Detector Training at EGO

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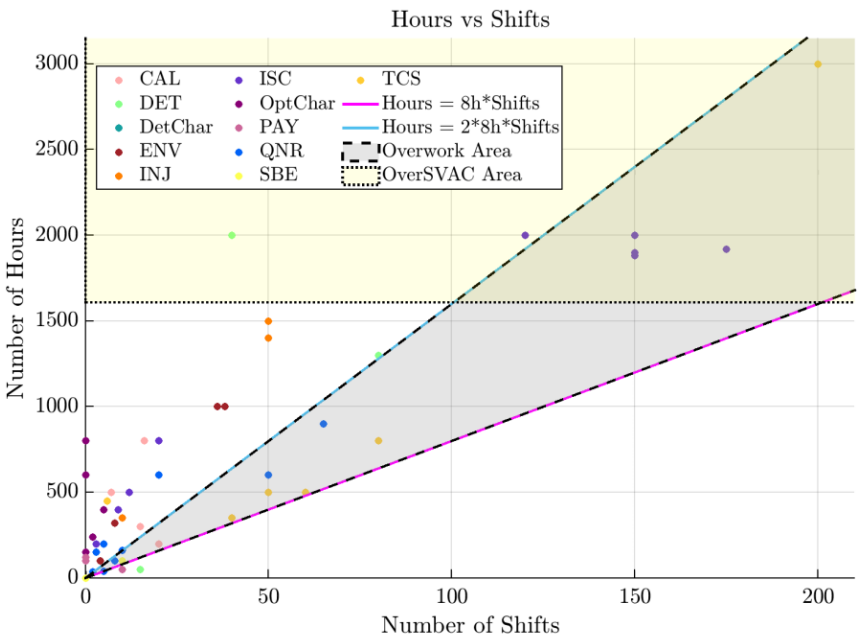
Commissioning & Detector training

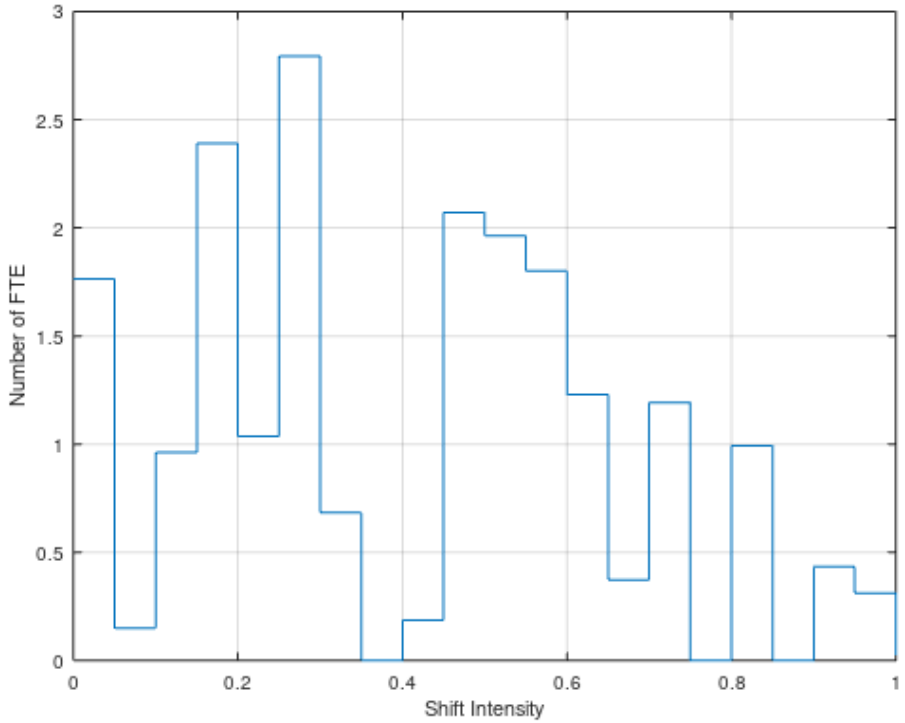
- Survey of present commissioning person power
- Training plan under construction with several emerging directions
  - Organize week long training sessions 3-4 times per year
  - Student projects
  - Facilitate weeks/months long stays at EGO

$\Rightarrow$ Needed for commissioning but also for Operations Division

- Requires also a recruitment plan $\rightarrow$ not started
  - PhD student
  - Postdocs
  - Permanent staff

Commissioning FTE survey



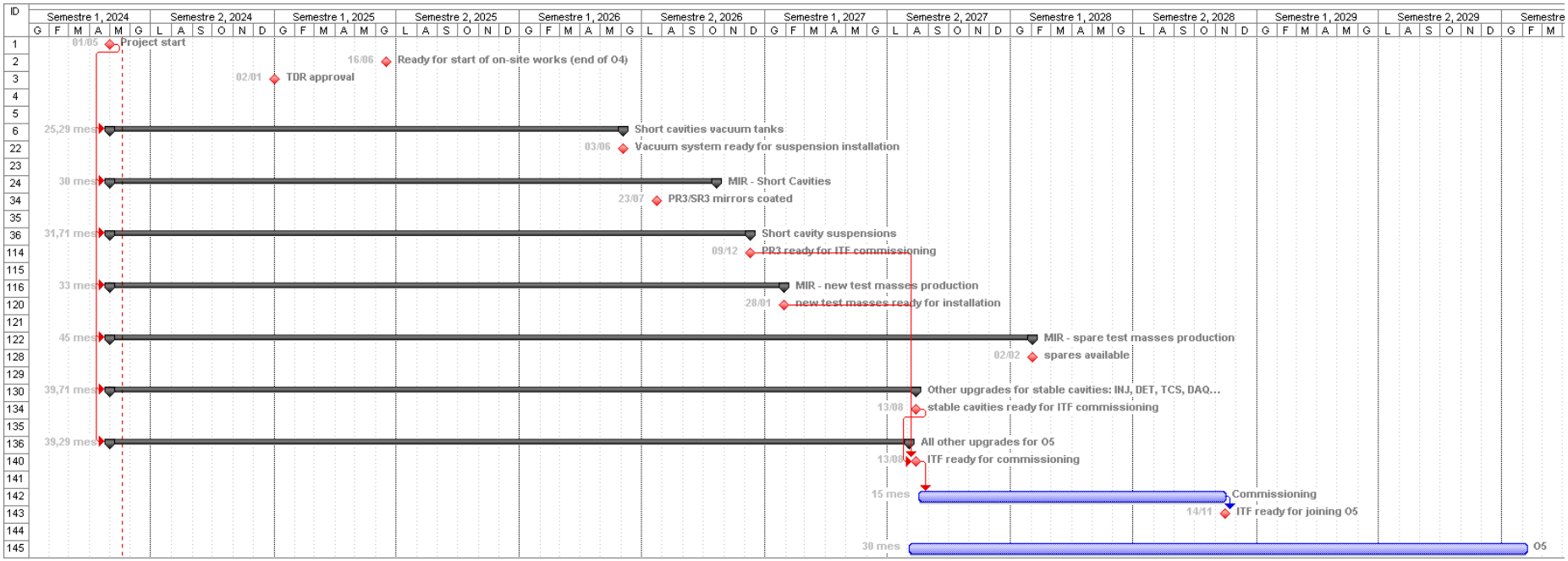


- Survey results:
  - 65 people responded
  - 20 FTE in 2023, but not uniformly distributed
  - need 30 FTE to avoid burn out assuming 13 shifts per week
- How long does it take to train a commissioner?
  - One year for someone to be autonomous
  - First sit next to someone doing commissioning and ask questions
  - Then press buttons doing commissioning with someone telling you what to do
  - Be left alone in the control room and try $\Rightarrow$ One learns from making mistakes

Training sessions

- Week long schools and workshops
- Organize 3 or 4 per year at EGO
- One general overview of detector, first planned for November 2024
  - past examples: VESF 2012 , 2019 commissioning training week
- Several more focused workshops
  - Optical & mechanical simulations applied directly to commissioning
  - Detector characterization sprint and interface with commissioning
  - June 2025 (just after end of O4b), hands on training on Virgo, for example how to align a suspended optical cavity by hand
- Try to attach these to Virgo weeks and organize social team building event on the weekend in between
- How to fund this?
  - 3 weeks of travel per year per PhD student is more than the typical student travel budget

Commissioning training schedule



- 1 year of run
- 1 year of construction
- 1 year of installation mixed with commissioning
- 15 months of round the clock commissioning

$\Rightarrow$ Two years to train and then two years of increasingly intensive work

Off-site training

- Science data taking and construction make practical training at EGO difficult in the next two years
- Use other facilities that use same control system as Virgo
  - CALVA, IJClab, France - three suspended mirrors forming coupled cavities
    - Proposal to organize 1-2 week hands on school in 2025
  - ET Pathfinder, Netherlands - a complete suspended interferometer under construction
  - LAPP, France - an in vacuum suspended bench under construction
  - ...
  - Many laboratories with 1064 nm laser locked on rigid cavity

$\Rightarrow$ Teaches how use the digital control system, and implement several control loops to control a cavity or a suspension

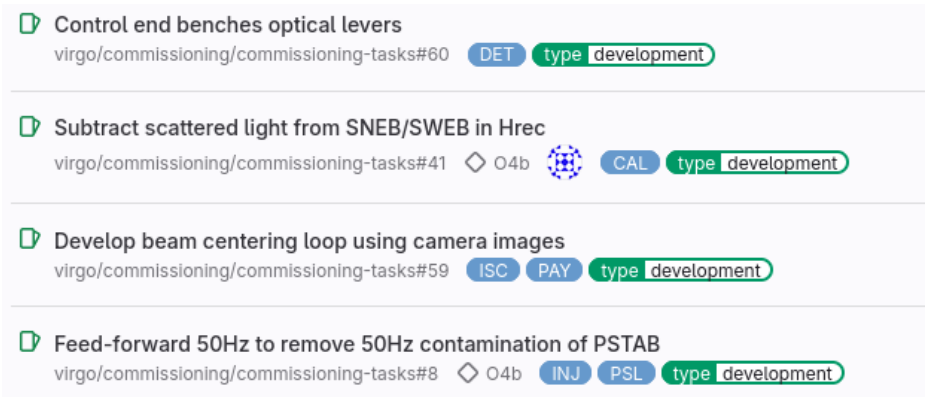
$\Rightarrow$ Saves several months of training at EGO

- Lower stake environment

Stable cavity opportunity

- 6 new suspension to commission for stable cavities - will require more FTE
  - Training opportunity, experts commission first suspension
  - More repetitive tasks can be taught to others for other suspensions
  - Could commission many suspensions in parallel if enough people are trained

Student projects



- Work in progress list of projects that could start right now
- Projects requirements
  - Not on critical path but useful in long term
  - Achievable: a few weeks for experienced commissioner → six months for a student
  - Agreement between student, supervisor and a mentor at EGO
  - Ends with detail report on progress made to create starting point for next person
- Need a separate list of more ambitious projects
  - Main project of PhD student
  - Leading to a short author list publication

Facilitate visits to EGO

- Up to date introduction on visits to the site
  - Where to sleep?
    - Practical hotels around the site
  - Where to eat?
    - Canteen and evening packed meals
    - Restaurants & fast foods opened late in the evening
  - How to travel to the site?
    - Taxi shuttles from Pisa train station
  - How to get access badges?
  - How to book an office / meeting room?
- EGO guest house for weeks/months long stays
  - Kitchen, washing machine, ...
- Improve commute to the site
  - Additional taxi shuttles at times aligned with commissioning shifts
  - EGO cars instead of long car rentals?

Conclusions

- Expect a need of 30 FTE for O5 commissioning
- There are also overlapping training needs for detector knowledge from the Operations Division (Detector Characterization, Calibration, ...)
- Training plan under construction
  - Several week long training sessions per year
  - A list of student projects
  - Hands on session at other facilities
  - 10-20 person to train
- Need to facilitate weeks/months long stays at EGO
- Requires also a recruitment plan $\rightarrow$ has not started
- Requires funding
  - $\sim$300 days of travel per year for training
  - $\sim$1300 days of travel per year for long term visits during commissioning
    - Lower costs by avoiding hotels and car rentals