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Topic	Wireless Communications

Digital Voice Standards for Amateur Radio

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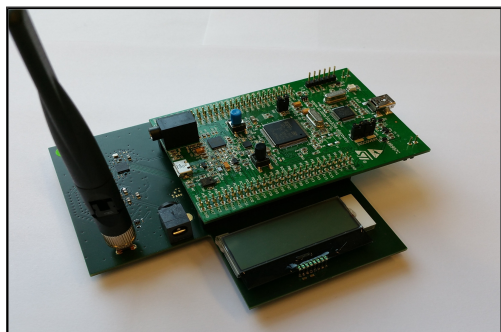
Problem: There are currently about four different digital voice communication standards with a corresponding network available for radio amateurs. All currently available digital voice systems use a proprietary voice codec. This is not in line with the ideology of most ham radio amateurs. They want to be able to build their own hardware and in the last couple of years, open-source software and open hardware has grown more and more important.

Proceeding: HBRadio, the Swiss Radio Amateurs Membership Magazine, asked for a comparison of existing digital voice radio standards in form of a written article in their magazine. Recently a suitable open-source voice codec named Codec2 was published and got ported to ARM architecture. The next step to be taken is the development of a standalone hardware working with that codec, enabling field use.

Solution: The following paper contains an in-depth comparison of existing digital voice systems focused on the radio frequency aspects. The systems covered are:

- APCO P25
- D-Star
- DMR
- System Fusion

Further, a testbed for the lately released open source vocoder Codec2 by Rowetel was developed. In a second step, the testbed was further developed into an open-source and open hardware radio handset operating in the 70cm band on a GMSK channel with 6.25kHz bandwidth and a bit rate of 4800bit/s.