BaBar Detector D&D

- MMS
  - Keeping components healthy for reuse

- D&D
  - Project phases
  - Schedule, Safety Plan
  - Progress & near future
The Minimal Maintenance State

- The goal of the minimal maintenance state is to safely preserve assets for reuse at the lowest cost in preparation for detector disassembly and reuse.
- A stand-alone version of the monitoring system is used to track the state of the detector in the MMS.
- MMS monitoring in use for all systems in September.
Moving the magnet to its MMS configuration was a very slow process. The support services (compressor, liquifier, monitoring systems) moved quickly, but warming the coil was slow:

- June 30: 210K
- July 21: 228K
- Aug 27: 251K
- Sept 23: 263K
- Oct 21: 271.6
- Nov 21: 278.1
- Dec 3: 280.1K
- Dec 15: 281.4
- Dec 19: 281.6

- Turn off one of the vacuum pumps
- Jan 5: 282.9K
- Jan 20: 283.9
- Feb 2: 284.7

- Back-fill with nitrogen
- Feb 3: 286.1K
- Feb 4: 287.1K

MMS achieved.

- Plans are well developed for removing external inputs to the cryostat.
# The Minimal Maintenance State

## 2007: expectation

<table>
<thead>
<tr>
<th>System</th>
<th>Front-end electronics</th>
<th>Power supplies</th>
<th>Gas</th>
<th>Cooling</th>
<th>Other utilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVT</td>
<td>Off</td>
<td>Off</td>
<td>dry air</td>
<td>off, drained</td>
<td></td>
</tr>
<tr>
<td>DCH</td>
<td>Off</td>
<td>Off</td>
<td>dry nitrogen</td>
<td>off</td>
<td></td>
</tr>
<tr>
<td>DRC</td>
<td>Off</td>
<td>Off</td>
<td>dry nitrogen</td>
<td>off, empty</td>
<td>SOB drained, purification system off</td>
</tr>
<tr>
<td>EMC</td>
<td>Off</td>
<td>Off</td>
<td>dry nitrogen</td>
<td>florinert circulating</td>
<td>water system drained and dried; source system drained</td>
</tr>
<tr>
<td>IFR-RPC</td>
<td>Off</td>
<td>Off</td>
<td>dry nitrogen</td>
<td>off, drained</td>
<td></td>
</tr>
<tr>
<td>IFR-LST</td>
<td>Off</td>
<td>Off</td>
<td>dry nitrogen</td>
<td>off, drained</td>
<td></td>
</tr>
<tr>
<td>Trigger</td>
<td>Off</td>
<td>Off</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>DAQ</td>
<td>Off</td>
<td>Off</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Online farm</td>
<td>Off</td>
<td>Off</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Safety systems/monitoring/UPS</td>
<td>On</td>
<td>On</td>
<td>n/a</td>
<td>EH cooling on</td>
<td>UPS maintained</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>EH cooling on</td>
<td>UPS maintained</td>
</tr>
<tr>
<td>Magnet</td>
<td>On</td>
<td>Off</td>
<td>n/a</td>
<td>n/a</td>
<td>On: vacuum pumps on</td>
</tr>
<tr>
<td>IR2 complex</td>
<td>n/a</td>
<td>On</td>
<td>On</td>
<td>On</td>
<td>gas shack limited use</td>
</tr>
</tbody>
</table>

## 2008/9: evolution

- **Dry air**: Off
- **Off**: On: MonteCarlo farm till ~2/15
- **Pumps off, Backfill N2 a week ago**: Decommission: remove hazards
Detector D&D has been broken into five parts:

- **Project management**
  - Includes detailed schedules, safety plan, material disposition plan. Takes the first of 4+ years.
  - The balance of the time goes to materials disposition.

- **Engineering and tooling refurbishment**
  - Gathering the tooling, preserving it, generating plans for disassembly, designing new tooling, etc. Expect that many of these items can be reused for SuperB assembly.

- **Peripherals disassembly**
  - Includes the EH, electronics on the detector, fluid systems, walkways, platforms, cabling. Many of these items will be kept aside for possible reuse on SuperB

- **Core Disassembly**
  - In 2009, down to serious work: done in early 2011. This is the time that the underlying structure becomes available for SuperB.

- **DIRC/EMC Disassembly**
  - Only expected if SuperB does not go forward. Would be complete by Fall 2012.
D&D Planning: Schedule

- Engineering staff came on board last quarter of 2008, once LCLS turn-on frees up staff.
  - Jim Krebs, Chief Engineer, only working part time earlier, but did produce a very detailed schedule.
    - Currently, ~2000 items. Does not include EMC disassembly details (SuperB use of this gives cost offsets).
    - Updated weekly. Two week look-ahead every week.
    - Engineering meetings: 4 topics, covered two at a time during alternate weeks, started beginning of November.
  - Technician crew increased in size at turn of the year.
D&D Work Planning

- SLAC is involved in executing a new Work Planning and Control system that was called for by a DOE safety audit team almost two years ago.
  - The new scheme involves more fixed format to the operations meeting, use of Work Integration Packages when multiple external groups are involved, and Job Safety Analysis for the task at hand (in cases where the task is a standard one, a library is being put together to simplify life: the point is that people review the hazards of what they are about to do very soon before they do it).
  - This new system is a bit of a burden as we start up. However, with the detailed schedule it is possible to identify the activities which require a WIP, and non-standard JSAs in advance. All folks working in IR2 will need to live with this system. Fortunately, it is very close to what we do as standard practice at our operations meetings.
## D&D Planning: Schedule

<table>
<thead>
<tr>
<th>ID</th>
<th>Task Name</th>
<th>Start Date</th>
<th>Start Time</th>
<th>Duration</th>
<th>Finish Date</th>
<th>Finish Time</th>
<th>Duration</th>
<th>Finish Date</th>
<th>Finish Time</th>
<th>Predecessor</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Drill Chamber Chillers Removed</td>
<td>Wed 2/18/09</td>
<td>8:00 AM</td>
<td>4 hrs</td>
<td>Wed 2/18/09</td>
<td>12:00 PM</td>
<td>4 hrs</td>
<td>Wed 2/18/09</td>
<td>12:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>02</td>
<td>Backup Cooling System</td>
<td>Wed 2/18/09</td>
<td>11:00 AM</td>
<td>2 hrs</td>
<td>Wed 2/18/09</td>
<td>1:00 PM</td>
<td>2 hrs</td>
<td>Wed 2/18/09</td>
<td>1:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>03</td>
<td>In-Box Work</td>
<td>Wed 2/18/09</td>
<td>2:00 PM</td>
<td>2 hrs</td>
<td>Wed 2/18/09</td>
<td>4:00 PM</td>
<td>2 hrs</td>
<td>Wed 2/18/09</td>
<td>4:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>04</td>
<td>Disconnect Electrical Power/Remove Wiring</td>
<td>Thu 2/19/09</td>
<td>8:00 AM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>8:00 AM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>8:00 AM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>05</td>
<td>Disconnect Inlet/Outlet Manifolds &amp; Controls</td>
<td>Fri 2/20/09</td>
<td>8:00 AM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>10:00 AM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>10:00 AM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>06</td>
<td>Remove Wiring/Control System</td>
<td>Fri 2/20/09</td>
<td>10:00 AM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>12:00 PM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>12:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>07</td>
<td>Remove Wiring/Control System</td>
<td>Fri 2/20/09</td>
<td>12:00 PM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>2:00 PM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>2:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>08</td>
<td>Disconnect Cooling System</td>
<td>Fri 2/20/09</td>
<td>2:00 PM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>4:00 PM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>4:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>09</td>
<td>In-Box Work</td>
<td>Fri 2/20/09</td>
<td>4:00 PM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>6:00 PM</td>
<td>2 hrs</td>
<td>Fri 2/20/09</td>
<td>6:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>10</td>
<td>Connect Electrical Power</td>
<td>Sat 2/21/09</td>
<td>8:00 AM</td>
<td>1 hr</td>
<td>Sat 2/21/09</td>
<td>9:00 AM</td>
<td>1 hr</td>
<td>Sat 2/21/09</td>
<td>9:00 AM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>11</td>
<td>Piping and Hoses</td>
<td>Mon 2/23/09</td>
<td>8:00 AM</td>
<td>2 hrs</td>
<td>Mon 2/23/09</td>
<td>10:00 AM</td>
<td>2 hrs</td>
<td>Mon 2/23/09</td>
<td>10:00 AM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>12</td>
<td>Piping and Hoses</td>
<td>Mon 2/23/09</td>
<td>10:00 AM</td>
<td>2 hrs</td>
<td>Mon 2/23/09</td>
<td>12:00 PM</td>
<td>2 hrs</td>
<td>Mon 2/23/09</td>
<td>12:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>13</td>
<td>Piping and Hoses</td>
<td>Mon 2/23/09</td>
<td>12:00 PM</td>
<td>2 hrs</td>
<td>Mon 2/23/09</td>
<td>2:00 PM</td>
<td>2 hrs</td>
<td>Mon 2/23/09</td>
<td>2:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
<tr>
<td>14</td>
<td>Piping and Hoses</td>
<td>Mon 2/23/09</td>
<td>2:00 PM</td>
<td>2 hrs</td>
<td>Mon 2/23/09</td>
<td>4:00 PM</td>
<td>2 hrs</td>
<td>Mon 2/23/09</td>
<td>4:00 PM</td>
<td>060</td>
<td>050.04</td>
</tr>
</tbody>
</table>

**Summary**

<table>
<thead>
<tr>
<th>Task</th>
<th>Start Date</th>
<th>Start Time</th>
<th>Duration</th>
<th>Finish Date</th>
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<th>Predecessor</th>
<th>Constraints</th>
</tr>
</thead>
</table>

**Bill Wisniewski**

**February 15, 2009**
D&D Planning: Safety

- In 2004 and 2006 upgrades we worked to formal, reviewed, safety plans.
- A detailed safety plan (includes a project description, the schedule, lots of photos (all told, 179 pages): sufficient material so that anyone reviewing the plan has the full context).
- The plan was reviewed about four weeks ago. The committee met a few times after that.
- In addition ES&H safety experts and two members of the DOE Site Office have reviewed it and produced, with the committee about thirty comments, which are included in the committee report.
- Final report released a week ago Friday.
- Much more scrutiny by more groups, including the DOE Site Office, than in the past: new work environment. This may slow the completion of BaBar disassembly and availability of components by months.
- Have been restricted from serious disassembly ‘behind the shield wall’ till approved. We are incorporating the comments in the plan: expect to be done in 2-3 weeks.
D&D Progress

- Shield wall removed from IR2 to the PEP Ring Road. Long hiatus waiting for the PEP Road to open. SSO asks for detailed engineering calculations for the LCLS tunnel carrying capacity. First four large blocks moved to Sector 12 (where the blocks will form part of a fenced materials storage area) a week ago.

- Other fenced areas set up for materials storage: issue of metals suspension. The metals suspension is an issue for parts not reused, but would not affect components for SuperB.

- Durable bar code tags ordered. Equipment database will be used to record component status.

- General cleanup: scrap stockpile at IR2, shelves at IR8, operations materials in the containers in the upper IR2 lot cleared of unneeded items (salvage & trash).

- Unneeded chillers removed from IR2 Apron (EMC water, DIRC, DCH, two IFR, two SVT) and stored at IR8 or the SLC North Adit. Some of these may be useful for SuperB.

- SOB water purification plant decommissioned and removed. SOB drained.

- About 2/3 of electronics in Electronics House racks removed, entered in database, and packed away awaiting decision on use/disposal.

- Many cables removed from racks. Some cables for which there is no reuse have been removed (with prejudice). Some are being set aside for possible SuperB reuse (EMC power, for example).

- Electricians, HVAC techs, fire techs all involved in planning the disconnect of the Electronics House before its move. By reusing this as a ‘Black Box’, demolition is not needed.

- Recovery of IFC small equipment has begun: some of it could be used for SuperB.
IR2 Chiller Pad
IR2 Apron
Storage

- The end door steel will be stored in the Collider Experimental Hall pit, out of the weather.
- The EMC will be stored in IR12, along with the DIRC cylinder and the magnet coil and cryostat. The DIRC bars will be stored in their bar boxes in a special purpose storage container.
Near Term D&D

- Clear EH, remove all external connections. Set up cameras to record the D&D details. This is critical for the reassembly of the detector components in SuperB. It is more likely to be essential if substantial portions of the steel are reused.

- Roll EH to corner of apron. Reuse as ‘Black Box’.

- Remove Rafts. Remove Support Tube.

- Remove Forward Endcap. Reuse structure? Reuse rings of crystals for SuperB?
EH Move Tooling
Support Tube & SVT
Forward Endcap EMC
Detector transport

- The magnet coil in its cryostat has been transported before in a single chunk by air.

- Can the same be done for the EMC barrel? If not, substantial disassembly and reassembly is required. Understanding if it is possible to transport as a unit is a critical bit needed.

- Other massive components can go by sea. Need to understand how the steel is reused.

Reuse saves funds for critical upgrades.

- Making prioritized lists of detector improvements is needed: what is critical to have, what is strongly preferred to have, what would be nice to have. Include consideration of effort to implement, as well as material cost.
Closing

Steel splits in two modules