

V.B - TESTING

Testing is significant, integral and critical to any new product planning & development due to its role in the following :

1. Checking the functional aspects.
2. Estimating the endurance capabilities.
3. Validating the design criteria.
4. Evaluating the performance characteristics.
5. Conforming to quality standard.
6. Verifying the production process.
7. Ensuring the acceptance of the product.

Testing has many aspects and kinds like :

I . TYPES :

1. Development test to check the function.
2. Functional test to validate the design.
3. Qualification test to estimate the endurance.
4. Acceptance test to ensure performance.
5. Flight test to evaluate performance.

II. LEVELS :

1. Components.
2. Subassembly.
3. Subsystem.
4. System.

III. ENVIRONMENTAL :

1. Vibration.
2. Acoustic.
3. Shock.
4. Thermal.
5. Thermal cycle.
6. Vacuum.
7. Pressure.

IV. SIMULATION :

1. Software test.
2. Software test with Control System
Hardware - in loop.
3. Air Flow test.
4. Gas / Vapour Flow test.
5. Water Flow test.
6. Cold Flow / LN2 test.

V. MOCK-UP :

1. Engineering Mock-up.
2. Electrical Mock-up.
3. Fluids Filling Mock-up.

VI: PERFORMANCE:

1. Main Engine hot firing test.
2. Gimbal Engines actuation hot firing test.
3. Propulsion Stage hot firing test.

Test Programme covers the following.

- Consideration of all the possible requirements in consultation with all the teams- design, quality, assembly and testing-and finalization of the total programme.

Test plan is a vital document for system level test covering the following details:

1. Objective.
2. Scope.
3. Test Article.
4. Test Facility.
5. Measurement plan.
6. Quality plan.
7. Safety plan.
8. Test details.

9. Predicted Performance.

10. Data Format.

11. Monitoring parameters.

12. Abort parameters.

13. Quick look data.

14. Full data set.

15. Test report.

Conclusion of Test :

1. Compliance of test plan.
2. Analysis of test results.
3. Deviations and Explanations.
4. Further actions- Analysis, Simulation, Test ?
5. Final Acceptance of Prototype.
6. Clearance to Manufacture / Commercialize.

In case of test failure, the following is the course of action.

1. Analysis of Failure.
2. Cause of failure.
3. Remedial measures.
4. Need for retest or not?
5. Retest if required.
6. Final Acceptance & Certification.
7. Clearance to Manufacture.

■ THANK

■ YOU