

KAGRA-SAS logistics considerations

Some ideas for speeding up implementation
and commissioning of type-B SAS

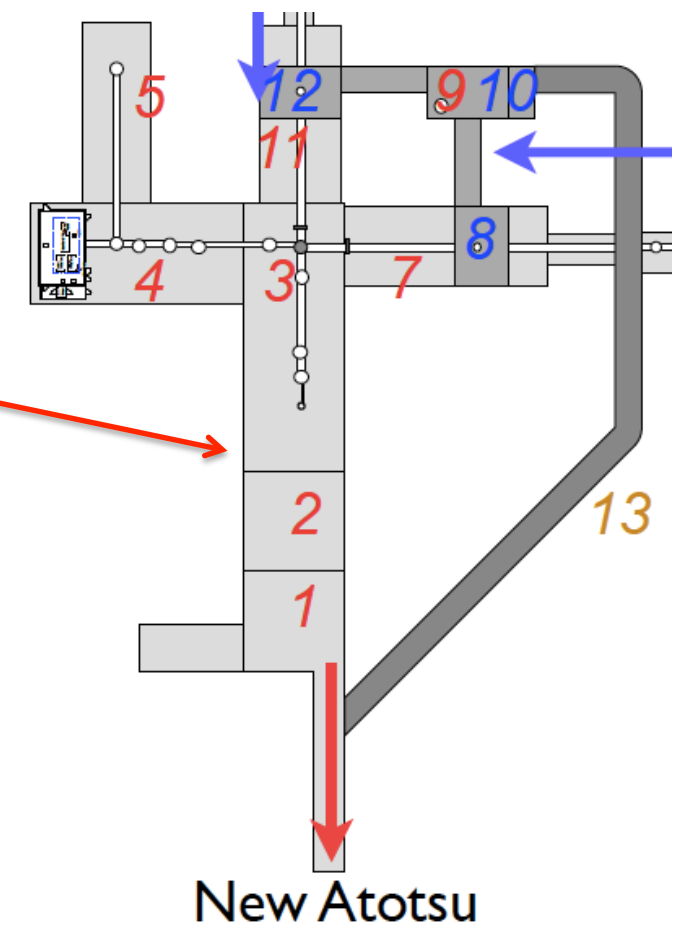
Seismic isolation team
JGW-T1200815

How many?

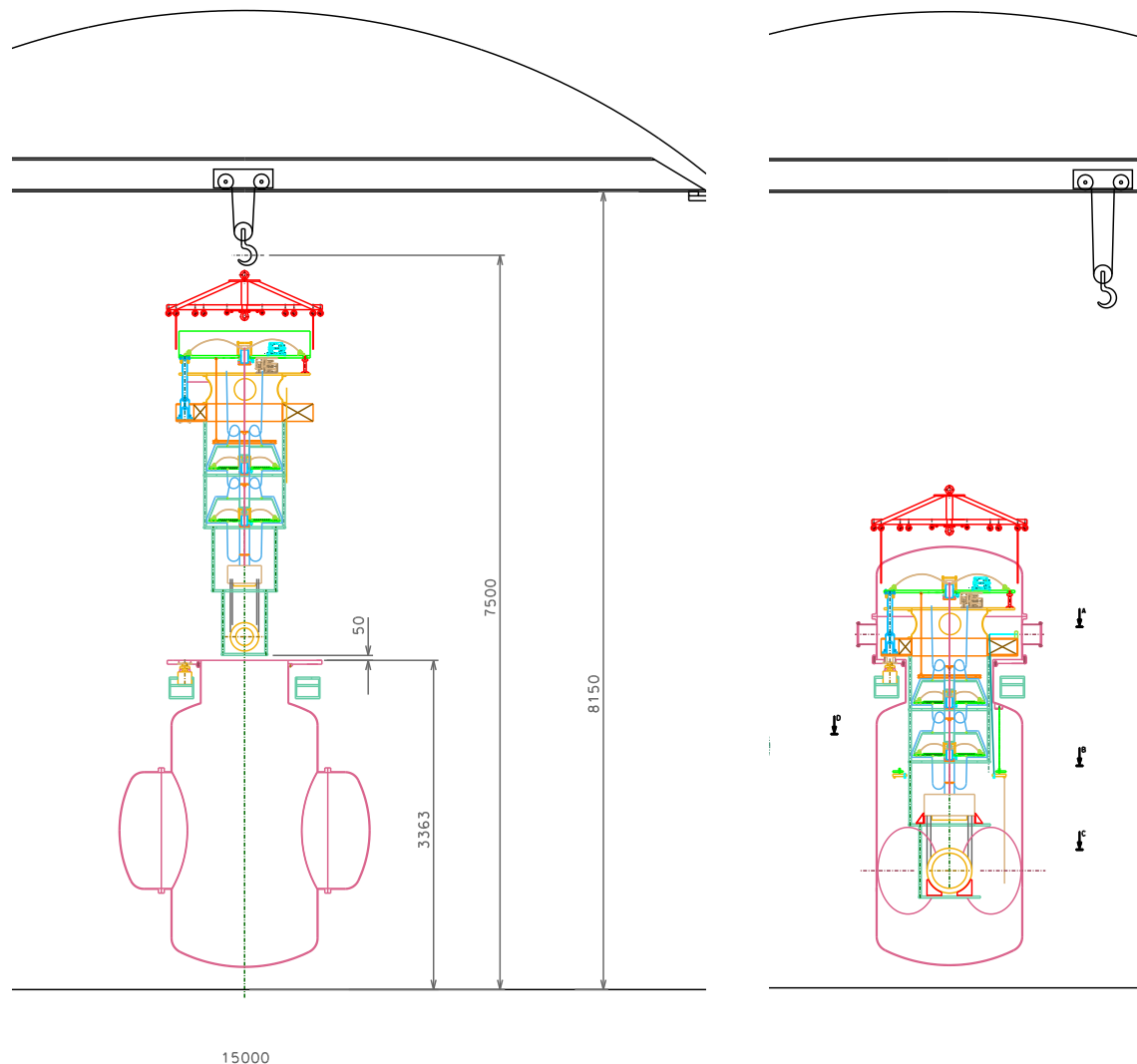
- We have seven Type-B SAS units
- 3 for power recycler
- 3 for signal recycler
- 1 for Beam splitter

Original installation plan

- Position the vacuum chambers
- Assemble SAS chains one by one in a clean room in center experiment room 2 or 3
- Lower SAS chain into its vacuum chamber
- Please see JGW-T1100637



- Designed to use crane to move the finished chain and lower in its vacuum chamber



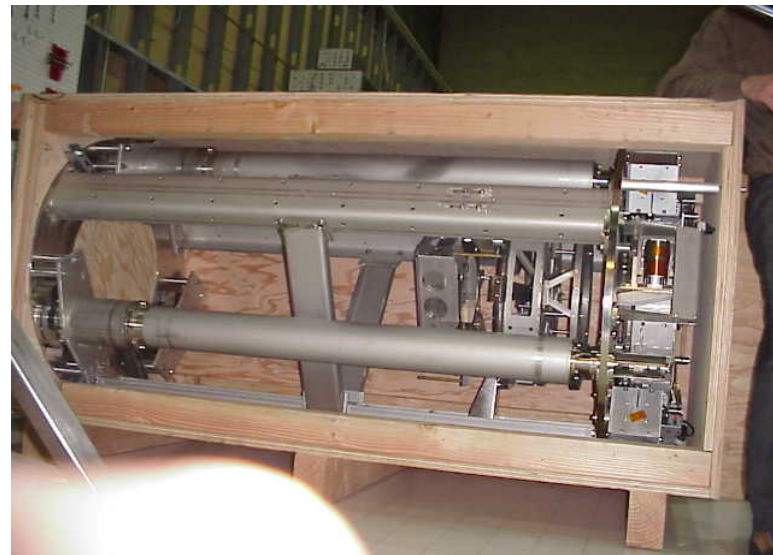
JGW-T1100637

Problem with original plan

- Assembly and cabling of a chain is a slow process
- Can make only one chamber at a time
- Any job in the tunnel is slower
- It will take very long time !
- Looking for an alternative solution

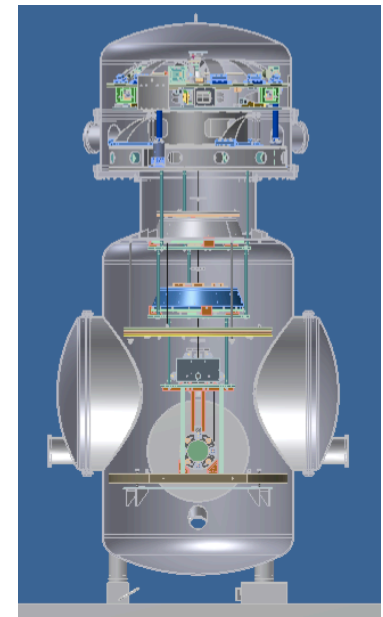
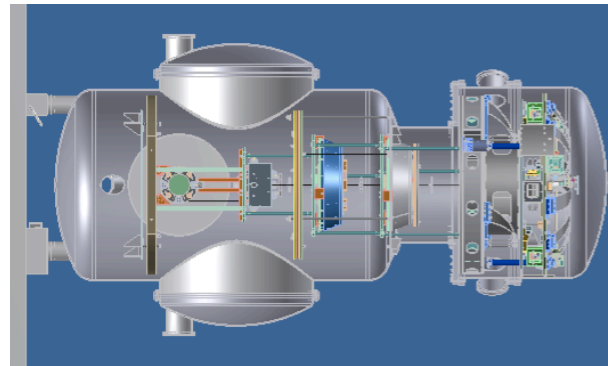
A good idea then, **bad now**

- Hongo SAS was assembled in Pasadena
- All parts were locked in place
- **It was flipped on the side**
- Shipped horizontally from Pasadena to Hongo
- **It worked fine !!**



Is it good for Type-B towers?

- Is it possible to
 - mount a type-B SAS into its tank,
 - lock all parts,
 - turn it on the side,
 - carry to Kamioka
 - flip up and install

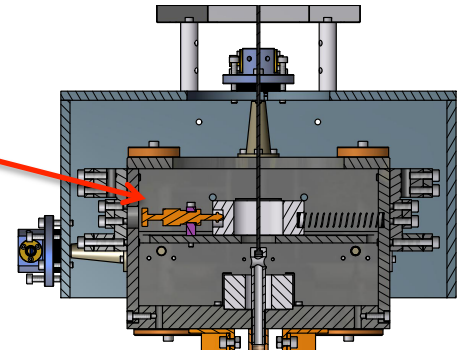


as it was done with Hongo-SAS?

- If yes it would be marvelous, we could build and test the entire units >1 year in advance!

The show stopper

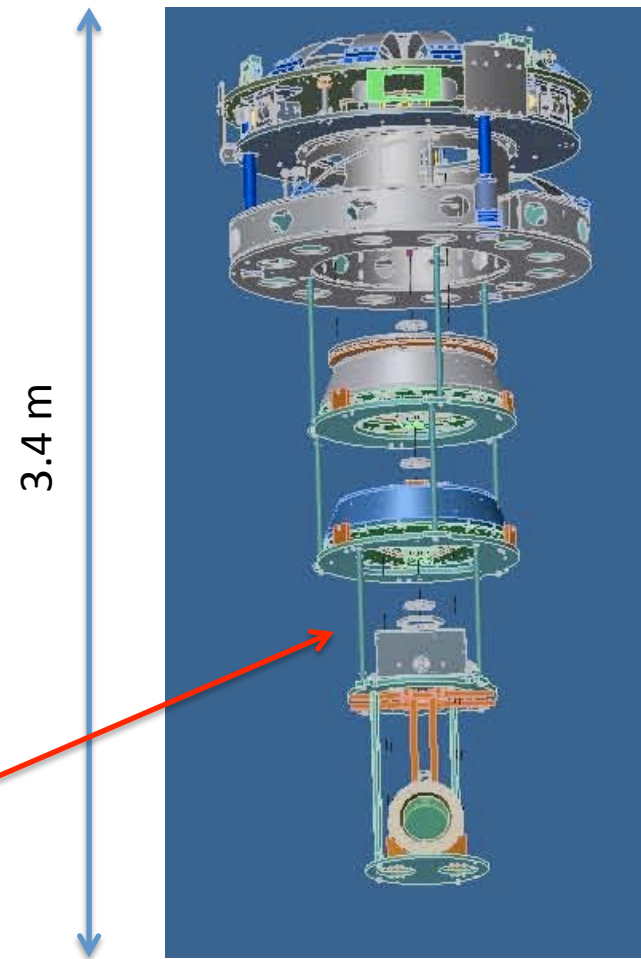
- Unfortunately KAGRA-SAS has balancing masses in bottom filter and intermediate mass
- Some are impossible to reach and lock !
- Transport over truck and long distance would break the picomotors



- Unfortunately a Bad Idea for type-B SAS

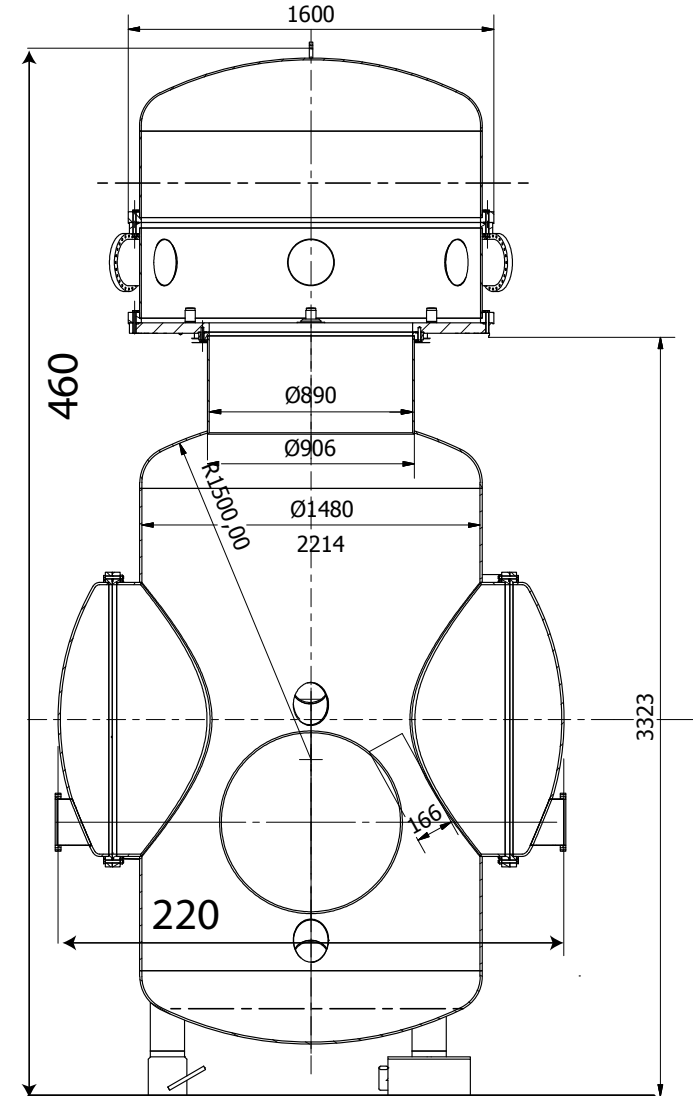
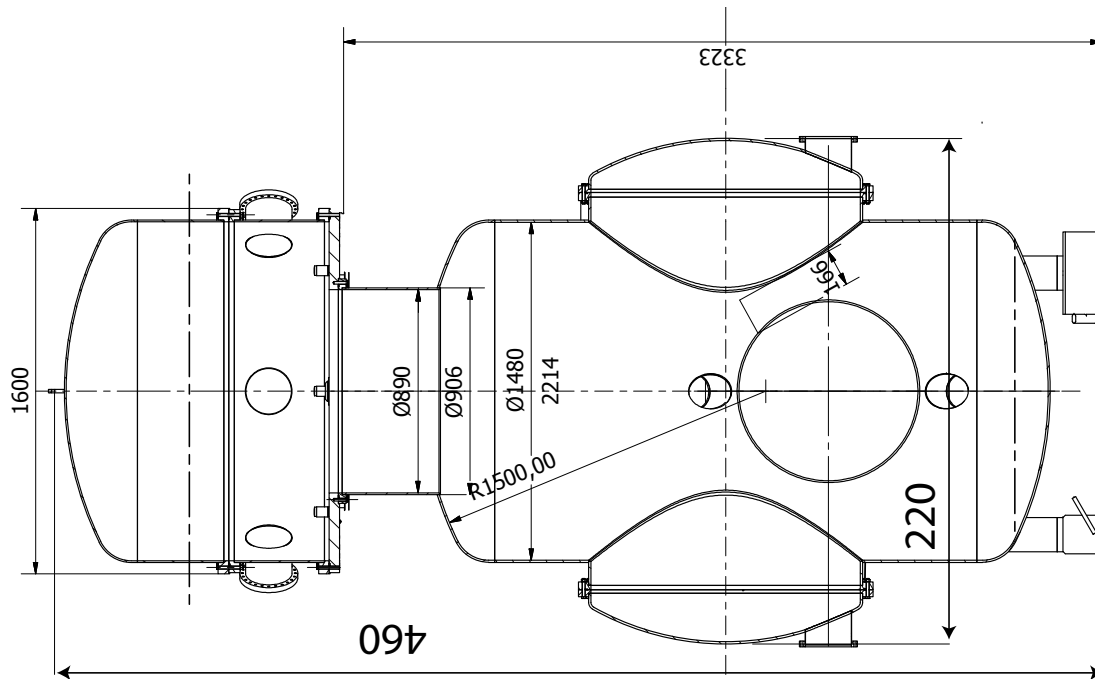
Useful alternatives

- SAS itself can fit in a container straight up and fit on a special cart and move along the 3.8 m tall tunnels
- Maybe it can even fit on a low-bed truck and travel on the road
- If need be it can be cut here



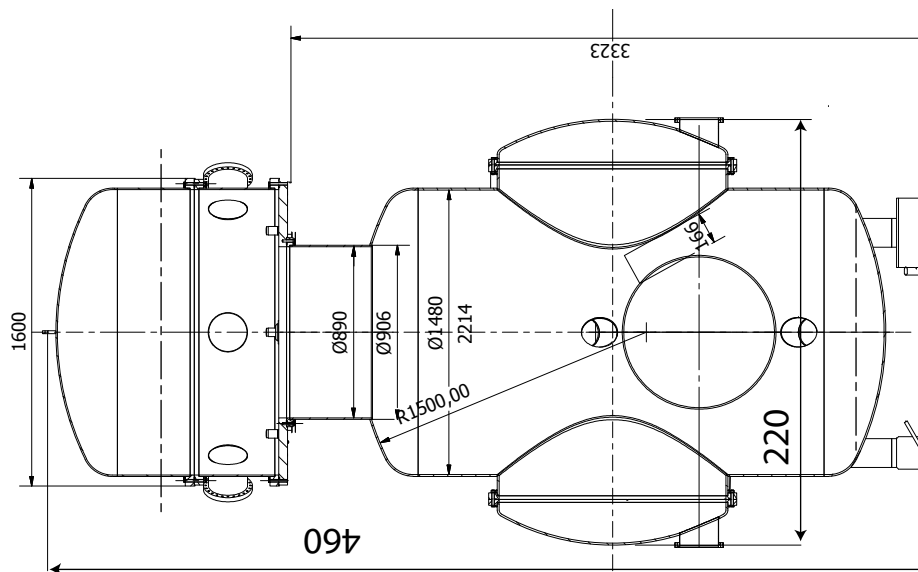
Useful alternatives

- This can rotate easily and fit on a truck



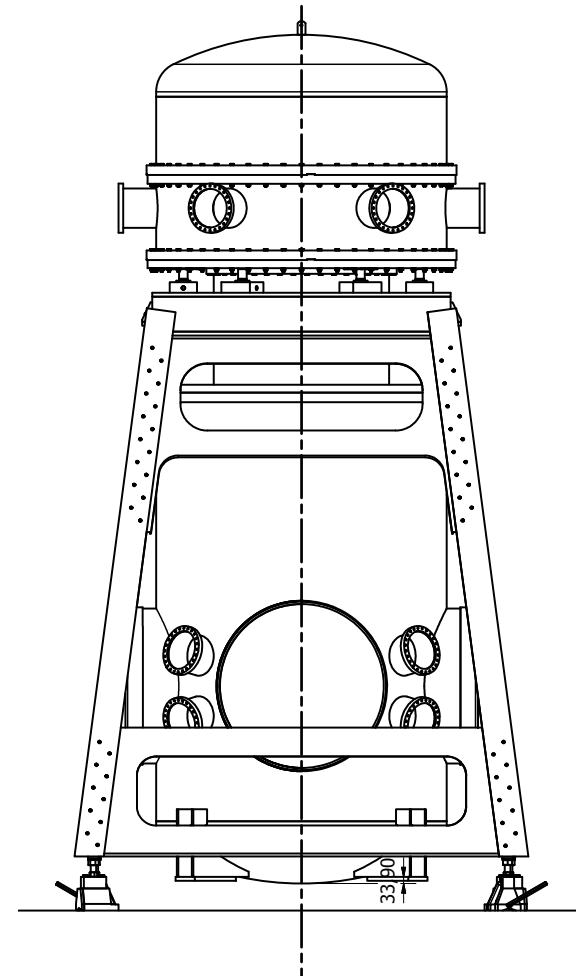
This is possible !

- If we divide Type-B SAS from its vacuum tank
we can transport as two semi-finished units,
and **rapidly** re-install



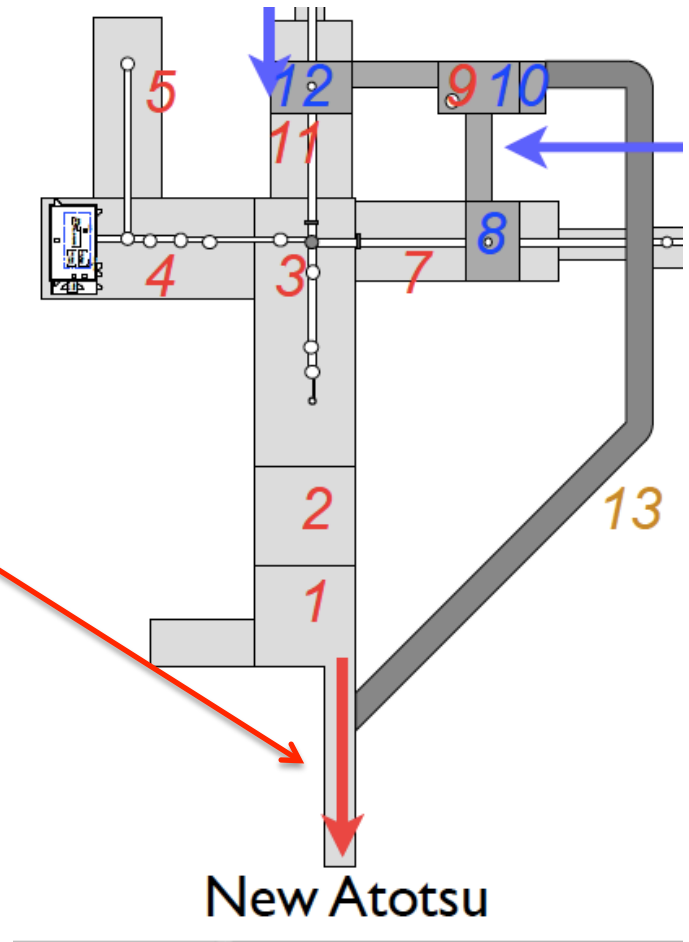
What is the use?

- We can pre-mount and cable it
- Mount optical levers
- Early test of damping, alignment and control programs
- Perhaps mount 2 in tandem and test lock acquisition programs
- Rapidly disassemble, transport
- Rapidly re-assemble in tunnel
- Save a lot of time ! !



Questions

- How tall is this tunnel?
- If tall enough perhaps we can mount SAS in it tank outside and bring in the entire in a single step ! !
- More thought to do !
- Please contribute your ideas



- Can this commissioning scheme be adopted elsewhere in KAGRA?