ETO Task force for ET detector layout - 13th weekly meeting

F. Sorrentino

Draft agenda for in-person meeting @ CERN

- For people traveling on Monday 5/5 morning: T. A. Bud is available to help in transfer from airport
- First day morning
  - 9:00 arrivals & registration
  - 9:30 informal discussion
  - 10:00 welcome by T. A. Bud
  - 10:15 start of plenary session since
- **Registration is over - 17 participants**
  - Any more people planning to join? Please let us know ASAP to help local support

Draft agenda for in-person meeting @ CERN

- Draft agenda:
  - 5/5 am
    - plenary: update on background information and main tools
    - definition of work plan and tasks assignment
  - 5/5 pm
    - Parallel: optical layout update
    - Parallel: TRL analysis
    - Parallel: civil infrastructure criteria & tools
  - 6/5 am
    - Plenary: update from previous day
    - Parallel: detector layout update
    - Parallel: risk analysis
    - Parallel: noise budget & science case
  - 6/5 pm
    - Plenary: update from morning
    - Parallel: optical layout flexibility envelope
    - Parallel: risk analysis
  - 7/5 am
    - Plenary: update from previous day
    - Parallel: optica layout flexibility demand
    - Parallel: flexibility analysis
    - Parallel: noise budget & science case
  - 7/5 pm
    - Parallel: detector layout flexibility envelope
    - Parallel: spare
    - Plenary: wrap up & conclusions

Main document - writing tasks & indicative length

- Introduction, scope and structure of the document **(F. Sorrentino)** **2 pg**
- Basic system decomposition **(R. Meijer)** **2 pg**
- Optical layout **(A. Green & A. Perreca)**
  - common features, definition of flexibility demand **2 pg**
  - baseline 2L layout (i.e. our choice), main features and comparison with 2024 reference 2L layout **4 pg**
  - baseline triangle layout (i.e. our choice), main features and comparison with 2024 reference triangle layout **4 pg**
- Integrated towers **(R. Meijer & F. Spada)**
  - Summary of tower categorization **4÷5 pg**
- Detector layout **(M. Majoor & P. Werneke)**
  - common features, definition of flexibility envelope **4 pg**
  - baseline 2L layout (i.e. our choice), main features and comparison with 2024 reference **4 pg**
  - baseline triangle layout (i.e. our choice), main features and comparison with 2024 reference **4 pg**
- Interface with infrastructure **(J. Bratanata)**
  - Volume requirements **2 pg**
  - Technical requirements **2 pg**
- Risk and flexibility **(G. Mahmoud)**
  - rationale for risk and flexibility analysis **2 pg**
  - analysis on 2L: list of options, comparison of baseline configuration with options and with 2024 reference **4 pg**
  - analysis on triangle: idem **4 pg**
- Performance
  - Noise budget for baseline configuration, comparison with 2024 reference **(M. Korobko & V. Sequino)** **4 pg**
  - Summary of science case for baseline configuration, comparison with reference **(F. Iacovelli & U. Dupletsa)** **4 pg**
- Appendix - list of annexes **(B. Tuybens)** **n.a. (delete? Everything is in the extended document)**

People in charge are expected to distribute writing sub-tasks whenever needed

Extended supporting document - writing tasks

- Study logic and workflow **(F. Sorrentino)**
- Detailed system decomposition **(R. Meijer & M. Korobko)**
  - interfaces
  - requirements
- Optical layout **(A. Green & A. Perreca)**
  - detailed explanation of flexibility envelope and flexibility demands
  - description of available options for 2L
  - description of available options for triangle
- Integrated towers
  - Main design options for seismic isolation **(C. Mow-Lowry & F. Spada)**
  - Main design options for cryogenics **(F. Ricci & H. J. Bulten)**
  - Main options for tower access **(J. Gargiulo)**
  - Rationale for tower categorization **(R. Meijer)**
- Vacuum pipes
  - Arm cavity pipes **(P. Werneke)**
  - Other pipes **(J. Gargiulo)**

People in charge are expected to distribute writing sub-tasks whenever needed

Extended supporting document - writing tasks

- Detector layout
  - explanation of major space claims
    - scaffoldings **(M. Majoor)**
    - clean rooms **(P. Rapagnani)**
    - technical rooms **(P. Werneke)**
    - cryogenics infrastructure **(S. Grohmann)**
    - other?
  - optional 2L layouts **(M. Majoor)**
    - no periscope for LF_FC
    - double cavern
    - etc.
  - optional triangle layouts **(M. Majoor)**
- Civil engineering **(J. Bratanata & T. A. Bud)**
  - Tools and criteria to determine cost of civil infrastructure vs detector layout changes
- Risk and flexibility **(G. Mahmoud & F. Sorrentino)**
  - Extended explanation of risk and flexibility analysis
  - Identification of options
- Performance
  - Tools for noise budget **(M. Korobko & V. Sequino)**
  - Figures of merit for science case and performance risk quantification **(U. Dupletsa & F. Iacovelli)**
  - Derivation of scientific requirements on main design parameters **(M. Korobko, V. Sequino, U. Dupletsa & F. Iacovelli)**
- Technical annexes (see below)

People in charge are expected to distribute writing sub-tasks whenever needed

Technical annexes

- Technical drawings
  - 2D model for optical layouts (baseline & options for 2L and triangle) **(optical team)**
  - 3D models for detector layout (baseline & options for 2L and triangle) **(M. Majoor)**
  - Technical drawings of individual elements? Suspensions, integrated tower, cryostat, etc. **(TBD)**
- Plots
  - Sensitivity curves for reference and optional layouts **(M. Korobko, V. Sequino)**
  - Science case plots for reference and optional layouts **(U. Dupletsa, F. Iacovelli)**
  - Interactive plots for science requirements on design parameters **(U. Dupletsa, F. Iacovelli)**
  - etc
- Additional supporting documents (incorporate in single extended supporting document?)
  - Flexibility envelope/demands for optical layout **(optical team)**
  - System decomposition **(R. Meijer, M. Korobko)**
  - Tower categorisation **(R. Meijer, F. Spada)**
  - etc
- Tables
  - System decomposition **(R. Meijer, M. Korobko)**
  - Tower categorization **(R. Meijer, F. Spada)**
  - TRL **(G. Mahmoud)**
  - Risk register **(G. Mahmoud)**
  - Rigidity matrix **(G. Mahmoud)**
  - Flexibility envelope & demand **(optical team, M. Majoor)**
- **Please include all hyperlinks and attach all needed images - or send them to Benoit**

Background information

- Terms of Reference of External Review Committee (shared);
- ETO Task Force mandate (shared);
- Optical layout 2024 document for triangle (pdf);
- Optical layout 2024 document for 2L (pdf);
- 2D drawing of optical layout 2024 for triangle (pdf);
- 2D drawing of optical layout 2024 for 2L (pdf);
- Detector layout 2024 document for the triangle (pdf);
- Detector layout 2024 document for the 2L (pdf);
- 3D model of 2024 detector layout (trimble connect) for the triangle;
- 3D model of 2024 detector layout (trimble connect) for the 2L;
- Trimble guideline;
- ESFRI proposal: 2020 CDR;
- Tunnel diameter requirements (pdf);
- Reference document for cryogenic system (pdf);
- LF TM suspension document (draft pdf);
- Suspension system classification (pdf) - completely changed in ETO Task Force work, highlight relevant sections;
- Science case: COBA paper (pdf);
- ET noise budget: sensitivity curve update (pdf);
- Reference on Civil Engineering (TBD);
- Guideline how to read the documents.

Timeline for document editing

- Main document
  - detailed t.o.c. by 31/3
  - early draft by 14/4
  - **mature draft by 28/4**
  - internal review @CERN meeting on May 5÷7
  - draft to ETO coordinators on 9/5
  - final version delivered to review committee 21/5
- Extended supporting document
  - incorporate material from old document by 31/3
  - detailed t.o.c. by 7/4
  - **early draft by 28/4**
  - second draft for ETO coordinators on 9/5
  - mature draft attached to delivery for review committee on 21/5, to be updated following review
- Annexes
  - list of annexes and responsibility assignments by 31/3
  - **drafts by 28/4**, internal review @CERN meeting on May 5÷7
  - mature draft attached to delivery for review committee on 21/5, to be updated following review

Contribution to ET symposium

- General summary @ plenary session
- Proposal for talks in dedicated parallel session
  - Optical layout updates - 2L & triangle (20 min)
  - Detector layout updates - 2L & triangle (20 min)
  - Integrated towers (20 min)
  - Noise budget & science case (20 min)
  - Risk and flexibility analysis? (20 min)
  - Requirements to civil infrastructure? (20 min)

Next steps

- No weekly meeting on 21/4 (Easter break)
- Next weekly meeting on 28/4 (last one before CERN in-person meeting)
- Main actions items during next 2÷3 weeks
  - complete mature draft of main document (writing task owners, distribute work if necessary)
  - feedback on main document (all, possibly use gitlab)
  - first draft of extended supporting document (writing task owners, distribute work if necessary)
  - finalise risk/flexibility analysis (Ghada + people in charge)
    - risk register
    - TRL table
    - rigidity matrix
  - input to requirements tables (all groups, see Romano's presentation)
  - progress on flexibility envelope (optical layout group + detector layout group)
  - progress on flexibility demand (optical layout group)
  - finalise noise budget and science case analysis
  - Prepare in-person meeting @CERN
    - optical layout update
    - detector layout update
    - finalize tools and criteria for civil engineering
    - finalise noise budget and science case analysis