Instructions for submitting information for the Upgrade Cost Group

This note is to describe the role of the Upgrade Cost Group (UCG) and the procedures we plan to use in validating the costs of proposed upgrades to LHC experiments.

The UCG will review upgrade TDR's shortly after their scientific merit has been evaluated by the LHCC. In a nutshell, collaborations need to make a persuasive case to the UCG that they have carefully evaluated and understand the cost, schedule, and manpower required, and the risks inherent in the technical approach. It is also important to indicate that the upgrade will efficiently result in significant science impact, and to indicate priorities should the project receive less than the total of the requested funding. *Please note that TDR's now require detailed information* on CORE costs, funding, manpower, schedule and risks, to assist the UCG in its evaluation.

Our goal is to make the process as interactive, direct and simple as possible, with the realization that "one size probably does not fit all" upgrade projects. Given all the work that goes into a TDR we hope the following requests will involve only modest additional effort. Please feel free to ask if you have questions, and know that your comments and suggestions in improving this process are most welcome.

In the above spirit, we should like each TDR to demonstrate that:

- The work scope is complete, well organized with clear assignment of responsibilities.
- Cost estimates are based upon standardized and disciplined processes.
- A well-detailed resource-loaded schedule exists and provides the basis for all cost and schedules.
- A well-detailed risk registry has been developed and implemented.
- Staffing needs are well identified and achievable.
- The project is poised to initiate and effectively manage the final detailed design phase of the project as well as begin long lead procurements.

TDR's should, if at all possible contain the following documents or equivalents. Template forms are attached for some of these -- experiments are welcome, but not required to use them. Please feel free to use instead similar forms and tools to provide this information.

1. A "Budget explanation and justification" section to help us understand the important requirements, tradeoffs, etc. in reaching the final design, and their impact on the cost. Please include a discussion of priorities should not all the requested funding be available.

2. A WBS chart down to at least level 2, showing costs, allocation responsibilities, expected funding sources, bases for estimates, etc. for the major subsystems (aka parts

or components) of the upgrade project. [A template WBS chart is attached, to indicate what information we seek.]

3. A WBS-like chart indicating the manpower resources needed, e.g. physicists, computing and software professionals, engineers, technicians, CERN technical groups, etc.

- For each person listed, please be sure to indicate the FTE-equivalent committed to the project [template attached]

4. The names of the senior project team, e.g. project leader and leaders of each subsystem, giving the FTE-equivalent of each person committed to this project, and a list of his/her other commitments.

5. A resource-loaded schedule that shows the duration of the major tasks, manpower required, and sources of the manpower.

6. A set of fixed major milestones, falling due at a reasonable frequency to allow efficient tracking of progress throughout the project.

6. A risk register, giving the likelihood and impact of each significant risk, and your strategy and plans for mitigation. [template attached.]

7. List of resources requested from the upgrade common fund, e.g. receiving, installation, commissioning.

8. The spending profile by year required to complete the project on schedule.

9. A confidential money matrix, and confidential estimate of possible funding profiles.

If you have questions, or suggestions on improving this process, please contact Stewart Smith (smithajs@princeton.edu).