PXL detector geometry and correction DB

1. Geometry DB

These tables are to be store in geometry db domain and are usually not expected to change.

Sector geometry, with sectorId as index. Size: 8

```
/* pxlSectorGeometry.idl
 *
 * Table: pxlSectorGeometry
 *
 * description: // pxl sector geometry
 *
 */
struct pxlSectorGeometry {
  octet sectorId; /* sectorId, 1-10 */
  float sectorAngle; /* rotation angle in degree relative to sector
1 */
};
```

ladder geometry, with ladderId as index. Size: 20

```
/* pxlLadderGeometry.idl
 *
 * Table: pxlLadderGeometry
 *
 * description: // pxl ladder geometry
 *
 */
struct pxlLadderGeometry {
  octet ladderId; /* ladderId, 1-4 */
  float ladderAngle; /* rotation angle in degree relative to z */
  float ladderX; /* ladder center X (cm) */
  float ladderY; /* ladder center Y (cm) */
  float ladderZ; /* ladder center Z (cm) */
```

```
};
```

wafer geometry, non-indexed. Size: 24

```
/* pxlWaferGeometry.idl
 *
 * Table: pxlWaferGeometry
 *
 * description: // pxl wafer geometry
 *
 */
struct pxlWaferGeometry {
  float waferStep; /* wafer step on ladder (cm) */
  float averageSensitiveDepth; /* (cm) */
  float pixelStepX; /* (cm) */
  float pixelStepY; /* (cm) */
  float xFirstPixel; /* relative to center of sensitive area (cm) */
  float yFirstPixel; /* relative to center of sensitive area (cm) */
};
```

2. different layers of correction by translation + rotation

These tables are to be store in calibration db domain. We don't know how frequent will they need to be changed yet, maybe on 100 days level.

for whole pxl detector, non-indexed. Size: 48

```
/* pxlCorrection.idl
 *
 * Table: pxlCorrection
 *
 * description: // pxl correction
 *
 */
struct pxlCorrection {
  float translation[3]; /* xyz translation */
```

```
  float rotation[9]; /* 3*3 rotation matrix */
};

for half pxl detector, halfId as index. Size: 52
/* pxlHalfCorrection.idl
 *
 * Table: pxlHalfCorrection
 *
 * description: // pxl half correction
 *
 */
struct pxlHalfCorrection {
  octet halfId; /* 1 for sector 1-5 and 2 for the rest */
  float translation[3]; /* xyz translation */
  float rotation[9]; /* 3*3 rotation matrix */
};

for sectors, sectorId as index. Size: 52
/* pxlSectorCorrection.idl
 *
 * Table: pxlSectorCorrection
 *
 * description: // pxl sector correction
 *
 */
struct pxlSectorCorrection {
  octet sectorId; /* 1-10 */
  float translation[3]; /* xyz translation */
  float rotation[9]; /* 3*3 rotation matrix */
};

for ladders,  sectorId and ladderId as index. Size: 52
/* pxlLadderCorrection.idl
 *
```

```
 * Table: pxlLadderCorrection
 *
 * description: // pxl ladder correction
 *
 */
struct pxlLadderCorrection {
  octet sectorId; /* 1-10 */
  octet ladderId; /* 1-4 */
  float translation[3]; /* xyz translation */
  float rotation[9]; /* 3*3 rotation matrix */
};
```

for wafers, sectorId, ladderId and waferId as index. Size: 52

```
/* pxlWaferCorrection.idl
 *
 * Table: pxlWaferCorrection
 *
 * description: // pxl wafer correction by translation and
rotation
 *
 */
struct pxlWaferCorrection {
  octet sectorId; /* 1-10 */
  octet ladderId; /* 1-4 */
  octet waferId; /* 1-10 */
  float translation[3]; /* xyz translation */
  float rotation[9]; /* 3*3 rotation matrix */
};
```

3. wafer TPS correction parameters
These tables are to be store in calibration db domain, expected
to change per year. sectorId, ladderId and waferId are indices.
The array length of X, Y, W should be nMeasurements, right
now it is 121. I don't see a need to change this 121 right now

but can't tell whether it will need to be changed in the future. I don't know whether there is a better way to deal with this kind of situation. Size: 1472, total size for 400 entries is 588.8 k.

```
/* pxlWaferTps.idl
 *
 * Table: pxlWaferTps
 *
 * description: // pxl wafer correction by Thin Plate Spline
 *
 */
struct pxlWaferTps {
  octet sectorId; /* 1-10 */
  octet ladderId; /* 1-4 */
  octet waferId; /* 1-10 */
  unsigned short nMeasurements; /* n measurements for TPS fit */
  float A[3]; /* */
  float X[121]; /* */
  float Y[121]; /* */
  float W[121]; /* */
};
```

All the idl files can be found at RCF
/star/u/qiuh/hft/offlineChain/DB/StDb/idl
Currently I will be the person who need to insert the data, login: qiuh