TELERAD
Aeronautical and Maritime Radiocommunication Systems
COMMUNICATION
DECEMBER 2021
The Newsletter for TELERAD preferred contacts

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Several partners

"Think globally, act locally"

TELERAD is one of the "strategic bricks" of the industrial base of French Defense Technology (BITD for *Base industrielle des technologies de défense*), but also the only small and medium size enterprise (SME) that specializes in the fields of design, development and manufacturing of radio systems for air navigation control and naval communications, whether in the civil or military sectors.

With partnerships and collaborations with Universities and major Engineering Schools and attending the Week of Industry and the Career forums, TELERAD contributes to the promotion of engineering professions in the area of radio communications and the production of high value-added technological products. The challenge today is to find talent and the players who will assist TELERAD in its strategy and the achievement of its new projects.

Thus, TELERAD contributes to the meshing of industrial, University and SME partners though its development of high value-added technologies and its international status. Its territorial location makes it a key player in creating direct employment and partnerships with its sub-contractors and other SMEs.

Thus, TELERAD has made the choice of a local industrial approach, in France, while retaining a global vision with the goal of contributing to French strategic independence, while pursuing its development in the international market, with a presence in more than sixty countries.

Patrice Mariotte
CEO of TELERAD

Three questions for:

Christophe Rouquié

Technical and Innovation Director (DTI) of French Air Navigation Services
(DSNA - *Direction des services de la Navigation aérienne*)

What are the missions of the DSNA?

Being the major air navigation operator in Europe in terms of traffic control, the Air Navigation Services, day and night, throughout the year, manages the flow of civil air traffic safely, fluidly and rapidly, observing environmental practices while controlling costs. It also provides related communication, navigation and surveillance services, develops and disseminates aeronautical information needed for flight preparations.

What has been the impact of the health crisis on your activity?

The health crisis linked to the coronavirus epidemic struck the global aeronautics sector brutally and without warning in 2020. In Europe, EUROCONTROL predicts a progressive return of the activity. In 2021, air traffic control by French air navigation services and associated fees, amounted to about 50% of the 2019 figures, taken as a reference year.

The DSNA has launched a major technical and operational modernization plan for its tools and installations. Amongst the new technologies, Voice over IP (VoIP) is currently being deployed. How will this contribute to the modernization of air traffic services?

As of today, VoIP allows modern communication networks based on IP (Internet Protocol) to be used. In fact, the old analog technologies are no longer really offered by operators, or if they are, at a prohibitive price with a degradation of the quality of service. Thus, on the ground-to-ground segment, the DSNA has deployed this technology for radio and telephone communications. For the moment, the air-to-ground/ground-to-air segment remains analog for radio, based on VHF or UHF for the military.

VoIP offers additional technical possibilities such as improved voice quality (digital quality), increased availability of communications, many more "voice" system configurations than in the analog world. This evolution offers other advantages with regard to the improvement of the radio service: freeing up of the VHF frequency spectrum dedicated to radio communications, reinforcing the fight against jamming.

In the very near future, we can imagine using Data Link communications for sending voice in VoIP format over the air-to-ground/ground-to-air segment. The study has started of the use of satellite data communications (Satvoice) or using air-to-ground/ground-to-air data communications stations deployed on terrestrial zones (LDACS system). The efficient deployment of these technology requires however, updates of the on-board (aircraft) and ground (ATC) systems.

For the DSNA, VoIP will allow us to improve system availability; the use of the IP networks, easily configurable on the fly, will allow more redundant architectures to be designed. The new digital technologies also allows us to envisage voice broadcasting services over operational centers. The moving of operator radio/telephone stations onto sites close to "primary" centers for voice processing is already being studied. All the potential features could only be exploited when all the elements of the communication chain (local networks, connections, radio/telephone channels, transmitters/receivers) will be entirely digital.

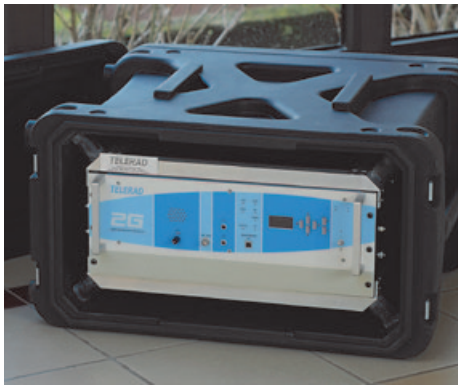
TELERAD has assisted the DSNA in this key-development for its operational communication systems. The DSNA uses about 3000 items of TELERAD equipment (transmitters, receivers and multiplexers) distributed throughout radio stations in Metropolitan France and its overseas territories.

With products and systems in more than sixty countries, TELERAD is specialized in the study, the development and the manufacture of radio systems used for the control of aerial and maritime navigation. A unique company in this area, it is a key player in the French and European defense, industrial and technological base.

NEWS

The French Military chooses TELERAD

In November 2020, TELERAD won the "Radio Air 8.33" contract in the framework of supplying and installing VHF/UHF radio transceivers. This contract, the first systems of which were delivered in October, will allow the three French Armed Forces (Army, Navy, Air-Force) to benefit from radio communications equipment suitable for use in all environments, including the most extreme, for example, during overseas operations. TELERAD is proud to continue its cooperation with the Defense Ministry that has gone back more than 50 years!



TELERAD in the land of Jasmine

The National Ministry of Defense of the Republic of Tunisia has awarded TELERAD with a contract for the acquisition and commissioning of seven GROUND/AIR VHF/UHF radio stations. These systems based on TRX90x0-2G type transceivers offer the most state-of-the art technological solutions, best adapted to the environmental constraints of the country, thus reinforcing the efficiency of internal and international air traffic control.

FOCUS

The multiple facets of signal processing

Signal processing is used today for exploiting the different types of signals coming from the applications used daily for processing video, sound, images, etc. Thus, we find them in the objects that surround us, whether it be digital television, smartphones, tablets or on-board computers in vehicles. Signal processing is everywhere!

Right from the start, the increase in the calculation power of electronic components allied with the advent of digital technology, made signal processing a key skill for technological innovation.

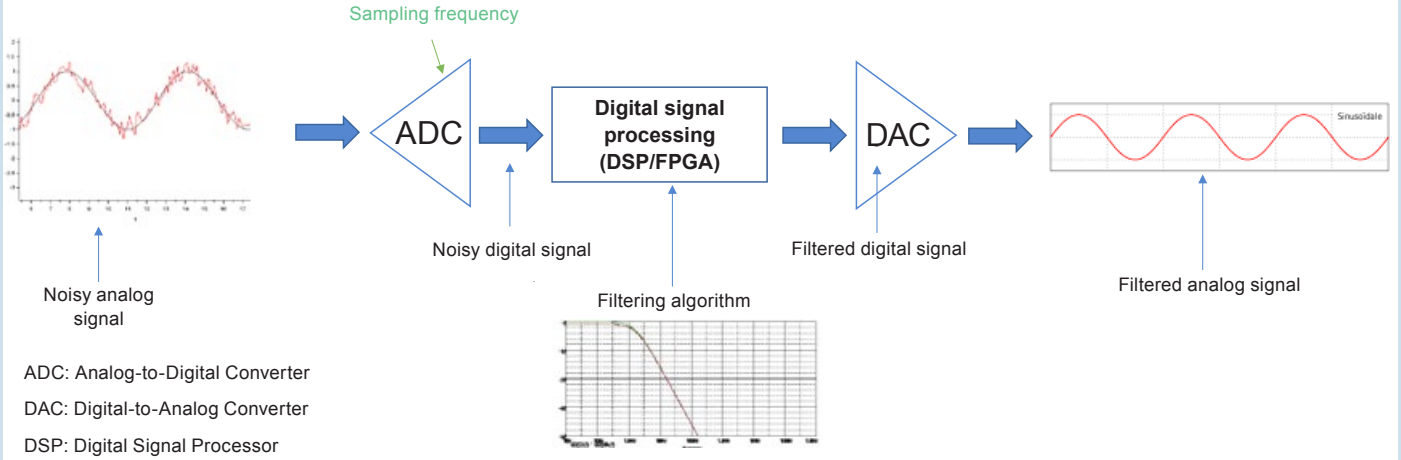
This is key for the transition from analog to digital. There are multiple challenges: data compression, image reconstitution, audio signal quality, etc.

In the radio sector, TELERAD has been introducing signal processing algorithms into its equipment since the beginning of the 1990's. Originally, the use was limited to voice signal filtering, to gradually extend to almost all of the typical features of radio with the goal of maximizing performances and increasing functionalities, etc.

There are many features implemented: algorithms for filtering, wave-form generation, encoding/decoding, noise reduction, etc. TELERAD has also developed other algorithms based in particular on the linearization of radiofrequency amplification stages and on the detection of simultaneous transmissions (see "Focus" December 2019 in the TELERAD Communication Letter: LINK).

Moreover, the technological developments based on Analog-to-Digital and Digital-to-Analog converters, allow us to consider faster and faster sampling speeds with greater dynamic ranges. By using more powerful DSPs (Digital Signal Processors) or FPGAs (Field Programmable Gate Arrays), it becomes possible to digitize the signal closer to the antenna. Once digitized, the signal can be transmitted over optical fiber networks (avoiding wiring) while overcoming long distance losses and reducing electromagnetic interferences.

While other perspectives open up in the area of radio communications, such as algorithms self-adapting to the waveform of the received signal, the simultaneous processing of several communication channels by a single radio (optimized architecture), a better use of the frequency spectrum, and more. From an applications point of view, the association of digital signal processing algorithms with artificial intelligence algorithms will eventually, using radio software, allow a smart radio to be developed for use in augmented reality.



ADC: Analog-to-Digital Converter

DAC: Digital-to-Analog Converter

DSP: Digital Signal Processor

FPGA: Field Programmable Gate Array

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