

# Innovative New Canister-type Auto Balloon Launcher aiming for Uninterrupted Observations

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## History of Meisei ARS (ABL)

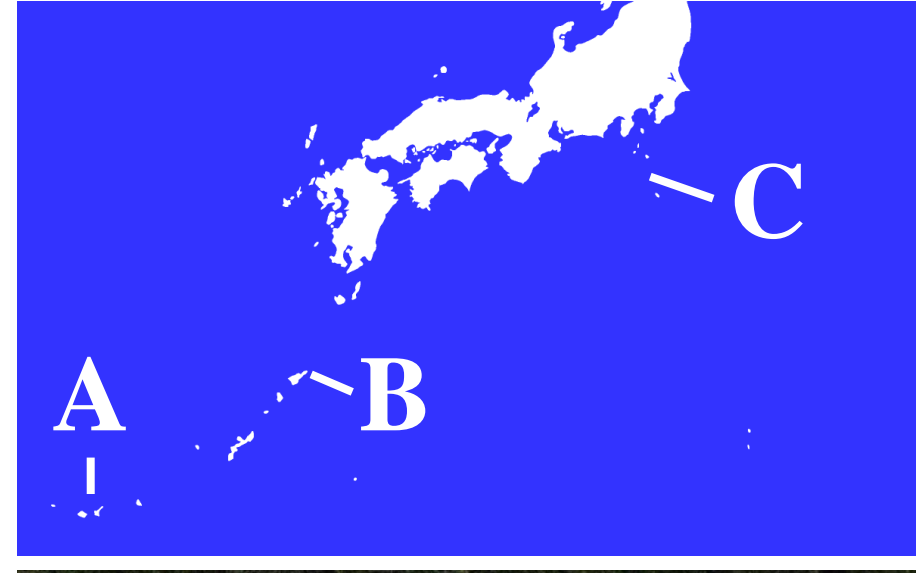
Current Meisei ARS (Automated Radiosonde System) automatically launches radiosondes maximum of 16 times without human manipulation. Current ARS was developed in 2006 and Japan Meteorological Agency (JMA) is now operating three (3) stations.



A ISHIGAKI Island  
Since 2006

B NAZE  
Since 2007

C HACHIJO Island  
Since 2009

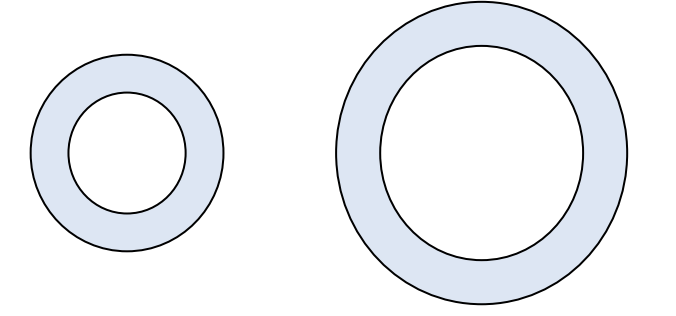


## Issues of current ARS

- 1) Several meteorological services still have not adapted ABL system yet mainly due to high capital investments, non-negligible maintenance and troubleshooting expenses and expensive ABL dedicated consumables.
- 2) Current ABL (Auto Balloon Launcher) adapts a rotating table as the sonde/balloon loading method. On this table, there is just one gas-filling and inflating point for balloon. When a trouble occurs in preparation phase on the rotating table, at least a staff has to attend the local site to clear the failure and recover the system. Otherwise, system stops operation.
- 3) Rotating table requires larger space with larger the number of radiosonde loaded.



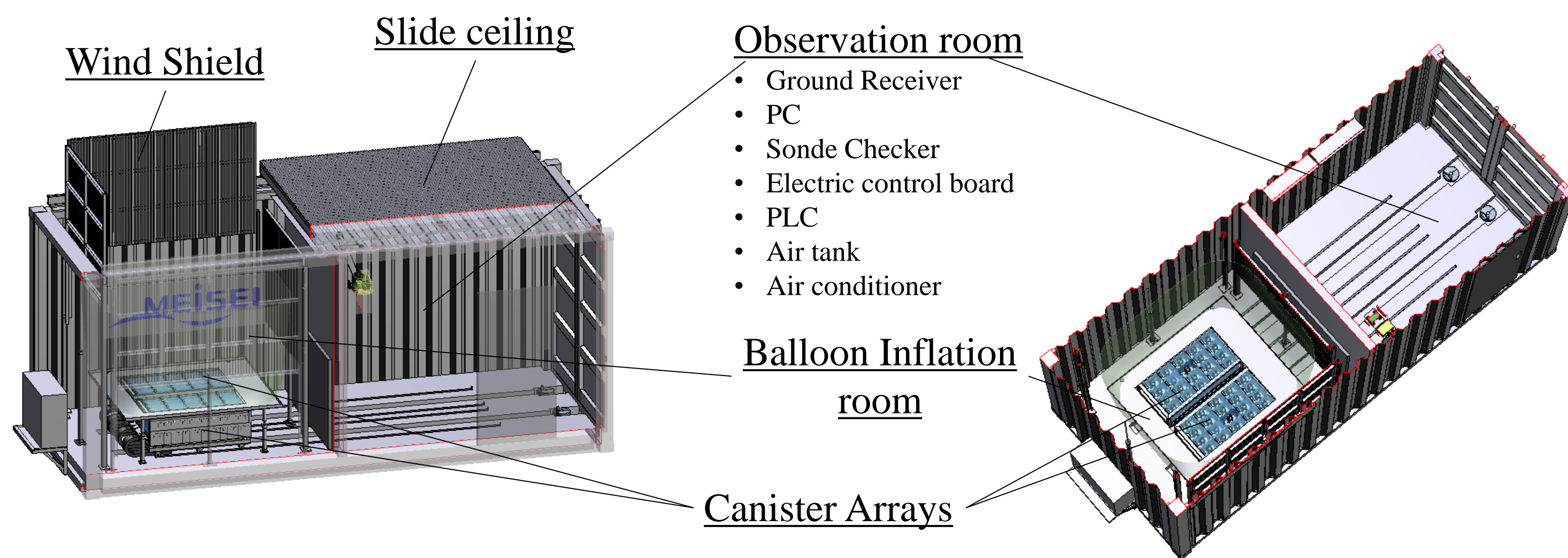
Rotating table type



Larger space is necessary for the large number of radiosondes

## Design Concept of New ARS

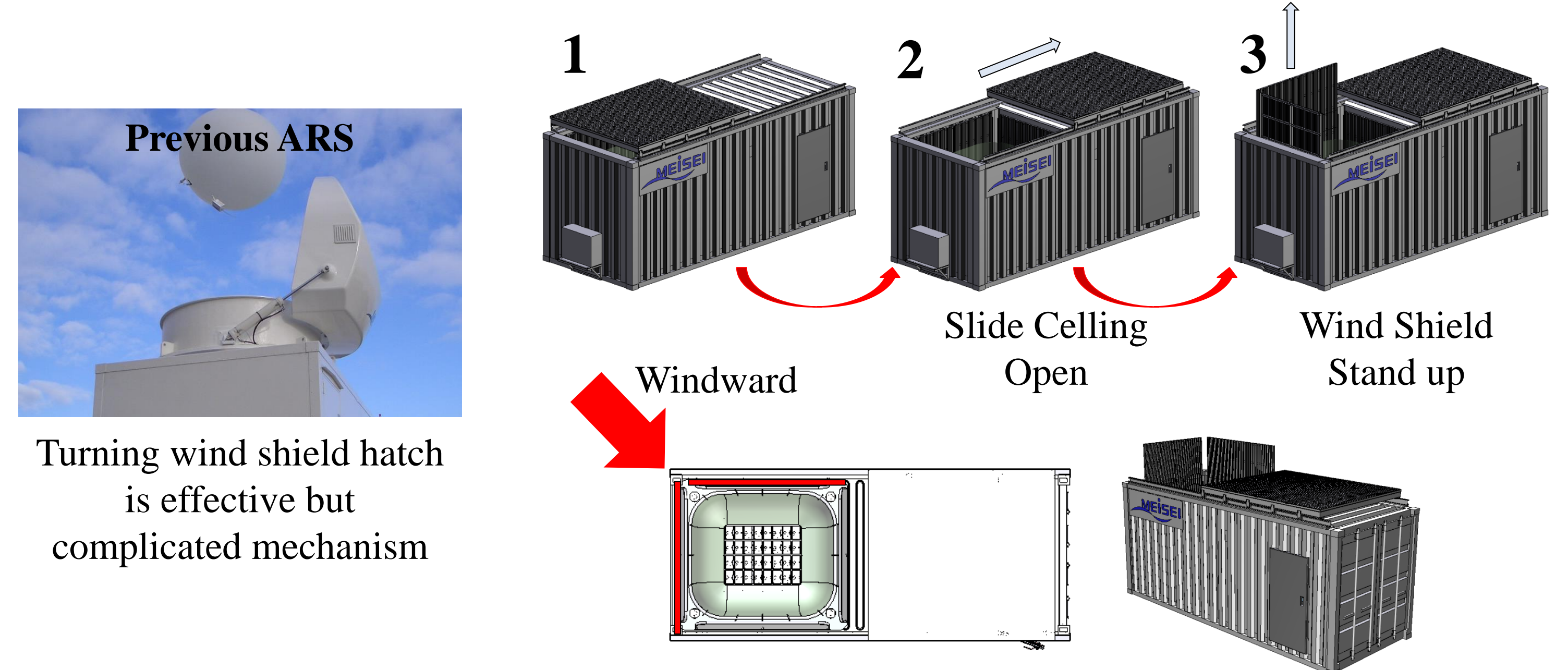
Meisei offers new ARS, to solve such issues, is designed to use multiple modularized canisters arranged in the balloon inflating area, "Canister-type".



Container: 6.06 m (L) × 2.44 m (W) × 2.59 m (H)

## -Wind Shield-

Simple and robust "Slide Ceiling" and "Wind Shield" to release balloon smoothly.

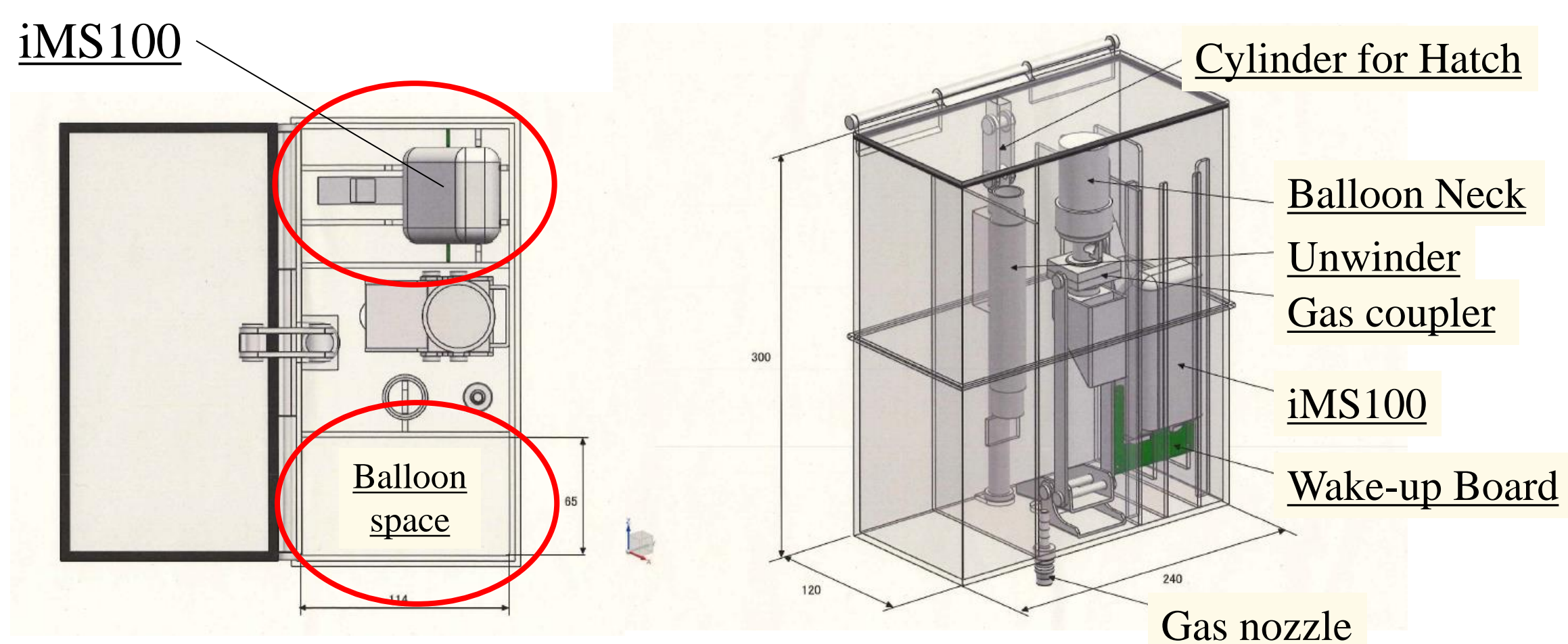


Turning wind shield hatch is effective but complicated mechanism

## -Canister Module-

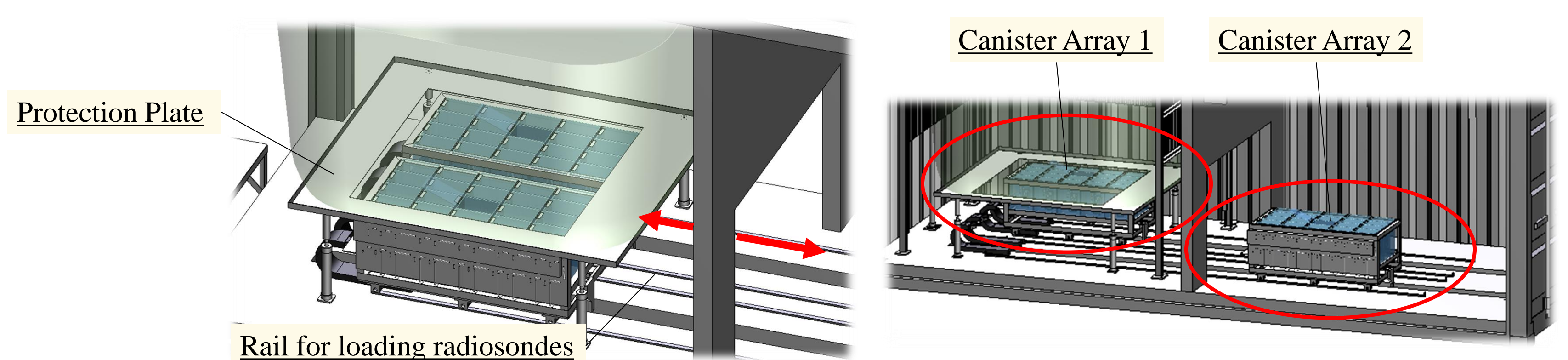
Canister loads a sonde and a balloon with automated gas filling capability independently. iMS-100 and balloon are stored and are maintained with good condition inside the canister. Up to 600 g balloon (including parachute) can be loaded.

Canister Module: (24 cm (L) × 12 cm (W) × 30 cm (H))



## -Redundant Canister Array System-

Tiny radiosonde iMS-100 is adopted in the new ARS to make the modularized canister smaller. So "Canister-type" achieves maximum 40 (2 × 20) sondes installation within the limited space (1 m × 1 m). To further ensure uninterrupted observations, two canister arrays are applied for redundancy in addition to that each canister is capable to inflate respective balloons independently.



## Advantages of Canister-type ARS

- Multiple modularized canisters are capable to inflate respective balloons. If one canister fails, other canister can be activated to continue observations without undue stoppage. To further enhance operation reliability, the Redundant Canister Array System is employed.
- Simple and robust structure with minimal moving mechanism allows steady and assured operations without mechanical troubles. Maintenance and troubleshooting burdens are thus reduced.
- Flexible canister-type design allows variety of selection in number of sonde (4 to 40) to best accommodate users' requirements, which leads to optimum capital investment.

	Canister-type	Rotating Table-type
Number of driving unit	Since small number of driving units and simple and robust structure, the risks of mechanical trouble are thus reduced.	Since rotating table is structurally complicated and it requires precise control, the risks of trouble are higher than canister-type.
Loading time of radiosonde	Only to move the canister array on the rails from balloon inflation room to observation room, it is easy to work loading new radiosondes in each canister.	It is necessary to rotate the table and to load sondes in the carousel one by one, which takes a few hours to complete the loading works.
Quality of balloon during storage	Balloon and sonde are stored inside canister one by one. They are less likely to be exposed to outside air and which quality is preserved.	Balloon is placed on the rotating table and more likely to be exposed to outside air. Balloon is easy to deteriorated in such condition.
Loading number of radiosondes	Allows variety of selection in number of sondes to meet user's requirements. Adequate price will be available from 4 to 40 sondes.	Since loading number of sondes is limited by the rotating table capacity, there is no choice to change number of sondes.
Recovery from the trouble	There are multiple modularized canisters to inflate respective balloons. if one canister fails, other canister can be worked without undue stop.	In case of that failure occurs on the rotating table, at least one staff has to go the local site to recover the failure.

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