DEFENSE AND SECURITY

3D LANZA RADAR FAMILY

Surveillance in five continents

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LANZA is a family of state of the art 3D radar systems based on a fully modular and scalable architecture, both in hardware equipment and software packages/capabilities.

Sharing common logistics and life cycle support concepts, this family includes a wide variety of possibilities of configuration adapted to the particular needs of each End User in all cases achieving the most demanding, or specific, operational requirements and cost effectiveness trade off.

All radar systems in the family are tri-dimensional, solid state, operate in L band, apply pencil beam exploration (electronic control in elevation of radiation beams), with distributed architecture, redundant in critical elements, allowing for soft-fail degradation in the case of certain items failure.

Furthermore, all LANZA family radar systems integrate the same constructive elements, such as, among others, antenna aray and spine, power amplifiers, transmitter power sources, beamforming, processing, mechanics, etc, in more or less quantity/units, with more or less capabilities/performance each.

Consequently, in order to be adapted/adjusted to the specific requirements of each End User (Navy, Army or Air Force) – even, potentially, to each operational site environmental conditions -, radar systems in the LANZA family can be configured, combining such fully certified unitary modules, from fixed-site or transportable extended long range radar systems, tactical/mobile long range radar systems, to medium range, gap filling or dual-use civil-ATC/military radar systems.

Even more, their exploration modes, totally software configurable from the radar console, allow to adapt any radar of the family to multiple applications, missions or air threats, taking into account the operational theater and environmental conditions at any moment.

More specifically, in accordance with the usual air surveillance applications, LANZA 3D Radar Family can be configured for instance as:

LRR: Long Range Radar, compliant with the most capable early warning NATO FADR requirements in both fixed-site and transportable installations, and with the extended long range possibility (XLR) for very low radar cross-section targets or TBMs.

MRR: Medium Range Radar, available in fixed-site, naval or tactical/high mobility full autonomous versions, with multimode range possibilities from gap filling or very low level surveillance applications to complementary surveillance to long range radars for air defence/air interception.

LTR: Long Range Tactical systems, last generation of mobile/deployable high performances 3D Radar systems, compliant with NATO DADR requirement and suitable to all above missions. In terms of range coverage most demanded versions include LTR-20 (210 NM) and LTR-25 (240 NM).

ARSR: Dual-use systems, suitable to approach (MR) and/or en route (LR) air traffic control while providing primary 3D air surveillance with range converges from 100 NM to 200 NM.
**Principles of operation**

The LANZA is a multi-scenario, multi-threat adaptive radar. The radar design meets not only the operational and technical requirements of the current NATO radar specifications, but anticipates the changing threat scenario of the future.

Established principles are combined with major advances in planar array, solid state amplifiers and signal processing technology to achieve the ultimate in radar detection. Precise energy adecuation to coverage needs and programmable detection algorithms create a versatile, multi-role operational capability. Inherent in the design are excellent performance against stealth-protected jammers, enhanced detection in clutter, improved low level performance and tracking capability.

The planar array antenna consist of precision cut horizontal linear elements vertically stacked, each with its own receiver. Ultra low sidelobes are achieved by precise control of the phase and amplitude of the signal fed to each element. The array is driven by distributed solid-state transmitter modules which are phase controlled. The position of the beams and their characteristics are software controlled to match the threat scenario and hence maximise the time on target, allowing TBM detection with a minimum degradation of ABT detection performances.

The shapes and the positions of the narrow pencil beam are controlled in range and elevation (both in transmission and in reception) to step over the clutter inducing terrain, with the exceptionally narrow beamwidth further reducing clutter returns. Target height is obtained using monopulse techniques, with enhanced measurement at low elevation angles by means of special pencil beam combination techniques.

**Main References**

Indra has over 25 years of experience in 3D Radar design, manufacture, operation and integration.

Currently, the LANZA Radar family is in service with different configurations in the five continents to fulfillment of demanding customer's requirements. Thus, the Spanish Air Force (Spanish Air Force) procured 10 3D long range LANZA Radars for use in its Sistema Integrado de Mando y Control (SIMCA) programme. Indra has delivered a 3D long range LANZA for Portuguese Air Force as a NATO project, and more units have recently been contracted for the Sultanate of Oman as part of an integrated early warning air defence system for its Royal Air Force (RAFO).

Uruguay Air Force (FAU) operates two LANZA radars since 2009, being able to provide back up civilian air traffic control services. Besides, a new generation mobile 3D long range LANZA LTR-25 radar is produced for Spanish Air Force, and currently being evaluated into the short list for the NATO DADR Tender. In naval version, two LANZA radar were acquired by the Spanish Navy, being currently considered in several opportunities worldwide. LANZA radar family also includes air traffic version (ARSR) procured by Central America and various African countries integrated with ATC.

Some references by radars are:
- LRR  Spanish Air Force, NATO, RAFO
- MMR  FAU, African Countries
- LTR-20  RAFO
- LTR-25  Spanish Air Force
- ARSR  Central America, African Country

**Principal features**

- Wide operating bandwidth, essential for effective ECCM. Distributed solid-state transmitter provides full coverage of the NATO D band spectrum
- Unmatched inventory of ECCM techniques
- Three fully controllable independent simultaneous channels (SUM, DIF, SLB)
- Advanced technology planar array antenna, with high efficiency distribution, yields exceptionally low sidelobe levels in both azimuth and elevation. Sidelobe blanking further enhances resistance to jamming
- Uncommitted frequency agility
- True agility pulse to pulse, burst to burst
- High PRF variability
- Programmable operating modes (pulse group, pulse coding, power concentration "Burnthrough")
- State-of-art reconfigurable, programmable signal processor with soft-fail architecture
- Advanced signal processing techniques for accurate extraction of target coordinates
- TBM detection and tracking in a wide elevation angle (tested with low orbital satellites)
- Terrain following capability
- Integrated IFF/MSSR system with Mode 4 and Mode 5 capability
- Transportable by road, rail, sea and air
- High MTBF soft-fail modular architecture, automatic hardware reconfiguration, comprehensive BITE and a low level of preventive maintenance - all contribute to a high level of operating availability with low through-life logistic support costs
- Automatic radar management with local or remote control and manual override
- For green field, semi-static or static installation
- Radar environment simulator (optional)
**Pencil beam architecture**

**Radar 3D ARSR (MR)**

### Hardware architecture and controller display

<table>
<thead>
<tr>
<th>Feature</th>
<th>LANZA-LRR</th>
<th>LANZA-MRR</th>
<th>LANZA LTR</th>
<th>LANZA ARSR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coverage</strong></td>
<td>360°</td>
<td>360°</td>
<td>360°</td>
<td>360°</td>
</tr>
<tr>
<td><strong>Azimuth</strong></td>
<td>360°</td>
<td>360°</td>
<td>360°</td>
<td>360°</td>
</tr>
<tr>
<td><strong>Elevation</strong></td>
<td>20° (30° TBM)</td>
<td>20° (40°)</td>
<td>20° (40°)</td>
<td>20° (40°)</td>
</tr>
<tr>
<td><strong>Electronic Programmable Tilt</strong></td>
<td>±5°</td>
<td>±5°</td>
<td>±5°</td>
<td>±5°</td>
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<tr>
<td><strong>Maximum Instrumented Range</strong></td>
<td>470 km (255 NM)</td>
<td>111 - 333 km (60 - 180 NM)</td>
<td>389 - 444 km (210 - 240 NM)</td>
<td>370 km (200 NM)</td>
</tr>
<tr>
<td><strong>Altitude</strong></td>
<td>up to 100 kfeet</td>
<td>up to 100 kfeet</td>
<td>up to 100 kfeet</td>
<td>up to 60 kfeet</td>
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<tr>
<td><strong>Antena Scan Rate</strong></td>
<td>10-12 s/scan</td>
<td>3-10 s/scan</td>
<td>5-12 s/scan</td>
<td>10 s/scan</td>
</tr>
</tbody>
</table>

**LRR:** Long Range Radar  
**MRR:** Medium Range Radar  
**LTR:** Long Range Tactical radar  
**ARSR:** Air Route Surveillance Radar
Indra reserves the right to modify these specifications without prior notice.