SM18 – CLEANROOM FACILITY UPGRADE

SPL cavity working group meeting

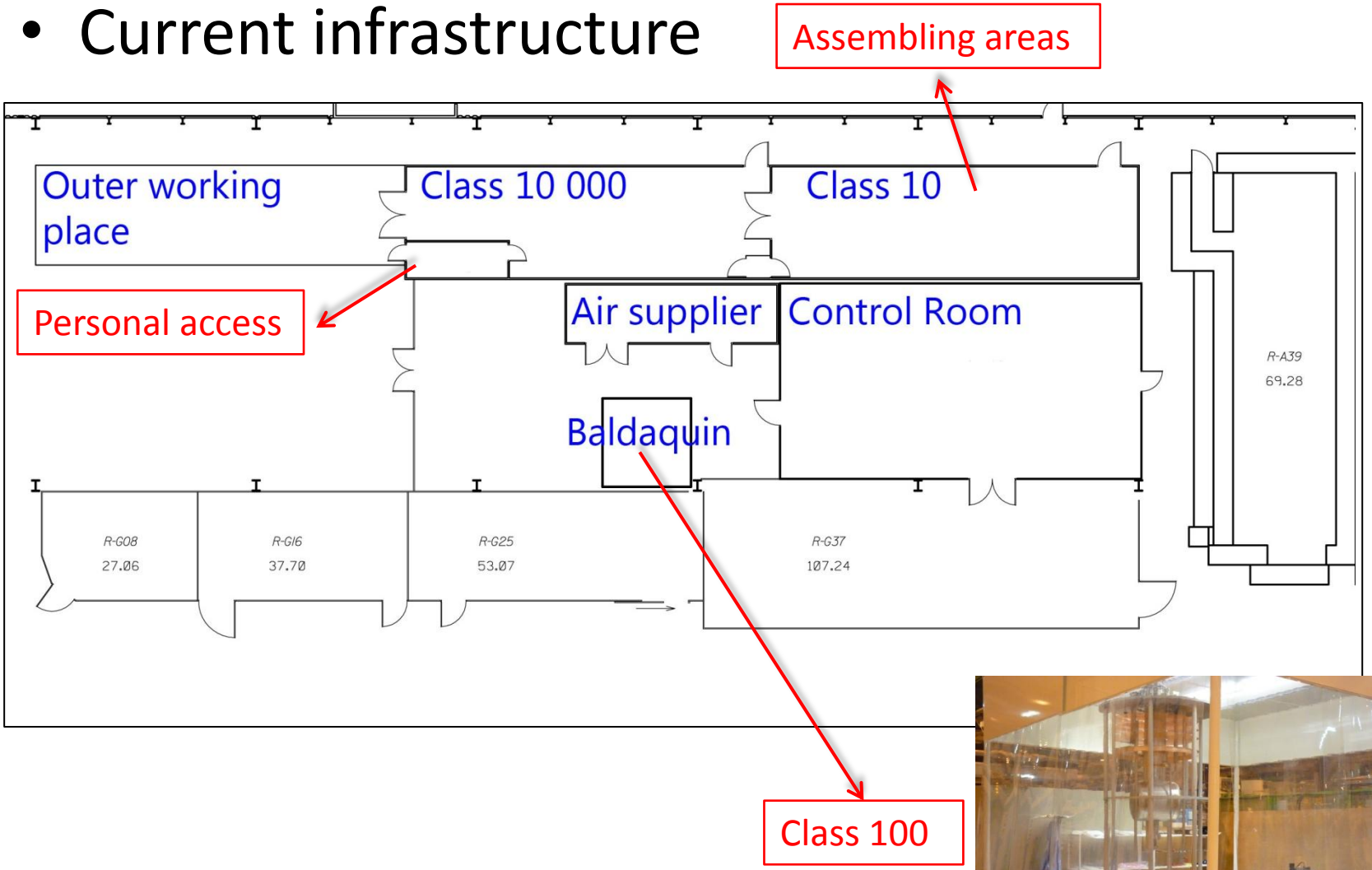
Reminders:

- Upgrade based on coupler experts recommendations (March 2010)[(1)]:
  - Get the needed infrastructure into one location
  - Class10 / ISO 4 is a must for gradient >25MV/m
  - SM18 facility has the best potential for high gradient component manufacturing

(1): E. Montesinos, SPL Main power Coupler (SPL-MC) Cleanroom requirements, May 17th, 2010

Reminders:

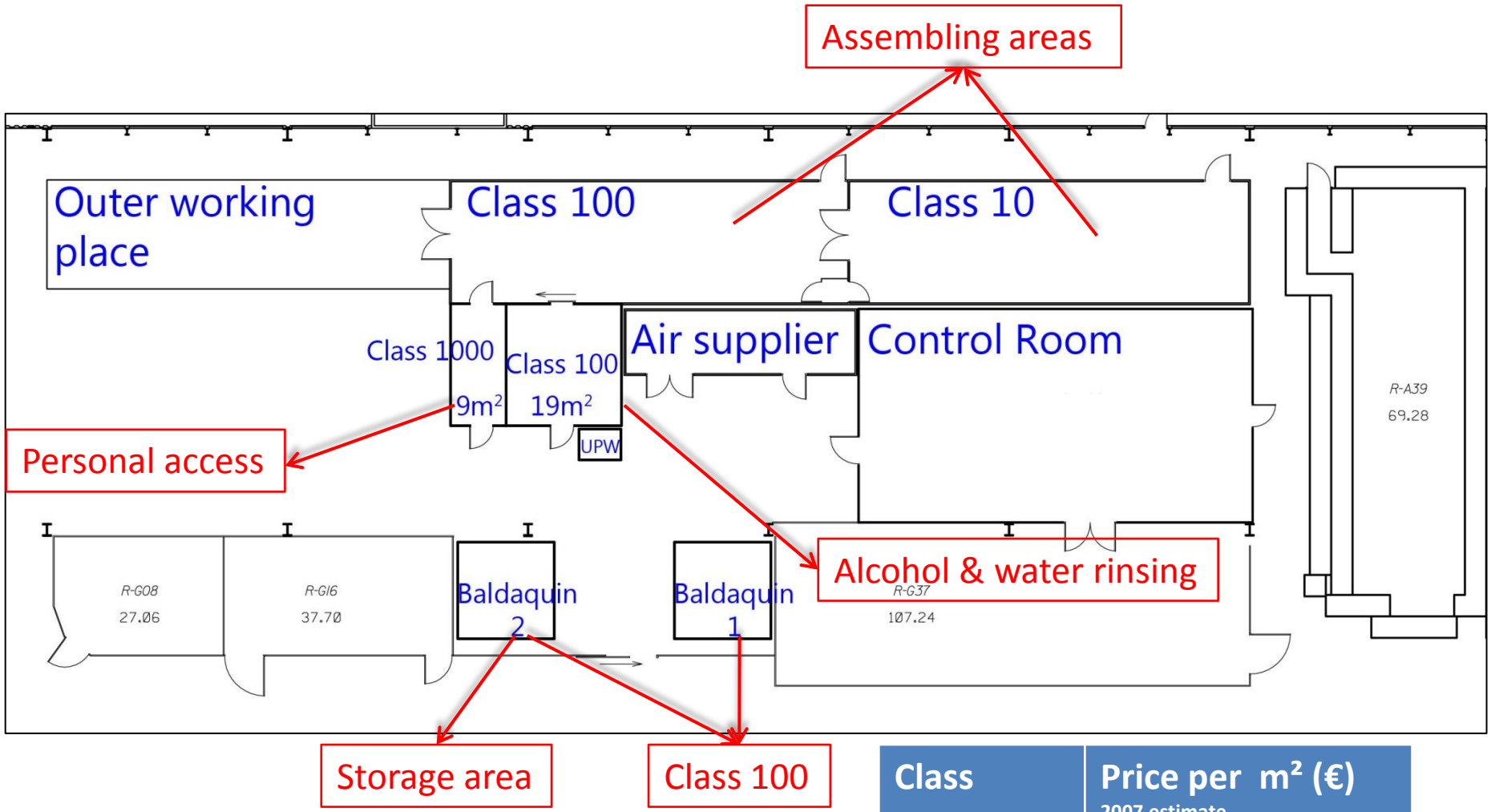
- Current infrastructure



Global needs:

- Additional class 100 & class 1000 rooms
- Water rinsing system:
  - Ultra pure water system
  - High pressure rinsing system
- Ionized air shower
- Control and monitoring of critical parameters:
  - Air and water quality
- New and well defined cleaning/assembling procedures

SM18, configuration proposal:



Class	Price per m² (€) 2007 estimate
100	6 000 to 10 000
1000	4 000 to 8 000

SM 18, water quality control:

- Based on DESY's experience[2,3,4]
- Ultra pure water control:
  - Particle counting (inlet and outlet)
  - Water resistivity (inlet and outlet)
  - Total organic carbon
  - Bacteria analysis
- Outlet measurements must be used as a cleanliness indicator

(2): Quality control at the TTF-Cleanroom infrastructure for cavity-processing , N. Krupka, T. Ebeling, K. Escherich, A. Matheisen, Morales Zimmermann, B. Petersen, D. Reschke, N. Steinhau-Kuehl, F. Zhu

(3): Clean-room facilities for high gradient resonator preparation, K.Escherich, A.Matheisen, N.Krupka, B.Petersen, M.Schmökel, contribution to the SRF2005, Ithaca, New-York, USA

(4): Quality control update of the cleanroom for superconducting multi cell cavities at DESY N. Krupka, K. Escherich, M. Habermann, K. Harries, A. Matheisen, B. Petersen, contribution to the SRF2005, Ithaca, New-York, USA

SM 18, water quality control:

Equipments	Comments
High pressure cavity rinsing system	Nozzle moving through a rotating cavity(5)
Online liquid particle counter (×2)	At inlet & outlet of the cavity rinsing system
Online Ohm-meters (×2)	Check water resistivity at inlet & at outlet
Bacteria analysis system	Check water quality at rinsing system inlet
Mechanical filter	Validate the rinsing at rinsing system outlet
Optical microscope	Analysis of the mechanical filter
Online TOC analyser	Check carbon presence in UPW
Drying system	Accelerate cavities' drying

DESY's HP rinsing system

(5): A new high pressure rinsing system established at DESY, A. Matheisen, K. E scherich, R. B andelmann, H. M . Zimmermann, N. K rupka,DESY

SM 18, air quality control:

- Air quality monitoring[2,3,4]:
  - Temperature
  - Humidity
  - Particle counting monitoring (with alarm)
  - Control of the installation before critical operation
  - Feedback from operators (handle particle counter with alarm)
  - Study of the air flow

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SM 18, air quality control:

Equipments	Comments
Air monitoring system / Particle counter	Control air quality, online monitoring
Temperature & humidity sensors	Permanent control
O_2 monitoring system	Survey of the O_2 level, online monitoring
Fog generator	Study and check air flow movement(2)

Flow pattern at power coupler port at DESY (argon overlay flow from cavity switched on)

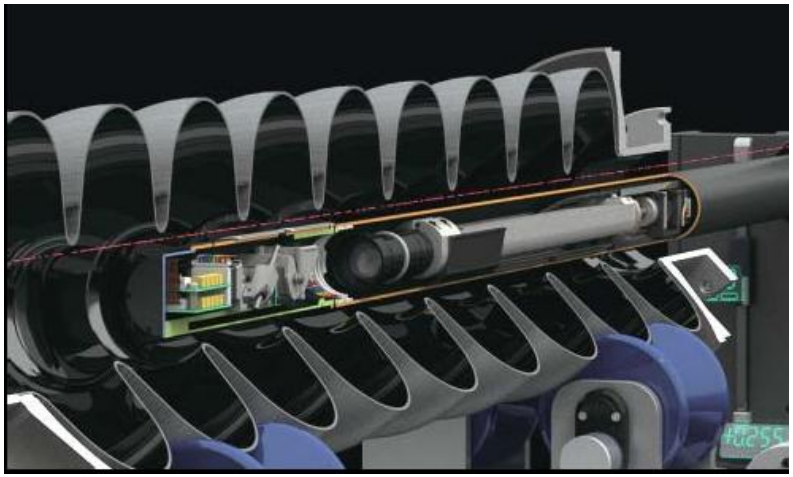
(2): Quality control at the TTF-Cleanroom infrastructure for cavity-processing, N. Krupka, T. Ebeling, K. Escherich, A. Matheisen, Morales Zimmermann, B. Petersen, D. Reschke, N. Steinhau-Kuehl, F. Zhu

Additional equipment:

Equipments	Comments
Leak detection system	He test
Ultrasound cleaning bath	Removal of dust
UPW production unit	Production of UPW
UPW tank	Buffer UPW use (if needed)
High pressure water pump	100 bars needed
Primary & secondary vacuum pumps	Oil free

Additional equipment:

Equipments	Comments
Air tight boxes & cabinet	Long term storage of clean component, have to be in stainless steel
Spray gun	Removal of dust
Optical cavity inspection system	Study cavity surface defects[6]



Kyoto cavity inspection system

(6): Review of optical inspection method and results, K. Watanabe, KEK, Ibaraki, Janpan

Conclusion:

Next steps:

- Contact cleanroom builders

-Get price of the equipment (sensors, particle counter, accessories...)

- Validation by CERN

Limitation:

LHC cavities must be able to enter in the cleanroom in case of problem