# GIF++ Installation in the EHN1/H4 Beam line

- Layout – the $Cs^{137}$ 10TBq source
- GIF++ organization
- Schedule

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# GIF++ in H4 beam line



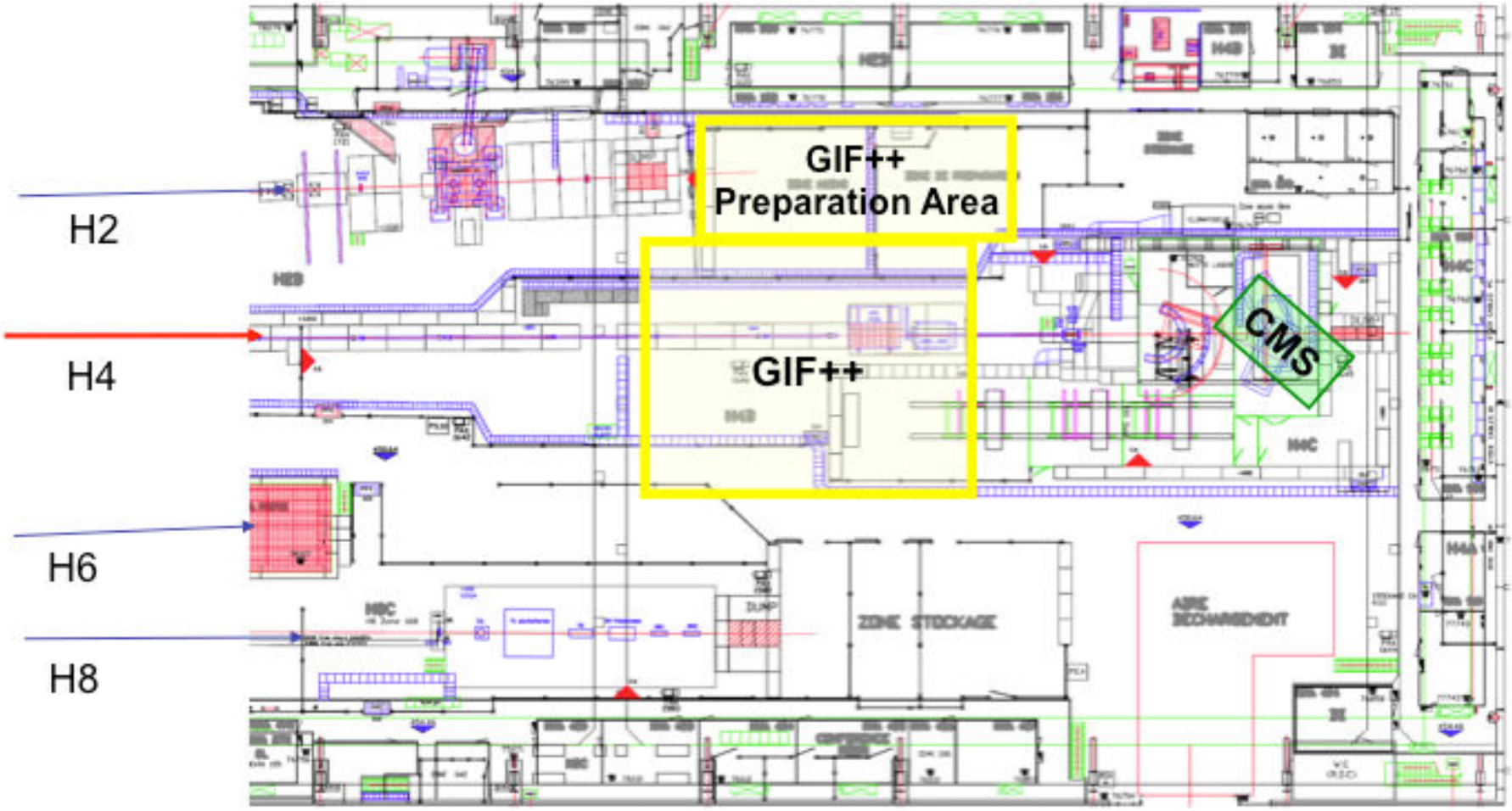
## Introduction

- **GIF** : is a **G**amma **I**rradiation **F**acility
  - use a powerful source (Cs137, Co60) to irradiate detectors or other equipment for performance, or ageing studies
  - strong point: presence of a particle beam to check detector performance, i.e. particle identification, on top of a photon background
- **++** : means upgrade wrt present installation in b.190
  - more powerful source in view of sLHC needs
  - bigger and better organized irradiation area to cover all needs
- Present installation phased out due to the dismantling of the West Area → no beam !
- Users: all gaseous detector builders (LHC & FT experiments, machine instrumetnation) plus groups related with radiation studies (EN/STI, RP,…)
- 
- If coupled with a neutron source would be a unique facility
  - could also cover the needs of accelerator installation (R2E)

# GIF++ in North Area/H4 beam line

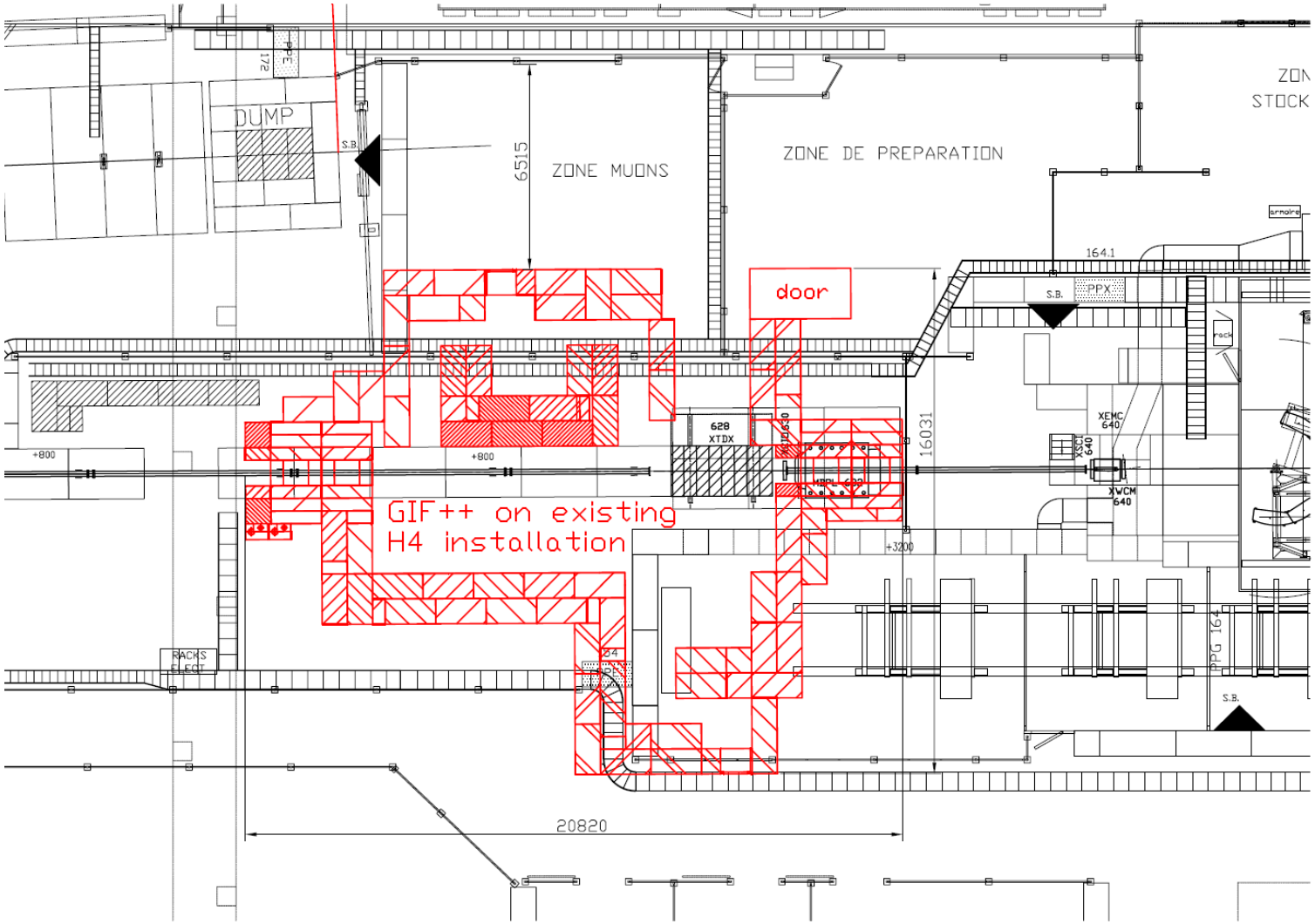


## Implementation proposal



# GIF++ in North Area/H4 beam line

4 Implementation proposal

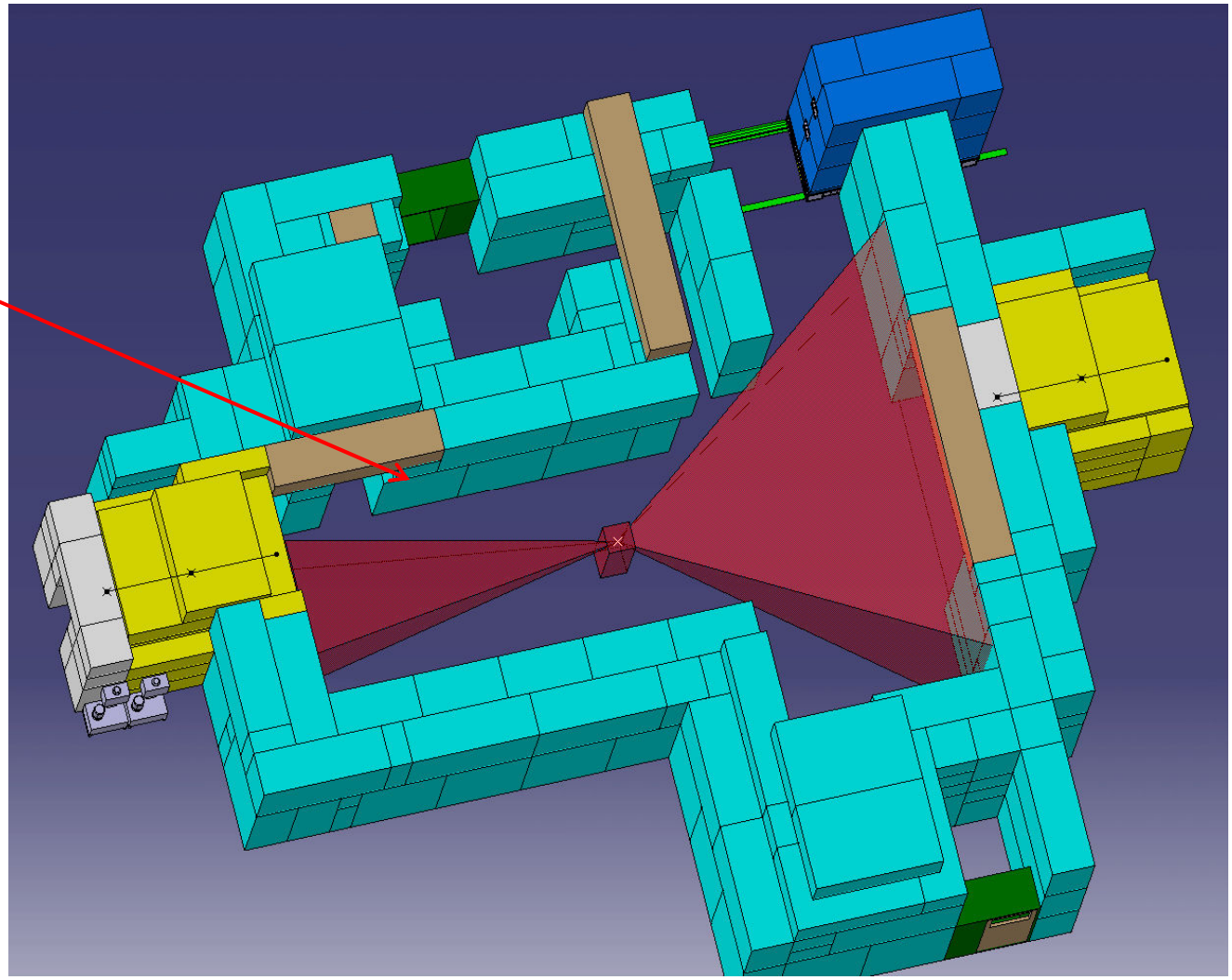


# GIF++ in North Area/H4 beam line



## Implementation proposal

Roof shielding of 0.8m concrete over the irradiation area



# GIF++ : The $Cs^{137}$ Source

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## RP considerations – (Heinz Vincke)

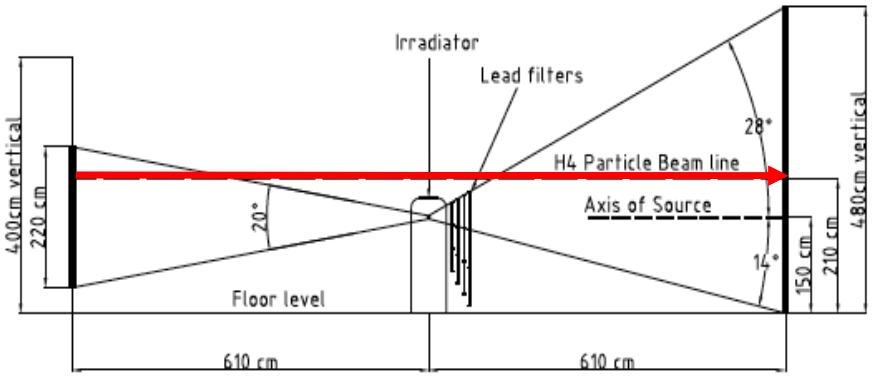
- **$Cs^{137}$, 10 TBq**
  - × 13 than present GIF source
  - half life 30 years
  - Radiation field : photons of 662 keV (85.1%)
  - ~1 Sv/h at 1m

| Max. expected doses at sLHC | Equivalent time at GIF++ (~ 50 cm from source → 2Gy/h) |
|---|---|
| Si-trackers: ~ MGy/y | >> years |
| Calorimeters: ~ 20 kGy/y | < 1 year |
| Muon systems: ~ 0.1 Gy/y | ~ minutes |

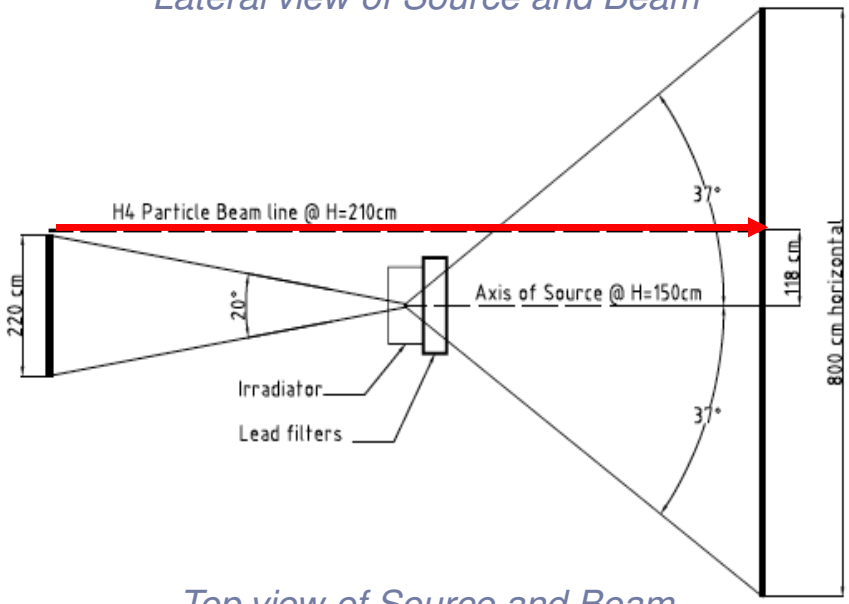
- The irradiation area will be classified as **prohibited area**
  - at 30cm distance from the source we have ~10 Sv/h, i.e. 1000 times the limit of a prohibited area
  - adequate side and roof shielding is required

- EHN1 is a **Supervised Radiation Area** (new limits since 2006)
  - **< 3 uSv/h** at permanent workplaces (was 25 uSv/h)
  - **< 15 uSv/h** in low occupancy areas (was 100 uSv/h)

**These are the limits to achieve outside the shielding**




*Lateral view of Source and Beam*




*Top view of Source and Beam*

# GIF++ Facility

7 The irradiator assembly

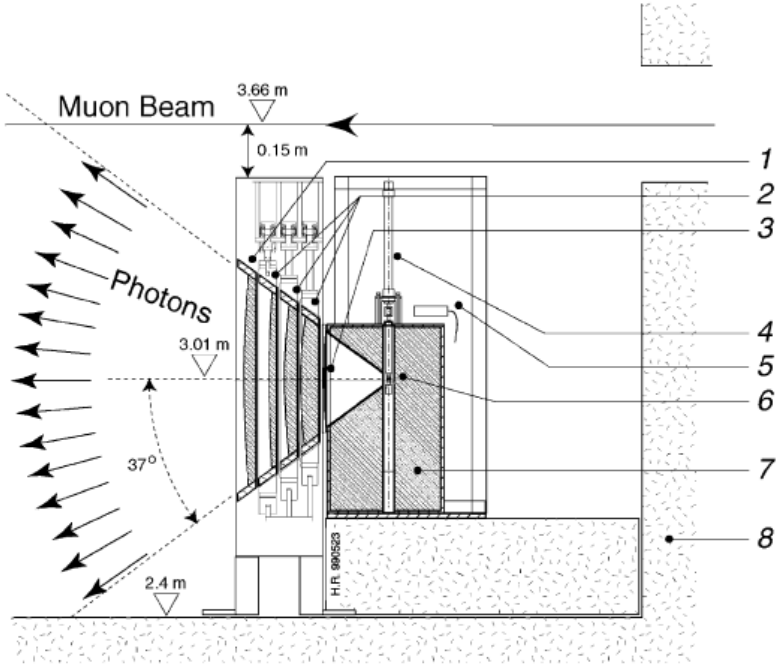



Fig. 3. Vertical cut showing beam, source and filters: (1–3) filters; (4) rod with source at lower end is lifted to place the source in irradiation position; (5) radiation monitor; (6) source; (7) lead housing of source and (8) concrete.

- The irradiator will be purchased as a “box” with all the functionalities and control software included - specs by DG/SCR
- The front filters will be recuperated from existing GIF; we may construct some new ones if needed
- Yearly maintenance by constructor – organized by DG/SCR radioacvie source service

# GIF++ Facility



**GIF++**

- **Beam time schedule :** *SPS Physics coordinator*
- **Overall management**
  - H4 Beam Line Physicist - *presently I. Efthymiopoulos,* ***EN-MEF***
- **Technical support**
  - Area and infrastructure - ***M. Jeckel EN-MEF***
- **Users**
  - GIF++ “spokesperson”/physics coordinator- **?????**
  - GIF++ technical coordinator - ***R. Fortin PH-DT***
- **RP supervision :** ***Heinz Vincke DG-SCR***

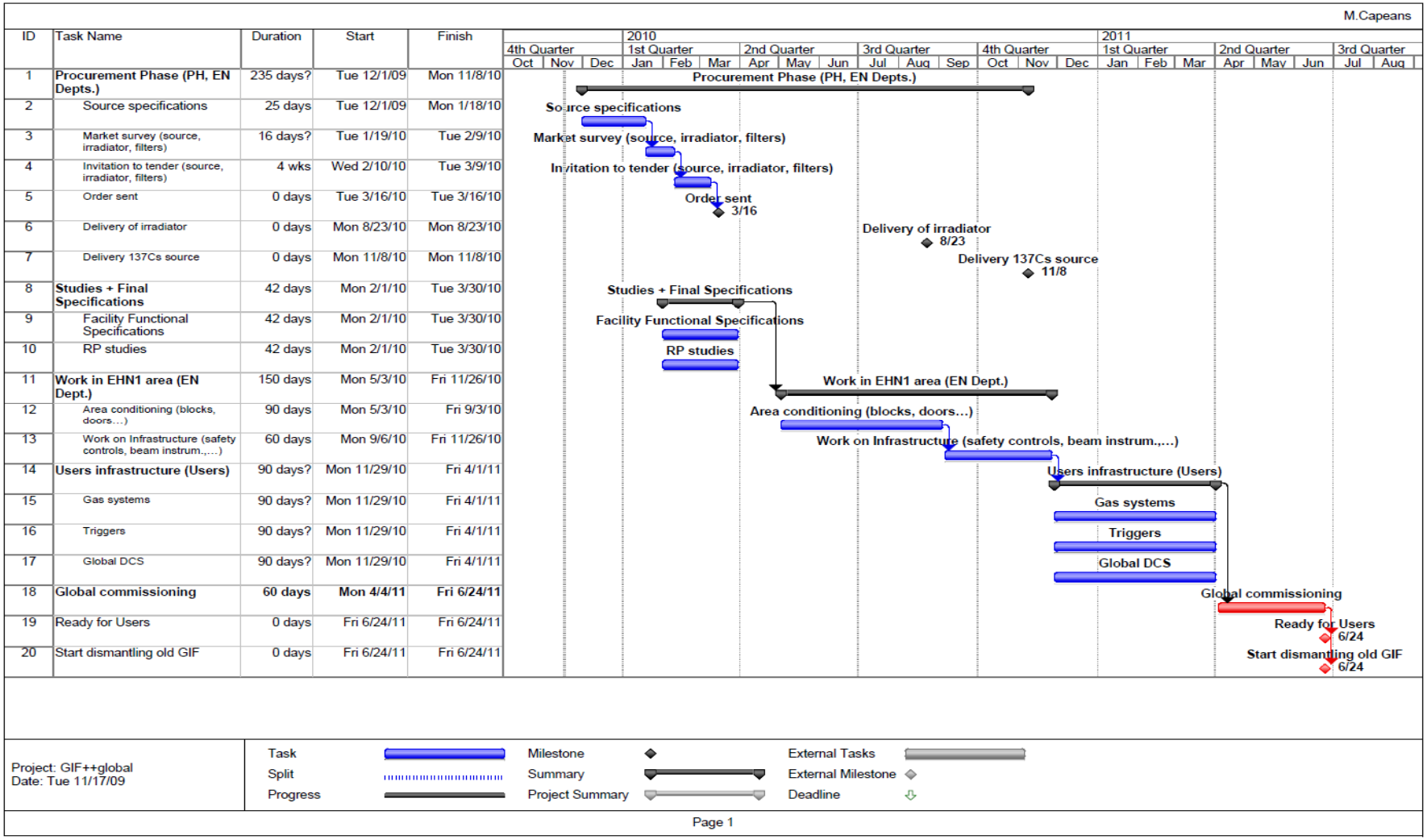
# GIF++ Construction

9 Status - schedule

- A Proposal was submitted to SPSC in September
  - CERN-SPSC-2009-029 ; SPSC-P-339
  - http://cdsweb.cern.ch/record/1207380/files/SPSC-P-339.pdf
- SPSC referees : **S. Maury** (CERN) + **M. Charlton**(UK)
  - Discussions with proponents and MEF
  - Main issue: beam time (6-8 weeks/year) and likely re-activation of CMS calorimeter test area – downstream from GIF++
- On positive recommendation from SPSC (rather likely) it will be brought to the RB for approval
- We are in a typical round loop: users want CERN approval to start investing money on the project ↔ their funds would ease the approval

# GIF++ Construction

10 Tentative schedule



# GIF++ Facility



## Organization – specific tasks

- **EN-MEF group**
  - Overall coordination and management
  - Maintenance of the GIF++ exp. Area and installed equipment
  - Assistance to the users for the installation and integration of their equipment
  - Optimization of required beam conditions
  - Maintenance of the fixed gas supply installations
- **PH-DT**
  - Assistance and liaison with users on a day-to-day basis
  - Maintenance of the detector control system of the facility
  - Maintenance of the gas mixing and purification plants, shared among the users
  - Follow up the annual maintenance of the $^{137}Cs$ source by a competent external firm
  - TSO of the facility
- **DG-SCR group**
  - Monitoring of all ionizing radiation in the area in view of safety regulations
  - Radiological risk assessments in view of different test conditions
- **Users**
  - Responsible for their specific detectors and peripheral equipment such as user-specific gas equipment, cables, power supplies, readout electronics, DAQ, etc.
  - Data taking shifts
- **PS/SPS Coordinator**
  - Allocation of particle beam time and its sharing between GIF++ users