Detector Assembly Schedule

2019/10/27

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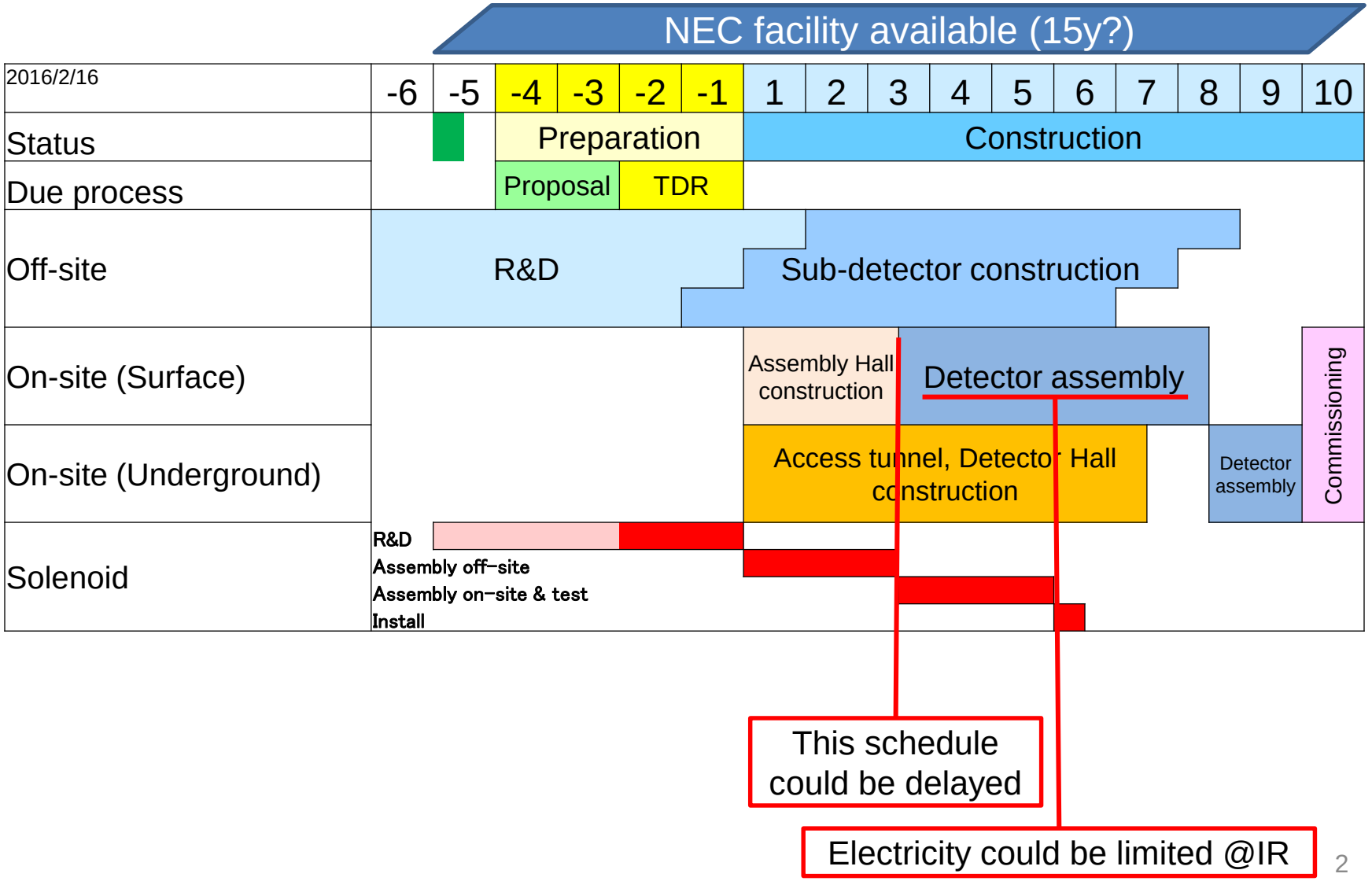
@Ichinoseki

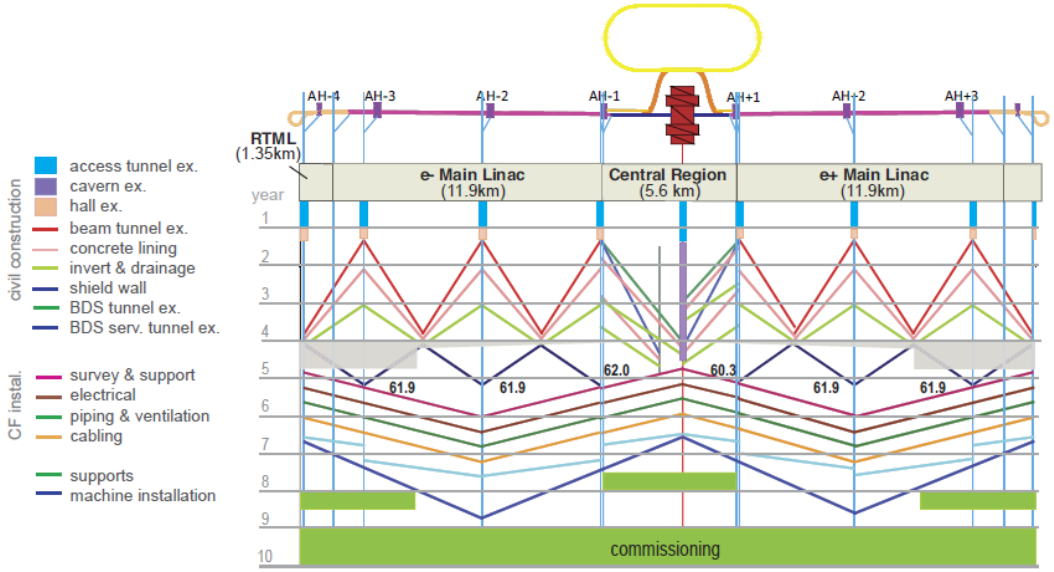
Plausible Schedule



Utility during construction period

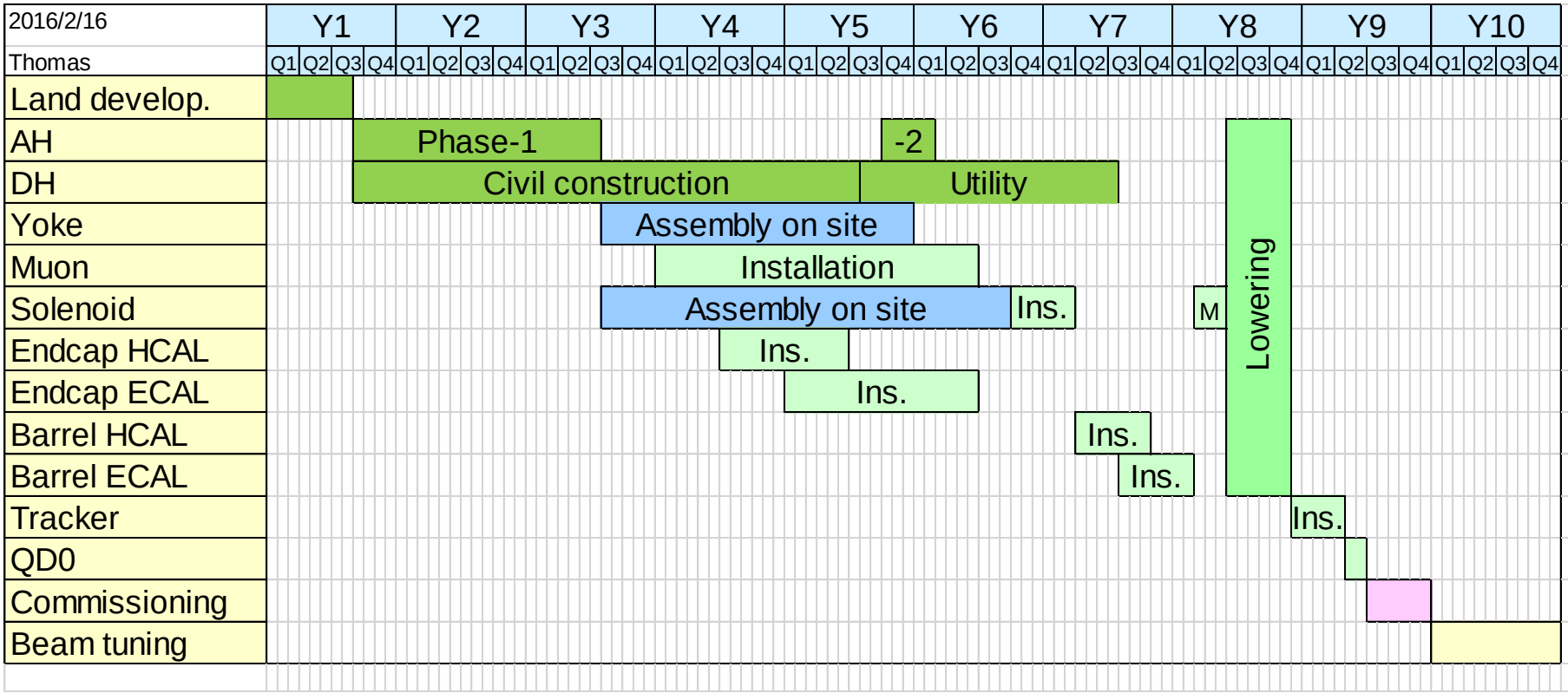
- New high voltage (154kV) electricity line (~15km) has to be build to IP campus (Tohoku team's study)
- Cabling in ML will be finished after T8 (TDR)
- Cooling water will be supplied from north end of ML (Tohoku team's study), and piping in ML will be completed at the end of T7 (TDR)

- Utility at IP campus will be fully available after T8, and limited during construction period
- Pre-campus should be utilized as much as possible in order to reduce utility requirement at IP during construction period



ASSEMBLY SCENARIOS OF INNER TRACKING SYSTEM

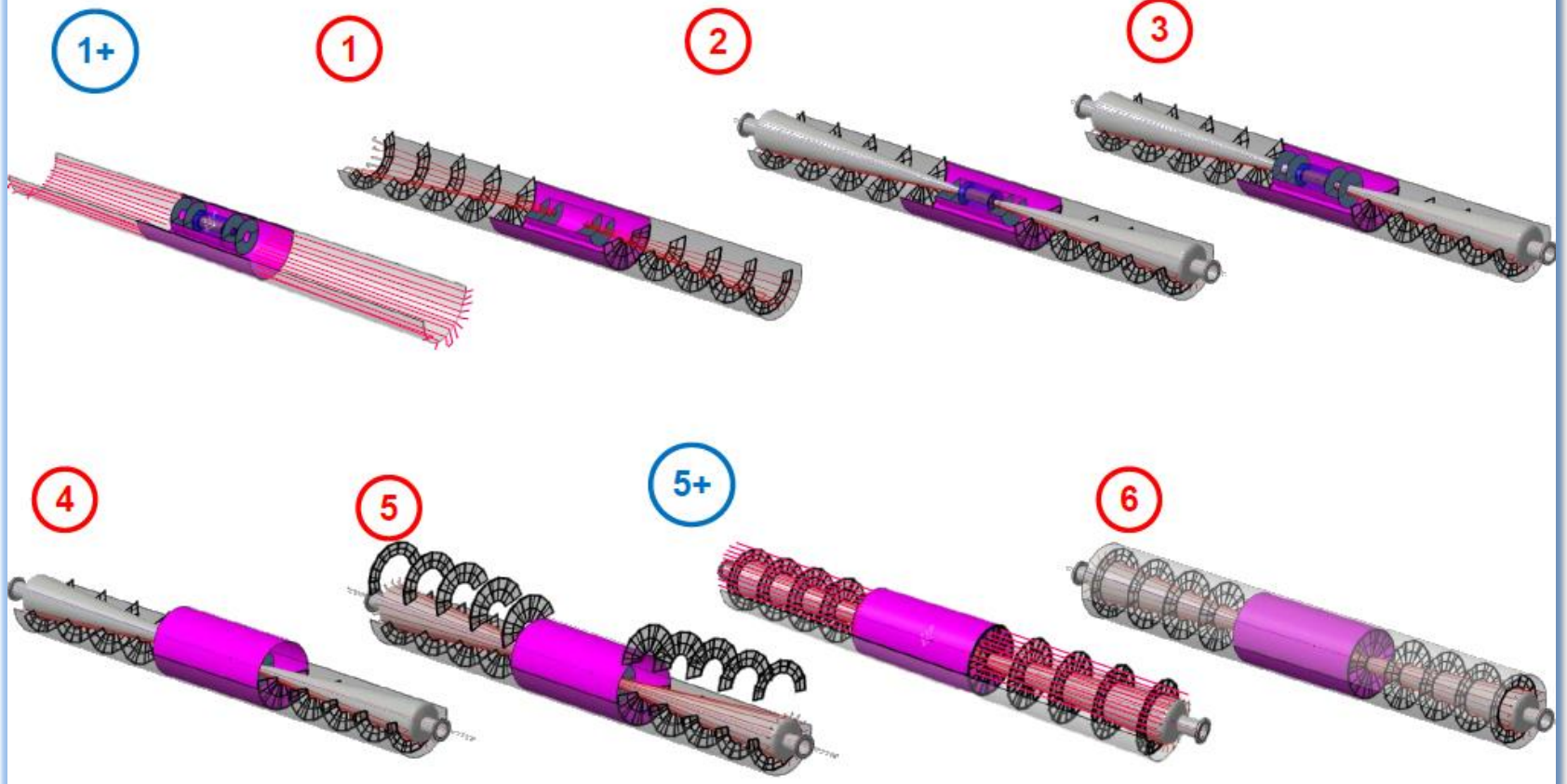
Sub-detector installation schedule



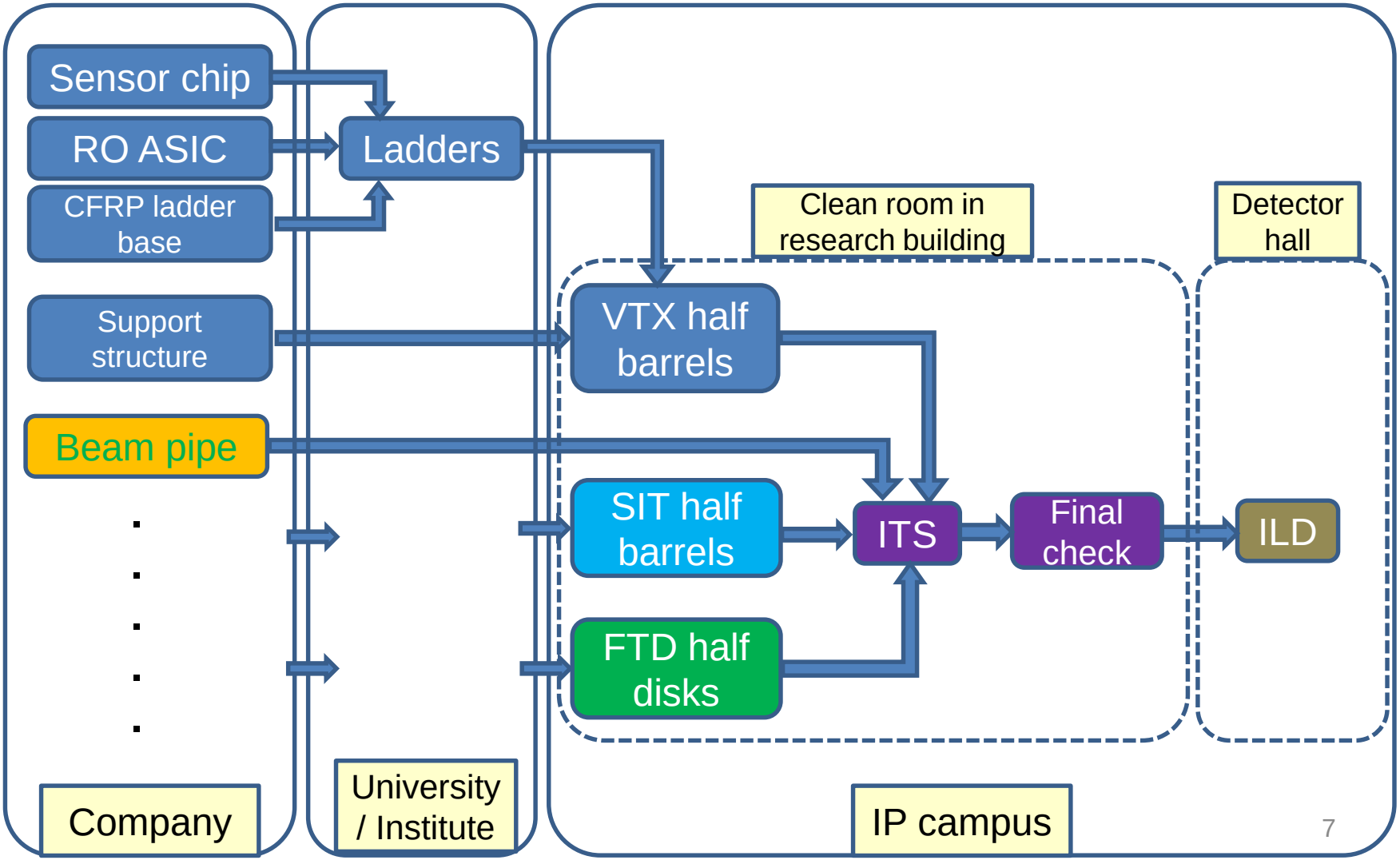
Inner Tracking System

Inner Region

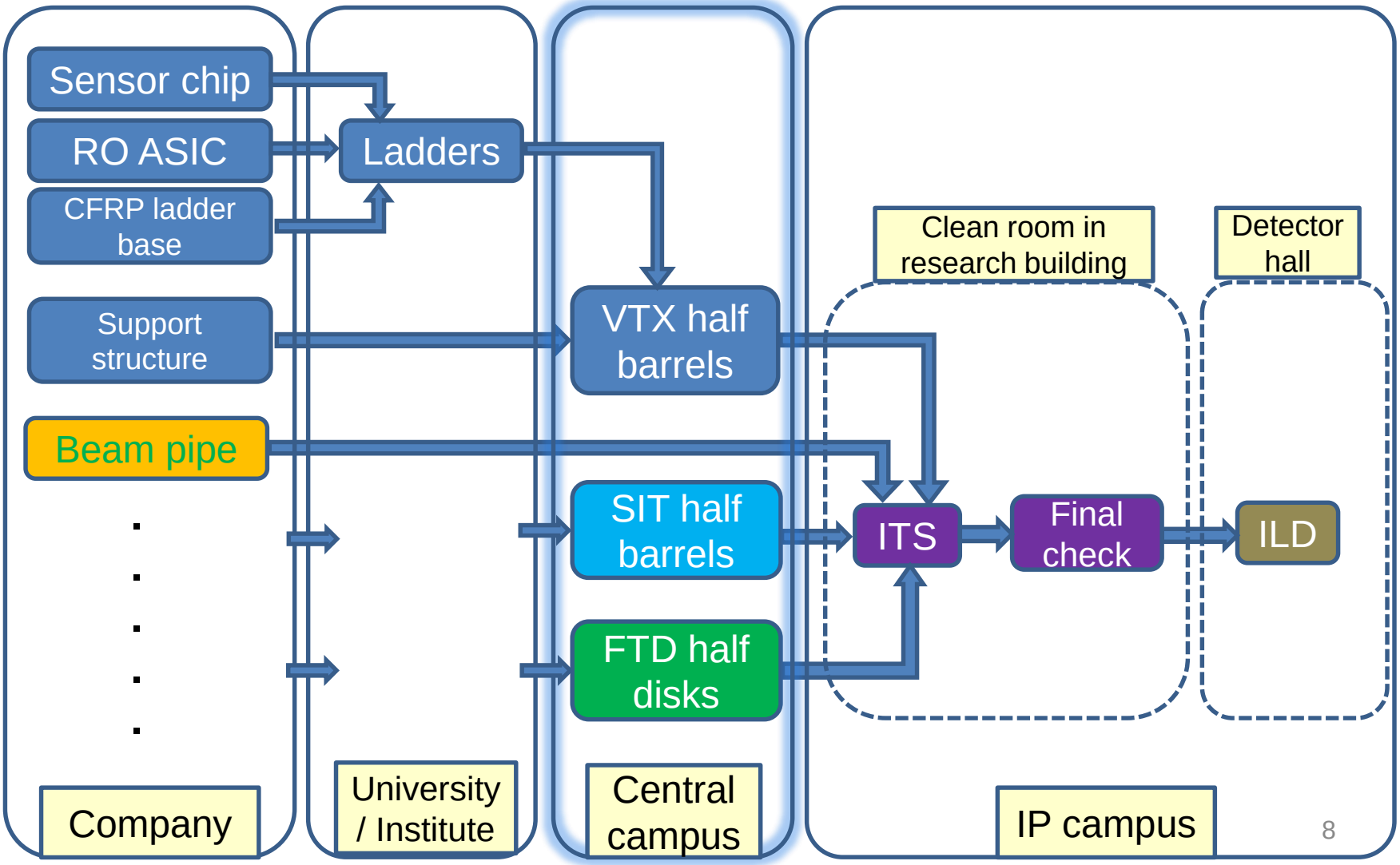
- **Assembly procedure :**



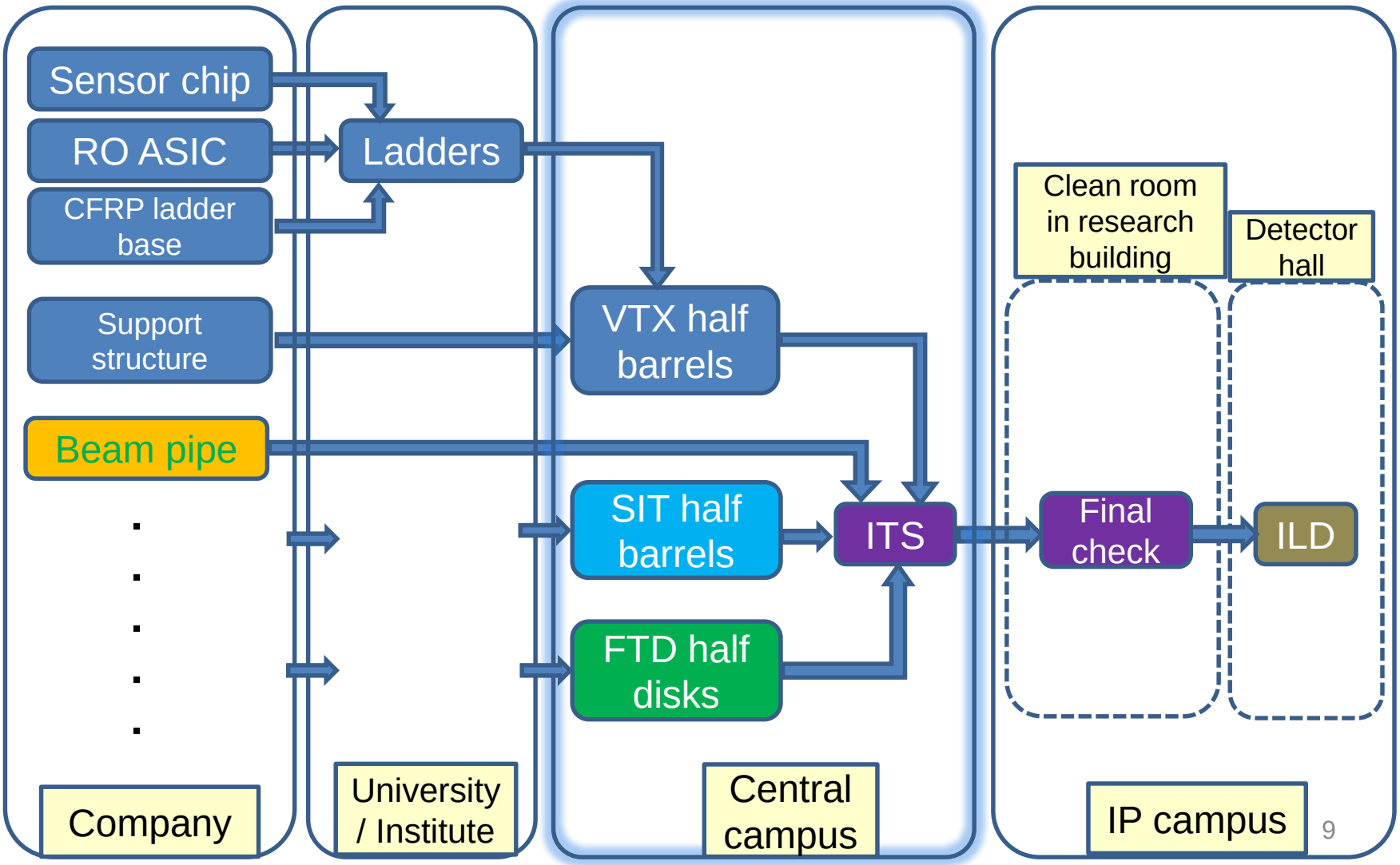
Assembly scenario 1-a



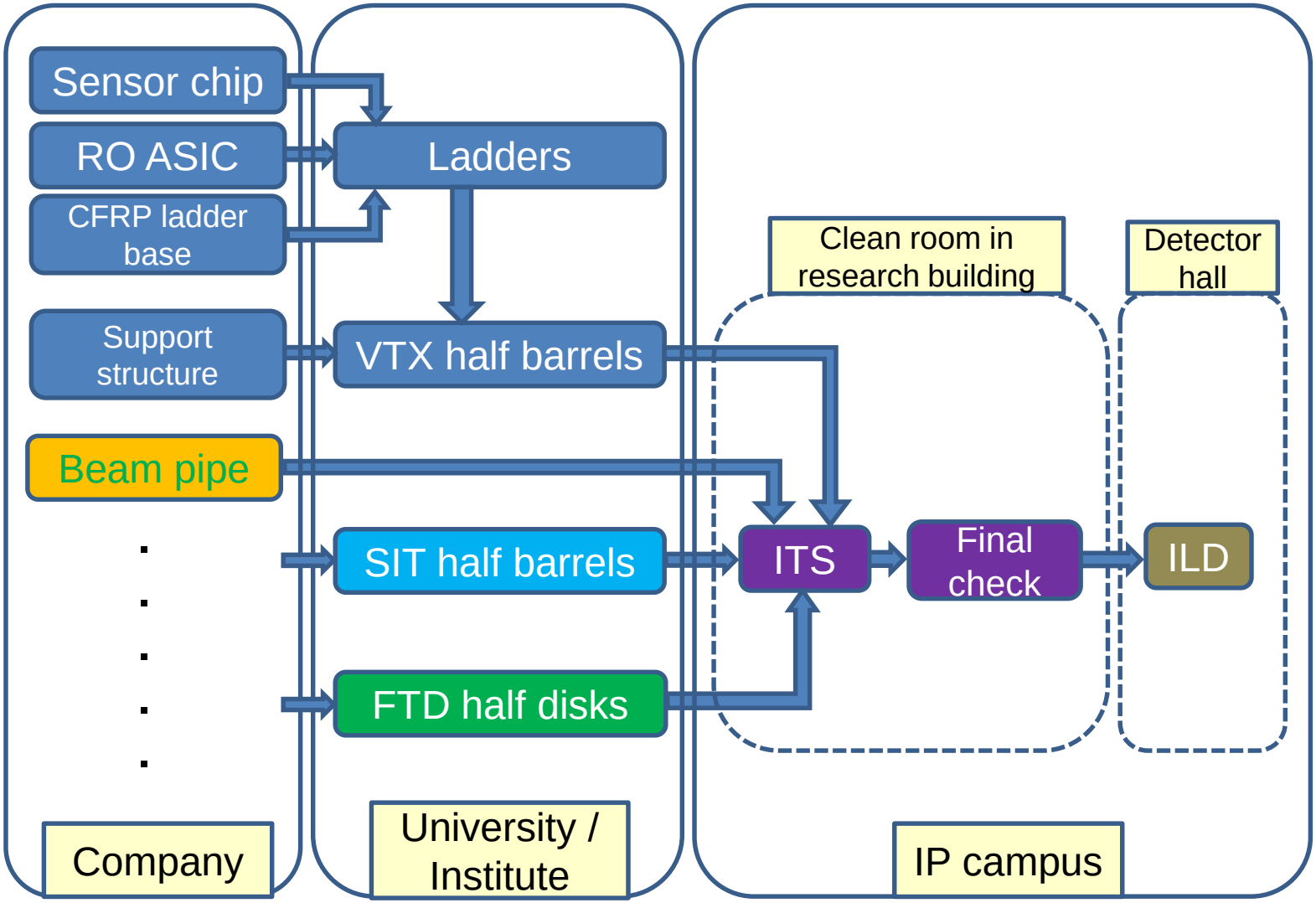
Assembly scenario 1-b



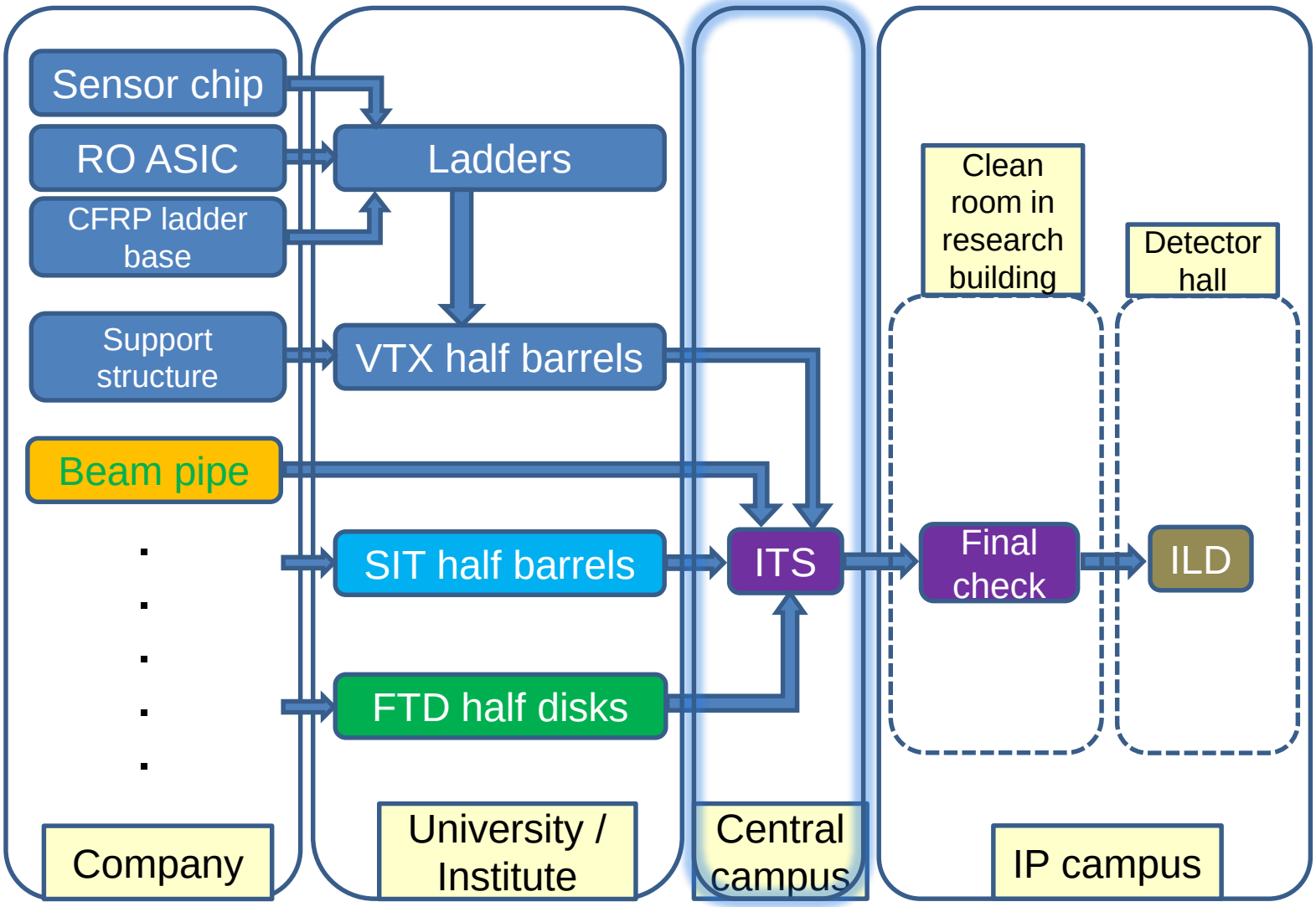
Assembly scenario 1-c



Assembly scenario 2-a

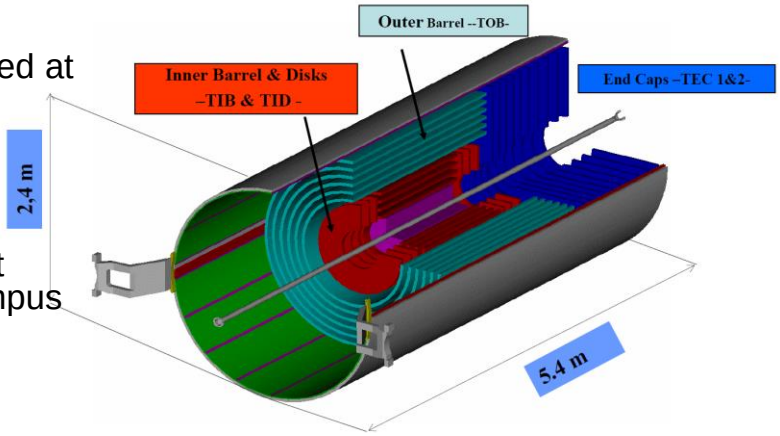


Assembly scenario 2-b

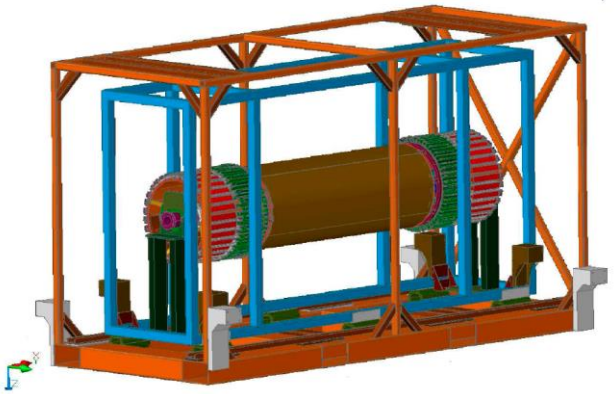


Comparison of scenarios

- Examples
  - Belle-II SVD: (a la 1-a)
    - Ladders are assembled in universities & institutes
    - Ladders are shipped to KEK, and full barrel is assembled at KEK
  - CMS Silicon Tracker: (a la 2-b)
    - TIB, TOB, TID, TEC are assembled in universities & institutes including CERN
    - These modules are assembled into a Silicon Tracker at Tracker Integration Facility (350m^2) at CERN main campus
    - Silicon Tracker is transported overnight to Point 5 for installation
  - ATLAS Inner Detector: (a la 2-a)
    - Sensor modules are assembled in universities & institutes
    - SCT barrel is assembled in Oxford University
    - SCT barrel is shipped to CERN inner detector integration facility
- Less number of transport is preferable
  - Less risk of damage
  - Inspection/test is necessary after each transport
- But transportation is manageable
  - Many examples such as detectors for LHC
- It seems there is no show-stopper in every scenario



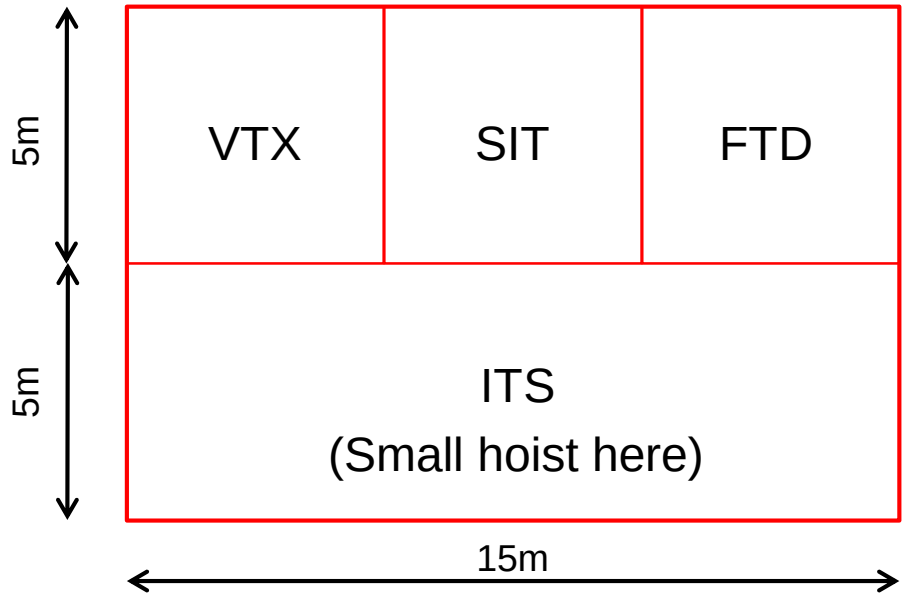
CMS Silicon Tracker



Shipping container for ATLAS SCT barrel

Space requirement

- We could build Silicon Tracker Integration Facility either in Central campus (1-b, 1-c, 2-b) or IP campus (1-a, 2-a)
- Even in case of 1-b, 1-c, and 2-b, a similar space, which can be shared with other sub-detector, would be necessary for maintenance or temporally storage at IP



A possible layout of Silicon Tracker Integration Facility ($150m^2$)

Summary

- Utilization of central pre-campus is strongly recommended in order to reduce utility requirements at IP campus during detector construction period

- There are several scenarios of Inner Tracking System assembly in which central pre-campus is used