Event biasing parallel session

Issues :

- There is no comprehensive document which covers all the event biasing options Geant4 has.
- Some options are not maintained for long time.
  - Does every option really work with the current release?
- Some cases, the uses of options are too complicated.
  - For example, leading particle biasing of hadrons is quite different from for that of EM particles.
  - For another example, geometrical importance biasing was tied with its dedicated scoring mechanism.
- There obviously are areas to improve.

Aim of this parallel session :

- Establish a work plan to improve above issues.

Geometry-based biasing

- What we have
  - Geometrical importance weight field
    - Need to migrate to parallel navigator (Alex)
    - Update examples (Alex, Tsukasa)
- What we need to add
  - Enhance particles toward a point (Alex)
  - Enhance particles toward a direction (Alex)

Physics-based biasing

- What we have
  - Primary particle biasing (GPS) (Fan)
  - Radioactive decay (Fan)
  - Energy weight window (Alex)
  - Leading particle (Jane)
    - Need to merge EM and HAD
  - MARS
    - Not maintained for quite a while. Drop it?
  - Wrapper class (Jane)
    - It works for process level. It does not work for model.
    - Do we need a new class, or modify the current wrapper class?
  - Cross-section biasing for HAD (Jane)
    - Base class of hadronic process has a cross-section scale factor.
    - Another hard-coded option for lepto/gamma-nuclear interaction, set by runtime environment variable. No document!

Physics-based biasing

- What we need to have
  - Forcing a process in a volume, forcing a particular mode (secondary) (Jane, communicate w/ V.I.)
  - Concrete implementations of wrapper class for various options
    - And examples, documents,… (Alex, Jane, Tsukasa, Marc, Fan)

Reverse Monte Carlo

- Geant4e is basically done and used in CMS. Merge into Geant4 release?
- Project independent to Geant4e is in progress at ESA

Plan

- Mini-workshop sometime early in next year.
  - Current proposal : March 19-23 @ SLAC
- Some first outcome should go along with summer 2007 release.
- Concrete proposals at the latest by the collaboration meeting next year for
  - Unified leading particle
  - General cross-section biasing