

ADS-B EXPERIMENT

A Wireless Communication Project
-PES2UG22EC063 K P RAGHAVENDRA

Introduction

What is ADS-B?

Automatic Dependent Surveillance–Broadcast (ADS-B) is a surveillance technology in which aircraft broadcast their position, altitude, velocity, and other data.

Widely used in air traffic control and aircraft tracking.

Objective of the Experiment:

To receive and decode ADS-B signals from aircraft using a Software-Defined Radio (SDR) setup and visualize them using a virtual radar.

Tools and Equipment Required

Hardware

RTL-SDR Dongle: A low-cost USB-based Software-Defined Radio receiver.

Antenna: 1090 MHz antenna for receiving ADS-B signals.

Computer : For running decoding software and visualizing data.

Software

Dump1090: An open-source ADS-B decoder.

Virtual Radar Server: Software for visualizing decoded ADS-B data on a map.

RTL-SDR Drivers: Necessary drivers for the RTL-SDR dongle.

Procedure (Step 1 - Setup)

Install RTL-SDR Drivers

Install the required drivers to make the RTL-SDR dongle work with your system.

Set Up Antenna and Dongle

Connect the 1090 MHz antenna to the RTL-SDR dongle.

Plug the RTL-SDR dongle into the USB port of the computer.

Procedure (Step 2 - Software Installation)

Download and Install Dump1090:

Install the Dump1090 software for decoding ADS-B signals.

Install Virtual Radar Server

Set up the Virtual Radar Server to visualize aircraft positions.

Procedure (Step 3 - Running the Experiment)

Start Dump1090

Run Dump1090 to begin receiving and decoding ADS-B signals from aircraft.

Configure Virtual Radar Server*

Use the decoded data from Dump1090 to display aircraft positions on a map.

Real-Time Aircraft Tracking*

Observe the positions, altitude, speed, and other parameters of nearby aircraft.

Results and Observations


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Map view showing flight paths over Bengaluru and surrounding areas. Key aircraft visible include VT-CIE, VT-IUC, VT-IIP, and VT-IHK.

VT-CIE
Air India
Airbus A320 251NSL
Altitude: 19850 ft
Vertical Speed: 2112 ft/m
Speed: 401.8 kts
Heading: 93.7°
Distance: 4365.50 nmi
Squawk: 1000
Engines: Twin jet
Species: Landplane
Wake Turbulence: Medium
Route: BLR Bengaluru, Bangalore, India
MAA Chennai, India

800BE6
AIC564
Civil
A20N



www.airport-data.com :: www.airliners.net :: www.airframes.org
Show on map :: Enable auto-select :: Submit route correction

Tracking 12 aircraft

Silhouette	Flag	Reg.	ICAO	Calisign	Route	Altitude	Speed
			801718			34225 ft	486.2 kts
		N607UP	A7E310	UPS9*	SZX*-CGN	4675 ft	233.6 kts
		VT-TNF	800C64			36000 ft	463.0 kts
		801509	AKJ162G			22400 ft	937.6 kts
		VT-IHQ	801428	IGO1127	BLR-MLE	9500 ft	298.0 kts
		801595				34975 ft	450.3 kts
		VT-CIE	800BE6	AIC564	BLR-MAA	19850 ft	401.8 kts
		VT-IUC	800D57	IGO6546		14825 ft	288.6 kts
			8015E5	IGO52MK		17375 ft	262.5 kts
			801684	GOA1923		9000 ft	203.1 kts
		VT-IIP	801503	IGO58KP	TRV-DEL	36000 ft	456.8 kts
		VT-IHK	80149A	IGO6571	BOM-HYD	25000 ft	301.2 kts

Powered by Virtual Radar Server

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Conclusion

Successfully received and decoded ADS-B signals using RTL-SDR and Dump1090.

Demonstrated real-time aircraft tracking and visualization using Virtual Radar Server.