



# Positron Source meeting

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# Positron Source close out

- Positron Source is broken down into the following parts
  - **Undulator Area**
    - Undulator Protection
    - Undulator Matching
    - Fast Abort Dump
  - Auxiliary Source
  - Target Area
  - Capture Area
  - 'Positron Source' Dogleg
  - Transfer Line (PTRAN 1 and 2)
  - 5GeV Booster
  - Positron Line Transfer (PLTR)
    - Spin Rotation
    - Energy Compression



# Positron Source close out

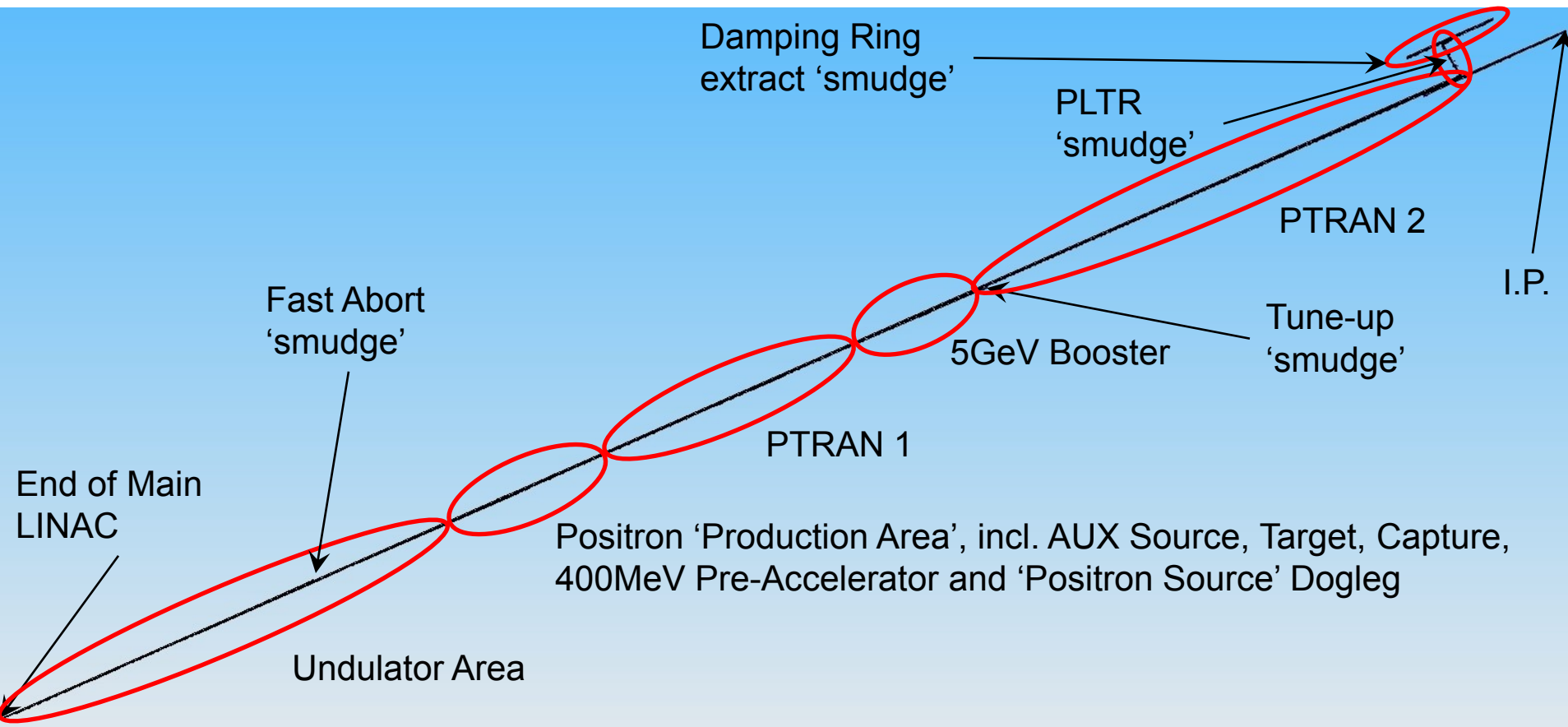
- Each section has a list of:
  - **Work done,**
  - **Improvement suggestion and**
  - **Work to be done**

**There are 2 documents pertinent to this work:**

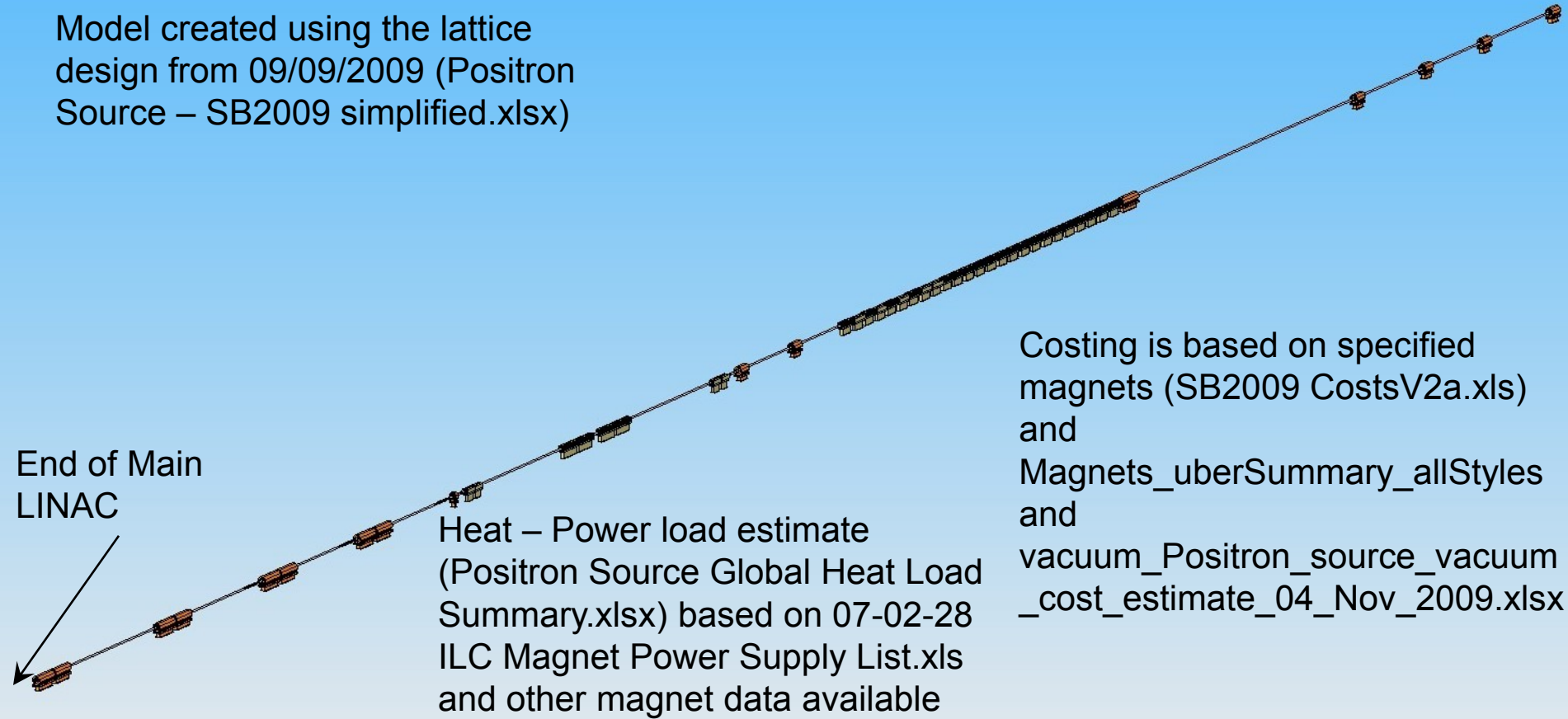
- **Document list – contains the majority of documents used to perform the work**
- **ILC Central Integration Close Out report – provides an overview of the work done for the Central Integration task**

# Positron Source – General View

Positron Source side of ILC including BDS, RTML, Positron Source and Damping Ring extract



Model created using the lattice design from 09/09/2009 (Positron Source – SB2009 simplified.xlsx)



Costing is based on specified magnets (SB2009 CostsV2a.xls) and Magnets\_uberSummary\_allStyles and vacuum\_Positron\_source\_vacuum\_cost\_estimate\_04\_Nov\_2009.xlsx

Heat – Power load estimate (Positron Source Global Heat Load Summary.xlsx) based on 07-02-28 ILC Magnet Power Supply List.xls and other magnet data available

This area can be optimised according to <http://projects.astec.ac.uk/ilcdecks/> in conjunction with the Fast Abort Dump. These sections have been ‘copied’ from the RDR Tune-Up line and undergone an initial optimisation process.



# Positron Source – Undulator Matching

Model created using the lattice design from 09/09/2009 (Positron Source – SB2009 simplified.xlsx)

Heat – Power load estimate (Positron Source Global Heat Load Summary.xlsx) based on 07-02-28 ILC Magnet Power Supply List.xls and other magnet data available

Costing is based on specified magnets (SB2009 CostsV2a.xls) and Magnets\_uberSummary\_allStyles and vacuum\_Positron\_source\_vacuum\_cost\_estimate\_04\_Nov\_2009.xlsx

This area can be considered complete. There may be a change in position (relative to I.P.) due to BDS optimisation.



# Positron Source – Fast Abort

Model created using the lattice design from 09/09/2009 (Positron Source – SB2009 simplified.xlsx)

Heat – Power load estimate (Positron Source Global Heat Load Summary.xlsx) based on 07-02-28 ILC Magnet Power Supply List.xls and other magnet data available

Costing is based on specified magnets (SB2009 CostsV2a.xls) and Magnets\_uberSummary\_allStyles and vacuum\_Positron\_source\_vacuum\_cost\_estimate\_04\_Nov\_2009.xlsx

This area must be revised. Some criteria to bear in mind are the shielding requirement and separation from Undulator section.



# Positron Source – Undulator

Model created using the lattice design from 09/09/2009 (Positron Source – SB2009 simplified.xlsx)

Heat – Power load estimate (Positron Source Global Heat Load Summary.xlsx) established from information supplied by RAL colleagues

Costing is based on information supplied by RAL colleague and includes Cryo and Power supply

The Undulator area has been extended to an effective 235m (306m physical) and the magnet length (at end of 3 Undulator string) increased. The Undulator prototype is now not far of completion). See: 2010.07.15\_-\_7th\_Positron\_Source\_Meeting\_-\_DESY\_-\_4m\_module\_-\_Owen\_Taylor.ppt

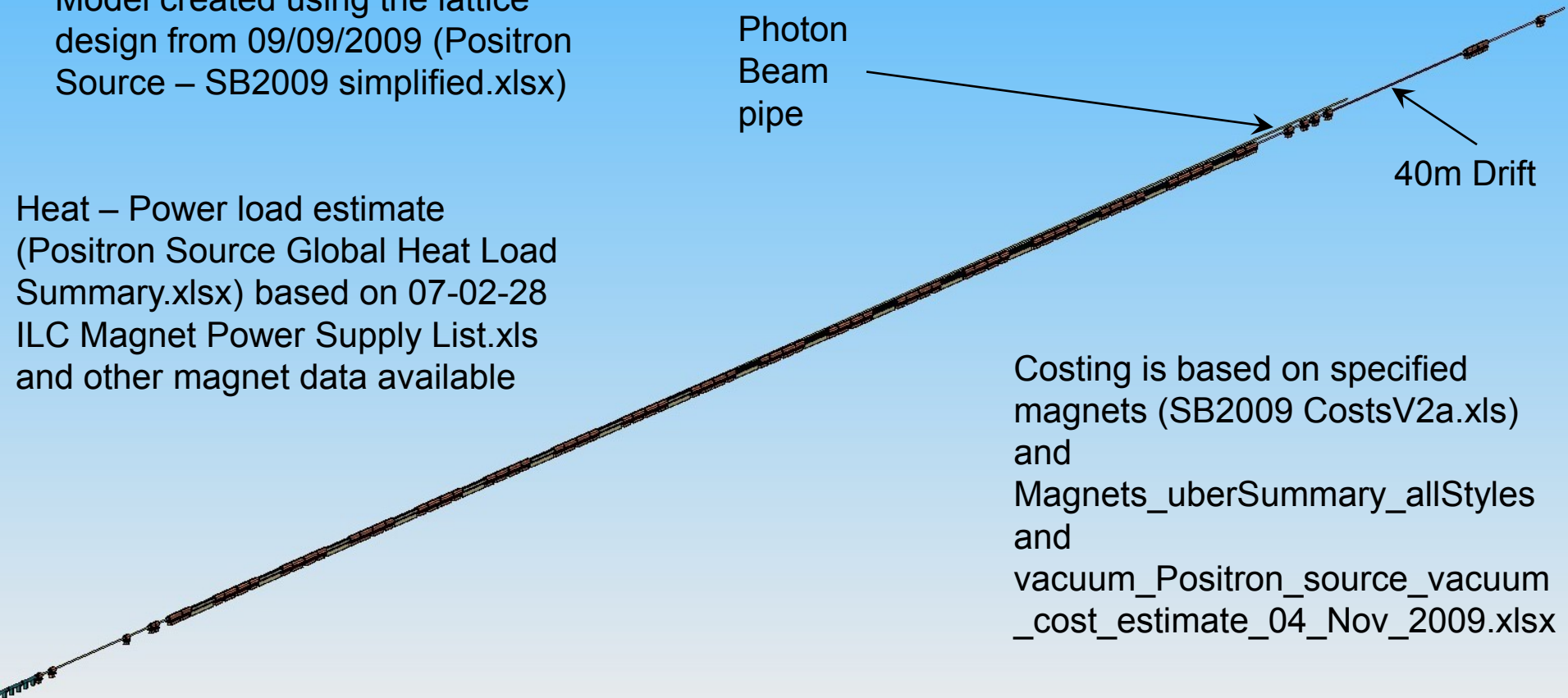


# Positron Source – Dogleg

Model created using the lattice design from 09/09/2009 (Positron Source – SB2009 simplified.xlsx)

Photon Beam pipe

40m Drift

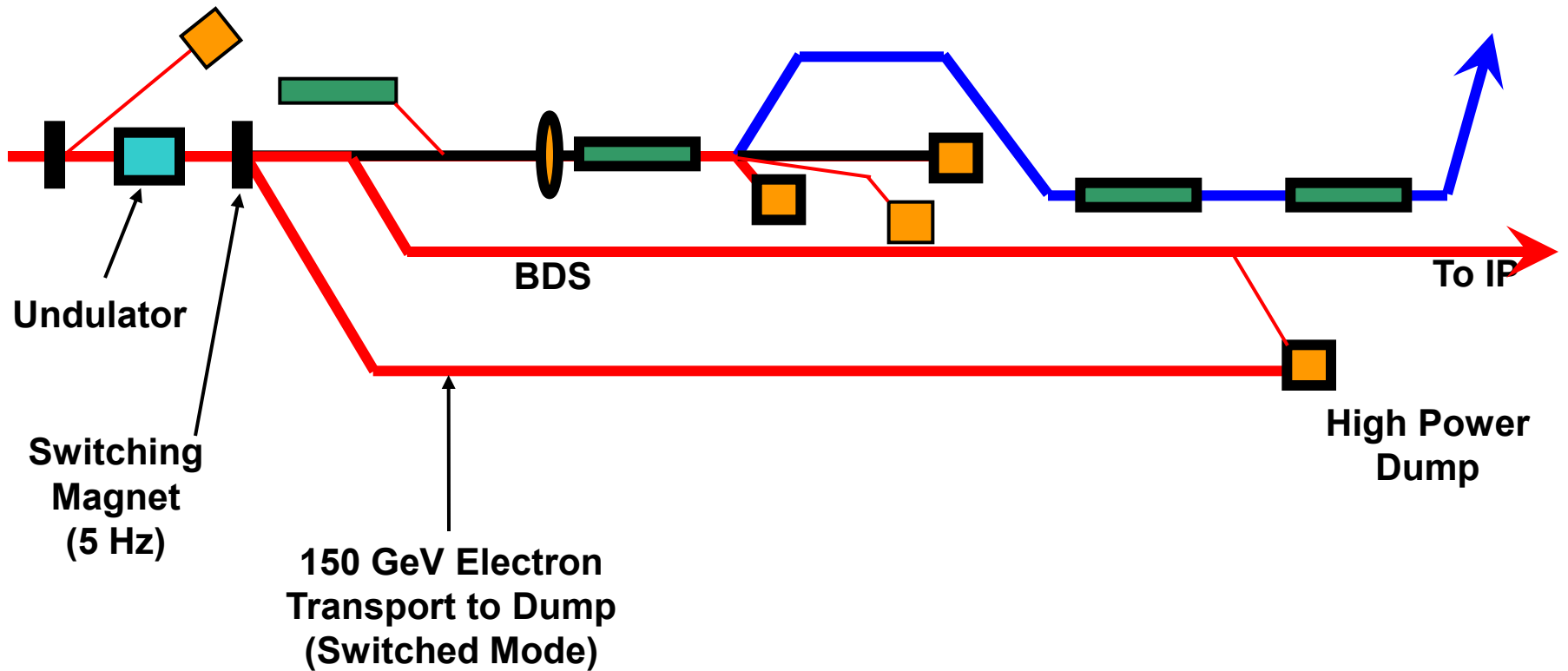


Heat – Power load estimate (Positron Source Global Heat Load Summary.xlsx) based on 07-02-28 ILC Magnet Power Supply List.xls and other magnet data available

Costing is based on specified magnets (SB2009 CostsV2a.xls) and Magnets\_uberSummary\_allStyles and vacuum\_Positron\_source\_vacuum\_cost\_estimate\_04\_Nov\_2009.xlsx

The dogleg provides a 1.5m beam offset. For the 10Hz low energy operation this must be revised. An Additional beam line is required and a 5Hz switching magnet. See 10HZ Low Energy Operation.pptx

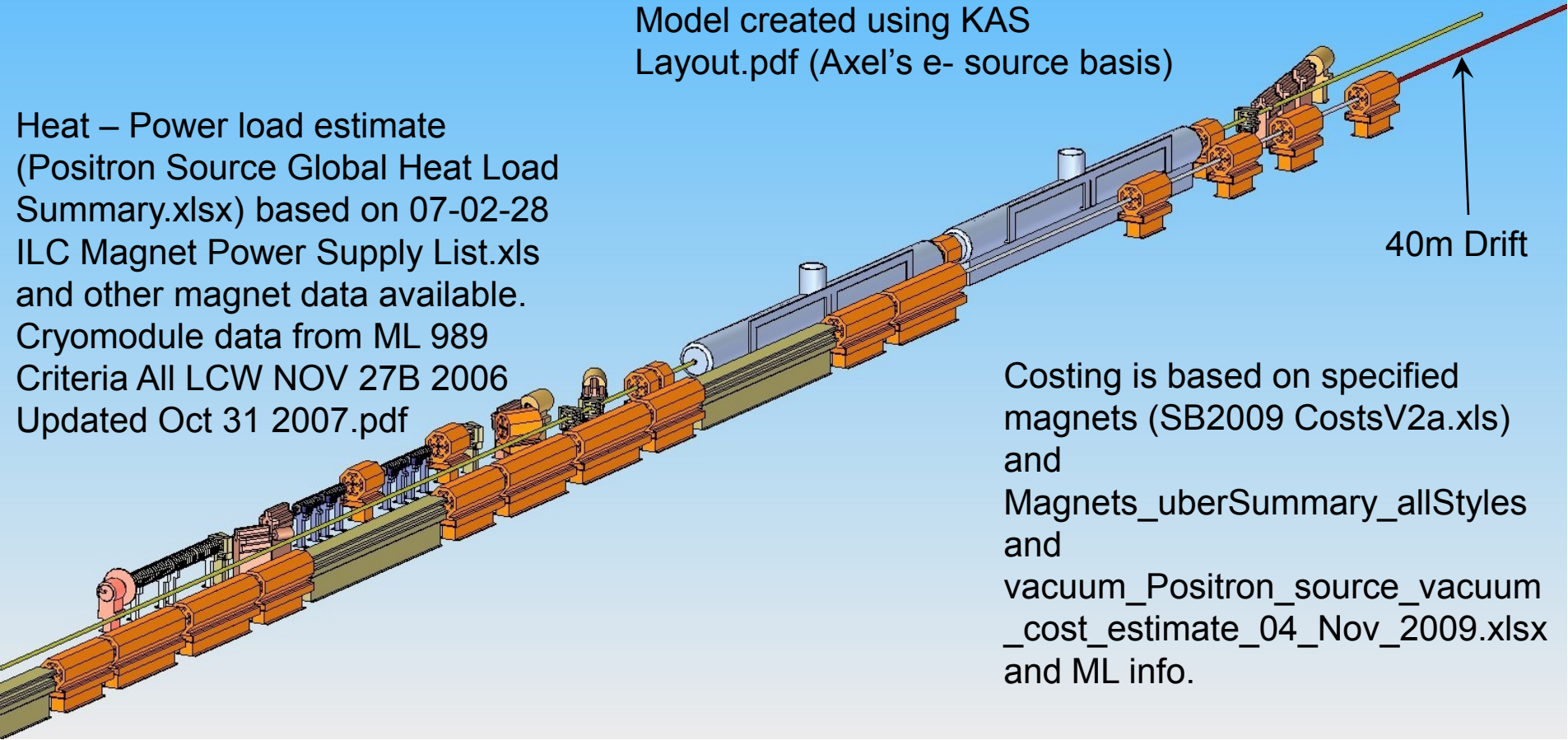
## Jim's 10Hz proposal:



# Positron Source – AUX Source

Model created using KAS  
Layout.pdf (Axel's e- source basis)

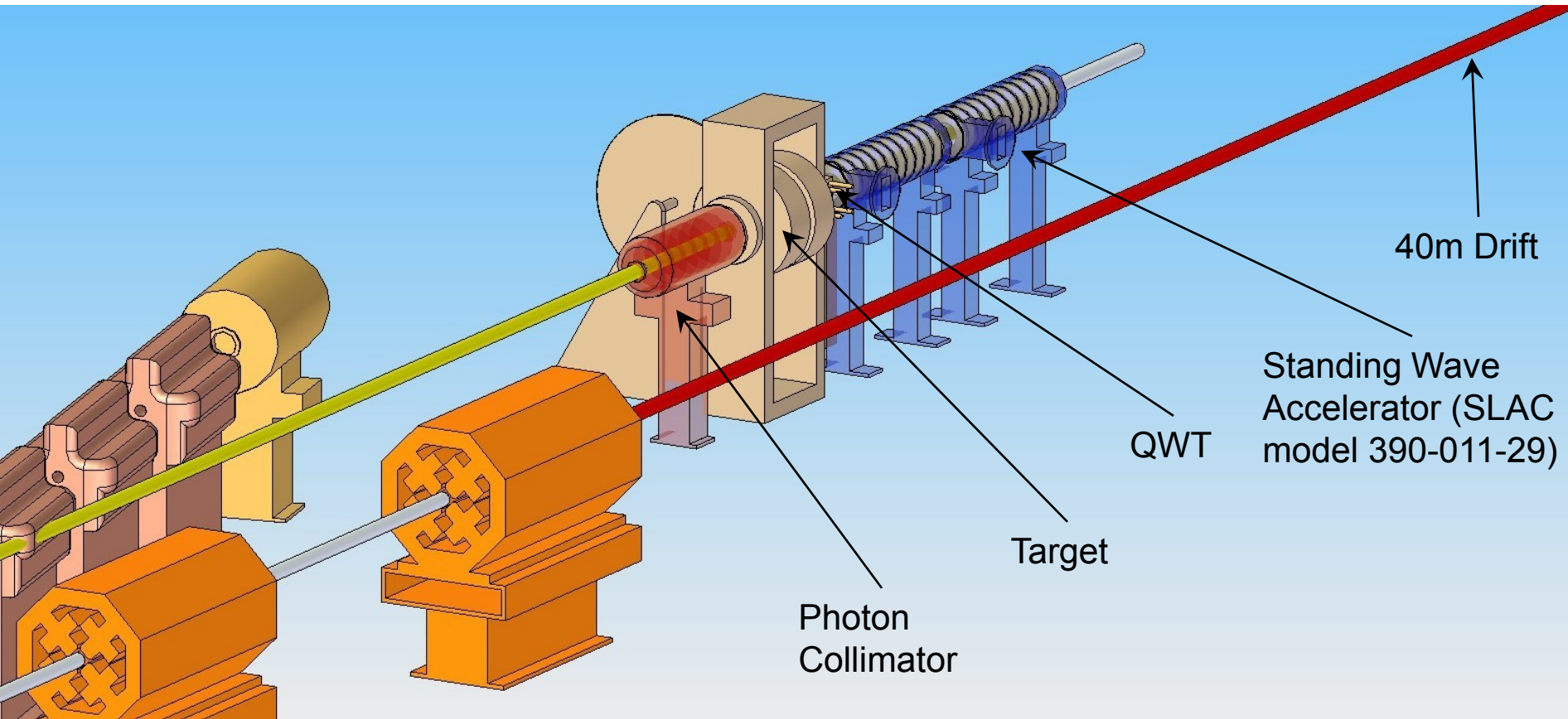
Heat – Power load estimate  
(Positron Source Global Heat Load  
Summary.xlsx) based on 07-02-28  
ILC Magnet Power Supply List.xls  
and other magnet data available.  
Cryomodule data from ML 989  
Criteria All LCW NOV 27B 2006  
Updated Oct 31 2007.pdf



Costing is based on specified  
magnets (SB2009 CostsV2a.xls)  
and  
Magnets\_uberSummary\_allStyles  
and  
vacuum\_Positron\_source\_vacuum  
\_cost\_estimate\_04\_Nov\_2009.xlsx  
and ML info.

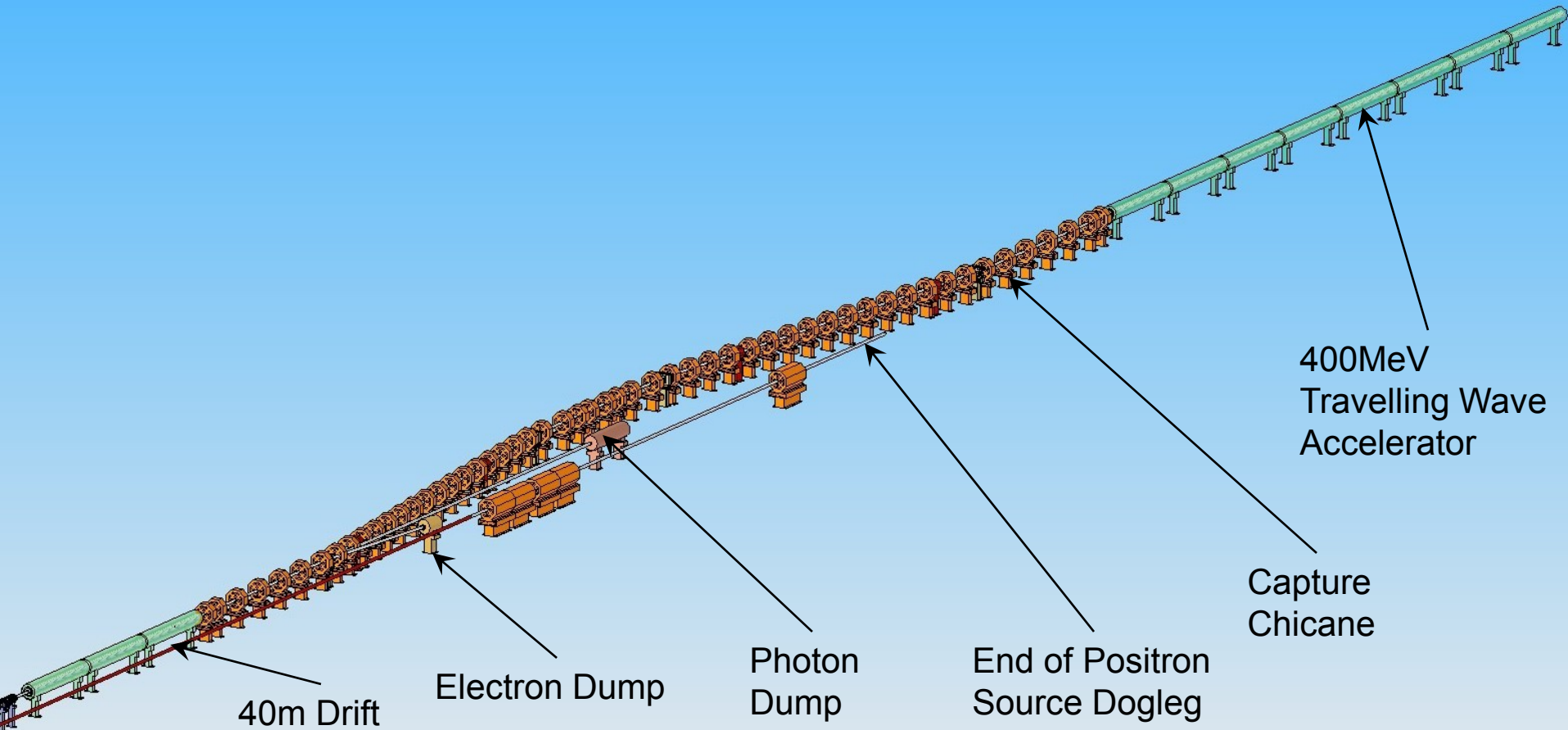
The AUX source is at this moment in time not much more than an artists impression. The lattice needs to be designed. It is feasible to utilise the photon vacuum vessel and the distance to the target needs to be defined.

# Positron Source – Target Area



The Target Area has seen a lot of work during Positron Source workshops. The remote handling enclosure is not shown. The target requires a redesign to cater for the AUX source. Latest workshop info: <http://indico.desy.de/conferenceOtherViews.py?view=standard&confId=3061>

# Positron Source – Capture Area



400MeV  
Travelling Wave  
Accelerator

Capture  
Chicane

End of Positron  
Source Dogleg

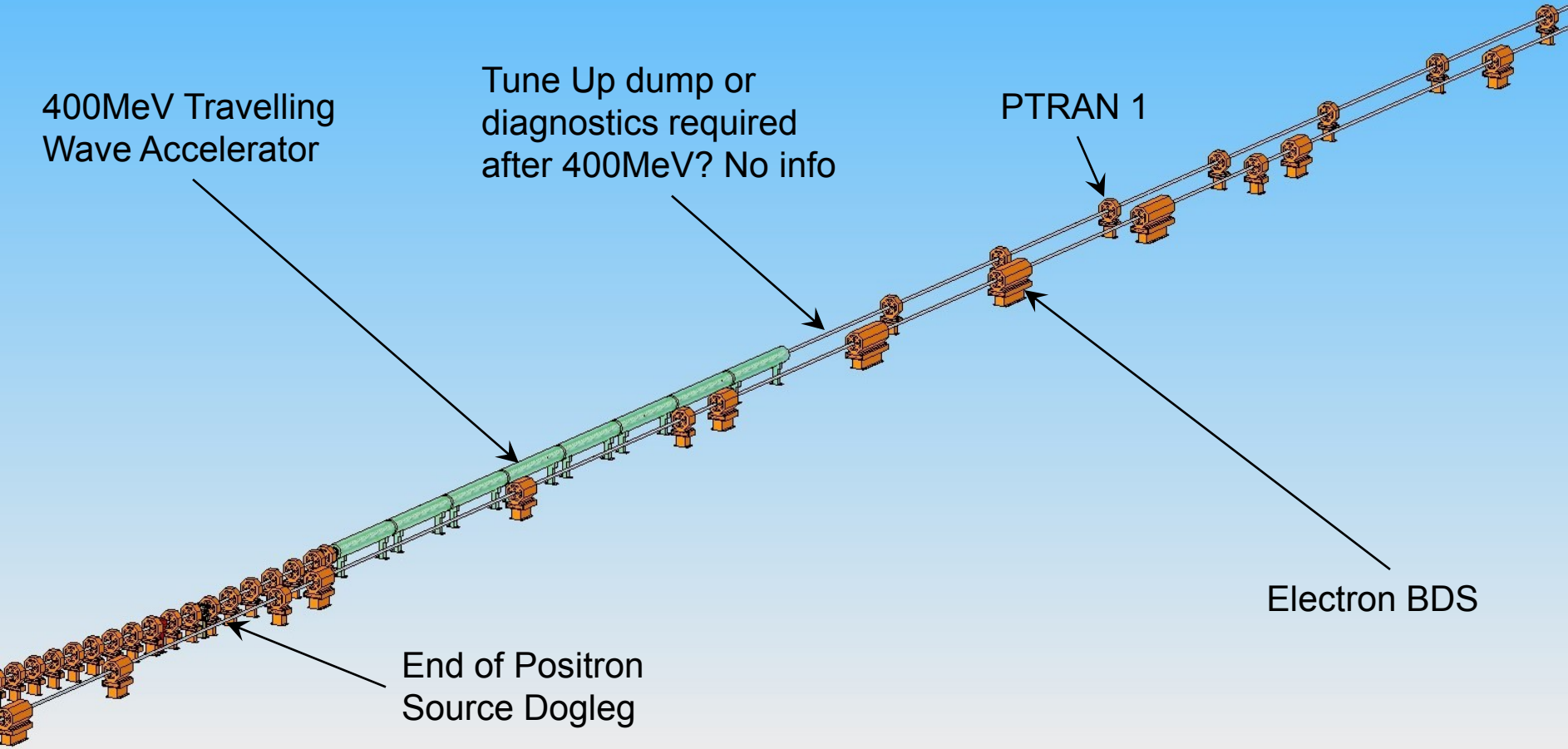
Photon  
Dump

Electron Dump

40m Drift

An additional Electron Dump is required due to the AUX source. The lattice needs to be designed as the illustration is a re-arrangement of the RDR layout (400 MeV in middle of chicane).

# Positron Source – PTRAN 1



Tune Up dump or diagnostics required after 400MeV? No info

400MeV Travelling Wave Accelerator

PTRAN 1

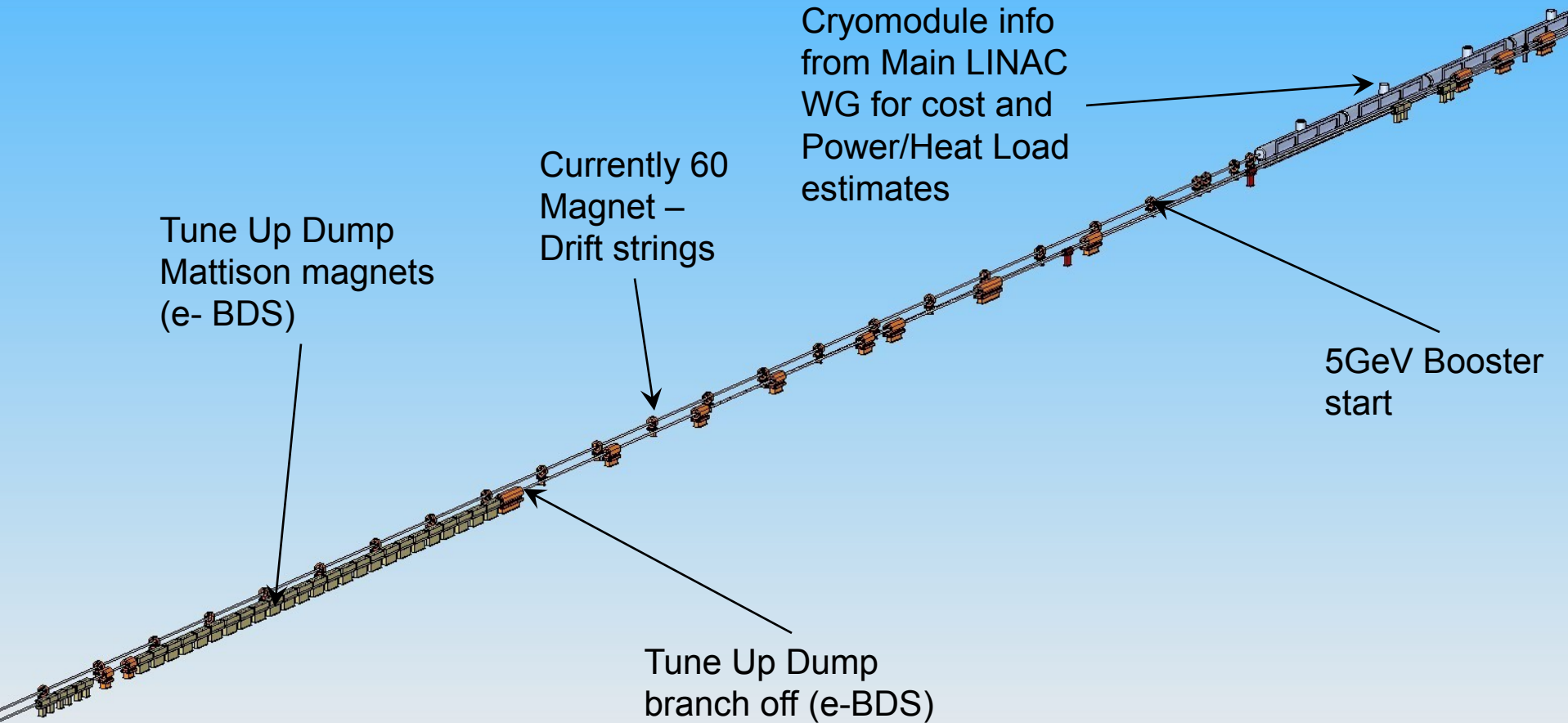
Electron BDS

End of Positron Source Dogleg

Again, this area is a best guess as far as CAD is concerned. The Positron Transfer (PTRAN1) is the same as the RDR where a Quad is followed by a drift. Lattice needs to be designed.



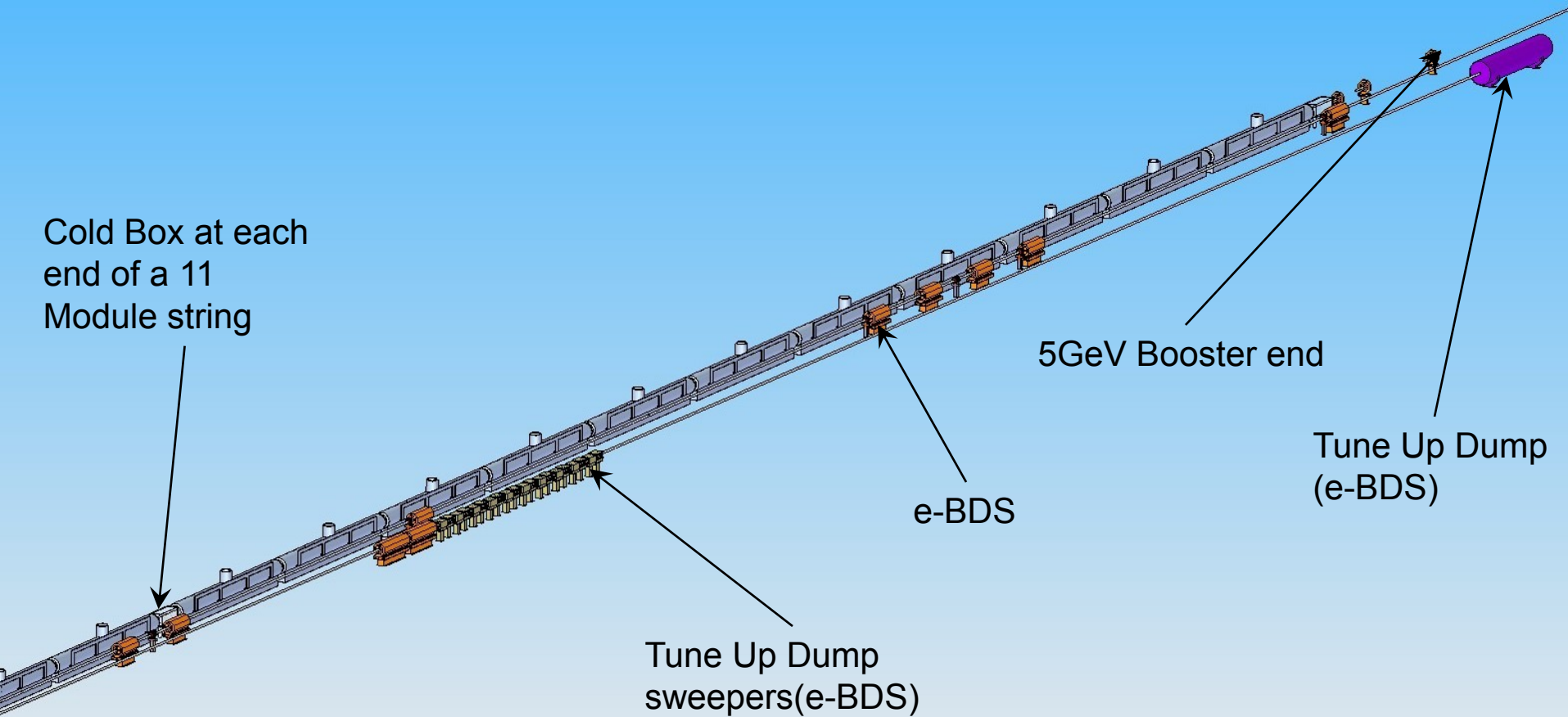
# Positron Source – End PTRAN1 – 5GeV Booster



The lattice needs to be designed. The 5GeV Booster section can still move up or down the beam line (PTRAN).

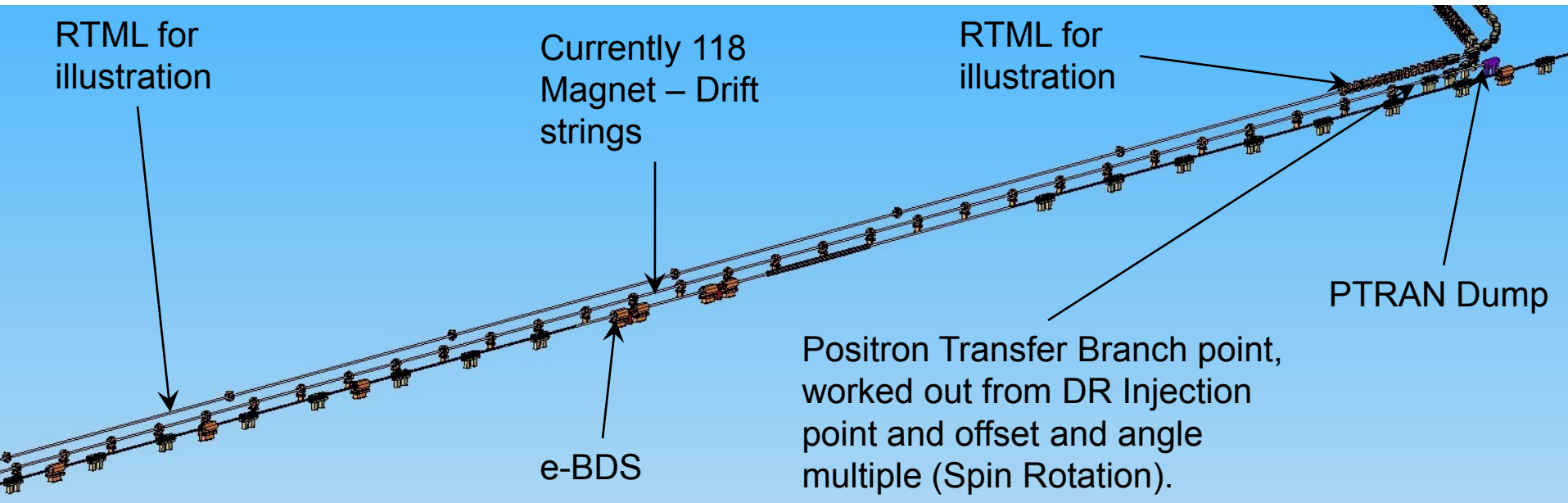


# Positron Source – 5GeV Booster End



The lattice needs to be designed. The 5GeV Booster section can still move up or down the beam line (PTRAN). Currently shown just upstream of e-BDS Tune up dump for radiation and CF&S reasons.

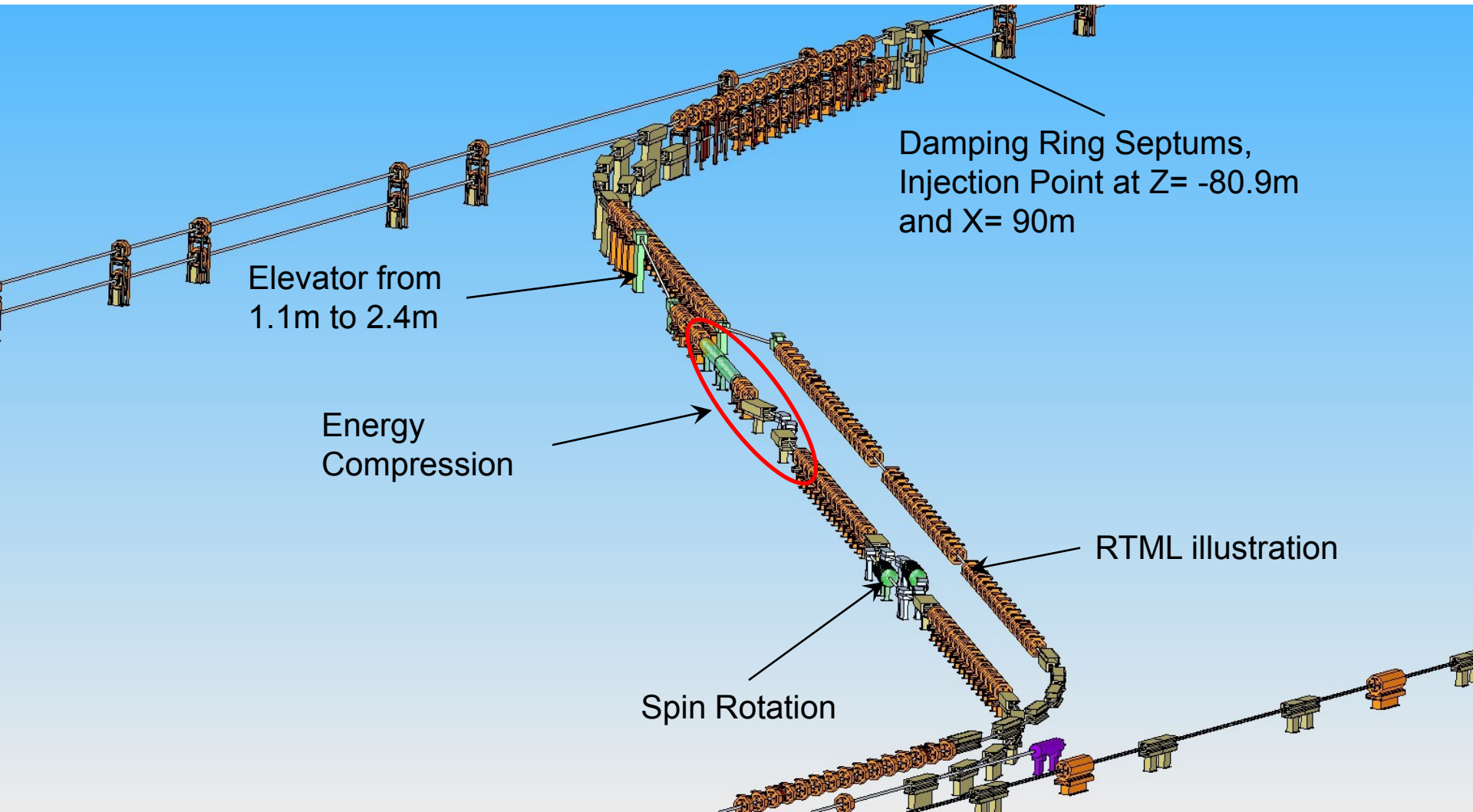




The lattice needs to be designed. Depending on the 5GeV Booster location, it is envisaged to have 118 magnet – drift strings.



# Positron Source – PLTR



The lattice needs to be designed. This area is a pure guesstimate and place holders have been used for the cost and Power/Heat load estimates.



# Positron Source notes

Notes to accompany slide numbers:

Slide X, comment