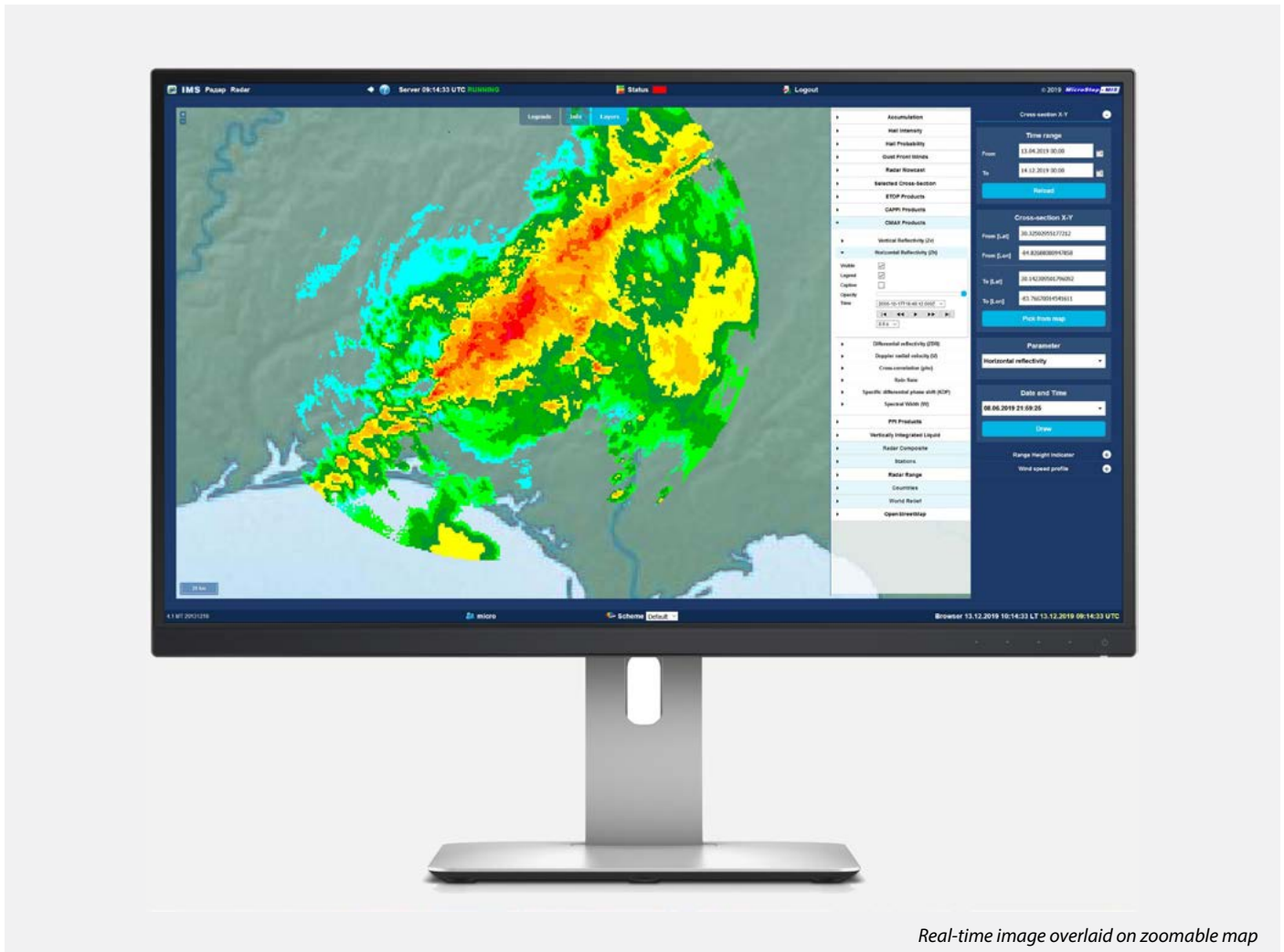# IMS4 Radar Studio

Application Software

IMS4 Radar Studio is a unique tool for processing, analyzing, and graphic presentation of radar and lidar data from standalone devices up to multi-radar networks.


Real-time image overlaid on zoomable map

Benefiting from 30 years of MicroStep-MIS experience in weather data processing, the IMS4 Radar Studio provides the meteorologists, hydrologists, aviation users and researchers with functionality starting from radar data collection, analysis, product generation up to the weather monitoring, nowcasting, detection of hazardous phenomena, and issuing early warnings.

- Coupled with MicroStep-MIS MMR radar or integrated with the 3rd party X/C/S-band weather radars, Doppler lidars, satellite imagery, weather station data, lightning data
- Support of different radar/lidar scanning strategies
- BUFR, GRIB, HDF5, OPERA ODIM, NetCDF, UF, etc. data formats
- Image export to GIF, GeoTiff, PNG, JPG, KML/Google Earth, etc.
- Intelligent feature detection algorithms to identify microburst and/or gust front:
  - Image recognition algorithm with the DBZH Storm Cell test
  - Shear-based algorithm with the VIL test
- Weather radar data export to ATC Console (ASTERIX CAT 008, 009)
- TITAN compatibility (www.ral.ucar.edu)
- Integration with other IMS4 products:
  - IMS4 Automated Weather Observation System (AWOS)
  - IMS4 Low Level Windshear Alert System (LLWAS)
  - IMS4 Maps: radar products via OGC Web Map Service
  - IMS4 Weather Studio
  - IMS4 Model Suite: integration with the Flash Flood models
- Embedded application / web server
- Multi-language support (EN, RU, FR, …)
- Certified for civil aviation use
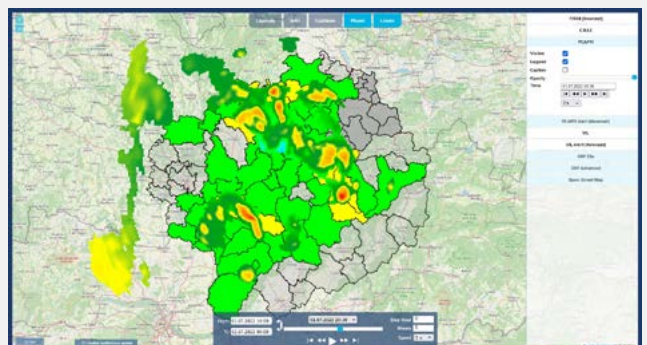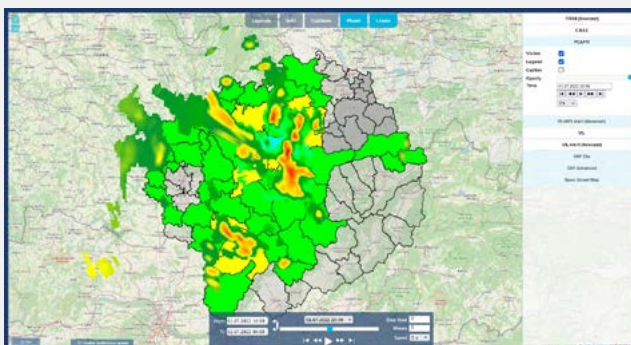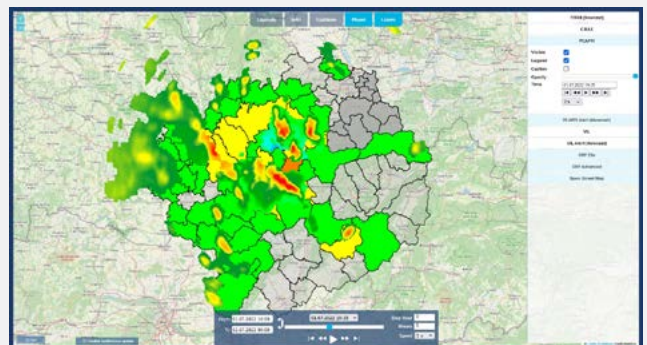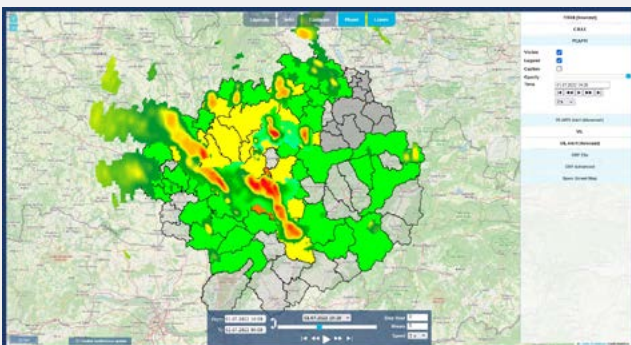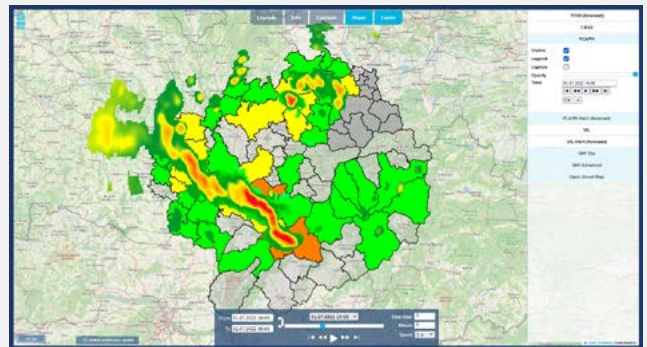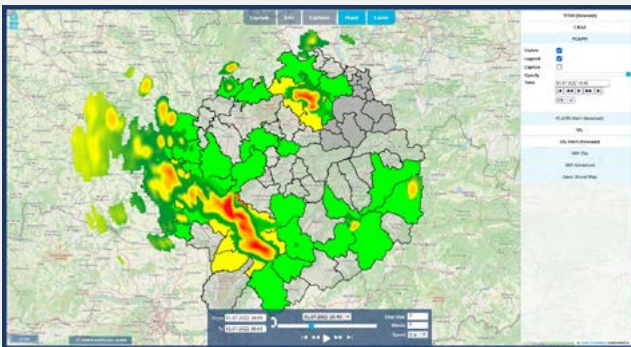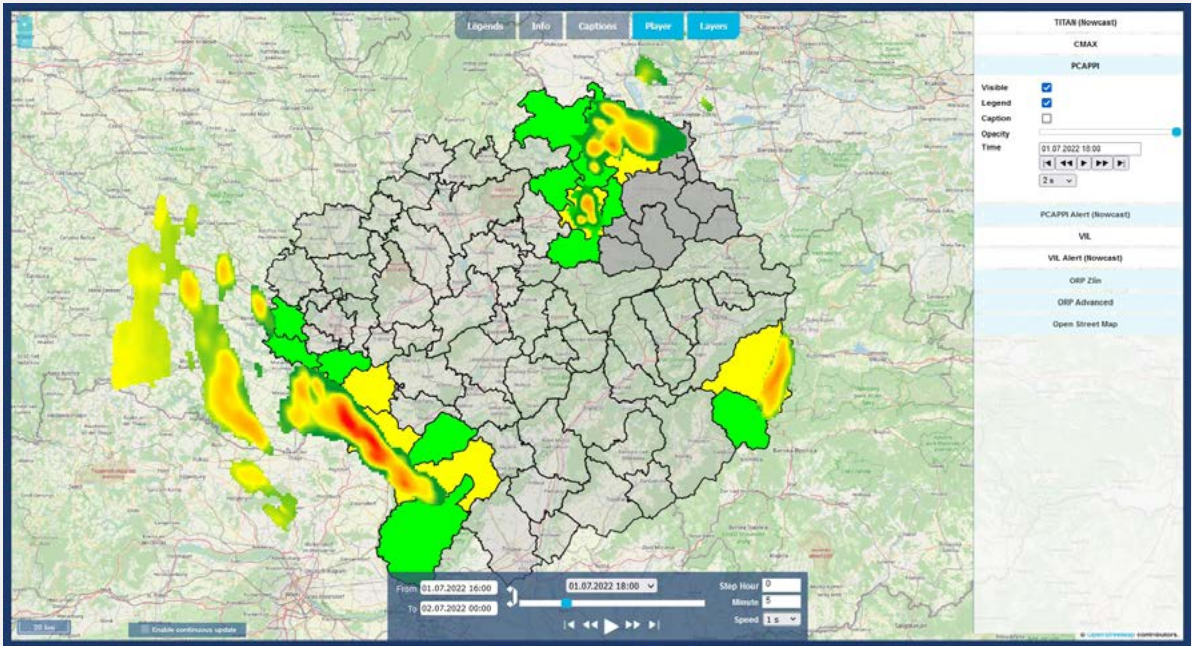
A cold front passing across South Moravia on July 1, 2022. Displayed are the CAPPI product, and its transformation to a qualitative nowcasting within the administrative units of the region (green/yellow/orange/red alerts).

Mini Meteorological Radar MMR-116
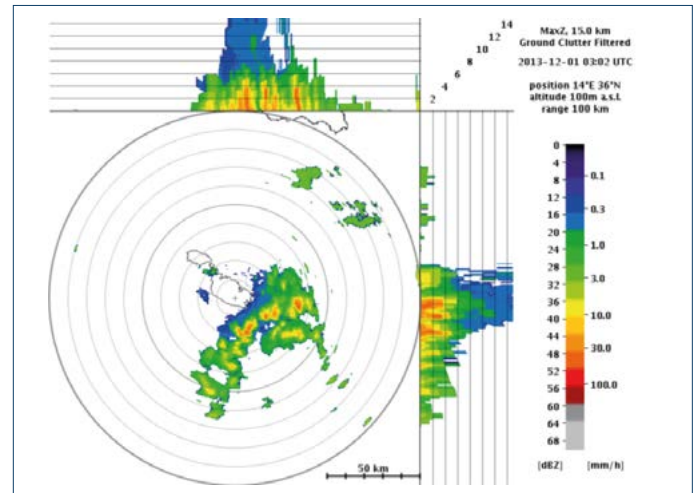
A real-time Column Max

Standard and Dual Polarization Moments [1]

- Z (Zh, Zv) Reflectivity
- V Doppler Velocity
- W Spectrum Width
- R Rain intensity
- ZDR Differential reflectivity
- LDR Linear Depolarization Ratio
- KDP Specific Differential Phase
- PhiDP Differential Phase Shift
- CC Correlation Coefficient
- SNR Signal-to-Noise Ratio
- SQI Signal Quality Index

_____

[1] If available from particular radar / lidar

Standard meteorological products

- PPI (Plan Position Indicator) one radar elevation
- CAPPI (Constant Altitude PPI) horizontal cross-section
- RHI (Range Height Indicator) vertical cross-section
- Echo top / base
- Composite Reflectivity (Column Max) maxima in columns

Wind Products

- VAD, VVP, UWT wind field reconstruction

Hydrological products

- Rainfall intensity
- VIL (Vertically Integrated Liquid Water) column sums
- QPE, rainfall accumulations over time intervals
- Rain gauge / river basin statistics

Windshear and turbulence products

- Radial / azimuthal / elevation shear
- Runway oriented shear
- Horizontal / vertical shear
- 2D / 3D shear
- Integration of radar / lidar / anemometer LLWAS systems
- Glide path profile
- FAA windshear alerts
- WS WRNG ICAO windshear warnings

Composite products

- Generation of the composite products from the heterogenous radar networks

### Phenomena detection and warning products

- Hail
- Gust front
- Microburst

Phenomena detection and nowcasting

- Storm cell identification and nowcasting
- TREC (Tracking radar Echoes by Correlation) nowcasting up to 2 h
- QPE (Quantitative Precipitation Estimation)
- Microburst and gust front movement nowcasting
- Qualitative nowcasting (no event / light / moderate / heavy event) as alerts issued for smaller administrative units
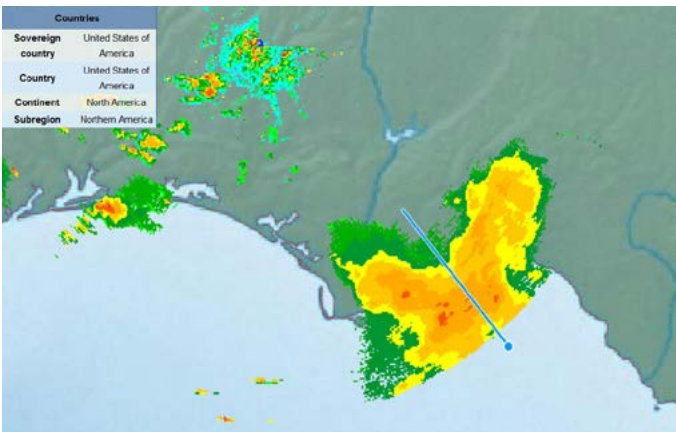
Cross sections

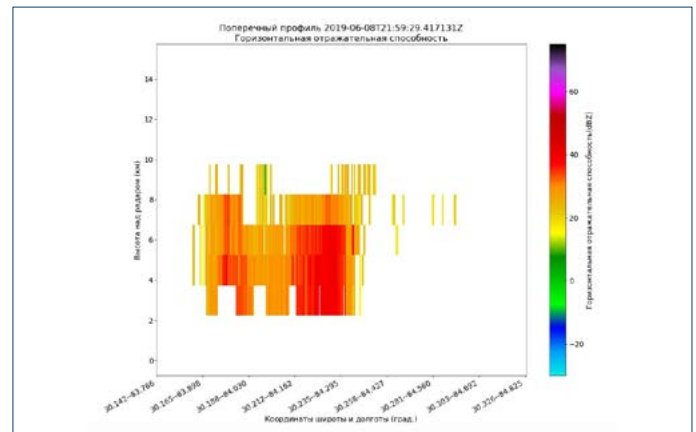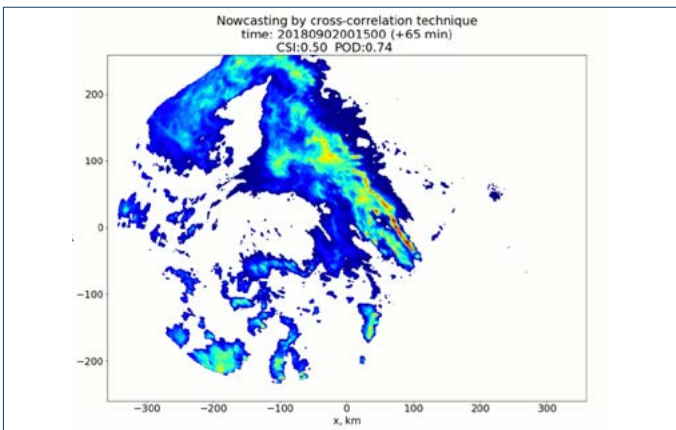- Mouse controlled cross-sections and profiles
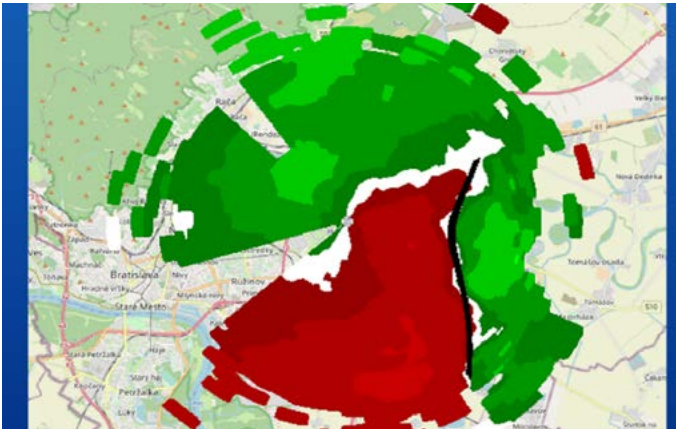
Gust front detection
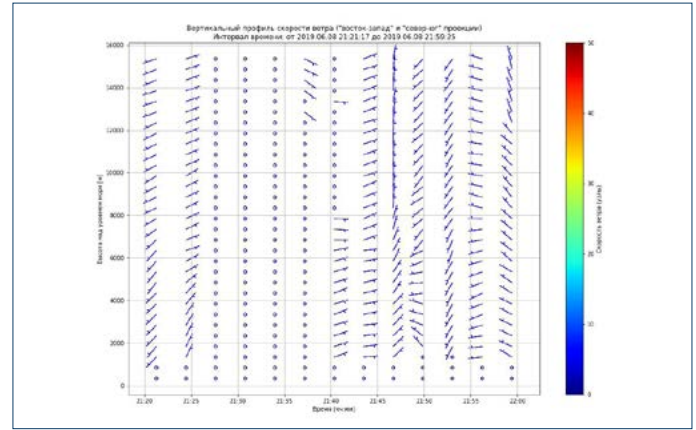
Wind speed profile

Cross-section selection

Horizontal reflectivity cross-section

TREC nowcasting

Interfaces

- File-based transfer (FTP, sFTP, scp, local/shared file system)
- UDP (multi-) cast (ASTERIX CAT008, CAT009)
- OGC Web Services (WMS)
- NTP
- IPv4, IPv6 support

Product processing

- format conversion
- re-projecting, re-gridding of products
- color scale change
- detailed logging of processing
  - input data size and arrival time
  - output product ID, size
  - failure (if any) including the reason
- product database and a browser of the generated products

System requirements

- Standard server or a dual hot-failover cluster
- Linux
- Mozilla Firefox/Google Chrome/Edge (Chromium-based) browsers supported