



Experiment Interlocks for LHC Injection



BT/BP AB/CO/MI 15th October 2007





A while ago...



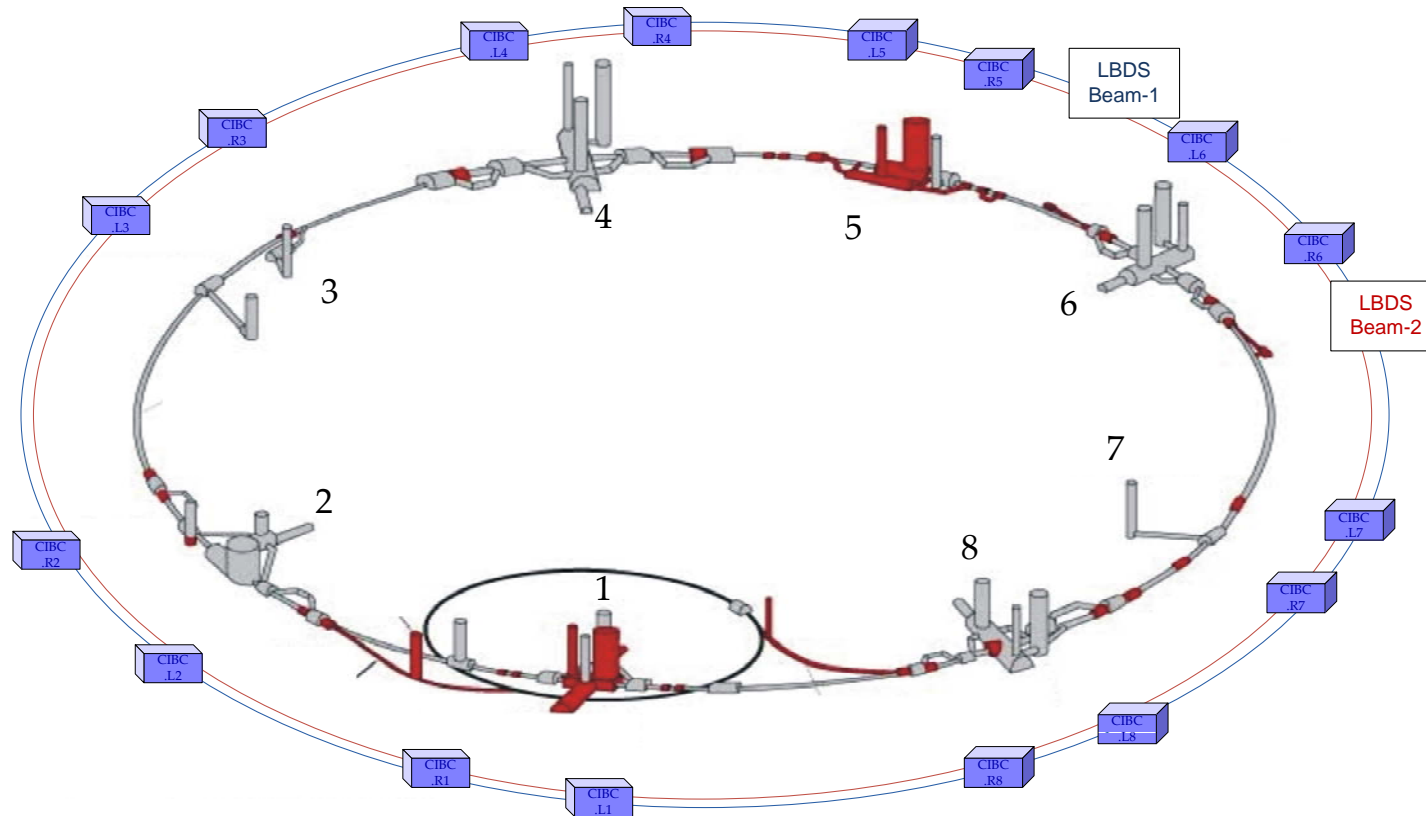
Late 2005 – Early 2006:

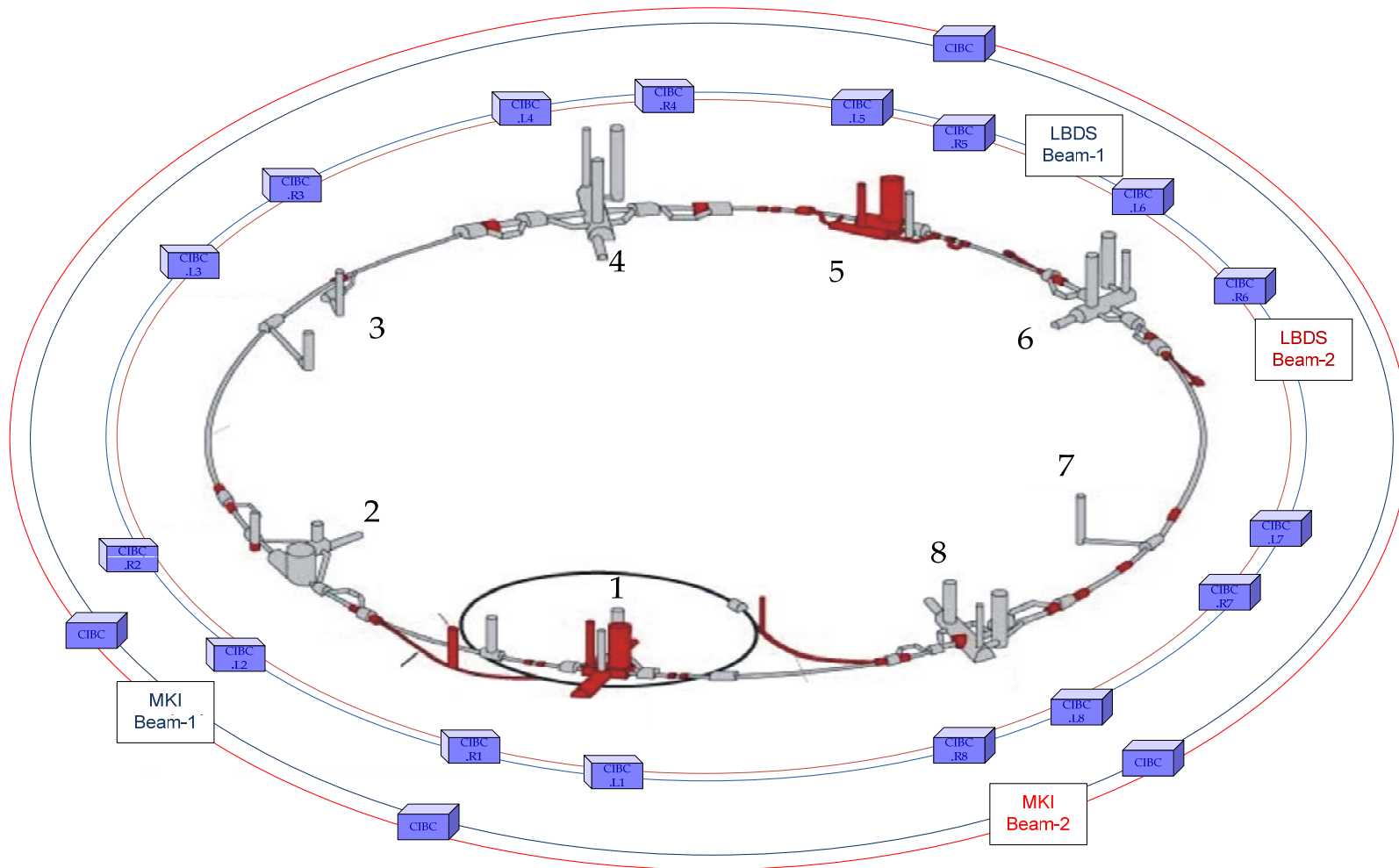
Interlock Section asked to investigate creation of an Injection Interlock System
Give each experiment a hardware interlock

Mid – Late 2006:

solution investigated, project is feasible

- Quite a heavy cost for functionality!
- 4 Further BICs for the LHC.. For just a few User Inputs







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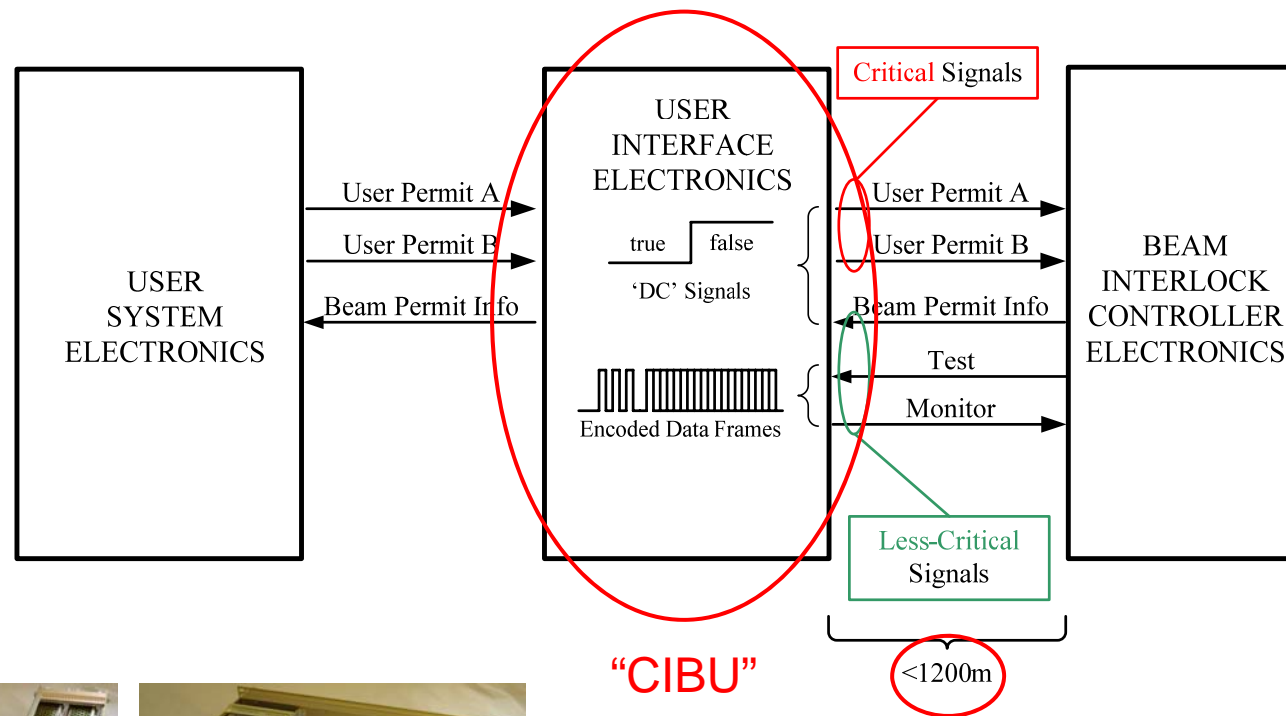
2007:

Significant electronic development in the Beam Interlock System

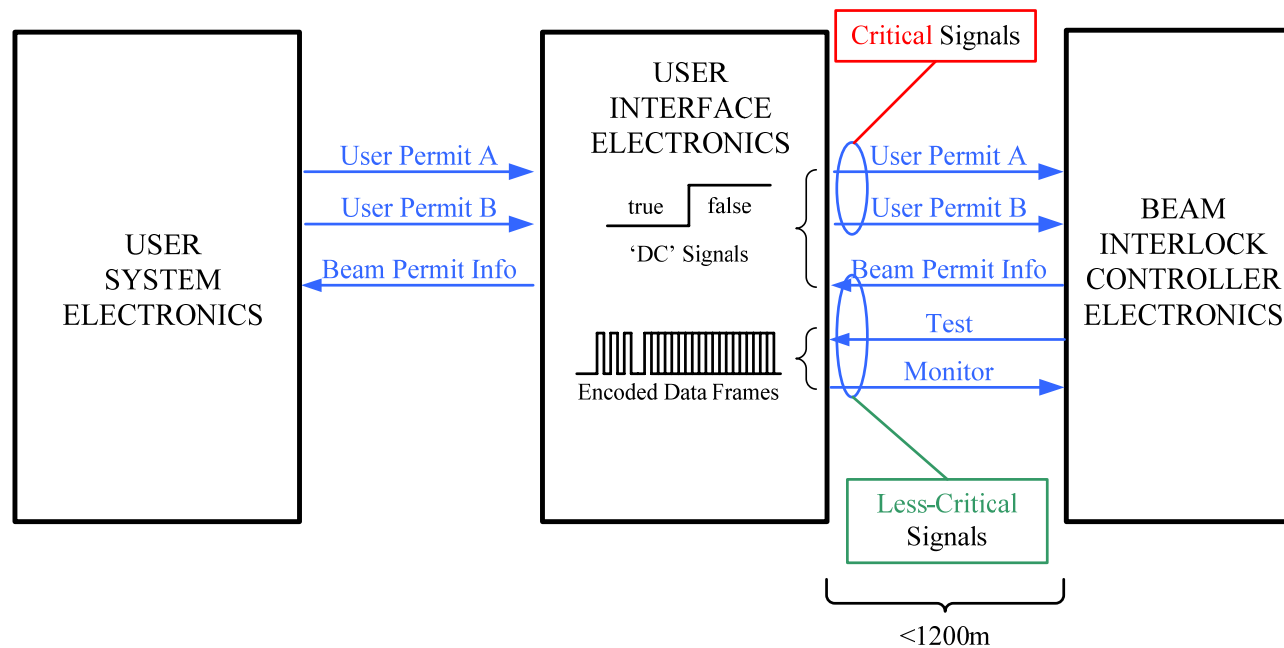
Allowing this interlock to be realised:
At reasonable cost
With reasonable impact on Interlock Section
Having attractive Maintenance

What is this development???

The typical User Interface supplied to a User System:

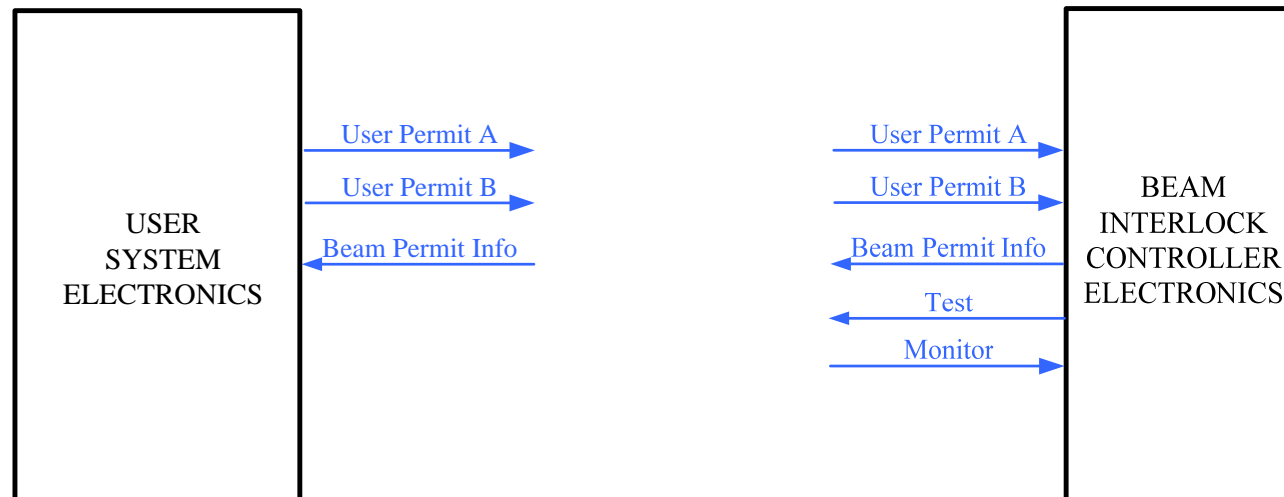


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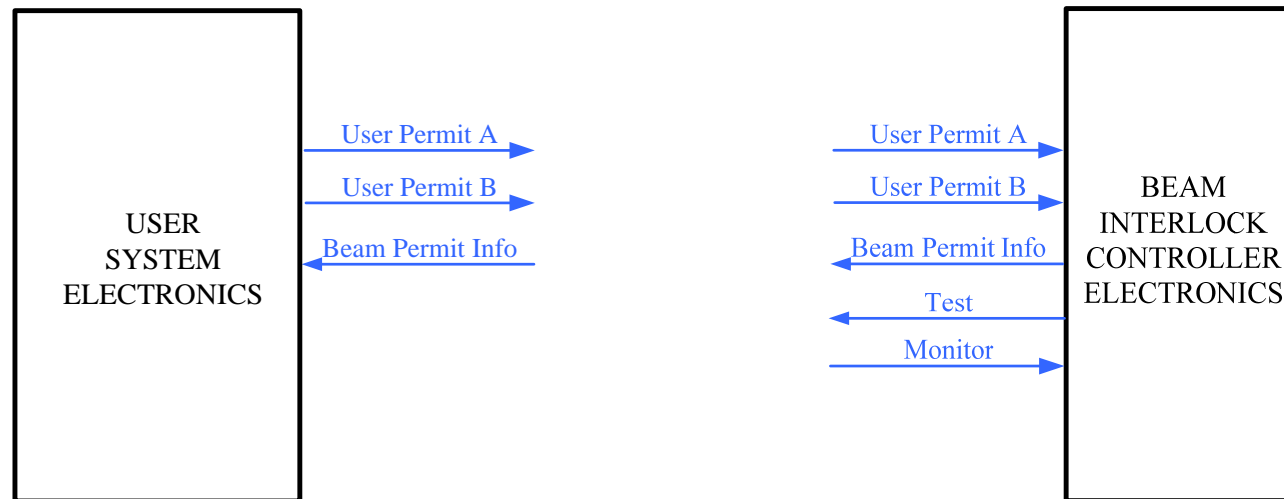


Technology Development





Technology Development

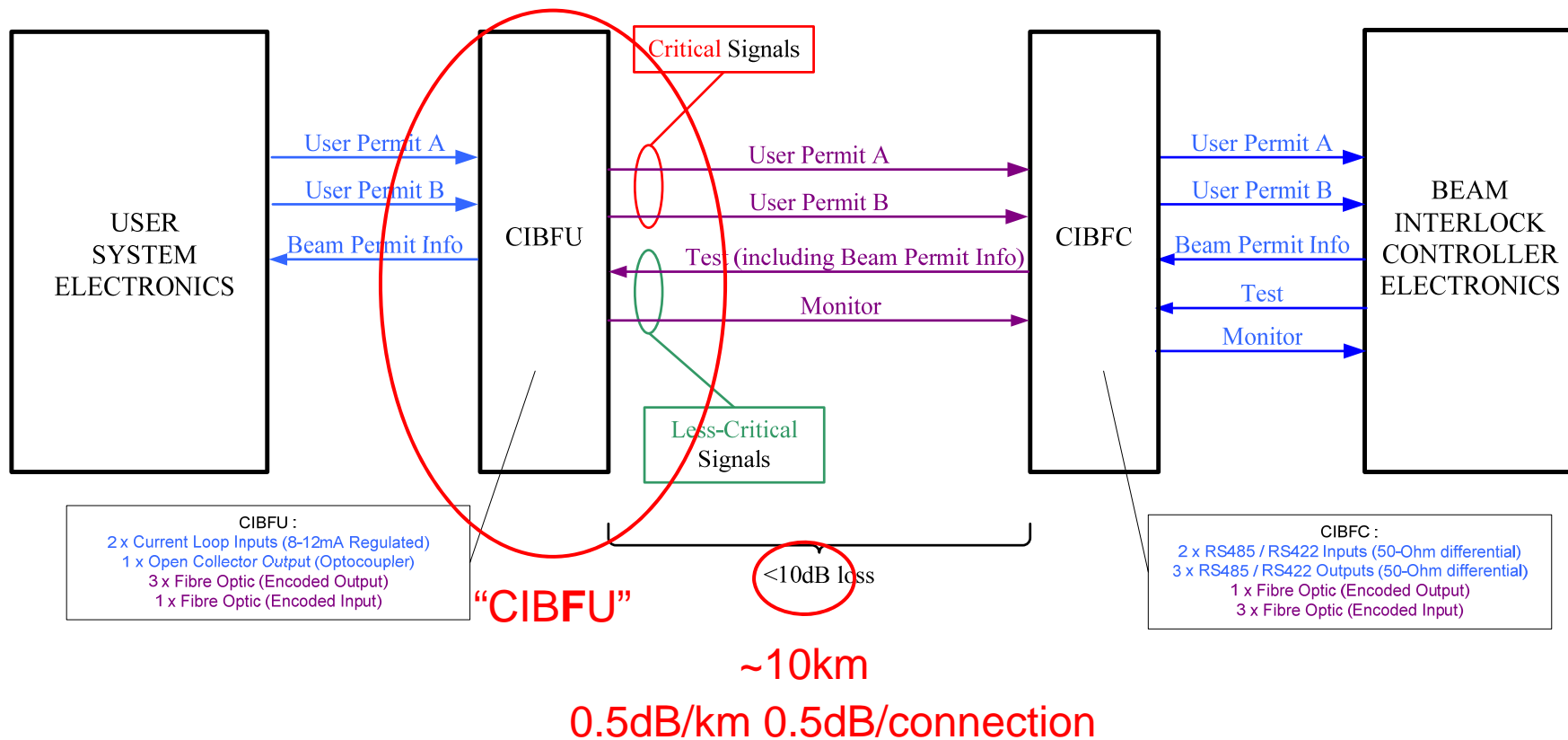




SAME as CIBU in EVERY respect for User

This is the 'CIBF'

Current Loops & 2U





CIBF developed for Extraction Systems

- Used in Operator Buttons for EXTRACTION INHIBIT
 - Foreseen within the BIS in other places
 - Foreseen within Safe Machine Parameters
 - We also need to stock some spares

= about 20 pairs already ordered

Same implementation as CIBU:

<https://edms.cern.ch/document/636589/>



For the experiments we assume we need

CMS x 2 (Beam-1 / Beam-2)
ATLAS x 2 (Beam-1 / Beam-2)
ALICE x 1 (one copper link, one fibre)
LHCb x 1 (one copper link, one fibre)

+ TOTEM?
+ LHCf?

+Others

= another 6 pairs?



Proposal to the Experiments



Install CIBF at each Experiment Point (details TBD)
Order Fibres to link to Injection BICS in SR2 and SR8

Cost: Difficult to be precise MAXIMUM ~5-7k CHF each **CONNECTION**
(CIBF, Fibre, Additional Boards needed in injection BIC VME Chassis)

This means:

1. Every Interlock Connection will remain the same (CIBU / CIBF)
 2. Easy for us to commission
 3. Easy for us to Monitor (like a CIBU)
 4. Easy to maintain (we use them already)
 5. Is a reasonable cost!

Decision should be taken soon:

- 1) Need MPWG to approve 😊 **Agreed 28th September 2007**
- 2) Need Experiments to approve **Today?**

N.B. A delay in ordering will increase cost by 30-50% for a smaller batch of CIBF



FIN