Sky radar Basic II

Figure 1: Sky radar Basic II - Didactional FMCW radar

The Sky radar Basic II is constructed as a special didactical FMCW radar for vocational training, specially adapted to the particular client requirement and the desired training topics. It uses a standard satellite dish with a diameter of 60 cm, mounted on a heavy camera tripod. Inside the housing (the black box under the antenna) there is the evaluation board ST200 with a USB 2.0 cable for connection to a personal computer or laptop. The feeding element of the parabolic dish is the transceiver K-MC1 operating in K–band. The antenna focuses the emitted power to a pencil beam with a width of about 2 degrees. This allows a very large maximum range of more than 200 meters, regardless of very low transmission power (much less than your own mobile phone).

Three different operating modes are used:

1. CW

   This mode uses unmodulated transmission for measuring the Doppler frequency as a measure of the radial speed.

2. FMCW

   The carrier frequency may be frequency modulated with a sawtooth or triangular waveform for measuring the distance and the radial speed.

The length and the shape of the ramp can be selected by the user in order to demonstrate the dependence of the range resolution and the measurable maximum unambiguous range. Because of the above average maximum range due to the energy budget, it is possible to present ambiguities in various modes of distance measurement.

3. FSK

   in the Frequency Shift Keying mode the radar can measure the radial speed and the distance simultaneously. The distance measurement may be very accurate in the range of centimeters. This mode is used at close range, while this measurement is ambiguous in range because it is based on differences in the received phase shift of the two alternating carrier frequencies.

Caused by the strong focusing of the beam by the parabolic dish it is possible to obtain a selective orientation of the antenna to detect various closely spaced objects. The measurement can also be recorded as a stream. This allows evaluation at a later date, for example in the seminar.

With precise angular alignment of the dish can be achieved following maximum ranges in reality:

- individual persons: 50…100 m
- Groups of people and cyclists: 100…150 m
- Cars: 250 m
- Trucks: more than 300 m

On request, the Sky radar Basic II can be fitted with a simple curved parabolic antenna, which then forms a fan beam. This offers advantages during the alignment of the antenna, since now the tilt of the antenna has got less impact on hitting the target with the beam. But the maximum range is reduced to about 70% then, since the transmission power is not as strong focused. The whole radar fitted with this kind of antenna will get more weight.

The marketing is organized by www.sky-radar.com. Each device is supplied with a customized training material to provide students to develop a practice in FMCW radar technology based on devision of own experiences.

Source: http://www.radartutorial.eu/02.basics/rp32.en.html