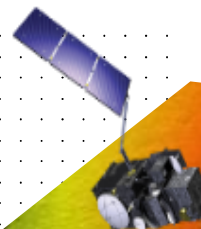




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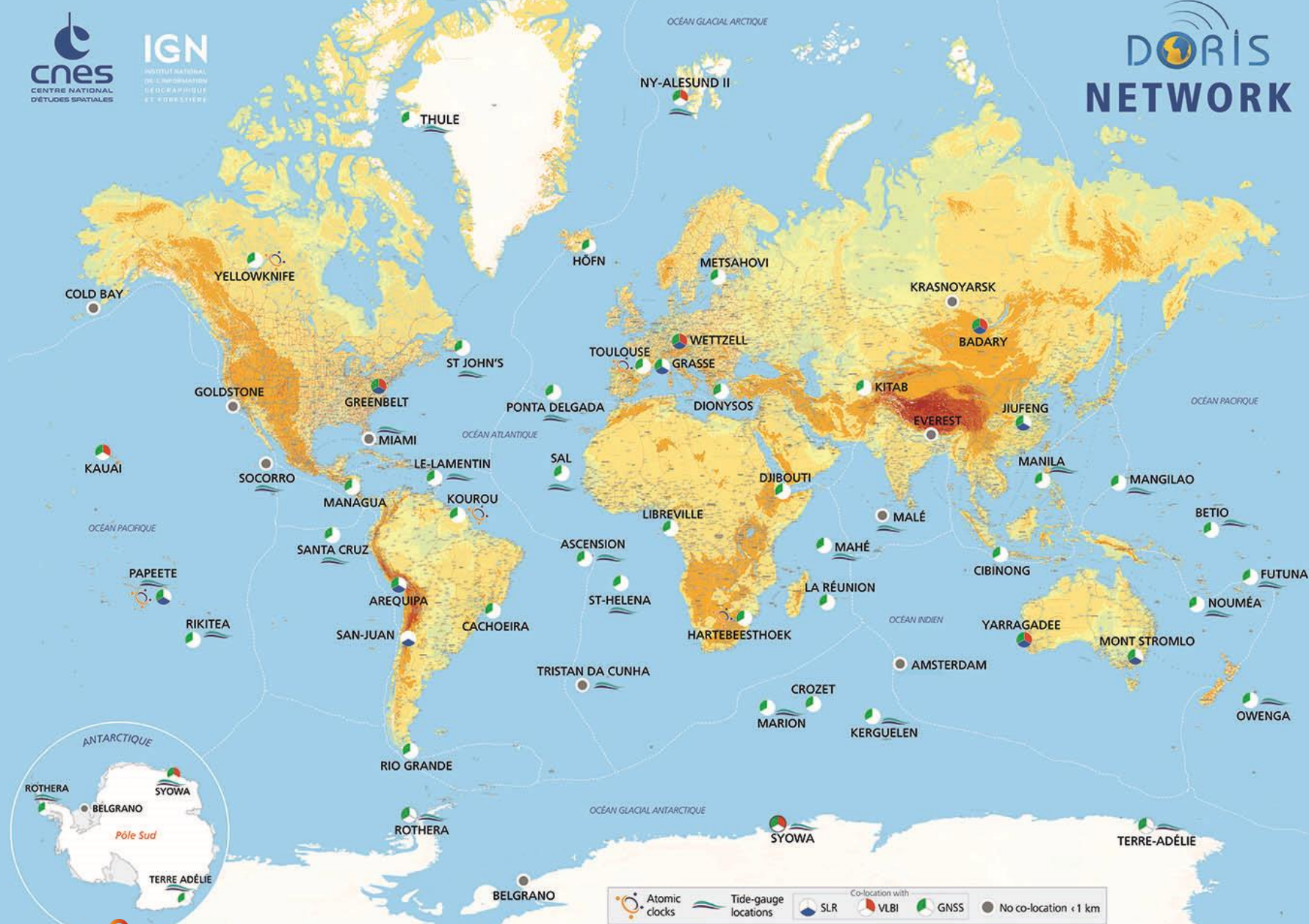


# DORIS NETWORK STATUS REPORT

IDS Analysis Working Group Virtual Meeting  
6-7 April 2021

Jérôme Saunier, IGN - France





Today: 49 stations out of 59 co-located with at least one other IERS technique / 27 with tide gauges



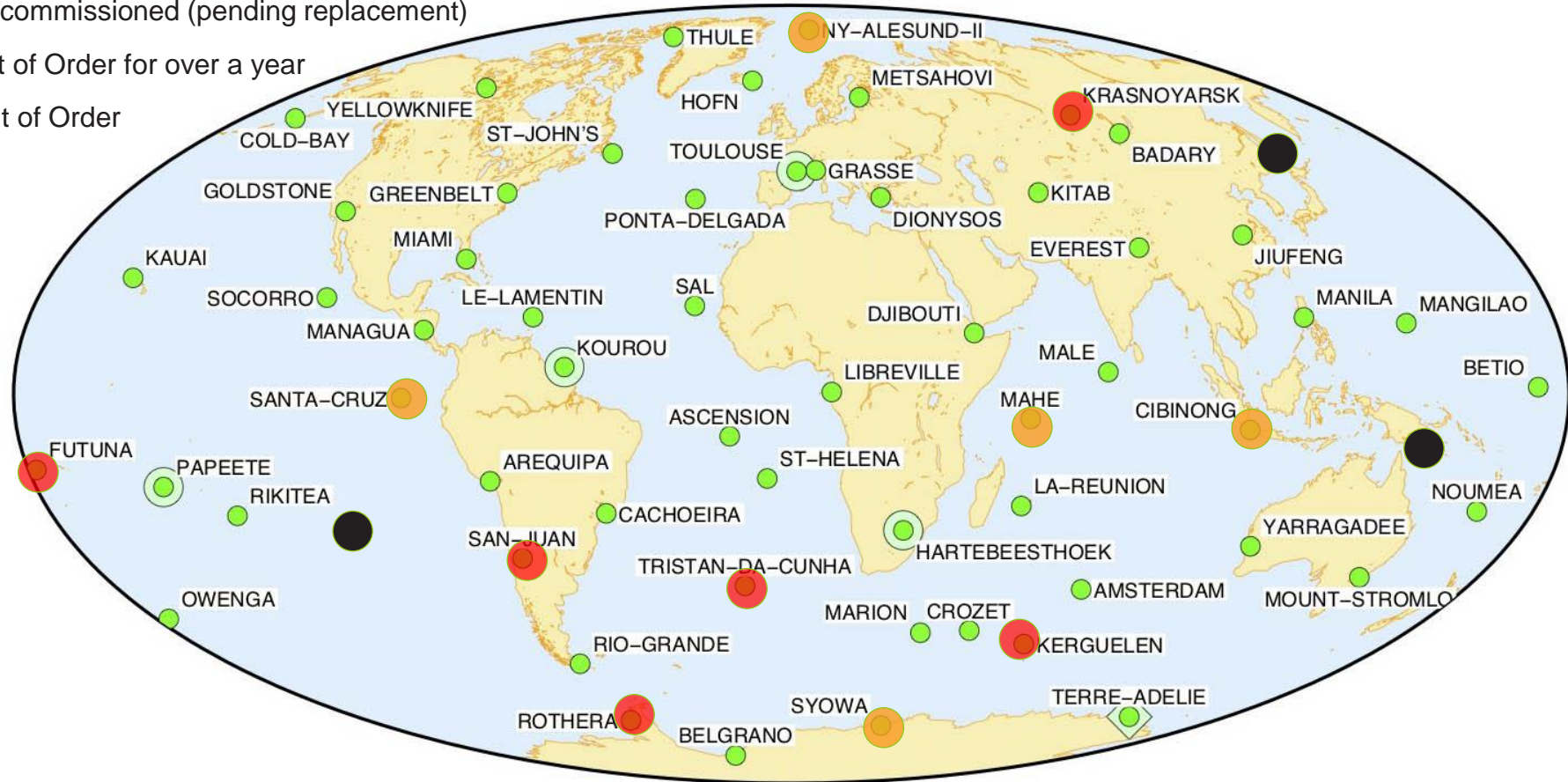
# PERMANENT NETWORK OPERATIONAL STATUS

◉ master beacon ◈ time beacon

● Decommissioned (pending replacement)

● Out of Order for over a year

● Out of Order



GMT 2021 Mar 31 09:29:32 This map was created by IGN-France

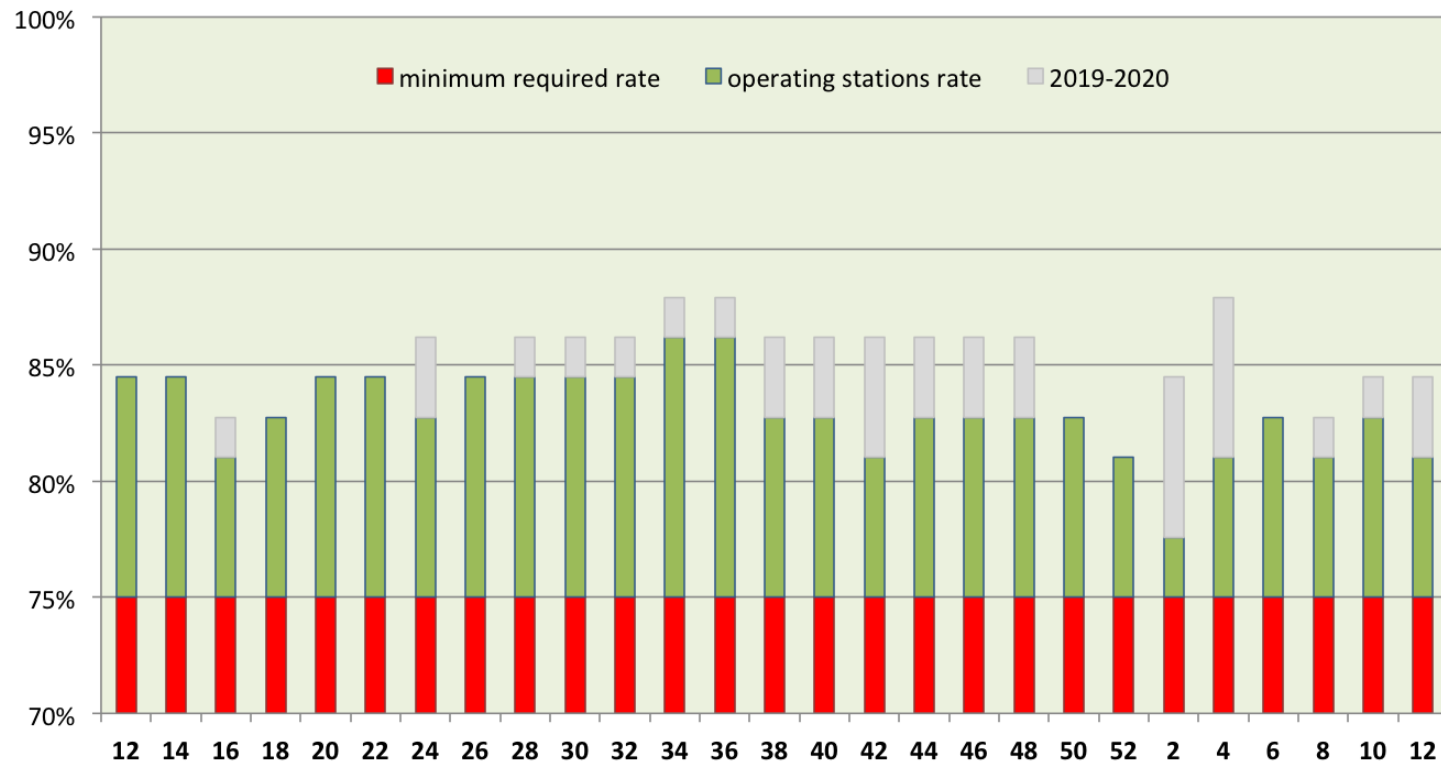
📍 60 stations of which: 11 beacons are out of order and 3 decommissioned



# NETWORK AVAILABILITY

- Despite the difficulties in maintaining the stations due to Covid-19, the ground network holds on!
- However, the number of operating stations decreased from mid 2020 compared to usual

**Network availability 04-2020 > 04-2021**





# NETWORK COVERAGE

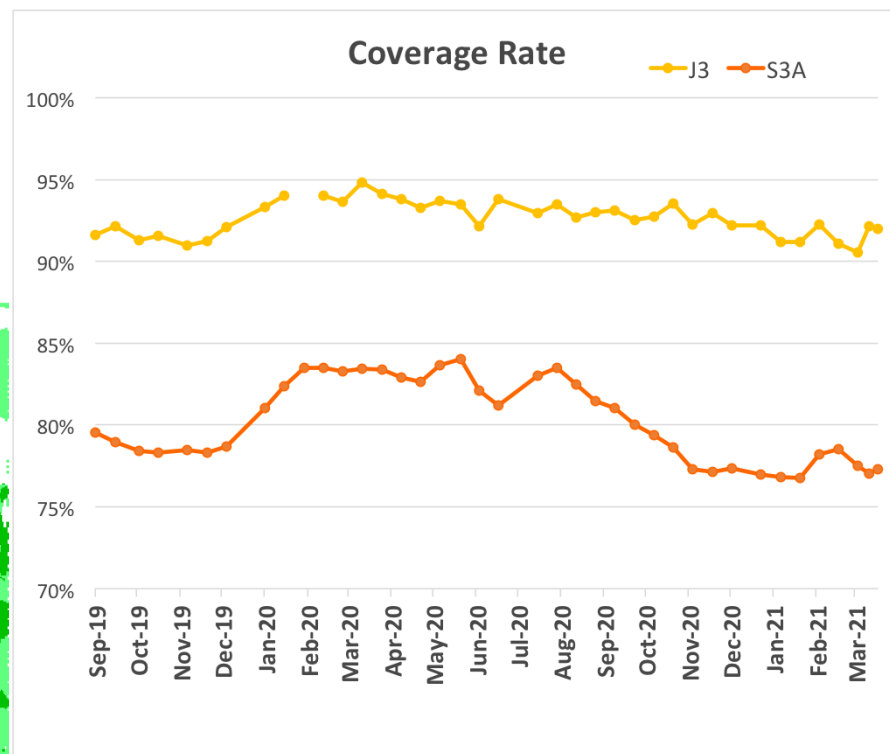
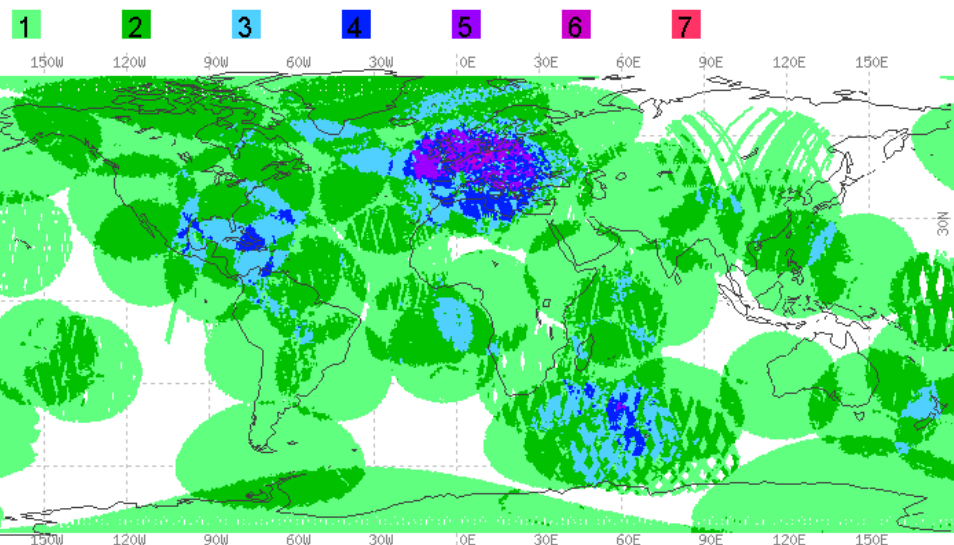
- 📍 As a result of our current difficulties in maintaining the stations in operation
- 📍 The coverage slopes gently down since April 2020

Coverage of SENTINEL3A orbit by the DORIS network

Period processed : from 01/03/2021 to 29/03/2021

Coverage rate : 77,32%

Nb of measurements received by OBSW at each sequence :



From CNES/SALP Data



# NETWORK EVENTS 2020

📍 Several autonomous installation of the 4<sup>th</sup> generation beacon were possible

📍 On-site operations in Europe and French territories

2020	Station		Event
Jan.	MALB	Malé	Reconnaissance with a view to renovate the station
Feb.	REUC	<b>La Réunion</b>	<b>Major renovation</b> (moved 70m south + equipment upgrade)
Mar.	MIAB	<i>Miami</i>	<i>Beacon replacement: 3G &gt; 4G</i>
May	CRQC	<i>Crozet</i>	<i>Beacon and antenna replacement: 3G &gt; 4G + C Antenna</i>
Aug.	MSPB	<i>Mount Stromlo</i>	<i>Beacon replacement: 3G &gt; 4G</i>
Sep.	TLSB	<i>Toulouse</i>	<i>Beacon replacement: 3G &gt; 4G</i>
	HOFC	<b>Höfn</b>	<b>New site in Iceland (replacing Reykjavik)</b>
	GAVC	<b>Gavdos</b>	<b>Reconnaissance with a view to installing new station</b>
Dec.	AMVB	<i>Amsterdam</i>	<i>Beacon replacement: 3G &gt; 4G</i>
	YASB	<i>Yarragadee</i>	<i>Beacon replacement: 3G &gt; 4G</i>

In normal font: on-site operations carried out by IGN

*In italics: operational maintenance (equipment replacement) managed by CNES with the participation of Host Agencies*



# NETWORK EVENTS 2021



 Continuation of autonomous installations of the 4<sup>th</sup> generation beacon where possible

2021	Station		Event
Jan.	KEWC	Kerguelen	<i>Beacon replacement: 3G &gt; 4G</i>
Feb.	GONC	Goldstone	<i>Beacon replacement: 3G &gt; 4G</i>
Mar.	DIOB	Dionysos	<i>Beacon replacement: 3G &gt; 4G</i>
April	KEXC	Kerguelen	<i>Antenna replacement</i>

In normal font: on-site operations carried out by IGN

*In italics: operational maintenance (equipment replacement) managed by CNES with the participation of Host Agencies*



# STATIONS DEDICATED TO IDS

## Wettzell:

Into operation since September 2016

Specificities:

- 📍 **Shifted frequency ( $k=18$ ) to avoid Doppler collisions**
- 📍 **Automatic stand-by when no DORIS satellite overhead**
- 📍 **Very few low elevation observations ( $<10^\circ$ )**

Good performance results

## Second IDS dedicated station:

Call for proposals: New DORIS site

- 📍 **Frank, Guilhem and Jérôme are working on it**
- 📍 **Waiting for appropriate time...**

3 requirements:

- 📍 **Potential interest for scientific studies**
- 📍 **Site complying to DORIS installation requirements**
- 📍 **Contribution to geographical coverage (Europe is offside!)**

Potential candidates:

- 📍 **Zhuhai (China), Kanpur (India), Gran Canaria (Spain), Sejong (Korea)**





# NETWORK EVOLUTION



## Scheduled in 2021:

Apr.: **Rothera**, UK Antarctica: 4<sup>th</sup> generation beacon autonomous installation

May.: **Malé**, Maldives: relocation and 4<sup>th</sup> generation beacon installation

Jun.: **Kourou**, French Guyana: 4<sup>th</sup> generation beacon installation

Jul.: **La Réunion**, France, Indian Ocean: maintenance operation (failed equipment)

Aug.: **Rikitea**, French Polynesia: major renovation (antenna move + equipment upgrading)

Sep.: **Gavdos**, Crete, Greece: station installation and site survey

## Short term (2022):

**Katherine**, Australia (co-location GNSS + VLBI): installation 300m away from VLBI

**Easter island**: following site closure in 2015, relocation and hosting migration

**Changchun**, China (co-location GNSS + SLR): disagreement on the financial level

## Longer term:

**Krasnoyarsk**: decommissioning and search for a new site

**Cachoeira, Le Lamentin, Sal, Everest**: antenna relocation and equipment upgrading

**Papenoo**, French Polynesia (co-location GNSS + SLR + VLBI): at a standstill



# NETWORK EQUIPMENT UPGRADING

## 4<sup>th</sup> generation beacon deployment

Slowed down by Covid-19

15 stations now equipped (see list in the next table)

Next on the list: Rothera, Malé, Futuna, Metsahovi, Kourou, San Juan, Djibouti

## Gradual replacement of Starec antennae B type with C

Reminder: the uncertainty of the vertical location of the 2GHz phase center is reduced from 5 to 2 mm

21 stations equipped with Starec C: 35% of the network

Last stations equipped with Starec C:

 Crozet (CRQC)

 Höfn (HOFC)



	acronyme text	date_installed date
1	GR4B	2019-03-26
2	STKC	2019-06-25
3	PDOC	2019-07-26
4	HEMB	2019-11-13
5	REUC	2020-02-12
6	MIAB	2020-03-11
7	CRQC	2020-05-14
8	MSPB	2020-08-19
9	TLSB	2020-09-01
10	HOFC	2020-09-24
11	AMVB	2020-12-08
12	YASB	2020-12-17
13	KEXC	2021-01-18
14	GONC	2021-02-04
15	DIOB	2021-03-06



# DORIS LOCAL TIE SURVEYS



## CNES/IGN contribution to ITRF2020

Delivery of new DORIS Tie Vectors (SINEX files) to ITRS Center

⇒ 25 site surveys performed by IGN between 2013 and 2020 on the occasion of on-site operations for DORIS or REGINA

N°	Site Ident (DOMES)	Site	Survey Date	GNSS	SLR	VLBI
1	10002	Grasse	2013	X	X	
2	41609	Cachoeira	2013	X		
3	97205	Le Lamentin	2013	X		
4	39901	Djibouti	2013	X		
5	22006	Manila	2014	X		
6	30313	Marion Island	2014	X		
7	31906	Ponta-Delgada	2014	X		
8	30302	HBK	2014	X		
9	23101	Cibinong	2015	X		
10	30602	Ascension	2015	X		
11	39601	Sal	2015	X		
12	41201	Managua	2016	X		
13	12334	Kitab	2016	X		
14	14201	Wettzell	2016	X		
15	92201	Papeete	2017	X		
16	41508	San Juan	2018		X	
17	66007	Rothera	2018	X		
18	82301	Mangilao	2018	X		
19	12602	Dionysos	2018	X		
20	40101	St-John's	2019	X		
21	91501	Terre Adélie	2019	X		
22	32809	Libreville	2019	X		
23	42005	Santa-Cruz	2019	X		
24	97401	La Réunion	2020	X		
25	10204	Höfn	2020	X		





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