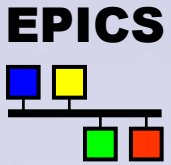

Progress Report on the DIAMOND Light Source to the EPICS Meeting Spring '02

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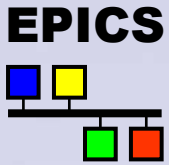
What Is DIAMOND?



- DIAMOND is the new UK Synchrotron Light Source
- Located at the Rutherford Appleton Laboratory (RAL) Oxfordshire
- Medium energy source
- Complement ESRF
- Due online early 2007

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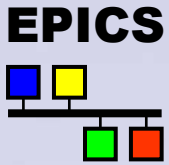
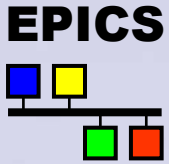
Major Parameters



• Energy	3 GeV
• Beam current	300 mA
• Lattice	DBA 24 cells
• Symmetry	6 fold
• Circumference	561 m
• Max length for ID's	18 x 5m
	6 x 8m
• Injection	100MeV Linac
	3GeV Booster

Recent Developments



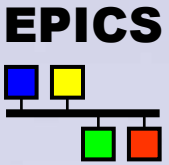
- **Completion of conceptual design phase March 02**
  - Publication of the design report, “Green Book”
  - Draft 1 is now out for peer review
  - Draft 2 will be made widely available from August 02
- **DIAMOND Light Source Ltd created March 27th**
- **Budget approved at £235M**
- **Appointments**

Chief Executive	Gerd Materlik
Tech. Director	Richard Walker

Interim Science Directors, Finance Director and Head HR

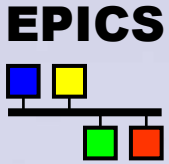
Recruiting technical group leaders

Programme Plan



- April 2002 Initiate procurement
- April 2004 Building weatherproof
- Aug 2004 Storage ring services available
- Jan 2005 Building complete
- Feb 2005 Linac acceptance
- Nov 2005 Booster acceptance
- Dec 2005 Start storage ring commissioning
- Feb 2006 Beamlines installed (start May 05)
- May 2006 Storage ring commissioned
- May 2006 IDs installed (start Feb 06)
- May 2006 Instruments ready for beam tests
- Sept 2006 Instruments ready for research

Control System Architecture

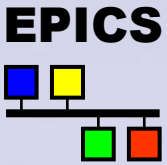


- **Based on EPICS using Two Layer Model**
  - Primary interface to CS through VME IOCs
  - Use VME64x, IP carriers, IP Modules and transition board for rear connection
  - Hot Swap capability
- **Will use PLCs to manage interlocks for protection**
  - Avoids Watch Dogs on IOCs and allow warm reboot of IOCs
  - Selecting preferred PLC and Interface to IOC
    - Have looked at Modbus now evaluating EthernetIP
- **Serial Interface to Instrumentation**
  - Potentially several thousand
  - Serial support through Stream Device and ORNL Serial
    - **(See P Owens presentation on Thursday)**

Hardware

- **Development**
  - Evaluating Linux for Development
  - Running EPICS 3.13.4
- **Consoles**
  - Either PCs Running Linux or Workstations
    - Evaluating both, decision 2003/2004
  - Will support NT
- **IOCs**
  - VME64x
  - PPC Processor boards
    - Select processor 2002/2003
  - Will use IP carrier and modules
  - Primarily 7 slot crates

Initial Assessment of IOCs



IOCs	Linac	Tx Paths	Booster	SR	BLs (7)
Main Magnets		1	1	25	
Steering Magnets		1	1	24	
RF	1		2	5*	
Vacuum	1	2	4	48	7
Diagnostics	1	2	4	25	
Pulsed PSUs			1	1	
Personnel Safety	1**			2	2
Vessel Prot + Loss Mons				24	
Rad. Monitors	1**			2	2
IDs or Motors				7	7
Misc				5	2
TOTALS	5	6	13	168	20

* LL RF, Cavites, Amplifiers, PSUs and Cryo plant

** Linac, Booster and Tx Paths

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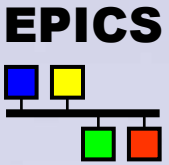
Naming Convention



- **DDD[-SSS]-TTT-CCCCC-NN[:sss]:rrr**

DDD	Domain	Device Name
SSS	Sub Domain Optional	
TTT	Technical Area	
CCCCC	Component	
NN	Identifier	
sss	Sub System Optional	Record Ref
rrrr	Record	

- **Examples**

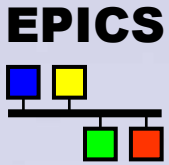
  LIN-VAC-PIRG-01:ILK:B01

  Linac, Vacuum, Pirg 1, Interlock, bit 1

  SR-A01-PSU-QUAD-01:IMON

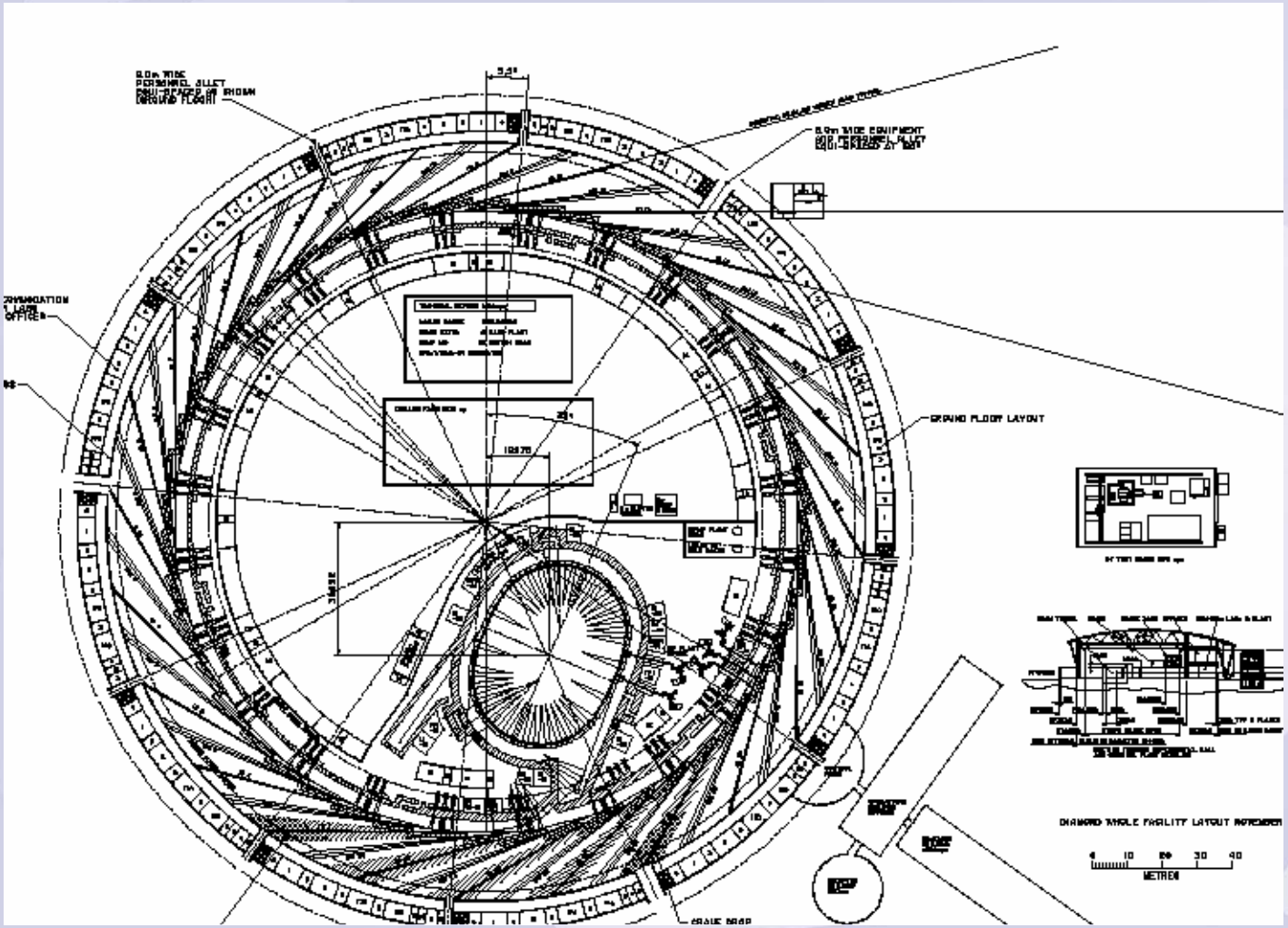
  Storage Ring, Arc 01, PSU, Quad, 1, Current monitor

Relational Data Base



- **IOC Development Cycle**
  - VisualDct to produce templates and other tools for subs list
  - Store in CVS for role back
  - Instantiate Templates
  - Load all record and fields into RDB
    - Manage alarms, op limits etc through RDB forms
  - Export to produce EPICS DBs
- **Looking at SNS, SLS & BESSY experiences**
- **Manage Physics parameters and other static information in RDB**
- **Link to Apps through CDev**
- **RDBMS Oracle**

DIAMOND Layout



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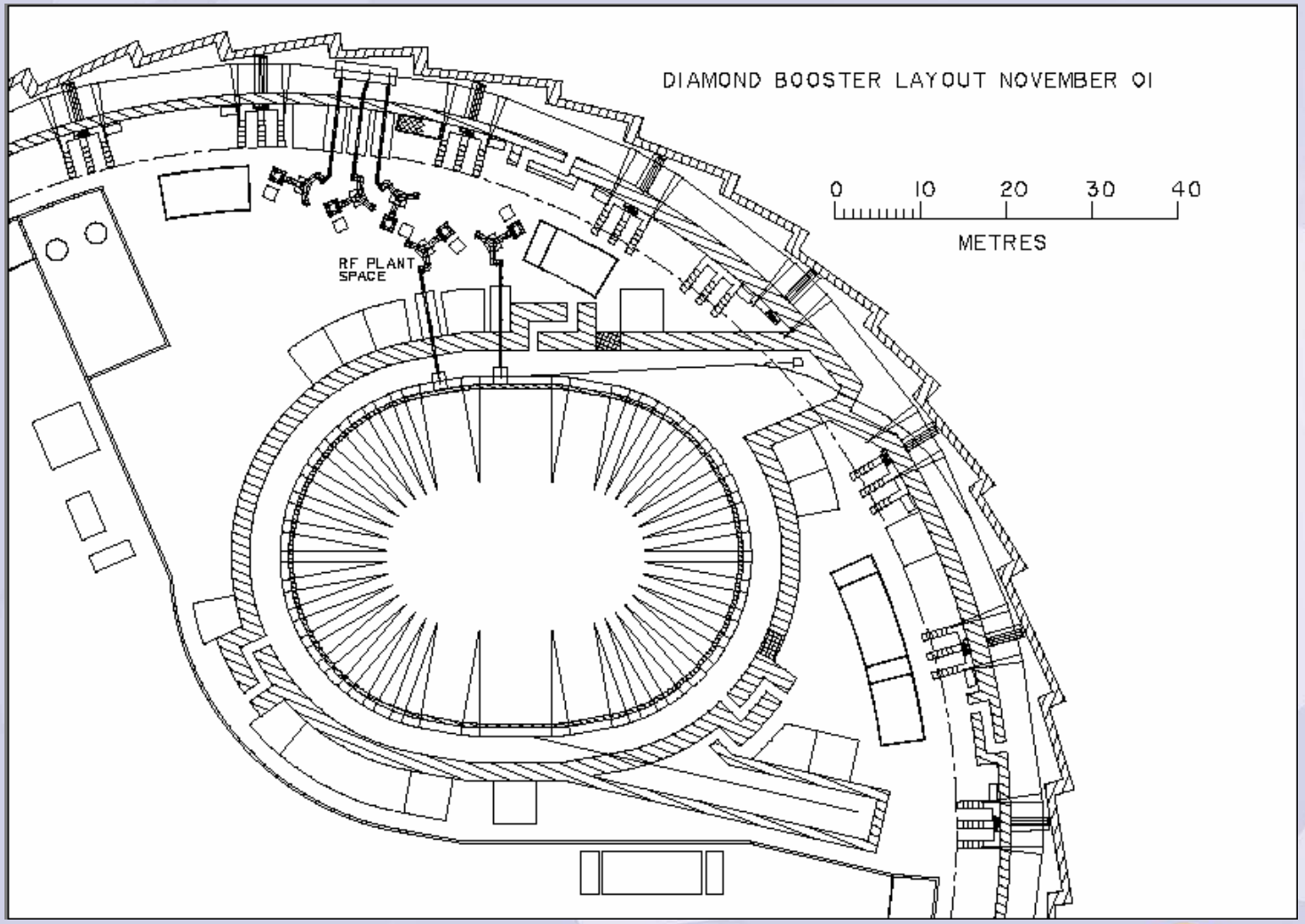
Injector Layout



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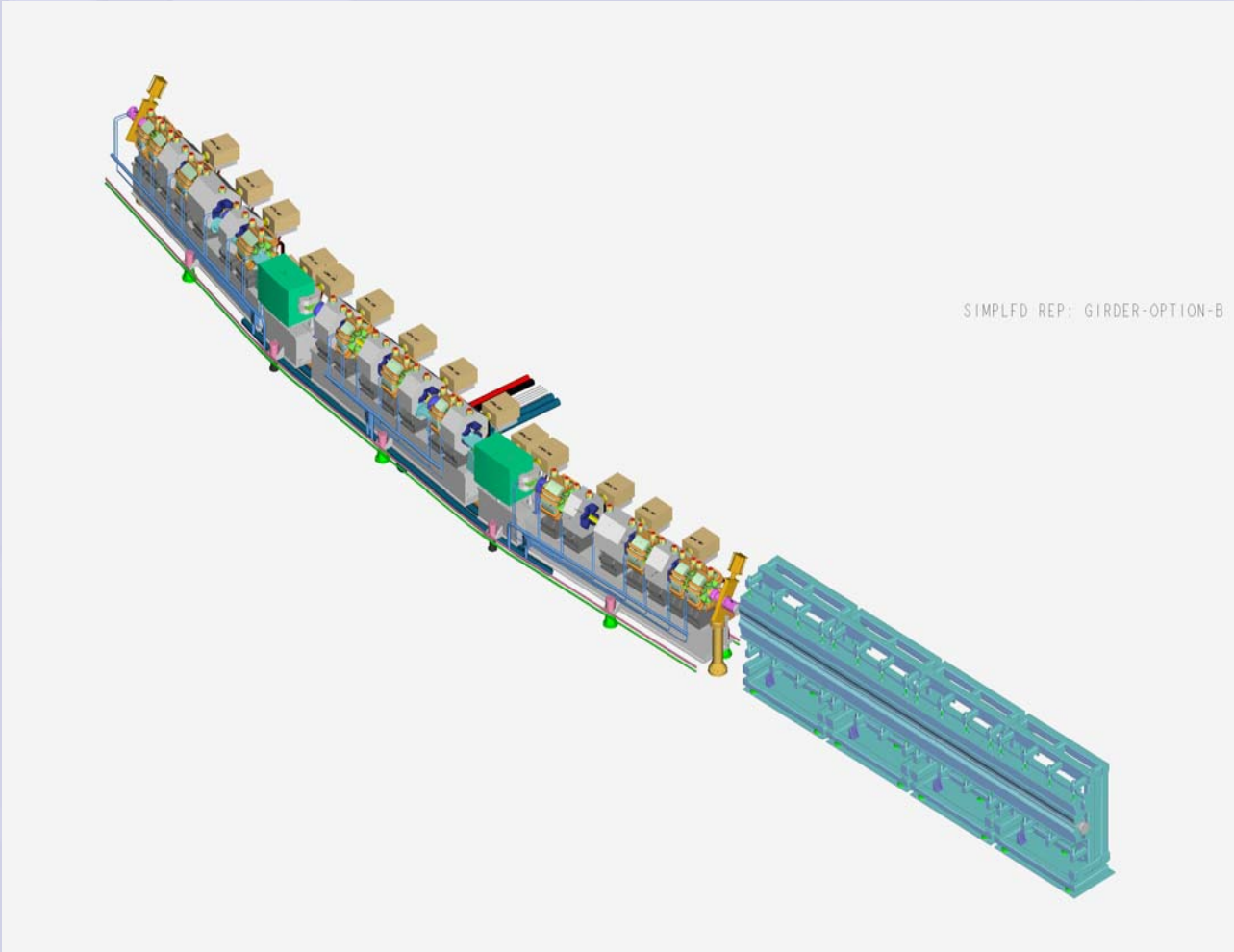
Girder Design



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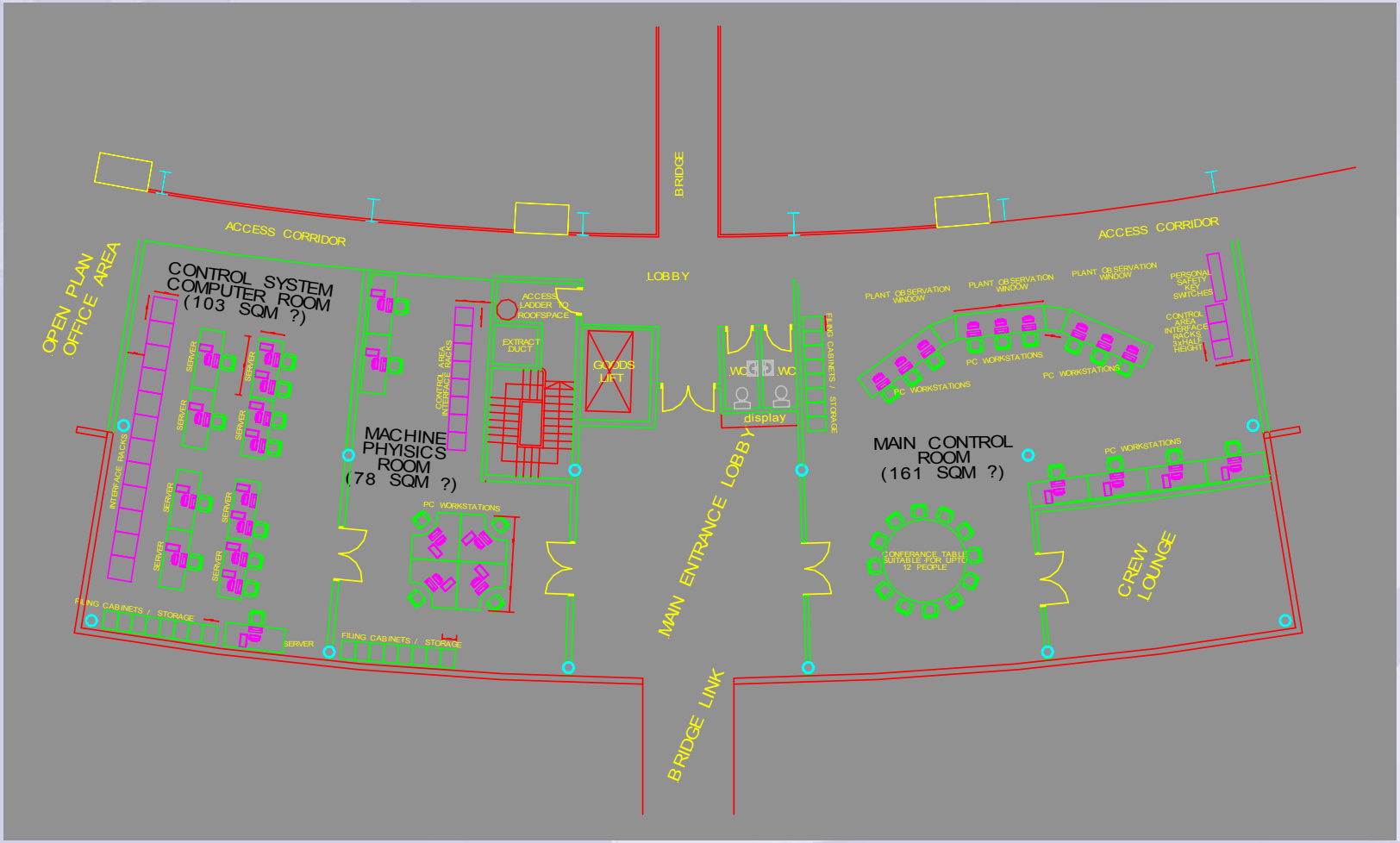
Control Room Layout



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Architect's Vision of DIAMOND

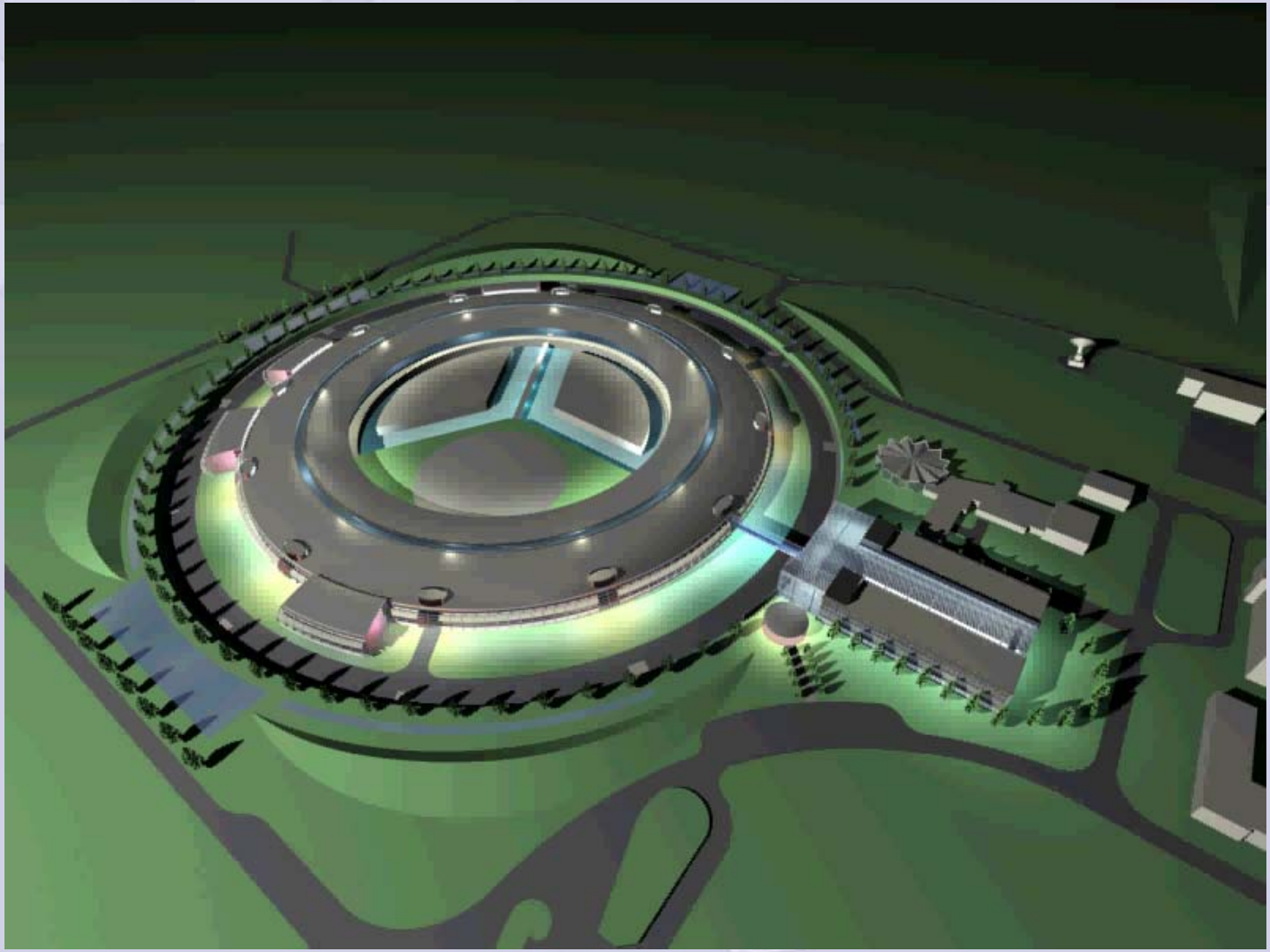

Image Courtesy of JacobsGIBB Ltd / Crispin Wride Architectural Design Studio

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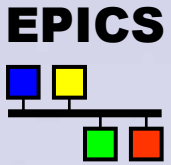

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