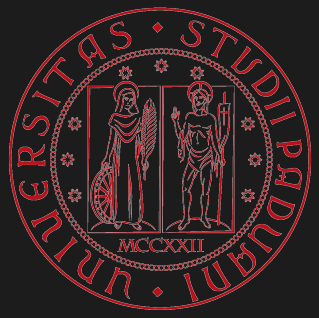
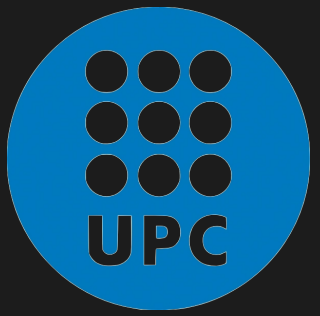


master degree in
Telecommunication Engineering



UAV-based GNSS-R Systems for Soil Moisture Monitoring

student
Tommaso Martini

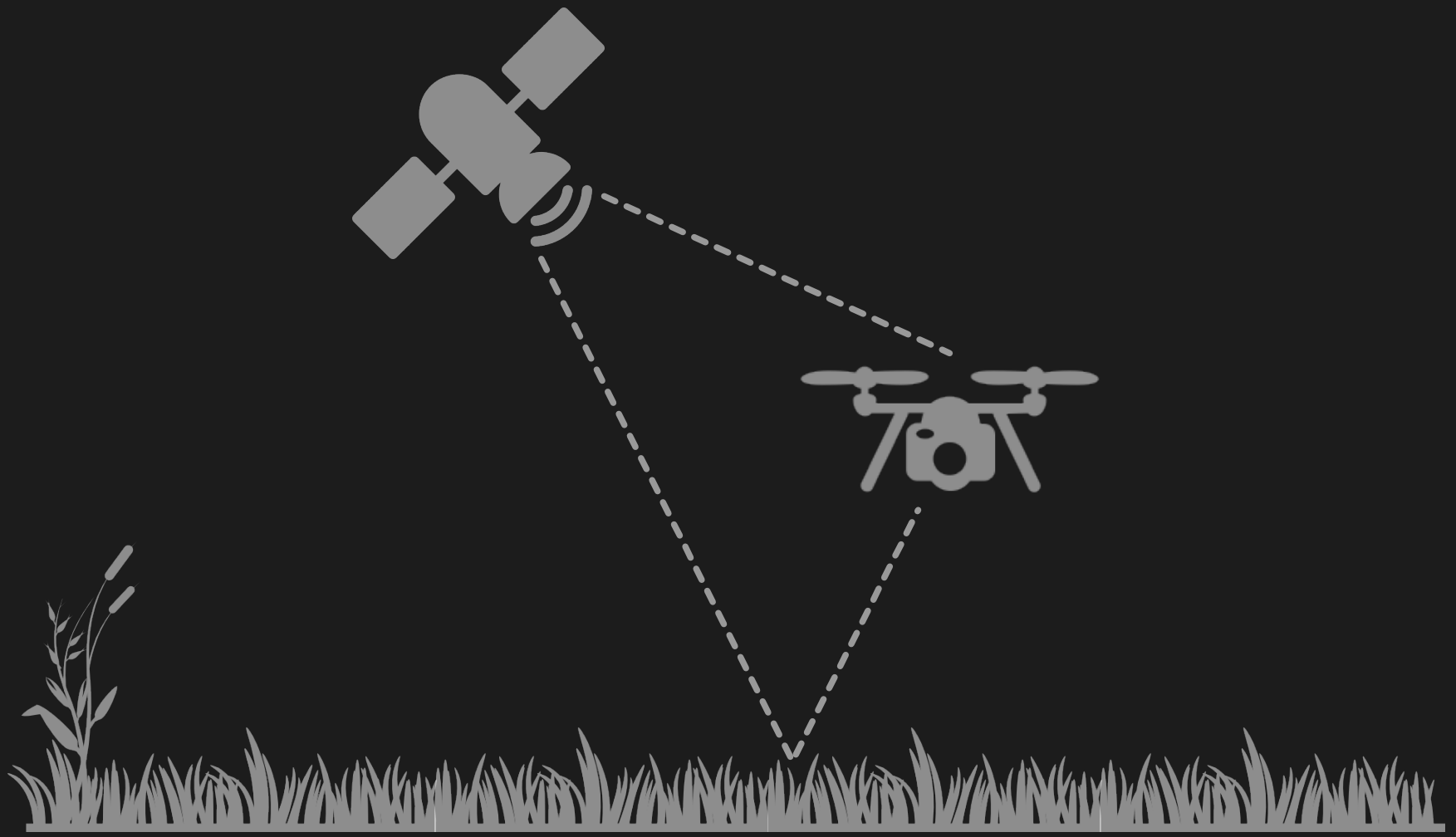
advisors
Luca Schenato
Adriano Camps

tutor
Alberto Alonso

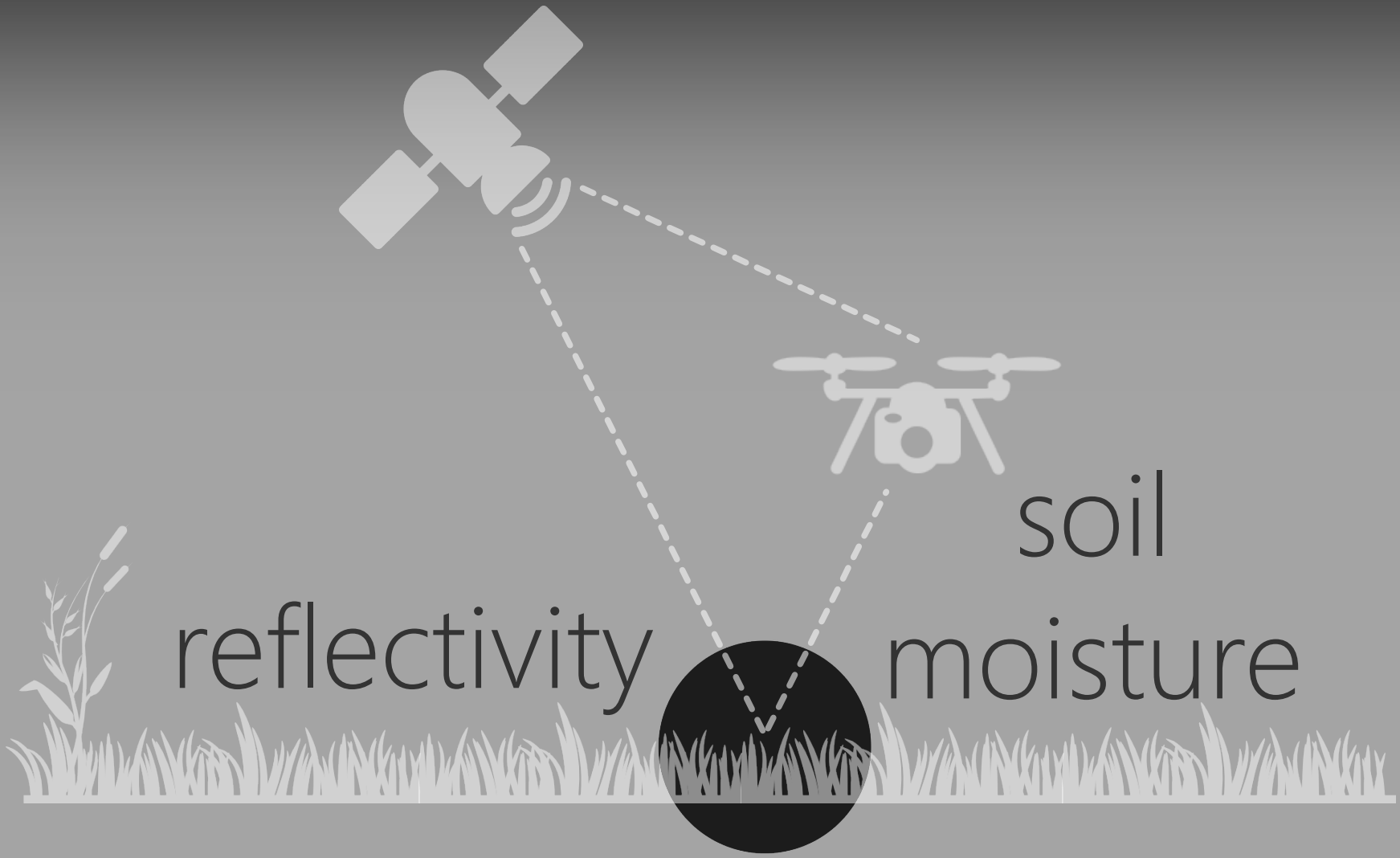
Padova, October 6th 2015

Remote Sensing Laboratory

GNSS-R



GNSS-R



state of the art

Light Airborne Reflectometer for GNSS-R Observations

3

state of the art

Light
Airborne
Reflectometer for
GNSS-R
Observations

UAV-based

lighter
smaller

goals

UAV-based

lighter
smaller

real-time

faster
smarter

5

my contribution

introduction development results conclusions

my contribution

hardware

my contribution

hardware

software

my contribution

hardware

software

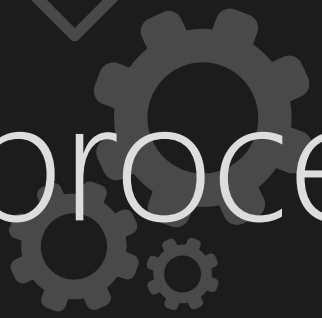
field campaign

my contribution

hardware

software

field campaign



post-processing

my contribution

Compact Reflectometer for Terrain Observations

my contribution

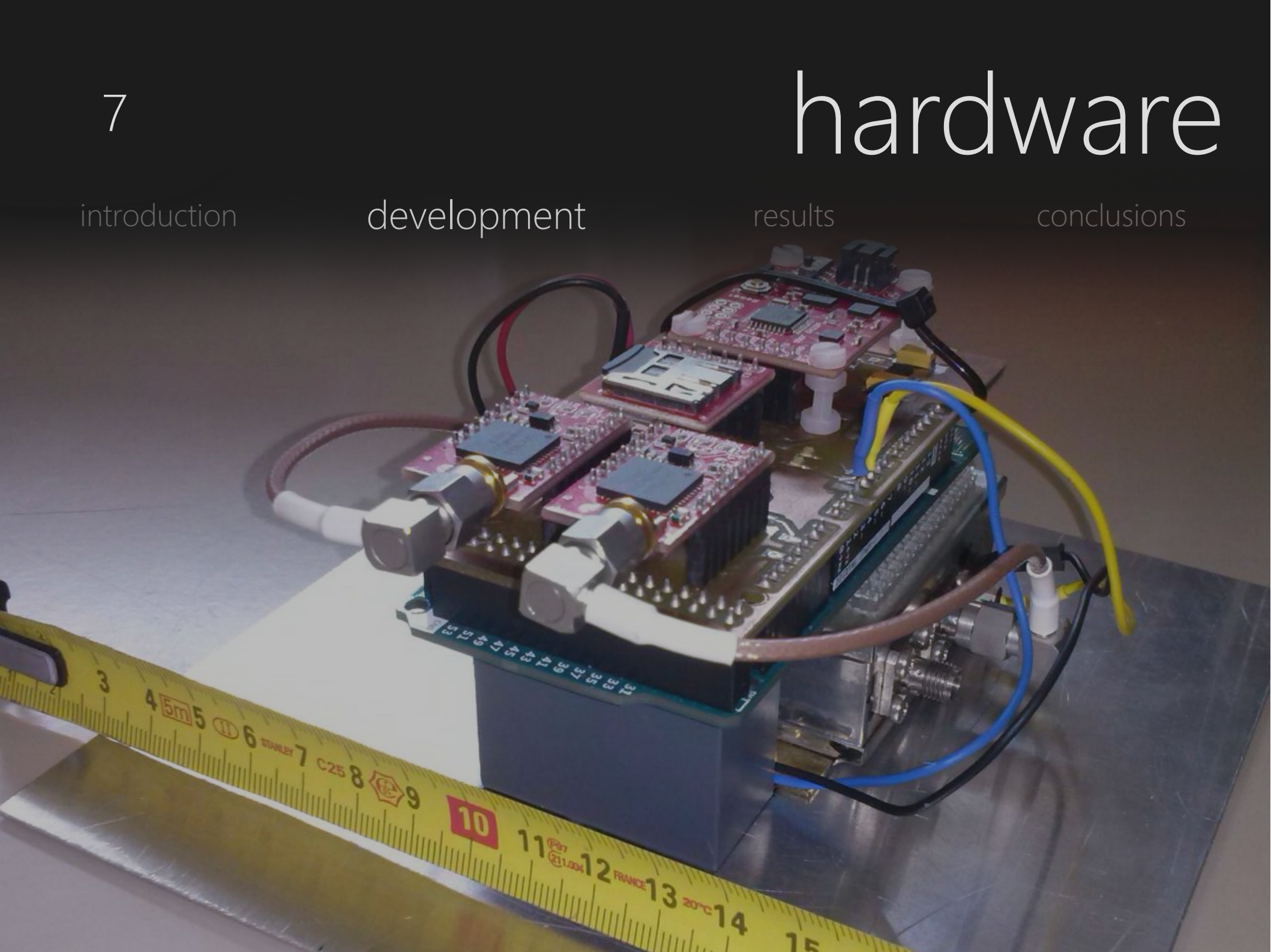
CORTO

Compact Reflectometer for Terrain Observations

7

hardware

introduction development results conclusions



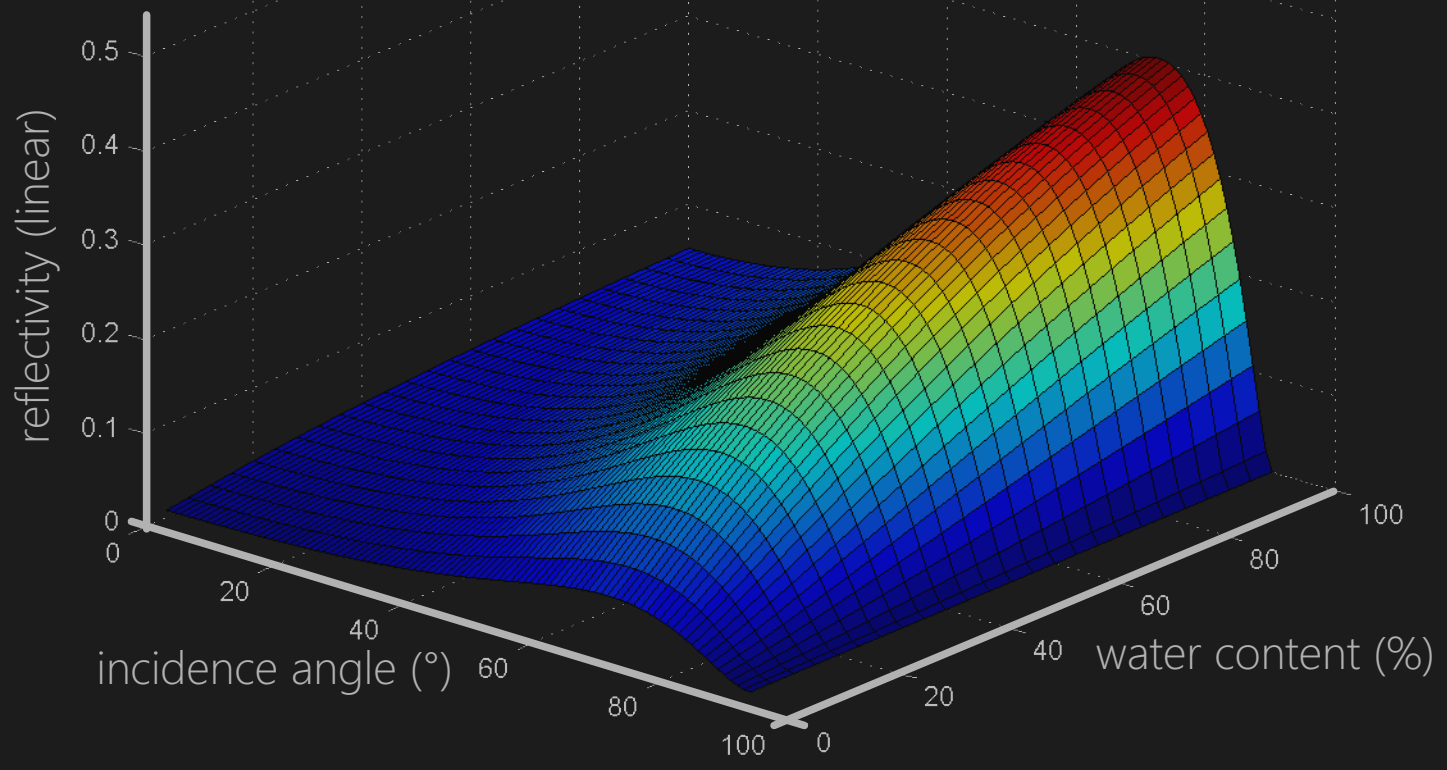
software

9

field campaign

introduction development results conclusions

post-processing



$$\Gamma_{RHCP,LHCP}(SM,\theta_i) = \left|\frac{\rho_{TE}(SM,\theta_i) - \rho_{TM}(SM,\theta_i)}{2}\right|^2 e^{-4k^2\sigma^2\cos^2\theta_i}$$

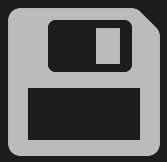
weight

LARGO

CORTO

17.5 Mbytes/h

1.1 Mbytes/h



LARGO

CORTO

time

introduction development results conclusions

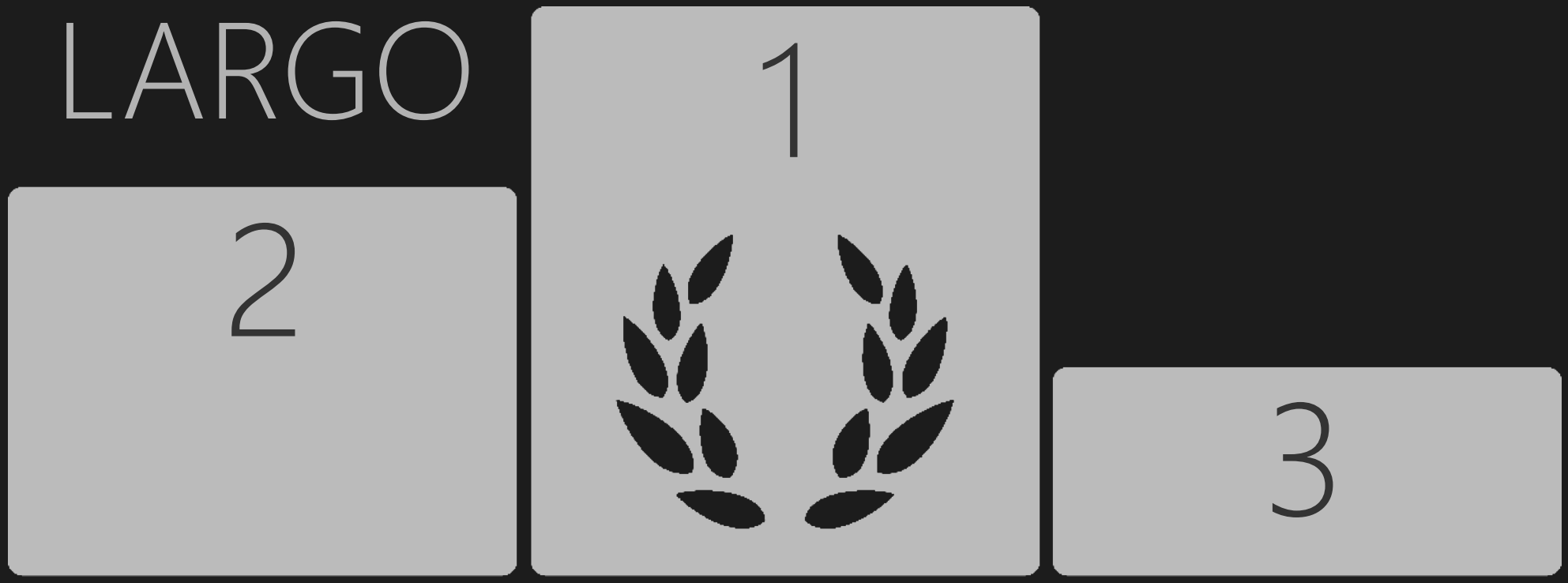
LARGO

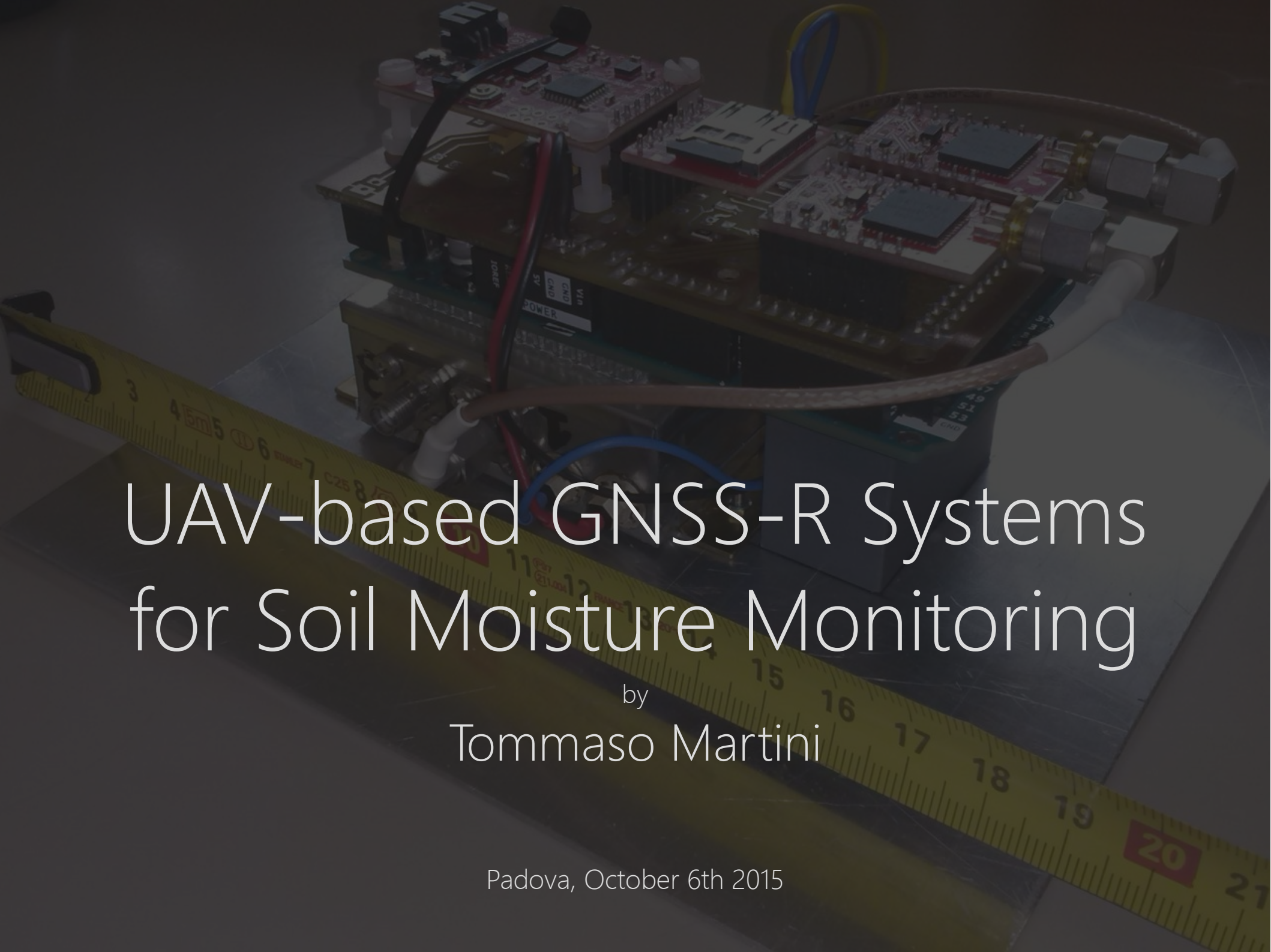
CORTO

performance

CORTO

LARGO





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by

Tommaso Martini

Padova, October 6th 2015