

Design Effort – XFEL Vacuum Systems

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- **Design topics included into the following estimation**

- layout of vacuum sections
 - 3-D modeling including all vacuum components and supports to main support structure
- 2-D overview drawing including positions, lengths of components, flange types, ...
- design of all vacuum chambers
 - tubes, flat chambers, bellows, pump chambers etc.
- design of all vacuum chambers for diagnostic elements (e.g. OTR, button BPM, ...)
- special components
 - RF gun, transverse deflecting cavities
 - collimators, kicker chambers
 - dump window, etc.
- individual supports of vacuum components to main support structure/girder

- **Not included are**

- separate diagnostic elements (toroids, phase monitors, etc) ➡ D. Noelle/H. Schlarb
- in-kind contributions (BPM's for BCI/II) ➡ PSI?
- main support structure/ girders ➡ MPL?

Boundary Conditions

- **Status of detailed layout of accelerator sections varies significantly**
 - modules – details are well known
 - Injector – similar to FLASH ...
 - + additional new parts (DOGLEG)
 - Main linac
 - BCI/II – concept exist, detailed layout presently worked out
 - Collimation section – concept?, detailed layout not yet started
 - Undulators
 - detailed layout presently worked out
 - Main dumps
 - detailed layout not yet started
 - Beam distribution system
 - detailed layout not yet started
- **Detailed boundary conditions/layout of numerous components presently unknown**

Detailed planning of overall design work ➡ rough estimate

Boundary Conditions

- **Assumptions concerning overall schedule**

- modules

- start of module assembly (series production) – 7/2009

- injector

- start preassembly of vacuum girders - 4/2011

- main linac

- start of preassembly of vacuum girders BCI/II - 7/2011
- start of vacuum installations 4/2012

- main dumps

- start of vacuum installations 10/2012

- beam distribution system/undulators

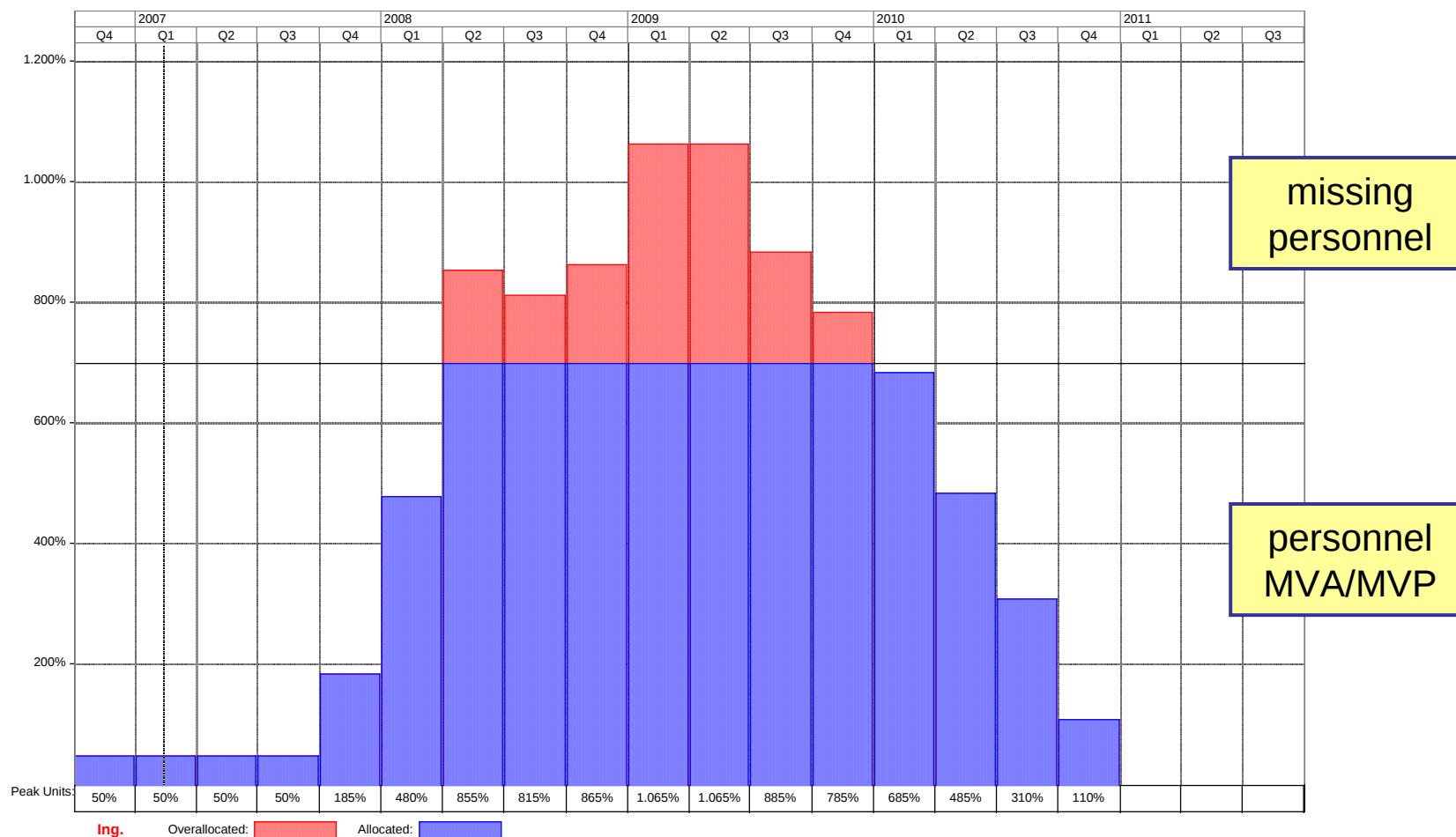
- start of vacuum installations 12/2012

**How realistic are
these dates???**

Consistent overall time schedule with miles stones needed

**Dates for finishing buildings not sufficient for detailed
planning of vacuum work!!!**

● Estimated profile designers (FTE)



- **Topics to be covered by vacuum groups**

- overall responsibility for vacuum sections
- concept/layout/overview
- simple vacuum components
- some more complex components
 - collimators
 - RF gun
 - ???

- **Personal of vacuum groups**

- presently 7 FTE for design work ➡ covers large part of XFEL work
- to designers retire in 2009 ➡ to be replaced!

- **Topics to be covered by ZM1 (external companies)**

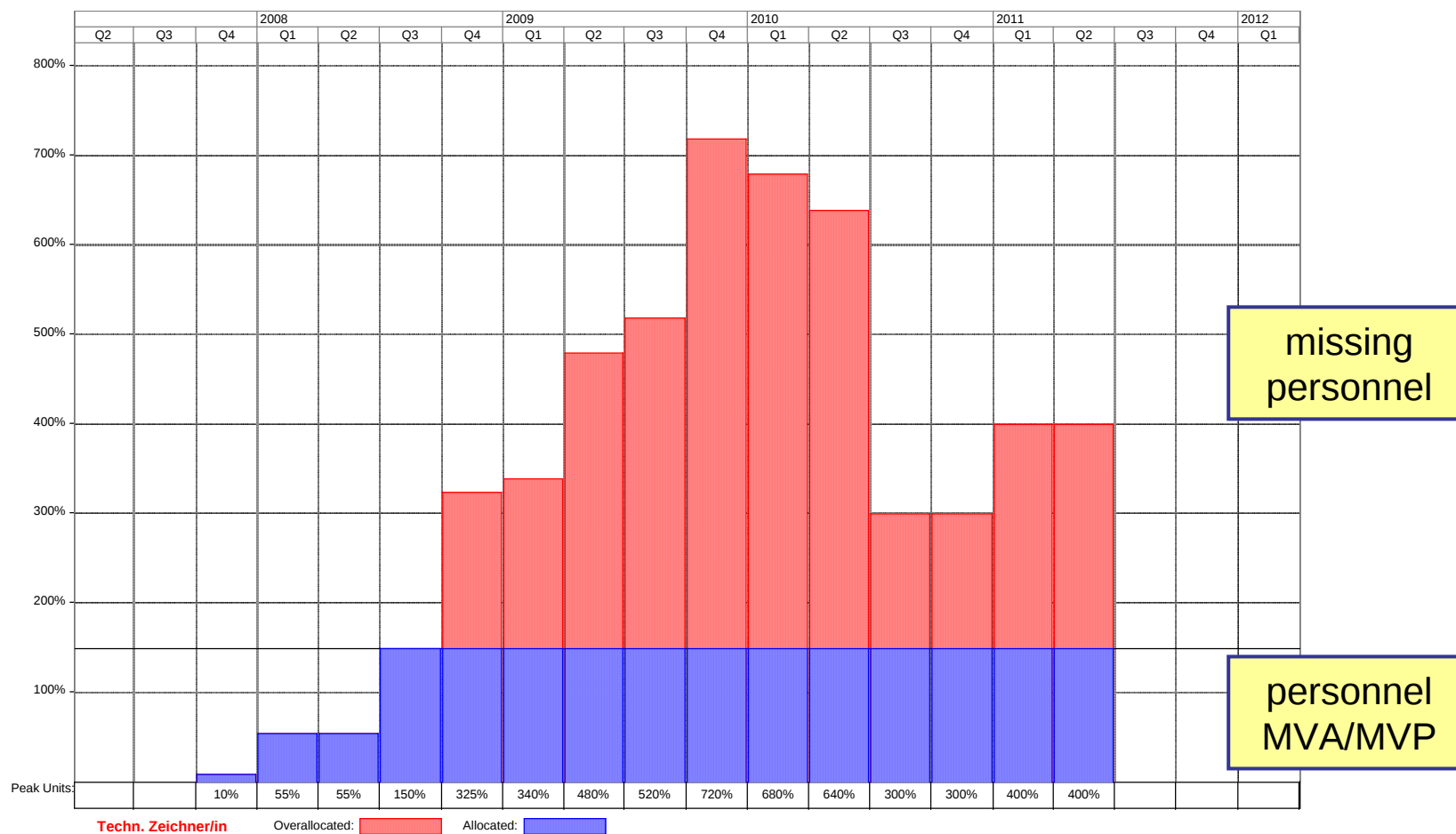
- undulator vacuum chamber and interconnections (not included in previous slides!)
- more complex components

- **Possible in-kind contributions**

- special components?

Drawing Work

- Estimated profile draftsman (FTE)



Drawing Work

- **Personal of vacuum groups**
 - 1.5 FTE only
 - retirement in 2010/2011 → to be replaced!
 - additional personal during peak phase for vacuum groups?
- **Topics to be covered by ZM1 (external companies)**
 - main load of drawing work (several FTE 2009-2011)
- **Possible in-kind contributions**
 - draftsperson from Poland?

- **Estimation of required personal**

- large fraction for design work will be covered by vacuum groups
- design support needed from ZM1 (external companies), in-kind
- substantial support needed for drawing work (ZM1, external companies, in-kind)
- room for further optimization of workload

- **Substantial uncertainty in detailed planning due to unknown details of**

- vacuum sections
- number of different components needed
- details of components
- present estimate to be taken as lower limit
 - ➡ + 2 FTE in peak periods?

- **Experience from TTF/PETRA III**

- substantial bottleneck expected for ordering and manufacturing though AV
 - strong wish of vacuum groups for sufficient personnel!
 - integrate personnel temporarily into vacuum groups?