CERN-EF-EHS-CC/76-3
9 December 1976

THE LAYOUT OF EHS

EHS has been divided into three parts (A,B,C). Only part A will reach a final design in the near future. However, it is not possible to discuss the specifications of part A disregarding the other parts even if they are in a much less advanced stage.

We therefore present a layout of the complete EHS system in fig. 1, which is an updated version of fig. 1.1 (c) from SPSC/P42/Add.2 Rev.

Components of part A	Part B	Part C
Bubble chamber (RCBC)	Cerenkov Co	FGDI, II, III
Vertex magnet (M1)	ISIS	IGD
Downstream magnet (M2)	(TRD)	
MWPC (WO, W1)		
Large drift chambers (D1, (D2, D3)		
Small drift chambers (D4, D5, D6)		

2. Part A

1. The form of the iron supporting the coils of M1 has been changed.
2. The beam height is assumed to be 2.50 m.
3. The magnet M2 is assumed to be made up of two type 5 Rutherford Laboratory magnets but until the bending power, now estimated to be 3 T-m, has been checked experimentally, a final decision is not possible.
4. The vertical dimensions of D1, D2 and D3 should be increased to 430 cm.
5. The horizontal dimensions of D4, D5 and D6 have been increased to 1.3 m to provide more freedom in choosing the aperture of M2.

6. In the horizontal plane, the dimensions of the beam exit window of the bubble chamber now allow only ± 13.5° for the emittance. The geometry of the magnet allows this to be increased at a later date if necessary.

3. Part B

1. Co and ISIS are now symmetric about the beam.
2. Co may be replaced by silica aerogel Cerenkov counters if that technique proves viable. They should fit into the space foreseen for Co only requiring the position (but not the size) of W1 to be changed.
3. Replacing ISIS by a set of Cerenkov counters would lead to some rearrangement of the positions of D1, D2, D3 *). Also, depending upon the configuration, M2 might have to be moved back to at least 20 m (present value 17 m). There would also be a case for adding a D3' to improve the sampling frequency of particles leaving the system before the last of the large drift chambers has been reached.
4. The transition radiation detector (TRD) is not shown. In Aachen, work on its development is continuing but is not clear that it could be used simultaneously with the FGD due to the amount of material in it. Should the TRD not be built, a long Cerenkov counter for triggering on fast particles will probably be proposed. Sufficient space remains behind the present FGD position for this to be fitted in.
5. At a later stage, some experiments may require the introduction of an additional Cerenkov between D5 and D6.

4. Part C

1. The FGD is now defined to consist of three sections. FGDI is a square, 90 x 90 cm located at 30 m, FGD II is the vertical extension of this to give 210 x 90 cm at 30 m while FGD III is a section in front of M2 allowing one to equalise (approximately) the angular coverage in the horizontal and vertical planes.

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*) See RCBC 75-24.

2. To help shield the photomultipliers of FGD III from the field of M2 a thick iron plate (with a suitable aperture) is located immediately upstream of the magnet coils.

3. The IGD is now defined to be another gamma detector which would cover an area extending approximately to ± 200 cm vertically and ± 100 cm horizontally. Located at the same distance as the FGD III, it would necessarily have a large hole in its centre. The size of the area to be covered dictates the use of a less expensive technique such as the one proposed by Conversi *). For the present there is no detailed study of the IGD going on and it is therefore only shown by dotted lines in the figure. However, it is important that there should be sufficient space, and in particular sufficient beam height, to be able to add the IGD at a later stage.

5. Layout in EHN1

Present ideas on layout within the hall EHN1 would leave approximately 30 metres behind the FGD for the addition of a large Cerenkov counter for fast forward particles, should that be required. Upstream of the chamber small beam-defining MWPC's would be needed. Assuming a precision of ± 0.3 mm (1 mm wire spacing) a lever arm 20 metres long would allow a precision of $\sim$ 0.015 mrad (compared with an uncertainty of about 0.01 mrad due to multiple scattering in the beam entry window at 400 GeV/c).

6. Triggering

Initially, triggering will not be particularly complex. One will require the presence of the selected incident particle type at the CEDAR counter, the presence of the same particle in the beam defining proportional chambers and its non-arrival at a small MWPC located behind D6. Operation will also require a scintillation counter in the beam in order to have precise timing information.

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*) EP Internal Report 76-20.

Though not a part of the trigger as such, one would also need to have the pulsed kicker magnets installed upstream of the target in order to deflect the proton beam off the target both at the time of the expansion and again as soon as a trigger occurs.

Though no proposals have been accepted at this time, it is very probable that one would want to use enriched beams of $\bar{p}$ or K^+ at an early date and their preparation should therefore be foreseen.

7. Control Room

It is expected that the control room and huts containing the data acquisition computer, drift chamber electronics, FGD electronics etc. will be located along the side of the hall. Detailed estimates of the surface area required and a possible layout are now being prepared. There seems to be no particular difficulty in meeting the requirements using the standard type of modular huts now being ordered. It is probable that a two-tier arrangement will be needed to limit cable lengths and limit the floor area.

8. Beam Height

See EHS-CC/76-13 in which a beam height of 2.5 m is requested.

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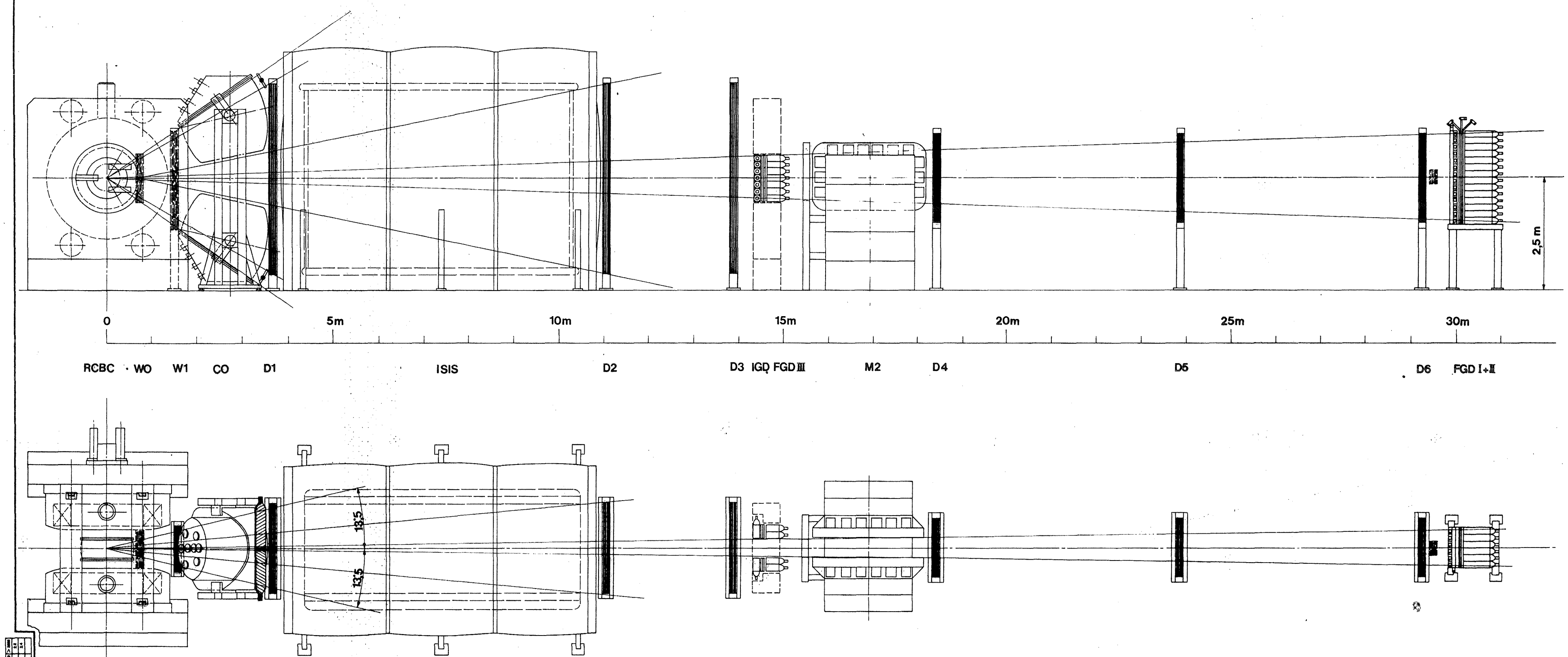

DESCRIPTION	POS.	MATIÈRE	COTES BRUTES	FOURNISSEURS
ENSEMBLE		S. ENSEMBLE	NOM	DATE

version 6

GENERAL LAYOUT

ÉCHELLE SCALE 1:30

DESSINÉ: Velliet, 3.12.76
CONTRÔLE
REMPLACE
REMPLACÉ PAR
RÉDUCTION

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