AugerPrime - Scintillator Surface Detector - SSD
Operations readiness review – Executive report

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The purpose of the review is to determine if the Scintillator Surface Detector (SSD) subsystem is ready to be integrated into the Observatory's operations for scientific production. Additionally, an assessment was required on the existence and availability of all necessary materials required for operation and maintenance. Key areas under scrutiny included the SSD module and associated mechanics, as well as the PMT and ISEG bases with all electrical connections and cable protections. We concluded that even if impressive progress has been made in the deployment of the SSD, **the SSD subsystem is not ready to be included in the operation of the Observatory for science production**. Based on the information provided, we have identified the pending and critical points to be completed and addressed before the SSD can be fully integrated within the operations of the Observatory.

Hardware commissioning

The initial cable protection for the SSD presents damages related to the UV. Another solution was proposed but its implementation is pending. This means that since the SSDs were installed, the cables have not been properly protected and they may have suffered damage. This committee points out:

- **cables are a critical risk and a mitigation measure is required promptly**;
- cover protection of cables needs to be installed;
- control cables have a fragile connector which it is impossible to find in Argentina, shipment from Europe should be envisaged.

Regarding the spare parts, we concluded that **there are enough PMT and bases** if the failure rate estimate is realistic. There are insufficient spares for:

- cables of all types;
- the gasket with UV protection for the lid of aluminium box.

No other components present any critical risks.

Documentation

This committee found that **there is missing or incomplete documentation in the EDMS and that it has to be completed or updated**. Among the missing information, we highlight:

- **the detector design: i.e. PMT base design, schematic of the gasket, new cable protector**;
- **installation and replacement procedures including safety measures**.

Detector performance and monitoring

We found that the **key performance indicators are not properly defined**. The Vmon and Imon values available in the monitoring tool used for performance characterisation are insufficient to assess detector performance. **Strong collaboration with the respective tasks should be encouraged and cross-coordinated**. We think that **a systematic assessment of SSD functioning and data quality is of primary importance within the next month**. Consequently, the committee emphasises the need to **understand PMT failures that are already known**. -

Operation resources

The estimation of the required resources (person-power and costs for operation and maintenance) has not been presented. Moreover, the person-power required to solve/implement all the above-mentioned tasks, including a comparison with the already allocated personnel, would help in assessing if the available person-power is sufficient or if it constitutes a critical risk.
This committee remarks that the construction of **a test bench for PMTs in Malargüe should be of high priority**, however, it is not critical for now. The committee recommends that **synergies with the other test benches should be investigated**.

Training

Even though several people from the staff are properly trained, we highly encourage the training of other teams to be able to solve possible SSD issues and therefore limitting the number of interventions in the field. Also, we emphasise the need for **an integrated maintenance strategy for the various components of the surface detectors.**