



# Experiment Interlocks for LHC Injection



BT/BP AB/CO/MI 28<sup>th</sup> September 2007



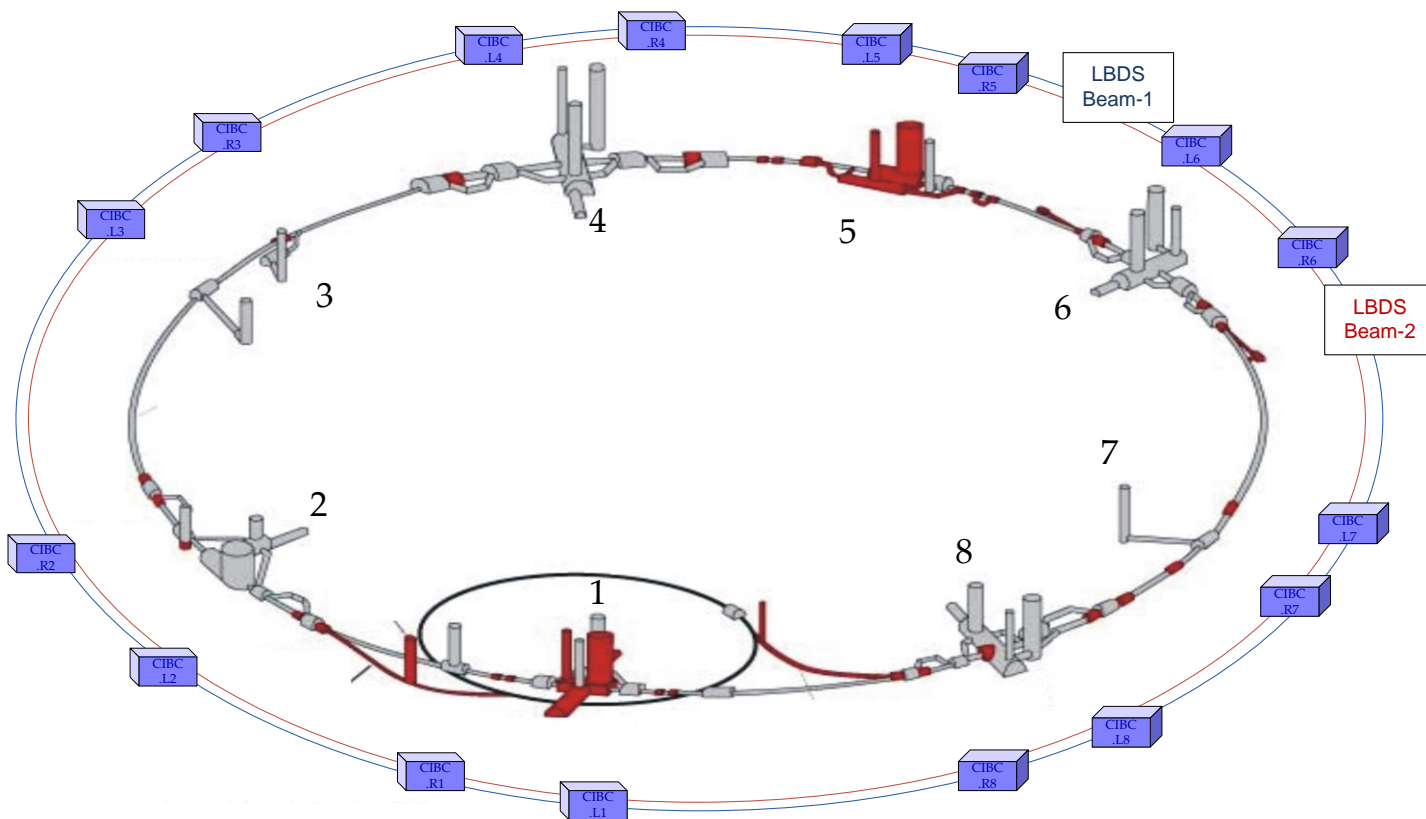


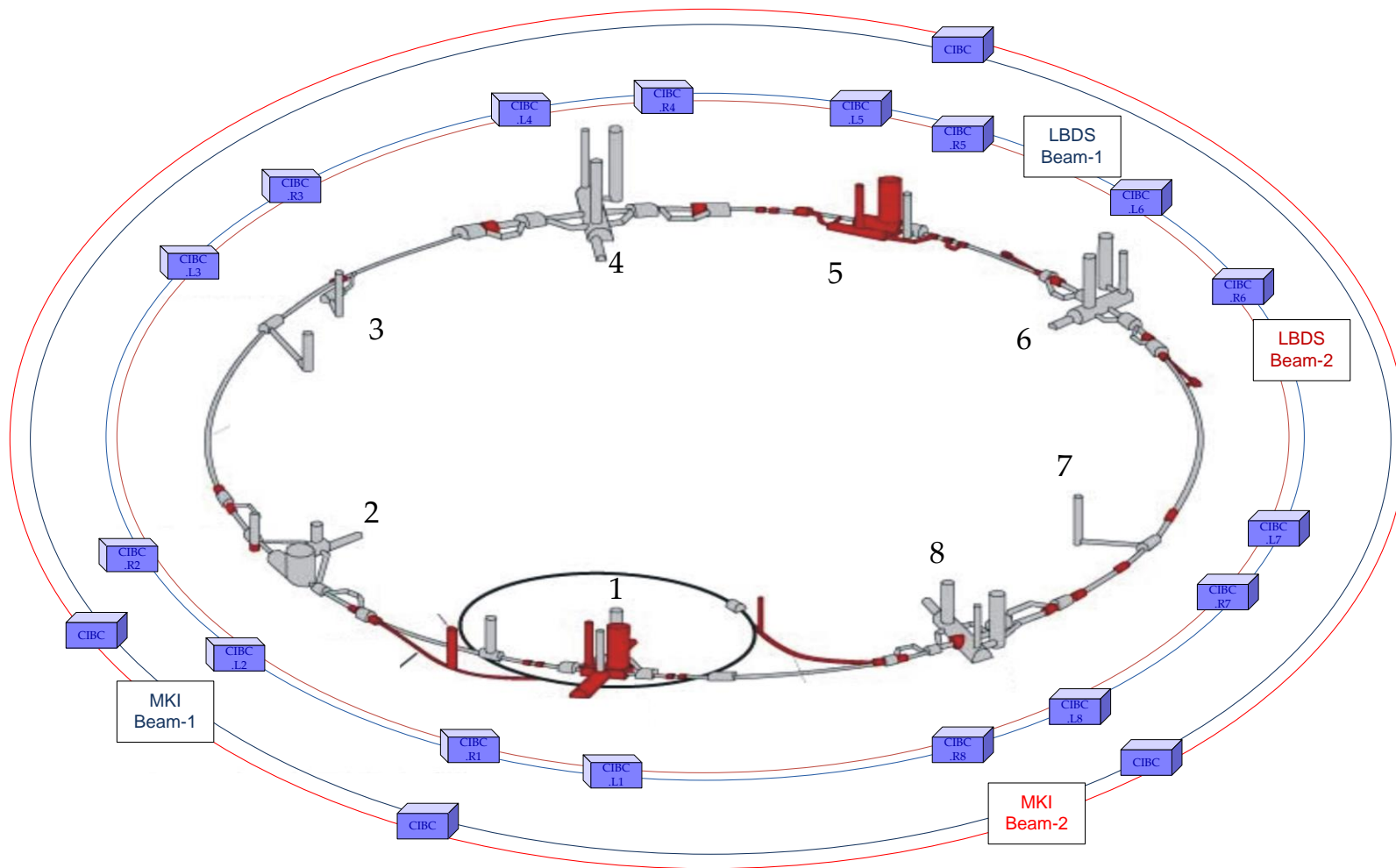
Late 2005 – Early 2006:

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







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

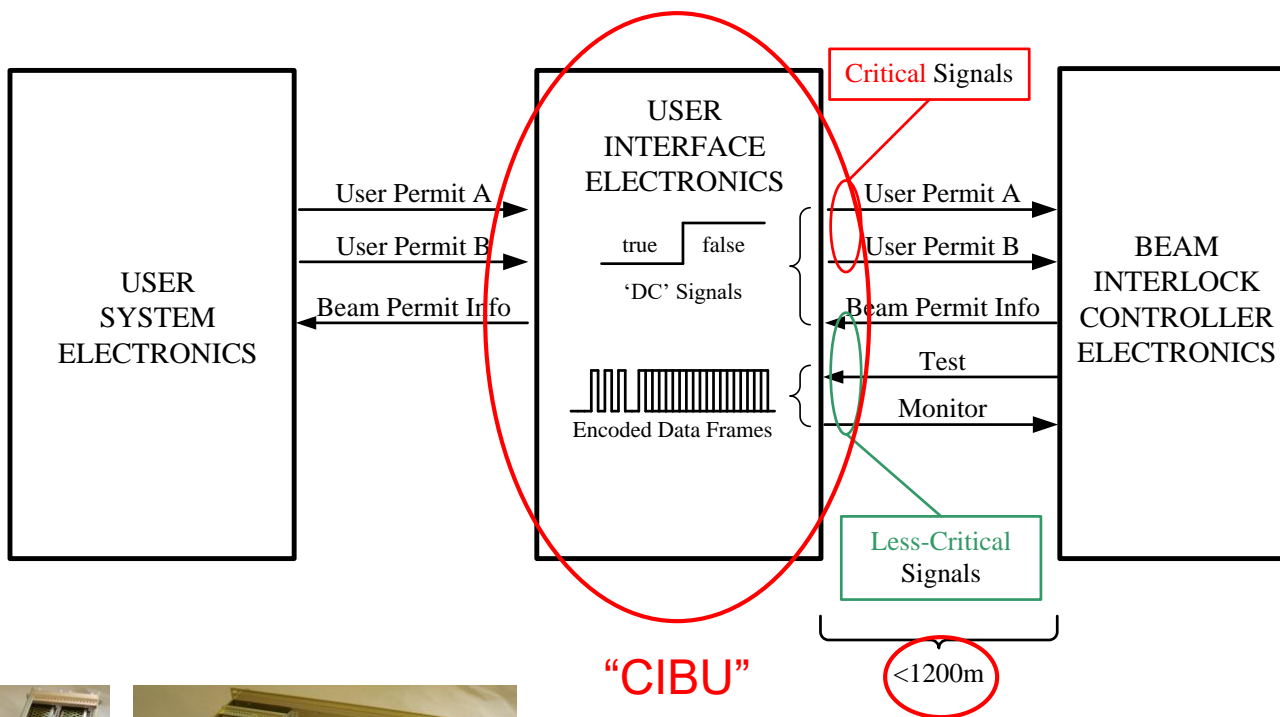
2007:

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???

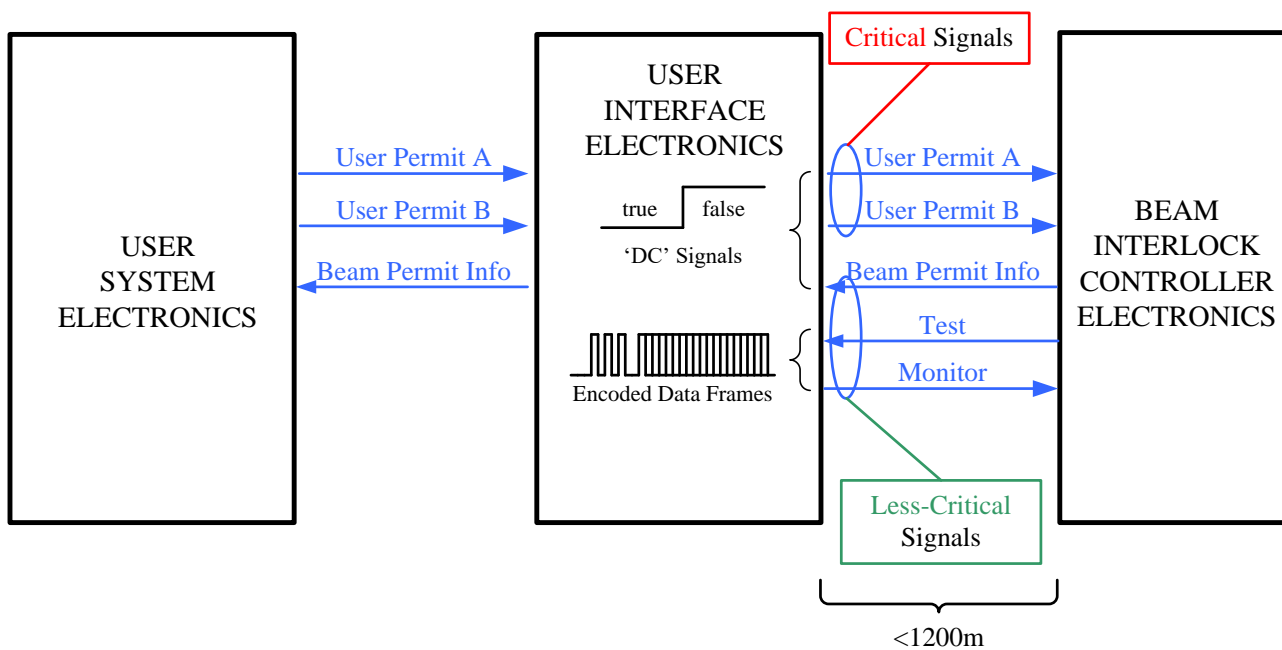
The typical User Interface supplied to a User System:

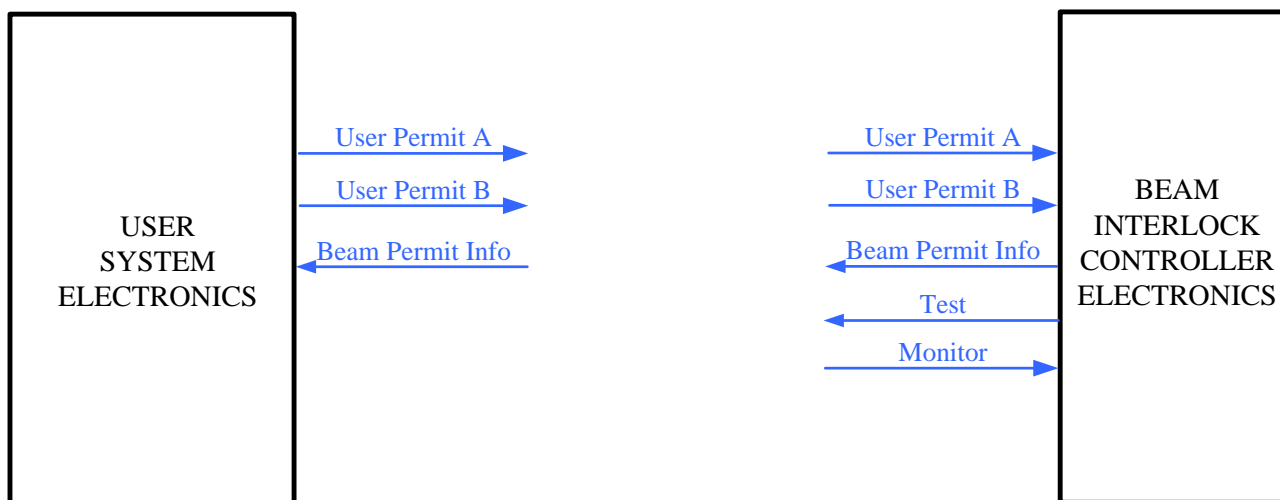


"CIBU"

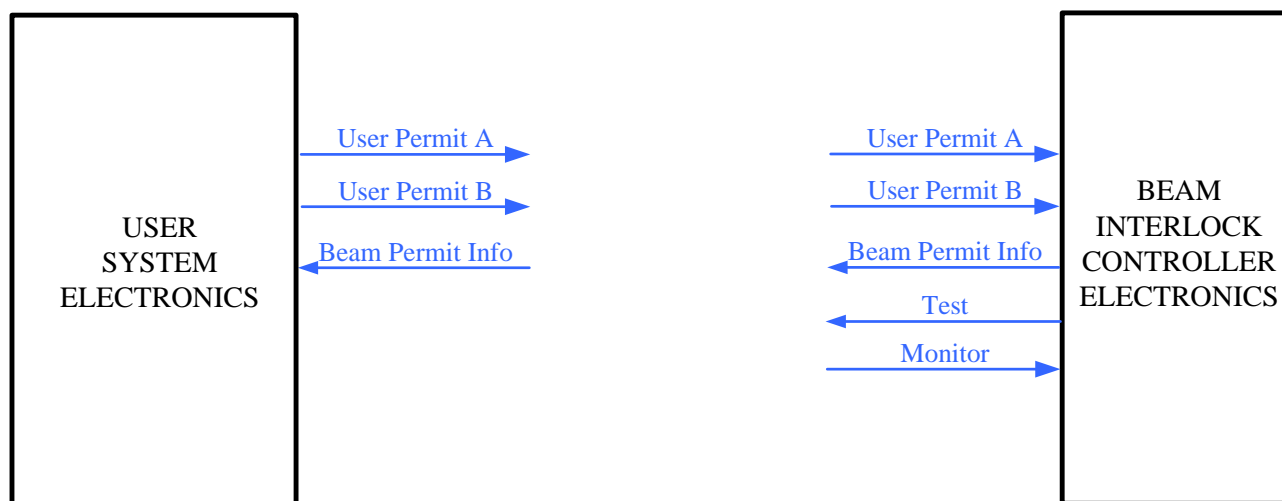
<1200m

The typical User Interface supplied to a User System:





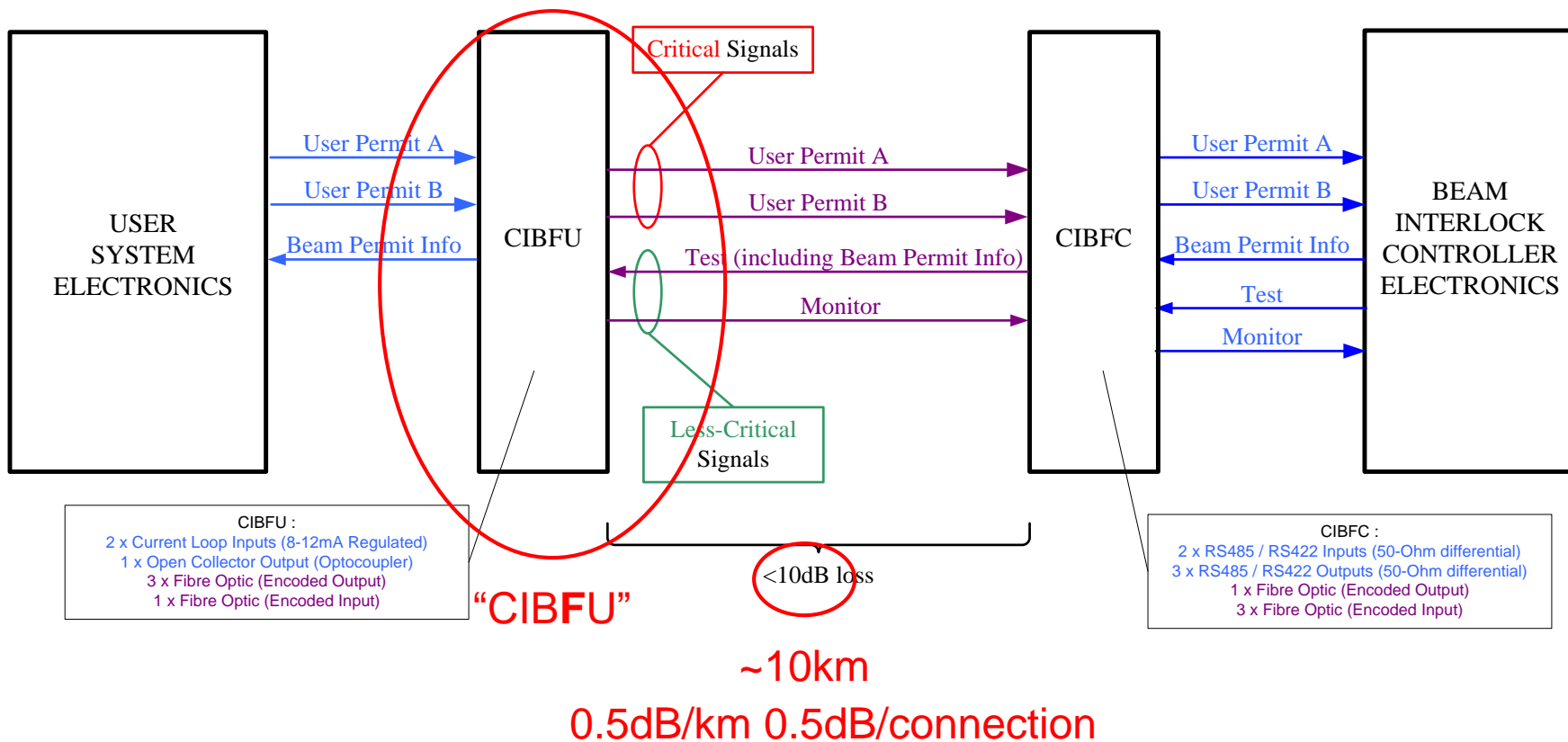




**SAME as CIBU in EVERY respect for User**

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

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  
Order Fibres to link to Injection BICS in SR2 and SR8

Cost: ~15k CHF each EXPERIMENT  
(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
- 2) Need Experiments to approve (LEADE in mid-October foreseen)

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



FIN