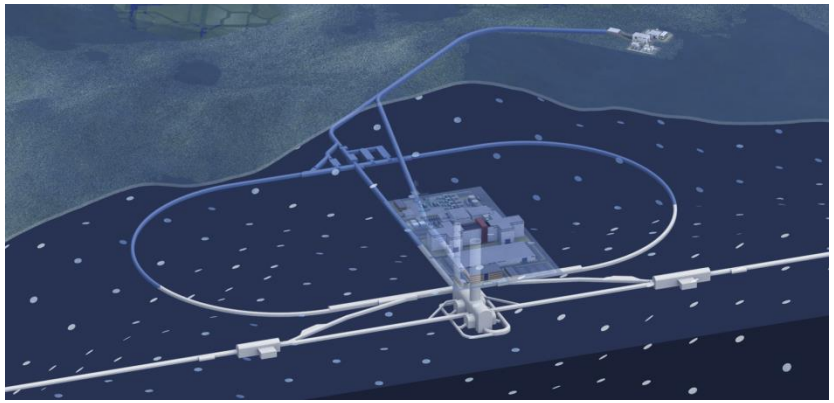
Tohoku Status

LCWS2019 Industry Session Aug. 30 2019

Masakazu Yoshioka
Iwate/Iwate prefectural/Tohoku University
(KEK Prof. Emeritus)

The most important recent event

Next Generation Synchrotron Radiation Facility in Tohoku (NGSR)
2019~ Construction starts
2023~ Commissioning and User Run



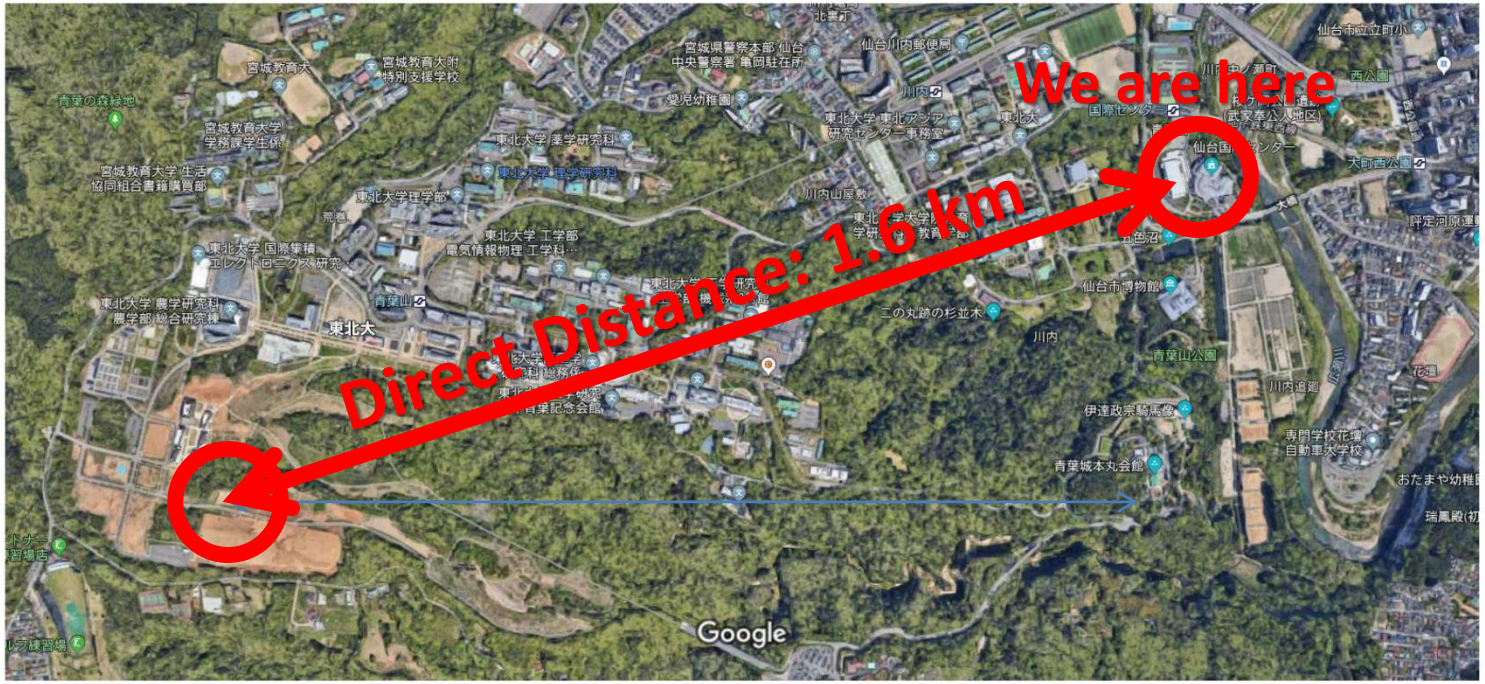
ILC, Hopefully, Ground breaking in 2024

①Next generation Synchrotron Radiation Facility project in Aoba-yama

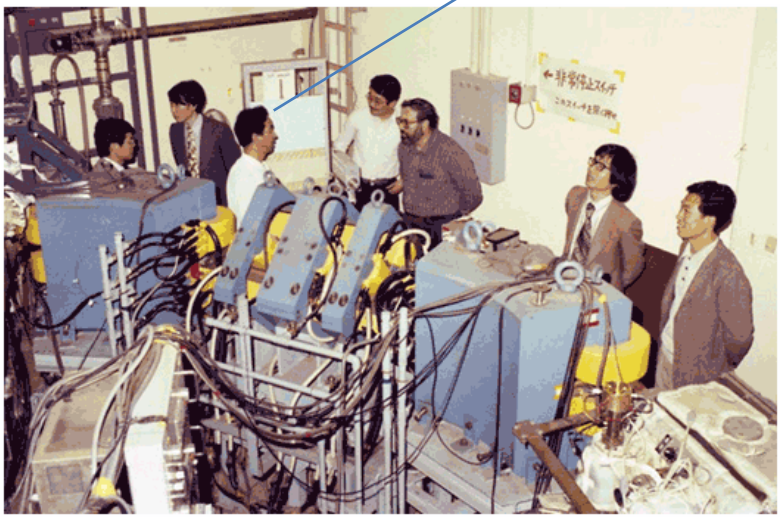
②Presentations of Tohoku companies in LCWS series

③Characteristics of Tohoku Industries

④Recent remarks



Beam Energy	GeV	3
Circumference	m	348.8432
Injection	Full-energy top-up	
Stored Current	mA	400
Horizontal Emittance	pm rad	1140
Natural Energy Spread	%	0.0843
Rattice Function [β_x, β_y]	m	(13.0, 3.0)
Coupling		0.002
Available ID Straights	m	4.2 0.6



Main stream of SR in Japan (my personal view)

First SR in INS of Tokyo University
(early 1960s, pioneering research)

↓

First dedicated 300 MeV SOR-ring
by Prof. Taizo Sasaki (Tokyo U.)
(1974)

↓

KEK-PF (1982)

↓

Spring-8 (1999)

↓

SACLA (2011)

↓

NGSR in Tohoku
(2019 construction start)

↓

Spring-8 II (Future Plan)

Next Generation Synchrotron Radiation Facility in Tohoku

Project Structure

- Joint project between QST (National Institute for Quantum and Radiological Science and Technology) and (General Foundation) Photon Science Innovation Center (PSIC)
- PSIC is organizing the "Public-Private-Regional Partners"
- Tohoku University is one of the members, provides location but does not commit the construction
- Tohoku Economy Federation is playing a leading role in PSIC
- Tohoku Economy Federation is also playing an important role in ILC
- It is natural to consider both projects as a series of projects, especially from industry view point

Budget system and responsibility

- QST responsible for accelerator facility and ~3 beam line construction (190 Oku-yen, from government)
- PSIC responsible for land, building and utility and ~7 beam line construction (170 Oku-yen, from partners)
- Total project budget is 360 Oku-yen (~333 M USD, 1 USD~108 Yen)

	2019	2020	2021	2022	2023
Accelerator (Injector Linac + Storage Ring)	Prepare procurement	17.0 B-Yen (QST)			
Beam Line (3+7 line)		2.0 B-Yen (QST)			
		4.0 B-Yen (Partner)			
Facility Building	8.3 B-Yen (Partner)				
Office Building			2.5 B-Yen (Partner)		
Land Development	2.2 B-Yen (Partner)				
User Run					

ILC-250 TimeLine

Now we are at pre-preparation phase (waiting for the preparation phase).
Four years preparation and 9 years construction.

	P1	P2	P3	P4	1	2	3	4	5	6	7	8	9	10	Phys. Exp.
Preparation CE/Utility, Survey, Design Acc. Industrialization prep.															
Construction															
Civil Eng.															
Building, Utilities															
Acc. Systems															
Installation															
Commissioning															
Physics Exp.															

- From Tohoku SR to ILC
- NGSR fits just to the P-phase of ILC
- Very continuous business from the industry view point

①Next generation Synchrotron Radiation Facility project in Aoba-yama

②Presentations of Tohoku companies in LCWS series

③Characteristics of Tohoku Industries

④Recent remarks

Tohoku company presentations at previous LC workshops

① LCWS2016(Morioka)

- C&A Corporation, Sendai, Crystal & Applications, Sendai, Spin-off company from Tohoku University
- Arisawa mfg Co., Ltd., Niigata, Flexible Printed Circuit
- Iwate Collaboration (Marui Galvanizing Co., Ltd., Higashi Nihon Kiden Kaihatsu Co., Ltd., and WING Inc.), Vertical Electro-polishing system for SRF
- Cosylab Japan, Sendai, Control system

② LCWS2017(Strassburg)

- Taiyo Kikai LTD., Yamagata, Custom-made printing machine and precision machining
- TDC, Miyagi, Mirror-polishing and precision machining

③ ALCWS2018(Fukuoka)

- Akita Kagaku, Akita, Plating, electro-polishing and surface treatment
- Iwate Iron Co., Ltd., Iwate, Casting technology

④ LCWS2018(Arlingtone)

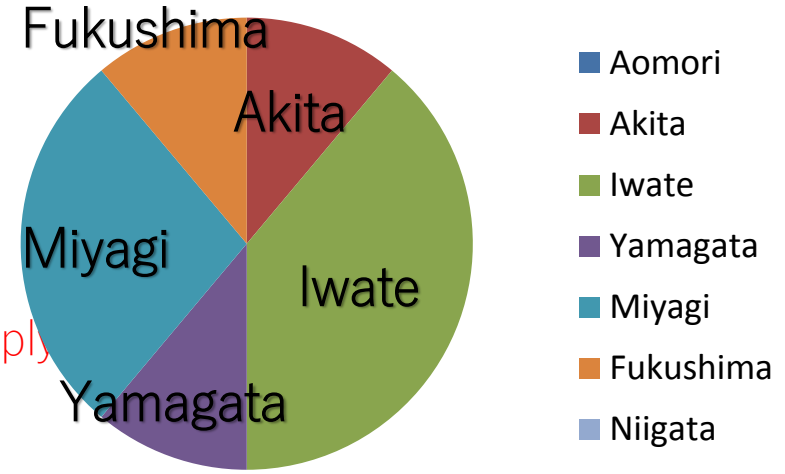
- Iwate Industrial Research Center, Morioka, Public laboratory to Support private industries
- Shelter Inc., Yamagata, Large wooden building

Presentations from Japanese industries at LCWS2019

①	Mirapro corporation (Yamanashi and Miyagi)	
	Yuki Machida	Vacuum technologies for KAGRA and accelerators
②	AMETEK Zygo	
	Ryohei Sakamoto	ZYGO ZPS absolute sensor for synchrotron application
③	TDC (Mitagi)	
	Yuko Akababe	Precision polishing technology
④	DAWONSYS Japan	
	Young Sonn Bae	Leading a new paradigm of power electronics industries
⑤	COSYLAB Japan (Miyagi)	
	Hrovatin Rok	Superior control systems for accelerators
⑥	NEC	
	Mayumi Takagi	NEC AI technology applicable to accelerator monitoring and equipment maintenance

LCWS2019 industry exhibition: total 55 industries, 18 from Tohoku (33 %)

- Akita
  - ① AKITA CHEMICAL INDUSTRIES Co., Ltd. : Plating, Electro-polishing
  - ② Sanei-Kikai Co., Ltd.: Precision machining
- Yamagata
  - ① SAKATA RIKAGAKU Co., Ltd.: Trading
  - ② VIC International Co., Ltd.: Vacuum, precision machining
- Iwate
  - ① Suzuki kikai Co., Ltd.: Precision machining
  - ② MARUI GALVANIZING CO., LTD.: Plating, Electro-polishing
  - ③ Higashi-Nihon Kidenkaihatsu Co., Ltd.: Vertical electro-polishing, Green ILC
  - ④ WING CO., LTD.: Plastic components
  - ⑤ Iwate Iron Co., Ltd.: Casting
  - ⑥ Fujikin Incorporated: Valve, piping
  - ⑦ Nichikon Corporation: Modulator power supply
- Miyagi
  - ① TDC Corporation: Mirror polishing
  - ② MIRAPRO CO., LTD.: Vacuum, bellows
  - ③ KUDO ELECTRIC CO., LTD.: DC power supply
  - ④ TOKIN Corporation: Magnet
  - ⑤ Cosylab Japan: Control system
- Fukushima
  - ① Tosei EB Tohoku Co., Ltd.: EBW, Laser processing
  - ② Alpha Electronics Corporation: Electronics



①Next generation Synchrotron Radiation Facility project in Aoba-yama

②Presentations of Tohoku companies in LCWS series

③Characteristics of Tohoku Industries

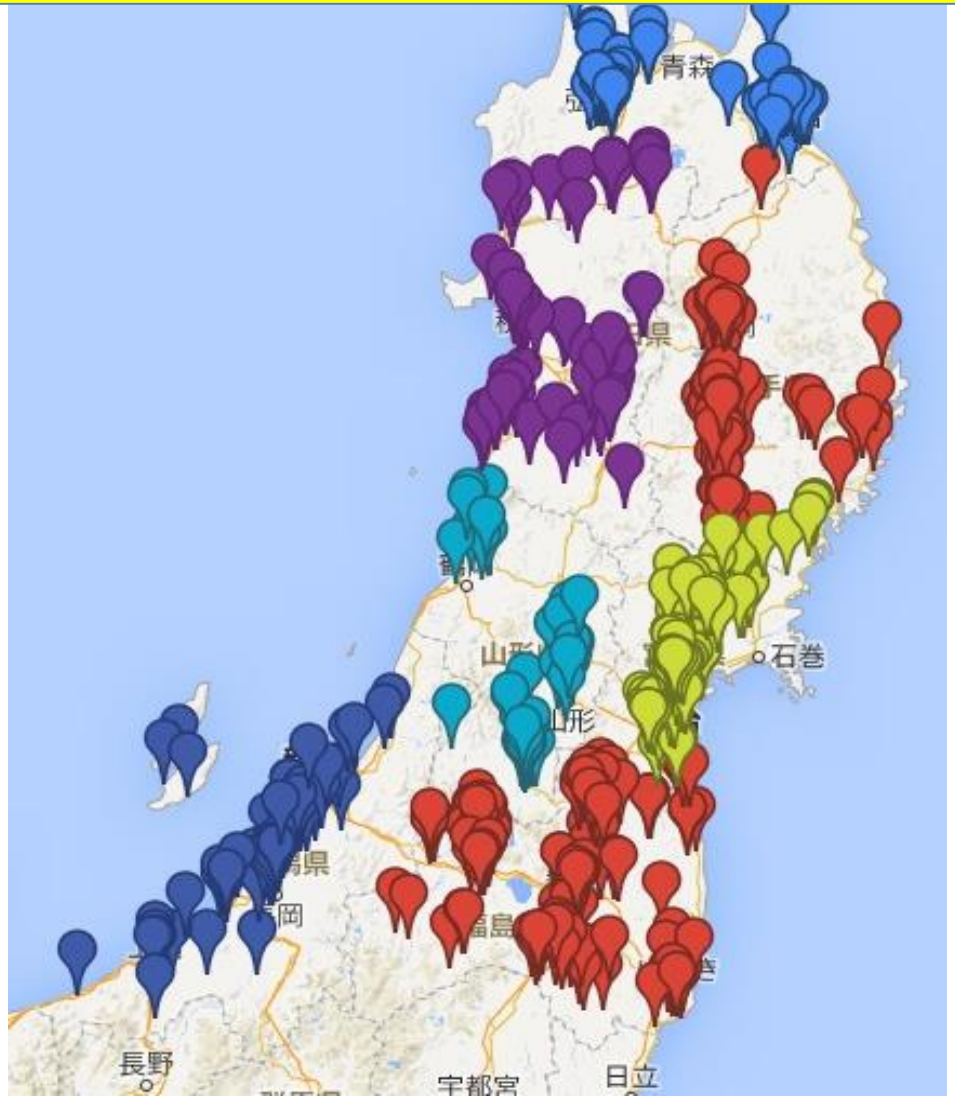
④Recent remarks

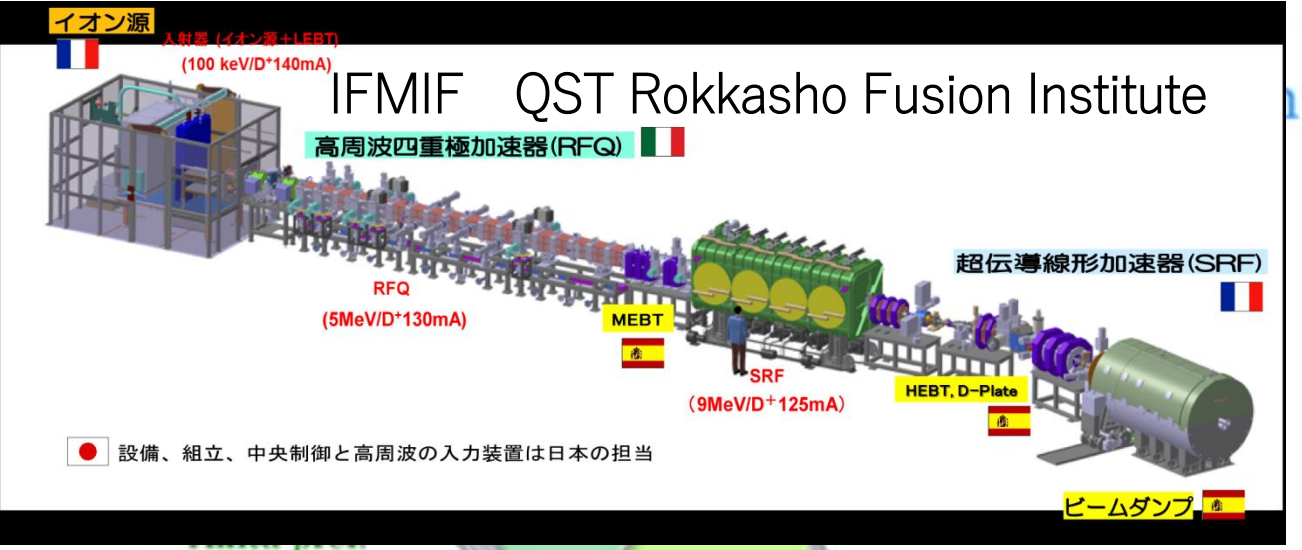
Gigantic industries (automotive, semiconductor, spacecraft, medical and precision machinery industries) and their many supply chain companies

TOYOTA Motor TOHOKU

DENSO IWATE

TOSHIBA Memory





Many accelerator-based facilities in Tohoku are in operation

SAPPORO

Southern Tohoku Proton Therapy Center

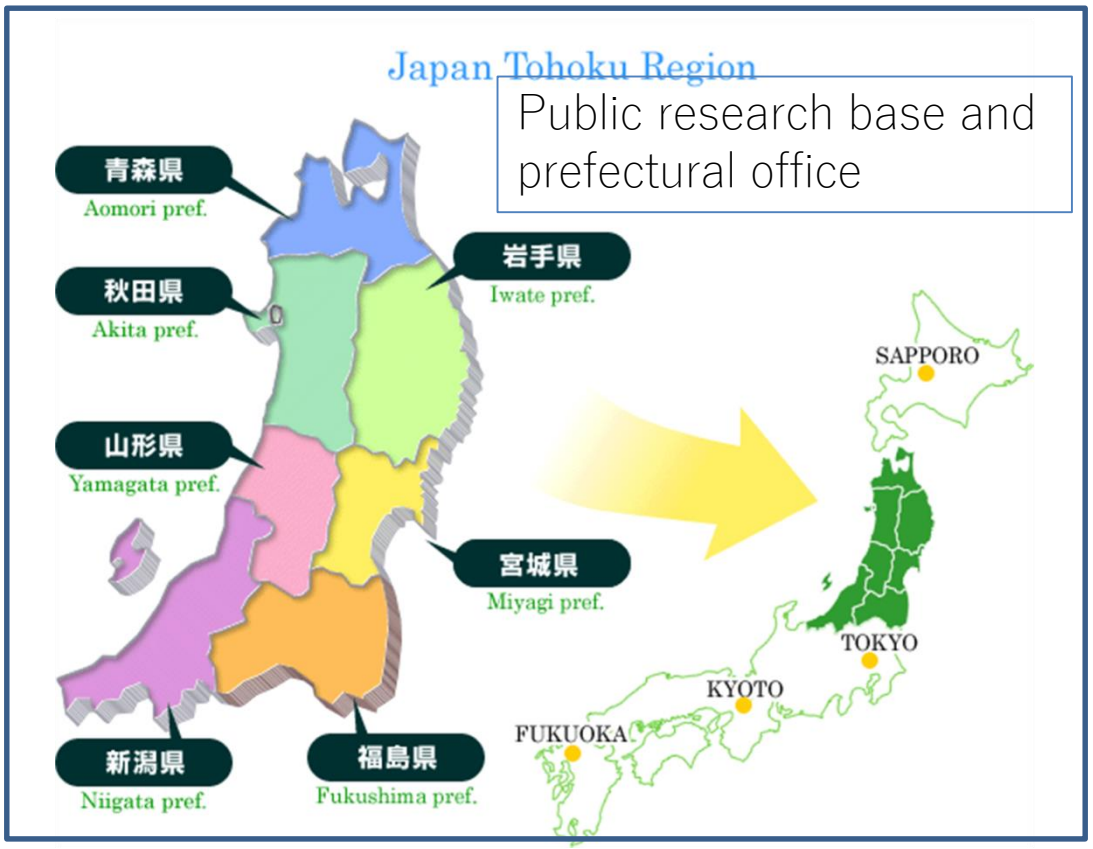
一般社団法人
東北経済連合会

TOHOKU ECONOMIC FEDERATION
BUSINESS CENTER

AAA
Advanced Accelerator Association Promoting Science & Technology

Collaborative efforts by

① Local governments
② Prefectural research bases
③ AAA (all Japan)
④ TOHOKU ECONOMIC FEDERATION
⑤ Academy



岩手大学
IWATE UNIVERSITY

IPU
岩手県立大学
Iwate Prefectural University

TOHOKU
UNIVERSITY

①Next generation Synchrotron Radiation Facility project in Aoba-yama

②Presentations of Tohoku companies in LCWS series

③Characteristics of Tohoku Industries

④Recent remarks

Remarks 1

公益財団法人 いわて産業振興センター

Iwate Industrial promotion center

Iwate prefecture

岩手大学 IWATE UNIVERSITY

IPU 岩手県立大学 Iwate Prefectural University

- Iwate Accelerator-related industry study group was established.
- Hosting a series of technical seminar for local industries to enter the accelerator-related business.

Remarks 2

秋田県産業技術センター
Akita Industrial Technology Center

Akita Industrial Technology Center plays a central role to organize
"High Energy Accelerator Technology Study Group"
in May 18, 2019

13 companies join until now
(not only from Akita but also from Yamagata, Fukushima and Iwate)
Akita University and Akita Prefectural University are also members

Akita Prefectural University
秋田県立大学

Activities

- Technical seminar
- Information sharing
- Organization of corporate clusters
- Encourage Private-Public Collaboration
- others

Akita University

Remarks 3

公益財団法人 いわて産業振興センター

- Iwate Industrial promotion center, which is a public interest incorporated foundation, gets new government (METI) subsidies in June 2019

- This is a support project for regional core companies to make new high-tech businesses by Tohoku Bureau of Ministry of Economy, Trade and Industry (METI)

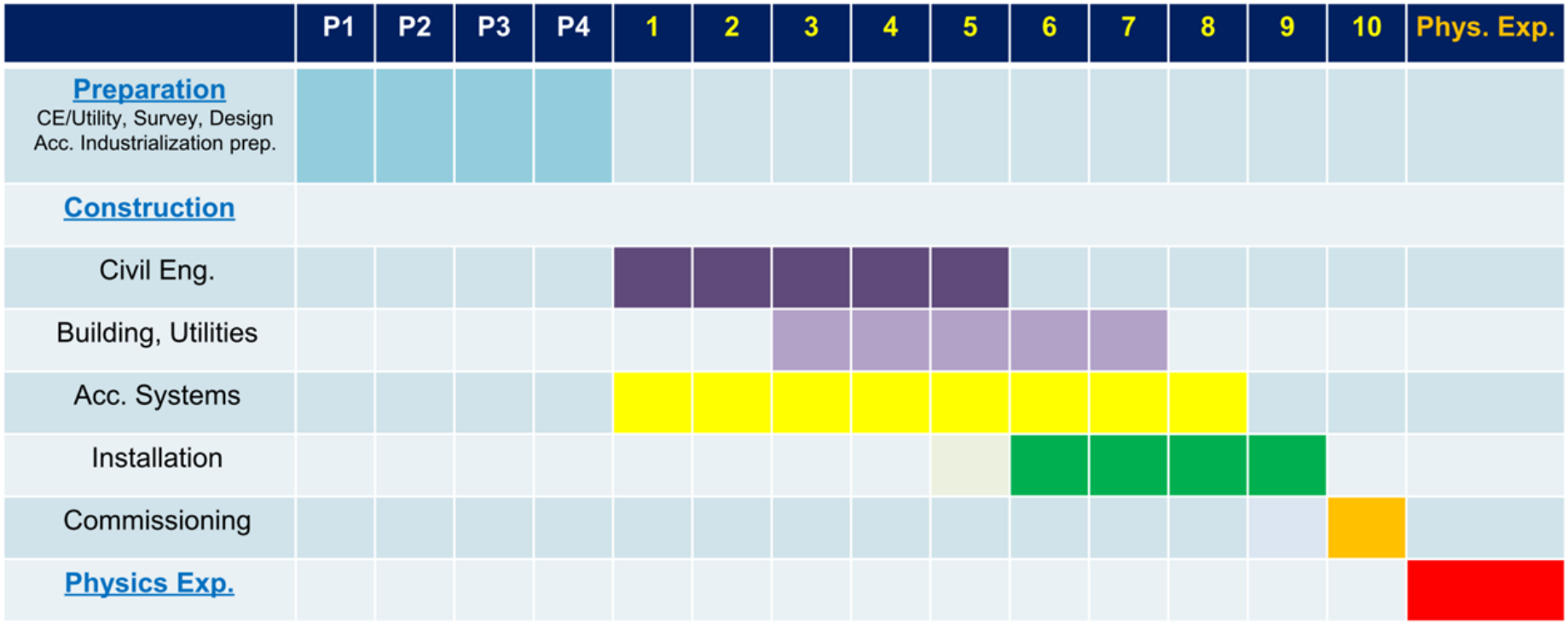
経済産業省
Ministry of Economy, Trade and Industry

- Purpose: Provide business support to regional core companies to make next generation accelerator (including ILC and synchrotron radiation facility) related businesses
- This is the first subsidy from METI for this purpose !

The last slide

ILC-250 TimeLine

Now we are at pre-preparation phase (waiting for the preparation phase).
Four years preparation and 9 years construction.



Tohoku is ready to go ahead