

# KAGRA tunnel

KAGRA tunnel sub-group

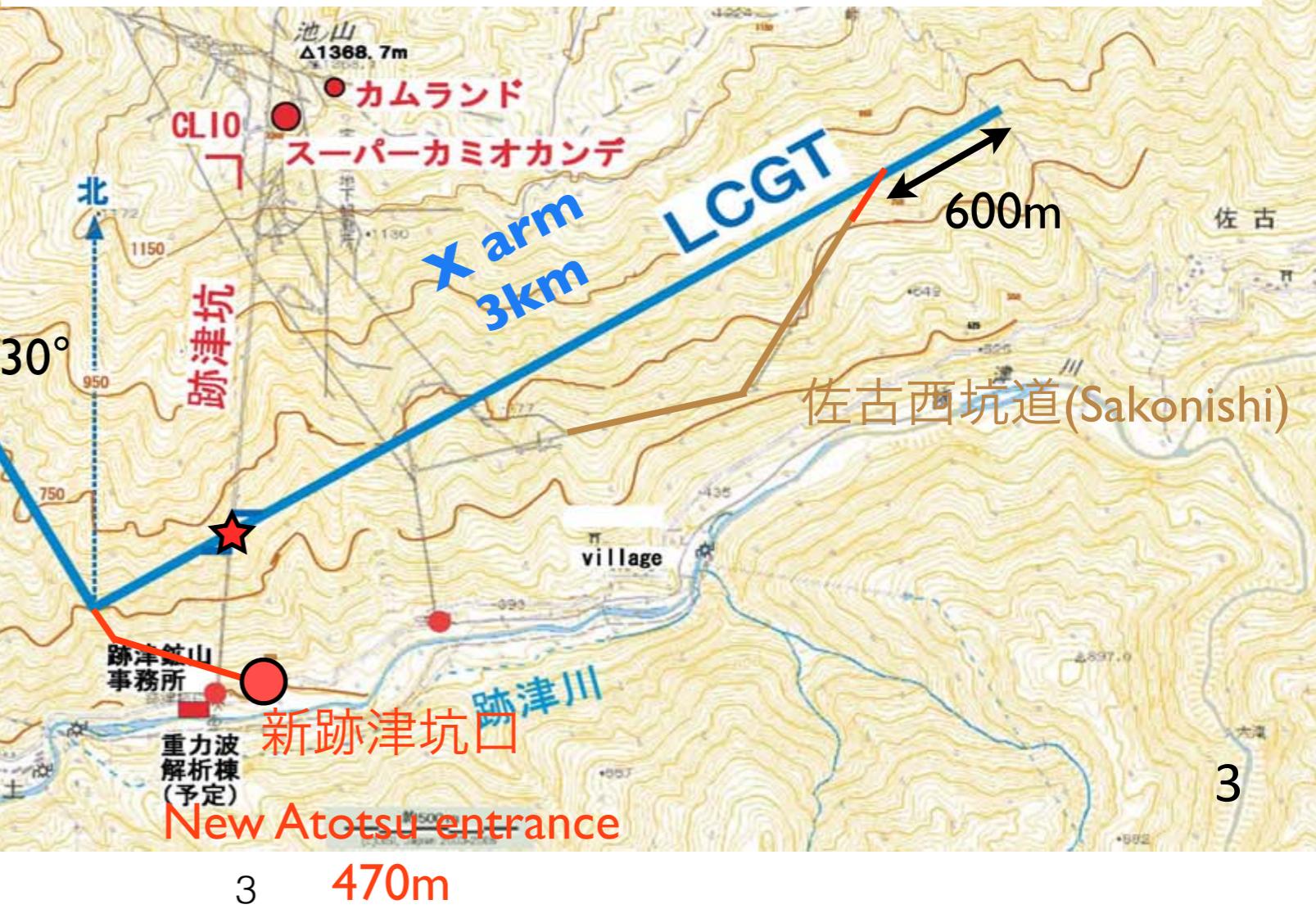
2012/07/31

- What's happened from the last f2f meeting.
- The tunnel excavation has started in Mozumi tunnel since 2012/05/22.
  - Mozumi tunnel of 350m has completed.
  - Now the Yend experiment room is going.
- The New Atotstu mine entrance has completed and excavation has started since 2012/06/18.
  - Current progress is 150m.
- We started to have a meeting with Kajima corporation on every friday.
  - Main topics are current status and next week plan of the tunnel construction.
- We started a blog for circulating tunnel construction information (sorry in Japanese).
  - <http://gwclio.icrr.u-tokyo.ac.jp/lcgtsubgroup/tunnel>
    - ID: kagra
    - Pass: 3kmarm

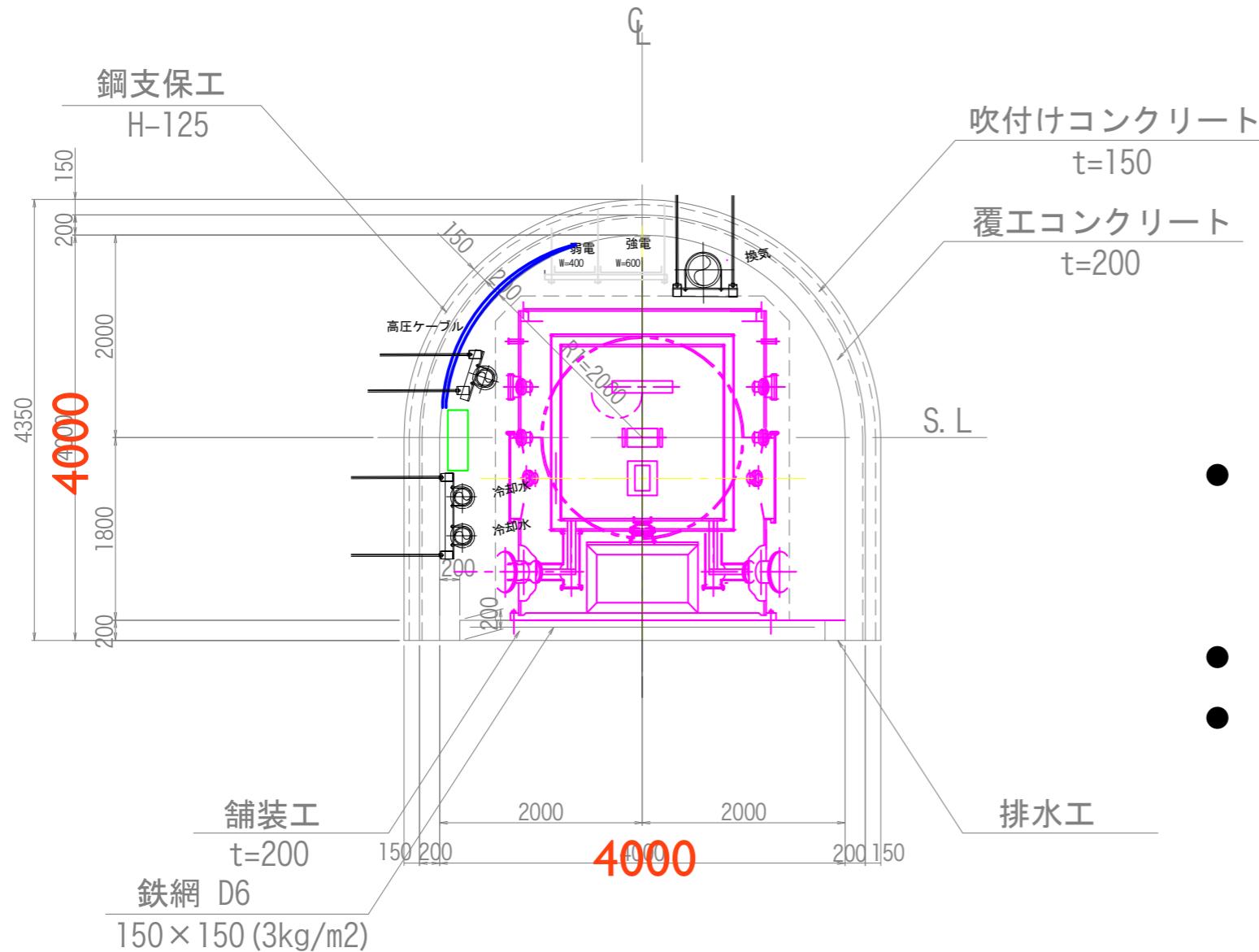


## Location of Center (BS)

- latitude: 36.41°N, longitude: 137.31 °.
- Y arm direction: 28.31 deg. from the North.
- Height from the sea level : about 372m.
- 2 entrances for the experiment room.
- Center, Xend, Yend are inside more than 200m from the surface of the mountain.
- Tunnel floor is tilted by 1/300 for natural water drainage.
- Height of the Xend: 382.095m.
- Height of the Yend: 362.928m.



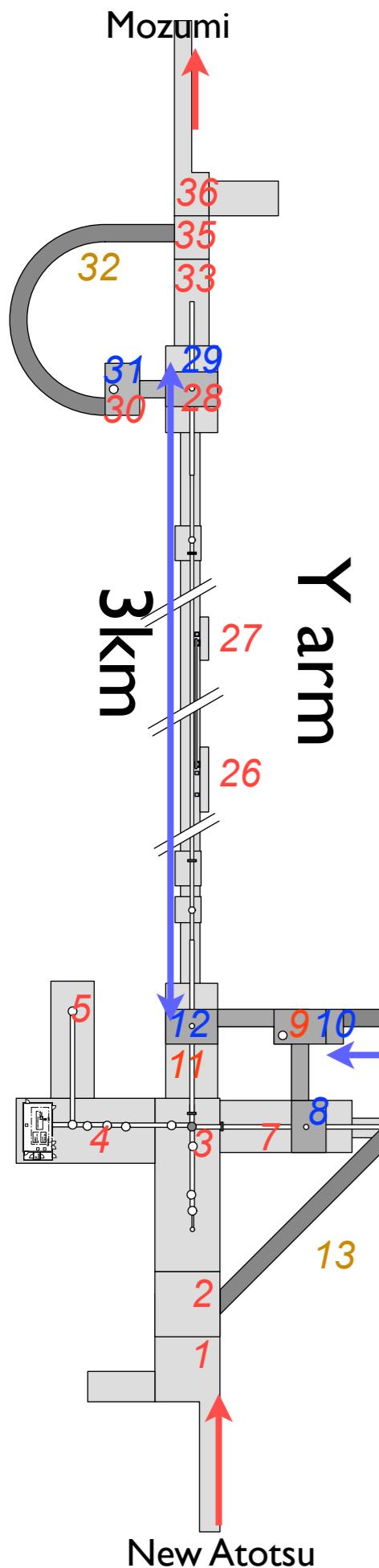
# Standard cross-sectional figures of the tunnels made by the NATM method



- Access tunnels
- New Atotsu
- Mozumi
- X arm & Y arm.
- Sloop tunnel for the 2nd floor.

1.4 (つづき) 全体工事 概要	なお、掘削工法等によりトンネル形状を変更できるものとするが、以下に示す基本規格を満足させるものとする。 【アームトンネルの基本規格】 <ul style="list-style-type: none"> <li>・ TBM工法による場合は、掘削径 <math>\phi</math> 4.5m以上、内径 <math>\phi</math> 4.3m以上</li> <li>・ NATM工法による場合は、内空幅 4.0m以上、内空高さ 3.8m以上(床コンクリート厚さを除く)</li> </ul>
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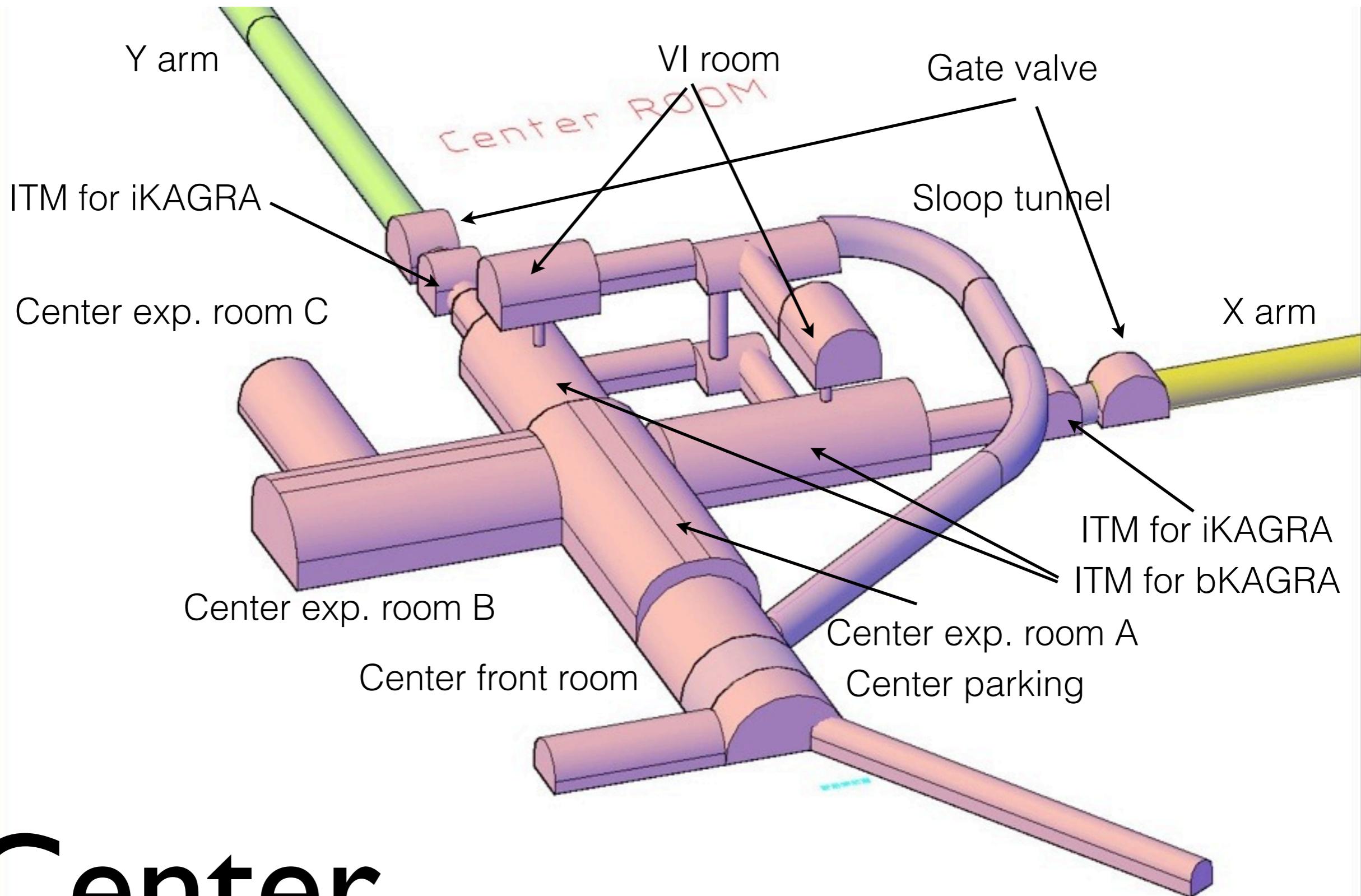
# KAGRA map



- 1. Center parking
- 2. Center front room
- 3. Center experiment room A
- 4. Center experiment room B
- 5. Center experiment room C
- 6. Laser room(Deleted)
- 7. X-front cryostat room
- 8. X-front VI room(2F)
- 9. Front machinery room
- 10. Front VI preparation room (2F)
- 11. Y-front cryostat room
- 12. Y-front VI room(2F)
- 13. Approach for front VI room
- 14. Geo-phys X-front
- 15. Sakonishi front
- 16. Sakonishi front parking (Deleted)
- 17. Geo-phys X-end
- 18. X-end cubicle room
- 19. X-end cryostat room
- 20. X-end VI room(2F)
- 21. X-end machinery room
- 22. X-end VI preparation room (2F)
- 23. Approach for X-end VI room
- 24. X-end experiment room
- 25. X-end staff room
- 26. Geo-phys Y-front
- 27. Geo-phys Y-end
- 28. Y-end cryostat room
- 29. Y-end VI room(2F)
- 30. Y-end machinery room
- 31. Y-end VI preparation room (2F)
- 32. Approach for Y-end VI room
- 33. Y-end experiment room
- 34. Cryogenic experiment room (Deleted)
- 35. Y-end staff room
- 36. Y-end parking

Xarm and Yarm cross perpendicularly  
at the center of BS chamber.

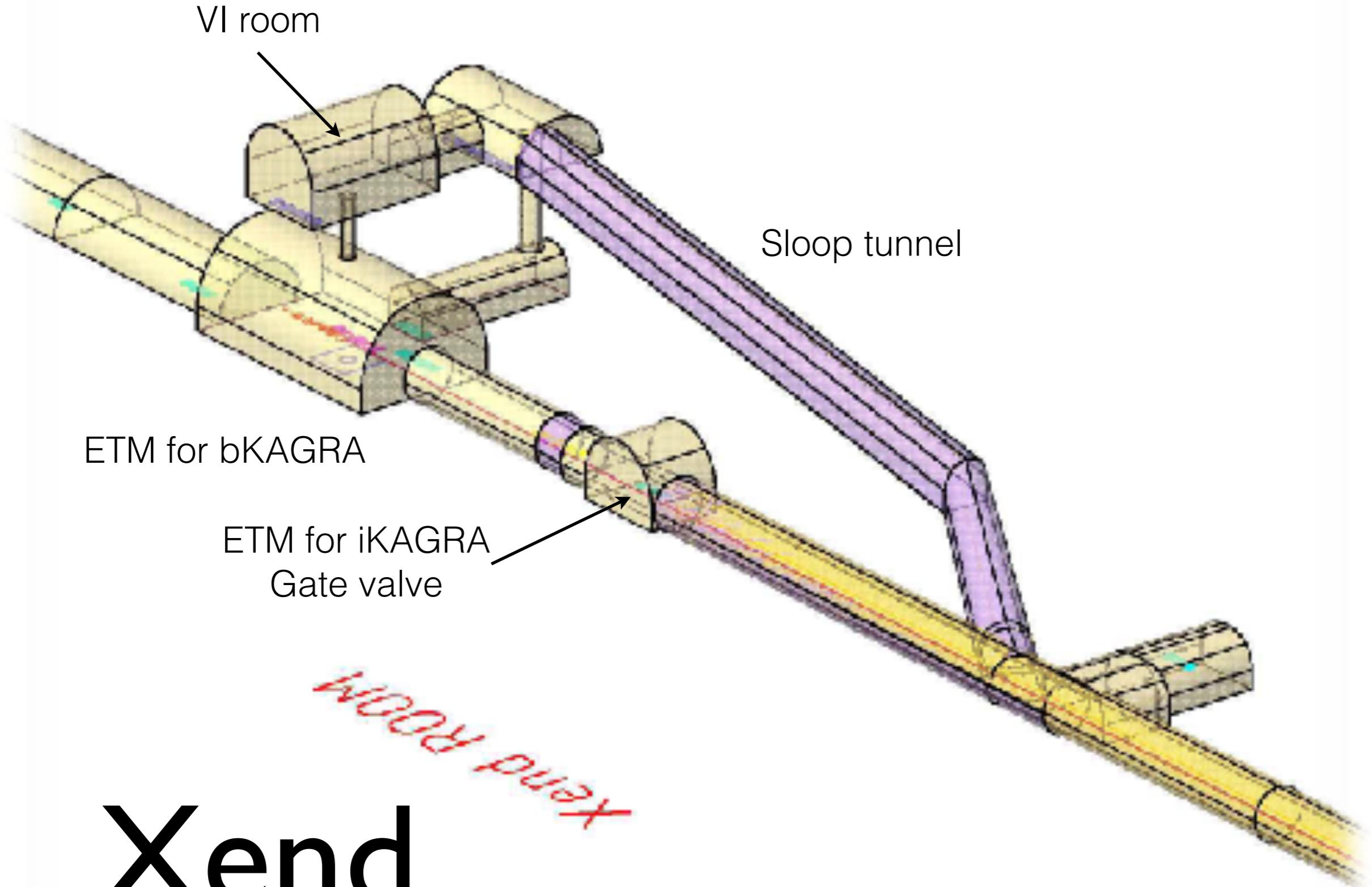
**3km:**  
X: (25+2m)from BS - Center of X end cryostat room  
Y: (25-2m) from BS - Center of Y end cryostat room



# Center

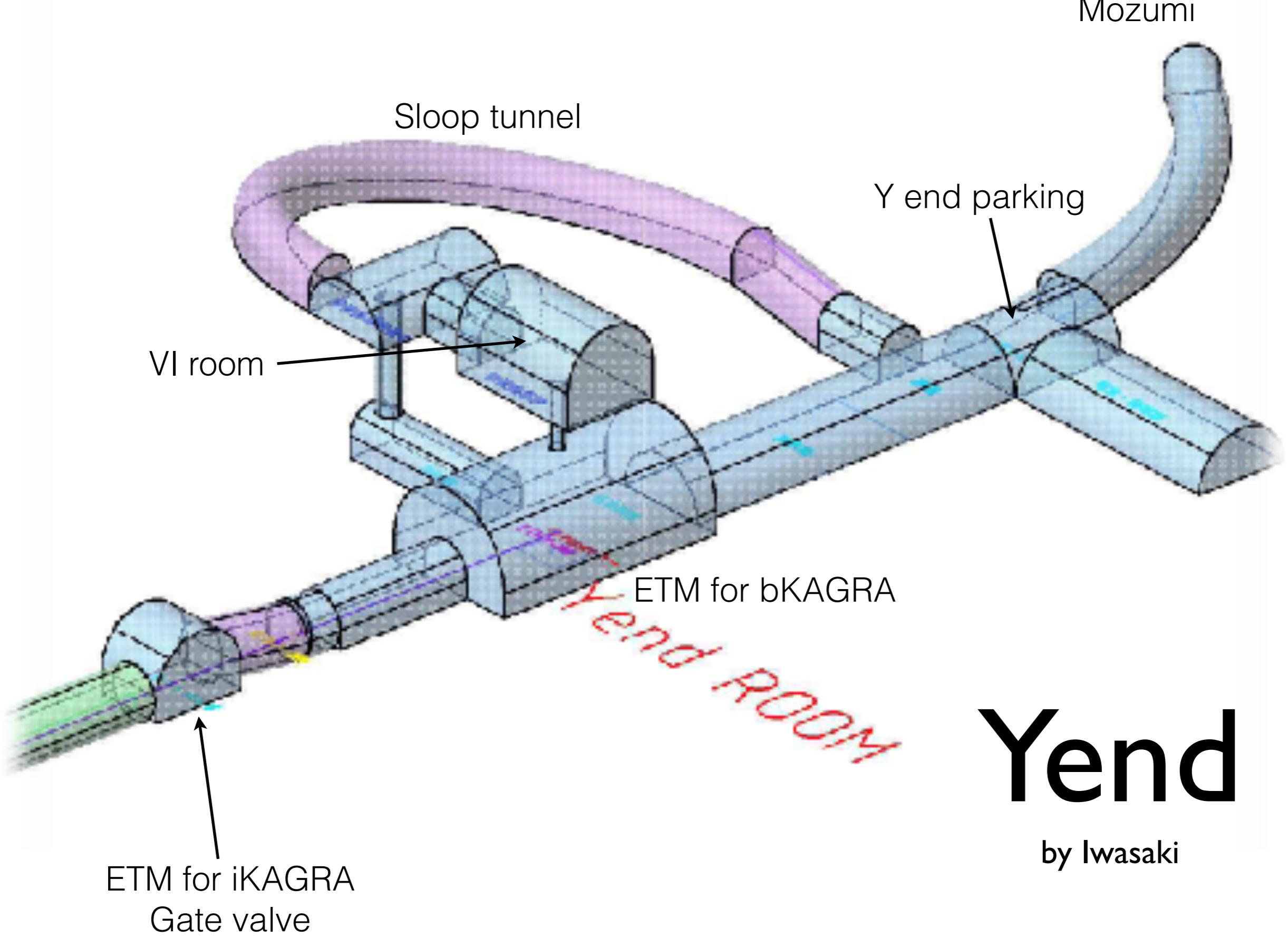
by Iwasaki.

New Atotsu



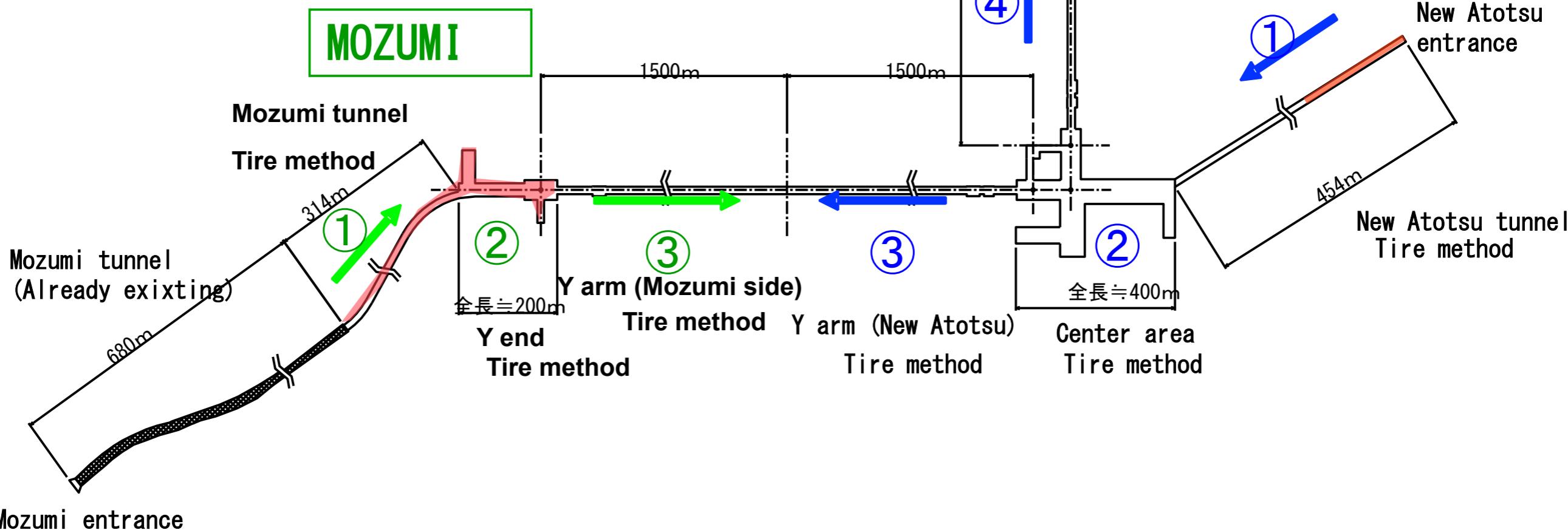
# Xend

by Iwasaki.



# ● Excavation schedule

- Three parties will enter from two entrances.
- One party from Mozumi entrance will excavate Mozumi tunnel, Y end and, the half of Y arm.
- One party from New Atotsu will excavate New Atotsu, Center area and the rest of Y arm.
- Another one party from New Atotsu will excavate whole X arm, Sakonishi, and Xend.

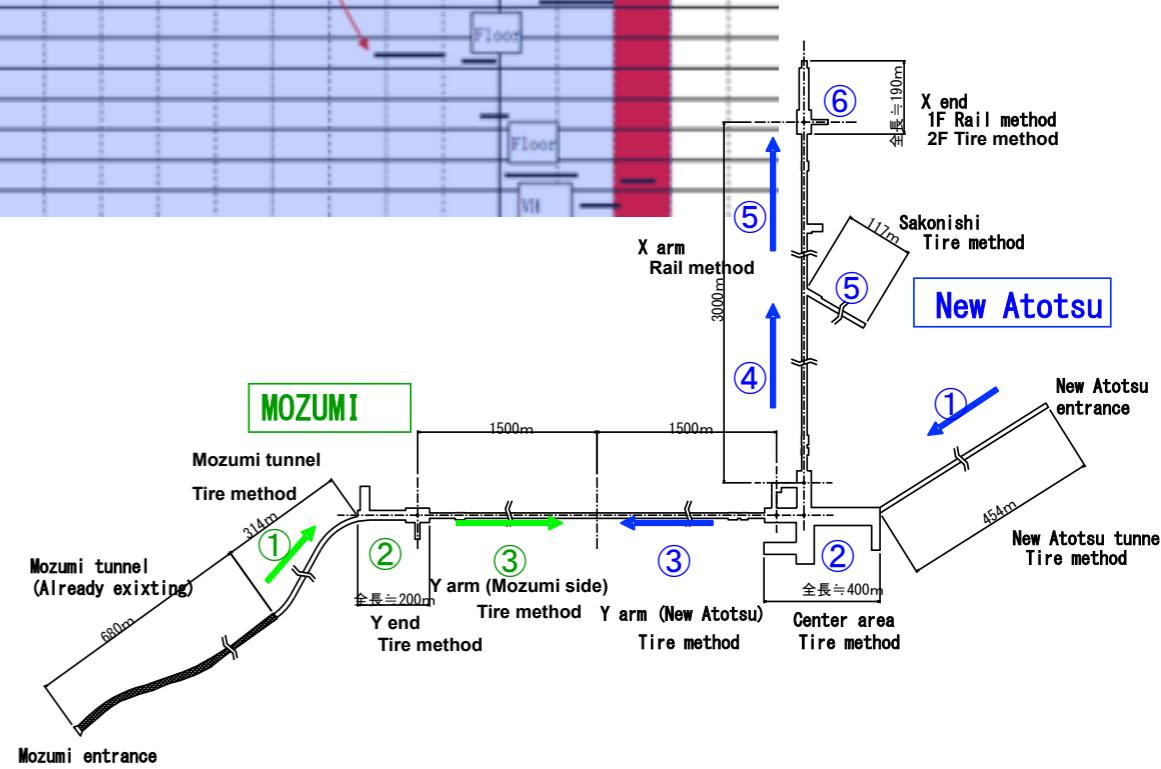


- The tunnel excavation will begin from two mine entrances (Mozumi and New Atotsu).
  - At Mozumi entrance; construction of the facilities for the excavation has completed on the end of April of 2012.
  - The excavation has started since on May 22. The Yarm of 1700m will be excavated till the end of February of 2013.
  - At New Atotsu entrance; construction of the facilities for the excavation has completed on June 11.
  - The excavation has started on June 18 of 2012. The Yarm of 1250m and the Xarm will be excavated till the end of June of 2013 and till the end of February of 2014, respectively.
- All the process for the tunnel construction will be completed till the end of March of 2014.

ITEM		Amount	Total	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
			Y	M	12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
MOZUMI																																	
Preparation																																	
Power line																																	
Coolant pipe																																	
Temporary facility	Powder magazine																																
	Batcher plant																																
	Water supply																																
Tunnel construction																																	
1 Mozumi tunnel	15.3m2	313.8	m																														
2 Yend	1F	41.3	m																														
		954.0	m3																														
	2F	109.7	m																														
		2,236.0	m3																														
3 Y arm		1,700.0	m																														
New ATOTSU																																	
Preparation																																	
Power line																																	
Coolant pipe																																	
Temporary facility	Powder magazine																																
	Batcher plant																																
	Water supply																																
Water pipe construction																																	
Tunnel construction																																	
1 New ATOTSU tunnel	15.3m2	454.0	m																														
2 Center area	1F	299.7	m																														
		21,652.0	m3																														
	2F	159.9	m																														
		3,579.0	m3																														
4 X arm		3,029.0	m																														
3 Y arm		1,256.0	m																														
5 Sakonishi		116.6	m																														
6 Xend	1f	88.6	m																														
		3,580.0	m3																														
	2F	105.8	m																														
		2,239.0	m3																														

We are here.

## Tunnel construction schedule



# Before blasting



# After the 1st blasting





2012年7月29日日曜日



2012年7月29日 日曜日



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