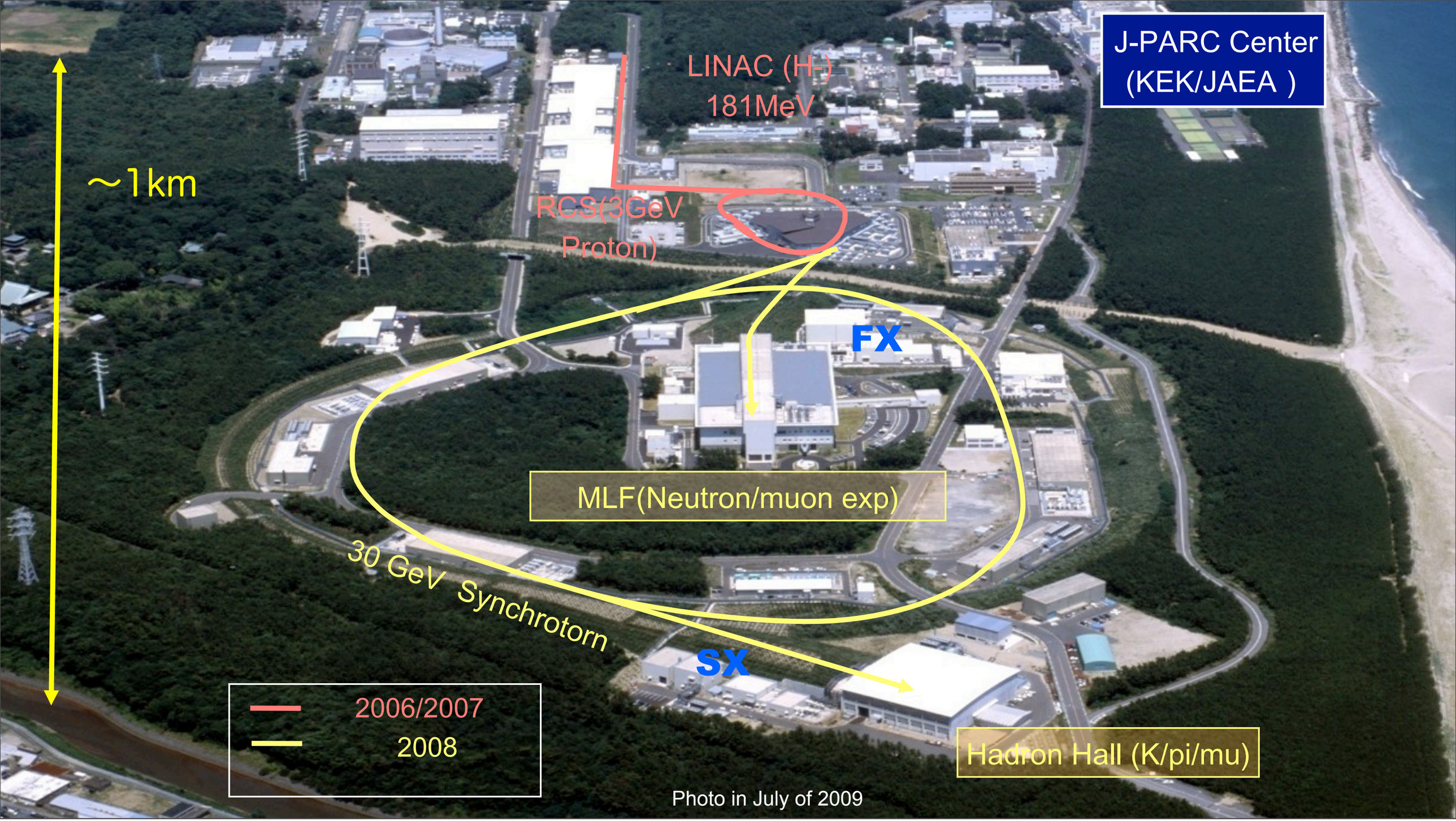
J-PARC MR Status

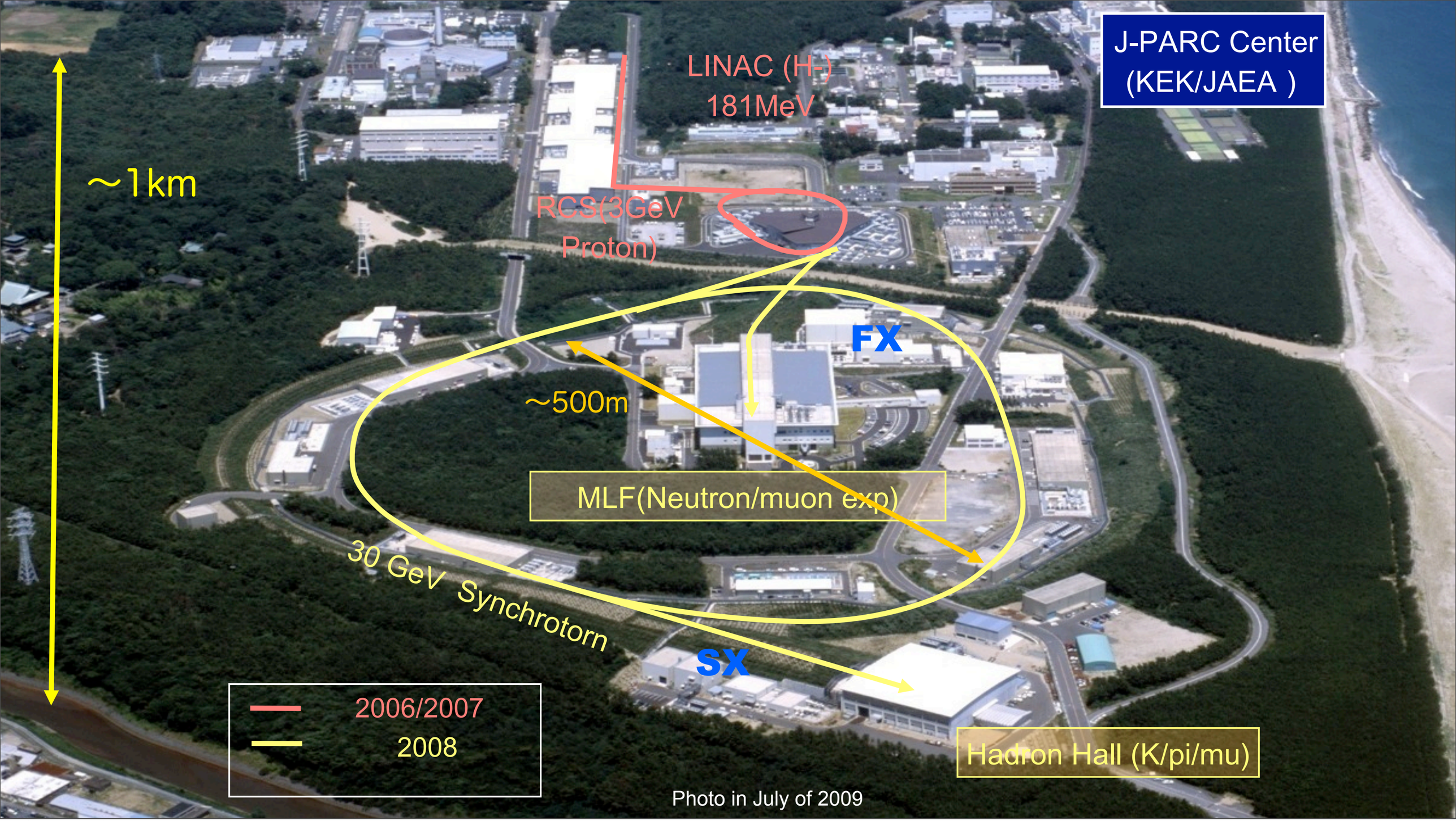
Noboru Yamamoto

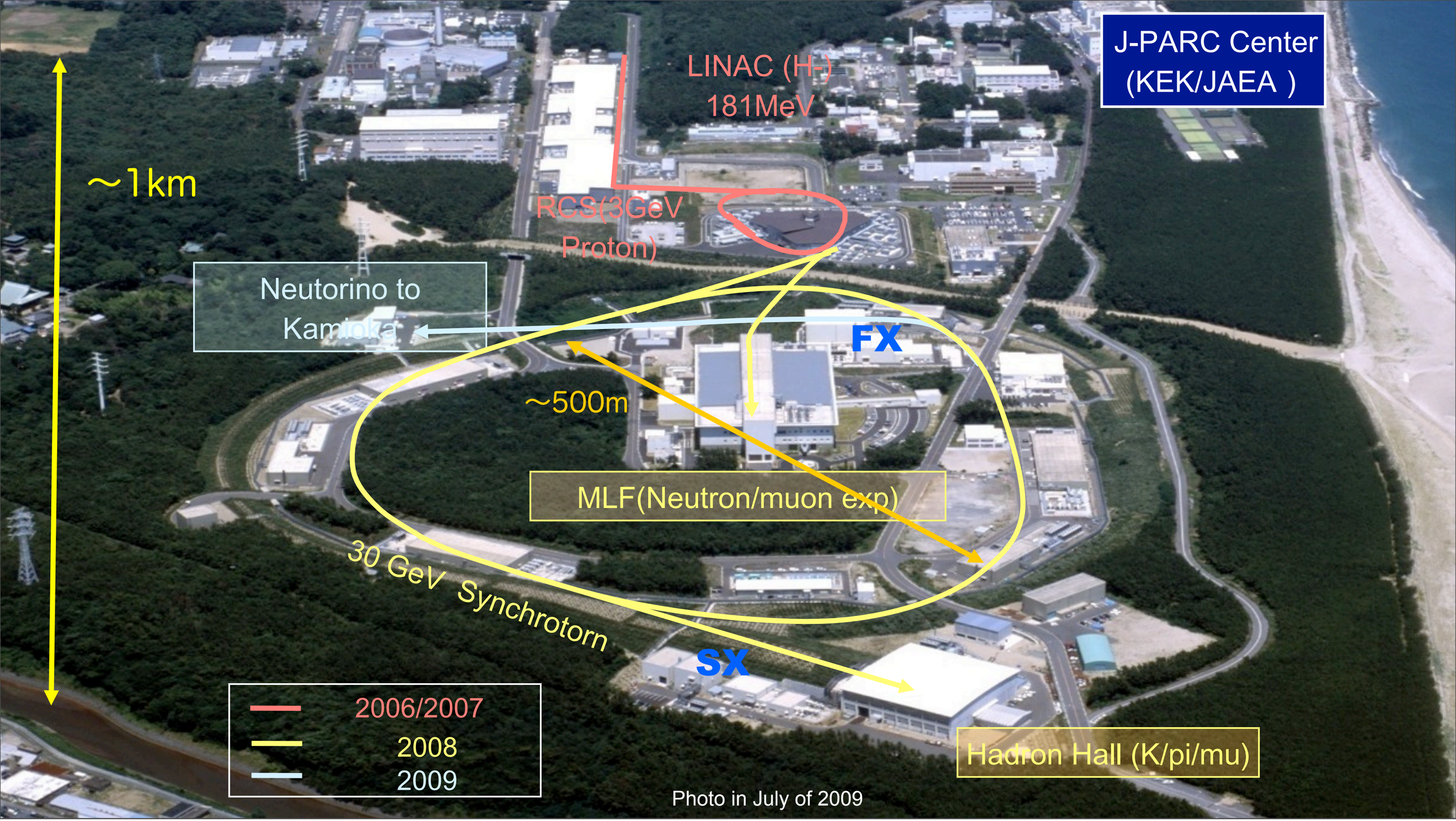
J-PARC Center
(KEK/JAEA)
FX
SX
Photo in July of 2009

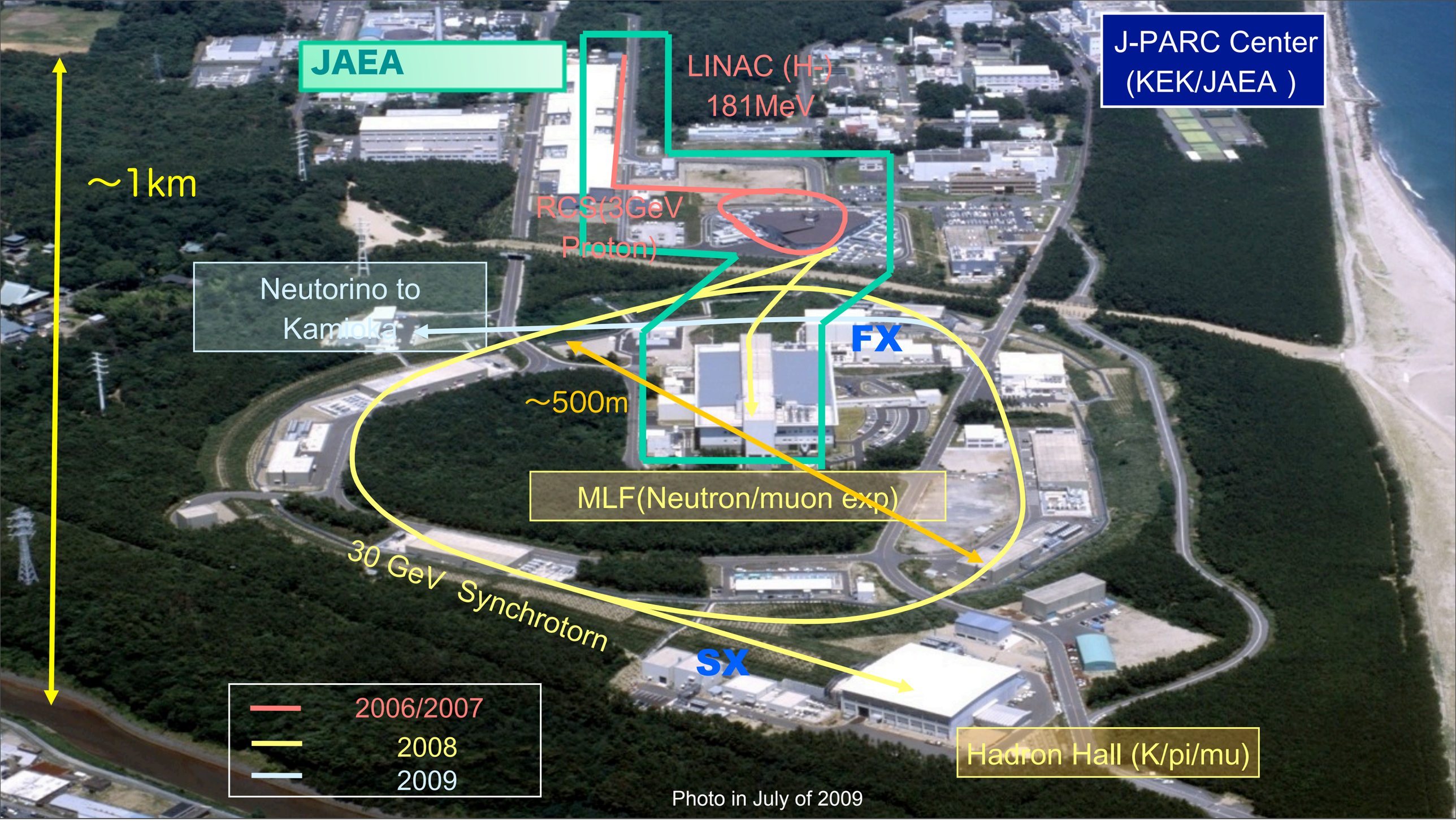
J-PARC Center
(KEK/JAEA)
~1km
FX
SX
Photo in July of 2009

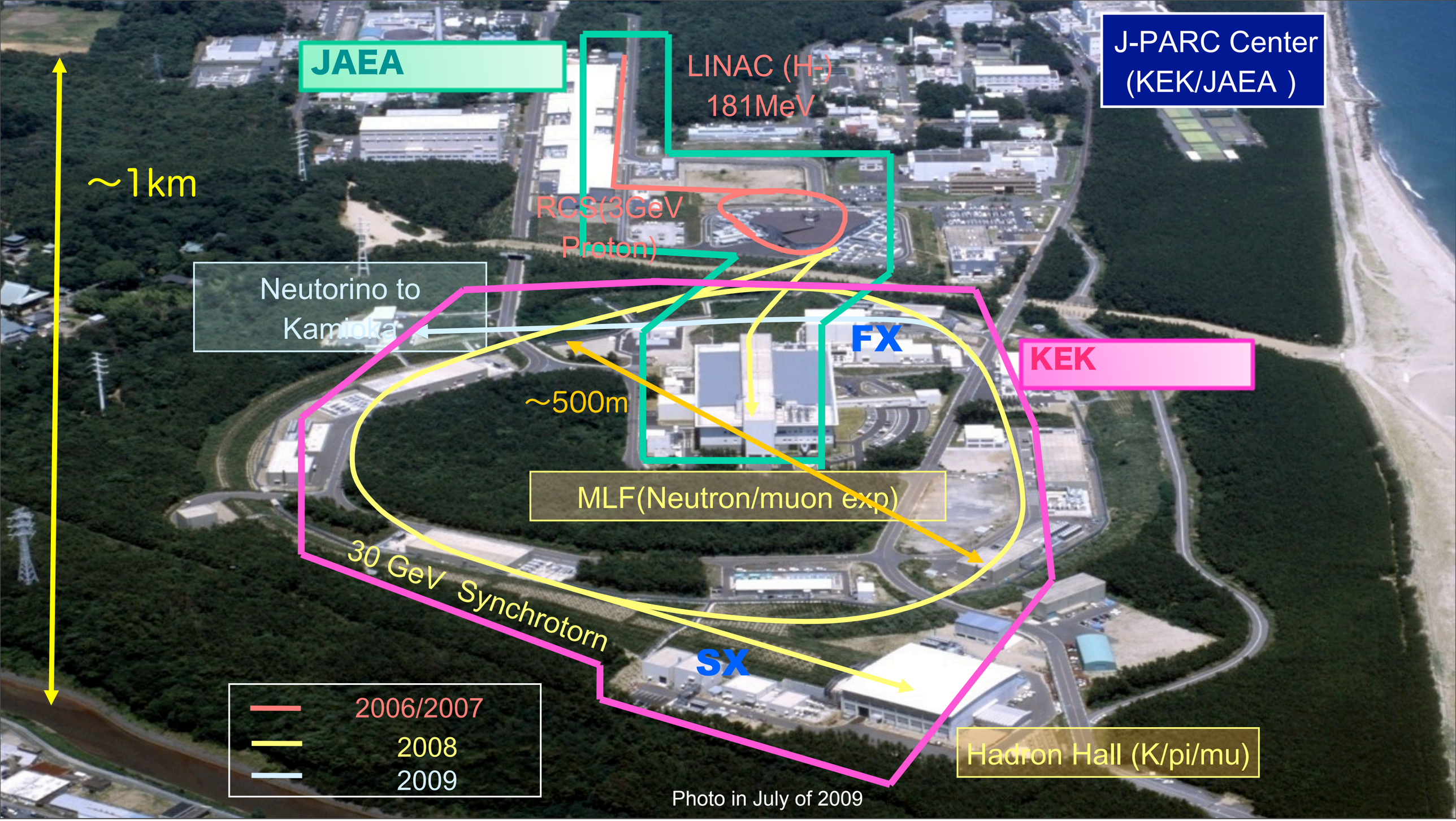
J-PARC Center
(KEK/JAEA)
LINAC (H-)
181MeV
RCS(3GeV
Proton)
~1km
FX
SX
2006/2007
Photo in July of 2009

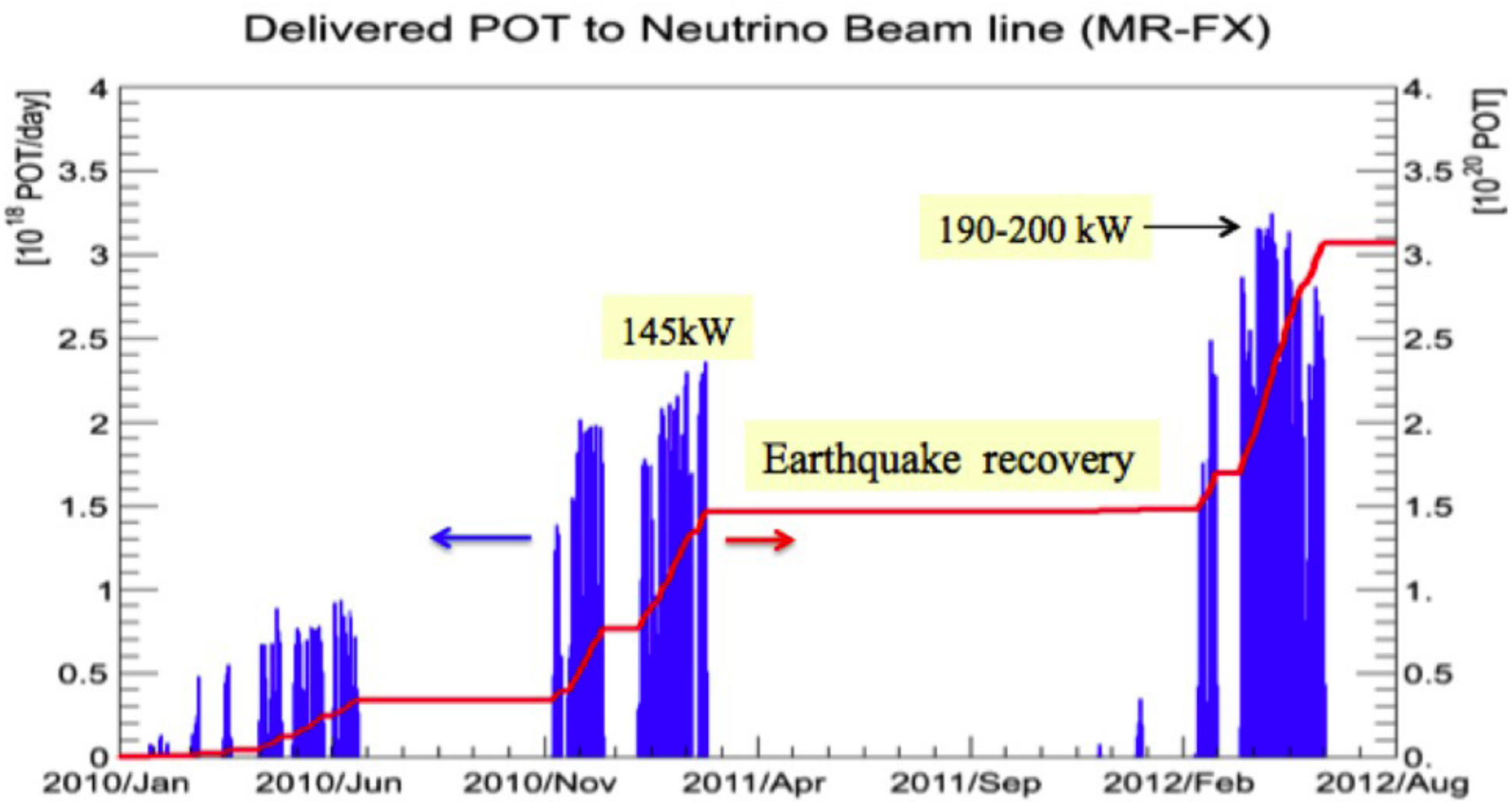

J-PARC Center
(KEK/JAEA)
LINAC (H-)
181MeV
RCS(3GeV
Proton)
~1km
FX
MLF(Neutron/muon exp)
30 GeV Synchrotorn
SX
Hadron Hall (K/pi/mu)
2006/2007
2008
Photo in July of 2009


J-PARC Center
(KEK/JAEA)
LINAC (H-)
181MeV
RCS(3GeV
Proton)
~1km
FX
~500m
MLF(Neutron/muon exp)
30 GeV Synchrotorn
SX
Hadron Hall (K/pi/mu)
2006/2007
2008
Photo in July of 2009


J-PARC Center
(KEK/JAEA)
LINAC (H-)
181MeV
RCS(3GeV
Proton)
~1km
Neutorino to
Kamioka
FX
~500m
MLF(Neutron/muon exp)
30 GeV Synchrotorn
SX
Hadron Hall (K/pi/mu)
2006/2007
2008
2009
Photo in July of 2009


JAEA
J-PARC Center
(KEK/JAEA)
LINAC (H-)
181MeV
RCS(3GeV
Proton)
~1km
Neutorino to
Kamioka
FX
~500m
MLF(Neutron/muon exp)
30 GeV Synchrotorn
SX
2006/2007
2008
2009
Hadron Hall (K/pi/mu)
Photo in July of 2009


JAEA
LINAC (H-)
181MeV
J-PARC Center
(KEK/JAEA)
~1km
RCS(3GeV
Proton)
Neutorino to
Kamioka
FX
KEK
~500m
MLF(Neutron/muon exp)
30 GeV Synchrotorn
SX
2006/2007
2008
2009
Hadron Hall (K/pi/mu)
Photo in July of 2009


Delivered POT to Neutrino Beam line (MR-FX)
[10^18 POT/day]
[10^20 POT]
190-200 kW
145kW
Earthquake recovery
2010/Jan
2010/Jun
2010/Nov
2011/Apr
2011/Sep
2012/Feb
2012/Aug

Operation Plan for J-PARC MR

Periods	Expected beam power	Improvements / Cycle time
2011. 6-11	shutdown	Ring collimator shields, 7th and 8th RF systems, New injection kicker
2011. 12 - 2012. 6 87kw(Op.)/124kw(.eq.)	100-200kW (RCS 300 kW eq.)	Cycle time 3.2 -> 2.56 Beam loading compensation, second harmonic cavities
2012. 7 – 9	shutdown	Collimator upgrade 9th RF system
2012. 10 – 2013. 6 2.48 sec cycle, Tuning for 200kw or more	> 200 kW (RCS 400 kW eq.)	Cycle time 2.56 -> 2.4 s Skew Q and Octapole magnets
2013.7 – 2014. 1	shutdown	Collimator upgrade Linac upgrade
2014. 2 – 2014. 6	> 300 kW (RCS > 600 kW eq.)	Cycle time 2.4 s

2017/2018(?) ~ ~ MR 750kW

Near future operation plan of MR-SX

Periods	Expected beam power	Improvements
2011. 6-11	shutdown	SX collimator
2011. 12 - 2012. 6	3-6kW (14kW for study)	
2012. 7 – 9	shutdown	Titanium chambers for magnetic septa
2012. 10 – 2013. 6	10 kW (50 kW for study)	2012/12/14~
2013.7 – 2014. 1	shutdown	Titanium chambers for ESS
2014. 2 – 2014. 6	50 kW (100 kW for study)	

We also started R&D of ESS with low-z material for low loss SX.

For duty :

- New RQ power supply for higher output voltage
- New excitor for 100 MHz/3 kW transverse RF
  (also for the bunch-by-bunch feedback system)

will be ready for run in September 2012.

JFY	2011	2012	2013	2014	2015	2016	2017
Events			Next 5 years plan (Budgetary request)				
Linac				400MeV Beam energy upgrade (ACS) 50mA Beam current upgrade (IS,RFQ)			
RCS				400MeV upgrade (PS of Inj. mag.)			

Control system

Software Upgrade

- We are in middle of software upgrade
  - Linux: Scientific Linux 4.x/5.x → 6.x
  - EPICS 3.14.7 -> 3.14.12.2
    - Both Servers and IOCS
    - Except VME IOCs using VME bus access
      - After test of VME bus driver in SL6
  - Revision Control System: cvs -> mercurial
  - medm/edm& Channel Archiver → Started the estimate of CSS

V(irtual)-IOC

- Network based equipments are widely used in J-PARC control system and integrated into EPICS based J-PARC accelerator Control System.
- Soft records, sequencer for machine operation.
- IOC running on Virtual Machine in the main blade server for J-PARC accelerator control system.
  - Xen → KVM
  - Host: 64bits SL6
  - Guest: 32bits SL6
  - We also test Virtual Console based on SPICE technology. However, it seems too early to adopt this technology to the production system.

Data Archiving

- Kikuzawa & Yoshii (J-PARC/JAEA)
  - Setup a test bench for data archiving system based on Hadoop/HBase
    - 10 nodes(master and slave)
    - 50TB disk space
  - measured read/write performance of the system with various data structures in HBase and data stored in the current data archiving system, which is based on PostgreSQL.
  - Result was reported in the 9th annual meeting of Particle Accelerator Society of Japan [WEPS103].