

T-Systems Airport Management,

Airfield Monitoring *with Webradar & AVD*

by Ad Wind

T Systems Let's power
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01

Airfield Monitoring:

Overview

Airfield Monitoring: Functional Overview

- WebRadar(Airport Map)
- Aerial View Display (AVD)
- AVD AICS
- Surface Usage Analytics



01

Airfield Monitoring:

Sources of Information

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Airfield Monitoring: Sources of Information

- AODB Operational Flightplan Data
- A-SMGCS (Movement Data) - MLAT, ASR & SMR. Aircraft and Vehicles
- ADS-B Movement Data. Aircraft and Vehicles
- Vaisala Weather Data
- External Sources

AIRFIELD MONITORING: SOURCES OF INFORMATION

4

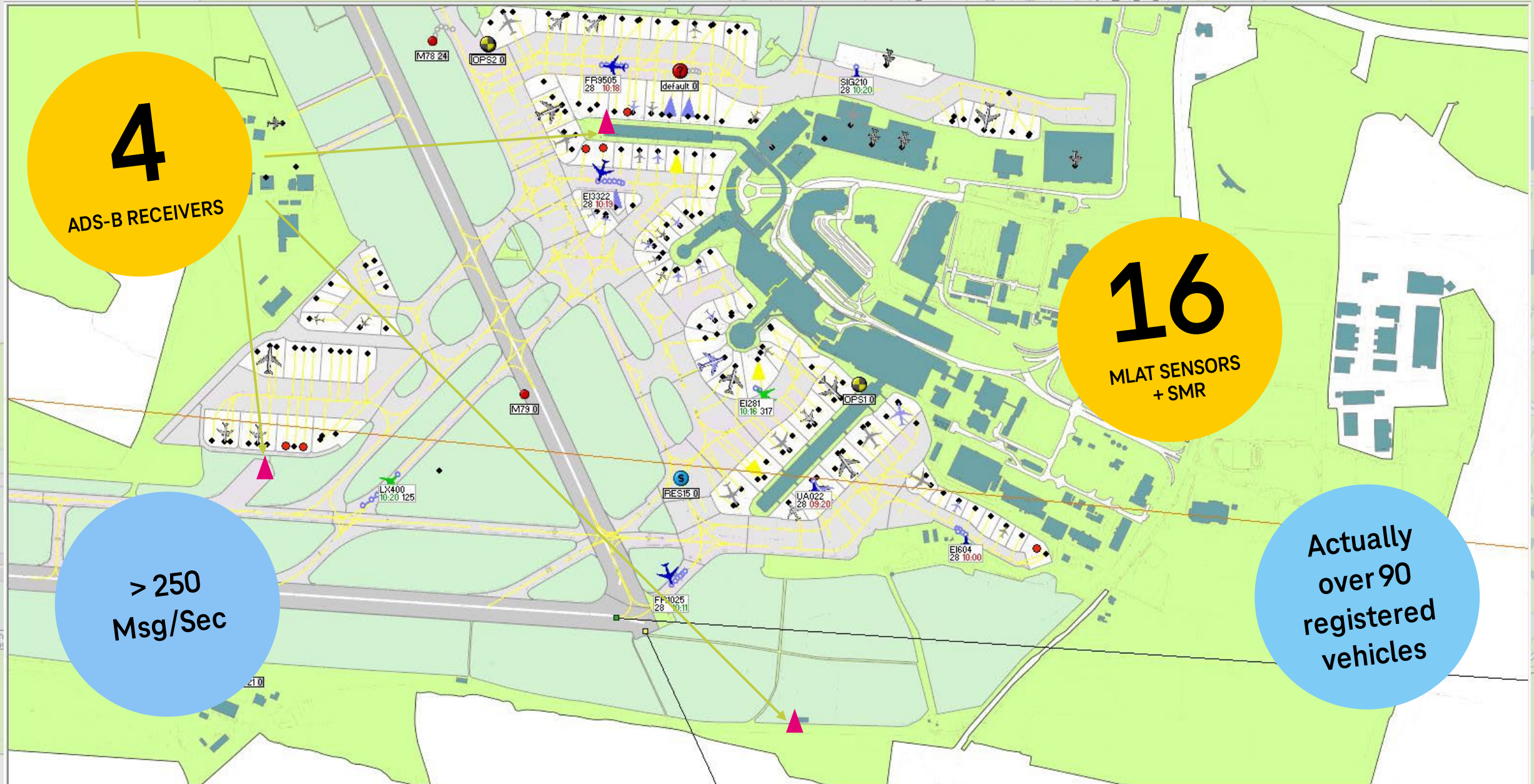
ADS-B RECEIVERS

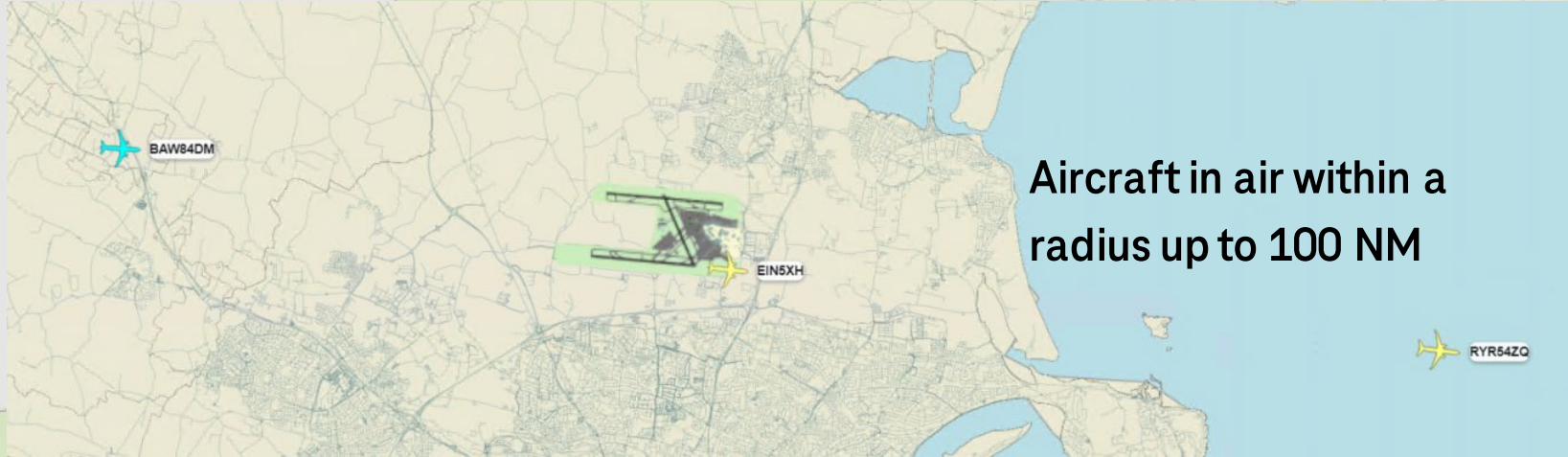
16

MLAT SENSORS
+ SMR

> 250
Msg/Sec

Actually
over 90
registered
vehicles





02

Airfield Monitoring:

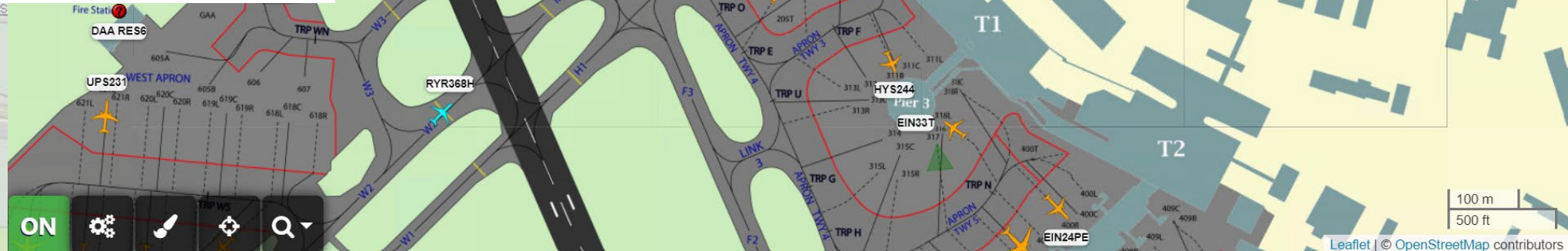
WebRadar

T Systems

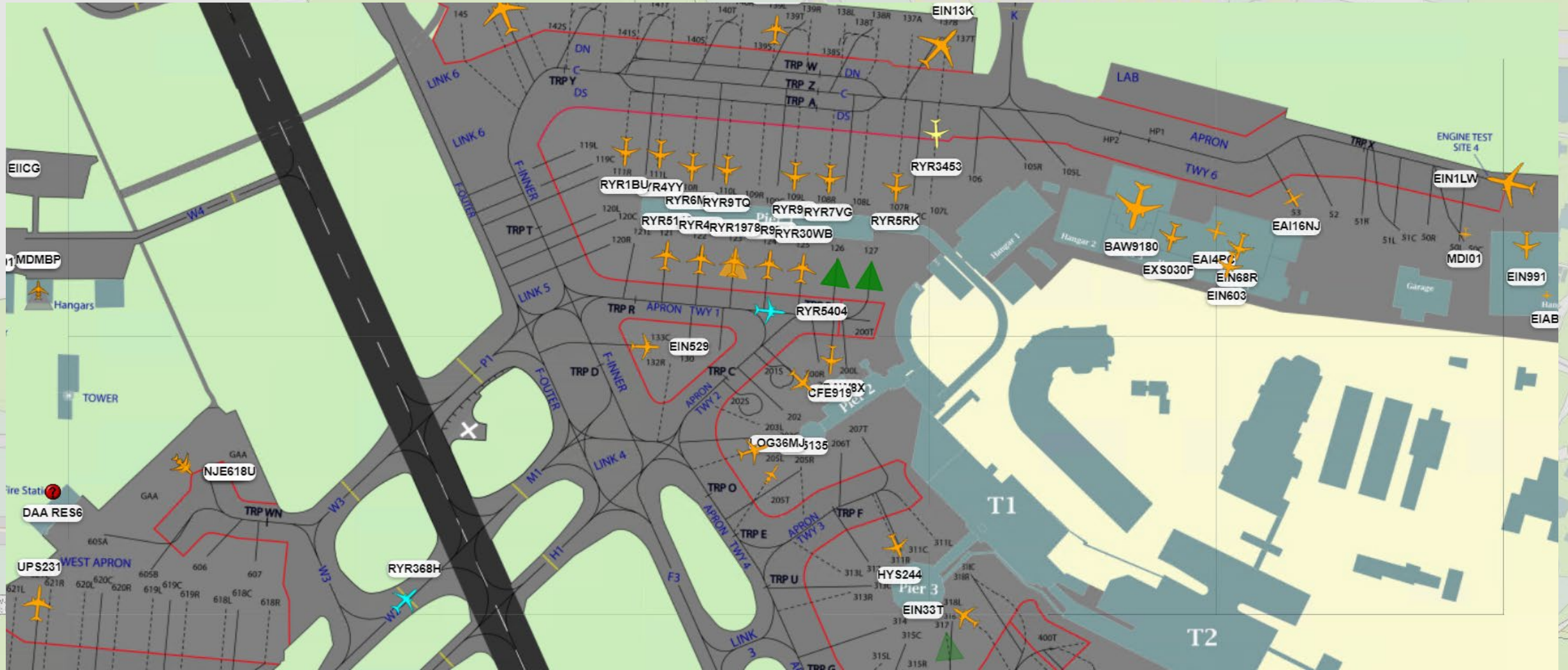
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Webradar

Introduction



Introduction



Webradar:

Airport Map

real-time visualization

state-of-the-art, web-based and cross-platform mobile application

Web application

future-proof web technologies

security features build-in

easy-to-use with an intuitive user interface (UI)

supports all browsers

Qapilar Gates 13-16

Qapilar Gates 5-6

Qapilar Gates 1-4

7-8 Qapilar Gates

Departures

18:15 Istanbul (Istanbul)

18:20 Athens

18:25 Moscow (Domodedovo)

18:30 Thessaloniki

18:35 Budapest

18:40 London

18:45 Warsaw Chopin (Warsaw)

18:50 Istanbul (Istanbul)

18:55 Vienna

19:00 Ankara

19:05 Berlin

19:10 Istanbul (Istanbul)

19:15 Paris

19:20 Rome (Fiumicino)

19:25 Athens

19:30 Moscow (Domodedovo)

19:35 Istanbul (Istanbul)

19:40 London

19:45 Warsaw Chopin (Warsaw)

19:50 Istanbul (Istanbul)

19:55 Vienna

20:00 Ankara

20:05 Berlin

20:10 Istanbul (Istanbul)

20:15 Paris

20:20 Rome (Fiumicino)

20:25 Athens

20:30 Moscow (Domodedovo)

20:35 Istanbul (Istanbul)

20:40 London

20:45 Warsaw Chopin (Warsaw)

20:50 Istanbul (Istanbul)

20:55 Vienna

21:00 Ankara

21:05 Berlin

21:10 Istanbul (Istanbul)

21:15 Paris

21:20 Rome (Fiumicino)

21:25 Athens

21:30 Moscow (Domodedovo)

21:35 Istanbul (Istanbul)

21:40 London

21:45 Warsaw Chopin (Warsaw)

21:50 Istanbul (Istanbul)

21:55 Vienna

22:00 Ankara

22:05 Berlin

22:10 Istanbul (Istanbul)

22:15 Paris

22:20 Rome (Fiumicino)

22:25 Athens

22:30 Moscow (Domodedovo)

22:35 Istanbul (Istanbul)

22:40 London

22:45 Warsaw Chopin (Warsaw)

22:50 Istanbul (Istanbul)

22:55 Vienna

23:00 Ankara

23:05 Berlin

23:10 Istanbul (Istanbul)

23:15 Paris

23:20 Rome (Fiumicino)

23:25 Athens

23:30 Moscow (Domodedovo)

23:35 Istanbul (Istanbul)

23:40 London

23:45 Warsaw Chopin (Warsaw)

23:50 Istanbul (Istanbul)

23:55 Vienna

00:00 Ankara

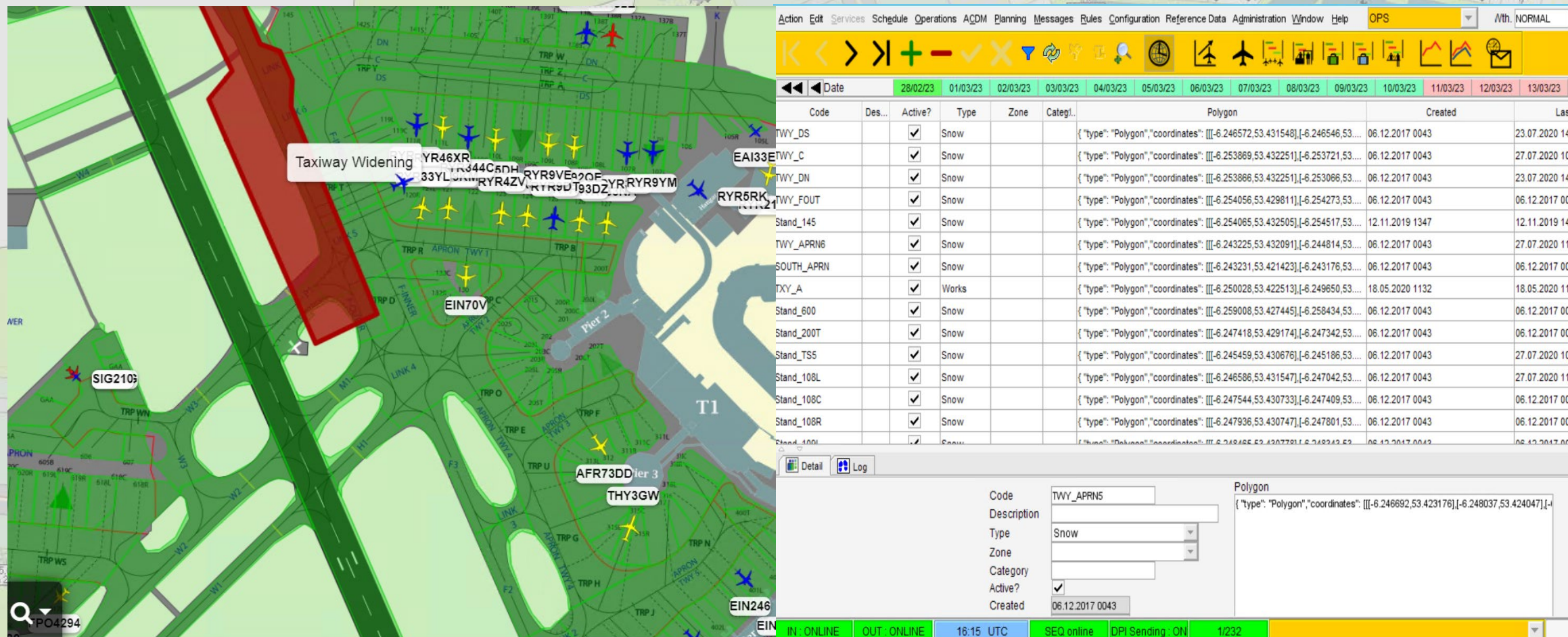
00:05 Berlin

00:10 Istanbul (Istanbul)

00:15 Paris

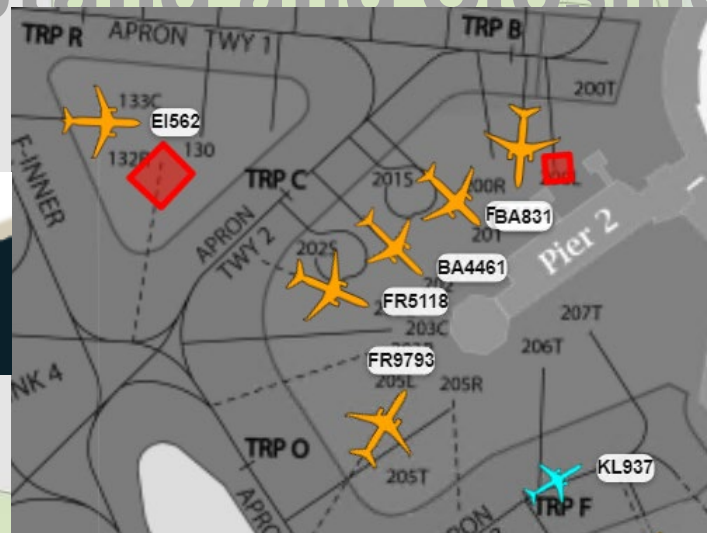
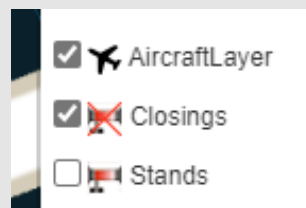
Operational Status Layer

Definition of Polygons in AODB for the Visualization of Snow / Construction Layers in Webradar



WebRadar

Aircraft, Stand and Closings Layer



Action Edit Services Schedule Operations ACDM Planning Messages Rules Configuration Reference Data Administration Window Help OPS With NORMA

< < > > + - ✓ ✗ 🔍 🔄 📅 📊 📈 📉 📧

Date: 28/02/23 01/03/23 02/03/23 03/03/23 04/03/23 05/03/23 06/03/23 07/03/23 08/03/23 09/03/23 10/03/23 11/03/23 12/03/23 13/03/23

Stands Baggage Bays Gates Desks Departure Belts Airbridges

Name	Valid From	Valid To	Start actual	End actual	GPU Inop?	Reason	Reason only?
406A	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
406B	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
406C	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
407C	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
407L	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
407R	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
411C	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
411L	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
411R	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
412	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
413	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒
414	09/12/22 2300	10/12/22 0400			☐	NASAH survey: Aircraft early to bed. ...	☒

Detail Log

Name: 407R
 Valid From: 09/12/22 2300

IN : ONLINE OUT : ONLINE 16:57 UTC SEQ online DPI Sending : ON 5/2.172

- AircraftLayer
Display of Aircrafts
- Stands
Display of Aircraft Stand Reference Information
- Closings
Display of Stand Closings which are displayed as red area at the Stand

Webradar - User Groups:

Airside Operations

Airside Duty Management

Airport Operations (Control) Center (AOCC/APOC)

Airport employees, ground handling, police, hub-airlines

Airside Operations

Ground Handling

Operations Center

Winter Operations

Management Tool

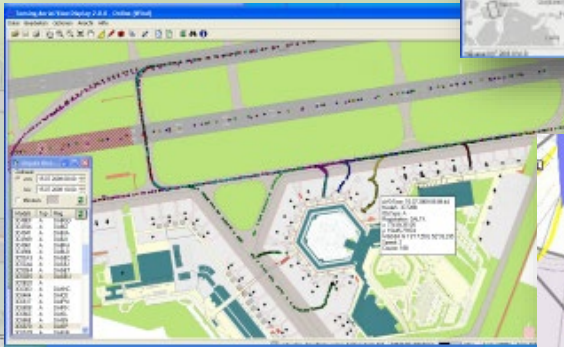
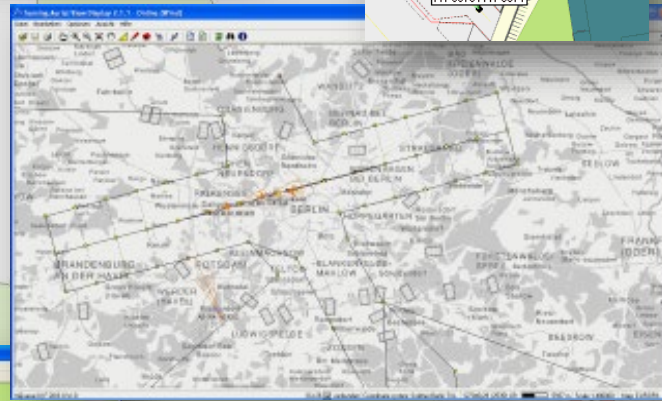
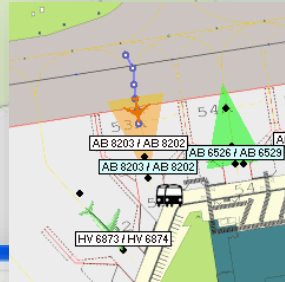
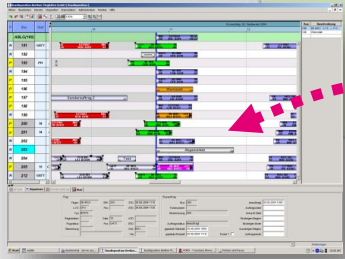
03

Airfield Monitoring:

Aerial View Display (AVD)

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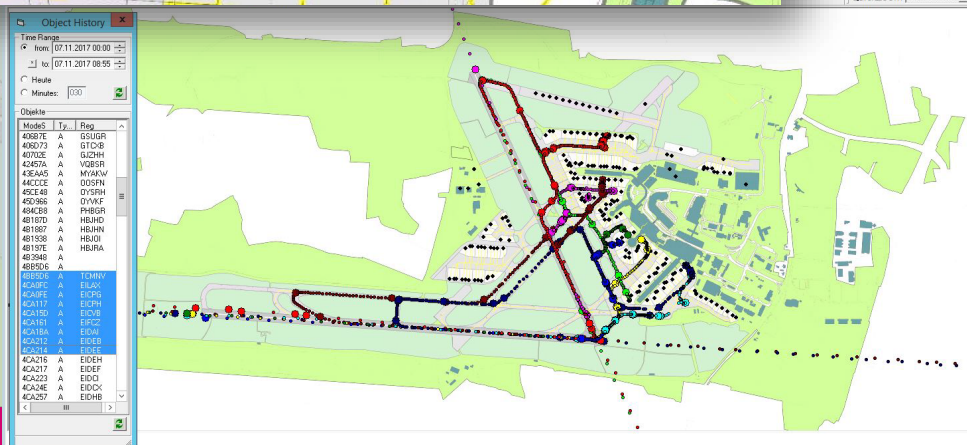
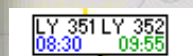
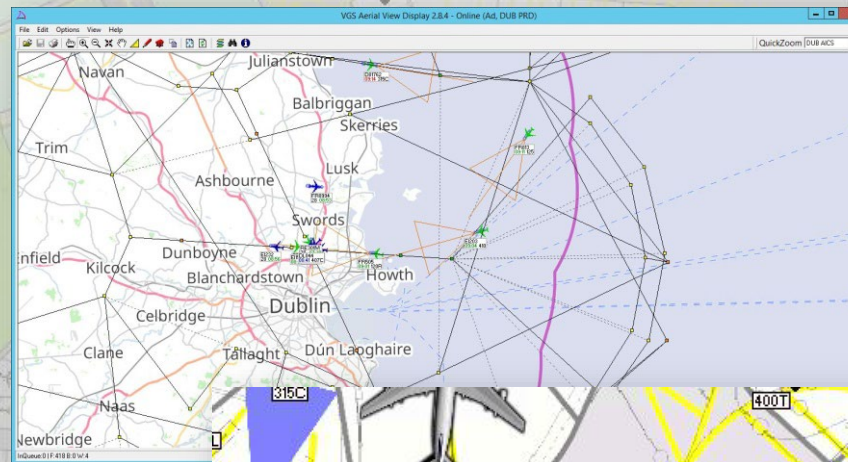
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Aerial View Display (AVD)

- Visual Flight Plan Status
- Common Situational Awareness
- Early Warning
- Preview on Resource Usage
- Post Incident Analysis and Playback Facilities
- Movement Geo-Event Data Collecting and Analysis
- Proof of Service
- Management Tool

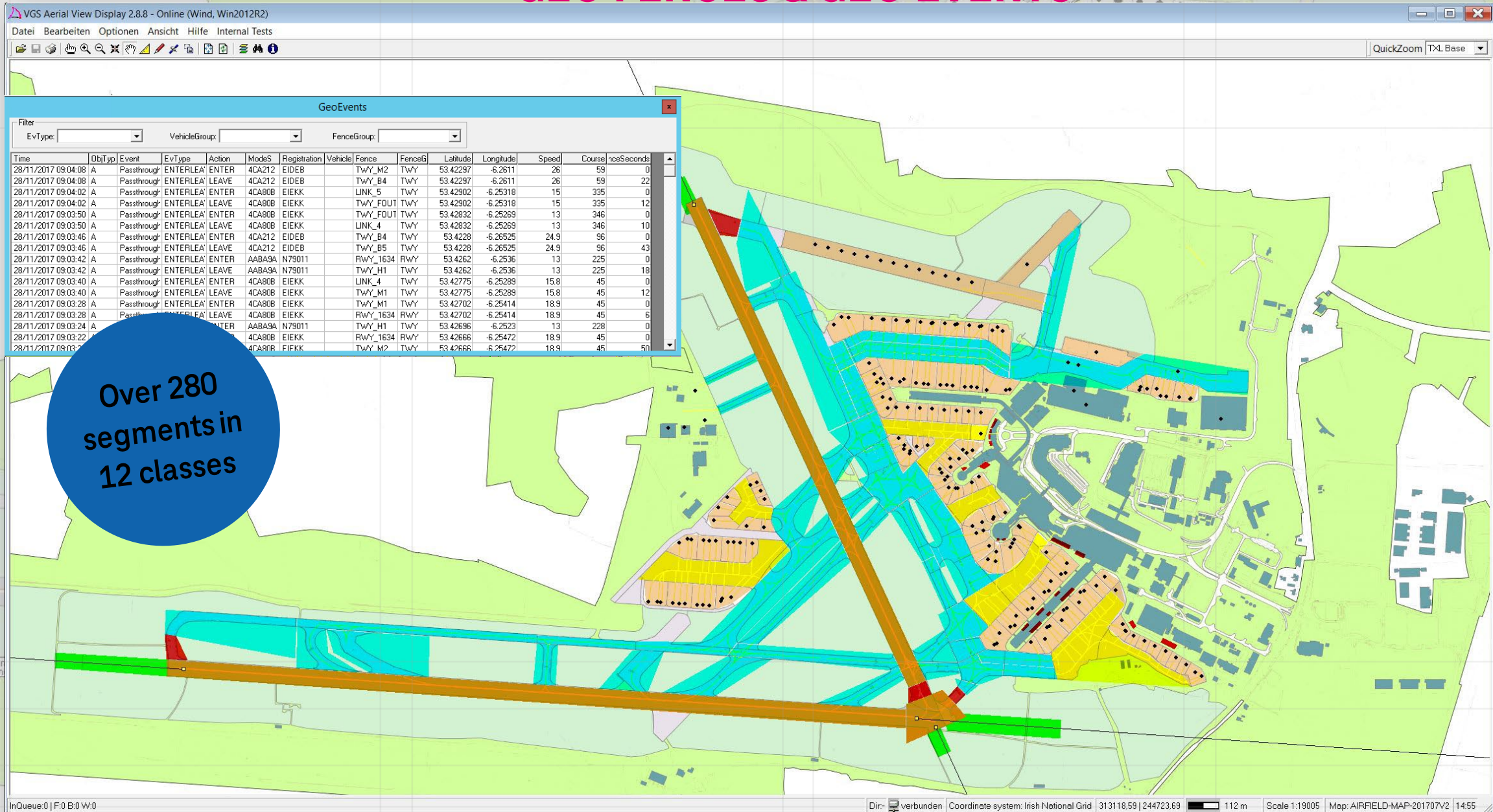
RWY 16 34 9.3°C
Wind: 2.3kmh 315°



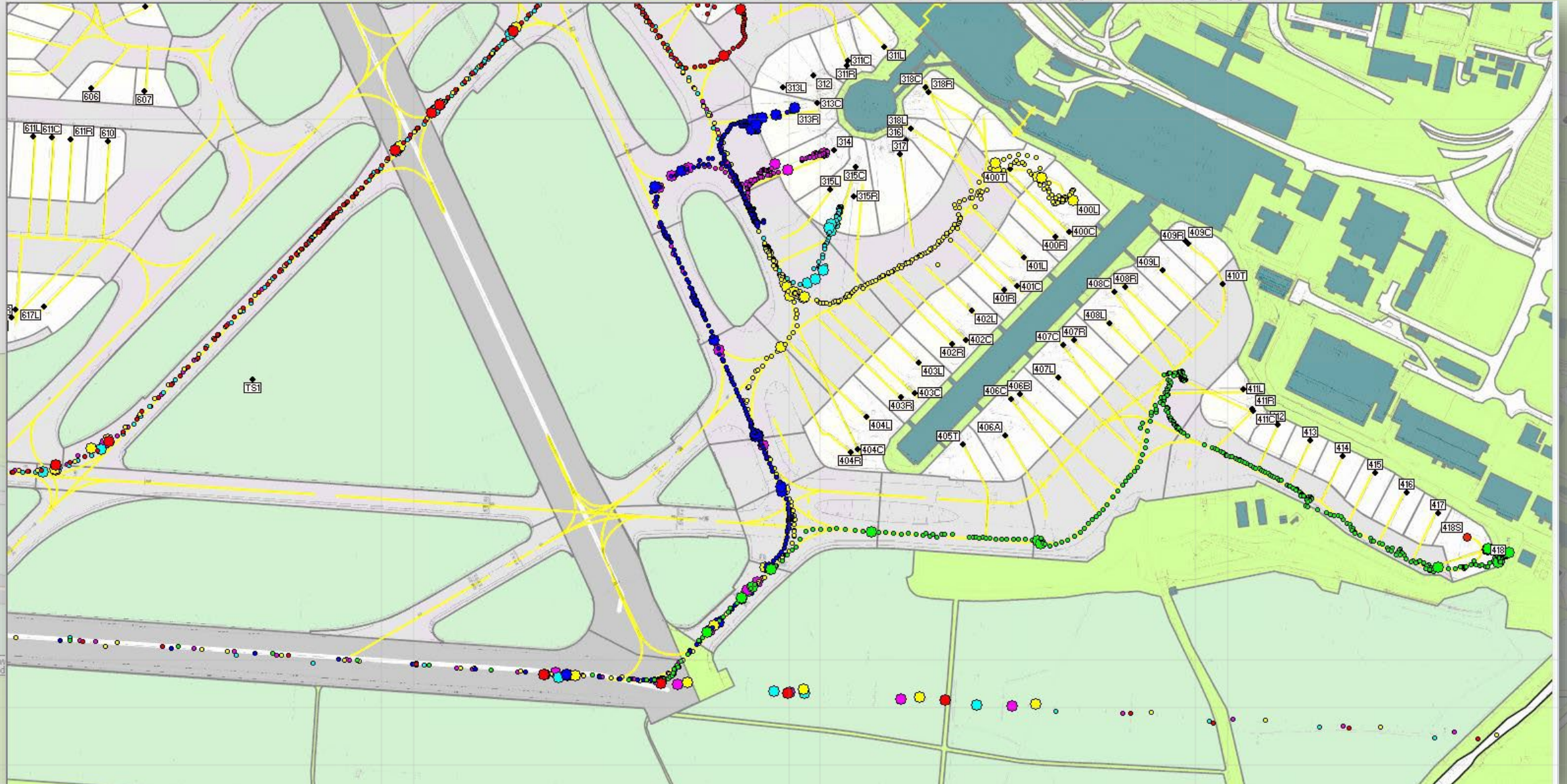
T Systems

Runway 28 11.4°C
Wind: 2kmh 226°

GEO-FENCES & GEO-EVENTS



OBJECT HISTORY: AIRCRAFT



04

Airfield Monitoring:

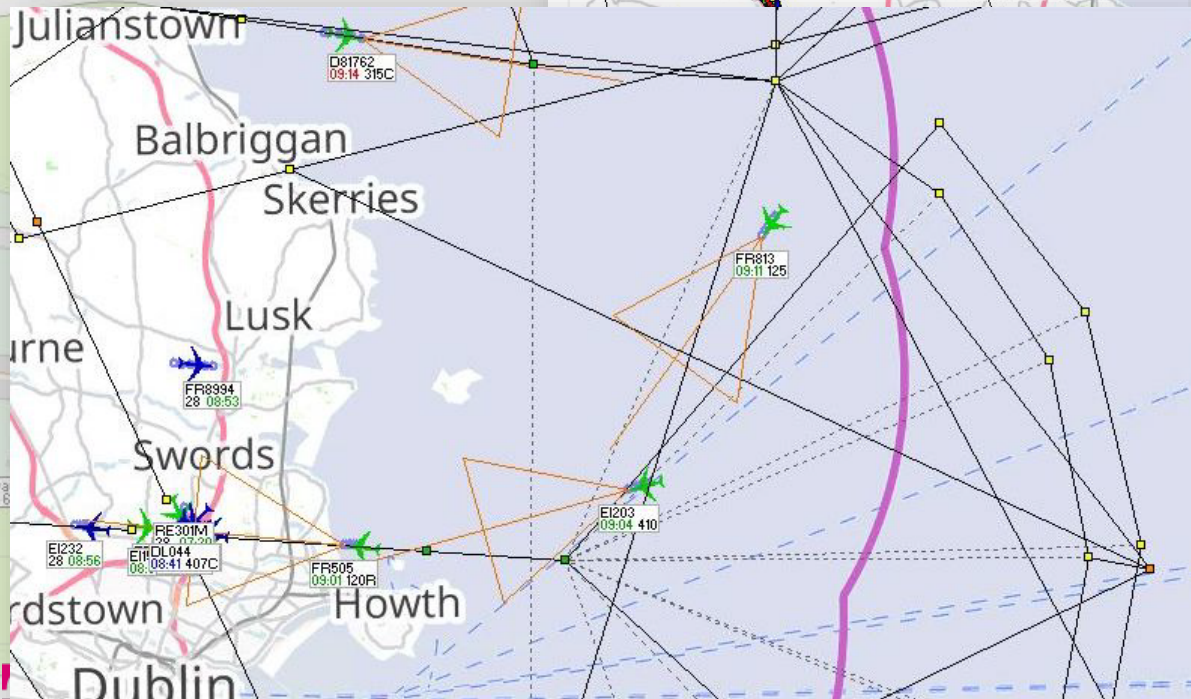
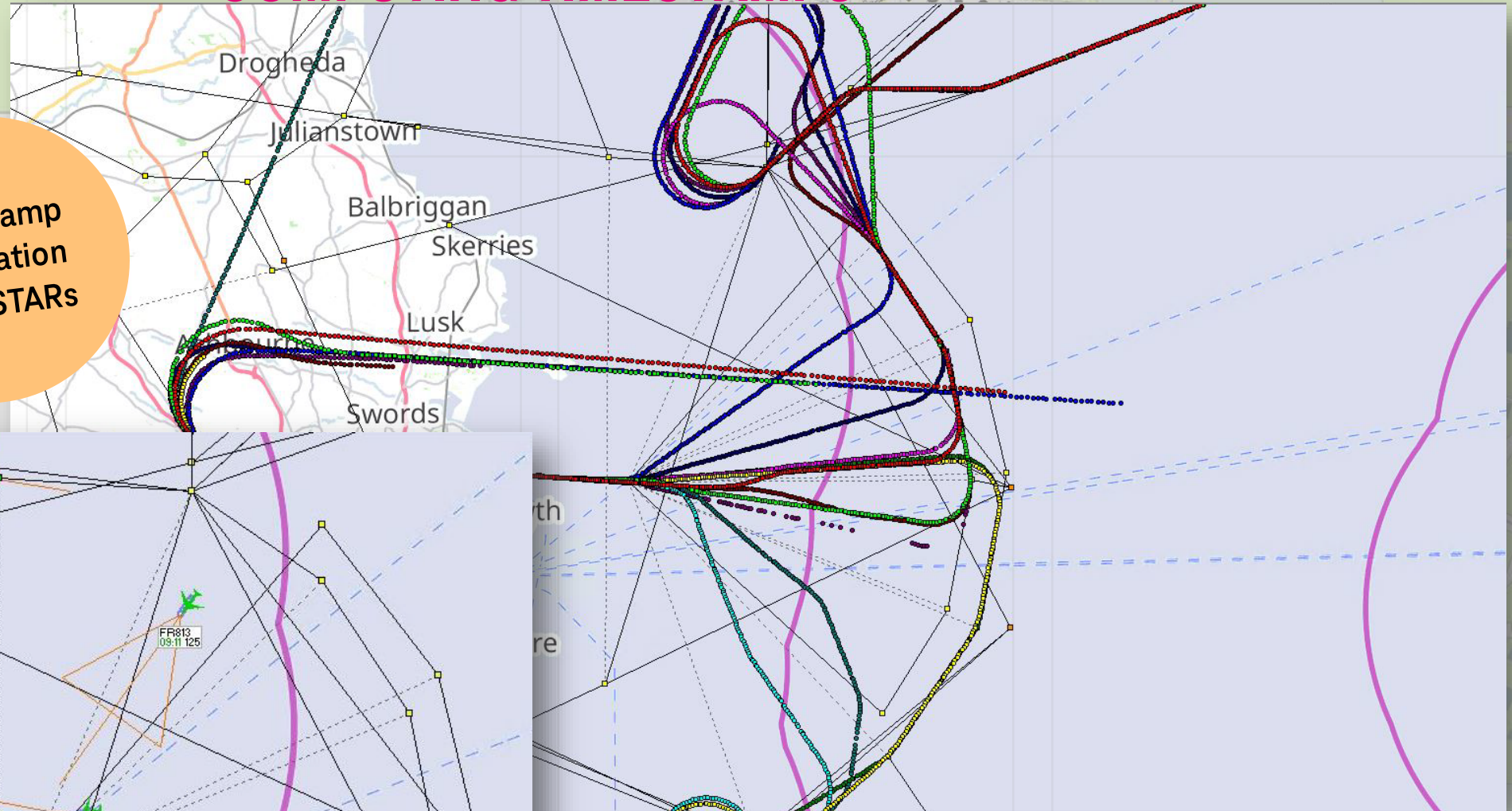
AVD AICS

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COMPUTING TIMESTAMPS

Timestamp
Calculation
using STARS



Computing Timestamps:

DAA: DUB / ORK

- FIRT
- FNLT
- ELDT
- ALDT
- AIBT
- AOBT
- ATOT
- Go Around detection

05

Surface Usage Analytics: Collecting Movement Data & Geo-Events

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GEO-FENCES & GEO-EVENTS

GeoEvents

Filter

EvType:

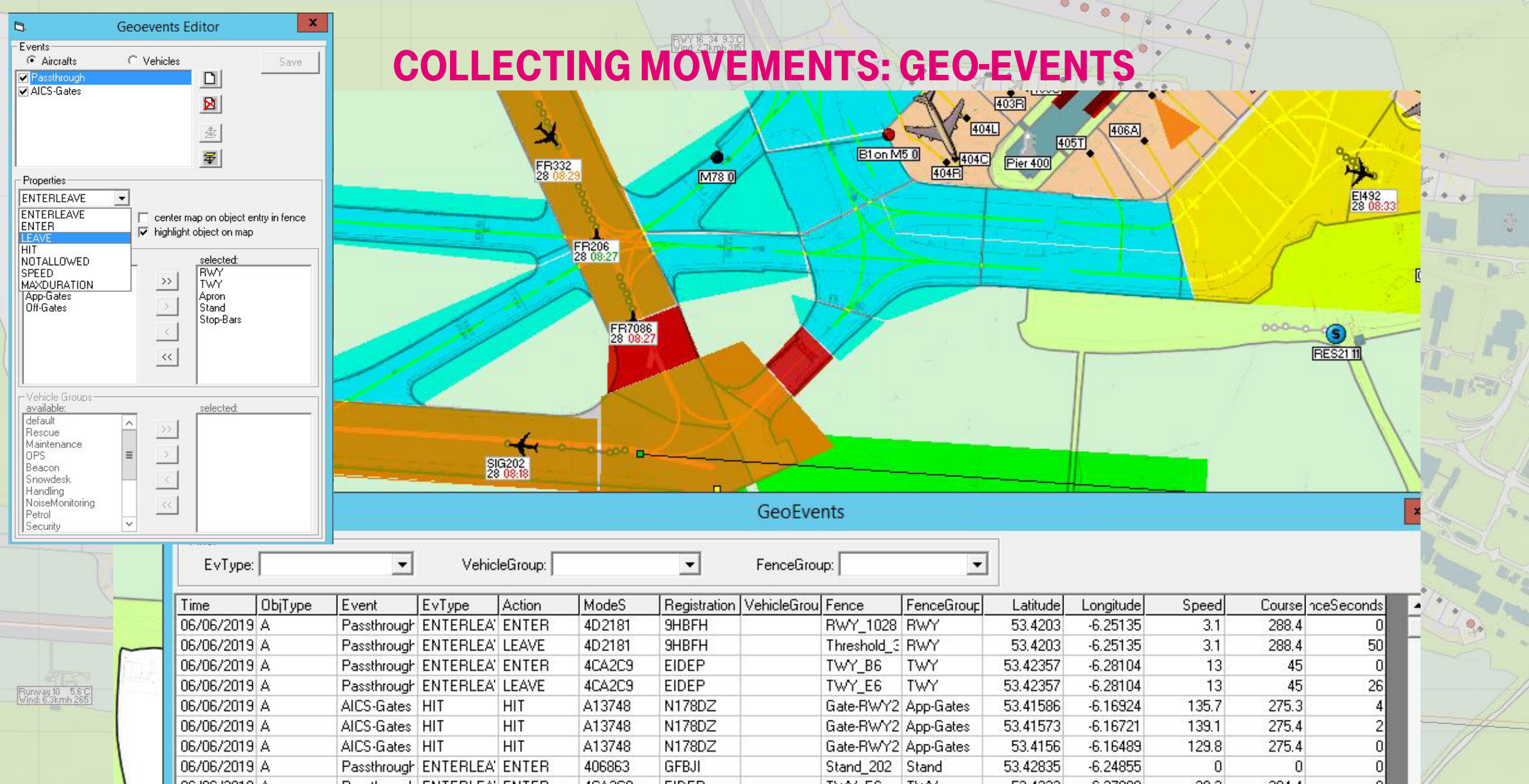
VehicleGroup:

FenceGroup:

Time	DI	Event	EvType	Action	ModeS	Registration	VehicleC	FenceGroup	Fence	Latitude	Longitude	Speed	Course	seconds	
14/03/2023	A	Passst	ENTEI	LEAVE	4D2330			Stop-Bars	SB_RWY16SB_	53.42788	-6.25588	9.9	45	14	
14/03/2023	A	Passst	ENTEI	ENTER	3C674D	DAIZM		TwY	JUNC_N_N4_F0	53.43385	-6.25785	17.8	68	0	
14/03/2023	A	Passst	ENTEI	LEAVE	3C674D	DAIZM		Stop-Bars	SB-RWY16SB_	53.43385	-6.25785	17.8	68	8	
14/03/2023	A	Passst	ENTEI	ENTER	4CA8E8	EIENW		Stand	Stand_124	53.43012	-6.24879	0	6	0	
14/03/2023	A	Passst	ENTEI	ENTER	3C674D	DAIZM		Stop-Bars	SB-RWY16SB_	53.43359	-6.25879	16.9	42	0	
14/03/2023	A	Passst	ENTEI	ENTER	4D2330			Stop-Bars	SB_RWY16SB_	53.42745	-6.2566	8.8	45	0	
14/03/2023	A	Passst	ENTEI	LEAVE	4D2330			TwY	TwY_W3	53.42745	-6.2566	8.8	45	24	
14/03/2023	A	Passst	ENTEI	LEAVE	C023C7	CFNOG		Stop-Bars	SB-RWY28RSB	53.435	-6.24558	15	352	10	
14/03/2023	A	Passst	ENTEI	ENTER	C023C7	CFNOG		Stop-Bars	SB-RWY28RSB	53.43436	-6.24555	15	11	0	
14/03/2023	A	Passst	ENTEI	LEAVE	C023C7	CFNOG		TwY	TwY_N_N2SB	53.43436	-6.24555	15	11	22	
14/03/2023	A	Passst	ENTEI	ENTER	4D2330			TwY	TwY_W3	53.42698	-6.25797	11	96	0	
14/03/2023	A	Passst	ENTEI	LEAVE	4D2330			Apron	WEST_APRON	53.42698	-6.25797	11	96	14	
14/03/2023	A	Passst	ENTEI	ENTER	C023C7	CFNOG		TwY	TwY_N_N2SB	53.43361	-6.24686	13.9	98	0	
14/03/2023	A	Passst	ENTEI	LEAVE	C023C7	CFNOG		TwY	TwY_N_N3	53.43361	-6.24686	13.9	98	35	
14/03/2023	A	Passst	ENTEI	ENTER	4D2330			Apron	WEST_APRON	53.42708	-6.25911	8.8	127	0	
14/03/2023	A	Passst	ENTEI	LEAVE	4D2330			Apron	WEST_APRON	53.42708	-6.25911	8.8	127	28	
14/03/2023	A	Passst	ENTEI	ENTER	4D2330			Apron	WEST_APRON	53.42777	-6.25934	4	222	0	
14/03/2023	A	Passst	ENTEI	LEAVE	4D2330			Stand	Stand_GA_Aproi	53.42779	-6.25932	4	222	4476	
14/03/2023	A	Passst	ENTEI	ENTER	C023C7	CFNOG		TwY	TwY_N_N3	53.43385	-6.25112	16.9	98	0	
14/03/2023	A	Passst	ENTEI	LEAVE	C023C7	CFNOG		TwY	TwY_N_N	53.43385	-6.25112	16.9	98	40	
14/03/2023	A	Passst	ENTEI	ENTER	C023C7	CFNOG		TwY	TwY_N_N	53.43408	-6.25548	9.9	98	0	
14/03/2023	A	Passst	ENTEI	LEAVE	C023C7	CFNOG		TwY	JUNC_N_N4_F0	53.43408	-6.25548	9.9	98	28	

Over 280 segments in 12 classes

COLLECTING MOVEMENTS: GEO-EVENTS



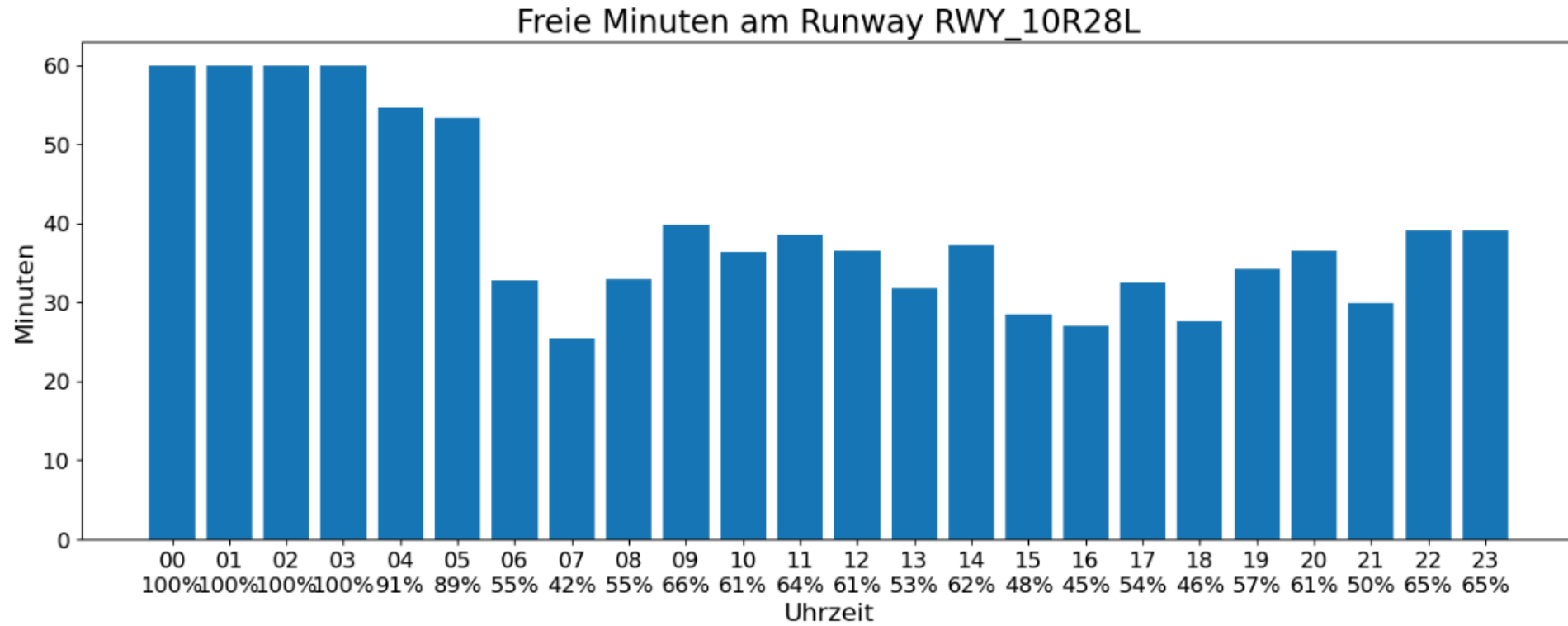
06

Surface Usage Analytics: Some Use-Cases

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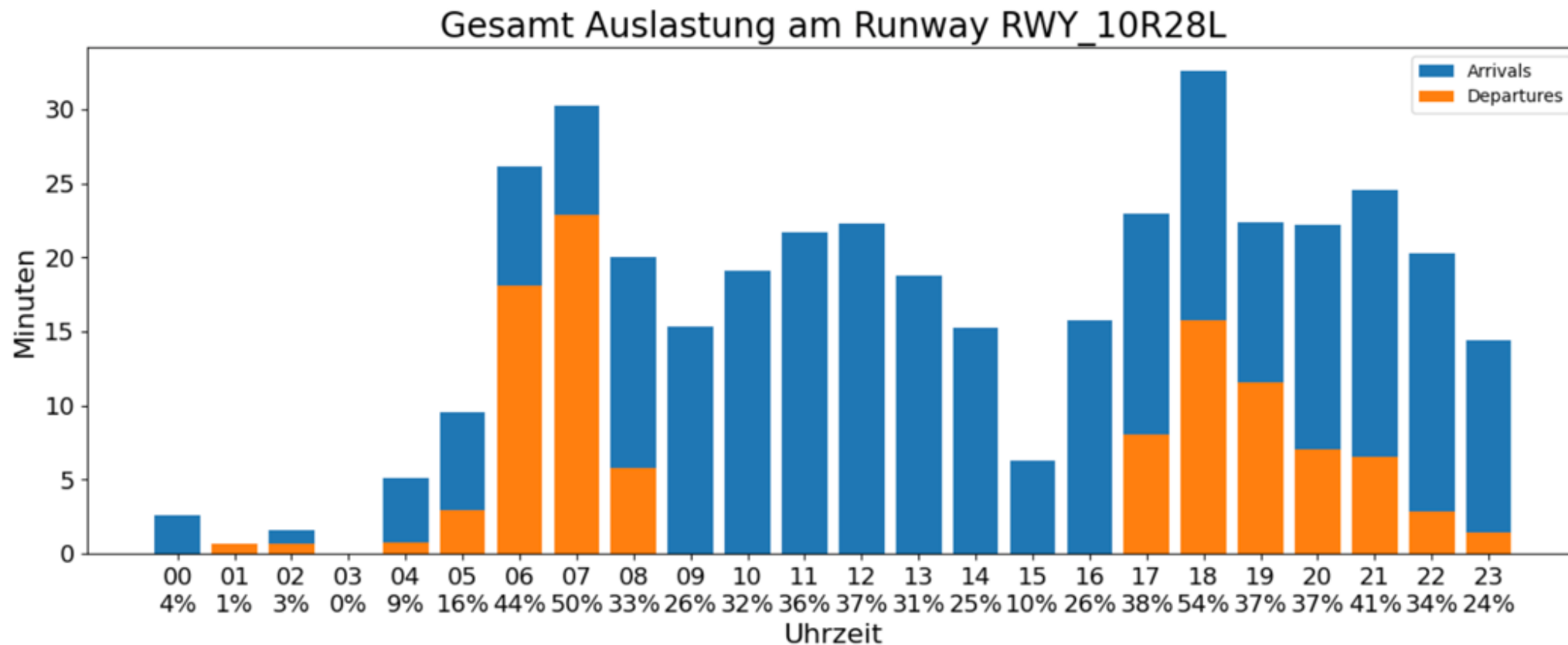
Availability RWY 10R28L in Minutes per Hour



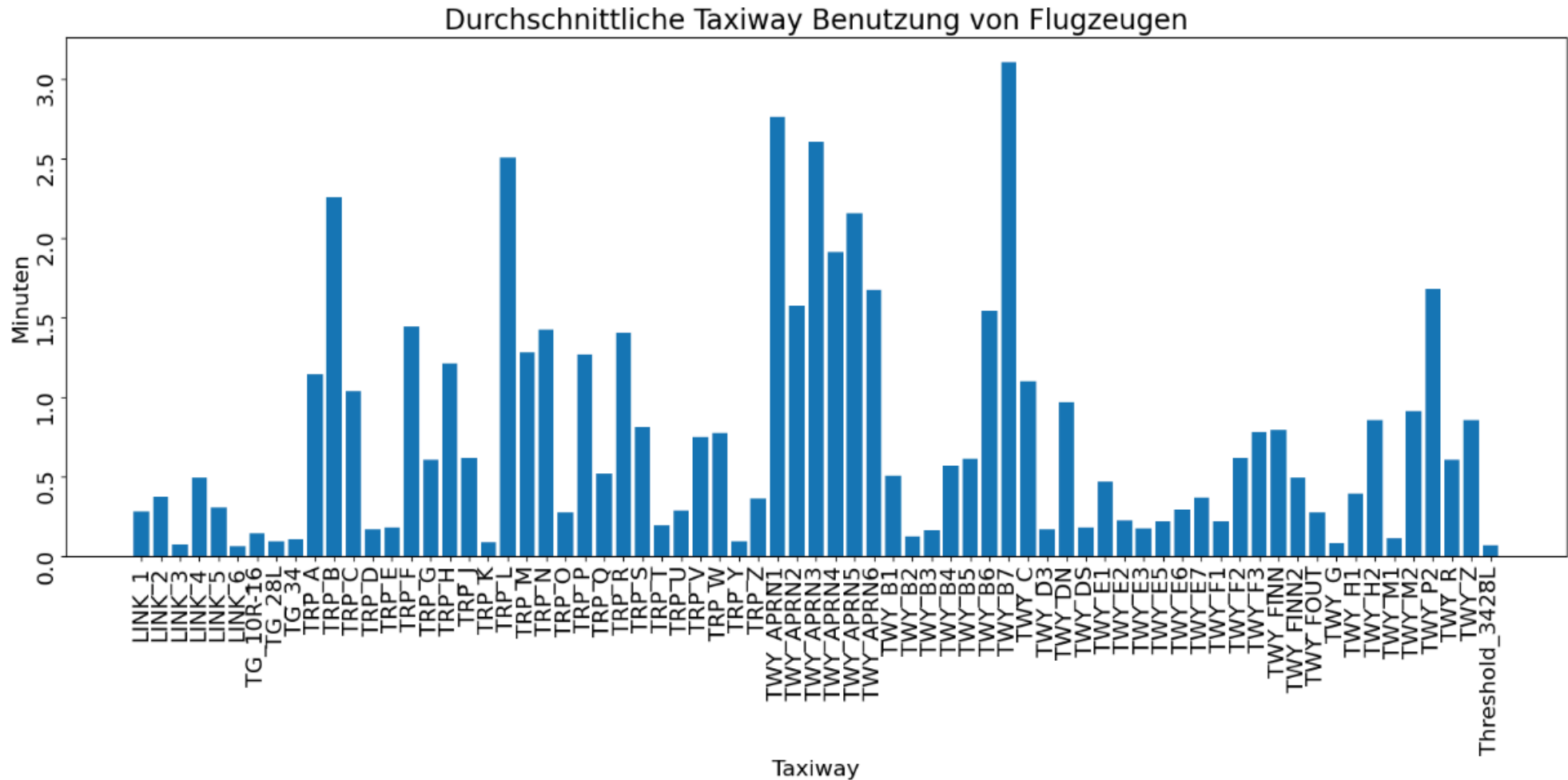
Occupation RWY 10R28L for Arrivals and Departures in Minutes per Hour

Runway Analysen

16.03.2023 ▾ RWY_10R28L ▾ Gesamt ▾ **Ausführen**



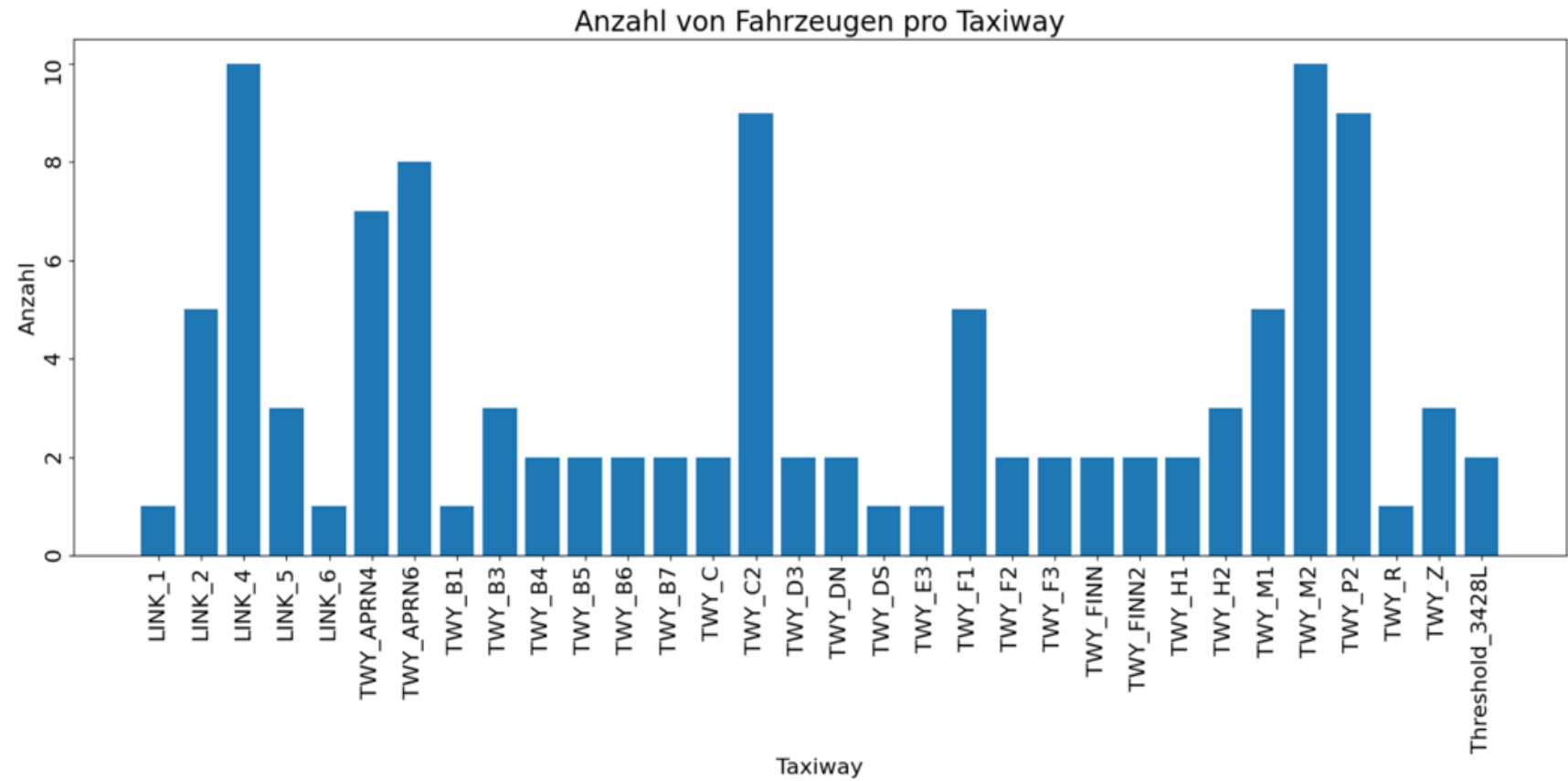
Average Occupation TWYs by Aircraft in Minutes



Number of Vehicles per TWY per Hour

Taxiway Analysen

17.03.2023 Fahrzeug pro Taxiway **Ausführen**



Number of Aircraft per Stop-Bar

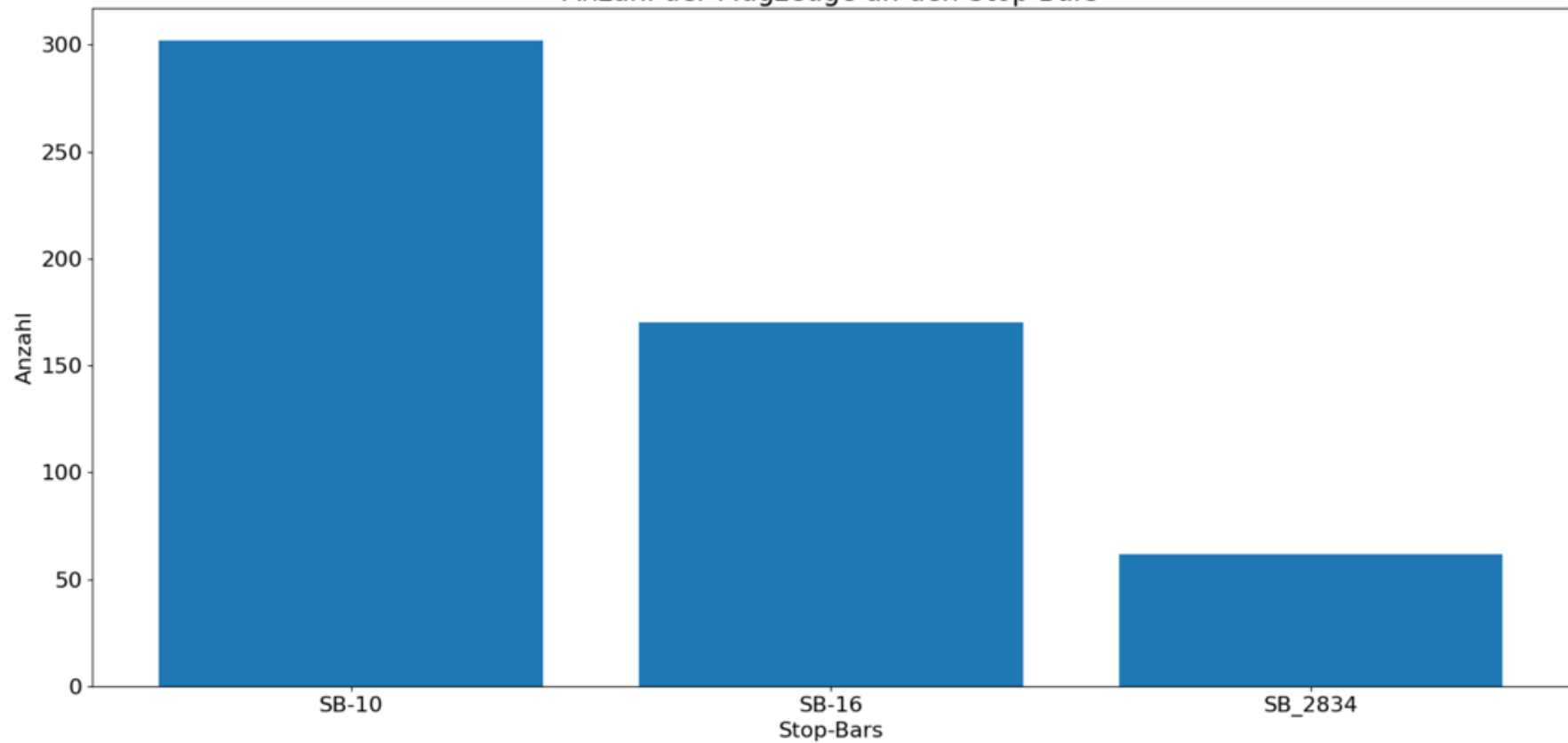
Taxiway Analysen

17.03.2023

Flugzeuge an Stop-Bars

Ausführen

Anzahl der Flugzeuge an den Stop-Bars



08

WebRadar & AVD:

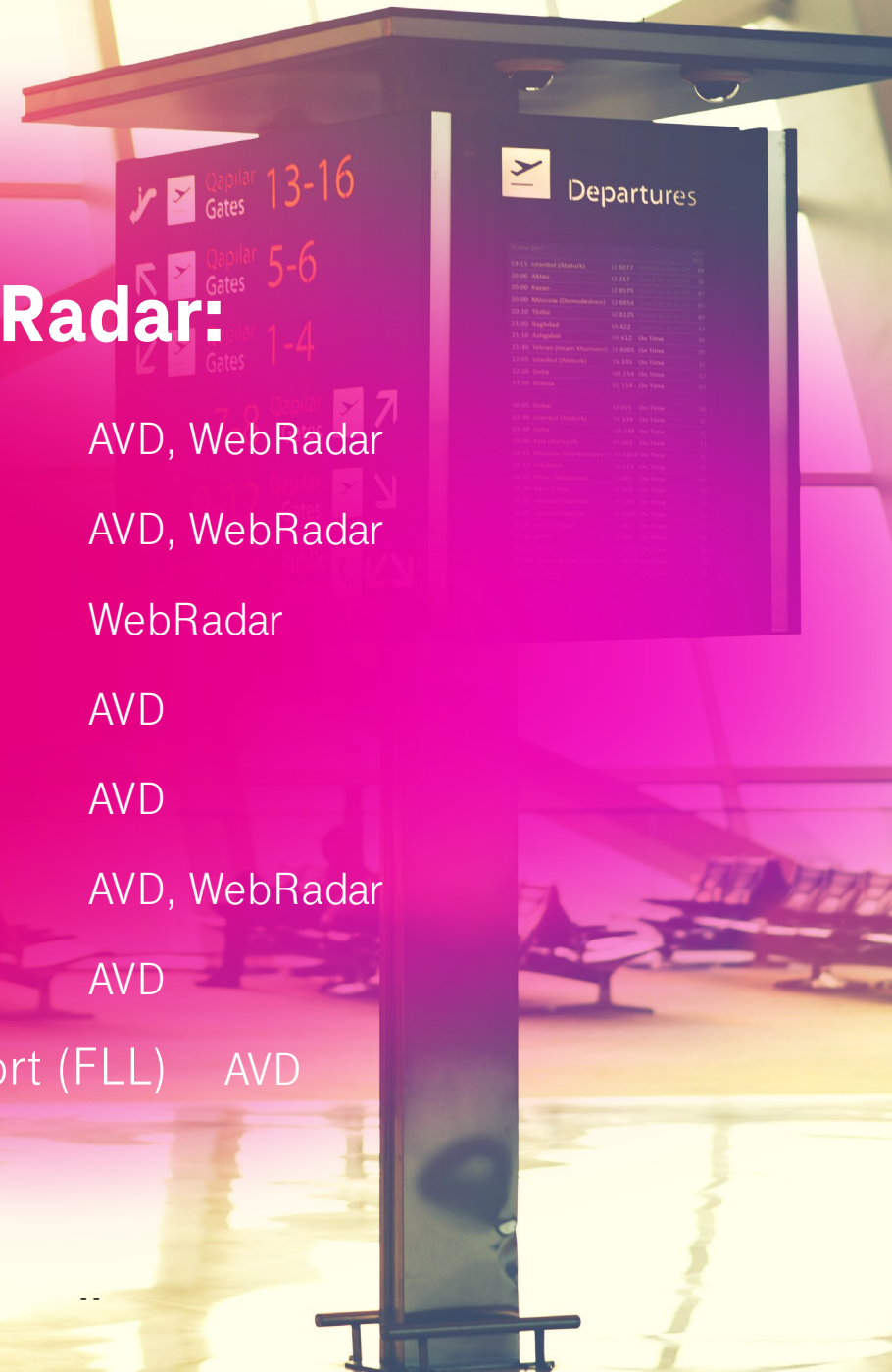
Installed Base

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Customers using AVD and WebRadar:

- Berlin Airports: BER (and formerly TXL, SXF) AVD, WebRadar
- Dublin Airport Authority: DUB and ORK AVD, WebRadar
- Jakarta Airport (CGK) WebRadar
- Aéroports de Lyon: LYS AVD
- Bangalore International Airport (BLR) AVD
- Kuala Lumpur Airport (KUL) AVD, WebRadar
- Miami International Airport (MIA) AVD
- Fort Lauderdale-Hollywood International Airport (FLL) AVD



Thank you!

T-Systems Airport User Days & Conference | September, 7-8 2023

Ad Wind Ad.Wind@t-systems.com

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Qapilar Gates 13-16
Qapilar Gates 5-6
Qapilar Gates 1-4
7-8 Qapilar Gates
9-12 Qapilar Gates
EXIT
Public Phones

Departures	
18:15 Istanbul (Istanbul)	12 0072
18:40 Athens	12 217
19:00 Rome	12 0075
19:00 Moscow (Domodedovo)	12 0054
19:10 Thessaloniki	12 0225
19:10 Baghdad	10 022
19:10 Bangkok	10 012
19:10 Tehran (Imam Khomeini)	12 0005
19:10 Istanbul (Istanbul)	10 005
19:10 Dubai	10 004
19:10 Ankara	10 004
19:10 Dubai	10 005
19:10 Istanbul (Istanbul)	10 005
19:10 Tokyo	10 004
19:10 Singapore	10 005
19:10 Moscow (Domodedovo)	10 005
19:10 Frankfurt	10 005
19:10 Munich (Munich)	10 005
19:10 Paris (CDG)	10 005
19:10 Istanbul (Istanbul)	10 005
19:10 Istanbul (Istanbul)	10 005
19:10 Athens (Athens)	10 005
19:10 Rome	10 005
19:10 Moscow (Domodedovo)	10 005
19:10 Istanbul (Istanbul)	10 005