

Buluttan



AI Powered Hyper Local Weather Intelligence

buluttan.com

Climate change adaptation is the #1 business problem for short–mid term



Top risks for business continuity & impact

Extreme
Weather

2024: #1*
2023: #2
2022: #1

2024 Damages

\$550 B

Frequency increase last
5 years

+50 %

Extreme weather is top-of-mind for execs:
Earning calls' mentions: 1700, up 300%**

* Disinformation and misinformation excluded

**CB Insights earnings transcripts search — [mentions of extreme weather events](#); CNBC

Weather Has Strong, Cross-sectoral Financial Impact!



ENERGY

Renewables



Electricity Distribution

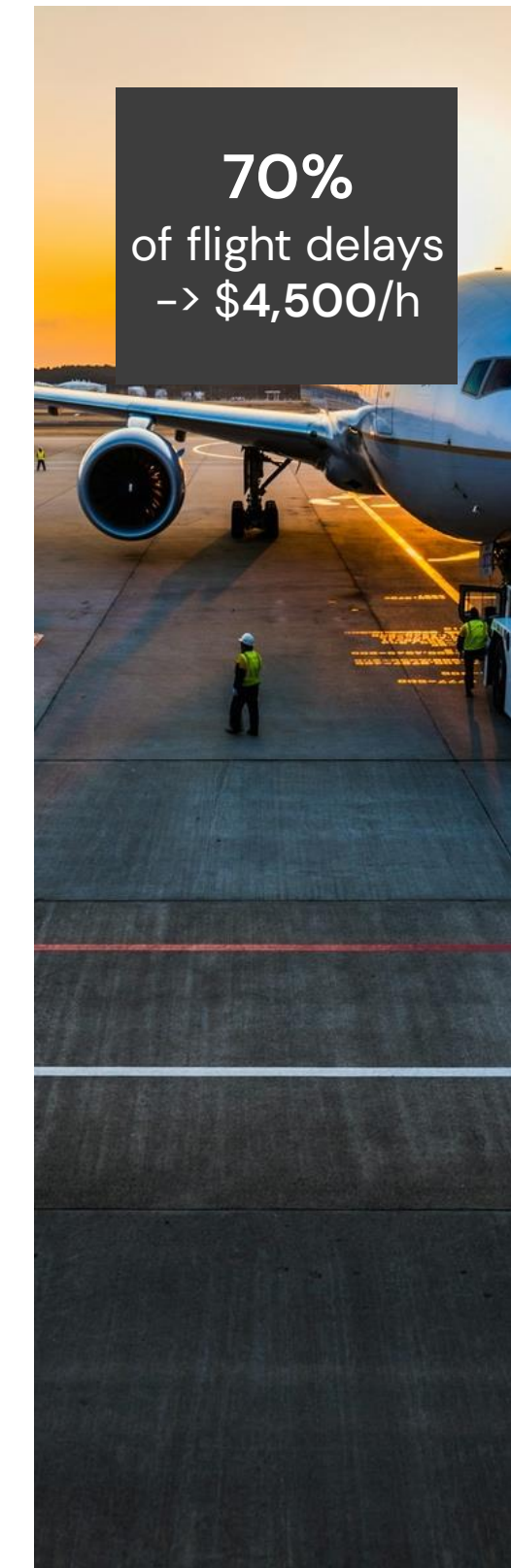


MOBILITY

Land Operations



Aviation Operations



Maritime Operations



In many industries, not knowing “local” weather causes operational problems, safety issues, financial losses



Aviation

- Flight delays
- Last minute cancellations
- Longer flight routes
- Increased fuel consumption
- Detours
- Diversions

\$30B*



Renewable Energy & Grid

- Incorrect production forecasts cause under/over supply
- Grid instability cause costly backup power
- Imbalance penalties \$3M/year for large farms

\$10B**

And many more:

→ Energy Trading & Markets

→ Defense

→ Agriculture

→ Municipalities

→ Marine Ports

→ Logistics

→ Insurance

→ Tourism

→ Sports & Events

Our products are already delivering value to customers, with many more in pipeline

Early Partners (>2 Years)



Journey Plan & Safety

First EV producer of Turkey. Integrated into > 50,000 Smart Devices ensuring driver safety and experience



Order & Delivery Plan

Providing Web service to respond weather-related demand increase and ETA delays



Hyper-local Data Provider

Buluttan MiniApp integration into Municipality Superapp (>4 million downloads)



Solar Energy Forecasting

Forecasting around ~1 GW capacity



Hydro Energy Forecasting

One of the largest hydro farms owned by Turkey's largest conglomerate



Wind Energy Forecasting

Turkey's leading capacity of wind energy

Recently Onboarded



Weather Generator

EU consortium with 16 partners to build Foundation Weather Forecasting AI Model



Flight Plan & Operations

Global data provider of Turkey's one of the two largest airlines, flying over 140+ destinations worldwide.



Flight Plan & Operations

Co-developing Weather Intelligence Service for flight plans with #1 defense industry company of Türkiye

Currently Onboarding



Flight Plan & Operations

Weather Intelligence service provider (still PoC) for Türkiye's largest airlines,

Energy Production Forecasting



Mobility

Energy

Co-Founders



Güven Bölükbaşı
CTO



M.Sc Comp Eng.





Gökmen Güven
CEO



B.Sc. Comp Eng





Mehmet Kırıl
CPO

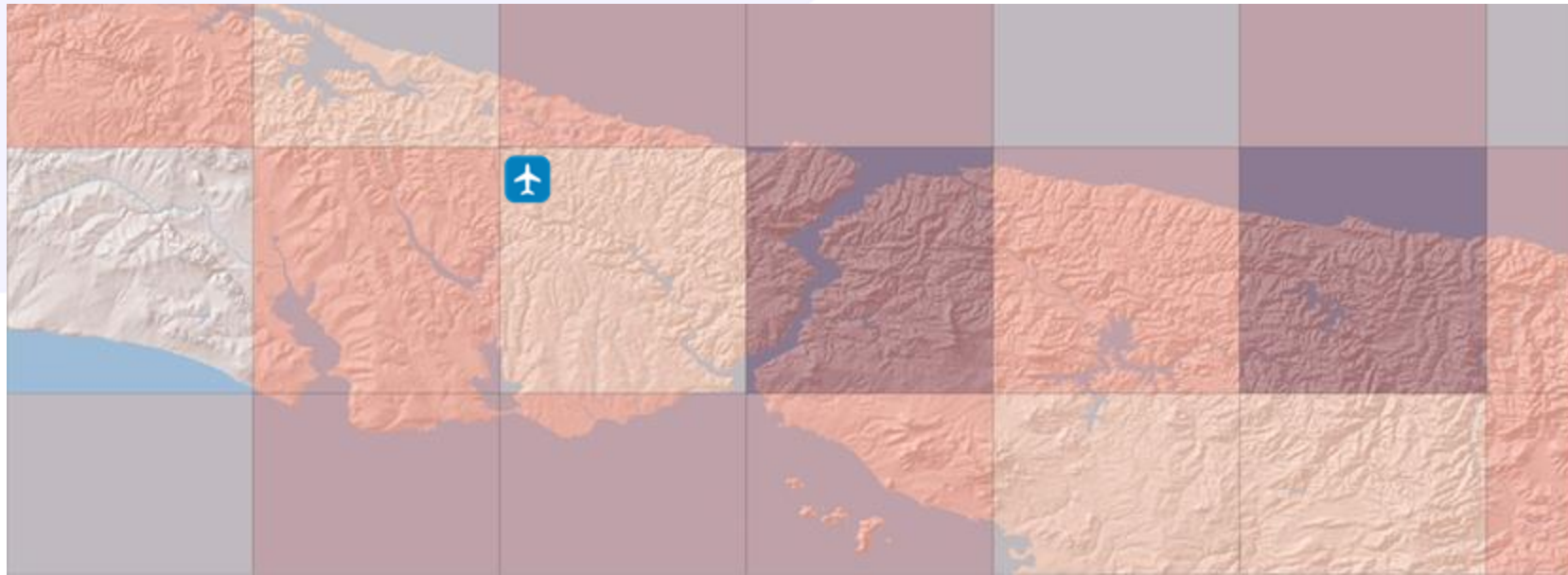


B.Sc. Ind. Eng

J.P.Morgan

Legacy global low resolution models lack the hyperlocal accuracy

An Example: Aviation

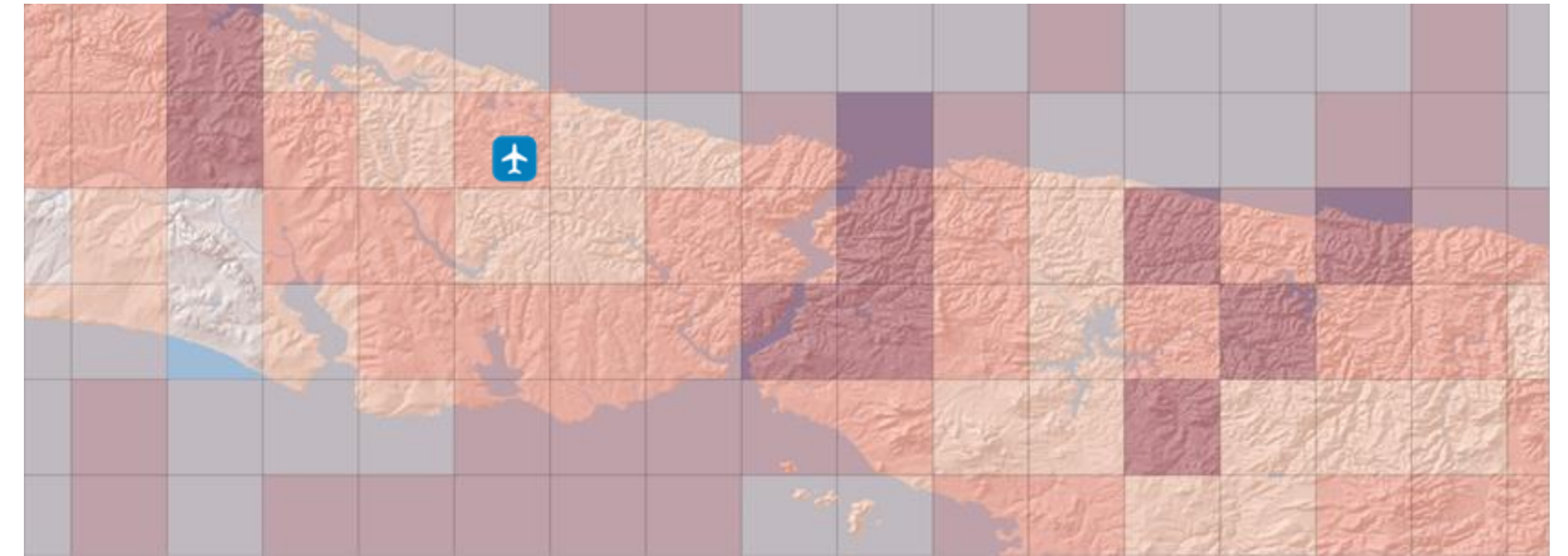


Legacy: Low resolution

Forecast: High Visibility – Observed: Low Visibility



- Plane detours or diverts
- Excess fuel used
- Disrupted next flight
- Compromised passenger safety / comfort



Next Gen: High resolution

Forecast: Low Visibility – Observed: Low Visibility



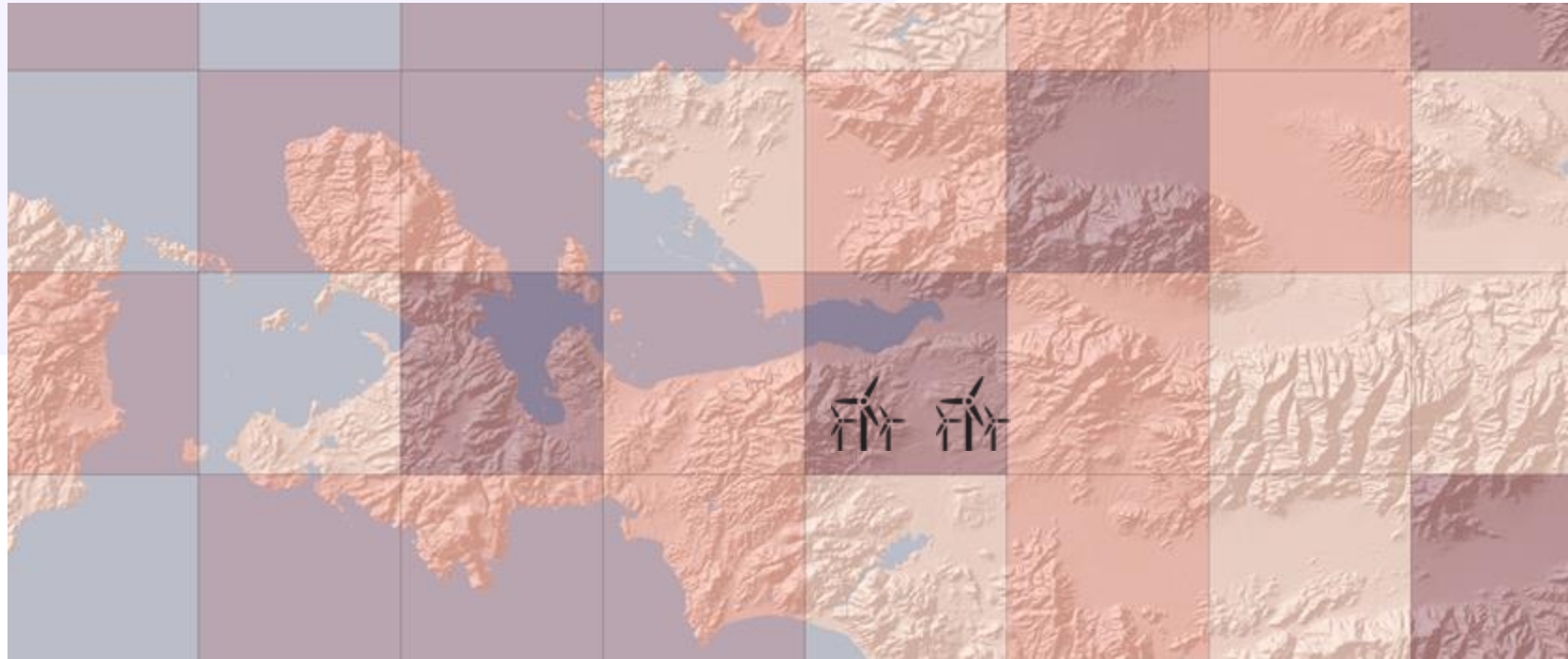
- Crew change to higher ranked pilots
- No detour or divert
- Fuel not wasted
- Safe & comfortable landing

\$10K saved / detoured flight

2.5 M
detoured flights
in 42,000 airports
per year globally

Legacy global low resolution models lack the hyperlocal accuracy

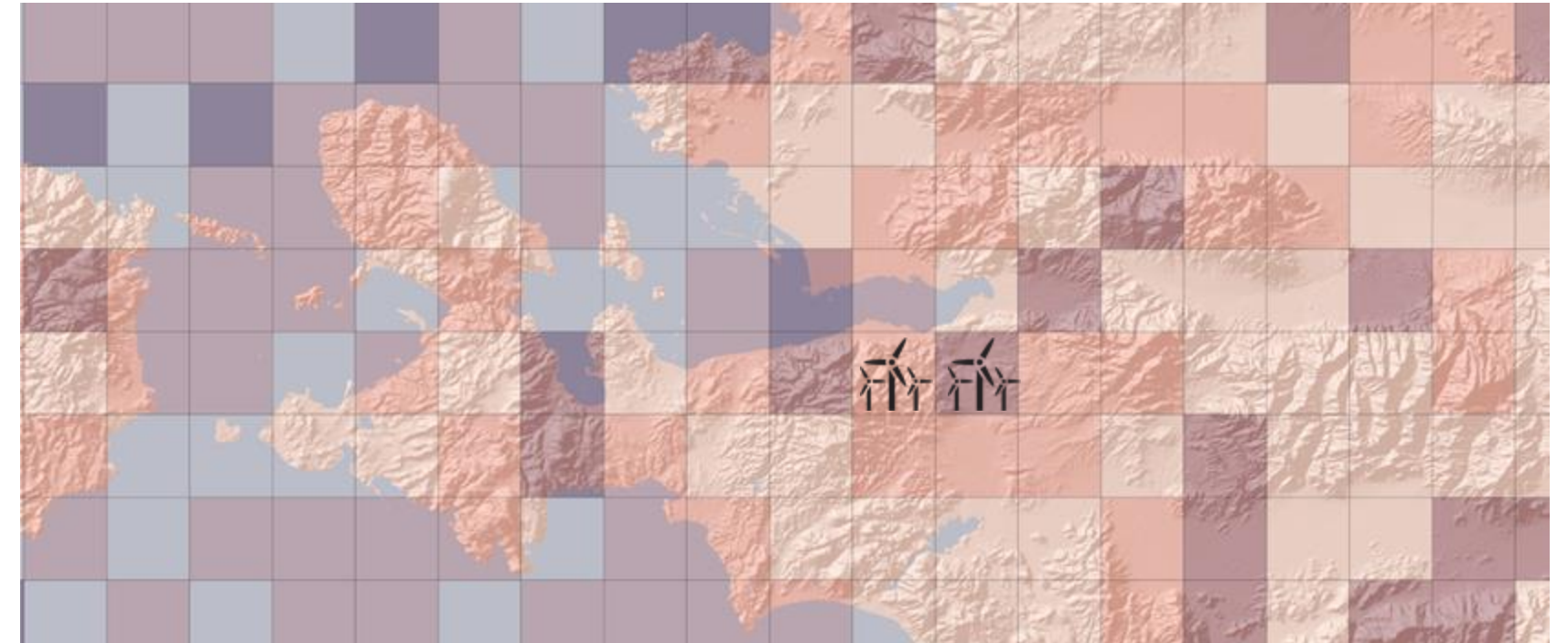
An Example: Wind Energy Production



Legacy: Low resolution

Forecast: 10 knot wind – 20 MWh energy produced
Actual: 7 knot wind – 15 MWh energy produced

- 5 mwh under supply penalty
- \$500k imbalance penalty/year



Next Gen: High resolution

Forecast: 8 knot wind – 17 MWh energy produced
Actual: 7 knot wind – 15 MWh energy produced

- 2 mwh under supply penalty
- \$400k imbalance penalty/year

20% better prediction \$100K saved / farm

**30,000 farms
globally**

Tailored & local weather forecast models solve these problems



Legacy

- Physics based model
- Uses public data
- 25 km spatial resolution
- 3 hour temporal resolution
- 6 hour refresh rate
- One model for everyone
- Mostly “offline” reports, not linked to operations

Vs



Buluttan

- AI powered hyperlocal model
- Superior accuracy
- Uses public & customer data
- Upto 1 km spatial resolution
- 10 minute temporal resolution
- Realtime adaptation
- Customer specific model
- Integrated to workflows

Benefits



OPEX savings



Preventive
measures, reactive
operations

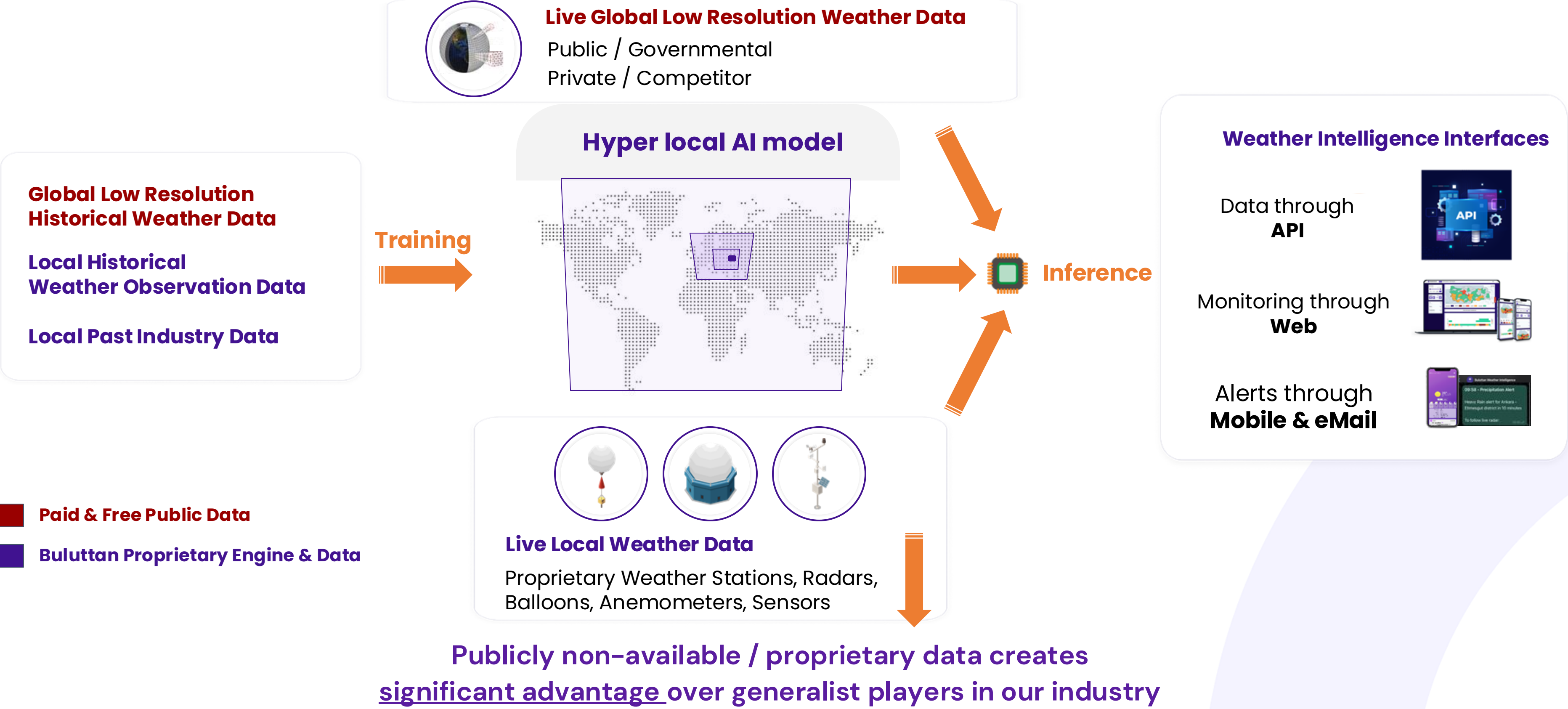


Reduced
employee and
customer risks



Reduced asset
damage risks

Buluttan Forecast Engine powered by AI model, superior data and continuous feedback



Buluttan Hyper Local Forecasts is superior to global generalist forecasts

CASE:

Wind speed
Prediction
at IGA

(Istanbul
Airport)



Globally known provider

Ground truth



Buluttan

Ground truth

Buluttan shows significant accuracy improvement compared to other available services

- ✦ ~ 50% Decrease in MAE, MAPE, R2 vs Global benchmarks
- ✦ Increase % Precision & % Recall vs Global Benchmarks

Model		Wind Speed (knot)	Wind Gust (knot)	Wind Chill (C)	Pressure (hPa)
Mean Absoulute Error	Buluttan Hybrid Model	1.3	1.7	2	0.8
	Buluttan Atmospheric Model	1.8	2.4	2.7	1.3
	Globally Known Provider	2.8	3	3.3	1.4
Pearson Correlation	Buluttan Hybrid Model	0.9+	0.9+	0.9+	1
	Buluttan Atmospheric Model	0.8	0.8	0.8	1
	Globally Known Provider	0.4	0.4	0.7	0.9

Stats of the POC executed at the Aliaga Port in Izmir/Turkey between Jan to May 2024

Pearson Correlation: (0-1) correlation levels between actual vs forecasted values. Values close to 1 indicates high correlation

Mean Abslue Error (MAE): Mean deviation from the actual observed values



HORIZON PROJECT:

WeatherGenerator

EU-Horizon | Weather Generator

Buluttan represents Turkey in the biggest Weather Consortium

Paradigm Shift in Weather Intelligence: AI-based meteorological modeling

Buluttan joins EU-Horizon Consortium!

Generative AI Weather Forecasting Initiative – Weather Generator

ECMWF is coordinating the project which aim to use machine learning in novel ways for weather forecasting and to model related Earth System Processes. Buluttan will be responsible for project's Energy Applications.



ECMWF
FZJ
MetNor
MPG
KNMI
BULUTTAN
METEO-FRANCE
SMHI
MET OFFICE
STATKRAFT
FONDAZIONE CMCC
ESCIENCE
KAJO
ETH ZURICH
METEOSWISS
LT

- Coordinated by ECMWF
- 16 organizations attending including European national meteorological services and research institutes
- **Buluttan only initiative from Turkey and one of the only two commercial partners.**
- **Four-year** period building a **Foundation Model** of machine learning for weather forecasting and **Earth system modeling**.
- The model will function as a large-scale weather model, delivering pure AI-driven weather forecasting. **Buluttan and its partners will be the first to implement it in industry applications.**



Buluttan | Mobility

Skywatch Aviation

Skywatch Marine

Skywatch Land



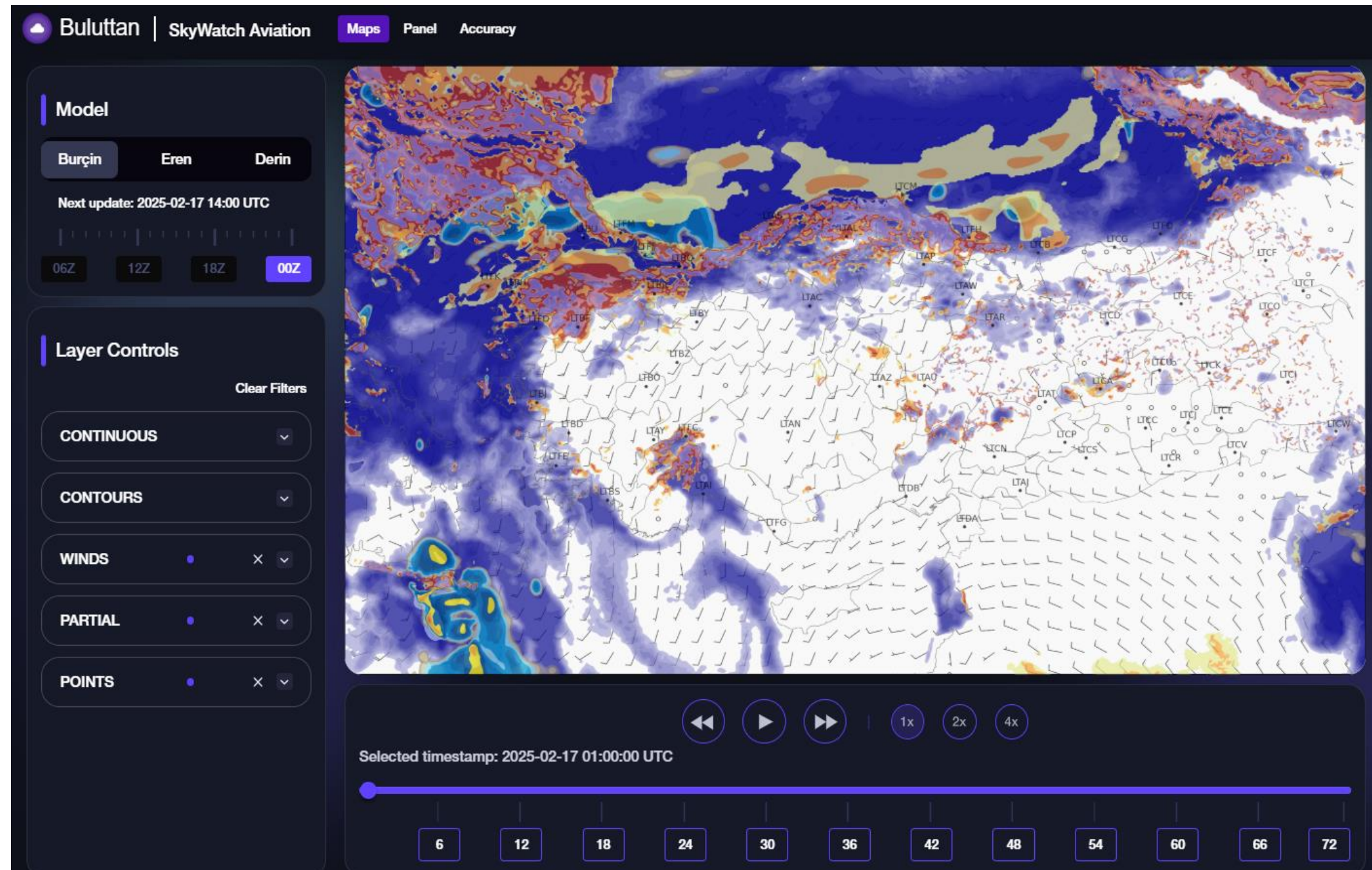
Skywatch Aviation: Point-based and Geospatial Interpretation



- **AI Powered** Aviation Meteorology Forecasts
- Ground Level & **Higher Altitudes** Data and Analysis
- **Point /Area /Route based** Weather Intelligence
- **Global & Hyper Local** Data



- **Muli-sectoral:** Defense, Military, Civil Aviation, Helicopter (VFR), UAVs, Logistics & Cargo
- **Multi-vehicle:** Planes, Helicopters, Drones, UAVs
- **Tactical** weather awareness & **AI-driven** decision support for **resilient & safe flight operations**
- Mission **planning**, **in-flight** adjustments, and **post-flight** analytics





Skywatch Marine:

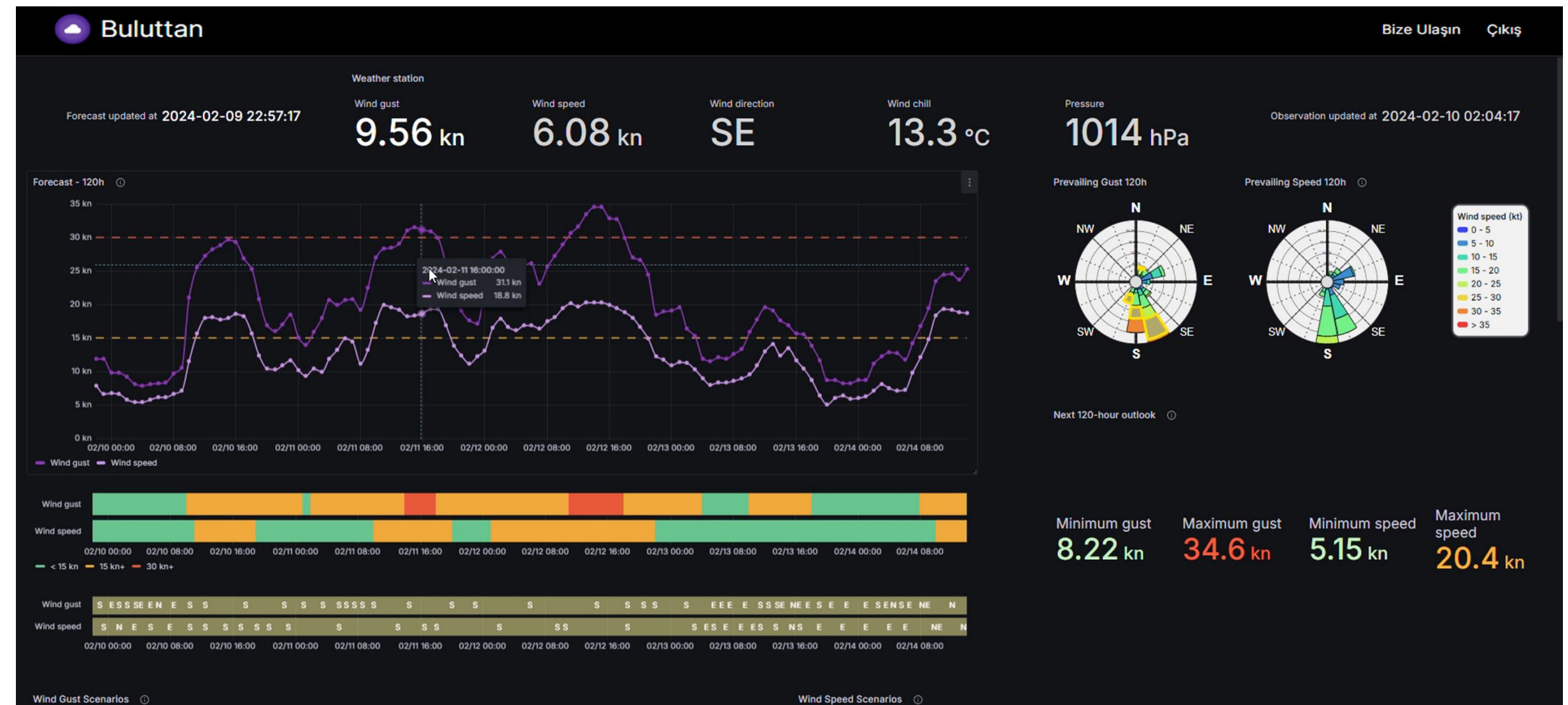
AI-Powered Weather Intelligence for Maritime Operations



- Designed for Marine Operations & Captain Decision-Making
- Hybrid Atmospheric + AI Modeling for high-precision forecasting of marine critical Parameters
- Proactive alerts via web & mobile for extreme weather events



- Multi-sectoral: Commercial Shipping, Offshore Operations, Naval & Civilian Fleets, Logistics
- Weather Intelligence for **safe & efficient maritime operations**
- Reduce demurrage fees
- Better supply planning for logistic operations





Skywatch Land: Route-based Weather Intelligence

BEFORE DRIVE



AFTER DRIVE

Receive **real-time weather alerts** on your mobile for your current location

Prepare your vehicle for extreme weather conditions like heavy rain or snow

DURING DRIVE

Instant notifications for **severe weather**

Drive safe with live weather updates along your route – **icing, fog, rain, wind, air quality**



Buluttan | Energy

Wind&Solar

Hydro

Grid



Power Forecasting: Wind & Solar Production

- Day-Ahead and Intra-Day markets energy production forecasting
- Live data driven algorithms fed with AI-powered forecasts
- Comprehensive Weather Intelligence sytem to manage renewable portfolios

Detailed Accuracy Analytics with Alternative Suppliers



Financial Reporting



Success Story: Power Forecasting: Hydropower Operations



Use-case:

Predicting the volume of water that will flow into hydroelectric power plants

“ 1 meter reduction in the water level accounts for 1% in the efficiency”.

Saving: 350–400 k\$ / year

Application

Precise, Hyper Local Hydro Model co-developed with Entek Enerji and KoçDigital

AI model developed using 56 parameters, of which **42 is produced by Buluttan’s Forecasting Engine**

Results

- **95% accuracy for daily** energy production forecasts
- **90% accuracy for seasonal** (6-months) energy production forecasts
- Project mentioned in [DAVOS Summit 24'](#)



> 40	25	6	15	T-1
Atmospheric Variables	Year Historical	Months Seasonal	Day Forecast	Daily Observation

Weather Intelligence for Power Grid Resilience and Demand Forecasting



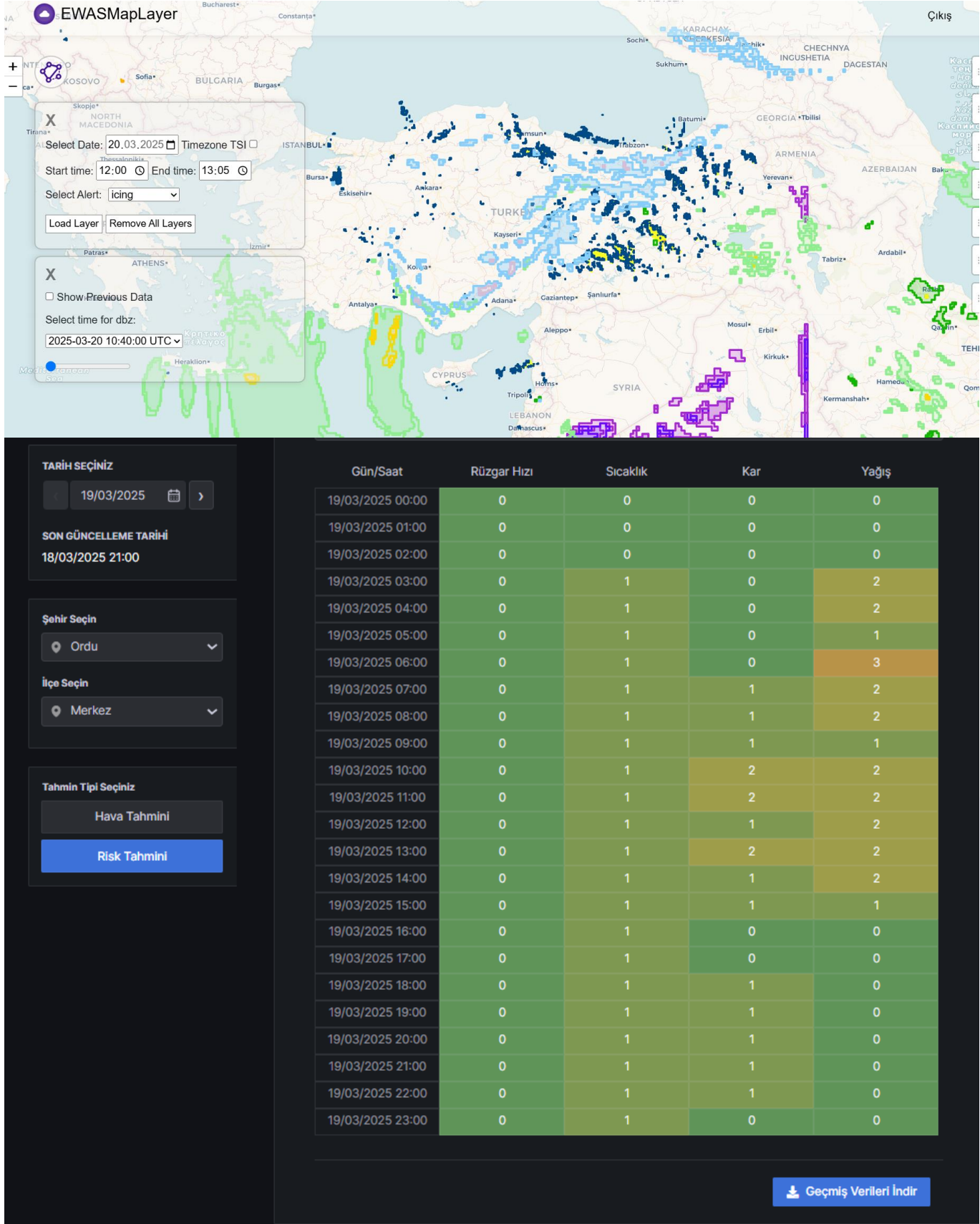
Weather Data Solutions for Demand Forecasting

- Hyper local high precision forecasts for demand forecasting critical parameters
- Dashboard designed for energy demand forecasting teams to monitor and analyze data efficiently.
- High-Resolution Data Access through dashboard or API



Predictive Weather Analytics for Infrastructure Protection & Power Stability

- Weather-wise risk scoring for operational decision-making.
- Real-time precipitation alerts with Rainwatch Alerts
- Weather intelligence for weather related outage predictions
- Maintenance & repair scheduling based on extreme weather conditions.



Buluttan



Contact us

Office: Maslak Mah, Bilim Sk, Sun Plaza, 9. Kat, Sarıyer, İstanbul

buluttan.com

contact@buluttanwx.com