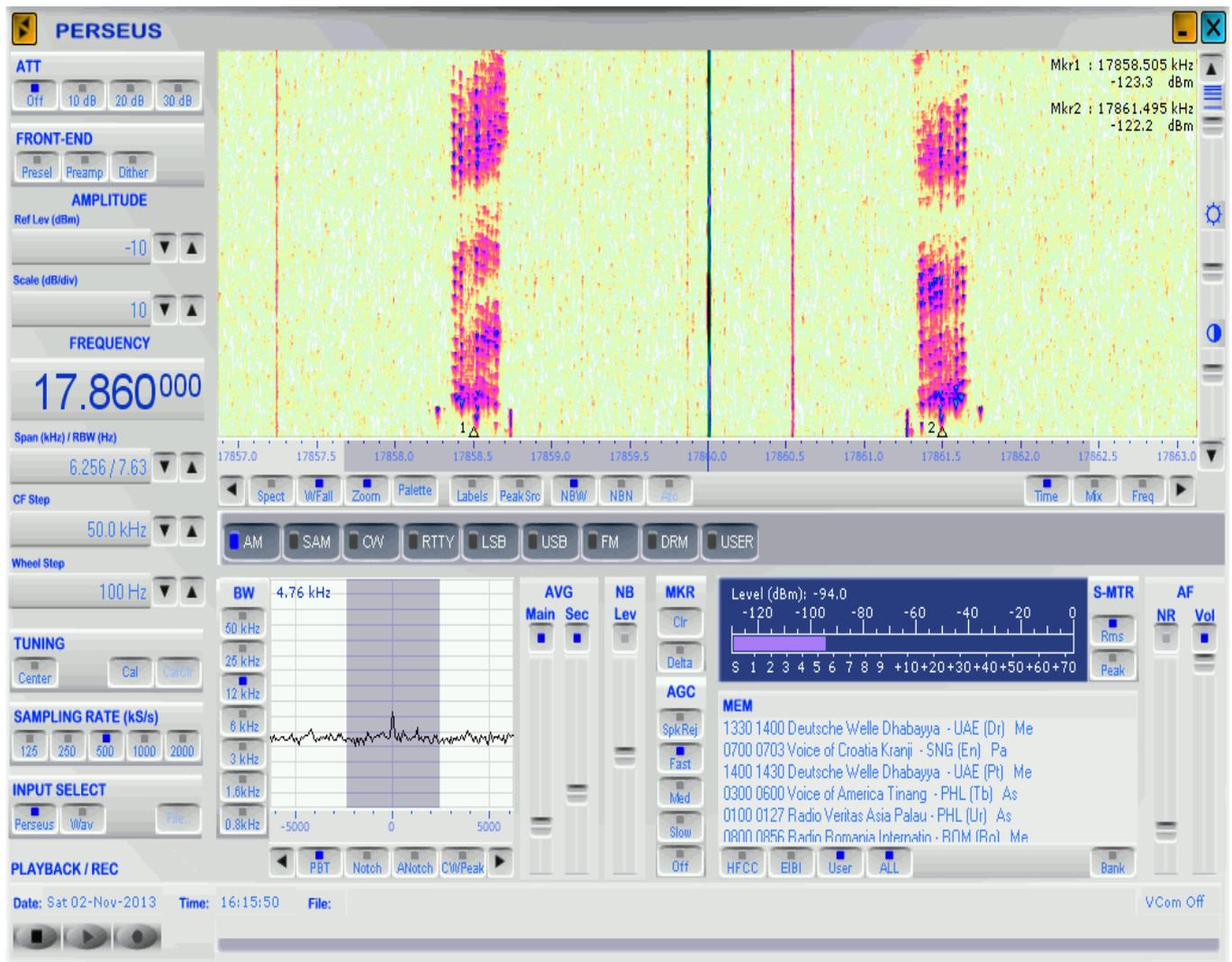


### 4.3 The future

To cut a long story short, broadcasting on shortwave will continue its sloooooooooow but steady decline - while very interesting **professional digital utility station radionets are on the rise!** Surely, we will not experience a rapid collapse, but we'll continue to lose around 5 % of active broadcast frequencies year after year. That said, even if you would opt for a 4 % decrease, it will take more than 12 years to arrive at halving broadcasters' activity. Note that currently, **260+ broadcast stations are still active on shortwave!** What's more, we're in 2024 and "DXers" rapidly become extinct. We've foreseen this development already 27 years ago. From its very start way back in 1997, the book in hand has never been written for "DXers", but for global travellers, ordinary shortwave listeners, technically interested people, and the like.



**State-of-the-art digital data signals have been tested since 2013 by innovative broadcast (!) stations such as the Voice of America ...**

**This screenshot shows parallel MFSK emissions on 17858.5 and 17861.5 kHz, i.e. on both sidebands  $\pm 1500$  Hz from the carrier frequency 17860.0 kHz**

**The MEM window of the PERSEUS shows our unique *userlist.txt* Frequency Database with both broadcast and utility radio stations combined - see page 329!**

The lengthy debate on the issue of planning of HF broadcasting has now lasted for more than 30 years. Unlike existing global radio handbooks that are actually written for the radio *industry* and for the broadcast *stations*, the book in hand is written for the shortwave *listener* and we can tell our opinion regardless of any dependences and conditions that arise e.g. from advertising contracts accepted by traditional publications: we have to bear the entire production costs ourselves - here in high-cost Germany!

From the view of independent experts in the broadcast field, there are two major factors that make planning in this area so difficult: the lack of sufficient frequency spectrum for HF broadcasting; and the variability of the ionosphere which they consider the most difficult transmission medium with almost unpredictable transmission characteristics. From our own point of view, we would like to add the crucial point: **the incompetence of many so-called experts in this field to realize that HF is a limited physical medium** that will not submit to the absurd and unrealistic demands by bureaucrats, politicians, and religious zealots for extensive frequency spectrum allocations for pure agitation and propaganda.

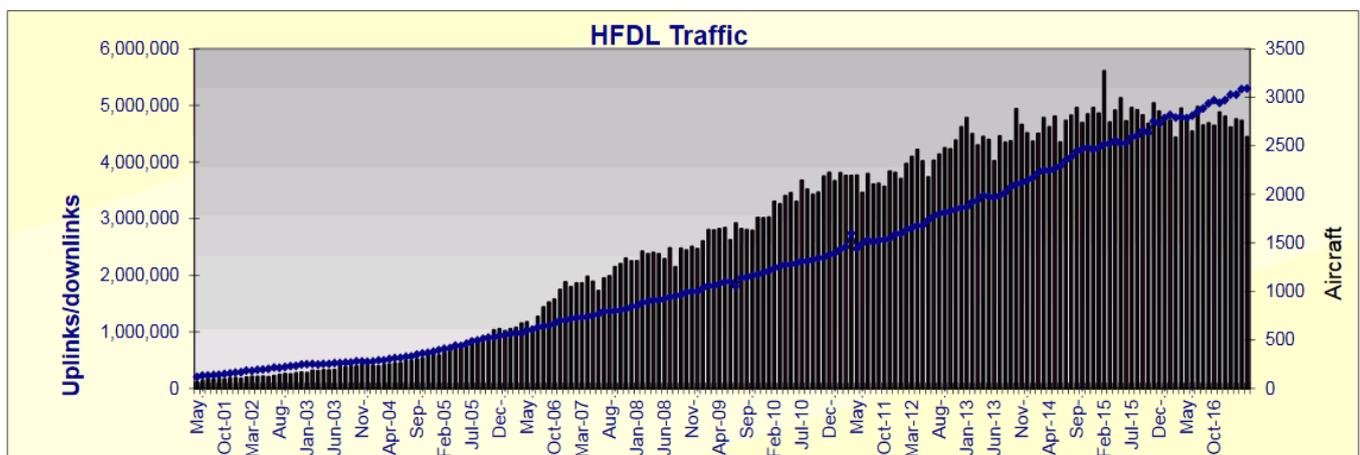
Historically, the First Cold War - i.e. the period from 1945, the end of the Second World War, to 1991, the collapse of the Soviet Union - has been the state-backed broadcasters' heyday. People all over the world listened to the BBC WS, Deutsche Welle, and Voice of America. For these broadcasters, it was a comfortable world. Today, China's international broadcasters have programming in more tongues than any other state-backed rival. Since 2000, CRI has doubled its shortwave output, and it even broadcasts from ... Cuba! Says *The Economist* on 16 June 2018: "In 2015 Reuters, a news agency, found that China-friendly news and other programmes made by CRI were airing on at least 33 radio stations in 14 countries, including America, with no acknowledgement of CRI's involvement." *The Economist* again on 8 May 2021: "China has spent hundreds of millions of dollars annually over the past decade ... expanding its media footprint abroad under the 'Great Foreign Propaganda Campaign', says a working paper for the Brookings Institution. Since 2009 ... China Radio International, a state broadcaster, has more than tripled its hours of programming in 65 languages." And on 7 May 2022: "Australia's national broadcaster stopped short-wave radio transmissions to the Pacific five years ago, despite their value to locals as a source of information. China Radio International now broadcasts on some of those same frequencies." On the other hand, international powerhouses such as BBC, DW and VoA are proceeding to shut down their shortwave broadcasts completely. Just one example: The United States Agency for Global Media (USAGM) says in its Financial Year 2023 Congressional Budget Justification at [www.usagm.gov/wp-content/uploads/2022/03/USAGMBudget\\_FY23\\_CBJ\\_03-25-22-FINAL.pdf](http://www.usagm.gov/wp-content/uploads/2022/03/USAGMBudget_FY23_CBJ_03-25-22-FINAL.pdf): "As shortwave usage wanes in parts of the world, affiliations with local medium wave, FM radio, broadcast television, and satellite channels have grown in importance. USAGM will increase distribution on platforms that audiences use - mobile devices, FM, satellite, and digital and broadcast television - migrating away from traditional platforms, such as shortwave and medium wave radio, that do not reach large audiences." Alas, government bureaucrats are unable to understand the simple facts explained below under 4.4 !

Regarding satellite TV with its enormous dissemination, compared to shortwave broadcasting ... Says Ken Reitz KS4ZR in *The Spectrum Monitor* - June 2021: "On April 22 the FCC adopted new sponsorship identification requirements that, according to an FCC press release, 'requires broadcasters to disclose when foreign governments or their representatives lease time on their airwaves. The order increases transparency, ensuring audiences are aware when a foreign government, or its representatives, uses the airwaves to persuade the American public.' - International propaganda on US pay satellite-TV systems is common today. Dish Network carries both RT America (Russia Today - a Russian state-run and funded channel) and CTGN (China Television Global Network - a Chinese state-run and funded channel). Both channels are available on every Dish Network package. Competitor, DirecTV, offers RT America, CTGN, CCTV-4 (China Central TV) and GZTV (Guangzhou Broadcasting Network)."

Traditional shortwave audiences are usually older, poorer, and more rural listeners. Today, we're in 2024 and the big battle is for urban opinion-formers, who consume their media chiefly by satellite and the internet, as mentioned before. Qatari-owned Al Jazeera is the best known of the racier channels and certainly the most impressive new entrant in recent years ...

Then, there are technical problems. 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 powerline communication (PLC), plasma television screens, and so on. Says David Summer K1ZZ, ARRL Chief Executive Officer, in *QST* December 2014 on occasion of the American Radio Relay League's Centennial Year: "Another threat [*to amateur radio*] is the rising tide of radio spectrum pollution. You might think that because access to the spectrum is worth billions of dollars at auction, there must be an army of lobbyists working to protect the value of the spectrum against interference from unintentional emitters of RF energy. There isn't. All too often the ARRL and other leading member-societies in the International Amateur Radio Union are lonely voices calling attention to inadequate standards for electromagnetic compatibility and inadequate shielding and filtering in products whose makers ought to know better." In fact, there is virtually no control on all types of cheap electronic goods imported from e.g. China, principally and regularly violating all those ridiculous "EU" technical regulations. Today, everybody knows that the useless "CE" label simply stands for "China Export"!

**Regarding professional worldwide communication on shortwave** - read: utility radio stations, that we've covered for 56 years as the leading publisher worldwide - **digital data transmissions have been a superb success for decades.** Contrary to the chaotic situation in HF broadcasting, global technical standards have been agreed upon many years ago, and innovative procedures and protocols resulted in a strong increase in the intelligent use of shortwave frequencies. Just a few easy examples for beginners: ACARS via HF DL currently handles more than 160,000 messages - per day! 3,000+ aircraft of 80+ worldwide customers are equipped with HF DL, and another ground station came up in 2019 in South Korea! Probably because Hat Yai has severe problems - we've not monitored 8825 and 10066 for years ... confirmed by the Future Air Navigation Services (FANS) Interoperability Team - Asia Meeting in Bangkok in July 2017: "HF DL performance consistently failed to meet both the 95 % and the 99.9 % criteria for ADS-C downlink latency. Aeronautical Radio Incorporated (ARINC) proposed to upgrade the HF DL network." What's more, we've not been able to monitor Krasnoyarsk and Muhurroq, anywhere, recently ...

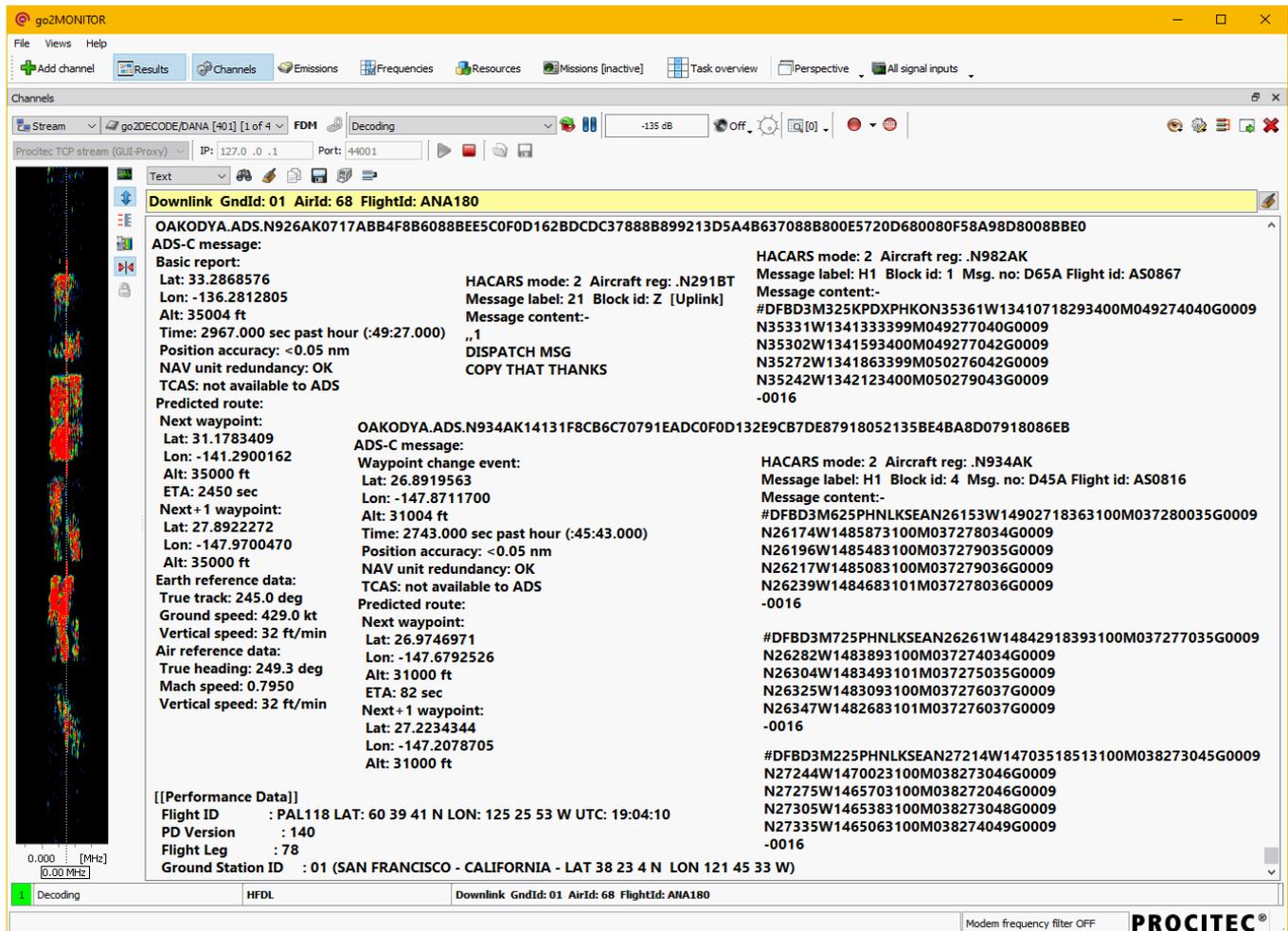


### HFDL traffic increase 2001-2017

© 2017 Rockwell-Collins • Proprietary Information  
 Courtesy of Ms. Carolyn S Bray, author of  
*HFDL and Polar Flights - CPWG Meeting* • May 2017

Then, there are thousands of HF networks using ALE. What's more, we've got hundreds of CODAN and PACTOR networks worldwide. And so on ...

We've monitored all these digital data transmissions for decades, using top-class professional analyzers and decoders such as PROCITEC's go2MONITOR. See the sample screenshots in the product in hand, and enjoy another 26,000 (twenty six thousand!) fascinating screenshots on our DIGITAL DATA DECODER SCREENSHOTS ON USB STICK - see page 331 for details!



The screenshot displays the go2MONITOR software interface. The main window shows a list of decoded messages. The messages are organized into sections: Basic report, Waypoint change event, and Performance Data. Each section contains detailed information about the aircraft and the message content.

**Downlink GndId: 01 AirId: 68 FlightId: ANA180**

**OAKODYA.ADS.N926AK0717ABB4F8B6088BEE5C0F0D162BDCDC37888B899213D5A4B637088B800E5720D680080F58A98D8008BBE0**

**ADS-C message:**

**Basic report:**

Lat: 33.2868576  
Lon: -136.2812805  
Alt: 35004 ft  
Time: 2967.000 sec past hour (:49:27.000)  
Position accuracy: <0.05 nm  
NAV unit redundancy: OK  
TCAS: not available to ADS

**Predicted route:**

Next waypoint:  
Lat: 31.1783409  
Lon: -141.2900162  
Alt: 35000 ft  
ETA: 2450 sec

**Next+1 waypoint:**

Lat: 27.8922272  
Lon: -147.9700470  
Alt: 35000 ft

**Earth reference data:**

True track: 245.0 deg  
Ground speed: 429.0 kt  
Vertical speed: 32 ft/min

**Air reference data:**

True heading: 249.3 deg  
Mach speed: 0.7950  
Vertical speed: 32 ft/min

**[[Performance Data]]**

Flight ID : PAL118 LAT: 60 39 41 N LON: 125 25 53 W UTC: 19:04:10  
PD Version : 140  
Flight Leg : 78  
Ground Station ID : 01 (SAN FRANCISCO - CALIFORNIA - LAT 38 23 4 N LON 121 45 33 W)

**HACARS mode: 2 Aircraft reg: .N982AK**  
Message label: H1 Block id: 1 Msg. no: D65A Flight id: AS0867  
Message content:-  
#DFBD3M325KPDXPBKON35361W13410718293400M049277040G0009  
N35331W1341333399M049277040G0009  
N35302W1341593400M049277042G0009  
N35272W1341863399M050276042G0009  
N35242W1342123400M050279043G0009  
-0016

**HACARS mode: 2 Aircraft reg: .N291BT**  
Message label: 21 Block id: Z [Uplink]  
Message content:-  
..1  
DISPATCH MSG  
COPY THAT THANKS

**OAKODYA.ADS.N934AK14131F8CB6C70791EADC0F0D132E9CB7DE87918052135BE4BA8D07918086EB**

**ADS-C message:**

**Waypoint change event:**

Lat: 26.8919563  
Lon: -147.8711700  
Alt: 31004 ft  
Time: 2743.000 sec past hour (:45:43.000)  
Position accuracy: <0.05 nm  
NAV unit redundancy: OK  
TCAS: not available to ADS

**Predicted route:**

Next waypoint:  
Lat: 26.9746971  
Lon: -147.6792526  
Alt: 31000 ft  
ETA: 82 sec

**Next+1 waypoint:**

Lat: 27.2234344  
Lon: -147.2078705  
Alt: 31000 ft

**#DFBD3M725PHNLKSEAN26261W14842918393100M037277035G0009**  
N26282W1483893100M037274034G0009  
N26304W1483493101M037275035G0009  
N26325W1483093100M037276037G0009  
N26347W1482683101M037276037G0009  
-0016

**#DFBD3M225PHNLKSEAN27214W14703518513100M038273045G0009**  
N27244W1470023100M038273046G0009  
N27275W1465703100M038272046G0009  
N27305W1465383100M038273048G0009  
N27335W1465063100M038274049G0009  
-0016

## HFDL messages via San Francisco Air, CA, United States of America

**Basic report downlink from aircraft N926AK = Alaska Airlines Boeing B737-9 MAX**

**Waypoint change event downlink from aircraft N934AK = Alaska Airlines B737-9 MAX**

**Flight parameters and enroute weather downlink KPDX - PHKO • PHNL - KSEA  
from aircraft N982AK = Alaska Airlines Boeing 737-9 MAX • N934AK**

**Performance data downlink from flight PAL 118 = RPLL → CYYZ**

*The Basic or Periodic Report gives position - trajectory intent - speed vector data plus the Figure of Merit code or data for navigational accuracy. The minimum reporting rate is usually not greater than every 14 minutes but can vary to suit the need of the ground station. This procedure allows longitudinal and lateral separation of aircraft in oceanic areas to be reduced to 30 naut. miles each*

*The Waypoint Change Event is triggered by a change made to the Next, or the Next-plus-one waypoint. This change normally occurs due to normal waypoint sequencing by the FMS. The Next or Next-plus-one waypoint can be either an ATS waypoint or a pilot inserted waypoint*

#### 4.4 Internet, SATCOM and HF Radio in dictatorships: censorship of the Internet and restricted online access vs. free worldwide shortwave reception for everybody

Just for the record, international and worldwide communication such as phone calls, fax messages, e-mail, SMS, data exchange, Internet access and so on relies on

- landline connections;
- submarine cables;
- satellite communication (SATCOM);
- high frequency (HF) / shortwave radio (SW).

Internet is certainly not some mystic new medium descending from Nirvana to Earth. In reality, it is merely some type of computer - e.g. a PC, a smartphone, a laptop, a tablet computer and the like - linked to a communication line: if the latter fails for whatever reason, there is no Internet at all, and that was that. No net  $\Rightarrow$  no Internet, e basta, ragazzi! Connectivity e.g. between Africa and Europe depends totally on the reliability of a few submarine cables and telecommunication satellites. If dictators such as Mr Qaddafi ☞ ☺ used to shut down the Internet plus all terrestrial mobile phone networks, this left only SATCOM and HF for ordinary Libyans wishing to communicate with the rest of the world.

Sure, SATCOM works perfect and everywhere, but it is pretty expensive, and not every buddy has a friend with an Inmarsat Isat or Iridium 9555 or Thuraya XT mobile phone just around the corner. This goes particularly for brutal dictatorships such as Communist China that kills thousands of so-called "dissidents" per year, the so-called "People's Republic" of North Korea, and so on, where the allotment of Inmarsat and Iridium and Thuraya and similar equipment is extremely restricted - if available at all.

In the case of an emergency or a revolution, **that leaves only HF** for ordinary people like you and us. Innovative nations such as the United States of America routinely fall back on the **amateur radio service as an officially recognized emergency communications medium** - as we've seen only recently during and after several tropical cyclones in the Caribbean. After the installation of a HF transceiver, or after the purchase of a cheap 50 Dollars HF radio for listening to SW transmissions from all over the world - i.e. once the initial investment in equipment is made - there are no call costs or ongoing monthly communication line or equipment rentals. Even better: **HF cannot be "switched off"**, and it is very difficult to block - let alone censor! - broadcasts from abroad. What's more, shortwave is not only "terrorist-proof", but "revolution-proof" as well: a mobile communication station using a cheap laptop computer, connected to a radio transceiver operating from a car battery and feeding a simple wire antenna, is much less vulnerable to an attack from outside than high-tech telecom switchboards, cellphone-repeater antenna farms on rooftops of high buildings, and satellite ground stations with large dish antennas. Remember Haiti and Katrina, the Thai and Japanese Tsunamis, supercyclone Yolanda / Haiyan that totally destroyed the Province of Leyte in the Philippines, with a death toll of ~ 5,000+? And Dorian that devastated Abaco and Grand Bahama Island with 200+ mph winds? And Putin's bloody war against Ukraine? And China's atrocities against democrats and ethnic minorities? **HF radio is vital!**

A recent study of the HFCC (High Frequency Coordination Committee) has been discussed in The Spectrum Monitor - May 2021. The HFCC concludes that "**the weak points of the Internet, FM and satellite are the strong points of shortwave.**" Examples of those strong points are:

- Broadcasts reach listeners over large areas far from the transmission site
- Shortwave is Free-to-Air (no subscription fees)
- The listener cannot be identified

- There isn't any need of an agreement from the administration of the territory where the broadcast is directed
- Receivers can be portable and inexpensive

Says *The Economist* on 12 March 2022, after the BBC launched a new shortwave service in Ukraine: "Radio is an early-20th-century technology. But the BBC hopes it can still be useful in the internet age because it is hard to stop. Shortwave signals bounce off the ionosphere ... The resulting 'skywave' travels for thousands of kilometres, meaning broadcasters can sit safely beyond the reach of censors, secret policemen - and invading armies."

Says Professor Benjamin J. Sacks from the Rand Corporation on 25 March 2022 at [www.rand.org/blog/2022/03/why-the-bbc-world-services-new-ukrainian-shortwave-service.html](http://www.rand.org/blog/2022/03/why-the-bbc-world-services-new-ukrainian-shortwave-service.html): "Shortwave cannot be hacked. It cannot be bombed or otherwise destroyed because it is being transmitted from far outside Ukraine. Despite its age, shortwave remains an enduring tool in the global fight against disinformation."

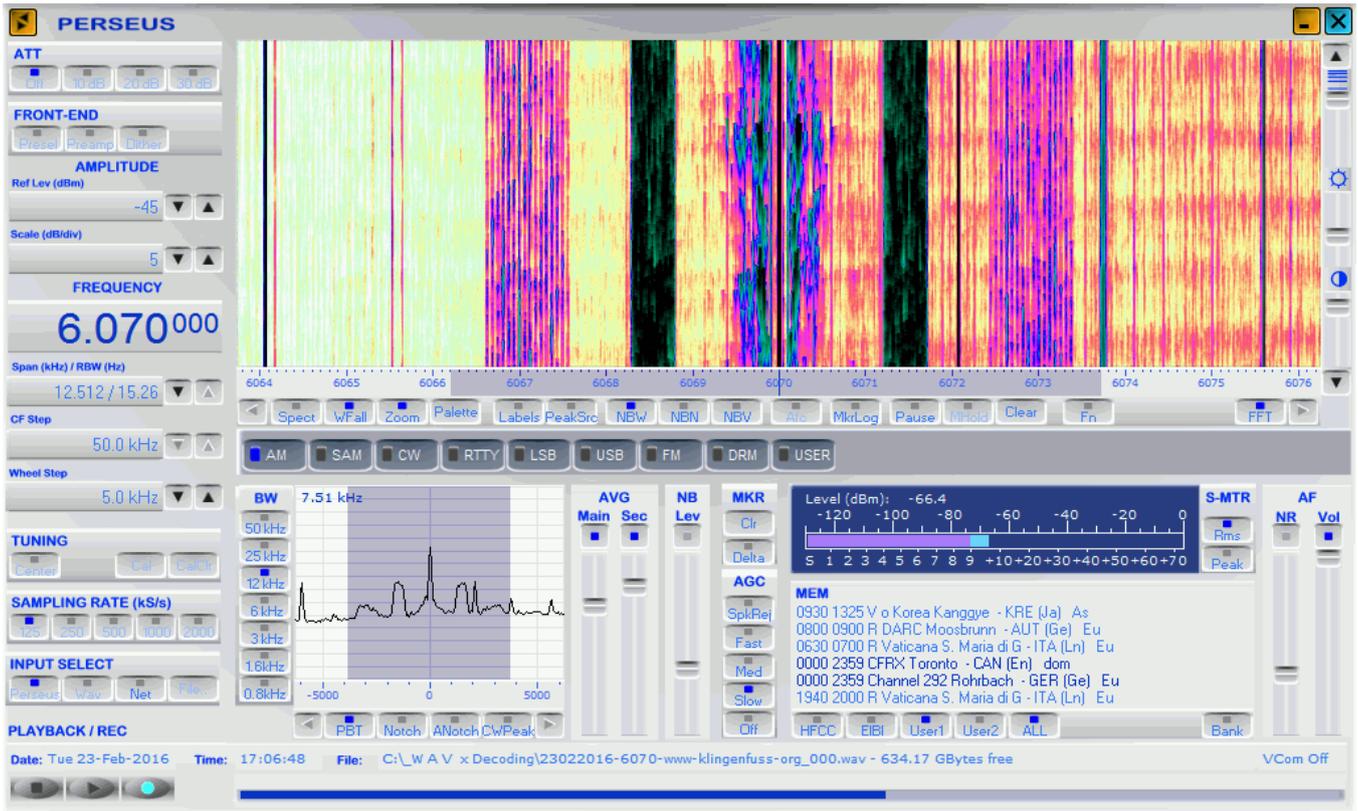
Says NEXUS on 22 October 2021 at [www.nexus.org/member-services/radio-and-tv/international-public-access-radio](http://www.nexus.org/member-services/radio-and-tv/international-public-access-radio): "Some countries censor access to the Internet, making it difficult for residents to access many online services. In other places, firewalls or network monitoring prevent users from connecting to certain sites. Internet censorship is a major issue that affects millions of people. As citizens become increasingly connected, some governments are finding new ways to censor the Internet. Anyone deserves the right to access all the content they want from anywhere in the world. Shortwave is the only media that can reach anywhere across borders and firewalls. **Shortwave radio receivers are inexpensive, portable, dependable and can be used almost anywhere.** Shortwave radio receivers, vs satellite dishes, are small and can easily remain undetected by local authorities."

Says Fred Osterman N8EKU in his 800-pages 3-kilograms masterwork **SHORTWAVE RECEIVERS PAST AND PRESENT** (see page 330; 4th edition September 2014, ISBN 978-1-882123-02-5, [www.universal-radio.com](http://www.universal-radio.com)): "Shortwave communication still has a role to play. A quarter of the world's population does not enjoy reliable electricity, much less Internet connectivity. Unfortunately, bureaucrats in many world capitals (except Beijing) have prematurely abandoned shortwave. Do these decision makers believe that people without Internet access simply 'don't count', or do they think everyone in Sudan or the Solomon Islands has an iPad? Do they understand that local regimes can disconnect or filter the web at will? Shortwave radio, and shortwave radio alone, can provide reliable, economical communications largely immune from censorship by oppressive governments."

Says the author of the book in hand: Exactly the same goes for those dull bureaucrats at Deutsche Welle. No buddy watches their boring and stupid DW TV. What we really do need in the jungles of Malaysia, or on top of the remote mountains of Rimella, is a shortwave broadcast in German - and nothing else! ☺

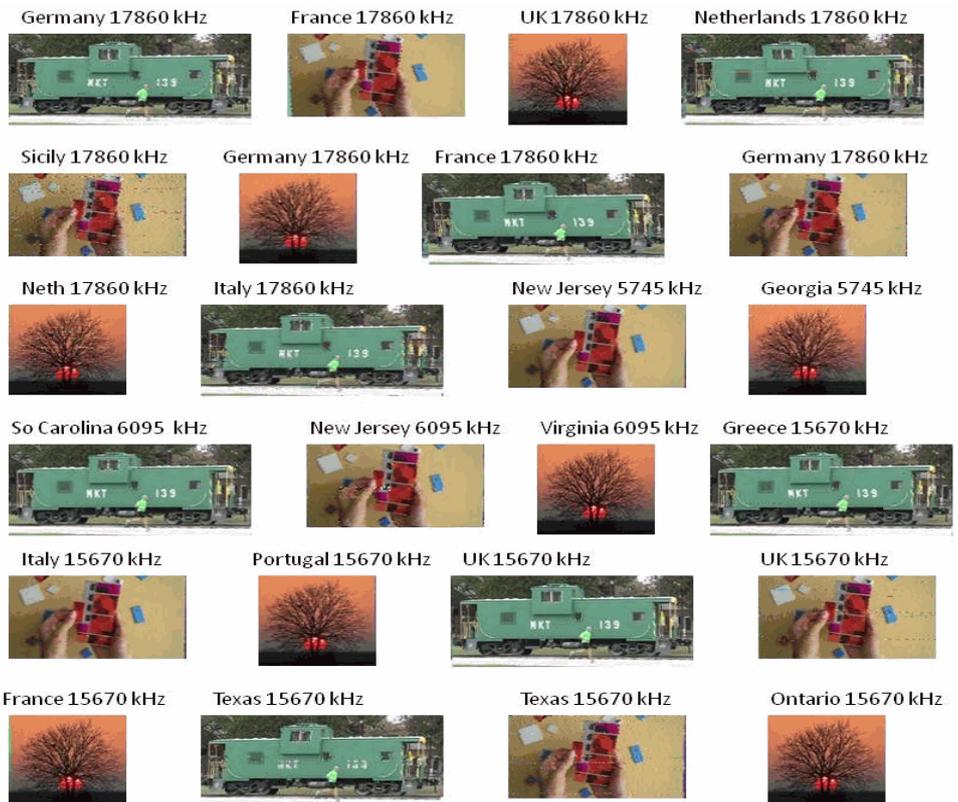
**Now consider the absurd decision by leading international broadcasters to drastically reduce their worldwide shortwave transmissions ... or to shut down HF completely!** Under the difficult situation described above: just how do BBC, DW, VoA and the like get their message - and mission! - across the border to the poor people that is most in need of independent information - and international support???

**Your comments are welcome!**



Shortwave Radiogram transmits PSK and MFSK signals mirrored on both sidebands  
 See page 5 for the zoom on the MFSK emission • New schedule see [swradiogram.net](http://swradiogram.net)

**Joerg Klingenfuss:**  
 Confirming your reception of  
 VOA Radiogram  
 on the  
 Voice of America  
 2 November 2013  
 1600-1630 UTC  
 17860 kHz  
 via North Carolina (GVL)  
[voaradiogram.net](http://voaradiogram.net)



**QSL via e-mail for a Radiogram via Voice of America digital data test transmission  
 It shows perfect sample colour graphic files received from listeners all over the world!**