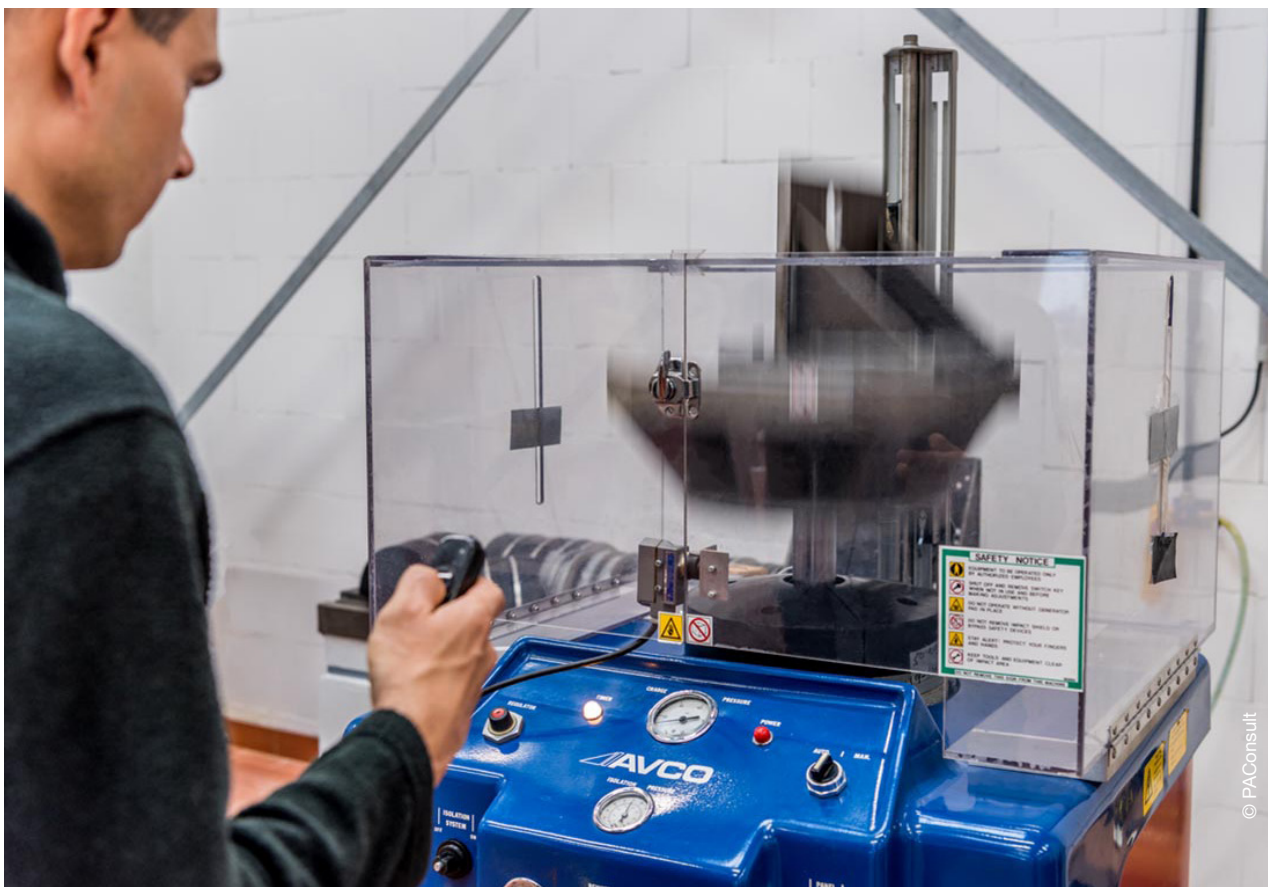


Application Note

Shock Measurement and Analysis with m+p Analyzer



This application note discusses several examples about m+p Analyzer solution for Classical Shock and Shock Response Spectra (SRS) acquisition and processing.

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1. Classical shocks with dedicated machines (AVCO/AVEX, ...)



AVEX shock machine



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The m+p Analyzer can interface with a variety of front-ends, from our own family of acquisition hardware (m+p VibPilot, m+p VibRunner, m+p VibMobile), or third-party NI modules (CDAQ, PXI). In combination with a shock machine (i.e. AVCO/AVEX, Lansmont,...), the m+p Analyzer provides powerful acquisition and data processing tools for classical shock applications.

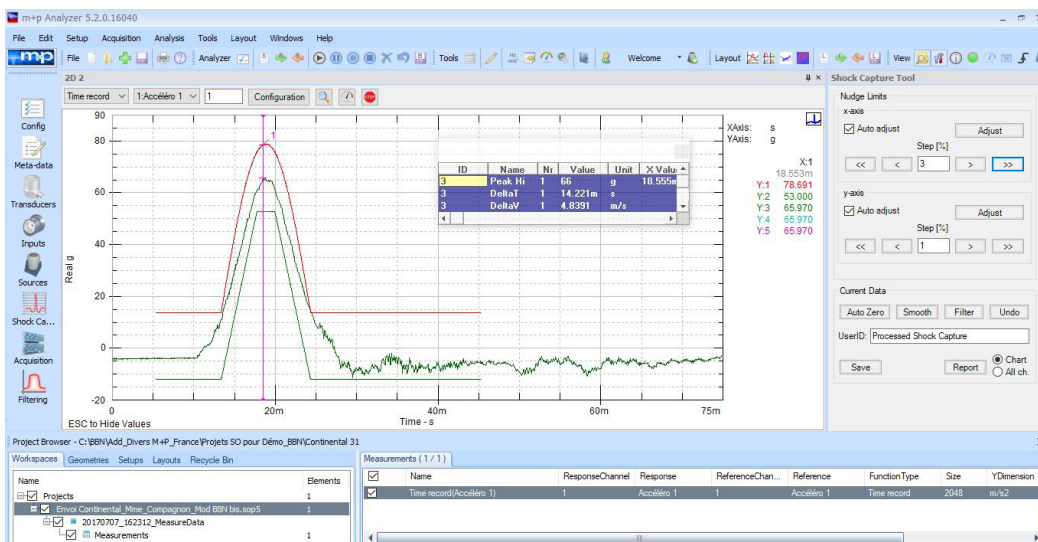
The acquired signal can be post-processed (offset, drift compensation, filtering, etc.) and compared to limits or to profiles that can be manually defined or loaded by the user (MIL STD 810, DO 160, etc.).

In order to optimise data processing and provide clear results, the m+p Analyzer includes options to display max levels in velocity, acceleration as well as the shock duration, which can be viewed in a value table and/or as legend in a graph.

The recent m+p VibPilot front-end can interface via USB or Ethernet and is capable of sampling up to 204.8 kHz. With this high sampling rate we can manage and characterize hard and pyrotechnic shocks in a better way.

By coupling two front-ends to increase the number of acquisition channels (it is possible to combine four m+p VibPilot units together) we can easily acquire multiple vibration/shock and even electrical signals, in order to verify the correct behaviour of tested electronic devices.

For classical shocks applications, the m+p Analyzer solution is utilised by Leonardo, Chemring (UK), Delserro Engineering (USA), Continental Automotive, SMAC – Groupe MontBlanc Technologies, Thales Alenia Space (France), PAConsult (Germany), for example.



m+p Analyzer screenshot – Classical shocks

2. Acquisition and SRS processing on Adetests test bench

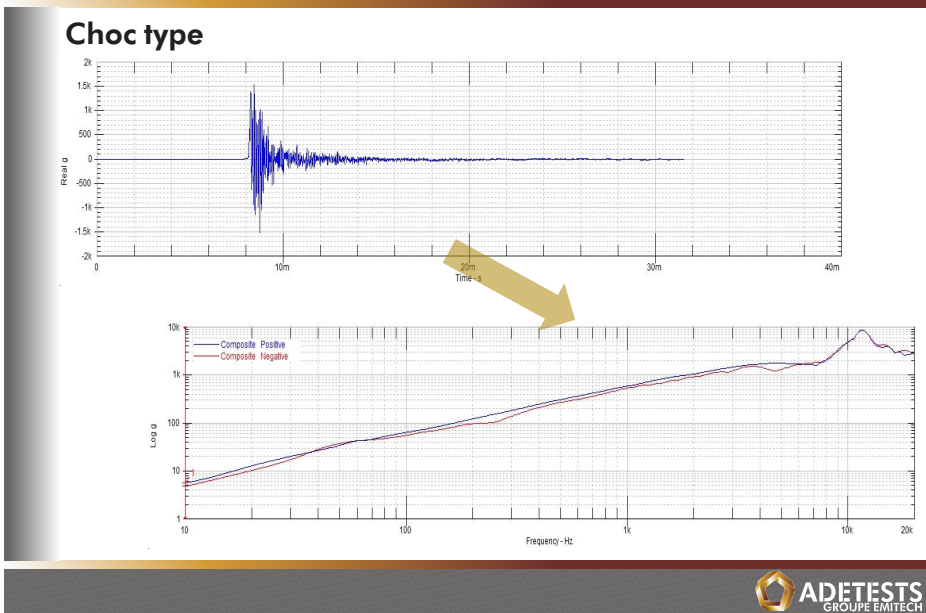
Adetests in France required an m+p system to integrate into a custom designed shock machine capable of performing SRS tests with a level of 4000 g to 1000 Hz.

A detailed lecture was made in November 2014 during AVE-INSA Blois congress. (Please refer to the literature section at the end of the report to recover the full content of this lecture in French.)

Présentation du banc



Analyse de la reproductibilité et de la dispersion

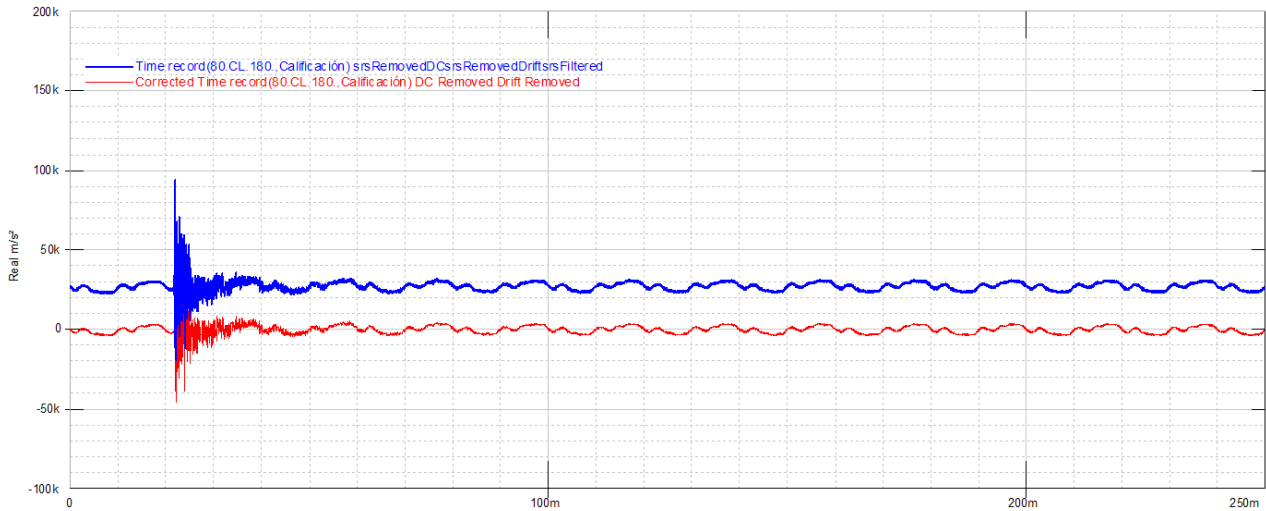


This system solution comprised of an Adetests guided free drop machine and an m+p VibPilot front-end which interfaced with the m+p Analyzer software. The shock system solution is currently utilised by Adetests & ASB Aérospatiale Batteries.

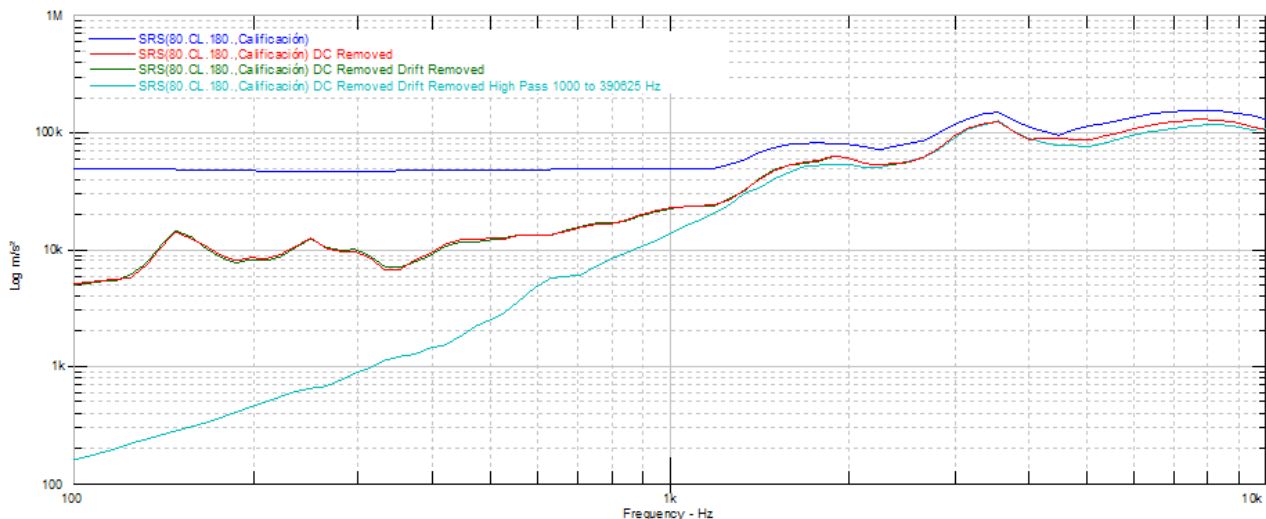
3. SRS post-processing at Airbus Defence and Space

Within space industry, Airbus Defence and Space utilise the m+p Analyzer software to post-process data acquired by third-party systems.

The capability to support a large number of data formats to clean recorded signals (offset and drift compensations, filtering) prior to SRS computations were critical features for Airbus Defence and Space, which m+p easily provided.



in blue: imported raw signal; in red: cleaned (offset, drift) and filtered signal



SRS results from raw signal, after offset, drift compensations and filtering

A dedicated wizard helps the user to get fast and significant results.

4. Literature

- Banc de simulation de chocs pyrotechniques par chute libre guidée – Mathieu CAYUELA – ADETESTS (Colloque AVE INSA Blois Nov. 2014)
- Prise en compte des chocs chez MBDA – Philippe DESSENDIER – MBDA (Colloque AVE INSA Blois Nov. 2014)
- m+p Analyzer user manual: chapters 8 (SRS) & 9 (Classical Shocks)
- m+p Analyzer Shock Response Spectrum product information

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