



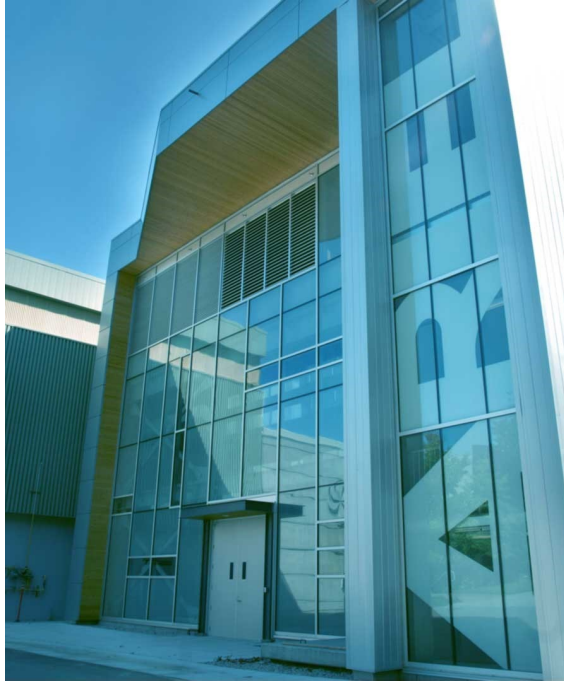
P374 – e-Linac status and strategy

ASSC Fall 2026

October 01, 2026

Project Leader:
Thomas Planche

Project Integrators:
Stephanie Diana Rädcl



Discovery,
accelerated

- ❑ Recommissioning the modified high-energy dump transport line (EHDT)
- ❑ Installation and test of the new low-level RF (LLRF) board
- ✓ Accelerator Cryomodule (EACA) Auto-ON developed and tested
- ✓ Purchase Solid State Amplifier for Injector cavity (EINJ)

Commissioning done in December 2025.
Formal commissioning is left. 4 documents need to be approved:

- E-Linac Beam Commissioning Record -EABT/EABD and EHAT and EHDT - under review
- Commissioning Record for the E-LINAC BLM EABT/EABD/EHAT/EHDT Section - under review
- E-Linac High Energy Beam Dump Commissioning Record - under review
- E-Linac Tune Lock Commissioning Record - in preparation

 Document-191099

E-Linac Beam Commissioning Record - EABT/EABD and EHAT and EHDT

Document Type: Commissioning Report (Record)

Release: 3 Release Date: 2025-07-31

Author(s): S. D. Haddad

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Reviewed By:	A. Haddad
Approved By:	T. Planché

Written Reviewed Approved



 Document-193267

Commissioning Record for the E-LINAC BLM EABT/EABD/EHAT/EHDT Section

Document Type: Commissioning Report (Form)

Release: 2 Release Date: 2025-05-10

Author(s): R. Reimann, W. Alkorta

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Reviewed By:	S. Haddad
Approved By:	T. Planché

 Document-204098

E-Linac High Energy Beam Dump Commissioning Record

Document Type: Commissioning Record

Release: 2 Release Date: 2025-11-17

Author(s): Brandon Humphries

Name:	
Author:	Brandon Humphries
Reviewed By:	Thomas Planché
Approved By:	Bob Larché

Written Reviewed Approved



 Document-206594

E-Linac Tune Lock Commissioning Record

Document Type: Commissioning Record

Release: 1 Release Date: 2021-09-13

Author(s): S. Haddad

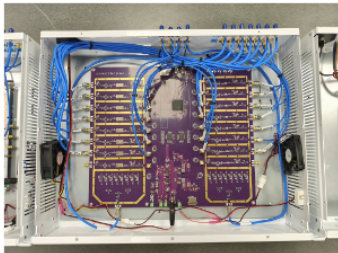
Name:	
Author:	S. Haddad
Reviewed By:	M. Haddad
Approved By:	T. Planché

Written Reviewed Approved

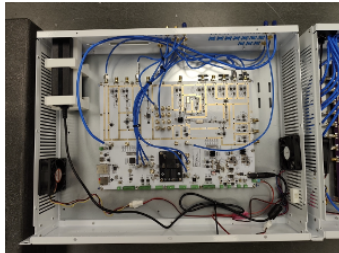


LLRF board testing

The LLRF board development needed more time as expected, but finished first half of 2026.



1.3 GHz 8-channel up/down-conversion module



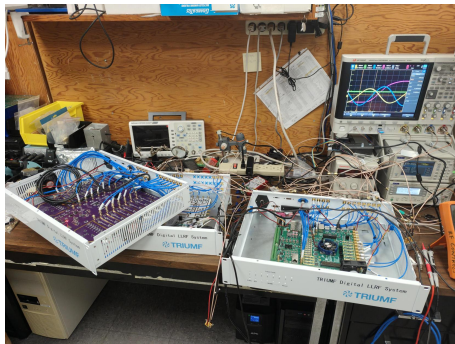
1.3 GHz multi-channel synthesizer module



Digital signal processing module hardware

LLRF board testing

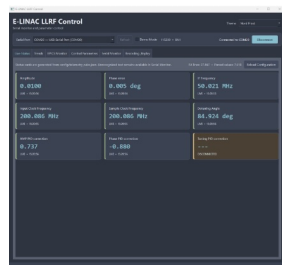
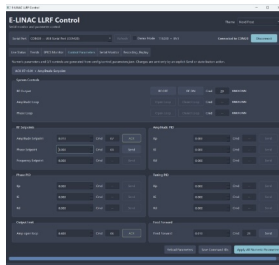
Bench testing finished on August 31st.



e-Linac is now warm, therefore boards cannot be tested on EINJ or EACA.

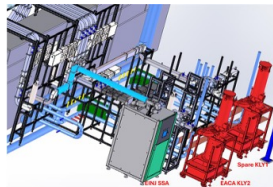
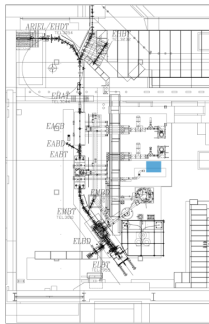
LLRF board testing

The full system was moved to the e-Hall roof for online testing and integrated into the buncher. Online testing has started. Progress is promising.



Solid State Amplifier

The Solid State Amplifier is part of a BC Hydro incentive. If we manage to have it installed and commissioned until March 14th 2027, we will get reimbursed. The SSA was purchased in May 2026. We are currently waiting for the SSA to arrive.



Solid State Amplifier

Under the circumstance that we will finish the demonstration of the purchased the SSA on time, our contact to BC Hydro estimates we can calculate with the incentive paying us \$600,000 back.

A selection of the most relevant risks from current risk registry:

Risk	Mitigation
SSA deliverable is demonstrated too late and we lose the BC Hydro incentive	We asked for a 3-month extension.
New LLRF not fully tested before starting EHBT commissioning	Can rely on the existing analog LLRF system, with increased risk (no working spare). Plan cooldown as early as possible in 2027 to allow for testing.
Limited number of trained operators	Dedicate time to operator training
No new cathode installed before starting EHBT commissioning	Work requests for replacements are already placed
Descopes work packages (safety cup, cooled racks) lead to equipment failure or poor performance	Risk accepted, no mitigation

Gate-3 for re-affirmation - A Reminder

- Gate review took place on September 12th, 2025
- Main focus on low-level RF controls (LLRF) upgrade.
- Controls side of the slow venting cart.
- Several minor work packages de-scoped.
- Risk register updated and resource-loaded schedule integrated with the rest of the ARIEL project plans.
- Add plasma conditioning was recommended at gate review.

TRIUMF		Gate 3 Review Report for P374			Document-251017	
Initiation	Definition	Planning	Detailed design	Implementation	Commissioning	Ops
Recommendations: • For LLRF project - Everything beyond rf group and cryo oversight (breakfixes -> WCG), planned extra resources requested through QRPP • Add procurement to your schedule • Integrate the schedule into the ARIEL schedule • Add plasma conditioning to the scope						
Actions					By	Date
Add procurement to the schedule					TP	Sept 19
Integrate schedule into the ARIEL schedule					TP	Sept 19

Work Package Description	2025				2026												2027			
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Cryo at 2K	Machine Cryo at 2K																			
Cryo maintenance																				
Recommissioning of EHDT																				
Auto-ON EACA with analog board																				
Digital LLRF design	Design		Review																	
Digital LLRF modules detailed design and fabrication				Fabrication																
Digital LLRF bench testing																				
Digital LLRF board testing on buncher														Test		Test				
Testing of FF upgrade using buncher														Test		Test				
Digital LLRF board testing on EACA																				
Digital LLRF board testing on EINJ																				
LLRF updated firmware testing on EINJ																				
LLRF updated firmware testing on EACA																				
Water system transfer to Beckoff PLC											Installation									
Slow venting cart Controls											Installation									
Slow venting cart commissioning															Comm					
Plasma conditioning devel	Development on test cavity																			
Plasma conditioning testing																		testing		
SSA purchasing											Procure									
SSA installation																	Installation			
SSA commissioning																	Commissioning			
Critical Path																				
Planned & On-track																				
Installation																				
Outsourced Work Pkg																				
Completed																				

- ☐ Formally recommissioning the modified EHDT beamline
- ☐ Finish testing the new LLRF board on buncher
- ☐ Install and commission Solid State Amplifier
- ☐ Commission slow venting card
- ☐ Finish decoupling water and vacuum PLCs

Thank you
Merci
Hay ce:p qə

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