SY-FCC workshop 04.10.24

Wrap up

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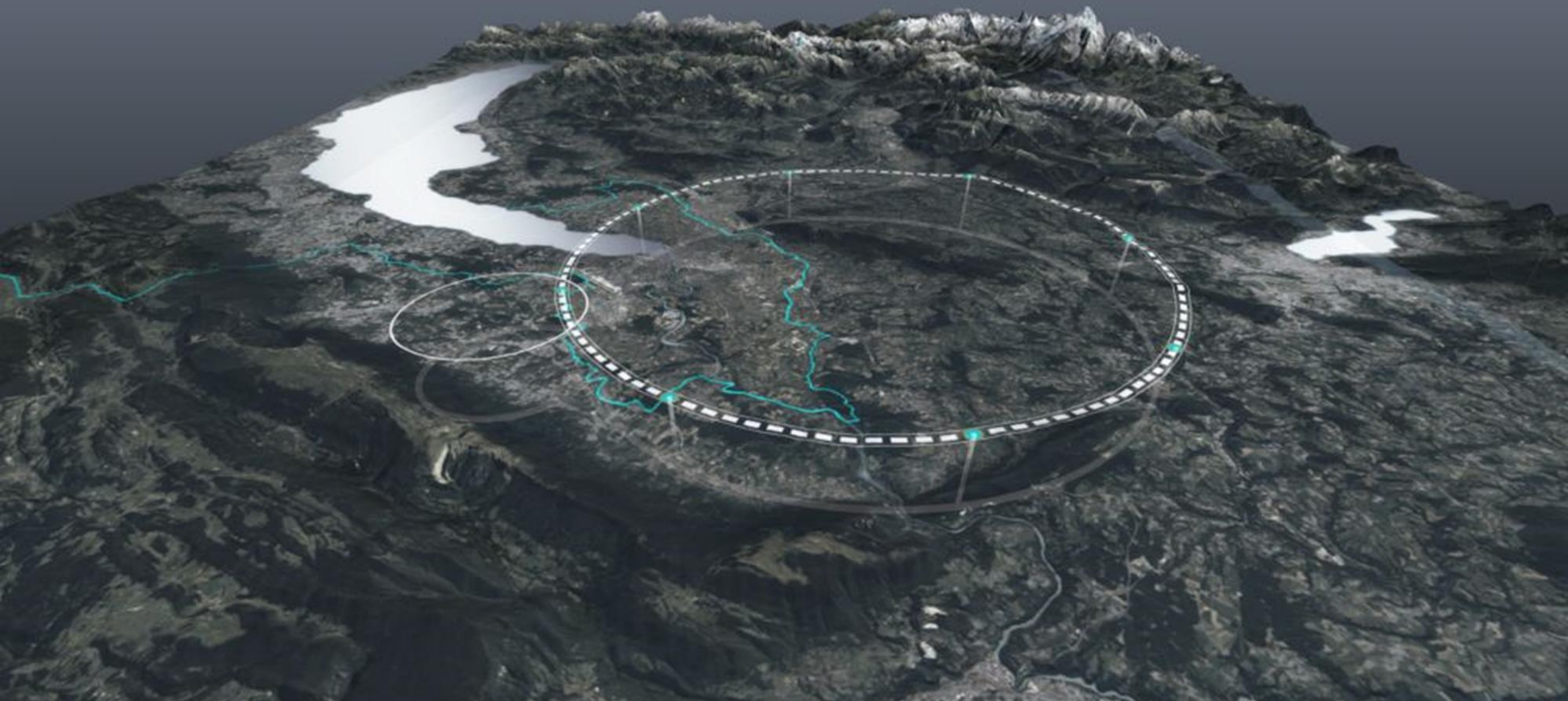

General comments

- Very impressed by the engagement and progress on all fronts from the groups - concepts and designs are converging and many of the big questions from a year ago are answered and the baseline path chosen
- Also true of the overall FCC project, where the progress is advancing at a great pace - our challenge in SY is to keep up

Timelines and deliverables

- Pre-TDR to be ready mid-2027
- All information regarding accelerator systems impacting CE **needs to be finalized by 2027** (volumes, loads, underground structures), since CE tendering phase will move ahead almost immediately
- High-tempo needs to continue while ramping up resources in next 3 years
- **WP descriptions and priorities** need to be finalized **now** → FCC, SY teams
- **Dependencies** on inputs for pre-TDR need to be understood – some aspects need to be fixed early or mid 2026. Through the ATDC? Machine protection timeline…
- Pre-engineering details needed from groups for pre-TDR, need to understand from ADTC what information is missing → reverse timelines to be finalized and iterated
- Procurement handbook deadline by Sept-Oct 2024 → **key input needed on in-kind**
- Some earlier decisions on concepts/approaches needed for pre-injectors where technology in collider will be the same (controls, powering, …)

Organisational / information aspects

- Project structure: **no further evolution** foreseen before new CERN management in 2026, ad-hoc working groups will continue
- Information flow much better since ADTC in place, some small adjustments still to propose/implement
- **"ECR-lite"** process linked to QA, config management and baseline versioning is requested from Groups (!) – single source of information with communication when updated → FCC management
- SRF is not under FCC but needs to be fully integrated into the planning, deadlines and performance → governance update
- Radiation in tunnel and electronics for DAQ → close/common WG
- Is the injector complex followed at the ATDC or another (new?) transversal meetings, or existing forum → to decide with new WP structure by FCC management

Resources

- Motivated and experienced teams in place, ramping up along the foreseen curve
- New resources were approved in 2024 MTP, will be hired in coming 2 years
- By end 2026 will be about 28 FTE (Staff) on FCC (9% of SY Dept.)
- Iteration with FCC with WP definition on priorities
- Resources for pre-injector top priority to define and allocate –need the TDR by 2027! Cannot waste 1 year to go through MTP 2025.
- Materials budget to address - need explicit and transparent allocations (again as outcome of WP descriptions)
- Taking resources from exploitation risks to show up at some point – confirmed that this risk is accepted at SY department level (will address explicitly in ATS in 2025)
- Plans for high-power test infrastructure also to now address in RF package

System design aspects

- Global optimisation and system-level aproach critical – EPC tools and methodology exists – extend? All agreed that this needs to be coordinated via ADTC
- All agreed on urgent need for BPM/quad alignment and characterisation test-stand → identify responsible, organise and coordinate. Separate functionaliity for Arc mock-up
- Still several areas where solution/feasibility to be demonstrated, or key design choices are open
  - 2-cell cavity at Z (RF transient beam loading, machine protection, powering)
  - Top-up injection
  - Fully remote automatic operation (polarimeter laser, …)
  - Collimator design
  - Tristron/klystron

Following up…

- Will collect all notes and input, then specific points will be defined as actions with FCC and allocated
- Clear urgency for pre-injector complex
- Propose to iterate within the dept, and then with project in ~1 month from now, to finalise and inform everyone about WS follow-up

Thanks to everyone for the fantastic work…

…let’s keep up the tempo!!

Draft list of actions/follow-up (work in progress)

Wishes/actions for FCC management (draft)

- Improve flow of info across pillars and flow of information from management (Coord Management Group) to equipment groups through ADTC and ADC --> pragamtic information flow, e.g. communicate any important high level project news at the beginning of the meetings, in particular important decisions an changes to parameters/configurations.
- How can the technical input/work from equipment groups better be taken into account in the decision processes?
- Mininum configuration management would be highly desirable, in particular versioning system for parameters and layouts. Central repository, which can be accessed by everybody
- Possibly lightweight ECRs to document the reasoning for changes in the baseline configuration. Ideally, should maintain a reference configuration (optics, layout), which remains valid for at least a certain duration (min 6 months). This is crucial to allow equipment groups to adapt their system design.
- For the pre-TDR phase, it is important that the optics/layout is frozen in (mid?)-2026 such that all systems can be adapted. Can the project commit to this?

Actions for SY groups (draft)

- In preparation for pre-TDR phase, SY groups should provide reverse schedule for different systems from SY groups → remains key to understand what is needed for the pre-TDR phase
- The groups should prepare WP description for ATDCs (open point: will there be similar WPs under the Accelerator Design Committee)
- Common follow-up actions for FCC management and SY groups:
- Close discussion between project and SY groups is needed in the coming weeks to identify possible in-kind contributions, considering the upcoming Procurement Handbook deadline. This is key for establish a basis for high level discussion between CERN and member states for in-kind contributions.
- Need to clarify what is exactly the work expected from the CERN groups within the pre-injector CHART-III WPs, considering that the TDR should ready by 2027; this is a much higher pace than for collider/booster desing and some things have to be studied/decided very early (in particular high level controls)
- Obtaining and maintaining an alignment on resources between project and SY is crucial; for example needed ad hoc meetings between FCC and SYMB early 2024 for MTP request definition, which worked well
- Need to figure out the support needed for R2M now and whether this should now come from FCC (for FCC needs only). Idem for the HSE CARE project which does all the cable irradiation studies for HL-LHC.

Actions for FCC WGs (draft)

- FCC-ee Rad&Shielding WG: Overall cost optimisation of target radiation levels, considering shielding costs and consequences&costs for equipment (cables, electronics).
- Machine Protection Task Force: Proposal to have ‘backward timeline’ from Machine Protection Task Fore should be enforced, need specific inputs (BLM specs) at specific times, need to define these as basis for the MPWG deliverable timeline