Supplementary Information

Title: Development and Evaluation of an ISO-Containerized Class III Clean Operating Room for Mobile Surgical Applications

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Figure S1. Illustration of the positions and number of test points used in airflow.

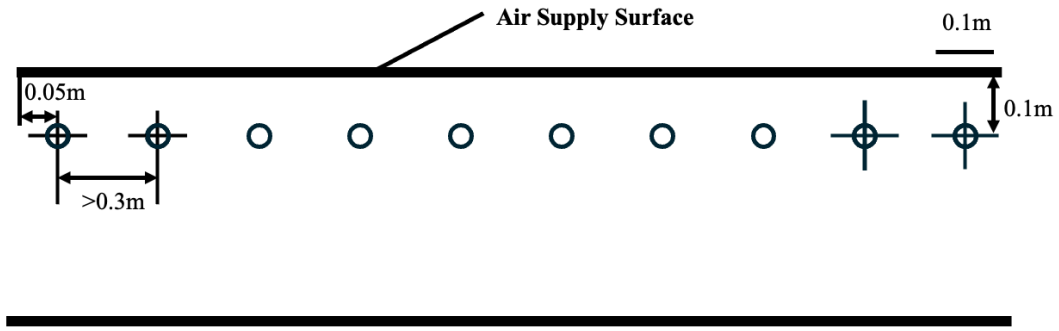


Figure S2. Illustration of the positions and number of test points used in dust

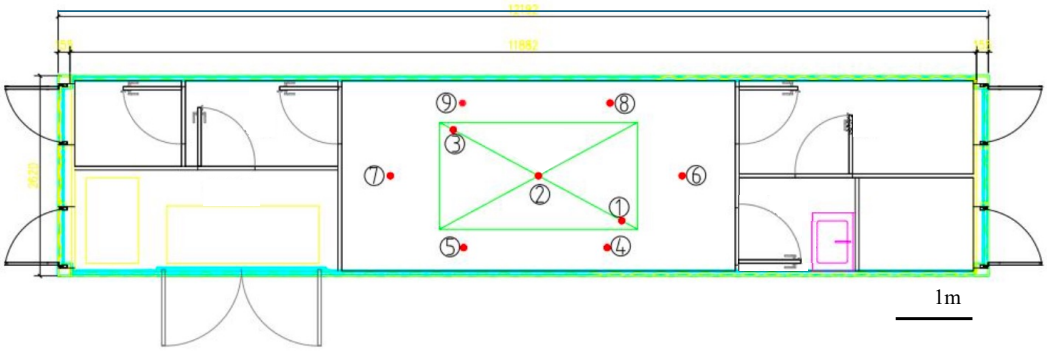


Table S1. Comparison of different modular surgical units

MSUs	Transportation modes	External dimensions (m)	Key functions
CBCS	Large cargo aircraft; trucks; ships	13.4 × 2.44 × 2.44 (45-ft ISO container)	Protection areas: patient treatment zone, PPE room, and staff rest area; integrated ventilation and disinfection system (HEPA supply/exhaust, negative pressure).
FSTSU	Trucks; large cargo aircraft	2 × (6.10 × 2.44 × 2.59) (2 × 20-ft ISO containers)	Battlefield emergency surgery and ICU: without centralized laminar airflow.
DGRF MSU	Vehicle-mounted	6.10 × 2.44 × 2.59 (20-ft ISO container)	Thoracic minimally invasive surgery: without centralized laminar airflow.
MIOR	Vehicle-mounted	13.4 × 2.55 × 2.44	Mobile interventional operating room: without centralized laminar airflow.
GMMIOV	Vehicle-mounted	11.985 × 2.55 × 3.98	Mobile interventional surgery (dual expandable units): equipped with centralized laminar airflow.

MSU: modular surgical units; FSTSU: Forward Surgical Team Surgical Suite; DGRF: Diego González Rivas Foundation; MIOR: Mobile Interventional Operating Room; GMMIOV: Guangtai Medical Mobile Interventional Operating Vehicle; MSU: Mobile Surgical Unit

Table S2. Sizes of different ISO standard containers

ISO container	External dimensions (m)			Internal dimensions (m)		
	Length	Width	Height	Length	Width	Height
20-ft standard	6.096	2.438	2.591	5.87	2.34	2.385
40-ft standard	12.192	2.438	2.591	12.032	2.352	2.393
40-ft high-cube	12.192	2.438	2.896	12.032	2.352	2.698

The internal size is defined as the distance from the inside of the door to the front inner wall, between the inner surfaces of the side walls, and from the floor to the underside of the top panel.

Table S3. Technical requirements in The Code

Area	Indoor pressure	Air changes (/h)	Temp. (°C)	Relative humidity (%)	Fresh air supply ($m^3/h \cdot m^2$)	Noise level (dB(A))	Illuminance (lx)	Air renewal time (min)
Class III operating room	poitive	18	21~25	30~60	15~20	≤49	≥350	20
Operating room anteroom	poitive	8	21~27	≤60	(2)	≤60	≥200	N.S.
Scrub room	Negative	8	21~27	N.S.	(2)	≤55	≥150	N.S.
Clean-zone corridor	poitive	8	21~27	≤60	(2)	≤52	≥150	N.S.

N.S. not specified

Table S4. Illuminance measurements at different points in the operating room

	Class III Operating Room				Contaminated corridor	Clean-zone corridor		
Point	1	2	3	4	5	6	7	8
Illumination (lx)	554	605	617	541	350	270	575	670