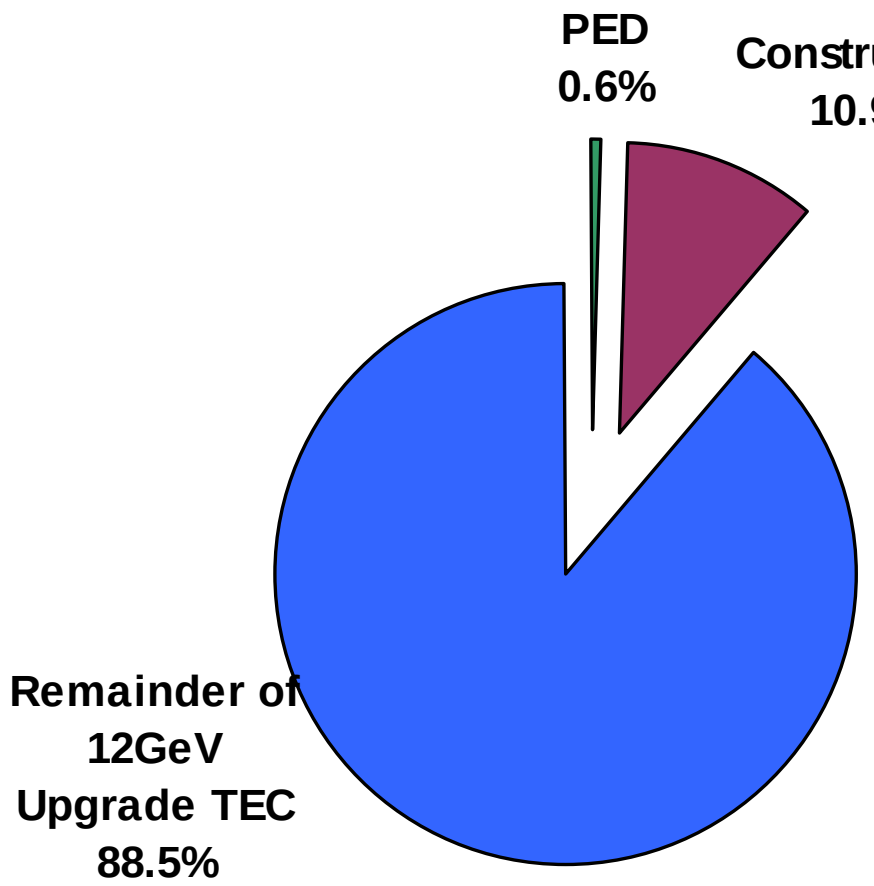
Motivation for Hall C Upgrade

- Pion and nucleon form factors at high Q^2
- Deep inelastic scattering at high Bjorken x
- Semi-inclusive scattering at high hadron momenta
- Polarised and unpolarised scattering on nuclei

- Highest Luminosity ($L=10^{38}$ nucleons/cm^2/s)
- Pair of magnetic spectrometers
- Detection of charged particles with highest momenta
- Accuracy and reproducibility
- Small angle capability
- Very good particle identification
- Compatibility with all target configurations

Hall C: Cost Summary



(FY05$K Direct)	
PED	$992
Construction	$18,961
TOTAL TEC	$19,953

R&D =	$382
ACD =	$201

Hall C level 4 TEC Elements

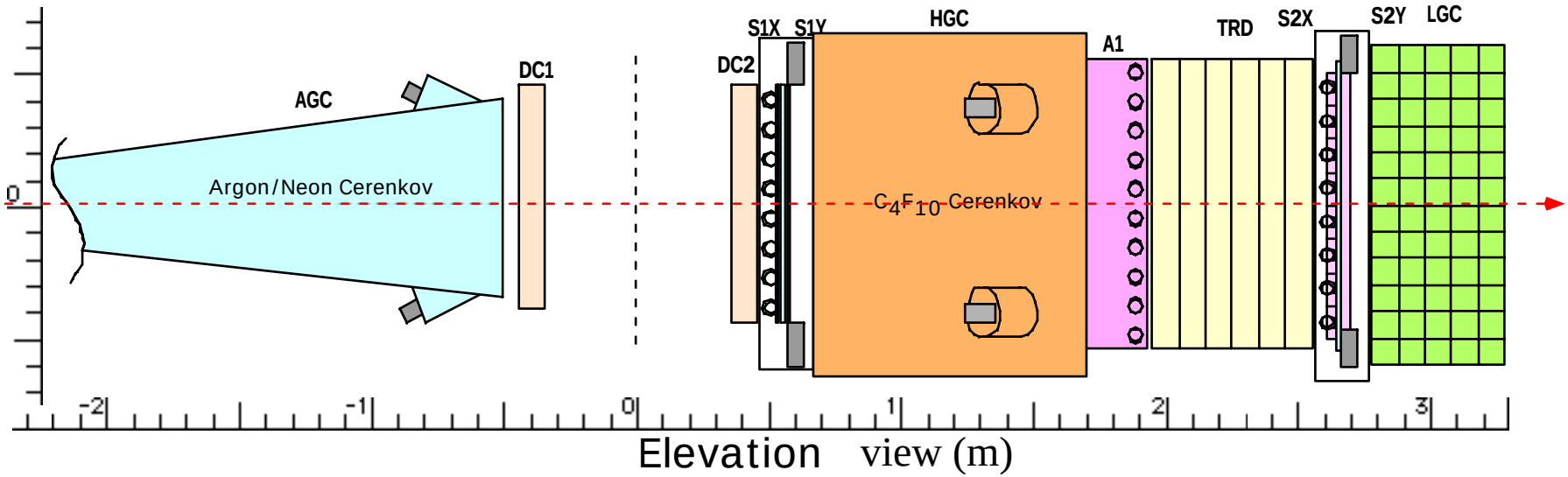
(FY05 $K Direct)

Description	PED	Const	Total	Contingency $	Contingency %
Magnet	576	9,522	10,098	3,365	33%
Detector	115	1,733	1,848	365	20%
Computing	-	-	-	-	0%
Electronics	-	784	784	158	20%
Beamline	-	715	715	123	17%
Infrastructure	300	6,208	6,508	1,273	20%
Total	992	18,961	19,953	5,284	26%

Remarks: 1) computing needs at 12 GeV similar to 6 GeV
routine Hall C computing improvements are all that is required
2) infrastructure includes spectrometer carriage ($2.4 M)
and detector shield house ($1.2 M)

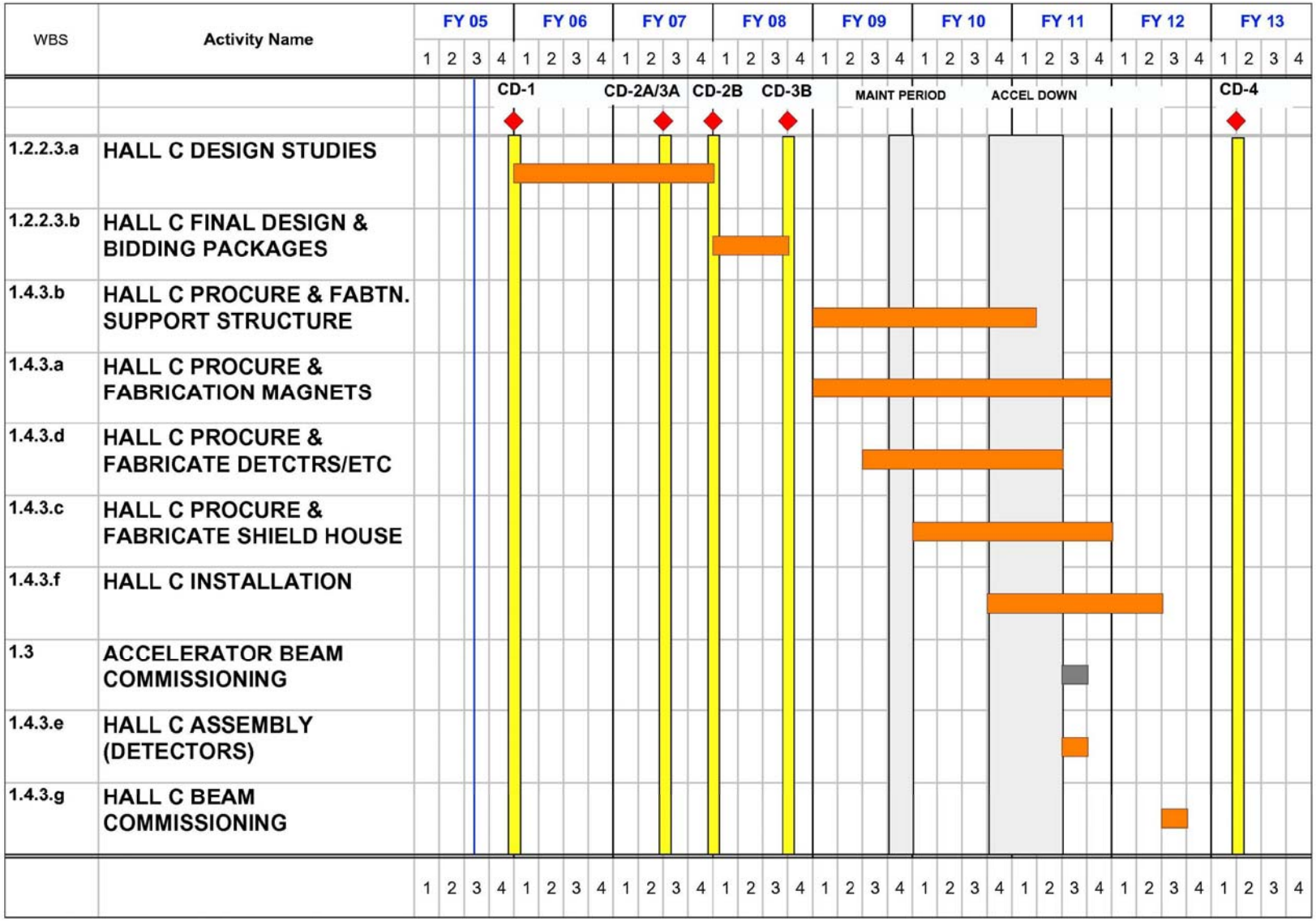
WBS 1.4.3.2 Hall C Detectors

Modular design: optimize for different experiments



Argon/Neon Cerenkov: e/π (or π/K) separation at high momenta
C_4F_{10} Cerenkov: π/K separation for momenta > 3.4 GeV
Scintillators (time of flight): e/π and π/K separation below 2 GeV
Calorimeter: e/π separation
Space for additional detectors (not included in the project)**:**
Aerogel Cerenkov: π/K separation at low momenta
TRD: improvement of e/π separation

Hall C Schedule



WBS 1.1.4 Hall C R&D

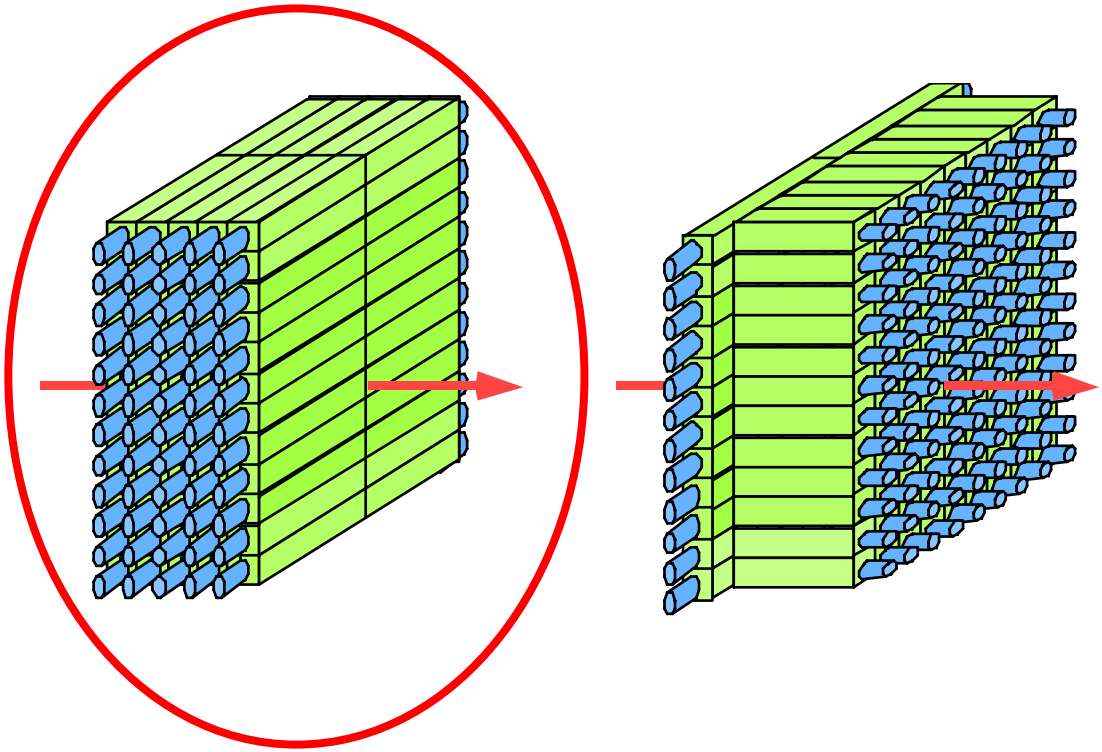
- **Key risks: superconducting magnets**
- **R&D tasks:**
  - **test of existing superconducting cable**
    - **successful**
  - **prototype of burnout proof current lead**
    - **successful**
  - **feasibility study of CF magnet**
    - **no major problems**
  - **force analysis for higher gradient quadrupoles (FY06)**
  - **prototype of support structure for cold mass of CF magnet (FY07)**
- **Hall C R&D budget: $ 382k (5.5% of total R&D budget)**
- **Key risks well addressed by R&D tasks !**

Shower Counter

Calorimeter design may depend on availability of glass block shapes.

120 Ch. Five-layer Stack -or- 132 Ch. Preshower + Projective

➡ R&D program



FY05, direct

120 lead-glass blocks: $377 k
120 PMTs: $62 k
120 bases: $31 k
disc/logic/delay: $6 k
cables: $7 k

$474 k procurement