REQUIREMENTS SPECIFICATION

For Development of HESR Transport System

CUSTOMER:

Institute fur Kernphysik
Dorschungszentrum Julich,
Germany

DEVELOPER:

CAD/CAM Engineering Center,
Tbilisi, Georgia

Juelih – Tbilisi
2008

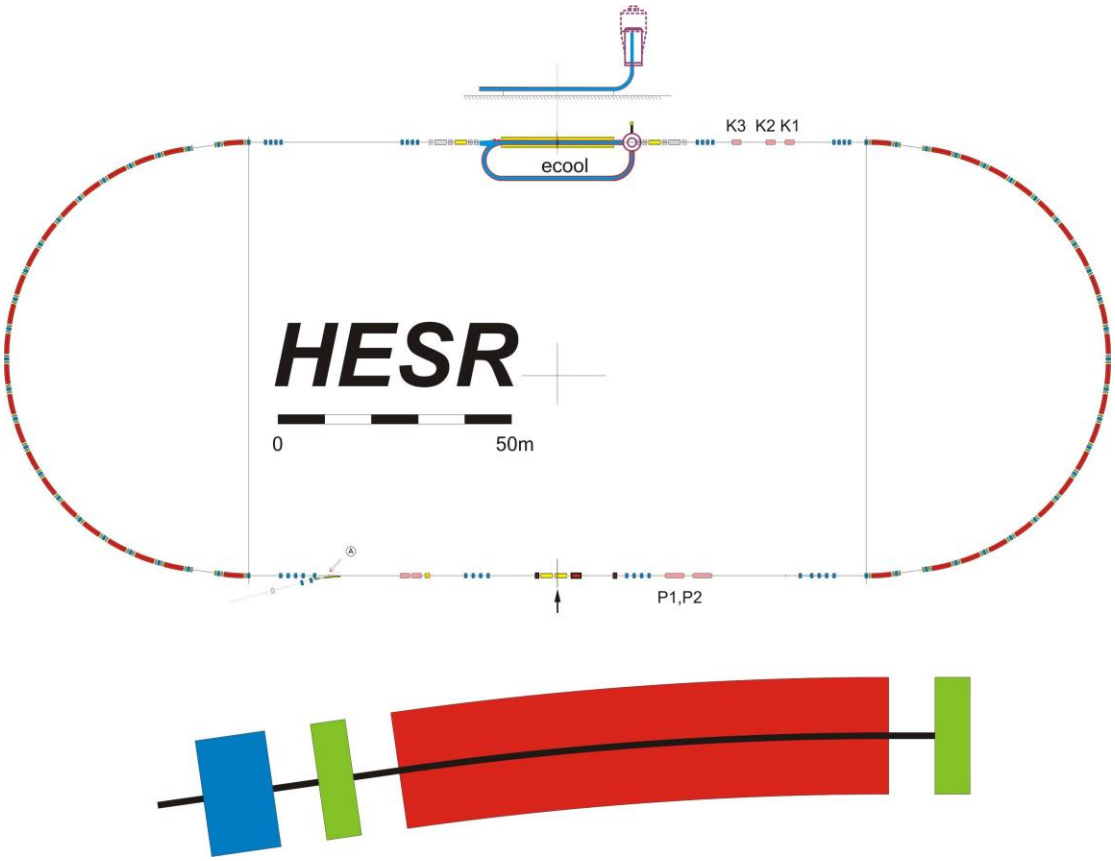


Figure 1

Purpose of Activity

1) Development of Transport facility for movement of objects from initial point (point A on the figure 1) to the *pre*-final position (close to the alignment points) with 10mm positioning accuracy
2) Development of facility for movement of objects from transport facility in to the *pre*-final position
3) Development of lifting fixtures on the objects
4) Development of method for fixing of transport facility

Notes:

Implied that object is already fixed on the transport facility in to initial point A

Description of Objects to be transport

1) All objects have a prism shape with ~30mm rounded edges
2) There are 4 types of magnets:
   a. Dipole : *length* 4-5 meter; *weight* 25-30 tone; *quantity* 44
   b. Quadropole : *length* 0.6 meter; *weight* 2-3 tone; *quantity* 100
   c. Sextupole : *length* 0.3 meter; *weight* 1.5 tone; *quantity* 40
   d. Correction Magnets : *length* 0.3 meter; *weight* < 1 tone

3) Dimensions of Dipole are as follow (Figure 2)

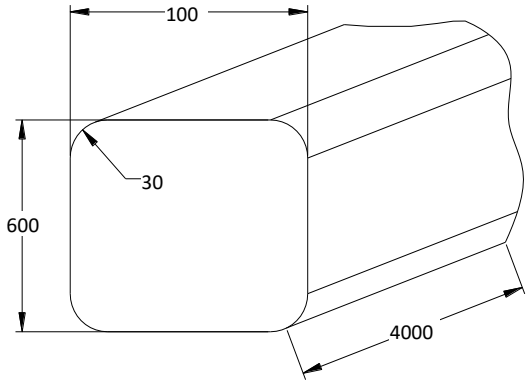


Figure 2

4) There is a coil also coming from the front face of Dipole (Figure 3)

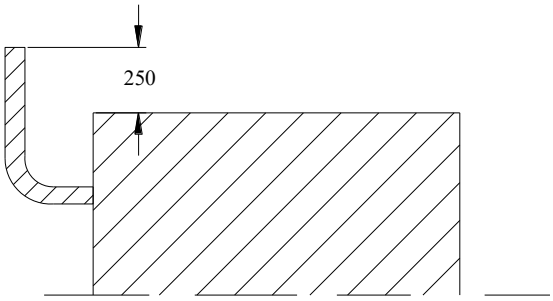


Figure 3

5) P_1, P_2 boxes, which are corresponding to Dipole in dimensions but are more light
6) K_1, K_2, K_3 boxes, which are corresponding to Dipole in dimensions but are more light
7) Initial boxes (2 pieces), which are half of Dipole in dimensions
8) Solenoids, which are half of Dipole in dimensions

Description of Infrastructure

1) Tunnel is situated on surface and has rectangular shape in section
2) Principal dimensions of tunnel are as follow: *high* 4 meter and *largeness* 4.5 meter
3) Fasteners of magnets are on the rails and it is close similar to LHC fasteners at CERN (Figure 4)
4) Distribution of cables, ventilation and cooling systems inside the tunnel is not the purpose of given project
5) Movement and positioning of objects into *pre*-final position have to be done on plane
6) For final positioning objects are equipped with so called alignment points, at least 3 points which are the spheres in reality
7) Transport system can be realized on the rollers or on the rails
8) At least 2 objects have to be moved per day

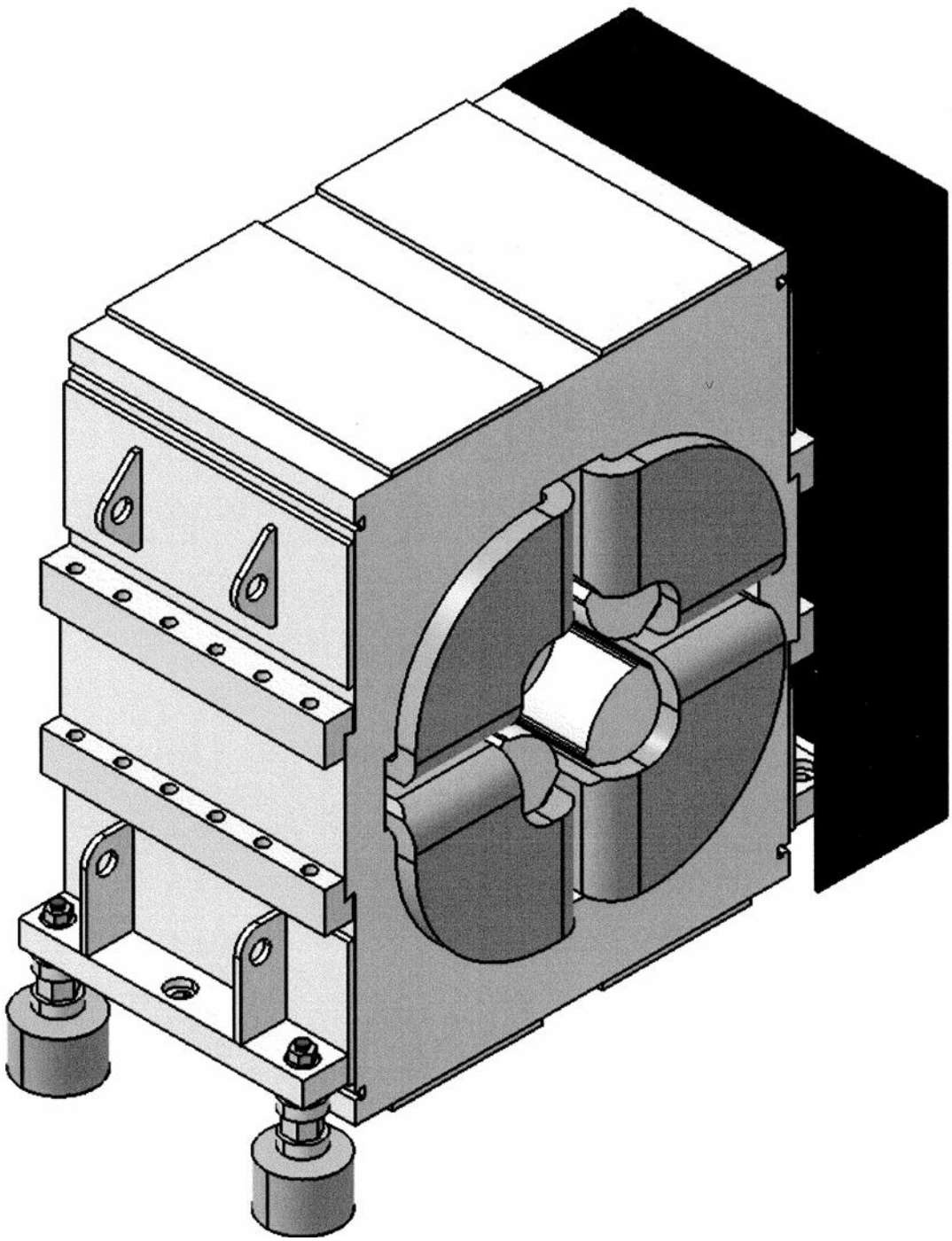
Notes:

”Small” objects can be moved together

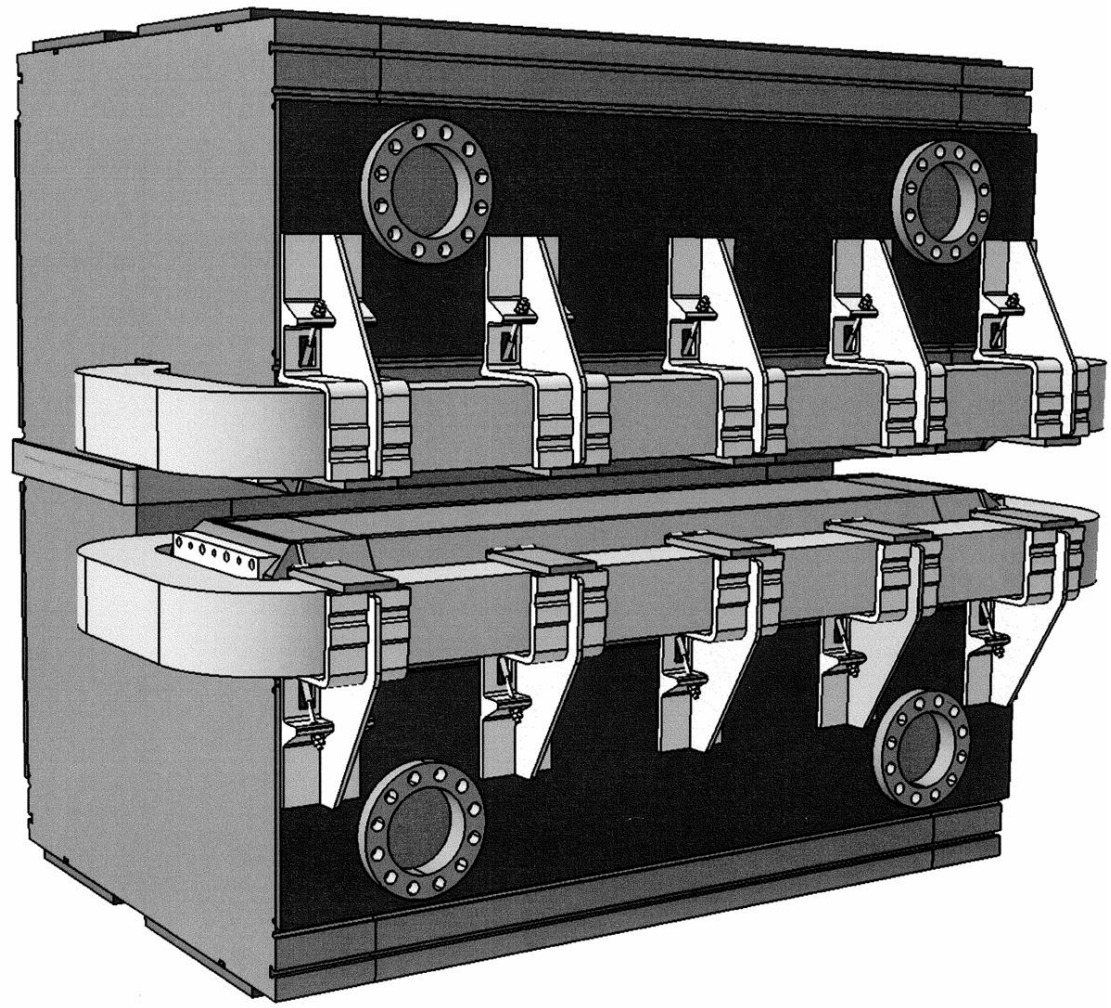

Installation von Magneten in der Transferline
...ab Dezember 2003

Figure 4

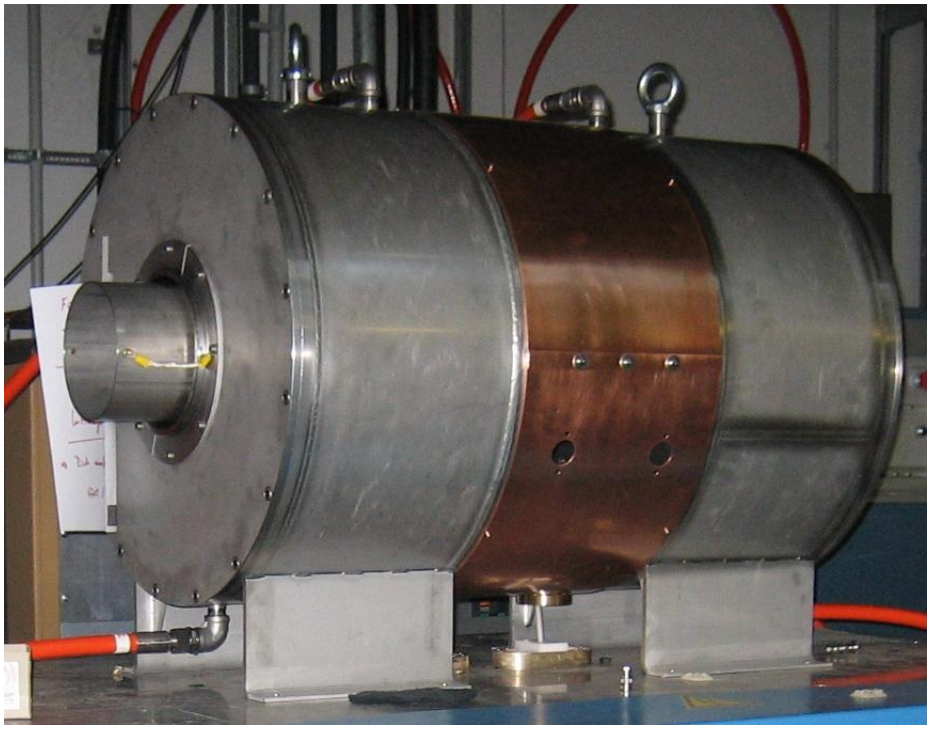
Enclosure

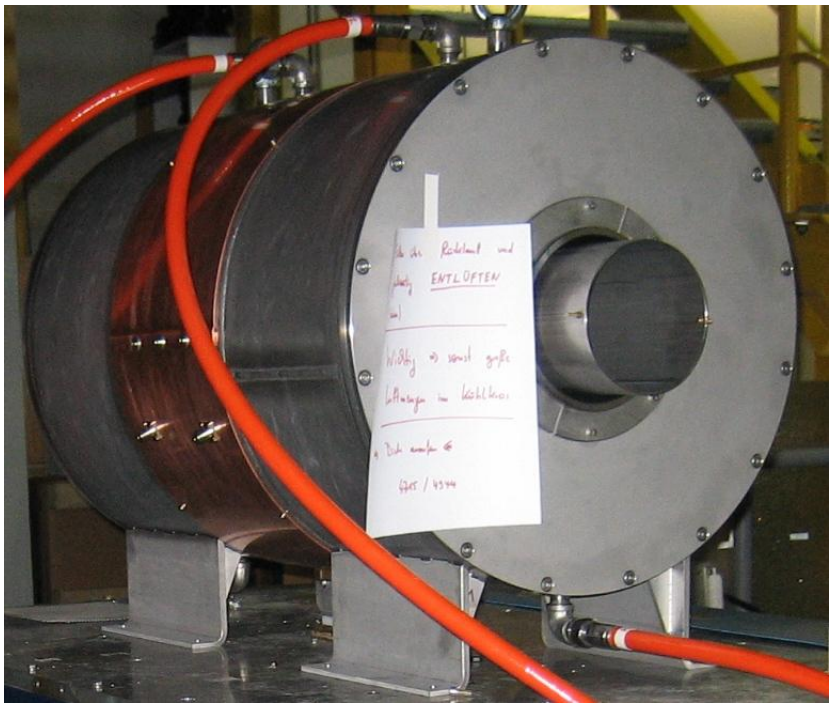


Sextupole magnet



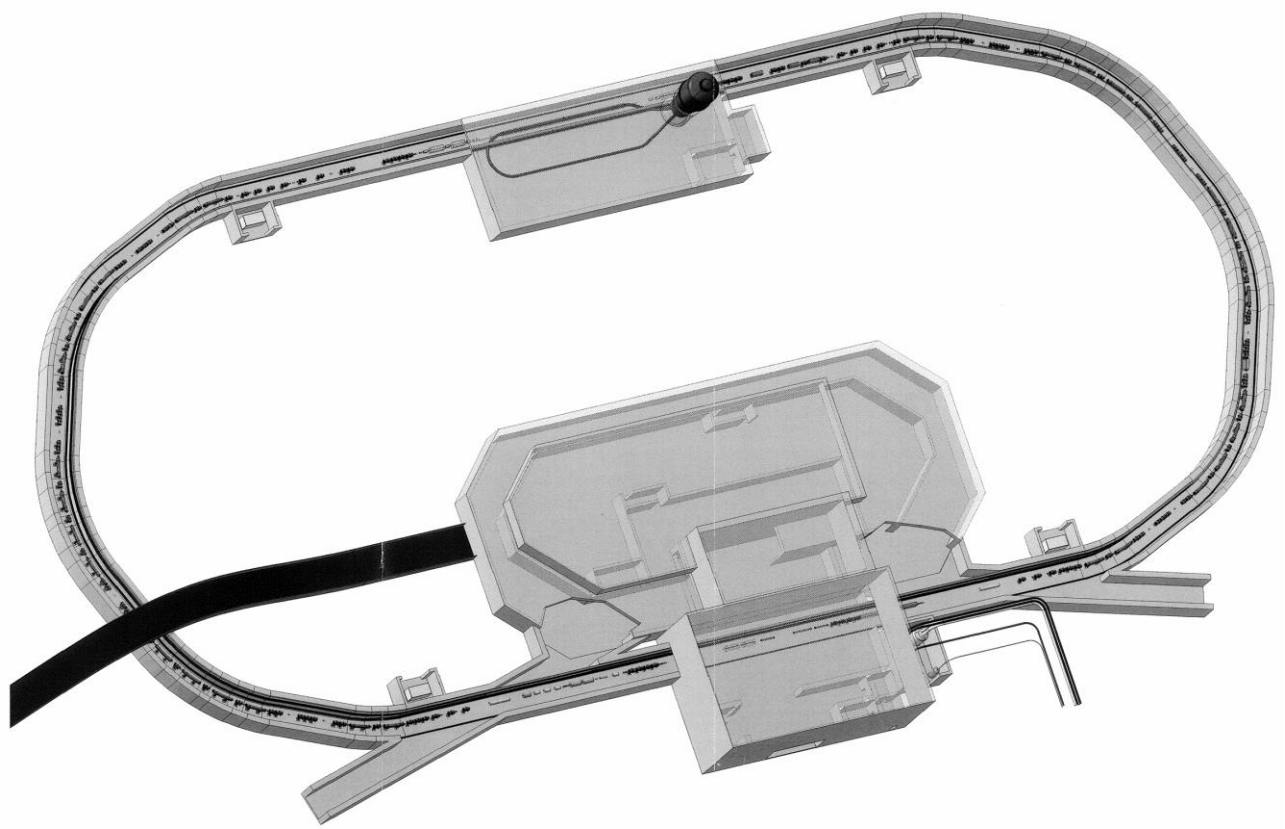
COSY magnet, close one to the HESR magnet





Approximative construction of ”small” size magnets

Example of fasteners to be mounted on the magnets



1st draft of the HESR infrastructure (to be updated soon in CATIA)

Concept of transport facility which was disliked

Final Design: 4-fold symmetry