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R&D : at the heart of the CRITT M2A's strategy

At the heart of its initial strategy, CRITT M2A is entering a phase of acceleration and dynamism in a context of unprecedented technological change.

To meet the demands of the automotive market and solve environmental and societal problems, CRITT M2A adapts the animation and the coordination of its R & D activity in 2 directions:

- The continuation of the laboratory's own needs in terms of enhancing new methodologies, innovative technologies for the market,
- A dynamic elaboration and support of collaborative R & D projects with academic and industrial partners.

Our strategy remains to position CRITT M2A at the leadership level through a proactive and partnering approach in order to meet tomorrow's technological challenges thanks to a strong internal potential to enhance and develop. In this respect, our newsletter presents two topics currently in progress.

NVH thesis

The objective of this thesis is to develop and validate a 3D experimental technique for the characterization of the broadband acoustic emissivity of compressors in circular ducts. In the end, this method will be used to establish and validate a numerical model to predict the acoustic emissivity of this type of components.

The project is intended to improve the acoustic performance of turbocharger and compressor type machines for Hydrogen engines. It combines experimental work on test benches and multi-physics and multidimensional computation methods (coupling of fluid mechanics and acoustic models).

It follows research carried out at CRITT M2A during a 2013-2017 CIFRE thesis. The aim was to develop a methodology for active and passive acoustic turbocharger characterization in condition 1D (plane wave propagation).

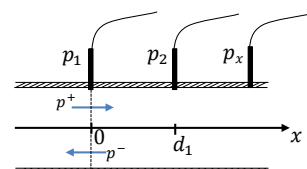
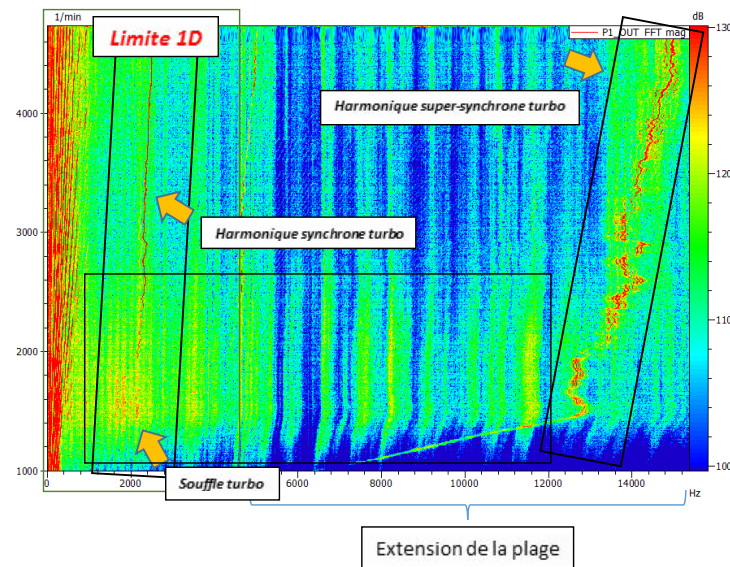


Figure 1 : Décomposition 1D



Parc de la Porte Nord
Rue Christophe Colomb
62700 BRUAY LA BUISSIÈRE

Telephone : +33(0)3 91 80 02 02
Fax : +33(0)3 91 80 02 01
Email : crittm2a@crittm2a.com



To carry out this new research, CRITT M2A chose to rely on the expertise of the Roberval laboratory of the Compiègne University of Technology (UTC), which carried out work related to the development of propagation measurement methods in ducts.

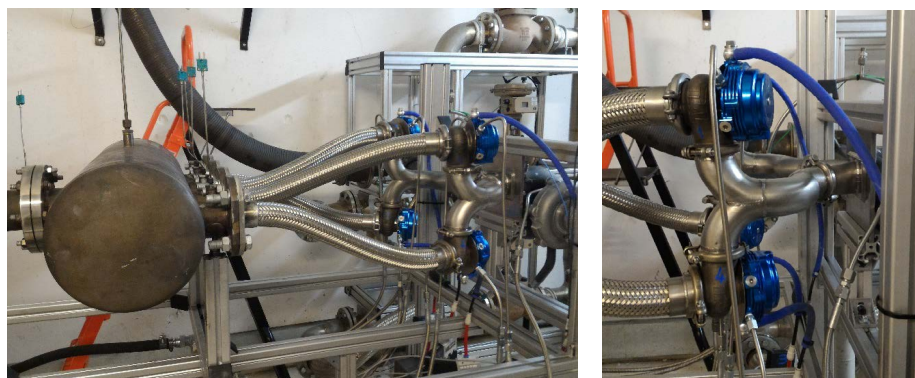
This work will therefore make it possible to gain knowledge on the properties of the turbocharger which are necessary to model and predict the noise generated by the turbo integrated in the engine air loop.

Turbo thesis

CRITT M2A and the Laboratory of Mechanics of Lille have joined forces to study the performance of turbochargers during a first thesis, defended in December 2017, carried out under a CIFRE contract. It focused on the realization of an innovative test bench to simulate an engine exhaust flow, and the operation of this device to characterize the turbine performance of a turbocharger pulsed.

To continue research on the subject, a new thesis is in progress and aims to answer the following questions:

- What are the impacts of pressure pulsations from an internal combustion engine on the performance of a car turbocharger?
- Should we question the hypothesis of «quasi-stationarity» that is made today in simulation to analyze the behavior of a turbocharger in pulsed mode?



Parc de la Porte Nord
Rue Christophe Colomb
62700 BRUAY LA BUISSIÈRE

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Fax : +33(0)3 91 80 02 01
Email : crittm2a@crittm2a.com



- Can we propose more relevant models that take into account the physics associated with the pulsations existing in turbine power supply?

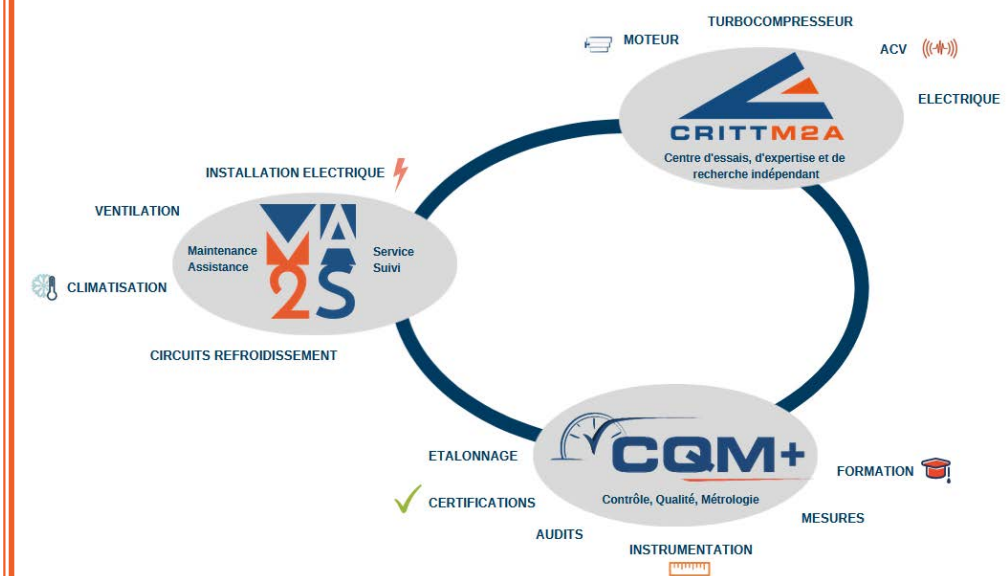
The study will focus on different types of turbochargers and in particular different types of turbine stages. It will mix experimental study and simulation. Through these various studies, the industrial interest is to know if the current desing methods of the turbochargers using the hypothesis of «quasi-stationarity» are viable or if they must be challenged so as to improve the design for use in real pulsed mode.

Since R&D is a driving force for innovation and growth, CRITT M2A regularly offers thesis for its 4 departments.

Critt Group, a restructuration and a new organization for new activities

As part of the development of its activities, two subsidiaries have been created in the Quality, Metrology and Maintenance fields.

The purpose of this group is to provide its clients with the technical expertise, innovation and implementation capabilities of its complementary subsidiaries by increasing the expertise of CRITT M2A in its fields.



The group plans to develop other activities in the future, always with a view to excellence and diversification of our know-how.



Parc de la Porte Nord
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62700 BRUAY LA BUISSIÈRE

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Fax : +33(0)3 91 80 02 01
Email : crittm2a@crittm2a.com



First acoustic characterization of an electric Powertrain

Used to perform acoustic and vibratory measurements of thermal powertrain (GMP) until now, the engine bench in anechoic chamber extends its capabilities to electric GMP.

The electrical power is supplied or absorbed by an e-Storage battery simulator, according to the different cases of life studied, traction or energy recovery. This last case of regenerative braking leads to use the bench electric machine in areas of operation usually untapped with thermal GMP.

The objective is to evaluate the acoustic quality of the engine and reducer, to identify the critical operating zones and to have a reference in order to evaluate the next evolutions.



Recruitment



Joining the CRITT M2A group is integrating a dynamic group in full expansion. To support this development, we are recruiting new employees.

The newly created MA2S maintenance subsidiary already has a strong activity and is looking for two refrigeration technicians.

The CRITT M2A is recruiting battery test engineers and technicians for its electrical test center, an engine and turbocharger engineer.

Feel free to apply by sending your application to crittm2a@crittm2a.com.



Forthcoming events

28-30 April 2020: CRITT M2A will attend the **Electric & Hybrid technology Expo**, in Stuttgart.

03-04 June 2019: CRITT M2A will attend the **SIA Powertrain & Energy** in Rouen.

16-18 June 2019: CRITT M2A will attend the **Automotive Testing Expo Europe** in Stuttgart.

