



# Summary of activities of the Geo-Spatial Image Quality sub-committee

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retour sur innovation

# Outline

Overview of on-orbit MTF measurements

Website status

Reference dataset

Methodological comparison

Discussion and roadmap

# Overview of on-orbit MTF measurements

Thanks to the speakers:

Gwendoline Blanchet (CNES)	Pléiades
Donghan Lee (KARI)	Kompsat 3
David Villa-Pascual (AIRBUS DS)	Spot 6/7
Ron Morfitt (USGS) and Dennis Helder (SDSU)	OLI (Landsat 8)
Dennis Helder (SDSU)	TIRS (Landsat 8)
Robert Kudola (Digital Globe)	Worldview3
Philippe Gamet (CNES)	Sentinel2

# Website Current Status

- Hosted at USGS EROS
  - [http://calval.cr.usgs.gov/rst-resources/sites\\_catalog/spatial-sites/](http://calval.cr.usgs.gov/rst-resources/sites_catalog/spatial-sites/)
- 11 (soon 12) test site locations listed including
  - 6 checkerboard targets
  - 2 bar targets
  - 2 fan targets
  - 5 bridge targets
- Two queries made thus far to populate the website

# Current Website Status

The screenshot shows a web browser window with the URL [calval.cr.usgs.gov/rst-resources/sites\\_catalog/spatial-sites/](http://calval.cr.usgs.gov/rst-resources/sites_catalog/spatial-sites/). The page features the USGS logo and tagline "science for a changing world" on the left, and navigation links for "USGS Home", "Contact USGS", and "Search USGS" on the right. Below the header is a navigation menu with items: Home, Satellite & Sensor Characterization, JACIE, USGS Optical Science Lab, RST Resources, Past Activities, About Us, and Sitemap. The main content area is titled "Test Site Catalog" and includes a sub-header "Test Site Home". It contains a search bar, a breadcrumb trail "You are here: Home » RST Resources » Test Sites Catalog » Spatial Sites", and a paragraph explaining the Spatial Sites section. A list of resources is provided, including "CEOS Reference Sites", "Radiometry Test Site Gallery", and "Download Google Earth KMZ". The right sidebar lists "RADIOMETRIC SITES", "GEOMETRIC SITES", and "SPATIAL SITES", each with a "Select Site" dropdown menu. At the bottom, there is an "ADDITIONAL INFORMATION" section with links for "Acronyms" and "References", and the CEOS QA4E logo.

**Remote Sensing Technologies**  
understanding the technologies needed to sense our world

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You are here: [Home](#) » [RST Resources](#) » [Test Sites Catalog](#) » [Spatial Sites](#)

## Test Site Catalog

The Spatial Sites section is the newest addition to the World-Wide Test site catalog, having first been put into place in late May, 2014. We are adding more information to it as it is made available to us.

Resources – For information on various methods of utilizing test sites, please consult one or more of the following links:

- CEOS Reference Sites
- Radiometry Test Site Gallery
- Download Google Earth KMZ

**RADIOMETRIC SITES**

Select Site

**GEOMETRIC SITES**

Select Site

**SPATIAL SITES**

Select Site

**ADDITIONAL INFORMATION**

- Acronyms
- References

CEOS QA4E

Current Radiometric Test Site Web Page hosted courtesy of USGS EROS Remote Sensing Technologies (Greg Stensaas, Jon Christopherson)

# Current Website Status

Lake Ponchartrain  
Causeway, USA



Peng-Hu, Taiwan



Salon de Provence, France



San Mateo Bridge,  
USA



Stennis, Mississippi,  
USA



Big Spring, USA



(Recently submitted;  
not on website yet)

# Website Current Status

- Results of discussion:
  - - provide an exhaustive list of checkerboard targets
  - - provide a fairly exhaustive list of bridges
  - - provide a list of other recommended natural sites (for example: paths, spotlights, stars catalog, urban areas)
  - - lists will be given in order of decreasing interest
  - - maintenance of the checkerboard will be mentioned and taken as the key parameter to recommend the targets
  - - the sites should be presented according to class of spatial resolution
  - - It is hoped that this catalog will encourage systematic acquisitions over common sites (like for radiometric sites)

# Reference dataset

## Objectives

Objective 1: share images and begin to understand the MTF differences for each kind of method and target (repeatability and precision)

Objective 2: share images with known parameters (i.e. MTF, SNR ) for quantitative comparison (accuracy)

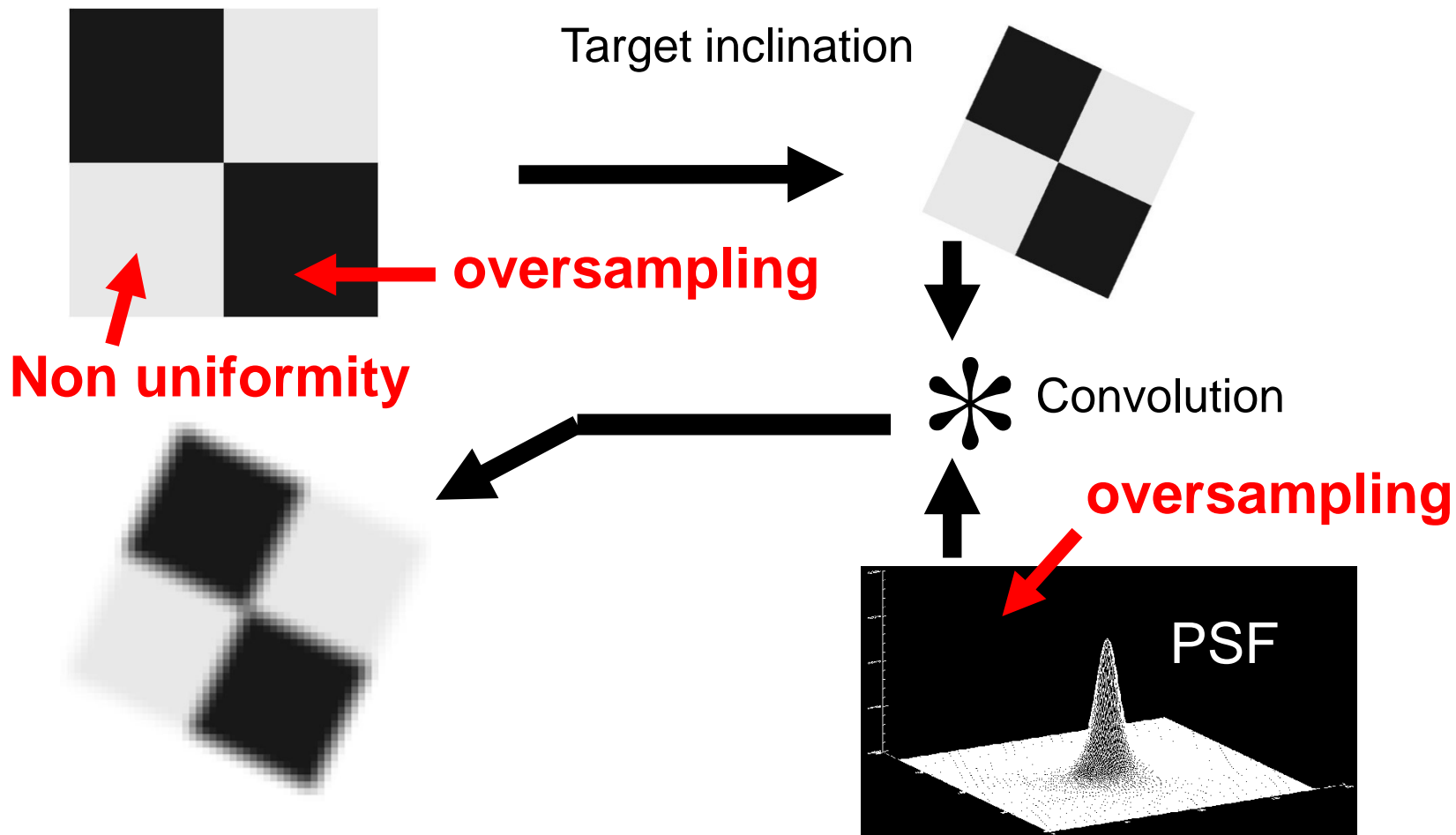
→ A need exists for creation of a reference dataset containing:

Actual images: in the coming slides

Synthetic images: initial effort

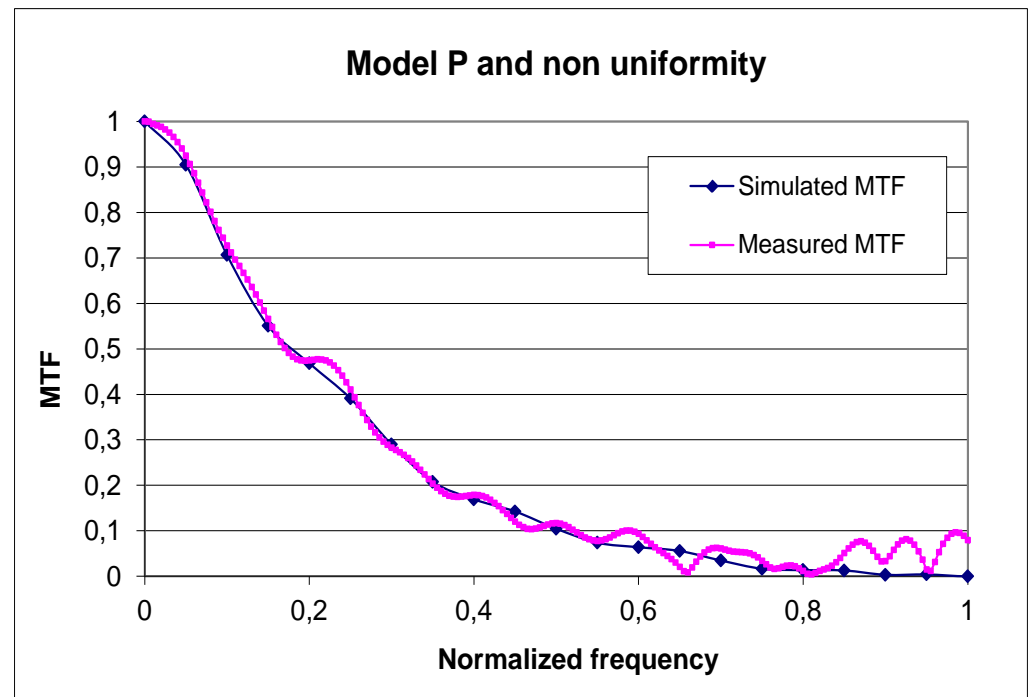
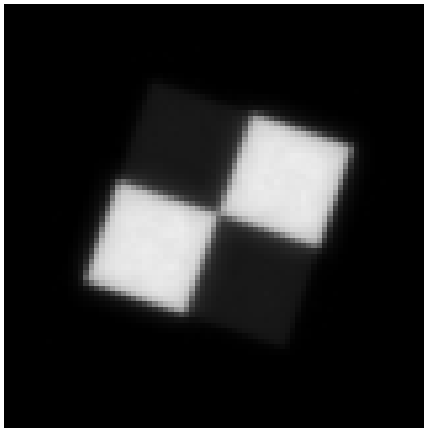


# Exemple of synthetic image generation



# Exemple of MTF estimate from synthetic dataset

- MTF created = FT( PSF)
- MTF measured = MTF measured with the ONERA edge method code
- Case 1 (with non uniformity):



# Reference dataset

Reference dataset begins with synthetic checkerboard:

Entity	Model	MTF value	SNR	inclination	Target contrast
AIRBUS DS	Tabled values of PSF	0.1 and 0.3	30 (dark square) 150 (bright square)	3.5/1	Salon de Provence target
CNES (To be confirmed)	MTF analytic model	0.1 and 0.3	30 (dark square) 150 (bright square)	3.5/1	Salon de Provence target

# Actual satellite images

Only a **small subset** of each image containing the target – Salon de Provence – is requested

<i>Name</i>	<i>Target/Landscape</i>	<i>Sensor</i>
<i>Digital Globe</i>	<i>checkerboard</i>	<i>worldview3</i>
<i>CNES (To be confirmed)</i>	<i>checkerboard</i>	<i>Pleiades L0</i>
<i>KARI</i>	<i>checkerboard</i>	<i>Kompsat3 &amp;3A</i>
<i>AIRBUS DS</i>	<i>checkerboard</i>	<i>S6/7</i>

# Methodological comparison

- People volunteering to process data from the reference dataset:

CNES	Digital Globe	Airbus DS	KARI
CSIR	TPZ	SDSU	ONERA

- First synthesis of results and meeting (via internet) : June 2016

# Conclusion

- Excellent overview of current methods
- Website reviewed and recommendations received for update
- Initial plan for reference dataset development outlined
- Pilot study of methodologies developed
- It was a good day !
- Thanks to all the attendees!!
- A pleasure to work with such a collegial group!!!