
Doing More With Less: A Digital Twin for Ti forgings

A Data Management Plan created using DMPonline

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Project abstract:

We will provide the UK high-value forging sector with a world-beating holistic computational ecosystem to decide whether to select a state-of-the-art forging route or an emerging near net shape disruptive powder-derived forging processing route, such as FAST-forge, for manufacture of a structure-critical component, based on environmental, societal, economical and performance-in-service assessment. The project goal is to develop a digital twin of the equivalent real-world forging process incorporating microstructure/property evolution for high integrity titanium alloy components and press performance by using accelerated Bayesian statistical models informed by experimental data and physical models. Due to the increase in aircraft orders and high demand on titanium alloy component production, the outputs of this programme are urgently required. With new infrastructure coming online (Henry Royce Institute, Future Forge at Advanced Forming Research Centre), the development of new data analysis approaches (Turing Institute) and the realisation of significant investment in underlying science and digital simulation (LightForm, MAPP), the interdisciplinary team are now in a position to tackle this complex and difficult problem, which will bring great rewards to the UK.

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UoM Project Details

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- No
- Re-use existing data (please list below)
- Acquire new data
- Other repository or storage system (please provide details below)

Data will be stored on [Zenodo](#)

- > 8TB (please provide details)

Synchrotron data in particular will require a lot of space. We estimate 10-20 TB over the 5 years.

Data Collection

Experimental (physical data):

- text files
- binary files
- images

More detail to be added later.

Very varied techniques,

Documentation and Metadata

We are going to use at the beginning a simple set of metadata which will be the bare minimum needed by Zenodo data repository. We are going also to define a set of metadata specific to the project but following as much as possible metadata standard with eventually additional informations needed for the specificities of the project.

Ethics and Legal Compliance

There not ethical issue for this project.

Individual agreements with collaborators.

Storage and Backup

During data processing analysis the data will be stored in the Manchester RDS.

Once completed, data and analysis will be uploaded after creation and a first curation to be sure that they are consistent and with the proper metadata to the data repository (Zenodo). The upload will be eased by the usage of a dedicated software which will verify the presence of the needed metadata.

Most of the data will be place under open data license. For the one which will need to have an embargo or to be closed, Zenodo is providing the necessary tool to allows that. Sharing can be done specifically by asking the data creators through Zenodo.

Security is provided by Zenodo.

Selection and Preservation

Most of the data created by the project will be kept for future usage or to be use by other members of the collaboration. Zenodo is providing the space which allows that conservation.

Zenodo via the community facility

Data Sharing

Data will be shared between the members of the project as soon as they are produced. At the end of the project most of the data under embargo will be shared under an open data license. Some data, coming from industrial partners, could be keep closed but with a contact person if needed.

For some porojects with substantial industrial funding, yes.

Responsibilities and Resources

Joao Fonseca and Project RSE

RSE time and intermediate data storage (RDS).