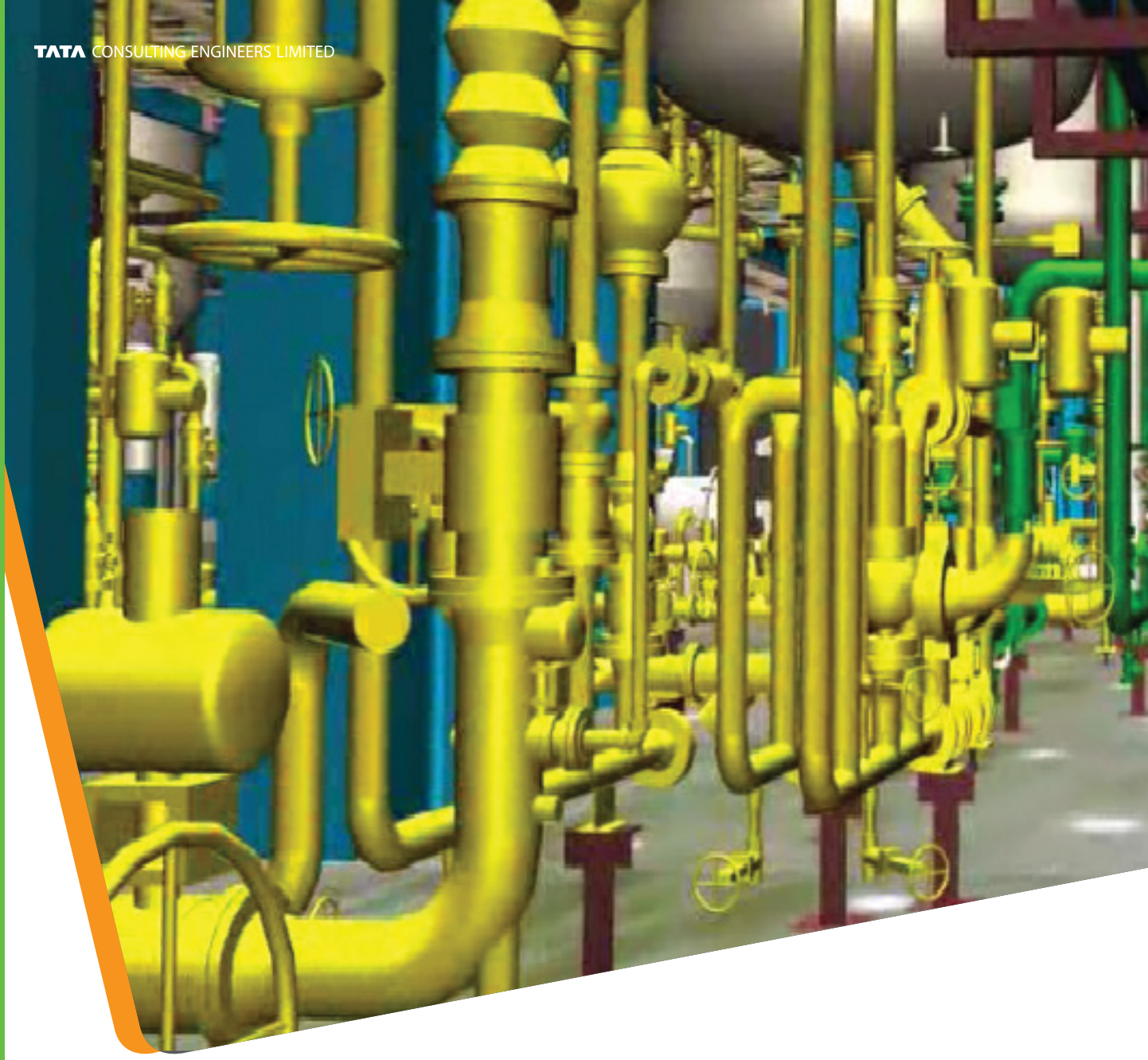
Advanced Technologies

Tata Consulting Engineers Limited (TCE) is known to provide one-of-its-kind services for special projects that requires capabilities in applied engineering along with the expertise of other engineering streams. Services in this exclusive segment resulted in TCE's contribution to Asia's biggest optical telescope in the 80s, world's largest steerable radio telescope in the 90s and contribution to the Indian Space Research Organisation's (ISRO) GSLV Mark III launch vehicle platform. Going beyond, TCE has included in its portfolio, services relevant for Industry 4.0. With increasing automation and need for digitisation, TCE's core process knowledge helps customers transition to a digital manufacturing set-up. TCE provides plant asset management and digital engineering services that help customers upgrade capacities, modernise or retire plant assets cost effectively. These services are delivered in a digital, simulated environment such that key decisions can be taken at the design stage with predictive cost management.



Key Sectors

Product Engineering

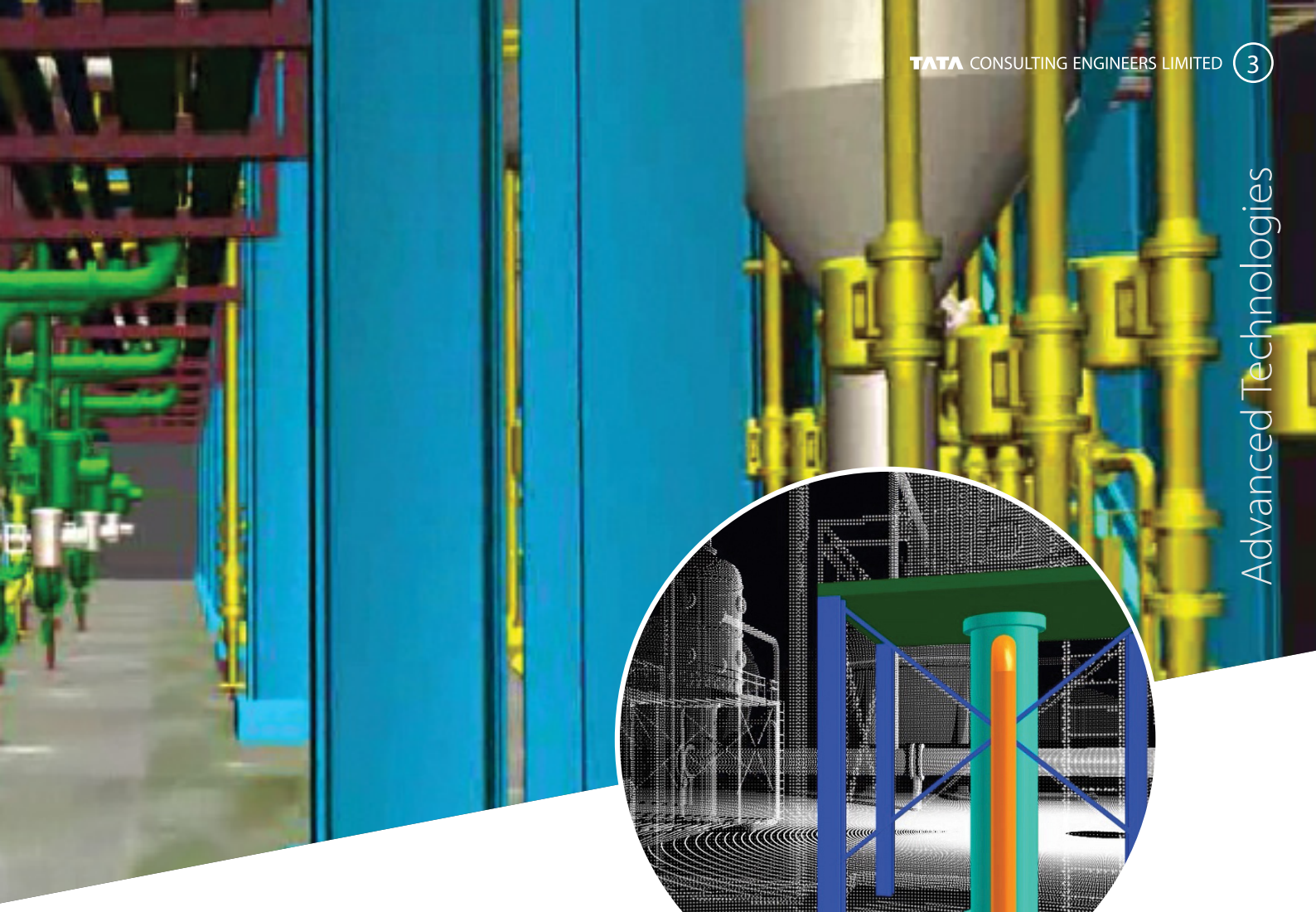
Machine design from concept, machine component design, reverse engineering, BIM services, smart P & ID solutions

Asset Management

Plant asset/digital asset management, plant digitisation, 3D-4D design solutions, simulations and walkthrough, Industrial Internet of Things (IIoT), plant data analytics, predictive modelling, etc.

Special Projects

One of a kind applied engineering solutions in industrial, nuclear, aerospace, defence, etc.



Key Segments

Infrastructure | Chemical | Energy & Steel Metal & Mining

Quick Facts

Design of mobile launch pedestal cum admin complex for India's ambitious satellite, **GSLV Mark III**

Completed plant digitisation for large European process plant, partner of choice to **large MNCs**

Value additions delivered through **Dedicated Engineering Centres (DECs)** for Middle East petrochemical major

State-of-the-art **3D-5D suites** for plant asset/plant lifecycle management

New service streams in engineering **big data** analytics and IIoT

Technology partnerships

AUTODESK.

AVEVA
CONTINUAL PROGRESSION

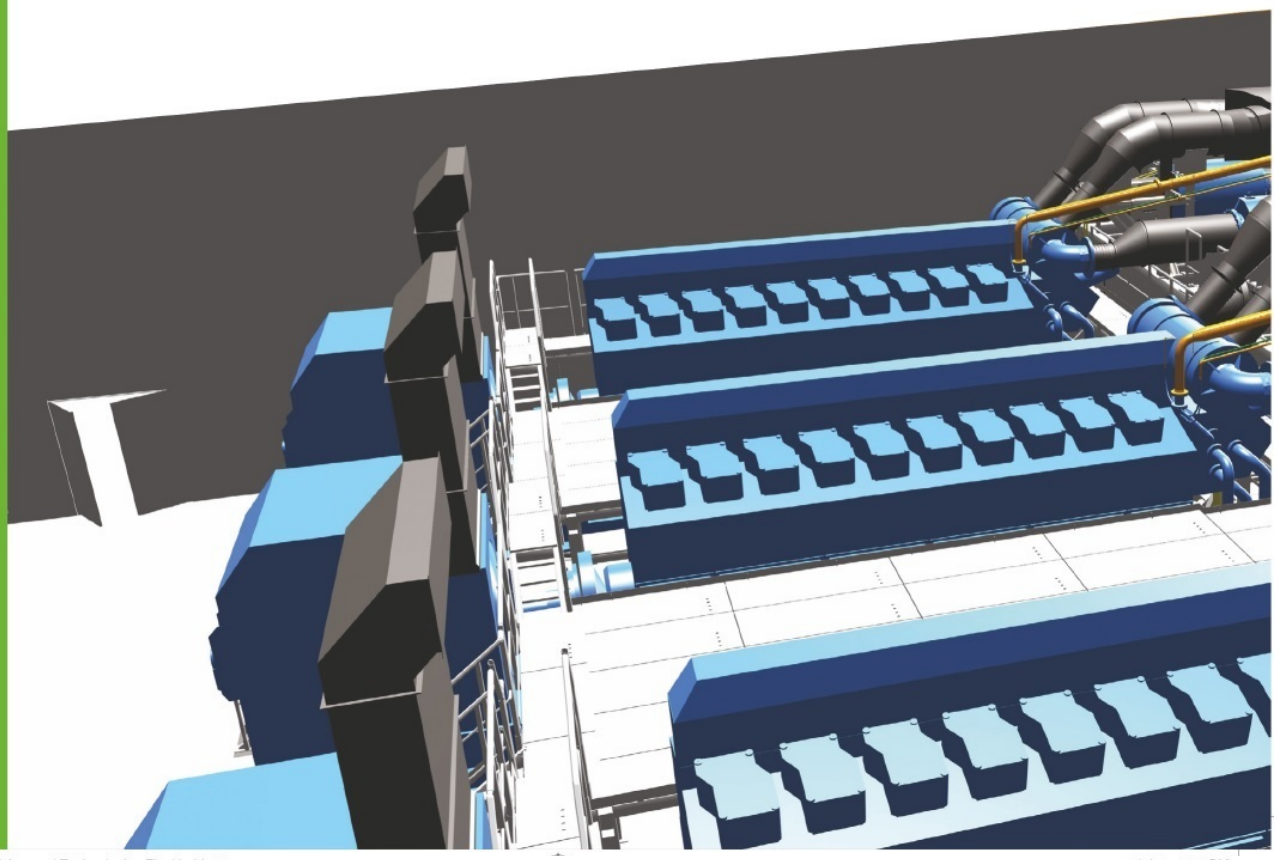
CADMATIC

INTERGRAPH

WRENCH

Bentley

CASSANTEC

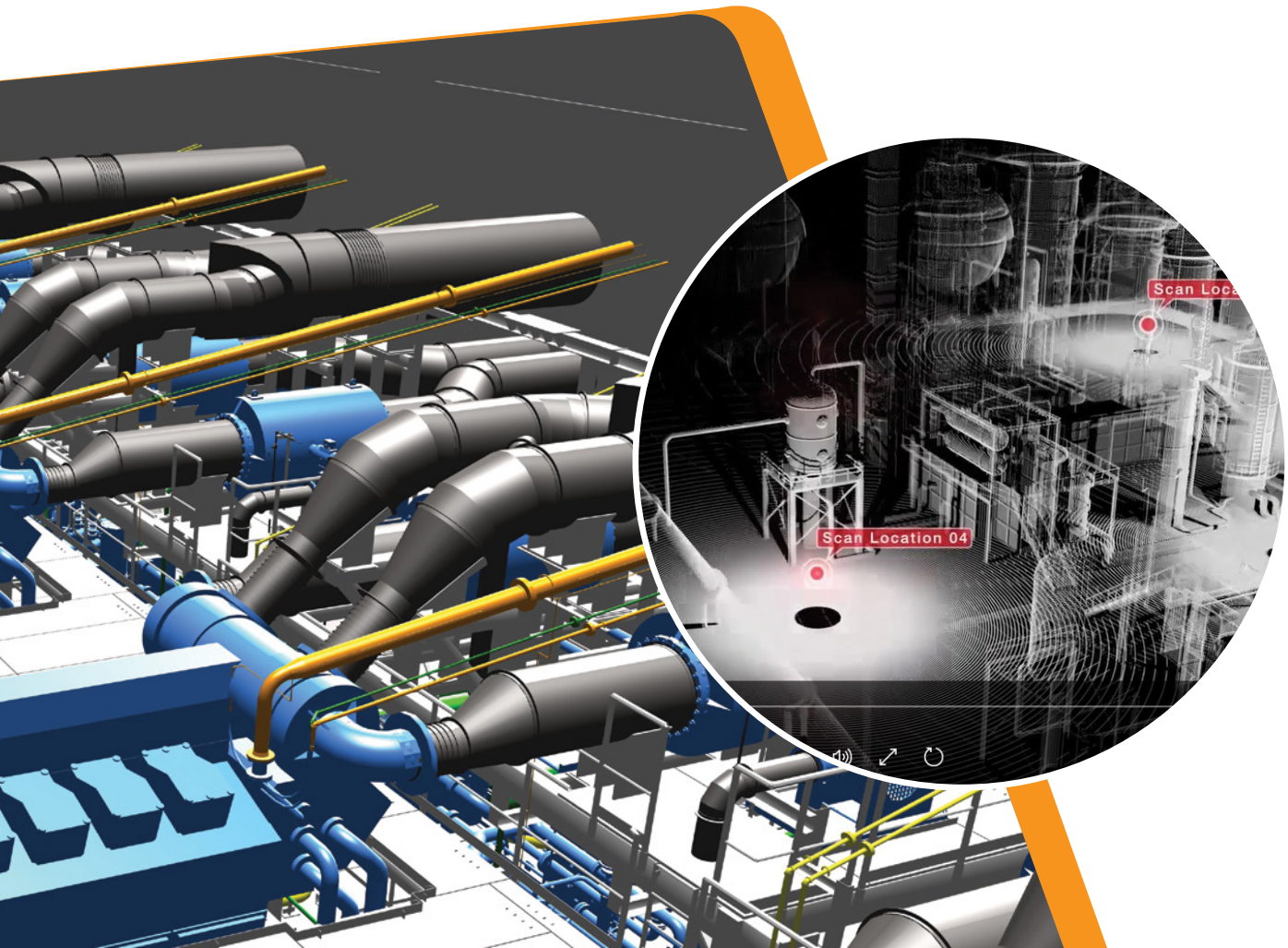


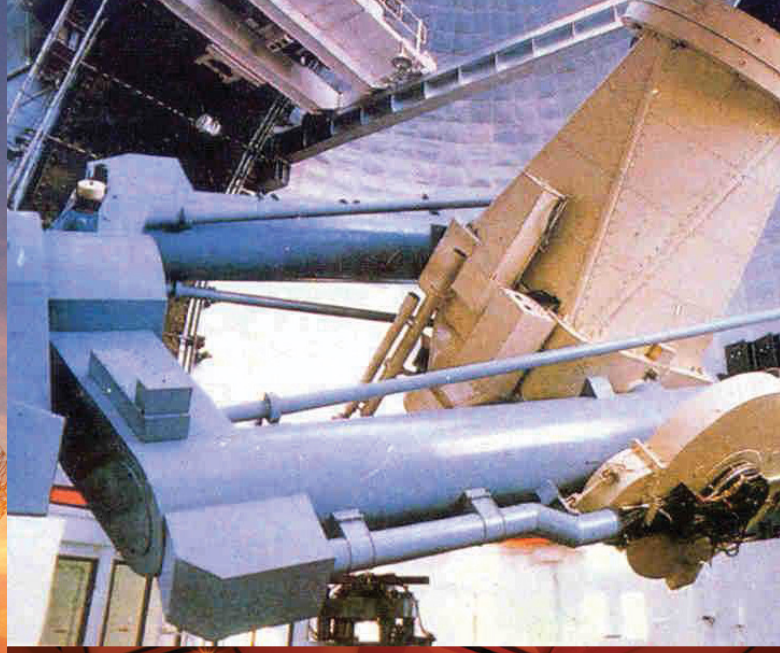
Value propositions

- A combination of next generation technologies and core engineering capabilities;
- Integrated Industrial IoT solutions;
- 3D-5D simulation technologies that brings predictability and decision making right at the design stage;
- Cost savings as construction planning and decisions are made in simulated environments;
- Plant digitisation solutions for planned, cost efficient plant upgrades and modernisation;
- Collaborative working using engineering tools such that teams work in synchronisation with client ecosystems;
- Multi-disciplinary engineering talent combined with state-of-the-art engineering suites expertise in one-of a kind special projects.

Key Achievements

- Introduced integrated engineering IIoT solutions
- Entry into plant asset digitisation solutions in Middle East & Europe
- Provided plant digitisation in Brownfield conditions for a steel plant





Special Projects

› Proud partners in India's ambitious rocket launch GSLV Mark III

The Indian Space Research Organisation (ISRO's) GSLV Mark III, the highest payload launch vehicle was launched and Tata Consulting Engineers (TCE) is a proud partner to ISRO's successful project. TCE's design simulation in 3D and 4D engineering provided the precision and predictability required for the project. Complete plant engineering for manufacture of solid propellant rockets including design of mobile launch pedestal came from the TCE design stable. The project also required handling of explosive material and hence the solutions provided by TCE involved engineering automation of the manufacturing process. Translating the concept into an actual commissioned project through support at various levels such as construction management, TCE helped write yet another success story in India's space program.

› Gravitational Wave Detector – LIGO India

LIGO-India is envisaged as a collaborative project between a consortium of Indian research institutions and the LIGO Laboratory in USA, along with its international partners. LIGO-India, LIGO Laboratory and the Indian Initiative in Gravitational Observations (IndIGO) will create a world-class gravitational-wave detector in India. The LIGO Lab will provide all designs and hardware for one of the two planned Advanced LIGO detectors to be installed, commissioned, and operated by an Indian team of scientists in a facility to be built in India. The Department of Atomic Energy (DAE) is part of the consortium and TCE is part of the project through feasibility studies and site identification.

› World's largest steerable telescope

› National Centre of Performing Arts' revolving stage

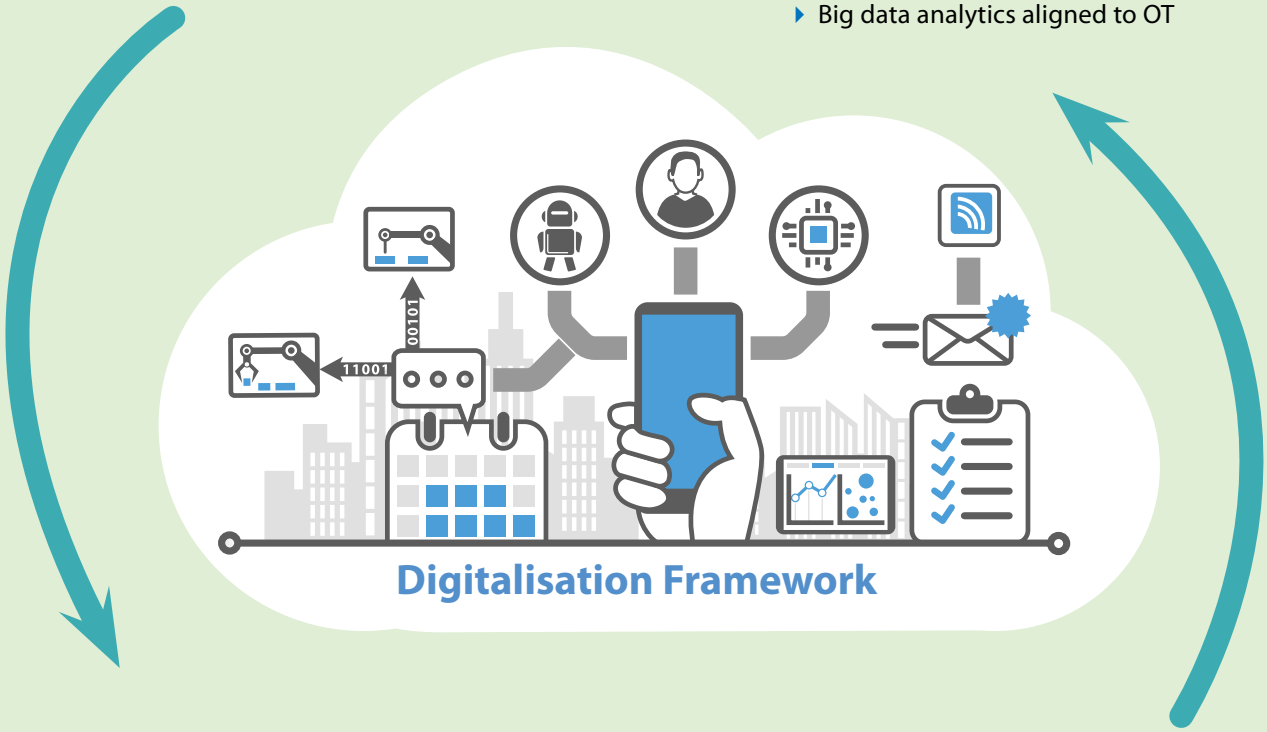
Engineering 4.0 - Industrial Internet of Things

1. Digitisation of plant/assets

- Plant digitisation using 3D laser to create digital twin of entire facility
- Assess legacy digital systems Evaluate digital maturity capabilities

4. IIoT aligned to operations architecture

- Build cloud architecture
- Mapping of asset data to IIoT systems
- Build applications with algorithms and machine learning tools
- Big data analytics aligned to OT



2. Blueprint for OT

- Create digitalisation strategy
- Create modular plan for process digitalisation, identify pilot assets for transformation
- Create asset life cycle platform across facility
- Identify retrofitting/transition plan
- Create business care

3. IT Infrastructure

- Identify hardware for asset modernisation
- Build IT architecture relevant to operations architecture, business processes & digital security requirements, identify pilot areas
- Create simulated environment
- Retrofit smart devices or upgrade to smart assets
- Build systems and applications to interface with assets

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