# Detector Characterization

## Kazuhiro Hayama

## On behalf of DET subsystem

# Tasks

- **Environmental monitor sensors with GIF**

- **Environment and Instrument monitor**

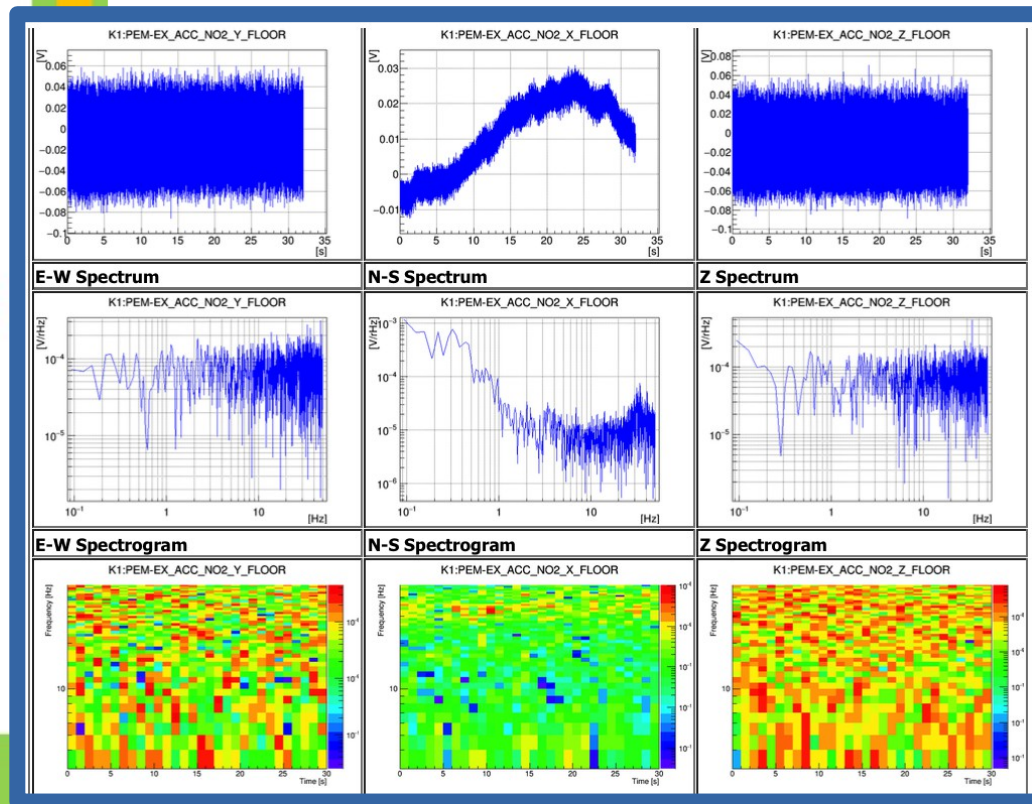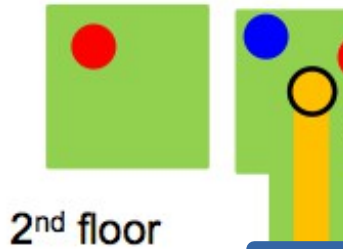- **Development of characterization system**

# Preparing Environmental Sensors
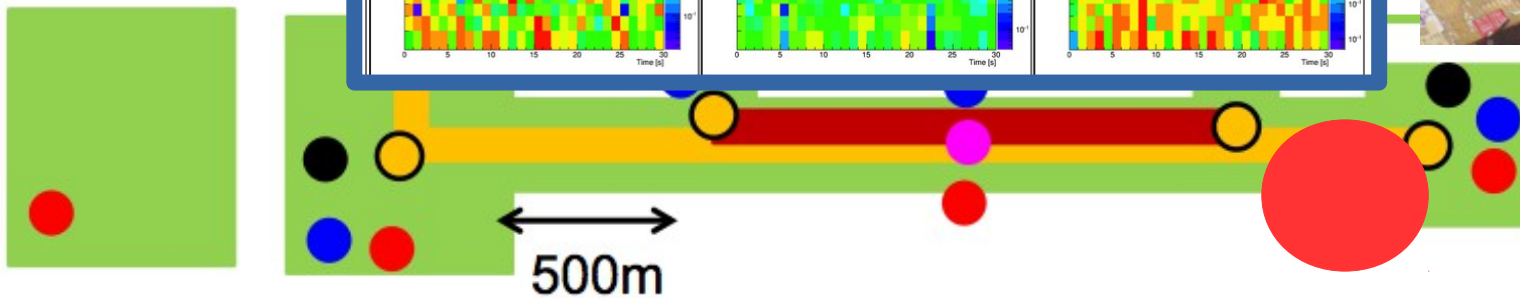
**With GIF**

- **Hygrometer, thermometer, barometer are tested at the center area of KAGRA now.**

- **Seismometers, accelerometers are waiting for installation. (Feb ~ earlyMarch)**

- **Magnetometers will be introduced in the middle of this March.**

- **Slow data acquisition system will be set up ~early this March.**

# Real-time environment monitor

## Env Monitor at the X-End

# Preparation of monitoring system

# Web-Based Tools

# Detchar software

- **Glitch Monitor**  非定常雑音モニタ

- **Line Finder**
- **Line Tracking**  発振などの ラインモニタ
- **Line Removal**

- **Rayleigh Monitor**
- **Non-Gaussianity M**  ガウス性、定 常性、非ガウ ス性
- **RMS Monitor**
- **Noise Floor Monitor**

- **Time-Series Monitor**  データの様子、 スペクトル
- **Spectrum Monitor**
- **Spectrogram Monitor**

- **Sensitivity Monitor**
- **Range Monitor**  重力波への感度
  - **Inspiral**
  - **Inspiral-Merger-Ringdown**
  - **Ringdown**
  - **Stochastic**

相関関係を 調べる

- **Coherence Finder**
- **Multiple-channel coherence finder (BruCo)**
- **Pearson correlation Finder**
- **NonLinear correlation Finder**

- **Realtime Quick look webpage**
- **Daily summary webpage**
- **GUI Interface**  インター フェース
- **Web-Base Interface**
- **Command-line Interface**

- **Health monitor**
- **Globally Correlated magnetic noise**
- **Violin mode**
- **Multi-channel analysis**
- **Newtonian noise**
  - **Effect of water inside the mountain**

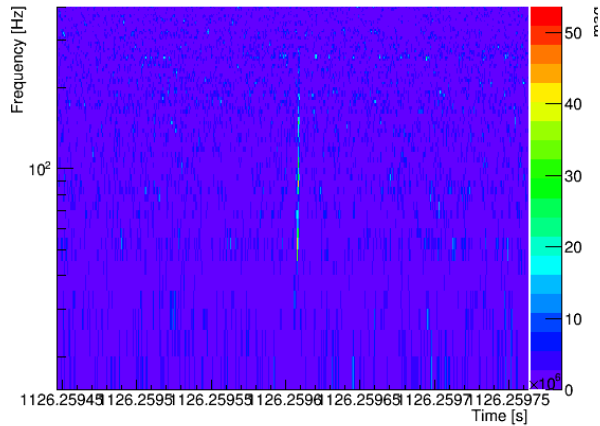# Example : GW150914

Data Characterization around GW150914

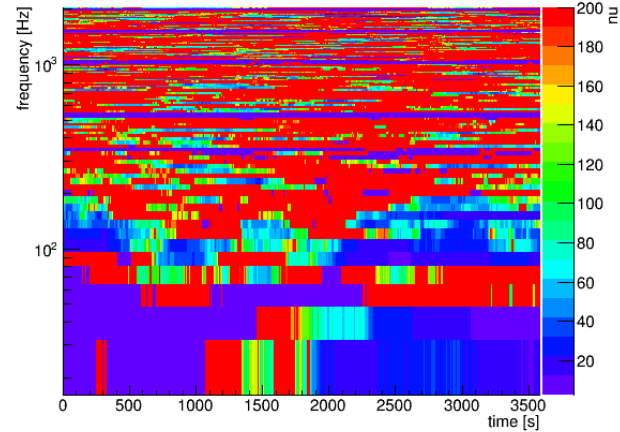http://seikai.hep.osaka-cu.ac.jp/~chino/GW150914/characterizeGW150914.html

**Glitch pipeline hayama**

**Non-Gaussianity Yamamoto**

**BLRMS (60~70Hz) Yuzurihara**
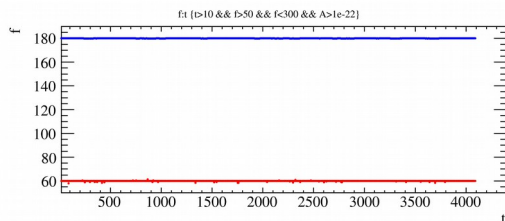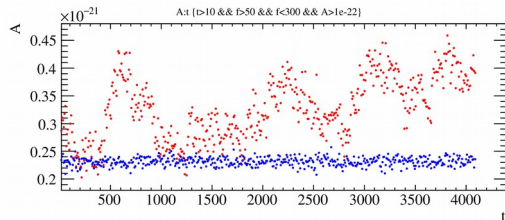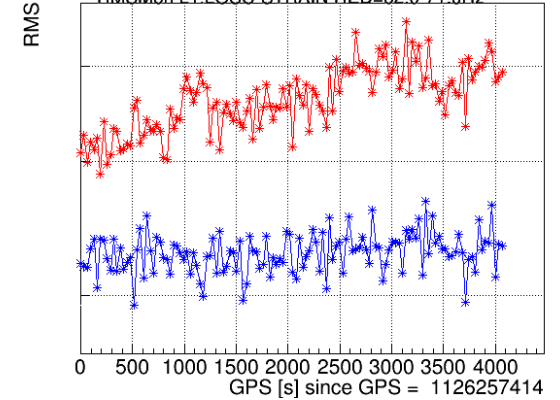


**Line Tracking**

**Ueno**

# Toward bKAGRA

- **Addition of Guardian info to the webpage(also for iKAGRA)**

- **Initial PEM plan will be finished in ~ this summer.**

- **PEM injection system**

- **Chanel selection to monitor deeply**

  - **With PEM injection study(2016-2017)**

  - **With Subsystems (2016-2018)**

# Network

IFO, DSG frontend

Environmental Monitor
(EPICS layer)

data concentrator
**hostname**

IP address

low latency
**hostname**

IP address

HUB
10G

frame writer
**k1fw0**

IP address

frame writer
**k1fw1**

IP address

primary data server
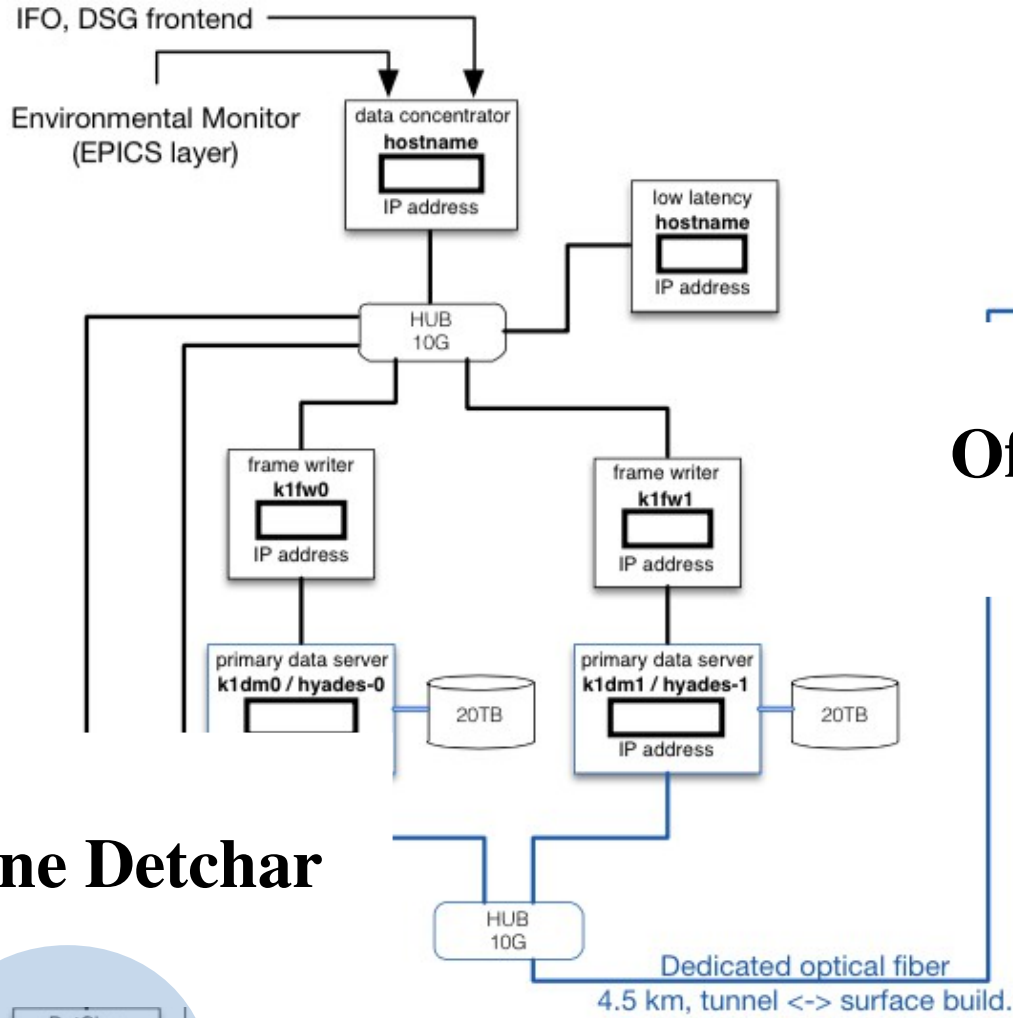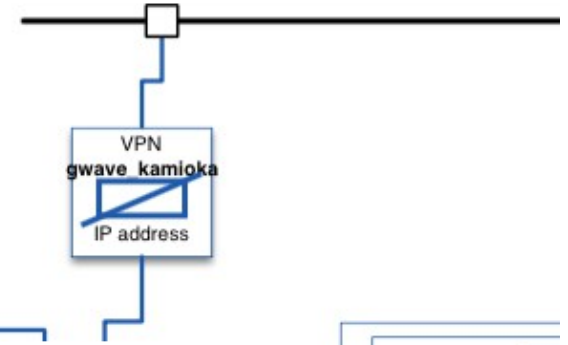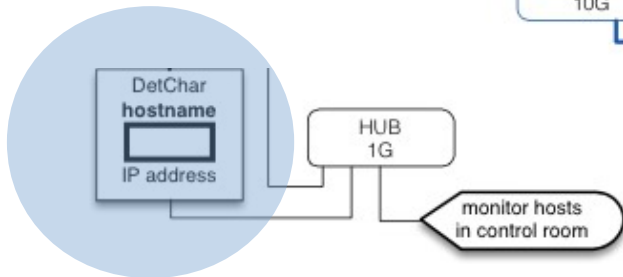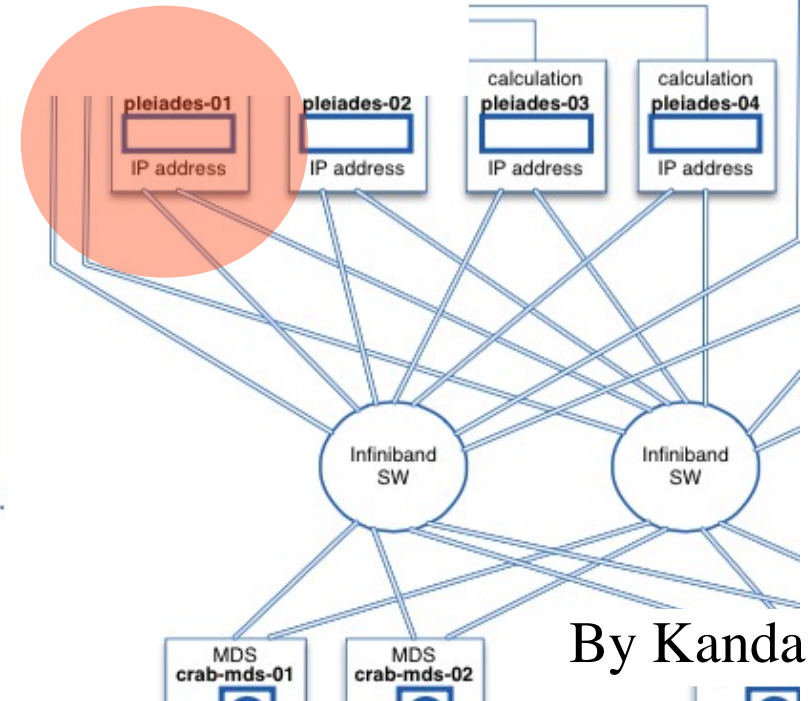**k1dm0 / hyades-0**

20TB

primary data server
**k1dm1 / hyades-1**

IP address

20TB

## Online Detchar

DetChar
**hostname**

IP address

HUB
1G

monitor hosts
in control room

HUB
10G

Dedicated optical fiber
4.5 km, tunnel <-> surface build.

VPN
**gwave_kamioka**

IP address

logi
**ta**

IP

## Offline Detchar

**pleiades-01**

IP address

**pleiades-02**

IP address

calculation
**pleiades-03**

IP address

calculation
**pleiades-04**

IP address

Infiniband
SW

Infiniband
SW

MDS
**crab-mds-01**

MDS
**crab-mds-02**

By Kanda