



Overview of CREATE-EGENE

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This work has been carried out within the framework of the EUROfusion Consortium and has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement number 633053. The views and opinions expressed herein do not necessarily reflect those of the European Commission.

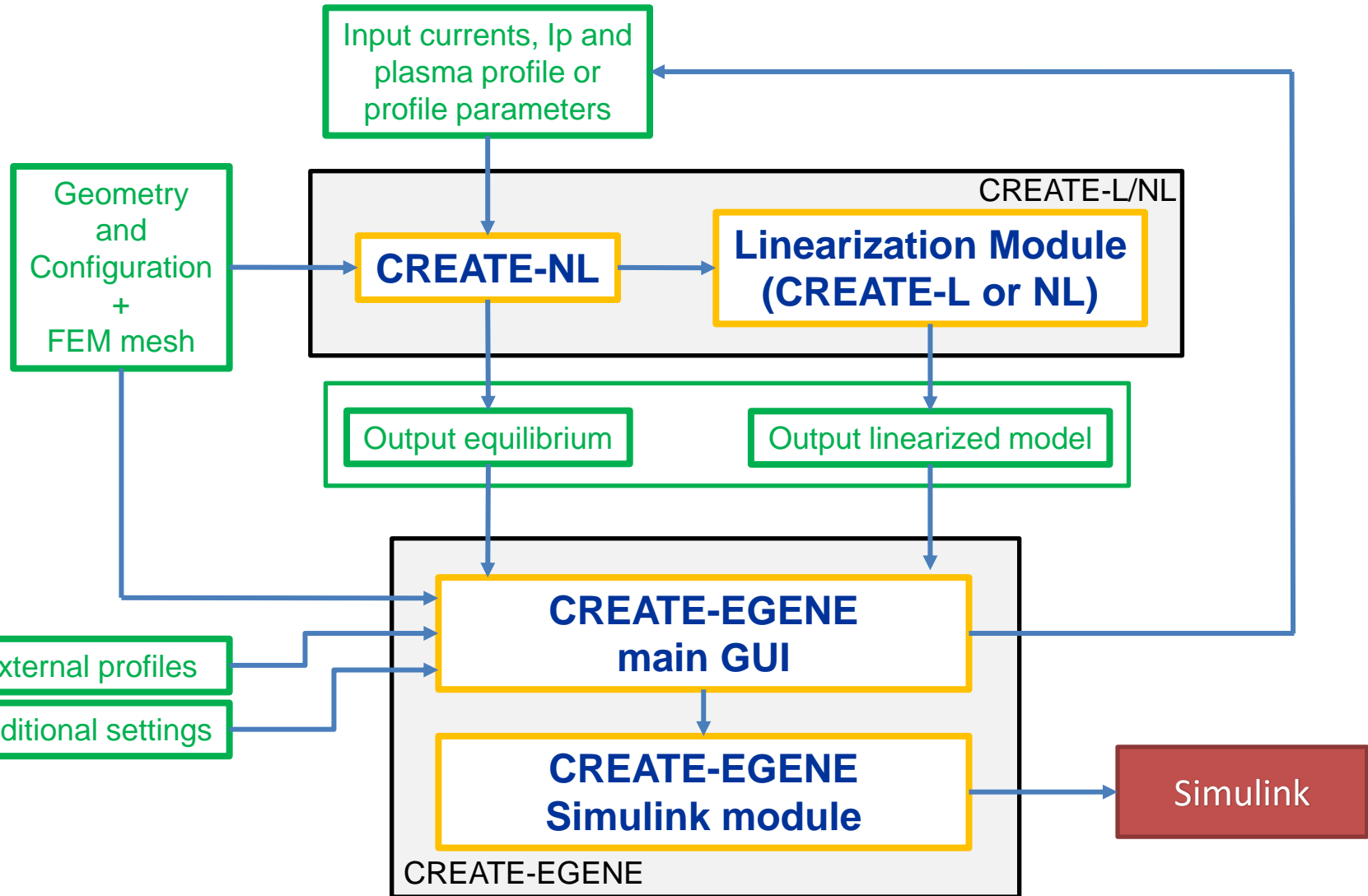


- **Overview of the CREATE-EGENE tool**
 - **Software structure**
 - **Main functionalities**
- To be followed by a live demo**



- **CREATE-EGENE is a Graphical User Interface developed for the CREATE-L/NL codes**
- **It has been designed as a user-friendly, control-oriented tool for magnetic equilibria generation and manipulation**
- **It was originally developed for JT-60SA and ITER, and it has been installed at the Remote Experimentation Center (Rokkasho)**
- **It has already been adapted to some other machines, EAST and RFX**

Overview





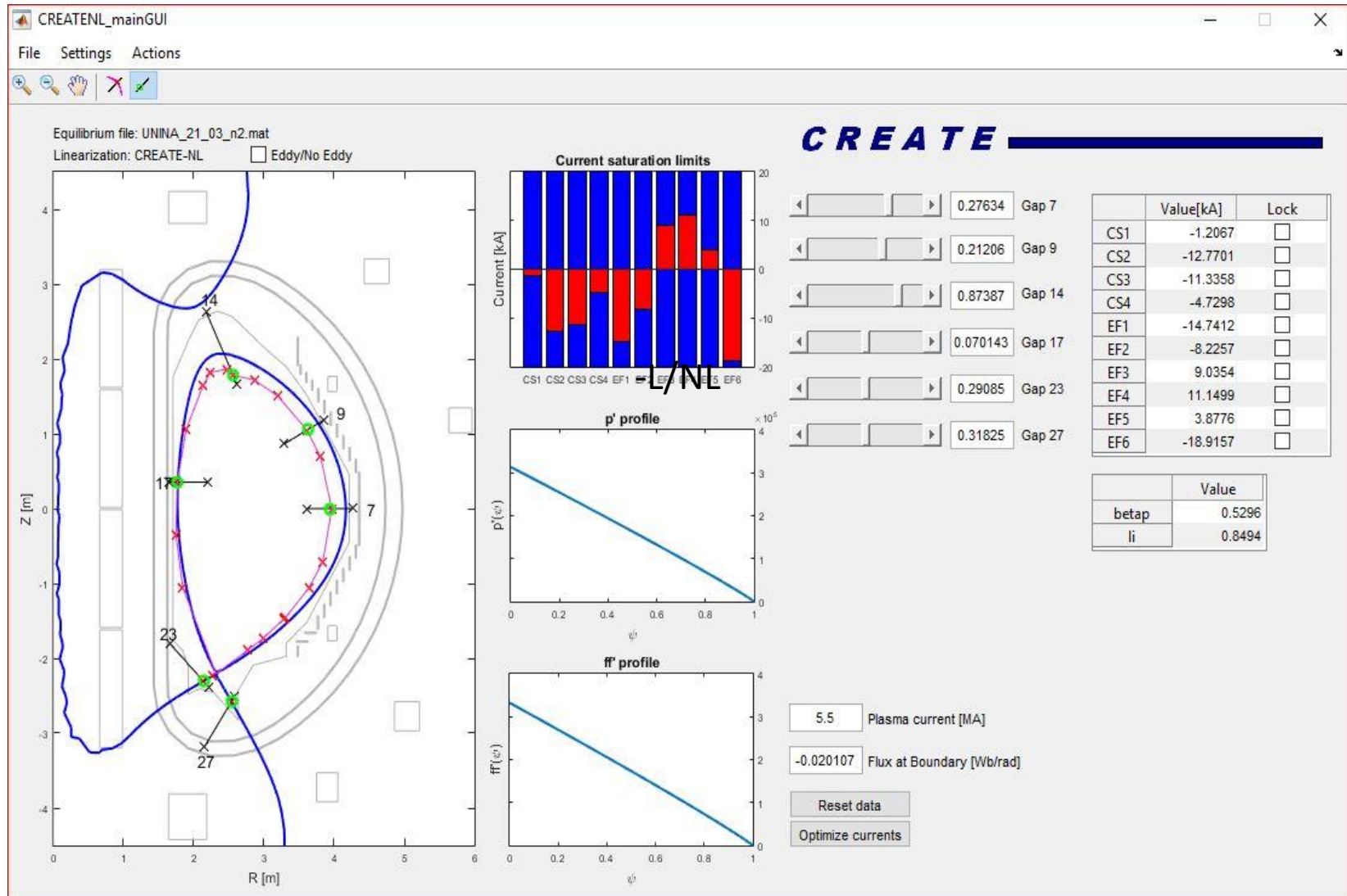
The main GUI allows to interact easily with the CREATE-L/NL codes

1. Visualize the poloidal flux map, the SOL geometry and the internal profiles
2. Compare different plasma equilibria
3. Compute adjustments to current equilibrium (based on linearized models)
4. Optimize currents to obtained desired shape/parameters variations
5. Easily import experimental data (done for EAST)
6. Launch CREATE-L/NL to compute free-boundary magnetic equilibria and generate linearized models for the plasma/circuits behavior
7. Open linearized models in Simulink and build control schemes with a dedicated Simulink library

Main Graphical User Interface



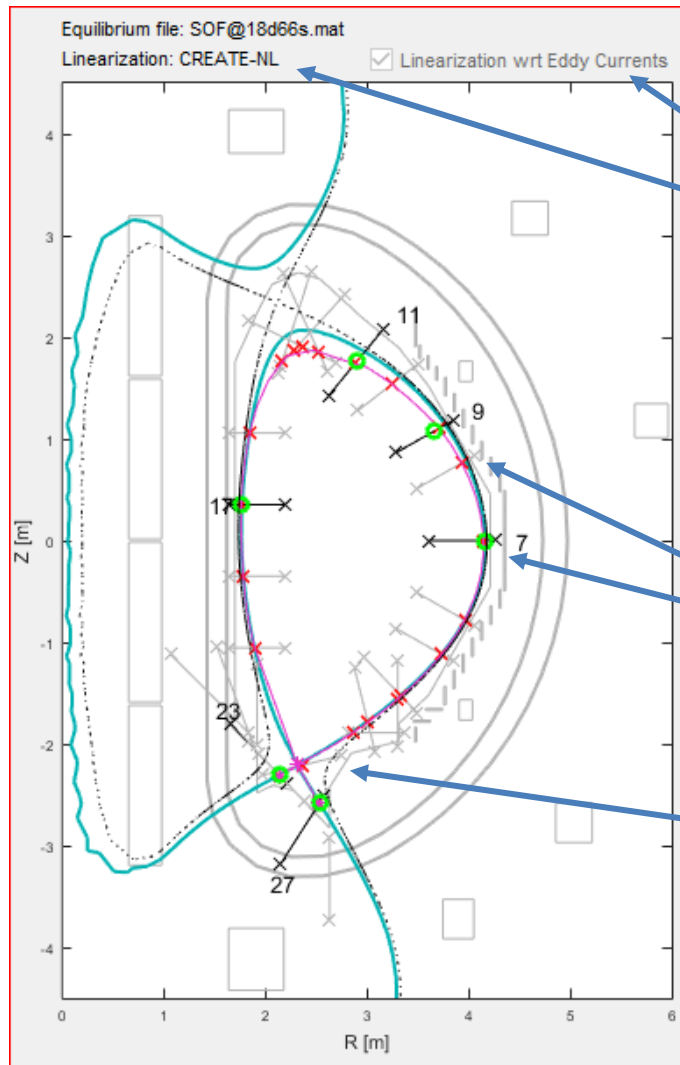
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Main Graphical User Interface



The main GUI allows to interact easily with the CREATE-L/NL codes



Linearization can be carried out with both CREATE-L and CREATE-NL

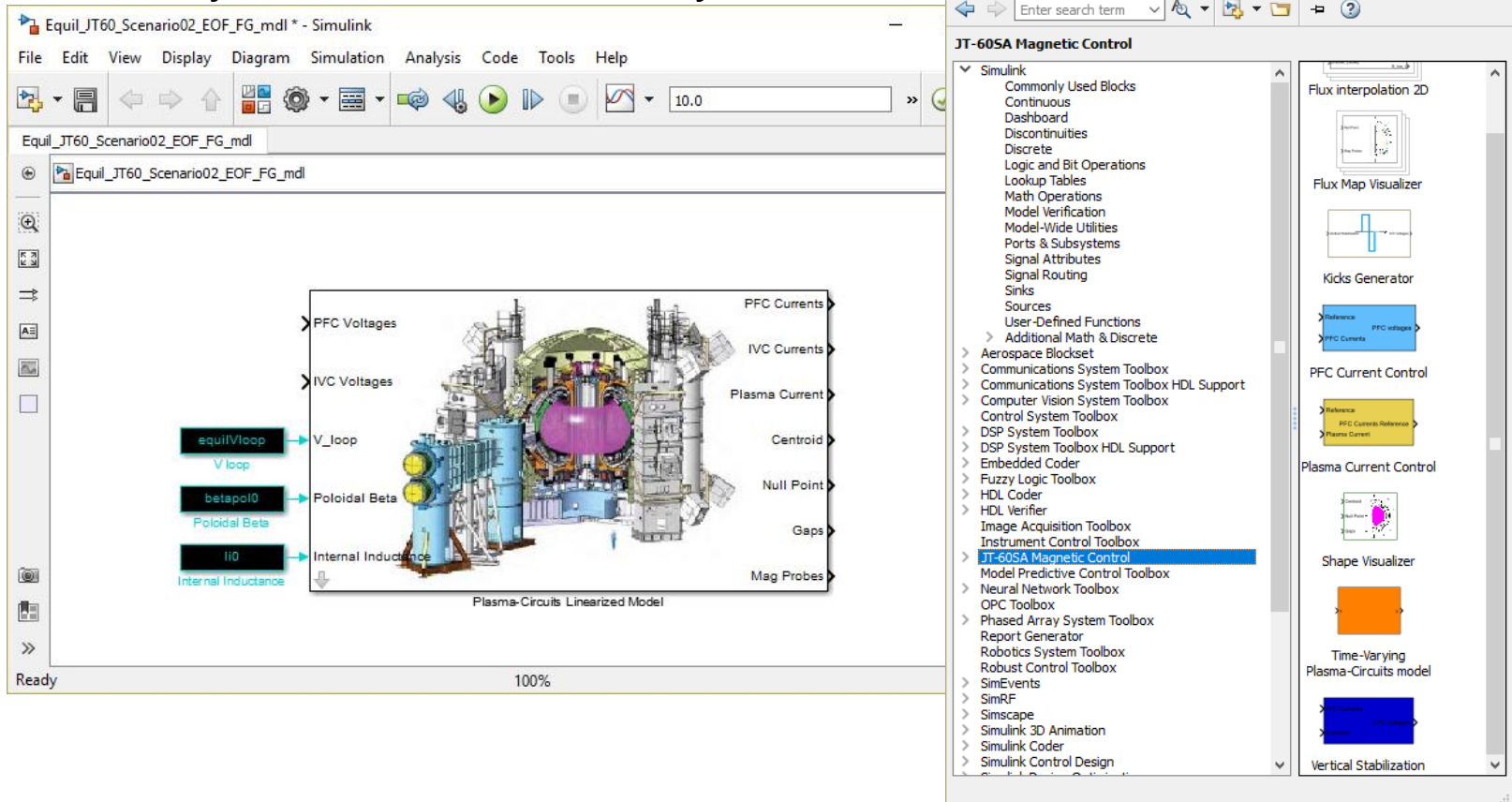
Optimization of the currents wrt a Desired shape

2° separatrix was introduced for integration with transport codes (e.g. METIS, RAPTOR)

Simulink module

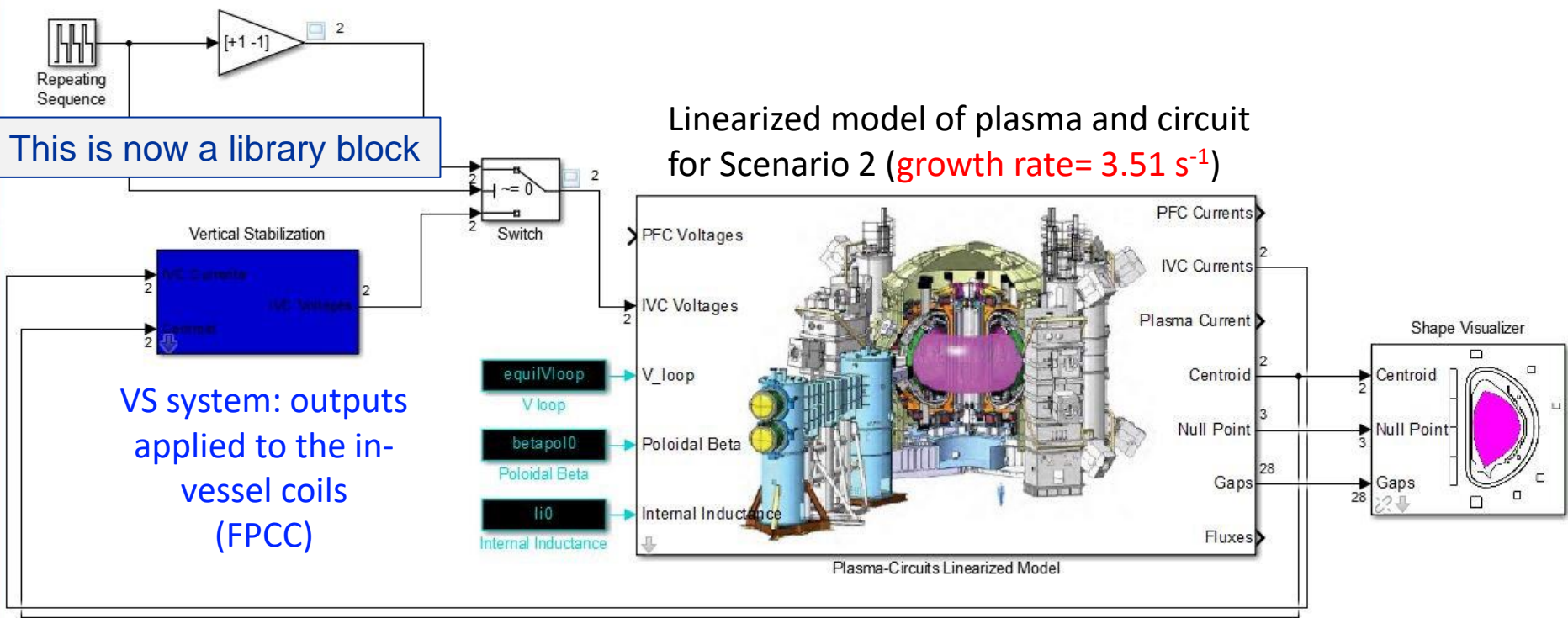


- A customized Simulink library has been developed to easily build-up **control-oriented** simulation schemes that make use of the CREATE linear model for containing
- Several controllers and utility blocks for magnetic control at JT-60SA are already included in the library





Simulation scheme used to assess the performance of the JT-60SA in-vessel coils (FPCC) to perform ELM-triggering voltage kicks



FPCC power supplies modelled as a 1st order transfer function with a time constant of 3 ms and a time delay of 1.5 ms (data provided by QST)

The first version is available at REC





- The latest available version of CREATE-EGENE can be downloaded from the discharge simulation wiki:

[https://users.euro-fusion.org/iterphysicswiki/index.php/
JT-60SA_simulator_development_page](https://users.euro-fusion.org/iterphysicswiki/index.php/JT-60SA_simulator_development_page)

- Coupling with METIS currently under development
- Developers and beta-testers are more than welcome!