



HAROKOPIO UNIVERSITY



esa

→ 4th ADVANCED TRAINING COURSE IN LAND REMOTE SENSING

ESA & Third Party Toolboxes

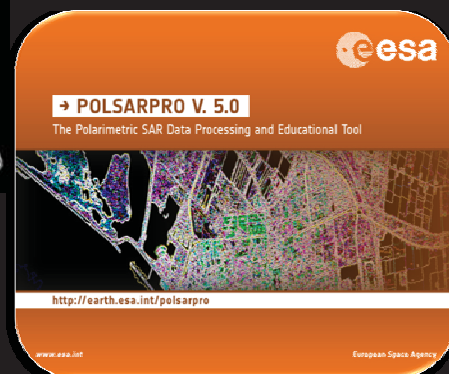
PolSARpro

Eric POTTIER

1–5 July 2013 | Harokopio University | Athens, Greece



esa



10 Years of PolSARpro



PolSARpro v5.0 SOFTWARE



esa

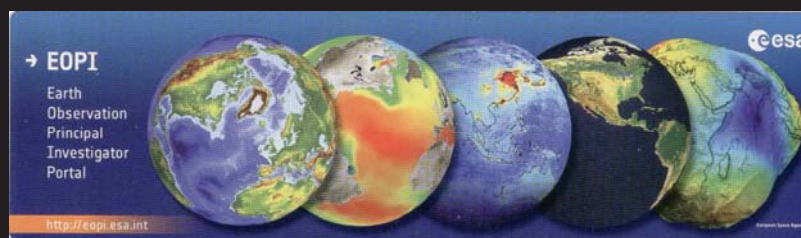
A Bit Of History



PolSARpro



The initiative development of **PolSARpro Software** is a direct result of recommendations made during the **POLinSAR 2003 Workshop** held at ESA-ESRIN in January 2003.



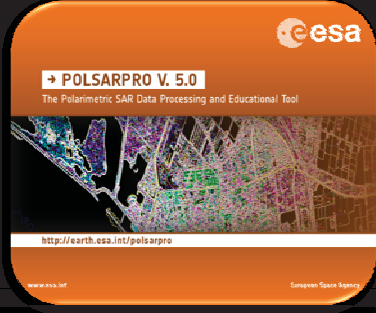
ESA free TOOLBOXES to exploit ESA & ESA TPM data available at <http://earth.esa.int/resources/softwaretools/>

 **A BIT OF HISTORY** 



v4.2
Jan. 2011





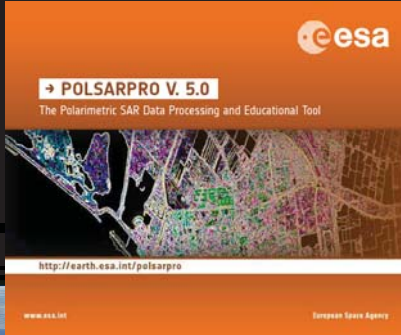


New!
v5.0
Jan. 2013



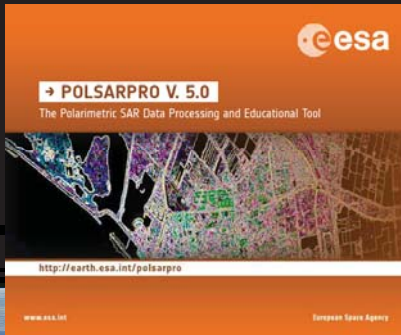
 **PolSARpro v5.0 SOFTWARE** 

Tool specifically designed to handle :
Polarimetric data
and
Polarimetric Interferometric data.



 **PolSARpro v5.0 SOFTWARE** 

Educational Software offering a tool for
self-education
in the field of **POLSAR** and **POL-InSAR**
data processing and analysis.

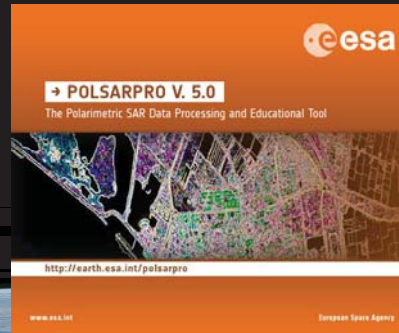




PolSARpro v5.0 SOFTWARE



Developed to be **accessible** to :
a wide range of users
from **novices** to **experts**
in the field of **POLSAR** and **POL-InSAR**.



PolSARpro v5.0 TEAM



In collaboration with :



University of Illinois at Chicago

University of Niigata

University of Alicante

University of Tor Vergata

University of Pisa

University of Sendai

University of Fairbanks

University of Marne la Vallée

University of Tsinghua

Naval Research Laboratory

NASA – JPL

Ressources Naturelles Canada

... ..



UPC

IE – CAS (MITL)

CEODE – CAS

CNES

GIPSA – Lab

Alaska Sar Facility

SERTIT

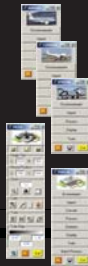
CSRE – IITB



USER INTERFACE

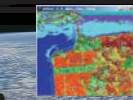


PolSARpro v5.0 Software is conceived as a flexible environment, with a friendly and intuitive Graphical User Interface (**GUI**)



The graphical user interface (**GUI**) is written in **Tcl-Tk**

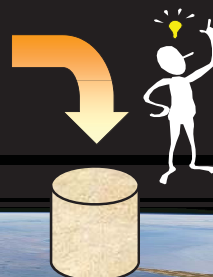
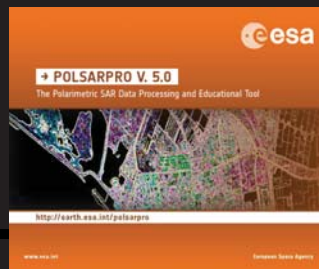
- **331185** lines managing **189** widget windows
- **1078 C routines** (**464803** lines) performing well-established algorithms in the field of POLSAR and POL-InSAR.



MODULAR STRUCTURE



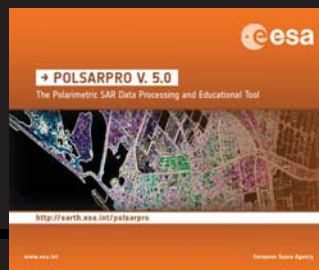
Each element of the Software (**a function**) can be **extracted** and **incorporated** individually into **users'** own processing software.



MODULAR STRUCTURE



Users can easily **add** their own functions and components, as **PolSARpro v5.0 Software** is conceived as a flexible and open software environment.





PolSARpro v5.0 SOFTWARE



OPEN SOURCE DEVELOPMENT



PolSARpro v5.0 Software is made available following the:

Open Source Software Development (OSSD) approach, and follows the:

GNU General Public License v2 – June 1991.

PolSARpro v5.0 Software runs today on:

Windows 98+, Windows 2000, Windows NT 4.0, Windows XP, Windows 7 and Linux I386

Macintosh OS:



PolSARpro v5.0 SOFTWARE



OPEN SOURCE DEVELOPMENT



The Tool is **free download** on the Internet from the **ESA Web Portal (Earthnet)** at :
<http://earth.esa.int/polsarpro>



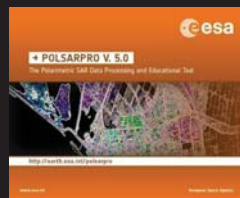
PolSARpro v5.0 SOFTWARE



Pol-SAR Sensors



PolSARpro v5.0 SOFTWARE



AIRSAR



SETHI



PISAR



ESAR



EMISAR



UAV-SAR



FSAR

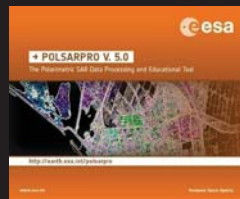
New!

CONVAIR

PolSARpro v5.0 Software offers the possibility to handle and convert polarimetric data from a range of well established polarimetric airborne platforms.



PolSARpro v5.0 SOFTWARE



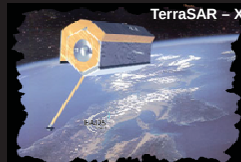
ENVISAT - ASAR



SIR-C



ALOS - PALSAR



TerraSAR - X



RADARSAT 2

PolSARpro v5.0 Software offers the possibility to handle and convert polarimetric data from a range of well established polarimetric spaceborne platforms.



PolSARpro v5.0 SOFTWARE



ALOS Input Data File (MKA - EDS Format)

Input Directory: F:\PolSARpro_Data\PolSAR_Data\ALOS\Montpellier

Output Directory: F:\PolSARpro_Data\PolSAR_Data\ALOS\Montpellier

SAR Header File (LED - recommended): F:\PolSARpro_Data\PolSAR_Data\ALOS\Montpellier\LED_ALPSRPO45700070.P1_1_A

Check Files

Scene ID: ALPSRPO45700070 Mode: Quad Pol Mode

Data Level: 1.1 Node: Ascending Projection Map

SAR Trailer File: F:\PolSARpro_Data\PolSAR_Data\ALOS\Montpellier\TRIALPSRPO45700070.P1_1_A

SAR Image Files:

- x11 F:\PolSARpro_Data\PolSAR_Data\ALOS\Montpellier\IMG_HH_ALPSRPO45700070.P1_1_A
- x12 F:\PolSARpro_Data\PolSAR_Data\ALOS\Montpellier\IMG_HV_ALPSRPO45700070.P1_1_A
- x21 F:\PolSARpro_Data\PolSAR_Data\ALOS\Montpellier\IMG_VH_ALPSRPO45700070.P1_1_A
- x22 F:\PolSARpro_Data\PolSAR_Data\ALOS\Montpellier\IMG_VV_ALPSRPO45700070.P1_1_A

Read Header Edit Header Extract Uncalibrated Raw Binary Data

COMPLEX SAR IMAGE

Initial Number of Rows: 18432 Initial Number of Cols: 1248

OK Cancel



ALOS-PALSAR Polar Modes

- PALSAR Dual & Quad POL

- PALSAR Data Level 1.1 and 1.5

JAXA - CEOS Data Format



PolSARpro v5.0 SOFTWARE



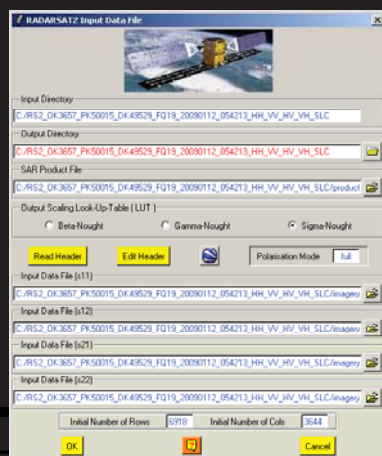
ALOS-PALSAR Polar Modes

- PALSAR Dual & Quad POL
- PALSAR Data Level 1.1

ERSDAC - Vexcel Data Format



PolSARpro v5.0 SOFTWARE



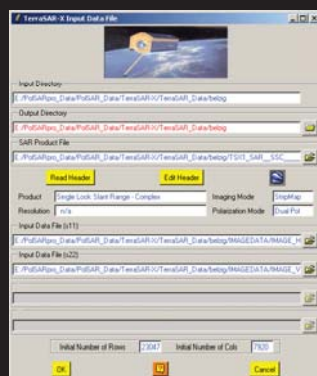
RADARSAT 2



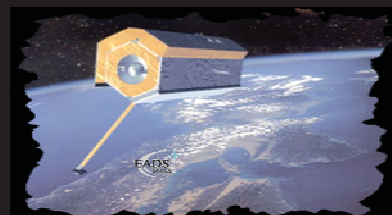
- Dual & Quad POL
- Fine and Standard Mode



PolSARpro v5.0 SOFTWARE



TerraSAR – X

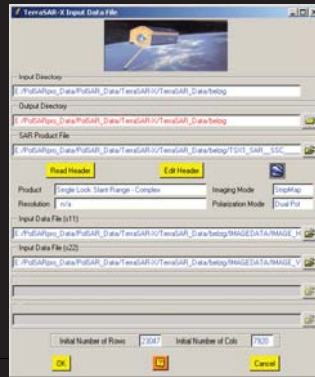


- TerraSAR – X Dual POL

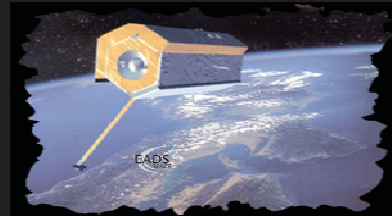
SSC: Single Look Slant Range Complex
EEC: Enhanced Ellipsoid Corrected
GEC: Geocoded Ellipsoid Corrected
MQD: Multi-Look Ground Range



PolSARpro v5.0 SOFTWARE



TerraSAR – X



SSC: Single Look Slant Range Complex

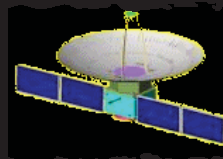
• TerraSAR – X Quad POL



PolSARpro v5.0 SOFTWARE



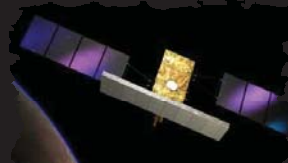
RISAT



TANDEM-X



COSMO - SKYMED



New!

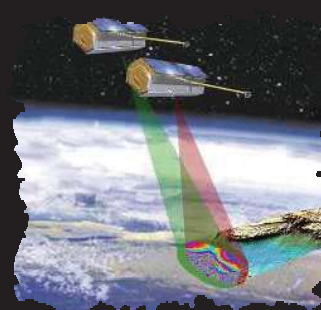
PolSARpro v5.0 Software offers the possibility to handle and convert polarimetric data from a range of well established polarimetric spaceborne platforms.



PolSARpro v5.0 SOFTWARE



TANDEM – X



SSC: Single Look Slant Range Complex

• TanDEM – X Dual POL

New!



New!



SSC: Single Look Slant Range Complex

New!



New!



PolSARpro v5.0 SOFTWARE



RISAT

RISAT Input Data File (CEOS Format)

Input Directory: D:\D_POLSAR_DATA\FRS-1\9441rdt_x33_SLC

Output Directory: D:\D_POLSAR_DATA\FRS-1\9441rdt_x33_SLC

Band Meta File: D:\D_POLSAR_DATA\FRS-1\9441rdt_x33_SLC\BAND_META.txt

Read Header

Scene ID: ENTER SCENE ID ?? Mode: Compact - Pol

Mode: FRS1 Level: SLC Format: CEOS Inc Ang: 44.000

Res Rg: 3.332 Res Az: 2.340 Pix Rg: 1.801 Pix Az: 2.365

SAR Loader File: D:\D_POLSAR_DATA\FRS-1\9441rdt_x33_SLC\scene_RN\img_01.001

SAR Image Files:

x11: D:\D_POLSAR_DATA\FRS-1\9441rdt_x33_SLC\scene_RN\img_01.001

x12: D:\D_POLSAR_DATA\FRS-1\9441rdt_x33_SLC\scene_RN\img_01.001

x21:

x22:

Initial Number of Rows: 13632 Initial Number of Cols: 10740

OK Cancel



• RISAT Dual POL – Compact POL

New!



PolSARpro v5.0 SOFTWARE



Software – General Presentation



PolSARpro v5.0 SOFTWARE

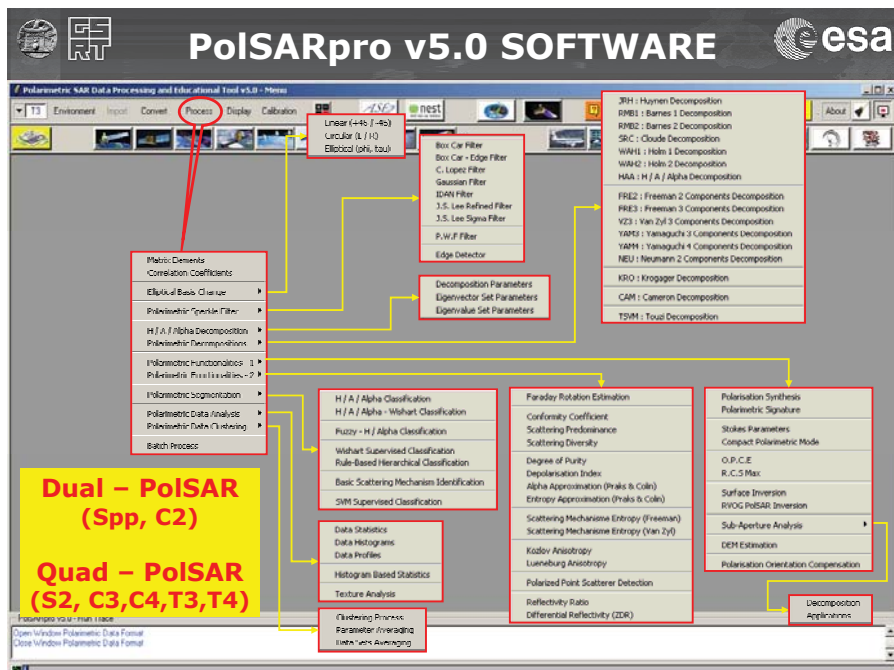
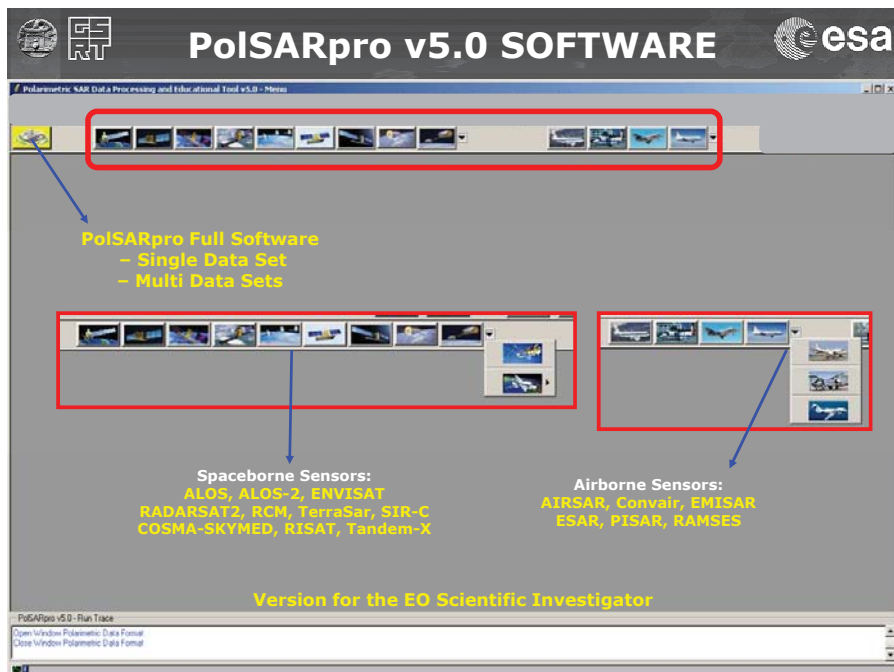
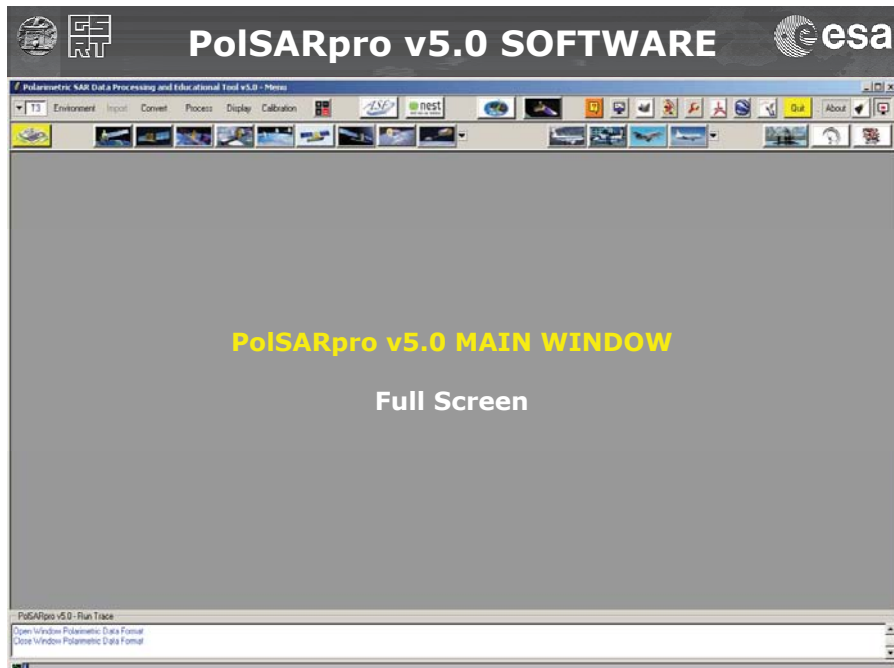


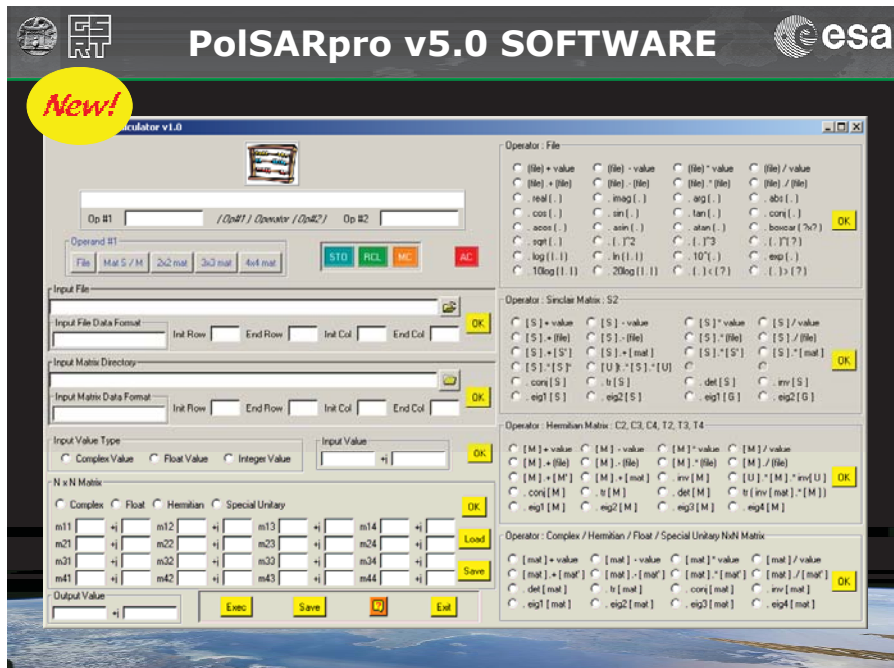
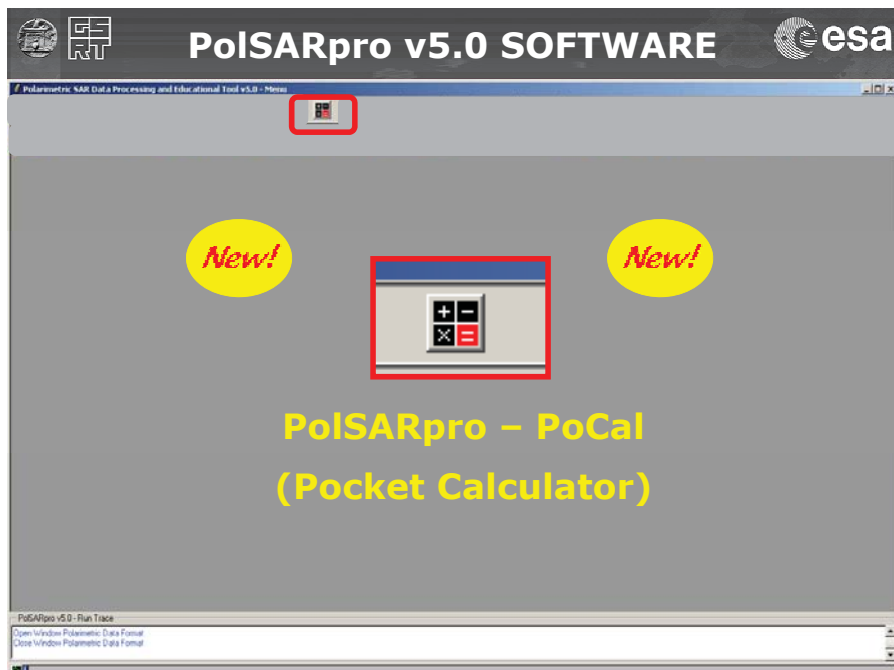
PolSARpro V. 5.0

The Parametric SAR Data Processing and Educational Tool

ENTRY SCREEN

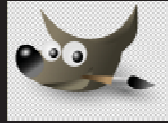
PolSARpro v5.0 WINDOWS







G.I.M.P



GNU Image Manipulation Program
Open Source
GNU License
(Win, Linux, Unix)



G.I.M.P

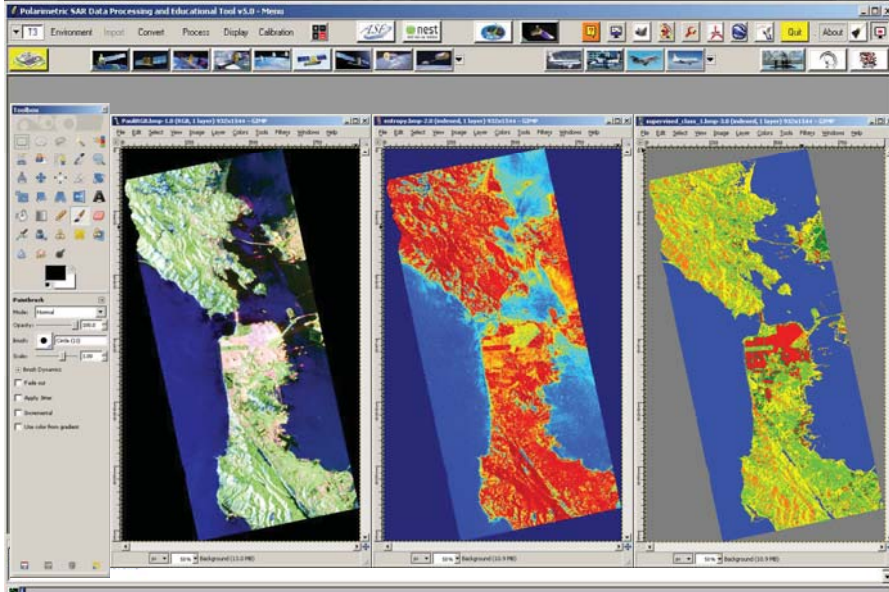


IMAGE MAGICK

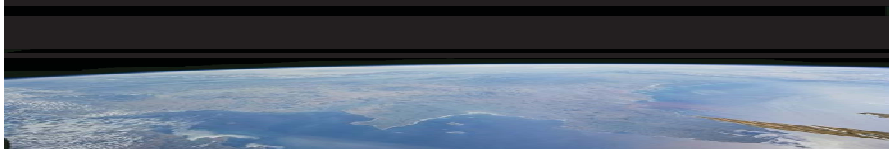
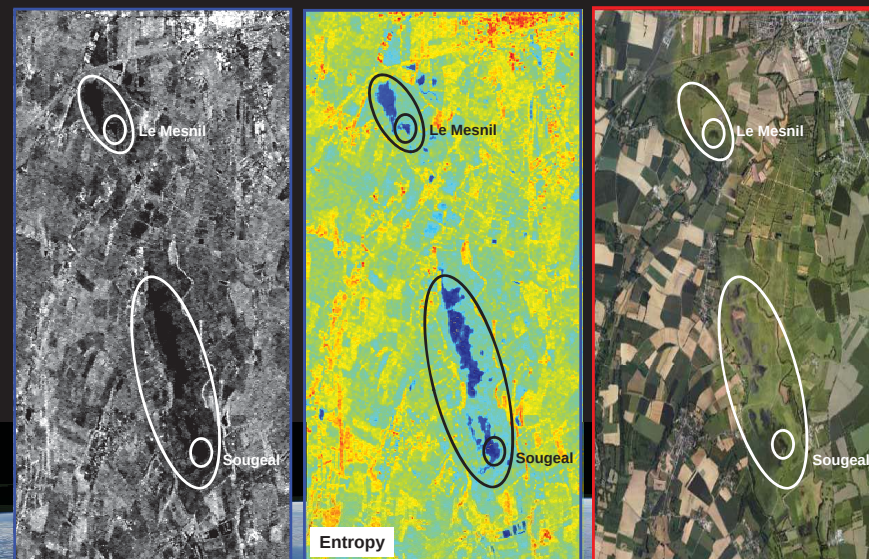




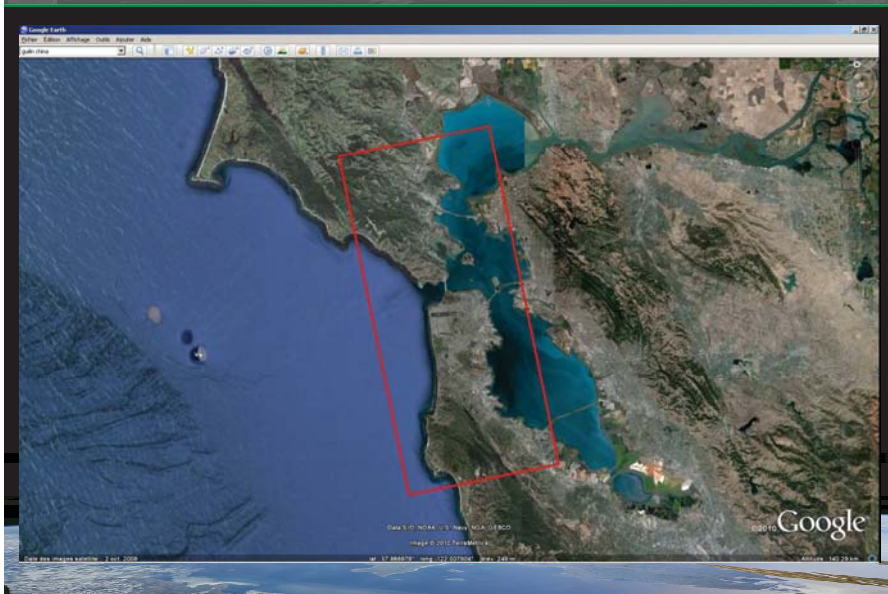
IMAGE MAGICK

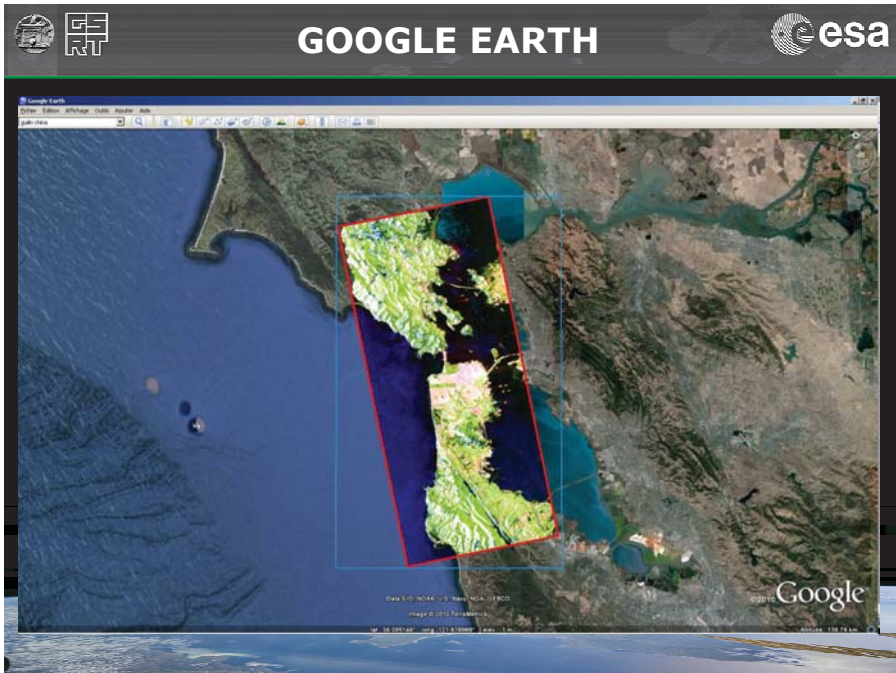


GOOGLE EARTH



GOOGLE EARTH







PolSARpro v5.0 SOFTWARE



GIS SOFTWARES



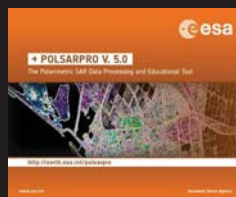
MAP READY



v 4.0

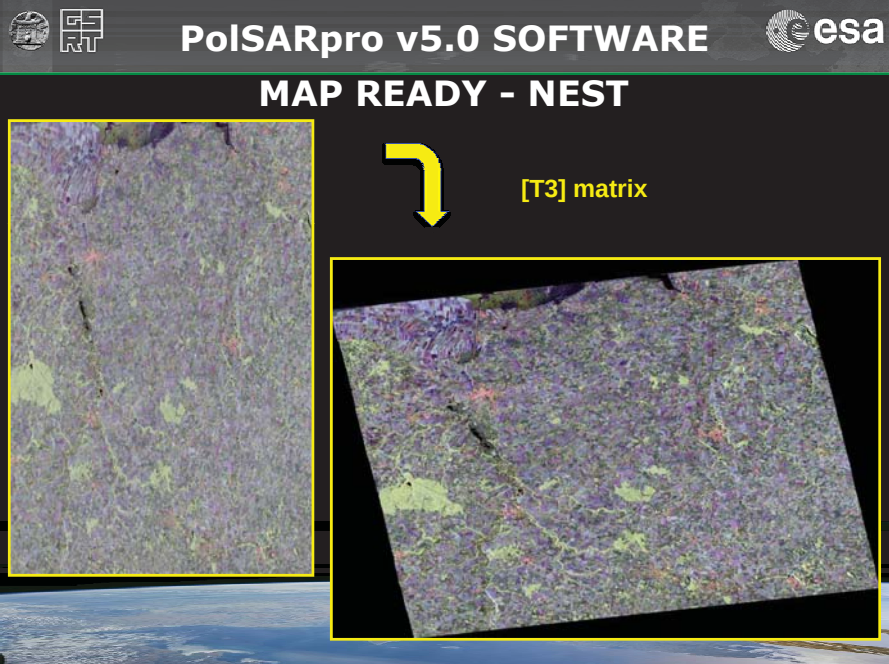
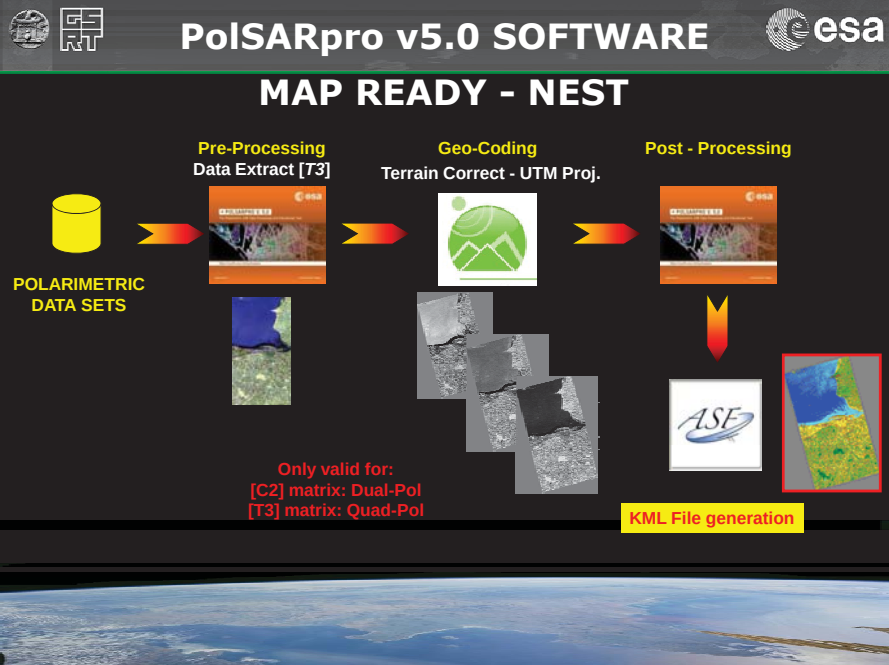
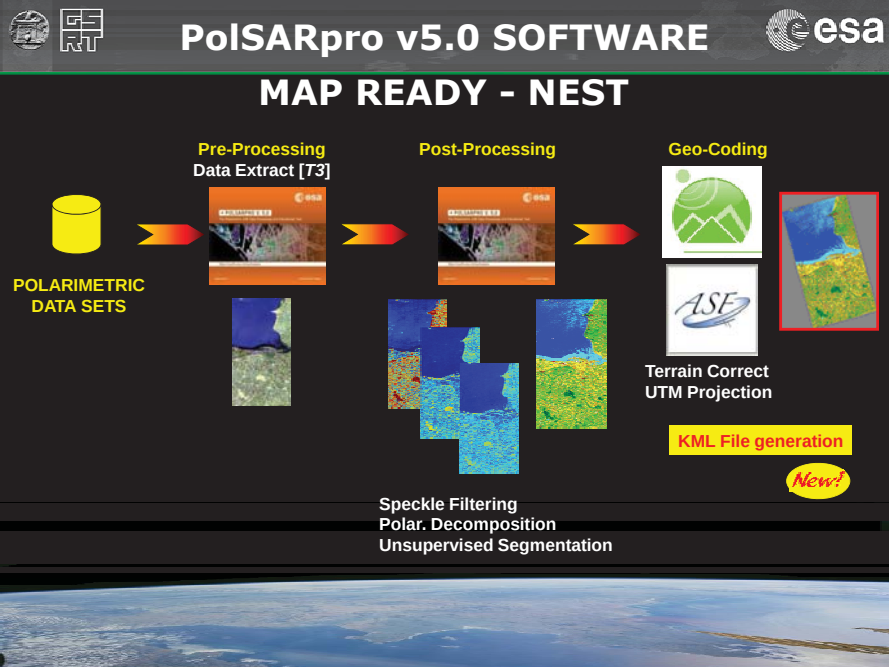


NEST



New!



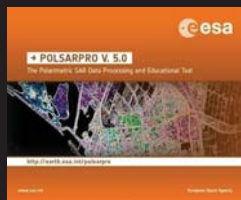




PolSARpro v5.0 SOFTWARE

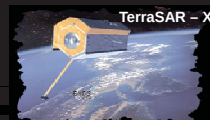


NEST



RADARSAT 2

Dual-Pol ([C2])
Quad-Pol ([T3])



TerraSAR - X

Dual-Pol ([C2])



PolSARpro v5.0 SOFTWARE



MAP READY



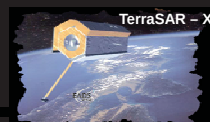
ALOS - PALSAR

Dual-Pol ([C2])
Quad-Pol ([T3])



RADARSAT 2

Dual-Pol ([C2])
Quad-Pol ([T3])



TerraSAR - X

Dual-Pol ([C2])



PolSARpro v5.0 SOFTWARE



Learning / Training Next P.I Generations



PolSARpro v5.0 SOFTWARE

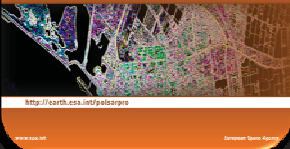


PolSAR-Ap



→

PolSARPRO V. 5.0
The Polarimetric SAR Data Processing and Educational Tool



<http://earth.esa.int/polsarpro>

PolSARpro



Educational Tools



PolSAR-Ap Project



Tutorials
Do It Yourself
Lecture Notes
Slides
Technical Documentation
Help Files.

WP360 : Review and update of the Basic Principles and Applications
(E. Pottier, C. Lopez Martinez)



UNDER CONSTRUCTION

PolSARpro v5.0 - Run Trace

Open Window Polarimetric Data Format

Close Window Polarimetric Data Format



PolSARpro v5.0 SOFTWARE



http://earth.esa.int/polsarpro

The Web Site provides



- Details of the project
- Access to the tutorial and software
- Information about status of the development
- Demonstration Sample Datasets