

CURRENT OPPORTUNITIES IN AIR NAVIGATION SERVICES



DHMI

Devlet Hava Meydanları İşletmesi

Türkiye





CANSO Euro-Asia ANSP's CEO Summit

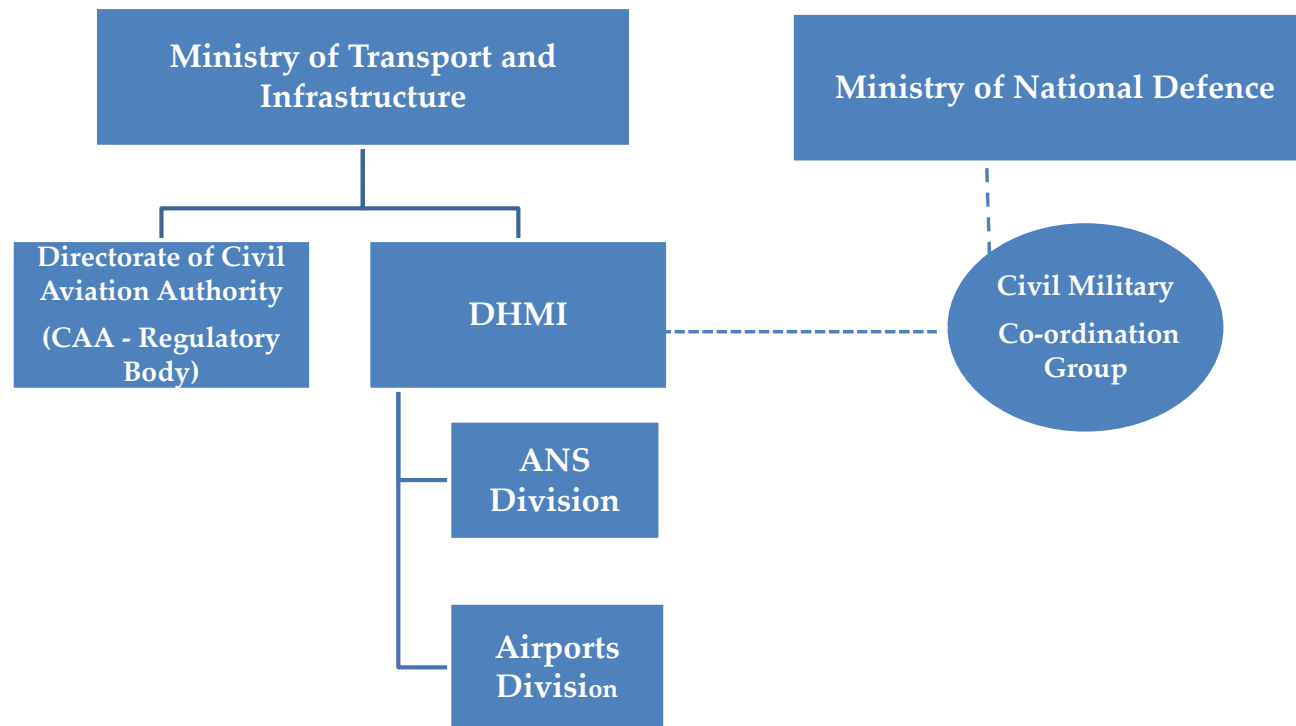
DHMI

Air Navigation Service Provider &
State Airports Authority of Türkiye





Organisation





DHMI

Devlet Hava Meydanları İşletmesi



- ✓ Provides air traffic control and other navigational assistance services
- ✓ Operates airports
- ✓ Provides innovative services to increase the efficiency and safety of airport operations
- ✓ Provides ground services at airports
- ✓ Installs and sets up air navigation systems
- ✓ Conducts training courses





DHMI - Air Navigation Services



- ✓ Air Traffic Control
- ✓ Airspace Design
- ✓ Aeronautical Information Services
- ✓ SMS
- ✓ ATM Research&Development
- ✓ Route Charging
- ✓ Flight Inspection
- ✓ Aircraft Maintenance
- ✓ Unmanned Traffic Management (UTM)





Air Traffic Control





Air Traffic Control Services



- ✓ 1 Area Control Center
- ✓ Ankara ACC Controlled Airspace **982.286** km²
- ✓ 48 Approach Control Units
- ✓ 52 Aerodrome Control Towers
- ✓ 2 Flow Management Positions





Human Resources



Our ANSP is recruiting the following staff;

- ✓ ATCO : 2045
- ✓ ATSEP : 700
- ✓ AIM Staff: 609
- ✓ Pilots: 15
- ✓ Flight Technicians: 14





CNS



Relating to CNS, our ANSP;

- ✓ Provides and installs navigation aids, radar systems, communication systems
- ✓ Prepares the periodic maintenance plans of existing systems
- ✓ Renews, repairs, calibrates and modifies the systems
- ✓ Organizes and conducts ATSEP trainings in line with regulations.



ILS	74
VOR	76
DME	153
NDB	68
PSR	7
SSR	24
A-SMGCS	5
ADS-B	14
TOTAL	421

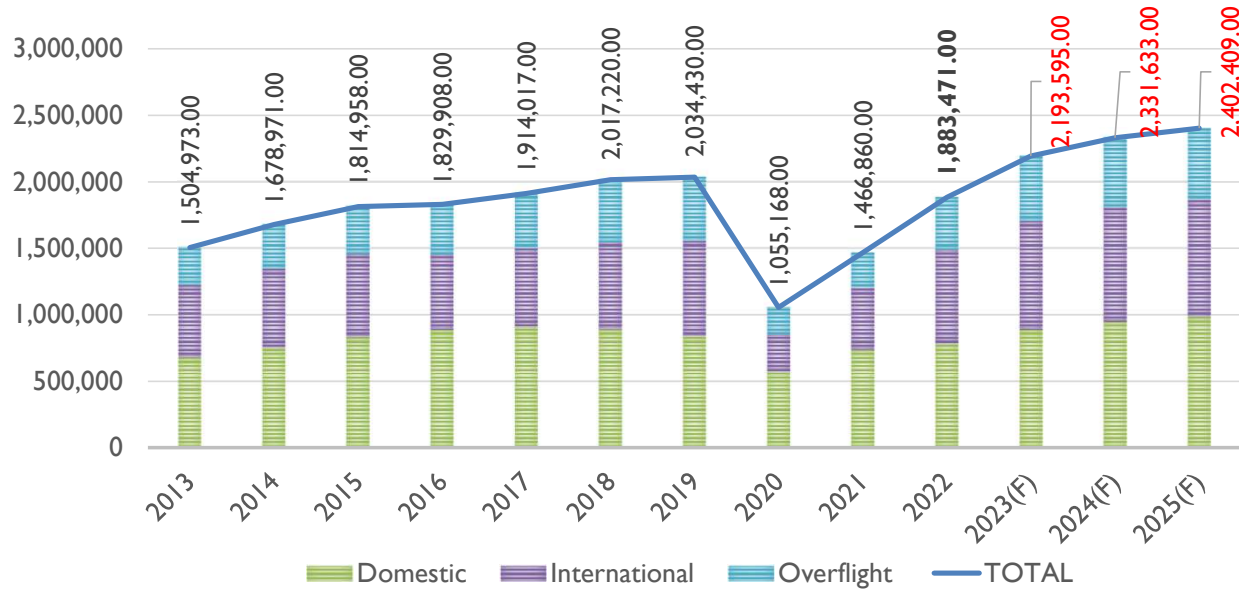


Traffic Evolution in Türkiye



Türkiye is one of the largest contributors to the European system in terms of traffic.

Türkiye has been one of the states showing the fastest recovery after the Pandemic; not only returning back to 2019 levels but even surpassing this level by 6% in 2023 (as of November 2023)





Airport Average Daily Movements



- ✓ On 11 June 2023; İstanbul Airport handled 1,684 arrivals/departures, beating by 60 flights the previous busiest-ever European airport record of daily flights on 11 September 2019.
- ✓ İstanbul Airport was ranked at the top in Europe according to average daily movements.
- ✓ Antalya and Sabiha Gökçen Airports was at the top 30 airports in terms of average daily movements in 2023.

#	AIRPORT	ICAO	AVG. FLIGHTS
1	İstanbul	LTFM	1.321
2	Amsterdam	EHAM	1.239
3	London Heathrow	EGLL	1.223
4	Paris Charles de Gaulle	LFPG	1.217
5	Madrid Barajas	LEMD	1.032
6	Frankfurt	EDDF	1.020
7	Barcelona	LEBL	831
8	Rome Fiumicino	LIRF	746
9	Munich	EDDM	714
10	London Gatwick	EGKK	641



Performance



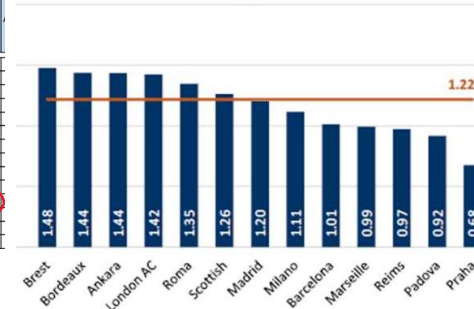
ANS Cost Efficiency and Major KPIs

- ✓ Türkiye is also one of the financially largest States amongst EUROCONTROL ranking on the 6th place in terms of its cost-base and provides high quality and cost efficient service to users who receive value for their money.
- ✓ Türkiye shows high performance in many KPIs:
 - The performance ratio for ATCO employment costs per composite flight hour (2.69)
 - '0' ATFM delays,
 - 3rd ranking in ATCO flight hour productivity, in terms of area control sectors open at max configuration >12.

ANSPs	Country	Financial cost-effectiveness KPI Index*	Performance ratio	
			ATCO-hour productivity	ATCO employment costs per ATCO-hour*
Albcontrol	AL	1.15	0.98	3.78
ANS CR	CZ	0.76	0.67	1.41
ARMATS	AM	0.96	0.31	4.75
Austro Control	AT	0.79	1.08	0.75
Avinor (Continental)	NO	1.23	0.98	0.92
BHANS	BA	1.50	0.59	3.06
BULATSA	BG	1.28	0.97	1.35
Croatia Control	HR	1.51	1.02	1.43
DCAC Cyprus	CY	2.05	0.95	2.31
DFS	DE	0.72	1.07	0.65
DHMI	TR	1.31	0.94	2.69
DSNA	FR	0.91	1.00	1.03
EANS	EE	1.25	1.05	1.24
ENAI	ES	1.04	1.07	0.82
ENAV	IT	0.97	1.04	0.87

ANSPs	(1) Gate-to-gate ATM/CNS provision costs (in €'000)	(2) En-route ATFM delays ('000 minutes)	(3) Airport ATFM delays ('000 minutes)	(4)=(2)+(3) Total ATFM delays ('000 minutes)	(5) % share in European system ATFM delays
Albcontrol	25 491	1	0	1	0.0%
ANS CR	129 919	798	6	805	4.2%
ARMATS	13 896	0	0	0	0.0%
Austro Control	233 790	79	21	99	0.5%
Avinor (Continental)	186 924	3	20	24	0.1%
BHANS	28 737	183	0	183	1.0%
BULATSA	114 852	0	0	0	0.0%
Croatia Control	87 246	408	0	408	2.1%
DCAC Cyprus	43 041	0	2	3	0.0%
DFS	1 091 344	5 496	210	5 845	26.4%
DHMI	595 219	0	162	161	0.8%
DSNA	1 369 412	7 942	548	4 890	26.4%
EANS	21 788	0	0	0	0.0%
ENAI	884 452	598	331	929	4.8%

Area control sectors open at maximum configuration
> 12





Completed International Projects



Several projects have been initiated and completed in recent years.
Some of these projects are provided hereunder;

✓ CASCADE	Cooperative ATS Through Surveillance and Communication Applications Deployed in ECAC	EUROCONTROL
✓ METIS	Mediterranean Introduction of GNSS Services	EC
✓ SHERPA	Support ad-hoc to Eastern Region with Pre-operational Actions on GNSS	EU
✓ SECURE DATA CLOUD	Secure Data Sharing and Computing of ATM Data	SESAJ JU
✓ RESILIENCE 2050	New Design Principles Fostering Safety, Agility and Resilience for ATM	EU

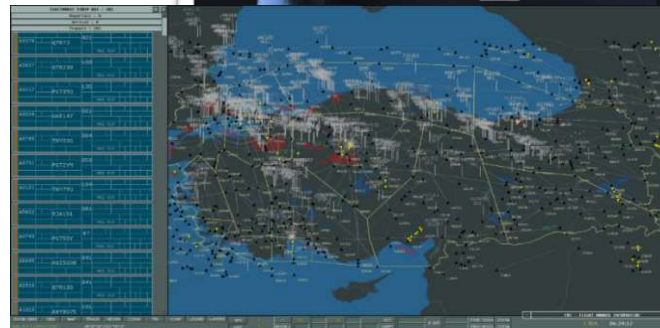


Completed National Projects



ÇARE (Multi-Purpose Radar Screen)

- ✓ ÇARE is an HMI (Human Machine Interface) system that displays details of real time flight data on the map and enables air traffic controllers manage the traffic in an effective way.
- ✓ This system has been installed at 44 airports, air traffic service units and governmental centers in Türkiye and has also been installed at 3 locations in Azerbaijan.

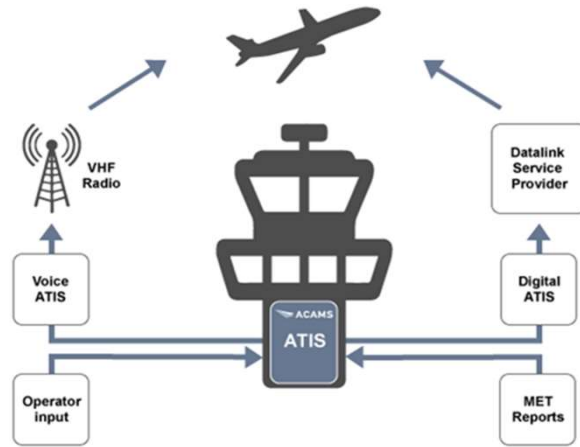
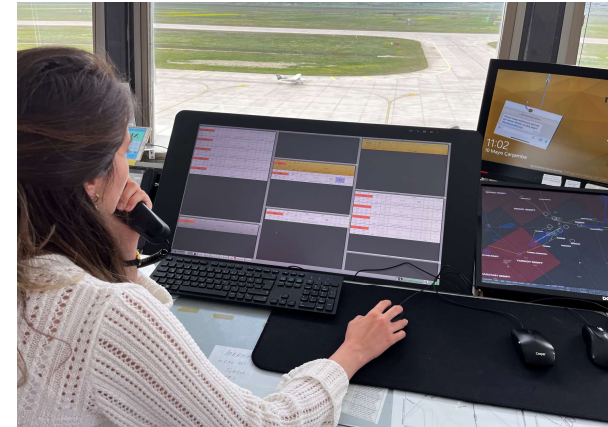




Completed National Projects



- ✓ The Electronic Flight Strip System (EFS) and the Digital ATC Clearance (DCL) system developed by DHMI in collaboration with TUBITAK is currently in service at our 19 airports and it is planned to install this system at 7 more airports in the near future.



- ✓ DHMI's Digital ATIS (Automatic Terminal Information Service) system has been certified by SITA.



Ongoing Projects

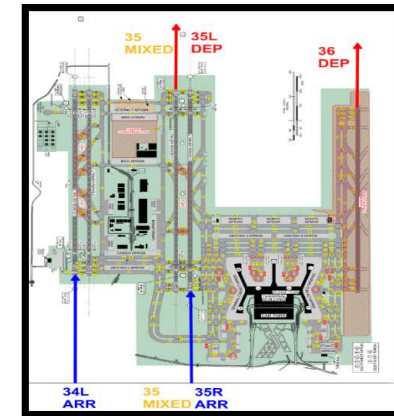
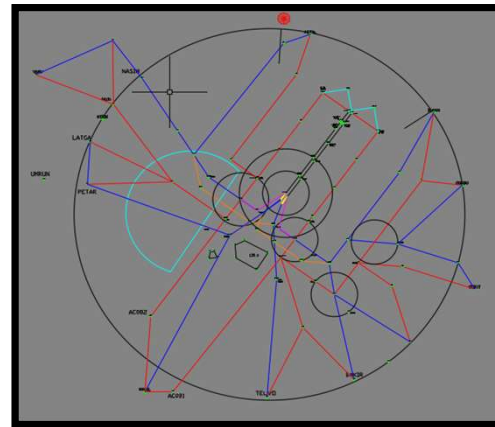
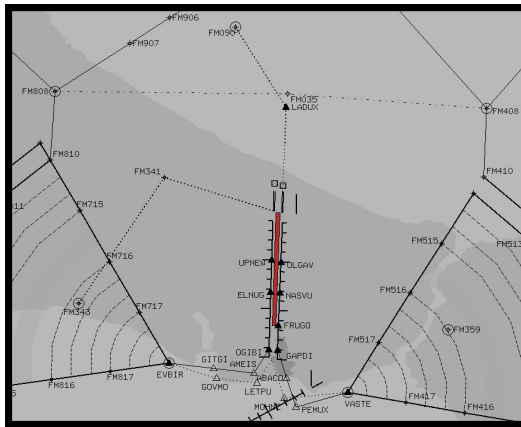


Independent Parallel Runway Operations

- ✓ Triple Runway Operations (TRO) for Istanbul Airport (LTFM) in collaboration with EUROCONTROL is currently being developed by DHMI

For the very first time in Europe, the TRO will enable 3 independent landings/departures all at the same time. It is expected that this implementation will bring along a significant capacity increase, in other words a highly efficient use of resources. Many ANSPs are awaiting for the Project to be completed which will definitively become an example to many airports in the coming years.

- ✓ Implementation is also ongoing to enhance and develop Simultaneous Approaches to Parallel Instrument Runways where possible (Sabiha Gökçen-LTFJ, Antalya-LTAI, Esenboga-LTAC etc.).



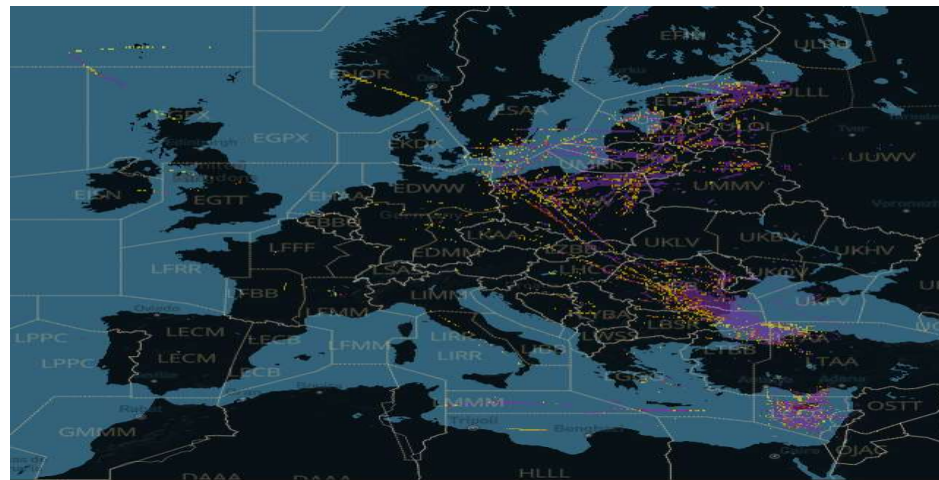


Ongoing Projects



GPS Losses

- ✓ The existing PBN SIDs and STARs have become unavailable due to GPS Outages
- ✓ A study has been concluded for airspace users to continue their operation by using RNP 1 SID/STAR procedures based on DME/DME positioning, when GPS outages exist.
- ✓ This project will ensure that operations are continued in case of GPS loss, by using DME/DME positionings to execute RNP SID/STAR Procedures.





Ongoing Projects



MGR/Mode-S SSR

- ✓ Developed by DHMI recently, the MGR System is an S-Band solid state Doppler Radar designed for detection and tracking of civil and military air traffic. The System is designed in accordance with the recommendations and standards of ICAO and EUROCONTROL. Provisional Acceptance of the systems has been made recently by our experts.



Air Traffic Control Tower & Radar Simulator (atcTRsim)



- ✓ This Project comprises two 180 degree tower modules -including update of the current one at Atatürk Airport- and 21 approach/route control position modules at the Air Traffic Control Center. These systems will be used for the fundamental and advanced trainings of the Air Traffic Control personnel.



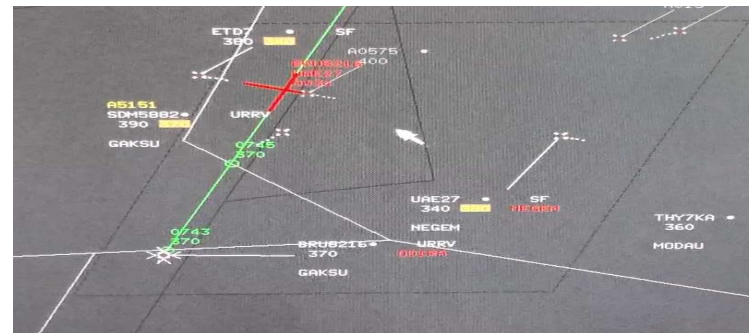
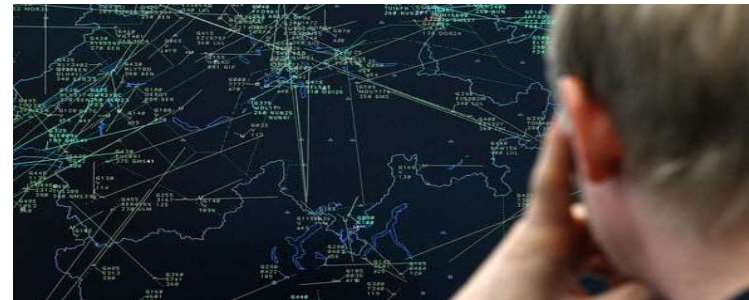
Ongoing Projects



National ATC (Air Traffic Control) Systems

✓ The project is considered as an holistic and efficient Air Traffic Control System that consists of following sub-systems:

- Surveillance Data Processing System (SDPS),
- Flight Data Processing System (FDPS),
- Operational Imaging System (ODS),
- Supervisor Operational Imaging System (SODS),
- Safety Networks (Safety Nets),
- ATC Support Software Tools (ATC Tools),
- Technical Monitoring Control System (TMC),
- Database Management-Software Maintenance-Development Environment (DBM-SDE),
- Data Link software used in Air Traffic Management





Ongoing Projects



National WMLAT (Wide Area Multilateration), A-SMGCS

- ✓ Multilateration is an hyperbolic positioning system that aims to locate the air targets by accurately computing the time difference of arrival (TDOA) of a signal emitted from the object to three or more receivers. It's one of the new generation surveillance techniques.
- ✓ The project's aim is to develop;
 - Multilateration Surveillance System,
 - Wide Area Multilateration System,
 - Surface Movement Radar,
 - A-SMGCS (Advanced Surface Guidance and Control System).
- The systems will be installed at İzmir Adnan Menderes Airport and its surroundings.





Ongoing International Projects



AI4Hydrop (An AI-based Holistic Dynamic Framework for a Safe Drone's Operation in Restricted and Urban Areas)

AI4Hydrop is a SESAR Project that aims to develop a framework that incorporates various AI-based tools and associated information flows to enable future drone operations at scale. The proposed framework will represent a digital step change in ATM, using AI as a means to move to more automated U-space services.

Project duration is 30 months (2023 - 2026). The project consortium is formed by;

- ✓ Sorost-Norge (Norway) University
- ✓ İTÜ (İstanbul Technical University)
- ✓ DHMI
- ✓ Madrid-Europe University (Spain)
- ✓ SINTEF (Norway)
- ✓ DLR (Germany)
- ✓ VZLU (Czech Republic)
- ✓ Katara (France)
- ✓ Sopra-Steria (France)
- ✓ Düzce Municipality (Türkiye)



Exploratory Research



International Cooperation



DHMI has always given great importance to International Cooperation and to strengthen its relations with other countries and associations.

We participate in relevant international fora, placing particular emphasis on:

- ✓ ICAO
- ✓ ECAC
- ✓ EUROCONTROL
- ✓ CANSO
- ✓ EUROCAE
- ✓ SOCEA





Final Remarks



As one of the states with:

- the highest traffic generated in Europe,
- the main support to the ATM network, and
- excellent traffic and capacity performance

Türkiye;

- ✓ Emphasizes the importance of CANSO and commits to continuous support,
- ✓ Is always willing to share knowledge and experience to the improvement of air navigation safety, capacity, sustainability and environment.
- ✓ Is open to cooperation and collaboration with the states in the Region.





QUESTIONS

