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COMRAD3

A multichannel receiver
for FM band radar

COMRAD 3

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Overview

The ComRad3 is a direct sampling, multichannel receiver designed for test and evaluation of passive radar using the commercial FM broadcast band. To allow for applications such as angle of arrival (AoA) measurements, 3 receiver channels are provided, i.e. 3 analogue stages each driving a coherently clocked analogue to digital converter (ADC).

The receiver allows for the continuous, simultaneous and coherent channelisation using 16 digital down converters (DDCs). Up to 8 FM band channels can therefore be digitised simultaneously when using 2 receiver channels or up to 5 FM band channels when using 3 receiver channels. This provides redundancy against the time-fluctuating modulation bandwidth of FM broadcast band channels as well as potential robustness against undesirable propagation effects such as multipath, achievable as a result of the concurrent exploitation of multiple carrier frequencies.

The GPS disciplined oscillator allows for accurate GPS based time-stamping, sufficient coherence over long coherent processing intervals and for deployments using separated receiver configurations.

ComRad3 receiver is portable, rapidly deployable and suitable for operating in harsh outdoor environments with exposure to dust, water and solar radiation. It also supports the ability to run off batteries.
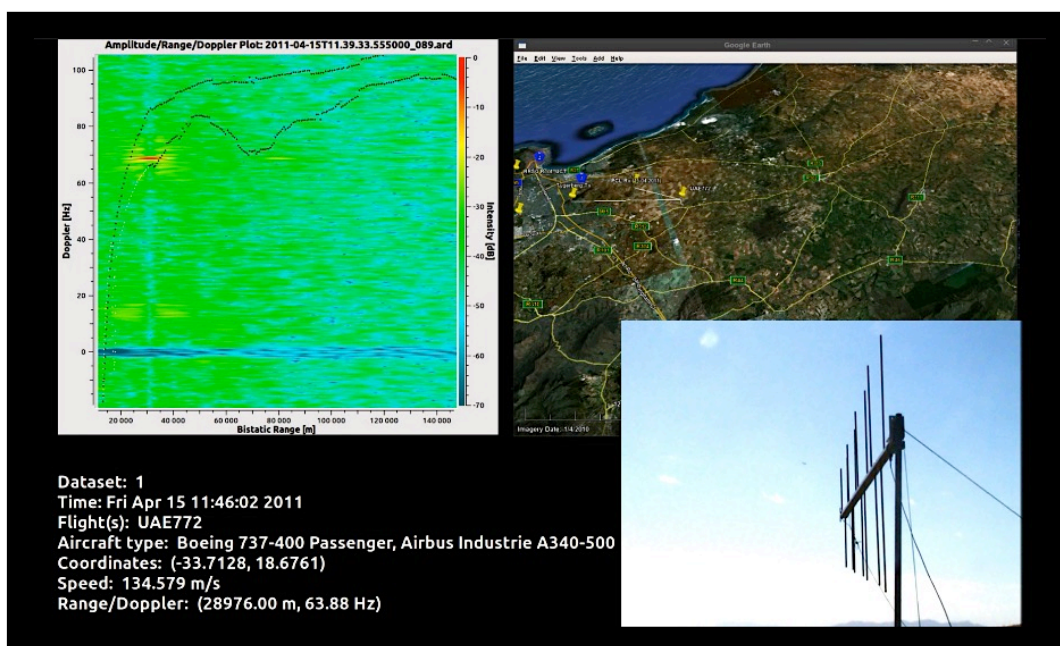
Key Features

- High dynamic range
- High sensitivity
- 3 antenna channels for angle of arrival capability
- Multiple FM channels
- Accurate time base and reference clock for multi-static applications

Applications

The ComRad3 is an ideal solution for test and evaluation of passive radar technology. It is a proven front-end receiver used in a current Commensal Radar demonstrator system. It is suitable for both multi-static configurations as well as single-site configurations where angle of arrival is required

API

The ComRad3 is interfaced via an Ethernet connection. A simple text based command interface on a telnet connection is used to control the unit and the resulting data is streamed in the open PXGF format. An SDK is available on request.

Amplitude/Range/Doppler Plot: 2011-04-15T11.39.33.555000_089.ard

Dataset: 1
Time: Fri Apr 15 11:46:02 2011
Flight(s): UAE772
Aircraft type: Boeing 737-400 Passenger, Airbus Industrie A340-500
Coordinates: (-33.7128, 18.6761)
Speed: 134.579 m/s
Range/Doppler: (28976.00 m, 63.88 Hz)

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Detailed Specifications

Parameter	Specification
RF Specifications	
Frequency Range	**88-108MHz**
Number of RF channels	**3**
Phase Noise	**≤ -125 dBc/Hz (Δf = 10 kHz)**
IP2	**≥ 60 dBm**
IP3	**≥ 18 dBm**
Noise Figure	**≤ 5 dB**
AGC dynamic range	**130dB**
Functional Specifications	
Number of DDCs	**16 x narrowband, 1 x wideband**
DDC Bandwidth	**156.25 kHz (narrowband), 25MHz (wideband)**
GPS	**16 Channel, ≤ 2.5 m CEP Accuracy**
Frequency Accuracy	**≤ 10ppb (with GPS)**
ADC	**16bit**
Physical Specifications	
Size	**430 x 285 x 140 mm**
Weight	**10kg**
Power Supply	**19-30 VDC**
Power consumption	**≤ 50 W**
Operational Temperature	**-10 °C to +55 °C**
Storage Temperature	**-30 °C to +70 °C**
Shock and vibration	**MIL-STD-810F**
EMC	**MIL-STD-461C** **IEC 61000—4-2/6** **CISPR 22 CLASS B**
Data interface	**1GbE LAN (1000BASE-T)**

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