Homeland Security

DMAMC

SAND2018-1435PE

Instrument Characterization Catalog

Belkis Cabrera-Palmer, SNL

AIPT Offsite Meeting

2018/02/07

Sandia National Laboratories

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CharCat

Definition (subject to change) : Online catalog containing characterization information of radiation detection instruments used at DNDO test events, with the goal of supporting test scientists and analysts.

FY18 Task: Define CharCat purpose, content and architecture:

1. Establishing both general and specific requirements on content and design, driven by target audience and use cases.
2. Initiate work towards a prototype containing Normalization Test (NT) ground truth (GT) detectors data.

Vote for a name:

Instrument Characterization Catalog

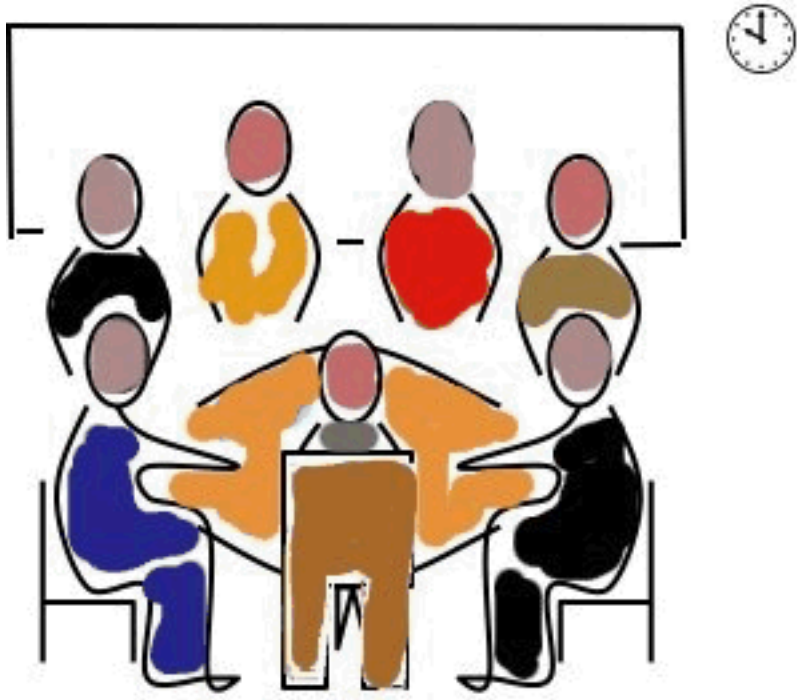
or

Detector Characterization Catalog?

CharCat Working Group

Members:

1. DNDO: Daniel Weidinger
2. LLNL: Jennifer Church
3. NIST: Miles McCord
4. Noblis: Colin Bowers
5. NRL: Lee Mitchell
6. PNNL: Geriann Gelston
7. SNL (lead): B. Cabrera-Palmer



Biweekly meetings:

Thursday, 1:30-2:30 pm EST

Next meeting: 02/15/2018

FY18 CharCat Task

Planned Activities:

- Define target audience and use cases: create and conduct survey
- Assessment based on NT GT detectors data
- Initiate prototype development work

Deliverables:

1. Survey report. March 31st.
2. Report of requirements on content and design derived from the NT GT detector data. July 31st.
3. Final report of general requirements on content and design derived from the join analysis of: the survey, the NT GT detector data assessment and the prototype architecture assessment. September 30th.

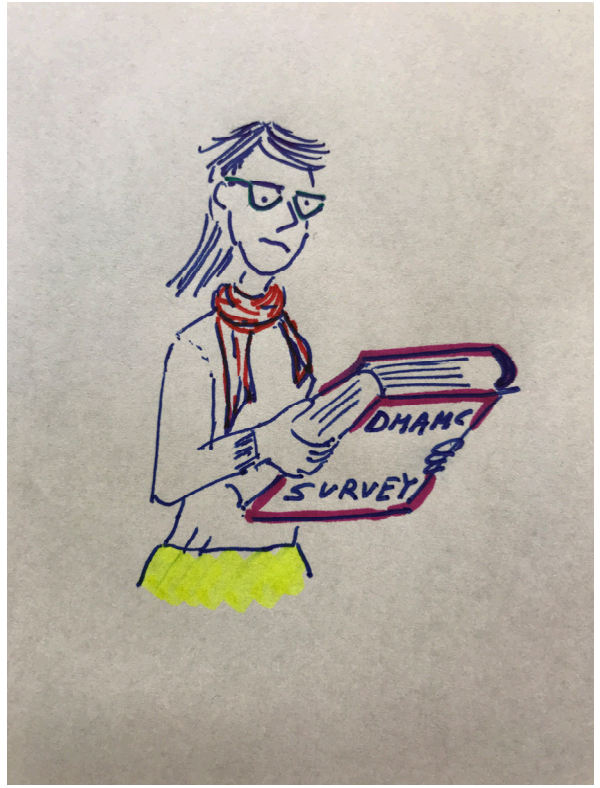
Survey Goals

Interview 5-10 test scientists and 5-10 DMAMC analysts, in order to:

A. Establish types of target audience and their needs
   - Who will use the catalog?
   - What are the most important instrument characterization quantities for the various user types?

B. Create a list of use cases
   - How will the catalog be most frequently used to support current needs?
   - What needs, currently difficult or impossible to satisfy, might be facilitated or enable by the catalog?

C. Identify target audience preferences for accessing and using the data
   - Should the data be processed into plots, and/or available as raw files to facilitate the user's own analysis.
   - How will the data be preferably accessed? E.g., using both mobile and desktop platforms?



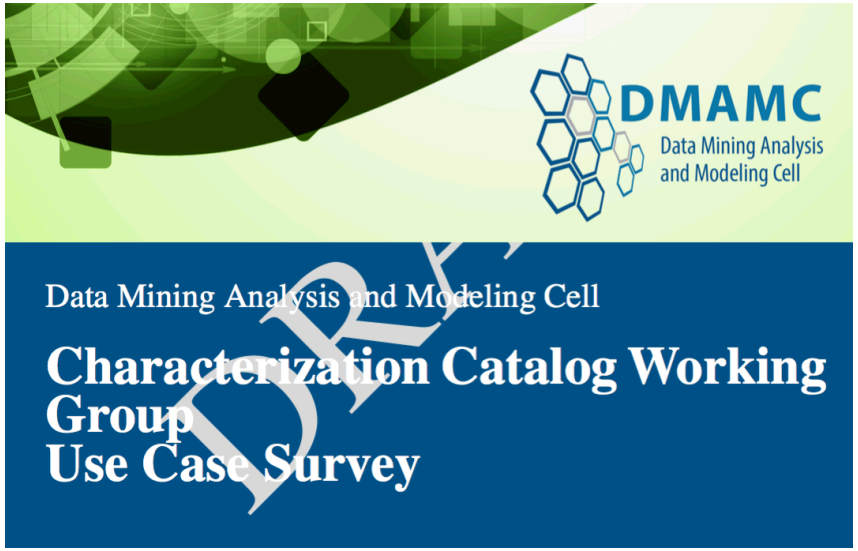
Brief brainstorming on use case examples

(audience participation encouraged)

- **Test scientists** use cases:
  - selection of NT GT instruments in preparation for a test event (pre-test activity)
  - comparison of NT GT instrument data over time and across tests to identify irregularities or malfunctions (post-test activity)
  - Others_____
- **DMAMC analyst** use cases:
  - comparison of instrument manufacture's data over time and across tests to assist stakeholders in their procurements (quickly create a report for stakeholders).
  - improve DOX by showing effect of experiment design on instrument performance (as a long/short term DMAMC study)
  - idem as above, but to show the effect of test location and environment.
  - Others _____

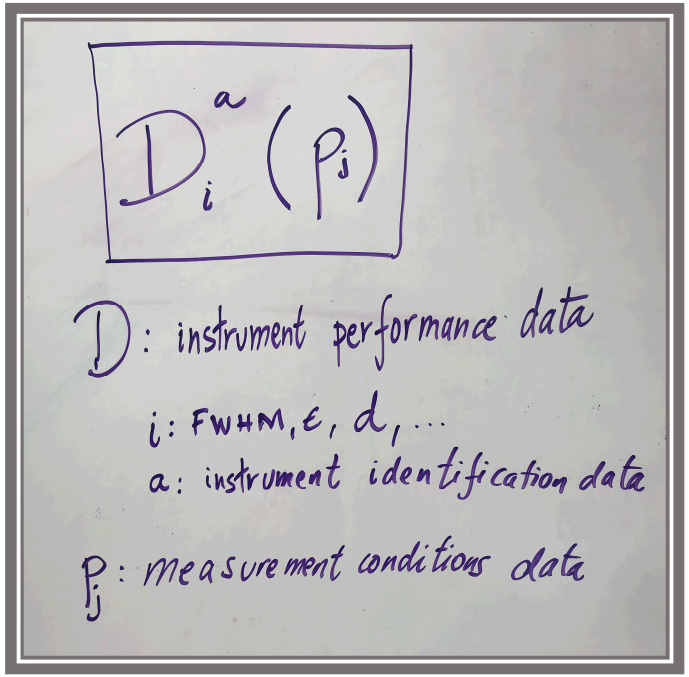
Conduct a successful survey

- Wrk Grp deadline to create survey: end of February.
- Current draft in ShareLatex: request access if interested in helping to draft it.
- To make it effective, we will need clear questions and good answers from interviewees.
- Suggestions for best way to conduct the survey?
  - face to face or by phone might be preferred
  - if not possible, then as a word document
  - any other suggestion?



CharCat content

- **Instrument identification data**: uniquely identifies the instrument,
  - Ex: serial number, model, year, software, firmware, active volume dimension, geometry, etc.
  - This is not an instrument library. Create a seamless link to the instrument library.
- **Instrument performance data**:
  - Spectra, gross counts, live time, dead time, etc.
  - Derived quantities: energy-dependent efficiency, energy resolution, isotope IDs, etc.
- **Measurement conditions data**: describe settings and environmental conditions during performance measurements, and thus, *parametrize* the performance data:
  - Ex: date and time, location, source, measurement configuration, environmental conditions, background, etc.
  - Determine how to present these data to reduce data volume?
  - Possibly create categories summarizing the test events: outdoors vs. indoors, inside vs. outside vehicle, distance to source, environmental parameter range during test, etc. A link to the detailed test event data should be provided.



Content

- Start with Normalization Test ground truth instruments data:
  - Data is “readily” available. It will soon be in RDNR.
  - It is the “most” complete dataset; all test event parameters should be collected.
  - Gamma and neutron detectors, with various resolutions, in various locations
  - Same detectors used in different test events.
- Next: determine **existing** dataset of relevance for the target audience to include in the catalog.

Requirements on architecture and design

In parallel, start working with developers to assess:

- The ease to:
  - start using it right away (make it intuitive for users),
  - browse and search for data,
  - compare data across user-defined parameters either as plots or as tables,
  - download data as cvs, pdf reports, etc.
- Flexibility to add new or change existing data fields.
- Automatize processing of new data into the CharCat from “raw” test data saved RDND?
- If above not possible, make easy to manually enter processed data.
- In-page linkages to all other applicable catalogs and data repositories.

Depending on progress of above FY19 activities, create a limited and locally deployed prototype containing NT GT detectors data (but not a deliverable).

Conclusions

- Others that want to join the CharCat Wrk Grp are welcome.
- Your support responding to the survey will really help.
- Expect more request for feedback during this process.


The Evening Herald
EXTRA!

Requirements: deployment

- Work on data hosting issues and linkages to other catalogs and data repositories.
- Create several access levels and their control. This could potentially be a self-service tool, not only for test scientists, but also for stakeholders from other agencies.
- Establish mechanisms for regular maintenance and updates of data content software and accounts information.
- Create code documentation.
- Create an users guides:
  - Create a sample report so users are aware of useful catalog resources
  - Create reference document describing how the test event data has been categorized.