NMIJ/AIST activity on digitized metrology

It enables “personalized”, “wearable”, “continuous” measurement, if it could be “traceable” and “connected”.
R&D of Radiation Dosimeter for Residents in Fukushima

- Demand for “personalize” evaluation of dosimetry
- Validated, traceable measurement
- Small, lightweight, data-logging type personal dosimeter has been developed (Fig.1).
- Validation test was performed by collaborating with Tsukuba City. The dosimeter was distributed to volunteers and city officials of 230 people in 2012 (Fig.2).

Fig.1 Developed dosimeter and PC screen.

Fig.2 Validation test in Tsukuba city.
D-shuttle dosimeter (Chiyoda Technol)

- Continuous operation for more than 1 year without battery exchange.
- Users can self-check the radiation dose anytime.
- The first system which can report detailed dose data in daily life.
- After 1 year usage, the company carries out battery exchange, recalibration, and submitting a measurement report.
- Wireless data accumulation, wireless calibration

**Specification**
- Scope of Radiation: Gamma ray
- Detector: Semiconductor PIN Diode
- Minimum detection dose: 0.1 μSv
- Alarm: Blinking LED at high dose rate.
## Features of ‘D-shuttle’ Dosimeter

<table>
<thead>
<tr>
<th>Dosimeter</th>
<th>Repeat usage</th>
<th>Battery (Battery life)</th>
<th>Minimum measurement dose</th>
<th>Self check of dose data</th>
<th>Portability</th>
<th>Data logging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Film Badge</td>
<td>☹</td>
<td>None</td>
<td>100 $\mu$Sv</td>
<td>☹</td>
<td>☀</td>
<td>☹</td>
</tr>
<tr>
<td>Glass Badge</td>
<td>☀</td>
<td>None</td>
<td>100 $\mu$Sv</td>
<td>☹</td>
<td>☀</td>
<td>☹</td>
</tr>
<tr>
<td>Electronic Dosimeter (Hitachi PDM)</td>
<td>☺</td>
<td>3V CR2450 (1 month)</td>
<td>1 $\mu$Sv</td>
<td>☀</td>
<td>+/−</td>
<td>☹</td>
</tr>
<tr>
<td>D-Shuttle (Chiyoda)</td>
<td>☺</td>
<td>3V CR2450 (1 year)</td>
<td>0.1 $\mu$Sv</td>
<td>☀</td>
<td>☀</td>
<td>☀ ☀ (*)</td>
</tr>
</tbody>
</table>

(*) D-shuttle has wireless and optical communication interfaces.
My personal dose history in September

Current Day
Month/Day/Year: 9/1/2017

Start Day
Month/Day/Year: 8/1/2017

Total Dose:
Total Dose: 0.229 mSv
Days: 79

Monthly/Daily Dose
1 month: 96.4 μSv
1 day: 0.0 μSv

Completed

Daily life in Japan
12Hr. flight

In Paris
CCAUV
11Hr. flight

in Japan
Personal dose during the flight

![Graph showing personal dose during the flight with annotations for security check and international flight.]
(Like or not) we are already connected.

But are they (data) really traceable?

Traceable to where?

To NMI!