

# ASCOM

## ASTECCOMunity

### OBJECTIVES

In the last decade ASTEC progressively became the reference European severe accident (SA) integral code for water-cooled nuclear power plants (NPP) through the capitalization of knowledge acquired in the frame of the EURATOM projects (SARNET or Severe Accident Network of Excellence) and of the OECD/NEA/CSNI R&D projects.

Then the CESAM FP7 project has been successfully conducted in EURATOM frame in the aftermath of the Fukushima Dai-ichi accidents, with two main goals: to achieve an improved understanding of all relevant phenomena during these accidents and their importance for SA Management (SAM) measures; to simultaneously improve the ASTEC V2.1 code to simulate plant behaviour throughout accident sequences including SAM measures.

However, though a significant modelling progress could be achieved, notably as regards Gen.II NPPs, all these efforts must be pursued for Gen.II, III & III+ NPPs.

The ASCOM project aims at fostering the collaboration between all ASTEC users, on the basis of in-kind contributions to be distributed over several work-packages (WPs). The main objective is to help amplify and accelerate the on-going process of making the IRSN ASTEC code a fully reliable tool for SA analyses and accident management by strengthening the activities of this ASTEC community in a consistent way.

### DESCRIPTION OF WORK

To carry out the ASCOM work programme, four separate but interlinked “technical” WPs are planned:

- **WP2** : Improvements of ASTEC physical modelling and ASTEC overall capabilities (e.g. Gen.III+ designs, spent fuel pools or SFPs...), along with an IRSN support to ASTEC users;
- **WP3** : Continuous validation of ASTEC V2 models vs. Separate-Effect-Tests or Integral experiments;
- **WP4** : ASTEC applications at reactor scale through two main lines :
  - Consolidation/update of ASTEC V2 existing generic reference input decks for PWRs, VVERs and BWRs, all of which are relating today to Gen.II NPPs;
  - Follow-up of comparisons at plant scale between ASTEC V2 and other reference codes on selected SA sequences for all Gen.II reactor types operated in Europe today.
- **WP5** : Development of few new generic NPP and SFP reference input decks to extend the ASTEC applicability to other kinds of nuclear installations. Apart from SFPs, main targets are on Gen. III & III+ NPPs that are operated today only outside Europe or that might be in the future built in Europe, as well as possibly on Small Modular Reactors (SMR).

Furthermore, two other transverse WPs (**WP1** and **WP6**) aim at addressing the overall coordination of the project and the dissemination of the ASCOM main results (including “Education and Training activities”), respectively.

### MAIN RESULTS / HIGHLIGHTS

The main expected outcomes of the ASCOM in-kind project are :

- Build-up of a joint “Dynamic Validation Database” (DVD) of ASTEC V2, aiming at dynamically collecting any new or improved experimental data relating to the code validation (DVD to be shared among all ASCOM members);
- Consolidation of the existing V2.1 dataset library for generic Gen.II NPPs through an intensification and a diversification of plant SA sequence simulations, while continuously improving this reference library to fit the modelling evolutions that will be integrated in ASTEC future versions (to keep generic input decks up-to-date);
- Extension of this open generic dataset library to some Gen.III & III+ NPPs, to SFPs and possibly to SMRs;
- Subsequent extension of the ASTEC V2 application scope, along with likely some further improvement of the ASTEC code reliability for SA analyses and accident management as a feed-back from the planned intensive use of ASTEC V2 by various partners.

### DURATION

October 1<sup>st</sup>, 2018 – September 30<sup>th</sup>, 2022  
4 years

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### PARTNERS

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