

In-Service Aircraft Engineering Support

Project Overview

BAE Systems (BAES) provides support to the worldwide fleet of In-service aircraft through a comprehensive modification and product development programme, which is managed and administered through its Farnborough and Warton offices.



Customer Requirement

Customer strategy was to align a key 'prime supplier' to support the engineering needs of its Harrier / Tornado aircraft in-service support programme based at Farnborough. This initiative, led by BAES at a corporate level identified a number of aims, in summary these were:

- Secure engineering resources for BAES – more consistent & improved quality
- Secure competitive rates through BAES corporate negotiation
- Reduce 'poaching' and 'leapfrogging' of hourly rates
- Simplify off-site (work package) subcontracting
- Reduce BAES management overheads by reducing the number of suppliers
- Encourage key 'prime suppliers' to invest in training and facilities.

Engineering Support Provided by GKNAES

GKNAES was selected as one of six engineering subcontract service providers by BAES to support Military Aircraft programmes and was aligned as the sole supplier to the Harrier programme; this role has now grown to include other aircraft types such as Tornado and Typhoon. In 1998 GKNAES set up a dedicated 'Harrier' design facility in Aldershot, two miles from BAES's Farnborough office, equipped with fully compatible IT infrastructure and networked into the BAES site. The 60-man team based at Aldershot provides a bespoke service with a high-level domain product knowledge supporting all aspects of the BAES in-service aircraft support programme.

Summary of Engineering Support provided by GKNAES

GKNAES currently provides support to the programme in the following key areas:

Harrier (Design)

- Design support on Harrier GR9 replacement rear fuselage.
- Support to Capability A programme, development of concept design schemes to full 'C' scheme status and full retro & detail drawing development.
- WQN incorporation into design engineering data set.
- GKNAES team members working on secondment at the customers Farnborough facility.
- Installation of full data link between BAES Warton / Farnborough & GKNAES Aldershot.

Harrier (Structures)

- Support to design tasks within the Aldershot office.
- Stores clearance – update software clearance of weapons pylon & up rated engine.
- Finite element modelling of rear fuselage for Harrier GR7 including main equipment shelf.
- Check stress relating to Harrier repairs.
- Stress analysis for structural / fatigue investigations for in-service aircraft.
- Support to Harrier Weights database for Harrier 1 & 2 aircraft.

Tornado

- Scoping & design incorporation of various modifications into the Italian MLU Tornado.
- Stress analysis support on various modification tasks.

Key Points

- Resources drawn from GKNAES's UK & Australian facilities are deployed on above tasks.
- An overall team size that peaked at 120 engineers was utilised within GKNAES's facilities in both UK & Australia.
- Teams deployed at both GKNAES and BAES sites.
- 'Value added' through high level of aircraft domain product knowledge within GKNAES team & GKNAES investments in facilities / systems infrastructure.
- GKNAES facilities fully networked into BAES sites - full connectivity.
- Seamless co-located working with BAES & GKNAES representatives at each facility.
- Strategic direction for relationship set by a joint senior level 'Steering Team'.
- Integrated Project Team (IPT) created with joint management training and jointly defined processes and procedures.
- IPT committed to generate cost savings and efficiency improvements inline with customer requirements.



Support to other BAES Aerospace Projects

Typhoon

- Generation of wiring diagrams & installation drawings utilising CATIA E3D for forward cockpit and ECS bay.
- On-site liaison and shop support to the Electrical Loom shop during manufacture of forward fuselage wiring harnesses.
- DLRI – design of digital mock-ups line replaceable items.
- Conceptual and detail design of additional conformal fuel tanks into rear fuselage.
- Compilation of digital mock-up data to enable model testing in the BAES wind tunnel.
- Manufacturing support to enable full-scale mock-up of the conformal tanks for test trials.
- Engineering design support to all European partners on conformal tank programme.
- Installation of full data link between BAES Warton & GKNAES Melbourne, Australia.

Nimrod

- MCR support – incorporation of modifications and change requests.
- Full conceptual and detail design of the outer wing structure.
- Systems safety assessment of main landing gear and bomb bay doors.
- FTI installation of various electrical systems and supports, including cameras, weapon pylons and flight test data recorders.
- On-site support to Woodford and Prestwick manufacturing sites.
- Manufacturing engineering support to various OEM parts suppliers (CMM & NC programming of major metallic components).
- Iron Bird test rig – Supply of test engineers to develop systems; prepare test reports and procedures in accordance with Airworthiness requirements.
- Nimrod MRA4 COMPASS software development for an operational assessment model, covering a variety of anti-submarine and anti-surface warfare roles.
- Conduct of Cadds 5 training courses for BAES engineers.