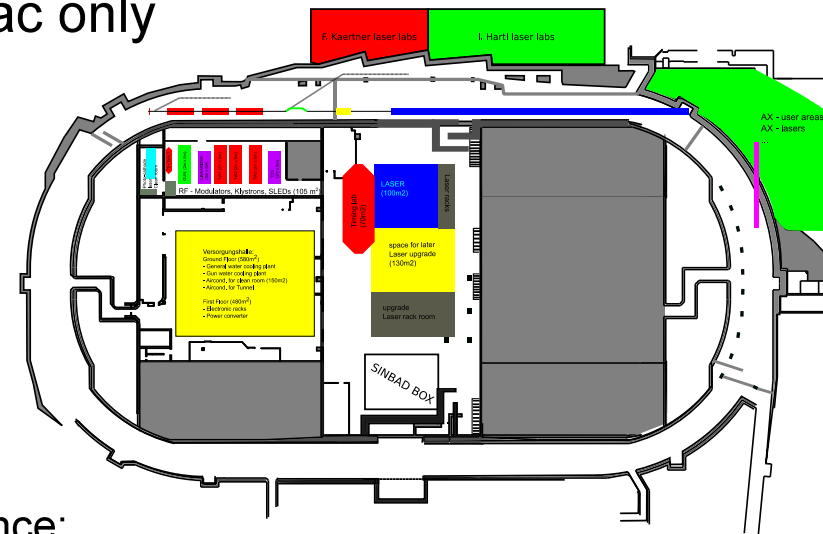


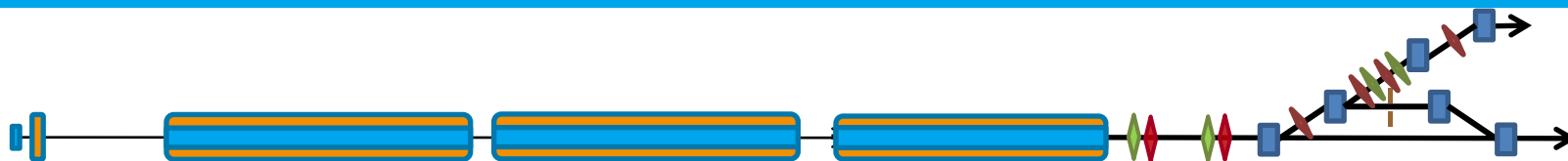
Diagnostic for SINBAD

- Turn the facilities of the old DORIS storage ring plus associated halls into a dedicated multi-purpose accelerator R&D facility with several, independent experiments from ultra-fast science and high gradient accelerator modules.
- Status: DORIS is removed, building renovation coming up soon
- Here I'll deal with the SINBAD-ARES-linac only
- Target time-line:
 - Beam from gun: End 2017
 - Beam from linac: end 2018
- Funding:
 - available up to the end of the linac
 - If successful, the Athena-proposal would finance:
 - laser-plasma acceleration, FEL line
 - a X-band transverse deflecting structure.
 - Decision spring 2016, funding starting 2018



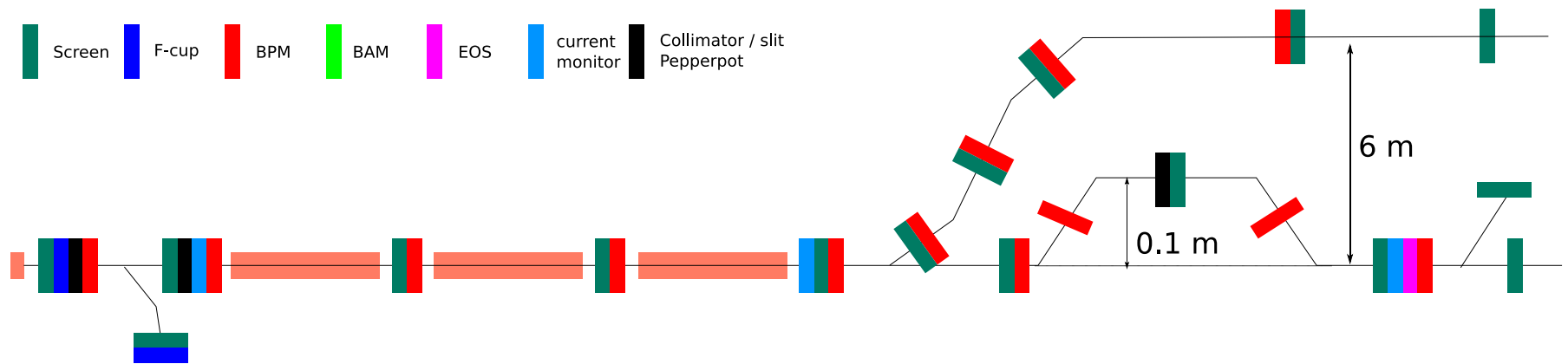
- build linac, achieve short bunch duration
- Use linac beam for injection into advanced acceleration schemes (aas)
 - Idea: Use well- characterized beam from linac to test concepts (“external injection”)
 - Typically have very short “RF-bucket equivalent” dimensions
 - e.g. 300GHz dielectric-loaded laser driven waveguides
 - To probe the acceptance and to accelerate with little energy spread, ultra short bunches are needed
 - In addition, often very strong focusing is needed
 - to match to the strong focusing inside e.g. the plasma
 - Foreseen experiments:
 - Dielectric laser acceleration: Test-site for the Moore-funded collaboration on “Accelerator on a chip”
 - Dielectric loaded waveguide tests (inject into AXSIS like structure to test)
 - If the request for Helmholtz strategic investment funds is successful, laser-driven plasma-acceleration with external injection
- Use linac beam for other interesting research topics
 - e.g. diagnostic tests?!
 - Proposed as transnational access facility starting in 2019





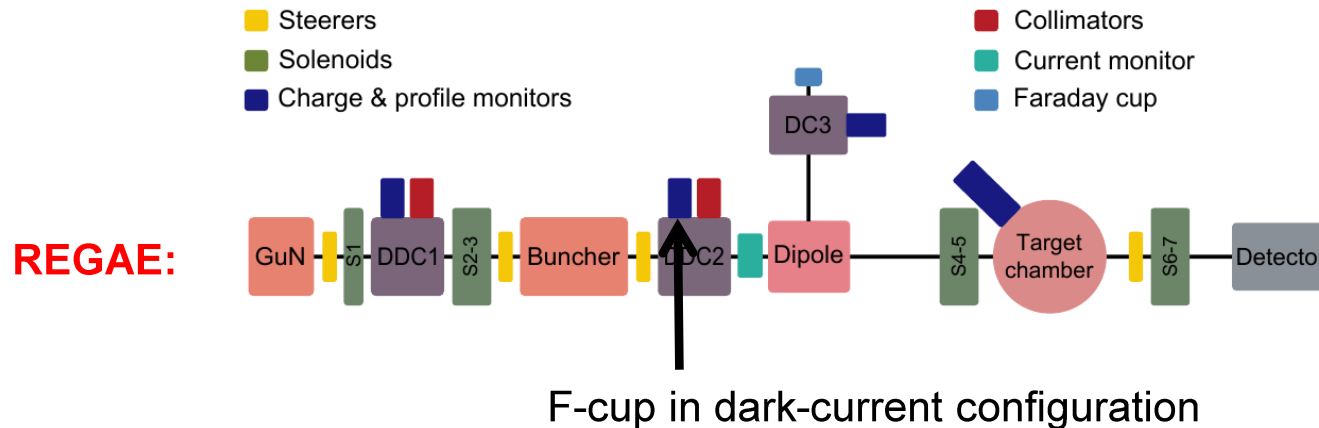
- Layout comprises:
 - REGAE-type RF electron gun (S-band)
 - 2 (upgrade 3) linac-II type S-band RF-structures
 - Magnetic compressor with slit
- Main design parameters
 - Particle type: electrons
 - Energy:
 - Gun: 5MeV
 - Linac end: **100MeV** (with upgrade option to 250MeV)
 - (If plasma-boosted: 1GeV)
 - RMS bunch length after linac exit:
 - Non-compressed: 2ps
 - Compressed: **few fs**, aiming for sub-1fs
 - Charge:
 - typical: **0.2-50 pC** (depending on bunch length)
 - Max: 1nC
 - dark-current: 30pC in 5 μ s (RF-pulse length).
 - Normalized transverse emittance < 0.5 mm mrad (20pC case)
 - Min RMS beam size: 2 μ m.
 - Rep-rate: min 10Hz (discussing up to 50Hz)
 - Aperture: diameter > 3cm

Updated after the meeting: F-cup after linac replaced by current monitor

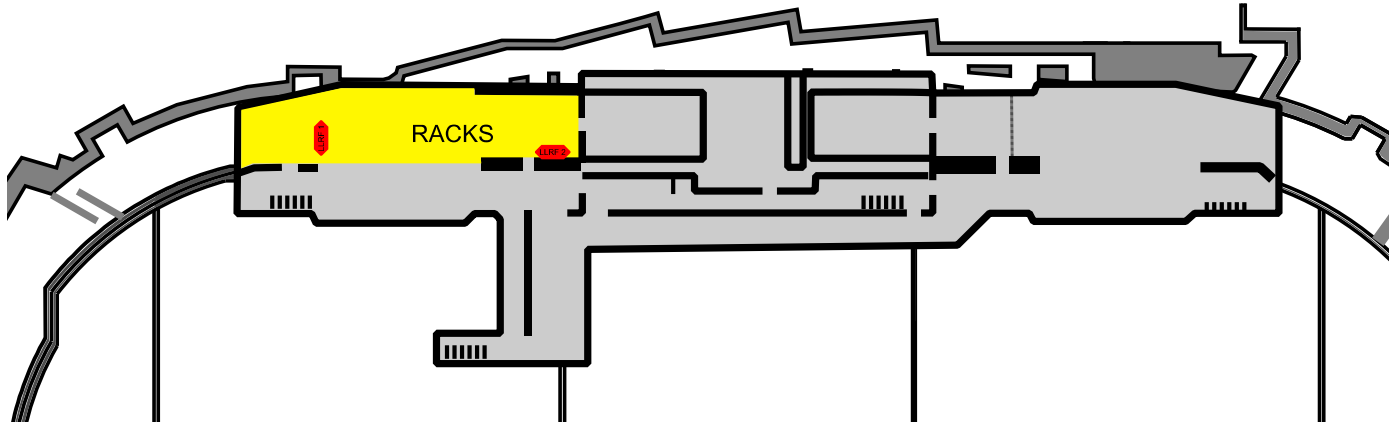


REQUIRED DIAGNOSTIC

- Gun-to-linac: Reuse REGAE as much as possible.
 - Optimized tanks for vacuum-performance, small footprint, proven to work, hopefully less effort ...



- Linac
 - X-FEL type screens should do the job (?). We should already have one (?)
 - Beam arrival time monitors: not MDI but MKS (?), locations defined by Holger(?)



- Racks placed in the cellar under the linac for short cable lengths
- Are there any special requirements? (cooling, max cable length, ...)
- Rackspace per device?

- Is this feasible within the time frame?
- What are the costs for each item and when do they occur?
 - We have to plan the budget / revise what we can afford
- Anyone got a smart idea on how to measure the bunch length....
- Grounding?

