

## Notes of MIRA refurbishment 2023 (Stefan)

Date: 14. - 18.08.2023

### Antenna replacement:

- OLD Cassegrain antenna dismantled and exchanged by new one with wine glass feed (no sub-reflector). 6 people were needed to do the job!
- New antenna also has new coating on the reflector (nano coating).
- The new feed should have less problems with attenuation artefacts due to rain (need to be proved).
- Also the drainage of the new antenna works without need to guide the rain water through the hoses going through the scanner interior. It now escapes the antenna at big holes at the side of the lower mounting ring of the antenna.
- The new antenna is bigger (1.2m diameter) and should gain 3dB in sensitivity
- Clutter fence (2 pieces) mounted around the new antenna to reduce ground clutter. Screws mounted using loctite
- New antenna+fence is more heavy, so we mounted steel bars with screws (loctite) on the bottom of the scanner unit (inside). In this way, the antenna and counterweight (scanner unit) are in mechanical balance.
- Antenna camera needed to be replaced as it would have touched the new (bigger) antenna. Need to re-focus the camera again. Also the Mobotic box inside the scanner unit was better fixed (with screws rather than cable ties)
- The old antenna was taken back by Metek; they will use it for testing purposes.

### New 45° twisted waveguide and antenna:

- Antenna turned by 45° together with Co-channel waveguide (made manually by 2 open-end wrenches; This enables use of SLDR mode

### Modulator tube replacement:

- Replaced old modulator tube by new one (old one is stored in Stefan's office). Also applied new thermal grease.

- Test of new tube revealed much improved modulator signal and TX signal.
- During re-powering of the TX, we discovered that the magnetron current increases strongly even though the magnetron HV was not yet at its maximum. Apparently, the magnetron is getting old and we only get 50% (8W average power) of the usual 20W. This 3dB decrease is probably compensated by the additional antenna gain. But we should consider buying a new magnetron if funding allows it and if Metek is able to provide a spare one.

Other things replaced/changed:

- Radar PC replaced by new one. New file formats due to new radar software version (e.g. .znc files containing spectra saved in Netcdf4 format)