Large contracts and way to work together around the ITER Project

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Disclaimer: The views and opinions expressed herein do not necessarily reflect those of the ITER Organization

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Opening the way to a new energy future

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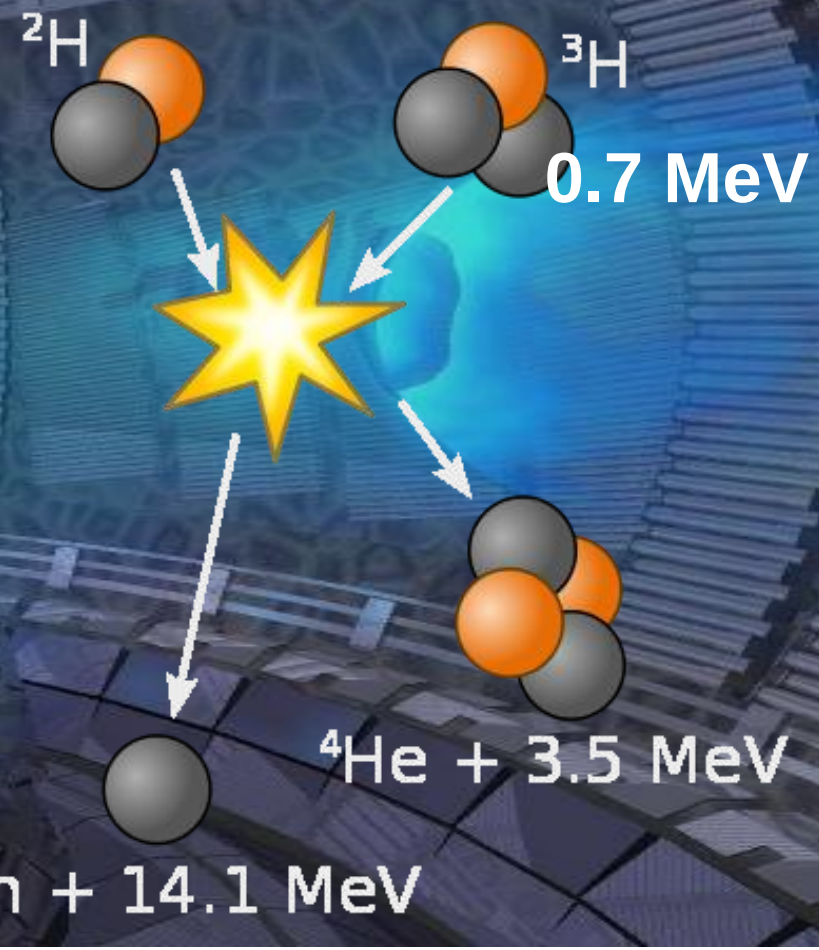
Hydrogen fusion on Earth

- A plasma of Deuterium + Tritium (hydrogen isotopes) is heated to more than 150 million ° C.
- The hot plasma is shaped and confined by strong magnetic fields.
- Helium nuclei sustain burning plasma.
- Neutrons transfer their energy to the Blanket.
- In a fusion power plant, conventional steam generator, turbine and alternator will transform the heat into electricity.



1 gram of fusion fuels = 8 tons of oil

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Work scope towards First Plasma
> 75% complete

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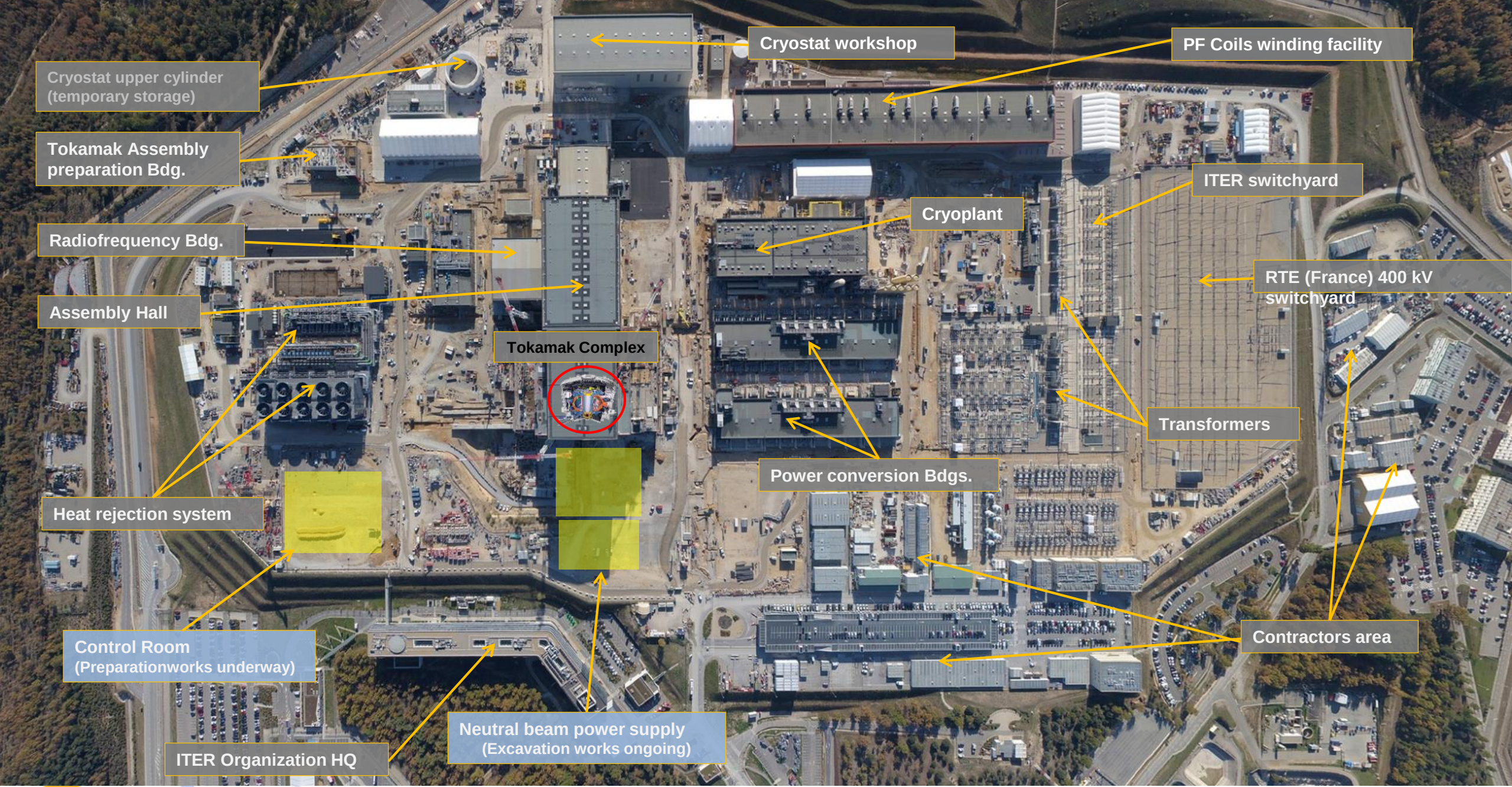

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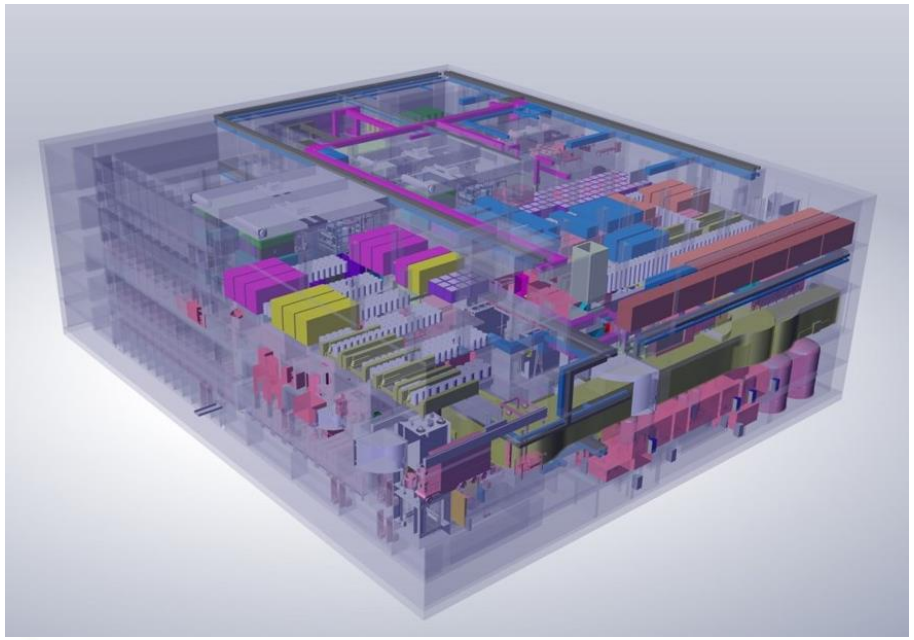
- **Machine Assembly**
- **Hot Cell Complex**



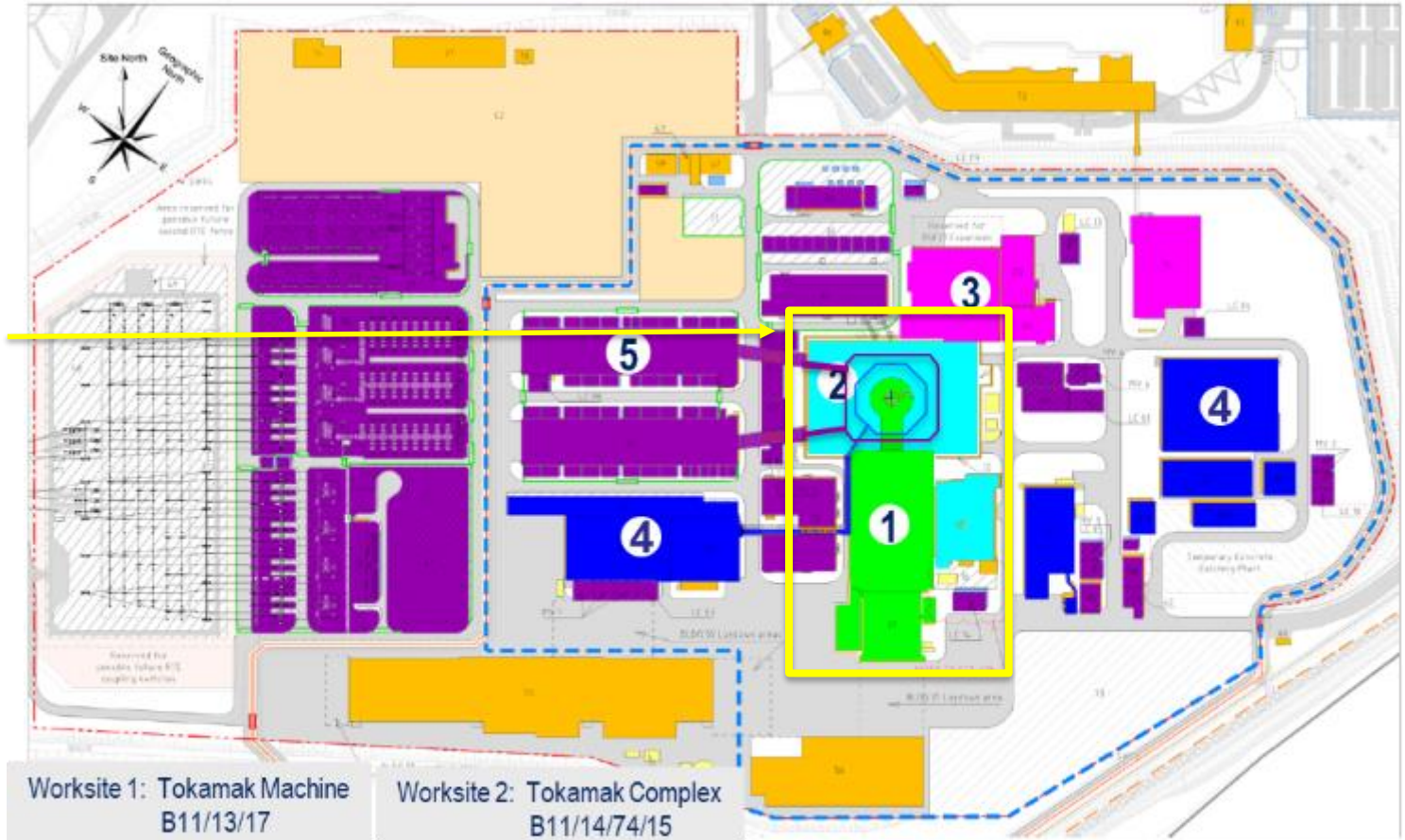
Machine Assembly

Worksite 1 Major Contracts (Around, 500 MEUR, 4,000,000 man.hours):

- A0: Lower Cryostat Early Works
- TAC-1: In-Cryostat/Ex-Vessel & Feeders
- TAC-2: Vacuum Vessel Assembly
- VVW2P: Vacuum Vessel Welding
- A6-I: In-Vessel Components Phase I

Worksite 2 Major Contracts (Around 500 MEUR, 4,000,000 man.hours) :

- TCC-0: Tokamak Complex Early Works
- TCC-1: B11 Diagnostics, Fuel, Vac, Cubicle, PRVR, and B14/15/74
- TCC-2: TCWS, VVPSS, TBM, B14 Valve Room, VAC
- TB04 : mechanical, electrical and HVAC



Machine Assembly
Worksite 1 Contracts

A7: Pre-Assembly

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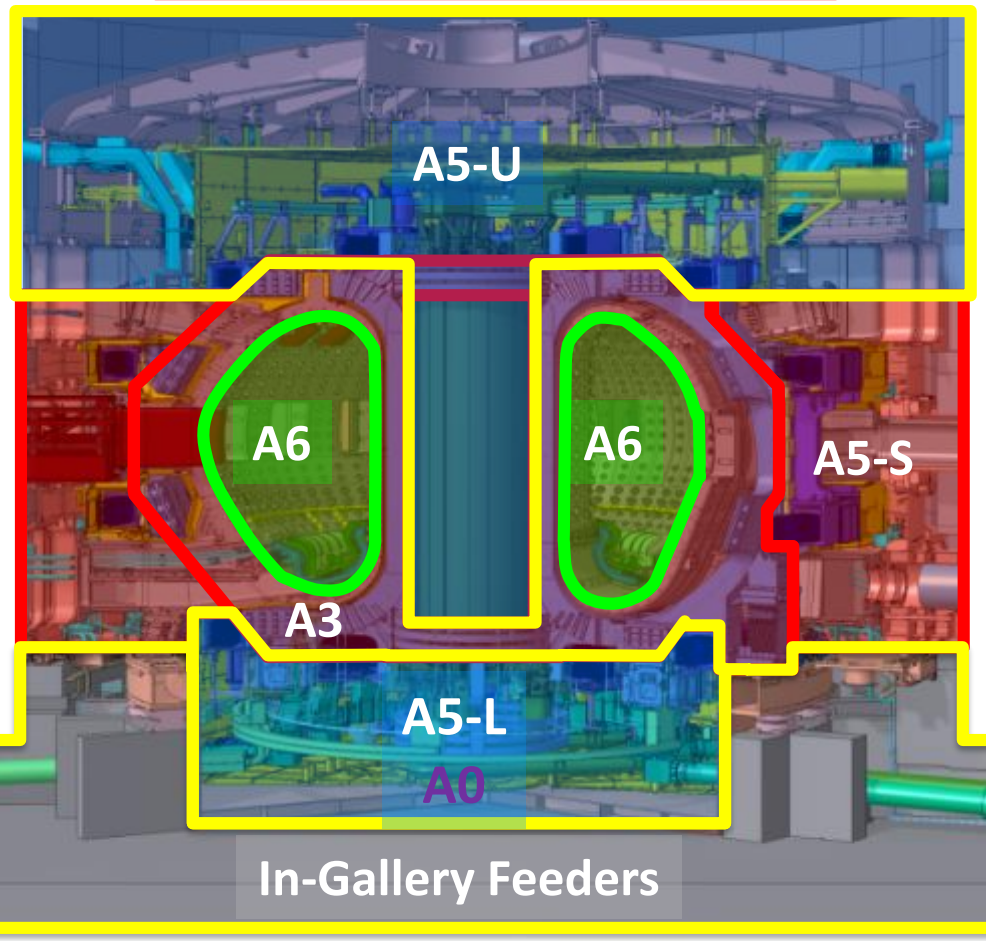
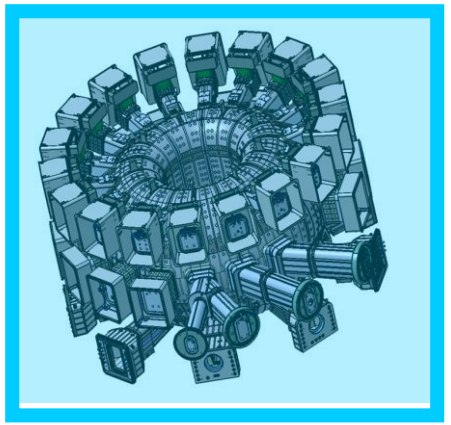
- A0
- TAC-1
- TAC-2
- VVW2P
- A6-I

A4: Metrology Activity

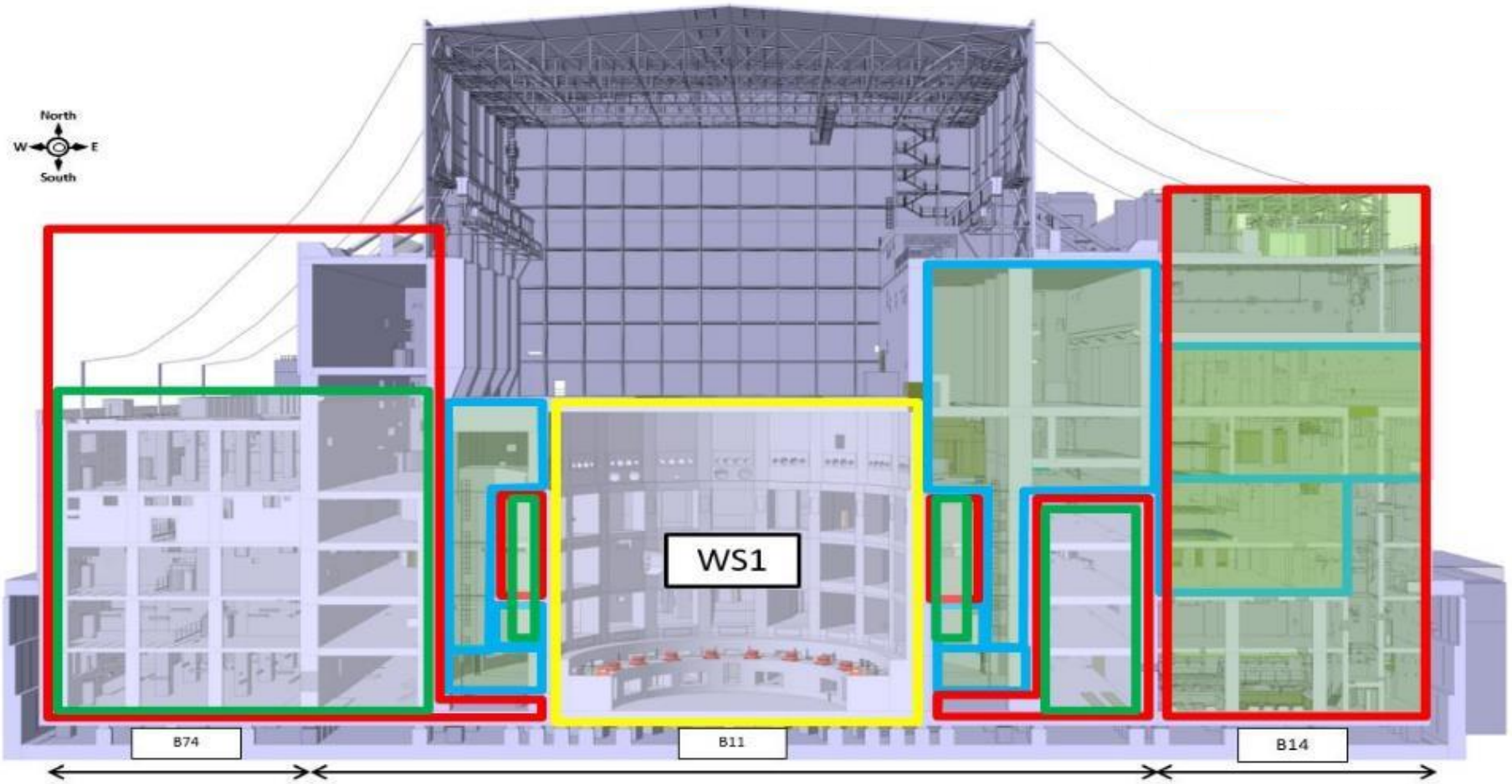


VV Welding



A2: Sector-Sub Assembly

Worksite 2 Contracts



TCC-0: Early Works

TCC-1: B11 Diagnostics, Fuel, Vac, Cubicle, PRVR, and B14/15/74

TCC-2: TCWS, VVPSS, TBM, B14 Valve Room, VAC

In Gallery Feeders

Contract Main Features :

- FIDIC Red-Book General Conditions
- MOMENTUM SNC as Construction-Management-as-Agent / FIDIC Engineer
- Progressive Works instruction via CWPs (2620 CWP for full Phase I Assembly)

Major Challenges :

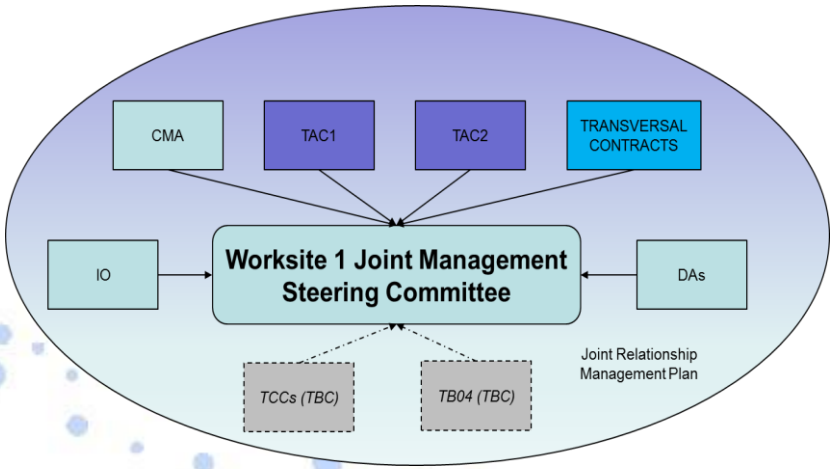
- Management of “First Of A Kind” installation and Learning Curve with Training, Qualifications and Tests
- Master Schedule, Cost and Quality in a Complex Execution Environment
- **Work together IO/CMA/Contractors with Interfaces / Co-activity Management**
- Nuclear Safety Culture
- On-site response to COVID 19

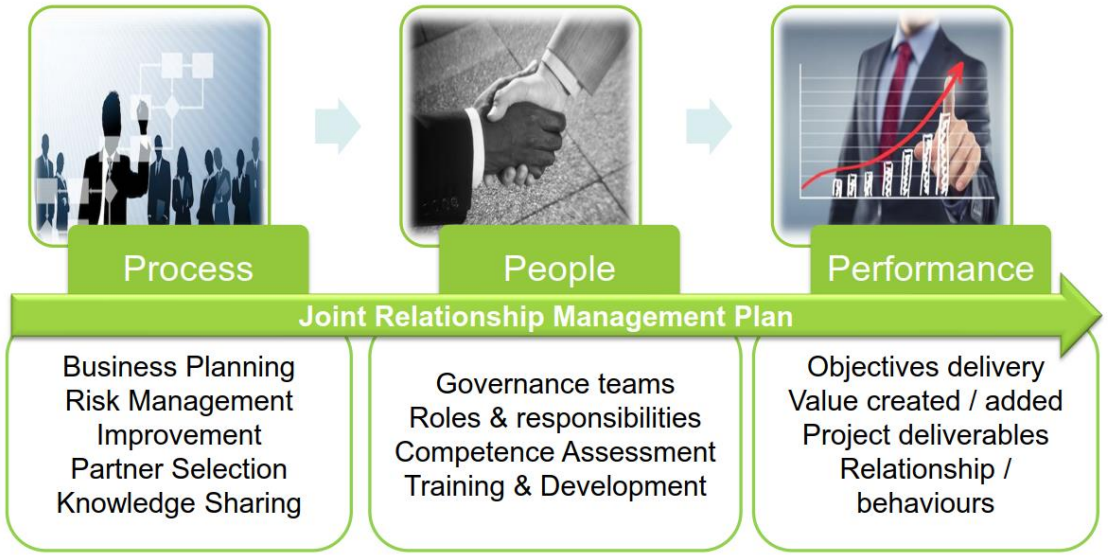
Collaborative Approach :

- Integrated Team IO/CMA
- Commitment of Contractors to act in the spirit of mutual trust and co-operation with other Contractors
- Early Warnings mechanisms (from IO and Contractor)

- Target Price mechanisms
- Joint Relationship Management Plan amongst Worksite Contractors, IO and CMA
- Worksite Joint Management Steering Committee
- Joint KPIs and common Incentive Fund

Set-up on going-going, not easy due to short term priorities / difficulties



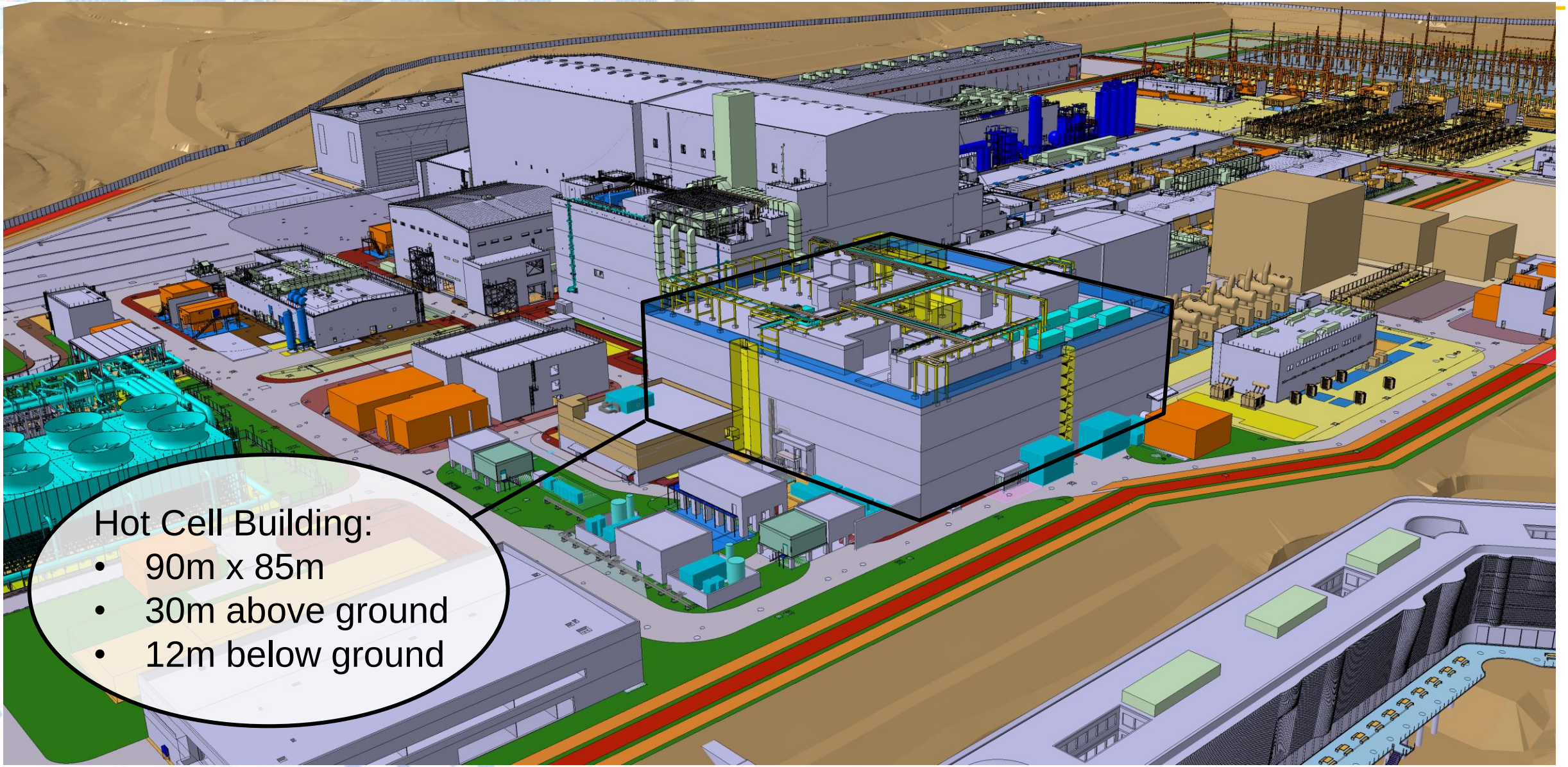


Hot Cell Complex

Functions of the Hot Cell Facility:

- the maintenance of activated and/or contaminated equipment:
  - In Vessel Components
  - Port Cell Equipment
  - Tokamak Remote Handling equipment
- the treatment of radioactive waste
- the import / export and specific nuclear functions.

• Hot Cell Complex

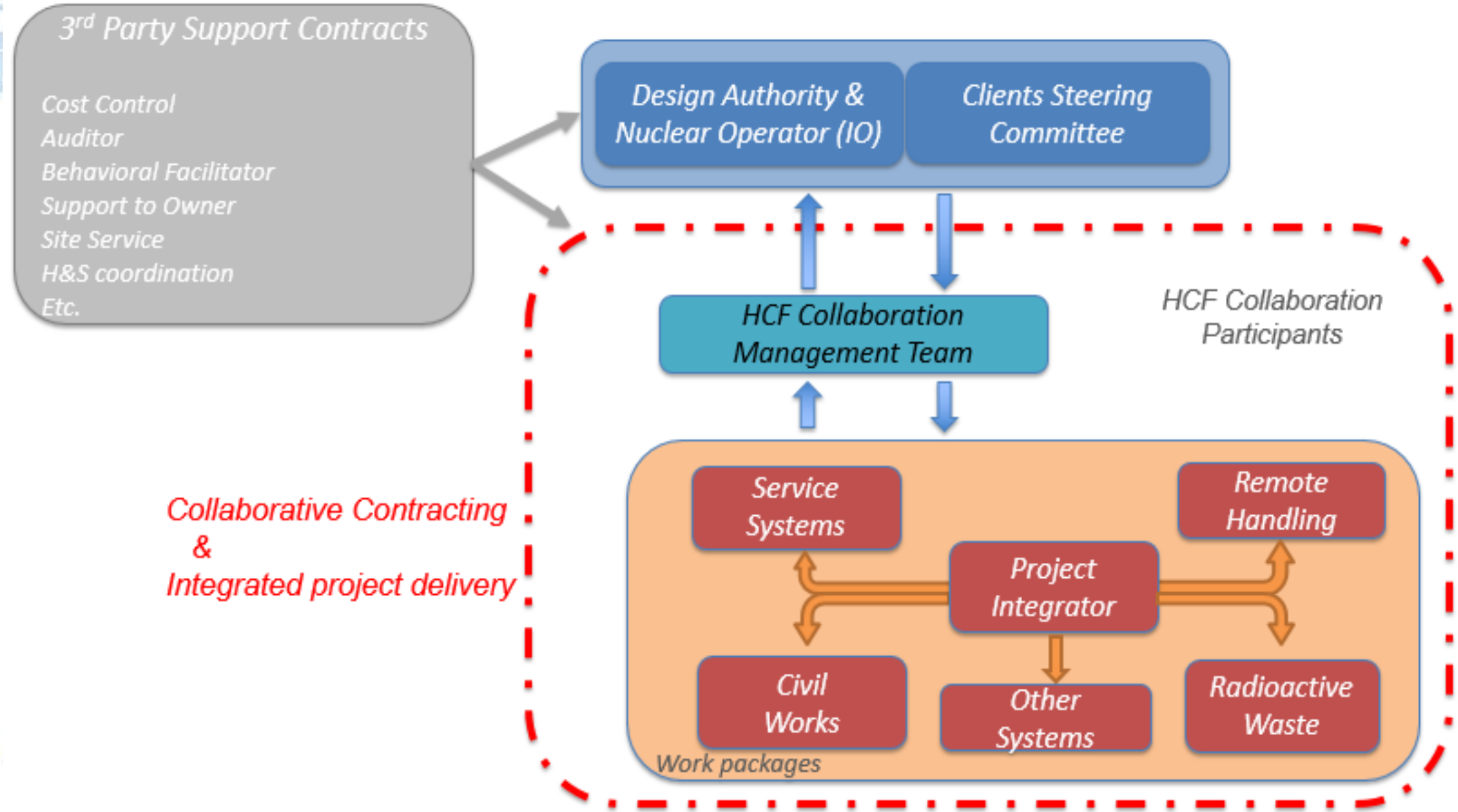


• Main Systems - Scope Share IO vs DA's Collaborative Approach on ITER Construction Contracts

Main system involved in the Hot Cell Facility	Procurement Responsibility	Current Status
Maintenance of In Vessel Components	iter	Conceptual Design
Maintenance of TKM Remote Handling systems	iter	Conceptual Design
Radwaste type B, Purely tritiated waste and TFA	iter	Conceptual Design
Radwaste type A	EU → iter (Transfer discussed)	Conceptual Design
Hot Cell Detritiation System	JA iter	Preliminary Design
Port Plug Test Facility	RU	Final Design
Hot Cell Complex Building	EU	Conceptual Design

Integration activities
Facility Review at concept level

• HCC – Contractual Framework



• Collaborative Strategy / Golden Rules

1. **Integrated team** of the Clients participants, best able to deliver the required project outcomes defined by the IO as Nuclear Operator (outcome-based contract). Early & flexible involvement of these stakeholders and their supply chains.
2. **Culture, behaviours** and expressed commitment to collaboration, mutual support, openness, constructive challenge, innovation, efficiency, outperformance, no fault, no blame.
3. Visible commitment and unconditional support from the executive of each participant.
4. **Equitable shared pain/gain** based on collective success in achieving required project outcomes rather than individual success or individual scope.
5. **Shared ownership of risks and their management**.
6. **Equitable internal management and governance** where decisions are on a “best-for project” basis.
7. The Clients shall keep some **reserved matters** (e.g. decisions affecting the HCF functionality, and/or safety case, licensing arrangements, cost/schedule changes that are beyond the delegations provided to the collaboration board).
8. Alignment of participants’ objectives.
9. **Shared information and tools** which facilitate all of the above.
10. Contracts with obligations around **mutual relationship and collective performance** and which facilitate all of the above.
11. Payment mechanisms and **financial incentives** which are transparent and which facilitate all of the above, and support delivery of the HCF project outcome

HCC – Procurement Strategy

- **Long term contracts covering the entire HCC project phases**
  - From preliminary design to commissioning
  - Step-by-step commitment with break points to update accurately to the upcoming phase
  - A strong yet realistic early involvement of the manufacturers/constructers within the design phases
- **Collaboration framework promoting best-for-project decisions**
  - Clients (IO as Design Authority and F4E) + Project Integrator + Technical Work Packages (Tier-1 contractors) committed within a common poly-party agreement
  - Collaboration features: open book commitment, collaborative decision making, shared risk and reward, aligned commercial incentives, etc.
- **A win-win incentive scheme**
  - Mainly reimbursable cost scheme type contacts
  - Common incentives on target prices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