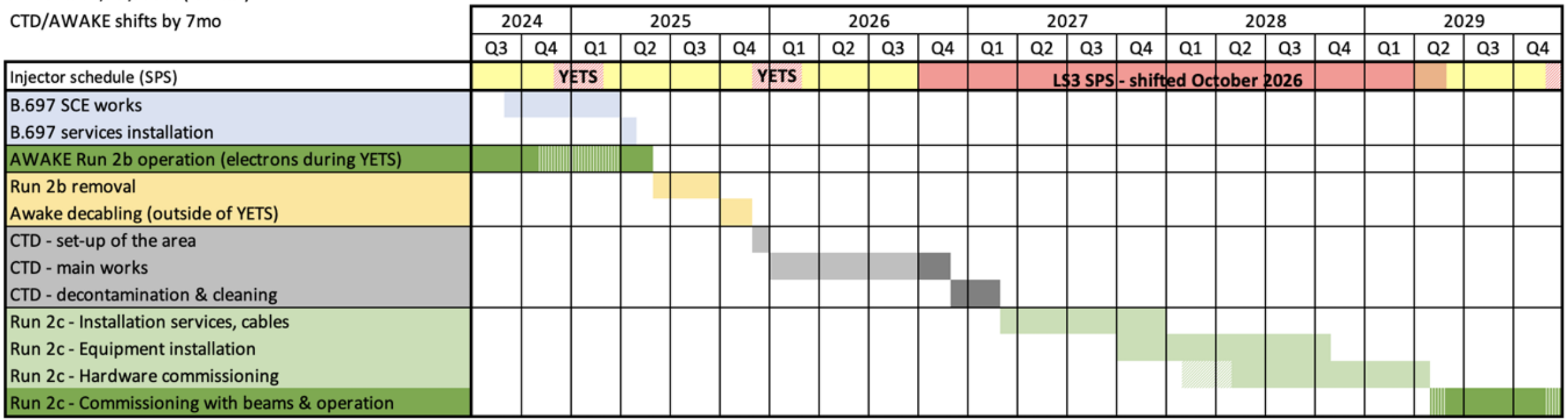
Status of BI for AWAKE run 2c

S. Mazzoni for the BI team

21st AWAKE BI Meeting, 21 January 2025

Latest AWAKE schedule

LS3 starts 1/10/2026 (+10mo)
CTD/AWAKE shifts by 7mo



As presented at last TB (27 November 24)

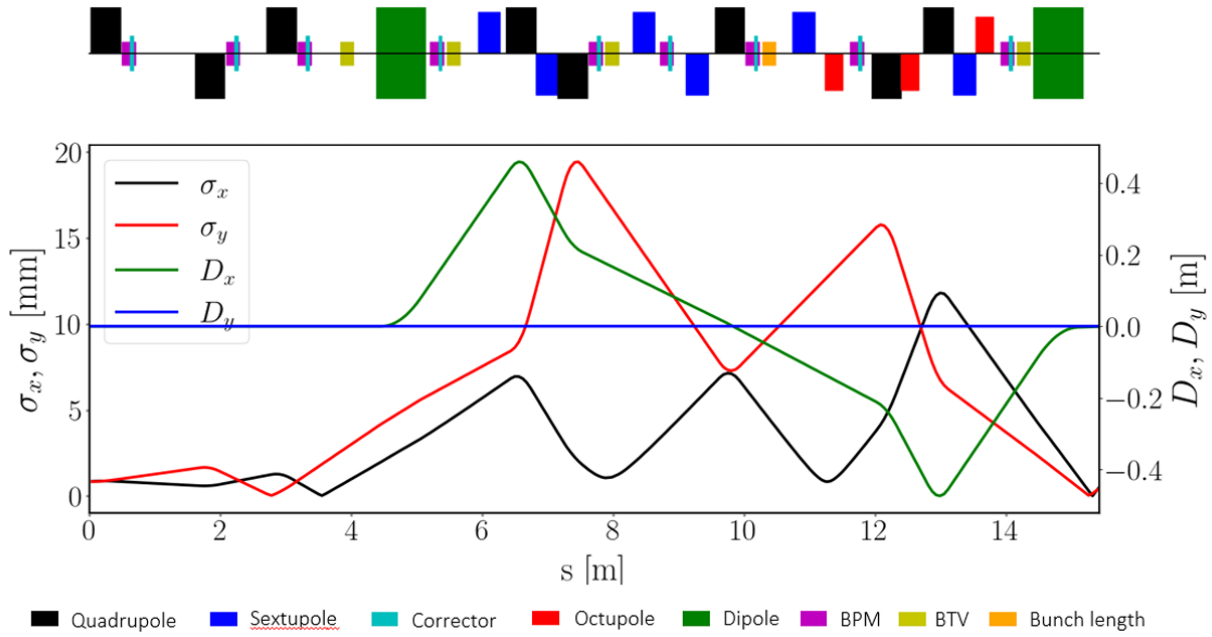
- **Run 2b end in June 25**
- **CNGS dismantling ends Q1 2027**
- **BI work in tunnel (installation > commissioning) start Q1 2027 until Q12 2029**

BI work for Run 2c

- Follow up / perform de-connection, transport and storage of Beam Instruments due to CNGS dismantling.
- Attend CSCP meetings for layout, integration, racks, cables, …
- Design and produce instrumentation for 150 MeV line
- Add digital cameras for laser lines
- Perform / follow up transport and connection of instrumentation of proton, 18 MeV, common, exp. hall instrumentation
- Instruments setup and commissioning with beam
- Support institutes (infrastructure for BI systems)

150 MeV line

- Agreement on number of instruments and line aperture based on line design by E. Belli
- Line aperture 40 mm except for high beta region
- 5 (+2 spares) screens (for transverse profile)
- 8 (+2 spares) 40 mm aperture BPMs
- 1 (+1 spare) 60 mm aperture BPMs
- Bunch length monitor
- Bunch charge monitor



150 MeV instrumentation: BPMs

- **BPM body: production based on TRIUMF design. Modification of feedthrough (not welded on body but on flange). First meeting with MME. Manufacturing instructions from Paul Dirksen (TRIUMF).**
- **Will produce 8 x 40 mm aperture, 1 x 60 mm. 3 spares (body + acquisition).**
- **BPM electronics: multiplexing + LP filtering + RF SoC. Performance OK for proton line (20 um res.), additional work needed for electron (10 um for 40 mm, 15 um for 60 mm).**
- **Schedule: initiate production in 2nd half 2025 (to be confirmed with MME), two years.**

150 MeV instrumentation: BTVs, ICT, BL

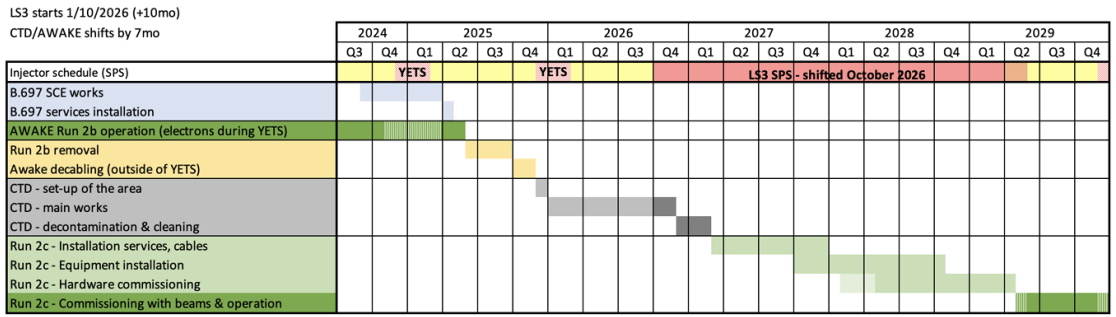
- **Commercial linear actuator with OTR, scintillator, calibration target whenever possible, will depend on beam size at BTV location**
- **Screen at 45 deg (standard choice), measures to reduce DoF possible**
- **Design will start in 20205, production 2026-27**

- **In-flange ICT from Bergoz, installation in 2027**

- **Bunch length: EOSD (CERN), Coherent ChDR (UMan), coherent radiation imaging (ULiv)**

Resources / changes / actions

- **AWAKE BI WP presented at BI project board on 16 Jan 25:**
  - origin tech (ML) start moved from 2025 to **Q3 2026**
  - origin tech (BP) start moved from 2025 to **2027**
  - Quest (SW) start moved to **Q3 2027**
  - Check all DICs (ICT not included) - open
  - New: investigate alternatives to camera servers (incompatible with FESA, no need for storage) - open
  - clarify position of BLMs (15 refurbished) - open



Issues / uncertainties

- **cost of cables for TT41 BPM electronics refurbishment NOT included**
- **supports NOT included**
- **Pepper-pot diagnostics not used in 18 MeV line. Convert into screen? (Steffen)**
- **Add in-flange transformer to 18 MeV line? (Steffen)**

- **ChDR / HF BPMs: more R&D needed for good performance with nominal (3E11 p+) proton bunch. NOT INCUDED in budget request. Present system not really used by AWAKE collab. Decision needed (keep as is / upgrade / descope).**

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