

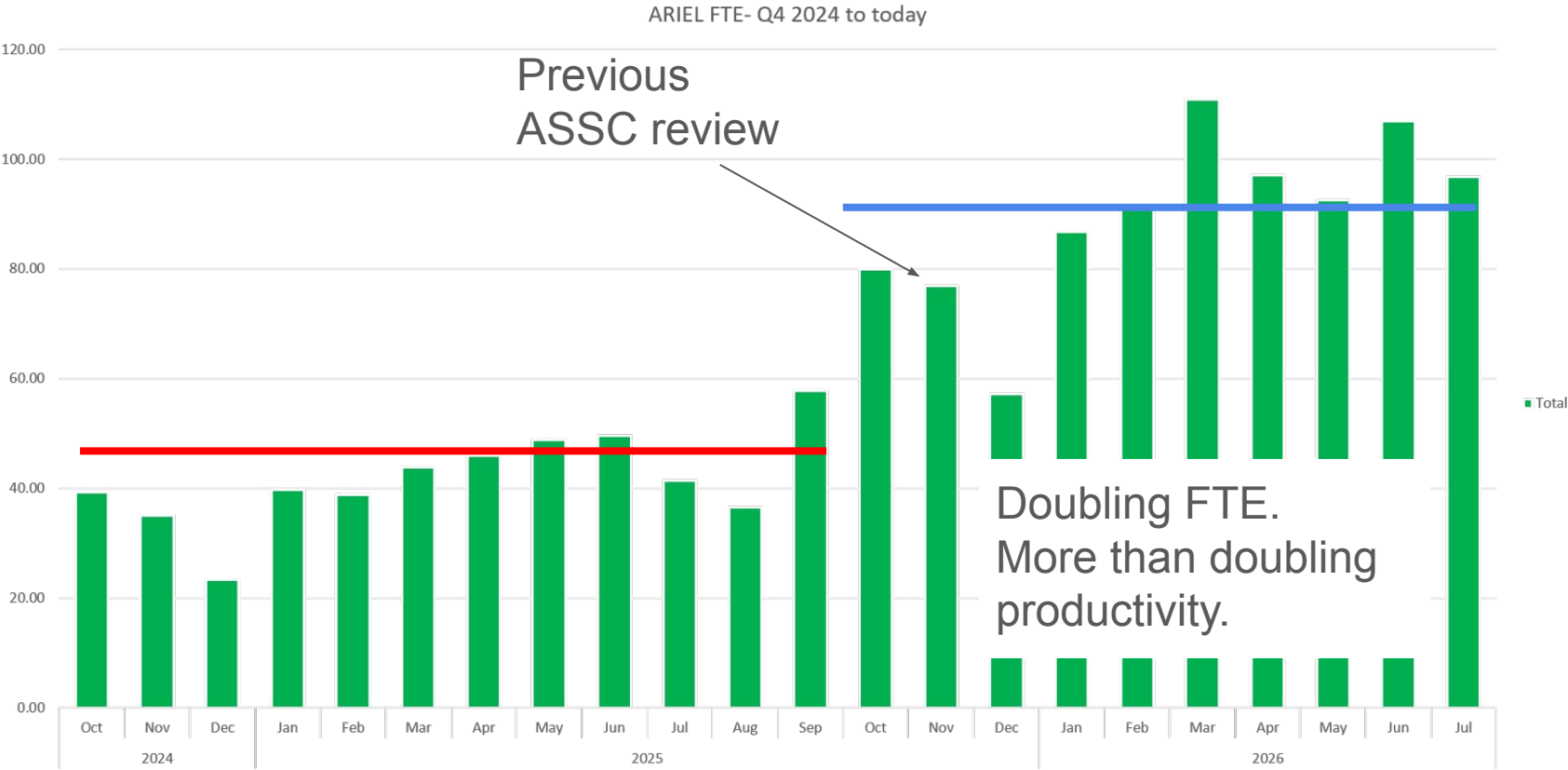
ASSC Review #18

closeout

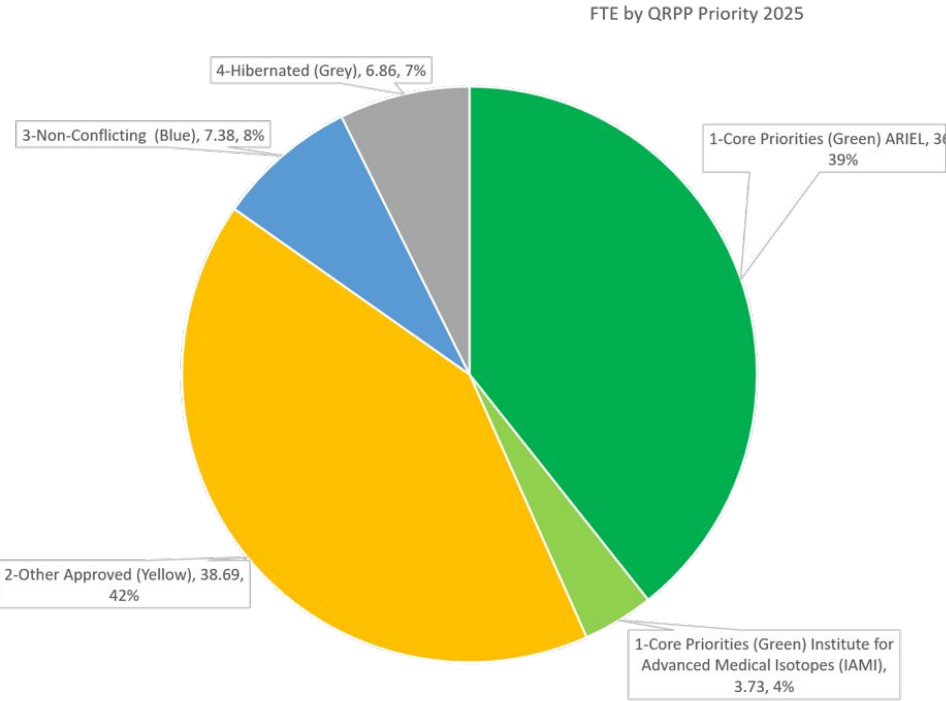
October 2, 2026

ASSC

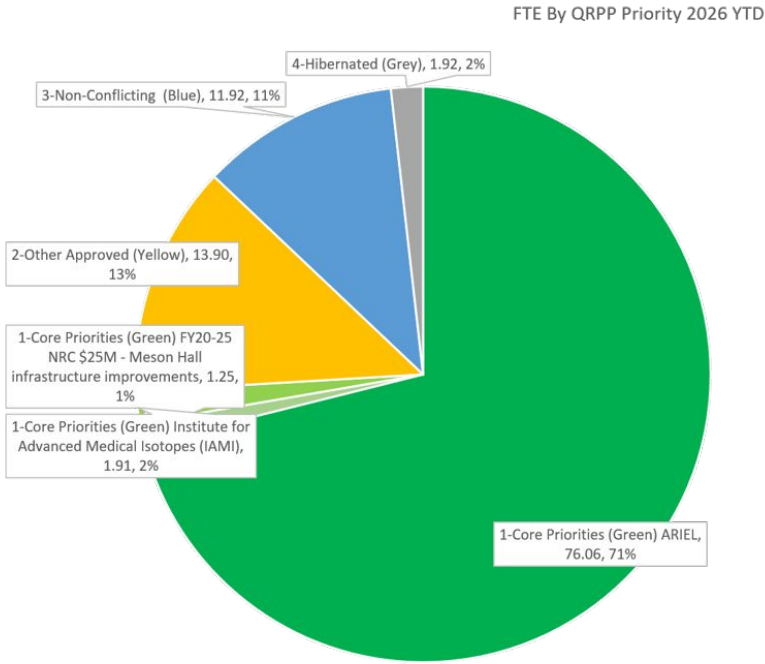
LS 2026: A phase transition in Lab activities



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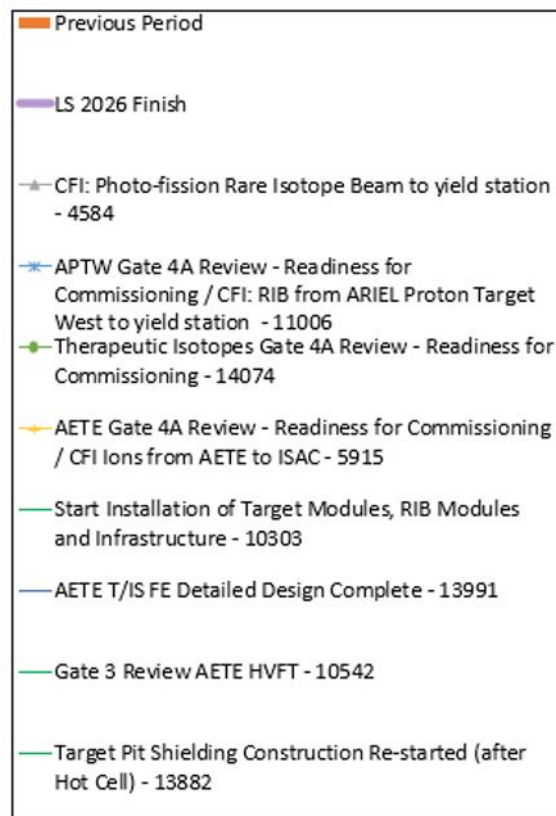


2025

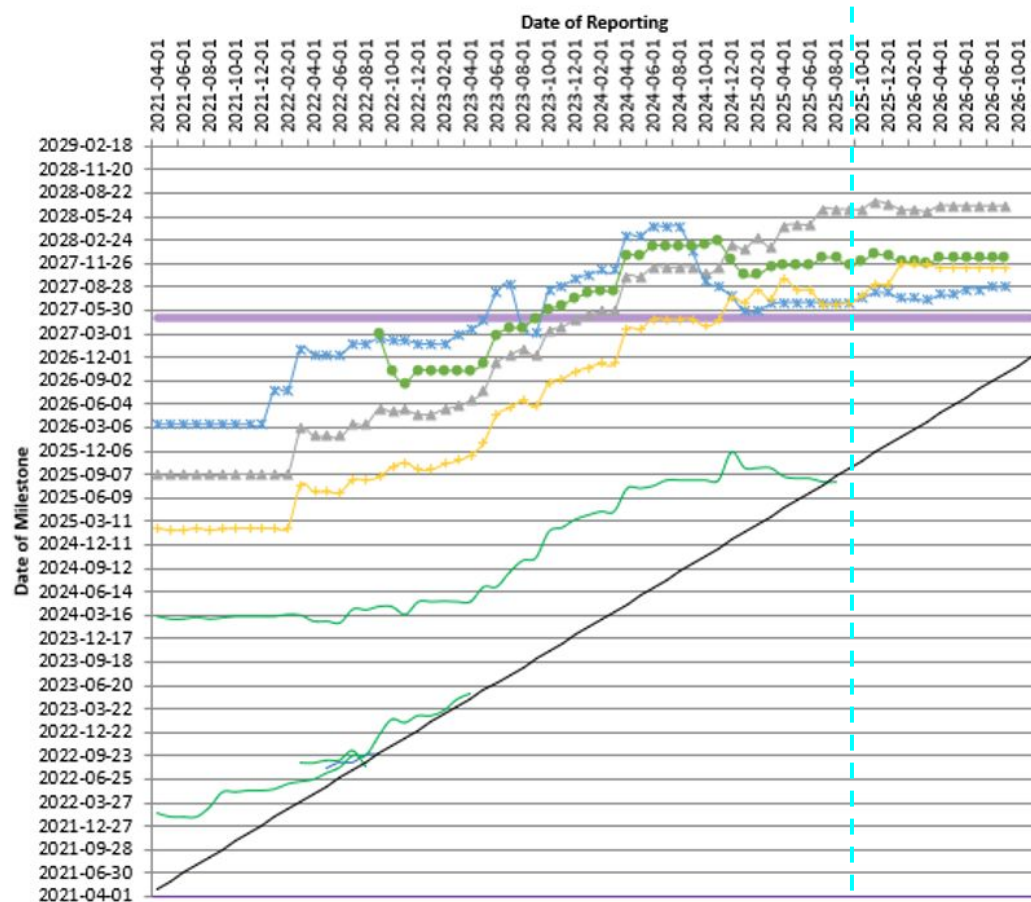


2026

LS 2026: Sunny forecast



P342 - Program Milestone Trend Analysis



LS 2026: Expanding ARIEL ecosystem

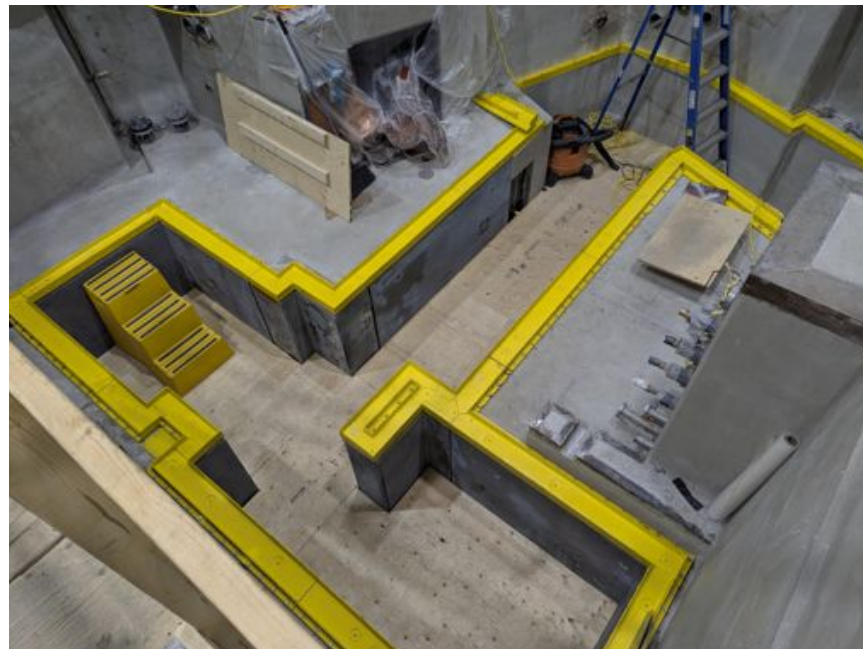
Growing the
Target Station
Forest

... soon to be
transplanted to...



LS 2026: Expanding ARIEL ecosystem

... Target System Canyon



LS 2026: Expanding ARIEL ecosystem

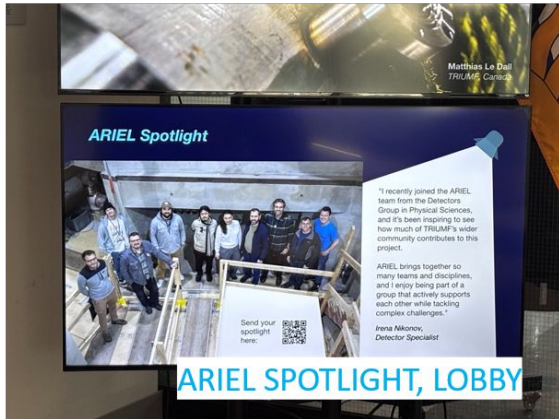


...outgrowth on
canyon walls...

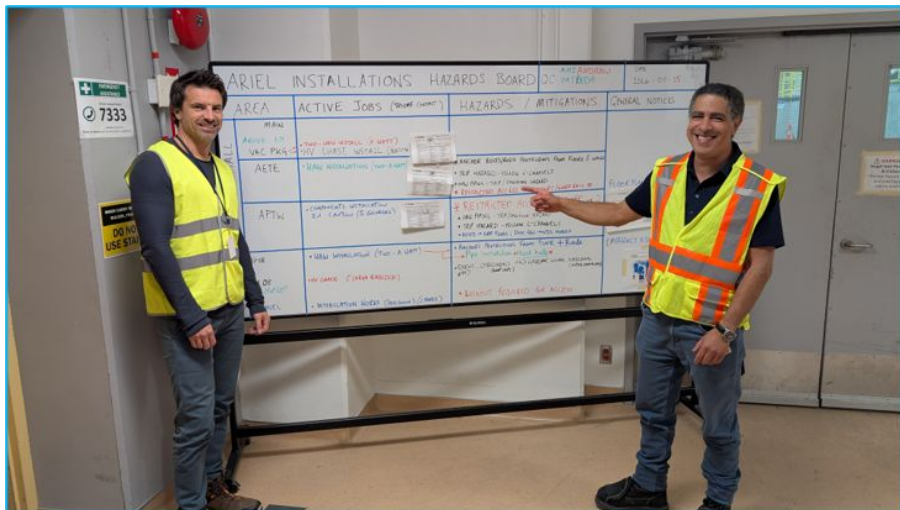


LS 2026: Broadcasting the achievements

ARIEL LS26 Dashboard		
Milestone		Status
 Fixed shielding construction complete		
 Ready to start all Proton Station modules assembly		
 Ready to start all Electron Station modules assembly		
 Proton Station infrastructure ready for first modules		
 Electron Station infrastructure ready for first modules		
 Proton Station modules ready to install		
 Electron Station modules ready to install		
 BL4N and electron lines installed		
 Controls, MPS and safety systems installed		
 Substantial completion of installation		

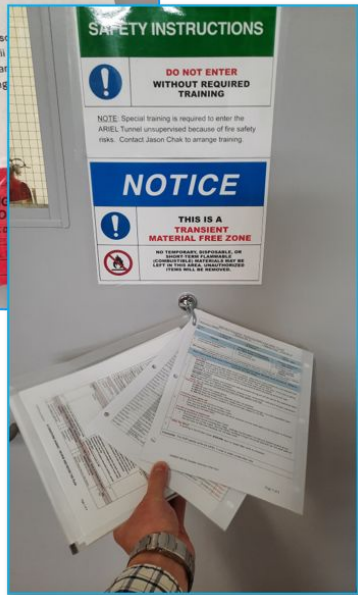
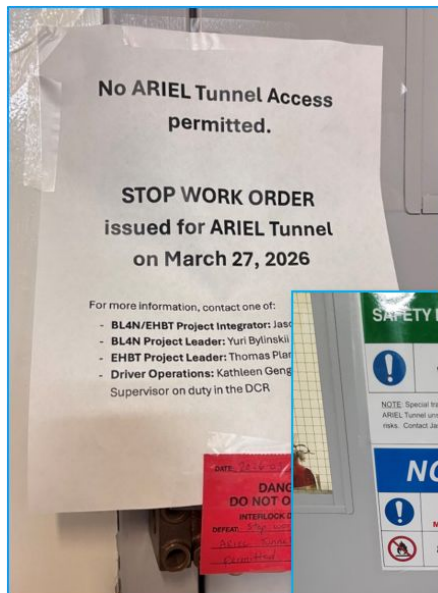


Prioritizing Safety

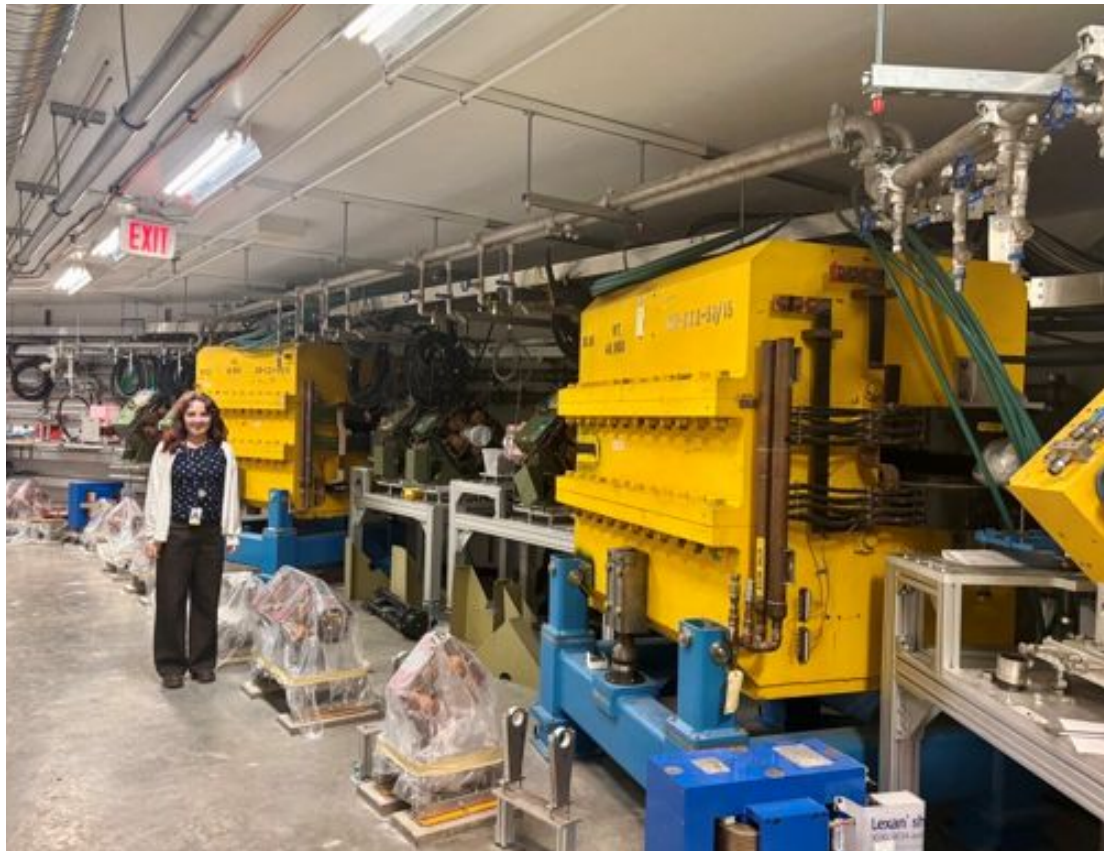


- **Qualified Coordinator:**

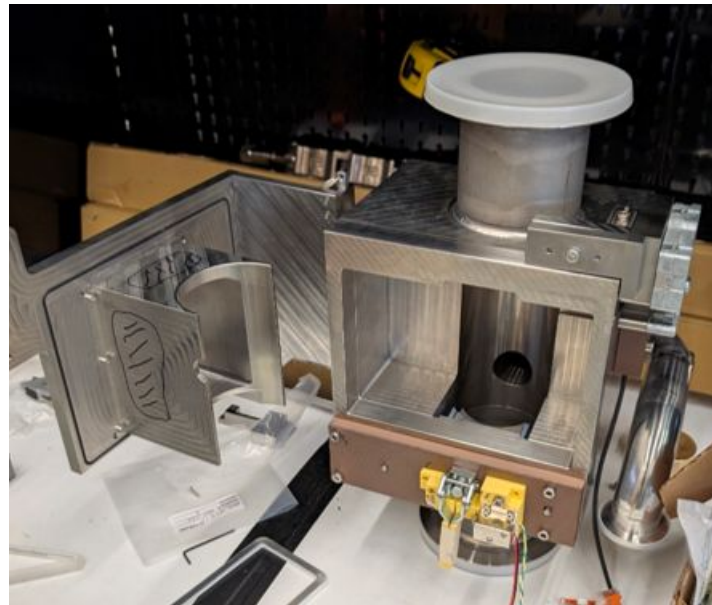
- *An individual appointed by a Prime Contractor to manage and coordinate the occupational health and safety activities at a multiple-employer worksite.*
- Roles and responsibilities defined.
- The QC is responsible for maintaining the Hazard Board, ensuring it is up to date.



Technical progress - beamlines



Technical progress - target systems

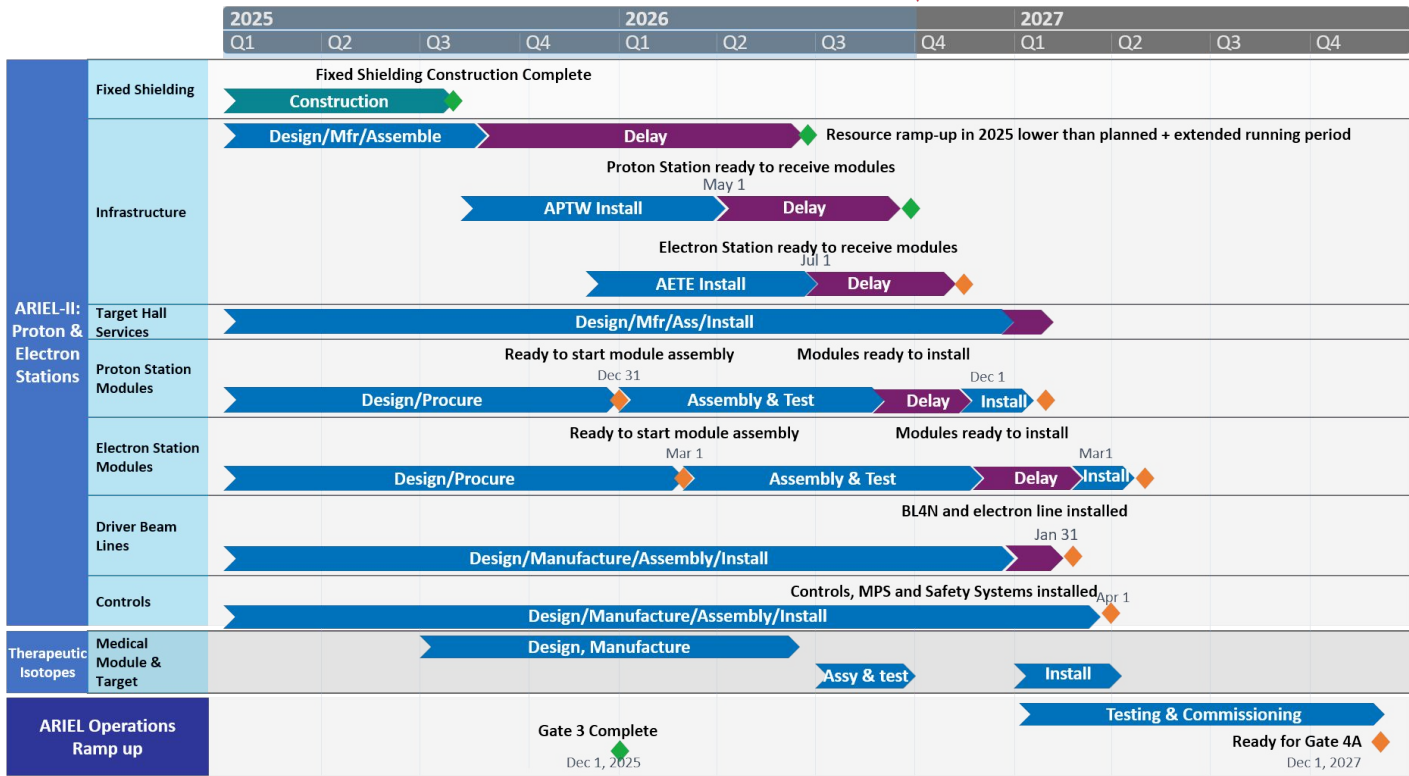


Technical progress - services



Delays compared to November 2025 plan

Oct 2026 Status - ARIEL - Milestones



Project Management Recommendations

- Distribute the ARIEL-wide commissioning plan (including all high-level system tests) at the next review.
- Following the delayed start of the LS, there have been additional delays in the infrastructure and services:
 - At next ASSC, present the list of activities which have been deprioritized/reprofiled (post LS26) as well as those which may be impacted by late commissioning of the safety systems.
- Give status of the controls work in a presentation at the next review.
- Present plan to address late budget requests / cost overruns.
- Recommend to include lab-wide maintenance activities in the ARIEL schedule and evaluate impact (co-activity, safety concerns, availability of services, resource).
- Dashboard draws visibility and engagement around ARIEL progress: recommend complementing with more photos and timelap videos.

P353 (Target stations)

- Impressive progress during LS26 is registered in both hardware manufacturing and on-site installation activities.
- Completion and delivery of the HVFTs (TM1 and TM2) continue to be a major schedule risk.
- The assembly of the target modules is progressing quite efficiently. However, the available space for module assembly is limited. This effort will require careful coordination of assembly activities and transport to the target hall to get everything completed in a timely manner.

Recommendation:

- Document lessons learned from installation and integration activities to support commissioning and operation.

P179/363 (Driver beam transport)

- Impressive progress made in beamline BL4N and EHTB installation; design completion, diagnostics fabrication, services and cable installations.
- Infrastructure challenges, including building settlement, some cable installation and shielding fitment issues, may all require corrective work.
 - Recommend: Early settlement impact analysis would help quantify level of optics adjustments required and reduce commissioning risk.
- MPS and safety systems remain a key schedule risk, with procurement, manufacturing and installation still outstanding and readiness timescales already constrained.
- Diagnostics, vacuum equipment and beampipes remain largely uninstalled despite hardware being available.

P424 (Target hall infrastructure)

- There seems to be excellent coordination and project execution considering the diversity of work packages managed within P424.
- The delay of the Module Storage Frame execution to allow engineering resources to focus on Cap Shielding scope – is a good example of reprioritization and resource management across interconnected project scopes.
- Several challenges, including shielding block composition, lifting concepts, storage integration, and transfer tooling, have been actively addressed and are under control.
- Procurement packages are reported as being off the program critical path and therefore they currently present limited impact to the overall project.

P424 (Target hall infrastructure)

- Gate 3 readiness appears generally positive although several project deliverables remain incomplete (including engineering notes, drawing releases, procurement planning for some packages, lessons learned documentation).
- The project currently reports no major technical risks/issues; successful completion depends on timely procurement and installation coordination.

The committee makes the following recommendations:

- Even when the scope of commissioning activities is limited, consider formalizing integration and testing documentation (lessons learned).

P374 (E-linac)

- Significant progress made on EHDT recommissioning, completion of DLLRF development and bench testing, procurement of the injector cavity SSA, testing of EACA Auto-ON functionality, completion of beam commissioning activities, and start of integrated LLRF testing with NC buncher cavity.
- Opportunity to secure BC Hydro income of \$600k, for energy savings demo, being critically reliant on receipt and test of SSA from vendor (China) - already late,
 - **Recommend: project should ensure funds are secured.**
- Plasma conditioning remains a priority (as per previous ASSC).
 - **Recommend: Commissioning/operational plasma conditioning plans to be confirmed and appropriately integrated.**
- DLLRF system not yet been fully demonstrated ahead of EHBT commissioning, reliant on existing analogue system (as backup), which has no operational spare.
 - **Recommend: LLRF system resilience to be confirmed.**

P358 (Technical infrastructure)

- Good progress has been made on technical infrastructure, with designs completed and having moved to installation during the last year.
- Target Hall nuclear ventilation started already last fall, ahead of the initially planned installation close to the end of the project. Installation is also making good progress on mechanical systems and cable trays in the Ariel tunnel, the target pit service rooms, BLN4, and the proton cave.

P310 (CANREB)

- Fabrication of the parts for the electron gun based on the demonstrated TITAN design started with some delay and is now 80% complete with remaining parts being outsourced. The planned off-line testing before installation in the EBIT is prudent.
- Expedited completion of the gun and conducting these tests will be important.
- Instability of extracting beam from the cooler buncher is an issue for which charge-up in the extraction optics has been identified as the most likely cause.
- This charge-up problem should be addressed without further delay and in a permanent manner by opening the system and mitigating possible insulator charge up. After the necessary modifications are made a recharacterization of the beam stability makes sense.
- Recommendation: Address the cooler buncher beam instability issue by opening the system and eliminating the possibility of insulator charge up in the extraction optics.

P354 (Separator and RIB transport)

- The ASSC commends the team on the progress made on the RIB modules, which was witnessed both during the tour and the presentation: Modules 1-4 are assembled and HV tests, leak checks, and alignment checks were successfully.
- The combined vacuum testing of the RIB modules assemblies will be the last critical step before installation in the target hall.
- Good progress has also been made on the remaining component fabrication and assembly or procurement, including Modules 5 and 6, the pre-separator magnets, and the APTW entrance module.
- The ASSC was very pleased to see the Module Mounting System, still on the critical path at the last meeting for this work package, to be completed for both stations and installed within a 150 μm tolerance.
- There appears to be no schedule risk and a healthy schedule contingency.

P487 (Hot cell and remote handling)

- There continues to be good progress on the preparation of the hot cells for ARIEL operations, including the medical target handling capabilities.
- The completion of detailed design drawings for target storage areas (main and intermediate) is behind schedule, but this does not yet impact the critical path.
- Completion of the implementation of the medical target handling system (i.e., installation of the blower) and design/fabrication of the internal flask transfer system should be prioritized to ensure readiness for initial operation of the APTW.
- A test of the turntable with a full load (i.e., a heavy module) needs to be scheduled and successfully completed to demonstrate the full capability of this hot cell for module maintenance activities.

P355 (Laboratories)

- The project team has demonstrated good progress within its direct scope, successfully delivering procurement, renovations, documentation, and laboratory preparation activities.
- Project completion is now driven primarily by infrastructure and service installation activities outside direct project control
- Delays related to ventilation, plumbing, electrical connections, and Hot Lab availability pose the main risks to achieving commissioning by the end of 2026.
- Budget sufficiency could become a concern if external contractors need to be engaged to compensate for unavailable internal resources.

Conclusions

- The committee congratulates TRIUMF for a successful transition to LS 2026!
- The (enhanced) ARIEL team has made impressive technical progress since the last ASSC (almost one year ago!)
 - We are halfway through LS 2026 - “half the work is done”
 - Good indication that installation work will be completed as planned
- Plans for commissioning with beams (Q1 2028) being developed
 - Holding an ASSC review in ~6 months would
 - coincide with end of LS 2026 (problematic?)
 - allow a deeper discussion of the completed beam commissioning plan. We request a presentation on this topic.