

### Italian Test Site: Power Room System

Two different power systems for the dynamic charging of an EV in an E-road

#### Introduction & Objectives

Nowadays efficiency is the key word for the power systems. Even power quality has to be taken into account for the grid connected systems. The EVs dynamic charging is a new challenge for the power system. The power room is the front end of the test site towards the grid. The main transformer connects the medium voltage (MV) grid, at the primary, to the low voltage (LV), at the secondary. An AC/DC converter feeds the Polito system.

#### Objectives

- Measure of the AC power in both SAET and POLITO systems;
- Measurement of DC power in POLITO system;
- Protections system;
- Power distribution;



Fig 1. Susa Test site

#### Partners involved



POLITECNICO DI TORINO

TECNOSITAF S.p.A.

saetgroup



Fig2. Power room location

#### Developments and testing activities

The system is supplied from the grid at 22kV. The Main transformer reduces the voltage at 400V. A wattmeter connected at the output of the breaker Q3 measures the power that is transferred to the EV during the charging. The DC side of POLITO is isolated in order to reduce the common mode currents. The SAET transformer steps up the voltage at 650V and has two three-phase secondary windings. The primary has a star connection whereas the second has a delta connection.

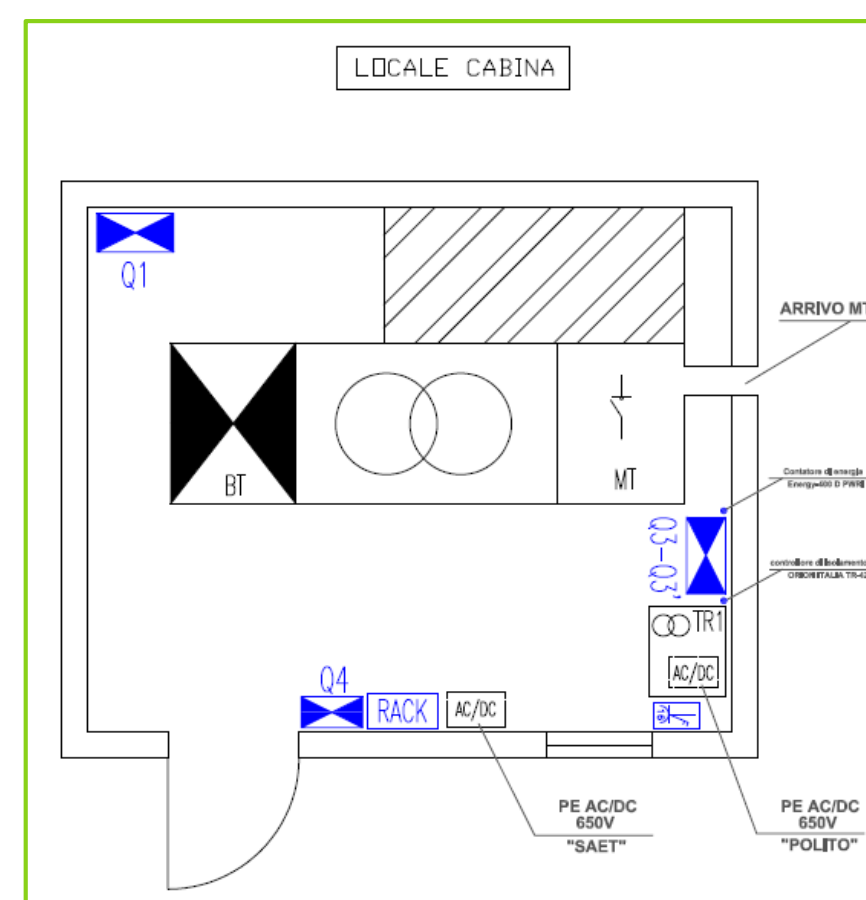


Fig 3. Power Room

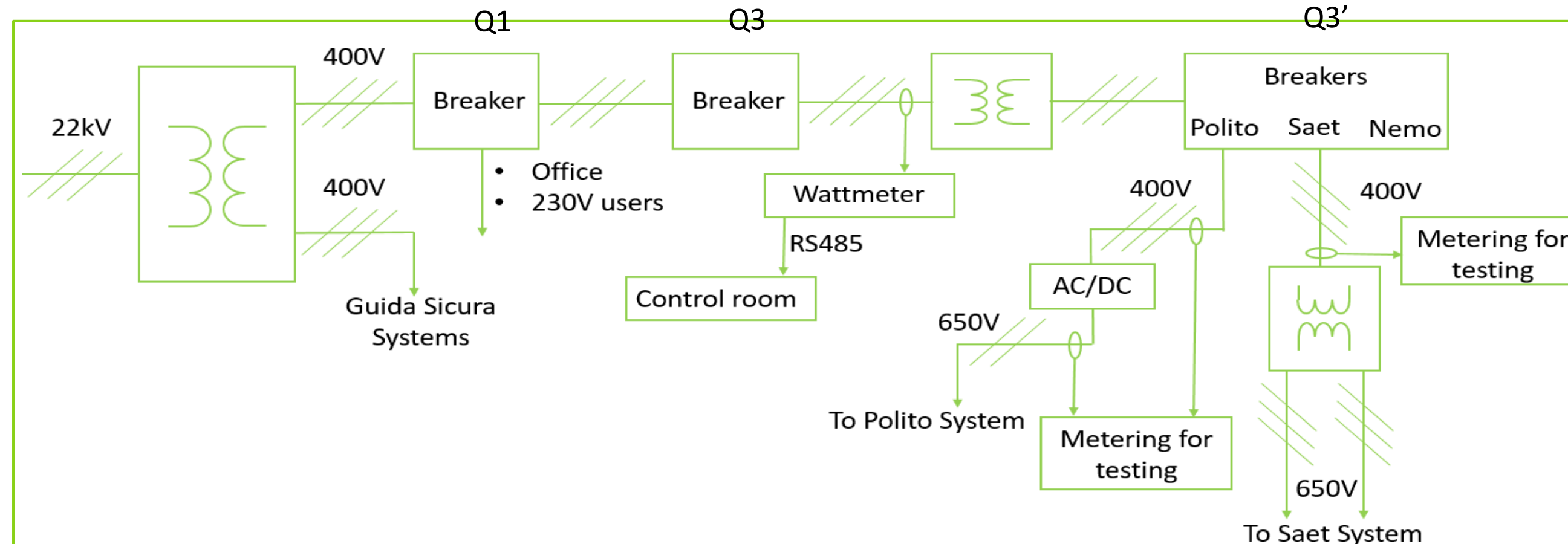


Fig 4. Power Room load distribution



Fig 6. Power Room test setup

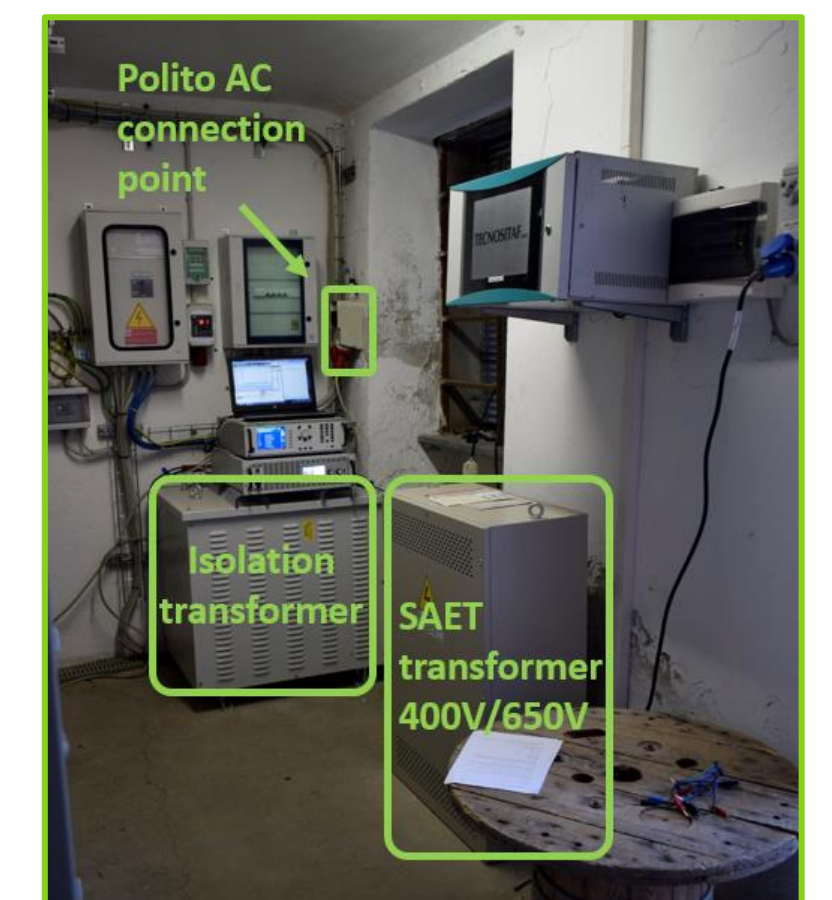


Fig 5. Transformers organisation

- AC/DC model number: EA-PSI 91000-30 3U
- Power Factor > 0,99
- Wattmeter: Zimmer LMG500
- Power measurement method: Aron

#### Achievements

Thanks to the isolation of the system, common mode currents are reduced (Fig7, Fig 8).

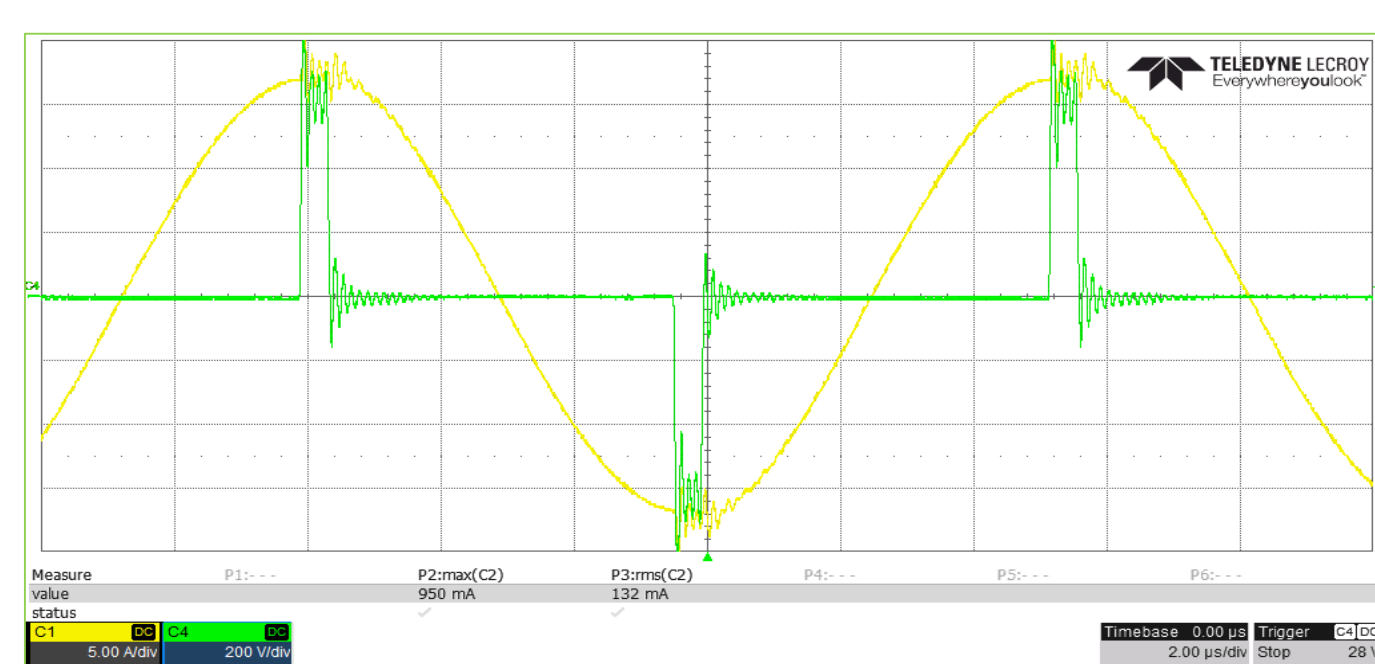


Fig 7. Measurement on the POLITO System

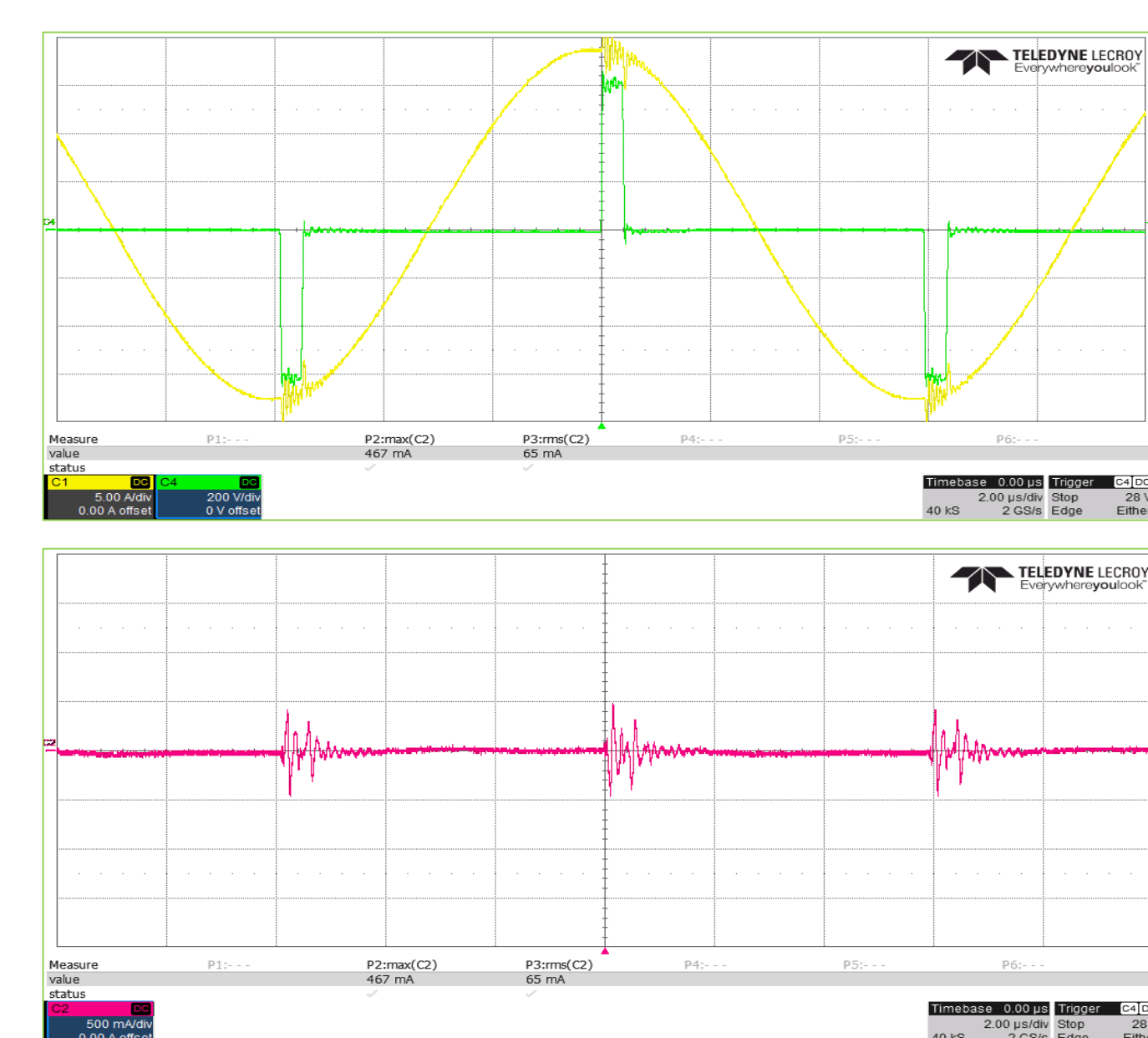
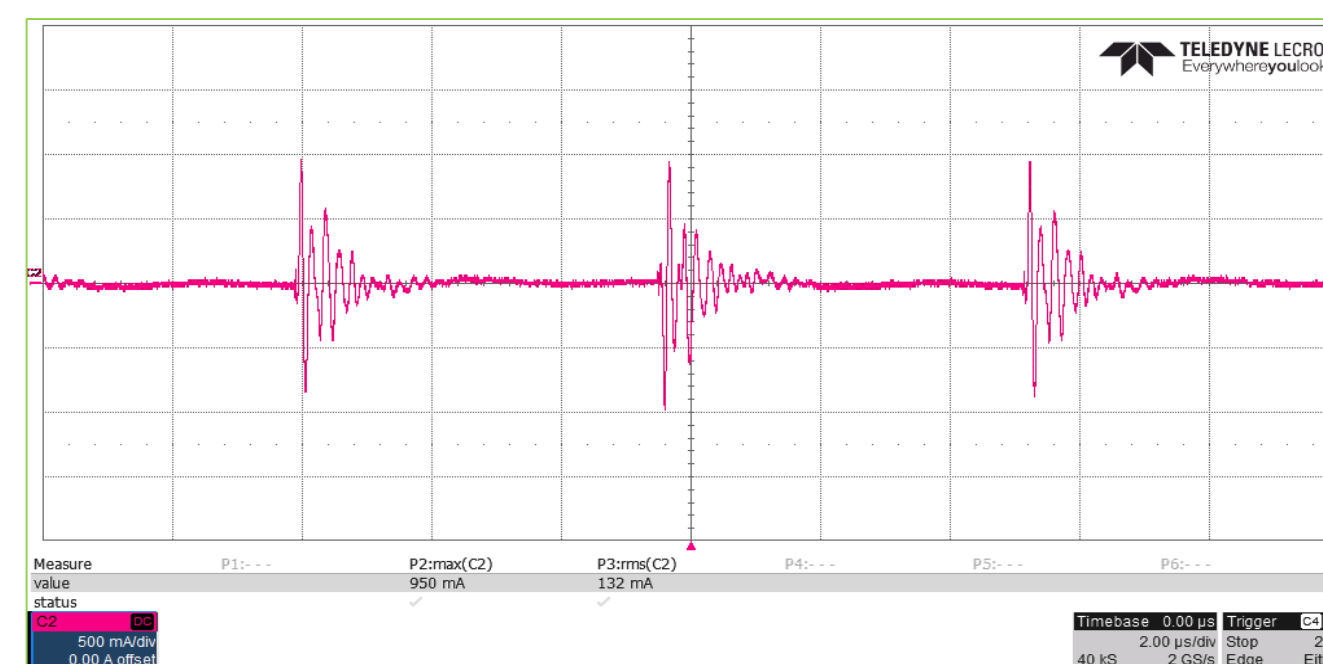


Fig 8. Measurement on the SAET System in the laboratory

#### Final Event & Demonstration | 21-22 June 2018 Italy

##### Contact

Alessandro La Ganga, Polito, Italy, Email: [paolo.guglielmi@polito.it](mailto:paolo.guglielmi@polito.it)

##### Coordinator

Angelos Amditis, ICCS, Greece, Email: [a.amditis@iccs.gr](mailto:a.amditis@iccs.gr)

##### Consortium

##### Project facts



Duration: 48 M

DG / Unit: Research and Innovation

Budget: 9 M€

Funding: 6.5 M€

This project has received funding from the European Union's FP7 for research, technological development & demonstration under GA no 605405.

