Role of Plug-compatibility

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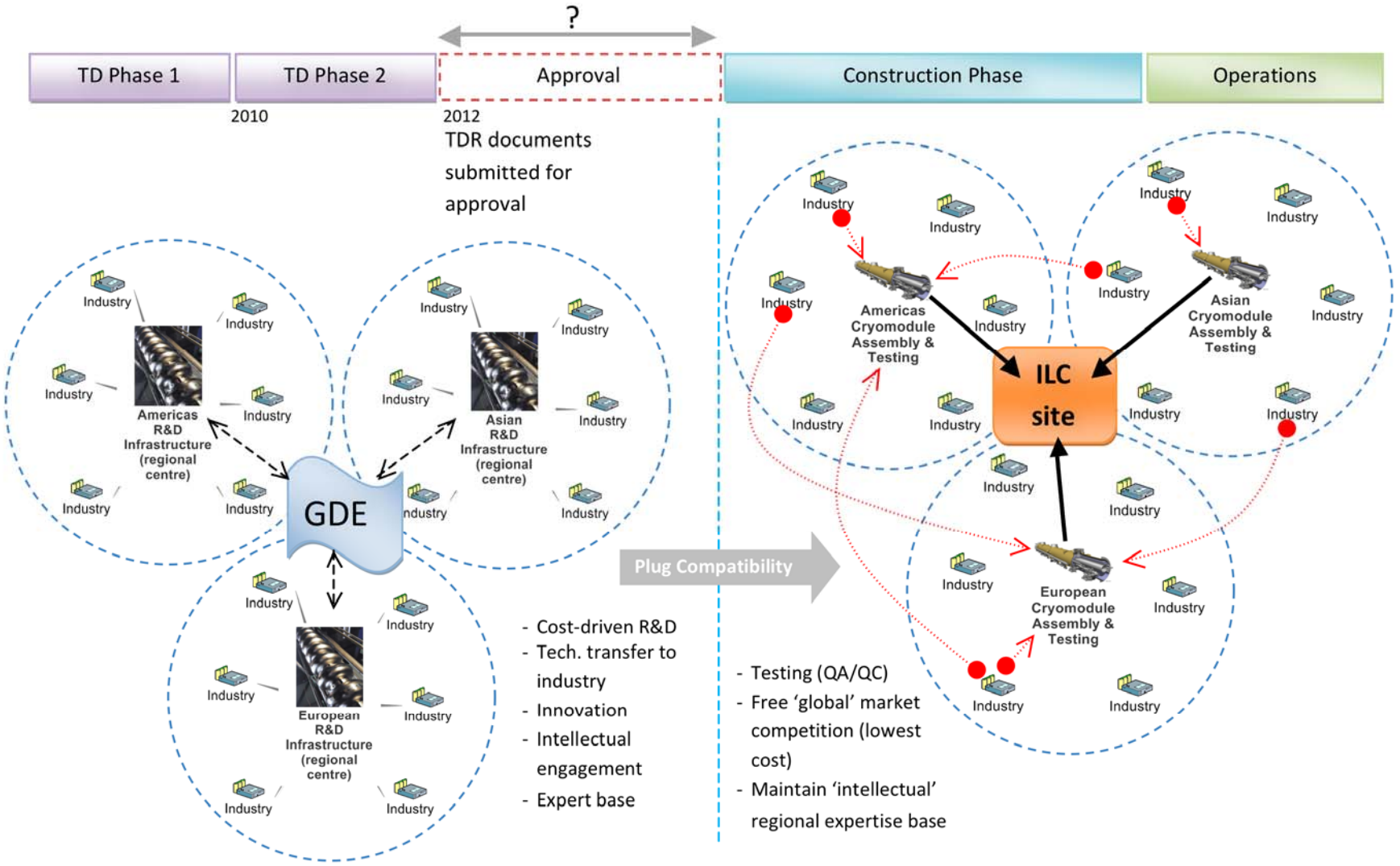
Why Plug Compatibility?

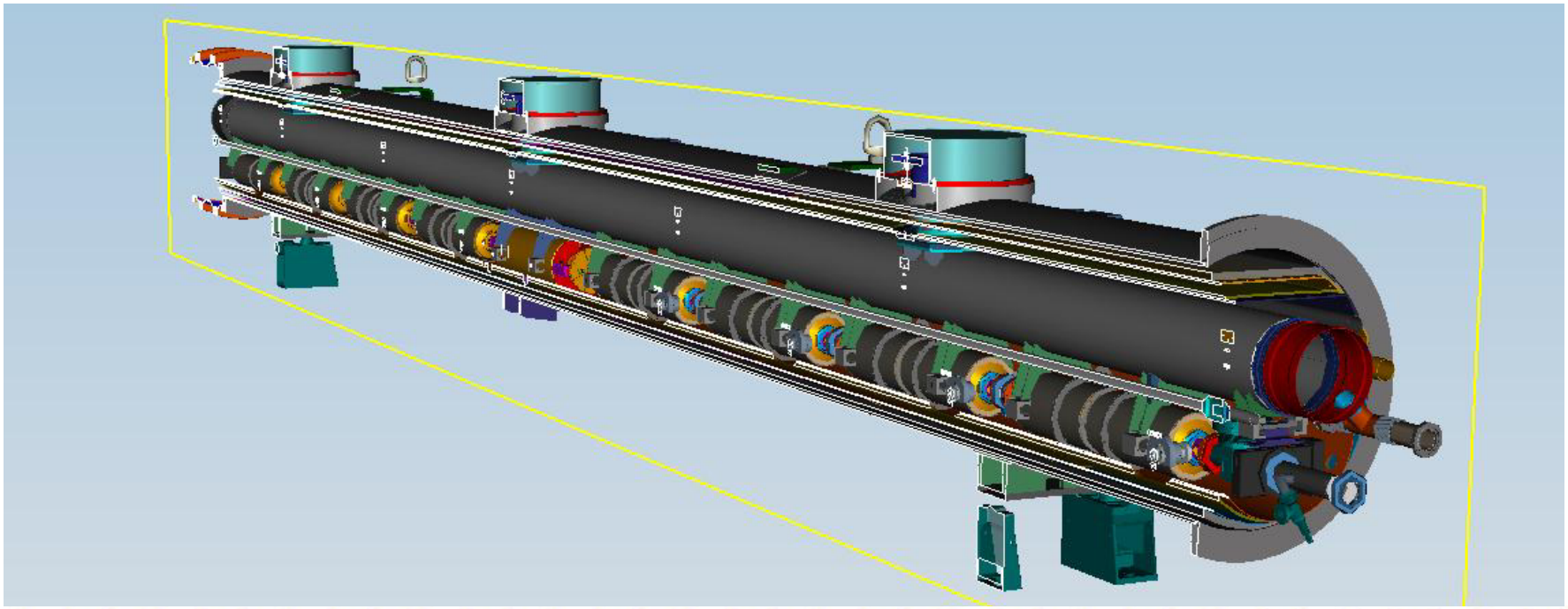
- **R&D Phase**
  - Encourage creative work and innovation for performance improvement from a common baseline
  - Global transfer of information
  - Sharing of components to continue progress world wide despite outside uncertainties
  - Development of the RDR design for system tests and in preparation for construction phase
- **Production/Construction Phase**
  - Keep competitive condition with free market/multiple-suppliers, and effort for const-reduction,
  - Keep flexibility to accept industrial effort, with features and constraints, to reduce the cost under acceptable flexibilities,
  - Maintain intellectual regional expertise base

The Role of Compatibility



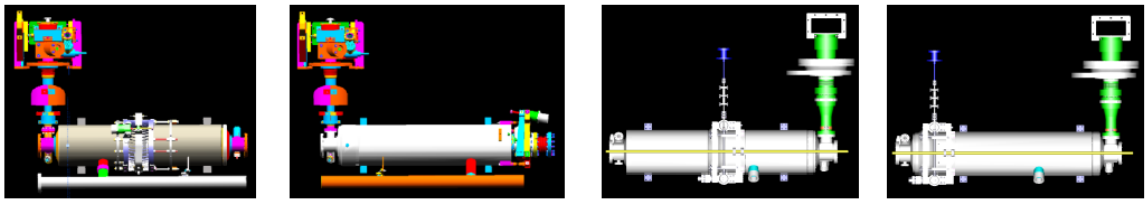
Level of Plug-compatibility

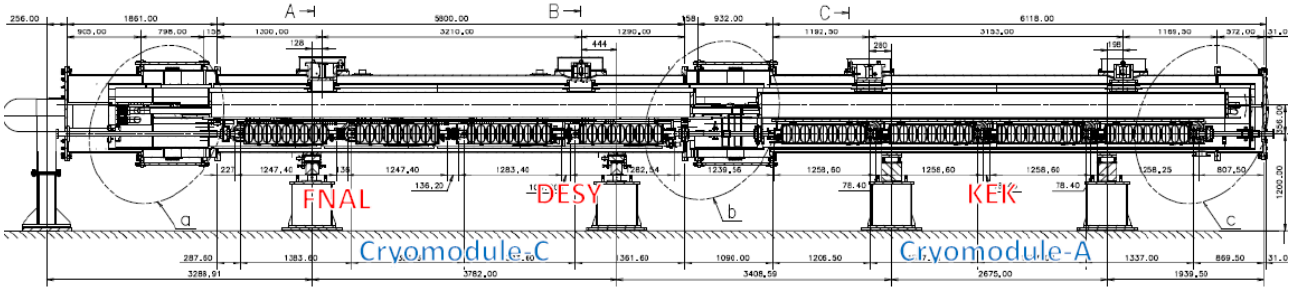
- **Plug Compatibility could be applied from a level of the whole cryomodule, to the smallest component. During R&D, it is appropriate to set boundaries such that technical components can be most efficiently addressed.**
  - setting of minimum number of boundaries required for compatibility, such a part can be accepted into whole while allowing for as much innovation as possible



S1 Global Cryomodule Design

Status of design works of S1-G cryomodules-1





1. Design of the Module-C and -A for S1-G started at May 2008.
2. Module-C has two FNAL cavities and two DESY cavities, and Module-A has four KEK cavities.
3. Two vacuum vessels are connected with a vacuum bellows.
4. The total length of the S1-G modules including end cans is designed to be 14900 mm.

Credit: N. Ohuchi

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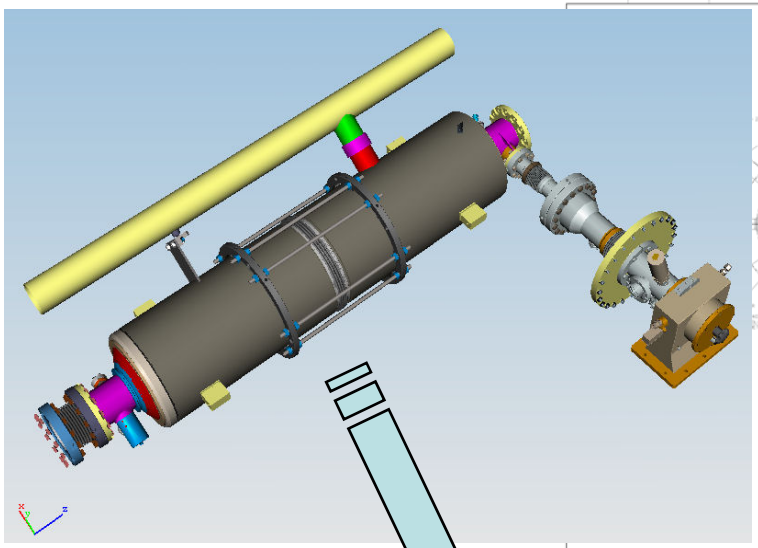
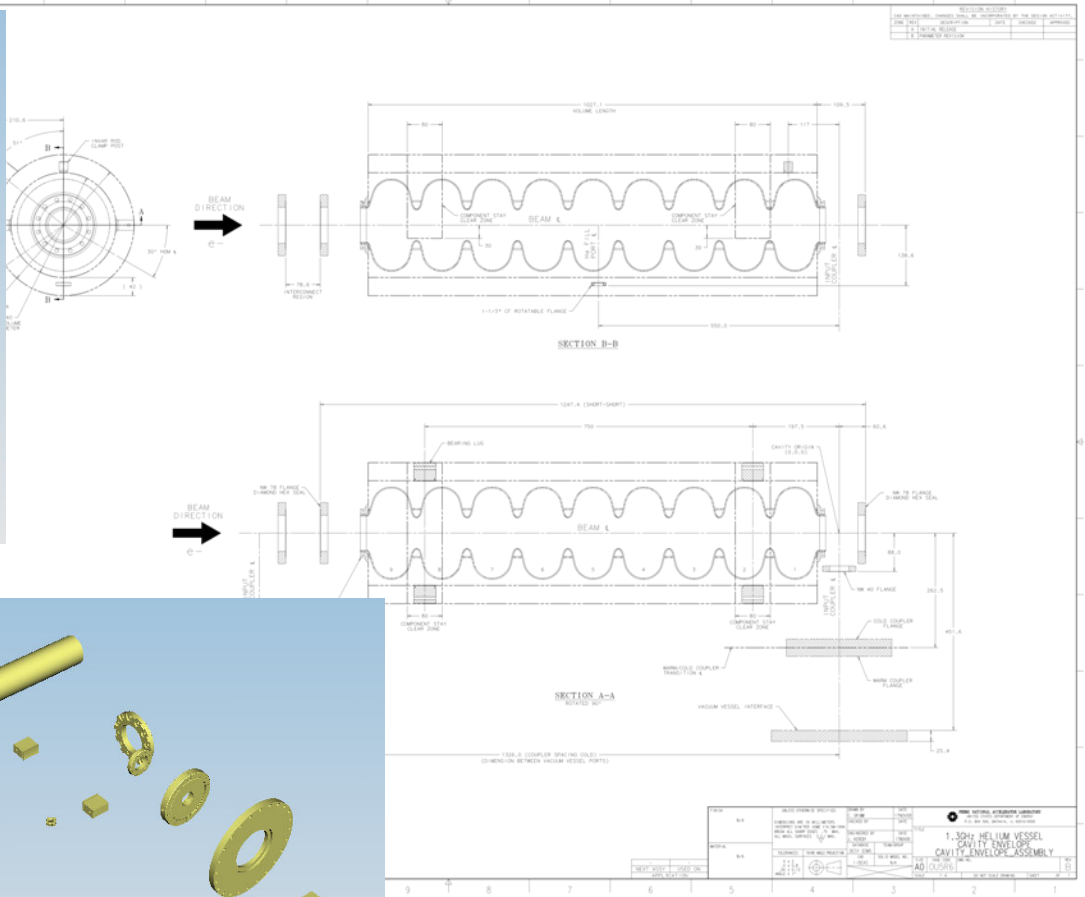
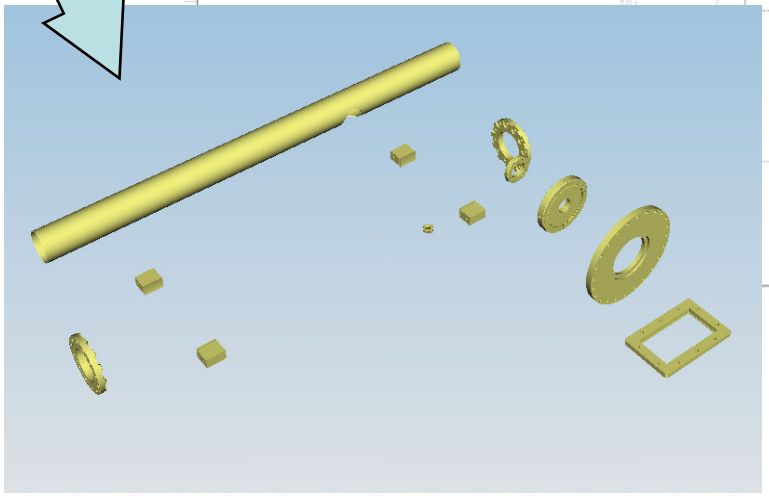
Goals and status described in detail in talk of N. Ohuchi

S1 Global effort also shows value of plug compatibility, allowing limited resources to work on technical goals as compared to singular interface efforts

Cavity: Plug-compatible Interface



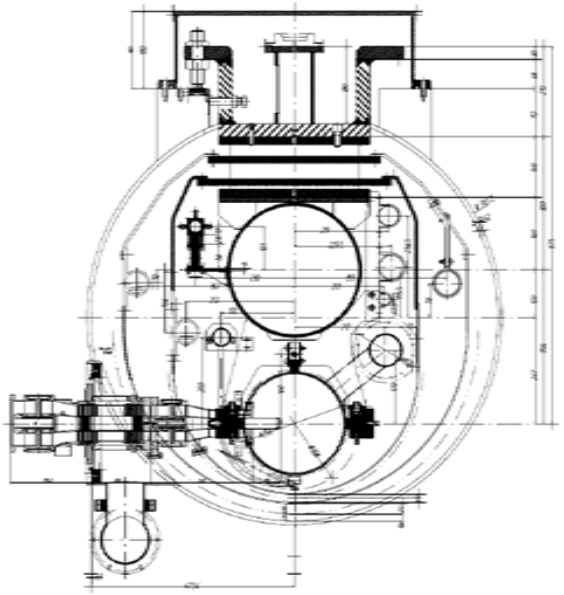




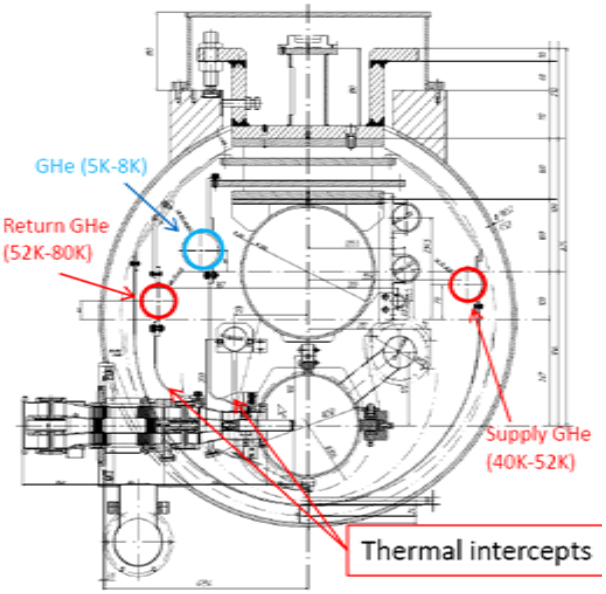
Component interfaces are reduced to the minimum necessary to allow for system assembly

S1 Global Cryomodule System Tests

Cryomodule cross section with/without 5K shield



Two shields model based on
TTF-III with KEK input coupler



One shields model based

1. 5K shield bridge is removed.
2. 5K cooling line is left in the cryomodule.
3. Flow direction of 40K helium gas is opposite to the original model.
4. All thermal intercepts are assembled before completing outer shield.

(Goals and status described in detail in talk of N. Ohuchi)

Credit: N. Ohuchi

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Plug compatibility will allow further component and system development, in parallel, in future assemblies with less design iteration between the assemblies

Summary

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Summary

- **Plug Compatibility is**
  - a means to allow continued innovation from existing and new(!) collaborators while acknowledging the work is part of a larger effort.
  - a way to segregate work such that efforts on components and systems can proceed in parallel
  - a means in the longer term to be more efficient in infrastructure usage
- **Plug Compatibility does**
  - have an initial setup cost
  - impose some minimal boundary conditions, though strong efforts are made to keep them as minimal as possible