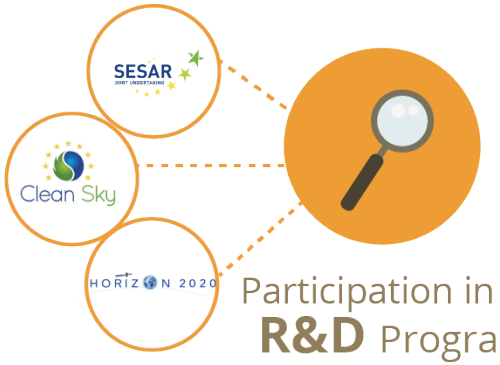
Present and "Future" implementation of Rotorcraft PBN flight procedures

santiago.soley@pildo.com
PildoLabs CEO
SOLAS Konferansen 18th Sept 2018



Participation in most
R&D Programs

Innovative
R&D
concepts

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PinS LPV
in Europe

ConOps
& Design Criteria
SNI + RNP-AR

A

Point-in-Space and Low Level Routes

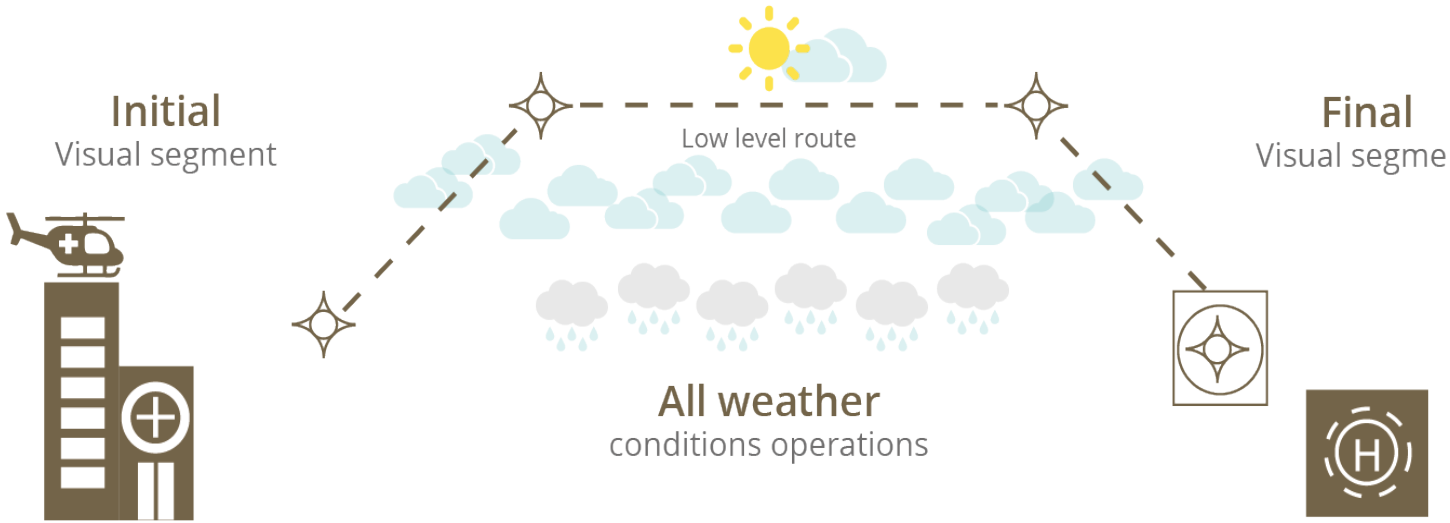
Satellite based
Navigation Services
(GPS and EGNOS)

+

Satnav
Equipped &
IFR certified

=

Point - in - Space
(**PINS**)
procedures



24/7
service

improved
safety

more
efficient

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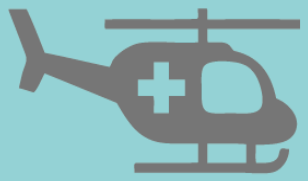
The facts



600
flights / year
cannot be performed to patients in need of urgent care

7.350.000
of profit / year
is not perceived

Many lives cannot receive appropiate help when needed

The implementation of PinS and Low Level Routes

Provides an opportunity to **improve** critical missions and services within rotorcraft industry

Most of the latest units already well equipped with **GNSS IFR (PBN)** capabilities

B Practical Implementation

NORSK LUFTAMBULANSE

rega

CHC

AIRBUS HELICOPTERS

babcock

POLIZEI

BM.I BUNDESMINISTERIUM FÜR INNERES

ÖAMTC

LOTNICZE POGOTOWIE RATUNKOWE

SLOANE HELICOPTERS

LEONARDO

FLAG

Working group for harmonisation of PinS implementation through Europe

PIONEERS

Safe and sustainable scheme on PinS ***operational implementation***

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PIONEERS

1

Approved

IFP Design Organization by UK Civil Aviation Authority

2

Platero

Cost effective

Solution to fly validate and inspect flight procedures

3

Financing model

Implementation and maintenance of procedures

4

Complete service

that covers all the different areas

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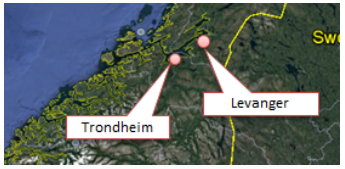
Present: First PinS LPV in Norway

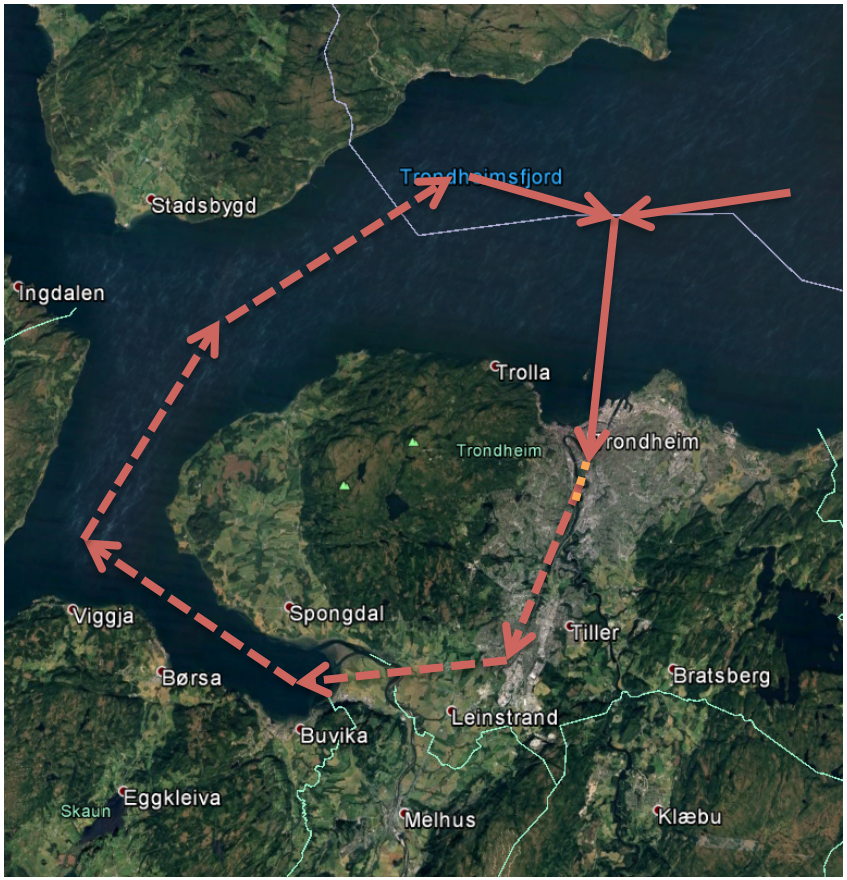
Trondheim hospital with first Helicopter LPV (SBAS) approach approved in Norway

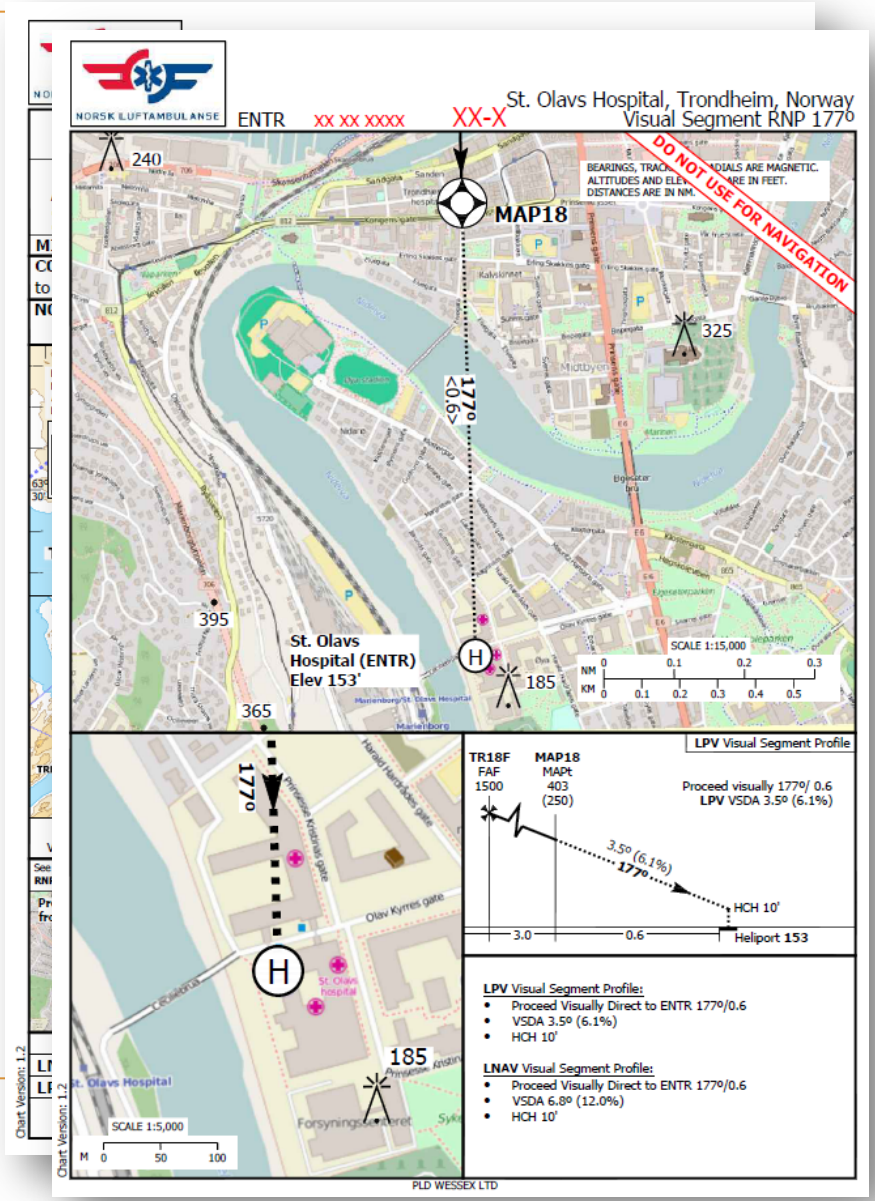
NORSK LUFTAMBULANSE

RNP0.3 Low Level Routes with Max ALT 1500'

PinS LNAV/LPV Approach







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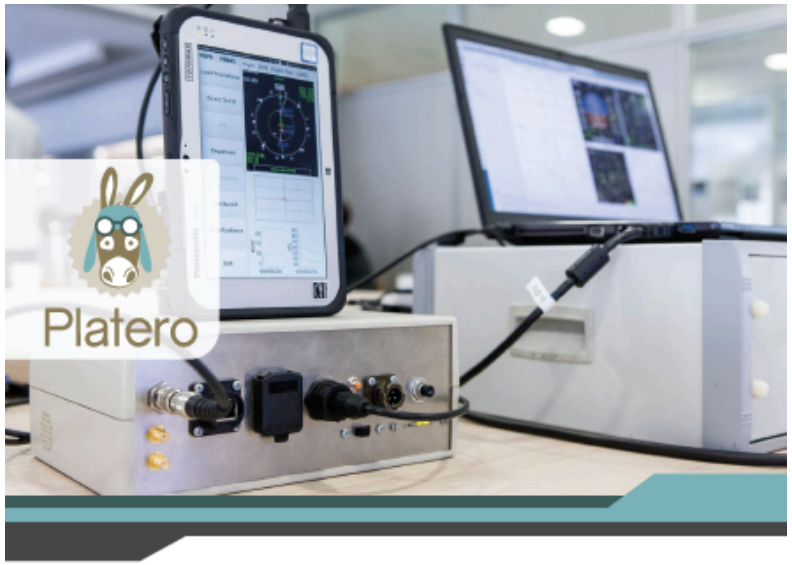
Portable Flight Validation and Inspection solution



FLIGHT VALIDATION AND
INSPECTION SYSTEM

PERFORMANCE BASED NAVIGATION (PBN)

European patent with n° 14004025 (EP3026461)

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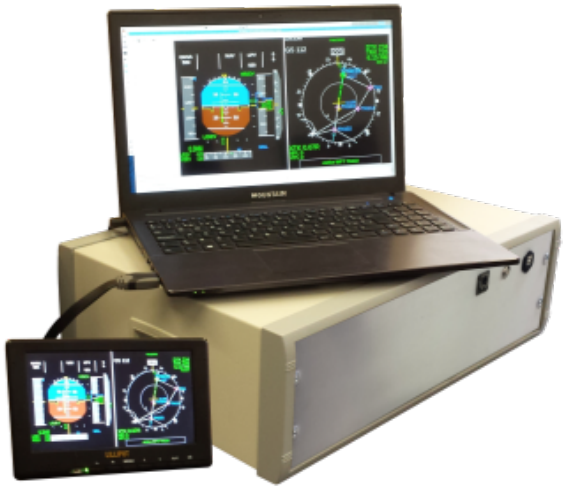
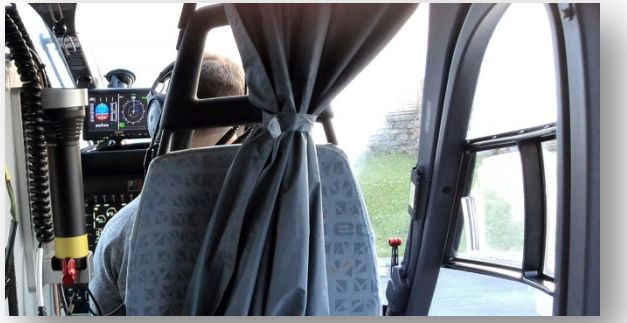
Flight Validation





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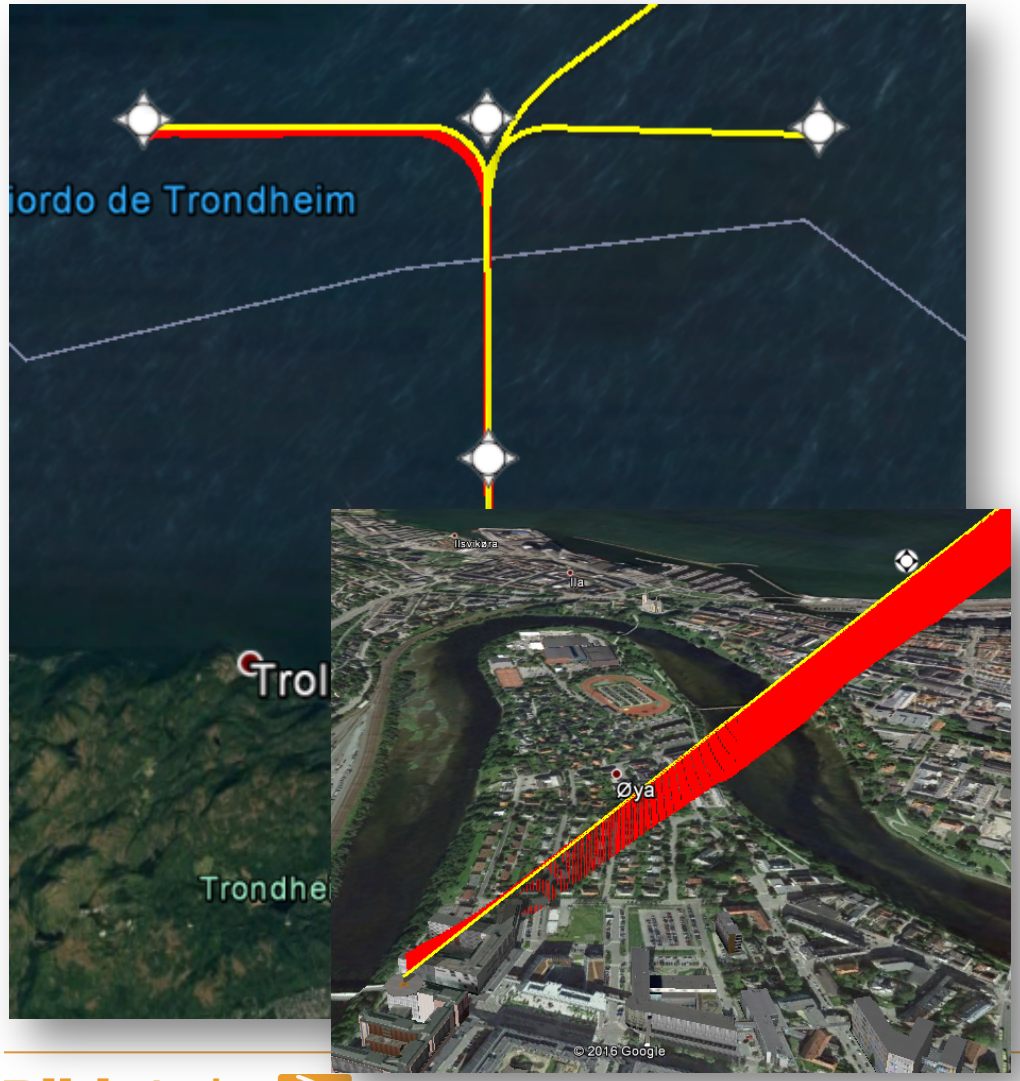
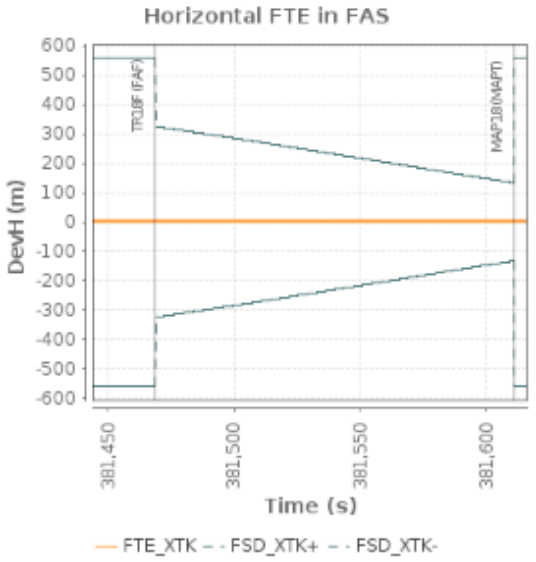
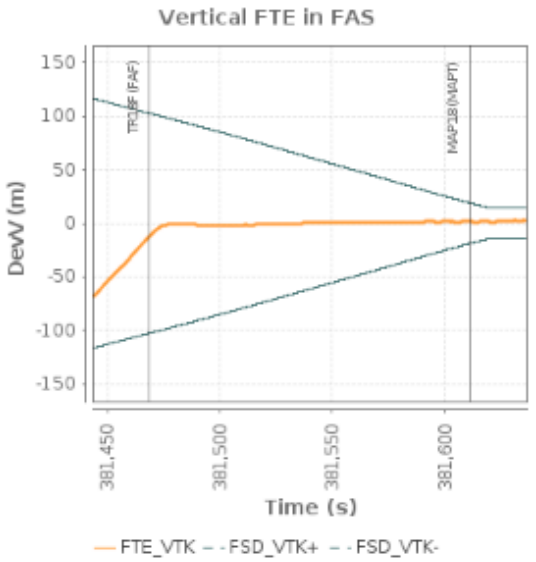
Flight Validation







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Other achievements

3 units H135 upgraded to LPV via Major Change developed by Airbus Helicopters
Norsk LuftAmbulanse obtains first operational approval for RNP 0.3

NORSK LUFTAMBULANSE

Kingdom of Norway

Specific approvals:	Yes	No	Specification	Remarks
RVSM ☐N/A	☐	☑		
ETOPS ☐N/A	☐	☑	Maximum diversion time: [ ]min	
Navigation specifications for PBN operations	☑	☐	RNAV 1 (P-RNAV) RNP APCH LNAV/VNAV RNP APCH LP/LPV RNP 0.3	All phases of flight
Minimum navigation performance specification	☐	☑		
Issue of CC attestation	☐	☑		
Continuing airworthiness	☑	☐	NO.MG.0025	
Other	☑	☐	Helicopter operations with the aid of night vision imaging systems	
Other	☐	☑	Helicopter hoist operations	
Other	☑	☐	Helicopter emergency medical service operations	

EASA

Luftfartstilsynet

Norsk Luftambulanse AS - Hovedkontor
Postboks 39
1441 DRØBAK

Saksbehandler: Ørnulf Lien
Telefon direkte: +47 97095094
Vår dato: 18.02.2016
Vår referanse: 15/05083-8

Deres dato 05.02.2016
Deres referanse: LMA

Utvidelse av spesielle godkjenninger for ytelsesbasert navigasjon (SPA.PBN) til å omfatte RNP 0,3 i alle flygefaser

Luftfartstilsynet (LT) viser til søknad 5.2.2016 med utfyllende informasjon 11.2.2016 om utvidelse av Operation Specification til også å omfatte RNP 0,3 i alle andre flygefaser enn innflyging, som selskapet allerede har godkjenninger for. Det vises også til selskapets første henvendelse i saken 30.5.2014 og diverse møter og annen kommunikasjon i saken.

I søknaden opplyser selskapet at det ønsker å utnytte eksisterende teknologi og regelverk til å implementere operative prosedyrer som bedrer tilgjengeligheten på helikoptertransport for pasientene som flys når været er under VFR minima. I områder med kupert terreng kan det være fordelaktig å benytte muligheten til å fly på ruter med en smalere korridorbredde (Semi Area Width). Det opplyses videre at det også vil være aktuelt å bruke RNP 0,3 på initial og intermediate segmenter av innflyginger. Utvidet bruk av IFR flyging er dokumentert å ha et sikkerhetsfremmende element som også vektlegges i denne prosessen.

For RNP 0,3 finnes foreløpig ikke spesifikke krav og retningslinjer i Forordning (EU) nr. 965/2012 (EASA OPS) eller AMC 20. LT har derfor besluttet å kunne legge til grunn retningslinjene i ICAO Doc 9613 Volume II Part C Chapter 7. Søknaden inneholder utfylt skjema som viser hvordan selskapet ivaretar aktuelle krav og retningslinjer. RNP 0,3 innebærer ingen store forskjell i forhold til RNP APCH som selskapet allerede har godkjenning for og forskjellene er beskrevet i prosedyrene og det er tatt inn i opplæringsprogrammet.

LT har vurdert søknaden etter bestemmelsene i EASA OPS SPA.PBN.100 og SPA.PBN.105 med tilhørende GM, ICAO Doc 9613 Volume II Part C Chapter 7 og AMC 20-26 der relevant, og finner at aktuelle krav og retningslinjer er ivaretatt.

Basert på søknaden og innsendt materiale og med hjemmel i EASA OPS SPA.PBN.100 og SPA.PBN.105 godkjenner LT søknaden på følgende vilkår:

- Godkjenningen er midlertidig i påvente av at denne spesifikasjonen inkluderes i EASA OPS, og er ingen garanti for at permanent godkjenning da vil bli gitt.
- RNP 0,3 i underveisfasen benyttes kun der det anses helt nødvendig.
- På grunn av behovet for alternativ navigasjonsdekning, benyttes godkjenningen i hovedsak i ankomst- og avgangsfasen som gir relativt kort eksponering for bortfall av GNSS.
- Bruk av godkjenningen over lengre strekninger underveis forutsetter inntil videre at værforholdene er slik at det er mulig å klatre til sikker høyde og oppnå alternativ navigasjonsdekning.

Luftfartstilsynet / Civil Aviation Authority

T: +47 75 58 50 00 | F: +47 75 58 50 05 | E: postmottak@caa.no
Postadresse: Postboks 243, 8001 BODØ
Besøksadresse: Sjøgata 45-47, 8006 BODØ
Fakturaadresse: Fakturamottak DFØ, Postboks 4104, 2307 HAMAR
fakturamottak@caa.no

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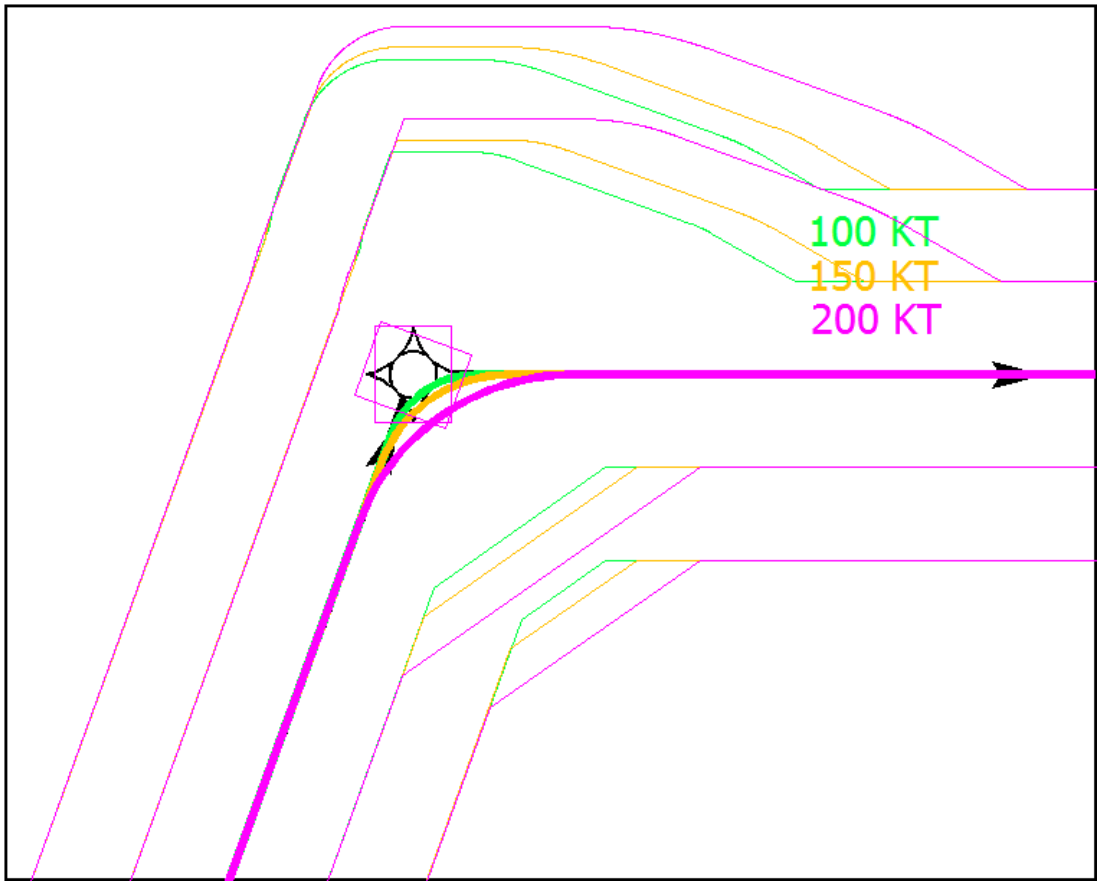
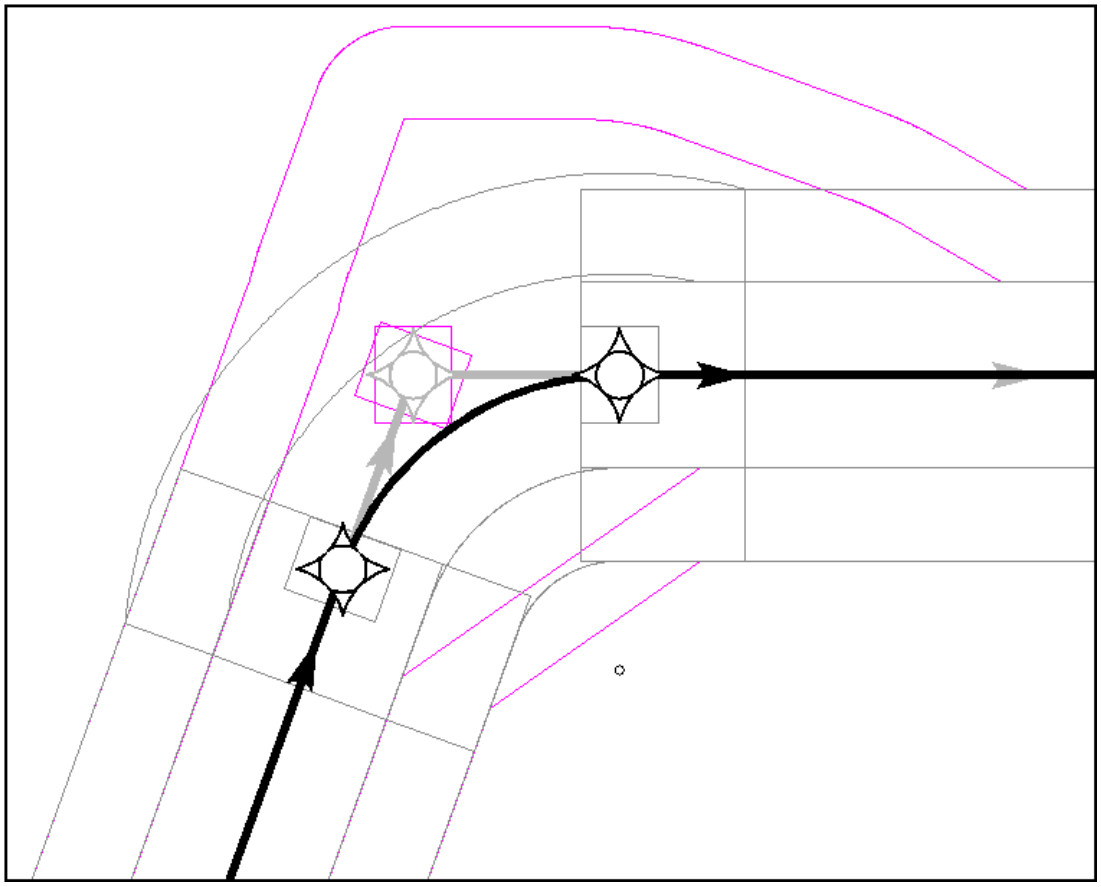
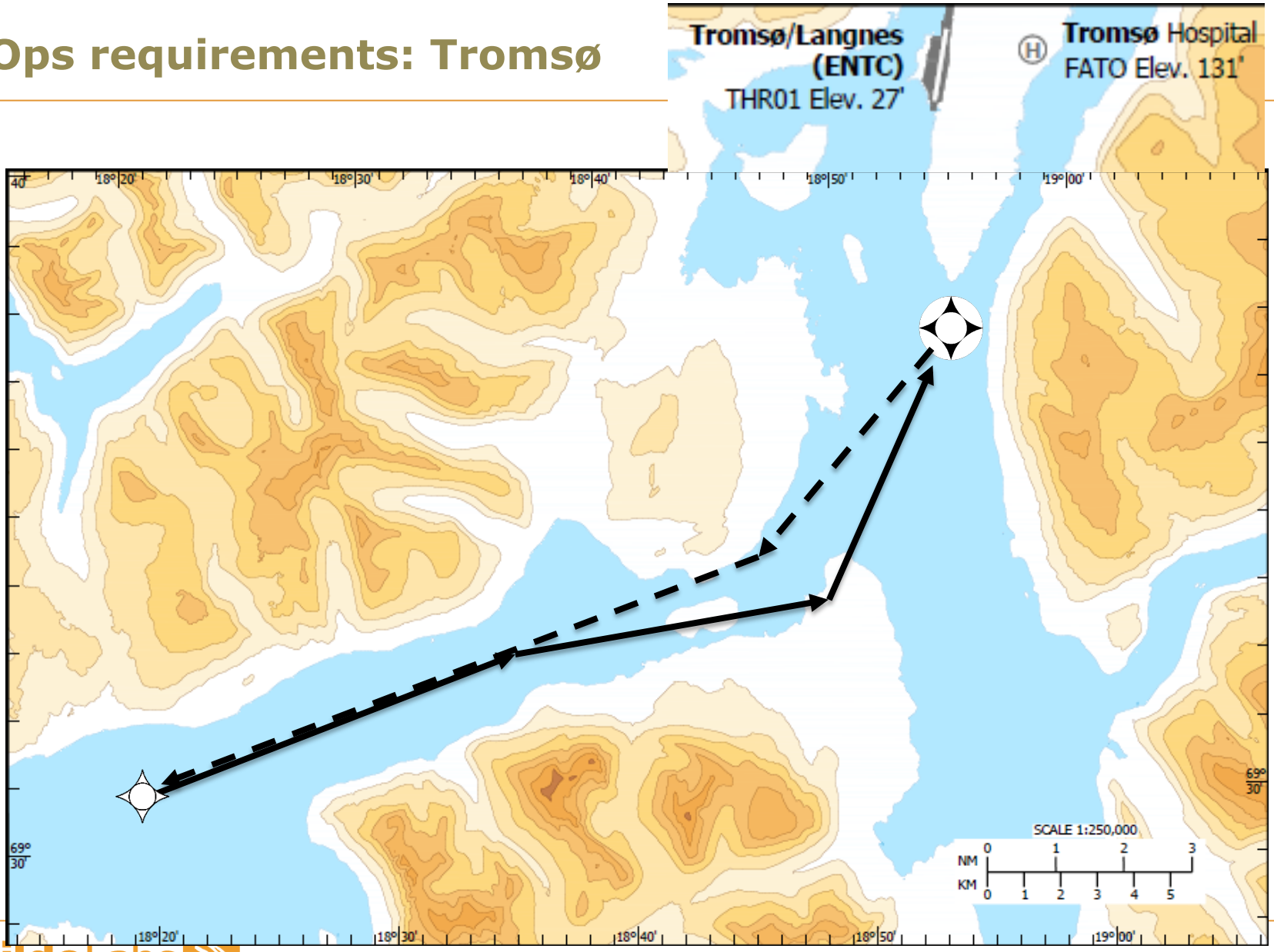
D "Future": PinS LPV with Radious to Fix Legs



Why RF legs...



Ops requirements: Tromsø



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Ops requirements… Tromsø

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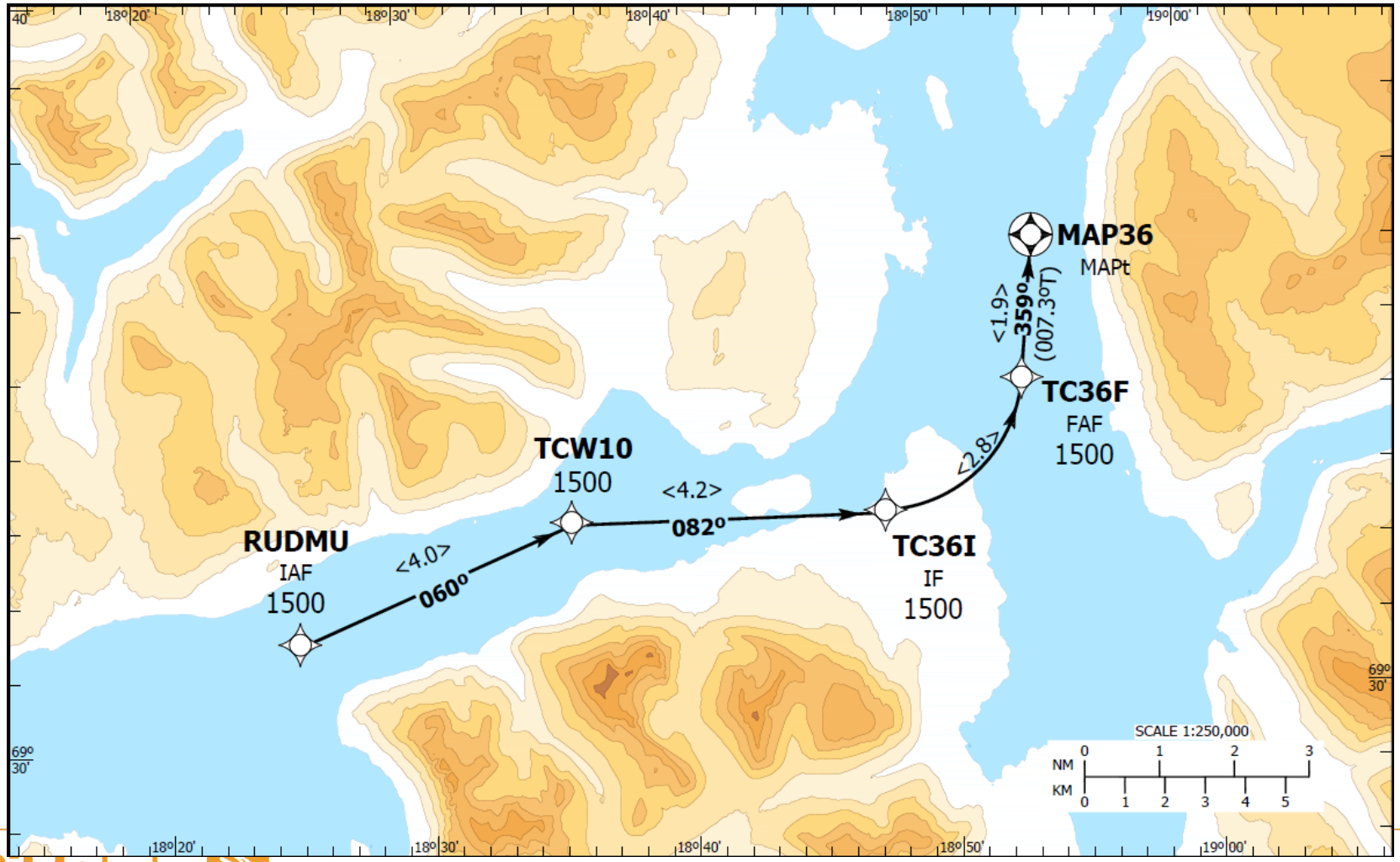
Initial Design...



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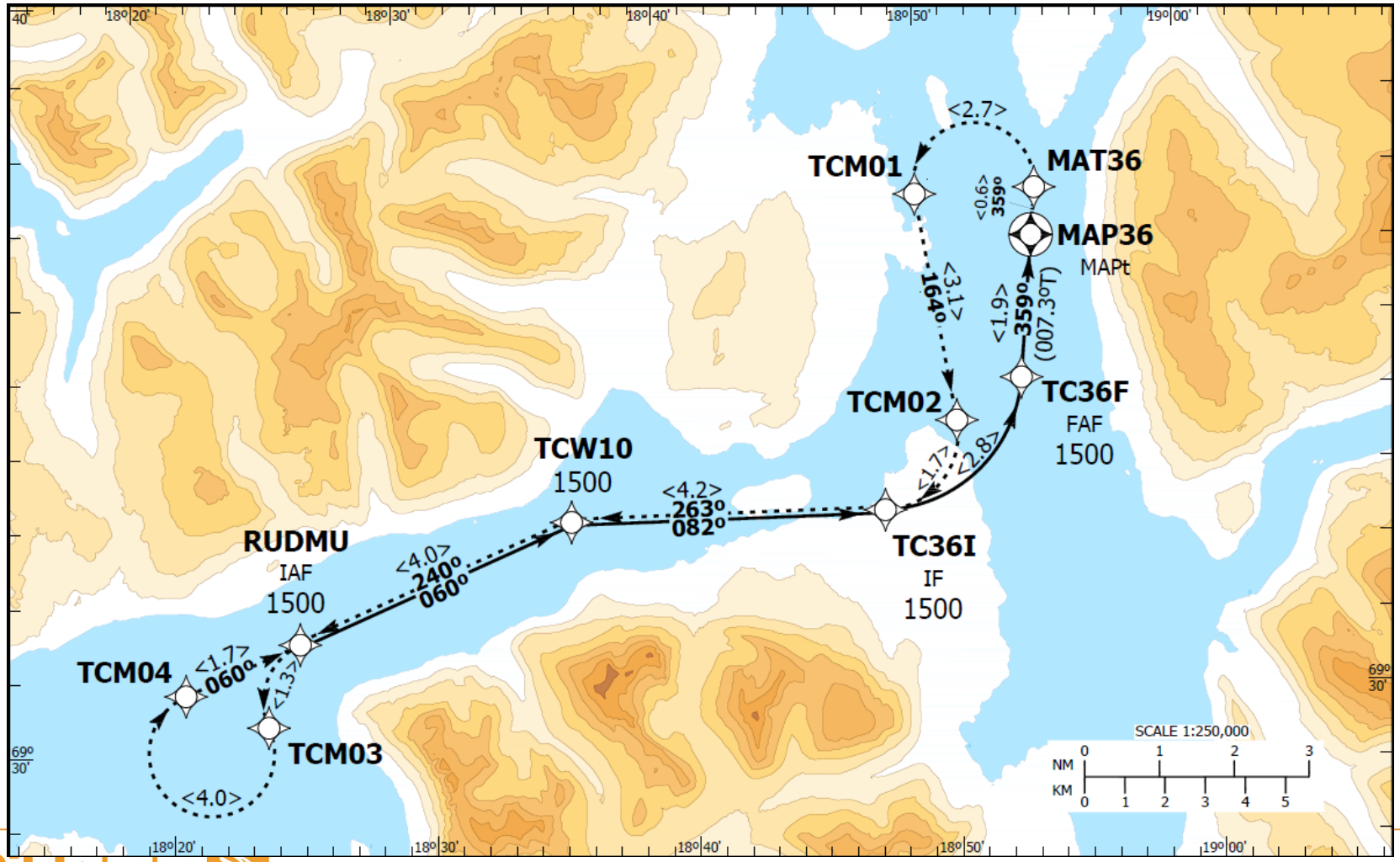
Missed Approach



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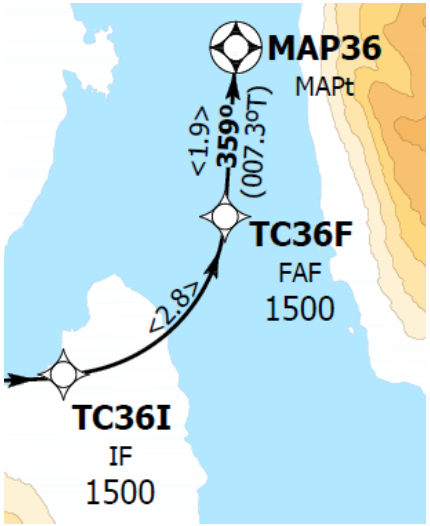
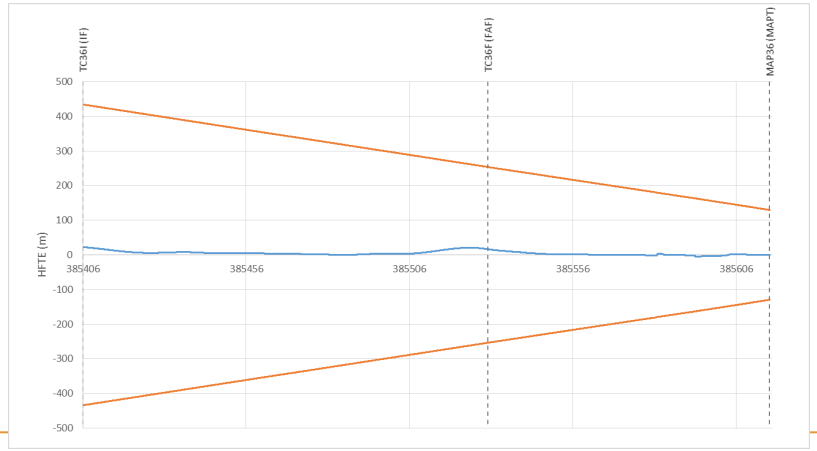
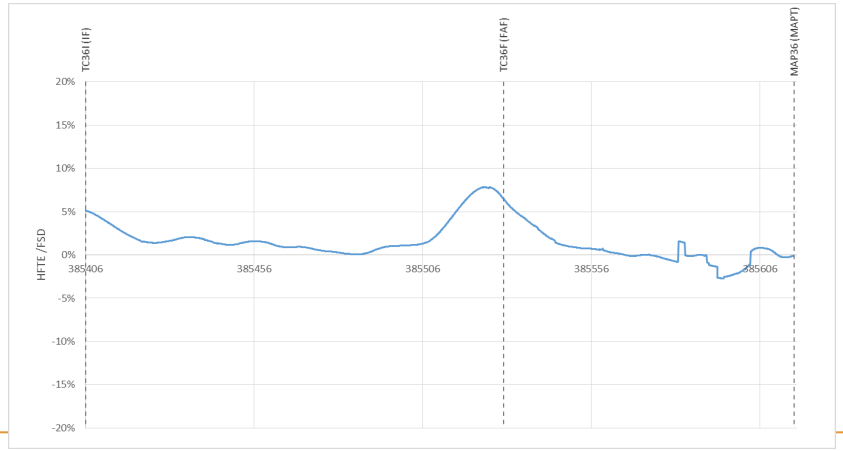
Validation: RF leg in intermediate

VIDEO







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D "Future": Other than HEMS operations

2 units S92 upgraded to LPV via STC developed by CHC including: Hardware acquisition, Installation & Certification, Crew Training, Documentation and Operational Approval

S92 equipped with dual FMS.
Credits: CHC

CHC

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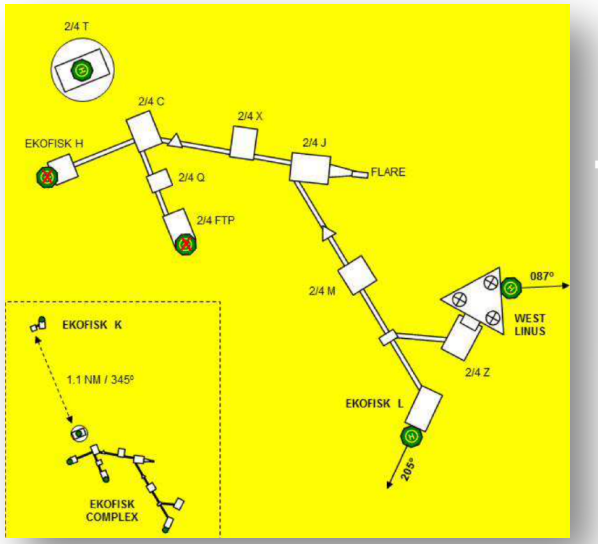
“Future”: PinS LPV at Oil Rigs

*Activities leading to the approval of a PinS LPV approach procedure to an helipad of the **Ekofisk** oil rig*



ConocoPhillips

Bristow

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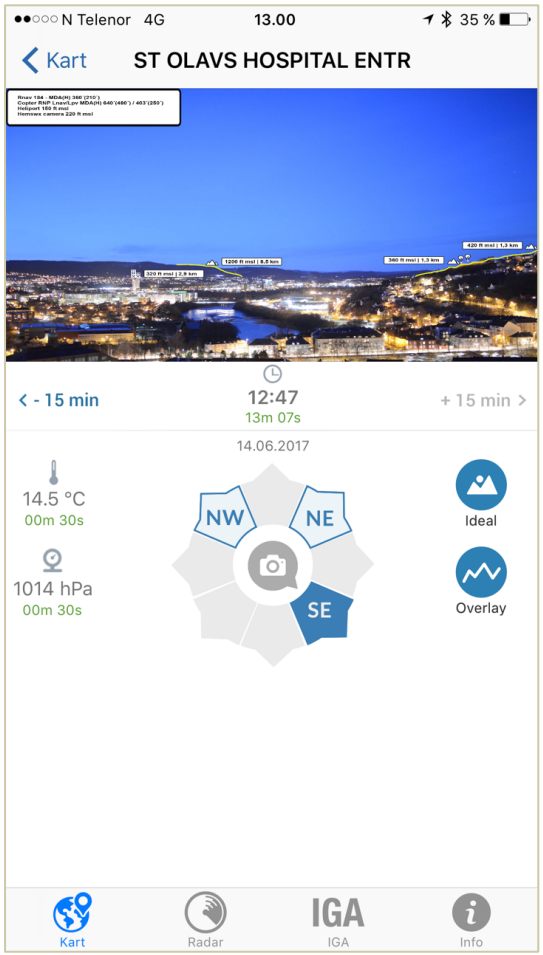
«Ice Bird» RNP<0.3
HB-ZRQ
anytime - anywhere - any weather
rega

“Future” ConOps: Information Management

Full promulgation of PBN operations in Non-Controlled Airspace

....

massive use of IT systems and services (5G IoT, web-cameras, B2B web-services and apps)



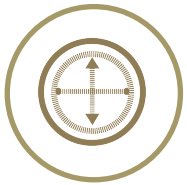
FLAG

Five Lives Advisory Group

Harmonize the implementation of rotorcraft GNSS operations at European level by establishing **coordination** between Aviation Stakeholders:

Conclusions

(1) Satellite Navigation (PinS) is an **opportunity** for rotorcraft operators



(2) Pioneers supports operational implementation avoid being tedious and costly

(3) Funding opportunities exist for early implementation towards a sustainable plan

(5) EU regulation evolving for special operations in **uncontrolled airspace** that will trigger others

(4) FLAG group promotes harmonized practices at European level

(6) Awareness to the aviation stakeholders is a key enabler for success

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The dream of yesterday is the hope of today and the reality of tomorrow

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Quote: Dr. med. Robert H. Goddard (1882-1945), American. Physicist and space pioneer