

PRESENT AND FUTURE OF LAUNCHER TEST BENCHES

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Abstract: A main strength of European launchers is reliability. Engine test benches play a key role in achieving this objective.

GTD has renewed the DLR P3.2 control bench in Lampoldshausen, Germany, enforcing the European test infrastructure capabilities and introducing a new generation of control bench. The main assets of the control system are:

- COTS based system: GTD has built up a solution 100% based on standard robust and reliable industrial products. In spite of the specific solutions developed in the past on the Space market, this solution will ensure long-term maintainability.
- Adaptability and expandability: the control bench is completely adaptable, depending on the test to be performed. Preparation tool allows definition and configuration of relevant parameters of the system (measurement and command channels, events, alarms, etc.) and the programming of control functions (test sequences, closed-loop control programs, etc.).
- High performances: the control system integrates high frequency acquisition measurements solutions (i.e. acquisition of hundreds of signals each at 10 μ s), around 1.000 low frequency acquisition measurements.
- Reliability and availability: the new MCC system provides a high MTBF (>100 000 hours) to assure a high availability of the system. In order to operate the Test Bench, the MCC-system is composed of three independent control systems.

On the other hand, the blooming of the NewSpace industry and the emergence of innovative ways to access the space has revealed the inherent need of creating the proper infrastructure to serve these new agents under requirements of cost, scalability and agile campaigns.

Far from the traditional approach to operate in the European space sector, companies demand flexible, easy access and price competitive ways to test their prototypes in a controlled environment. Following these lines, the average profile of companies currently developing new launch solutions is defined by its relatively small size and economic power. Consequently, it is not the most sensible outcome to build their own engine test benches, as it requires an exceptionally high CapEx investment, supposing a fixed cost in the company accounts and can be an actual barrier to its development.

Consequently, GTD has put on the table the construction new engine test benches aimed at giving response to this growing demand, putting all client-oriented services -fluid communication, time flexibility, clear definition of requirements, price competitiveness and easy access- upfront and with the ultimate goal of helping to grow the NewSpace industry in Europe.

Indeed, GTD, along with the collaboration of local public and private entities, plans on building a state-of-art test bench for rocket engines in the city of Lleida, Spain, devoted at providing services to the southern European demand and other potential users. Following the current market needs previously stated, the test platform at Aeroport d'Alguaire, will feature a wide variety of fuels, highlighting the use of liquid methane as the one of the propellants most demanded by NewSpace companies. Among others, PANGEA Aerospace, the first NewSpace company to ever develop an aerospace for small launchers, has already expressed their interest in the construction of such a platform and have defined themselves as a potential operator.