

### 5583.0 kHz Auckland Air, New Zealand

#### Cruise sector data downlink from aircraft CC-BGL (LATAM Airlines Boeing B787-9)

**12 hours SCEL - NZAA across the Southern Ocean without an alternate airport ... Note that all those famous flight tracking webpages such as Flightradar 24 have ZERO real-time data for the 10+ hours cruise sector of this flight; they simply visualize some great-circle extrapolation ... while it's all here on HF - updated every 15 minutes - if you know when and where to look! Now you can easily calculate the fuel consumption: 191357 - 191227 = 90 Minutes; 202231 - 194347 = 7884 kg corresponding to the rounded 43500 - 35500 = 8 tons; this makes around 5 tons per hour up there at FL 360 - FL 380 ... See our hotfrequencies webpage for the explanation of very special abbreviations, procedures and terms - particularly for avionics - and a primer on ATS Facilities Notification, codes of FIRs providing data link services - different from ICAO location indicators! -, and codes of ACARS and HFDL Message Labels • The Basic or Periodic Report gives position - trajectory intent - speed vector data plus the Figure of Merit code or data for navigational accuracy • TS = Time Stamp 19 APR 2022 1504 UTC**

## 2.9 Internet-controlled Software-Defined Radios (Web-SDR)

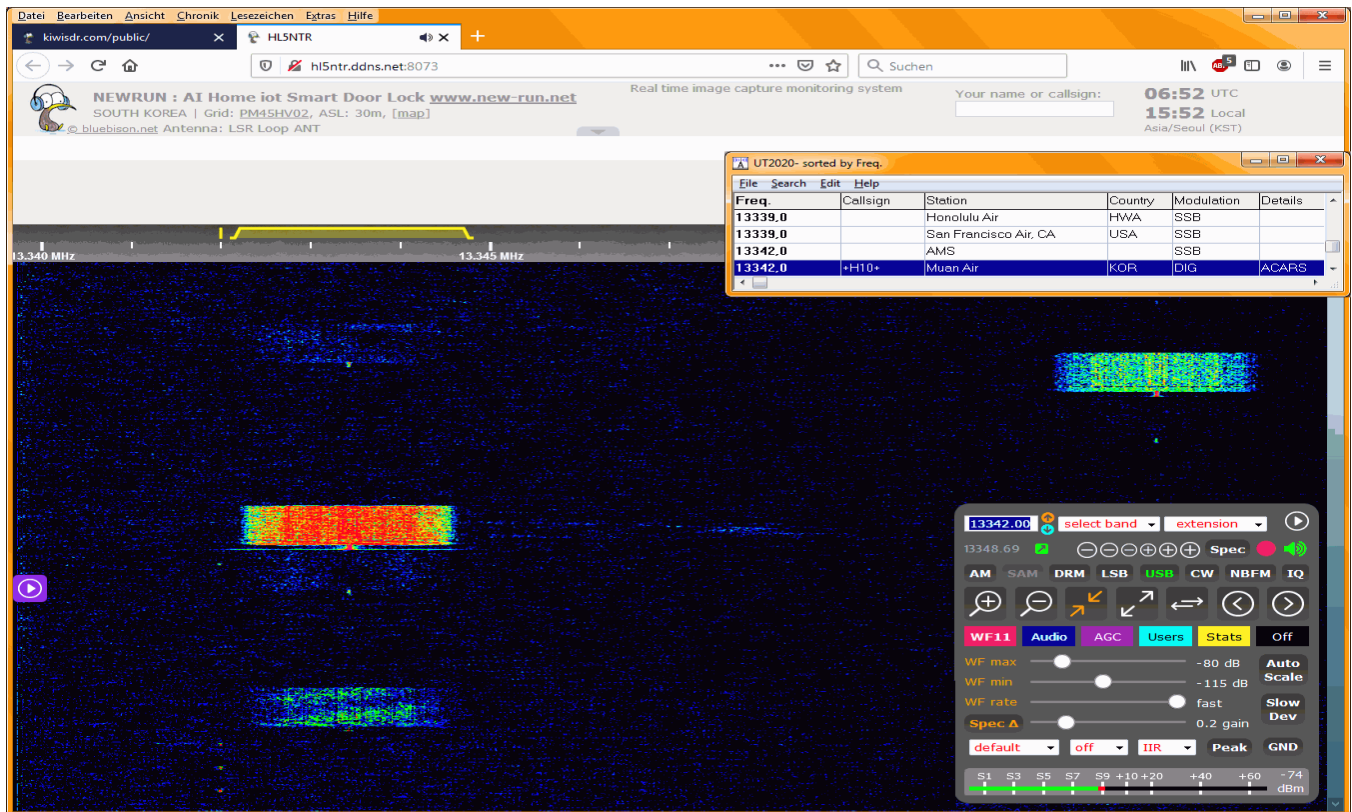
In urban areas all over the world, shortwave radio listeners experience an increasing level of man-made noise by around-the-corner and in-house digital techniques such as cheap electronic goods from China, powerline communication (PLC), plasma television screens, and so on. The radio spectrum is polluted, and that makes HF reception impossible in certain places. Constructing a state-of-the-art listening post far away in the "quiet" countryside, and controlling it via the Internet, is the optimal solution to this problem that has been successfully adapted by e.g. Christoph Ratzer OE2CRM in Austria. His Remote DX Blog at <https://remotedx.wordpress.com> reports incredible receptions from far-away and weak shortwave (and mediumwave!) broadcast radio stations all over the world.

Fortunately, there's a much less expensive solution. Currently (2024), **more than six hundred (!) Kiwi-SDRs worldwide covering the complete 0-30 MHz spectrum are linked at [www.kiwisdr.com](http://www.kiwisdr.com) and [www.ve3sun.com/KiwiSDR](http://www.ve3sun.com/KiwiSDR)**. This is the Open Web RX project of Andr s Retzler HA7ILM with the superb Kiwi-SDR user interface for the Beagle Bone computer board. It is simply great for the reception of HF utility radio stations, and even NAVTEX on MF, from interesting locations all over the world. What's more, many radio amateurs, radio clubs, researchers, and universities have made available their SDRs via Internet. Dozens of such projects are linked e.g. at [www.websdr.org](http://www.websdr.org). The frequency bands covered are usually certain amateur radio bands  $\pm$  a few kHz beyond. Consequently, the antennas used are optimized for these bands, and their performance decreases sharply for frequencies beyond. Anyway, a good starting point is the University of Twente's Web-SDR in the Netherlands that covers the entire MF and HF band from 0 to 29 MHz.

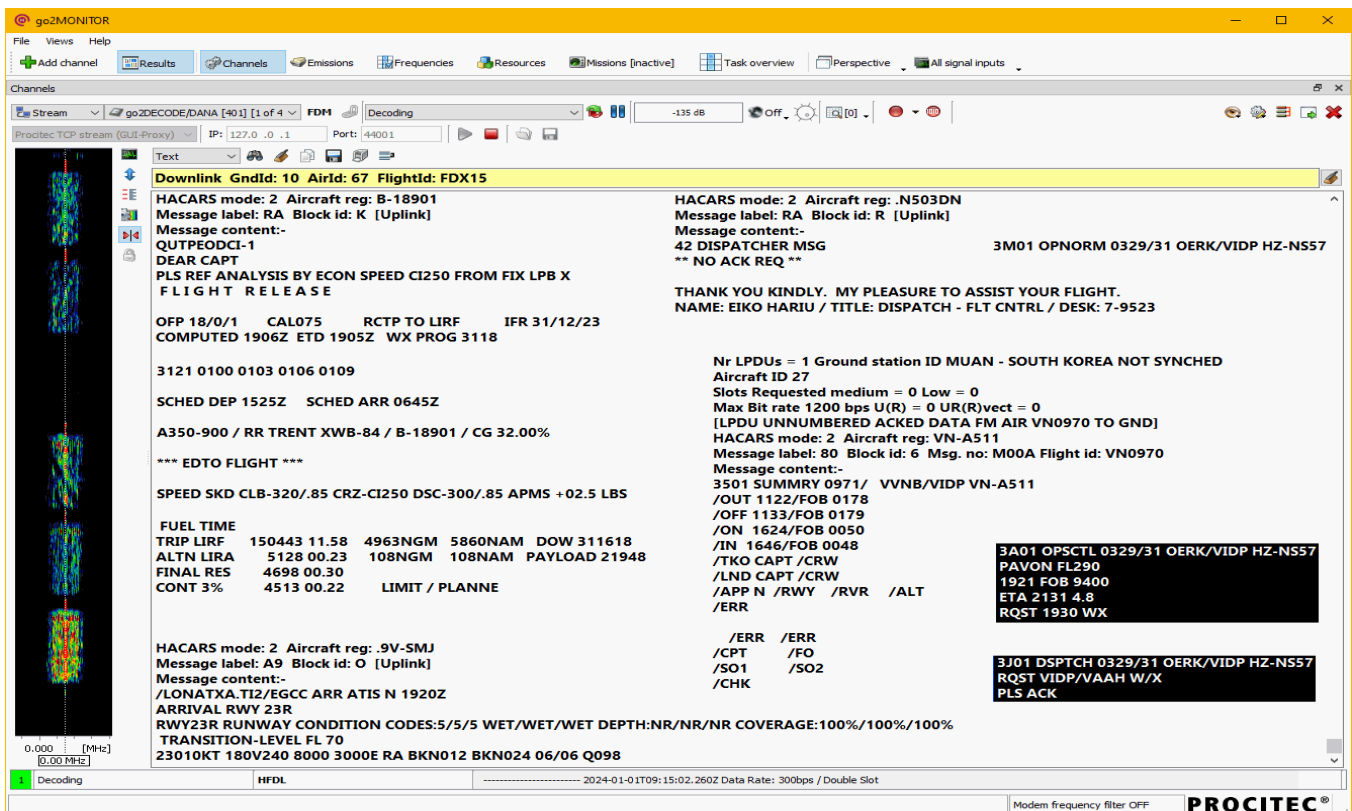
The screenshot displays the go2MONITOR software interface. The main window shows a decoded message from PACTOR I FEC, dated 11/MAR/2024A 1200Z. The message contains weather analysis and forecasts for various locations, including AREA BRAVO (FM LAGUNA TO ARRAIAL DO CABO), AREA DELTA (FM ARRAIAL DO CABO TO CARAVELAS), AREA ECHO (FM CARAVELAS TO SALVADOR), AREA FOXTROT (FM SALVADOR TO NATAL), AREA GOLF (FM NATAL TO SAO LUIS), AREA HOTEL (FM SAO LUIS TO OIAPOQUE), and AREA BRAVO (FM LAGUNA TO ARRAIAL DO CABO). The interface also features a frequency list table with columns for Frequency, Bandwidth, Name, Mode, Modulation, Modem, Country, Callsign, Groups, Edited by, and Remark.

Frequency	Bandwidth	Name	Mode	Modulation	Modem	Country	Callsign	Groups	Edited by	Remark
12.7045 MHz	1.000 kHz	Kagoshima F.R.	USB	CW	STANAG 4285	JAP	JFX	KLINGENFUSS UT DATABASE 2024	IMPORT	
12.7052 MHz	3.000 kHz	NATO Lisbon	USB	DIG		POR	CTA	KLINGENFUSS UT DATABASE 2024	IMPORT	
12.7110 MHz	3.000 kHz	BN Rio de Janeiro	USB	DIG	PACTOR I FEC	BRA	PWZ	KLINGENFUSS UT DATABASE 2024	IMPORT	

**go2SIGNALS' superb DANA allows direct input of a Kiwi-SDR signal (here ex PT2FHC) into the go2MONITOR decoder • Up to 32 decoding channels are provided!**  
**A specially formatted sample Klingenfuss frequency database is perfectly integrated in the go2MONITOR GUI • 12711.0 kHz Brazilian Navy Rio de Janeiro, Brazil**

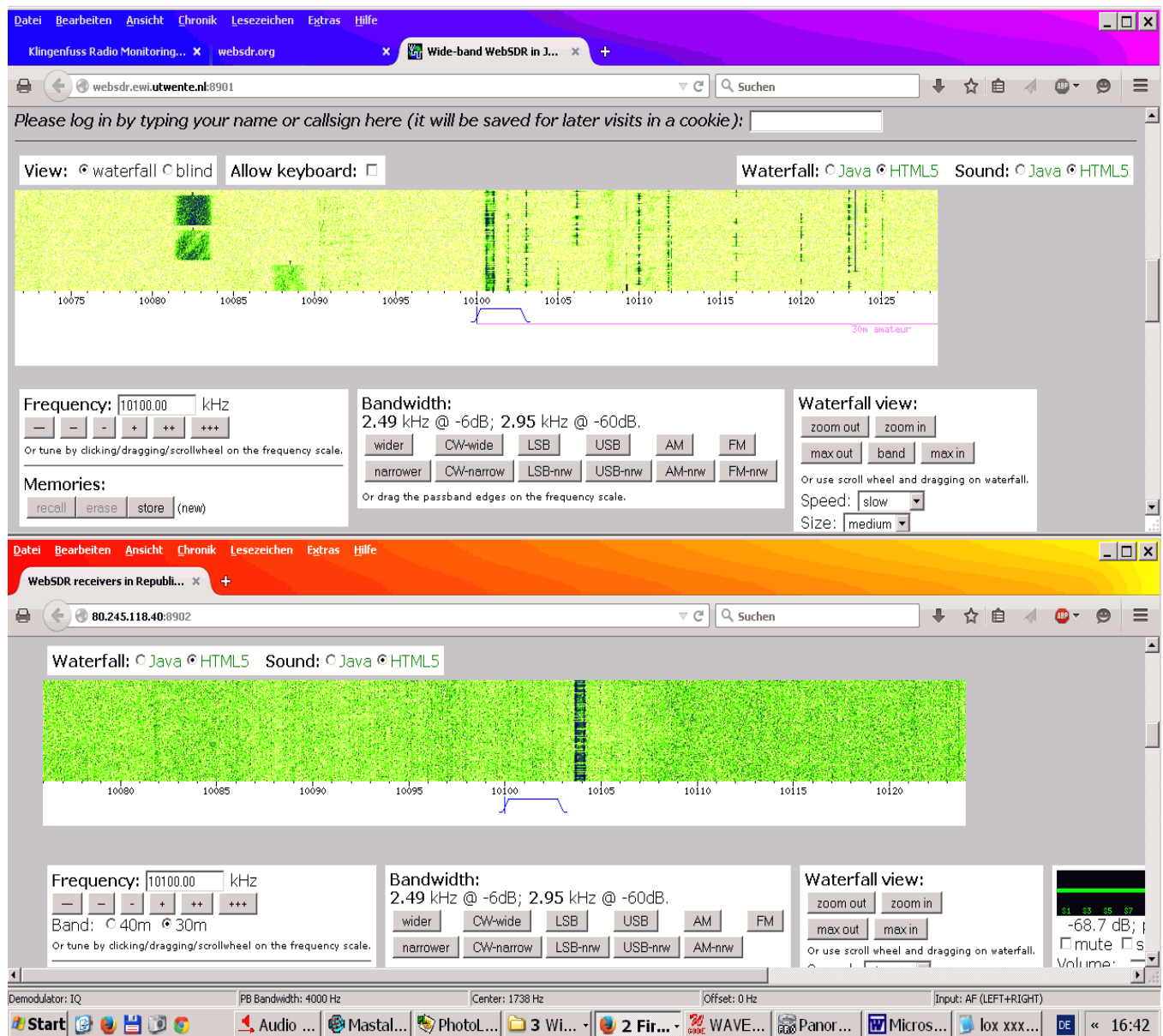


Kiwi-SDR in Daegu, South Korea (left: Muan 13342.0 kHz - right: Auckland 13351.0 kHz)  
Perfect HFDL PSK-aggregate data bursts - note the pilot tone at 1440 Hz!



Perfect decoding of the Kiwi-SDR's signal above  
10060.0 kHz Muan Air, South Korea





## Web-SDRs Twente, Netherlands, and Crimea, Russian Federation

This screenshot - made 7 March 2015 at 1642 UTC - shows the difference between a professional project like Twente, above, and an amateur project elsewhere, below. The strong FSK signal in the centre of the spectrum is Hamburg Meteo on 10100.8 kHz. On the right is the amateur radio band with many digital signals. On the left is the aeronautical mobile band with HF DL aggregate bursts at 10081 kHz USB (Shannon), and 10087 kHz USB (Krasnoyarsk). On the other hand, Crimea is as deaf as a dodo: it receives just Hamburg and nothing else, neither in the amateur band nor in the aeronautical band where Krasnoyarsk would be just one propagation hop away ... What's more, the frequency displayed is 3 kHz too high!

Twente is often accessed by 400+ users at the same time. It allows perfect decoding of sophisticated digital data signals, even if your Internet connection delivers only a real-life data rate of 400-500 kB/s. A chatbox allows a discussion of the project, and comments on the stations received. At <http://websdr.ewi.utwente.nl:8901/m.html>, there is a Web-SDR version for mobile devices such as smartphones and tablet computers. Be sure to use the latest versions of modern browsers such as Chrome, and select HTML5 instead of Java.

**ftdigi ver4.1.00 - WWW.KLINGENFUSS.ORG**

**150953 LT APR 2024**  
**HAIPHONG RADIO HPNAV1684**

**CANH BAO HANH HAI**  
**VUNG BIEN - NAM DINH**  
**TEN LUONG: HAI THINH**

**THIET LAP KHU VUC THI CONG VA PHUONG TIEN THI CONG CONG TRINH**  
**NAO VET DUY TU LUONG HANG HAI HAI THINH NAM 2023 NHU SAU:**  
 1. KHU VUC THI CONG NAO VET  
 - KHU VUC NAO VET LUONG HANG HAI HAI THINH: DOAN LUONG TU CAP PHAO SO 1, 2 DEN CAP PHAO SO 9, 10.  
 - KHU VUC HO CHUA TAM, LUONG TAM, NAM BEN TRAI LUONG HANG HAI HAI THINH, CACH PHAO SO 8 VE PHIA HA LUU KHOANG 220M, DUOC GIOI HAN BOI CAC DIEM DAC TRUNG CO TOA DO NHU SAU:  
 DIEM C :  
 VN-2000: 20-00.33N 106-11.68E  
 WGS-84: 20-00.27N 106-11.79E  
 DIEM D :  
 VN-2000: 20-00.36N 106-11.65E  
 WGS-84: 20-00.30N 106-11.77E  
 DIEM E :  
 VN-2000: 20-00.36N QYAAQMUJEE  
 WGS-84: 20-00.30N 106-11.84E  
 DIEM F :  
 VN-2000: 20-00.40N 106-11.70E  
 WGS-84: 20-00.34N 106-11.81E  
 - KHU VUC CHUA CHAT NAO VET: KHU DAT PHIA NAM CUA CUM CONG TRINH LUONG QUA CUA SONG NINH CO.  
 2. CAC PHUONG TIEN THI CONG  
 1- TEN PHUONG TIEN: LONG HAI 38  
 SO DANG KY: NB-8429  
 CHUNG LOAI: SA LAN DAT CAU  
 2- TEN PHUONG TIEN: LONG HAI 27  
 SO DANG KY: NB-8788  
 CHUNG LOAI: SA LAN VAN CHUYEN CHAT NAO VET  
 3- TEN PHUONG TIEN: NAM HAI 2  
 SO DANG KY: NB-9889  
 CHUNG LOAI: TAU HUT PHUN  
 3. **THOI GIAN THI CONG: TCMNGAY 15/2024.**  
 CACKMHUONG TIEN THIY HOAT DONG TREM LUONG HANG HAI HAI THINH LUUVY  
 BAN IN DO TONG CONG TYVOAO DAM AN TOAN HANG NAI MIEN BAC CUN CAP.  
 NNNN

**The 2024 Super Frequency List**

Databases | Text files | Additional text files and screenshots | About

OldFreq Formerly active frequencies  
 UT2024 Utility stations 2024  
 BC2024 Broadcast stations 2024

**UT2024- sorted by Freq.**

Freq.	Call sign	Station	Country	Modulation	Details
4209.5	worldwide	NBDPT NAVTEX frequency		DIG	
4209.5	LGS	Svalbard R, Spitsbergen	NOR	DIG	SITOR
4209.5	L2C	ACG Buenos Aires	ARG	DIG	SITOR
4209.5	NRV	USCG Apra Harbour	GUM	DIG	SITOR
4209.5	SUZ	Serapeum R	EGY	DIG	SITOR
4209.5	SVH	Iraklion R	GRC	DIG	SITOR
4209.5	TAH	Istanbul R	TUR	CW/DIG	SITOR
4209.5	XSG	Shanghai R	CHN	DIG	SITOR
4209.5	XSQ	Guangzhou R	CHN	DIG	SITOR
4209.5	XSV	Tianjin R	CHN	DIG	SITOR
4209.5	XVG	Hai Phong R	VN	DIG	SITOR

**3- TEN PHUONG TIEN: NAM HAI 2**  
**SO DANG KY: NB-9889**  
**CHUNG LOAI: TAU HUT PHUN**  
**3. THOI GIAN THI CONG: TCMNGAY 15/2024.**  
**CACKMHUONG TIEN THIY HOAT DONG TREM LUONG HANG HAI HAI THINH LUUVY**  
**BAN IN DO TONG CONG TYVOAO DAM AN TOAN HANG NAI MIEN BAC CUN CAP.**  
**NNNN**

**4209.5 kHz Hai Phong Radio, Viet Nam**

## Kiwi-SDR Hanoi, Viet Nam 4209.5 kHz Hai Phong Radio, Viet Nam

**go2MONITOR**

File Views Help  
 Add channel Results Channels Emissions Frequencies Resources Missions [inactive] Mission channels Perspective All signal inputs

**Channels**

Stream go2DECODE/DANA [1 of] FDM Decoding -135 dB Off [Q] [0]

Proctec TCP stream IP: 127.0.0.1 Port: 49001

**Download GndId: 01 Aird: 255 FlightId: VIV104**

**- WTL TX01 16JUL/1609 C-FGDX/836/AC0301**  
**//**  
**CYVR/YVR 08L RWY COND: 5-GOOD**

**INPUTS - RUNWAY AND ATMOSPHERE:**  
 LDA 9219 WIND 073/06  
 ELEV 13 HW/XW 5/1  
 OAT 17 QNH

**30.07**  
**INPUTS - TECHNICAL:**  
 MEL NO REVERSERS NO  
 CONST NO NON-NORMAL NO  
 WEIGHT 176.0 VREF ADD 5

**OUTPUT:**  
 LDG WT 176.0  
 REV NO RECOMMENDED BRAKE  
 CO

**OLING TIME:**  
 FLAP 25: OPLD TPL GROUND  
 MAX MAN BRK 6506 4000 67  
 AUTO BRK 1 \*11037 -- 47  
 AUTO BRK 2 \*9405 -- 56  
 AUTO BRK 3 8416 2572 61  
 AUTO BRK 4 7341 3647 65  
 AUTO MAX

**6614 4000 68**  
**VREF25+5:155KT**

**6953 3978 59**  
**AUTO MAX 6251 4000 62**  
**VREF30+5:150KT**

**STD MA CLB WAT: NON-STD MA CLB GRAD:**  
 FLAP KG/1000 FLAP FT/NM PERC  
 25 256.4 25 419 6.9  
 30 255.2 30 419

**MESSAGES:**  
 NO  
 END

**75 AT 00:55Z AND 17:55LCL**  
**FLIGHT AC0279 DEPARTS TO YXY FROM GATE C46 AT 04:00Z AND 21:00LCL**

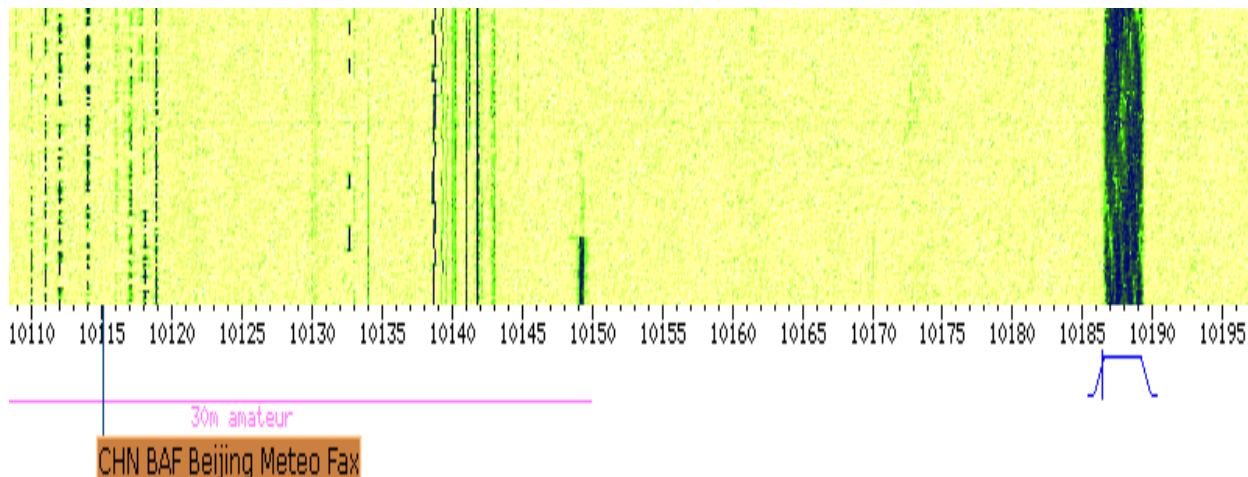
**--- PART 2 OF 2 ---**

**HACARS mode: 2 Aircraft reg: JA877A**  
**Message label: RA Block id: J [Uplink]**  
**Message content:-**  
**NOTE4 DUE TO HVY TRAFFIC AND RAMP**  
**STAFF SHORTAGE AT APO UPON ARR,**  
**MARSHALLER MAY NOT BE AVAIL WHEN**  
**B/L IN THAT CASE, PLS STBY B/L.**

**Decoding HFDL Downlink GndId: 01 Aird: 255 FlightId: VIV104**  
 Modem frequency filter OFF **PROCITEC®**

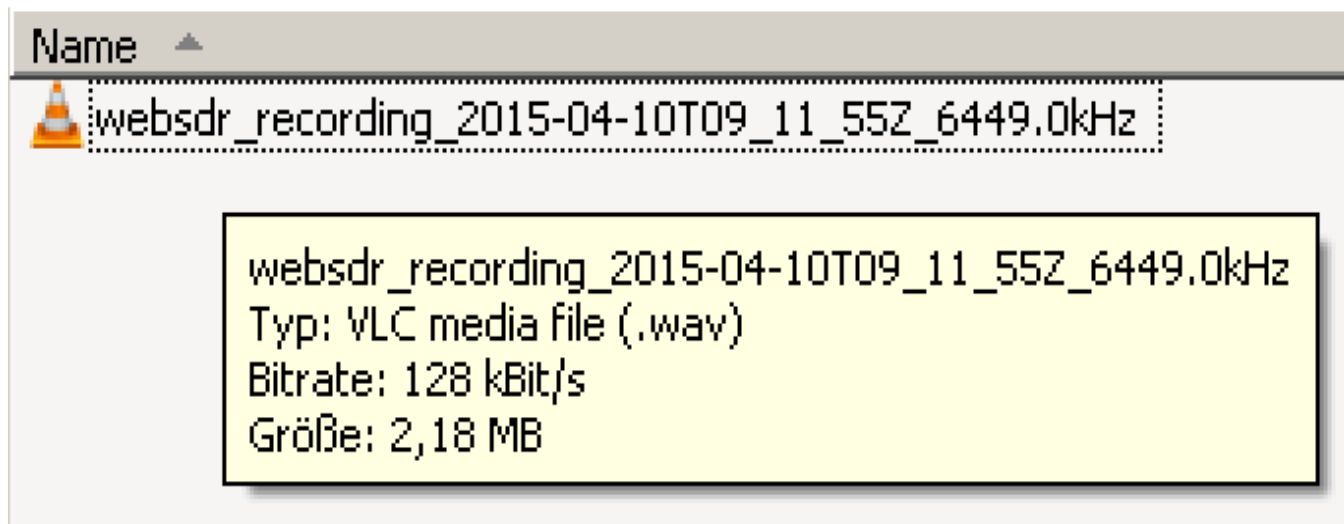
**Kiwi-SDR Keelung, Taiwan, Democratic Republic of China**  
**6559.0 kHz San Francisco Air CA, United States of America**  
**Vancouver runway 08L landing data and transfer flight connections uplink**  
**to aircraft C-FGDX (Air Canada Boeing B787-9)**  
**Tokyo-Narita ramp chaos uplink to aircraft JA877A (All Nippon Airways Boeing B787-9)**

Just for the record ... the "Station information" from certain databases displayed in some Web-SDR's "Frequency labels" is totally outdated and misleading. It includes hundreds and thousands of users that ceased transmissions on HF several decades ago. What's more, most radio amateurs simply do not know even the most common professional digital data modes, stations, and frequencies ...



**"CHN BAF Beijing Meteo Fax" on 10117 (not 10115!) kHz closed way back in 2002 ...  
while real-time data such as the strong FUG PSK aggregate on 10187.9 kHz  
is listed only in up-to-date publications such as our  
GUIDE TO UTILITY RADIO STATIONS - Professional HF Communication Today  
and on our SUPER FREQUENCY LIST ON CD!**

For standard digital data transmission systems, the required data rates on your e.g. SDR ↔ PC ↔ Internet ↔ WebSDR connection are not too demanding. Example: Recording WAV files from a Web-SDR. With the channel bandwidth set to around 3 kHz for e.g. PACTOR-FEC, the data amounts to approximately 930 kB/min or 16 kB/s. This means that even complex PSK aggregate signals such as STANAG 4285 - let alone 10-kHz-wide DRM! - do require just a few dozen kB/s which is easily achieved with even those "slow" DSL connections somewhere in the countryside.

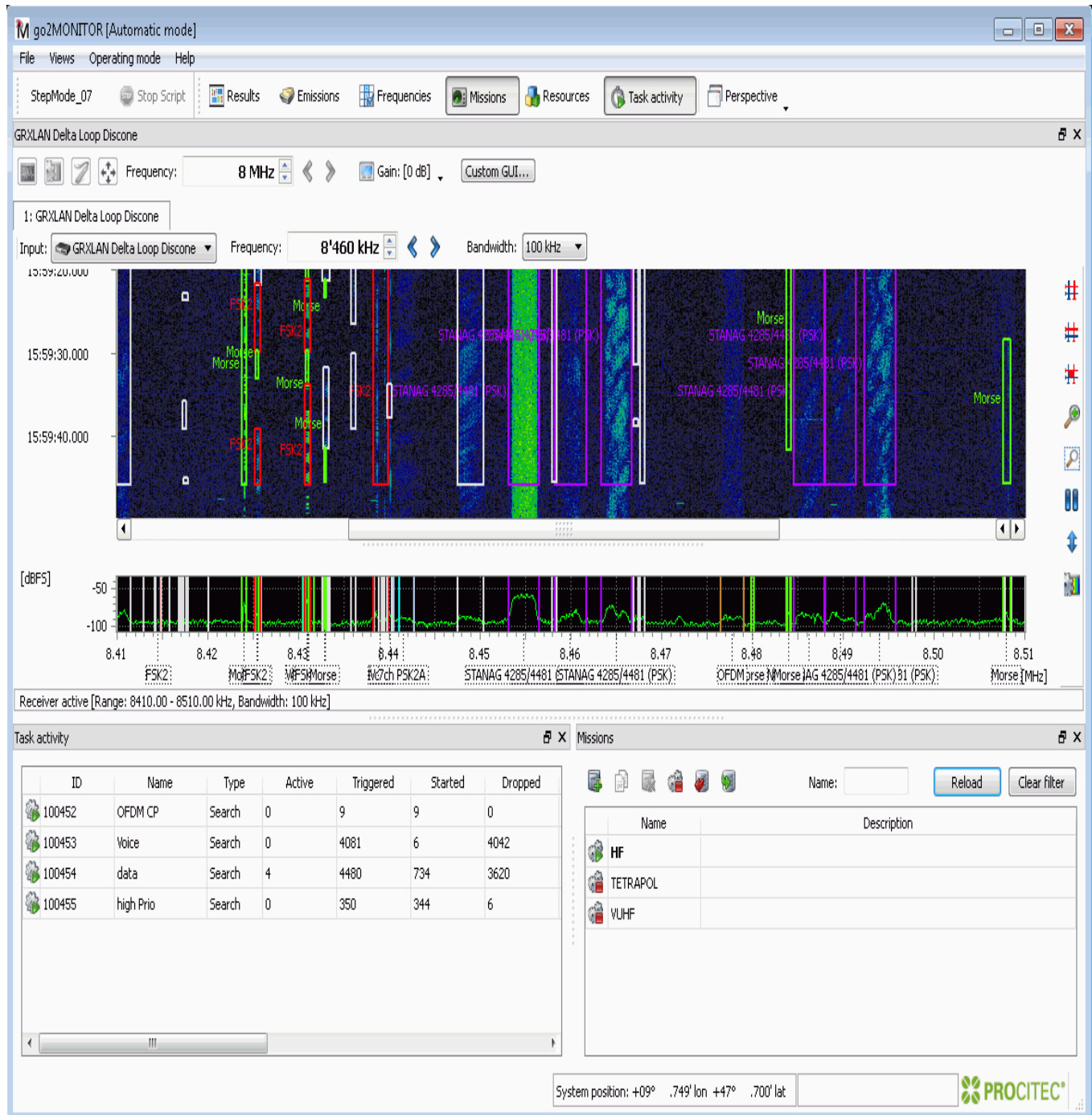


**2:23 minutes Web-SDR recording Brazil ↔ Germany**



## 2.10 Automatic monitoring using wide-band SDRs

State-of-the-art radio monitoring tools now allow continuous automatic classification of emissions monitored over a wide frequency spectrum.



**PROCITEC go2MONITOR displays a 100 kHz wide sonagram between 8410 and 8510 kHz and continuously classifies all emissions in realtime**

**All those fascinating digital data signals visible here in the sonagram are perfectly identified and listed in our latest publications!**

**PACTOR-2-FEC scan**
✕

**Summary**  
Task overview

**General**  
**Type:** Wideband Signal Search with Live Processing  
  
**Name:** PACTOR-2-FEC scan  
  
**Description:**  
  
**Priority:** Normal  
  
**Enabled:** Yes

**Activation**  
**Time:**  
No activation criteria  
  
**Region:**  
0 regions defined  
  
**Signal Input:**  
Receiver, Stream or File Input  
  
**Frequencies:**  
1 frequencies defined  
☒ FrequencyRange\_1, 4.0000 MHz - 25.0000 MHz, Search

**Start Trigger**  
**Modem:**  
PACTOR II FEC  
**Modem trigger type:** Trigger if not excluded  
  
**Energy:**  
snr: >10  
Bandwidth from: 0  
Bandwidth to: 5000  
  
Triggering from wideband classifier emissions

**Actions**  
**Live processing:**  
  
Narrowband channel configuration: default  
Signal processing duration: 30 s  
Use modem list from trigger: Yes  
Using channel type: All channels  
Allow fast triggering from classification results

**Settings**

General

Result Storage

☒ Delete results automatically  
  
Delete non-archived results after: 120 days  
Delete archived results after: 120 days

Mission Details

Name: PACTOR-2-FEC scan  
Use production channels in: Realtime mode  
Use GUI perspective: JK

Tasks

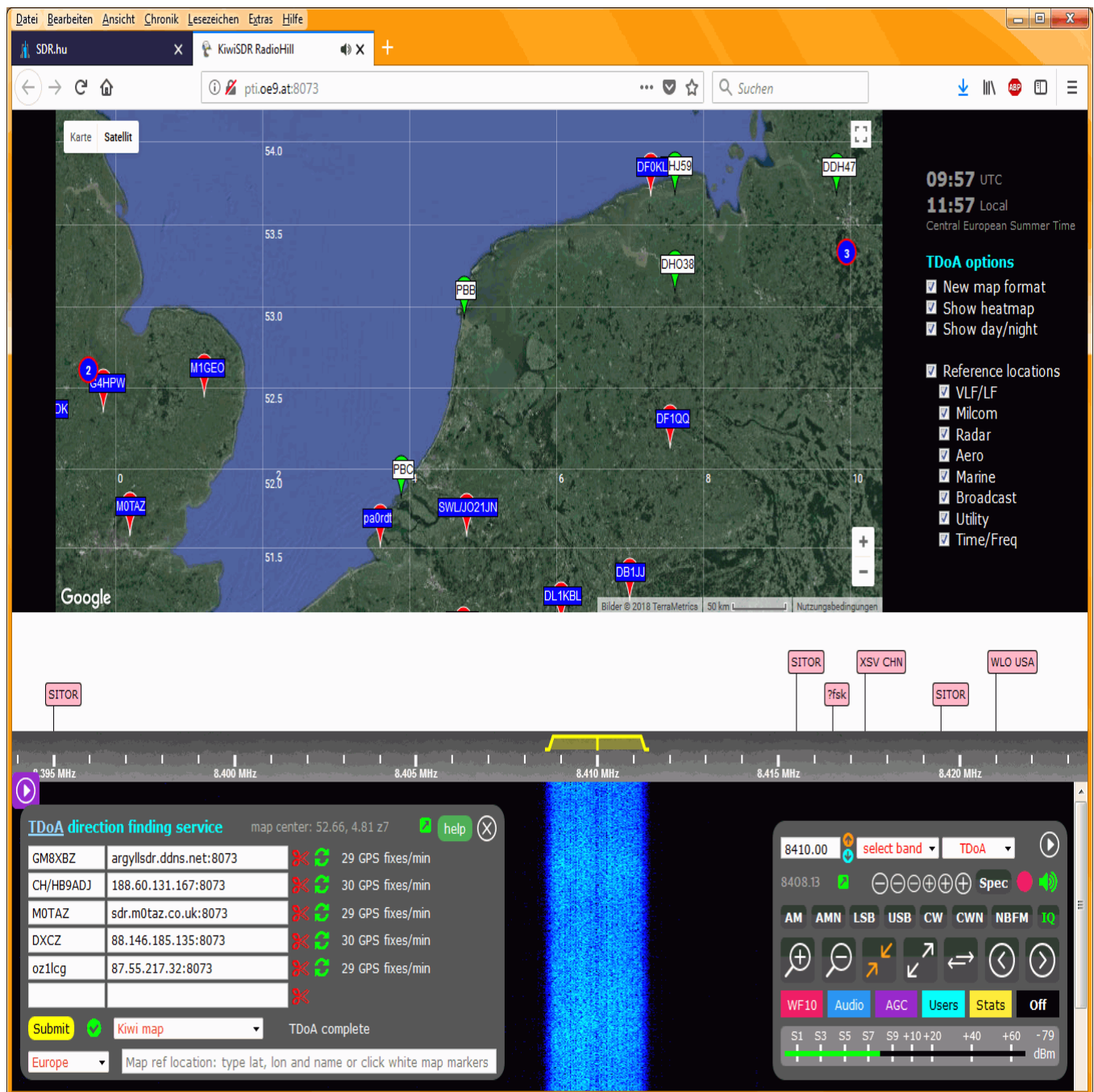
Name JK  
PACTOR-2-FEC scan Enabled

**Mission activation and task definition with the go2MONITOR decoder allows specified search for e.g. strange PACTOR-2-FEC signals monitored only recently in certain maritime bands**



## 2.11 Direction-finding using the Kiwi-SDR system

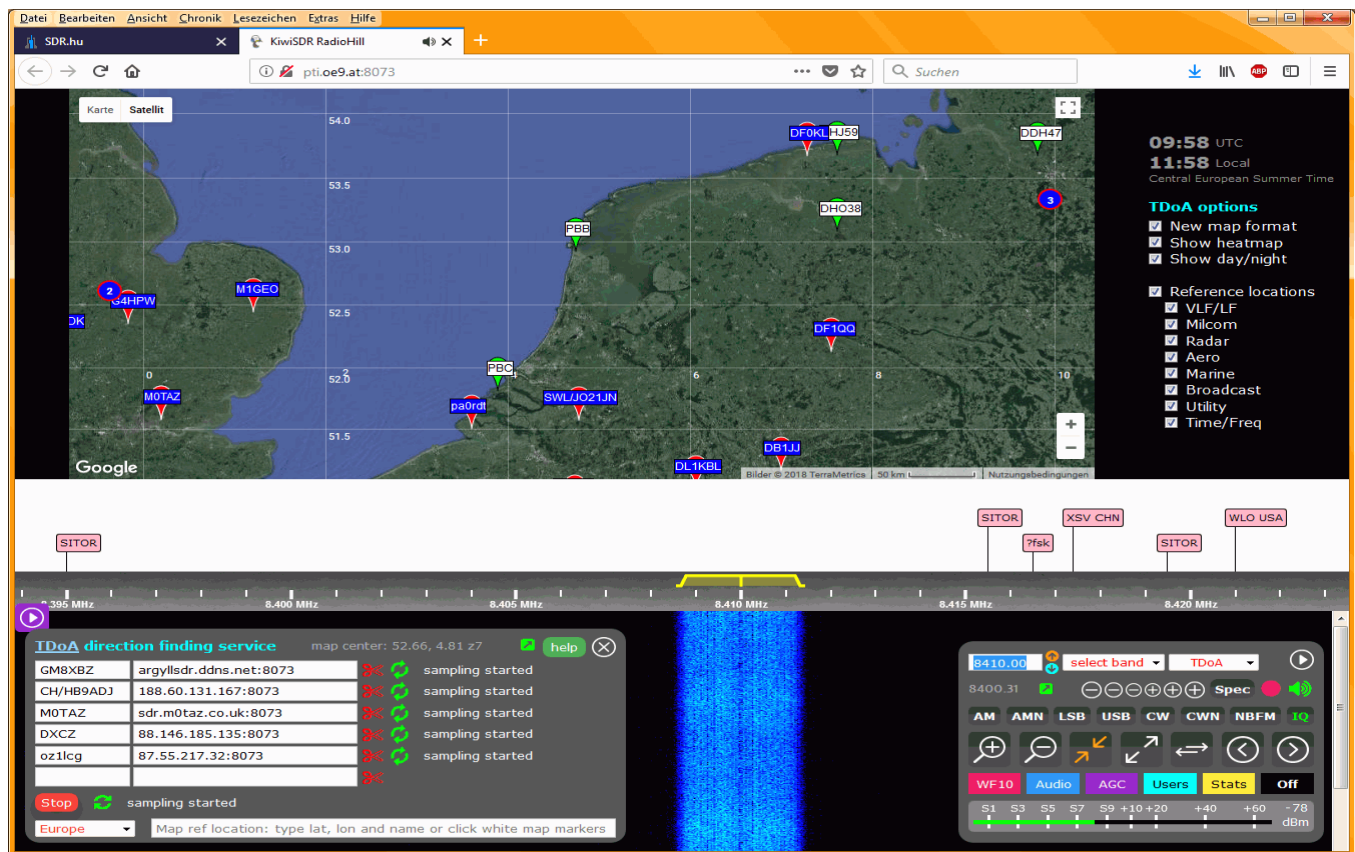
The location of unidentified radio stations can now be measured with a precision of up to 5 - 10 kilometres. This Kiwi-SDR software feature is called Time Difference on Arrival (TDOA). Similar to the established GPS system, it measures the time-difference of signals received from at least three radio stations and, via cross correlation, calculates the geographical location on the Earth's surface by simple triangulation. (Note that GPS requires at least four satellites for calculating the altitude as well.) The following screenshots demonstrate the complete workflow.



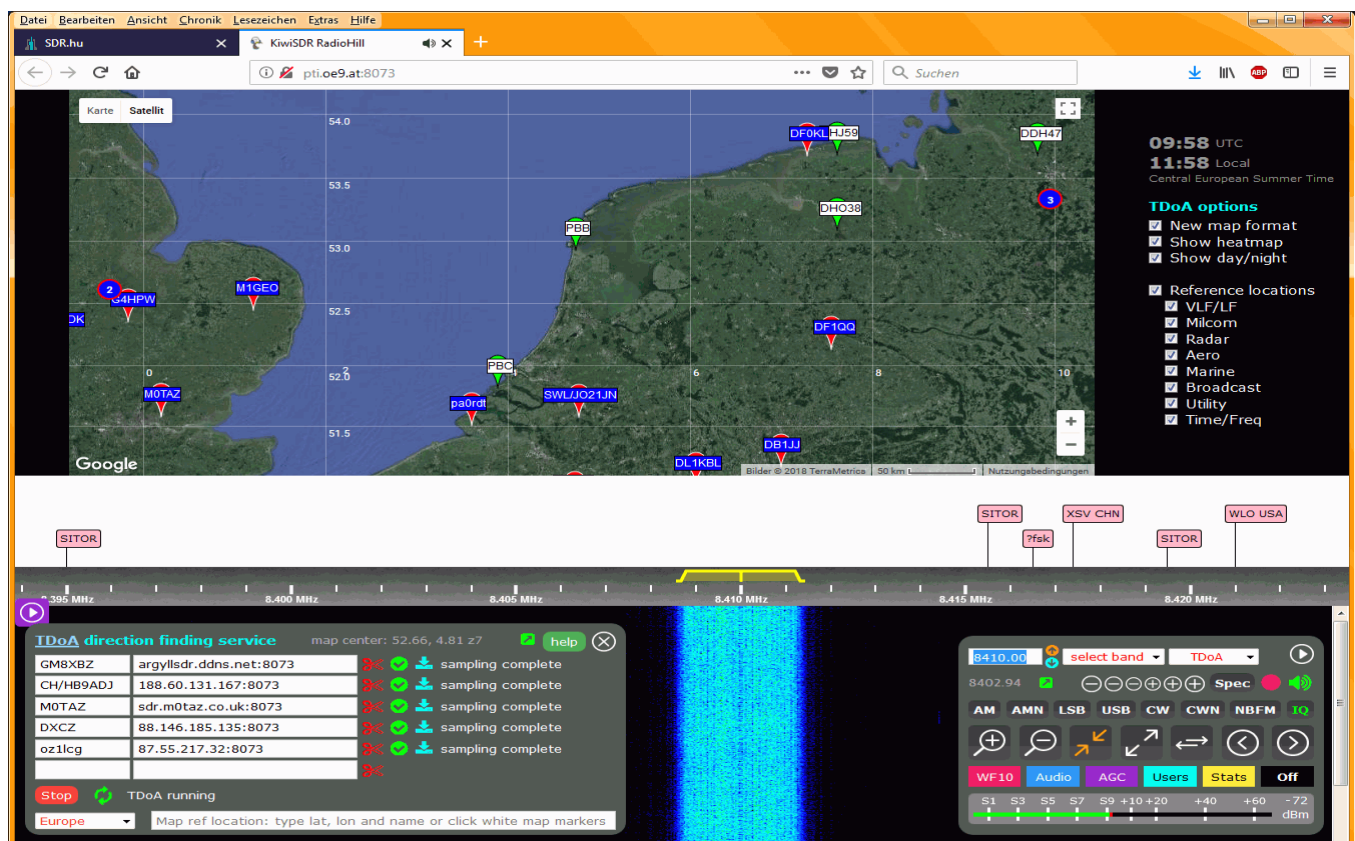
**Select In-Phase-and-Quadrature (I/Q) demodulation**

**Select at least three GPS-locked Kiwi-SDRs around the presumed location**

**Each of these must provide good reception of the desired signal!**

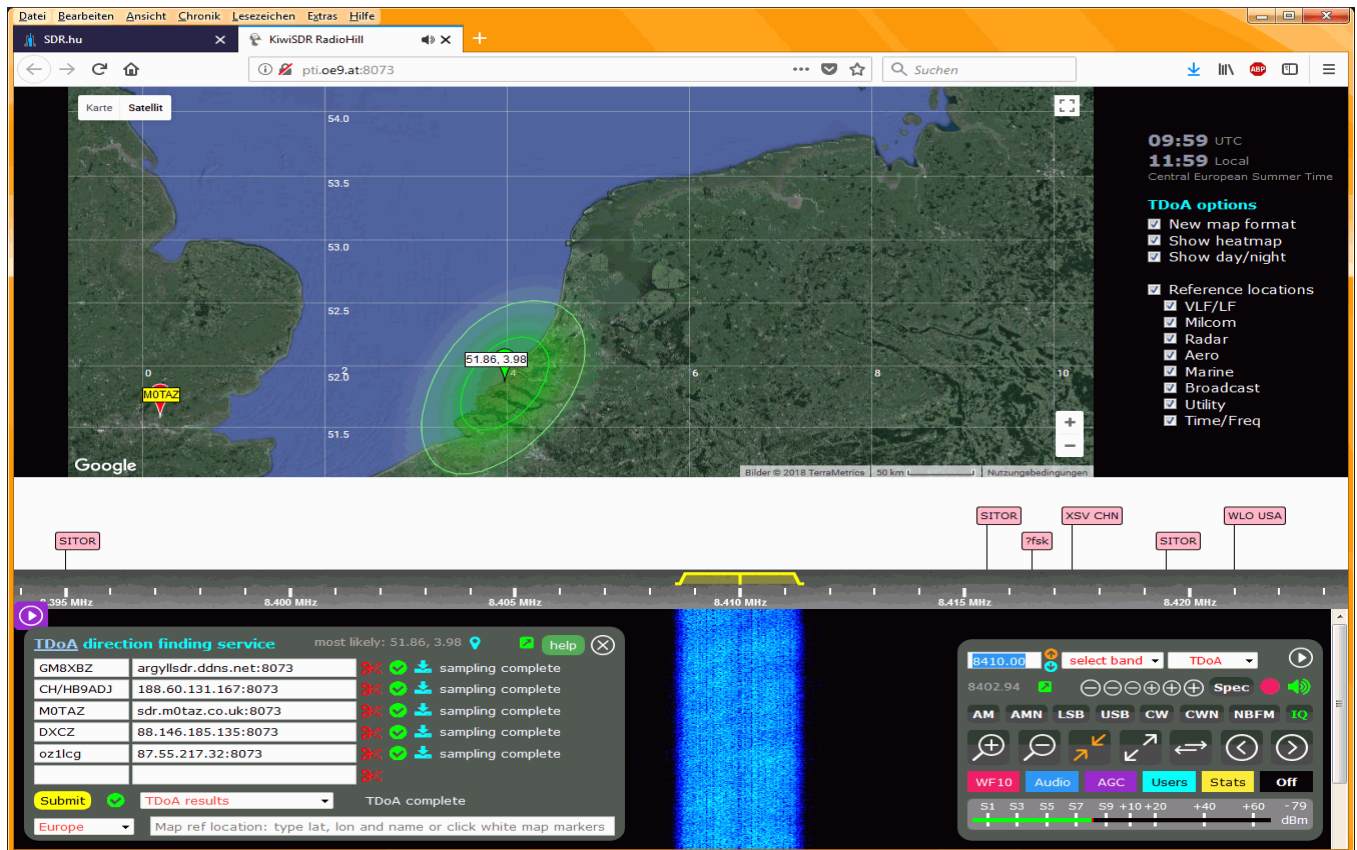


The I/Q data stream sampling process takes around 30 seconds ...

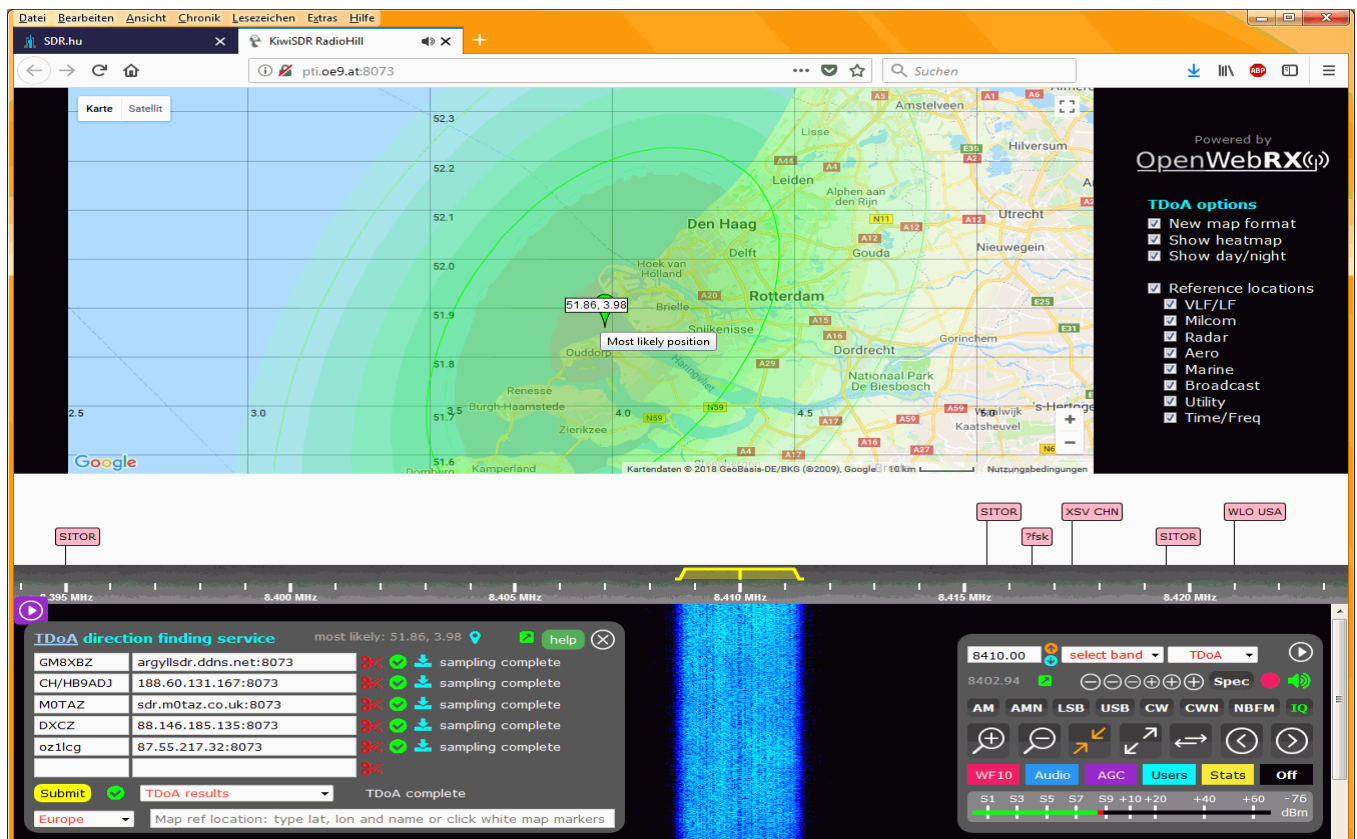


The TDOA calculation process takes 1-2 minutes ...

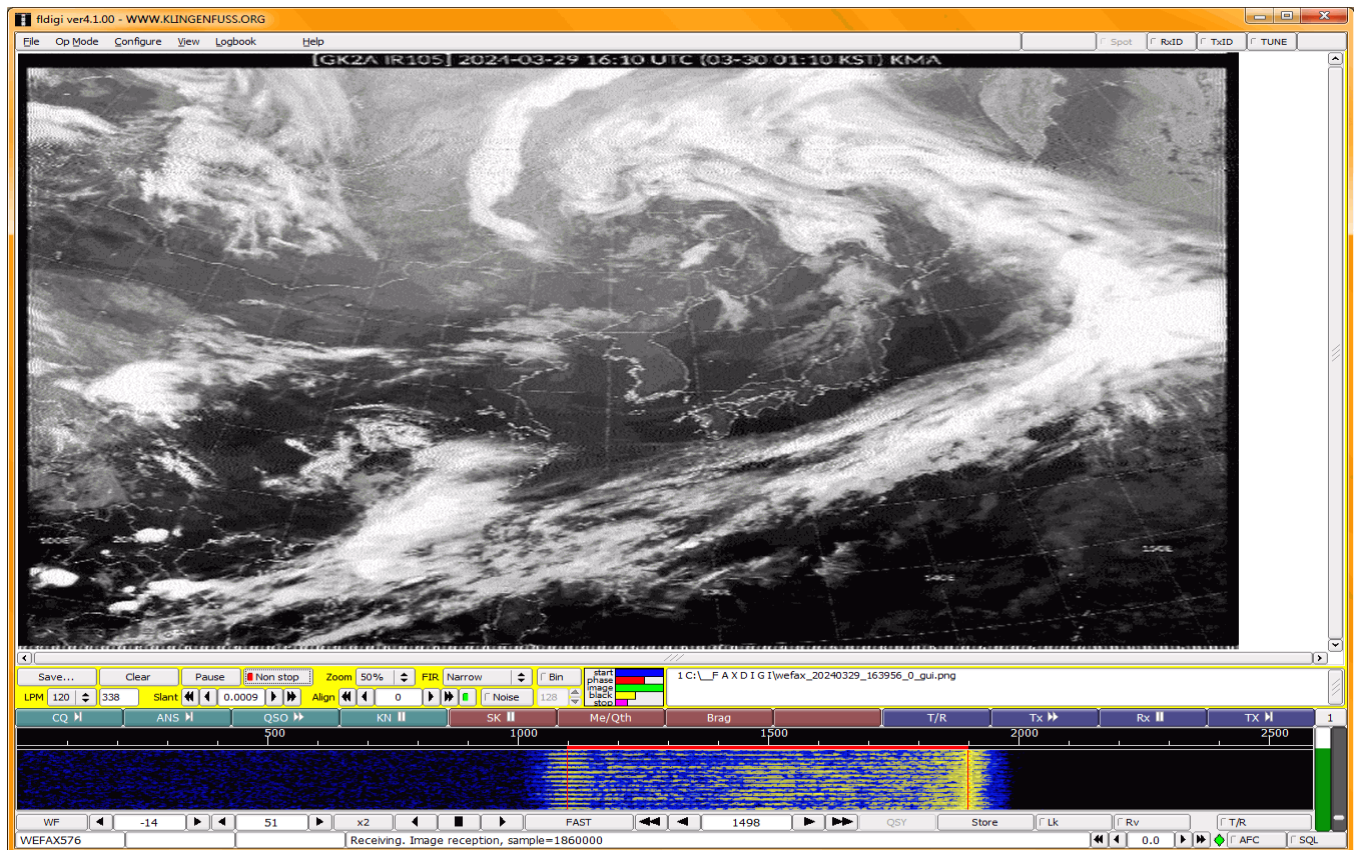




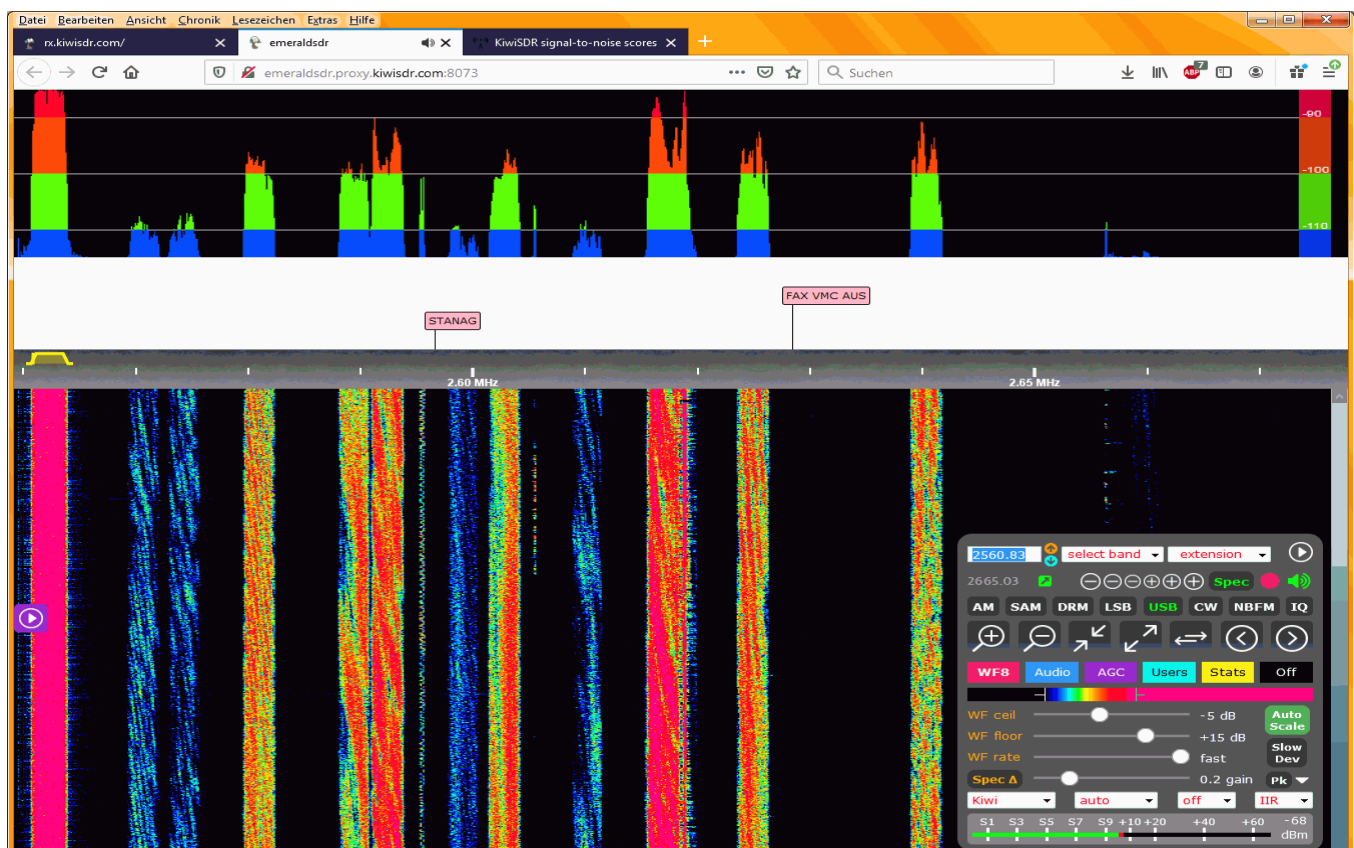
The possible location is shown on the map ...



... and identified as the Dutch Navy on Goeree Island, Netherlands!



9165.0 kHz Soul Meteo, South Korea • Satellite image



2615 ± 50 kHz • many STANAG 4285 signals on a Kiwi-SDR ☺