MoEDAL SOFTWARE ACTION PLAN 2014

1 Organisation

People
- Alberta
    - James Pinfold
    - Richard Soluk
    - Andy Kale
- Geneva
    - Philippe Mermod
    - Akshay Katre
- Cracow
    - Janusz Chwastowski
    - Dominik Derendarz
    - Paweł Malecki
    - Rafał Staszewski
    - Maciej Trzebiński
- Valencia
    - Vasiliki Mitsou
    - Matthew King
- Korea
    - names?

Coordination (Jim and Philippe)
- Meetings every 2 weeks on Thursday afternoons, by Vidyo

Webpage (Andy)
- Drupal expertise
- MoEDAL Software page (MoEDAL member access only)
    - links to relevant information (tutorials, talks, drawing and picture databases...)
    - updated TODO list (Philippe)

2   Material description

Picture database (Richard)

- pictures from 2013 LHCb VELO cavern inspections presently available on Google Drive

    - https://drive.google.com/folderview?id=0BxRe7KkQbTNXT0hySi1WSWh5UWM&usp=sharing&usp=sharing#

CERN Drawing Database (CDD) expertise (Cracow) TIMESCALE: April 2014

- learn to quickly get needed information

- CDD website: https://edms.cern.ch/cdd/plsql/c4w.get_in

- HP-GL viewer: http://service-hpglview.web.cern.ch/service-hpglview/download_index.html

LHCb software expertise (Cracow, Akshay has some experience) TIMESCALE: April 2014

- tutorials: https://indico.cern.ch/event/175918/

- learn to run the code that gives material budget as a function of position

    - need also backward directions

- learn to implement new geometry components into GAUSS LHCb Detector Description (XML format)

- learn to use Panoramix viewer

Component implementation into the LHCb geometry (Cracow)

- detailed study of materials and dimensions

    - use CDD

    - cross-check with geometry from radiation protection study made by Matthias Karacson

- implementation in LHCb Detector Description (XML format)

- validation using Panoramix viewer

- continuous inclusion into LHCb database to avoid divergences -- keep in contact with Gloria Corti

- maps of material budget (in g*cm-2, target few % uncertainties)

    - as a function of eta and phi for various z

    - as a function of x and y for various z

    - dominant material (e.g. steel, aluminium...) at each position

- Priority components:

    - vacuum vessel back-cover and protruding elements TIMESCALE: May 2014

- dust cover TIMESCALE: May 2014

- elements in the backside of the vessel TIMESCALE: June 2014

- elements on the sides of the vessel TIMESCALE: June 2014

- additional elements which are not in CDD database (e.g. cables) TIMESCALE: July 2014

- MMT-2012 detectors TIMESCALE: July 2014

- NTD-2012 detectors (incl. encasing and all sheets) TIMESCALE: July 2014

- elements below the vessel TIMESCALE: December 2014

- elements on top of the vessel TIMESCALE: December 2014

- MMT-2015 detectors TIMESCALE: January 2015

- NTD-2015 detectors TIMESCALE: January 2015

3   Model-independent simulations

Single-particle generator (Valencia) TIMESCALE: June 2014

- learn to run particle gun in Gauss
- ensure compatibility with monopoles and multicharges
    - add specific PDG codes if needed
- produce event (.sim) files as inputs to Geant4 in Gauss (GiGa)
    - flat eta and energy distributions
    - various masses and charges (both electric and magnetic)

Geant4 propagation (Valencia) TIMESCALE: June 2014

- learn to use GiGa
- test monopoles and highly-charged particles
    - dE/dx as a function of velocity (Bethe-Ahlen)
    - dE/dx at very low velocity -- is it modelled and does it make a difference?
- output should be suitable to MoEDAL analysis (no need for digitization and reconstruction)
    - should contain in minimum:
        - truth particle information (direction, energy)
        - position at which the particle stopped
        - component in which the particle stopped
        - track position in each of the NTD sheets
        - energy deposition in each of the NTD sheets
    - format should be readable directly with ROOT

4   Model-specific simulations

Drell-Yan (Geneva and Valencia)

- choice between Pythia and Madgraph frameworks (Philippe)
- produce events in the HEP-MC format TIMESCALE: June 2014

At least one more model of kinematics (Geneva and Valencia) TIMESCALE: September 2014

- photon fusion? (difficult and not so different from Drell-Yan)
- random phase space?
- Fermi phase space?
- "soft" model?