



Product Overview

Radarcape

Professional ADS-B Receiver

Günter Köllner Embedded Development GmbH - Am Rain 24 - 85256 Vierkirchen - Germany

Radarcape

Professional ADS-B Receiver with Outstanding Features & MLAT Functionallity



Benefits

Radarcape is unique, no other ADS-B receiver on the market has this versatility of powerful features.

Start flight tracking without any additional software. All you need is a web browser on a computer, tablet or any other device, with our user friendly responsive design. Everything you need is built-in and does not require any software or apps to be installed. Watch aircrafts in 2D on different maps and styles (OpenLayers, ATC) and see the flight parameters in detail in the aircraft flight list. External software is supported by RAW and pre-decoded data in many formats and ports over ethernet and USB. Even a 3D display can be done by using KML viewers (e.g. Google Earth). With its built-in GPS module you have a very high time accuracy of 50 ns, ideal to support multilateration (MLAT) with Mode-S and even ADS-B. A minimum of three Radarcapes is sufficient to start your own MLAT network. You may use our public Jetvision MLAT server (see below). Within the community, you can build up your own shared group. Optionally we can operate a dedicated server for you. If privacy is required you can have your own server running in your own network.

Solutions

Even with a single device you can observe your airspace within around 400 km (line of sight), stable and reliable, to have all information about aircraft movements. Being connected to our Jetvision server you can increase your area by making your own group with serveral Radarcape devices including MLAT.

You can start airfield and ground traffic observation with MLAT & ADS-B starting with nothing more than three Radarcapes and a MLAT server. MLAT calculation can be done also for ADS-B aircraft to be independent from their ADS-B results and to prevent of ADS-B spoofing.

As a single device or together with other devices, the Radarcape is a very fail-save tool for a wide range of operations.



Inside

Radarcape has high quality RF circuits for a wide reception range with high accuracy, a Linux based firmware, low power consumption and is proven to operate in a wide temperature range. The GPS data is provided to Chrony or NTPD as a Stratum-1 time server. Three options make the Radarcape the best solution for special requirements: Antenna diversity, ADS-B video out and an external clock reference input.

Radarcape Antenna Diversity (optionally)

Using the Radarcape two channel (2CH) option (Fig.1) will give you best results in difficult surroundings. Many problems can be solved, e.g. you need a favorite direction to observe a hot spot (Fig.2), have your antenna on a tower with blocking condition (Fig.3) or you have a long observing range (Fig.4).



Web Browser User Interface

(powered by the Radarcape)

- Different Map-Styles including ATC and OpenLayers*
- Table view with all aircraft data and flight details
- Settings, protokols, etc.



With its amazing filter functions each connected client can setup and filter to various conditions including:

- Center screen to home location
- Keep selected aircraft in the center
- Filter on altitude, speed, distance...
- Filter on flight, aircraft type, fleet watch
- Select data souce e.g. ADS-B, MLAT, FLARM, OGN
- Setup track length, refresh intervall

✓ Altitude (ft)	from		to	Ŵ	×
Speed	from		to		
Distance	from		to		
 Flight Aircraft Type Eleetwatch 		e.g. e.g. D-*,/	DLH1330 c A320 or A3 ABCDEF,FF	or DL 2*	.H*
Track Length		5400)		
✓ ADS-B ✓ MLAT ✓ FIAwa 🗌 OGN ✓ Flarm					
Preferred Source		Aut	:0		¢
Refresh Inte	erval	(1s			¢
			Apply &	Clos	se

.....

Radarcape Technical Data

Radarcape Hardware	
Trimble Resolution SMT GPS module	GPS localisation and timestamps with a resolution better than 50 ns 1σ (15 m)
Beaglebone Board***	AM335x 1 GHz ARM Cortex-A8 512 MB DDR2 RAM, 4 GB eMMC USB host port, USB device port
Sensitivity	-93 dBm signal level for 50 % decoding rate or better
Decoding	FPGA based decoding
USB expansion port	SDR sticks, measurement devices, data storage systems
Temperature range	Tried and tested in a wide temperature range
Power	Low power consumption, typical 3 W (external power supply)
Extensions	Open design for customer extensions
Optional hardware modules	 2 channels for antenna diversity Video out (ADS-B analog signal) External clock input (10 MHz)

Aircraft Data Output	
Raw Mode-S data	 Non-decoded raw data available for formats DF-0, DF-4, DF5, DF-11, DF-17, DF-18, DF-20 and DF-21 AVR-Hexdump or Beast-Binary formats 12 MHz counter legacy timestamp or GPS based ab- solute timestamps
Decoded data formats	 Port 30003 CSV style format JSON format HTML web GUI XML format
Decoded information	 Aircraft data: ICAO hex code Flight parameters: location, altitude, speed, track, vertical rate Flight ID, Squawk BDS registers (partly) Signal level
Accessibility	 TCP connection UDP streaming USB VCP serial interface

Remark:

Jetvision MLAT server has the same data interfaces as Radarcape. */**/*** see last page

Radarcape Software Features

Firmware - Integrated Webserver			
Decoding	High performance FPGA based decoding (Mode-S, ADS-B and Mode-A/C data on 1090 MHz)		
Operating system	Linux operating system		
User interface	Web browser access with web interface (built-in webserver, compatible with all common browsers, responsive design)		
Map styles	Real time flight tracking in 2D map view (ATC or OpenLayers Maps) ^{*/**}		
Table style	Real time flight table update		
MLAT (Multilateration)	MLAT via Jetvision server or licensed customer operated server		
Feeder	Multiple feeder options built-in (Flightradar24, FlightAware, Opensky Network, PlanePlotter)		
FLARM®	External FLARM® receiver connectable by LAN		
Open Glider Network (OGN)	OGN aircrafts can be shown by access to OGN server		
Network interfaces	Multiple network interfaces (TCP, UDP, USB-VCP)		
Data formats	Multiple pre-decoded and raw data output formats (JSON, CSV, KML, Port 30003, raw data)		
Time server	Stratum 1 NTP server		
Optional	Optional own feeder and formats possible		

Powerful Software Options

🛧 Aircraft Data 🗸	Status	 ❸ Status - 	🖌 Settings 🗸	🛿 About 🗸	🗲 Settings 🗸	🛛 About 🗸		
Aircraft List		🌣 System			🌣 General			
C Live 2D OpenLay	ers Map	💠 Jetvision	💠 Jetvision MLAT			💠 Jetvision MLAT		
Live 2D GMap		network Data Ports			추 Feeder Settings			
3D Tracks	3D Tracks		① Database Update			External Sources Settings		
 ✔ Live 3D KML Output ▼ KML Output Filter Settings 		♥ GPS			🛱 Streaming Data Output			
		External Sout Open Glider Open Glider	urces Net Server Connec Net Local Receiver	tion Connection	 ➡ Save & Res ➡ Network ➡ Software M ▲ Change Pa: 	tore Configuration aintenance ssword		
		C Feeder		C Reboot				
		Flightradar24	4					
		PlanePlotter						
		FlightAware						

Opensky Network

Radarcape Basics

Radarcape Basic Data	
Power	5 V external power supply, 2.1 mm DC connector
Dimensions	92 x 80 x 45 mm (L x W x H)
Weight	300 g
CE and FCC certified	CEE and FCC
ROHS conform	Yes

Radarcape Delivery Includes		
Radarcape	Hardware options must be ordered separately	
Power supply (5 V)	4 types of wall plugs: EU/ US/ Australia/ UK we ship the one that fits to the destina- tion country	
Network cable	5 m, CAT-5	
GPS antenna	Cable length 5 m, extension up to total of 15m available	



Radarcape Accessories

Antennas	and Filter			
	A3 ADS-B Antenna	A3 ADS-B Antenna - V4A offshore		
	Premium A3 ADS-B antenna with a high gain (+5 dBi) for the frequency range of 1090 MHz including antenna mount. N-Connector	This ADS-B antenna (V4A stainless special steel) is suitable for off-shore use and is including mounting kit. N-Con- nector		
	It is suitable for installations with short to medium length antenna cables or when using low loss cables.	SCO-1090-MO certified MIL-STD-810G, method 509.5 (48/48h).		
Antennas	The antenna is best suitable for outdoor use.	This passive antenna has a high gain (+5 dBi).		
1090 MHz		It is suitable for installations with short to medium length antenna cables or when using low loss cables.		
	Active Diapason Antenna			
	Active high performance ADS-B Antenna 1090 MHz with 2 dBi gain, noise figure typ. < 1dB, LNA amplifier, ca. 21 dB gain. SMA-Connector.			
	For remote antenna setups to compensa- te for associated cable losses.			
	1090 MHz Cavity Filter			
	090 MHz 3 Pole Filter, 2x SMA-female or SMA/N female. filter with high quality and low attenuation. Ideal when GSM, FM or TV stations nterfere with the ADS-B receiver.			
Filter	The filter has a massive DC short on the input and the output for static electricity and lightning protection.			
	Passband Attenuation: 0.5 dB only. Bandwidth (-3 dB): better than 9 MHz			

For more products and accessories please visit www.jetvision.de

jetvision	Professional ADS-B & MLAT Flight Tracking Hume My Account Sign in Second	a 💻 🛚		jetvision	Professional ADS-B & MLAT Flight Tracking Home My Account Sign in County	v a = 38	
jetvišion Cetootes Rancac AOS Internet AOS 4 USS Singer AOS 4 USS A AOS 4 USS A	Professioni ADS-8 & Real Tright Textile Text of future 1 Text of future 2 Text of future 2 <thext 2<="" future="" of="" th=""> Text of future 2</thext>	ALSOT Toor back is ensy: UNIT WORK NA ADD ST Answer NA ADD ST Answer NA ADD ST Answer NA Cost You Too State You Cost You Too State You Cost You Too State You Cost Yo	6 10	Jetvision Cettores Names Abartonia Alia Sub Surger Alia Sub Surger Alia Sub Surger Alia Sub Surger Sub Surger Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub Sub	Professional ASSA & SLACT Fight Tasking Concent on the Concent o	Automatic and a second and	
	A factor due can be neglected from a factor for the factor of the neglected from the neglected f	NewsLettERS Name (Spring) Ernel Rebanke - Unschotte	Collect ADD 10		Here the section of t	Nonsierren Sone Material Material Consisten Consisten Consisten Consistent Co	0

Multilateration Requirements

	Katuarcape & Aront Data - O Status - > Sattings -
MULTILATERATION HIGH ACCURACY - LOW LATENCY	Conversion in the second secon
TI DIRECT	A Transmission of the second s
T3 T2 Sution 3 MLAX Server Sution 7 Sution 7	

Client Requirements	
Accessibility	Port 10011 must be open for both TCP and UDP from the Radarcape to the server
Firewalls on Radarcape side	In most cases, firewalls don't need special configuration (like DSL Fritz-Box, Speedport etc.)
GPS	GPS antenna must be installed and have a free sky view
Location	MLAT processing can be done for aircrafts within a com- mon airspace with at least two other Radarcapes
Prerequisites	Clients will receive a key file from the MLAT server ope- rator which enables MLAT functionality

Privately Operated MLAT Server Requirement		
Accessibility	Server must be reachable from clients on network	
License	Our licenses will contain a license for the server plus a defined number of key files for the clients	
Hardware requirements	Linux Debian 8.2 OS, Dual Core, 2 GHz CPU, 4 GB RAM	
Monitoring and maintenance	Status monitoring over HTTP: • Connected clients • Client's performance supervision • Currently tracked aircraft (summary of all clients)	
Mode-S data	All data formats that are available from a single Radar- cape are accessible on a MLAT server (implementation on request)	

Further information on the MLAT server can be found in our product brochure "Multilateration".

Jetvision Flight Tracking Network

Every Radarcape can join our public flight tracking network in order to enjoy features like remote access, sharing groups or multilateration (for areas where a sufficient number of stations are part of the network). Privately operated customer networks can be established by either jetvision as a payable service. For a strict privacy we issue licenses and support for local MLAT server operations.

Remark:

Please note that all these features must be paid by commercial customers. See also our terms and conditions on www.jetvision.de. For more informationabout licensing, options and special requirements, please contact our support: support@jetvision.de



Features Jetvision Flight Tracking Network	
Tracking data	Access to realtime tracking data including MLAT data
Grouping	Closed user groups
Remote access	To private groups using an app (e.g. PP mobile)
MLAT	 MLAT starting with three ADS-B receivers for a common area only MLAT is also available for ADS-B aircraft
Commercial options	 Option A: Operate a private flight tracking network on our jetvision server including MLAT Option B: Operate a jetvision MLAT server on your own hardware, using a server license Archive all flight tracking data for later reviews Individual functions on request

Trademarks & legal notices

FLARM® is a registered trademark of FLARM Technology Ltd., Hinterbergstrasse 15, CH-6330 Cham Jetvision® is a registered trademark of Günter Köllner Embedded Development GmbH

* OPENLAYERS: THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLU-DING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSARE DISCLAMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EVENPLARY, OR CONSEQUEN-TIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLU-DING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. https://openlayers.org

** **OpenStreetMap*** is open data, licensed under the Open Data Commons Open Database License (ODbL) by the OpenStreetMap Foundation (OSMF). © OpenStreetMap contributors. http://www.openstreetmap.org/copyright/en

*** Beaglebone: Terms and Conditions of Beaglebone can be found at: http://beagleboard.org/terms

jetvision

The Radarcape has best performances and technical features, but it is not certified and not for use in highly sensitive air traffic control evironments. We do not give any warranty to the results and data. Any liability is excluded!

V3.0.0 - 09.2018

German Head Office

Günter Köllner Embedded Development GmbH Am Rain 24 85256 Vierkirchen

Phone: +49 8139 9961909

www.jetvision.de support@jetvision.de

China Office

General Aviation Electronics Technology Co., Ltd. Floor 7, Long Quan Hu Building, No.2 Shangdi Two Street Haidian District, Beijing, China

Phone: +86 13552176105 +86 13001992718

