

Capability Document



BrahMos Aerospace
Thiruvananthapuram Ltd.,
(An AS 9100 Rev D & ISO 9001:2015 Company)



Brief History

Management Structure

Products manufactured

BATL Facility

Services offered

Why deal with BrahMos

1.0 BRIEF HISTORY

BrahMos Aerospace Thiruvananthapuram Limited (BATL) with its registered office at Chackai, Beach.P.O.Trivandrum is a wholly owned subsidiary of BrahMos Aerospace Pvt. Ltd (BAPL), Kariappa Marg, New Delhi. This hi-tech manufacturing unit as a new entity came into existence in January 2008 when the erstwhile KELTEC (Kerala Hitech Industries Ltd.), a state public sector unit was handed over by Government of Kerala to BrahMos (BAPL), a joint venture of Ministry of Defence/DRDO and NPOM, Federation of Russia and the company was rechristened as BrahMos Aerospace Thiruvananthapuram Ltd (BATL).

The erstwhile KELTEC was setup by the Government of Kerala in June 1989 having an initial capital outlay of Rs.40.56 Crores. Lead by a team of ex-scientists from ISRO with the goal of development and production of critical hardware for the space program, The Company widened its scope of manufacture to other customers like DRDO for its Integrated Guided Missile program, Kaveri Engine project etc and indigenization of strategic products like Three piece manipulator, Double door container transfer system etc for BARC.



The company was successful in developing critical mission hardware for the space programme such as the VIKAS Engine, Titanium Gas Bottles, Liquid Tankages, Control System Components and much other critical mechanical hardware. During this period, the company supported DRDO and BARC as a development centre for developing various rocket motor cases and critical hardware for the Integrated Guided Missile Programme, Nuclear program etc thereby accomplishing many technologies for manufacturing critical hardware assembles in niche areas not generally available in the private sector.

BATL is an AS 9100 Rev D certified Aerospace Company and is contributing to the various projects of strategic importance to the nation.

2.0 MANAGEMENT STRUCTURE

BrahMos Aerospace Thiruvananthapuram Ltd. (BATL) is a Government Owned Company Operated (GOCO) company under DRDO, Ministry of Defence.

The unit is headed by its Managing Director who reports to the Board of Directors. The Chairman of BATL is also the Director General, DRDO and CEO & MD, BrahMos Aerospace Pvt. Ltd. The Board comprises of eminent personalities representing DRDO, ISRO, BrahMos Aerospace, Government of Kerala and external experts of highest repute.

The BATL Board of Directors is as follows:

1. Dr. Sudhir Kumar Mishra	CEO & MD, BrahMos Aerospace Private Limited.	: Chairman
2. VAdm. Raman Prabhath (Retd)	Former Program Director ATV Program under DRDO	: Managing Director
3. VAdm. Nadella Niranjan Kumar(Retd)	Executive Director-Production, BAPL	: Director
4. Mr. Govind Das Moorjani	Director Finance, BAPL	: Director
5. Dr. Dasharath Ram	Director, DRDL	: Director
6. Dr. A. Manimaran	Deputy Director(MME), LPSC	: Director
7. Dr. M.G. Rajamanickam, IAS	Managing Director, KSIDC	: Director
8. Dr. C.G.K Nair	Former Chairman & MD of HAL & Former MD of CIAL	: Independent Director
9. Dr. V. Radhakrishnan	Professor Emeritus (IIT)	: Independent Director

3.0 PRODUCTS MANUFACTURED

BATL has developed and supplied a wide-ranging array of precision and critical products for Indian Space Research Organisation (ISRO), Defence Research & Development Organisation (DRDO), GTRE, HAL & Dept. of Atomic Energy (DAE).

AEROSPACE

The entire component manufacturing, fabrication, assembly and testing of the Prestigious VIKAS ENGINE, the liquid engine powering the rockets PSLV and GSLV of ISRO, is done at BATL. Propellant Tanks, Water Tanks, high-pressure Titanium Gas Bottles, Titanium liners, Hydraulic Control Systems, Structural Assemblies, Feed Lines, DTG Components, Transducers, etc are the other products being supplied to ISRO.

Aerospace Products manufactured at BATL is listed below:

For PSLV & GSLV PROGRAMME OF ISRO

- LIQUID PROPELLANT ENGINE (VIKAS ENGINE)**
- SITVC TANKAGE, PS2/GS2 (AA2219) TANKAGES, L40 TANKS**
- PS2 GAS BOTTLES**
- INJECTION VALVES**
- ACTUATOR STAGES**
- CONVERGENT & DIVERGENT NOZZLES**
- TRIPLET INJECTORS FOR PS4 ENGINE**
- TITANIUM GAS/ AIR BOTTLES**
- CRYO COMPONENTS, DTG COMPONENTS**

For SATELLITES OF ISRO.

- STRAP ON SYSTEM**
- INSAT LINER**
- CARBON LINER**
- YOKES**
- SOLAR PANEL SUBSTRATE**
- CAMERA MOUNTING STRUCTURES**

DEFENSE

BATL has actively participated in the development and production of several types of rocket motor casings and critical Mechanical Hardware for DRDO under the Integrated Guided Missile Programme, namely for Agni, Sagarika, Astra and Advanced Air-Defence Projects. It is also contributing for the LCA Kaveri Engine, Marine engine programme of GTRE/ DRDO & STFE Engine.

Defense Products manufactured at BATL is listed below:

DEFENCE PRODUCTS (DRDO)

MISSILE MOTOR CASINGS:

- AIR BOOSTER CASING ASSEMBLY
- UNDERWATER BOOSTER MOTOR
- CC-400 MOTOR CASINGS
- DAISY 2 (AGNI) PARTS
- CANNISTER ASSEMBLY FOR DRDL
- ASTRA MOTOR CASING
- GAS GENERATORS FOR DRDL
- PITCH & YAW MOTORS
- RETRO MOTOR

LCA PROGRAM

- COMBUSTOR ASSEMBLY
- COMPRESSOR CASINGS
- AFTERBURNER
- EXHAUST CORE
- INTERMEDIATE CASING
- SMALL TURBO FAN ENGINE

BrahMos PJ10 Program

- Solid Booster Motor (BIB2)
- Air Frame (F3)
- Cannister Pressurisation System
- Gas Generator
- Metallic Airframe Components
- Launcher Container etc

INTEGRATION AND ASSEMBLY

- PSLV IV STAGE INTEGRATION
- SITVC INTEGRATION
- RCS INTEGRATION
- BRAHMOS CRD-SRD INTEGRATION
- NOZZLE INTEGRATION AND TESTING

NUCLEAR SECTOR

For the Department of Atomic energy, BATL has developed Robotic Mechanisms (Three piece manipulators) and fuel transfer sub-systems for use in hot cells of nuclear installations of DAE. These products were developed as import substitutes and are installed at various installations of DAE. In addition, BATL is fabricating Radio frequency Quadrapole (RFQ) for the proton accelerator programme of BARC. BATL is now developing automated electronically controlled robotic arms for remote handling of hazardous matter.

Today, BATL has the technology and competence for manufacture, integration and testing of a wide range of complex systems.

4.0 BATL FACILITIES

BATL is equipped with State-of the-art facilities to achieve reliable and quick realization of qualified hardware including its prototype development. The following are the major facilities at BATL:

Machine Shop:

Our Precision Machine Shop houses machines capable of machining products having tolerances less than 10 microns and is equipped with CNC machines for High precision Turning, Milling, Jig Boring, Grinding & Electro discharge machining. The machines available are Schaublin Lathes, Hauser Jig Boring Machine, Juaristi 4 Axis Heavy Duty Machining Centre, Huron 5 Axis CNC Machines, Kellenberger Grinding Machine, Studer Grinding Machine, Maho 3 Axis and 4 Axis Milling Machines apart from HMT make conventional Lathes, Milling and Grinding Machines.

Fabrication facility:

BATL has 3 Fabrication shops with overall area of 60000 Sft equipped with Automated welding machines and supported by modern material handling facility capable of producing upto 40 Rocket Motor casings / month. Some of the major equipments installed are listed below:

Electron Beam Welding Machines – 2 nos (EOPATON, UKRAINE)

5 Axis Robotic welding – KUKA (JAPAN)

Tig Welding -Computer integrated Jetline (USA)

Manual Ac/DC Inverter Tig welding machine.

Long seam auto Tig welding machine.

Jet line Tilt positioner

Cirseam auto Tig welding station.

Weld Planisher (Jetline USA)

MIG Welding station KEMPI

1000 T Hydraulic Press

800 T Hydraulic expander

Heat Treatment facility:

BATL is equipped with State of the Art facility comprising of Electrical Pit Furnace, Box Furnace, Muffle furnace, Ageing Furnace, Drop Bottom Furnace and Vacuum Furnace for Heat Treatment, Quenching and related Processes.

A fully equipped General Machine Shop comprising of VTL, Jig boring machines, SB CNC lathes, Heavy duty lathe with bed length of 10m etc is operational to support the above facility having total area of 1,60,000 Sft.

Pressure Test facility:

Hydraulic Pressure test upto 1800 bar, Pneumatic pressure testing upto 600 bar equipped in modern Armoured room facility for Burst test, Strain Gauge Measurements with 100 Channel Data Logger facility (VISHAY MAKE, USA) is available where upto 100 points of Strain gauge measurements can be

monitored. Pfier Pneumatic Leak testing facility (MSLD) is also available for measuring leak rates upto 10-12 Milli bar.

Surface Treatment facility:

Full fledged surface treatment facility for Hard anodizing (Both sulphuric acid & Chromic acid route), Hard Chromium plating, Electroless nickel plating, Chemical Milling, Neoprene coating, Titanium Anodising, Zinc Plating etc is operational under this facility. We also have facility for Surface Preparation through Grit/short Blasting and a Paint booth for final painting.

Inspection and Testing facility:

Measuring Instruments:

CMM - ZEISS make
Micro Hite - TESA make
Roundness tester - Tally round
Thickness measuring equipment - Mahr make
Form Tally Surf & Tally Round
All General Purpose Instruments
Tilting Rotary table
Optical profile projector
Sterio Microscope
Anodisation thickness measurements.

NDT:

X - ray Machine (Xylon, US Make)
Ultrasonic Flaw Detector
DP Testing facility

Mechanical Test:

Hardness Tester (Brinell and Rockwell)
Universal Testing Machine
Impact Testing Machine
Form Tally Surf & Tally Round
All General Purpose Instruments.

Integration facility:

Climate controlled integration facility (1 lac class clean room) for precision and dust free assembly of Missiles, rockets and critical aerospace hardware. This facility is supported by facilities like Baro Vacuum Chamber, Leak testing, Pressure testing, Electrical checkout system etc. Also, clean room facility (10,000 class) is established to cater precision dust free assembly of defence and space products.

5.0 SERVICES OFFERED

BATL core capability is Precision engineering, Fabrication, Assembly, Testing and Integration of complex mechanical hardware with the support of a strong team comprising of engineers and skilled workforce in the areas of design,

process engineering, precision machining, fabrication, Heat treatment, Assembly, Integration and Testing.

Gaining from over 25 years of experience in the defense and aerospace sector, it understands the stringent and complex requirements of its customers. We shape our products with this understanding in mind. This is our core competency well supported by the State-of-the-Art Infrastructure.

BATL is committed to helping its customers by providing the best manufacturing solutions using the vast pool of knowledge, skill and experience. It has proven capability to deliver cost effective solutions to all complex manufacturing requirements in the Aerospace, Defence and Nuclear sector. This is the reason customers has entrusted BATL with contracts varying from Cryogenic engine hardware for ISRO to the highly complex Radio frequency Quadrapole for the Proton accelerator project of BARC.

All the major players in the Defence, Aerospace and Nuclear sector rely on us when there is a requirement/ development of complex engineering hardware.

6.0 WHY DEAL WITH BATL

Understanding the stringent demands of its customers is our core strength acquired over the last 25 years of dealings with our customers in the Aerospace, Defense and Nuclear sector.

Since its inception, BATL has been dealing with the stringent and wide varying demands of its customers especially in the Aerospace and Defence sector. We shape our products with this understanding in mind. This is our core competency well supported by the fully integrated and State-of-the-Art Infrastructure all under one roof.

Its well oiled AS 9100 Quality management systems which pervades through the entire organization ensures Quality, Reliability and Cost effectiveness in all its products and services.

BATL aims to establish long lasting relationship with its customers by focusing on the following:

- 1. Providing the best manufacturing solutions.**
- 2. Exceeding expectations in terms of quality and cost efficiency.**
- 3. Maintaining Quality Assurance in Conformance to AS 9100 Rev C Standards**
- 4. Supply in minimum time to the expectation of the customer, thanks to the integrated manufacturing facility covering the entire gamut of operations all under one roof at Thiruvananthapuram.**
- 5. Maintaining strict business integrity in all its dealings.**
- 6. Presence of Resident Inspectors from ISRO, Defense (MSQAA) at BATL so as to enable quick and efficient quality assurance.**
- 7. Compliance with all occupational and safety requirements.**



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