

## PACE 4.0.0 Technical Information

PACE (Probabilistic Accident Consequence Evaluation) is a code for performing level 3 Probabilistic Risk Assessment for accidents involving the release of radioactive material into the atmosphere.

PACE was developed by the Radiation Assessments Department (RAD), of Radiation, Chemical and Environmental Hazards Division (RCEH), part of UK Health Security Agency, an executive Agency of the UK Government Department of Health and Social Care (DHSC).

PACE was developed as an Add-in to ArcGIS Desktop created by ESRI (<https://www.esri.com/en-us/home>). PACE users will need at least one licence for ArcGIS® Desktop to use PACE. PACE 4.0.0 was developed and tested under ArcGIS desktop 10.4.1 and has been tested under 10.5.1. PACE should work on all versions of ArcGIS Desktop later than version 10.4.1 and, because of future development plans for PACE, users are advised to get the latest version of ArcGIS possible. NB PACE will not work with the new ESRI desktop product ArcGISPro®.

PACE was developed to be used with ArcGIS in a Windows 10 (64-bit) environment.

PACE has been designed to work with the UK Met Office's atmospheric dispersion model NAME. However, the PACE licence does not include a license for use of NAME. Therefore, PACE users wishing to use NAME will need to agree terms with the Met Office independently. Once a NAME licence is granted UKHSA can provide the correct version of the NAME executable to work with PACE. NAME is not essential as PACE incorporates a simple Gaussian Atmospheric Dispersion model that can be used as an alternative.

Under PACE, NAME can use the following Meteorological Datasets available from the Met Office; MESUM5 (UK, Ireland most of France, 2002-2009), REGUM5 (Europe, 2002-2005), GLOUM (Global, 2006-2008), 4KM50L\_UM6 (UK, 2007-Present), UMG\_Mk10 (Global, 2018-present), UM1p5km\_Mk2 (UK, 2014), UM1p5km\_Mk2 (UK, 2015-2016), UM1p5km\_Mk4 (UK, 2018-present). Inclusion of more formats is planned.

PACE has been successfully and productively run on a laptop with the following specification:

- Windows® 10 Enterprise

- Intel® Core I7 processor at 2.90 GHz

- 32 GB Ram

- 500 GB hard drive

It should be noted that a full PACE run involves repeated modelling of atmospheric dispersion over potentially hundreds of different meteorological conditions. This can take several days and therefore higher specifications are preferable. Meteorological inputs can be large; for example, one year of MESUM5 data requires 235 GB of hard-drive space. Depending on user options, output files can also total 100s of GB. It is therefore preferable for the computer to have large local hard drives e.g. 1-2 TB. NAME3 is a multi-threaded code and will therefore benefit from a multi-processor architecture.

The PACE installation requires approximately 0.5 GB of hard-disk space excluding meteorological data but including default sets of data (population, agriculture and economics) for the UK.