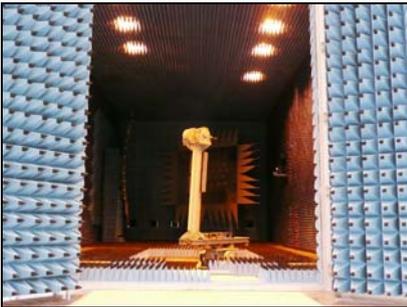


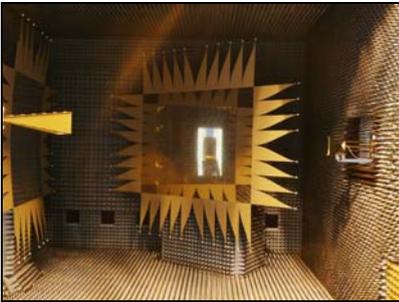


CTR: Compact Test Range of DLR for Antenna and RCS Measurements

The Compact Test Range



The CTR system is assembled inside a shielded, anechoic chamber of 24 x 11.7 x 9.7 meters.



Dual reflector system, manufactured by March Microwave Systems B.V.

The DLR Compact Test Range is fully equipped to perform antenna radiation measurements and RCS (Radar Cross Section) characterisation. The facility is operated by the Microwaves and Radar Institute. The core component is a March Microwave Systems B.V. dual cylindrical parabolic reflector configuration. It provides far field conditions for accurate real time measurements. The reflectors are built of a precisely shaped aluminium layer that covers an aluminium-core honeycomb substructure. Their surface accuracy allows the reflectors to perform well from 1 GHz (30 cm wavelength) up to 100 GHz (3 mm wavelength). Their geometry results in a quiet zone diameter of up to 3.8 meters (in a height of about 5 meters above the ground floor level). They are set up in a 24 m x 11.7m x 9.7 m shielded anechoic chamber that is lined with pyramidal foam absorbers. Their design enhances the frequency range down to 300 MHz.

A 6-axis model tower is used to handle the devices under test. Its first linear axis is a rail system that allows the model tower to completely roll out of the chamber. To perform radar cross section measurements, a Styrofoam tower can be erected on a second independent linear slide on the rails.

Measurement Equipment

Control and measurement equipment is housed in an adjoining room close to the feed slide on the first floor level.

A 4-port Rohde & Schwarz ZVA network analyser is used as RF-source and LO oscillator. The high measurement accuracy and fast sweep time enhance the capability of the CTR. It is placed in the control room close to the feed slide system. To change the feed antenna two stacked linear slides are available for comfortable feed antenna handling. The antenna itself is mounted on a polarisation turntable.

Measurements are controlled by the control, post-processing and analysis software tool ARCS V3.5. The software is running on two identical quad-core personnel computers for reliability and data handling during data acquisition.

Specified by the Institute, the facility was assembled by March Microwave Systems B.V. into the "TechLab" building. in 2009 The ambient hall is designed to house the shielded, anechoic chamber. For the comfort of the user, the complete infrastructure facilities of the building are available.

Owner of the system is the German Aerospace Center (DLR). System operations are under the responsibility of the Microwaves and Radar Institute (DLR-HR) in Oberpfaffenhofen, Germany.

Contact

Customer requests may be directed to:

Markus Limbach

Phone: +49(0)8153 28 - 3060

Email: markus.limbach@dlr.de

Or

Bernd Gabler

Phone: +49(0)8153 28 - 1182

Email: bernd.gabler@dlr.de

www.dlr.de/hr/en/



Picture of the new TechLab building on the DLR site in Oberpfaffenhofen. The left hall is equipped with the CTR chamber.

Deutsches Zentrum
für Luft- und Raumfahrt e.V.
German Aerospace Center

Microwaves and Radar Institute
Münchener Str. 20
D-82234 Wessling

Markus Limbach
Phone: +49 (0)8153 28 - 3060
Fax: +49 (0)8153 28 - 4 3060
markus.limbach@dlr.de
www.dlr.de

CTR SYSTEM SPECIFICATION

Type	Dual reflector compact range
Readings	Antenna measurements Radar Cross Section
Frequency range	1 GHz up to 100 GHz
Shielded, anechoic chamber	
Height:	9,7 m
Width:	11.7 m
Length:	24 m
Main reflector	
Height (incl. serrations)	8.0 m
Width (incl. serrations)	7.4 m
Sub reflector	
Width (incl. serrations)	6.0 m
Height (incl. serrations)	7.4 m

Test Zone

Diameter	Up to 3.8 m at 10 GHz
Amplitude ripple	<± 0.5 (0.2*) dB
Phase ripple	<± 5 ° degree
Cross-polar level	-40 (-50*) dB
	*) for the majority of practical applications

Model Tower

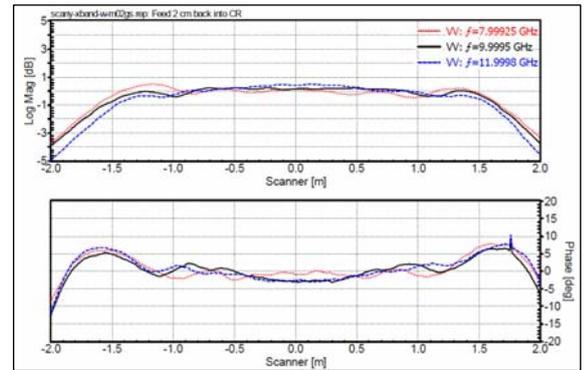
Axis	6 (1 pick-up elevation axis)
Accuracy	< 0.03° degree
Max. load	300 kg
Test Zone Scanner	5.4 m scan range + polarisation positioner

Software / RF equipment

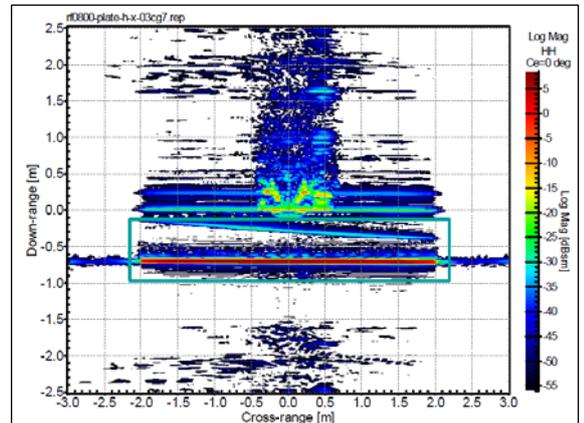
ARCS	V 3.5 Data acquisition, Post-Processing, Data Display and Analysis
Rohde & Schwarz ZVA	4-Port Network Analyser used as RF / LO source and receiver
HP LO distribution unit and measurement mixers	HP 85301 B

Measurements

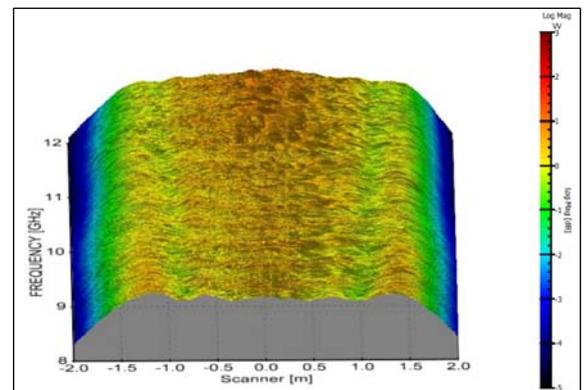
Antenna measurements	State-of-se art data readings 2D / 3D
Radar Cross Section	RCS measurements in a wide frequency range
ISAR imaging	
Tomography	



Plot of Test Zone scanning at x-band. 8 GHz, 10 GHz and 12 GHz. Amplitude and Phase.



ISAR Image of rectangular plate without Positioner removal.



Amplitude ungated, 3D, x-band vertical VV.

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www.dlr.de