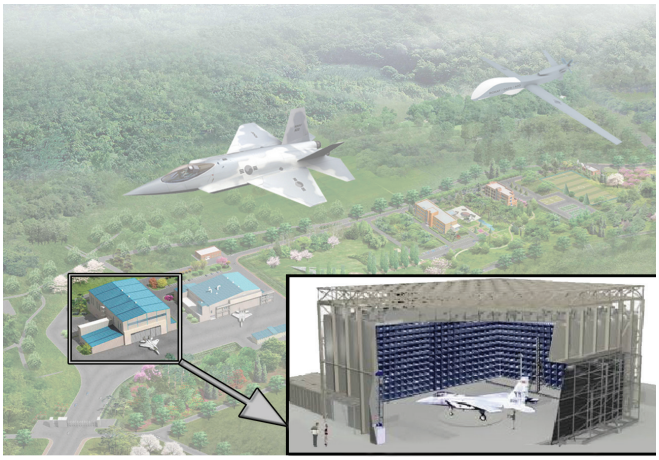
CASE STUDY ELECTROMAGNETIC TEST CENTER – SOUTH KOREA



The Boeing Company awarded a contract to ETS-Lindgren to design, manufacture, install and certify an Electromagnetic Test Center for the Korea Agency for Defense Development (ADD), located in South Korea. The Boeing Company managed the project and selected ETS-Lindgren based upon the company's extensive experience design, managing and integrating complex multi-purpose RF Microwave/EMC anechoic aircraft and component level test facility. In addition, ETS-Lindgren, with offices and manufacturing facilities worldwide, offered an active presence in Asia with excellent customer support from its various Asia offices. ETS-Lindgren also assembled a team of key strategic partners to compliment our expertise and support the overall mission of this project. The contract included construction of one large chamber for testing full size aircraft, tanks and vehicles as well as various support chambers, shielded rooms, system measurement equipment, and training. The state-of-the-art test center, one of the largest in the world, provides ADD with the capability to perform electromagnetic compatibility (EMC) measurements, antenna characterization, lightning, electrostatic discharge (ESD) and electromagnetic pulse (EMP) simulations. These tests will be conducted on a wide variety of military/commercial aircrafts and vehicles. Mark Mawdsley, Managing Director for ETS-Lindgren Asia Pacific operations commented, "We're excited about the scope of this large contract and the new test capabilities this facility will bring to ADD. We have an excellent team of dedicated engineers, project managers and installers working on this project. We were very proud to be selected for this project and will miss working so closely with The Boeing Company and ADD personnel involved on this dynamic project. We look forward to a continued partnership in supporting the test chambers as the customer's needs evolve in the future."

Main Anechoic Chamber (MAC) Technical Specifications

- Designed to test full size aircraft, military and commercial vehicles with nominal chamber dimensions of 42m x 33m x 18m high.
- The MAC is installed with EHP-36 and EMC-24 absorber for near field and far field testing. In the far field mode, the quiet zone is a spherical area 6 m in diameter. The absorber is designed to meet the requirements specified in MIL-STD-461E, MIL-STD-464A, RTCA-DO-160D, and ANSI C63.4-2000 at test frequencies as low as 30 MHz. The combination of two types of RF absorber provides excellent reflectivity performance at the higher frequency range, notably from 500 MHz to 40 GHz per MIL-STD-461E. The absorber at normal incidence exceeds the minimum requirement of 6 dB from 100 to 250 MHz, and 10 dB above 250 MHz, as specified per RTCA-DO-160D.
- Unique pneumatically operated sliding door with a clear opening of 35 m wide x 11 m high, designed for semi-automated push button entry/egress control.
- Secondary 4 m x 4 m Euroshield™ sliding door for EUT access and three Euroshield personnel-sized RF sliding doors (1.2 m x 2 m high).
- 30 metric ton capacity "monorail" hoist crane capable of lifting a full aircraft to test height during free-space testing. A 1.83 m high x 1.83 m wide x 34 m long housing is built on top the main chamber to allow special RF absorber treatment that is placed around the rail and crane system. This maximizes the anechoic performance of the chamber without compromising the mechanical handling capability of the crane system.
- Partial raised floor designed to support a 30 metric ton load.
- Extensive network of hatches and cableways in the floor allow for RF, signal, and electrical distribution to the chamber.
- An 11 m turntable with azimuth control capable of positioning a 63 metric ton load to an angular accuracy of 0.25 degrees.
- Planer near field scanner, retractable AUT positioner, transmit source tower and E-field generator.

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Semi-Anechoic Chamber

- Measures 14m x 8m x 7.2m high; Commercial type FACT™ 3 chamber used for radiated and conducted emissions and susceptibility testing per ANSI C63.4, MIL-STD-461-462, and RTCA DO-160D. Features removable copper topped test benches for the MIL-STD and RTCA testing, a 1.2m x 2.0m high Euroshield RF sliding door, and a EuroPro™ turntable. This room is lined with FerroSorb™ 600 absorber that exceeds the minimum requirement, at normal incidence, of 6 dB from 100 to 250 MHz, and 10 dB above 250 MHz, as specified per RTCA-DO-160D.

Antenna Measurement Room

- Measures 8m x 4m x 4m high. This chamber is lined with EHP-8 absorber and is equipped with a small vertical plane near field scanner supplied by MI Technologies.

Control Room

- Measures 12m x 8m x 4m high and features a 1.2m x 2m high Euroshield RF sliding door. A 50cm raised floor houses the instrumentation suite and CCTV control center. The CCTV system consists of nine cameras and eight monitors multiplexed into a single control center/rack.

Shield Room #1

- Measures 12m x 12m x 4m high and features a 1.2m x 2m high Euroshield RF sliding door. This chamber is designed for conducting power characteristics measurements and lightning induced transient susceptibility testing. It includes a GTEM as part of the lightning test system.

Shield Room #2

- Measures 8m x 4m x 4m high and is designed to house support equipment.

RF Room #1

- Located in the basement and measures 8m x 8m x 4m high and houses instrumentation in support of radiated susceptibility and aircraft testing in the main chamber.

RF Room #2

- Also located in the basement and measures 6m x 6m x 4m high. It houses instrumentation to support component level EMC testing in the semi-anechoic chamber.

Turntable Support Room

- Measures 15m x 15m x 4m and houses the turntable and related support equipment, including the vehicle exhaust extraction system required for military vehicle testing.

Features:

- ETS-Lindgren popular Series 101™ pan-shield type shielding construction that is lightweight and modular in design.
- VESDA air sampling protection system for fire detection and toxic gas detection.
- Integrated design for chamber and parent building services to ensure high shielding performance, effective compatibility of materials, as well as cost effective construction and timely schedules. ETS-Lindgren project management worked with the customer in advance to ensure an optimal coordination of the chambers with the parent building.

Test Capabilities:

- EMI/EMC per MIL-STD-464A and ANSI C63.4
- Antenna Characterization per MIL-STD-461E
- Lightning Simulation per
- RTCA DO-160D

About ETS-Lindgren

ETS-Lindgren is an international manufacturer of components and systems that measure, shield, and control electromagnetic and acoustic energy. The company's products are used for electromagnetic compatibility (EMC), microwave and wireless testing, electromagnetic field (EMF) measurement, radio frequency (RF) personal safety monitoring, magnetic resonance imaging (MRI), and control of acoustic environments.

Headquartered in Cedar Park, Texas, ETS-Lindgren has manufacturing facilities in North America, Europe, and Asia. Additional information about ETS-Lindgren is available at www.ets-lindgren.com. Additional information about ETS-Lindgren's parent company ESCO and its subsidiaries is available at www.escotechnologies.com.

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