13th ALICE RRB - CtC

- **Cost-to-Completion**
- **Status & Contingency plans**

CERN-RRB-2002-146

Summary of CtC

- prel. **'Cost-to-Completion'** of MoU detector (Oct. 2001)
  - detectors sub-systems: 3.3- 3.9 MSF
  - services, installation, commissioning & integration: ~ 3 MSF (> 25%)
    - **assumes 2 MSF of savings can be realized**
  - Sum: **6.3 - 6.9 MSF**

- final CtC incl. 200 kSF from Greek withdrawal (April 2002)
  - **Detector : 3.7 MSF**
  - **Common Cost ('C&I'): 3.2 MSF**
    - **C&I : 2.9 MSF membership fee: 300 kSF**
  - Sum: **6.9 MSF**

Proposal for Sharing CtC

- MoU underfunding (ITS, 0.825 kSF)
  - not responsibility of any FA, no cost increase
  - cover from CERN share of CtC (20% of total CtC)

- Detector specific (2.9 MSF)
  - distributed according to MoU responsibility in detector projects

- Common items ('C&I') (3.2 MSF)
  - propose to cover ~ 10% (300 kSF) by extending yearly fee (5kSF/Institute) to 2006
    - LHC startup now 1 year later
  - C&I according to MoU contribution

Response from FA's

- full contribution
  - CERN, Denmark, Finland, Germany, Hungary, Italy, Netherlands, Norway, Sweden, Armenia, Mexico, Ukraine
- full contribution possible
  - Czech Rep., France, Slovak Rep., India,
- partial contribution
  - Russia, JINR, USA
- no final response
  - Poland, UK, China (MoU not yet signed), Croatia, Romania
- nothing
  - Switzerland (left ALICE)

Funding Agency	*Requested*	*Agreed*	*Possible +*
CERN (Si Pixel, Strip)	825	825	
CERN	525	525	
Czech Republic	52	10	+42
Denmark	103	103	
Finland	77	77	
France CEA	172	150	+22
France IN2P3	846	650	+196
Germany BMBF[3)]	679	679	
Germany GSI[3)]	389	389	
Hungary	32	32	
Italy	1,378	1,378	
Netherlands	147	147	
Norway	117	117	
Poland[1)]	53	0	53
Slovak Republic	51	30	+21
Sweden	199	199	
Switzerland[2)]	14	0	
United Kingdom[1)]	69	0	69
Armenia	11	11	
China NSFC[1)]	125	0	125
Croatia[1)]	17	0	17
India	276	165	+111
JINR	206	95	
Mexico	6	6	
Romania[1)]	23	0	23
Russia	394	24	
Ukraine	82	82	
United States	19	15	
Total	***6,887***	***5,709***	***679***

CtC Status

- FA's very positive and supportive !
  - **ALICE would like to explicitly acknowledge and thank all FA's for their very generous help**

- agreed contributions
  - **5.7 MSF => 1.2 MSF missing**
  - in addition up to 680 kSF might be possible
    - => only 500 kSF would be missing
    - **25 of 27** FA's would contribute with full contribution

- possible additional contributions to reduce shortfall
  - discussion with **Greece** to re-join T0/FMD
    - might reduce shortfall in these two detectors by up to **200 kSF**

- contingency plan for up to 1.2 MSF
  - current funding: 1.2 MSF missing
  - best case: only 300 - 500 kSF missing

Contingency Plans

- possible items for 'deferrals'
  - ALICE is single stage detector => no 'natural' candidates
    - no second 'high luminosity phase' as in ATLAS/CMS
  - several scenarios evaluated, taking into account:
    - minimize physics damage
    - production status and funds spend already
- proposed deferrals supported by LHCC

Contingency Plans

- PHOS: redirect up to 440 kSF to muon arm
  - 5% of PHOS cost (10 MSF), but up to 20% reduction in area
    - only small part (i.e. 'cash' funding) can be redirected
  - early stage of procurement
  - single arm detector, easy accessible =>could eventually be restored
  - **physics deterioration:** significant but not catastrophic
    - reduced acceptance at low pt, lower statistical accuracy at high pt
- DAQ: reduction of bandwidth, defer up to 1.1 MSF
  - deferring up to **40% of capacity saves ~ 1.1 MSF** (~ 20% of cost)
  - DAQ deployment plan: end 2006: 20%, end 2007: 30%, end 2008: 100%
    - final DAQ slice foreseen only for 2008 (first Pb run at design L)
    - DAQ performance is scalable by design
  - **impact on physics significant** : **40 % loss** in most statistics limited signals
    - significant deterioration of the most interesting 'hard' signals @ LHC (jets, charm, physics with TRD, …..)

If 'possible' contributions materialize (even after 2006), we would not need to implement this scenario !

CtC Time Profile

- C&I spending 'early' (2002 - 2006, peak in 2004)

- Funding Profiles partially discussed with FA's
  - some money can come early, but some only > 2006
  - currently ok for at least 2003

- we will need to solve some cash-flow problems
  - where possible, shift CORE <-> CtC funds **within** projects or FA's ?
  - borrow from CF (as long as CF has positive balance) ??
  - borrow between projects or FA's ???

Conclusion

Thanks to the generous support from our Funding Agencies, ALICE can built a viable detector ready for LHC turn-on.
If the 'possible' additional resources would eventually materialize, the impact on physics capabilities of the remaining shortfall would be limited.