SUPPORTING
EUROPEAN
AVIATION

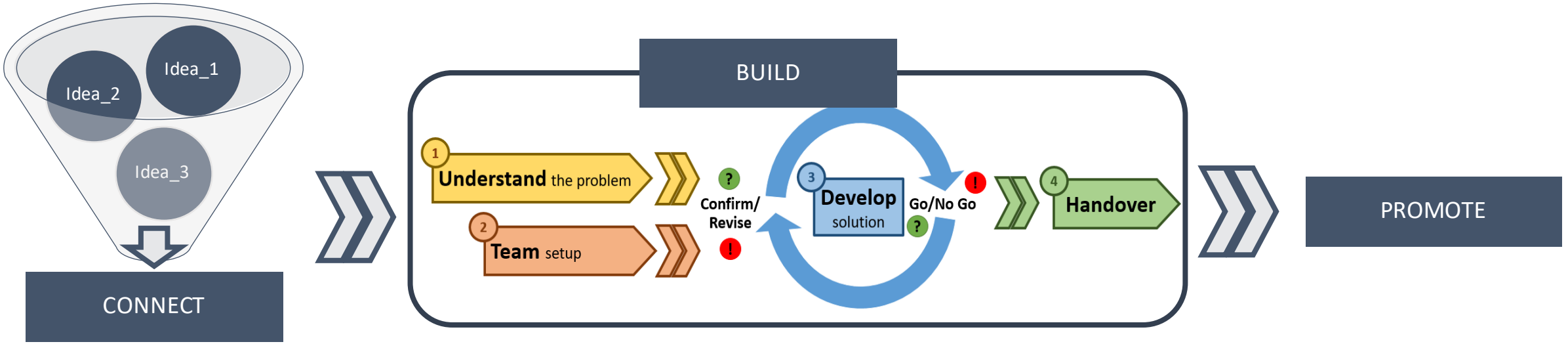
From Ideas to Ops Room

Leveraging AI R&I for Operational Benefits

Camille Anoraud and Benjamin Cramet

29 April 2024

EATIN Innovation process
users, expertise & agility



Collect & Select OPS challenges

- Open to all Member States' OPS stakeholders
- Operational pain-points
- Incremental innovation

User-driver development

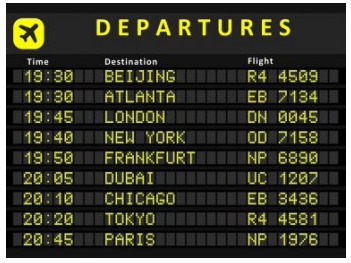
- EUROCONTROL team + OPS stakeholders
- Develop and validate prototypes addressing users' needs

Share and Handover

- Federation of results
- Handover to:
  - NM
  - Stakeholders
  - Industry

EUROCONTROL

EATIN: Stakeholders engagement since 2020 (70+ organisations)



AIRPORTS

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6 cycles:

- Oct. 2020
- March 2021 ; Oct 2021
- March 2022 ; Oct 2022
- March 2023; Oct 2023
- *April 2024; Nov 2024*

60 OPS Challenges submitted

30 Projects launched

NSAs

dgac · Civil Aviation Authority · ENAC

EUROCONTROL

CURRENT PROJECT PORTFOLIO

On-going trials

HAWAII: hazardous weather impact on airport capacity
PETA: improved ETA predictions using multiple already developed AI models
TITOP 1.0: de-icing trial in Sweden

Upcoming trials

TITOP 1.0: taxi-in/taxi-out time prediction
Runway in Use: early prediction of the RWY in use
WIND: APT WX database to support choice of new destinations

Completed trials

EDDY: early diversion detection system
READI: real-time delay info sharing
MassDiv: massive diversions

Build phase

PAXCOIN: passenger connectivity issue indicator
OPTT 2.0: improved OPTT model for CDM airports
CURDEP

Operational

FADE: forecast of ATFM delay evolution – NMP Flight
Curfew Collaborative Management: infringement prediction – NM Mirror tool
PAX Demand Prediction: prediction of passenger demand – NMOC Airport function
OPTT 1.0: prediction of turnaround times – PRG Airport

Scoping phase

TITOP 2.0: stand waiting time prediction
SOPEL: SID/STAR prediction model
ENIP: pilot app

EDDY - Early Diversion Detection System

CONTEXT

Can we anticipate the risk of diversion at the arrival airport?

PARTNERS

vueling · SWISS · SunExpress · AirEuropa · transavia · Prague Airport · Istanbul Airport · brussels airport · EBAA

SOLUTION & PERFORMANCE

Wx forecast (TAF)

Wx observations (METAR)

Machine learning

PROBABILITY OF DIVERSION FOR EACH FLIGHT

AFR1234 - 05 %
TVF3406 - 94 %
SWR108 - 53 %

90% precision

34% recall

Nov | Airline | RYR | Traffic: | Load | Entry | WEF: 06:00 | UNT: 14:00 | proposals: | Fcst: | Alg: NM | Auto Refresh: never | GO

ARCID	ATYP	ADEP	ADES	D	RM	T	IOBT	U	E/CTOT	X	S	TOBT	A/TTOT	DELAY	E/C/ATA	MPR	O	OAO	RVR	DIV	DIV NATURE
RYR2481	B738	EGSS	LRTR	>	EIEKM	E	29-05:55	AS	06:09E		I	05:55	06:07a		09:10A		N	RYR	200	68	OBSER
RYR26AF	B738	LPPR	EDDK	>	EIEGB	E	29-06:55		07:23C		I		07:18	13	09:49A	EHEHA29E	N	RYR	200	100	OBSER
RYR98	B738	EDDK	EKBI	>	9HQEP	E	29-08:30		08:52E		I		08:45		09:41A		N	MAY	200	0	OBSER
RYR98	B738	EGCC	EGCC	>	EIDWE	E	29-10:00		10:09E		I	10:00	10:12a		11:20A		N	RYR	200	86	OBSER
RYR9273	B738	EGSS	EDLV	>	EIEGA	E	29-10:30		10:41E		I	10:30	10:33a		11:25A		N	RYR	200	98	OBSER

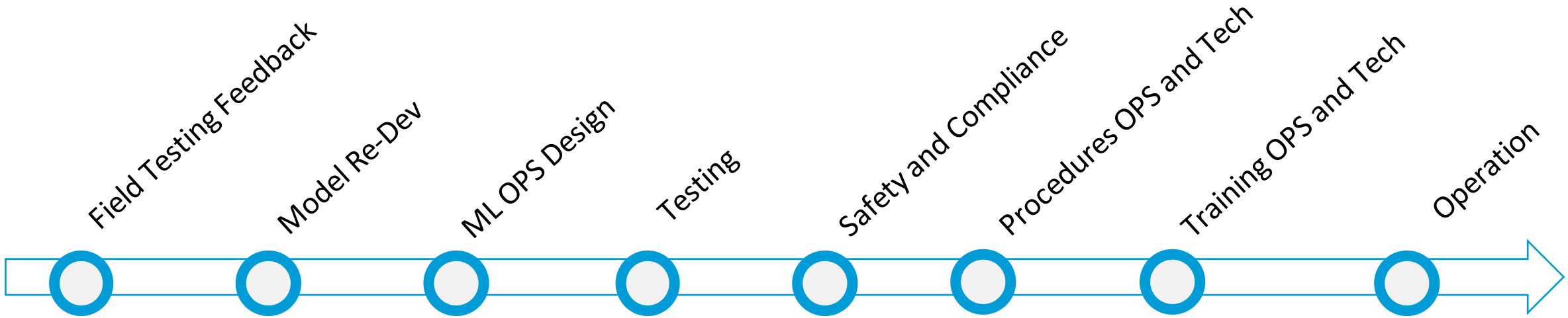
2022 | 2023 | 2024

Scope | Dataset and AI model | HMI | Live trial | Live trial extension | Deployment

June | July | Sept. | Oct. | June | Sept. | Jan.

EUROCONTROL

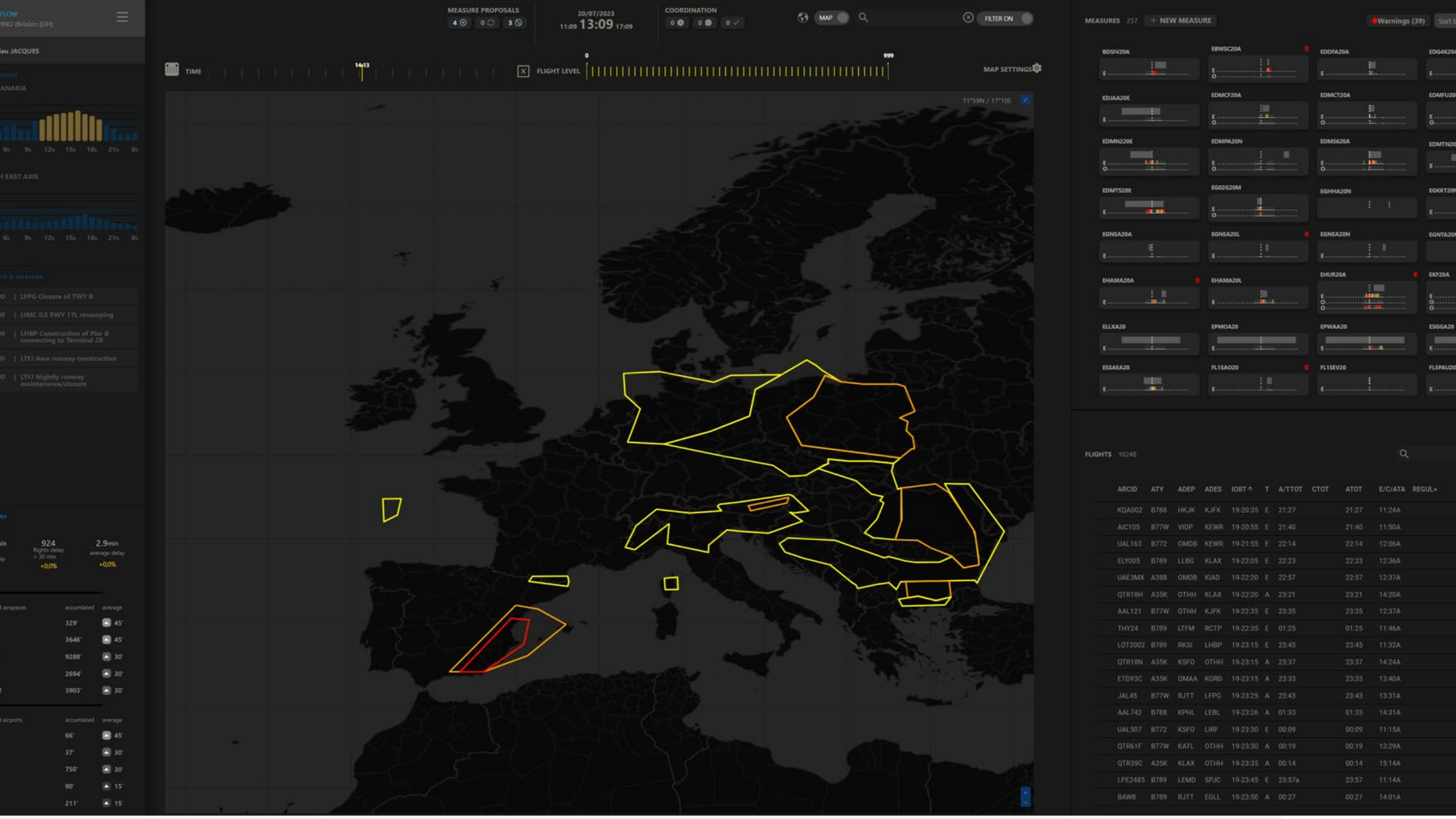
Industrialisation Pipeline



EUROCONTROL

ISOBAR
From SESAR to Operations

EUROCONTROL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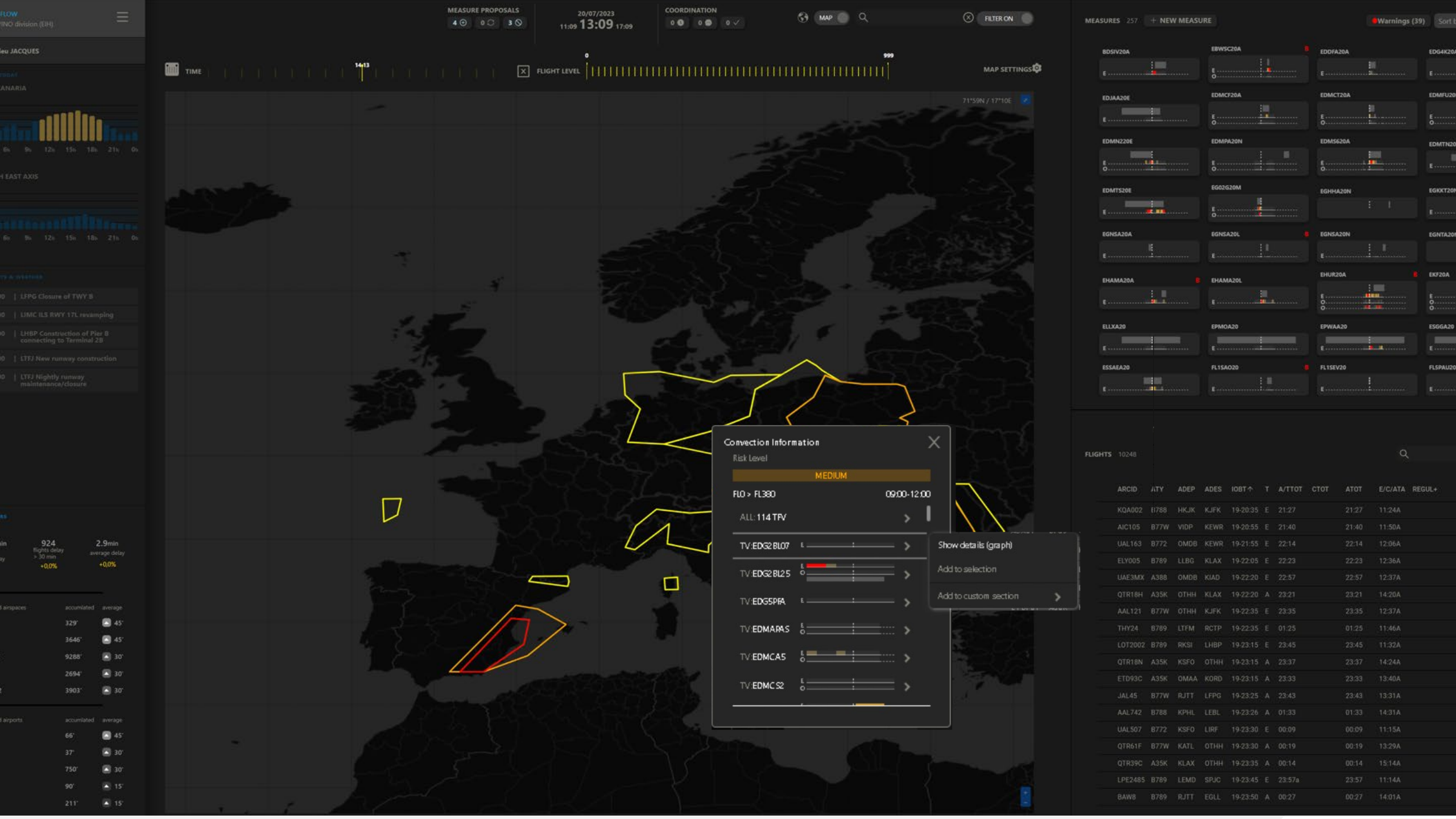
4 0 3
20/07/2023
11:09 13:09 17:09
COORDINATION
0 0 0
MAP
FILTER ON
TIME
14:13
FLIGHT LEVEL
0
999
MAP SETTINGS
71°59N / 17°10E
MEASURES 257
+ NEW MEASURE
Warnings (39)
BDSIV20A
EBWSC20A
EDDFA20A
EDJAA20E
EDMCF20A
EDMCT20A
EDMN220E
EDMPA20N
EDMS620A
EDMTS20E
EG02G20M
EGHHA20N
EGNSA20A
EGNSA20L
EGNSA20N
EHAMA20A
EHAMA20L
EHUR20A
ELLXA20
EPMOA20
EPWAA20
ESSAEA20
FL1SAO20
FL1SEV20
FLIGHTS 10248
ARCID ATY ADEP ADES IOBT T A/TTOT CTOT ATOT E/C/ATA REGUL+
KQA002 B788 HKJK KJFK 19-20:35 E 21:27 21:27 11:24A
AIC105 B77W VIDP KEWR 19-20:55 E 21:40 21:40 11:50A
UAL163 B772 OMDB KEWR 19-21:55 E 22:14 22:14 12:06A
ELY005 B789 LLBG KLAX 19-22:05 E 22:23 22:23 12:36A
UAE3MX A388 OMDB KIAD 19-22:20 E 22:57 22:57 12:37A
QTR18H A35K OTHH KLAX 19-22:20 A 23:21 23:21 14:20A
AAL121 B77W OTHH KJFK 19-22:35 E 23:35 23:35 12:37A
THY24 B789 LTFM RCTP 19-22:35 E 01:25 01:25 11:46A
LOT2002 B789 RKSI LHBP 19-23:15 E 23:45 23:45 11:32A
QTR18N A35K KSFO OTHH 19-23:15 A 23:37 23:37 14:24A
ETD93C A35K OMAA KORD 19-23:15 A 23:33 23:33 13:40A
JAL45 B77W RJTT LFPG 19-23:25 A 23:43 23:43 13:31A
AAL742 B788 KPHL LEBL 19-23:26 A 01:33 01:33 14:31A
UAL507 B772 KSFO LIRF 19-23:30 E 00:09 00:09 11:15A
QTR61F B77W KATL OTHH 19-23:30 A 00:19 00:19 13:29A
QTR39C A35K KLAX OTHH 19-23:35 A 00:14 00:14 15:14A
LPE2485 B789 LEMD SPJC 19-23:45 E 23:57a 23:57 11:14A
BAW8 B789 RJTT EGLL 19-23:50 A 00:27 00:27 14:01A
LFPG Closure of TWY B
LIMC ILS RWY 17L revamping
LHBP Construction of Pier B connecting to Terminal 2B
LTFJ New runway construction
LTFJ Nightly runway maintenance/closure
924
flights delay > 30 min
+0,0%
2.9min
average delay
+0,0%
accumulated average
329' 45'
3646' 45'
9288' 30'
2694' 30'
3903' 30'
accumulated average
66' 45'
37' 30'
750' 30'
90' 15'
211' 15'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EDMCF20A
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EDMN220E
EDMPA20N
EDMS620A
EDMTS20E
EG02G20M
EGHHA20N
EGNSA20A
EGNSA20L
EGNSA20N
EHAMA20A
EHAMA20L
EHUR20A
ELLXA20
EPMOA20
EPWAA20
ESSAEA20
FL1SAO20
FL1SEV20
Convection Information
Risk Level
MEDIUM
FL0 > FL380
09:00-12:00
ALL: 114 TFV
TV:EDG32BL07
TV:EDG32BL25
TV:EDG05PFA
TV:EDMAPAS
TV:EDMCA5
TV:EDMCS2
Show details (graph)
Add to selection
Add to custom section
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211' 15'

last update 24-07-2023 10:35
TFV - LIMANW
LIMMFMPA
Entry
Occupancy
By type
Load
Interval
20
Step
60
number of flights
40
30
20
10
0
10:00
12:00
14:00
E
Close
Show on Map
New scenario
New regulation

SUPPORTING
EUROPEAN
AVIATION

Thank you!

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