# Direct Field Acoustic Testing Workshop

Facilitated by Siemens PL

**When:** Tuesday 29th May

**Time:**  14:00 - 17:00

**Location:**  Aj030 or ESCAPE (tbc), ESTEC

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**Background:**

Acoustic testing is a milestone in the qualification and acceptance process of space hardware. Subjecting an item to the intense noise levels while measuring its vibration responses is a test performed on subsystem, e.g. reflectors, solar panels, as well as on system level, i.e. on the assembled satellite. Presently, acoustic noise tests are executed mainly in dedicated reverberant chambers. This test setup aims to reproduce the characteristics of the sound field, that is generated inside the launcher fairing during a spacecraft launch, in the most representative manner. Over the past 15 years, mainly US space industry has been investigating alternatives for acoustic noise tests in reverberant rooms. Main drivers were the demand for a less expensive test setup that is flexible and transportable to allow testing at the assembly site, eliminating the need to ship the spacecraft and the engineers to a dedicated test facility. These efforts have resulted in the definition of a new test methodology, called Direct Field Acoustic Testing, which makes use of commercial, professional audio equipment such as loud-speakers and audio power amplifiers. The differences between the two testing methodologies are manifold:

* space needed for the test set-up,
* required environment and shape of surroundings,
* electrical power demands,
* complexity of control,
* safety and cleanliness and contamination aspects,
* etc.

The most important difference lies in the characteristics of the created sound field itself. The uniformity, diffusivity, and achievable sound pressure level which are inherent to the sound filed generated in a reverberant chamber are conditions that can only partially be achieved with the Direct Acoustic Field excitation method.

**Objective:**

This workshop is an open forum where some of the world’s experts working in the field of acoustic noise testing of space hardware and systems will share their experiences and opinions. The aim is to collect ideas, opinions and experiences that are genuine and free of any vendor interests with the objective to identify future research and development needs in the field of acoustic noise testing.

**Workshop Format:**

To trigger the discussion, experts from NASA JPL, ESA, MSI DFAT Services, Thales Alenia Space, DV-2 and Siemens PL will prepare brief presentations on related topics and their experiences. Workshop participants are invited to comment, as well as to contribute actively to the open discussion thereafter.