

BAE SYSTEMS award DIT-MCO contract to streamline Eurofighter Typhoon production

SUBHEAD:

BAE SYSTEMS/DIT-MCO team challenges conventional design of aircraft industry electrical test facilities.

Like the overhead boom arms that drop interface cables within arm's reach of the test technician, DIT-MCO's performance on an innovative turnkey contract puts BAE SYSTEMS' goals for streamlined production within arm's reach.

When the Military Aircraft and Aerostructures division of British Aerospace (now BAE SYSTEMS) awarded a turnkey contract for the Eurofighter Typhoon electrical test facilities to DIT-MCO International early August 1998, it signaled sweeping changes. DIT-MCO is responsible for development of the entire electrical test equipment for the front fuselage, major components, and electrical sub-assemblies that BAE SYSTEMS is building for the Eurofighter Typhoon, an advanced multi-role combat aircraft.

Collaboration is synonymous with this initiative, with partners in four countries cooperating in the Eurofighter Typhoon consortium. Each company in the consortium manufactures different components of the Eurofighter Typhoon. In addition to BAE SYSTEMS in the UK, consortium partners include Daimler Chrysler Aerospace in Germany; the Aeronautics division of Alenia Aerospazio in Italy; and CASA of Spain.

"This program required a vendor who could manage all aspects of the project – electrical and fiber optic test equipment, microwave testing, ergonomic access staging, a test cable management system and overall project management – not just the electrical test system," says Andy Best, Manufacturing Development team leader of BAE SYSTEMS. "DIT-MCO's experienced staff confirmed during the Tender Assessment that they had the right combination of design, engineering and project management expertise."

There's no question that the high-tech Eurofighter Typhoon requires top-of-the-line test equipment to ensure the integrity of its electrical systems. Production of the fighter also represents an opportunity to extend traditional boundaries in the way DIT-MCO supports its customers.

“Working with BAE SYSTEMS on the Eurofighter Typhoon represents a unique project in the electrical test industry,” says Rick Thompson, DIT-MCO president and CEO. “To our knowledge, this is the first time a single vendor has designed, outfitted, and installed the entire testing facility, as well as the test equipment.” In keeping with BAE SYSTEMS corporate initiative of streamlining manufacturing processes and the use of Integrated Product Teams (IPT), DIT-MCO collaborated with a multi-disciplined team led by Glenn Ivett, Equipping and Test Manager for BAE SYSTEMS Eurofighter Typhoon project to supply an integrated turnkey solution.

“We really took a concurrent engineering approach,” Glenn says. Concurrent engineering – manufacturing before design is complete – requires flexibility and a fast response time by everyone involved. BAE SYSTEMS’ objective is to build efficiency into the production process from the first aircraft. This required involvement on Day 1 from all those involved in procuring, installing, and using the test facilities. Glenn summarizes, “DIT-MCO has fully supported BAE SYSTEMS in this approach.”

BAE SYSTEMS is responsible for electrically testing the Twin and Single-Seat front fuselage and vertical stabilizer (fin), along with a number of sub-assemblies such as avionics trays, throttle box and cable harnesses, etc. Sub-assemblies undergo the same level of testing to validate the integrity of electrical and fiber optic systems. In total, eight test systems were supplied. The Eurofighter Typhoon includes extensive fiber optic systems, and this aircraft represents the first time BAE SYSTEMS will perform fiber optic testing in production mode.

The major element of the contract was to develop a 4,000-square foot test facility inside the BAE SYSTEMS military aircraft plant in the Samlesbury Aerodrome, Lancashire. The facility will support electrical test operations and fiber optic system testing of the Eurofighter Typhoon front fuselage.

The electrical test area houses two large steel-frame staging structures, each approximately 25 feet wide and 12 feet high. The two DIT-MCO Model 2508 automatic test systems each include 33,000 termination points.

The fiber optic test operation is located across the aisle from the electrical test area. Two 144-channel systems will test the 24-way Fiber Optic Reflecting Star Couplers (FORSCs) and direct fiber links installed on the aircraft.

Contract Status

The detail and sub-assembly electrical test equipment has already been delivered and accepted to the agreed delivery program and is in production use. The front fuselage electrical test system was

delivered in December 1999 with commissioning to be completed by the end of February 2000. The contract will be completed following acceptance of the fiber optic test systems in April 2000.

Go with the Flow

FLOWLINE PICTURE

While continuous assembly lines have become virtually synonymous in modern industry, aircraft manufacturing has traditionally followed a different model. In aircraft factories, parts are brought to a “build line” comprised of stage assembly fixtures. The time an aircraft remains in the Stage is dependent upon the work content. Rate production is achieved by increasing the number of stage fixtures to provide the required output.

With its Eurofighter Typhoon front fuselage production, BAE SYSTEMS is implementing a “flow line” in which the assembly, equipping, and test activities are divided into stations of equal work content. Parts and sub-assemblies will be delivered “just in time” to each station. Initially, the aircraft will be craned to each station. Following structural completion, the fuselage will be mounted in a trolley for the equipping and test stations.

Throughout BAE SYSTEMS, people are looking to the new flow line as a means to improve productivity and enhance the entire production process.

What does this mean for the application of DIT-MCO test systems?

“In reality, from a purely technical standpoint, the DIT-MCO testers aren’t doing anything out of the ordinary to verify the electrical integrity of an aircraft,” notes Jim Stone, DIT-MCO’s Project Manager for the Eurofighter Typhoon contract. True enough. The 33,000-point Model 2508 DIT-MCOs will perform standard electrical tests.

“The challenge was responding to the customer’s situation – how to facilitate the test process and accommodate BAE SYSTEMS new flow line concept,” says Jim Stone. The solution was an innovative integration of a structure to house the DIT-MCO switching equipment and the concept of overhead boom arms to support and maneuver the heavy and awkward bundles of interface cables.

Lowering the Boom, Ups the Benefits

CATIA IMAGE DIT-MCO STATION 12

Moving a massive aircraft *through* an electrical test facility requires an innovative, equally substantial structure to house test systems. In addition, the hook up and disconnection of the interface harnesses are a major element of the throughput time. The overhead boom arms are fundamental to the management of the interface cables and allow the aircraft to move through the test facility.

“The boom idea – literally dropping the cables down to the fuselage – was a big surprise,” says Henry Minorczyk. Henry and his counterpart, Neil Edmundson, experienced Electrical Installation Operatives and DIT-MCO users, have been actively involved in the concurrent engineering design process since its inception.

Four retractable boom arms in each test bay will support and maneuver 300 to 400 interface cables. When the trolley-mounted fuselage rolls into a test bay, operators lower the boom arms, positioning the interface cables to easily plug into the connections. DIT-MCO’s Special Products Group in Kansas City fabricates the cables to BAE SYSTEMS’ specifications.

The framework that supports the booms is a substantial structure. “Each bay weighs about 12 tons,” says Jim Stone. Even so, the structures are modular and can be broken down and re-configured or moved to other locations – another BAE SYSTEMS objective for the new production line.

Additional Features of the DIT-MCO Front Fuse Test Solution

Each test system can be expanded to 40,000 points and the testing area can be expanded to three bays to support higher production runs.

The DIT-MCO units, which will be installed in the test bay’s structural steel framework, will perform tests for insulation resistance, circuit continuity, and hipot breakdown.

BAE SYSTEMS will also utilize DIT-MCO’s Fault Locator software. “It’s quite quick and accurate,” says Operator Neil Edmundson. “It points us right to the problem.”

Fault Locator has a proven track record in BAE SYSTEMS Warton facility. “Fault Locator will be invaluable on the Eurofighter Typhoon,” says Jim Stone, “especially whenever you have a new design. Fault Locator pinpoints problems, reducing troubleshooting and repair time.”

BAE SYSTEMS has also opted for the wireless remote control feature for test systems. This feature allows complete control of the test system through an RF antenna which clips onto a laptop computer. This communication link utilizes spread spectrum radio technology with the ability to penetrate walls, ceilings, and floors at distances up to 800 feet (244 meters).

The Selection Process

In addition to technical superiority, BAE SYSTEMS set new standards for procurement of high-tech products. The company focused on multiple international governmental and industrial partnerships, pushing the technological envelope, improving the procurement process and building flexibility into the product and its production.

DIT-MCO's selection followed an extensive survey of international vendors. BAE SYSTEMS representatives visited DIT-MCO's Kansas City headquarters several times, interviewed current customers, and evaluated all aspects of the company's business, from production and on-time shipping performance to financial standing. This process took place over a nine- to twelve-month period. "It was, by far, the most rigorous evaluation DIT-MCO has ever experienced," said Rick Thompson.

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