ERDC
Engineer Research and Development Center

Documentation and Help for GenCade

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US Army Corps of Engineers®

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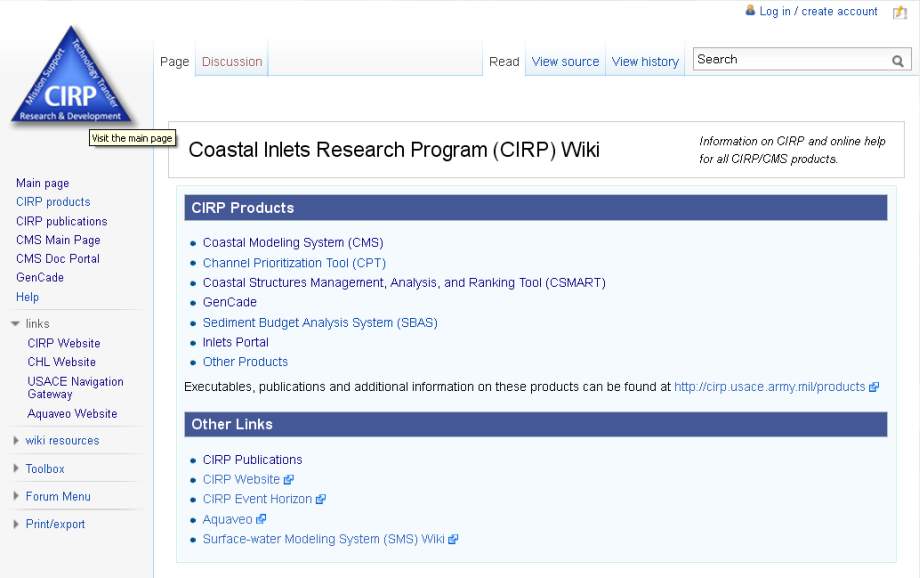
http://cirp.usace.army.mil

- CIRP Wiki



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GenCade, Version 1.0

GenCade is a newly developed numerical model which combines the engineering power of GENESIS and the regional processes capability of the Cascade model. GenCade calculates shoreline change, wave-induced long-shore sand transport, and morphology change at inlets on a local to regional scale and can be applied as a planning or engineering tool. GenCade is operated within the Surface-water Modeling System interface, bringing functionality of a georeferenced environment together with accessibility to other U.S. Army Corps of Engineers numerical models. GenCade is being developed jointly by CIRP and the Regional Sediment Management (RSM) program.

GenCade version 1.0 (release)

System Requirements:
Surface-water Modeling System (SMS) version 11.1 beta (when available)..
For the latest version of SMS 11, see **SMS** tab above.

- Gencade 1.0 [~400 KB zip file] - **updated April 2012**.

Fact Sheet: GenCade, Version 1 **(PDF)**

Available Documentation:
Documentation is under developement. A GenCade User's Guide is in progress and is located on the following wiki page:
http://cirp.usace.army.mil/wiki/GenCade.

A Technical Report describing GenCade will be available in Summer 2011.

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GenCade

GenCade is a 1D model that combines GENESIS and Cascade. It is operated within the Surface-water Modeling System (SMS) interface. The first official release of GenCade is expected to occur in 2011. A beta version of GenCade is presently available and can be obtained by contacting the POC below. A user guide, examples of simple cases, applications, frequently asked questions, and important information will be posted here. A Technical Report is presently being drafted.

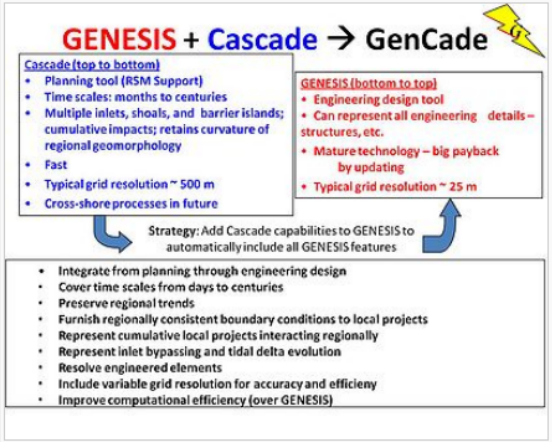

Figure 1. Combination of GENESIS and Cascade

GenCade was highlighted during two CIRP Workshops in 2011. The first took place in February in Jacksonville, FL. This was the first workshop to include GenCade. About 25 students listened to several GenCade presentations, watched a demonstration, and participated in a hands-on example. A full day session of GenCade was featured in San Diego in August. The next CIRP Workshop is scheduled for March 2012 in Philadelphia. An overview of all CIRP tools, including GenCade, will be given on the first morning. A hands-on session of GenCade will take place during the second afternoon.

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GenCade Users Guide

1. Getting Started

This GenCade guide was last updated in January 2012. Most of the screenshots used in this guide were created with the August 19, 2011, build of the SMS. Developers are constantly upgrading the SMS and GenCade executables, so the graphics in a future version may look slightly different than the visuals included in this user guide.

A very simple example can be found here. This example shows all steps necessary to produce results and includes a zip file with all of the input and output files that can be used to reproduce the results on another computer.

1.1 Setup GenCade in the SMS

GenCade is run within the SMS 11.1 Development. SMS 11.0 and earlier versions do not have interfaces for GenCade. This section will guide a user through the process to set up the conceptual model, convert to a 1D grid, review the GenCade model, run GenCade, visualize results, and develop alternatives. It is assumed that the reader has no previous experience with GenCade.

First, the GenCade executable must be identified on the machine. The GenCade executable will be some variation of GenCade_v1_.exe. This executable must be placed in the models folder under SMS 11.1. The folder containing SMS 11.1 will most likely be located in Program Files.

Once SMS 11.1 is open on the machine, it is necessary to specify the location of the GenCade executable. If this is specified incorrectly or not at all, GenCade will not run. In order to indicate the location of the executable, it is necessary to click on *Edit*, go to *Preferences*, and click on the tab labeled *File Locations*. The user should scroll down to *GenCade* under *Model Executables* and click on *BROWSE*. Once the GenCade executable is selected, the path for the executable should be listed under *Model Executables* next to *GenCade*. Figure 1 shows the *File Locations* window.

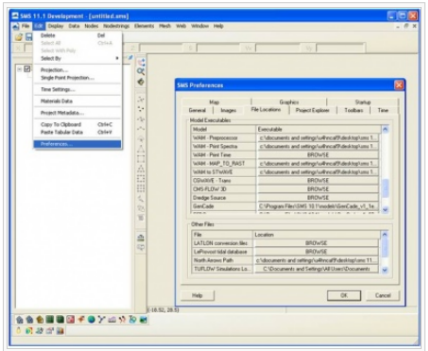

Figure 1. Define GenCade model executable

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GenCade Input Files

After saving the GenCade project, several files will be created in the user specified folder. These files include *.gen, *.shi, *.shr, *.wave, *.shdx, and *.wl. For example, if the name of the project is test, the input files would be named test.gen, test.shi, test.shr, and test_wave1.wave. In order to run GenCade, at least the *.gen, *.wave, and *.shi files are needed. The *.shr file is necessary for a case with a regional contour, while *.shdx is created when variable grid resolution occurs. The *.wl file is only created when using time-dependent wave transmission for a detached breakwater.

The *.gen file is the control file. The first section of this file lists information about the other input and output files. The first line under files shows the path for the location of the initial shoreline. If the case has a regional contour, the next line will list the location for the regional contour. The next line specifies the number of wave gages included for the simulation while the next lines list the cell of the wave gage, the depth, number of time steps for the wave information, and the path for each wave gage. The next section of the *.gen file is the model setup. This section includes the grid origin and orientation, the simulation start and end date, the time step, the longshore sand transport coefficients (K1 and K2), and the number of cells in the offshore contour smoothing window (ISMOOTH). The next section of the *.gen file is the waves section. This section includes the height amplification factor, angle amplification factor, and angle offset. The D50, berm height, closure depth, and boundary conditions are found under the beach heading. Seawalls, beach fills, inlets, groins, and other features included in the conceptual model follow the beach section in the *.gen file.

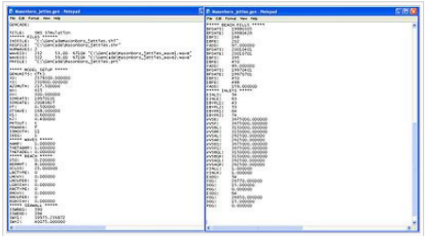
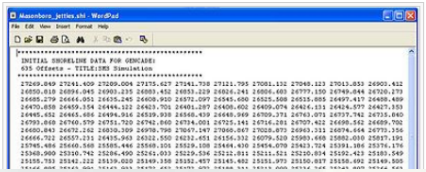


Figure 1. Example *.gen - Left panel is top of file

The *.shi file is the initial shoreline data file. Each number in this file represents a cell, and the number is the distance the shoreline is offset for the baseline.



Technical Reports and Technical Notes

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- Thomas, R., and Dunkin, L. 2012. **Erosion Control and Environment Restoration Plan Development, Matagorda County, Texas, Phase 1: Preliminary Investigation.** ERDC/CHL TR-12-11. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- Beck, T. M., and Legault, K. 2012. **Optimization of Ebb Shoal Mining and Beach Nourishment at St. Johns County, St. Augustine Inlet, Florida**. ERDC/CHL TR-12-14; Report 3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- Frey, A.E., Munger, S., Williams, G.L., Wutkowski, M.J., and Conner, K.J. 2012. **GenCade Application at Onslow Bay, North Carolina**. ERDC/CHL CHETN-IV-85. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- (In printing) Frey, A.E., Connell, K.J., Hanson, H., Larson, M., Thomas, R.C., Munger, S., and Zundel, A. 2012. **GenCade Version 1 Model Theory and User's Guide**. ERDC/CHL TR-12-XX. Vicksburg, MS: U.S. Army Engineer Research and Development Center.