

TRADE

MEDIA

BRIEFING

19



LOUT

A GE-national LO Demonstrator

DEFENCE AND SPACE

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AIRBUS

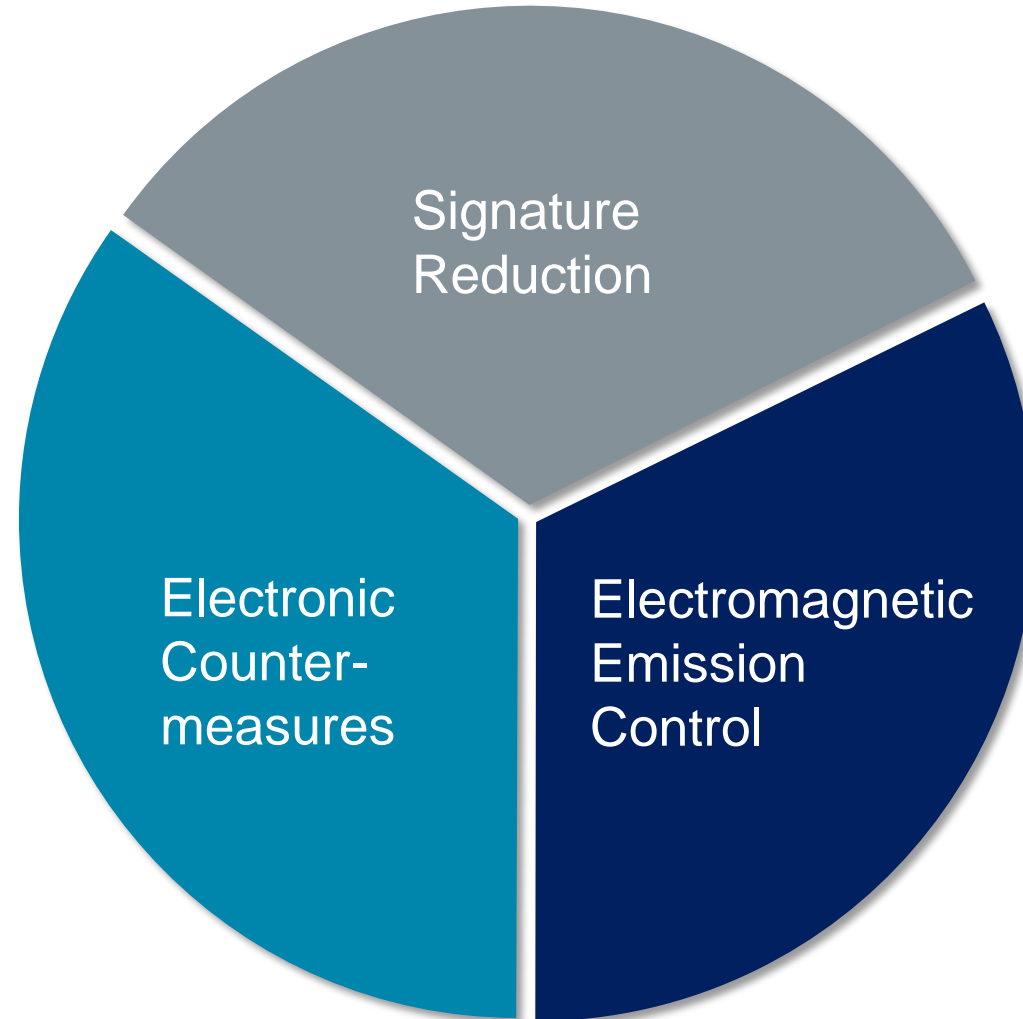
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GE VLO Demonstrator

- LO Activities at Airbus
- LOUT
- Q&A

Stealth: A holistic approach

The contributing dimensions



Electronic Countermeasures

Use of means such as e.g.

- Jamming
- Deception
- Signature augmentation

Signature Reduction

Signature Reduction

To be achieved in various domains

- Radar signature (low RCS)
- IR signature (low IR emission)
- Visual signature
- Acoustic signature

Electromagnetic Emission Control

Electromagnetic Emission Control

Includes means such as e.g.

- Emission management
- Data links with spread spectrum technique
- New sensors with lower detectability

Airbus: Our LO capabilities

Some key examples

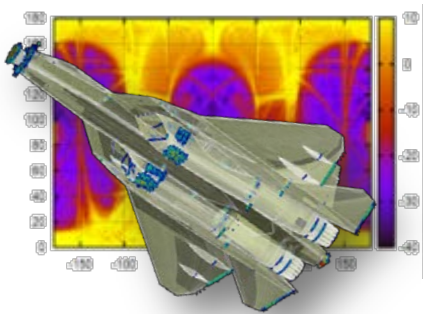
Integrated design process from operational requirements to system design



Devising balanced solutions between various constraints:

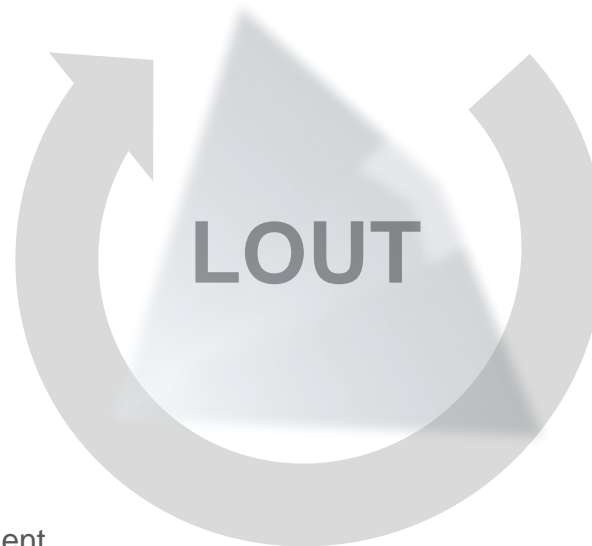
- Aerodynamics
- Electrodynamics
- Materials & processes
- Structural & environmental requirements

Computational electromagnetics (CEM) for LO design



World Class set of CEM tools and processes

- 20 years of Airbus development, funded by GE MoD
- Airbus core team cooperating with scientific Institutes & specialised companies
- Proven by several benchmarks & applications



Technology maturation

Vital activities to maintain & extend LO competences

- Design & manufacturing (with external partners) of LO hardware, materials & structures
- Identification of emerging disruptive LO technologies



Signature verification, test ranges

Several signature test assets from component, mock up to full scale aircraft signature measurement:

- Tornado LO Kit
- Demonstrators & concept designs
- System design responsibility of the Eurofighter Typhoon's detectability suite



Airbus: Our LO vision

The Low Observable UAV testbed – LOU

Design, Simulation and Measurement

Demonstration of the LO Properties of a VLO Platform at full scale

Technology Maturation

Risk reduction for technologies related to LO relevant components

Testing and Demonstration

Modular testbed to integrate camouflaged sub-components

Multidisciplinary approach

Covering radar-, IR- and acoustic-signature

LOUT schedule

An over 10 year programme

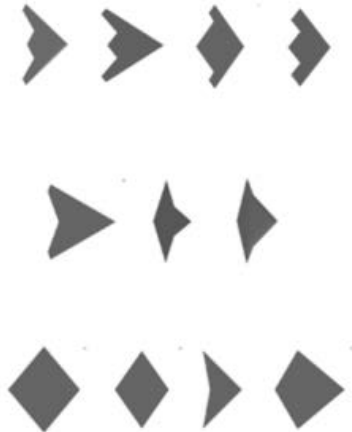
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Configuration Development			RCS simulation of outer shape ▼										
Testbed Manufacturing and Integration				Contract Award ▼									
Basic Configuration										RCS Basic Conf. ▼			
Iterative Camouflage Optimization													

- LOUT has been contracted by the German MoD in 2010 as a VLO ground testbed for demonstration of wideband signature reduction technologies and a testbed for further VLO integration bringing together simulation and measurement based on a potential configuration for a VLO-platform.
- LOUT was developed from 2010 onwards in Manching and Bremen in a Skunk Works approach

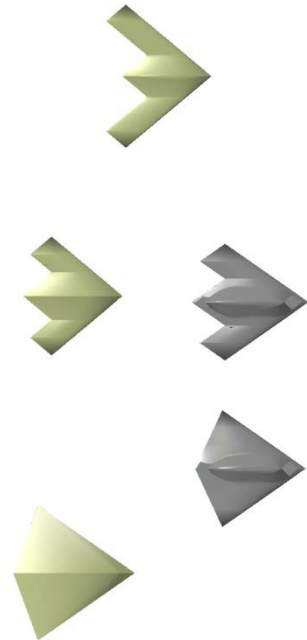
LOUT configuration findings

Several configurations were elaborated

2D Platforms



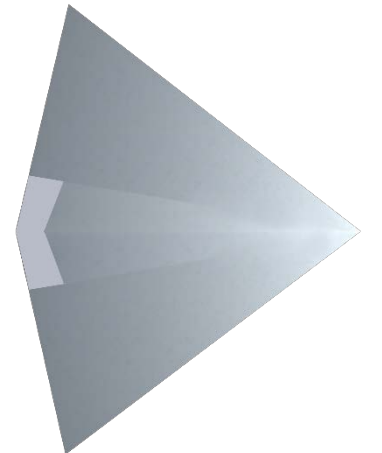
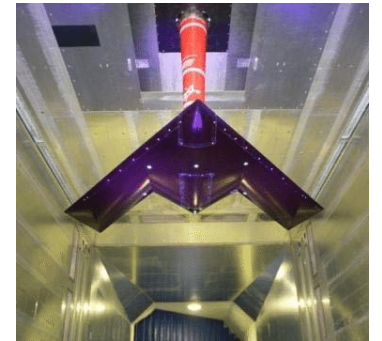
3D Layouts



3D Configurations



Test Configurations



LOUT LO key features

A broad overview

VLO Configuration for multispectral Stealth

Innovative Design supporting Radar, IR, visual and acoustic Stealth

Engine inlet with very low RCS

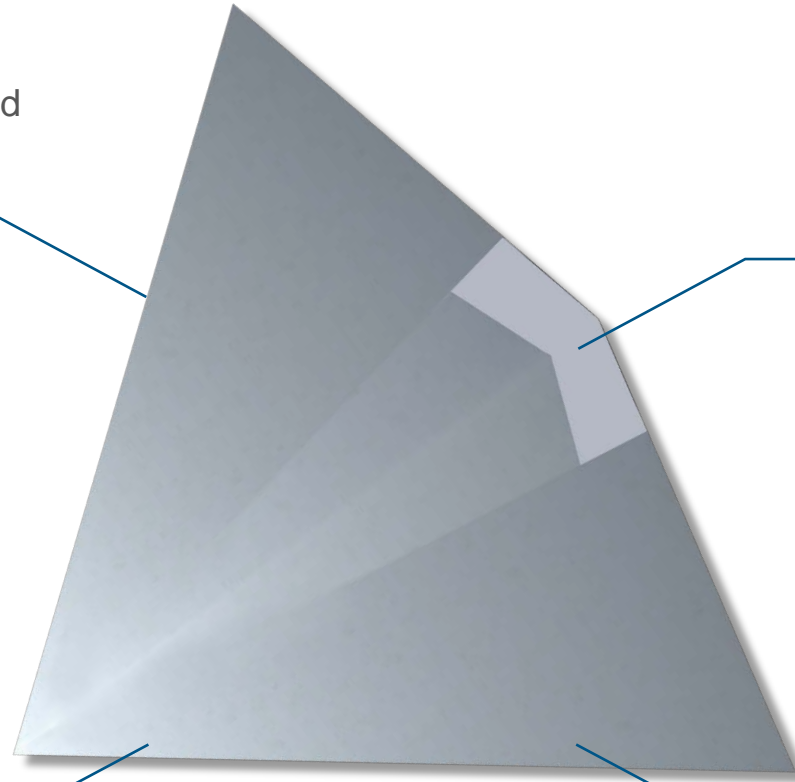
- Duct made of radar absorbing structure
- Broadband leading edge LO design
- Diverterless inlet
- Provisions to suppress IR radiation

Integrated Flat nozzle design

- Investigation of various LO compatible Thrust Vector Control options
- Options for cooling of structural parts

Wing / Body

- Ultra wideband L/E concept
- Aperture integration demonstration



LOUT LO key features

Some examples of contributing LO coatings

Surface Wave

- Surface wave attenuation to decouple mutually spaced scattering effects

Steps and Gaps

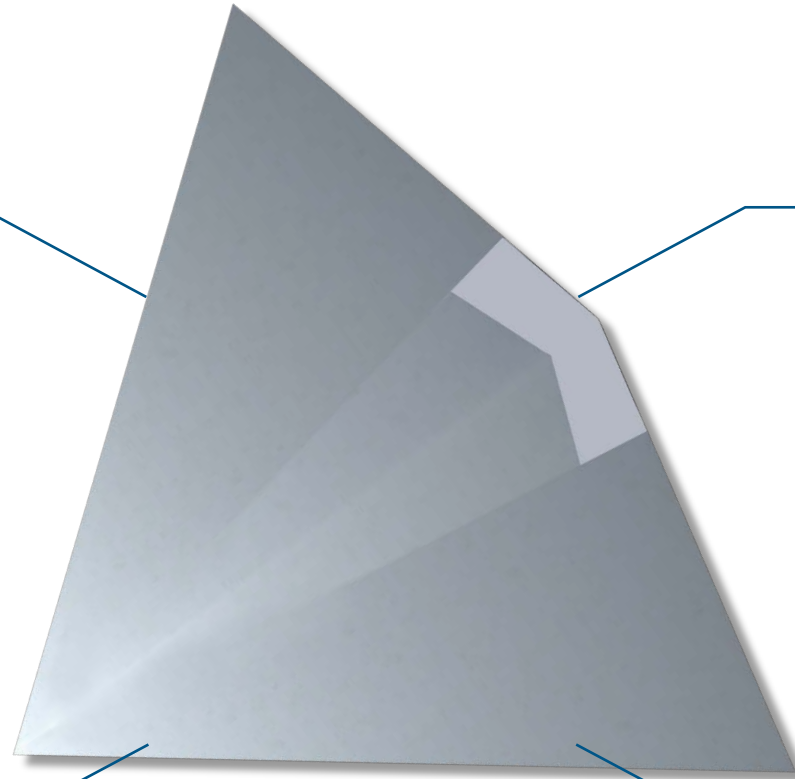
- Reduction of contributions from gaps

Transparencies

- Shielding of transparencies, optically transparent & electrically conducting

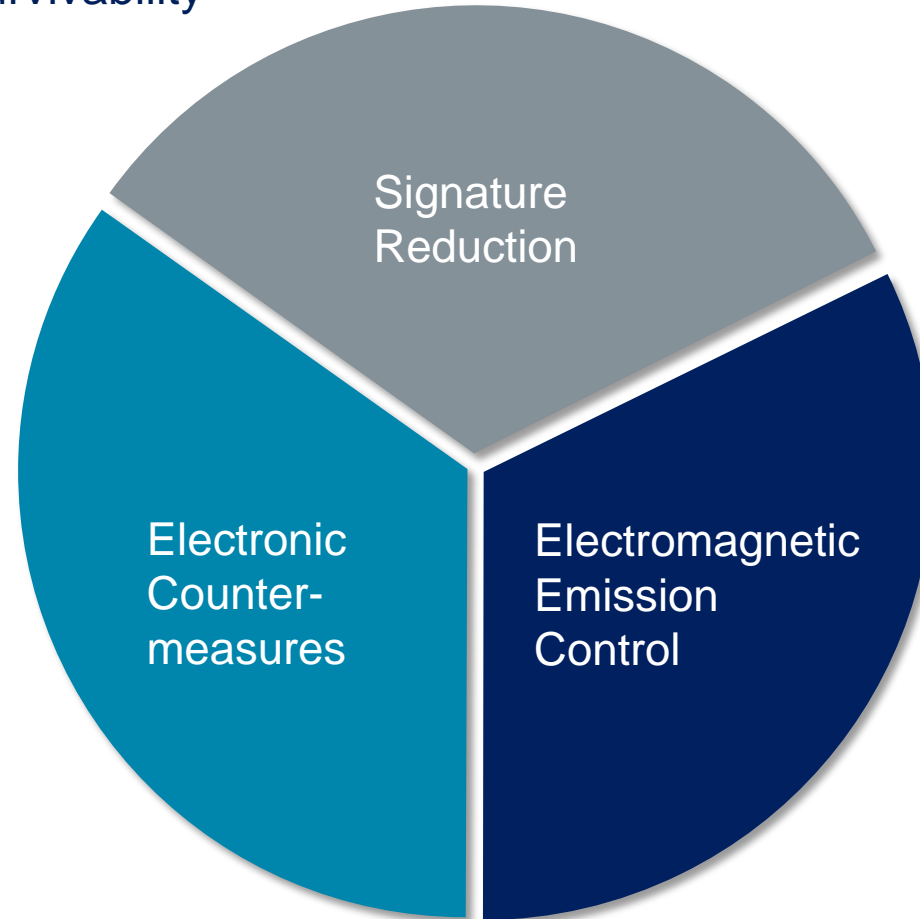
LO Coatings

- Further coatings were applied to treat other locally significant effects



LOUT: Key Achievements

A holistic approach towards survivability



Electronic Countermeasures

- Electronic countermeasures are complimentary means which have to be orchestrated across platforms

Signature Reduction

- RF (VHF to Ka-Band)/ acoustic/ infrared signature
- Awareness of the own signature linked to the mission management system
- Passive sensing

Emission Control

- Complementary projects took care of aspects such as electromagnetic emission control, covert communication & cyber security

LOUT covers all aspects from simulation and development to production and measurement.



Thank you very much for your attention!