

Release Notes 2022

MIKE 3

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Introduction

Welcome to MIKE 3 2022 Update 1

In this Release Note, you will find information about new features of MIKE 3, and what you need to know in order to install and get started with Release 2022.

MIKE 3 is a complete 3D modelling package for estuaries, coastal areas, and seas. It covers a wide range of hydrodynamic, environmental and sediment transport processes.

System requirements

Operating systems

Fully supported Windows operating systems *	Windows 11 Pro, version 21H2 (64 bit) Windows 10 Pro, version 21H2 (64 bit) Windows Server 2022, version 21H2 Windows Server 2019 Standard, version 1809
Non-supported but partially tested operating systems **	Windows Server 2016 Standard, version 1607

* Fully supported operating systems are systems that have been tested in accordance with MIKE's Quality Assurance procedures and where warranty and software maintenance agreement conditions apply.

** Non-supported but partially tested operating systems are systems, which are not officially supported by the MIKE software products. These operating systems have only undergone very limited testing for the purpose of MIKE software, but the software and key features are likely to work. Installation of MIKE software on a non-supported operating system is done so at the user's own risk. The MIKE software warranty and software maintenance agreement conditions do not apply for unsupported operating systems and DHI is under no obligation to provide assistance or troubleshooting for cases where the software is being used on a non-supported operating system.

Please note when running a fully supported operating system as a 'guest operating system' on a virtualization platform, it is automatically downgraded to a non-supported operating system under the conditions provided above.

Minimum hardware/software requirements

Processor	compatible with x64 instruction set, 2.2 GHz or higher
Memory (RAM)	4 GB or higher *
Storage	64 GB or higher *
Display	resolution 1024 x 720 (High-Definition) or higher, 24-bit color (true color)
Graphics adapter	64 MB RAM (256 MB RAM or higher recommended), 32-bit true color **
Software requirements	Microsoft .NET Framework 4.7.2 or higher

* The actual required amount of memory and disk space depend on the usage (application, model setup, size of data files etc.)

** MIKE 3 Flow Model FM utilizing GPU requires a Nvidia graphics card with compute capability 5.2 or higher. Please note that some of these graphics' cards have varying performance in single compared to double precision calculations. The GPU functionality is based on version 11.1.1 of the Nvidia® CUDA® Toolkit.

Installation

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To install MIKE 3, please go to the MIKE Zero product folder and execute the setup.exe file either on the MIKE 2022 USB or from the downloaded, un-zipped installation files. Press the 'Install' button to begin installation.

The setup program will automatically install all necessary files and folders on your computer. Additionally, an entry is created in the Start Menu for MIKE Zero.

Important information: Please be aware that all MIKE software on the same computer must be installed with the same service pack. This is due to the dependencies between MIKE software products and the ability for the software to use the latest feature and systems updates.

License file and dongle

Please Note that when using the local or network license option, which require a license file and a dongle, then

- the DHI License Manager must installed separately.
- all licensed applications included in MIKE 2022 require a 2022 version of the DHI License Manager.
- a new license file format (file extension dhilic2) has been introduced with MIKE 2022 and these license files can only be used together with a DHI License Manager 2022 or newer.

To use MIKE software in licensed mode, please refer to the DHI License Manager Release Notes. ([License Manager Release Notes](#))

Product invocation

Launch 'MIKE Zero' from the Windows Start menu. Then you can select MIKE 3 from within the MIKE Zero Shell.

Starting any MIKE Zero application without a DHI configured hardware key and valid license files will cause the program to run in demo mode. If this happens, a message box will inform you during program initialization. When running in demo mode, the MIKE Zero installation supplies full access to all editors, computational engines and editing facilities. However, restrictions apply to the setups that can be executed as a model simulation.

Support

For general support, please refer to our [FAQ](#).

If you experience any difficulties, or if you have questions, please contact our Customer Care team at mike@dhigroup.com.

You can also contact your local Customer Care team for support in your local language. You can find the list [here](#).

New features and fixed issues

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Every new release of MIKE 3 consists of new modules, new features and/or corrections to problems or significant inconsistencies discovered in previous releases. Please find below short descriptions of the most significant news

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New features

Module/type	New feature
MIKE Zero	A redesigned Start Page for MIKE Zero collects an extended set of MIKE tools within theme-based (rather than product-based) interactive workflows, and introduces new MIKE Cloud applications and Cloud-enhanced functionality.
MIKE Zero	A new graphical overview , working together with the updated tabbing functionality in MIKE Zero, collects important model components (for example, sources and structures) in one interactive, customisable and floating mapping window.
MIKE Zero	Updated tabbing functionality: New tab grouping (horizontal and vertical), tear-off tabs from the main MIKE Zero shell, and new cascade and restore options.
MIKE Zero	The Grd2Mike tool has been updated to allow the specification of item details and land value.
MIKE 3 Flow Model FM	It is now possible to specify simulation period as a function of time step interval, simulation start date and simulation end date.
MIKE 3 Flow Model FM	Modelling of Coastal Vegetation: Vegetation density can be considered as constant or time varying zones of rigid plants (for example, mangroves). Additionally, the application of flexible stems and/or flexible blades, after Luhar (2011) and/or Nepf (2013), is also possible.
MIKE 3 Wave FM	Modelling of Coastal Vegetation: Vegetation density can be considered as constant or time varying zones of rigid plants (for example, mangroves).
MIKE 21 Flow Model FM	It is now possible to import information for multiple pier structures via a text file.
MIKE 21 Flow Model FM	It is now possible to use rating curves in combination with simple sources. The discharge from a source is determined from a rating curve table using the water level in the cell where the source is located.

MIKE 21 Flow Model FM	Line structures (for example, gates) have been updated to better handle multiple overlapping structures.
MIKE ECO Lab	Improved handling of dry elements: An option to enable MIKE ECO Lab calculations in dry elements for fixed (not transported) state variables has been included. If enabled, fixed variables will be computed in dry elements, concentrations of transported state variables will be set to zero and not be updated, and certain built-in forcings will be handled in a special manner. Finally, the flood and dry state of an element is available as a new built-in forcing.
MIKE ECO Lab	Dynamic removal of unused expressions to improve performance: You can now 'replace' unused equations with a constant value before the simulation runs, thereby saving on computational time. 'Unused' in this context refers to an expression that is written to a result file but not relevant for a model output and therefore has no side effects (like calling an external plugin, random numbers, etc).
MIKE ECO Lab	New built-in constants and forcings: The FM-based engines now support several new built-in constants mainly useful for ABM modelling. These include: <ul style="list-style-type: none"> • IS_SHORE_ELEMENT • DISTANCE_TO_SHORE • DIRECTION_TO_SHORE The first returns a flag (0/1) if an element has a land vertex or face (if the element is a shore element or not). The last two compute the approximate distance and direction to the shore from an element centre. If the element is a shore element itself, the shortest distance and direction (from the cell centre) to the closest land boundary is computed. For any other (non-shore) element it is the distance and direction to the nearest shore element (plus its shore distance). Please note that these constants are computed on simulation start-up, and do not change during the simulation.
MIKE ABM Lab	New algorithm for RASF computation: ABM Lab templates can contain Remote Area Search Functions (RASFs) to query other particles or concentration-based variables within a defined radius around a particle. The algorithm to compute these RASFs for concentration-based variables has completely been rewritten. Depending on the computational mesh size and search radius this new algorithm can have a greatly improved performance.
MIKE ECO Lab	New pseudo-random number generator: The basic pseudo-random number generator (PRNG) used in MIKE ECO Lab has been replaced and coordinated with MIKE 21/3 FM. Additionally, ABM (and PT) particles now 'carry' their own state and seed.
MIKE ECO Lab	Particle spawning from standard MIKE ECO Lab expressions: This update release allows the creation of new particles from normal, standard MIKE ECO Lab expressions. The syntax has been enhanced with two new parameters, defining where in the horizontal and vertical the new particles will be placed.
MIKE 3 Flow Model FM	Advance notice of end of support for 'Maxwell' and 'Kepler' type NVIDIA GPU cards. The 2023 Release of MIKE 3 Flow Model FM utilising GPU acceleration will require NVIDIA graphics cards with compute capability 6.0 or higher. Accordingly, from this next release, MIKE 3 Flow Model FM will no longer support 'Maxwell' and 'Kepler' type NVIDIA GPU cards.

Fixed issues

Module/type	Error/Inconvenience
General	Numerous corrections, stability and performance fixes.
MIKE Zero	Lambert Conformal Conic (both 1 and 2 standard parallel versions) projections have been updated.

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MIKE 3 Flow Model FM	A correction has been made to the Mud Transport module where the hindered settling did not work as intended.
MIKE 3 Flow Model FM	Stability of MPI parallelisation has been improved for the combination of jet sources and HD feedback from the MT module.
MIKE 3 Flow Model FM	An issue has been corrected in the jet source calculations.
MIKE 3 Flow Model FM	An issue has been corrected when using discharge boundary conditions in combination with the Navier-Stokes equations.
MIKE 3 Flow Model FM	An issue has been corrected in the disposal calculation of sediment mass from the Mud Transport module when using combined sigma and z-level.
MIKE 3 Flow Model FM	When output is excluded for all vessels for disposal calculation in the Mud Transport module an issue has been corrected where disposal vessels were omitted from the simulation.
MIKE 3 Wave Model FM	An issue has been corrected in the turbulence model in connection with porosity.
MIKE 3 Wave Model FM	An issue has been corrected when using combined sigma and z-level and porosity.

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Every new release of MIKE 3 consists of new modules, new features and/or corrections to problems or significant inconsistencies discovered in previous releases. Please find below short descriptions of the most significant news.

New features

Module/type	New feature
MIKE Zero	New tab-based navigation between editors, including 'tear-off' functionality to support multiple monitor setups, has been added to the MIKE Zero user interface.
MIKE Zero	Time Series editor has been extended and improved with new import and export functionality. Additional options now include import from Excel and KMD files.
MIKE 3 Flow Model FM	A new sea bed (ground) to water heat transfer based upon the ground equilibrium temperature, depth of ground equilibrium temperature and the conductivity of soil or rock has been added.
MIKE 3 Wave Model FM	The turbulence modelling in MIKE 3 Wave Model FM has been extended with the option to use a k-omega model, after Wilcox (2008), for improved flow calculation near structures. In addition, limiters for both k-omega and k-epsilon turbulence models have been improved.
MIKE 3 Wave Model FM	At closed (land) boundaries, wall friction can now be applied in MIKE 3 Wave Model FM. This new functionality has been applied to both k-omega and k-epsilon turbulence models.
MIKE 3 Flow Model FM	The turbulence modelling in MIKE 3 Flow Model FM (Navier-Stokes formulation) has been extended with the option for using a k-omega model, after Wilcox (2008), for improved flow calculation near structures. In addition, limiters for both k-omega and k-epsilon turbulence models have been improved.

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MIKE 3 Flow Model FM	At closed (land) boundaries, wall friction can now be applied in MIKE 3 Flow Model FM (Navier-Stokes formulation). This new functionality has been applied to both k-omega and k-epsilon turbulence models.
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Fixed issues

Module/type	Error/Inconvenience
General	Numerous corrections, stability and performance fixes.
MIKE Zero	Performance of short notation map projection string handling has been improved.
MIKE Zero	Performance of colour legends overlay has been significantly improved.
MIKE Zero	An error specifically related to Belgian map projections has been corrected.
MIKE 3 Flow Model FM	A rare issue related to the of the Navier-Stokes formulation with geographical domains has been rectified.
MIKE 3 Wave Model FM	Output of cumulated statistics has been improved.
MIKE 3 Flow Model FM – MIKE ECO Lab	Handling of particle releases on dry elements has been improved.
MIKE 3 Flow Model FM – MIKE ECO Lab	Handling of molar concentrations in particle sources has been improved.