

Transonic Compressor

Research since 1994

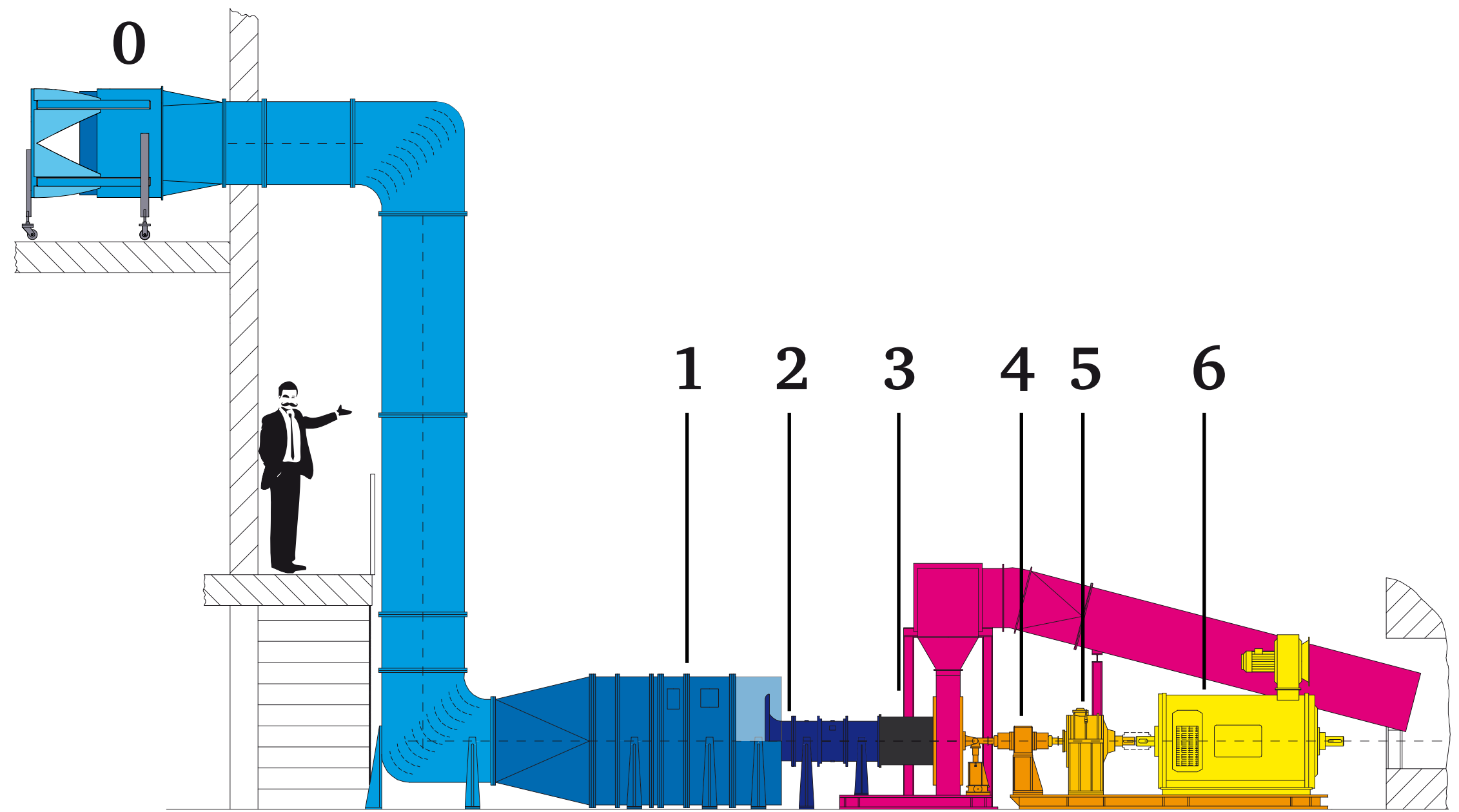


TECHNISCHE
UNIVERSITÄT
DARMSTADT

Sketch of the rig

The transonic compressor is run in an open loop. Air is taken from the ambience and guided through an inlet throttle (0), a settling chamber (1) and a mass flow measurement section (2) to the test section (3).

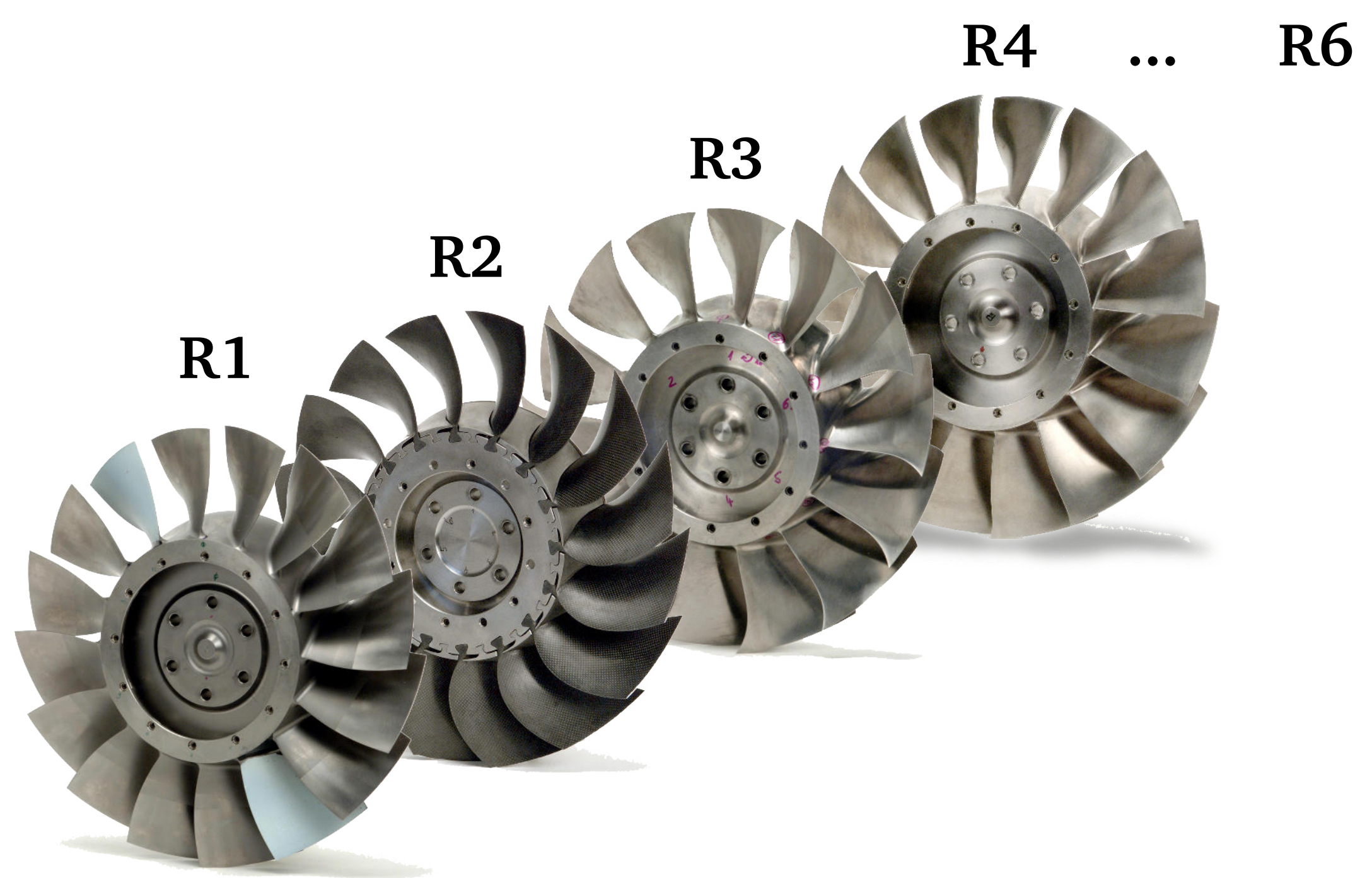
A 800 kW DC drive (6) and the gearbox (5) enable the rig to run up to 21,000 rpm. Shaft input torque and rotor speed is measured using a torquemeter (4).



State of the art compressor rotors

Since 1994 the transonic compressor test rig was equipped with 6 modern compressor rotors, comparable to the ones in front stages of a modern aircraft engines.

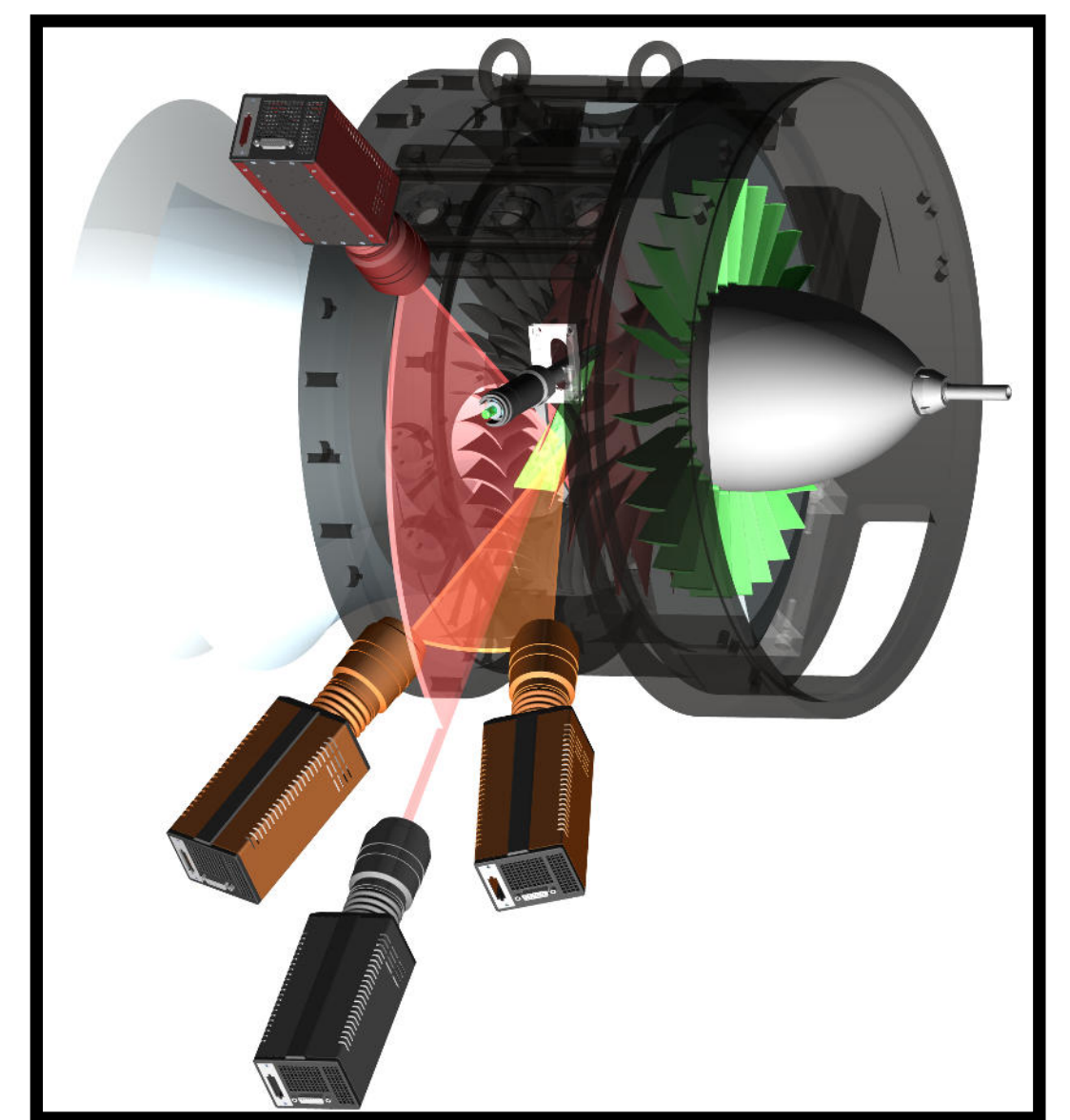
The rotors are run as a part of an 1.5-stage compressor that includes variable inlet guide vanes (VIGV).



Measurement techniques

Steady instrumentation of the rig allows the measurement of aerodynamic properties and the performance of the stage. Therefore VIGV and stator can be clocked.

Different casings allow the implementation of unsteady instrumentation like pressure transducers, capacitive blade sensors in the casing, PIV and strain gauges.



Research Activities

Research focuses on aerodynamic and aeroelastic aspects of modern compressor stages.

Different casing configurations are used to investigate the influence of the rotor tip gap, inlet distortions and casing treatments on performance and stability of the compressor.

