What's New in GASTAR 4?

November 2025

GASTAR 4 is the latest general release of CERC's dense gas dispersion model. GASTAR 4 contains a number of improvements, most notably:

- The interface screens have been redesigned, including a new **Setup** screen, to streamline the process of setting up a new modelling scenario
- Various changes have been made to the **GASTAR Graphics** screen, used for viewing X-Y line (and flammables) plots
- A number of improvements have been made to the format of the main output (*.gof*) file for easier viewing and interpretation of the results
- Gridded output can now be plotted in Surfer (if installed) using the Contour Plotter utility, which is included with the model install
- Multiple 'snapshots' of the dense gas cloud can now be output for time varying sources
- The User Guide has been extensively rewritten, including a new 'Worked Examples' section to help new users familiarise themselves with the model

This document contains details of the improvements and model corrections implemented since the last release of GASTAR (version 3.2.2, September 2013). Also contained in this document are instructions for installing GASTAR 4 and upgrading from previous model versions.

In this release

This version of GASTAR includes an updated user interface, model and User Guide. The GASTAR 4 User Guide can be found in the '*Documents*' sub-directory of the GASTAR install directory.

Installation

Before installing GASTAR 4

Log on to your computer as Administrator, and uninstall any previous version of GASTAR. To do this, click on the Windows button, type 'Settings' and hit **Enter**. Select **Apps** from the left menu and click **Installed apps** from the resulting list. Select GASTAR from the list of installed applications and then click **Uninstall**.

Installing GASTAR 4

If you have not already done so, log on to your computer as Administrator.

GASTAR 4 will have been supplied by download link. Extract the downloaded *.zip* file to a local directory. In Windows Explorer, browse to this directory and double-click on the file *setup.exe*.

Follow the instructions on the screen. Further details are given in Section 2.2 of the GASTAR 4 User Guide which can be downloaded from the CERC website.[1]

You should also have been provided with a new licence file, which is required in order to run the model. To install the licence, rename the file to *GASTAR.lic* and then copy it to the directory in which the model is installed. Alternatively, drag and drop the licence file onto the title bar of the GASTAR interface.

The first time that you launch the model after installation, it is important that you are connected to the internet so that your licence can be registered.

Upgrading your input files

Model input (*.gpl*) files that were set up using the previous version of GASTAR (version 3.2) will need to be upgraded before they can be run with GASTAR 4. This can be done by opening the *.gpl* file in the latest GASTAR interface; a warning message will be issued indicating that the file will be updated to the latest format – click **OK** to continue. Saving the *.gpl* file will then overwrite the old-format file; you may therefore wish to make a backup copy of the old-format *.gpl* file in Windows Explorer before upgrading it.

[1] https://www.cerc.co.uk/UserGuides

Improvements

Interface

1. A new **Setup** screen has been added. This is now where the user defines the title, source material, source type and model options, which have all been moved off other screens as a result (see below). This facilitates a more natural order of inputting data when setting up a new modelling scenario.

2. There is no longer a **Complex Effects** screen. To model obstacles and/or slopes, tick the relevant checkbox(es) under **Model options** on the **Setup** screen and click the relevant **Edit** button to bring up a dedicated screen for defining the obstacles or slopes.

3. The checkboxes to calculate dose, concentration-time history, flammables and/or maximum range output have been moved from the **Outputs** screen (renamed from **Output**) to the **Model options** box on the **Setup** screen.

4. The source material and its properties are now always selected/edited from the **Material properties** screen, accessed via the **Edit** button in the **Source material** box of the **Setup** screen. The 'Probit A' and 'Probit B' material properties have both been removed as they were not used by the model. An option to set a default source material for future sessions has also been added.

5. The **Outputs** screen now includes checkboxes for selecting whether to calculate gridded output, specified points output and/or specified times output, which enable/disable the relevant input boxes. The **Define Specified Output Points** screen, launched via the **Edit** button, has also been redesigned for improved usability.

6. Various improvements have been made to the **File details** box of the **Graph** (renamed from **Graphics**) screen:

    a. One or multiple graph (*.gph*) output files can now be drag-dropped from an Explorer window into the file list (lower) panel as an alternative to browsing to the file using the in-built controls.

    b. A right-click menu has been added to the folder path panel to allow the user to **Browse** to a *.gph* file using a pop-out Explorer window instead of the in-built folder browser, **Open in Explorer** the currently selected folder, and **Copy path** and **Paste path** options. Hovering the cursor over the folder path panel (or a folder with a long name in the folder browser panel) will also show a tooltip with the full path to the folder, which can be useful if it has been truncated.

    c. Double-clicking on the selected *.gph* file(s) in the file list (lower) panel will now plot the graph where possible.

7. Various improvements have been made to the **GASTAR Graphics** screen, used for viewing X-Y line (and flammables) plots:

    a. The appearance the plots has been improved, including better default line

colours and symbols when plotting multiple lines, and bigger font sizes for titles, axes labels and the legend.

b. **Graph settings** buttons have been added to save the current graph settings as the new defaults, reset the current graph settings to the saved defaults, and restore the graph settings to the factory defaults.

c. **Output** buttons have been added for copying the current plot to a *.bmp* or *.wmf* file for subsequent pasting into relevant applications.

d. It is now also possible to zoom in and out of plots that use log axes. The current X,Y value of the cursor is also now displayed when using log axes.

8. A new **Results** menu has been added. This includes a **Contour plot** option to generate concentration contour plots in Surfer (if installed) from a run with gridded output (see also 14 below), an option to open the associated run **Log file**, and an option to open the current **Results folder** in an Explorer window. The **Numerical output** option replaces the **File, View Output**... option in the previous version and can be used to open a particular output file in your preferred viewing application (e.g. Notepad, Excel). The **Line plot** option simply switches focus to the **Graph** screen.

9. The **Help** menu has been expanded:

   a. There are new options for opening the model **User guide** or this **What's New** document in the default PDF viewer.

   b. A **Contact helpdesk** option has been added to auto-address a new email to the GASTAR helpdesk in the default email client. There is also an option to launch the **CERC website** in the default web browser.

   c. Additional features are available via the **Licence details** option; the licence file path and licence number can be copied for pasting into other documents using the **Copy**  buttons, and the licence can be located in Windows Explorer using the **Find**  button.

   d. For users with an 'online licence' (see also 24 below) there is a **Release licence** option to release the licence from the current PC so that it can be activated on another PC.

10. Model input (*.gpl*) files can now also be opened by drag-dropping the file from an Explorer window onto the title bar of the GASTAR interface.

11. Multiple copies of the GASTAR interface can now be open simultaneously. This is particularly useful for comparing two *.gpl* files side-by-side.

Model

12. A number of improvements have been made to the format of the main output (*.gof*) file, including:

    a. The tabulated data in this file is now properly (tab) delimited, meaning it can be easily viewed in a spreadsheet editor such as Microsoft Excel.

    b. A short (release-type-specific) description of each results section has been added below each section header.

    c. Tables no longer wrap onto multiple 'pages'.

    d. Improvements have been made to column labelling, e.g. the 'time' column has been renamed 'Time since release' for instantaneous releases, and 'Travel time' for the other release types.

    e. The last column in the dose results table is now labelled 'Comment' and is used to inform the user if an output point is 'Behind [the] source', 'Still covered' by the cloud at the Modelled time (for instantaneous releases) or 'Not reached' by the cloud at the Modelled time.

    f. Concentration-time history output has been reduced to one table, with one column per output point for instantaneous releases, one row per output point for continuous releases or one row per output point-segment pair for time varying releases.

    g. Flammables output has been reduced to one table for instantaneous releases, with one column per output time.

13. In addition, the following changes have also been made to the contents of the main output (*.gof*) file:

    a. For time varying releases, additional snapshots of the cloud at each specified output time (before the 'Modelled time') are now added to the 'RESULTS' section, after the main table (which is a snapshot of the cloud at the 'Modelled time')

    b. Any output point that is 'Not reached' for continuous or time-varying releases will display '----' instead of zero for dose and concentration-time history results

14. Gridded output is now written to a *.gst* file (for continuous releases) or *.gtd* file (for instantaneous releases), both of which are file formats recognised by the Contour Plotter (see also 8 above). A command-line flag option exists to revert back to the legacy *.ggd* file format if desired (`/G2`).

15. Specified output points are now always used in the integration calculation, not just if dose output is requested.

16. Safety checks have been added to ensure that it is not possible to run two instances of the same *.gpl* file simultaneously.

17. If running the GASTAR model from a batch file, the `/I` command line flag is no longer required; the model will assume the input file is in *.gpl* format.

18. The full *.gpl* pathname can now be up to 256 characters (previous maximum was 128 characters).

19. Flammables results at specified output times beyond the 'Modelled time' are no longer extrapolated (-999 is output instead, and a warning given).

20. The information written to the *.log* file has been tidied up for easier reading.

Documentation

21. The User Guide has been extensively rewritten, and its format brought more into line with other CERC User Guides such as those for ADMS 6 and ADMS-Roads.

22. A 'Worked Examples' section has been added to the User Guide (Section 6), containing three worked examples that guide new users through the main functions of the model.

23. A new '*Managing CERC Online Licences*' document has been added to the '*Support/Licence Management*' sub-directory of the GASTAR install directory (see also 24 below).

Licencing

24. Most GASTAR users will now be issued with an 'online licence', which requires a periodic internet connection for licence checks. Further information can be found in the new '*Managing CERC Online Licences*' document, which can be found in the '*Support/Licence Management*' sub-directory of the GASTAR install directory. This document includes information on how to determine which user(s) are currently using a given licence, and how to remotely deactivate a licence from a given machine.

25. The licence file name has changed to *GASTAR.lic*.

Model Corrections

26. Concentration-time history results no longer require the **Calculate dose** option to be selected.

27. The *.gpl* filename can now contain periods ('.') before the '*.gpl*' extension without issue.

28. An issue has been fixed which meant that the mass fraction for time varying sources was always calculated using the mass flux of the first segment rather than the current segment.

29. An issue has been fixed that could lead to spurious jet touchdown/transition coordinates if the jet source transitioned to a 'standard' (i.e. non-directional release) plume very close to the source.

30. An issue has been fixed that could cause the model to crash for jet sources at ground level.

31. An issue has been fixed in which the contribution of the final segment of a time varying source was not included in the dose results. Additionally, the dose calculation for time varying sources no longer uses linear interpolation; the dose is now simply the sum of $C_i \times T_i$ over all segments, where C_i is the (steady-state) concentration associated with segment i at that output point and T_i is the duration of segment i.

32. An issue has been fixed in which gridded output for an instantaneous release was incorrect for specified output times beyond the 'Modelled time'. Such output is now set to -999, and a warning is issued.

33. An issue has been fixed in which time varying source segments with zero mass flux could cause the model to crash.