

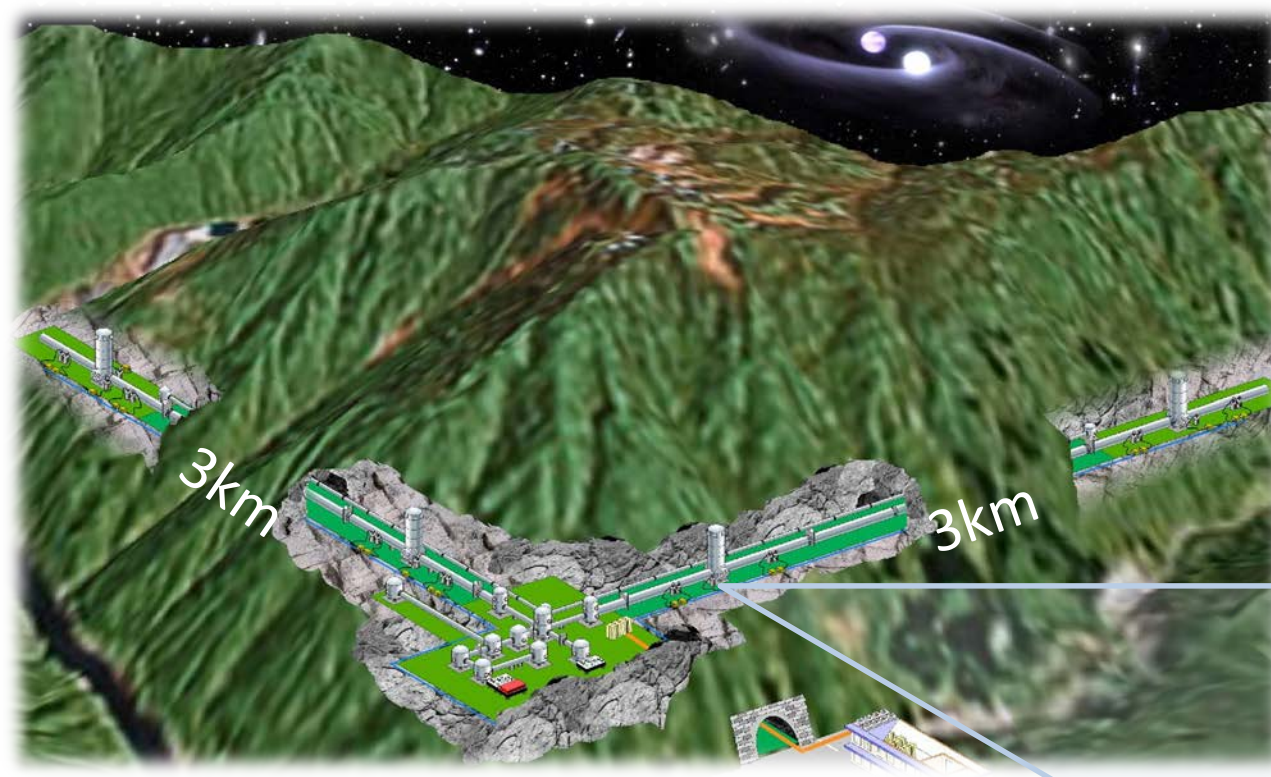
# *Overview of the KAGRA Project*

Feb 5, 2014

KAGRA F2F International meeting

Takaaki Kajita

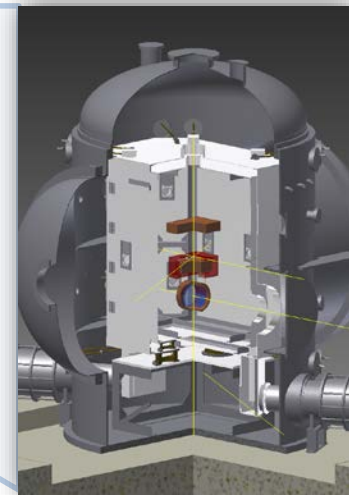
# Key features of KAGRA



The detector will be constructed **underground** Kamioka.

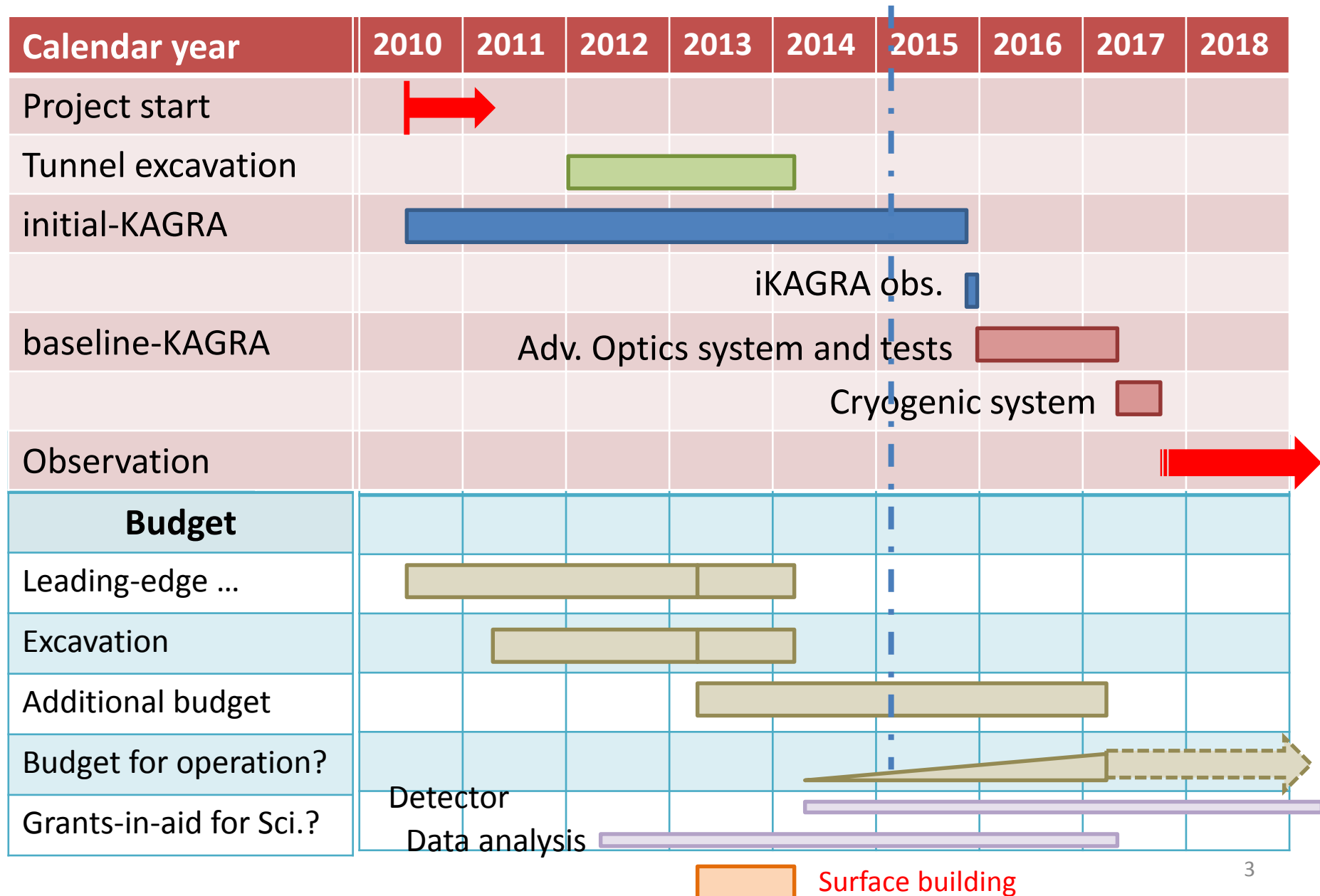
➔ Small seismic noise (approximately 1/100 of that of the surface).

**Cryogenic mirrors** will be used to reduce the thermal noise (in the 2<sup>nd</sup> phase).



➔ Very high sensitivity.

# Budget and revised schedule



# iKAGRA schedule (2014-2015)

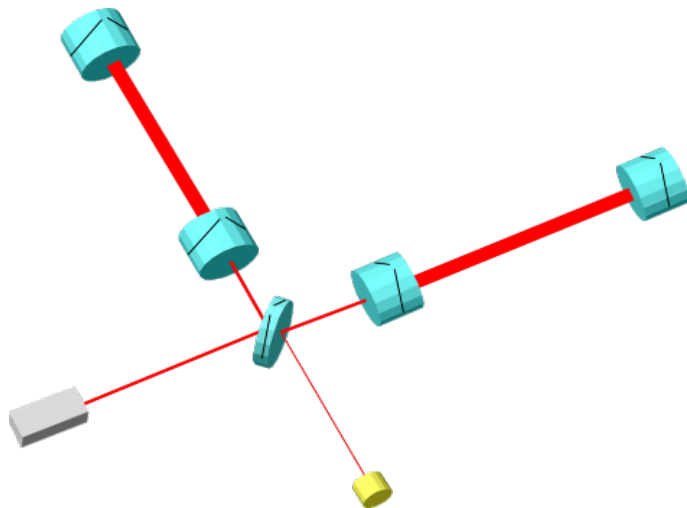
	2013		2014				2015			
	III	IV	I	II	III	IV	I	II	III	IV
electricity	tunnel excavation			wiring			(Slide from Y. Saito (PM), June KAGRA International video meeting in June 2014)			
ventilation				duct						
drainage				tubing						
crane				girder						
hanging anchor				drilling						
dust prevention coating					laser room	c-room				
clean booth					laser room	c-room, e-room				
network and PHS										
arm tube										
laying a chalk line										
carrying and anchoring										
flange fastening/leak test										
chamber										
marking										
anchoring					cryo	other chambers				
mirror suspension						Type-C, Type-Bp, BS Install / tune in chambers				
input/output optics						laser setup	PMC to MC			
optical baffle (arm)					during flange fastening/arm					
target monitor (arm)					during flange fastening/arm					
vac pumping					bidding	during flange fastening/arm				
Geophysics interferometer						inst.		test/operation		
Environment monitor						test/operation				

Many onsite (underground) works are on-going.

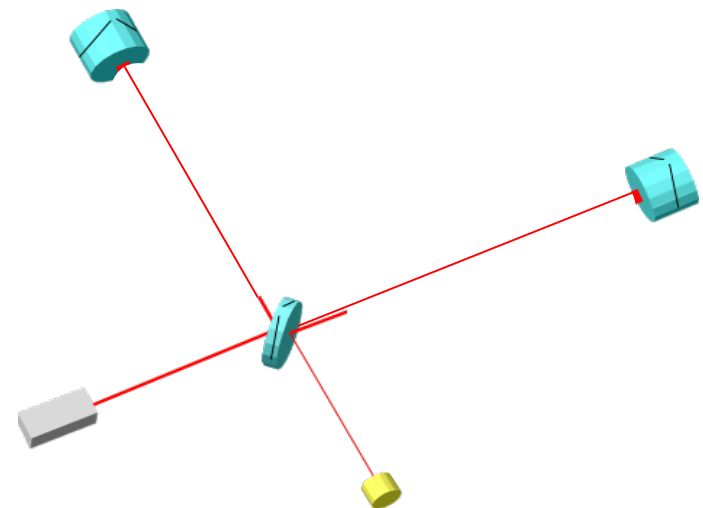
Dec 2015  
operation

# *Changing the iKAGRA configuration*

Due to the limited manpower and resources, and due to the higher priority in bKAGRA, it was decided at the end of 2014 that the iKAGRA configuration will be changed from FPMI to MI. We hope you agree with this difficult decision.



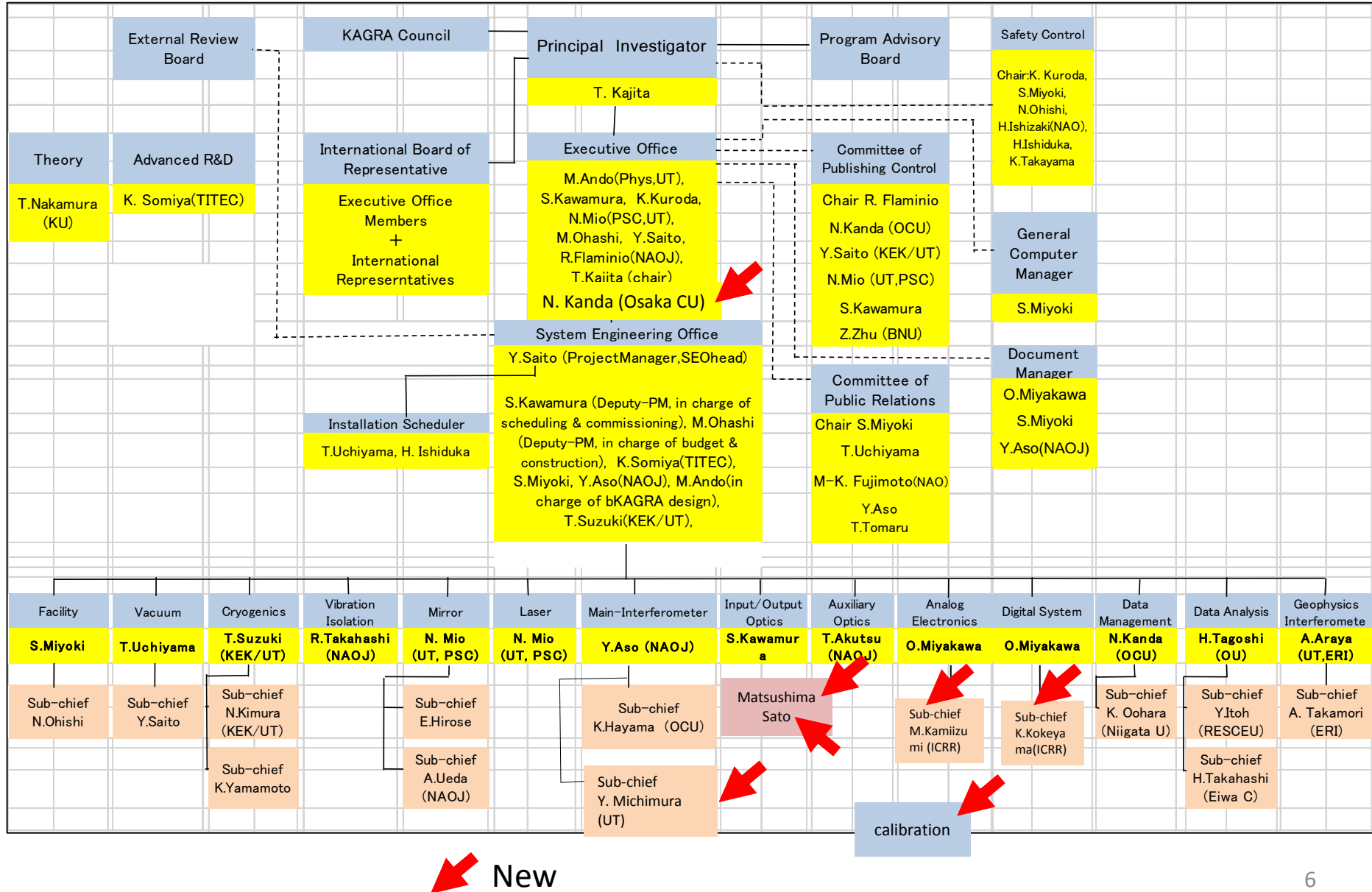
Original iKAGRA



Descoped iKAGRA (Dec. 2015)

Of course, we will no change the FINAL bKAGRA configuration.

# Project chart



# *Changes in the project chart*

## *(after the previous F2F meeting)*

- New EO member: N. Kanda (from April 2015)
- New sub-chiefs: Y. Michimura --- MIF  
M. Kamiizumi --- AEL  
K. Kokeyama --- DGS  
F. Matsushima --- IOO  
T. Sato --- IOO
- H. Ishitsuka --- New chief meeting member
- New subgroup: Calibration (the chief to be decided)
- At the Dec. 2014 KAGRA international video meeting, it was discussed to form a body to make collaboration wide decisions (such as the paper publication). We continue the discussion in this meeting. (Please see Kuroda-san's presentation.)

# *Budget related*

- The FY2015 construction budget has been **PARTIAL** approved.
- Items that have been included from the original budget request are **FULLY** approved:
  - Sapphire mirror polish & coating , Recycling optics, Cryogenic suspension & control, Cryogenic shield ducts
  - Sub-total 3.94 oku-yen (~3.3 M\$)
- Items that have been newly requested last year are **PARTIALLY** approved:
  - Advanced DGS (advanced control & interlock) (mode detailed items: network, I/O boards for control, servers, software, interlock for vacuum, mirror support for earthquakes)
  - Sub-total 2.80 oku-yen (~2.4M\$)
    - Items that are **NOT** approved this FY are: 532nm AOS, Local angle control, Baffles for cryostats, output mode cleaner, BRT for Bkagra, Local vibration control, Advanced computer control system (interlock and digital system installation/commissioning)
- Total = 6.74 oku-yen (requested = 9.84)



## *Budget related (2)*

- The operations budget for the KAGRA facility has been PARTIALLY approved.
  - Requested: 1.49 oku-yen
  - Approved: 1.30 oku-yen (~1.1 M\$)
- General remark: In general the Japanese budget for FY2015 is very, very tight. Many of the projects had ~30% cut without any reason...
- We have to negotiate with MEXT for the next FY's construction budget (and the operations budget) seriously, since we do need (at least) +8 oku-yen more than the original budget.

# *PAB meeting report*

- KAGRA Program Advisory Board meeting was held on Oct.31-Nov.1 at Toyama University. The report is available at;  
<http://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=3089>
- Some critical recommendations:
  - Onsite safety management organization
  - Instilling a safety consciousness (meeting every morning)
  - Stop working policy
  - Closer interaction of 3 projects at Kamioka for safety
  - Review by safety engineer, especially X-end
  - Continue ask for additional budget for X-end
  - Adding a new member to EO from data analysis
  - Assigning more members to sub-groups.
  - Some of the core members tasks to the other members
  - Integrate all activities into a single project (schedule).
  - Risk register: both identify risks and to mitigate them.



Safety

The diagram consists of two blue rectangular boxes with white text. The top box is labeled 'Safety' and is connected by a blue bracket to the first six items of the recommendations list. The bottom box is labeled 'Manpower' and is connected by a blue bracket to the remaining six items of the recommendations list.

Manpower

# *PAB meeting report (2)*

- Consulting with the LIGO and Virgo cleanliness experts
  - Making an early decision on installation plans vs. cleanliness
  - Should act quickly to descope bKAGRA to fit the available budget
  - Labor from the local area.
  - Must consider the logistics for handling large number of people working in 2015.
  - Importance of detector characterization and calibration
  - ....
- cleanliness
- EO and SEO are making actions on these recommendations
  - There was a proposal from PAB to hold the PAB face-to-face meetings 2 per year. EO agreed with this proposal.

# Reviews

- KAGRA Program Advisory Board meeting will be held (probably) in July @Toyama/Kamioka.
  - Stan Whitcomb (Caltech, chair)
  - Gary Sanders (TMT)
  - Masanori Iye (NAOJ)
  - Akira Yamamoto (KEK)
  - David McClelland (ANU)
  - Misao Sasaki (Yukawa Institute)
  - Bangalore Sathyaprakash (Cardiff University)
  - Jo Van den Brand (Nikhef)
  - Inwoo Han (Korea Astronomy and Science Institute)
- External review meeting (for bKAGRA) ➔ Under discussion in SEO.

# *Various activities*

- Many collaborative works are going on with LIGO, Virgo and ET.
  - Various collaborative works with LIGO and Virgo.
  - Cryo-suspension activity with ET (Yamamoto et al.).
  - The ELiTES meeting will be held on Feb.9-10, 2015 in Tokyo.
- MoU between ICRR and NAOJ: signed on Oct.1 2014.
  - Kamioka branch of the GWPO, NAOJ is going to be established.
- Korea-Japan workshop on Dec.19 and 20 at Toyama University.
- Discussions at Annual physics meeting PSRC, Taiwan (Jan.28-30, 2015).
- MoU between Toyama Univ. and ICRR to be signed soon.
- And more ...

# *Important topics of this meeting*

*(copy of the presentation at the Dec. International Video meeting)*

## *Next F2F meeting and related*

- The next F2F meeting will be held on Feb. 5 (Thu) – Feb.7 (Sat) at the University of Tokyo (@Hongo).
- **Important items to be discussed at the next F2F meeting:**
  - More detailed discussion on iKAGRA installation and commissioning.
  - Planning bKAGRA
  - Publication and authorship policies
  - Safety control
  - More on shift works
  - E-log?
  - We would like to encourage reports by young colleagues and overseas collaborators.

# backup