



ADVANCED MODEM FOR LINK 22

ENHANCING TACTICAL DATA LINK CAPABILITY FOR IMPROVED ALLIED INTEROPERABILITY

BY ANDRE KOTLOWSKI

This article presents a brief summary of the Tactical Data Link 22, the today German situation and engagement, and the new Telefunken RACOMS SPC 1920 providing the Signal Processing Controller (SPC) function for Link 22.

BACKGROUND

Started in 1992, NATO Improved Link 11 (NILE) – known today as Link 22 – has been developed collaboratively by 7 nations with the goal of replacing Link 11 and complementing Link 16. Now Link 22 is finally getting ready to enter the operational world. Under an MOU, Canada, France, Germany, Italy, Spain, UK, and US will

carry out the in-service support (ISS) phase until 2007. The NILE steering committee, consisting of national representatives, has tasked the NILE Program Management Office (PMO) with overseeing all required program tasks.

LINK 22 CAPABILITIES

Both Link 11 and Link 22 operate on HF and UHF frequency bands, whereas Link 16 only uses UHF. Link 22 will overcome Link 11 deficiencies on throughput, robustness, routing, EPM measures and message standard limitations. Network access through a dynamically configurable TDMA architecture provides flexible resource management. The built in relay function extends communication range.

LINK 22 ARCHITECTURE

A Link 22 net consists of a Super Network (SN) of up to 125 NILE Units (NUs) connected by RF links. One designated NU will act as SN management unit (SNMU). The SN is subdivided into up to 8 NILE Networks (NNs), each composed of a subset of the NUs operating on a common RF channel, and administrated by a network management unit (NMU). NUs are able to simultaneously participate in up to 4 NNs, depending on the availability of RF links. Fig. 1 depicts the devices comprised by a NU supporting four channels.

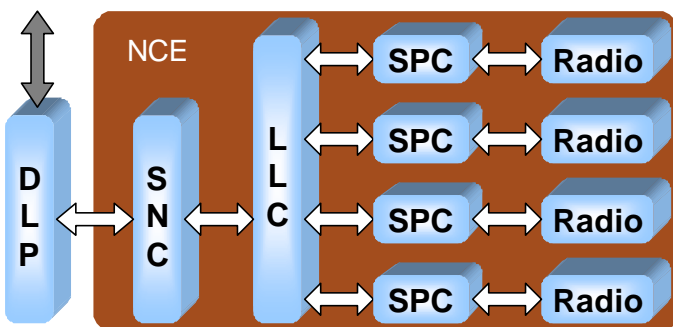


Figure 1: Multi-Network NILE Unit (NU)

The Data Link Processor (DLP) is a functional entity and could be a distinct physical one, depending on national implementation. The DLP provides in interface between the host tactical data system and the NCE. It generates all tactical messages and is heavily involved in message addressing and forwarding to other data links.

The System Network Controller (SNC) is a functional entity whose present implementation is NILE nations proprietary, based on specifications developed by the NILE PMO. The SNC provides NN management and monitoring, SPC configuration, and message



Figure 2: German Frigate F124 "Sachsen"

delivery including addressing, timestamping or relaying. The SNC (as NMU) controls the operational network cycle structure (ONCS), within which each unit has its own Transmission Slot. Transmission Slot lengths can vary and can be tailored to meet individual platform's data requirements.

The Signal Processing Controller (SPC) is another functional entity whose implementation is a national level responsibility. The SPC provides message fragmentation, forward error correction (FEC), modulation, radio configuration, and link quality feedback. Highly precise transmission and reception is mandatory and provided based on an accurate external time-of-day reference. For a dedicated NN RF channel, the SPC will be configured to one of the following Media:

- HF Fixed Frequency, according to STANAG 4539 annex D
- HF EPM, according to STANAG 4444
- UHF Fixed Frequency, according to STANAG 4205
- UHF EPM, according to STANAG 4372 (SATURN)

For Beyond Line of Sight (BLOS) communication, HF links are optimised for 300 nm while UHF is only intended for LOS.

For fixed frequency media, existing Link 11 radios can be used.

GERMAN SITUATION AND INITIATIVE

Link 11 is currently used in the following frigates classes: F122, F123, F124, as well as the support ship EGV702. Link 16 is currently only available in the F123 and F124 classes. The K130 corvette and F125 frigate classes are also scheduled for Link 16. German ships are to begin receiving Link 22 systems in 2008.

As a NILE nation, Germany is actively participating the Link 22 ISS phase and subsequent implementation. The German MOD has tasked Telefunken RACOMS to develop a HF fixed frequency SPC to be integrated in the currently setup German NILE reference system (NRS-GE).

TELEFUNKEN RACOMS LINK 22 PRODUCT SCOPE

The new SPC 1920 will provide the Signal Processing Controller function for the NILE Communications Equipment. The Telefunken RACOMS (www.tfk-racoms.com) SPC 1920 is a new tactical data link modem, which will offer all media types of Link 22.

For ground and ship borne applications, a 19" 1U standard rack equipment will provide dual link capability, e.g. two SPCs in one housing. Each link, e.g. each single SPC, will be configured selectively as one of the four SPC medias. Setup is either manually via front panel or by remote control interface. By loading SW, functionality can be upgraded to particular radio device drivers as well as future evolutions. Automatically initiated self-test at power-on and a comprehensive built-in-test will ensure faultless operation.