



Link 11 has been operational for over 25 years and, despite a general allied consensus to migrate all TDL functionality to one of the J-Series Family links (Link 16, Link 22, Variable Message Format (VMF) or Integrated Broadcast System (IBS) Common Data Format), it is likely that it will remain in service for the foreseeable future, even if only for non-NATO users. Consequently, it is important that link planners, users and managers remain fully conversant with Link 11 as an integral part of the Network Centric Warfare approach that we are all moving towards.

SyntheSys employees have been involved with Link 11 issues for many years. Consequently, we can provide Link 11 training wherever it is required. This information sheet provides a very brief overview of this old but important TDL.

### **Link 11 can exchange air, surface, subsurface, Electronic Warfare (EW) and Command and Control (C2) data**

Link 11 is found in two main variants - standard Link 11 (sometimes called Link 11A) and Link 11B.

- Link 11A is typically used as a netted system on Ultra High Frequency (UHF) and High Frequency (HF) with a data rate of either 1340 bps or 2400 bps between air, surface and ground platforms.
- Link 11B is a 'point-to-point' system using landline, microwave or Satellite Communication (SATCOM) links between ground units usually at 1200 bps. Link 11 uses M-Series messages which are 48 bits long. Both systems are typically operated encrypted.

Data forwarding between Link 11A and B is very straightforward because the messages are

identical in most cases and only the bearer system needs to be changed. Link 11 has numerous automated track management systems such as track handover, ID changes, difference reporting, etc. Broadly these are the same as for Link 16. However, its track numbering system is limited to 4-digit octal numerals.

Normally Link 11A is operated on only one frequency, i.e. on a Single Net. However, some Link 11 units (referred to as Participating Units (PUs)) can simultaneously send the same data on 2 or more frequencies, i.e. Dual Net. This has the effect of providing a much-needed element of 'anti-jam' capability by providing a degree of frequency diversity. Data forwarding between Link 11 and Link 16 does require data translation, but it is well defined in Allied Tactical Data Link Publication (ATDLP)-6.16 (formally STANAG 5616). Link 11A can operate as a simplex broadcast system but this is not used very often.

- The most common operating mode is 'Polling' in which a nominated Data Net Control Station (DNCS) electronically polls each PU.
- The polled unit then transmits all its data (subject to its own transmission filters) which can be received by any other PU on the net within RF range. When that PU finishes its transmission the DNCS polls the next PU and so it goes on. This system is very effective, but it does have some problems.

Two waveforms can now be used for Link 11 operations; Conventional Link Eleven Waveform (CLEW) and Single Tone Link Eleven Waveform (SLEW). SLEW provides increased message fidelity and an increased likelihood that a message will get through first time without any repeats. SLEW is the more recent development but unfortunately it is not interoperable with CLEW. Consequently, a Link 11A net can only be operated on one of them. If less capable PUs need to be in the net, then only CLEW may be used.

### **About SyntheSys**

SyntheSys provides defence systems, training, systems and software engineering and technical management services over a spectrum of different industry sectors. Along with distinct support and consultancy services, our innovative product range makes us first choice provider for both large and small organisations. Established in 1988, the company focus is on fusing technical expertise with intuitive software applications to solve common industry challenges.