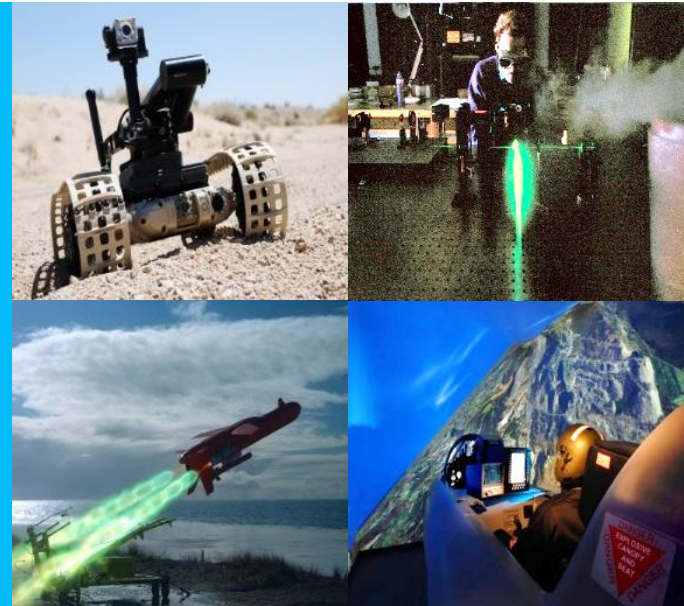


The Future of the HF House?

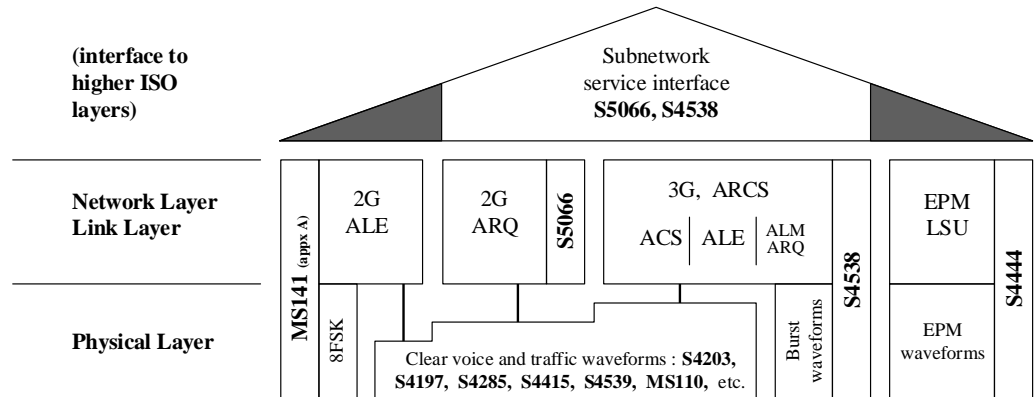


Keith Loudon

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The HF House

- During the 1990s a set of standards for HF communication was produced through the NATO HF working group
- These standards, along with the US MIL-STDs, were presented as a family of standards within the ‘HF House’
- The HF House covers the lowest levels of the standard OSI Network model
- It allows standards with complementary functionality (though not necessarily interoperability) to be selected by implementers

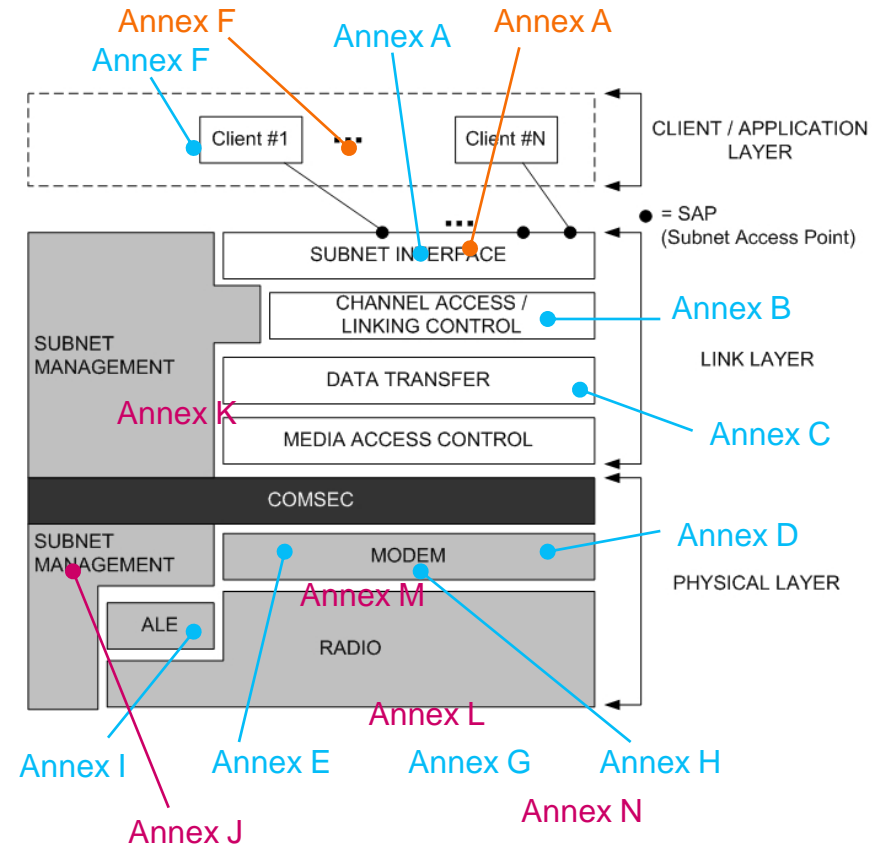


KEY 2G: second generation 3G: third generation Smmn: STANAG MSmm: Mil-Std

- **The HF House has been very successful and the standards form the basis for most military HF communication systems today**
 - Other frequency bands use the HF House as a good model on which to base their standard development
- **The HF Standards have continued to be developed to keep track of modern technology and processing capability**
 - Functionality that was inconceivable when the HF House was first being developed is now a reality – video over HF!
 - A reasonable amount of effort has been made to align the NATO standards with the US MIL-STDs to promote interoperability
 - Technology marches on. Vendors are keen to sell new products and customers like the new capability
- **Standard enhancement is excellent ... up to a point**

The example of STANAG 5066

- In the beginning there was STANAG 5066. A standard developed for point to point, reach back communication, with data rates between 75bps and 2400bps
 - And it was good.
- But it needed tweaking for interoperability, and the client interfaces needed to be redefined. So edition 2 was created
 - And it was good.
- But it lacked support for ad hoc networking, token passing, TDMA ... so edition 3 was created
 - And it was good.
- But it lacked support for wide band HF and didn't work well at data rates of 120000bps!
 - Maybe it's time for a new STANAG?



We all know what a standard is ...



- **We all know what a standard is ... don't we?**
- **Let's take STANAG 4285**
 - STANAG 4285 provides a set of PSK modulated, coded waveforms with rates 75, 150, 300, 600, 1200, 2400 bps
 - Interleaving lengths of 10.24 and 0.853 seconds provided
 - Extensively used for broadcast by NATO BRASS
- **Well, not quite**
 - The above coded waveforms are included in the 'For Information Only' Annex E of the standard
 - THEY ARE NOT A MANDATED PART OF STANAG 4285
 - A compliant implementation of STANAG 4285 does not need to include the above coded waveforms!

Why does this matter?



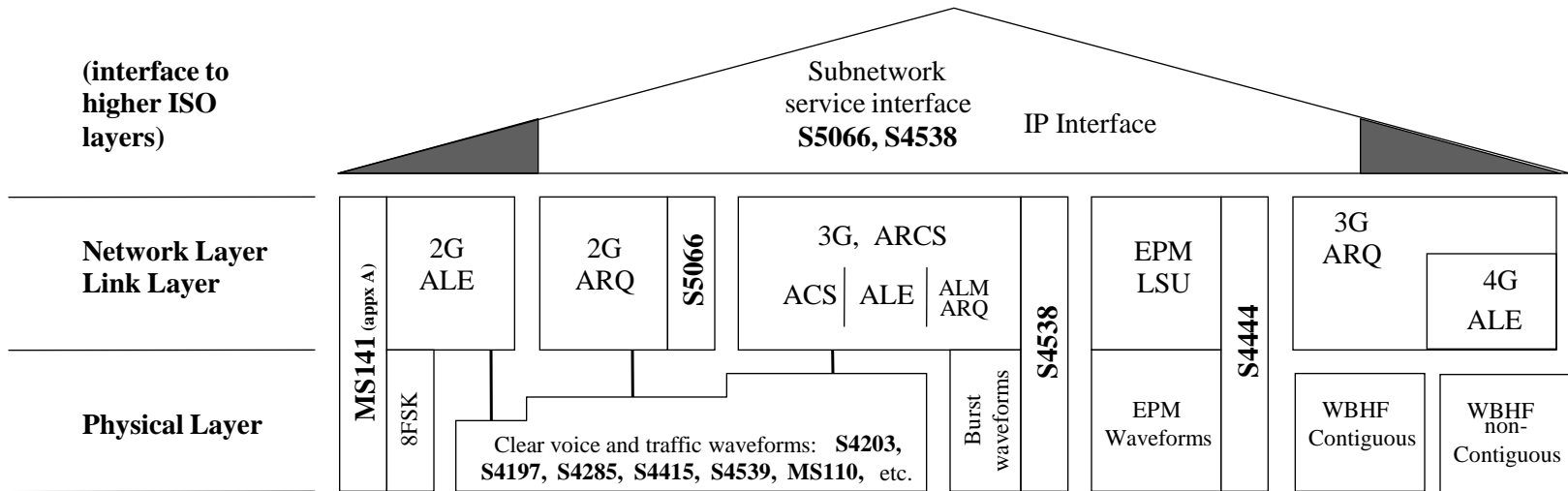
- **Procurement agencies and prime contractors have become ‘less intelligent’**
 - No longer have HF experts embedded in teams
 - Don’t understand the intricacies of the standards
 - ‘You have 5066, I have 5066, we must be fully interoperable’
 - Black and White, Shall/Shall not interpretation of standards
 - More complicated standards have less mandated requirements, and more options
- **The principle of the HF House was there is NO one HF standard**
 - You want 2G ALE ... you’ve got it!
 - You want a high speed waveform with that ... you’ve got it!
 - You want ARQ ... you’ve got it!

Time to build an extension to the HF House



- **HF is undergoing the next step change in capability, with the introduction of WBHF and 4G ALE**
- **The existing HF House standards work very well, let's leave them alone**
 - If it ain't broke, don't fix it!
- **Rather than producing new editions to existing standards, it's time to write some new ones**
 - Existing standards can still be procured to, and retired when they become obsolete
 - New standards can be built on old ones (e.g. VLF 4724 from 5030), so we don't need to totally reinvent the wheel
 - Remove the millstone of full backward interoperability
 - An end system designed to run at 64000bps will never work at 75bps, so let's stop trying!
 - Complementary standards can be produced
 - e.g. Contiguous/non-Contiguous WBHF

A new HF House?



KEY 2G: second generation 3G: third generation 4G: fourth generation Snnnn: STANAG MSnnn: Mil-Std

Any questions?

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