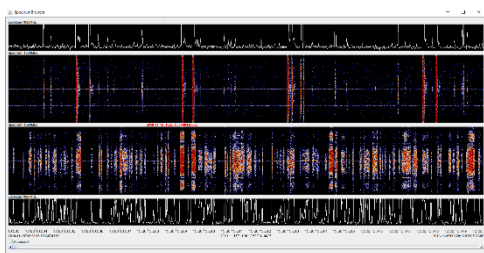


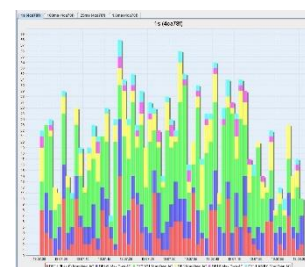
openAir1090F Frequency Monitoring System consists of one or more 1030 and 1090MHz receiver stations, a central server and display stations. Purpose of the system is to visualize the frequency utilization of the important ATC uplink and downlink frequencies and monitor the interrogation activities of surveillance radars and multilateration systems in the vicinity.



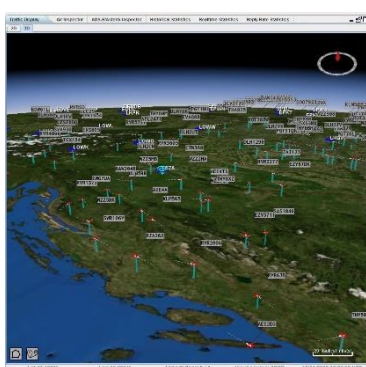
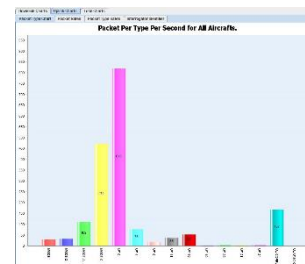
The system receives and decodes all data available on the uplink and downlink frequencies. The raw sample data is stored in a compressed format for multiple days on the server disks and is available for detailed analysis.

The data on the frequencies are decoded and categorized into message formats. The system supports Mode 1, 2, 3/A, C, Mode-S, ADS-B interrogation and reply messages and stores the decoded information together with metadata in a database.

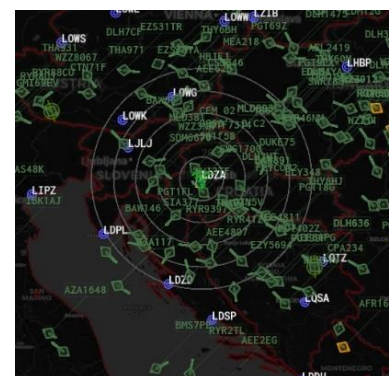
Messages are timestamped by a high-precision GPS synchronized timestamp to correlate messages between the uplink and downlink channels and detect duplicate messages from the multiple receiver stations.



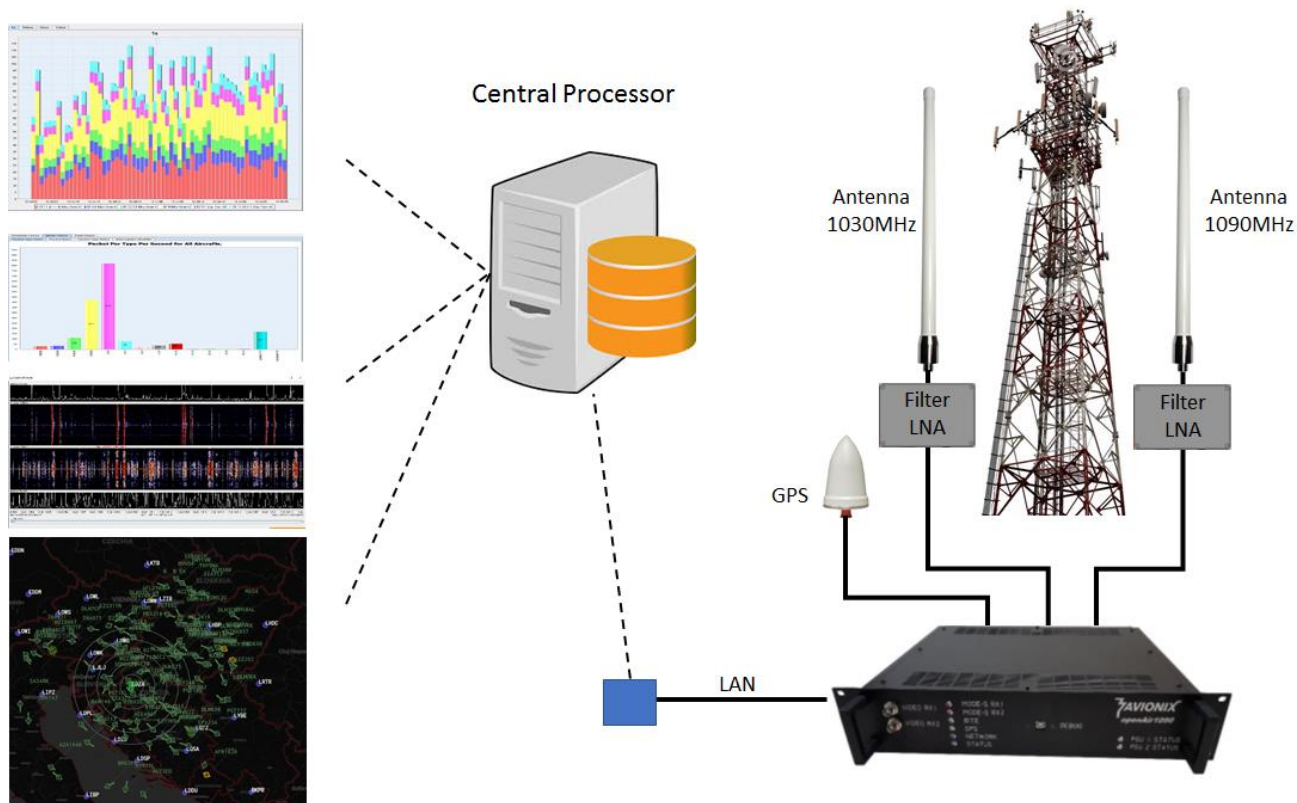
Statistical evaluations are performed by the server on-the-fly and derived data is stored in additional tables of database. On top of this tables a variety of predefined charts are available to monitor the frequency utilization and traffic situations in real-time or on time periods from the past. The data is available for export in various formats for further processing in 3rd party tools.



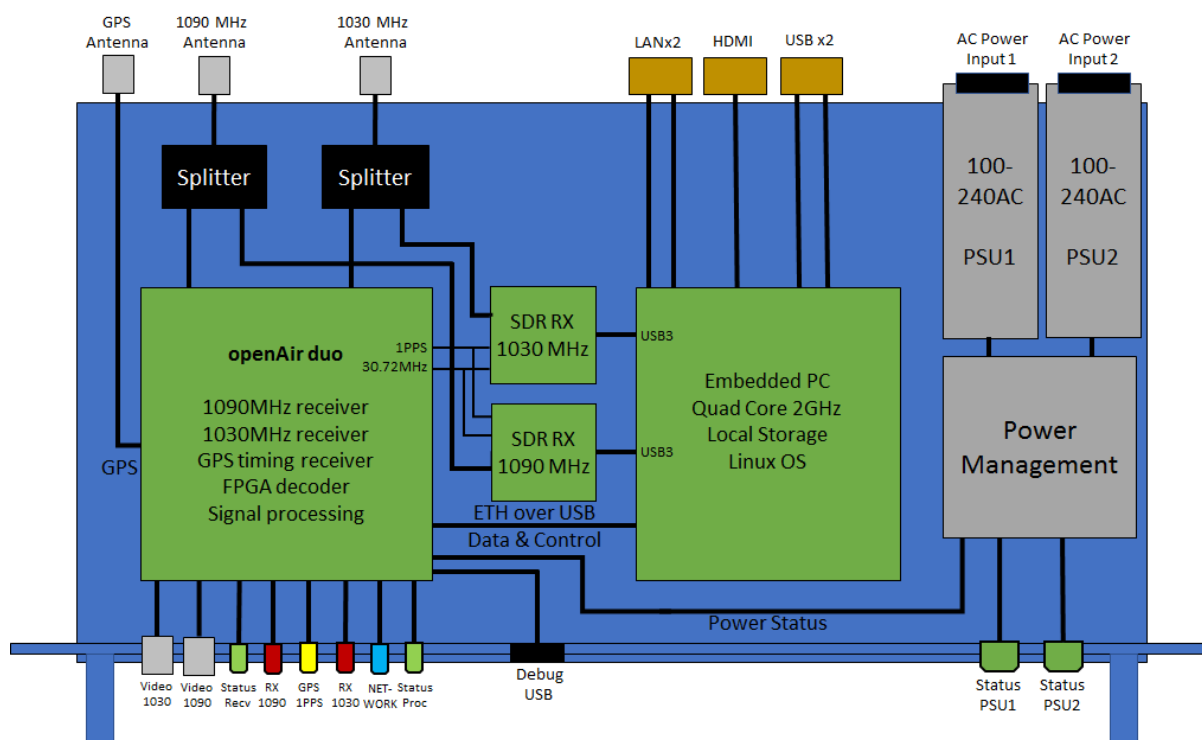
The Frequency Monitoring application provides 2D and 3D map windows to analyze the traffic situation from different perspectives. The maps can be used to overlay interrogation rate heatmaps, accumulated historical traffic and perform playback of recorded traffic. The system provides all data in raw and ASTERIX CAT021 format on network interfaces.



System Overview



Block Diagram



Front Panel



Item	Description
Video 1090	1090 MHz base band output connector (BNC female)
Video 1030	1030 MHz base band output connector (BNC female)
RX 1090	Red LED, Pulse for message on 1090 MHz
RX 1030	Red LED, Pulse for message on 1030 MHz
NETWORK	Blue LED, Connection to processing server established
GPS	Yellow LED, GPS pulse-per-second
STATUS PROC	Green LED, Status of processing PC
STATUS RECV	Green LED, Status of receiver
DEBUG	USB Debug port connection
PSU 1 STATUS	3 state LED OFF: PSU switch OFF, GREEN: PSU switch ON and status OK, RED: PSU switch ON and input or output power problem
PSU 2 STATUS	Same for PSU 2

Rear Panel



Item	Description
PSU1	Mains connector and ON/OFF switch for PSU 1
PSU2	Mains connector and ON/OFF switch for PSU 2
COLD START	Button to reset system to default settings during start-up
ALARM	Normal open and normal closed relay alarm contact
RX 1090	1090 MHz antenna connector (N-type female), 5V Bias-T
RX 1030	1030 MHz antenna connector (N-type female) , 5V Bias-T
GPS	GPS antenna connector (BNC female)
ETH 1	Ethernet LAN connection (RJ-45 jack)
ETH 2	Ethernet LAN connection (RJ-45 jack)
HDMI	HDMI output for LCMS
USB 1	USB port 1, eg. for mouse
USB 2	USB port 2, eg. for keyboard
⏏	Earthing point

Technical Parameters

Power supply		
Input voltage 1	100 - 240 VAC / 50Hz	IEC60320 / C14
Input voltage 2	100 - 240 VAC / 50Hz	IEC60320 / C14
Power consumption	50	[W]
Dimensions		
Type of enclosure	19" rack enclosure, 2U	
Front panel width	483	[mm]
Front panel height	88	[mm]
Enclosure dimensions (w * h * l)	425 * 84 * 335	[mm]
Weight	9	[kg]
1030MHz Receiver Input		
Frequency	1090	[MHz]
Antenna Input	50	[Ω] n-type female
BIAS-T	5	[V]
1090MHz Receiver Input		
Frequency	1090	[MHz]
Antenna Input	50	[Ω] n-type female
BIAS-T	5	[V]
GPS receiver		
Antenna/power supply	Active antenna with 3.3VDC power	BNC connector
1PPS Frequency Stability	<=5ppb	GNSS locked
Hold-over, 24 hours	< 100 ppb typ	GNSS not locked
Dual Network connection		
Ethernet type	Cat. 5e, 10/100/1000BaseTX	RJ45 connector
Surge protection	IEC 61643-21	
Data protocols	TCP/IP, UDP/IP, HTTP	
IP address	Fixed or DHCP	
Alarm Contact		
Max. Voltage	24	[V]
Max. Current	5	[A]
Environmental specification		
Ambient temperature	0 to 40	[°C]
Relative humidity	<80	[%]
Cooling	Passive	no fan