LHCb Web Site Developent and Online Display Panels

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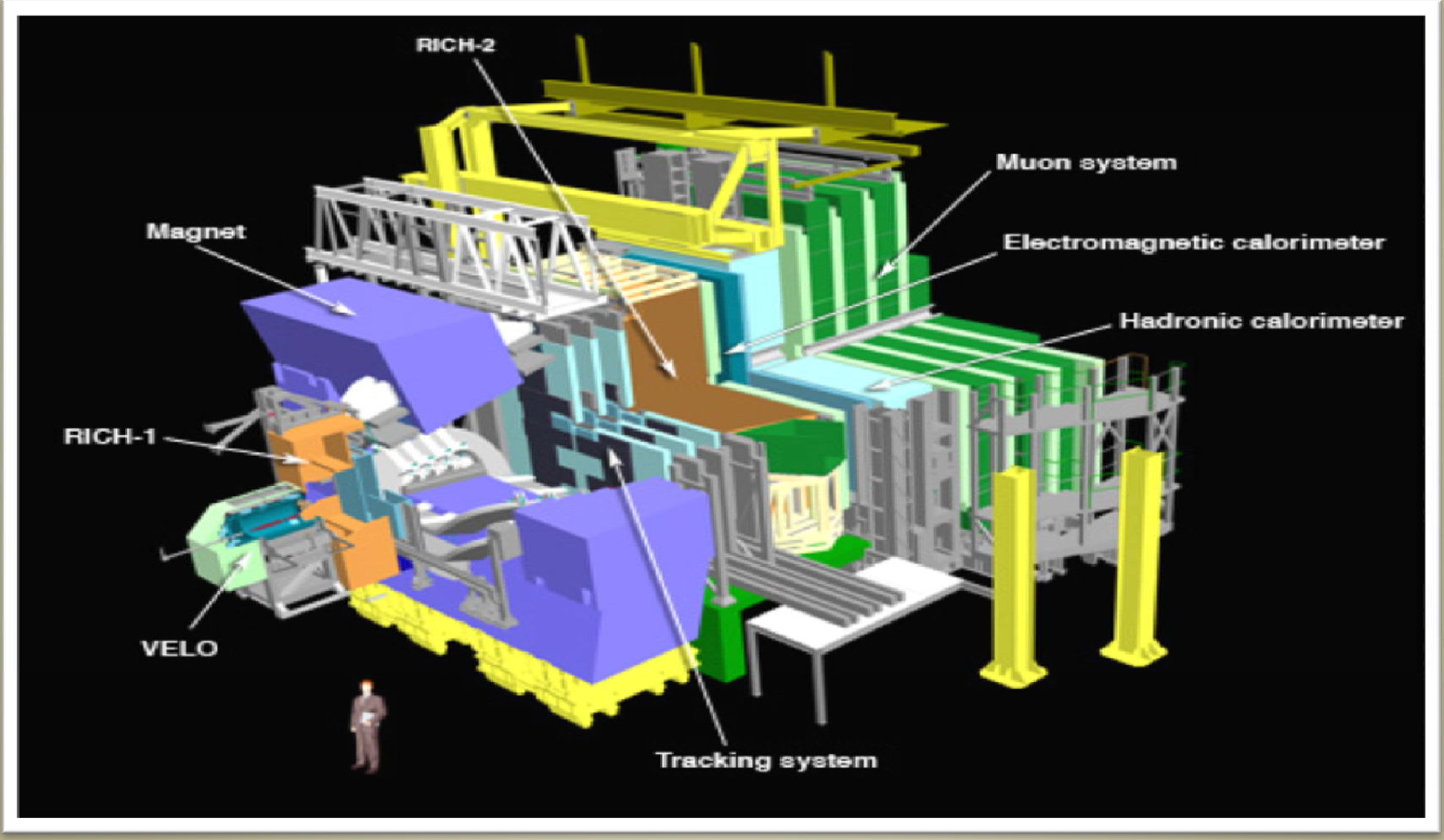
University of Michigan CERN REU 2008

14 August 2008

The LHCb Experiment

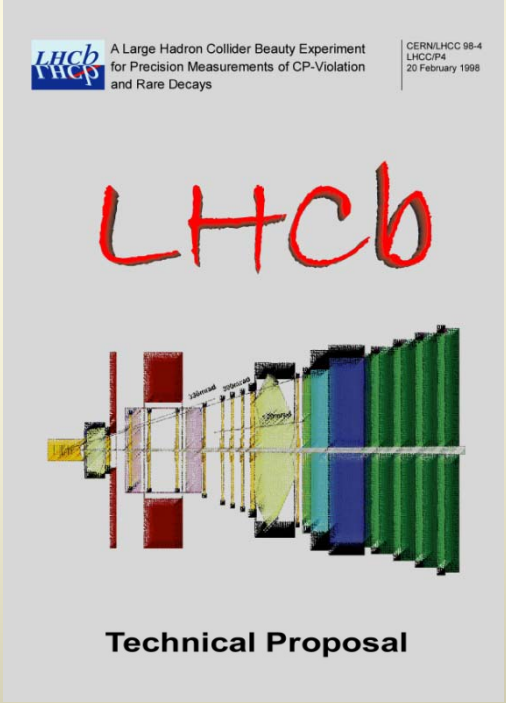


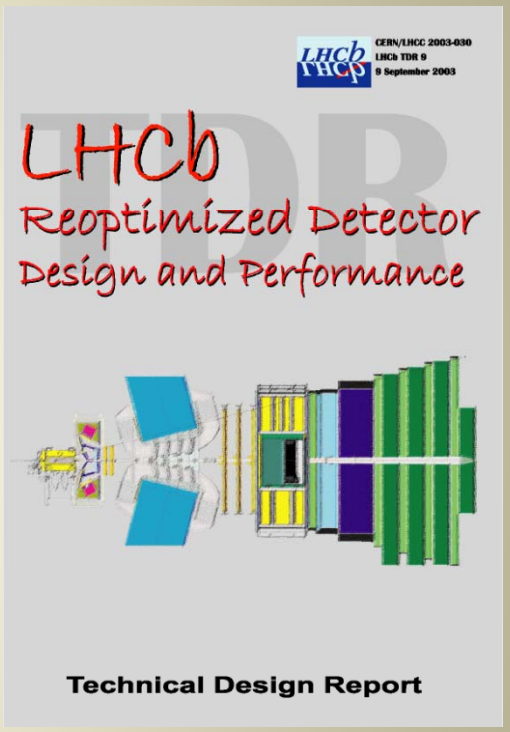
Phases of My Project

- Phase 1 Learn about the LHCb experiment and detector
- Phase 2 Learn about web site design and create a site devoted to the LHCb magnet
- Phase 3 Create online display panels reflecting state of the detector

Phase 1: Reading

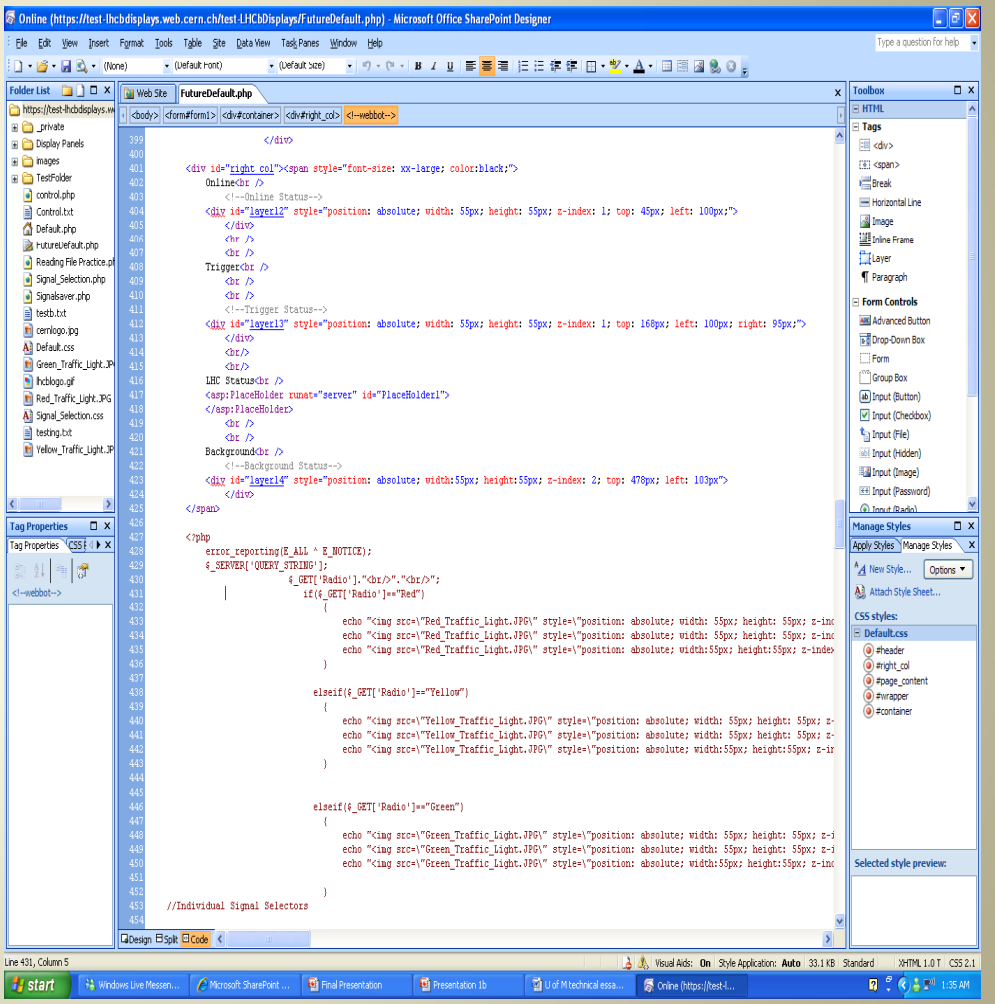
- Technical Proposal from 1998
- Design Report from 2003
- Many web sites and articles about the LHCb





Phase 2: Web Site Design

- HTML Tutorials
- Learning way around SharePoint
- Usefulness of CSS style sheets
- Created practice web site



Phase 2: Magnet Site

- Purpose: Serve as a source of information for scientists wanting to know the state of the magnet at any given moment

- Implementation: Designed using SharePoint and written in HTML with attached CSS style sheets

Homepage

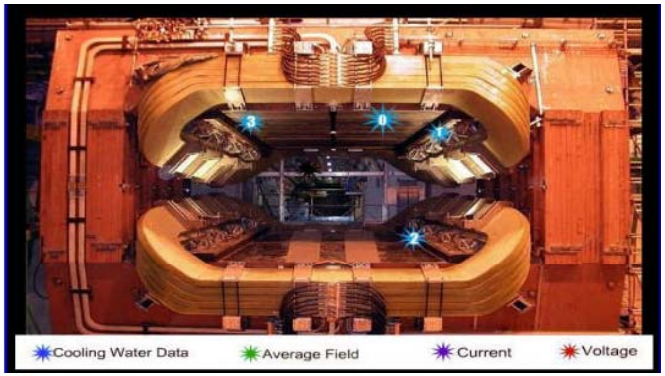
The Large Hadron Collider Beauty Experiment

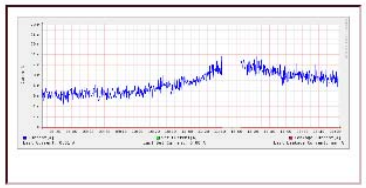
The LHCb Dipole Magnet

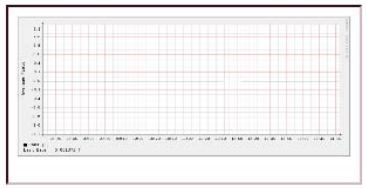
MAGNET SUBGROUP HOMEPAGE

Magnet Status

Click on the sensors in the photo below to view temperature, field, cooling water, current, and voltage plots for the magnet.







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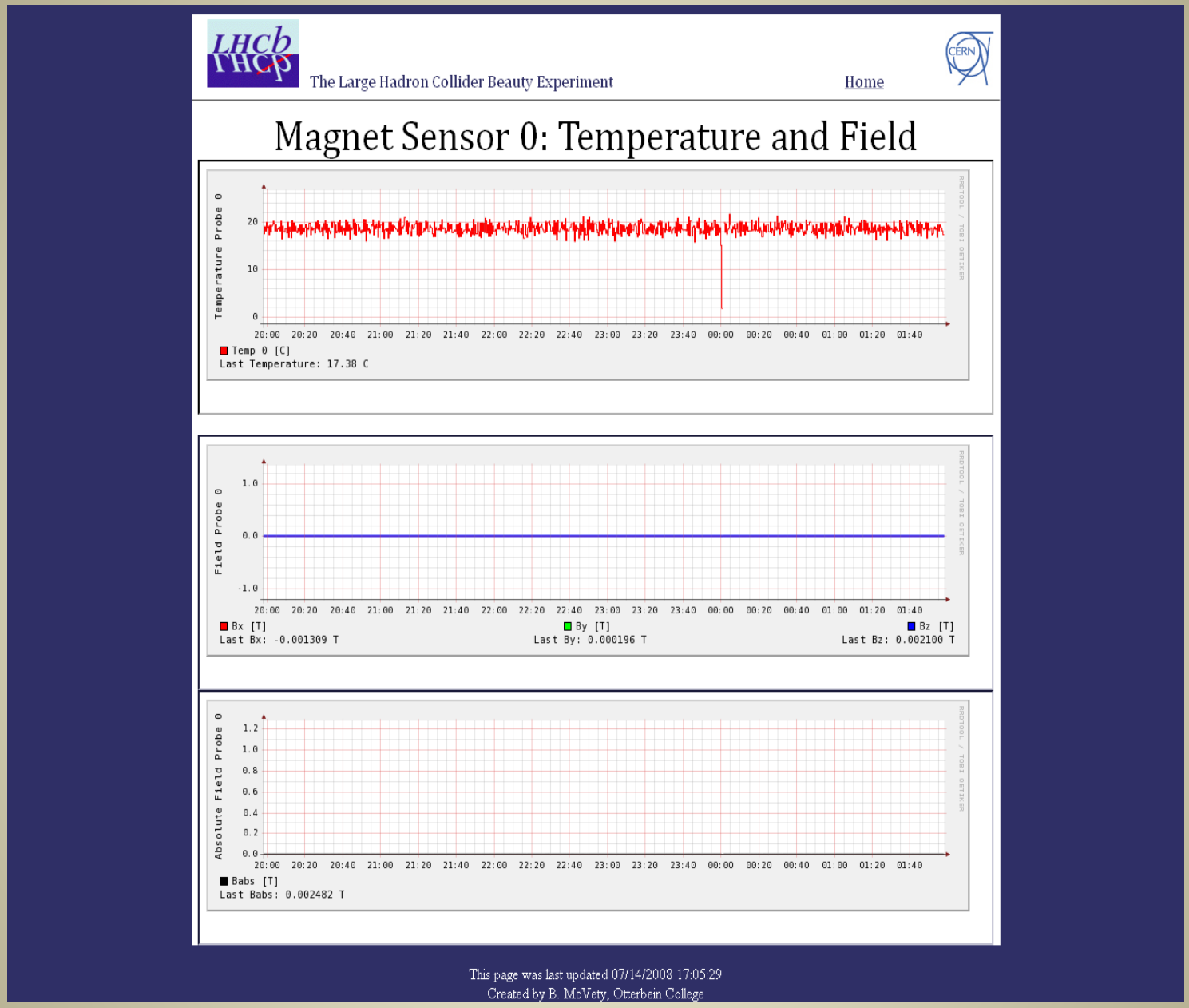
Sensor 0


The Large Hadron Collider Beauty Experiment
Home
Magnet Sensor 0: Temperature and Field
Temperature Probe 0
Temp 0 [C]
Last Temperature: 17.38 C
Field Probe 0
Bx [T]
Last Bx: -0.001309 T
By [T]
Last By: 0.000196 T
Bz [T]
Last Bz: 0.002100 T
Absolute Field Probe 0
Babs [T]
Last Babs: 0.002482 T
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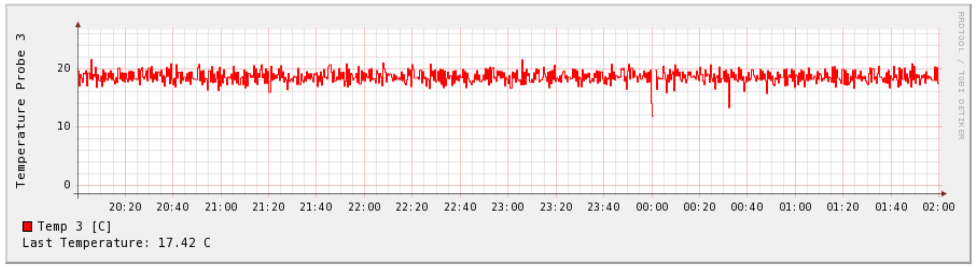
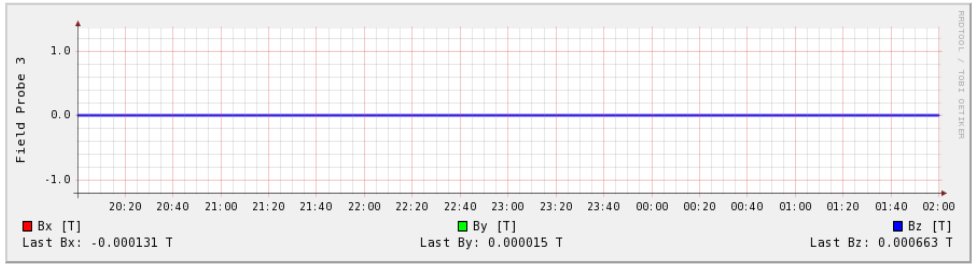
Sensor 3

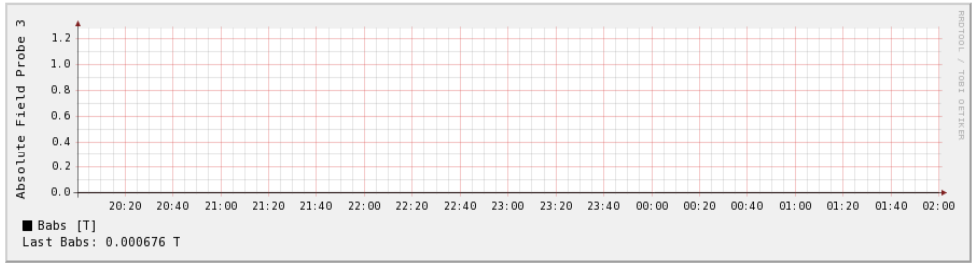
The Large Hadron Collider Beauty Experiment

Home

Magnet Sensor 3: Temperature and Field







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Homepage

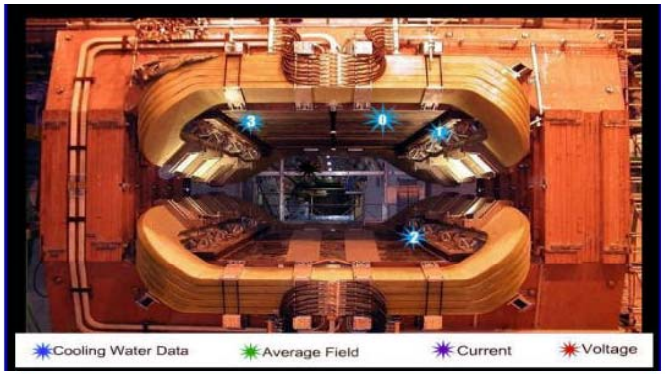
The Large Hadron Collider Beauty Experiment

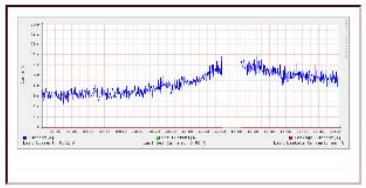
The LHCb Dipole Magnet

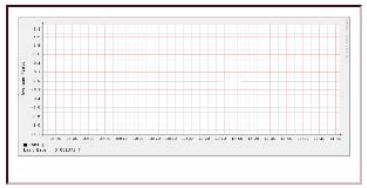
MAGNET SUBGROUP HOMEPAGE

Magnet Status

Click on the sensors in the photo below to view temperature, field, cooling water, current, and voltage plots for the magnet.







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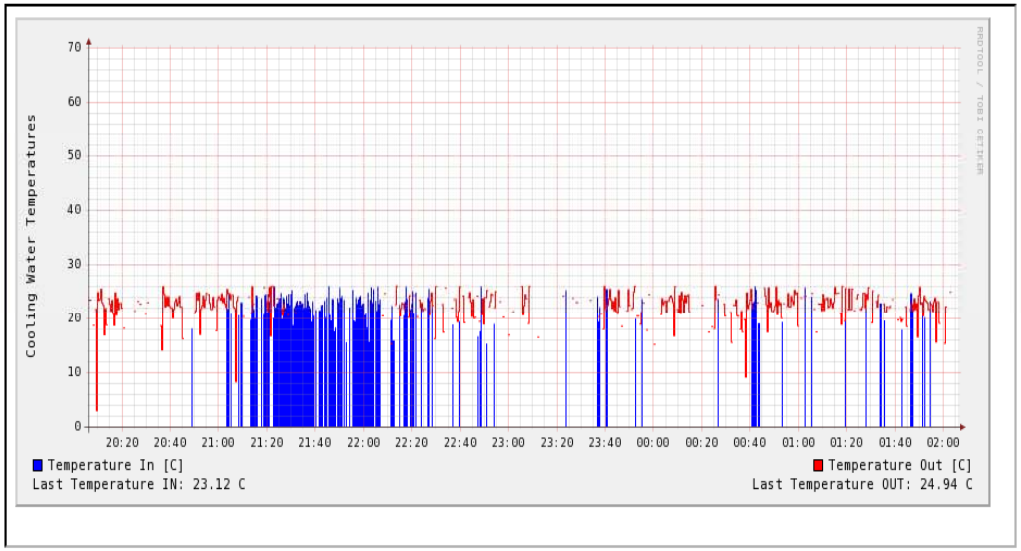
Cooling Water

The Large Hadron Collider Beauty Experiment

Home

Magnet Cooling Water Plot



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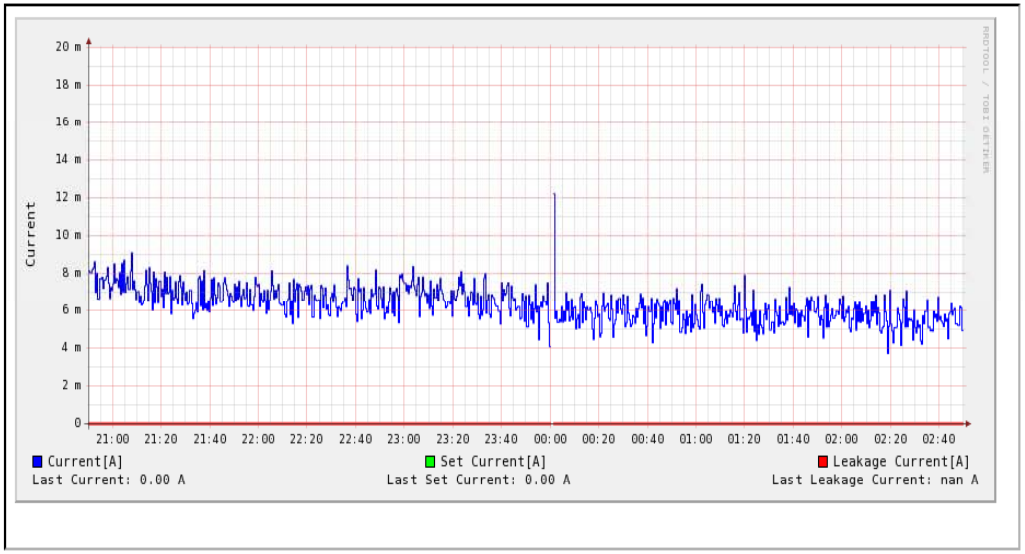
Current

The Large Hadron Collider Beauty Experiment

Home

Magnet Current Plot



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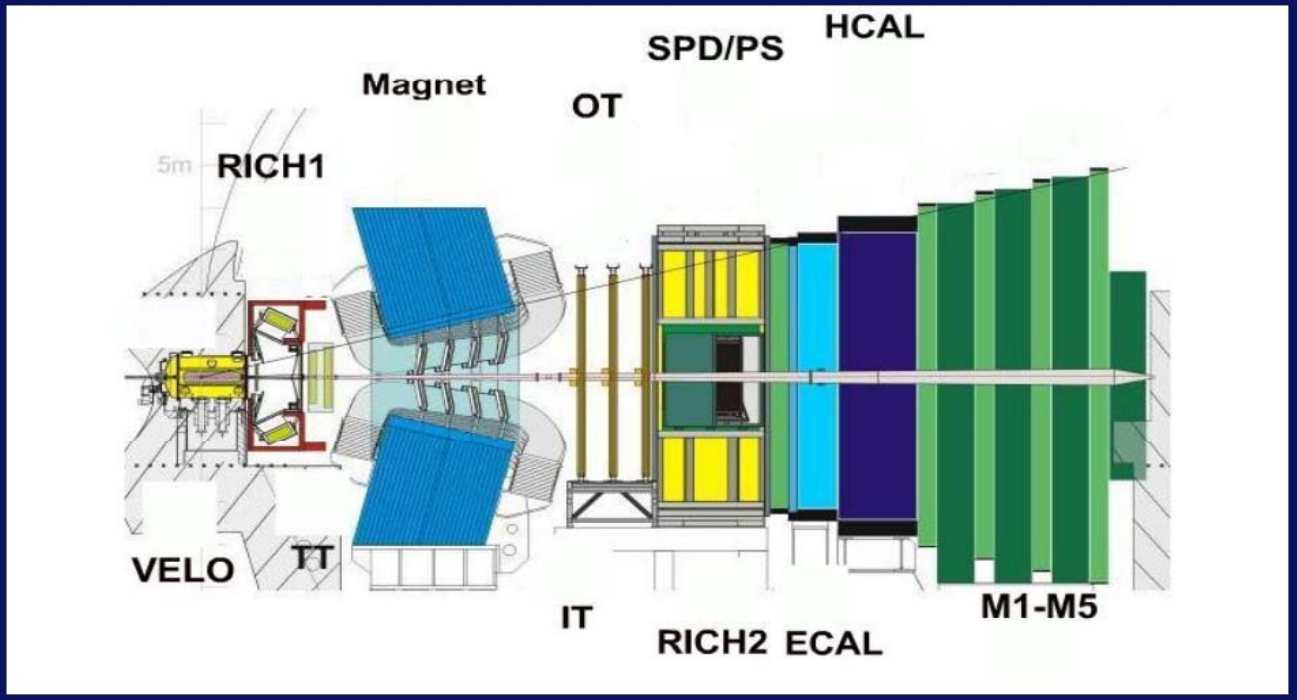
Phase 3: Online Display Panels

- Purpose: Serve as a source of information for those wanting to know the state of the LHCb
- Implementation: Designed using SharePoint and written in HTML and PHP with attached CSS sheets

Panel Design 1

The Large Hadron Collider Beauty Experiment

Signal Selection



Online

Trigger

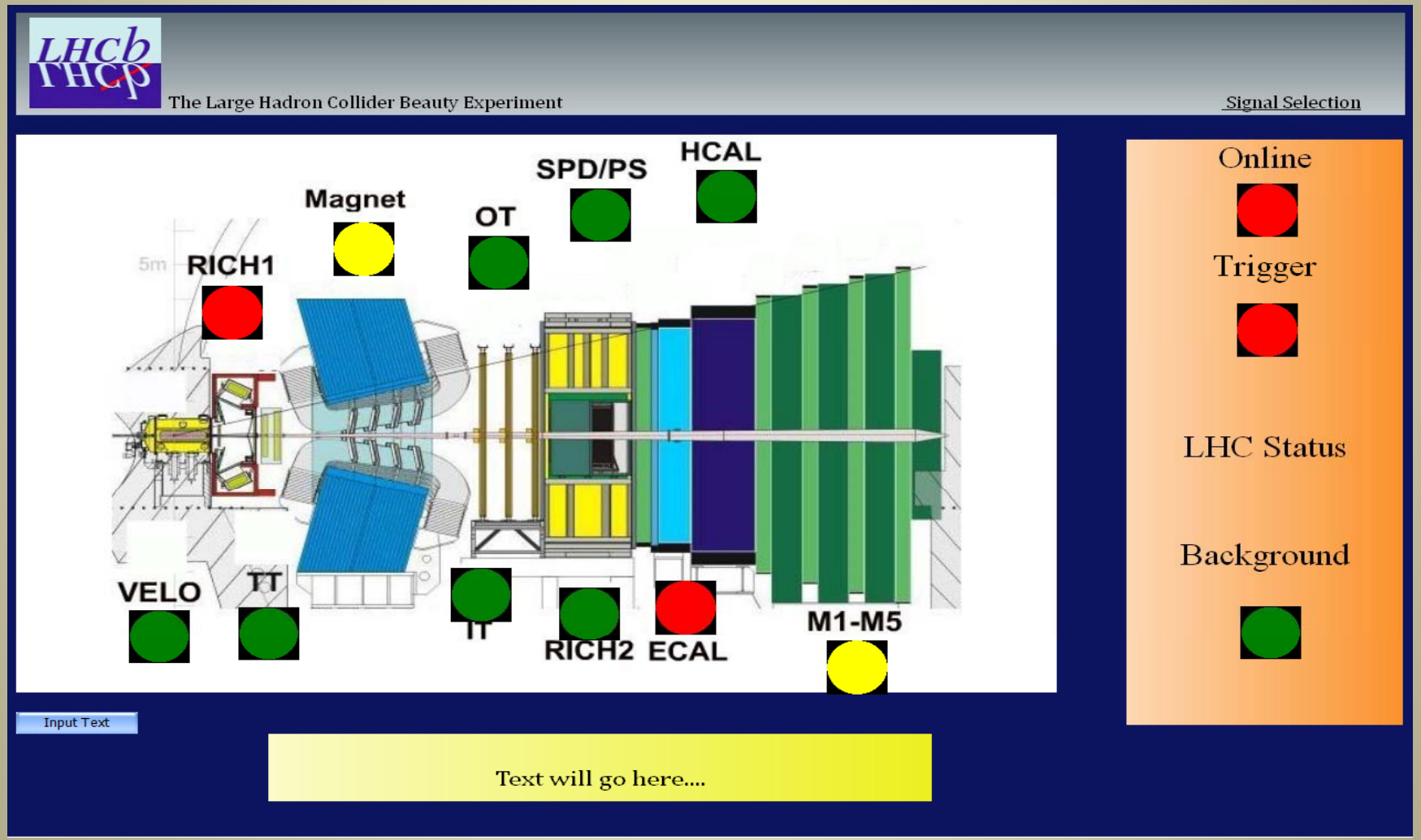
LHC Status

Background

Input Text

Text will go here....

Panel Design 2



What is PHP?

- A server-side scripting language that can be embedded into HTML
- Useful for creating dynamic web pages
- Remains invisible to users when viewing source

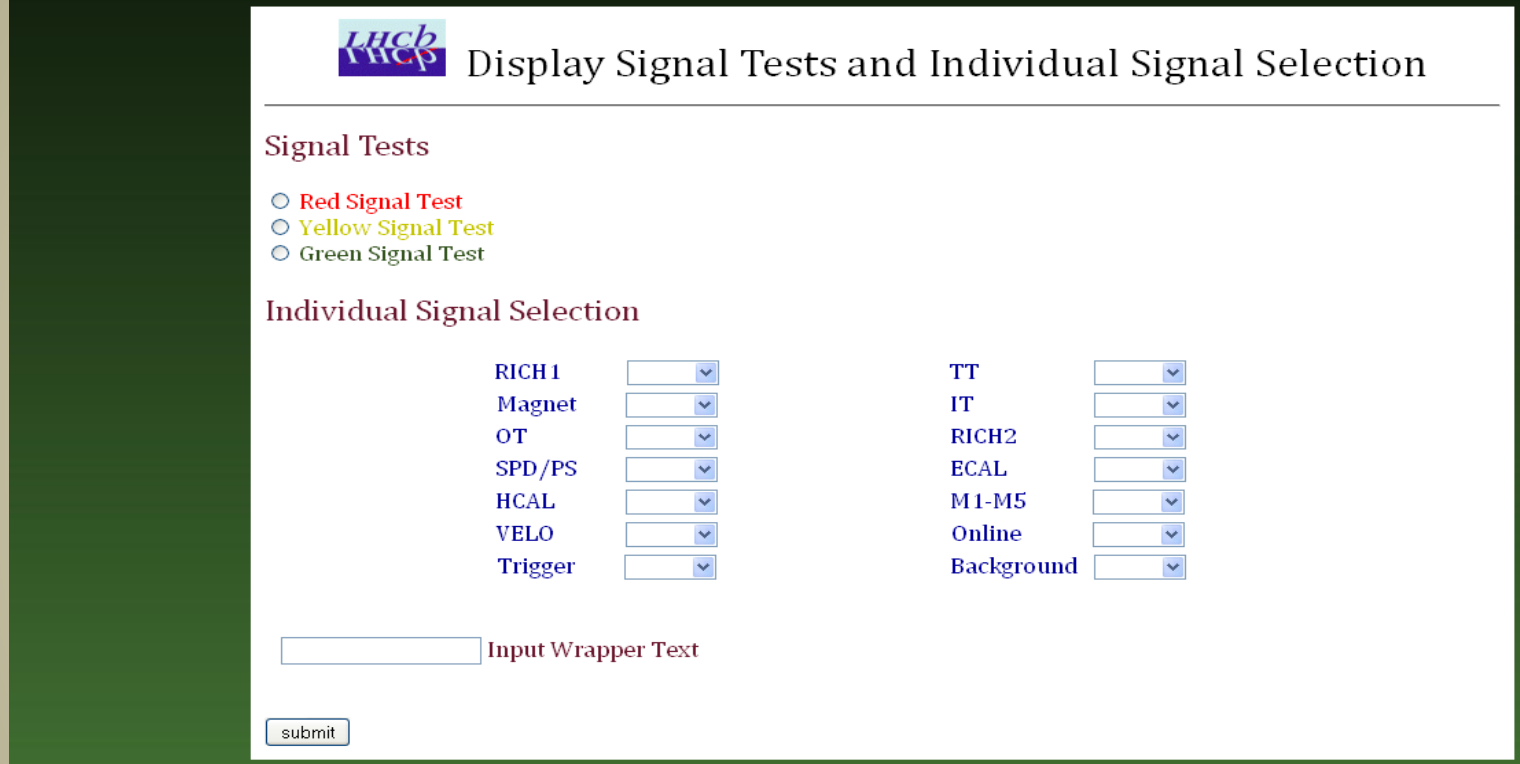
```
<?php
        error_reporting(E_ALL ^ E_NOTICE);
        function getlightstatus($lightnumber)
            {
             if($lightnumber=="1")
                {
                 echo "<img src=\"Green_Traffic_Light.JPG\" width=50 height=50>";
                }
              elseif($lightnumber=="2")
                {
                  echo "<img src=\"Yellow_Traffic_Light.JPG\" width=50 height=50>";
                }
              elseif($lightnumber=="3")
                {
                  echo "<img src=\"Green_Traffic_Light.JPG\" width=50 height=50>";
                }
                                                              .
                                                              .
                                                              .
              elseif($lightnumber=="13")
                {
                  echo "<img src=\"Green_Traffic_Light.JPG\" width=50 height=50>";
                }
              elseif($lightnumber=="14")
                {
                  echo "<img src=\"Green_Traffic_Light.JPG\" width=50 height=50>";
                }

            }
?>
```

HTML Form

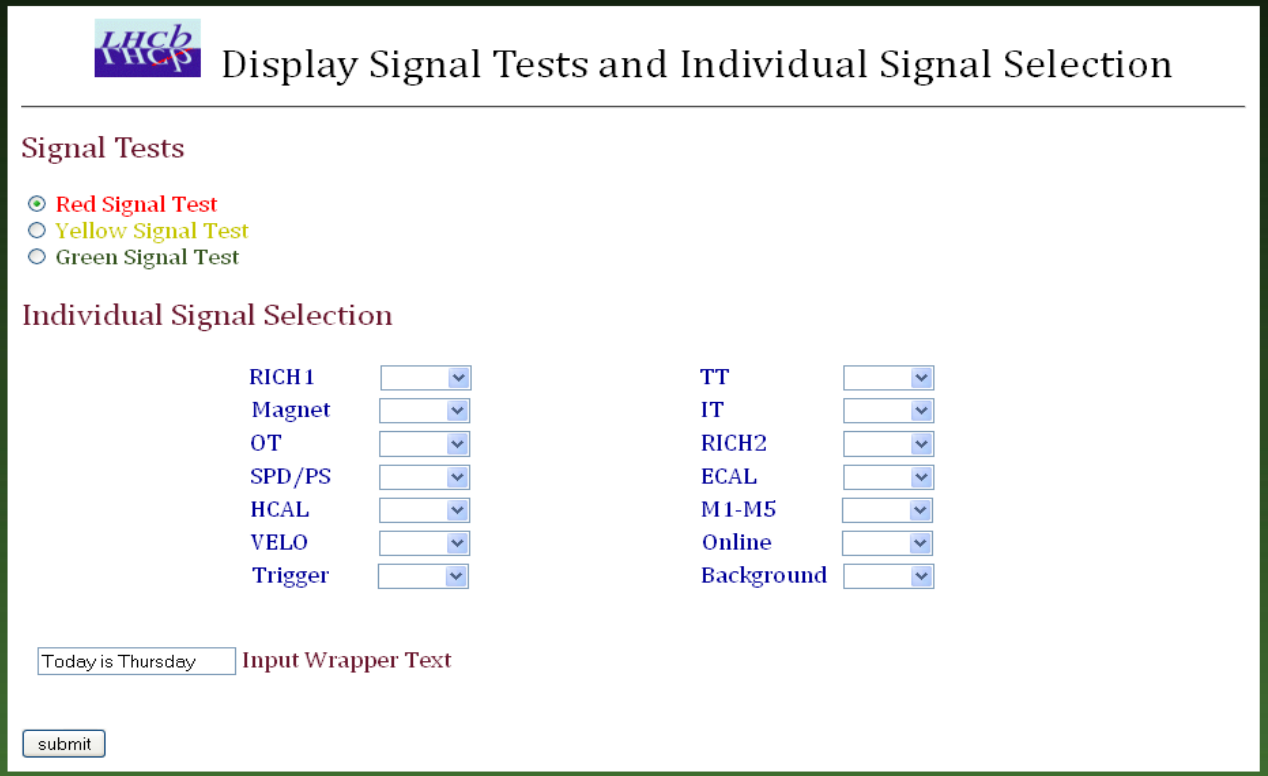
https://test-lhcbdisplays.web.cern.ch/test-LHCbDisplays/Default.php?RICH1=Red&TT=Green&Magnet=Yellow&IT=Green&OT=Green&RICH2=Green&SPD%2FPS=Green&ECAL=Red&HCAL=Green&Muon=Yellow&VELO=Green&Online=Green&Trigger=Red&Background=Green&Text1=&Submit=submit

```
                <option>Red</option>
                <option>Yellow</option>
                <option>Green</option>
        </select></span>
        <input name="Submit" type="submit" value="submit"
/>
</form>
```

My HTML Form Page



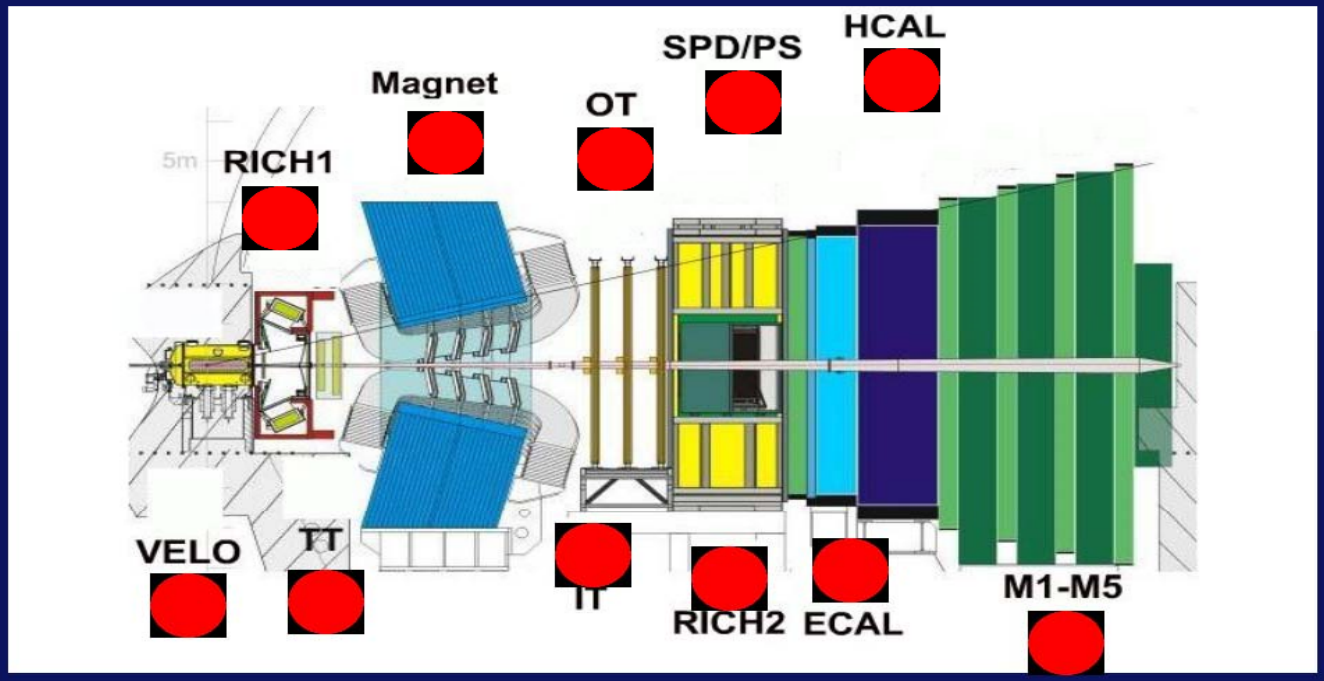
Example 1: Red Signal Test



Example 1: Output

The Large Hadron Collider Beauty Experiment

Signal Selection



Online

Trigger

LHC Status

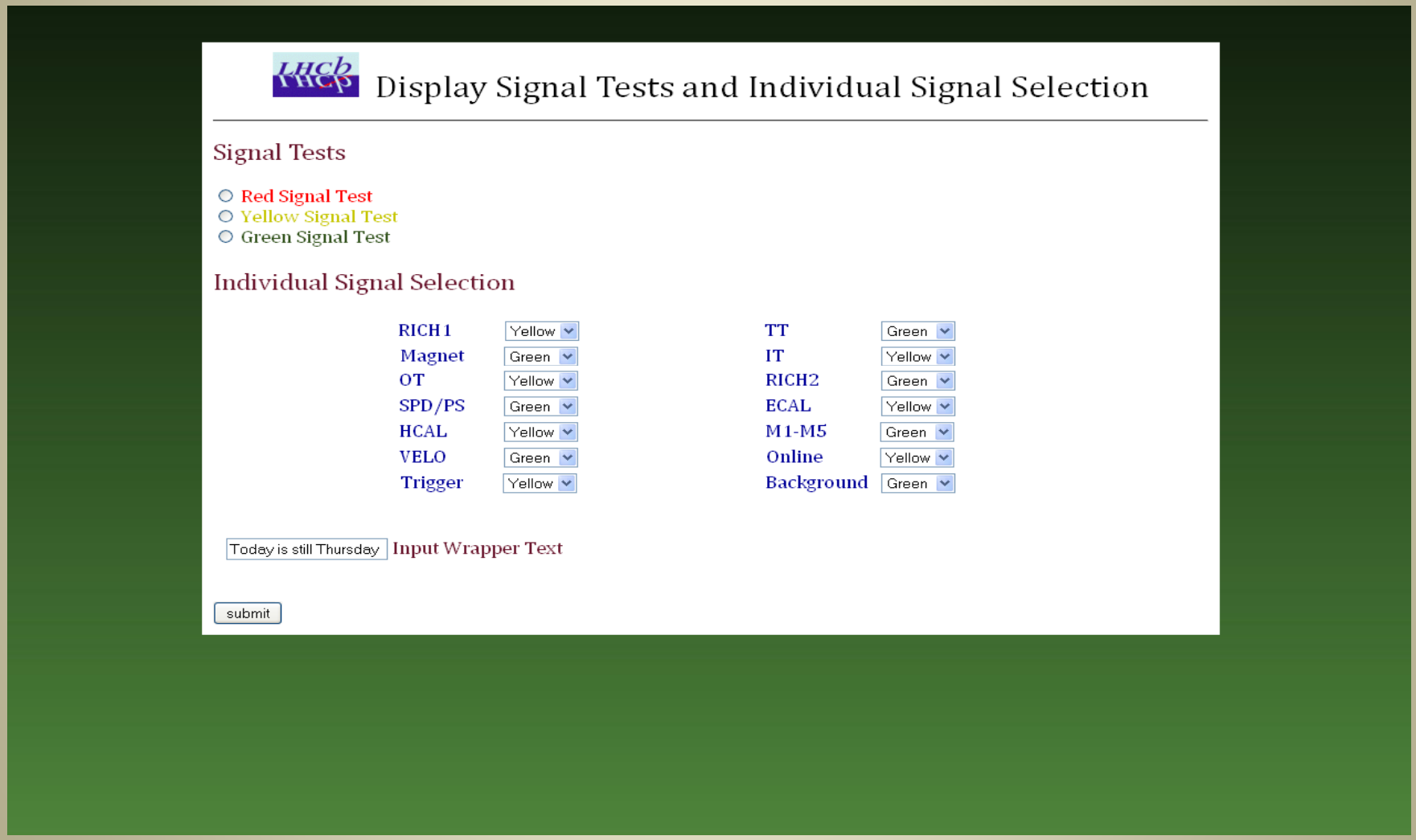
Background

Input Text

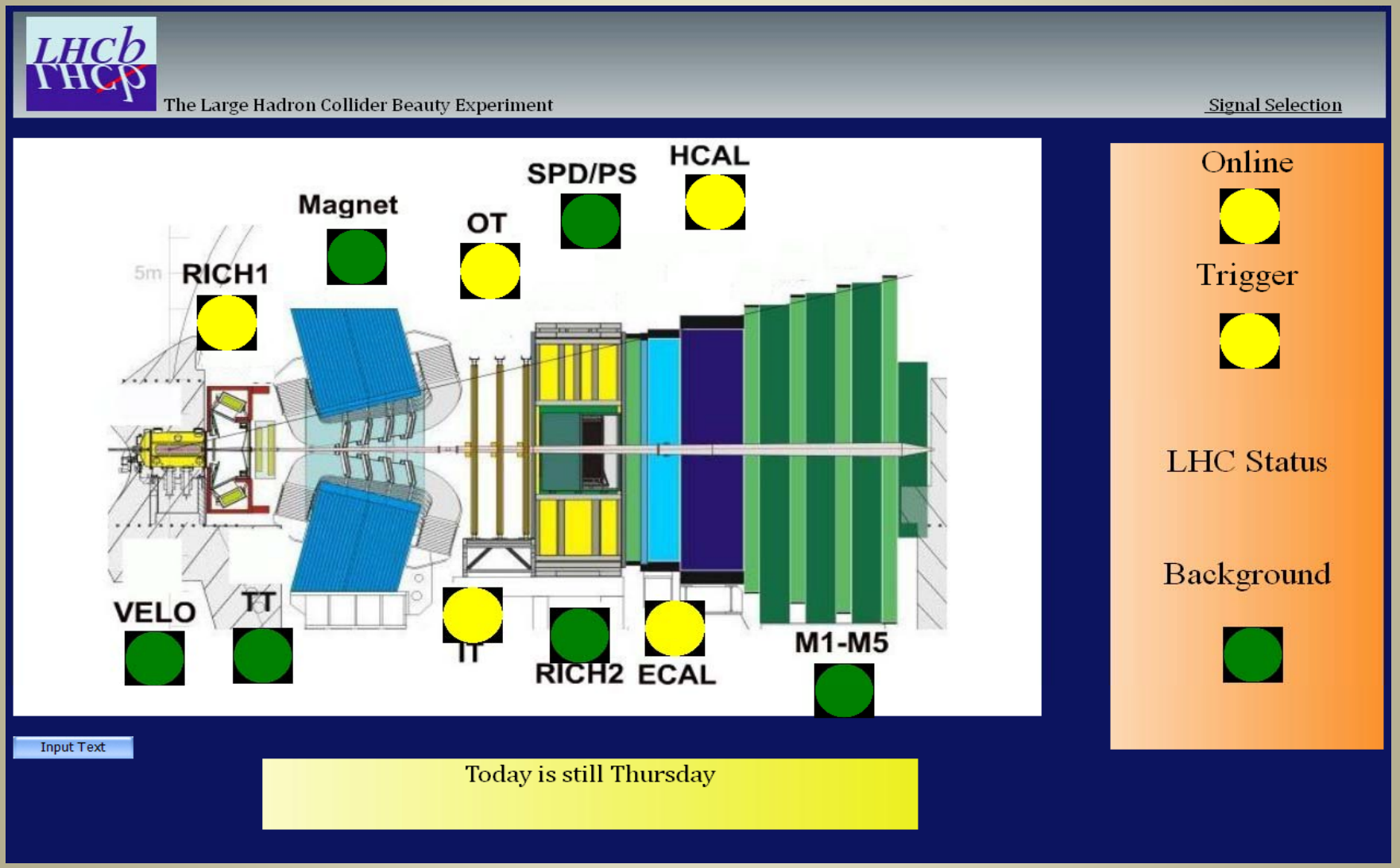
Today is Thursday

Test Signal: Red

Example 2: Individual Selections



Example 2: Output



Currently…

- Display page and signal selection page are not saved between sessions
- Have started to lay the ground work for signal selections to be saved to a file, which will then be read and updated each time the signals change
  - Minor Glitch: I currently lack permission to write to files in PHP

Acknowledgements

Professor Jean Krisch

Professor Homer Neal

Professor Myron Campbell

Professor Steve Goldfarb

Dr. Dirk Wiedner

Jeremy Herr

National Science Foundation

Thank You!

Questions?

The LHC in General

- 27 Kilometers in circumference
- Accelerates beams of protons to just under the speed of light
- Supports 4 main experiments