

Fiducial Reference Measurements for Validation of Surface Temperature from Satellites (FRM4STS)

Project aim:

To establish and maintain SI traceability of global Fiducial Reference Measurements (FRM) for satellite derived surface temperature product validation and help develop a case for their long term sustainability. An ESA funded project on behalf of the international community to establish community agreed best practises and international harmonisation through support of a CEOS WGCV calibration project following on from the 'Miami series of comparison experiments'

What are Fiducial Reference Measurements?

"The suite of independent ground measurements that provide the maximum return on investment for a satellite mission by delivering, to users, the required confidence in data products, in the form of independent validation results and satellite measurement uncertainty estimation, over the entire end-to-end duration of a satellite mission" (Sentinel-3 Validation Team)

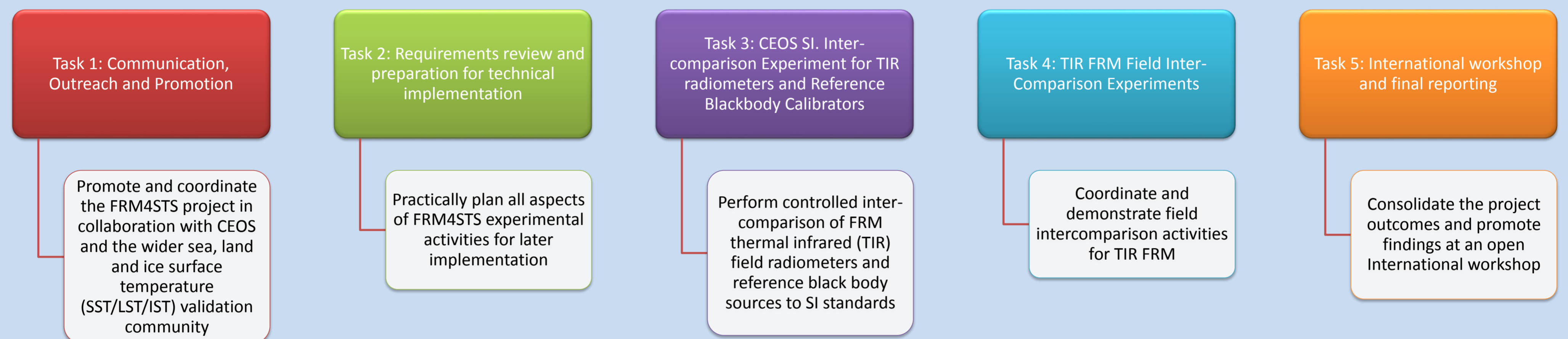
An FRM must:

- Have documented evidence of its degree of consistency for its traceability to SI through the results of round robin inter-comparisons and calibrations using formal metrology standards
- Be independent from the satellite geophysical retrieval process
- Have a detailed uncertainty budget for the instrumentation and measurement process for the range of conditions it is used over.
- Adhere to community agreed measurement protocols, and management practises.

Requirements for project objective:

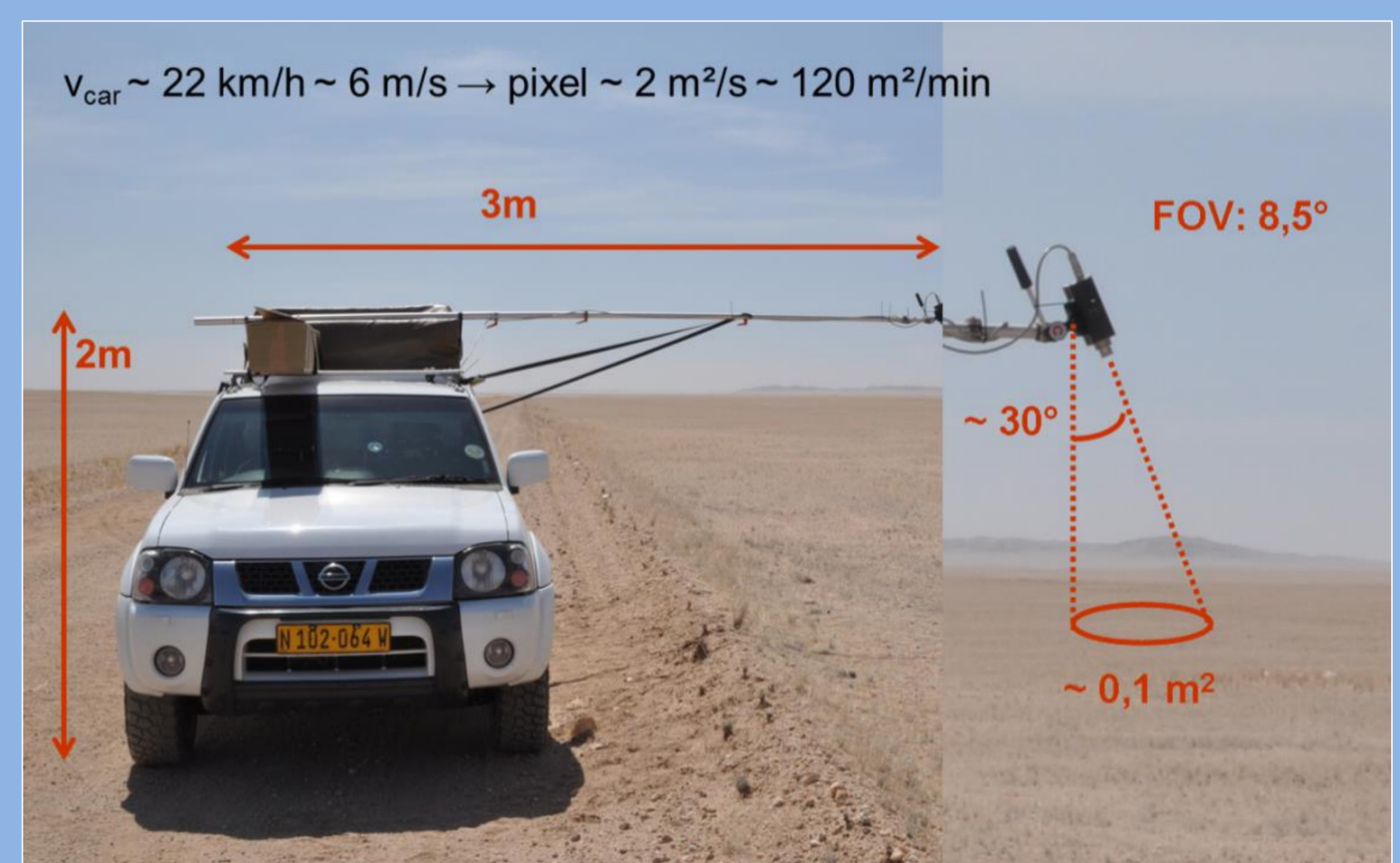
- Comparisons to ensure consistency between measurement teams
- Common descriptions and evaluation of uncertainties
- Robust links to SI
- Experiments to evaluate sources of bias/uncertainty under differing operational conditions
- Provision of guidance and best practises and access to standards and comparisons
- Evidence and publicity of benefits to ensure resources needed to maintain collection of global FRM is forthcoming

Project breakdown



Key deliverables

- Laboratory-based comparison of the results of participants calibration processes for FRM TIR radiometers (SST, LST, IST) (spring 2016)
- Laboratory-based comparison to verify TIR blackbody sources used to maintain calibration of FRM TIR radiometers. (spring 2016)
- Field inter-comparisons of SST using pairs of FRM TIR radiometers on board ships to build a database of knowledge over a several years.
- Conduct field-campaigns for FRM TIR of LST. (winter 2016/17)
- Best practise protocols for the calibration, operation and performance of FRM of Surface temperatures.
- Full data analysis, derivation and specification of uncertainties, following agreed NMI protocols on all data collected as part of FRM4STS.
- All outcomes published to promote benefits of Cal/Val.
- Potentially perform a study of means to establish traceability and potential benefits to satellites validation and CDRs of high accuracy Ocean temperature measurements using buoys and similar floating systems.



Mobile radiometric measurements across the gravel plains at Gobabeb, Namibia