

Summary of core team discussions

Charles, Cyril, Foteini, Ke, Kohta,
Kumiko, Mauricio, Olivier
Sijbrand, Xiang-Ping

The GRAND mission:

To unveil the sources of ultra-high energy cosmic rays through a multi-messenger approach (neutrino's, photons and cosmic rays)

...

Topics to be discussed

- Stages towards GRAND
- Funding strategy for GRANDproto300 & following stages
- Human resources
- GRAND organization
- Workshop organization & timetable
- White paper writing planning
- Access to Ulatai
- Work tools within GRAND

Stages towards GRAND

Stage	Start year	Cost per station (€)	Total station cost (k€)	Infrastructure and deployment cost (k€)	Cost of this phase (M€)	Cumulative cost (M€)
GRANDProto35	2017	4500	158	—	0.16	0.16
GRANDProto300	2020	3500	928	250	1.18	1.34
GRAND20k	2025	1500	29550	500	30.05	31.39
GRAND200k	2033	500	90000	10000	100	131.39

Timeline

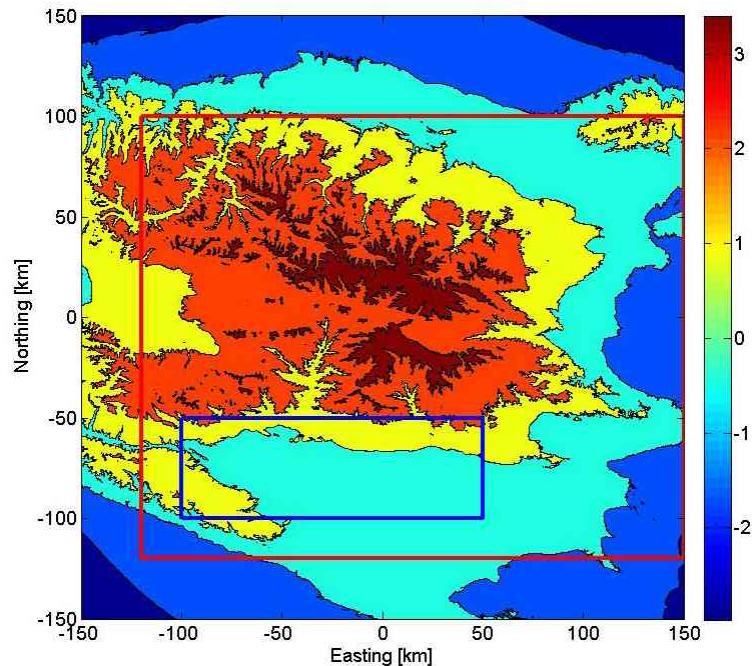
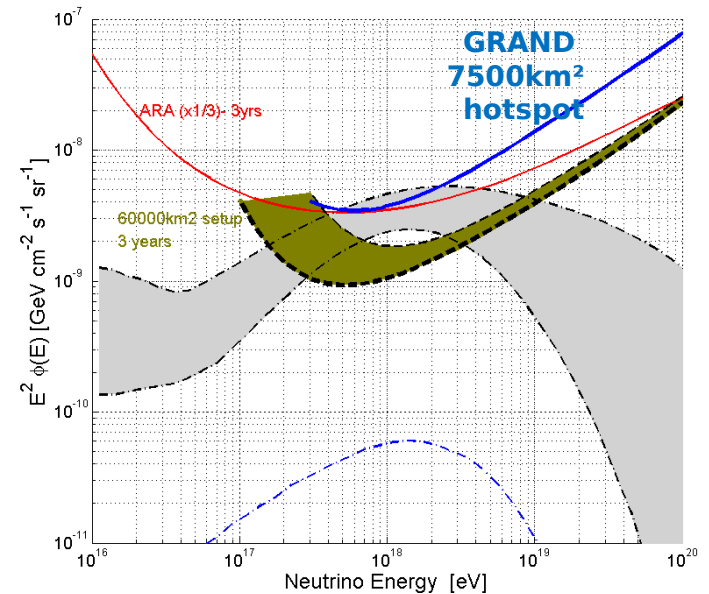
- Before 2018
 - Complete GRAND sensitivity & reconstruction simulations study.
 - Build and test horizon-sensitive antennas @ Ulaanbaatar (& Nançay?)
- 2018
 - DAQ prototyping and production for GRANDProto300 (300 antennas over 300km²)
 - HorizonAntenna validation & production (including HF)
 - GRANDproto300 site survey
- Early 2019
 - **GRANDProto300 deployment.** Use 30W solar pannels (run at daylight only) + Wifi comm.
- 2019:
 - Establish « proof of principle » for detection & reconstruction of very inclined EAS with GRANDproto300.
 - Initiate GRAND10k R&D for trigger & comms with GRANDproto300.
- 2020-2023:
 - Prototyping & production for GRAND10k (antenna, DAQ, trigger & coms).
 - Site survey for GRAND10k.
- 2024: deployment of GRAND10k
- **2025: first light of GRAND10k.**
- 2028: GRAND announces of detection of cosmogenic neutrinos ;-)

Assumption: funding guaranteed

GRAND 10(20)

Similar detection efficiency as ARA/ARIANNA at similar timescale

Disclaimer: to be confirmed by full end-to-end simulation.



From Auger data: Cosmogenic neutrino flux likely very low (close to Iron assumption).

Funding

- GRANDproto300
 - January: application to China Academy of Science program for GRANDproto300. Lead: Wu XiangPing. Total amount: 2MRMBx5 years = 10MRMB (1.4 M€)
 - Would fully cover GRANDproto300 cost.
 - Decision: ~This summer
 - National programs, individual grants
- GRAND10k
 - Go for large Chinese program
 - Go for large European program
 - National programs, individual grants
 - Requires more robust structure & institutional support.
 - Requires a proper organizational structure of GRAND

Funding

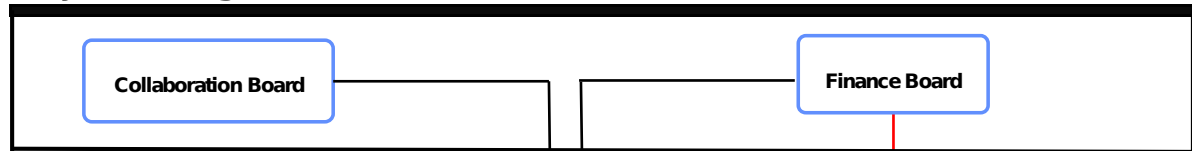
- GRANDproto300
 - January: application to National Science Foundation of China program for GRANDproto300. Lead: Wu XiangPing. Total amount: 2MRMBx5 years = 10MRMB (1.4 M€)
 - Would fully cover GRANDproto300 cost.
 - Status?
 - National programs, individual grants
- GRAND10k
 - Go for large Chinese program
 - Go for large European program
 - National programs, individual grants
 - Requires more robust structure & institutional support.
 - Requires a proper organizational structure of GRAND

Requires an excellent physics case: The white paper

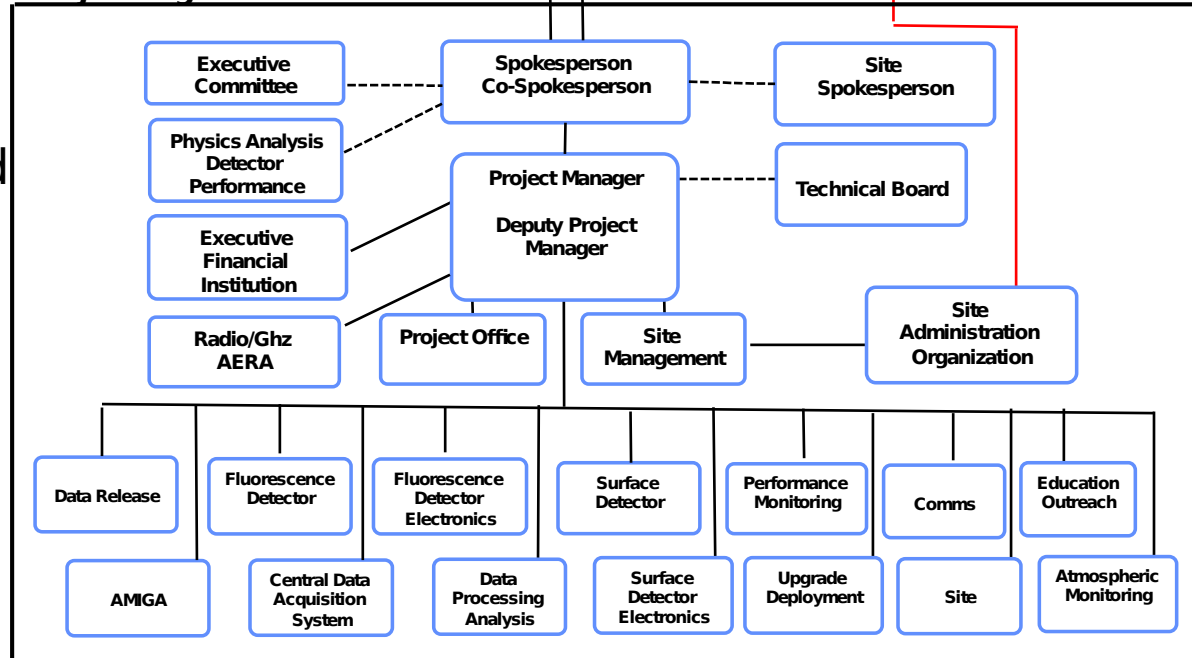
Organization of GRAND

Global Organization

Project Oversight



Project Organization



Could be modelled after the Pierre Auger organization

Requires more thought and comparison to similar organizations

We will need to have something in place before requesting real money/participation of institutes

China will be the leading country in the endeavour

Practical organization of GRAND

- Wiki:

 - <http://www.iap.fr/grand/mediawiki/index.php?title=Accueil>

 - Presentations
 - Papers

- Slack

 - Communication

- GIT

 - code