Appendix F: Stability and Accuracy of the Positioning System

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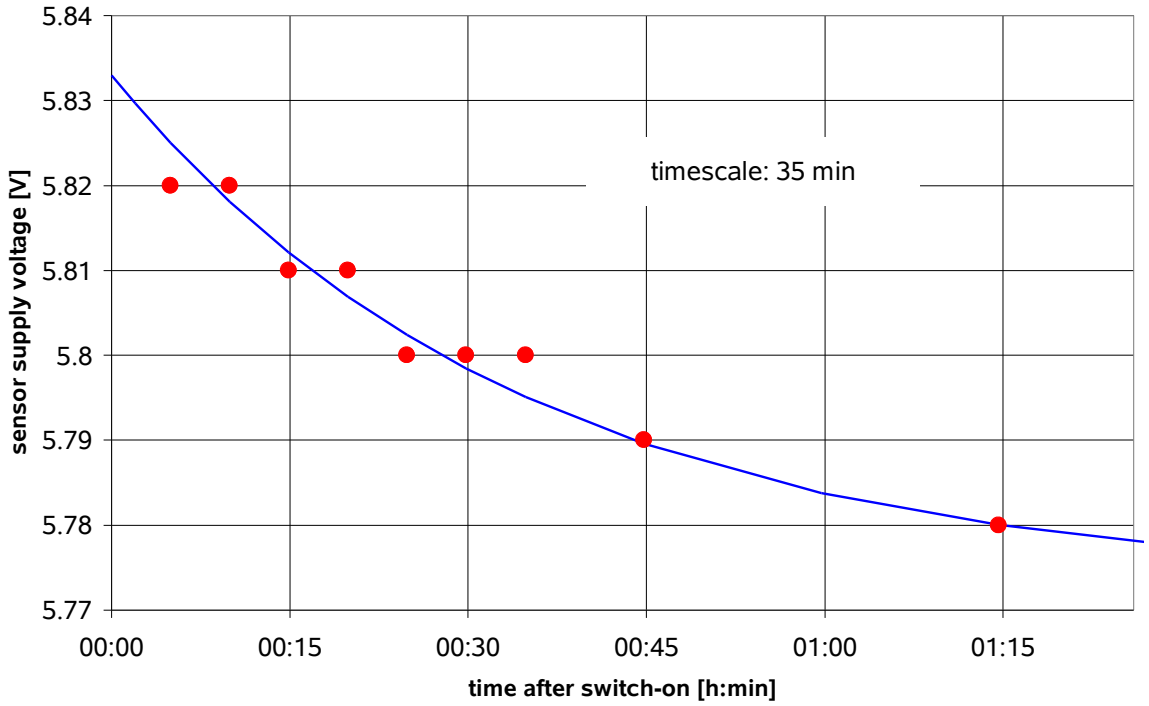
Experiences during Observation Runs:

- It was found quite regularly that setting the telescope to the predicted position of e.g. the Sun did not result in the Sun passing centrally through the antenna beam. This was particularly true for the first hour after switching on the apparatus.
- The HPBW of the antenna is about 1.5°, and thus the accuracy of the positioning system of ±1° does not allow a blind positioning.
- Also, it was noticed that a short manoeuvre in either direction could well improve the signal – when hunting for the Sun – but that such a change did not change the value indicated on the computer screen. Most probably, such a manoeuvre gave a change of the angle of less than 1°, so that it would not show up in the display of integer values.
- Sometimes, the display would change by 1° – or even 2° - entirely by its own.

Localizing the Azimuth Drift:

The following procedure was carried out: At the end of the previous observational period the telescope had been oriented towards the Astra 1H satellite. Now the computer and the controller interface were switched on. With a digital voltmeter the supply voltage for the azimuth sensor (terminals No. 1 and 3) was monitored, and its value noted as a function of time after switching on the Yaesu controller. This is shown below:



Also, the voltage from the azimuth sensor (terminals No. 2 and 3) was monitored, and found to track the supply voltage. Thus, the sensing potentiometer itself is not the source of any appreciable drift. The azimuth values read from the computer screen correspondingly drifted from initially 201° down to 199°.

This shows that the heating up of the LM 7806 voltage regulator in the Yeasu controller is responsible for a systematic drift of the position values, with a timescale of about 35 minutes. This drift is not noticeable in elevation, because of the smaller range of values from 0 to 90°. However, in azimuth, this causes an annoying overall drift of about 2° within the first hour after switching on the controller.

At the moment, there is no evidence for other sources of drift, such as by the operational amplifiers which sense the sensor outputs or the analogue-digital conversion in the controller interface.

Thus, it is recommendable to wait for about 1 hour until the Yeasu controller has stabilized, or – more simply – do not blindly rely on the azimuth readings, but determine a current offset values by localizing the target (the Sun) before positioning the telescope for a full drift scan.