MICE Integration Engineering

Jason Tarrant - STFC

- Contents
  - » Integration Engineering
    - – Inputs & information required
    - – Outputs (documents)
    - – Checks
    - – Forthcoming work
    - – Immediate integration issues

MICE Integration Engineering

- Integration Engineering
  - » Main inputs / information required
    - **3D models** of MICE components & assemblies = enable quick generation of 'perfect' geometry
    - **2D drawings** of MICE components & assemblies = show tolerances i.e. non-perfect sizing
    - (and/or) Inspection & survey **results**
    - **Installation information** – (when, what, who, how) incl:
      - Installation instructions (incl. tooling, hardware etc required)
      - Position / placement & mass information
      - Services requirements (installation, testing and operation)
      - Testing plan – Mechanical requirements (e.g. apparatus / hardware)

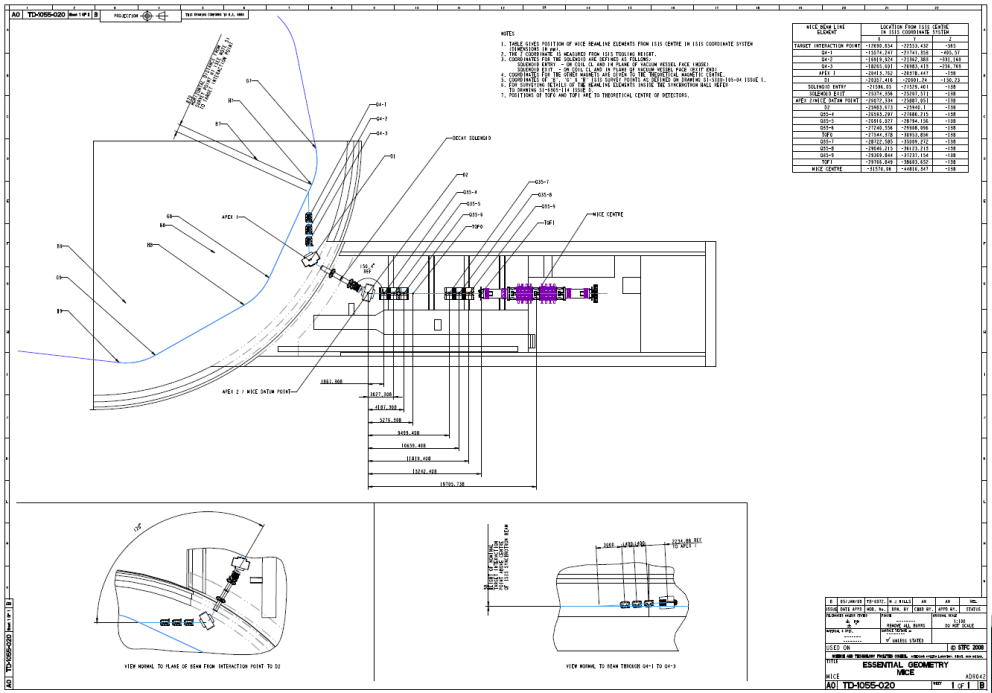
MICE Integration Engineering

- Information required...cont'd

Expected delivery?
Current model(s)?
Engineering drawings / tolerances / specifications?
Pending / future expected changes?
Position & orientation confirmation?
Mass & C of G?
Known interfaces and any prior checks?
Infrastructure required (hardware, services, tooling, survey, inspection & test equipment etc) @ all stages e.g. deliver, installation, testing, operation?
Safety (incl. unwanted outputs / interaction)?
Post manufacture test, inspection and other quality control or survey related data?
Delivery state? Storage requirements?
Installation (when, what, who, how)?

MICE Integration Engineering

- Integration Engineering
  - » Outputs
    - – **Essential Geometry** model & drawing
      - General specification of MICE channel component position
      - Interact with device suppliers & physicists
      - Sign-off Technical Board (?)
      - To include RFCC change (old version shown below)



MICE Integration Engineering

- Integration Engineering
  - » Outputs
    - **Component / system** models (mainly) and drawings
      - For checking overall interfaces, envelopes etc, for services and infrastructure hardware development (e.g. flooring platforms)
      - Interact with device suppliers, services & peripheral developers
      - Sign off with inclusion of
        - » RAL Infrastructure Team
        - » Component / system suppliers
        - » Hardware developers / suppliers
    - **Survey development** models & drawings
      - For development of compatible survey hardware & procedures (e.g. magnetic survey deployment system)
      - Interact with survey groups

MICE Integration Engineering

- Integration Engineering
  - » Outputs
    - – **Installation** models, drawings, documents & schedules
      - For specific installation information & placement requirements for MICE devices, including e.g.
        - » Datum features
        - » Placement tolerances
        - » Testing requirements
        - » General mechanical (e.g. kit lists, torques, tooling)
      - Interact with both magnetic and physical survey groups as well as device developers, infrastructure and installation team
      - Sign off with inclusion of
        - » RAL Infrastructure Team
        - » Component / system / hardware suppliers

MICE Integration Engineering

- Integration Engineering
  - » Outputs
    - **Actual placement** version of Essential Geometry drawing (i.e. post installation & survey)
      - A record of actual placement e.g. for simulations (possibly 3D models as well for G4MICE simulation)
      - Interact with survey group & simulation group
      - Sign off (as built) with Technical Board (?)

MICE Integration Engineering

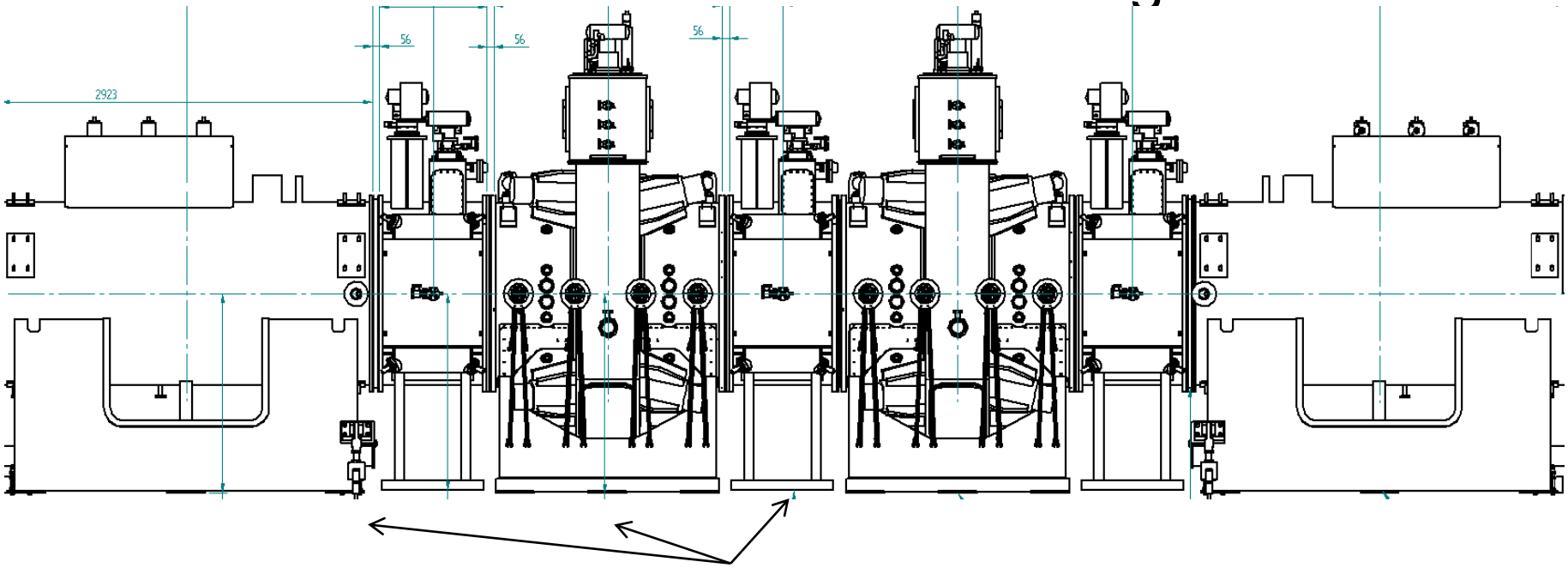
- Integration Engineering
  - » Checks on components & systems
    - **Envelopes**
      - Ensure fit with MICE environment & surrounding hardware
      - Ensure it can be manoeuvred into location & any subsequent locations (e.g. future steps or testing)
    - **Placement**
      - Ensure physics & mechanical compatibility requirements (e.g. floor to centre height)
    - **Interfaces**
      - Ensure interface details match, including allowance for manufacturing tolerances, surveying accuracy etc
      - Determine flexibility at interfaces for adjustment if required
      - Services routing and connection interfaces

MICE Integration Engineering

- Forthcoming Work
  - » Understand who ‘stakeholders’ are
  - » Get information on the components & systems, and their integration into the MICE hall
    - – Obtain the information listed earlier...
  - » Continue work on models & drawings (bulk of work)

MICE Integration Engineering

- Immediate Issues: Floor to Centre Height

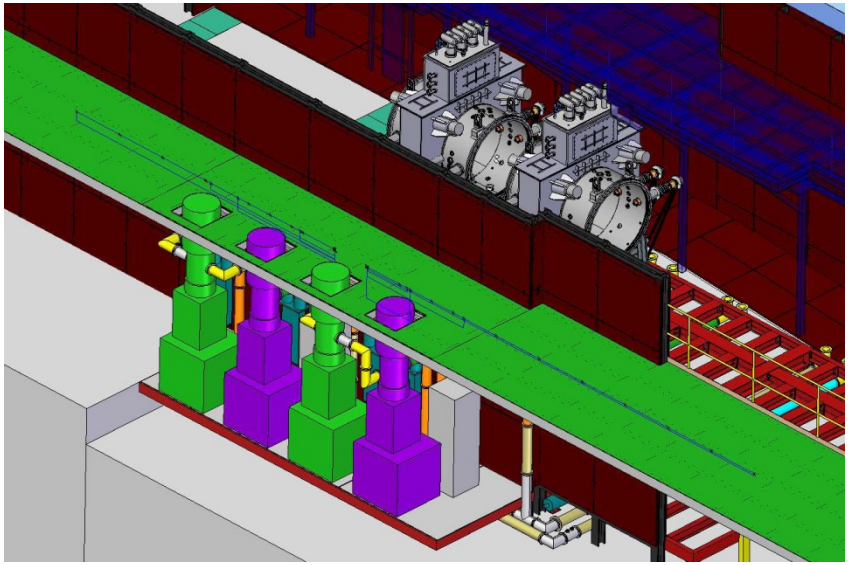


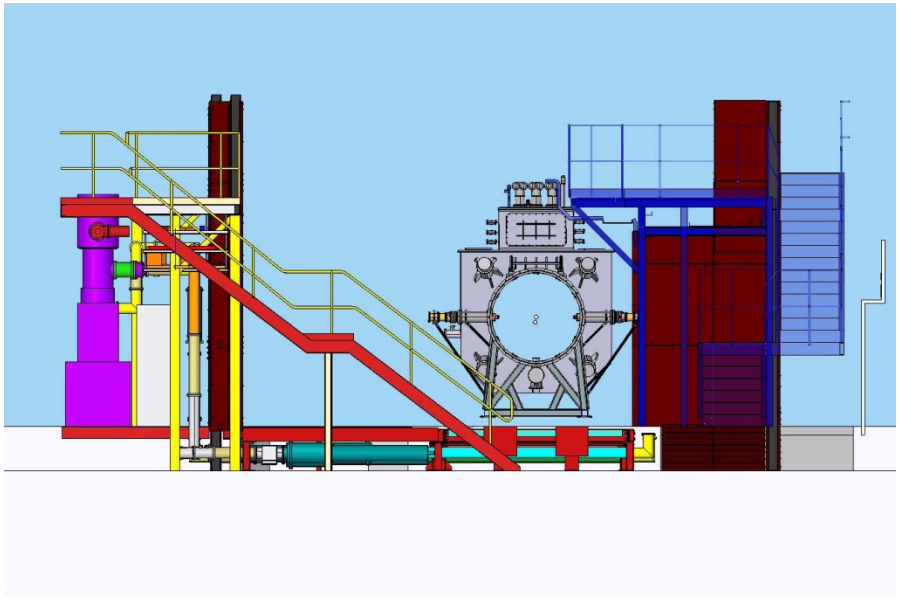
Bases of models currently @ different distances from centre

- Required 1515mm or less
  - ~OK from SV (SS), A DeM (RFCC), TESLA (AFC)

MICE Integration Engineering

- Immediate Issues: RFCC Clash





  - » Mezzanine will be modified to suit
  - » Other local hardware might also be a problem (TBD)