

### CORS data flow in NKG

NKG Science week Iceland 2024 WG GNSS Positioning

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### Background

WG meeting April 2023 in Copenhagen

→ Summary table of services

Thank you for filling!

(If you don't have the link, send a message topi.rikkinen@nls.fi)

	stations			metadata	sof	tware	RINEX		RTCM streams		NRTK service		
	IGS	EPN	new stations	communication	private owned		NRTK/streaming	other (QC, handling )	generation method(s)	availability	pricing	pricing/info	users (approx.)
Finland	2	20	* 2023: 5-10 new slace B	NG (Bud-siln) on		Findhalfuture A	Oso-ONOHWIT	* Anubis for PBNEX QC * Alterding for NBTTK QC * PRTQ for pervertiprocessAIP*0 monitoring	* to: GB/SRAART togo from RTCMI placan * 20s receives togo jar or RB/SCX (FTP)	"Is from browser-UI via FRIPOII (open data) "30s from EPRIPTIP (20 strations)	- -09 materia - 100 r	"nor sold "only for RLS "estemal users only share reen for PILO	*co. 986 NLS PCTX 5 DIGN *860 registered DIGNOSAR PCTX uppers
Iceland	2			Various rubb. 30.40		Special offendings, sessings 650/6579 constance	Open—Object-0007 (consists f), in (organization, 1007 will opplicate to consists, 1			Through Gro est aggle aton des decage	Pres		There are 300 registered a
Latvia			Platforration of 2-4 hours stratilistic to planned in 2623	Culife commercials her diffuses studions		MISS for all stations	Laine (MISS Spaler	Great Anados (FT) Someon	Spider rethreps from Loise NESS Stre, RMSCY Stre are only generated from LoP'es have	access and Laffins volume, and for		All data pines and realistics insured in two of charge for all	
Lithuania				for different strations	-20	MOStrian all strations	Transpor Pluce	Anabia, Sterrages	Transpir Placer for broady and disk	altern Berr to FTF		free to registered users	
Norway			Last 1 pages - 190 new stations for the Rall Administration, one alignet station, dama on.	all trations, some couplisher vis floor and sadich (service	-Strump bookings	Self-developed station developed (See Self-Self-Self-Self-Self-Self-Self-Self-	Tanda Poor	"MCA" Neudlinic Data Angulatina (ren 1911)" Quilvagalines (ren 1911)" Quilvagalines (ren, ren), coggiinese (ren, ren), congresso (ren), congresso (ren) Presenti chia ci pissoling presente i con biburg presente i con biburg	Tagged non RF27 - RFCM proving NO proving NO proving NO proving NO binary day, which is larse convenied to their by using intraducts from the proving not actually no fine for their proving not proving NO provi	To and 20th feasing and daily mail from fact 2 monthler via aftig (advantigation personal) (Ripp, mail for and 20th attented german personal) to data	All owned mallows, private printion private and or	Trudy indisordylasis, prisor vay dipending on user augment. Observations and sentiment of the conference of the conferen	
								conducting of NATTIC constant. "Reported dissolitor stallings with self developed pathwayer to dispolitor parkethageous of NATTIC constant "Anadric for	AMERICAN STATE OF THE STATE OF	20 v dody flore			

### Stations

	Denmark	Estonia	Finland	Iceland	Latvia	Lithuania	Norway	Sweden	Greenland
NMA owned	27	29	112	32	30	35	283	481	67
Private owned	>150	~110	~250	(several stations for plate monitoring exists)	none	<20	<50	29	?

- Class A + B
- More private owned most likely exists

#### NRTK service & RTCM streams

	Denmark	Estonia	Finland	Iceland	Latvia	Lithuania	Norway	Sweden	Greenland
price	free (NRTK only from TAPAS)	free (only for government)	free (only for NLS, and R&D)	free	free	free	800-1200 €	~1050 €	free (no NRTK)
users		~200 (only for government)	~500 NLS <500 short- term external RTK	~350 registered	~2800	~2200	~4500 (Kartverket only)	~10 500 (SWEPOS onlv)	
RTCM streams	free for all	not sold	100 € / station / month	free	not sold		~200 € / station / month	~140 € / station/mon ht	free

Latvia 0,15 % of population!!!

Lithuania, Iceland, Sweden ~0,1 %

# RINEX – end user perspective

	Denmark	Estonia	Finland	Iceland	Latvia	Lithuania	Norway	Sweden	Greenland
generation	FTP (1s)	FTP, (0.5s, 30s)	RT stream, FTP (1s, 30s)	RT stream	RT stream	RT stream	RT stream	FTP (1s ,15s) RT stream	FTP (1s)
interface	SFTP (1s, 30s)	www	www	www	FTP, www	www, FTPS	FTP/SFTP, www (1s, 30s)	FTP/SFTP (1s, 30s)**	SFTP (1s, 30s)
availability	1 s = ∞ 30 s = ∞	1 s = 3 mos	1 s = 8 mos		1 s = 2 mos 30 s = ∞	1s,30s = 2 years	1s,30s = 3 mos	1 s = few mos * 30 s = ∞	
price	free	free	free	free	free	free	~700 €/year	1 s = 90 €/year	

Registration is needed for all!

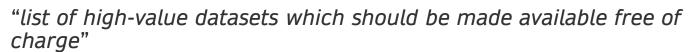
- EPN stations' data available via EPN data centres FTP/HTTP!
- Non-public FTP etc. might exist!
- \*plans to increase availability to full data length
- \*\*HTTPS server coming soon

### EU open data directive

#### DIRECTIVE (EU) 2019/1024 OF THE EUROPEAN PARLIAMENT

on open data and the re-use of **public** sector information

"Dynamic data must be made available for reuse immediately on collection via an application programming interface and, where relevant, as a bulk download"



→ geospatial and earth observation and environment included. But GNSS data not specified directly

"The reuse of documents should be free of charge. However, marginal costs incurred to reproduce and disseminate documents, anonymise personal data and protect commercially confidential information may be recovered."





#### RINEX in other EU countries

		Netherlands	Belgium	France	Spain	Portugal	Austria
ins	stitution	Kadaster	ROB	Institut national de l'information géographique et forestière	Instituto Geográfico Nacional	Direção-Geral do Território	BEV (Bundesamt für Eich- und Vermessungswes en)
in		HTTPS, FTP (1s, 30s)	HTTPS, FTP (30s)	FTP, www	HTTPS, www (30s)	FTP	HTTPS API (STAC), www
ava	ailability	1 s = ∞		1 s = ∞	1 s = few mos	5 s = ∞	1 s = 2 mos
avaita		30 s = ∞	30 s = ∞	30 s = ∞	30 s = ∞		30 s = 2 years
	price	free	free	free	free	free	free

No registration needed for almost all!

## Thoughts

- www interface for RINEX does not fulfil the EU open data directive? It is not an API!
  - 2 RTCM streams should be provided to anyone? Free or with a cost
  - (3) Do users want tailored RINEX file? Or only 1s/1h FTP/HTTP?
- 4 Comments?

# Thank you

