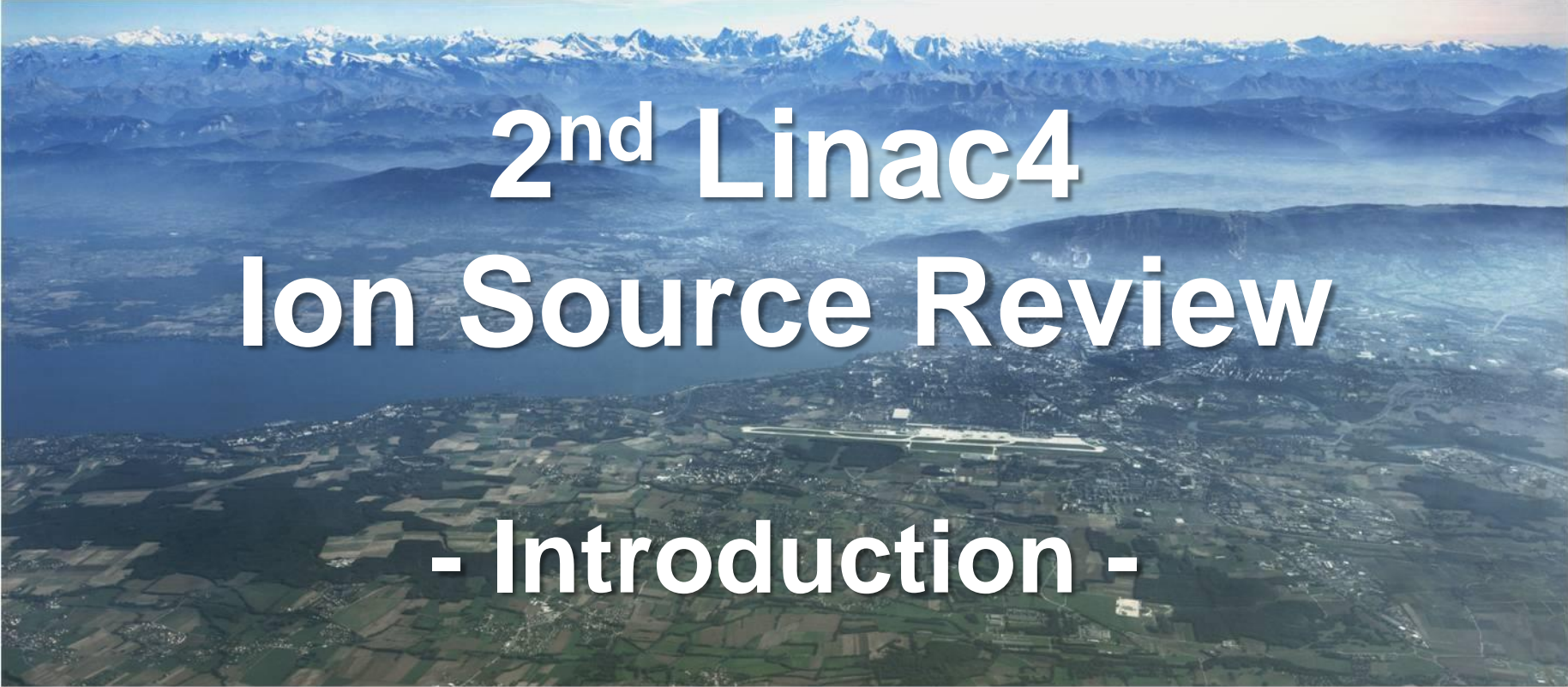




LHC Injectors Upgrade

An aerial photograph of a mountainous landscape. In the foreground, there is a green valley with a small town and a long, low building. In the middle ground, a large blue lake is visible. In the background, there are snow-capped mountains under a clear sky.

2nd Linac4 Ion Source Review

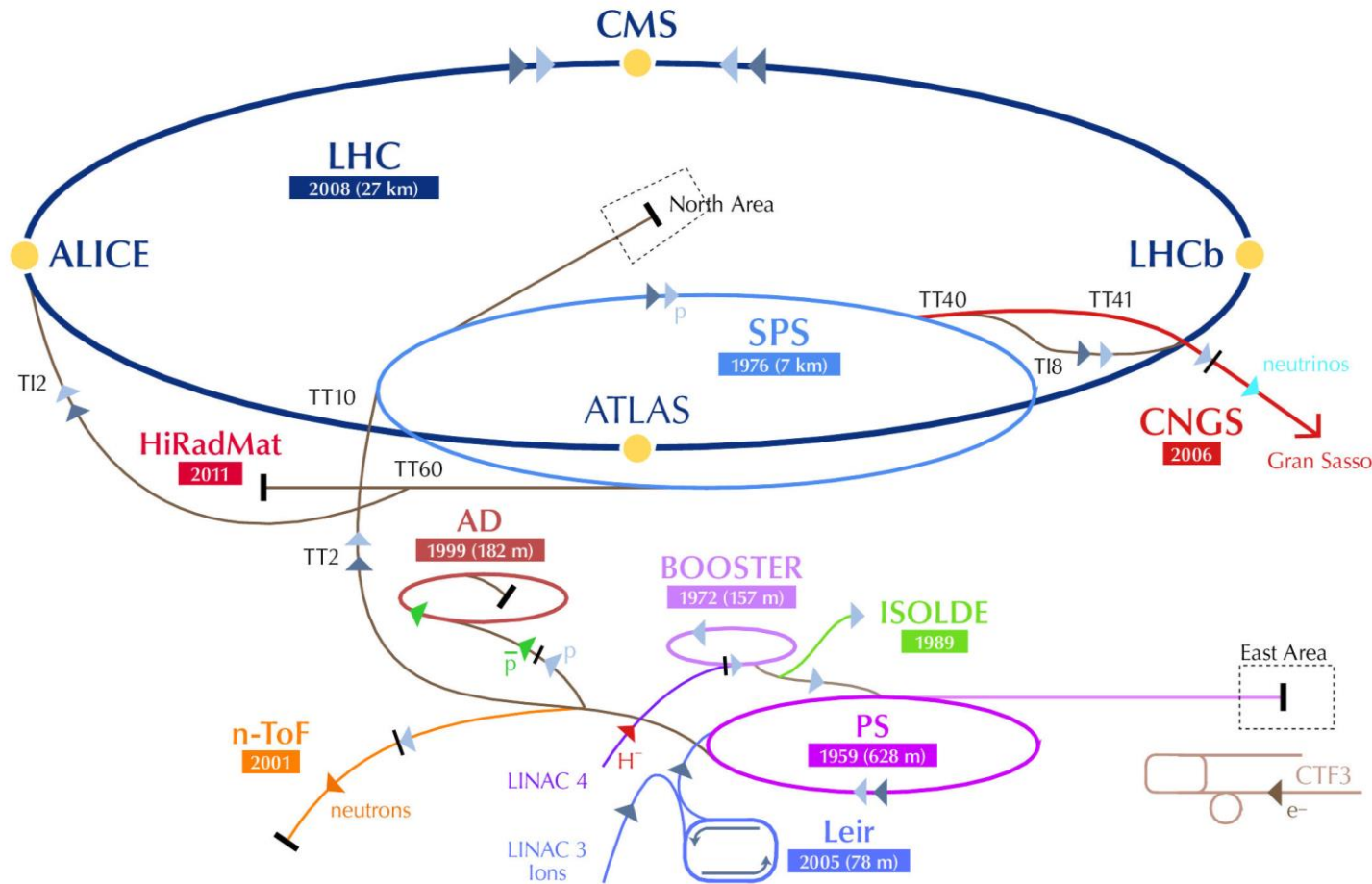
- Introduction -

R. Garoby
14/11/2013





Linac4 mission



Once connected to the PSB, Linac4 will be the source of all protons at CERN, for all experimental facilities (ISOLDE, AD, nToF, East Area, SPS North Area and LHC).

In addition to beam characteristics, **availability & stability of performance are crucial requirements** (e.g. for the future HL-LHC, where robust injectors are key to minimize turnaround time).



Outcome of the Review of LHC and Injectors Upgrade Plans («RLIUP» – 29-31 Oct. 2013)



<https://indico.cern.ch/conferenceDisplay.py?ovw=True&confId=260492>

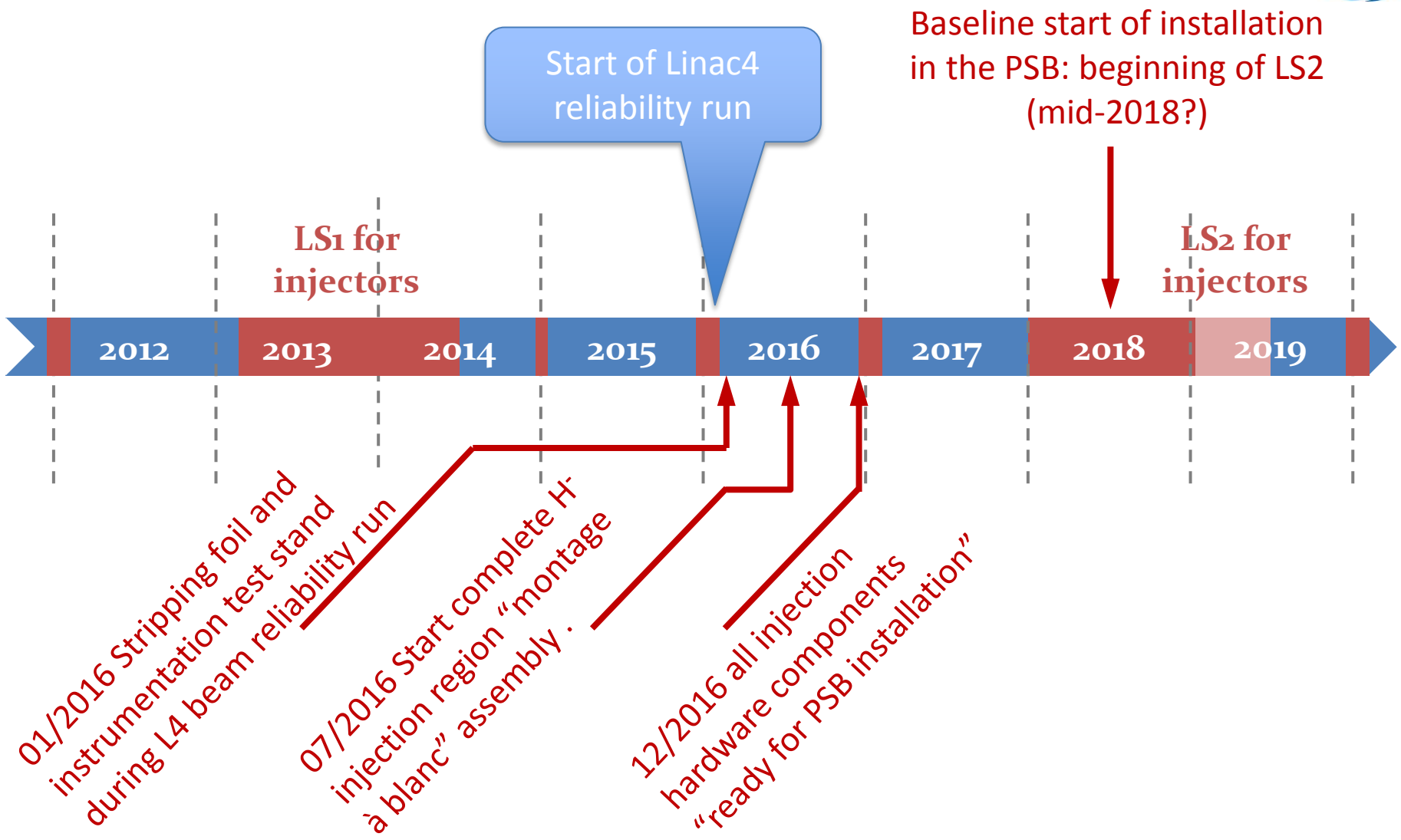
No experiment supported our proposal of connecting Linac4 to the PSB with H^- injection at 160 MeV during LS1 and LS2 because of the 4.5 months of additional interruption of proton physics.



1. It is likely that the new baseline schedule of LHC will foresee the connection of Linac4 to the PSB (160 MeV H^-) during LS2. The start of LS2 itself is probably going to be in the second half of 2018.
2. **The planning of the Linac4 project will however not change**, to preserve a working alternative to Linac2, in case of failure.
3. Hence **the goal for the H^- ion source is to be of nominal characteristics at the latest in February 2016**, when the reliability run will start.



Updated plan for Linac4 to PSB Connection





LHC slipped baseline (typical example)



	J	F	M	A	M	J	J	A	S	O	N	D	Days/year
2011		1	2	3	4	5	6	7	8	9	IONS		200
2012			1	2	3	4	5	6	7	8	9		200
2013	IONS	IONS	LS1 - SPLICE CONSOLIDATION										0
2014													0
2015	CHECK-OUT	RECOM	RECOM	1	2	3	4	5	6	7	IONS		130
2016		RECOM	1	2	3	4	5	6	7	8	IONS		160
2017	EXTENDED YEAR END TECHNICAL STOP			RECOM	1	2	3	4	5	IONS		100	
2018		RECOM	1	2	3	4	5	6	7	8	IONS		160
2019	LS2 (LIU UPGRADE: LINAC4, BOOSTER, PS, SPS...)												0
2020							RECOM	RECOM	1	2	3	4	80
2021		1	2	3	4	5	6	7	8	9	IONS		190
2022		RECOM	1	2	3	4	5	6	7	8	IONS		160
2023	HL-LHC UPGRADE - PHASE 1 (Inner triplets...)												0
2024	HL-LHC UPGRADE												0



Mandate of the Review Committee



- a) **Review of the linac4 ion source Work Package; Compare what has been achieved with respect to what was planned and review what is foreseen. Lessons?**
- b) **Estimate the probability of having a sufficient beam current (40, 60, 80 mA) within the right emittance (0.25 mm.mrad) and the right duration (100 + 400 μ s) in time for the final commissioning (February 2016).**
- c) **Is it still necessary to pursue an alternative solution, and is the magnetron source still considered as the most appropriate option? When a decision has to be made and what has to be prepared to make such a source available on-time for the final commissioning of Linac4?**

**Thank you in advance for your
help and support!**