBAS. DME/DME based RNAV systems will not be capable of consistently providing RNP 0.3 performance, and States should not plan on implementing RNP 0.3 operations through application of DME/DME-based navigation. States must also not use RNP 0.3 in areas of known navigation signal (GNSS) interference. Operators relying on GNSS are required to have the means to predict the availability of GNSS fault detection (e.g. ABAS RAIM) to support operations along the RNP 0.3 ATS route. The on-board RNP system, GNSS avionics, the ANSP or other entities may provide a prediction capability. The AIP should clearly indicate when prediction capability is required and acceptable means to satisfy that requirement. This prediction will not be required where the navigation equipment can make use of SBAS augmentation and the planned operation will be contained within the service volume of the SBAS signal.

Note.— Should the State permit the operator of an SBAS-equipped aircraft to disregard the requirement for a RAIM prediction when the RNP 0.3 operation occurs in an SBAS service area, then it is recommended the State consider establishing a requirement for that operator to check SBAS NOTAMS prior to the flight to ensure the availability of the SBAS SIS.

ICAO PBN manual, Part C, Chapter 7

GNSS LFN Prediction NOTAM

- › Helicopters are SBAS capable
- › SBAS performance higher than GPS/RAIM performance
- › Request to ESSP to provide RNP0.3 SBAS NOTAM proposals
- › ESSP NOTAM system ready by 25.06.2015 → greatly appreciated !!!

skyguide



Questions ?

Contact:
Marc Troller
marc.troller@skyguide.ch

