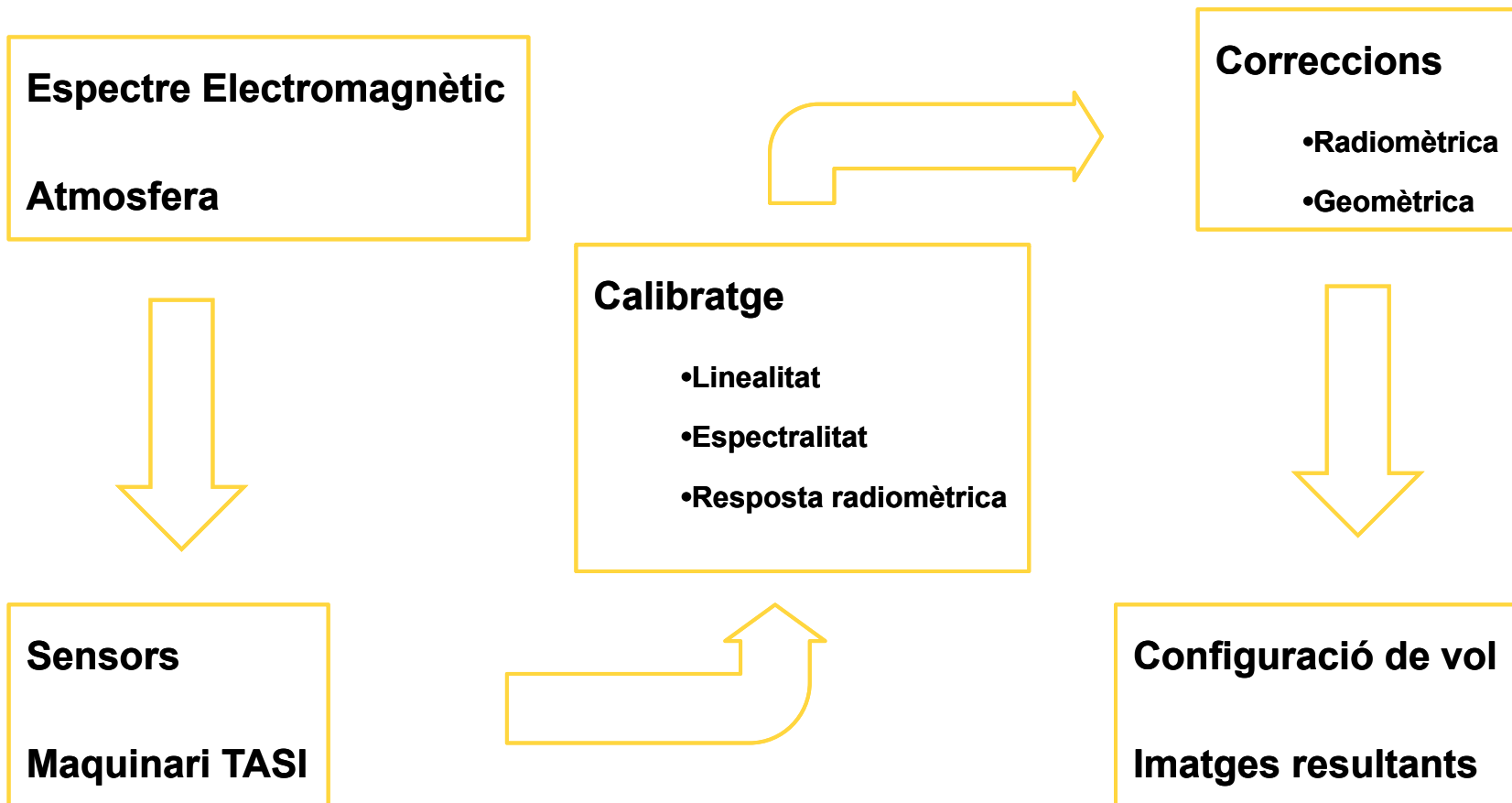


Sensor TASI: Descripció de l'instrument

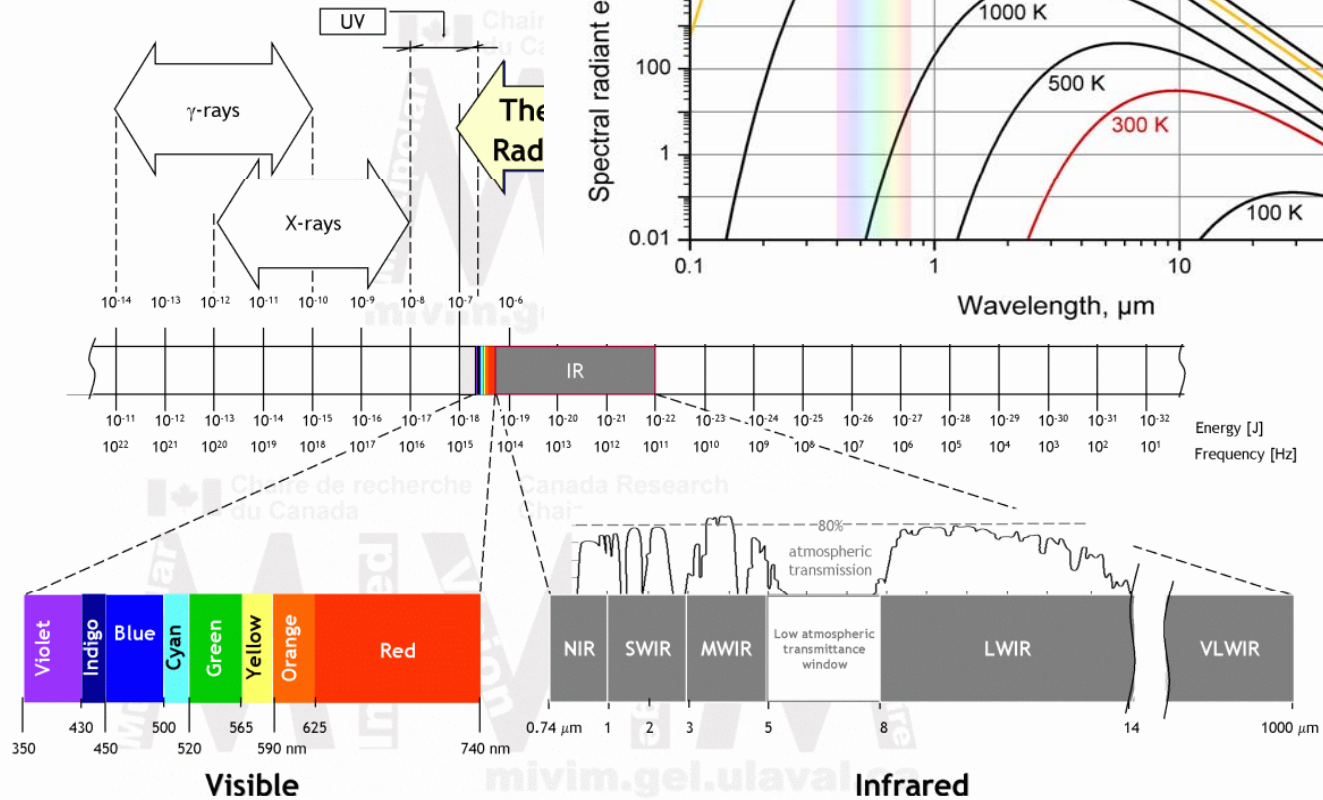
Fernando Pérez Aragüés (fernando.perez@icc.cat)



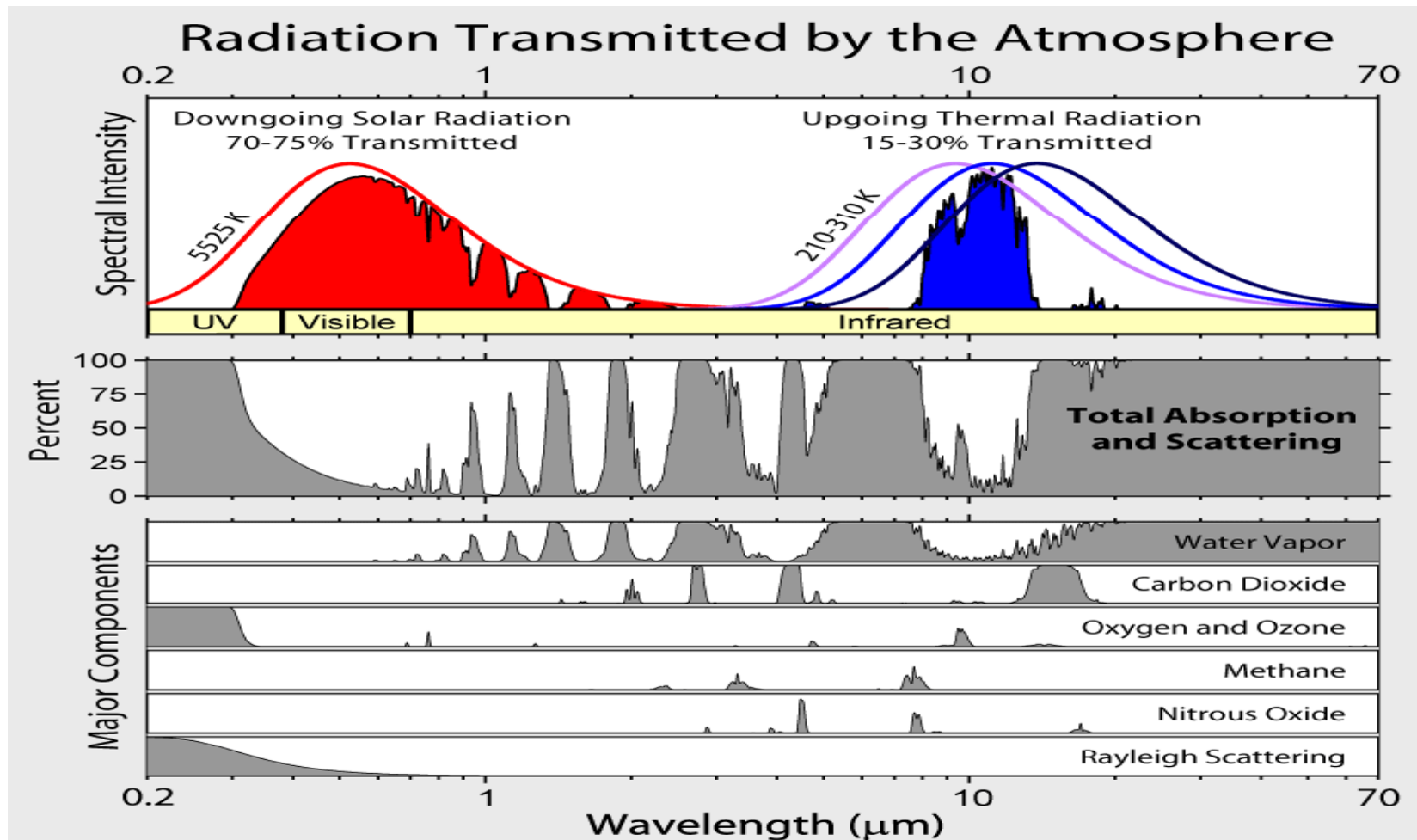
Contingut



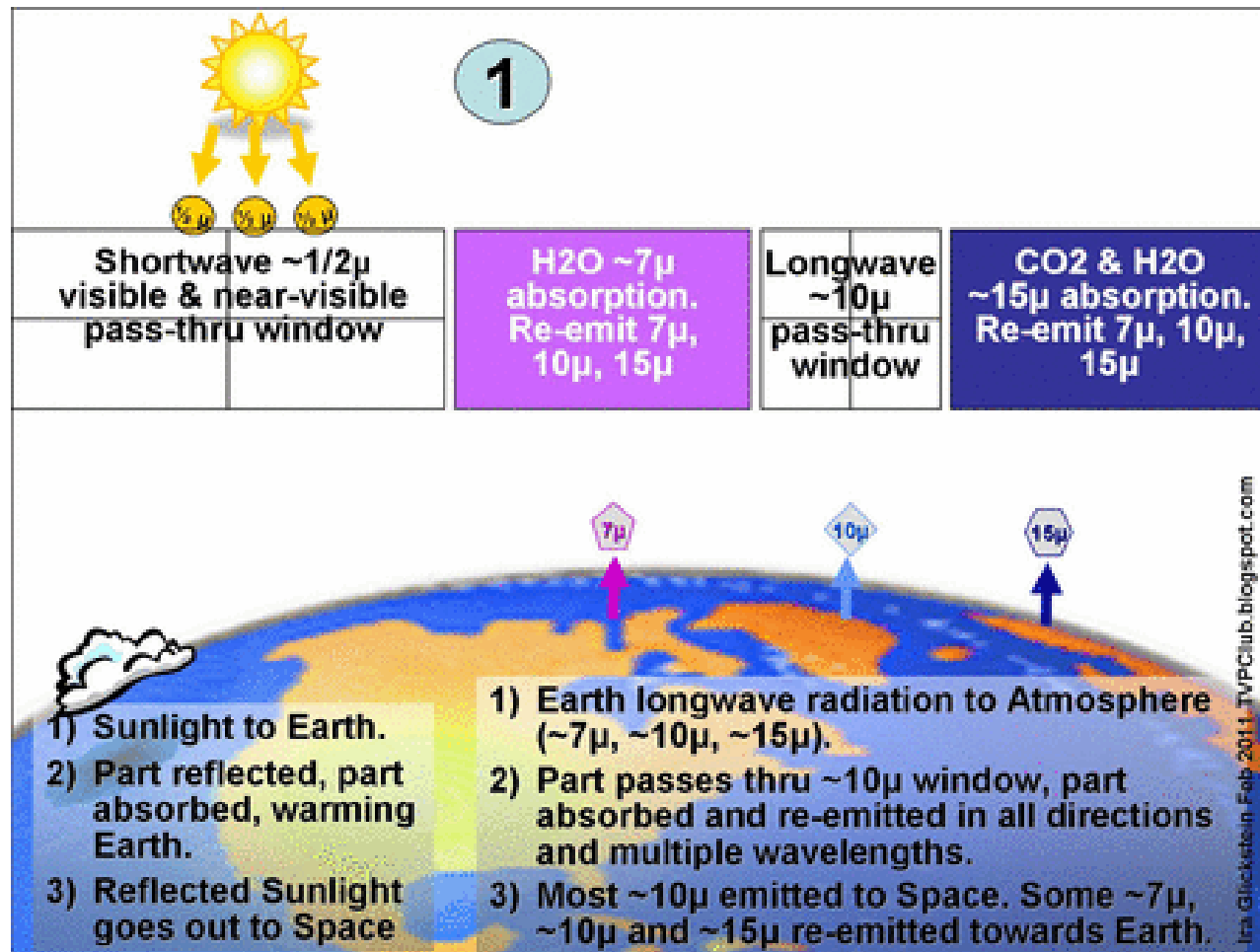
Espectre Electromagnètic.



Atmosfera I



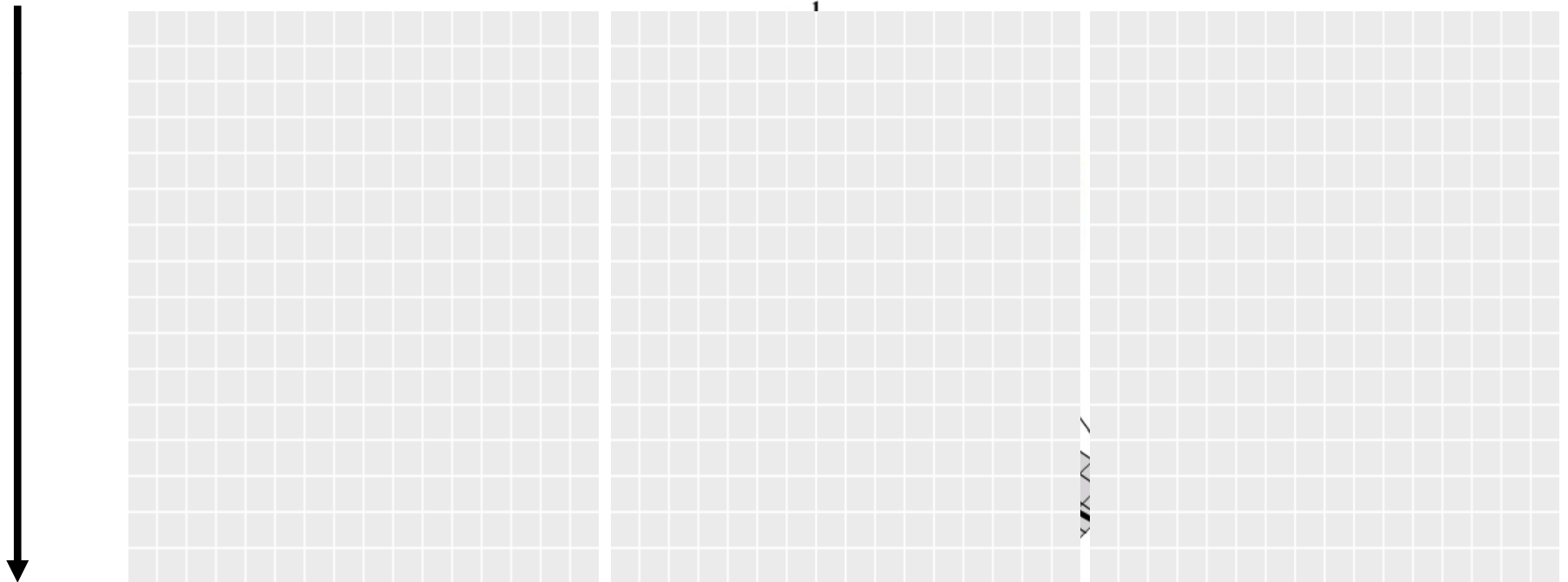
Atmosfera II



Sensors I

Tipus d'escombrat.

Digital Photography



Sensors II

Opcions actuals

| | TASI-600 | FIRST | AisaOWL | SYSIPHE |
|--|--------------------------|--|-----------------------------|--|
| Wavelength range | 8.0 – 11.5 μm | 1.5-5.5 μm or 8.0-11.5 μm | 8.0 – 12.0 μm | 0.4-2.5 μm 3.0-5.3 μm 8.0-11.5 μm |
| Number of spectral pixels (bands) | 32 / 64 | +500 +500 | 84 | VIS-NIR 210 MWIR 150 LWIR 90 |
| # of spatial pixels | 600 40° | 320 | 384 24° | 384 |
| Spectral resolution | 125 nm | MWIR 2.5 nm – 1.3 μm LWIR 0.4-226 nm | 100 nm | VIS-NIR 10 nm MWIR 13 nm LWIR 39 nm |
| Detector type | MCT | MCT | MCT | MCT |
| Acquisition mode | Pushbroom | Staring | Pushbroom | Pushbroom |
| Spectral selection | Prism | Interferometer | Grating | Interferometer |
| Sensor dimensions (mm) | 300x850x200 | 178x356x457 | 220x200x220 | NA |
| Sensor weight (kg) | 40 | 29 | 8.5 | NA |

Maquinari I Visió general

SHU (Sensor Head Unit)



MUSIC

(Multiple Sensor Instrument Controller)



Maquinari II MUSIC.

Display for the Unit Number & Activity State Lock: Secures Drive to its Receiving Frame



Removable Hard Drive and Enclosure

SSL Discs

Maquinari III SHU.

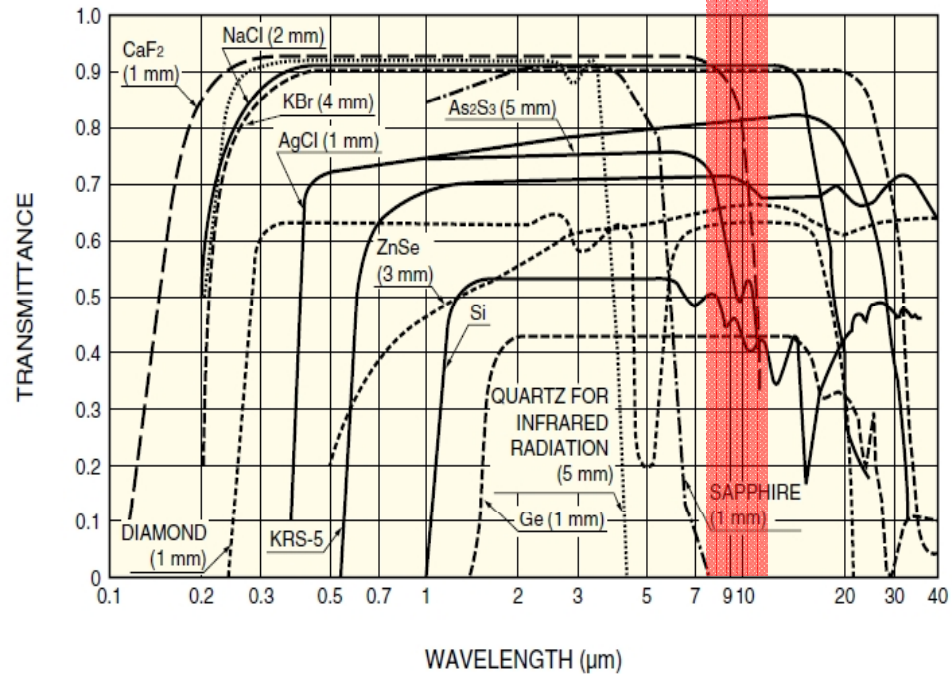
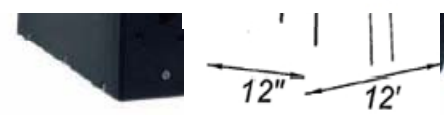


Table 1.
General material properties for common IR materials.

| | Index of Refraction (Approximately) | Transmission Range [µm] | Relative Cost of Stock 25-mm-Diameter Window |
|---------------------|-------------------------------------|-------------------------|--|
| Sodium Chloride | 1.20 to 1.85 | 0.17 to 18 | 1 |
| Germanium | 4.05 | 1.8 to 23 | 4.7 |
| Sapphire | 1.80 | 0.17 to 6.5 | 1.9 |
| Zinc Sulfide | 2.40 | 0.4 to 12 | 5.6 |
| Zinc Selenide | 2.20 | 3.00 to 12 | 6.6 |
| Calcium Fluoride | 1.40 | 0.13 to 12 | 2.8 |
| Magnesium Fluoride | 1.38 | 0.11 to 7.5 | 5.6 |
| Thallium Bromiodide | 2.20 to 2.40 | 0.5 to 40 | - |
| Silicon | 2.50 | 1.2 to 7 | 3.6 |
| Diamond | 2.30 | 0.25 to 4 and >7 | 171.0 |
| Potassium Chloride | 1.20 to 1.80 | 0.21 to 30 | 1.3 |
| AMTIR-1 | 2.50 | 0.70 to 12+ | - |



Maquinari IV Detectors.

Tecnologia CMOS

MCT (Mercury Cadmium Teluride)

Refrigerament

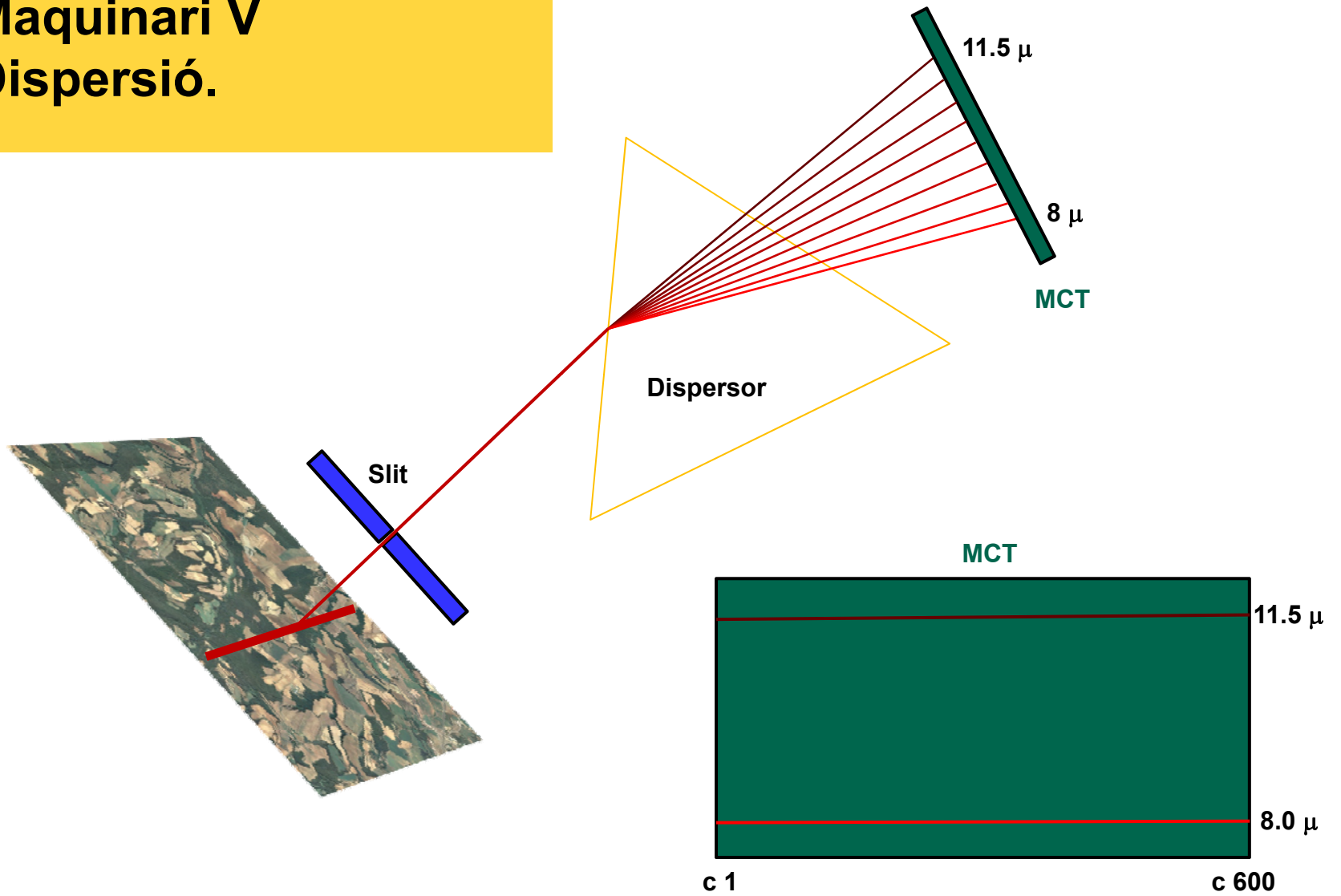
TED (Thermo-Electric Device)

| Spectral bands | Range [μm] | Detector materials* | Applications |
|----------------|------------|----------------------|-----------------------------------|
| NIR | 0.7-1.4 | Si, SiO ₂ | Communications |
| SWIR | 1.4-3.0 | Si, SiO ₂ | Remote sensing, night vision |
| MWIR | 3.0-8.0 | Si, SiO ₂ | Thermal imaging, missile guidance |
| LWIR | 8.0-14.0 | Si, SiO ₂ | Thermal imaging, night vision |
| VLWIR | 14.0-100.0 | Si, SiO ₂ | Thermal imaging, night vision |

*Si: silicon; SiO₂: silicon dioxide



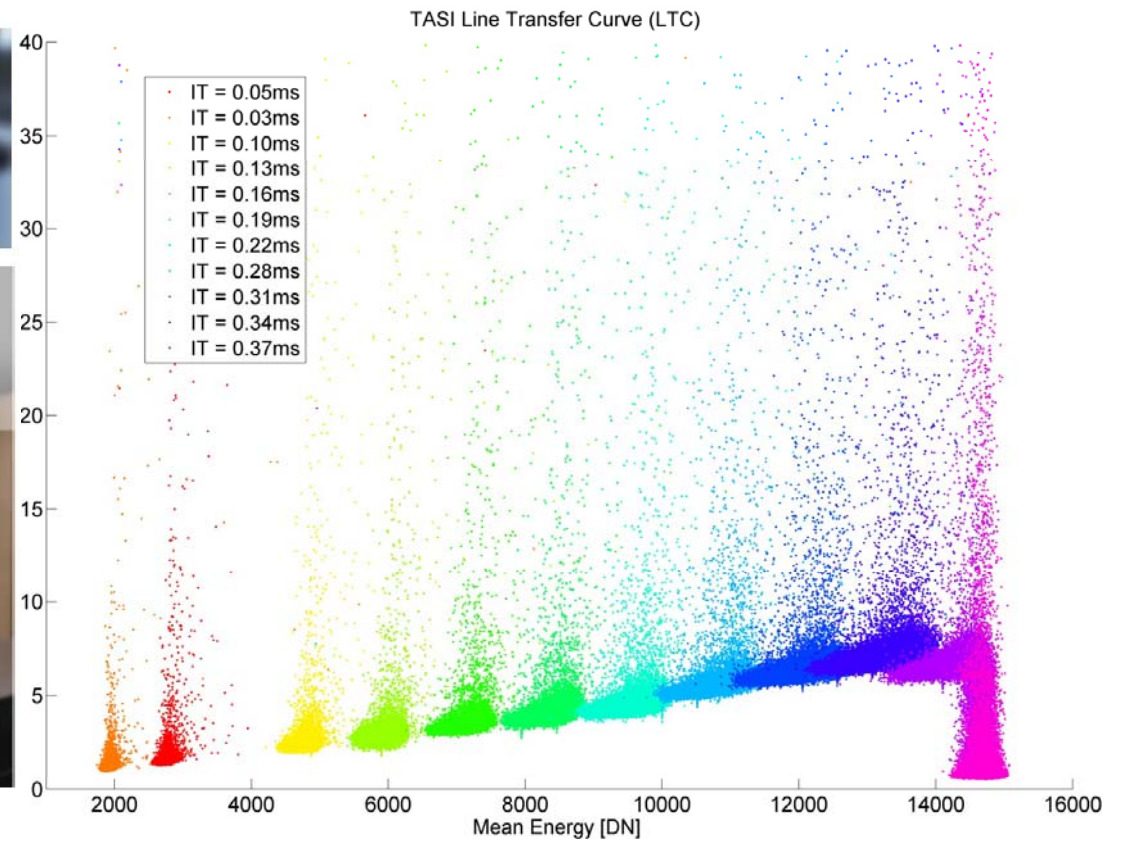
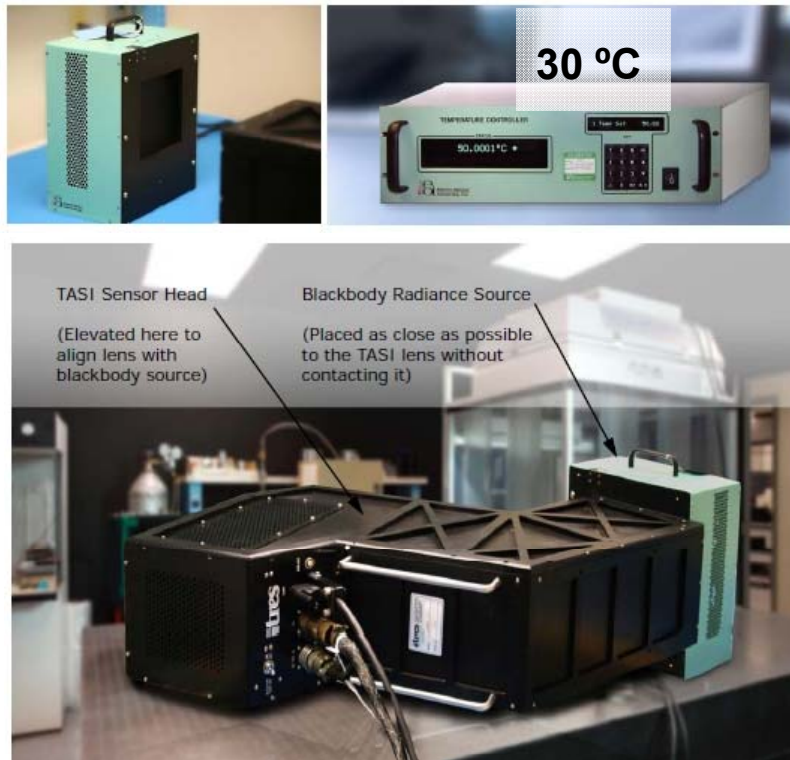
Maquinari V Dispersió.



Calibratge sistema I

Linealitat

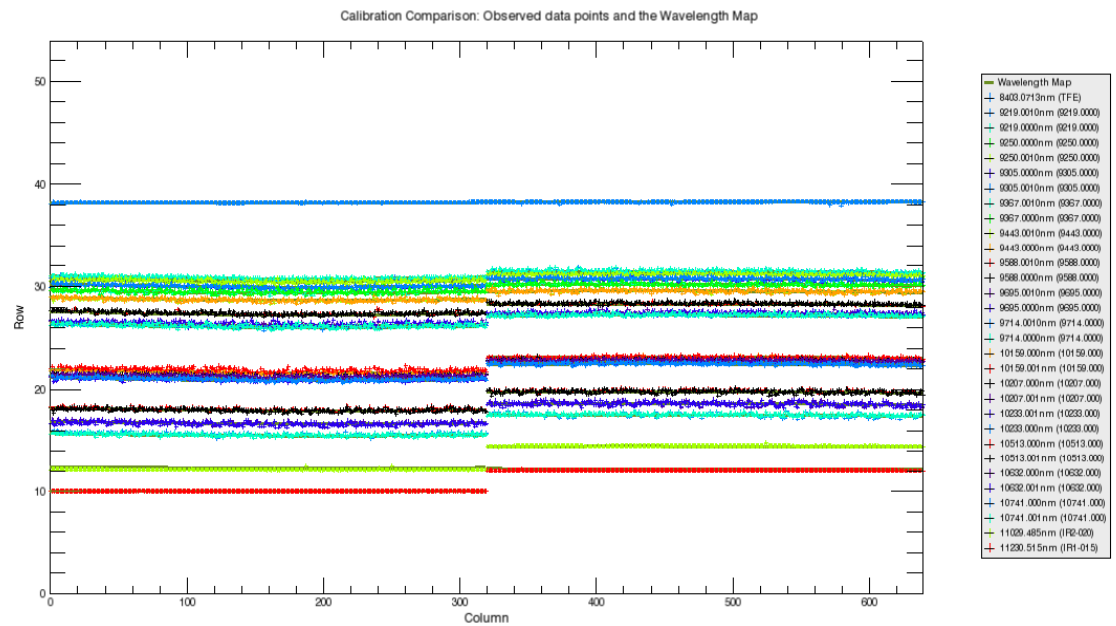
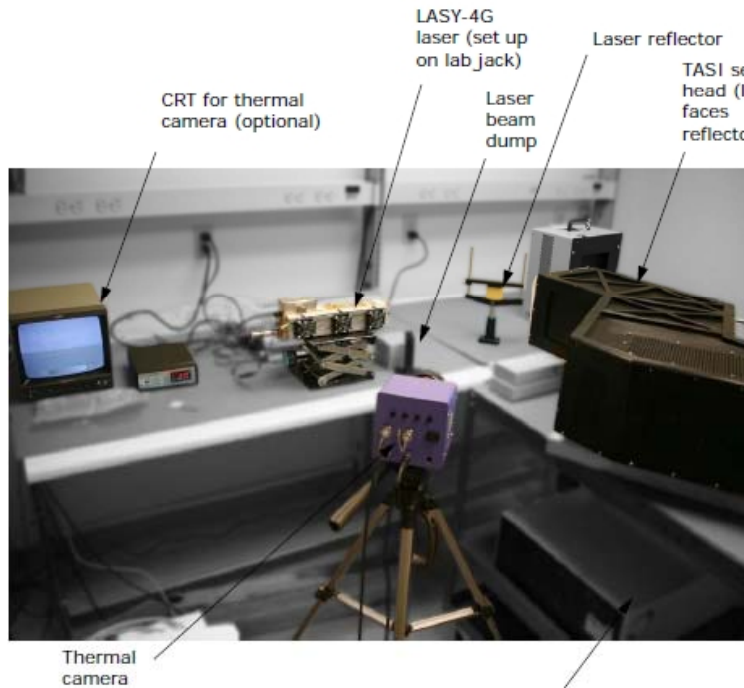
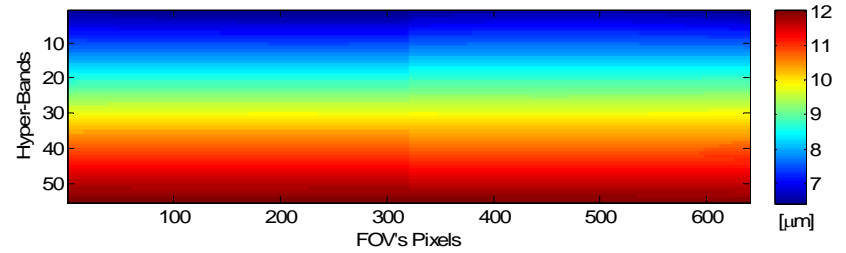
Var



Calibratge sistema II

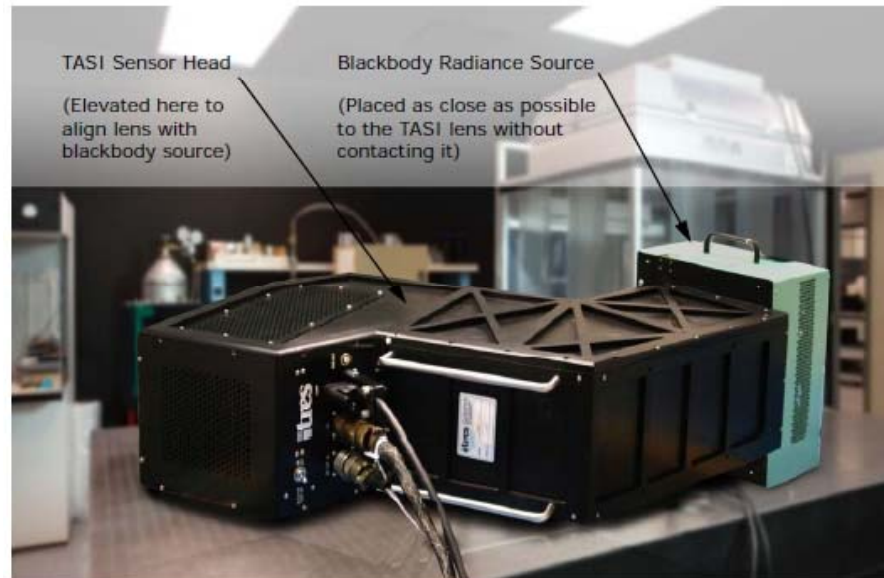
Espectralitat

Central Wavelengths (λ_0)

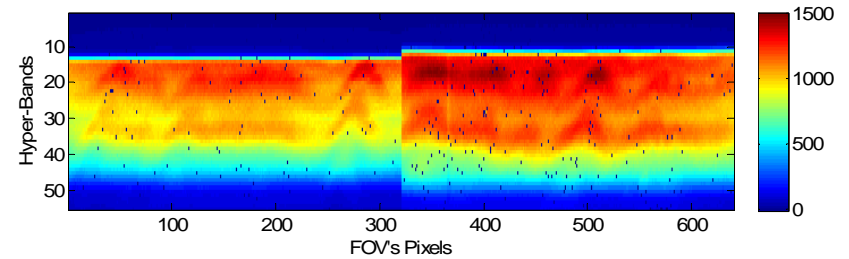


Calibratge sistema III

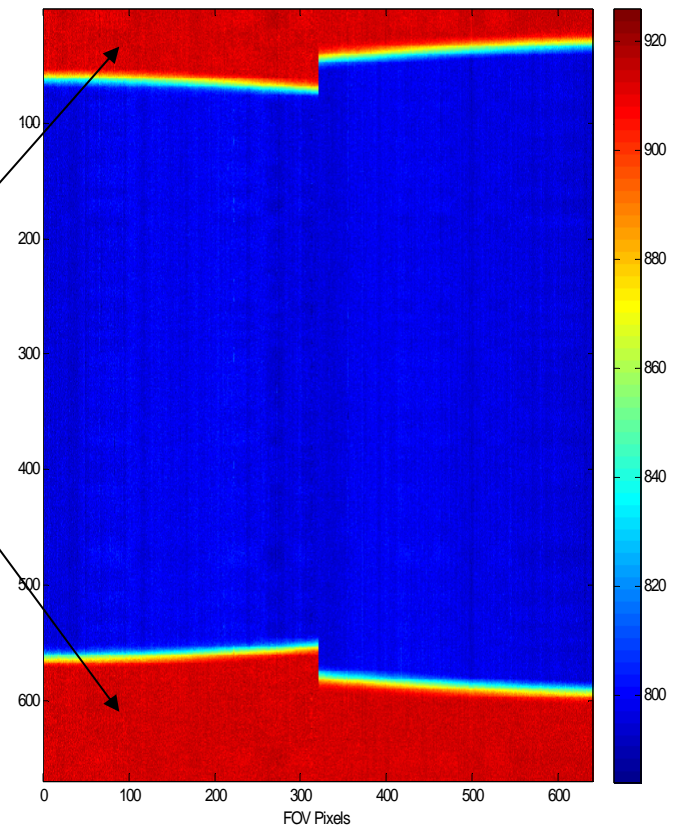
Resposta radiomètrica



Radiometric Coefficients



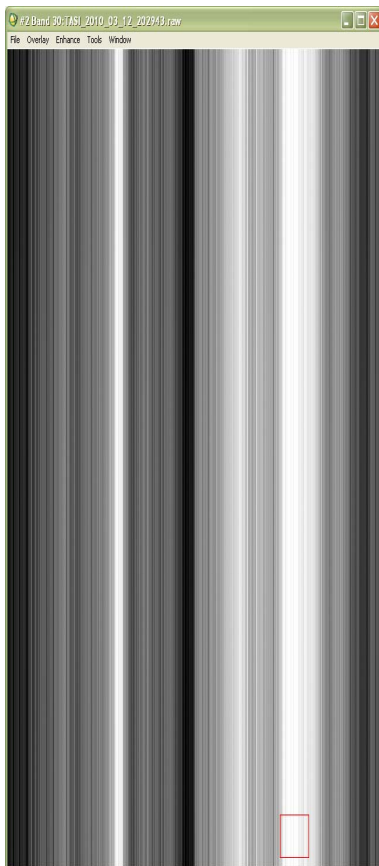
Dark Data



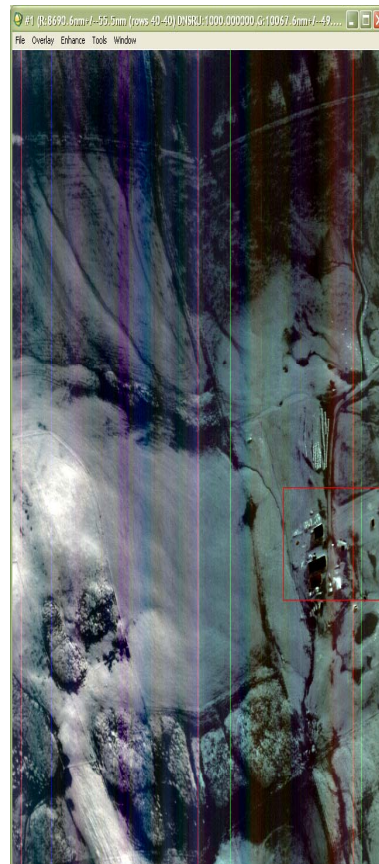
Correcció Radiomètrica

Temps d'integració!!

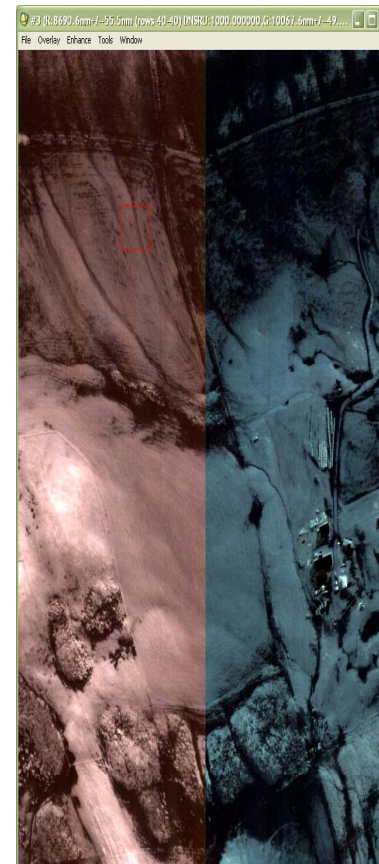
Raw Data



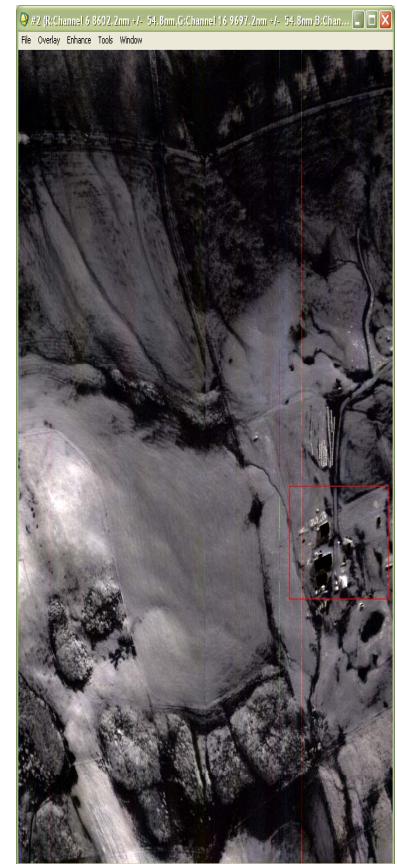
Dark Corrected Data



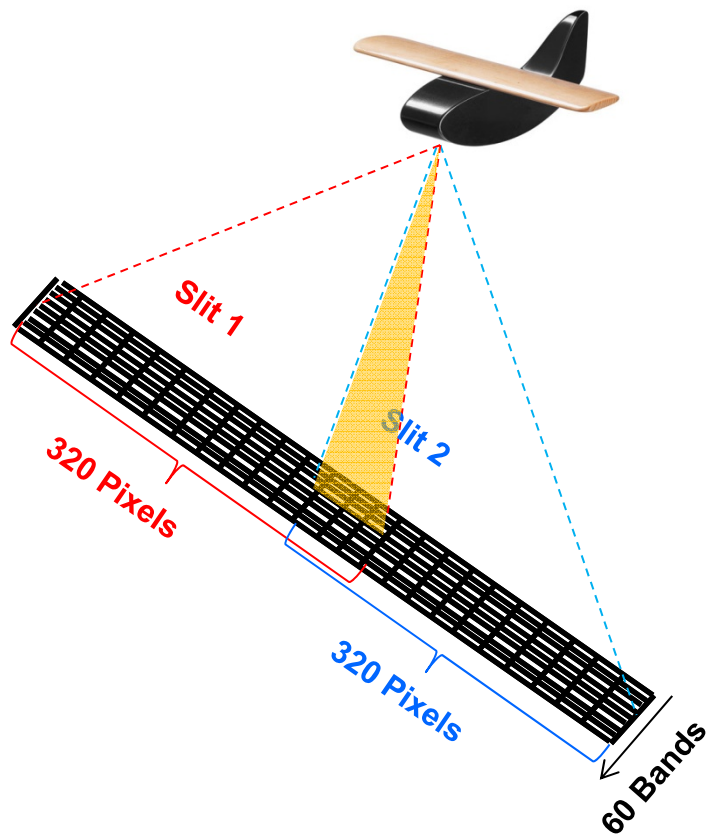
Calibrated Data



Spectral Resampling

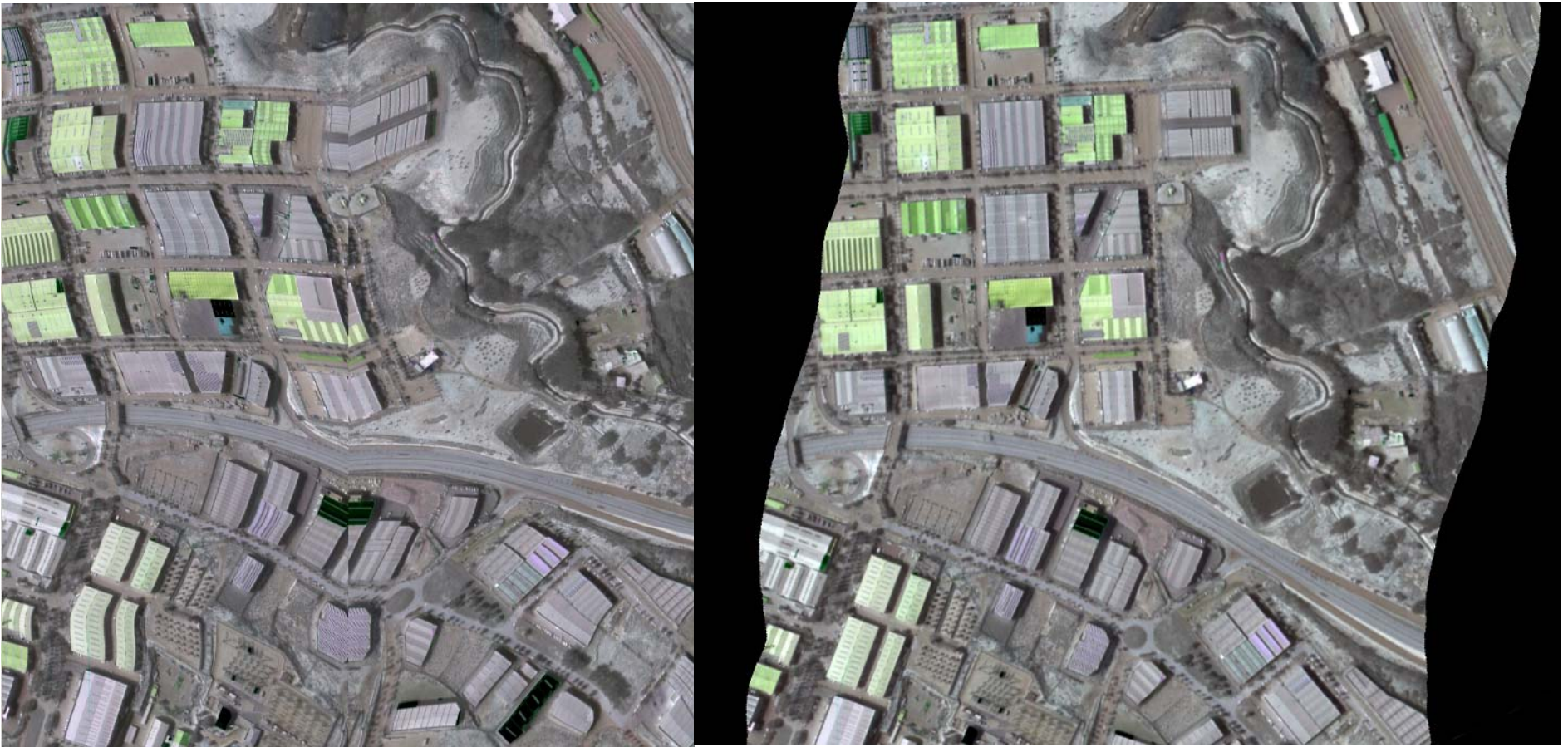


Correcció Geomètrica I



Correcció Geomètrica II

LLEIDA. Model geomètric ICC



Configuració de vol

| Sensor TASI | | | |
|------------------------|------------------------|---------------------|--------------------|
| | Resolució espacial (m) | Amplada passada (m) | Altura del vol (m) |
| Partenavia/ Caravan | 0.5 | 300 | 412 |
| | 1 | 600 | 824 |
| | 1.5 | 900 | 1236 |
| | 2 | 1200 | 1648 |
| | 3 | 1800 | 2473 |
| | 4 | 2400 | 3297 |
| Caravan | 5 | 3000 | 4121 |

Avions

Partenavia P68

Cessna Caravan

Beechcraft B2

Sensor



TASI



Imatges resultants.

Radiància \neq Temperatura



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