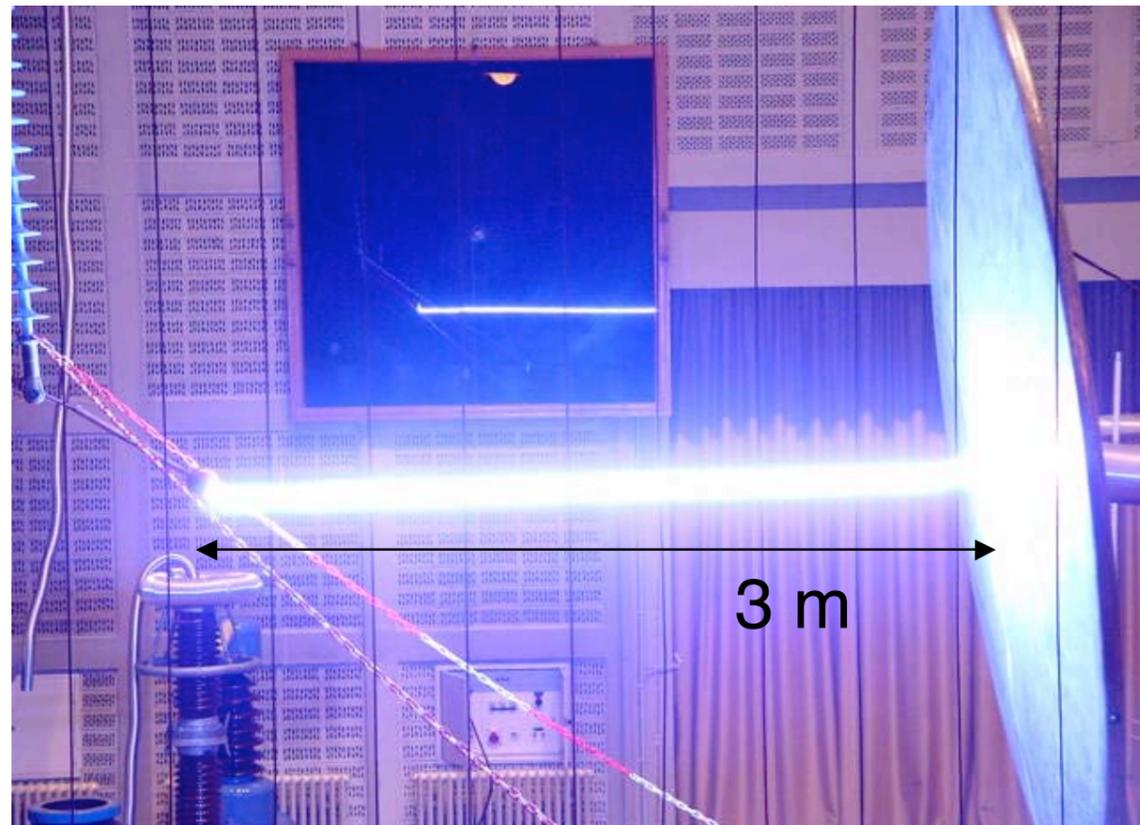


Laser-controlled lightning

The Teramobile laser permitted us to trigger and guide high-voltage (1 MV) discharges along filamentation in air. Those results open the way to active laser-control of lightning.

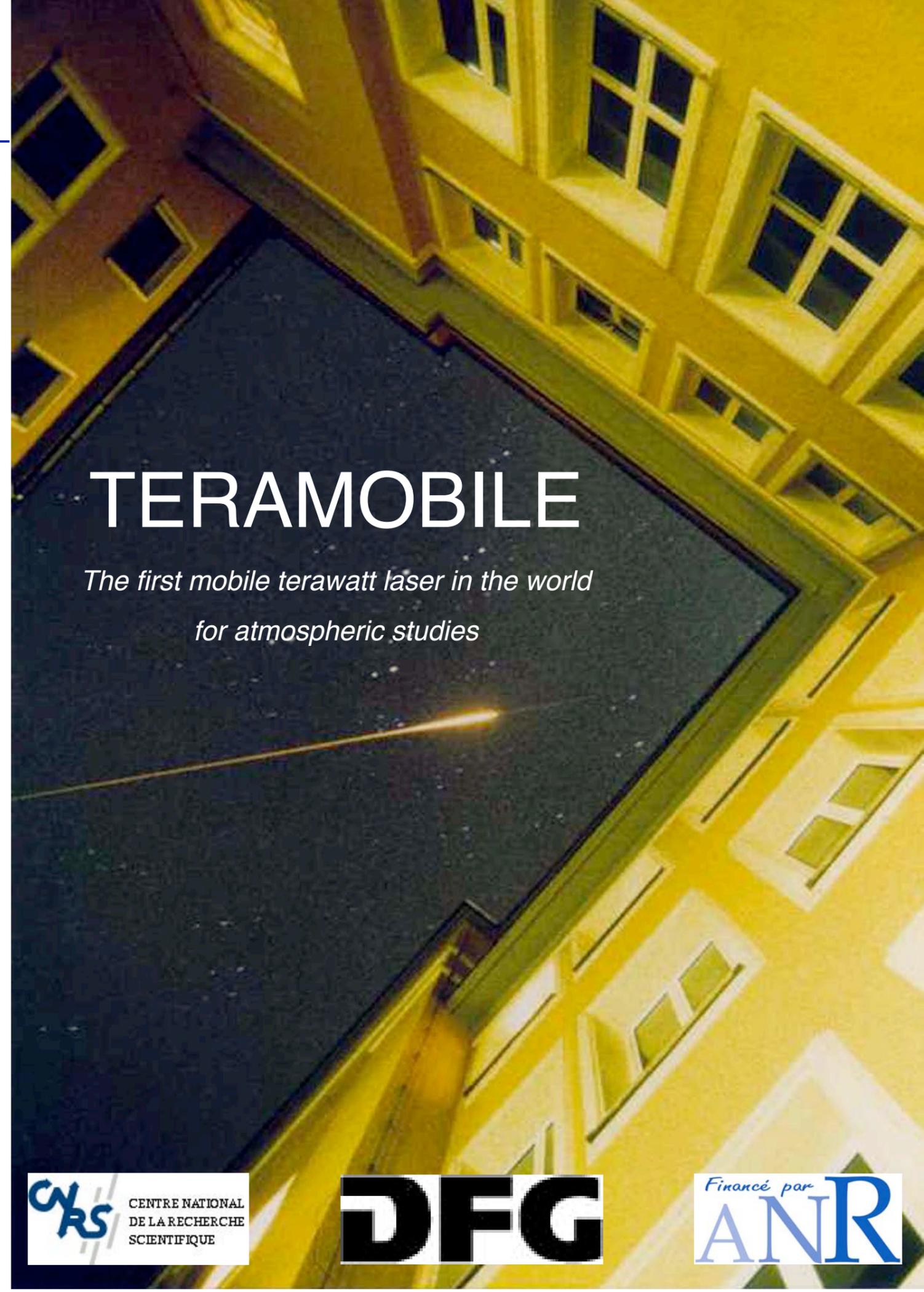


Laser-guided discharge: straight path and discharge voltage reduced by 30 %

More under: <http://www.teramobile.org>

LASIM, Université Lyon 1, 43 bd du 11 novembre 1918, 69622 Villeurbanne Cedex, France
IOQ, Friedrich Schiller Universität, Max-Wien-Platz 1, D07743 Jena, Germany
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Cover: white-light filament produced by a fs-TW infrared laser over Jena, Germany



TERAMOBILE

*The first mobile terawatt laser in the world
for atmospheric studies*

An international collaboration

Teramobile is an international project initiated jointly by a French-German collaboration of CNRS and DFG. It is now funded by ANR and implies 5 laboratories:

- LASIM (CNRS/University Lyon 1, J. P. Wolf)
- Free University of Berlin (L. Wöste)
- University of Jena (R. Sauerbrey)
- LOA (CNRS/X/ENSTA, A. Mysyrowicz)
- GAP (Université de Genève (J. P. Wolf)

A unique tool

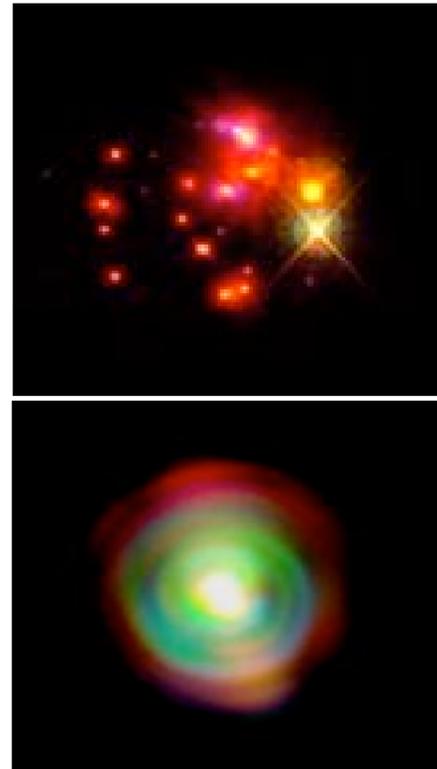
The Teramobile system is the first mobile laser yielding **5 terawatts (TW)** and **100 fs** (10^{-13} s) pulses. It concentrates the state-of-the-art laser technology in a 20' standard freight container, allowing field measurement campaigns (below at Tautenburg observatory, Germany).



fs-TW pulse propagation

The Teramobile laser allows outdoor measurements, hence over very long distances. The non-linear propagation of powerful laser pulses raises fundamental physical questions as well as new application opportunities:

- propagation as **self-guided filaments** by Kerr effect, where the ionised air is electrically conducting (lightning control)
- broadband « white light » continuum generation (230 nm-4 μ m). This « **white-light laser** » covers the absorption band of many atmospheric pollutants (multi-component optical remote sensing)



Multi-component Lidar pollution remote sensing

Our fs-TW laser used as a « white-light laser » allows simultaneous remote sensing of multiple pollutants. We have characterized a urban ozone pollution episode, measuring the several species involved.

Backscattering of a laser beam up to 10 km: cloud measurement based on multiple scattering

