

**Towards a simple frame for
geotechnical monitoring in BIM**

GEO-STRUCTURES MONITORING

**A glimpse to the proposed IFC5
GroundIFC structure**



Status

Oct 2019

Achievements

Prototype of smart geosynthetic (geocell) based on low-cost components

RASPBERRY® Pi B+

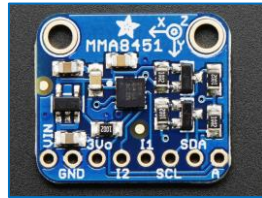
ADAFRUIT® MMA8451 (Triple-axis accelerometers)

Standard IP68 enclosure

Basic edge computing + alarm triggers

Custom Python3 code

(mostly based on SciPy and SKLearn)



SciPy



Status
Oct 2019

State-of-practice analysis and contributions

Geotechnical BIM Workgroup (started Jan 2019)

c/o Ordine degli Ingegneri di Bologna
In collaboration with FED Spinoff
and University of Naples Federico II



Contributions to BuildingSmart

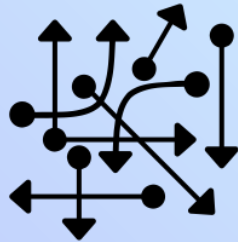
Collaboration with BuildingSmart Geotechnics
(Formerly Infrastructure Room)

BIM & Monitoring:
Some attention from few authors (e.g. Riaz et al. 2017) but little to no attention from BuildingSmart and regulators

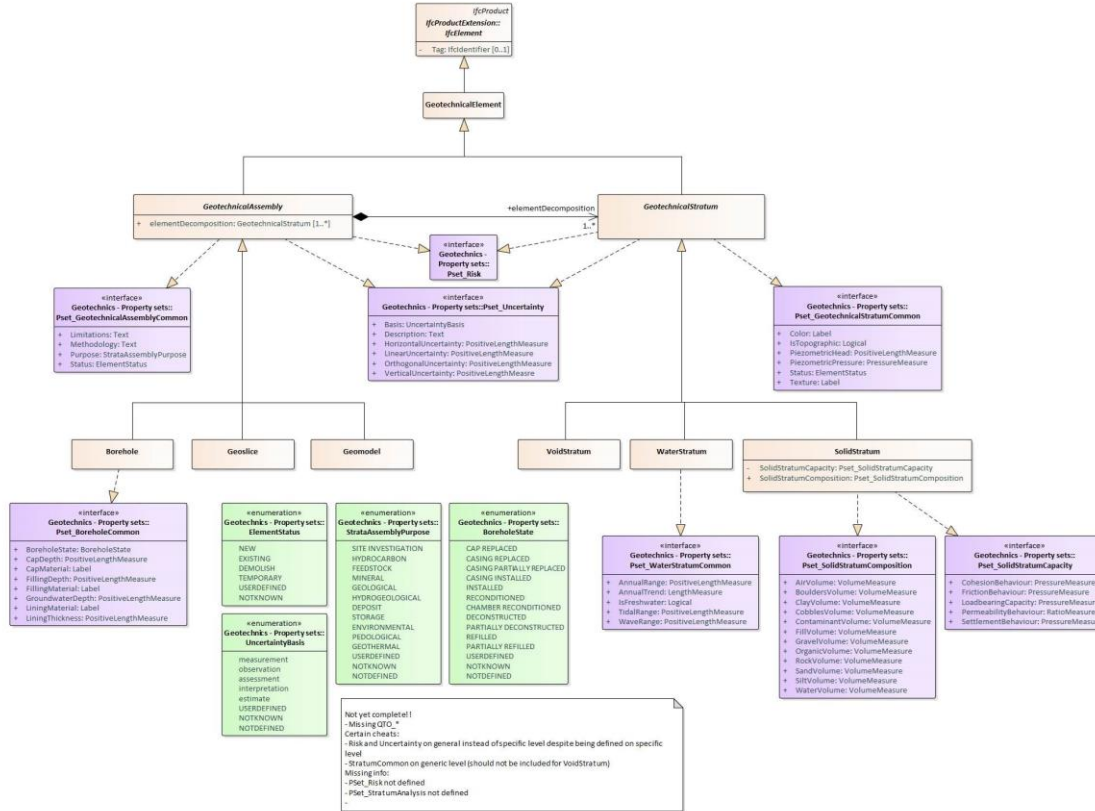
Inertial sensors open up wide possibilities in terms of data features and allow for higher installation flexibility.

What we've learned

The proposed GroundIFC structure is unclear about monitoring data yet very complicated



Existing exchange formats (AGS, DIGGS) include some “space” for geotechnical monitoring data



There are various types of risk that may be encountered and there may be several instances of Pset_Risk associated to an instance or type.

```

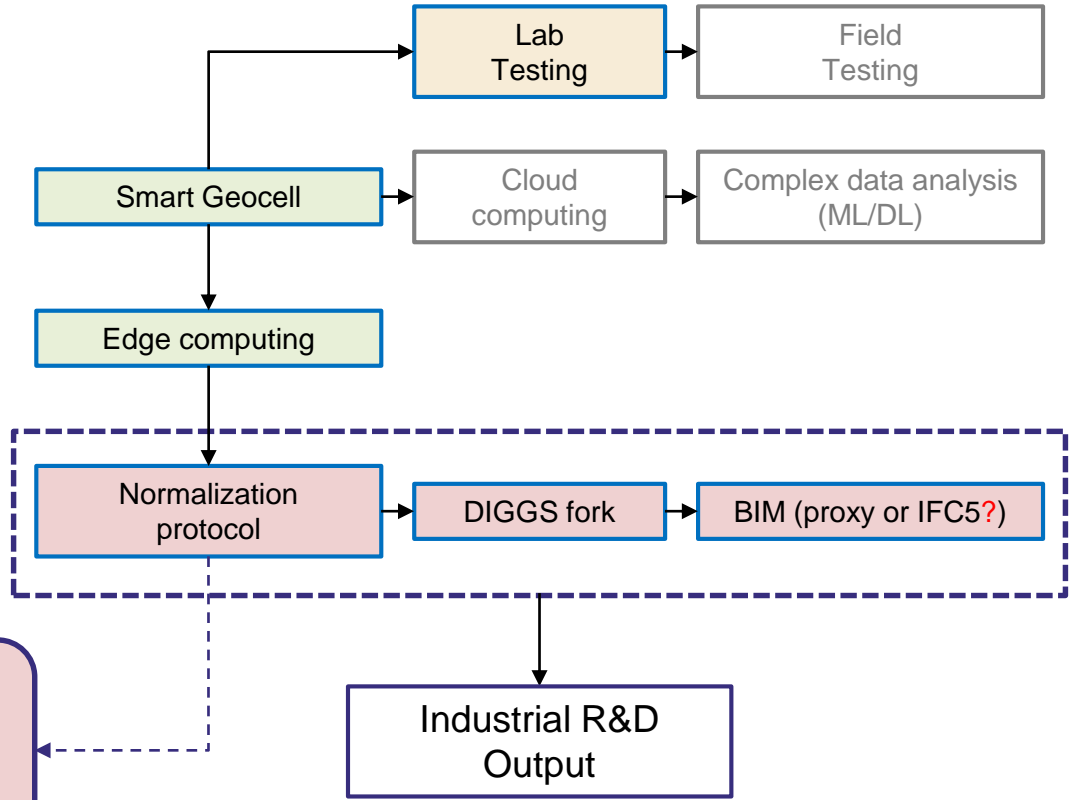
</td>
</tr>
</table>
</h3>
<font color="green">Property Definitions:</font>
</h3>
<table border="1" width="90%">
<tr bgcolor="#D0D0D0" valign="bottom">
<td width="23%" align="center">
<font size="2" />
<b>Name</b>
</td>
<td width="23%" align="center">
<font size="2" />
<b>Property Type</b>
</td>
<td width="23%" align="center">
<font size="2" />
<b>Data Type</b>
</td>
<td width="31%" align="center">
<font size="2" />
<b>Definition</b>
</td>
</tr>
<tr>
<td valign="top">
<font size="2">Risk Name</font>
<font size="1" />
</td>
<td align="left" valign="top">
<font size="2">
</td>
<td align="left" valign="top">
<font size="2">IfoLabel</font>
</td>
<td align="left" valign="top">
<font size="2">A locally unique identifier for the risk entry that can be used to track the development and mitigation of the risk throughout the project life cycle</font>
</td>
</tr>

```

[...]

ToDo 2019-2020

Field data to flag



THANK YOU

