

Super Cal/Val Site Identifier Tool: SCalSIT Developed for the Sentinel-3 Topography mission Assessment through Reference Techniques (St3TART) project

https://sentinel3-st3tart.noveltis.fr/



Context - St3TART project

- The St3TART project is aimed at preparing a roadmap and providing a preliminary proof of concept for the provision of Fiducial Reference Measurements (FRM) in support of the validation activities of the Sentinel-3 (S3) radar altimeter over land surfaces of interest, i.e. inland water bodies (lakes, reservoirs, rivers including estuarian areas), as well as sea ice and land ice areas (ice caps, mountain glaciers).
- Typically, St3TART and its follow-up activities should ensure a supply of fiducial data for the Cal/Val activities of the ESA S3 Mission Performance Center/Cluster and of the S3 Validation Team.
- The Super Cal/Val Site Identifier Tool (SCalSIT) software aims to support the Cal/Val community and scientists in identifying potential in-situ Cal/Val sites over Inland Water Surfaces, to contribute to the validation activities effort of the Copernicus Sentinel-3 STM mission, but also to perform in-situ hydrological measurements for downstream applications or R&D".

SCalSIT: How does it work?

- To identify such sites, it detects all potential intersections between inland water surfaces and altimetry satellites orbits.
- The user only needs to define a water surface mask and the altimetry satellites orbits, and the tool will automatically calculate the intersection zones of both within a specific area of interest, taking into account any additional parameters defined by the user, such as the distance to the water body, the time period, a specific water body, a minimum number of passes over the water body.
- Once the intersection zones are calculated, the user can save these zones and use them within any GIS tool.

GOOD TO KNOW!

The tool has been created for the S3 Topography mission Assessment, but it could work for other altimetry satellites, because it takes the satellites orbits as an argument.



Example on the Garonne river

Satellite tracks					
s3a.shp, s3b.shp, s6a.shp					
Land water masks					
05_Adour-Garonne_CoursEau.sh	p subset="TopoOH"	= 'la Garonne'			
Basin					
MRB Basins				-	
Anna affintenent					
Area of interest					
	Draw C)n Map			
Min. longitude -0.777309560720	0904	Max. longitud	e 1.20410571206011	106	
Min. latitude 43.6509298430638	14	Max. latitude	45.09824269030601		
' Configuration					
SCalSIT mode					
SCalSIT mode		Cross-ove	rs only		
SCalSIT mode O Full mode Date Selection		• Cross-ove	rs only		
SCalSIT mode Full mode Date Selection		Cross-ove	rs only		
SCalSIT mode Full mode Date Selection Start date 01/01/2000 00:00 Minimal number of gross quere		Cross-ove End date	rs only 1/01/2000 00:00		*
SCalSIT mode Full mode Date Selection Start date 01/01/2000 00:00 Minimal number of cross-overs		Cross-ove End date	rs only 1/01/2000 00:00		
SCalSIT mode Full mode Date Selection Start date 01/01/2000 00:00 Minimal number of cross-overs 1	(m)	Cross-ove End date	rs only 1/01/2000 00:00		 ↓
SCalSIT mode Full mode Date Selection Start date 01/01/2000 00:00 Minimal number of cross-overs 1 Maximum distance to water body	(m)	Cross-ove End date	rs only 1/01/2000 00:00		
SCalSIT mode Full mode Date Selection Start date 01/01/2000 00:00 Minimal number of cross-overs 1 Maximum distance to water body 500	(m)	Cross-ove End date	rs only 1/01/2000 00:00		
SCalSIT mode Full mode Date Selection Start date 01/01/2000 00:00 Minimal number of cross-overs 1 Maximum distance to water body 500 Percentage of surface water occu	(m)	Cross-ove End date	rs only		

Marmande site identified as a Super site, with several "one cross-over zones" and one "two cross-over zone"

Zone attributes, with satellite, orbit and pass information, and MRB Basins metadata

Cal/Val sites L 2022-10-14 19:05:16 — Total des entités: 0. Sélectionnées: 0.	
	- L X
fid xover	RIVER BASI
1 1 [{"Orbit": 222 "Pass": 444 "source": "s3a"} {"Orbit": 300 "Pass": 599 "source": "s3a"}]	GARONNE (also RIO GARONA)

P	Ų			
	fid	xover	sources	RIVER_BASI
1	1	1	[{"Orbit": 222, "Pass": 444, "source": "s3a"}, {"Orbit": 300, "Pass": 599, "source": "s3a"}]	GARONNE (also RIO GARONA)
2	2	1	[{"Orbit": 222, "Pass": 444, "source": "s3a"}, {"Orbit": 300, "Pass": 599, "source": "s3a"}]	GARONNE (also RIO GARONA)
3	3	1	[{"Orbit": 222, "Pass": 444, "source": "s3a"}, {"Orbit": 35, "Pass": 70, "source": "s6a"}]	GARONNE (also RIO GARONA)
4	4	1	[{"Orbit": 300, "Pass": 599, "source": "s3a"}, {"Orbit": 35, "Pass": 70, "source": "s6a"}]	GARONNE (also RIO GARONA)
5	5	1	[{"Orbit": 300, "Pass": 599, "source": "s3a"}, {"Orbit": 35, "Pass": 70, "source": "s6a"}]	GARONNE (also RIO GARONA)
6	6	1	[{"Orbit": 300, "Pass": 599, "source": "s3a"}, {"Orbit": 35, "Pass": 70, "source": "s6a"}]	GARONNE (also RIO GARONA)
7	7	2	[{"Orbit": 222, "Pass": 444, "source": "s3a"}, {"Orbit": 300, "Pass": 599, "source": "s3a"}, {"Orbit": 35, "Pass": 70, "source": "s6a"}]	GARONNE (also RIO GARONA)
8	8	2	[{"Orbit": 222, "Pass": 444, "source": "s3a"}, {"Orbit": 300, "Pass": 599, "source": "s3a"}, {"Orbit": 35, "Pass": 70, "source": "s6a"}]	GARONNE (also RIO GARONA)



Need more info?

This tool is an open-source software. It will be distributed on Gitlab once validated by ESA.

If you are interested by this tool, please contact us through the project website contact form: <u>https://sentinel3-st3tart.noveltis.fr/contact/</u>, and we will keep you informed as soon as the tool is publicly available.



Elodie Da Silva¹, Mathis Bertin¹, Eric Munesa¹, Nicolas Picot², Jean-Christophe Poisson³, H. Yésou⁸, A. Tarpanelli⁴, A. Paris⁵, N. Sneeuw⁶, M. Tourian⁶, R. Fjortoft², F. Boy², D. Blumstein², M. Calzas⁷, M. Cancet⁸, B. Laignel⁹, J. Crétaux¹⁰, S. Calmant¹¹, K. Nielsen¹², O. Andersen¹², J. Maxant⁸, P. Bonnefond¹⁴, S. Camici⁴, N. Taburet¹⁵, M. Vayre¹⁵, P. Féménias¹⁶ ¹NOVELTIS, ² CNES, ³ vorteX.io, ⁴ CNR-IRPI, ⁵Hydro Matters, ⁶Stuttgart University, ⁷DT-INSU, ⁸ICUBE-SERTIT, ⁹UNIVERSITE DE ROUEN NORMANDIE/M2C CNRS, ¹⁰LEGOS, ¹¹ IRD, ¹² DTU, ¹³ CNRS, ¹⁴ SYRTE, ¹⁵CLS, ¹⁶ESA