

AB Accelerator Consolidation Project

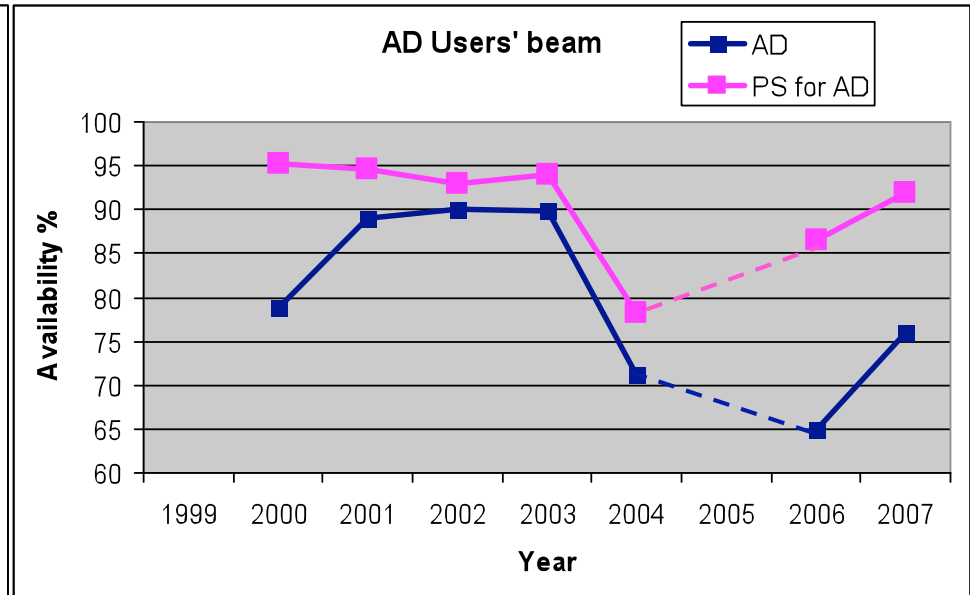
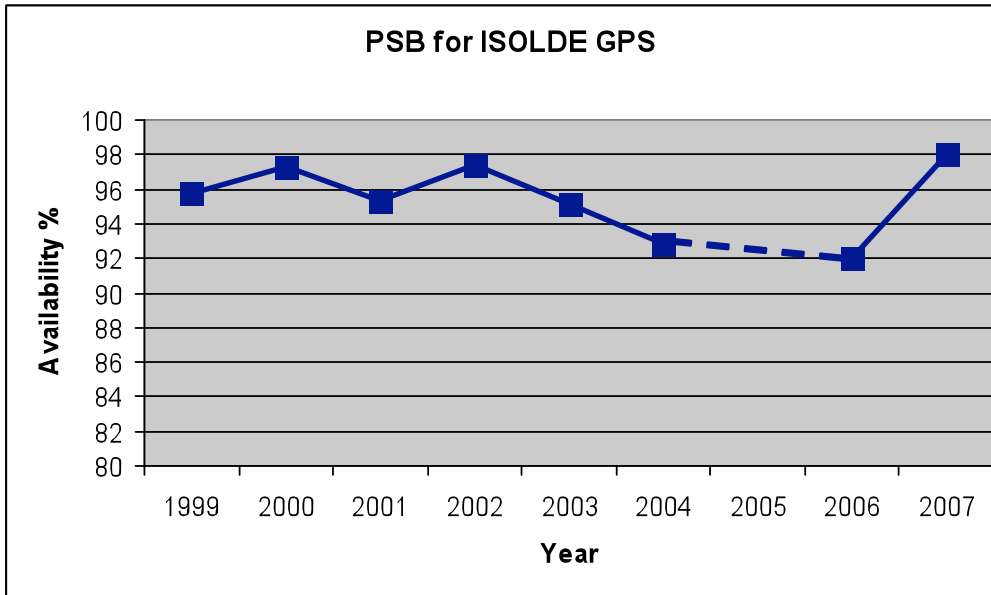
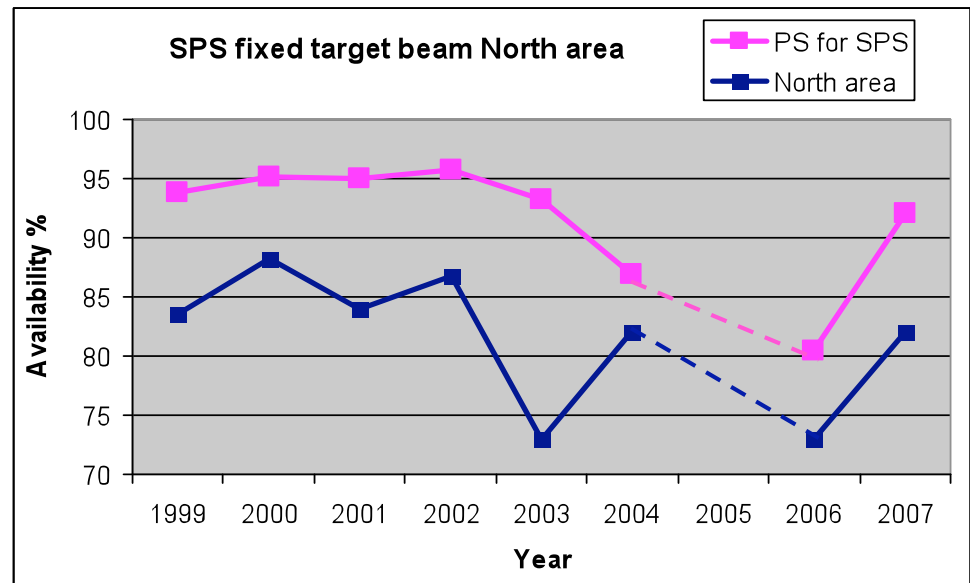
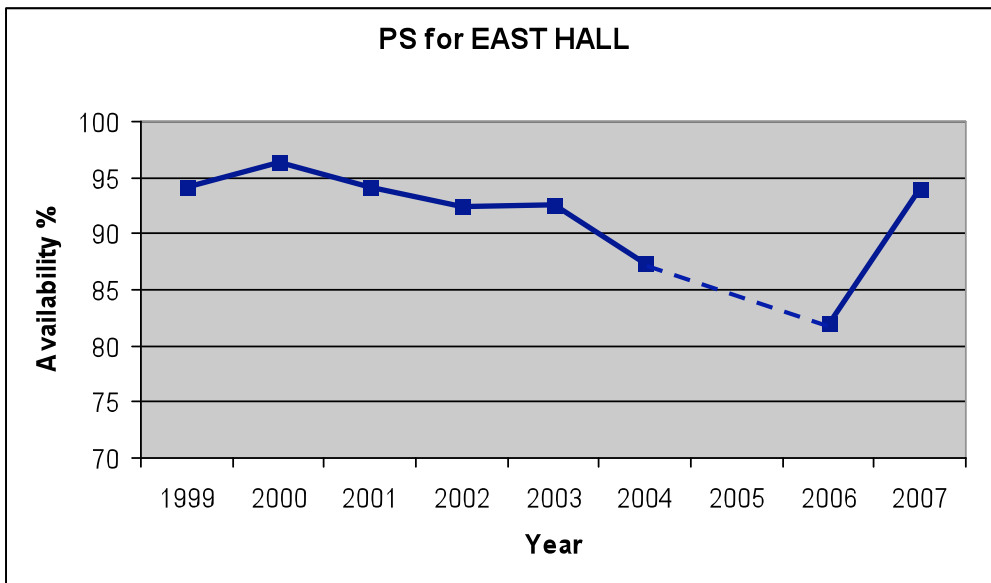
S. Baird

16th September 2008

Accelerator Consolidation

- Introduction
 - Why, What, When etc.
- Existing Consolidation
 - Outline of budgets, resources
- “White Paper” Consolidation
 - Timetable, resources, etc..
 - Potential calls for tender

Beam availability for East Hall, ISOLDE, SPS North area and AD



Why, What, When...

- “The decision to use the PS and SPS machines as injector for the LHC, means that a long term core consolidation for the AB Department had to be launched.”
- 2004: Risk Analysis:-
 - Likelihood of failure, impact of failure etc
 - CERN Risk Management system
- AB Consolidation project was born from two existing PS and SPS projects
- Additional information can be found at [AB Consolidation WWW page](#)

How to choose what to Consolidate

- The system most likely to fail is NOT necessarily the highest risk
- Use a simple Risk Analysis
 - Probability of failure ($P = 1, 2, 3, 4$)
 - Impact on CERN scientific objectives ($Io = 1, 2, 3, 5$)
 - Impact on CERN's reputation ($Ir = 1, 2, 3$)
 - Financial impact of failure ($If = 1, 2, 3, 5$)
 - Safety impact in case of failure ($Is = 1, 2, 3, 5$)
 - Facility concerned (weighting factor $i = 0.1 < 1$)

$$\text{Risk} = P \times \max(Io; Ir; If; Is) \times \sum i$$

Risk analysis: Failure of a PS Main Magnet

- Probability of failure
 - $P = 4$ (Frequent = once/year)
- Impact on CERN scientific objectives
 - $Io = 3$ (Major = up to 1 month lost)
- Impact on CERN's reputation
 - $Ir = 3$ (Major = discussed at Council)
- Financial impact of failure
 - $If = 2$ (Moderate = 1 – 4% of AB budget)
- Safety impact in case of failure
 - $Is = 1$ (Low = no injury or environmental consequence)
- Facility concerned
 - $i = 0.9$ (affects all facilities except ISOLDE)
- Risk = $12 * 0.9 = 10.8$ (This is HIGH)

AB Consolidation

- 58MCHF in 71 Work Units
 - Average Work Unit ~500kCHF
 - 4 WU's (PS Magnet renovation, SPS Compensator, PS MPS and SPS access system) = 22MCHF
- End of 2008 = 50 Work Units completed & 43MCHF spent

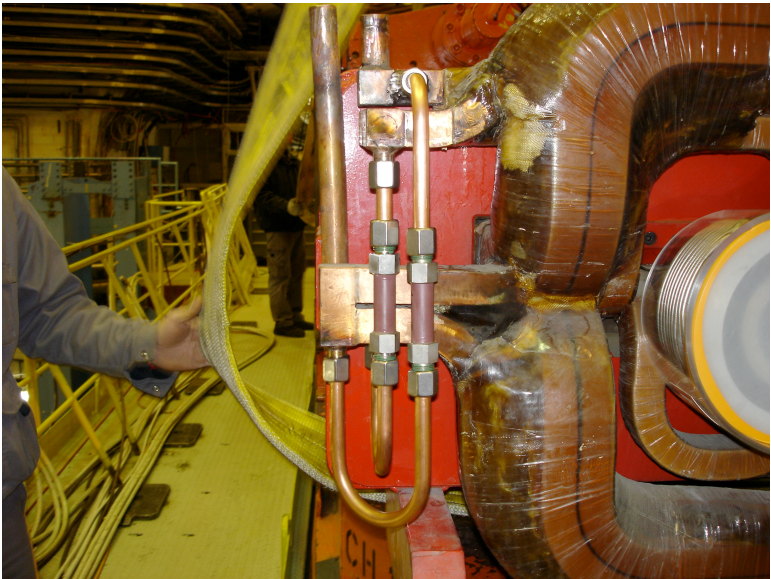
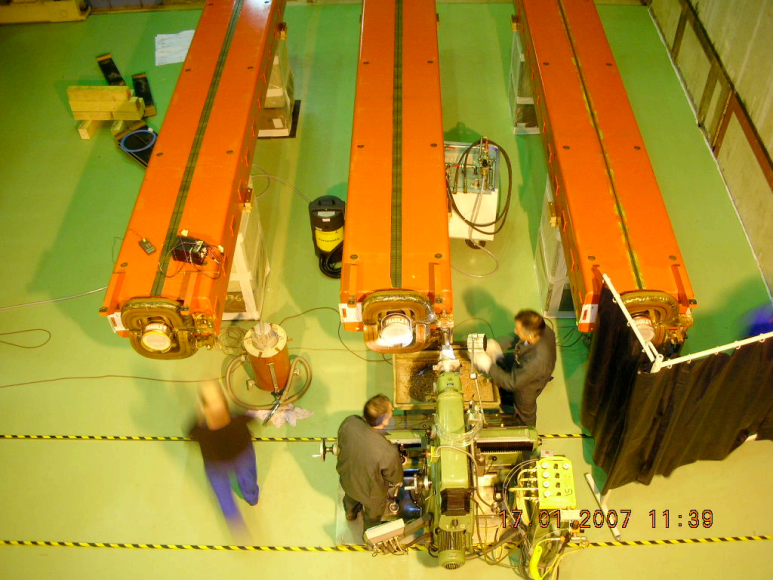
AB Consolidation budget (MCHF)

2003	2004	2005	2006	2007	2008	2009	2010	2011	TOTAL
840	3333	9285	7774	12711	9281	6965	5680	2305	58181

“White Paper” Consolidation

- 2007- additional request for Consolidation
 - Package approved for 24 Work Units at a total cost of 32.7MCHF & 62 Man-years
 - Again average cost is ~500kCHF
 - 3 Work Units (SPS 18kV, SPS MPS and PS Access system) = 20MCHF
 - 18 Work Units approved in April 2008 with material budget of 5.8MCHF. However, it is now estimated that only 2.4MCHF will be spent
 - Further Work Units are scheduled for approval in 2009

SPS main dipole water manifold



PS Main Power Supply rotating machine

Monday 12th June 2006
Repaired rotor inserted





42/100 PS main magnet units have been renovated





PS main magnet yoke (coils removed)