



Overview

B. Foster (Oxford)

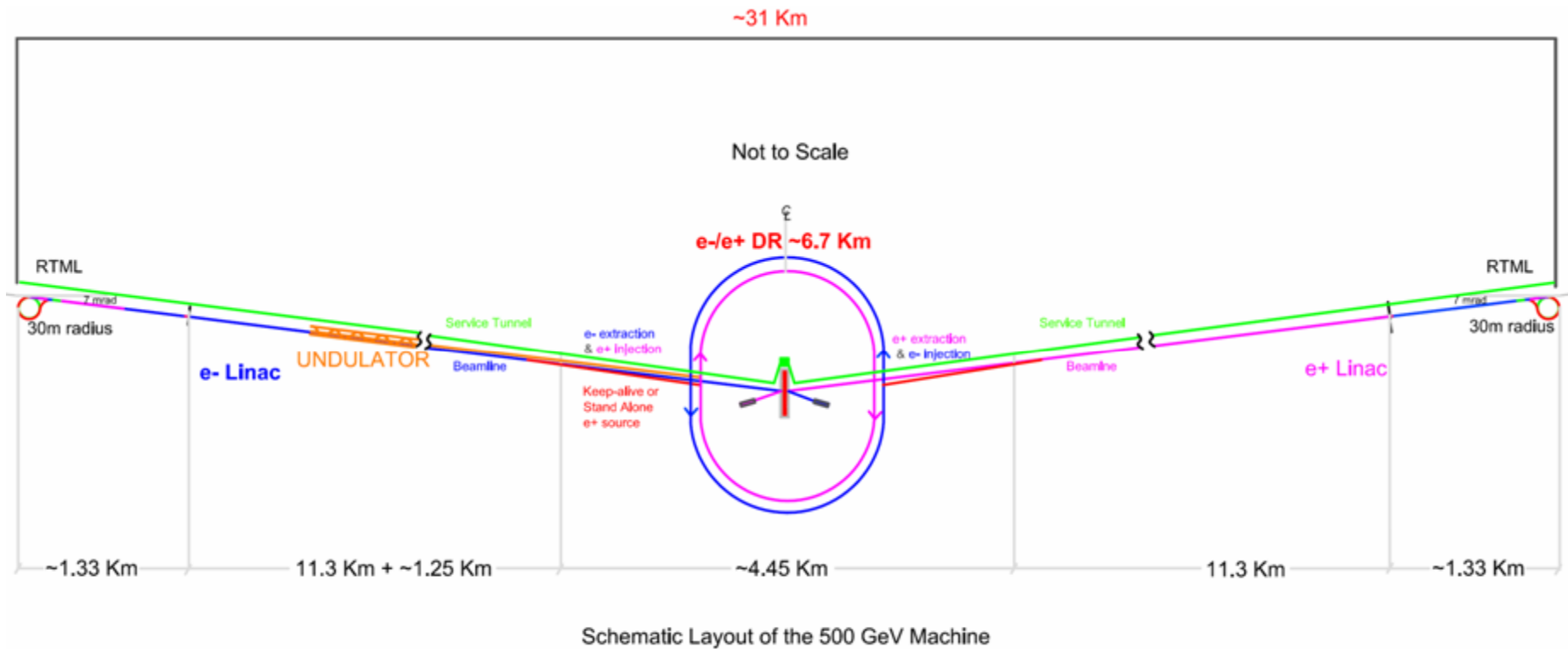
LCUK Birmingham
18/04/07

- ILC Progress since last LCUK - global, European, UK.
- Summary of Steering Committee and Collaboration Council
- Outlook



Overall Layout @ RDR

1st Stage: 500 GeV; central DR et al. campus; 2 “push-pull” detectors in 14 mrad IR.





FALC Meeting

- FALC met 17/18.1.2008 & confirmed that the physics motivation for a linear collider remains unchanged.
- The R&D underway in all three regions is fulfilling an important mission to establish the feasibility and technology necessary for the next large collider.
- FALC recognized that funding stability is the key to any international collaborative effort so none of the partners' investment is jeopardized.



ICFA/ILCSC Meeting

- ICFA Statement on Funding for the Linear Collider
- ICFA expresses its deepest concern about the recent decisions in the United Kingdom and the United States of America on spending for long-term international science projects.....



ICFA/ILCSC Meeting

- ...the sudden cuts implemented by two partner countries have devastating effects.
- ICFA feels an obligation to make policy makers aware of the need for stability in the support of major international science efforts.
- It is important for all governments to find ways to maintain the trust needed to move forward international scientific endeavours.




ILC in EU

- HiGrade is for “Preparatory Phase” and is intended for projects on the ESFRI Road Map.
- We have now agreed the boundaries of the project, EU starting documents received – started on Feb 1st. “Site selection & governance” is ~ 50% of effort; remainder in SCRF and cavity production on back of XFEL.
- “Son of EuroTeV” submitted – substantial request from UK which can be matched with planned STFC effort. Lots of competition.



ILC in US

- The only thing predictable about the US pp budget is that it is unpredictable.
- However, signs seem positive. GDE request for DoE budget line increased from 30M (50% of the level hoped for after Black December) to 31.5M. MH has detailed plan for restoring work in FY09.
- Now working its way through Congressional process 
- But election year –may have to survive on continuing resolution until ~ Feb?



GDE - The Technical Phase

- The last 3 months have been ones of turmoil and substantial rethinking.
- ALL of the major areas developed by the RDR were led by US or UK scientists.
- It can't be business as usual when such a large fraction of resources lost – 40 FTEs in UK – round £4M/year from UK - \$60M -> \$15M in US.
- New plan for TP phase concentrates and reduces work and lengthens timesales.



GDE response - the Technical Phase

- Particular concentration in early phase of TP is on cost reduction. Task forces at Sendai met for two days looking at very many ideas – some crazy, some obvious – as to how to reduce the cost of the RDR machine significantly.
- Will continue to be a priority at future meetings.



TDR phase - technical areas

- The R&D will be divided into 15 technical areas:

	Technical Area		
	1. Superconducting RF Technology	2. Conventional Facilities & Siting and Global Systems	3. Accelerator Systems
Technical Area Groups	1.1 Cavity Processing	2.1 Civil Engineering and Services	3.1 Electron Source
	1.2 Cavity Production and Integration	2.2 Conventional Facilities Process Management	3.2 Positron Source
	1.3 Cryomodules	2.3 Controls	3.3 Damping Ring
	1.4 Cryogenics		3.4 Ring To Main Linac
	1.5 High Level RF		3.5 Beam Delivery Systems
	1.6 Main Linac Integration		3.6 Simulations



Technical Design Phase Planning

	2008												2009												2010										
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S		
TDP-I	[Red blocks in 2008]																																		
2.1.1.1 - Final Criteria Development and Design TDR-1																																			
Functional requirements template publication																																			
Functional requirements complete - Main Linac																																			
Functional requirements complete - BDS and IR																																			
Functional requirements complete - Sources, DR, RTML																																			
2.2.2.1 - Cost and Schedule development - baseline Value Engineering																																			
Process water value engineering - Main Linac																																			
Underground space usage - Main Linac																																			
	2008												2009												2010										
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S		
TDP-II																																			
CFS - Update RDR Main Linac design																																			
CFS - Update RDR design for other areas																																			
2.2.2.1 - Cost and Schedule development - baseline Value Engineering																																			
Air Handling - all areas																																			
Underground space usage - non-linac																																			
Surface buildings																																			
Electrical - all areas																																			
Project Schedule																																			

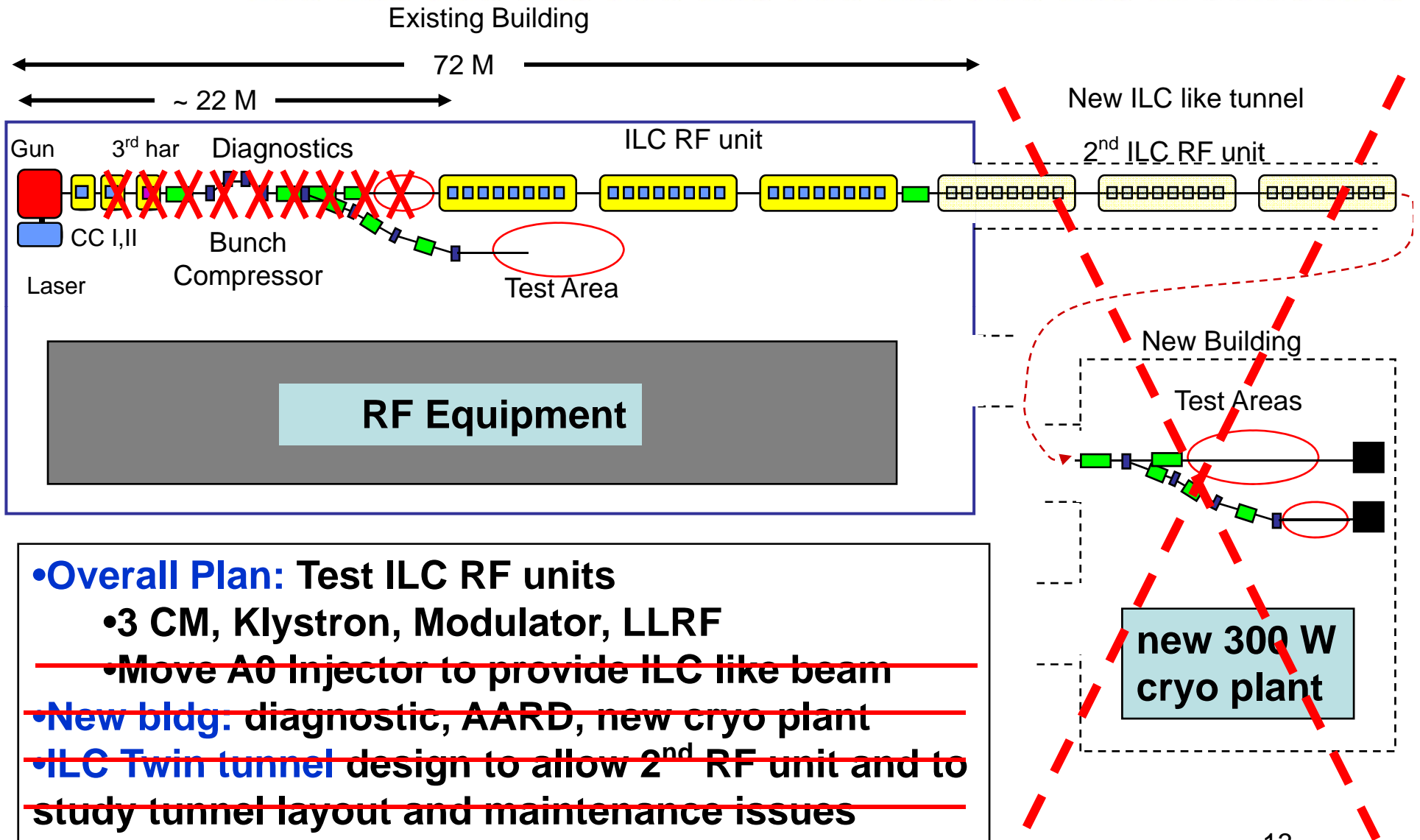


TDP R&D - SCRF

Calendar Year		2008	2009	2010	2011	2012
EDR	TDP1			TDP-II		
S0: Cavity Gradient (MV/m)	30	35 (> 50%)			35 (>90%)	
KEK-STF-0.5a: 1 Tesla-like/LL						
KEK-STF1: 4 cavities						
S1-Global (AS-US-EU) 1 CM (4+2+2 cavities)			CM (4 _{AS} +2 _{US} +2 _{EU}) <31.5 MV/m>			
S1(2) -ILC-NML-Fermilab CM1- 4 with beam			CM2	CM3	CM4	
S2: STF2/KEK: 1 RF-unit with beam			Fabrication in industries		STF2 (3 CMs) Assemble & test	

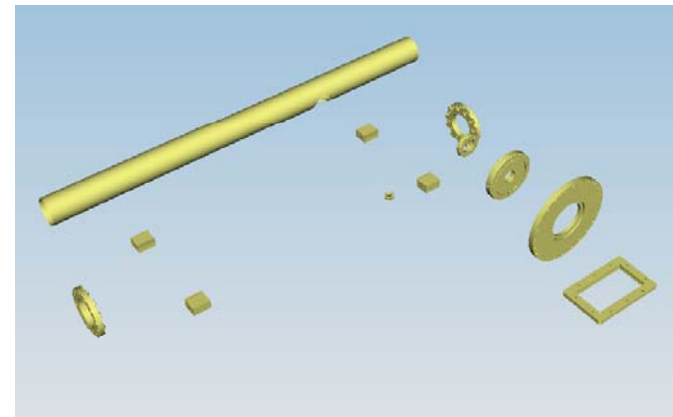
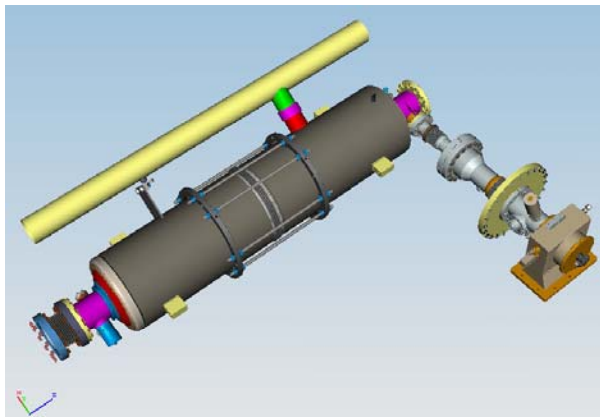
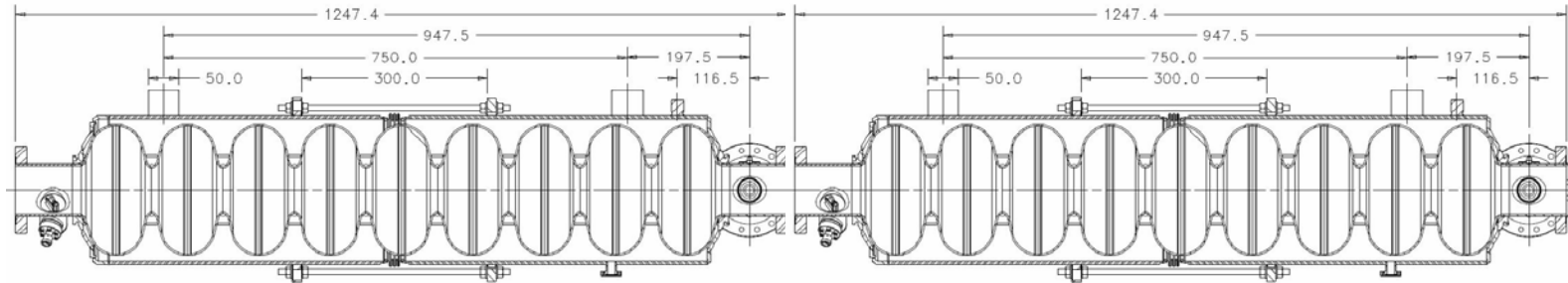


TDP R&D - SCRF





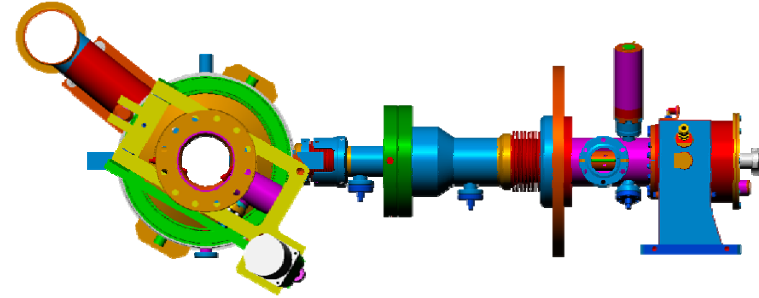
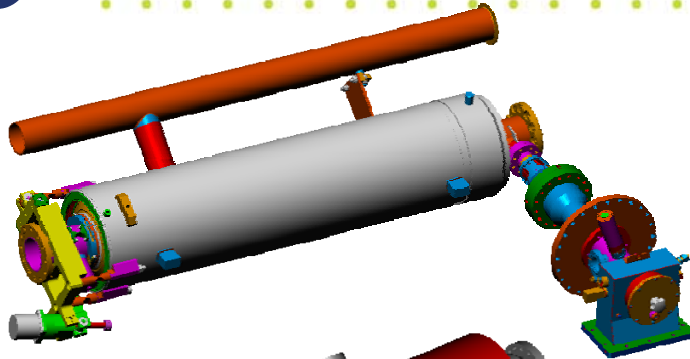
TDP R&D - SCRF



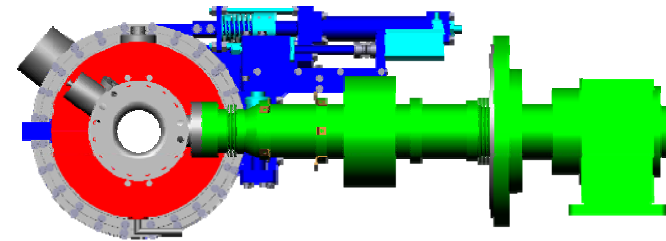
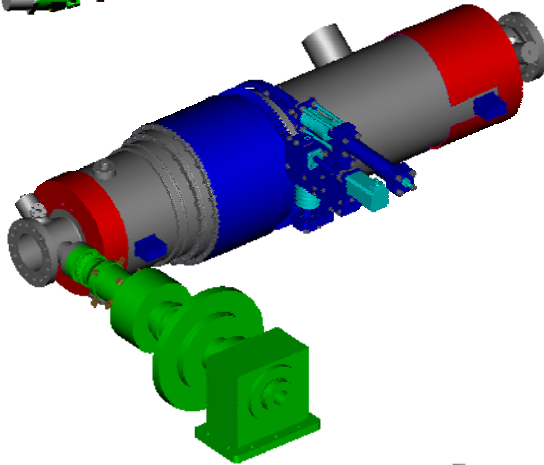


TDP R&D - SCRF

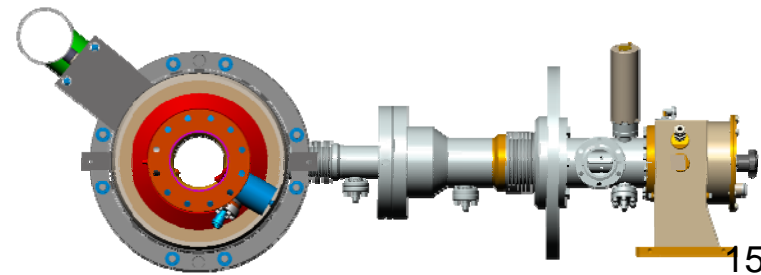
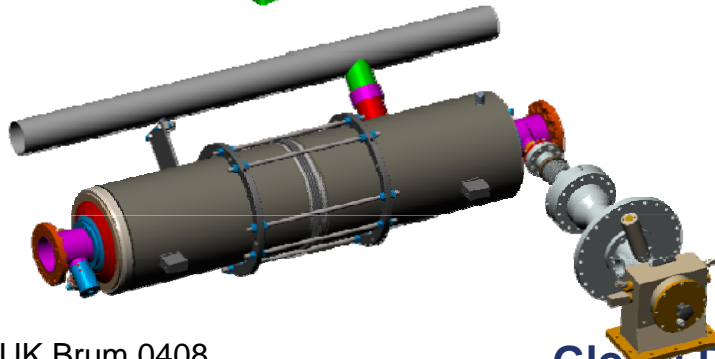
DESY



KEK

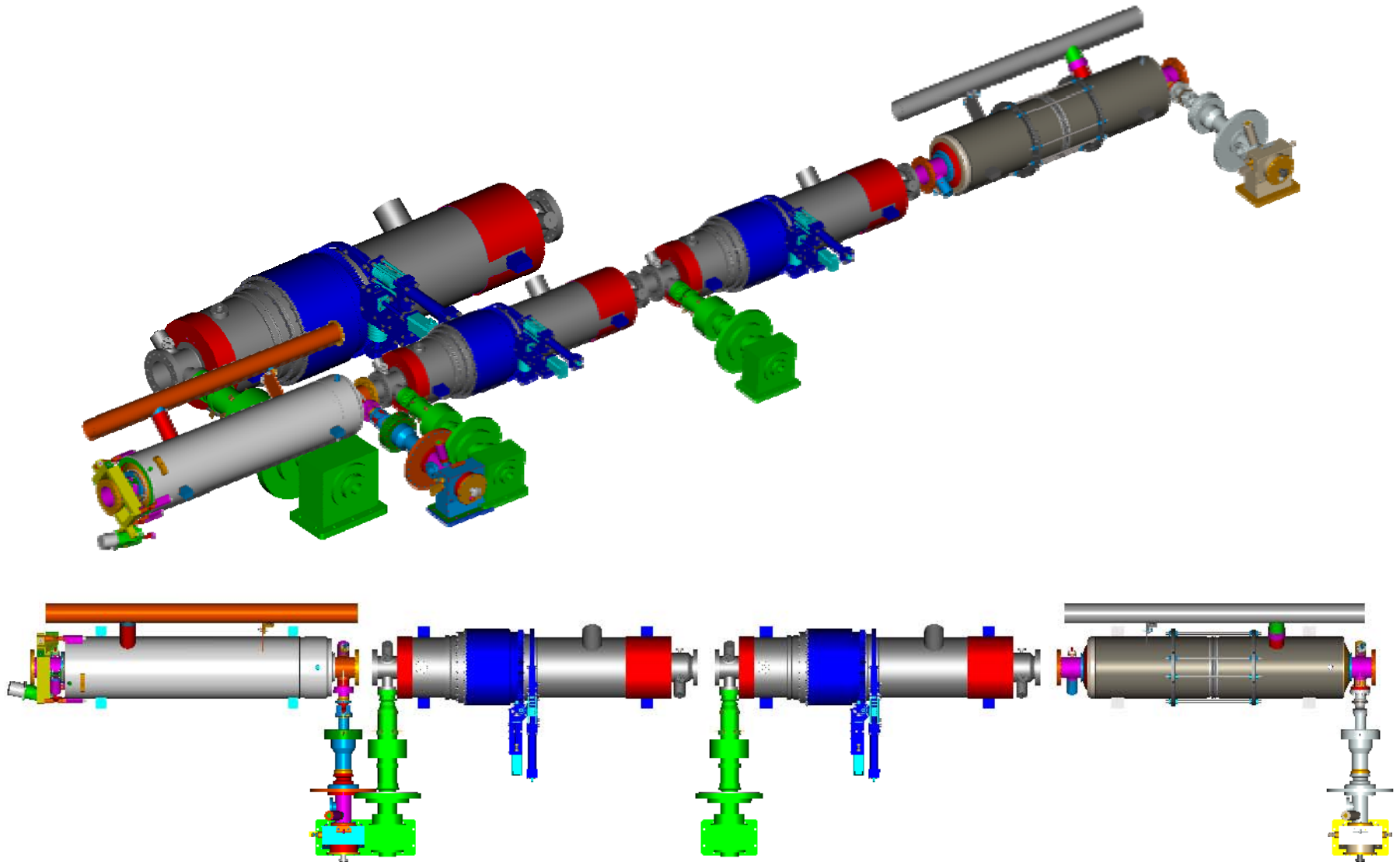


FNAL





TDP R&D - SCRF





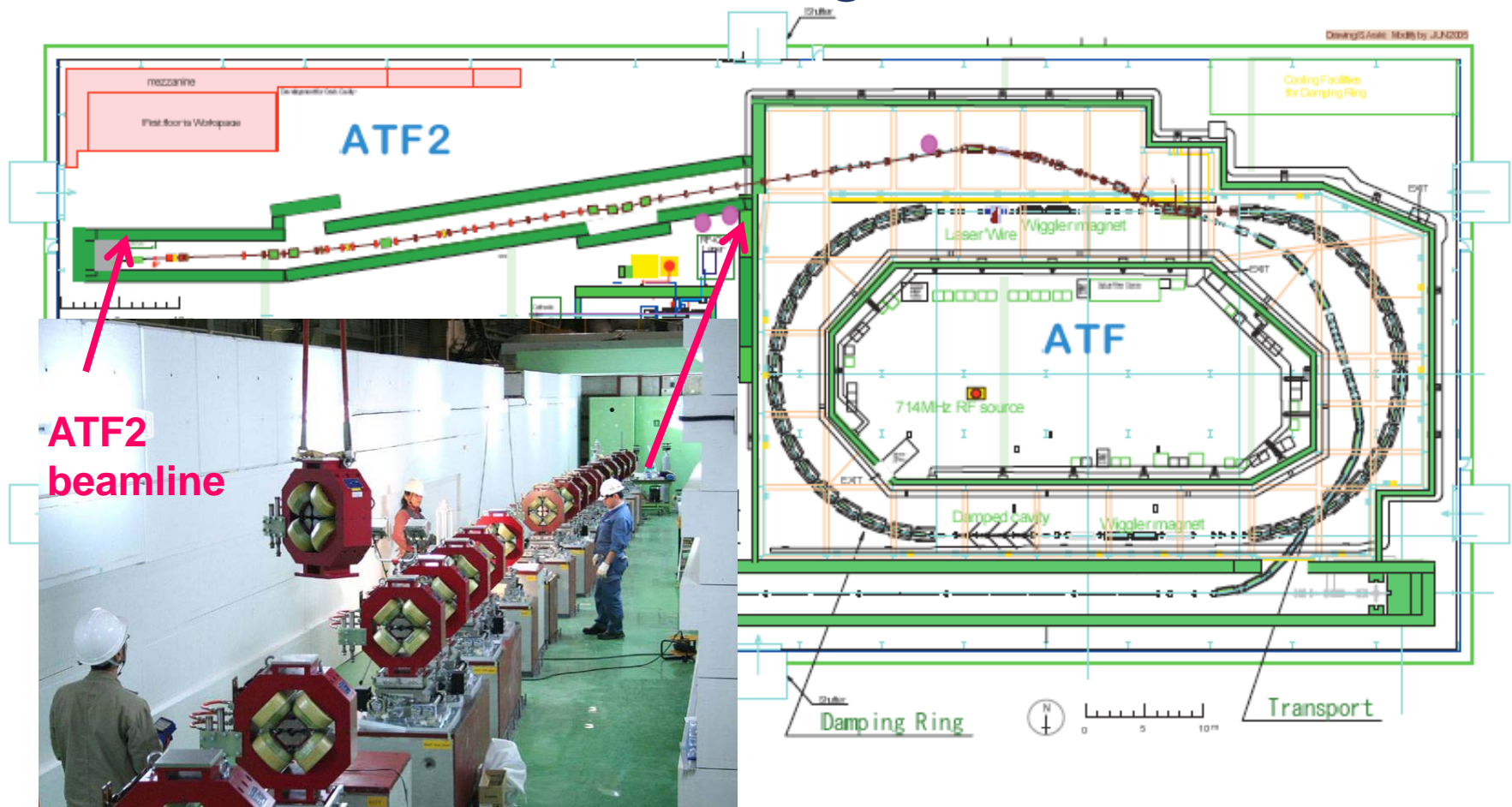
TDP R&D – BDS/MDI

- Perhaps group most strongly affected by “Black December” – dominated by UK/US.
- A great deal will have to be put on hold – but work is continuing on highest priority issues.
- Remember that ATF2 due to come on line in Oct! Will be of major importance for BDS studies and much more!



TDP R&D – BDS/MDI

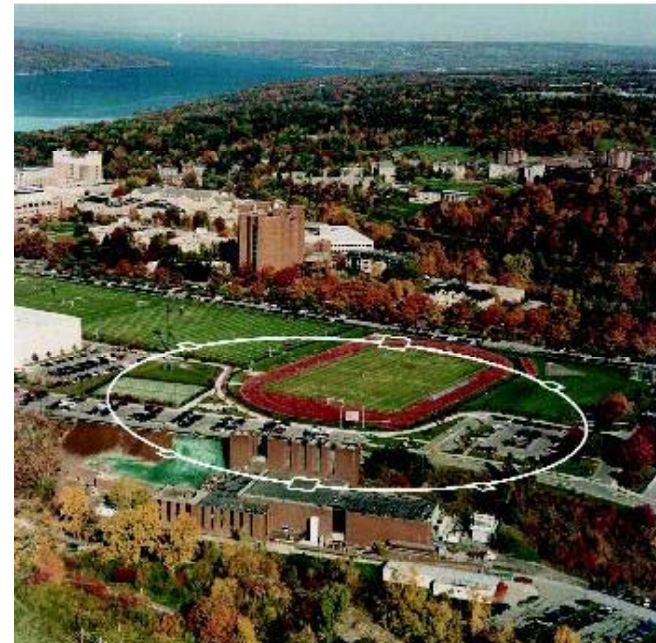
- ATF collaboration > 200 scientists, 20 institutions. ATF2 designed for ILC.





TDP R&D – DR

- One of areas where significant critical R&D remains to be done – if particular in properties and defences against electron-cloud effect.
- CESR-TA project (funding ~agreed from NSF with some matching funds from DoE)





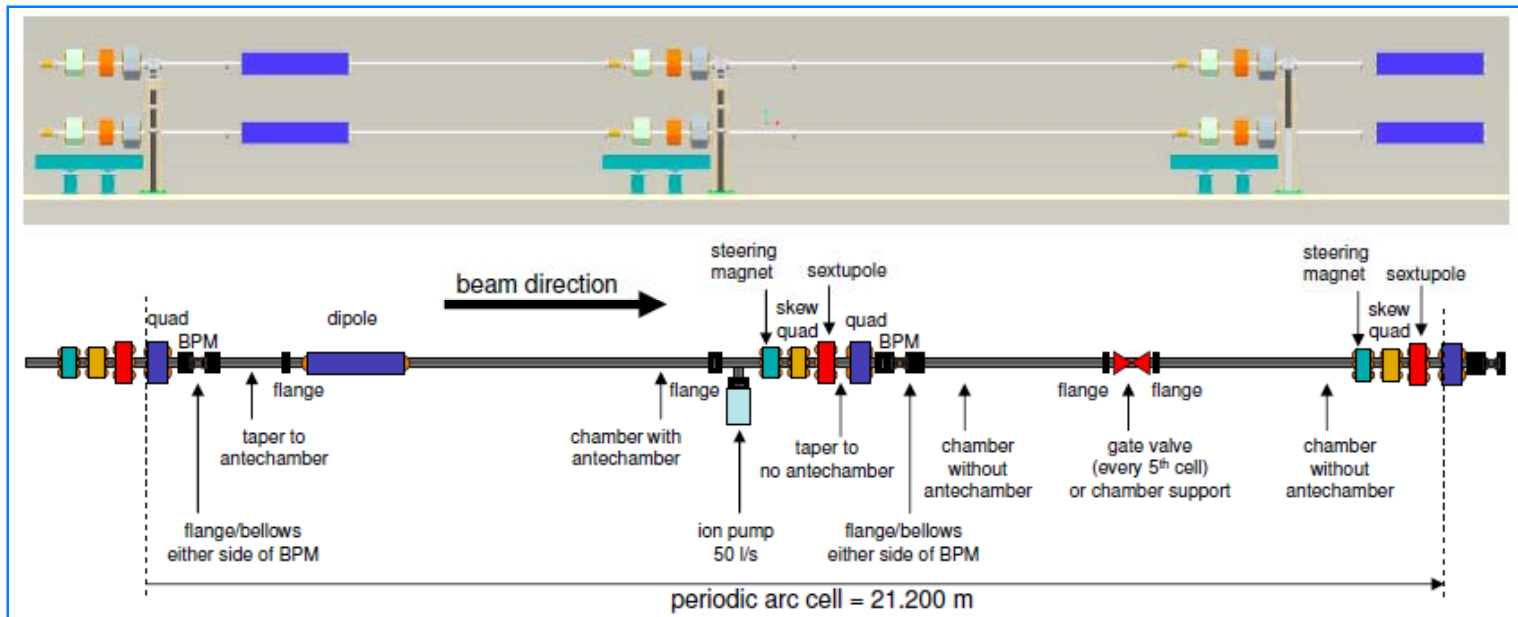
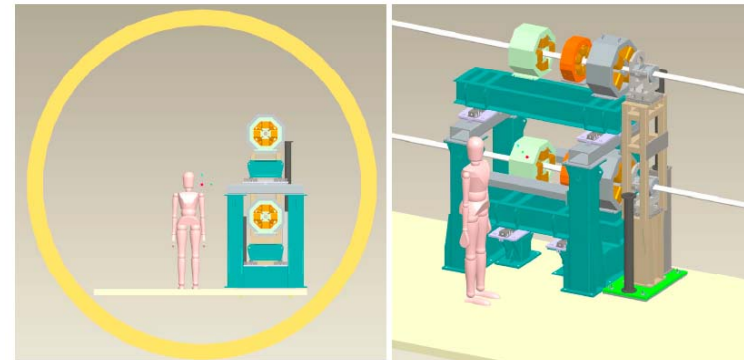
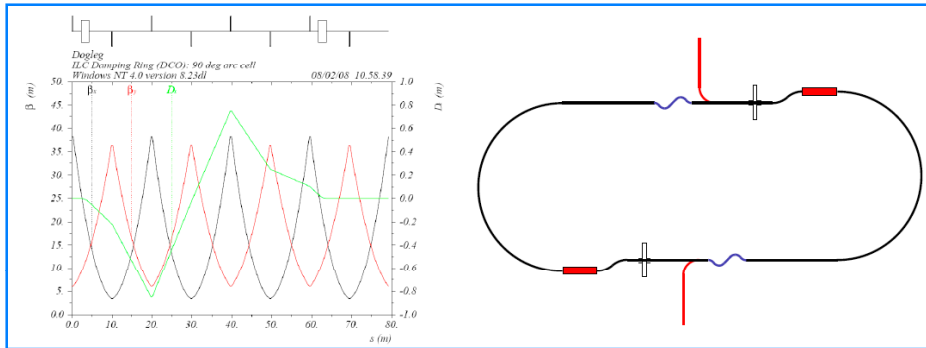
TDP R&D – DR

- Some High and Very High Priority R&D Items that Can Be Addressed at CEsrTA...
 - Electron Cloud
 - Growth in quadrupoles, dipoles, and wigglers
 - Suppression in quadrupoles, dipoles, and wigglers
 - Instability thresholds and emittance growth in the positron damping ring
 - This issue has become more significant due to the decision to employ a single positron damping ring
 - Ion Effects
 - Instability thresholds and emittance growth in the electron damping ring
 - Ultra-low Emittance Operation
 - Alignment and Survey
 - Beam-based Alignment
 - Optics Correction
 - Measurement and Tuning
 - Fast (single bunch) high voltage kickers for injection/extraction
 - >100 kV-m of stripline kick required
 - <6 ns wide pulse into a 0.3 m long stripline so as not to perturb neighboring bunches in the damping ring
 - Development of 650 MHz SRF System



TDP R&D – DR

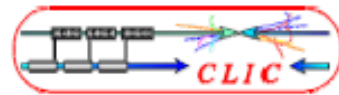
- DR lattice defined:





ILC-CLIC synergy

- Meetings going on and planned before “Black December”. Latest @ CERN in Feb.



Conclusions - CFS



- Interaction Area is obvious area where resources can be shared
- Civil Engineering models can be worked on ‘in parallel’ for ILC & CLIC.
- Other possible areas of collaboration in the TS area : Ventilation, Electricity, Handling....
- Resources to be defined, if limited, then perhaps Joint ‘Value Engineering’ exercises could be the way forward, rather than full blown studies.....
- First milestone : At Sendai meeting develop deliverables for 2008 for ILC Value Engineering and ILC/CLIC common efforts
- Identify link persons for highlighted areas
- CFS Video meetings will continue with possible CLIC input on specific subjects

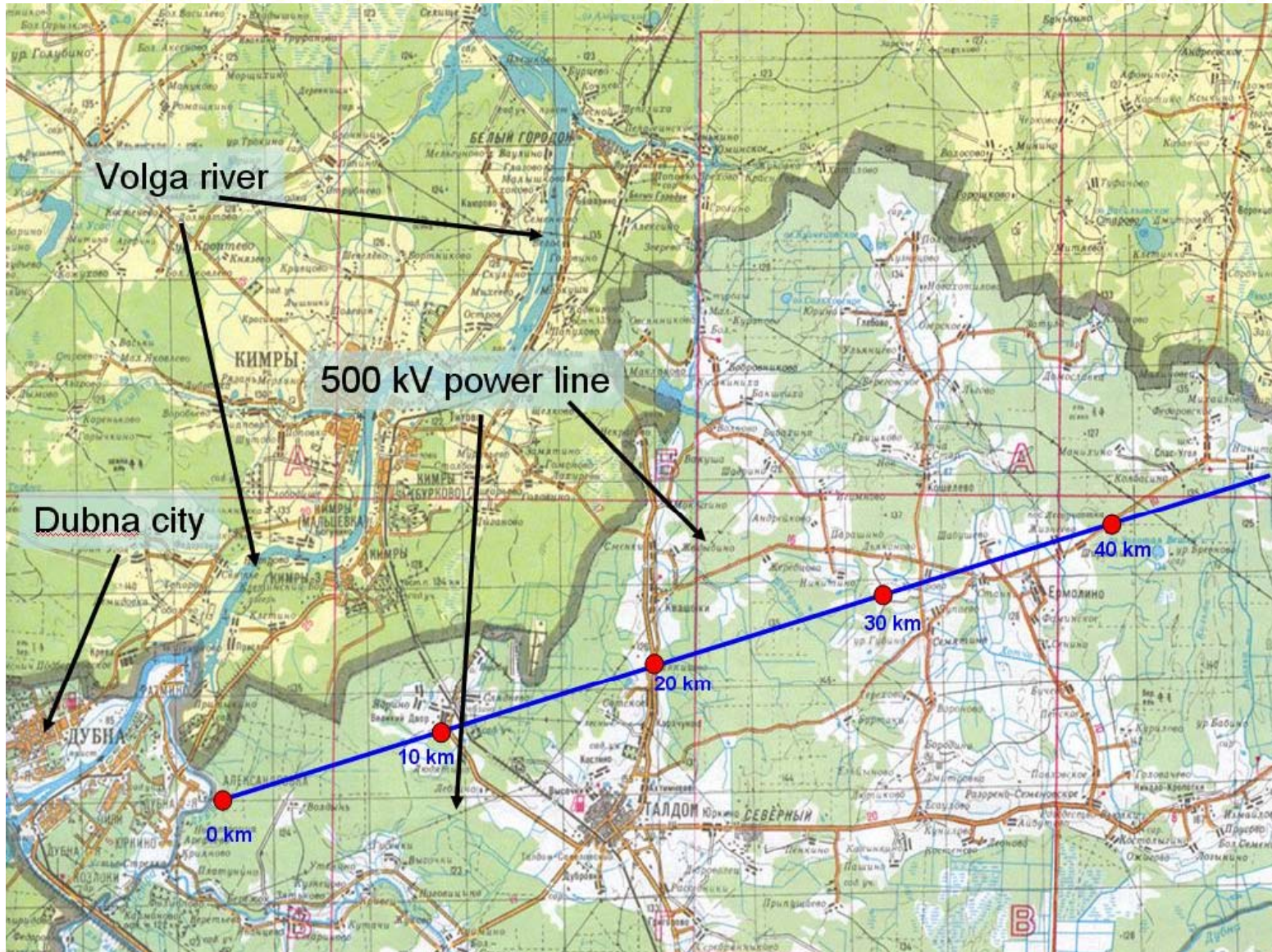


Future meetings

- April 7-8 DESY Zeuthen
 - Positron source meeting
- April 21-25 FNAL
 - SRF Main Linac Technology Review
- **June 4-6 JINR (Dubna)**
 - **GDE Meeting: ILC CFS Workshop**
- July 7-11 Cornell
 - Damping Ring Workshop (CESR-TA)
- November 16-20 Chicago
 - LCWS / GDE Workshop

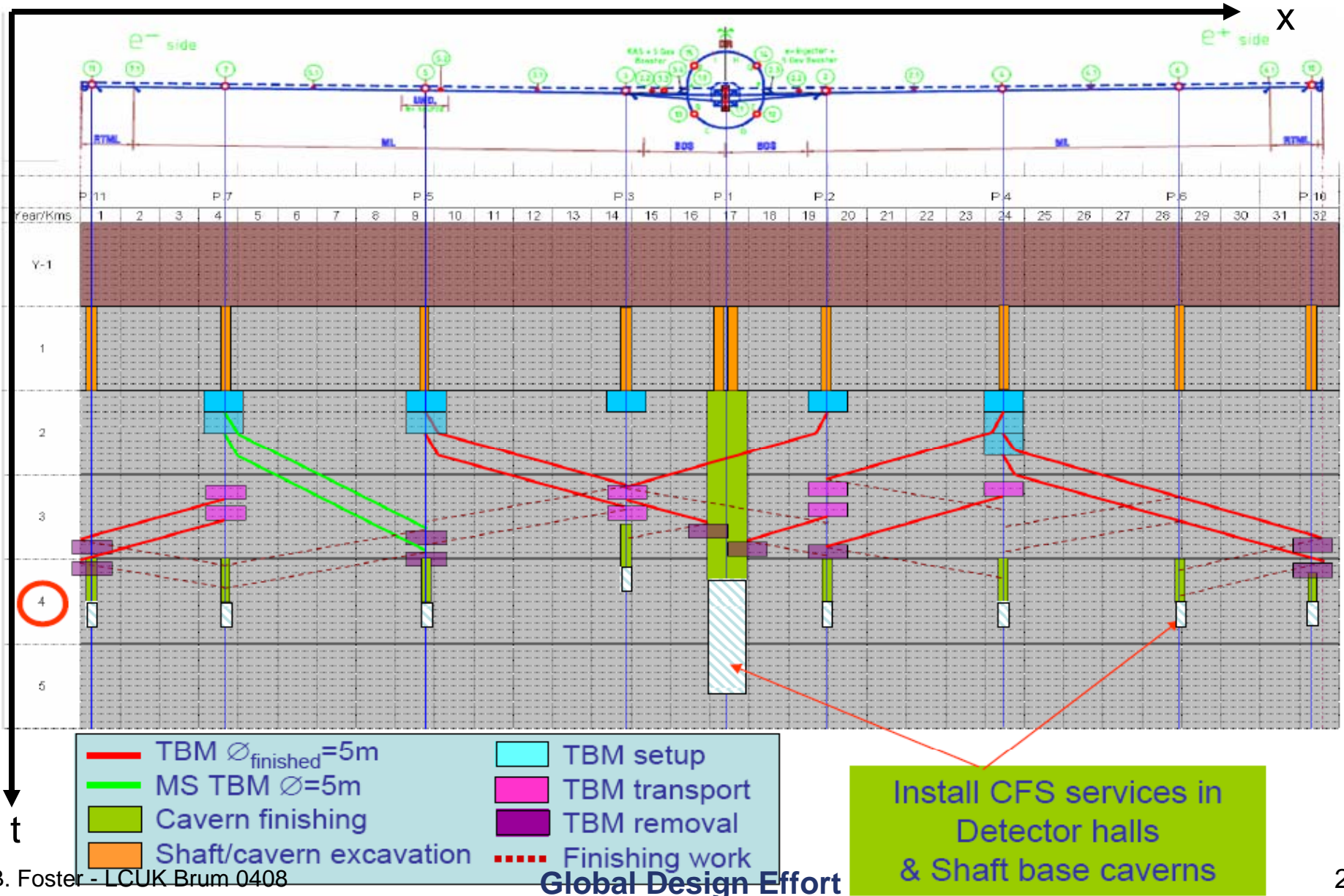


Dubna Site





Civil Construction Timeline





Dubna meeting

WGs	Subjects	Convener
1	Shallow solutions: Explore features and develop reduced-cost, shallow tunnel solutions. Both CLIC and ILC. Includes single tunnel.	Dubna+ILC-CFS(CERN)
2	Infrastructure: Review infrastructure requirements and develop cost-effective solutions for accelerator infrastructure – power, water, air etc. Both CLIC and ILC.	Dubna+ILC-CFS (KEK)
3	Siting: Examine possible sites and evaluate possible design differences that accommodate features. Includes staging, design modifications and upgrade issues.	AS+ Integration
4	Accelerator Systems: particular focus on the central injection complex, BDS and RTML, including beam dynamics.	Two AS leaders



UK Developments

- UK still supporting ILC Common Fund – nevertheless, we have been told that work on LCABD, LCFI & CALICE will “stop”.
- I have been working with J. Womersely and “Accelerator Group” including K. Peach, M. Poole et al., to rescue whatever possible from LCABD wreckage. Agreement reached on ongoing (3-year) programme at around £1M/year. Safeguards leading management roles in GDE + engineering and small R&D and travel/cons.



ILC in UK

- Currently LC-ABD Steering Committee are discussing how to use these very limited resources in the optimal way.
- Very pleasing that the main accelerator group leaders are willing to continue in their roles in these very difficult circumstances.
- Also substantial resources left in EuroTeV until end of year; UK substantial partners, in agreement with STFC for matching funds, in the new Framework VII application to follow on from EuroTeV.



ILC in UK

- PMs are very concerned that even situation of ever-tighter resources, there should be as much coordination as possible.
- “The key is to facilitate technical planning on a global basis and to coordinate ongoing R&D. We hope that the R&D plan is able to describe objectives and strategy of each of our major programs to an extent that allows each participating institution and region to develop a specific plan. Such specific plans usually become the basis for funding. Reasonably, one could expect that institutional constraints (expertise, infrastructure, aspirations of key individuals) are suitably accounted for in the 'aligned' plans mentioned above. I believe that will require a dialog between the pm and the regional directors and their top managers.



ILC in UK

- Not so easy for detector collabs. – LCFI and CALICE. Hope to be able to continue “generic” aspects. Discussions with various organs at STFC continue. Hopeful that the panels to which STFC agreed will be instrumental in finding a solution.
- Some bad news in that voluntary redundancy schemes have had an effect on some of our best and brightest people. Some key people will be leaving LCUK.



ILC in UK

- But also some good news is award of STFC Postdoc Fellowship to work on CALICE. We further believe that other STFC *ad hominem* awards, like CASE studentships, will be considered on their merits and should be sold using “generic LC” labels.
- We will clearly need to redouble our efforts to recruit good young people via all possible mechanisms – *ad hominem* STFC schemes are extremely important in that regard.



UK developments

- Very substantial developments since our meeting in Oxford.
- The PR disaster of the STFC CSR has got the attention of the government fixed firmly upon us. This has good points and bad points.
- There has been an enormous amount of press coverage – mostly for astro but substantially for pp – including features on Newsnight.
- The pp Action Group have orchestrated this process.



UK developments

- Select Committee meetings have been very helpful – often not the public ones but the private visits to places like RAL, Daresbury.
- SC report is expected next week. Rumours are that it will be pretty damning of STFC.
- However, governments have a habit of utterly ignoring SC reports.
- The whole process has shown that there are major problems with the former STFC management. Substantial reorganisation has taken place with R. Wade COO and John Womersley taking his place.



UK developments

- There is recognition from STFC that mistakes were made. RW said at SCPP last week that it was a mistake to dissolve advisory groups before something put in their place.
- Recognition that STFC communications has been dire.
- PPAG got agreement to review of PPAN decisions by ad-hoc group including members elected from community including pp members of PPAN and chaired by S. Lloyd.



UK developments

- Elected members were P. Burrows, N. Glover, N. Harnew & N. McCubbin.
- Each member has been given a set of experiments to “look after”. N. Harnew has been assigned LCFI and CALICE.
- S. Lloyd has been ringing around group leaders to ask for suggestions as to what to do. My input concentrated on how important it was to retain a viable and leading role in LCFI & CALICE. I believe that there is a willingness among STFC people to be positive.



Wakeham

- The Wakeham committee has met once. Its members are:
- Professor Bill Wakeham (Chair, University of Southampton), Professor Sir Mike Brady (University of Oxford), Dr Jørgan Kjems (Technical University of Denmark), Professor Donal Bradley (Imperial College London), Professor Martin Barstow (University of Leicester), Professor Sir Richard Friend (University of Cambridge), Professor Carlos Frenk (University of Durham), Professor Christine Davies (University of Glasgow), Professor Richard Peltier (University of Toronto)



Wakeham

- They are already taking input – heads of department have been asked to answer a set of questions.
- The questions are a bit depressing - the first one after the department name and staff FTEs is:
 - Please list and describe 5 non-academic impacts and collaborations that have stemmed from research carried out by members of your department over the past 5 years. (max. 100 words each) *For the purpose of this exercise, impact refers to a situation where you have evidence that a research outcome has been considered by a third party. Economic impacts range from those that are readily quantifiable, in terms of greater wealth, cheaper prices and more revenue, to those less easily quantifiable, such as effects on the environment, public health and quality of life.*



Wakeham

- The PPAG are trying to accelerate production of pp2020, which will contain much of the input that the pp community wish to make. We hope that this will be input into the review by IoP.
- This will not be a glossy version for politicians/opinion formers, but will contain the main points we want to make.
- Important that we ensure that our VCs, HoDs are aware of things like the student survey indicating importance of pp in attracting students.



Wakeham

Subject Area / % interest	No Interest	Some Interest	Significant Interest
Mathematical aspects	11	44	45
Fundamental Particles, Quantum Phenomena	5	22	73
Mechanics & Kinetic Theory	6	55	39
Electricity & Magnetism	14	63	23
Properties of Solids	37	52	11
Waves and Optics	21	60	19
Nuclear Physics	4	35	61
Astrophysics	12	34	54
Medical Physics	55	34	11
Electronics	36	49	15
Applied Physics	11	57	32



Wakeham

Q2. If you intend to continue physics research, which areas of current physics research are of interest ?

	No Interest	Some Interest	Significant Interest
Atomic & Molecular Physics	19	68	13
Lasers, optics & photon Physics	34	51	15
Particle Physics	11	43	46
AstroPhysics/Cosmology	27	33	40
Superconductors/fluids	47	45	8
Nuclear Physics	18	48	34
Materials, nanotechnology, condensed matter Physics	43	37	20
Quantum computing/communication	35	45	20
Medical/Biological Physics	54	33	13
Environmental Physics / Renewable energy	35	44	21
Geo-Physics	66	26	8



Wakeham

- Outcomes? Explicitly told on several occasions that there would be no more money on the table.
- Best outcome would be ringing statement of centrality of physics to science, call to fund it better cf Germany, France etc.
- But many signs that there will be noises that physics has to become more applied, less dependent on pp&a funding; could move grants to EPSRC etc etc.
- We have to have a positive agenda!



UK developments - summary

- Very substantial developments since our meeting in Oxford.
- We have not been successful in explicitly reversing the decision on ILC.
- We have succeeded in convincing ~ everyone that the decision was a disaster.
- We have succeeded in finding quite successful work-arounds for some of our problems.
- A lot of work still remains to be done.



Summary of SC meetings

- BF reported on the world outlook for ILC.
- Discussion on UK situation – reported above. Technology funding through other STFC streams should be explored.
- Reports from the projects. Will be reported below.
- Future of Collaboration Council. Agreed that an open Collaboration meeting would best be taken at the end of the meeting in conjunction with discussion session. Thus plenary meeting would start earlier – say 9:30 or 10.



Summary of SC meetings

- Next collaboration meeting – there will be an STFC Council meeting in early July which will take decisions based on the input from the consultative committees. This will make the overall landscape much clearer. SC should therefore meeting shortly thereafter and we should plan for a collaboration meeting sometime in September. It is the turn of the north to host it – BF will make enquiries.



Summary

- **“Black December” has been a major setback to the prospects of the ILC and particularly affects UK & US**
- **It has precipitated a major rethink of the way forward and we now have a new plan.**
- **Many details still need to be resolved to get all the R&D back on the road in a coherent way.**
- **No sign of any “domino” effect and strong determination among all to stay the course and produce design for this machine.**