

# 4 International Clinical Engineering & Health Technology Management Congress

October 24-26, 2021 - Virtual Edition

## High Level Isolation Unit (HLIU)

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Event Website: <https://www.globalcea.org/icehtmc>

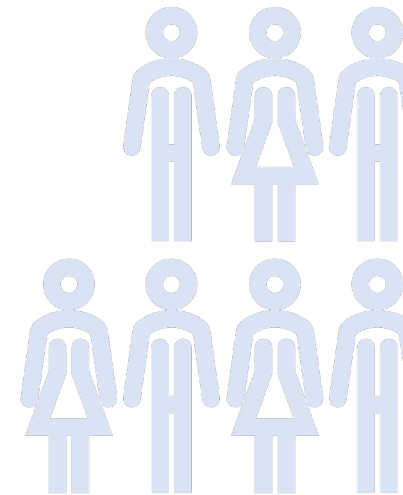


# The Team / Workgroup

Beatrice Panigada, Paolo Lago, Manuel Gadaleta – *Clinical Engineering Dept.*

Riccardo Boerci, Rossella Delbò – *Technical Dept.*

Raffaele Bruno – *Infectious Disease Dept.*



# Description

A real case study performed to create an inpatient ward for continuous hospitalization of patients with high biocontainment



Two BSL4 rooms with one bed



Four BSL3 rooms with one bed



Eight BSL2 rooms with two beds



BSL4 laboratory



Emergency room - Triage

Analysis for the hospital in terms of economic investment, level of patient care, prestige and talent acquisition



Fundamental aspects and implications that this kind of massive projects triggers in terms of facilities, technology equipment and people management





# Isolation rooms – features and technologies

- Negative pressure (BSL3 and BSL4)
- Advanced air-handling system with HEPA filtration
- 12 air changes per hour
- Monitoring system for pressure and temperature
- Medical gases supply system
- Camera system

- Reversible air flow mechanism (BSL2)
- Anteroom
- Unidirectional flow of staff
- Donning and doffing rooms
- Self-closing and interlocking doors
- Controlled access



- Bed
- Ventilator
- Vital signs monitor
- Anaesthesia unit
- Bronchoaspiration system
- Surgical light
- Infusion pumps and docking station

- Headwall unit
- High flow oxygen therapy device
- Humidifier
- Central monitor
- Defibrillator
- Dialysis machine
- Refrigerator

- Portable radiographic imaging device
- Portable ultrasound scanner
- Bronchoscope
- Laryngoscope
- Portable electrocardiograph
- Disinfection systems
- PPE





# Laboratory – features and technologies

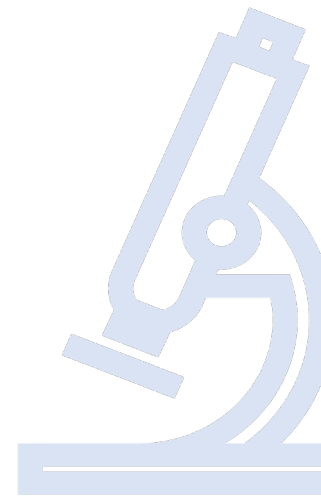
- Negative pressure
- Advanced air-handling system with HEPA filtration
- Positive pressure suits
- Monitoring system for pressure and temperature
- Autoclave
- Passbox

- Anteroom
- Unidirectional flow of staff
- Clean and dirty paths
- Donning and doffing rooms
- Self-closing and interlocking doors
- Controlled access



- Centrifuge
- Biological safety cabinet
- Blood culture incubator
- Cell culture incubator
- Blood cell counter machine
- Microscope
- Electrophoresis equipment

- Coagulation analyzer
- Electrolyte analyzer
- Nanopore sequencing machine
- Refrigerator
- Freezer
- Workstation





# Costs



## Acquisition



## Maintenance

### *Facilities*

3.000.000 € (one-off)

70.000 €/year

### *Isolation rooms equipment*

1.300.000 € (one-off)

200.000 €/year

55.000 €/year

### *Laboratory equipment*

200.000 €

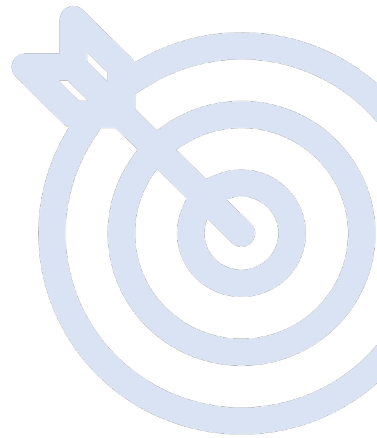
10.000 €/year



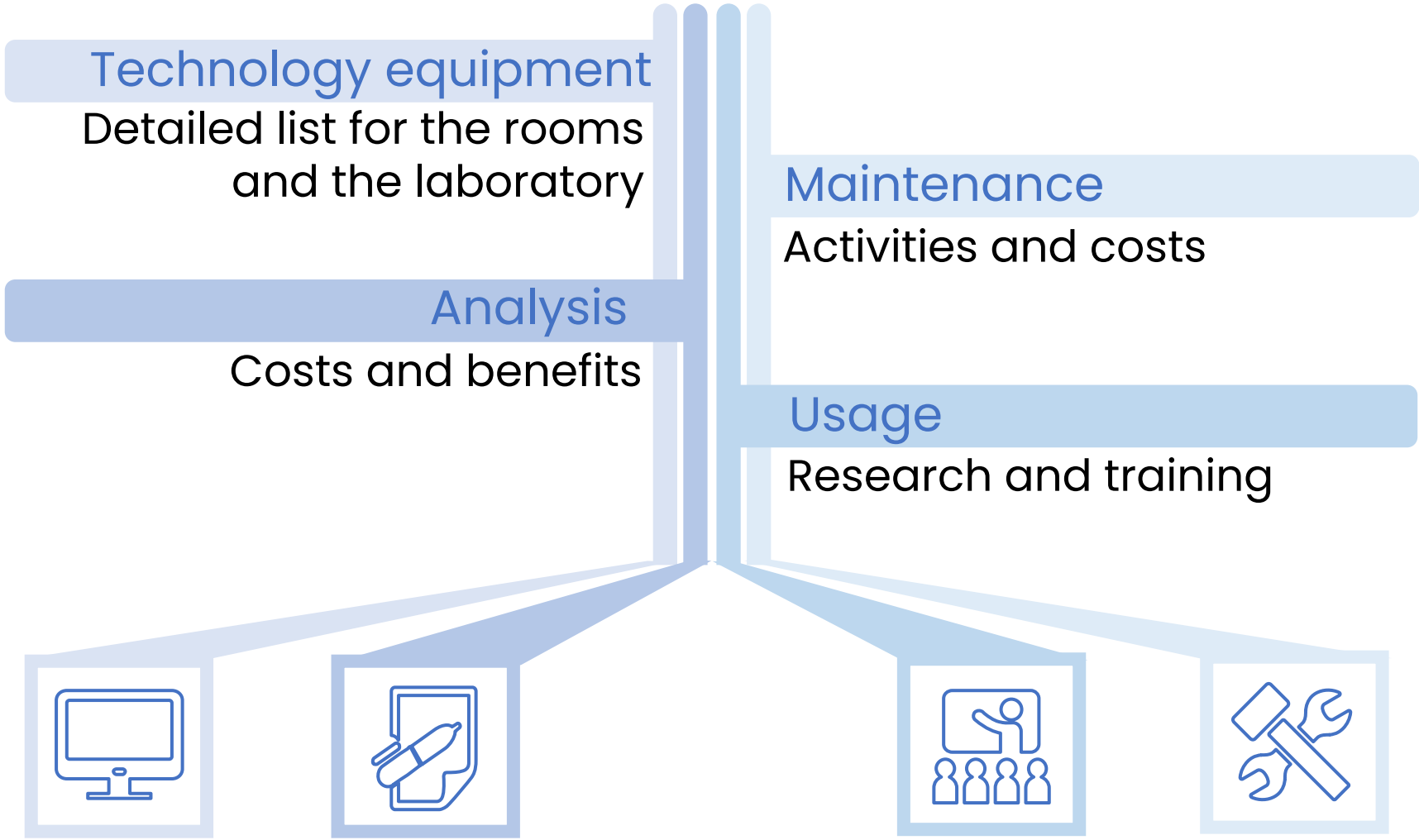


# Goals of the project and final users that will benefit

*Providing a **framework** for the professionals' community, mainly **clinical engineers**, who foresee to create or enhance their hospitals with a **HLIU**, giving them the tools to perform their own specific assessment*



# Results





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