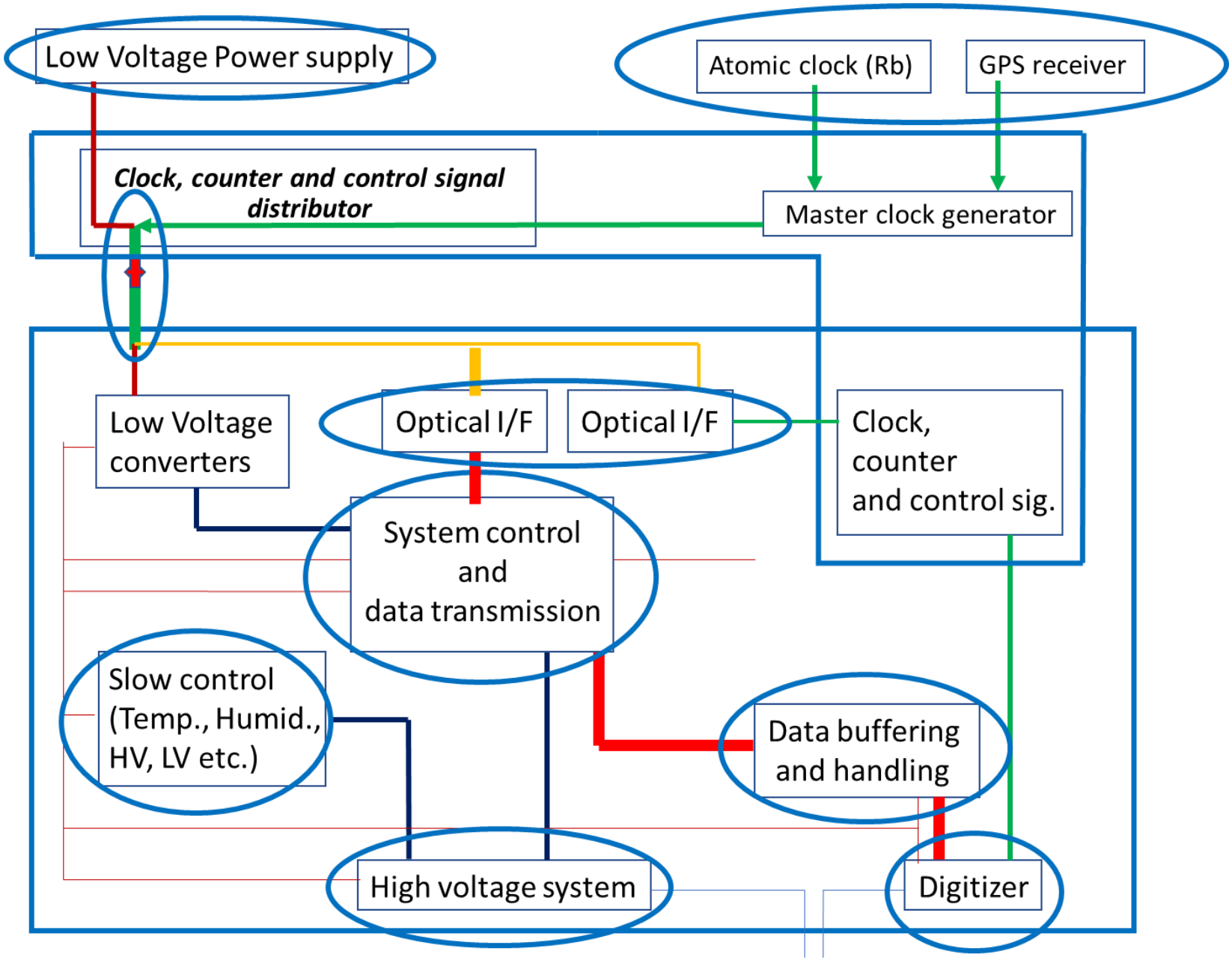
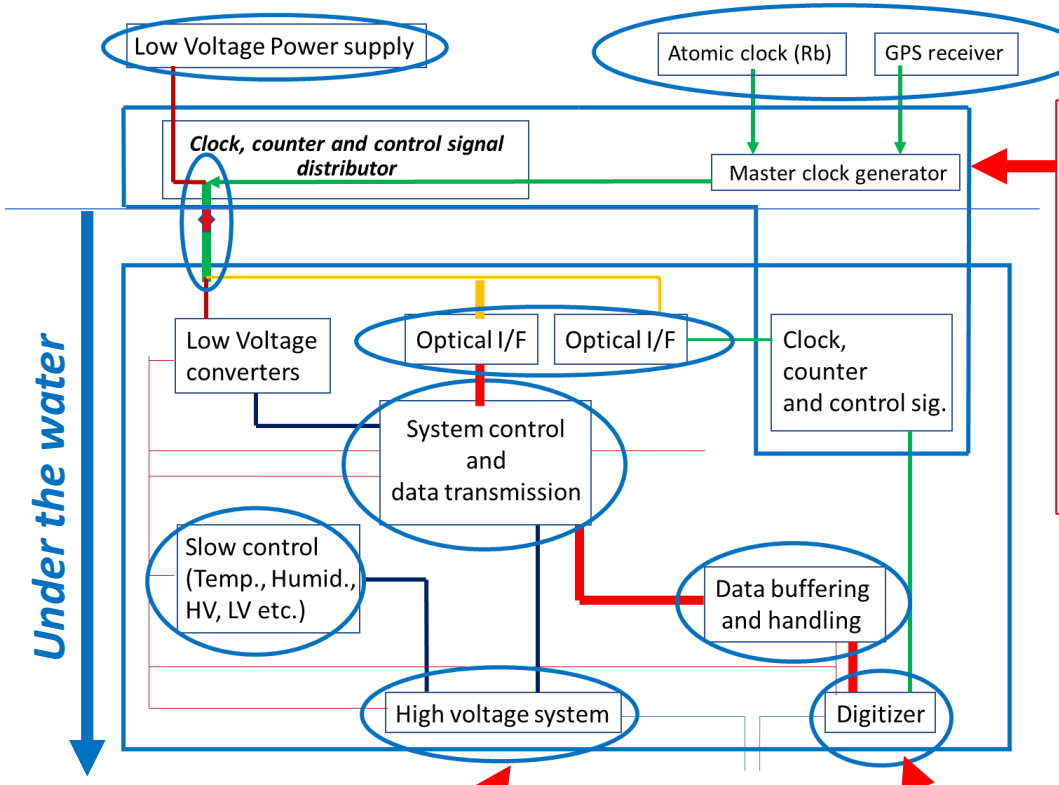
Working packages and Schedule

Yoshinari Hayato for WG4

Work packages (Electronics)



Work packages (Electronics)



Synchronization

(Clock, Counter & Status monitor)

Candidates

- Custom
  (based on the SK and Belle2)
- Customized White Rabbit?

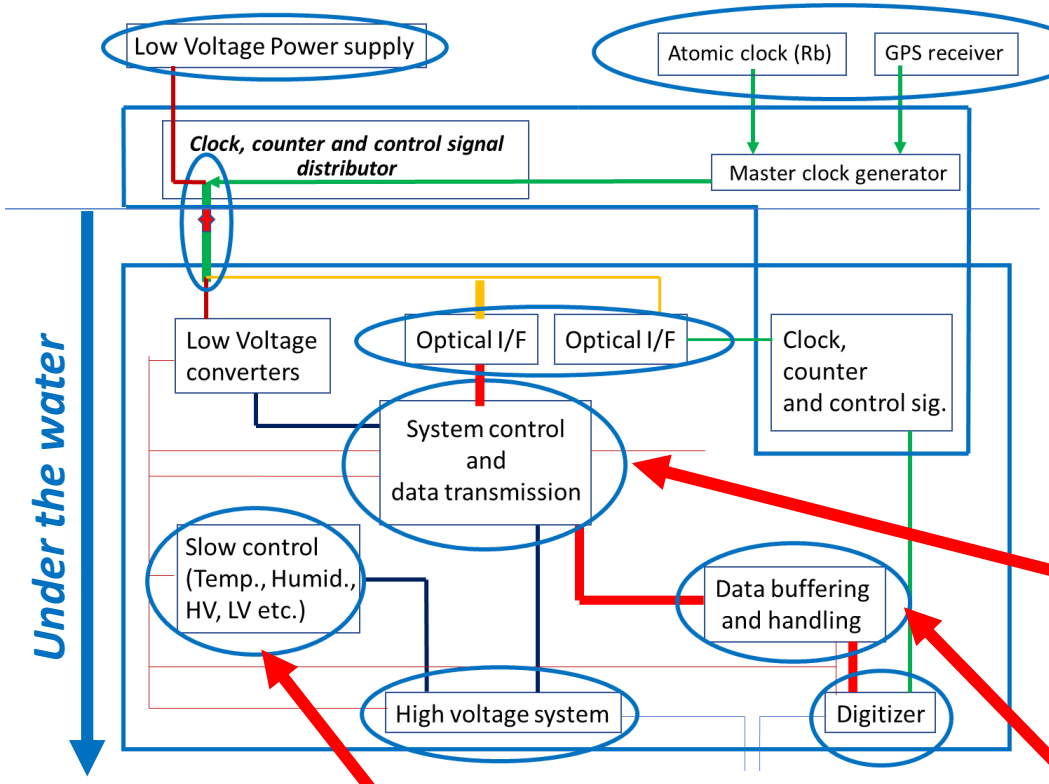
High Voltage PS

- CAEN (Italy)
- iSEG (Germany)
- Bellnix (JPN)
- Kaizu Works (JPN)

Photosensor digitization

- Candidates (= ongoing R&D)
  - QTC + TDC (FPGA)
  - Waveform sampling

Work packages (Electronics)



GPS + Reference clock
- Commercial products?
- Common view GPS receiver?

Front-end module control & Data transmission
- Command handling
- Data handling

Slow control
- HV monitor
- LV monitor
- Environment monitor

Data handling
- Data buffering
- Data compression

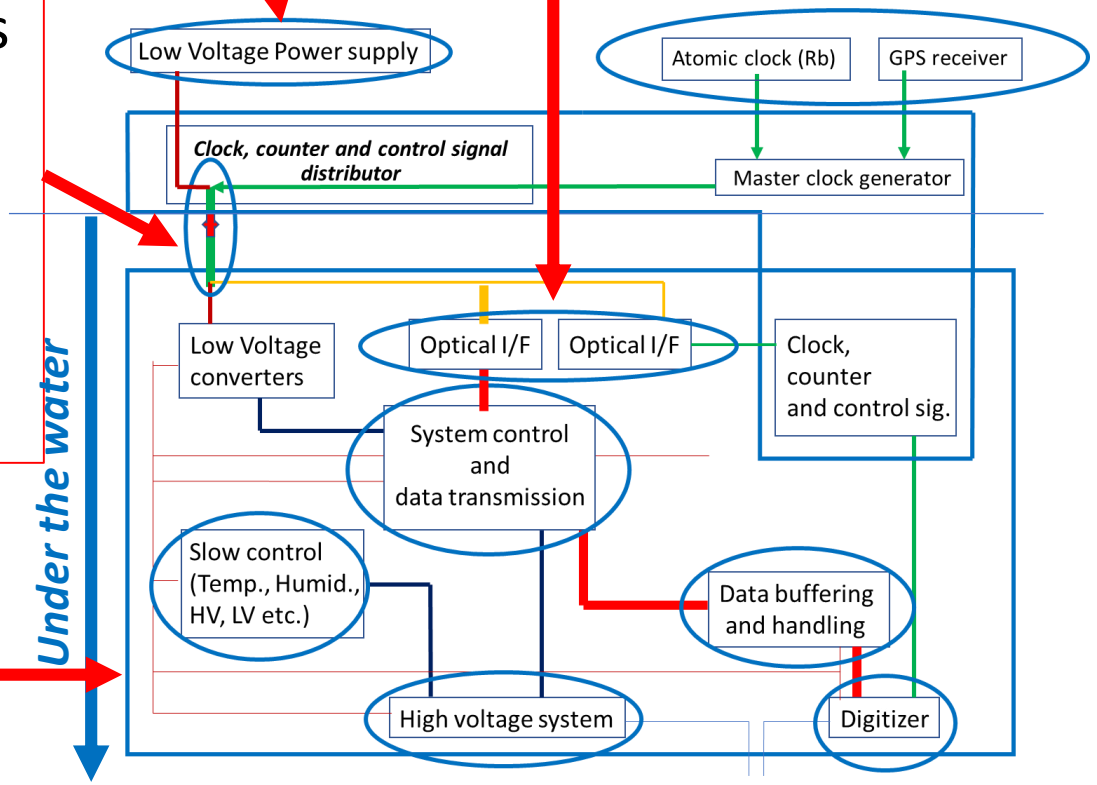
Work packages (Electronics)

Low voltage power supply
- iSEG (Germany)
- Custom (commercial)

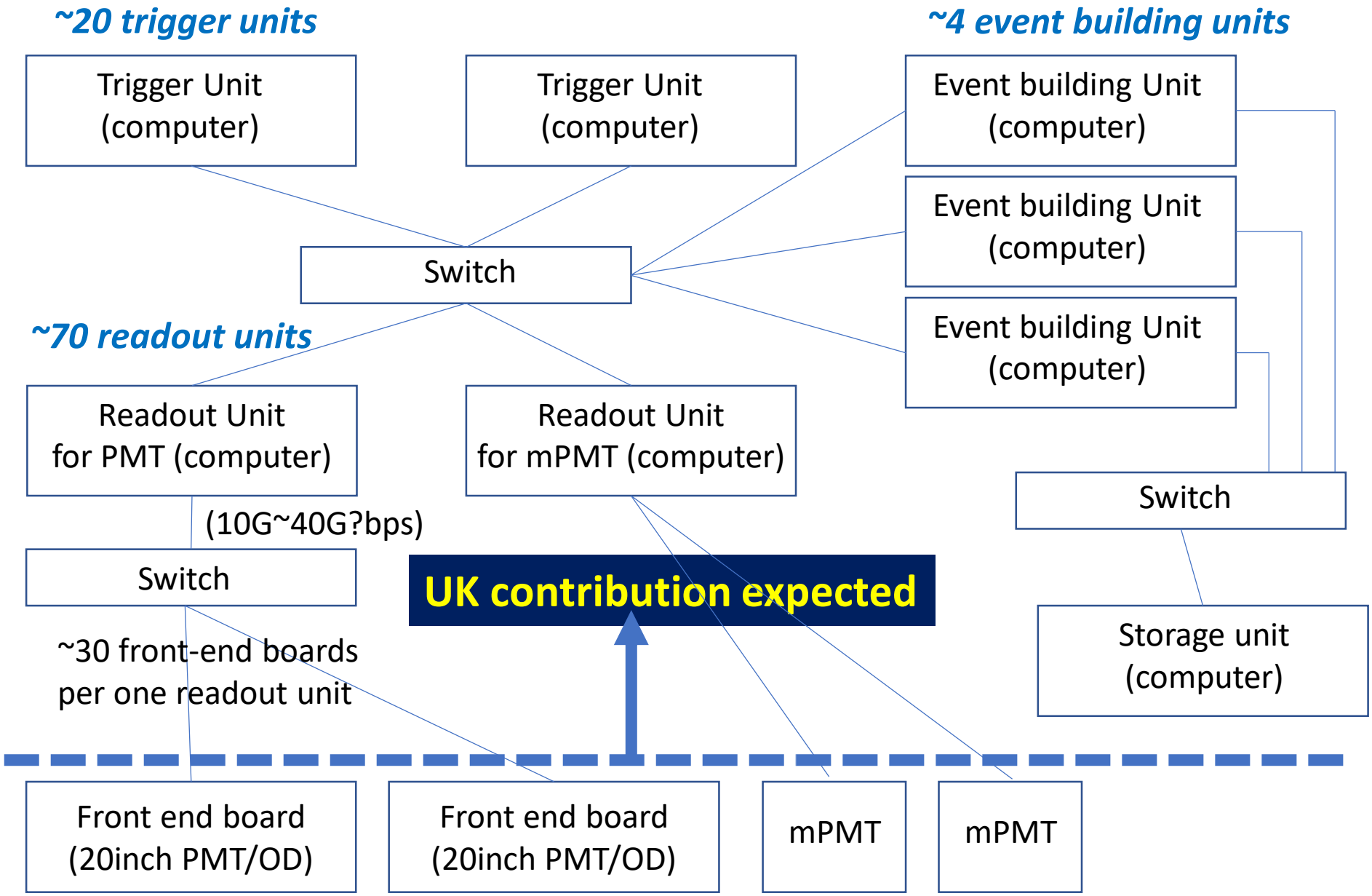
Durable optical I/F
- Appointech (Taiwan)
- Versatile Link (CERN)?

Optical fibers + copper cables
underwater connector
with special combined cable
- ODU (Germany)
- LEMO (Switzerland)
- Meisei (Cable, JPN)

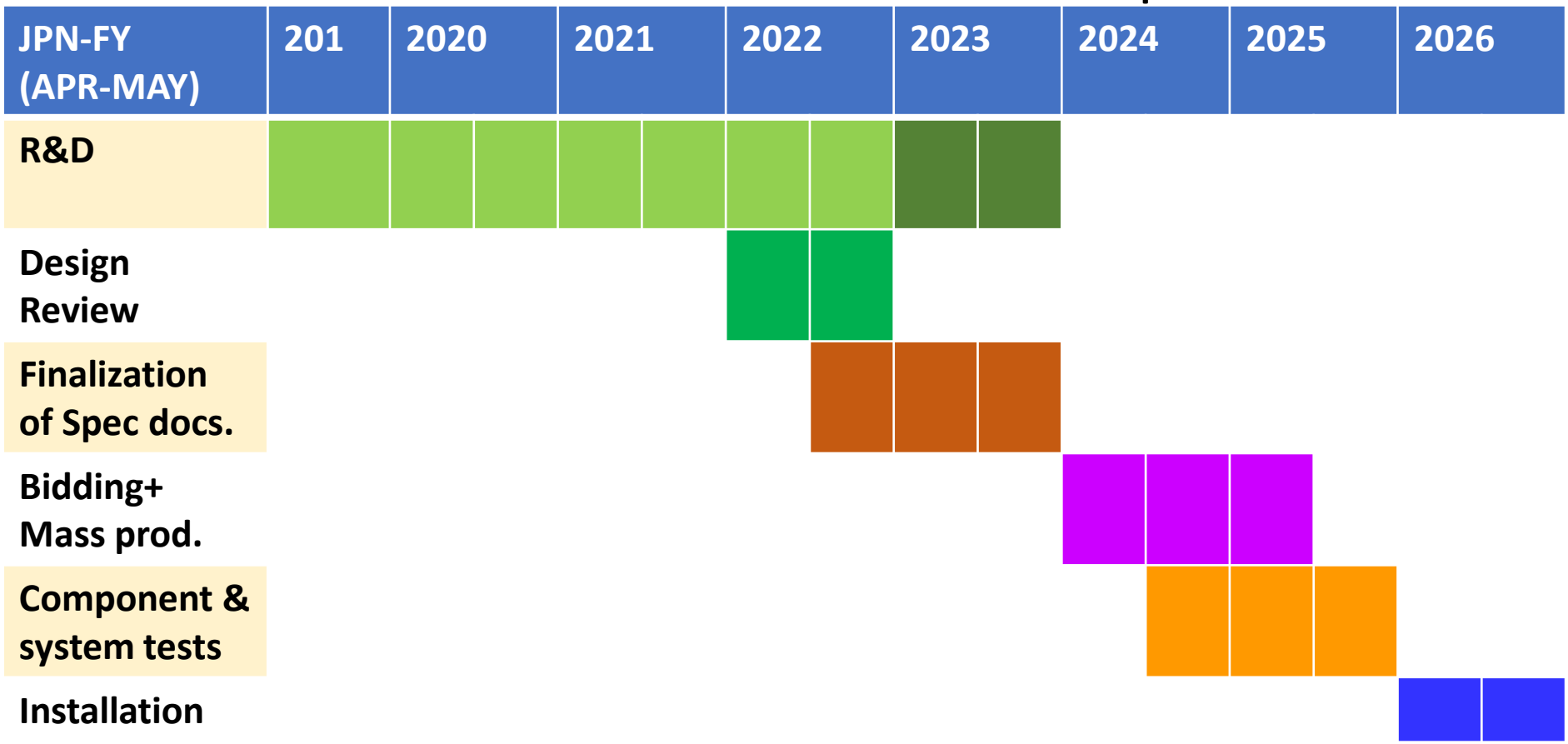
Water tight case
- Conceptual design by MSR (JPN)



Work packages (DAQ)

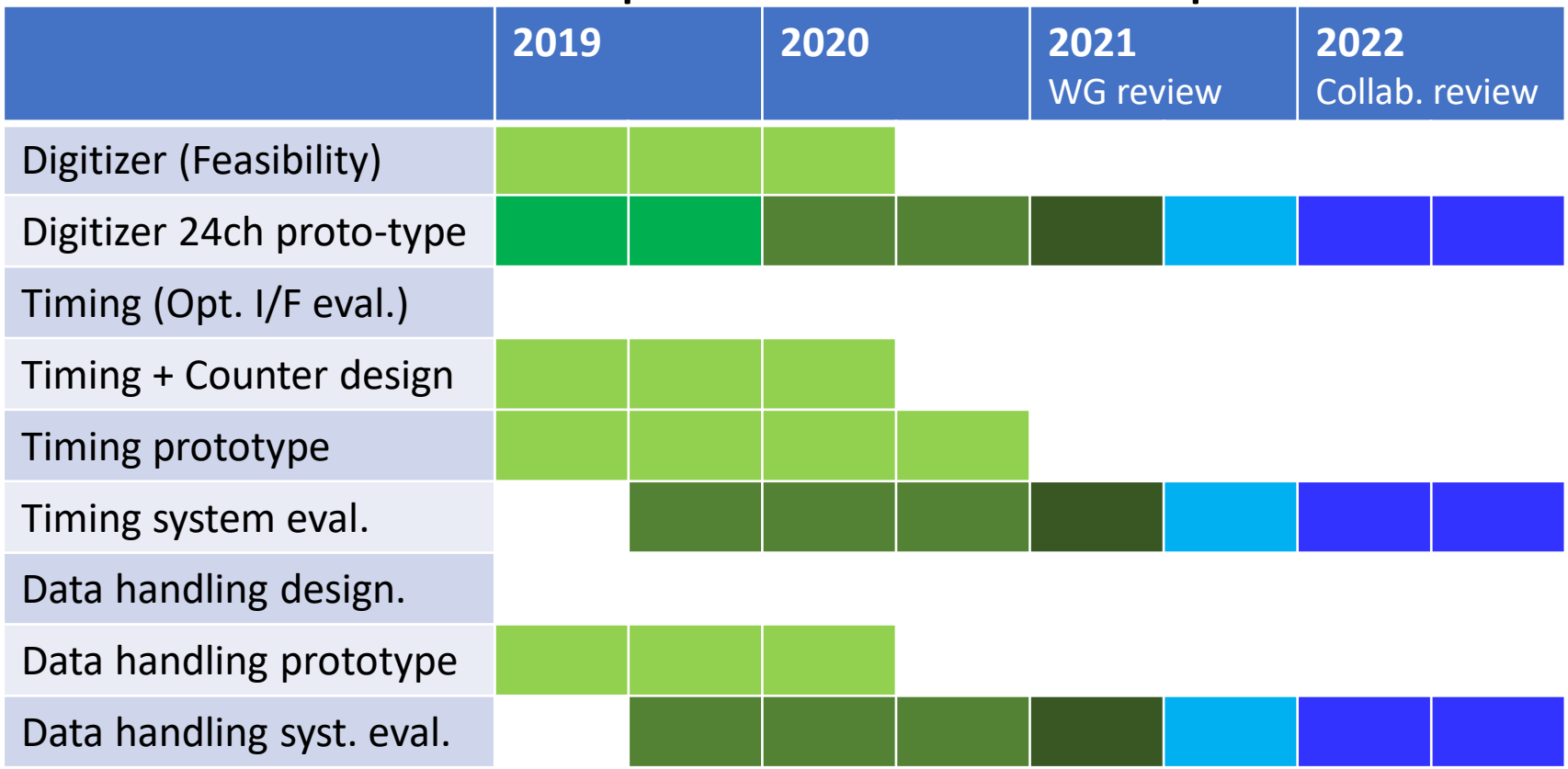


Overall schedule of the electronics development



Design review is expected to be done by an advisory committee and then, the recommendation from the committee will be implemented in the next year.

Schedule of the electronics component development

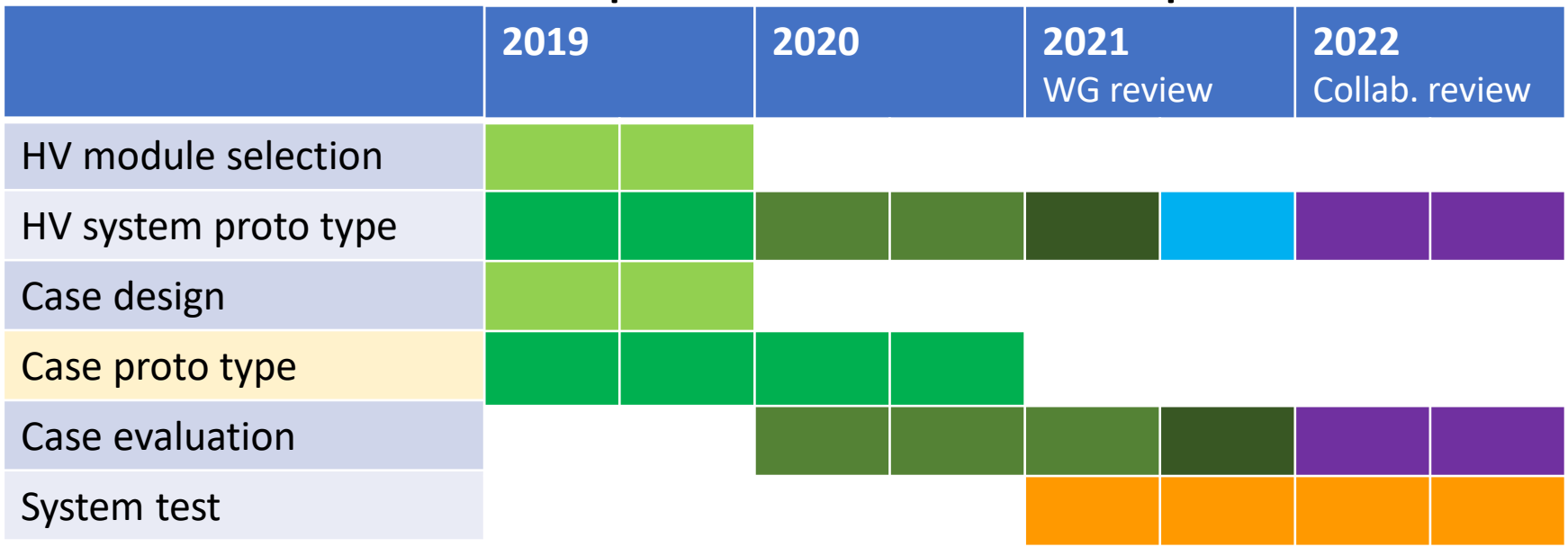


Choices of the technologies have to be made by the end of FY2020, before the WG design review.

Due to the restrictions from the productions of components (ASIC), may need to decide the technology by the end of FY 2020.

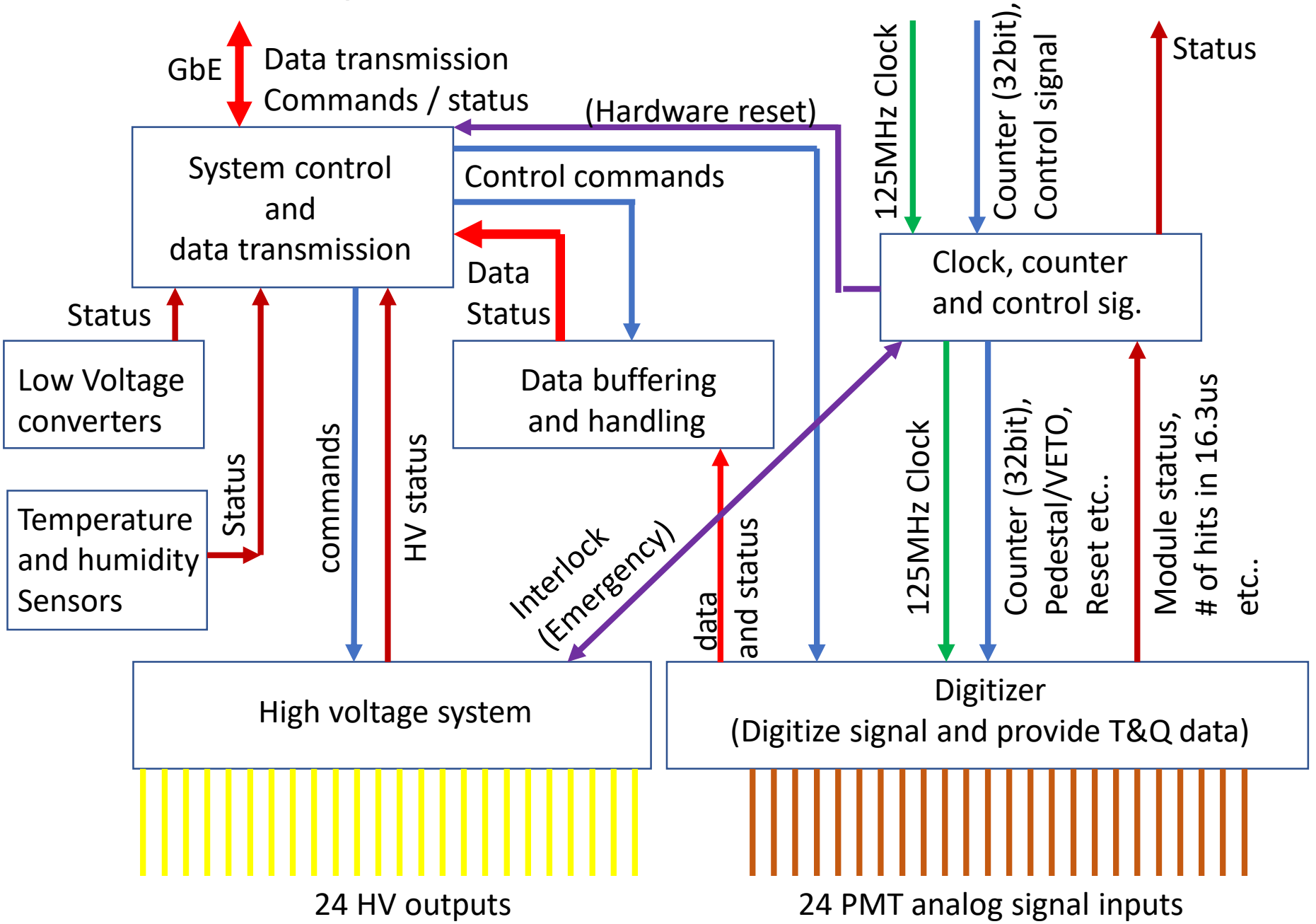
Schedule of the electronics component development

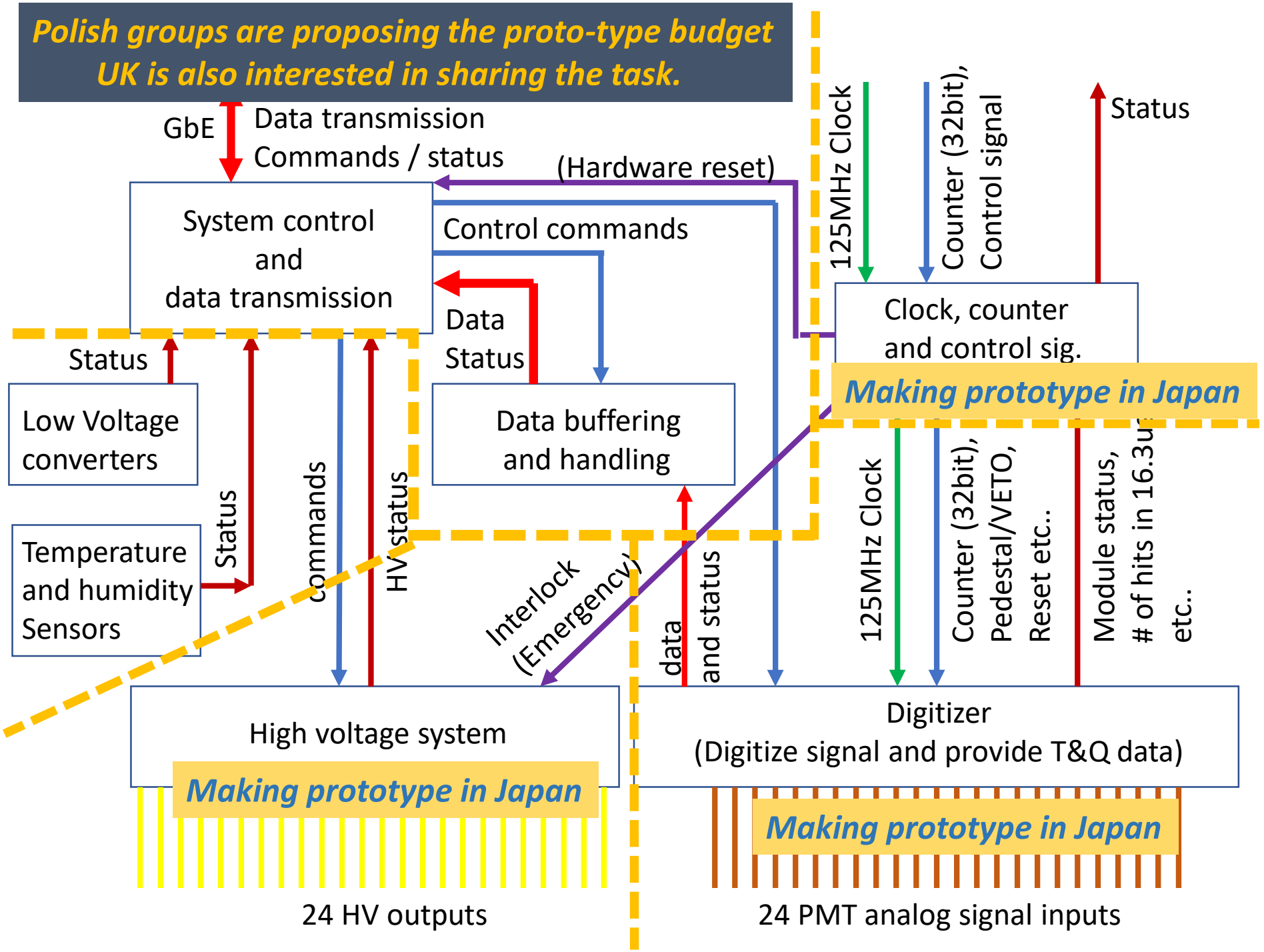
(Sep. 2018)



In parallel to the design review,
all the components have to be combined and tested as a system.
In the beginning of 2022, the final review of the “system”
may be necessary to start the bidding processes.

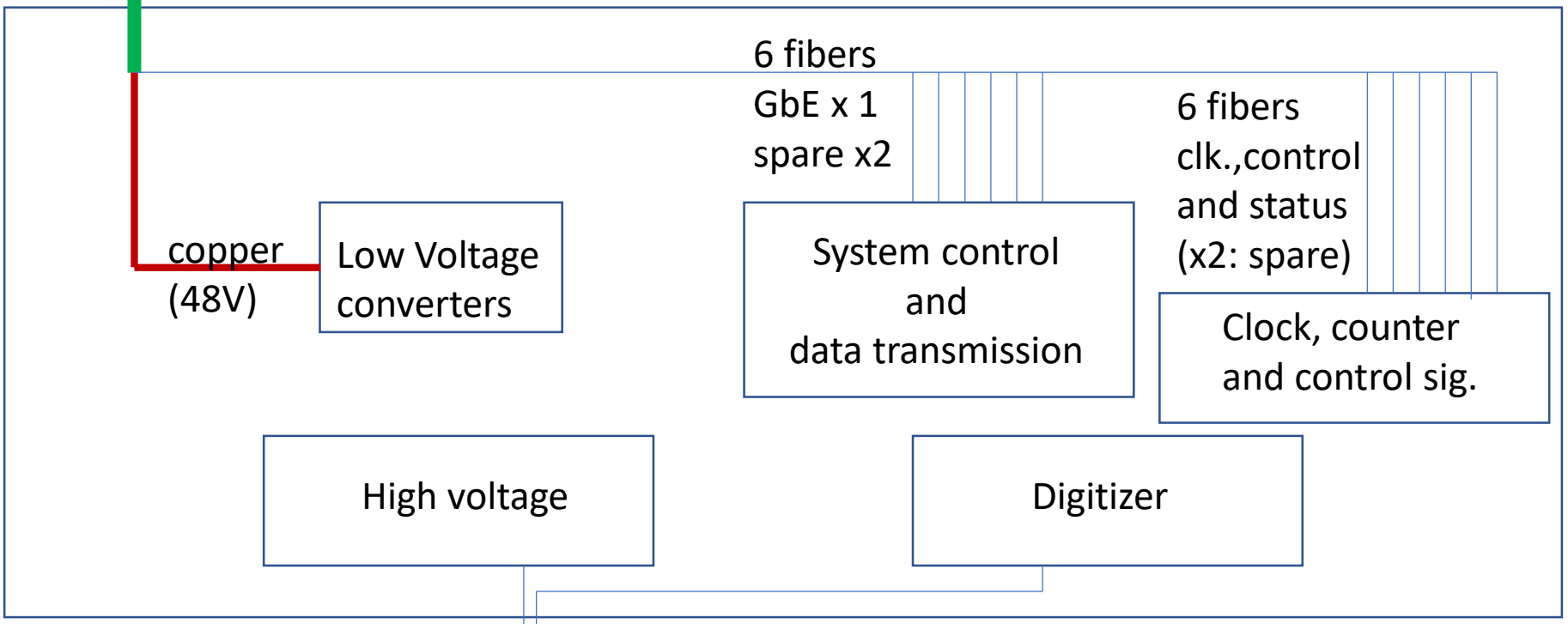
Schematic diagram of the front-end electronics module




Polish groups are proposing the proto-type budget
UK is also interested in sharing the task.
GbE
Data transmission
Commands / status
(Hardware reset)
System control
and
data transmission
Control commands
Data
Status
125MHz Clock
Counter (32bit),
Control signal
Status
Clock, counter
and control sig.
Making prototype in Japan
Status
Low Voltage
converters
Data buffering
and handling
Temperature
and humidity
Sensors
Status
commands
HV status
Interlock
(Emergency)
data
and status
125MHz Clock
Counter (32bit),
Pedestal/VETO,
Reset etc..
Module status,
# of hits in 16.3u
etc..
High voltage system
Digitizer
(Digitize signal and provide T&Q data)
Making prototype in Japan
Making prototype in Japan
24 HV outputs
24 PMT analog signal inputs

Schematic diagram of the synchronization system

12 fibers + 1 pair of copper for LV combined cable
Current baseline option:
Special under water connectors (ODU and LEMO are making prototypes)

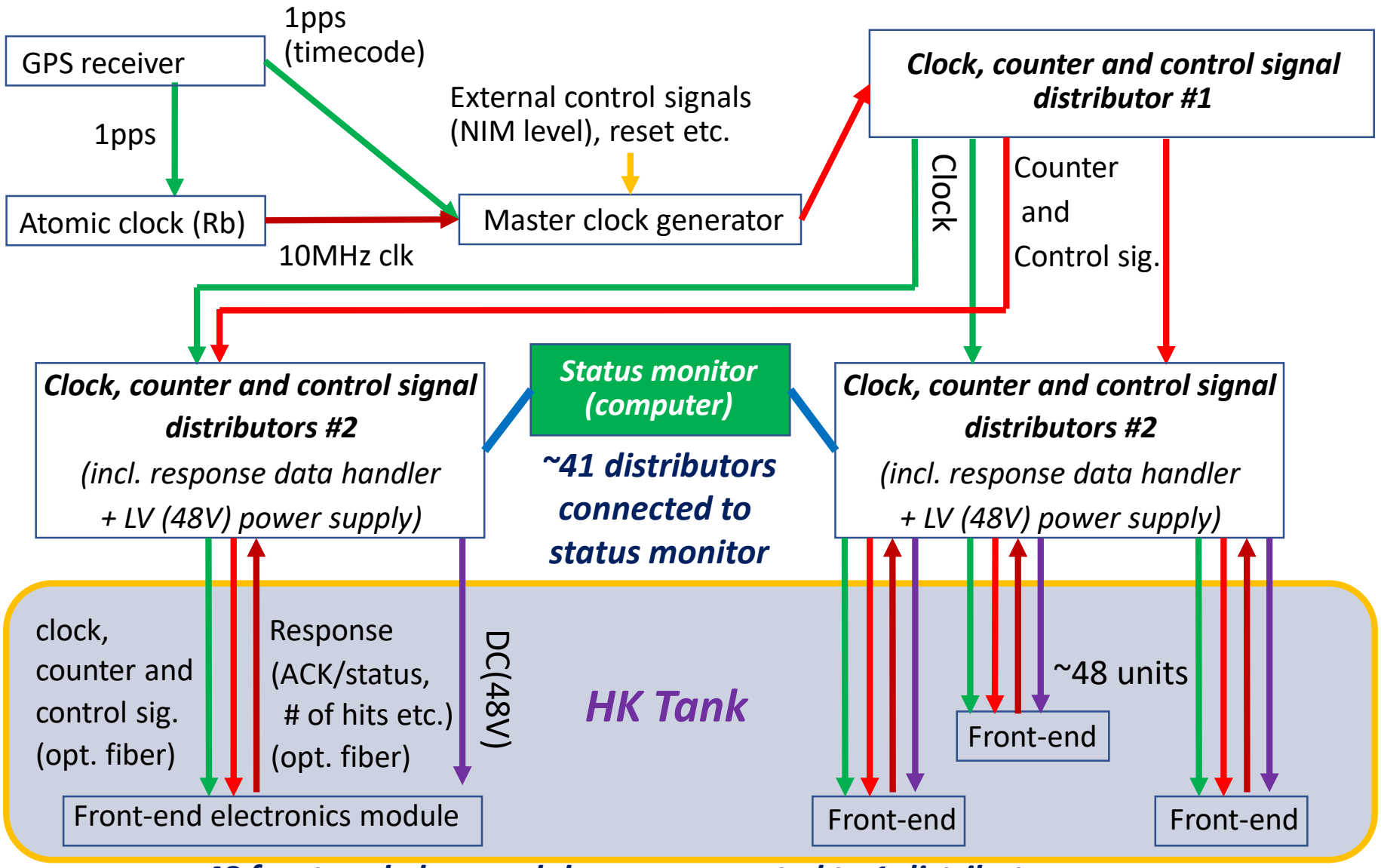


Underwater case is also
in the early R&D stage.

Current baseline option:
HV and Signal cables are connected
with the similar methods of current SK
(BNC, swage connector for HV
covered with heat shrink tubes)

Case, cables and connectors:
Making prototypes in Japan

Schematic diagram of the synchronization system



48 front-end elec. modules are connected to 1 distributor

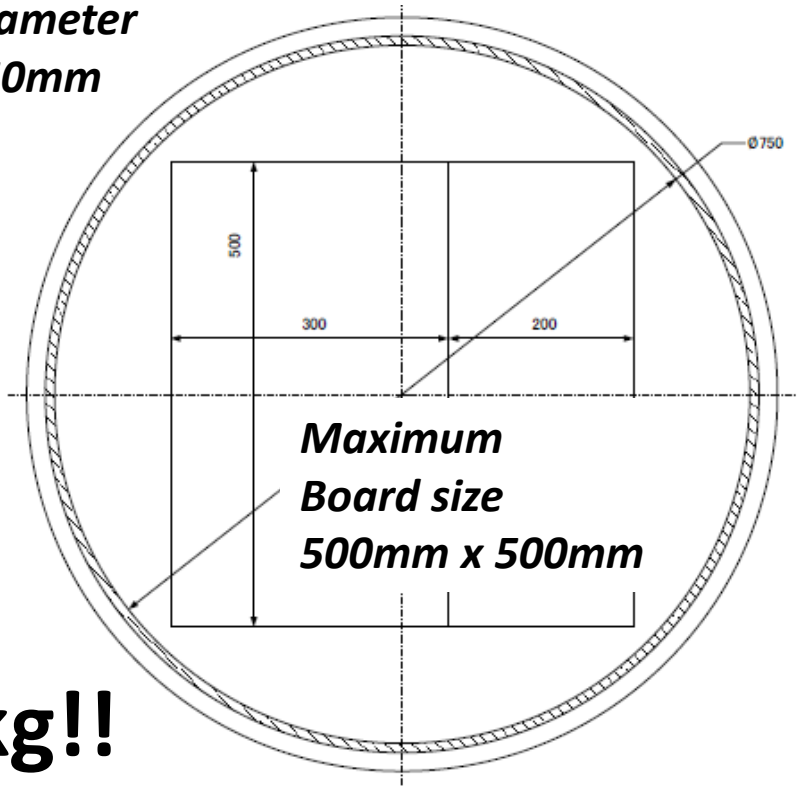
There will be ~41 distributors #2. (#1 and #2 could be identical)

Current status of the case

- Japanese group asked one company to start the conceptual design of the water tight case.
- It is not easy to design small, light weight case with stainless steel.
- It will be really helpful if any country can contribute in designing and producing the case.

Initial ideas of the case from a company

Diameter 750mm

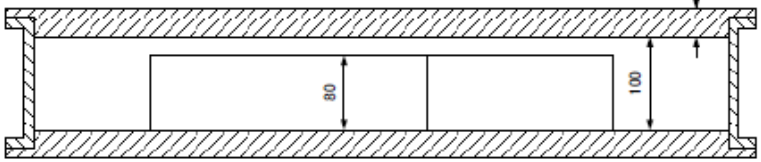


Maximum Board size 500mm x 500mm

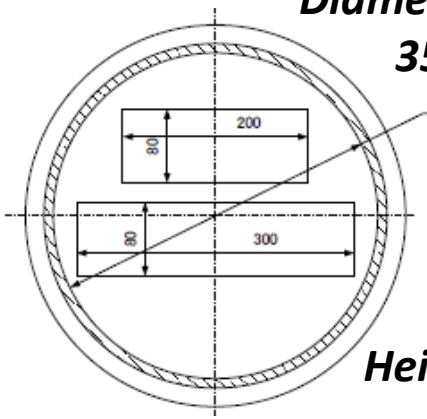
250kg!!

Height (inside) 100mm

Plate thickness : 30mm

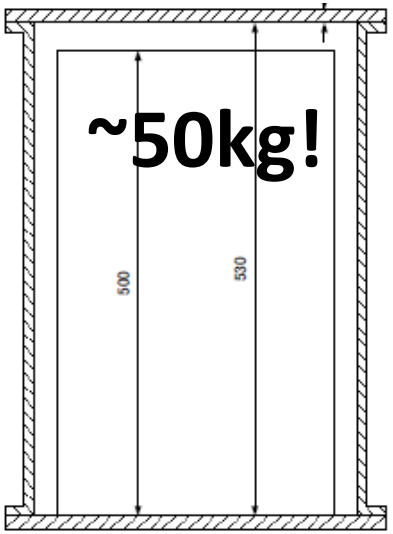


Diameter 350mm



Height (inside) ~80mm

Plate thickness : ~14mm



~50kg!

Width (inside) ~500mm

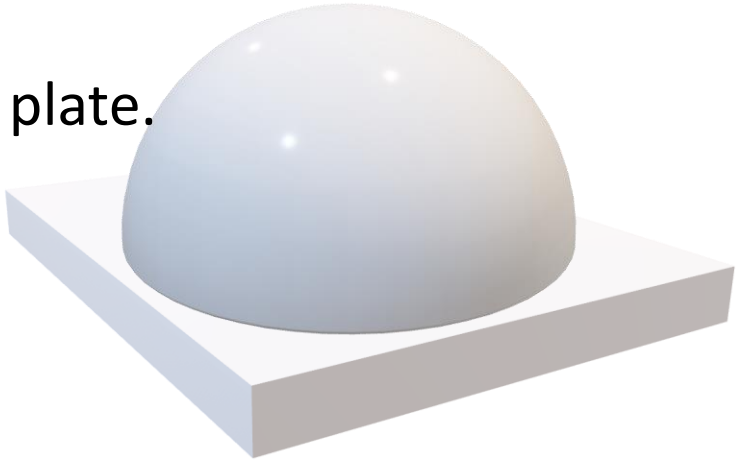
Maximum Board size 300mm x 500mm

Possible ideas of the cases

Suggested shape #1

One sphere on a flat plate.

Cables penetrate though the bottom plate.



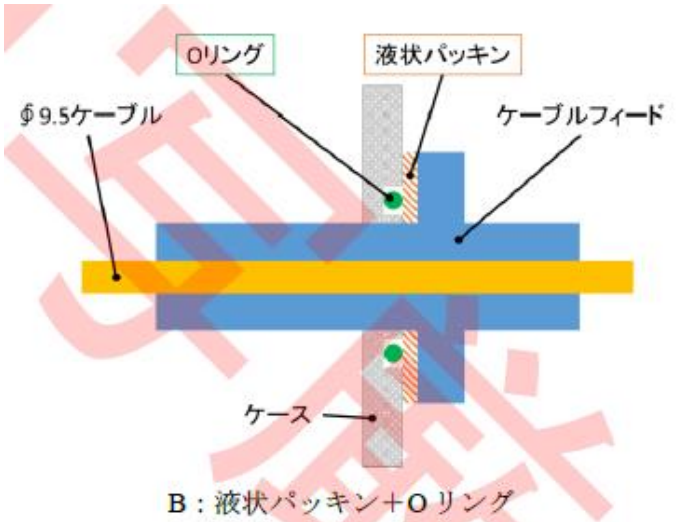
Suggested shape #2

Two sphere surfaces with pipe.

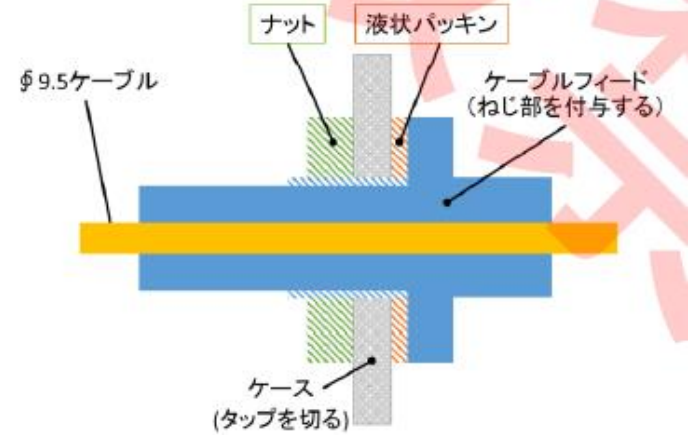
Cables penetrate trough

the wall of the pipe.

Possible ideas of the feed through



B：液状パッキン＋Oリング



C：液状パッキン＋ねじ構造

idea A)
Use liquid type gasket with (or without) O-ring.

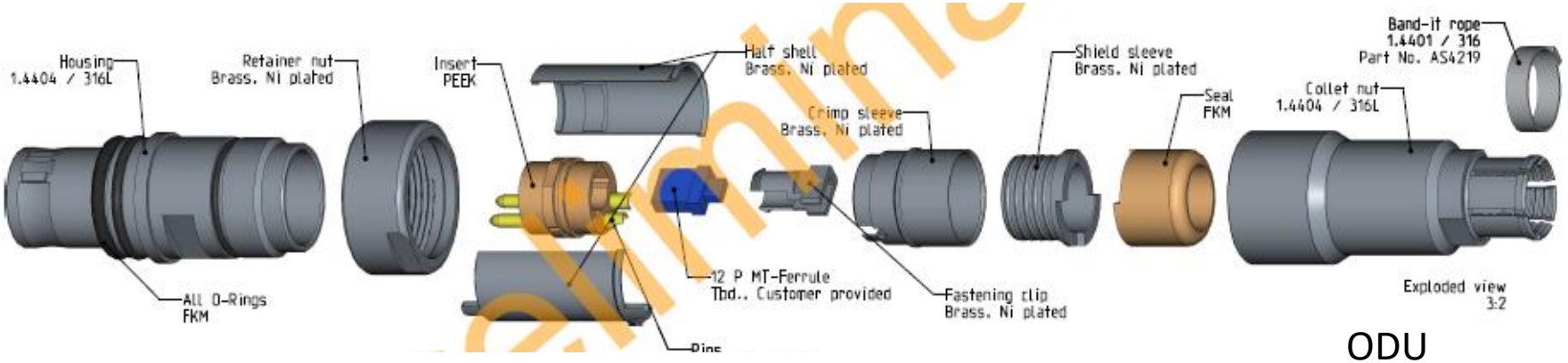
idea B)
Use liquid type gasket and screw.

Current status of the optical fiber + copper combined connectors

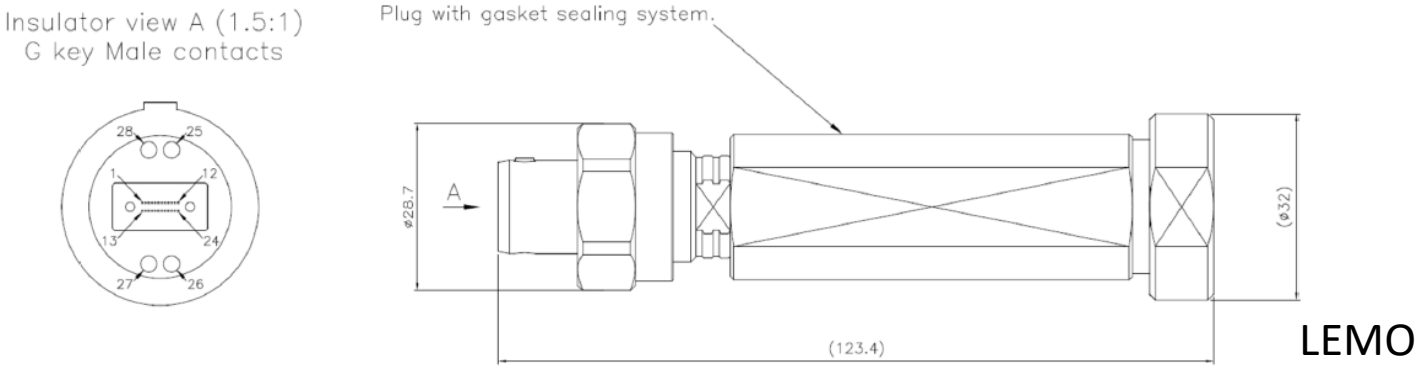
- Japanese group asked companies to design the connectors for optical fibers and LV power supply cables.
- Three companies raised their hands, ODU (Germany), LEMO (Switzerland) and Sanwa (JPN).
- We have asked ODU and LEMO to make prototypes and the ones from ODU will be delivered by the end of March 2019. LEMO will provide by summer, 2019.
- We would like to know whether some of the groups are interested in to take part in this R&D.

Optical fiber + copper combined water tight connectors

2 companies, ODU (Germany) and LEMO (Switzerland)
are designing special combined connectors.
Samples will be delivered soon.



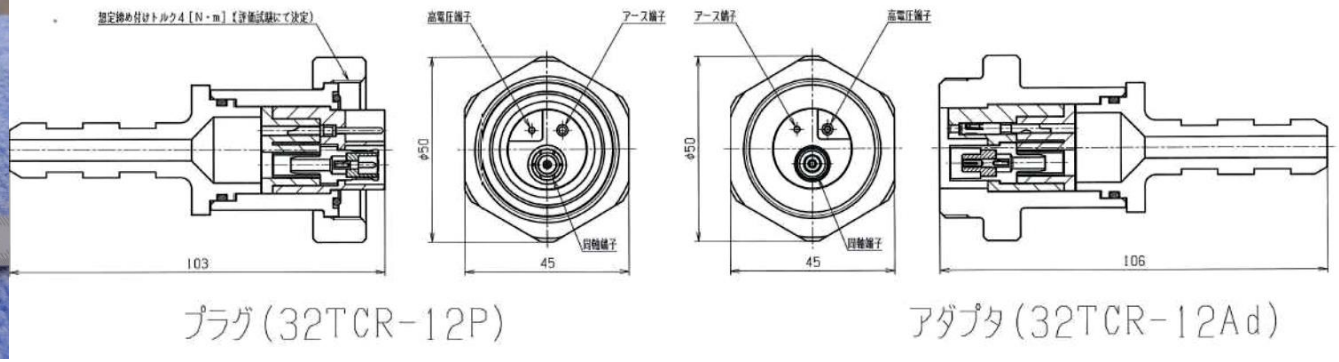
ODU



LEMO

Signal + HV combined connector for photo-sensor & Ethernet connectors

Signal + HV connector



Ethernet connector