The Large Hadron Collider (LHC) will reach an instantaneous luminosity of \(5 \times 10^{34} \text{cm}^{-2} \text{s}^{-1}\) (~2027 onward)[1]. This necessitates the upgrade of the ATLAS Muon Spectrometer. The innermost station of the muon end-cap system, the Small Wheel, will be replaced by the New Small Wheel (NSW). The NSW is required to improve the trigger selectivity in a high background environment (up to 20 kHz cm\(^{-2}\)). The small-strip Thin Gap Chambers (sTGC) sub-system will be the primary trigger detector for the NSW. It is expected that the sTGC should provide hardware-based online track-segment measurements with a pointing accuracy of 1 mm for the muon Level-1 trigger in the end-cap region. The sTGC detector system is equipped with several types of radiation tolerant ASICs, electronics cards and FPGA based back-end processors to move a large volume of both trigger and Level-1 readout data from ~400k active channels off the NSW. We present the status and the results from the surface integration and commissioning of the sTGC sub-system at CERN. sTGC detector is in the form of wedges. Each wedge has 3 multilayered modules (quadruplets). Total 64 such wedges need to be assembled and tested.

**STGC WEDGE ASSEMBLY & X-RAY SURVEY**

- **sTGC Detector Assembly:**
  - Reception tests (Pulsers and high radiation tests)
  - Assembly into a wedge
  - Alignment platform installation, Faraday cage mounting
  - Gas Leak and Long Term High Voltage Test

- **Gluing of the quadruplets**

**X-Ray Strip Alignment Survey:**

- **X-Ray gun**
- **X-Ray survey station**
- **Micrometric Screw Setting (mm)**
- **Measurements of the collimated x-ray profile to determine the layer-to-layer strip alignment with a precision better than 40 \(\mu\)m[2].

**INSTALLATION OF THE STGC DETECTOR SERVICES & ELECTRONICS TESTS**

- **Service Installation:**
  - Fitting data cables + Front-End boards in a very tight space

- **Noise Measurement:**
  - For verifying the connectivity between physical and electronic channels.
  - Using an oscilloscope and Analog-To-Digital Converter on the Front-End Boards. Problematic channels: typically <2%

- **Trigger and Readout:**
  - The trigger and readout data connections are checked.

- **Data Quality & Synchronization:**
  - Tuning and calibration of a large number of clock phases from the on-wedge electronics for the proper data alignment and synchronization. Other signal quality tests (e.g. eye diagrams).

**REFERENCES**

[1] https://project-cifilo-industry.web.cern.ch/content/project-schedule