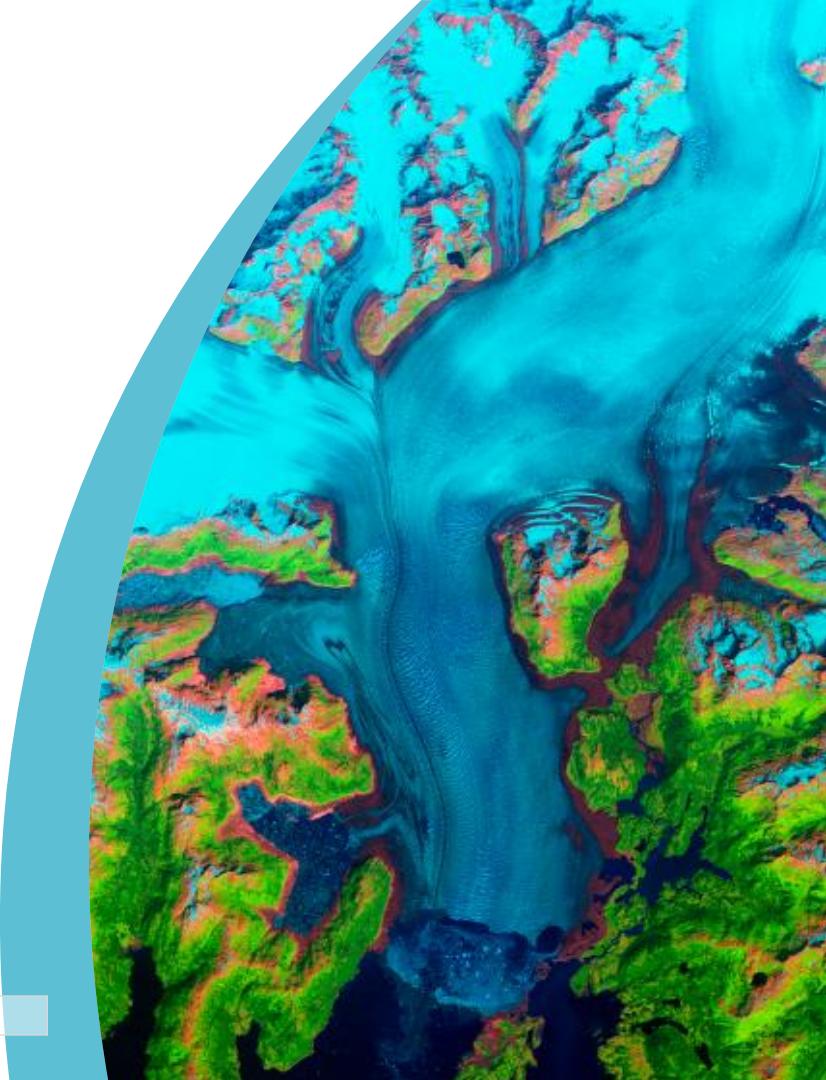




## Innovative solutions based on INSPIRE and Copernicus data

PRESENTATION OF NASA WORLDWIND VIRTUAL GLOBES

INSPIRE CONFERENCE, 8TH SEPTEMBER 2017  
NICOLAS VILA, SYLVIE BARRAU-HUGUET  
JEAN-BAPTISTE HENRY



## Agenda

- Current status of geo-data availability & standards
- Introduction to NASA WebWorldWind
- Presentation of features
- Collaboration with NASA & ESA agencies
- Examples and application using Copernicus & EO Data
- Conclusion

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# Geo/EO data availability in 2017

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## INSPIRE compliant data



## Copernicus & EO data

- ESA Sentinel Missions (4TB/day)
- NASA Landsat Missions (1PB)
- Private sector image providers



## Open-Data sources

## Others (UAVs, etc.)

# Open Standards & formats widely adopted

I OGC : WxS, KML/KMZ, Collada



I INSPIRE



I ISO



WFS

WMS

WMS-C

TMS

WMTS

CSW

SOS

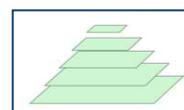
SAS



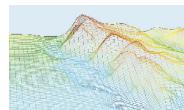
Vector



Raster



Tiled data



DEM



Metadata



Sensors

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## NASA WorldWind ?

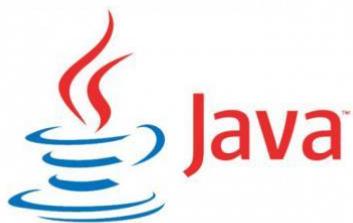
- 3D Globe
- Different SDKs
- Component-oriented (not an application)
- Simplicity & extensibility made easy for leveraging 3D globe technology
- Baked and maintained by two major space agencies



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# Current Worldwind platforms & SDKs

## WorldWind Java



## WorldWind Android



## WebWorldWind



# NASA WebWorldWind - introduction

| Multi-platform/multi-purpose 3D Globe

| Pure HTML5, JavaScript, WebGL

| No plugin required

| Started in 2014



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## A quick tour

- WebWorldWind is free and open-source 3D virtual globe API for HTML5 and JavaScript developed by NASA with support of the European Space Agency (ESA) and THALES as private sector contributor
- Based on WebGL, available stably as part of HTML5 since 2011 (also on mobile)
- Web technology great for distribution, portability, data access, ease of use -> and thus for research and education
- WWW is the web version of WorldWind, started in 2014
- THALES joined the effort in 2016, bringing development capabilities on open standards implementations

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## International geospatial standards support

- OGC WMS
- OGC WMTS - Web Map Service Tiled Services  
Simple Profile" OGC specification (OGC 13-082r2) **THALES**
- OGC TMS – Tiled Map Service (global geodetic support) **THALES**
- OGC WMS-C – Web Map Service with Constraints **THALES**
- OGC WCS
- OGC KML/Collada
- GeoJSON
- GeoTiff
- Well-Known Text

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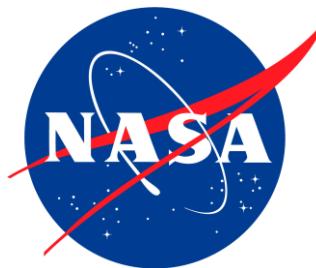
**THALES**

# Collaborating with NASA & ESA space agencies

| International development team

| Sharing knowledge

| A win-win collaboration



THALES

# Collaborating with NASA & ESA space agencies

## How do we work together?

- Source code management
- Code reviews
- Weekly meetings with NASA/ESA/Thales teams



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NASAWorldWind / WebWorldWind	
AkeluX	/ WebWorldWind
dailiwei	/ WebWorldWind
drees1	/ WebWorldWind
emxsys	/ WebWorldWind
enikabiswas	/ WebWorldWind
ESAFastPrototyping	/ WebWorldWind
dsere	/ WebWorldWind
ens121	/ WebWorldWind
GabrielePrestifilippo	/ WebWorldWind
huihuizhao	/ WebWorldWind
jenipherph	/ WebWorldWind
LemonStudioZeus	/ WebWorldWind
Lyoshes	/ WebWorldWind
olivierfavre	/ WebWorldWind
paladin74	/ WebWorldWind
petabytekr	/ WebWorldWind
planetserver	/ WebWorldWind
revo09	/ WebWorldWind
strikerm	/ WebWorldWind
tbpwang	/ WebWorldWind
thales-geo	/ WebWorldWind
KhaledSharif	/ WebWorldWind
bench4ng	/ WebWorldWind
wangtun	/ WebWorldWind
YahirAlejandro	/ WebWorldWind
zhaocry	/ WebWorldWind

# Some links

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## Show me the code:

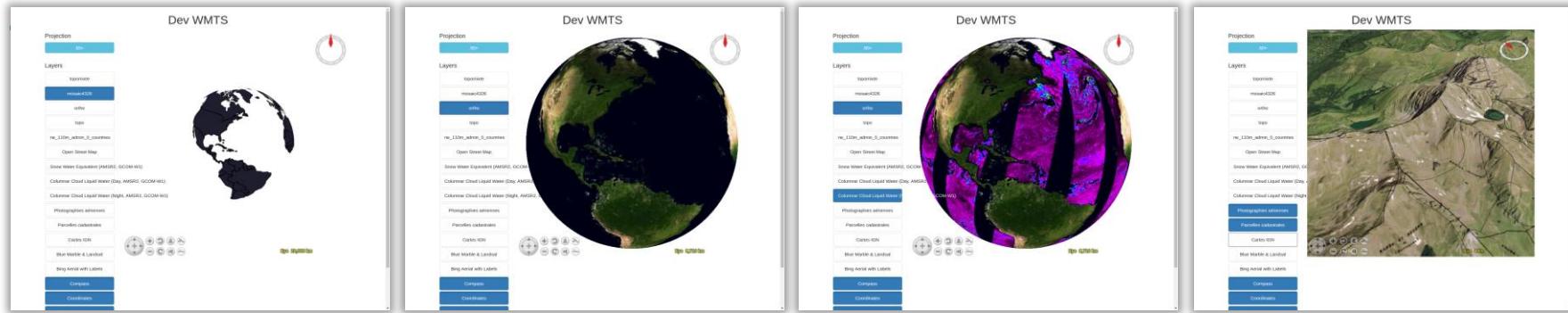
<https://github.com/NASAWorldWind/WebWorldWind>

<https://github.com/thales-geo>

<https://github.com/NASAWorldWindResearch>



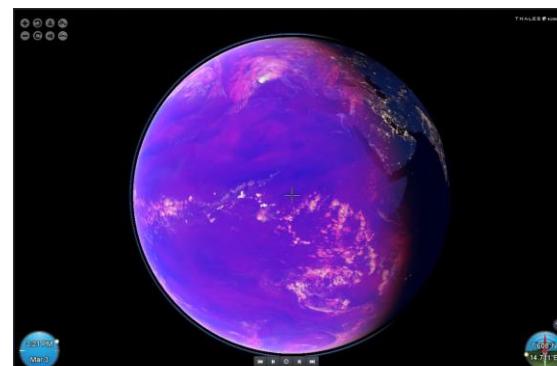
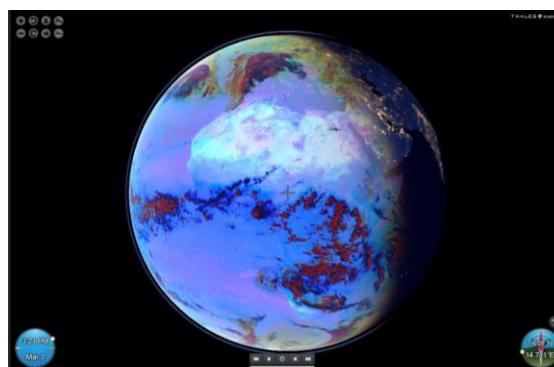
## Browse the examples



The image displays four side-by-side screenshots of a "Dev WMTS" application interface. Each screenshot shows a globe or a terrain map with various layers and controls. The leftmost screenshot shows a dark globe with a single layer selected. Subsequent screenshots show the globe with more layers applied, creating a colorful, multi-layered effect. The interface includes a sidebar with "Projection" (set to "WGS84"), "Layers" (listing "mapnik", "mapnik2D", "ortho", "topo", "re\_130m\_elevation\_0\_orthorectified", "Open Street Map", "Snow Water Equivalent (AMSR2, GCOM-W2)", "Column Cloud Liquid Water (Day, AMSR2, GCOM-W2)", "Column Cloud Liquid Water (Night, AMSR2, GCOM-W2)", "Photographs aériennes", "Périmètres cadastraux", "Cartes IGN", "Bun Market & Landolt", "Bring Aerial with Labels", "Compare", and "Download"). The rightmost screenshot shows a terrain map of a specific area with a red dot and a green circle, with the same sidebar options.

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# Climate change monitoring use cases: Sentinel2/Eumetsat data

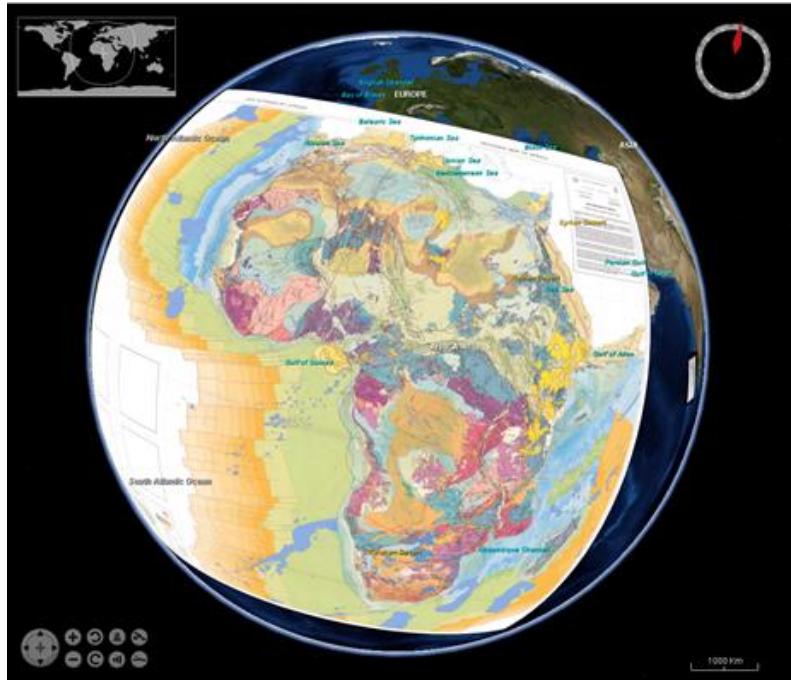
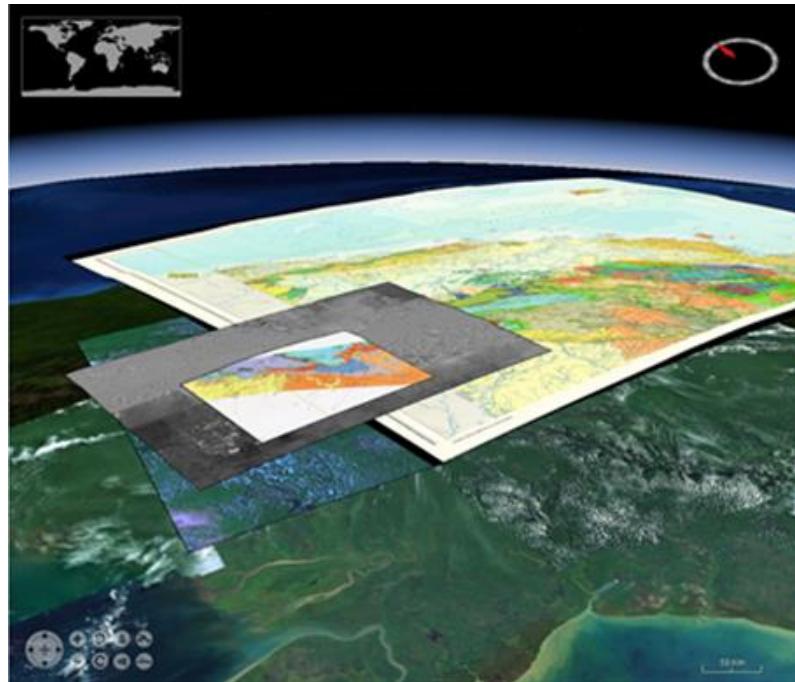


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# Display of heterogeneous datasets/datasources

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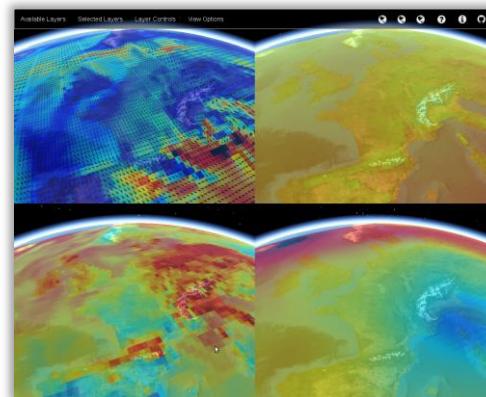
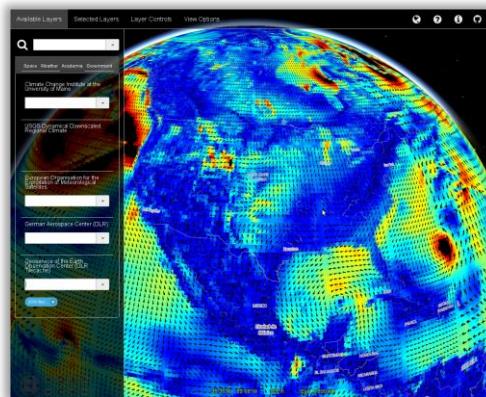
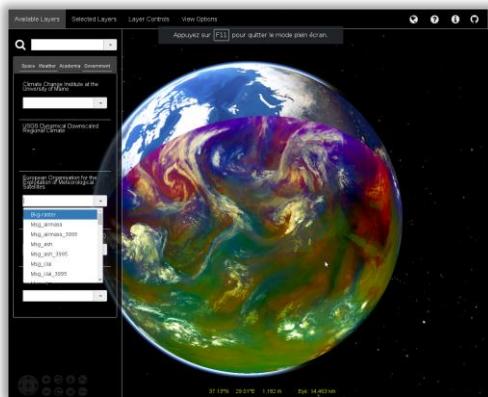


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# Multiple views applications

## A few examples from WorldWind summer of code

### > WorldWeather (WorldWindResearch)

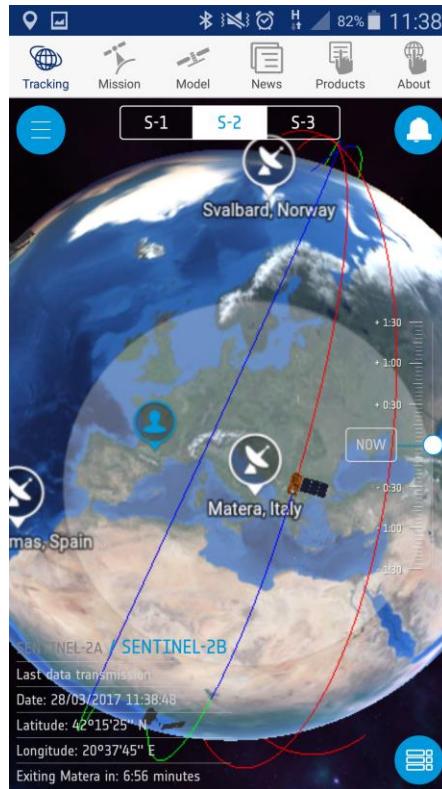


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# Use of WebWorldWind in hybrid applications



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# Worldwind Demo

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# Outlook & perspective

- | Growing use of WebWorldWind SDK
- | New applications & uses: SmartCities, Climate change monitoring
- | Platform of choice for EO data visualization at ESA, as well as for any geo-data
- | Thales will keep and increase its efforts in development of new features



Thank you !

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[jean-baptiste.henry@thalesgroup.com](mailto:jean-baptiste.henry@thalesgroup.com)

