

Comments on Rogers proposed schedule items for telecom on 2015/12/10 (K. Reif 2015/12/09)

1) BonnShutter: status report.

Level of completion:

- What's design work remains?

Design work is basically finished, mechanics as well as control electronics with interface.

Few minor things remain:

- Detachable handles for all 4 sections of the top cover (baffle side). This can be completed when the design of the pivot mechanism of the baffle is final.
- The cable route of the motor and encoder cables and corresponding fixations need to be defined/designed.
- Load hooks for crane (at the 2 outer brackets)



- What's in fabrication?

- Shutter drive section
- Shutter frame (Al extrusions)
- First shutter blade ordered (external manufacturer)
- Control interface
- Support structure for tests in cold chamber (Zeuthen)

- What has not yet been received

- Al sandwich (honeycomb) for the shutter covers, to be machined by the manufacturer
- Transport boxes (Shutter, electronics)
- Shutter blades

2) BonnShutter:

New test results, if any.

Light tightness of the tongue and groove structure of the shutter blades:



With a static arrangement that is similar to the final shutter blades when closed:

- Two black wooden boards with tongue and groove,
 - depth of groove: 10mm
 - Thickness of tongue 4mm
 - 2mm spacing all around.
- Illumination with 900lux, measured just at the gap.
- Integration 600 sec
- Distance to LN cooled CCD detector ca. 90cm
- **Result: 4 Electrons per 15 micron pixel per 600sec.**

Servo motors:

Operation with servo motor was tested and optimized to work over the required temperature range down to -10C. The Control unit allows reading back after an exposure operation parameters like velocity, torque, position deviation with high time/position resolution.

Tests pending.

- Functioning tests after assembling in Bonn
- Zeuthen: Vibration
- Zeuthen: Operation in cold chamber (chamber in Bonn is too small)
- Zeuthen: Light tightness
- Zeuthen: Stability of the illumination profile

3) BonnShutter: Shutter blades:

- **Design properties:** Sandwich of carbon fiber layers (0.5mm) and foam, total height 20mm, tongue and groove are exchangeable, i.e. all blades can be identically manufactured, easy replacement of tongue/groove when damaged.
- **impact resistance:** given by 0.5mm carbon fiber (more carbon – more weight)
- **static load survival:** as required, 200N over any 0.01 m²
- **wind resistance:** as required, at 180N per blade (half aperture) bending will be around 1mm (calculated independently by Alexander)
- **mass:** according to manufacturer 2.7kg (without paint, without tongue/groove)
- **Procurement status.** (Has a vendor been selected?) Yes

4) Caltech: report on last round of telescope tests.

Richard W., let's review your results and make sure we are ready to present.

We need to file a report on the ZTF Twiki.

Discuss whether vibration isolation is required at shutter interface

This is very important for Bonn/Zeuthen because that may have influence of our test plan