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NIROPS imagery for calibration and validation of satellite fire products

By: Luigi Boschetti

About Me

Luigi Boschetti, professor of Remote Sensing
Since 2012: Dept. of Forest, Rangeland and Fire Sciences, University of Idaho
Previously: Dept of Geography, University of Maryland; National Research Council (Italy); Institute for Environment and Sustainability (JRC-EU), Natural Research Institute (UK)

Work focus areas: development and validation of global burned area products
(member of the MODIS-VIIRS fire team since 2005)
greenhouse gas emission inventories from biomass burning
quantitative RS applications (passive and active sensors)
international outreach for fire applications (GOFC, CeosCalVal)

Team members for your idea: Andrew Hudak (USFS)
Vince Ambrosia (NASA)
Gareth Roberts (Southampton University, Ceos Cal-Val LPV fire co-lead)

The Idea

NIROPS imagery for calibration and validation of satellite fire products

- **Scope of Idea: national dataset with global implications. The project would benefit the global fire applications and fire RS product community**

The Idea

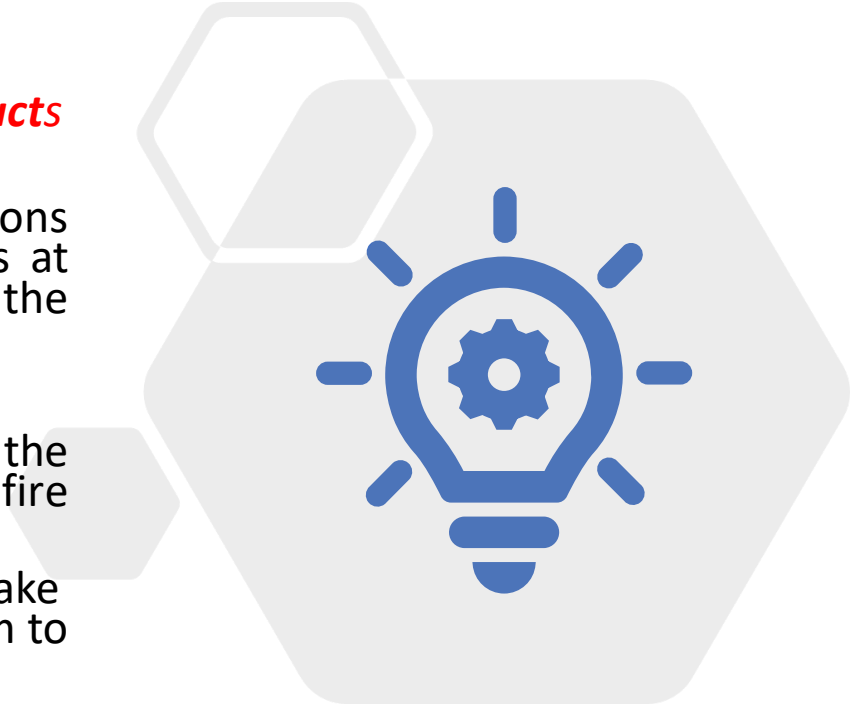
NIROPS imagery for calibration and validation of satellite fire products

Airborne infrared scanners operated by National Infrared Operations (NIROPS), deliver geolocated, GIS ready active fire detection maps at very high spatial resolution, with incident management teams as the primary user.

While maintaining the primary focus on real-time incident support, the datasets could also have a very high value for the satellite fire community with a modest effort and investment to:

(a) perform absolute radiometric calibration of the IR imagery, and take full advantage of the 2 bands (2-5 μm, 8-12μm) of the Phoenix system to estimate Fire Radiative Power (FRP)

(b) archive, document and distribute the data through a dedicated or existing data portal.



Issue(s) being addressed

1) The calibration and validation of satellite fire products is extremely challenging, because of the very fast temporal dynamic of fire, requiring contemporaneous reference data. This has been identified by CEOS Cal Val as one of the priorities to support current and future products.
2) There is a large gap between the spatial scale of reference ground measurements, and the scale of the satellite products (375m resolution and up). NIROPS imagery could fill this gap, at very low cost as the flights are conducted as part of incident support.
3) Besides the validation of fire products, the availability of a large dataset of airborne active fire detections and FRP would allow for new research, for example on:
    - Fire spread models
    - Fire behavior
    - Fire effects on vegetation
    - Carbon emissions with FRP-based top-down approaches

The Idea

Issues Addressed

What EO data does your idea utilize?

This idea would provide datasets for the validation of active fire products generated from:

- Landsat
- Sentinel-2
- MODIS
- VIIRS
- GOES-R
- JPSS

And enable new research on fire monitoring from:

- Landsat
- Sentinel-1
- Sentinel-2
- Ecostress
- LiDAR

The Idea

Earth Observation Tools

The Idea – Outcomes / Societal Benefits

- Fill the need for validation and calibration of satellite fire products, which will translate in better products in the future
- Fire satellite products (especially from US assets such as MODIS, VIIRS, and GOES-R) are the ‘golden standard’ for fire research and fire applications worldwide.

Thank You!