





Introduction to the Linac4 Reliability Run: goals, schedule, organization

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Motivation



Reliability is one of the main challenges of Linac4

Goal of Linac4 is availability $> 95\%$

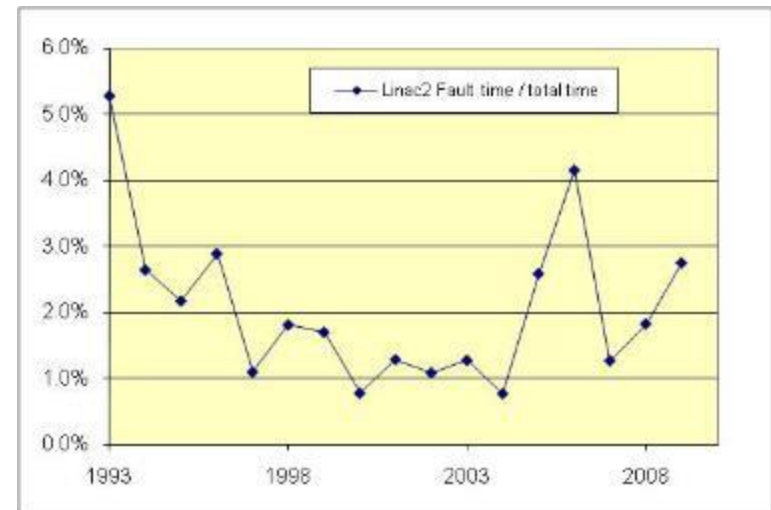
(expected lower availability than Linac2 because >3 times higher energy and number of components)

Initial phase (first 1 or 2 years): expected availability $< 95\%$
(note: this is my personal feeling...).

Reliability Run:

Debugging off-line for the initial teething problems

Objective for the Reliability Run:
reaching **90 – 95 %** availability at the end of the RR.



Example:
Linac2 fault rate after the installation of the new RFQ2 in 1993.

Responsibilities



4 main actors:

1. The **operation** team (BE/OP);
2. The **supervision** and **setting-up** team (BE/ABP);
3. The **control** and **bookkeeping** team (TE/MPE);
4. The **equipment** teams for good functioning and repairs (BE/RF, BE/ABP source, BE/BI, TE/EPC, TE/VSC, etc.).

Goal of this mini-workshop is to have the main actors around the table and define a plan of action to be further discussed and then presented at Chamonix 2017 for final approval by all Groups.

Note: invited here only the equipment teams that I expect will be more involved in the Reliability Run – from the Linac2 experience!

Long-term goals



The Reliability Run is intended as a step in the transition to the final operational organisation of Linac4 (being discussed between ABP and OP).

→ Towards the end of the RR, the new structure should be already in place!

Organisation



Beam 24/7 on the Linac4 main dump

Yes, but:

1. What will be the **beam intensity and pulse length** (need to compromise on activation of the dump).
 2. What will be the **operation schedule** (technical stops, shutdown, etc.).
 3. **Who** will check which **beam parameters** and what will be the **threshold** to declare a fault?
 4. What will happen when a **fault is declared**?
 5. **Who** will come to Linac4 and **when** if the machine is «on fault»?
 6. Who will do the «**post-mortem**» of the faults, how the information will be structured and communicated, and who will decide/implement actions?
1. Expect an answer from Alessandra.
 2. I will make a schedule proposal.
 3. The operator; regular measurements to be organised.
 - 4,5 I will present a sequence of events, for discussion.
 6. TE/MPE, but the resulting actions need to be defined by the project.

Linac4 Masterplan



2017												2018											
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Shut down	Half Sector Test	Debuncher installation	Reliability Run								Shut down	Spare for Reliability Run	interventions, repairs						Beam recommissioning	Shut down			
EYETS												shutdown										LS2	

Present Masterplan

RR starts in June after completion of beam line and beam setting-up and DB measurements in the second half of May. Good timing with EYETS.

Continues until the end of 2017 run (18.12).

Could restart in 2018 if needed – for 2 months or more, before or after the end of the yearly shut-down, depending on the interventions foreseen on the machine and on the results of the initial RR period. The decision has be taken in Autumn 2017.

2017 RR schedule



Proposal:

Synchronise with the Injector Schedule – Technical Stops at the same time but longer (compromise availability of services – radiation - availability of personnel).

Allow for more Technical Stops if and when needed – to be decided during the Run.

Need to keep a **flexible approach** to the Run!

2017 RR schedule - proposal



	Apr			May					June				
Wk	14	15	16	17	18	19	20	21	22	23	24	25	26
Mo	3	10	Easter Mon 17	24	May Day 1	8	15	22	29	Linac4 Run 1			
Tu	Recommissioning with beam			NA setup		Injector MD 10 hrs 8 to 18			UA9 (24 h)				
We	ISOLDE, nTOF, EA, AD					Injector MD 10 hrs 8 to 18			Technical stop (TS) 24 hrs (50c)				
Th						Ascension							
Fr													
Sa													
Su	G. Friday												

Proposal:

Run 1: 7 weeks, June-July

Run 2: 13 weeks (should be split in 2?), August-October

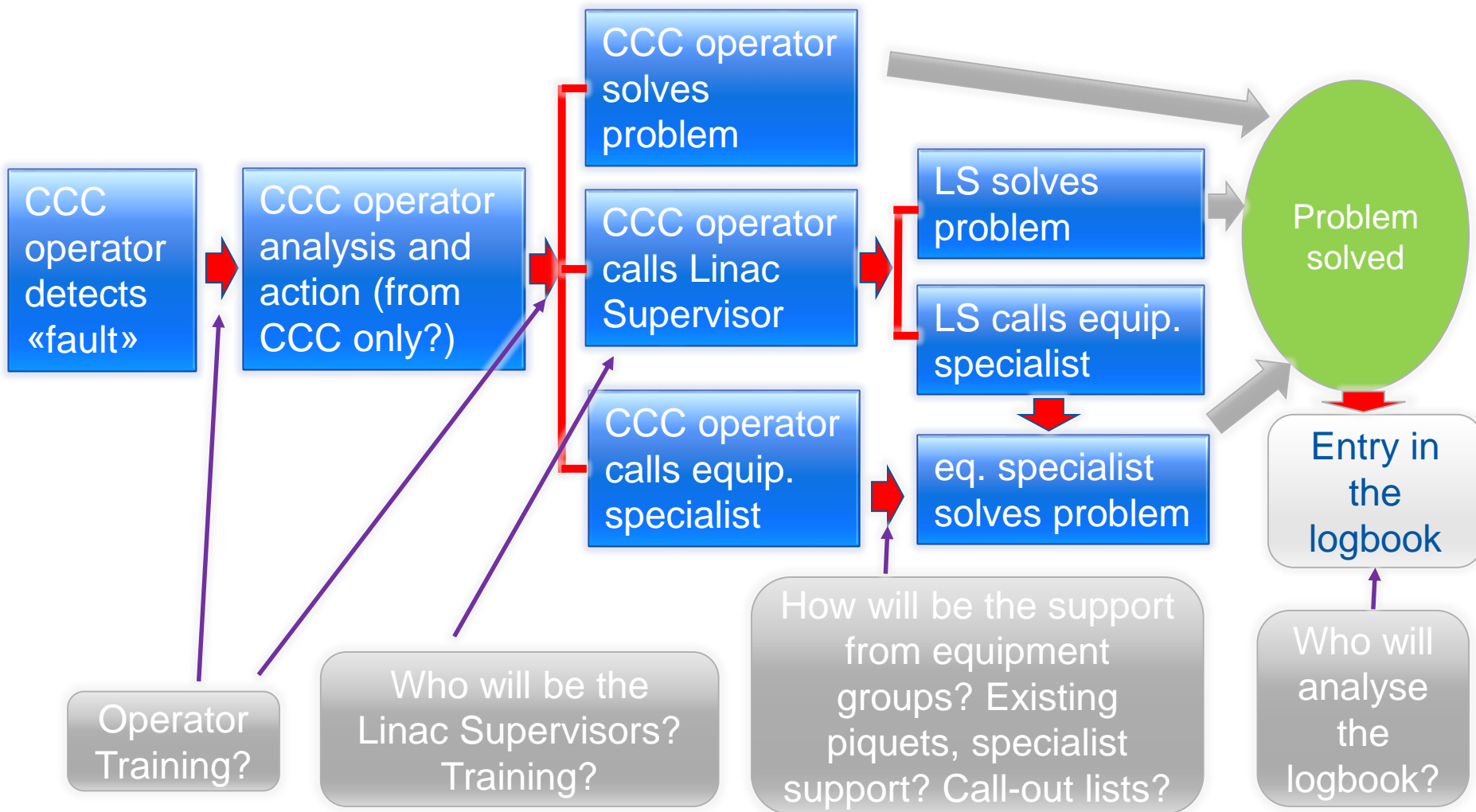
Run 3: 6 weeks, November-December

Flexibility: the duration of the TS can be modulated and other TS can be added, depending on needs and plans

	July			Aug					Sep				
Wk	27	28	29	30	31	32	33	34	35	36	37	38	39
Mo	Linac4 Run 1			24	Linac4 Run 2								
Tu				COLDEX 24 hrs									
We				Cool-down									
Th				Technical stop (TS) 36 hrs									
Fr													
Sa													
Su													

	Oct			Nov					Dec					
Wk	40	41	42	43	44	45	46	47	48	49	50	51	52	
Mo	Linac4 Run 2				30	Linac4 Run 3							18	Xmas 25
Tu				COLDEX 24 hrs										
We				Technical stop (TS) 36 hrs										
Th														
Fr														
Sa														
Su														

Sequence



Interventions



- We understand that the **same people** is going to be in charge of interventions on the LHC and its injectors and on Linac4.
- A new machine can be very demanding on the operation teams and we don't want to **increase stress** with the risk of impacting LHC operation.
- The proposal is to **avoid interventions during nights**: in case of a Linac4 fault detected after 17:30, the operator will try to solve the problem and if not successful the **counting clock will be stopped** and the specialist (linac or equipment) will be called only at 8:30 the following day – apart some exceptions (e.g. regular piquets).
- But interventions should still be **done during weekends**, allowing for a more relaxed reaction time (time between call and time on site).
- This intervention policy should be **revised** (both directions are possible!) following the initial experience.

Conclusions



The Reliability Run is a great opportunity that we cannot miss, but to be effective it must be well organised.

All the time that we spend on Linac4 in this reliability phase will be time saved during the initial operation time!

Fixing
Linac4:



During Reliability Run



After Reliability Run



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