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HERD project

Team Progress Report and proposals

HERD Mechanical Meeting
May 20th, 2021

Mechanical team
Perugia
L. Mussolin, G. Morettini, E. Mancini

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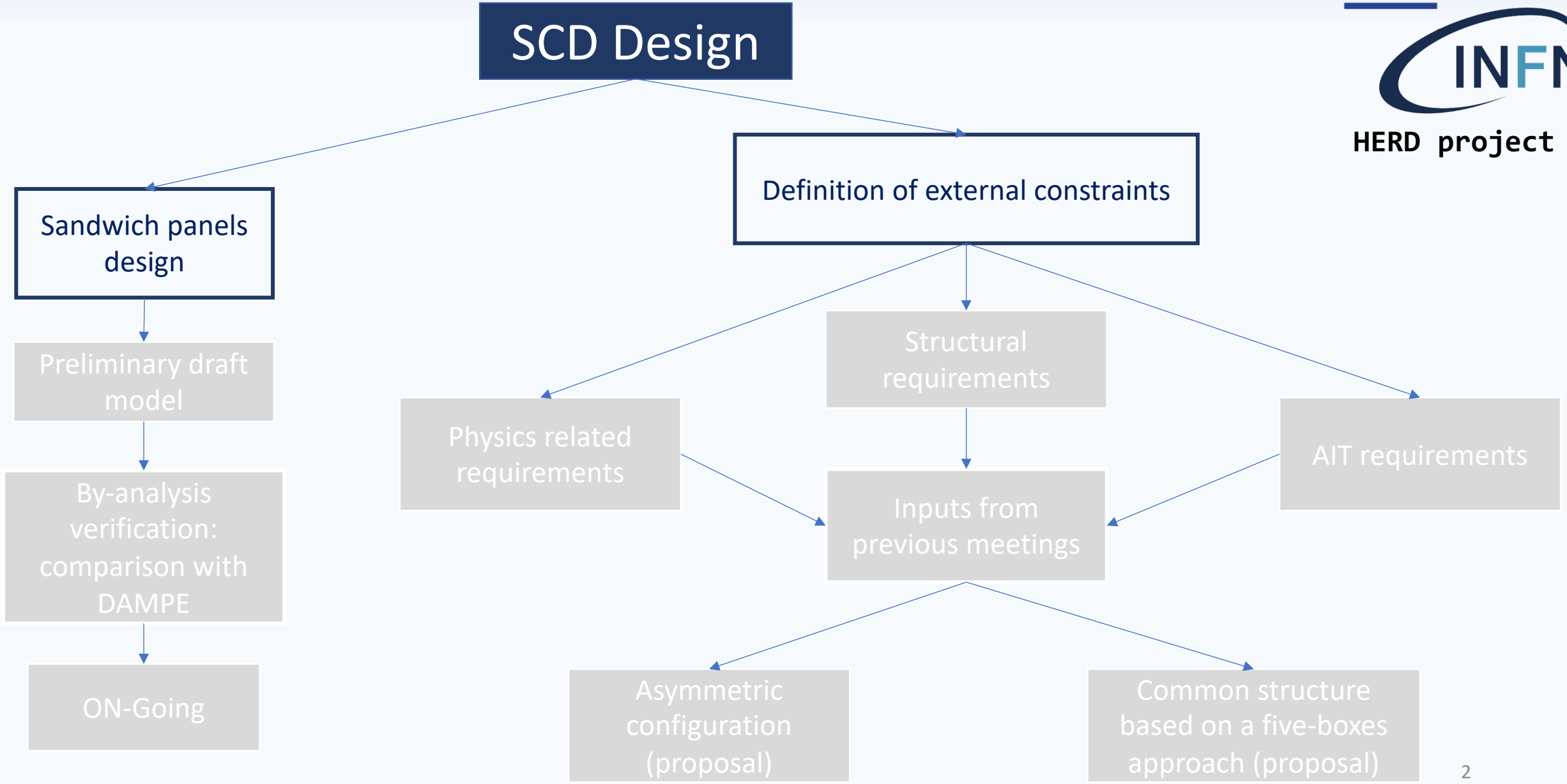

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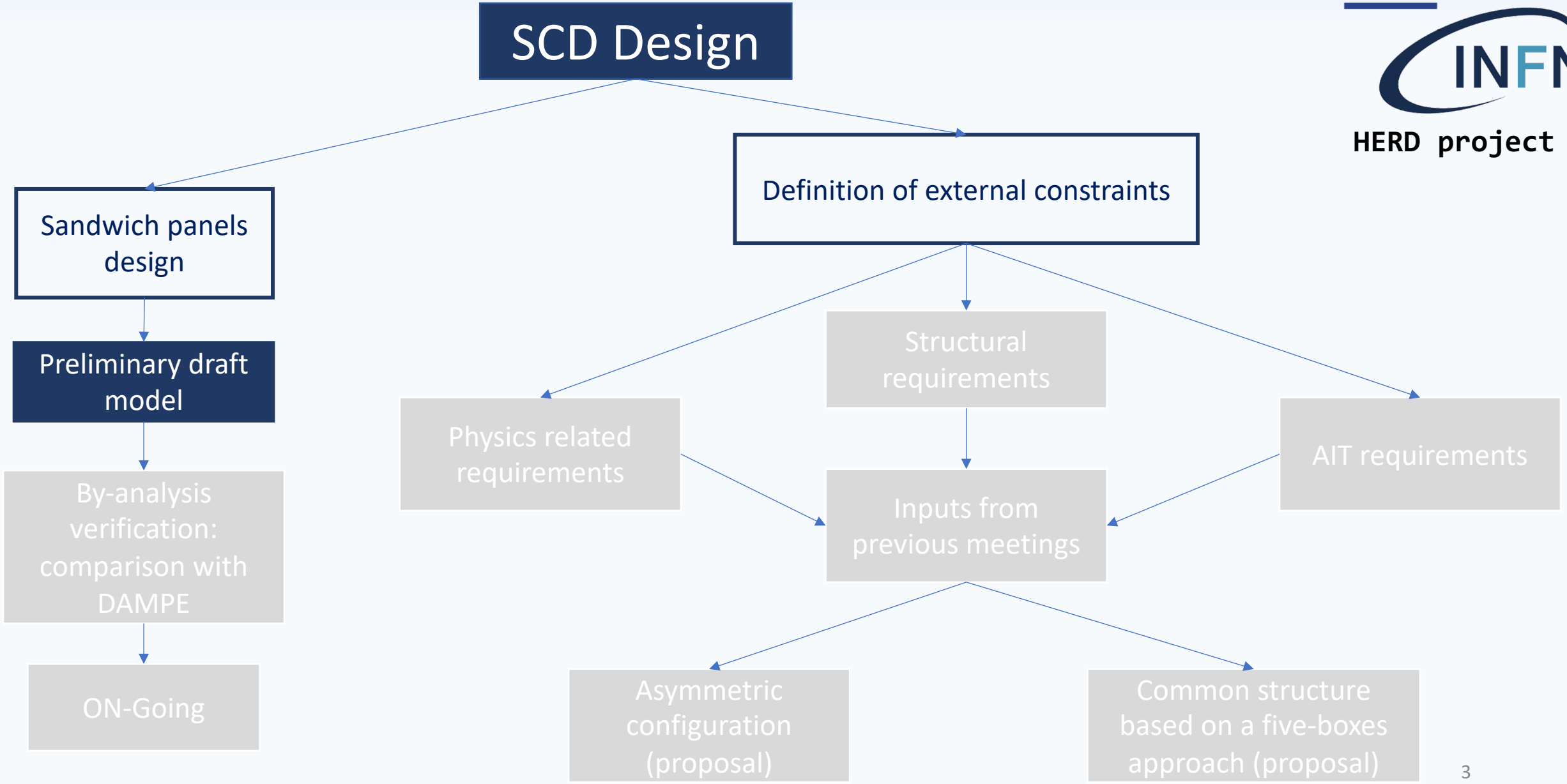

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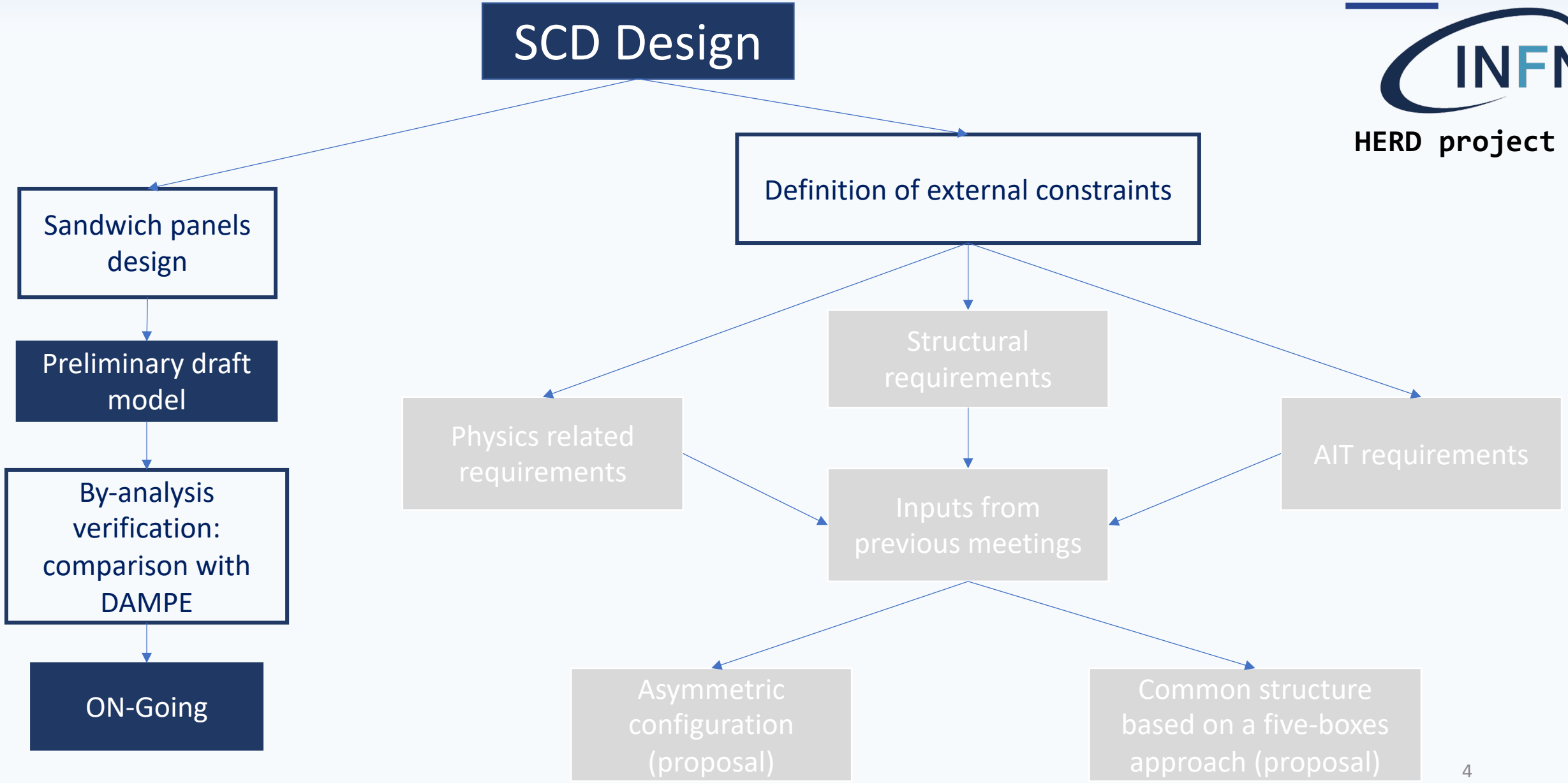
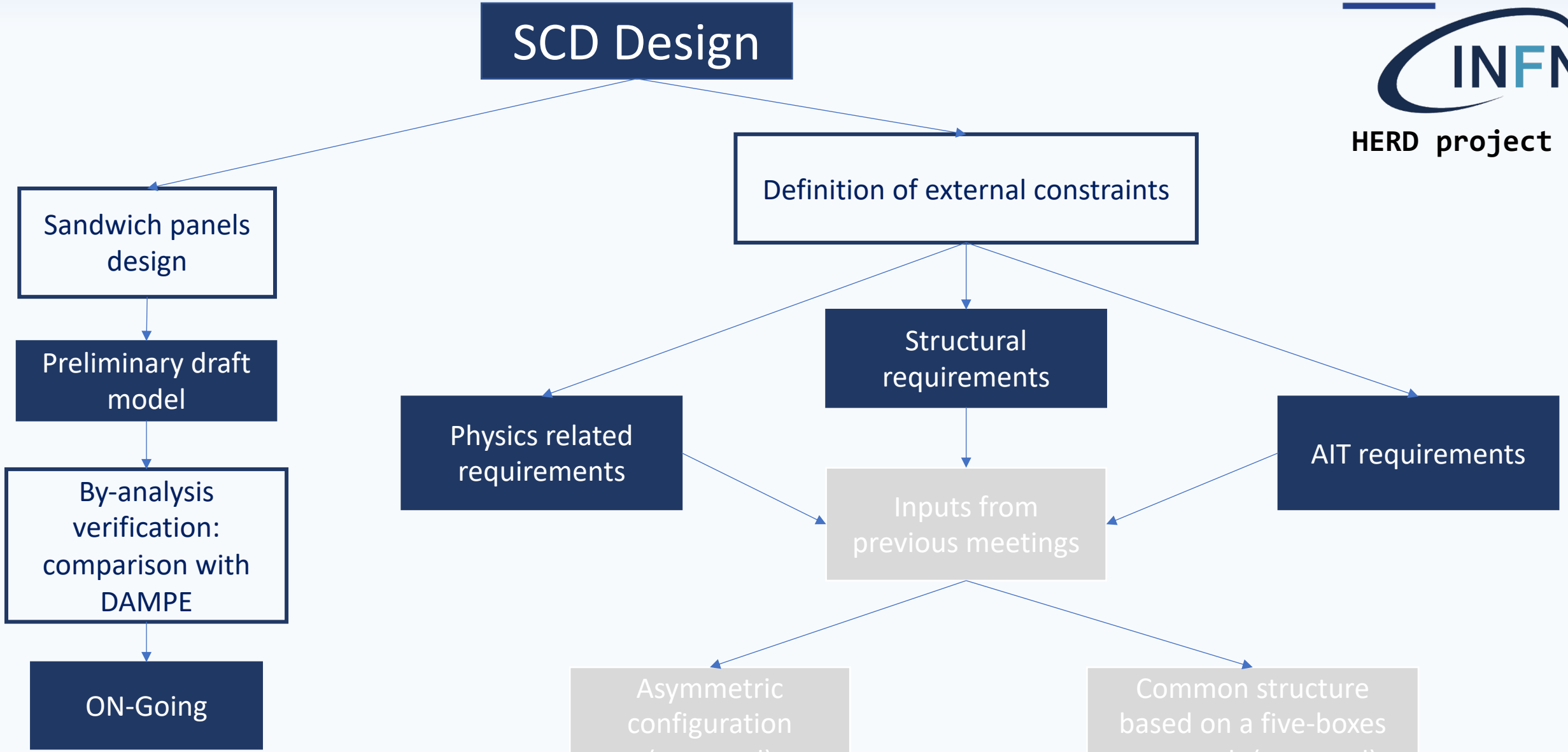


SCD Design


SCD Design
Sandwich panels design
Preliminary draft model
By-analysis verification: comparison with DAMPE
ON-Going
Definition of external constraints
Physics related requirements
Structural requirements
AIT requirements
Inputs from previous meetings
Asymmetric configuration (proposal)
Common structure based on a five-boxes approach (proposal)

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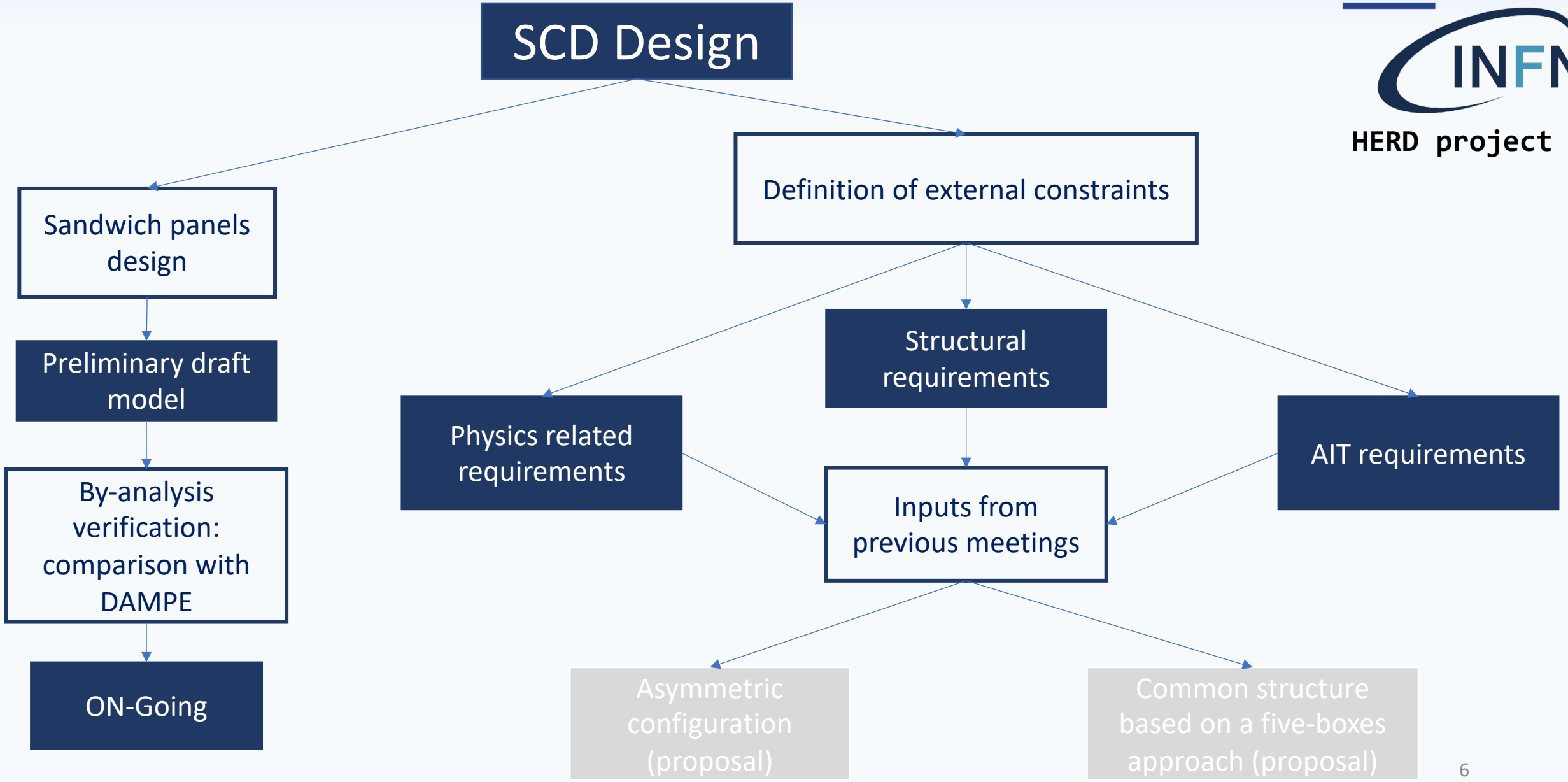

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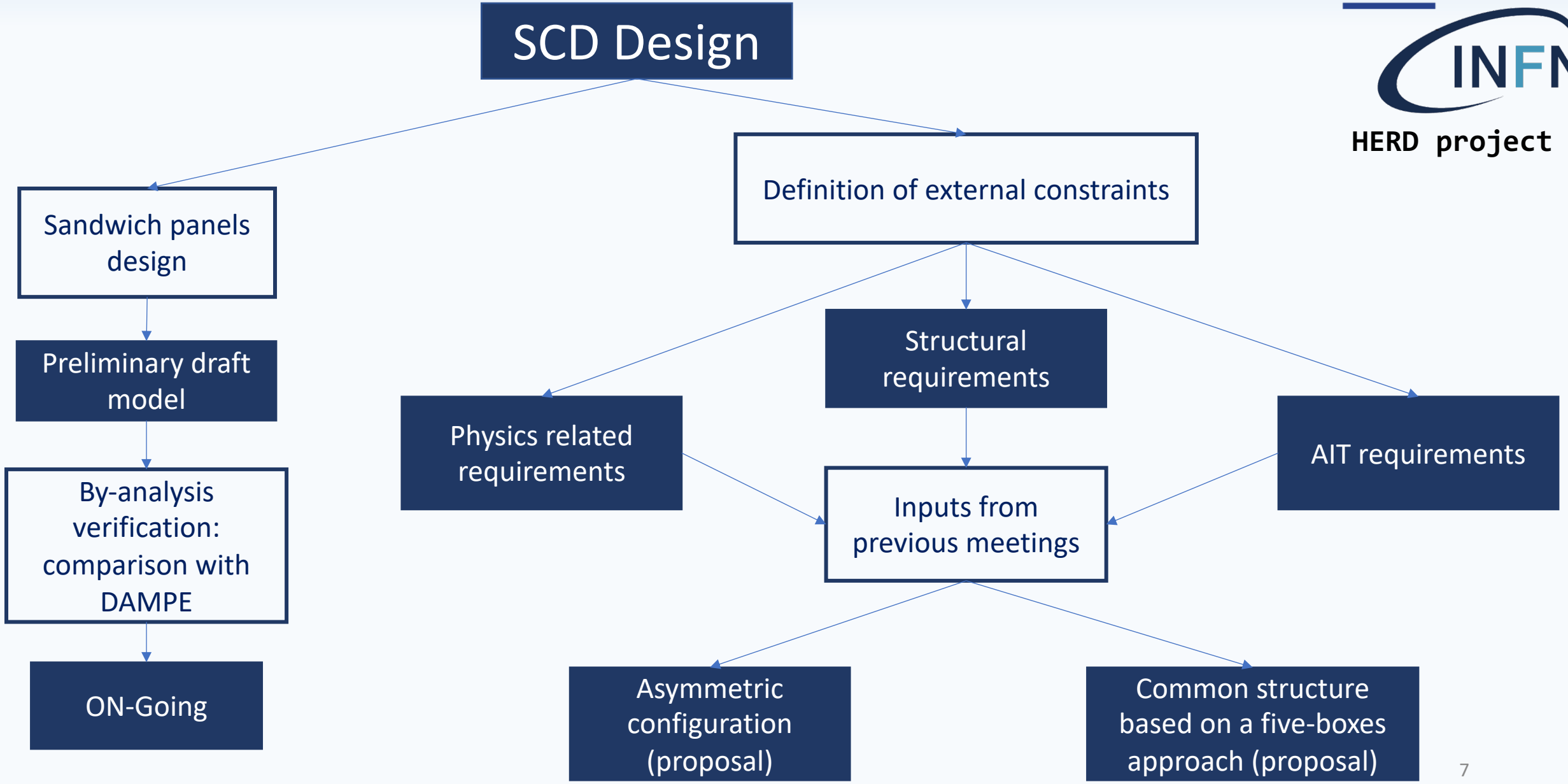

Identification of mechanical constraints

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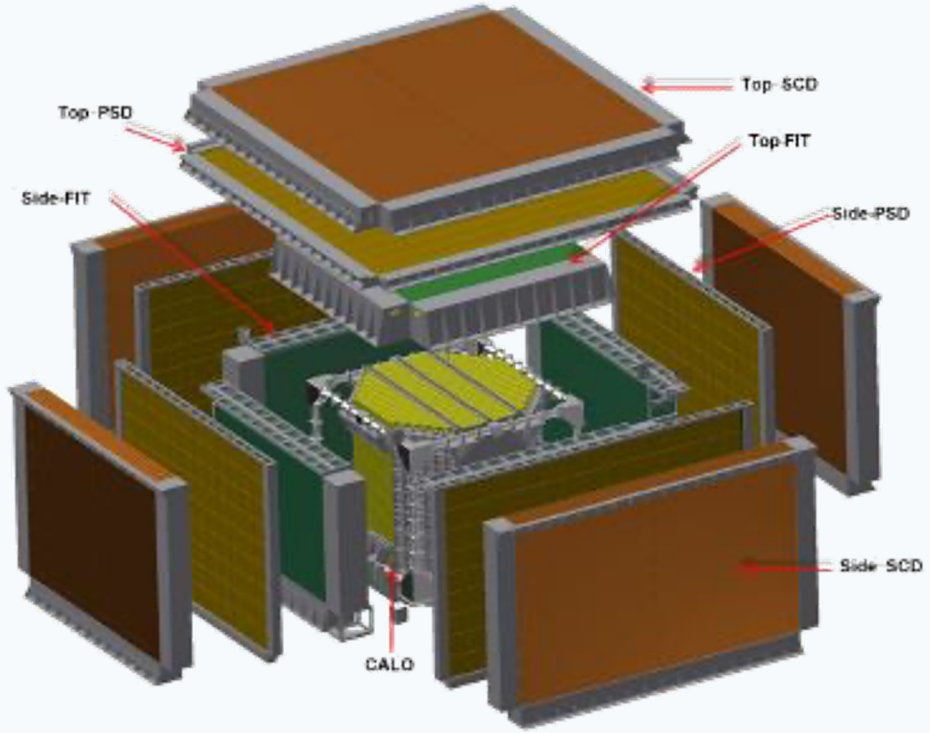
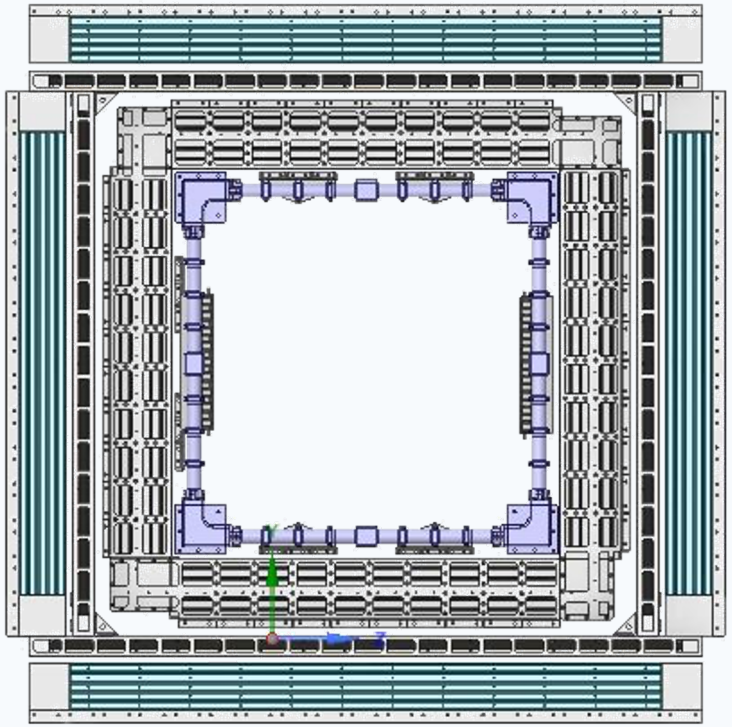
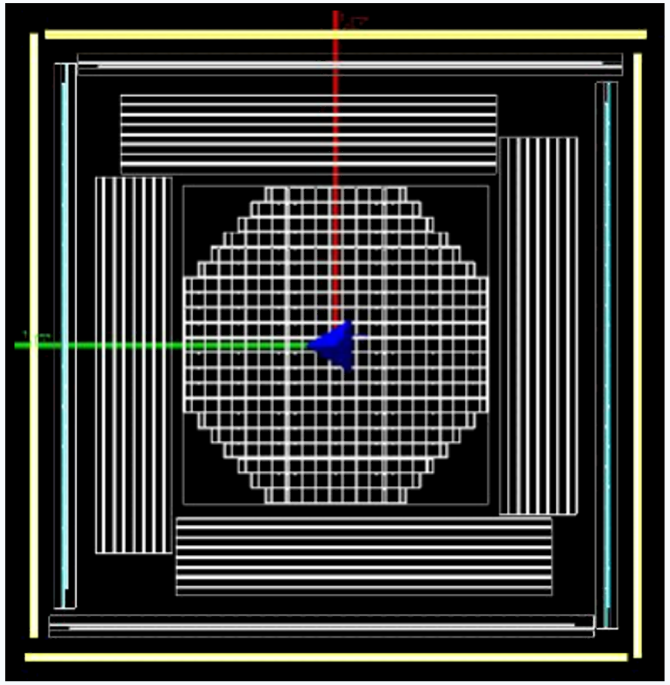
Inputs:

- Preliminary experiments disposition -> PowerPoint presented in April
- Herd CAD model -> HERDdetector.stp
- Theoretical optimization from physics team -> Herd reference geometry.ppt



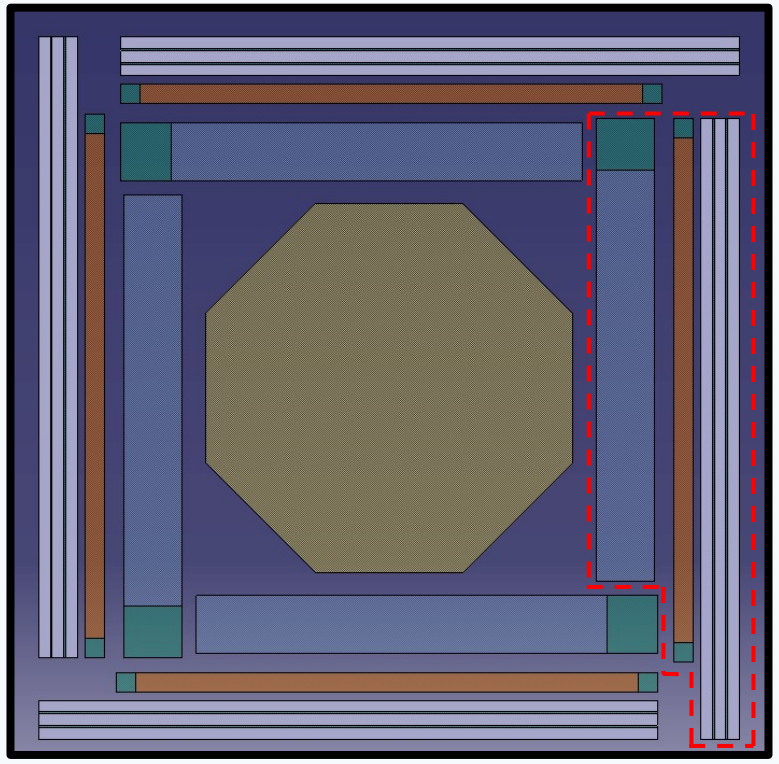




HERD project

Outputs:

1. Possible asymmetric disposition of the experiment



Approach:

- Rearrangement of the .stp to implement Herdreference geometry.ppt

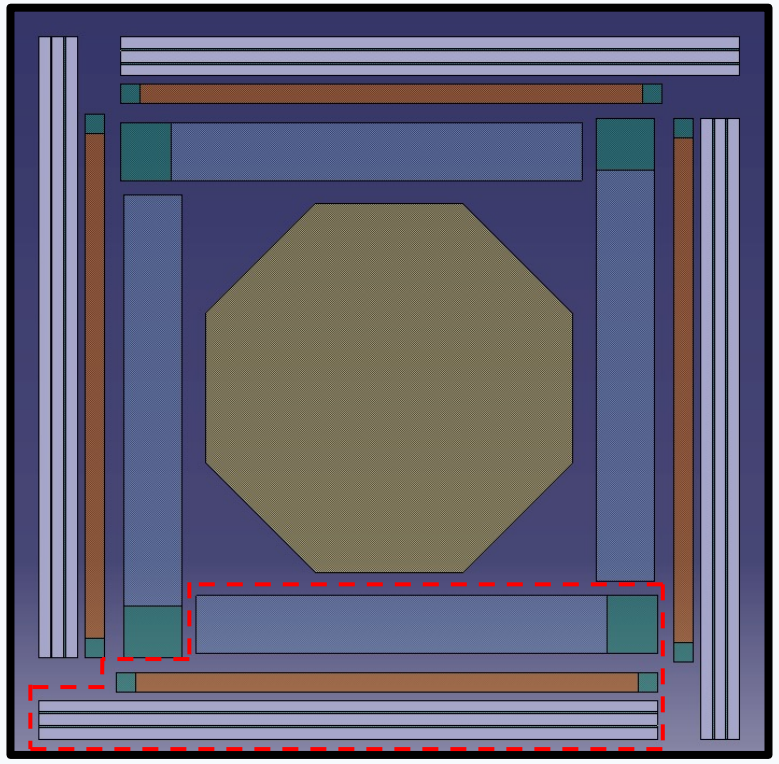
Outcome:

- A possible baseline for the feasibility verification of a design which increases the hermeticity
- A starting point for the external SCD envelope
- The identification of a repetitive pattern inside the structure

HERD project

Outputs:

1. Possible asymmetric disposition of the experiment



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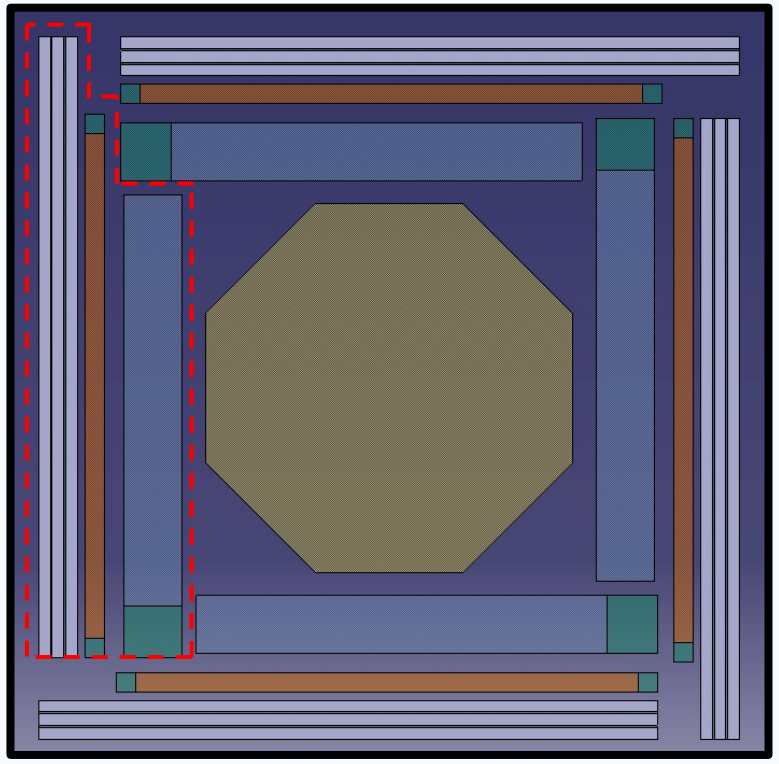

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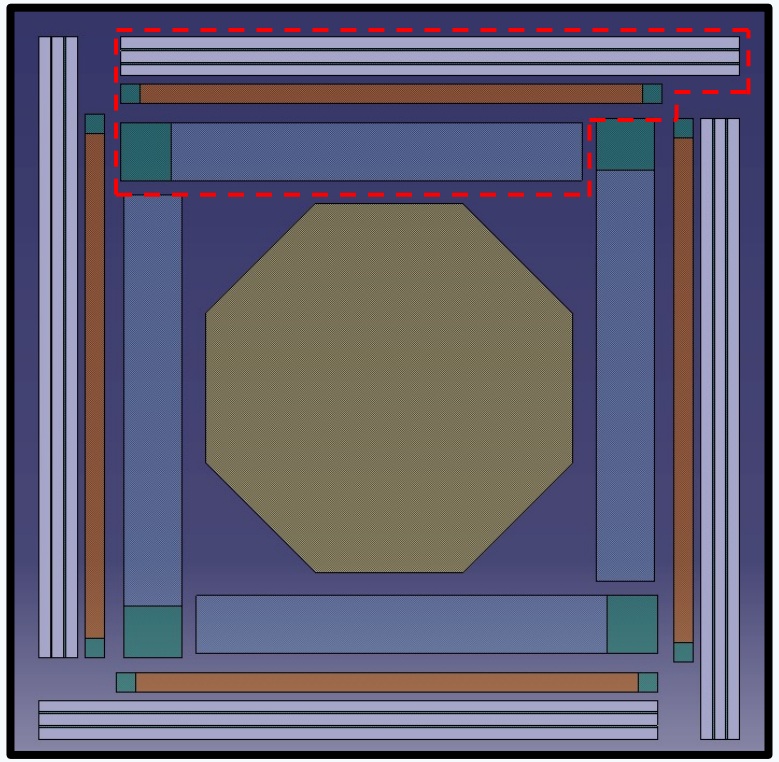

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Outcome:

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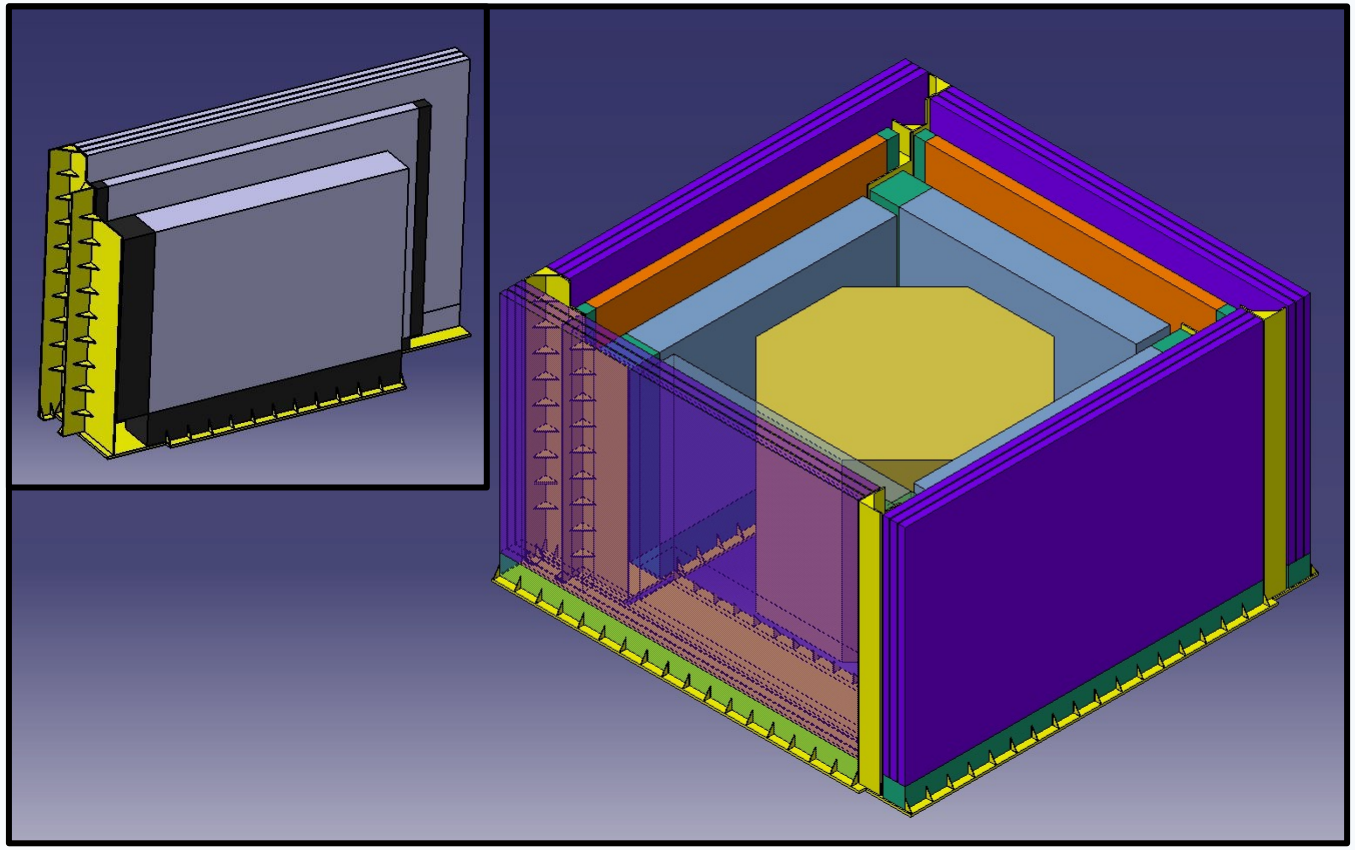
HERD project

Outputs:

1. Possible asymmetric disposition of the experiment
2. Draft of a possible supporting structure following the proposed 5 boxes (4 sides + 1 top) design



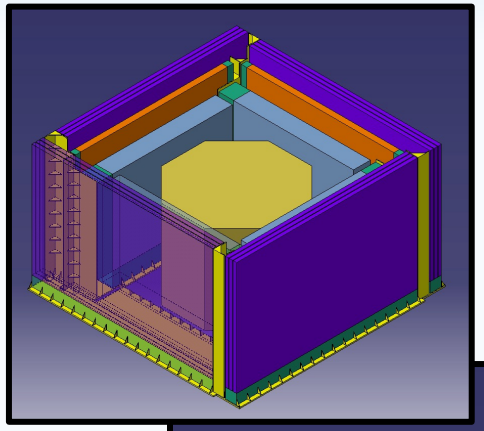
Approach:

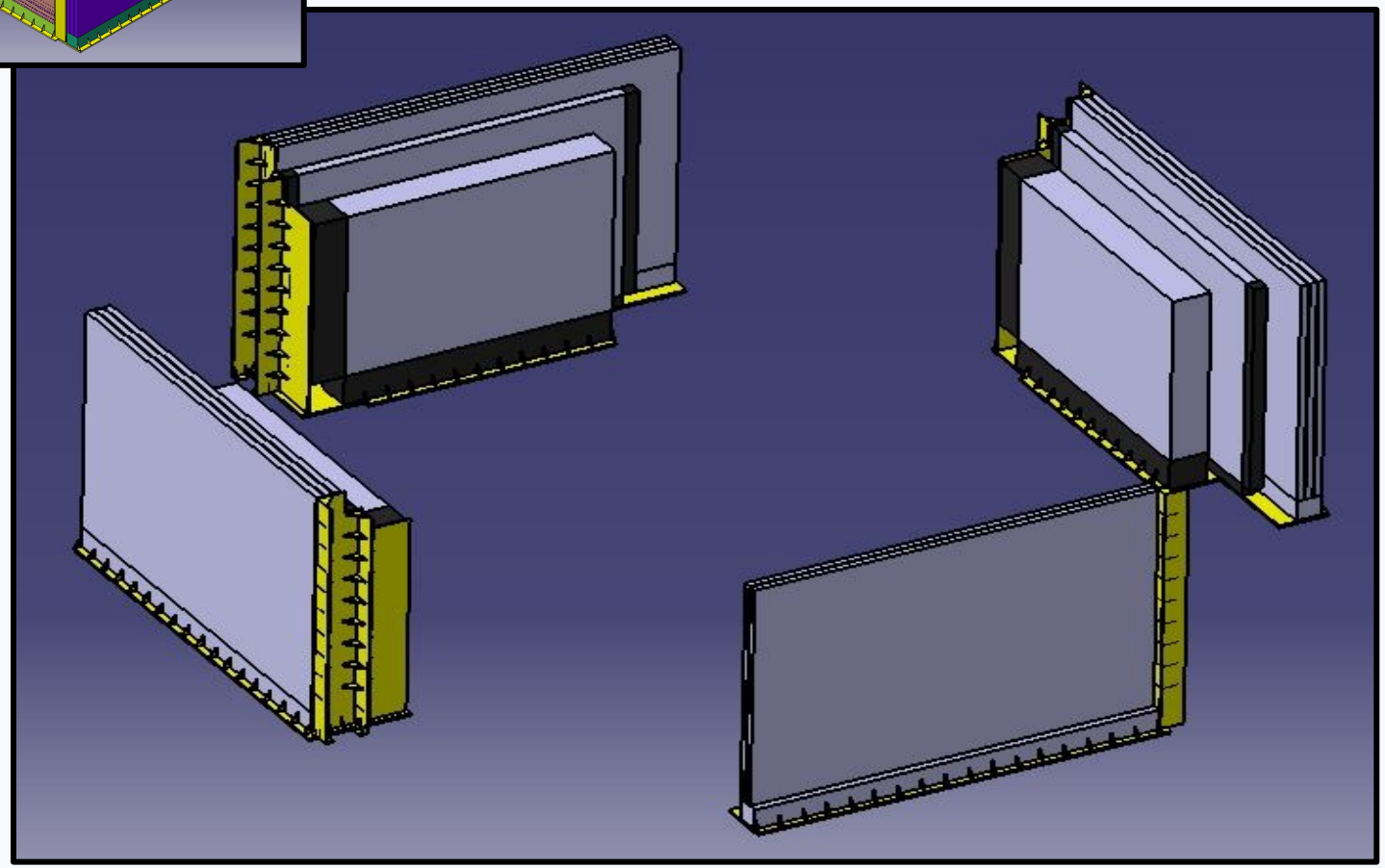
- Preliminary design of an element which follows the patterns of the structure

Outcome:

- A possible supporting structure allowing the manufacturing of 4 identical sub-elements which can be integrated and pre-validated in Europe and then shipped to China

Identification of mechanical constraints





Pros:

- Simplified overall integration
- Detection and solution of integration problems in Europe
- Possibility of carry-out preliminary validation (sub-assembly testing)
- Possibility to manufacture a spare module which can be integrated easily
- Top-down design approach

Cons:

- Increased design effort
- Intercorrelated design leading to stricter relative constraints

Items to be addressed

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- Debris shielding of the experiment,
- Thermal sink (radiators),
- Base-plate connecting to the space station

Thanks for the attention!