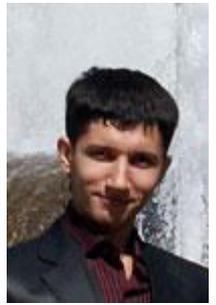


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FTool.script overview

FTools.script is a complex of scripts that can be used by 3D designers to facilitate animation and 3D imaging of fountains.

FTools.script is intended for reducing the routine while providing more space and time for a creative work.

Integrated algorithms can be used to parametrically generate water scenes, to create animation for them, to control valves and regulators of virtual nozzles, to animate lighting and for many other useful features.

Follow this link to view some work samples made with FTools.scripts:

<http://www.fountain-tools.com/gallery>

This utility can be used to animate music (musically synchronized), dynamic (unsynchronized) and static (all jets are always on) fountains.

Besides, it is often used to create fast and easy rendering (just not animated image) thanks to the module for parametric generation of water scenes.

Installation:

First, you need to download a demo version of the utility from the page:

<http://www.fountain-tools.com/service/service-ftools-script-utility>

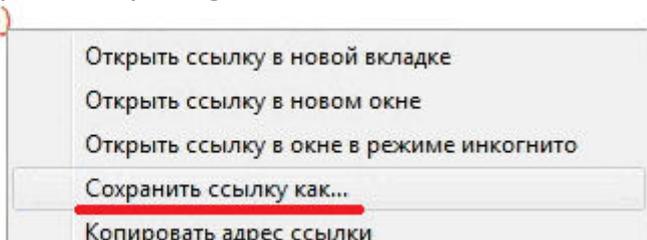
You should be logged in as administrator in order to properly install, start and use the scripts. Moreover, **3DS Max must be started under the administrator account.**

There are two ways to install the tools: automatically or manually.

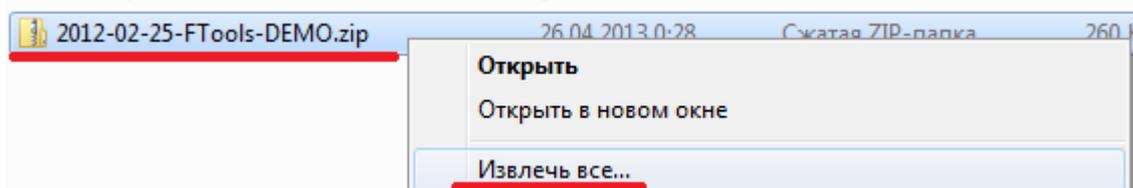
Automatic installation.

1. Download FTools.script on your PC by using the link above.

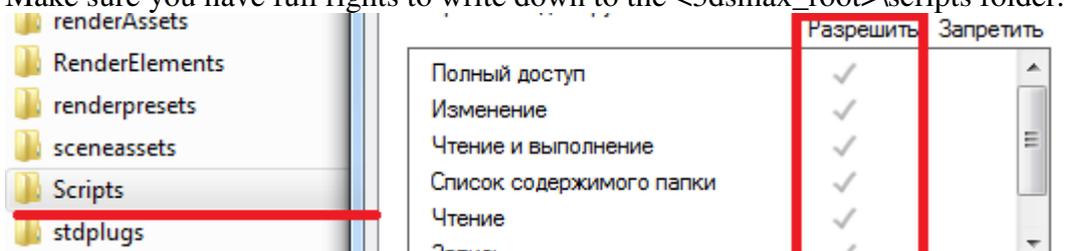
[F-Tools.script\[DEMO\] \(o\)](#)



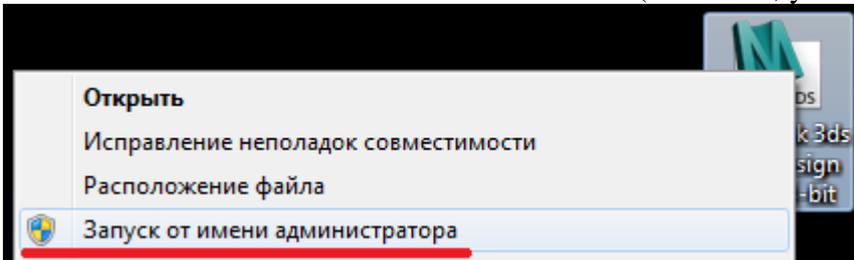
2. I've made a .zip package with setup file to avoid problems when downloading. Unzip the contents to any folder of your choice. There will be a .mzp file inside – that is the installer for FTools.script.



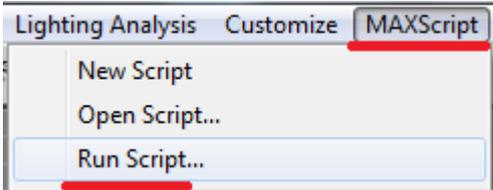
3. Make sure you have full rights to write down to the <3dsmax_root>\scripts folder.



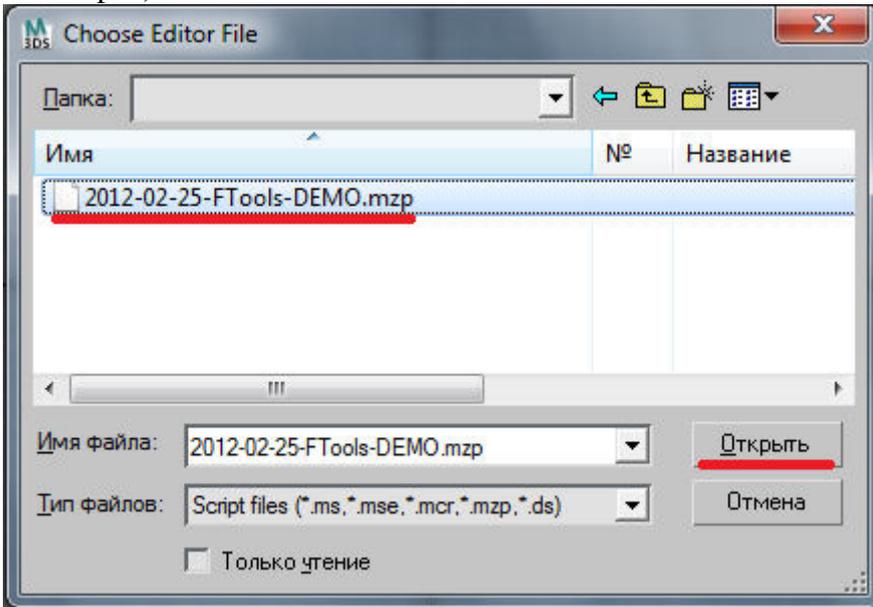
4. Start 3DS MAX under the administrator account (otherwise, you may get error message).



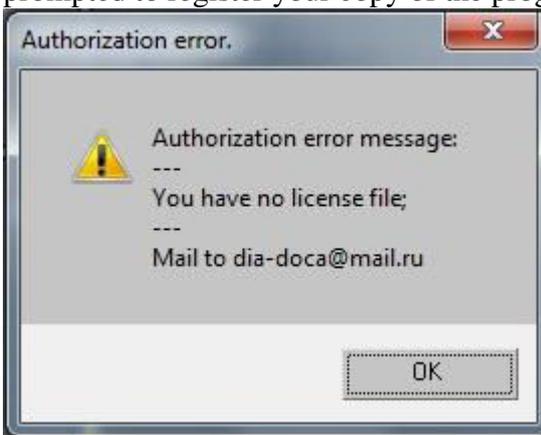
5. Choose MAX Script -> Run Script... in the program's main menu bar to continue with the installation of .mpz script file.



6. A new dialog screen will open. Specify the location and open your .mpz file (select the file and then click Open).



7. If the installation is successful, you will see the "license key absent" message. Don't worry, you are only prompted to register your copy of the program and receive a key.



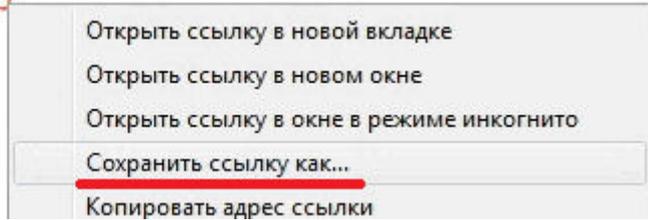
8. For registration procedure and FTools.script keys, please, refer to the relevant section on the site.

Manual installation.

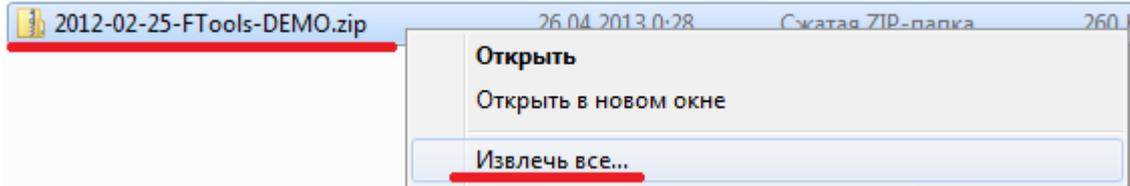
You may want to do things manually, if something goes wrong during the automatic setup process. User privileges, specific 3DS MAX version (e.g. localized copy or other incompatibility issues), including solar flares or magnetic storms, may be the case.

1. Download FTools.script from the link above.

F-Tools.script[DEMO] (o)

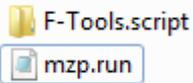


2. It is supplied in a .zip package with the setup file to avoid problems when downloading. Unzip the contents to any folder of your choice.

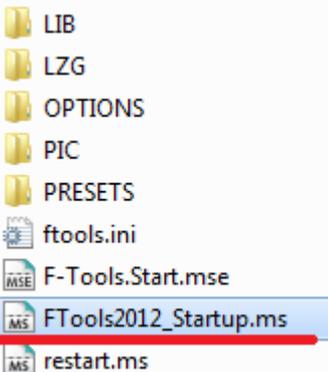


3. Change the unpacked .mpz file to .zip extension and repeat extraction.

4. In the result you will get the F-Tools.script folder.

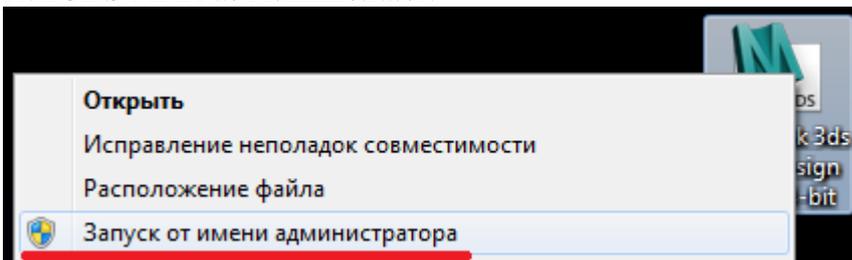


5. Move the **FTools2012_Startup.ms** to the **<3dsmax_root>/Scripts/Startup** directory.

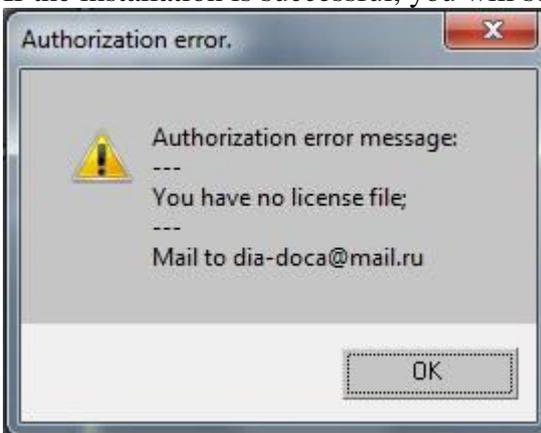


6. Now, move the **F-Tools.script** folder to **<3dsmax_root>/Scripts**

7. Run 3DS MAX as Administrator.



8. If the installation is successful, you will see the "license key absent" message.



9. Register FTools.script. to receive your key. Please, refer to the [Registration](#) section.

Registration

After you have downloaded and setup the program, you will need to obtain a key by registering your copy of FTools.script.

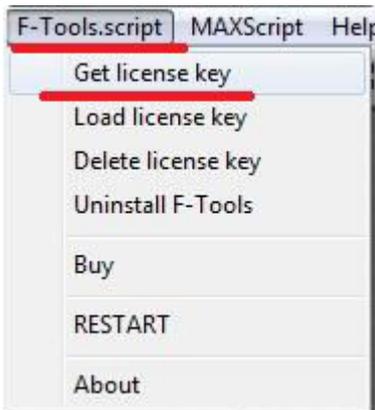
Key is an encoded file which contains the data about your computer, start and end dates of your key.

Each key is unique and will work only on the specifically assigned computer (i.e. where the key was registered).

Windows or 3DS MAX versions do not matter. So don't worry, if you need to re-install them later. Moreover, it also means that you can use the same key on the separate computer but on several operation systems or 3DS MAX applications at once.

Warning! PC system date must be correct or there may be problems with the key registration procedure.

1. Run 3DS MAX, if you have not done it already.
2. If everything is right, you should see **F-Tools.script** in the main menu bar. Select **Get License Key** from this menu.

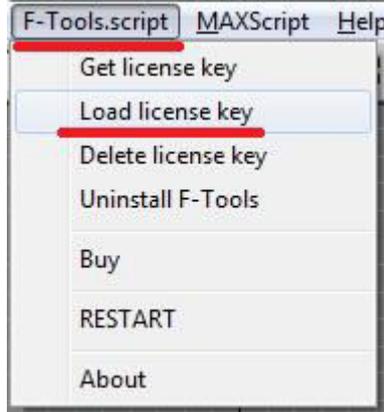


3. You will be redirected to the registration page (the Internet connection must be on).

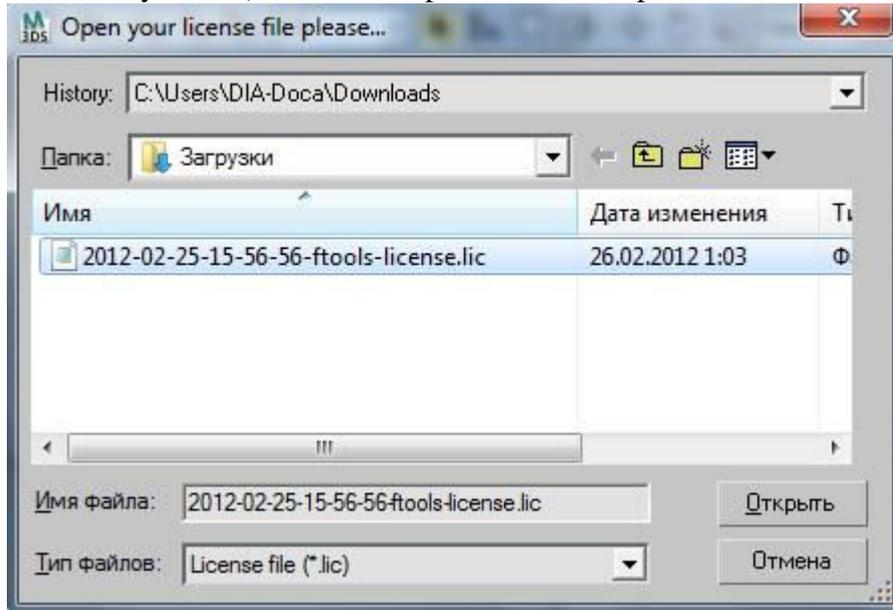
A registration form with a light blue background. At the top right, there is a 'Language: English' dropdown menu. The form contains several input fields: 'Company name:', 'Company WEB:', 'Your name:', 'e-mail:', 'Country:', and 'City:'. A red arrow labeled '1' points to the 'e-mail:' field. At the bottom right of the form, there is a 'Get key' button, which is also pointed to by a red arrow labeled '2'. Below the form, there is a small text block: 'All fields are mandatory. Correctly specify your e-mail address as it, you will receive an email with registration key and other information. Kindly requested to fill in the fields trustworthy information. This will help for further development of tools and technical support.'

4. Fill the fields in with the information required. **Make sure to enter an existing e-mail address** – it will be used for the generated key.
5. Click **Get Key**, when ready.
6. If the registration is successful, you will receive the message with the attached key.
7. **Save the key on your computer.**

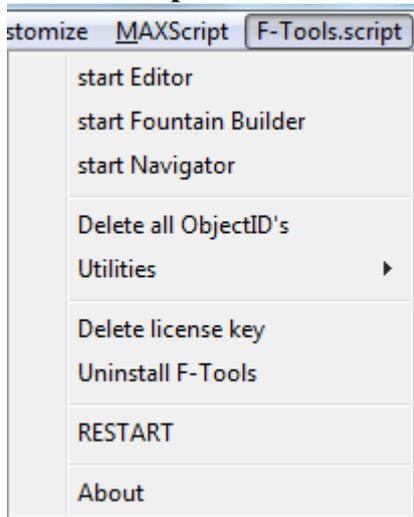
8. Now, go to **F-Tools.script** and **Load License Key** in the 3DS MAX main menu bar to download the received key into the program.



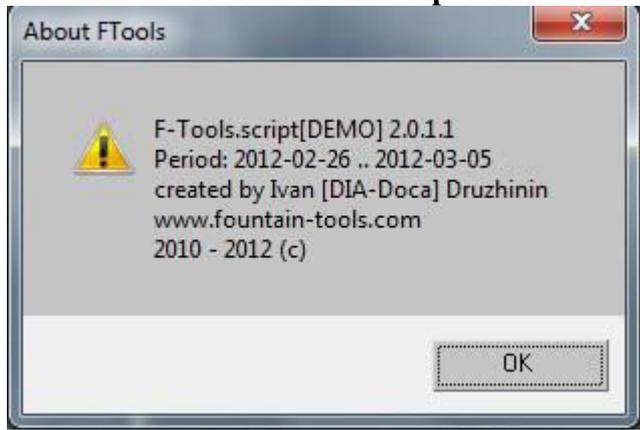
9. A new dialog will open, prompting you to specify the location (it is the place, where you stored the key received by e-mail). Choose the path and click Open.



10. If the registration is successful, and the key is accepted by the program, you will see this in **F-Tools.script** menu contents, saying that you are now using the registered and working version.



11. Select **About** in the **F-Tools.script** menu to know the term of validity for your key.



License

Commercial license is valid **for one year** and only for one computer.

The demo version is limited by 8 days.

If you have several copies of 3DS MAX or Windows installed on the computer, the same key will be OK for all of them.

PC system date must be correct or there may be problems with the key registration procedure.

Fountain Builder (FB) Module

This module is used for parametric generation of water shapes.

Main purposes

- Deflectors
- Gravity
- Water scene rendering based on parameters
- Automated reference to Gravity and Deflectors
- Put to Layer and Named Selection functions

Working principle is simple.

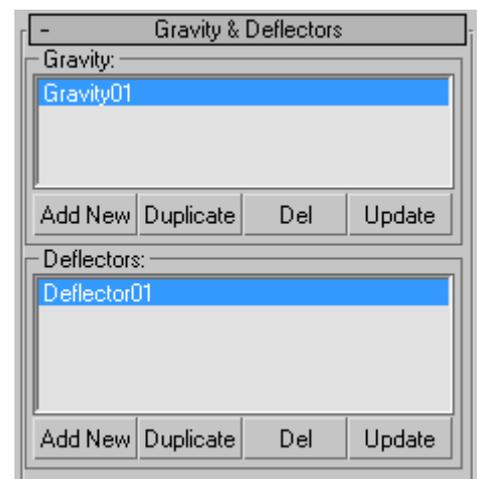
For a start you should create gravity and deflector (they are necessary to simulate jets deflecting from the water surface, thus, creating splashes). You can do by your own or in the FB module.

Then, you need to pick a water shape available in the list, indicate parameters (number of streams, shape size, etc.) and click **Build** to build an outline.

Gravity & Deflectors Rollout

Use this section to create gravity and deflector. Program will apply the FTools.script. recommended settings.

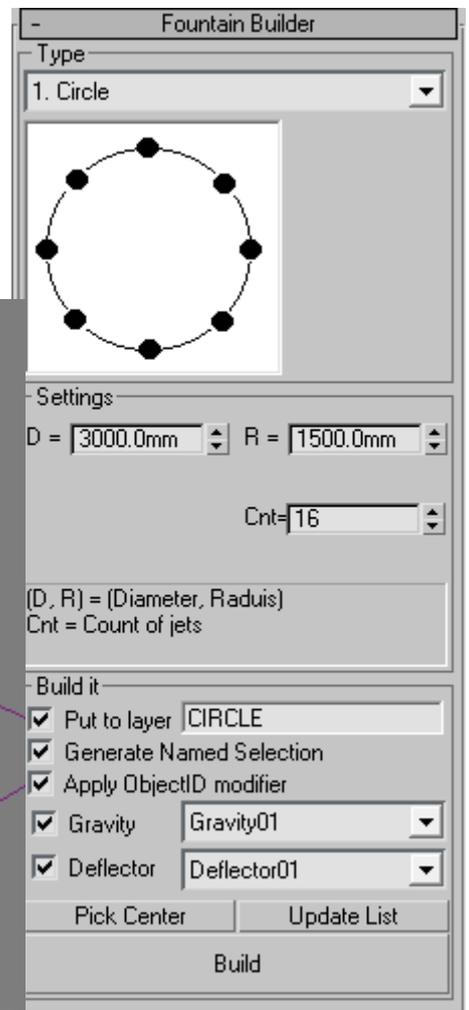
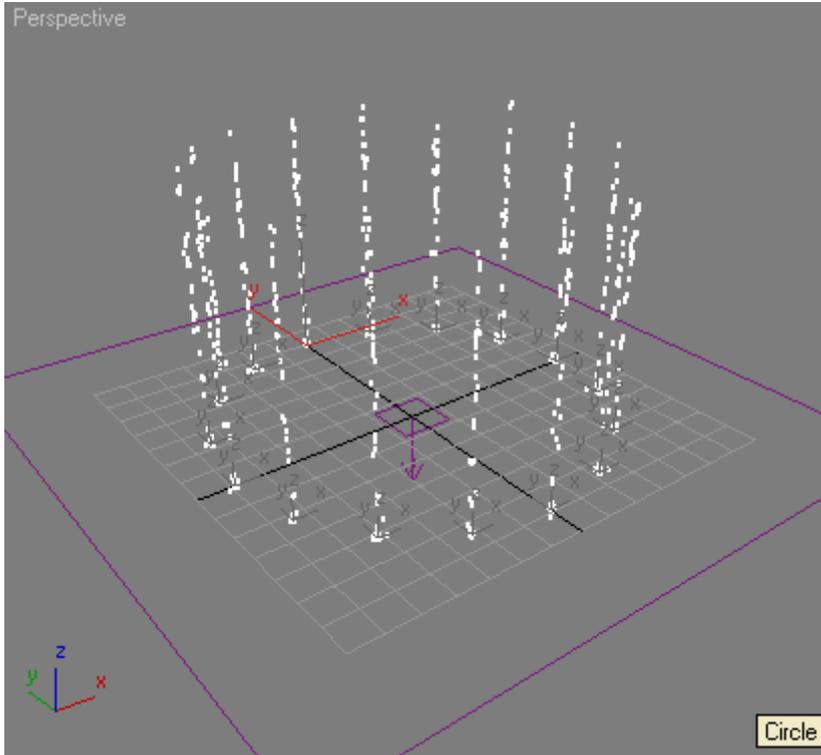
- **Add New** – creates a new Gravity/Deflector (with optimized settings by default)
- **Duplicate** – clones a Gravity/Deflector selected in the correspondent group list.
- **Del** – deletes a Gravity/Deflector selected in the correspondent group list.
- **Update** – updates the group list (required, if Gravity/Deflectors were manually added or deleted in a scene)



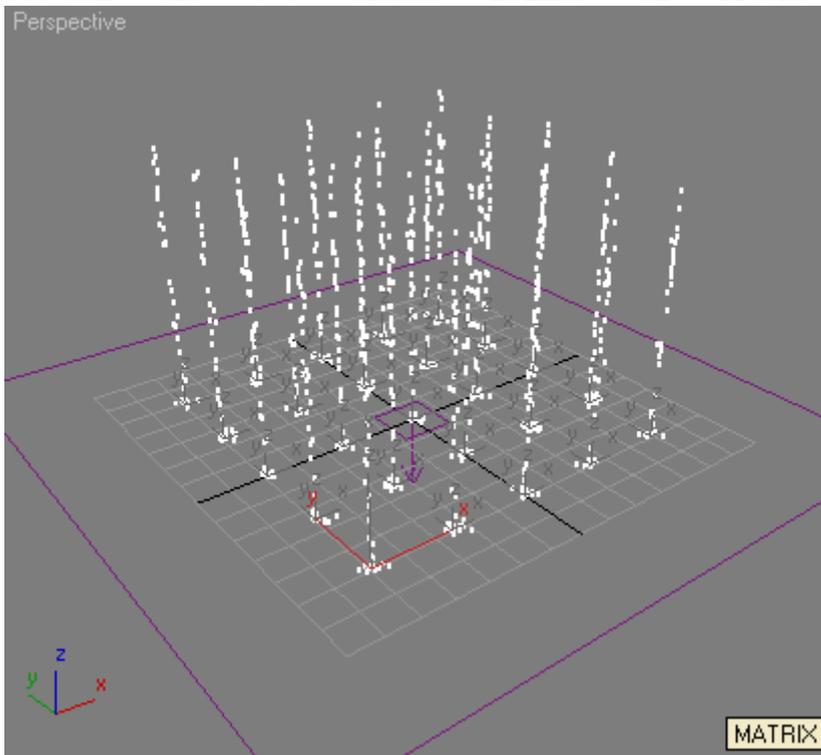
Fountain Builder Rollout

Layouts for all water shapes can be viewed on icons. This provides better navigation for the user.

- **Type** – a list of water scenes available for parametric rendering
 - **Circle** – water nozzles in the amount of Cnt are evenly distributed around the circle of given diameter/radius (D/R). If D=0 or R=0 or Cnt=1, then only one spray jet will in the circle center will be created.

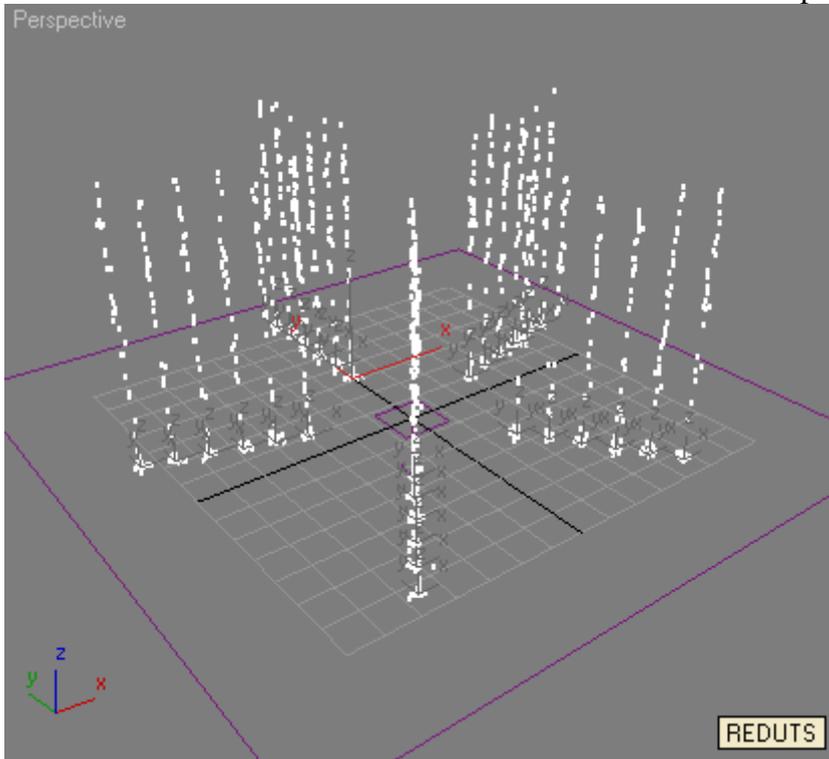


- **Matrix** – a set of water nozzles viewed as a matrix. Xc/Yc – number of nozzles on Tx/Ty – distance between the extreme nozzles on X-axis and Y-axis respectively. Dx/Dy – distance between the two closest nozzles on X-axis and Y-axis respectively.

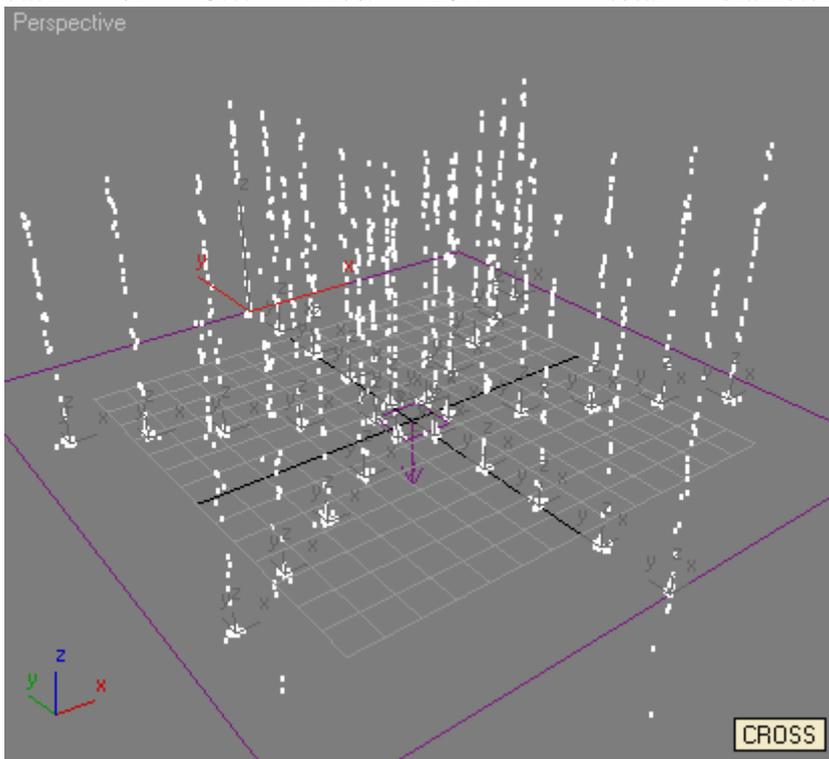


- **Reduts** – Rays ("reduts") radiating from the center and located around the circle curve. D1/D2 – inner and outer diameters. D1/D2 – inner and outer radii. R.c. – number of rays ("reduts"). S.c. –

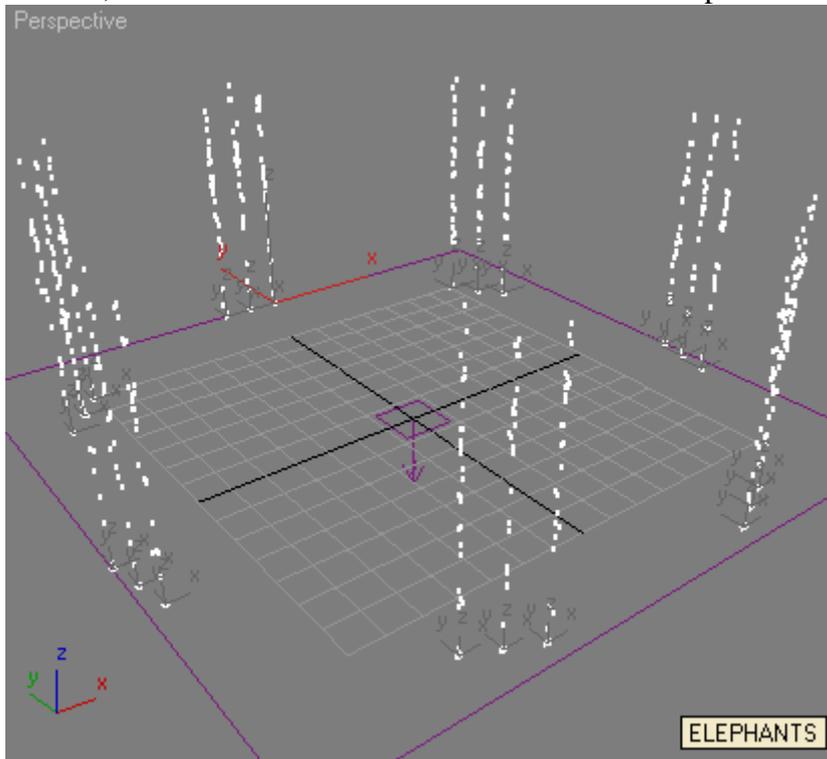
number of water nozzles per ray ("redu").



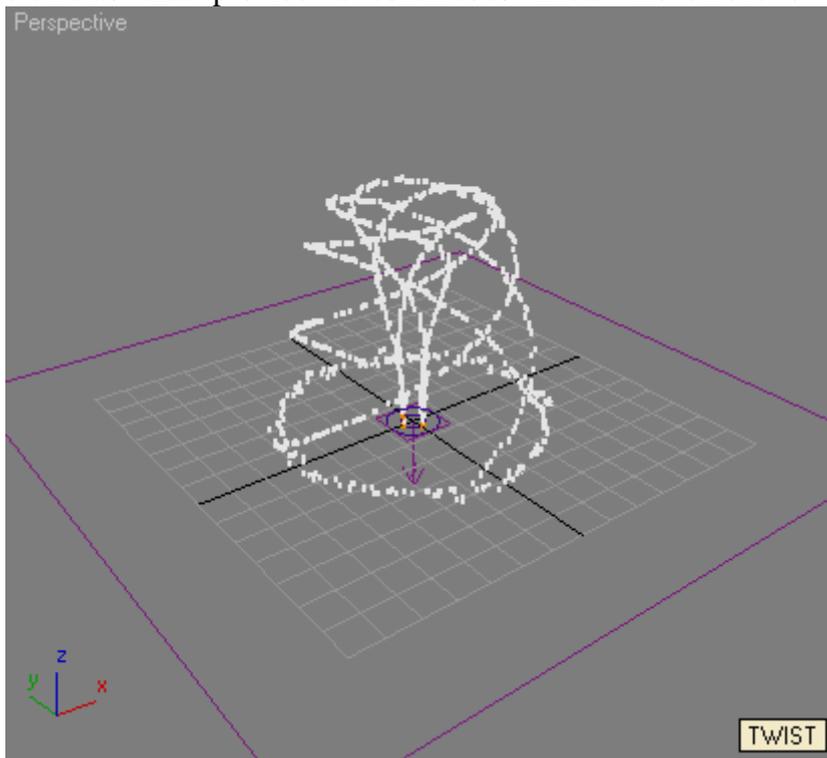
- **Cross** – crossing lines in the amount of C.c. filled with water nozzles in the amount of S.c. in each of C.c. lines. D/R – total diameter/radius for a structure.



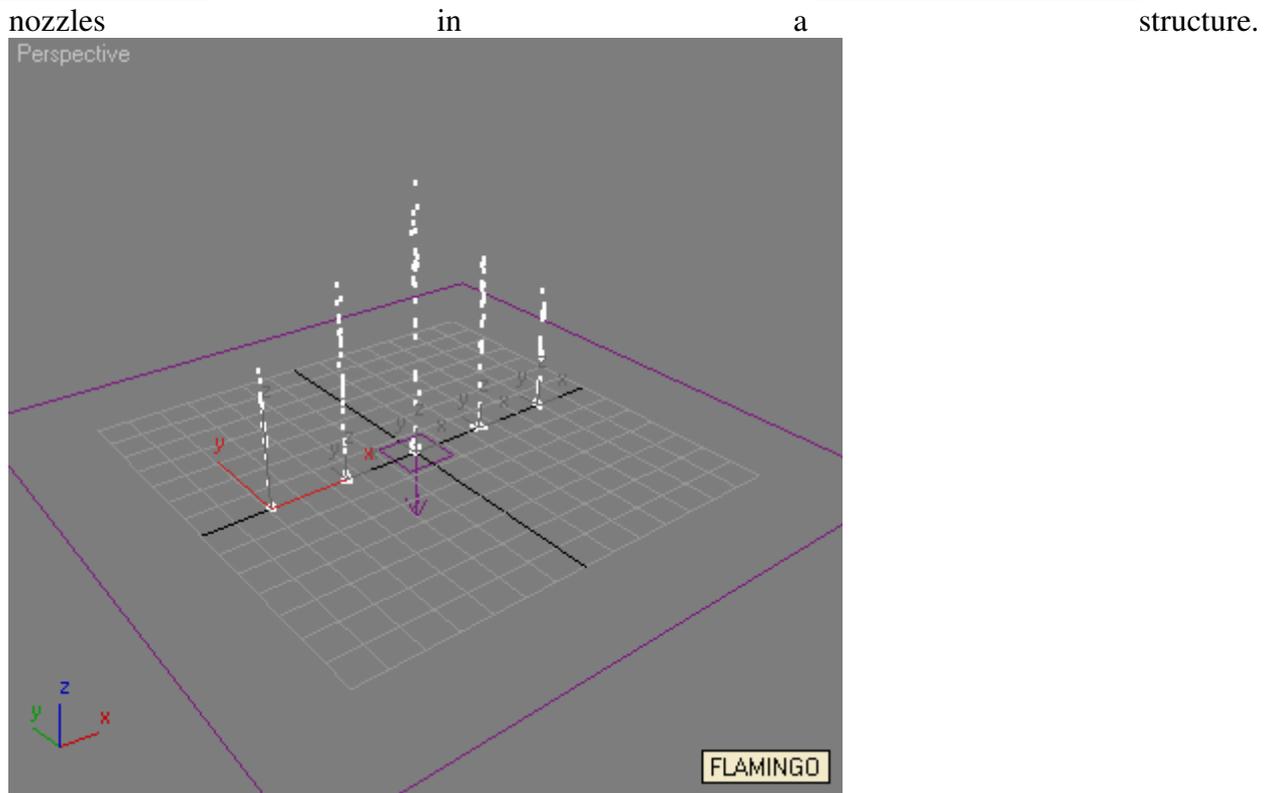
- **Elephants** – structure consisting of Ele groups, of which every has a Cnt defined number of nozzles, located around the circle of the specified D/R (diameter and radius).



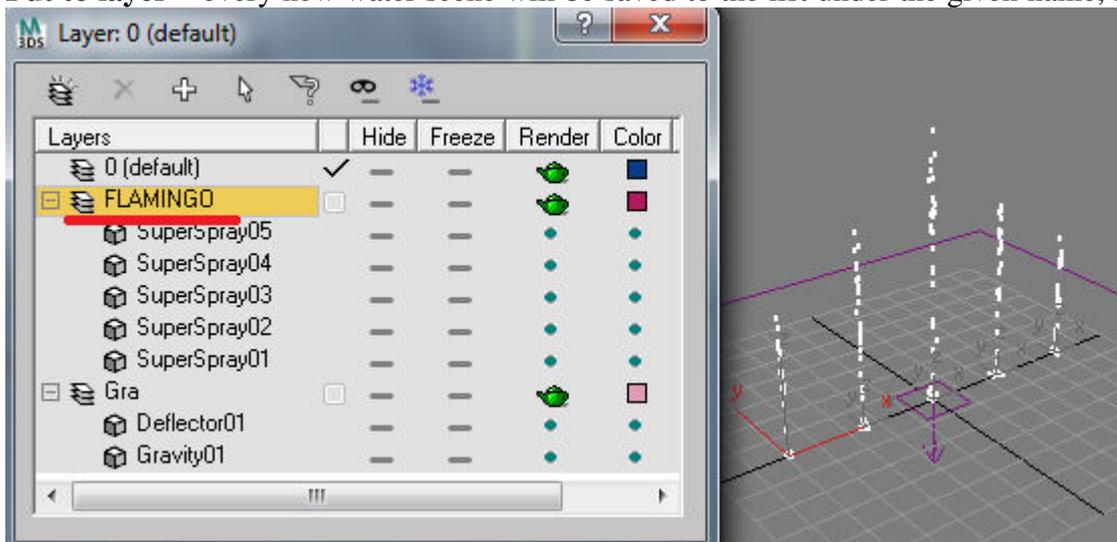
- **Twist** – structure consisting of a Cnt defined number of nozzles, located around the circle of the specified D/R (diameter and radius). Unlike the Circle, this structure is anchored to secondary elements that provide a continuous linear movement of the structure around its axis.



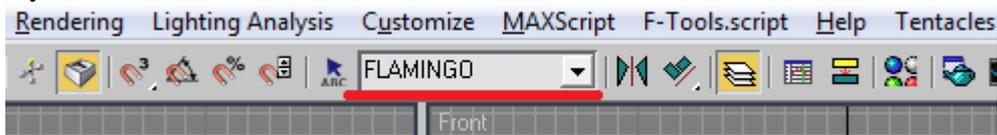
- **Flamingo** – structure represented as a sequence of water nozzles with the highest one in the middle, while the heights of others decrease progressively from the center. T – Distance between the two extreme nozzles. W – Distance between the two nearest nozzles. C – Total number of



- **Settings** – individual parameters for each water scene type (Type). Parameters are described above.
- **Build it** – additional parameters that are common for all scene types.
 - **Put to layer** – every new water scene will be saved to the list under the given name, if checked.



- **Generate Named Selection** – Named Selection will be generated under the name set in Put to layer, if checked.



- **Apply ObjectID modifier** – applies a modifier of the same name as a scene that is needed for lighting animation, if checked.



- **Gravity** – specifies the gravity parameter for your water scene. If there is no required gravity available in the list, then click Update List to refresh parameters.



- **Deflector** – binding to a deflector. It works similar to gravity.



- **Update List** – updates gravity/deflector list.
- **Pick Center** – allows you to define any scene object as a center for building a water scene. By default, the grid center is selected, if you leave it blank. You may deselect scene objects by the right click on Pick Center.
- **Build** – runs a parametric building algorithm for fountain water rendering.

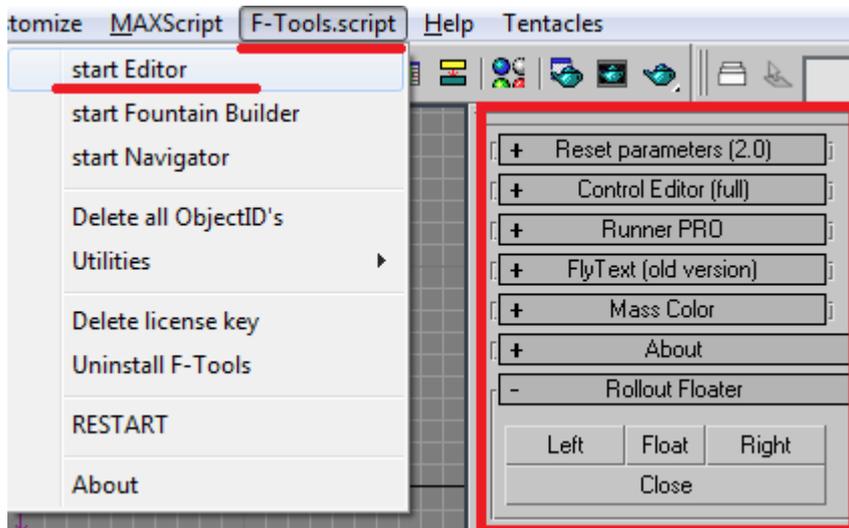
Rollout Floater Group

It allows the user to control the FB module window on the screen.

- **Left** – attaches the module to the left edge
- **Right** – attaches the module to the right edge
- **Float** – leaves the module unattached (you can freely move the module around)
- **Close** – closes the module window.

Editor Module

This module is intended both for setting the system particle parameters and animation rendering.



Reset Parameters (RP) Rollout

By default, 3DS MAX has a severe restriction – You cannot edit simultaneously the parameters of the multiply selected SuperSpray particle systems. Reset Parameters rollout serves to remove these restrictions.

RP is required for changing the parameters of selected SuperSpray particle systems. Most of them just copy all settings from standard SuperSpray particle systems. For more information, please refer to 3DS MAX help.

The utility works only with standard particle systems. We will use particle system meaning SuperSpray ones hereafter.

Parameters

- **Get params** – downloads the parameters of the first particle system in the selection and opens them for editing.
- **Set params** – applies the entered parameter values to the selected particle systems
- **Auto update** – if checked, **Get params** will be applied by default every time you select new particle systems, while **Set params** will be applied for all modified parameters on the form. If unchecked, **Get params** and **Set params** functions should be done manually.
- **Use Seed Randomize (!)** – Check the box, if you want to apply by default a random SEED* value to each particle system selection. **RP Low Speed** – it is enough to click on **S** (see below) for selected particle systems.
- **S** – forces random SEED* values for selected particle systems. (i.e. SEED* parameter is applied only once).
- **Get** – update the max. height values for selected particle systems.

* SEED is a value influencing the random number counter when spraying the particles. Set random SEED values for a each and separate particle system, so they can be visually distinguished from each other, while giving more reality to your scene.

Flamingo

- **Speed multiply** – value used to determine the difference between the highest and lowest water jets for the Flamingo scene in Fountain Builder.

Particle Formation

- **Axis_Spread** – deflection from particle momentum vector (X-axis).
- **Plane_Spread** – oXZ plane deflection around the momentum direction vector for particle system (Z-axis)

Particle Quantity

- **rate** – this value determines the quantity of particles emitted from the system.
- **Uncheck** the box, if you want RP to ignore this variable. In other words, RP won't apply the specified parameter value to all selected particle systems.

Viewport Display

- **Dots/Ticks/Mesh** – particle visualization technique for the scene viewer
- **viewPercent** – amount of particles displayed in the scene viewer
- **Icon Size** – size of icon for particle system displayed in the scene viewer
- Check the **hide** box below the parameter, if you don't want to display this icon on the screen.

Particle Motion

- **speed** – initial emission velocity for particles

The screenshot shows the 'Reset parameters (2.0)' dialog box with the following settings:

- Get params | Set params
- Auto update
- Use Seed Randomize (!) S
- 2079.057mm | get | set
- "7. Flamingo"
- speed multiply 0.5
- Particle formation: Axis_Spread 0.3, Plane_Spread 180.0
- Particle Quantity: Rate 20
- Viewport Display: Dots, viewPercent 5.0, hide, Icon Size 20.0mm
- Particle motion: Speed 10.0, Variation 10.0
- Particle Timing: Emitter_Start 0, Emitter_Stop 83, Display_Until 83, Life 40, Variation 5
- S..E | S..C | C..E
- Creation time
- Emitter Translation
- Emitter Rotation
- Particle Size: Size 12.0mm, Variation 10.0, Growth_Time 0, Fade_Time 8
- Standard Particles: Facing
- Other: Die after collision
- Save/Load: Save | Load | Del

- Uncheck the box, if you want RP to ignore this variable. In other words, RP won't apply the specified parameter value to all selected particle systems.
- **Variation** – a random value affecting the initial emission velocity for each separate particle.

Particle Timing

- **Emitter_Start** – life start time for a particle system
- **Emitter_End** – life end time for a particle system
- **Display_Until** – particle visualization end frame
- **Life** – a lifespan of the particles being generated
- **Variation** – limit of frames, which can be used to vary the set life parameter for each particle.
- **[S..E] [S..C] [C..E]** – sets start and end frames of particle lifespan. Respectively: [from the start to the end animation frame] [from the start to the current animation frame] [from the current to the end animation frame]
- **Creation time** – activates intermediate frames for particle generation
- **Emitter translation** – makes the particle motion smooth by adding more frames.
- **Emitter Rotation** – makes the particle rotation smoother

Particle Size

- **Size** – specifies the particle size
- **Variation** – particle size and size value deviation ratio
- **Grow_time** – number of frames during which the particle will grow from 0 to the specified size.
- **Fade_time** – number of frames during which the particle will decrease from the specified size to 0 value.

Standard Particles

- Use a drop-down list to select a visualization method at rendering.

Other

- **Die after collision** – if checked, the particle will fade away after hitting the deflector to which it is attached.

Save/Load

- **Save** – saves parameters to your file
- **Load** – uploads parameters from your file.
- **Del** – deletes all previously saved files with parameters

Control Editor (CE) Rollout

It should be understood that animation, being generated in FTools.script, is based on key frames. Key frames, in their turn, are used both to animate jet dynamics and lighting.

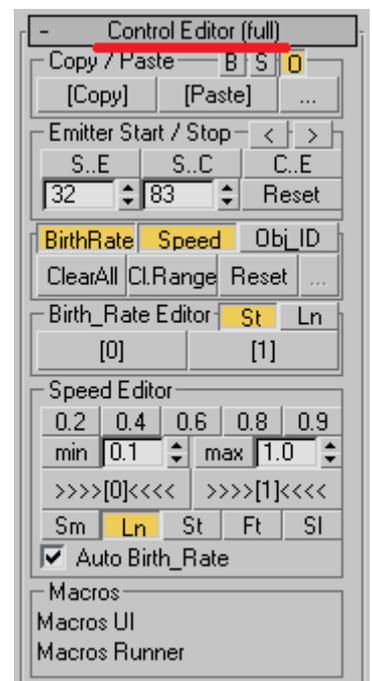
There are two standard and most important SuperSpray parameters that are filled with key frames for dynamics animation. This Birth_Rate and Speed parameters are used to model the working valves of the real water nozzle and of the fountain speed controller respectively.

It is essential to understand this difference.

For example, Birth_Rate should be always set to 1 for a smooth animation of the dynamic fountain. Speed is the only value to vary here, i.e. we use just the speed controller.

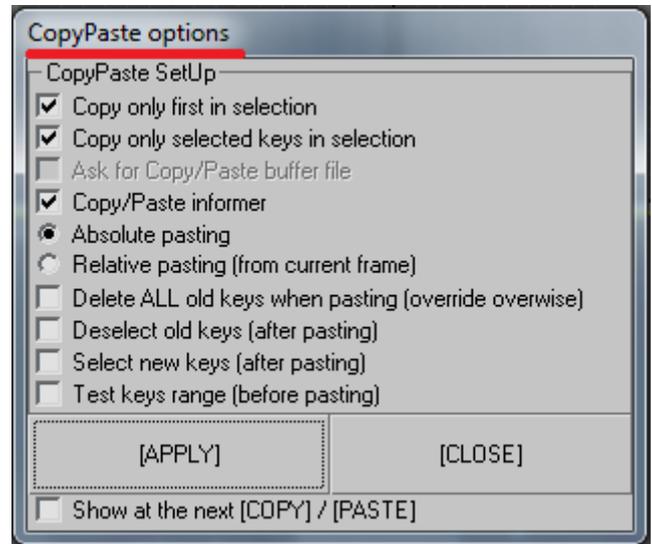
Music fountain is another example. Music fountains widely use the valves. Speed controllers are not available with them. So the valves are used alone to generate a "running wave" pattern (Birth_Rate alternates from 1 to 0). while the pumps are operating statically (i.e. Speed is always 1).

Copy/Paste



Copy/Paste function allows to copy and then paste the animation keys for birth rate (B), particle speed (S) and object id (O), which is used to create an animated lighting of fountain streams.

- **B** – Copy_Birth_Rate_Keys on/off
- **S** – Copy_Speed_Keys on/off
- **O** – Copy_Object_ID_Keys on/off
- **[COPY]** – copy the keys according to the settings
- **[PASTE]** – insert the keys according to the settings
- **[...]** – copy/paste settings
 - **Copy only first in selection** – if it is known that all selected particle systems have a similar set of key frames, then you should better check the box in order to simplify (optimize) algorithm calculation.
 - **Copy only selected keys in selection** – if checked, you will copy just the key frames within the selection as indicated. Otherwise, all key frames will be copied.
 - **Copy/paste informer** – if checked, you will see a dialog with key frame statistics every time you use COPY/PAST command.
 - **Absolute Pasting** – check this box, if you want the key frames to be pasted exactly on the same points of the timescale.
 - **Relative Pasting (from current frame)** – use this property to insert the key frames with some shift, where the current frame will be the first in a row.
 - **Delete all old keys when pasting (override otherwise)** – indicates that all key frames must be deleted before pasting.
 - **Deselect old keys (after pasting)** – deselects the keys after PASTE is done.
 - **Select new keys (after pasting)** – indicates that new key frames must be selected after PASTE is done.
 - **Test key range (before pasting)** – if checked, the program will inform the user about the new frames overlapping the old ones.
 - **Show at the next** – if checked, a dialog box with settings will pop up every time before executing Copy/Paste.



Emitter Start/Stop

Use these settings to change particle system rendering in your scene. If properly used, you will benefit from saving your machine resources for the computer will calculate the animation only in set range, neither will it render the scene in the viewport. (parameters influence the way that particles are seen both in the viewport and the renderer)

- **<** - copy the current frame number to the "start" field
- **>** - copy the current frame number to the "end" field
- **S..E** – "start" field = start frame, "end" field = end frame
- **S..C** – "start" field = start frame, "end" field = current frame
- **S..E** – "start" field = current frame, "end" field = end frame
- **Reset** – resets the start and end frame values for rendering of selected particle systems to those values as they are specified in the "start" and "end" fields.

BirthRate/Speed/Obj_ID

- **BirthRate** – if pressed, the action will be applied to birth rate keys (valve animation).
- **Speed** - if pressed, the action will be applied to speed keys (i.e. speed controller animation).
- **Obj_ID** - if pressed, the action will be applied to **Object_ID** modifier keys (i.e. lighting animation).
- **ClearAll** – deletes all animation keys (for birth rate and/or speed and/or lighting animation)
- **Cl.Range** – deletes all animation keys within a specified range (for birth rate and/or speed and/or lighting animation). Start and end range frames are taken correspondingly from the left and right numeric field in "**Emitter Start/Stop**" group.

- **Reset** – can be applied just to birth rate and/or speed. It deletes all key frames. If **BirthRate** is pressed and held down, then a zero value birth rate key will be created before the scene initial frame. If **Speed** is pressed and held down, then the scene initial frame will be preceded by a birth rate key of 1. Initially, the idea was to reset all selected particle animations and set the initial state of the valve to OFF position. There is sense to use it when both **BirthRate** and **Speed** are pressed and held down.

Birth_Rate Editor

It can be used to control birth rates for particles. Which is to say, it imitates the valve performance on the real fountain.

- **St** – is an abbreviated form of "Step". In this mode the birth rate switches immediately in the key frame. You should use this particular mode.
- **Ln** – is an abbreviated form of "Line". In this mode the birth rate changes smoothly from the previous key frame value to a new one in the next frame. Which is to say, we have an example of linear interpolation for values between the two frames. This mode is not commonly used.
- **[0]** – sets the value to zero
- **[1]** – sets the value to 1

Speed Editor

It can be used to monitor the speed controller of your fountain. In other words, it regulates the power of fountain pumps.

You can create animation of fine switching between water scenes of your fountain.

This is a simple but very powerful tool for creating fountain animations.

- **0.2** – 20% of power
- **0.4** – 40% of power
- **0.6** – 60% of power
- **0.8** – 80% of power
- **0.9** – 90% of power
- **Min** – sets the power relatively to the left numeric input field
- **Max** – sets the power relatively to the right numeric input field
- **Auto Birth_Rate** – if checked, the program will set both speed and birth rate keys. If checked, the buttons for key setup are placed in brackets >>>>[0]<<<< and >>>>[1]<<<<. This mode is recommended to be turned off, if not used. Thus, you will save both your time and computer resources. For example, if the pumps are off, we not only set the particle speed to 0 but also set birth rate for particles to 0. In other words, the computer needs not to spend resources for crating particles with a zero speed, because you will never see them on the screen. It is important to understand this moment.
- **[0]** – sets the key value to 0
- **[1]** – sets the key value to 1

Runner PRO Rollout

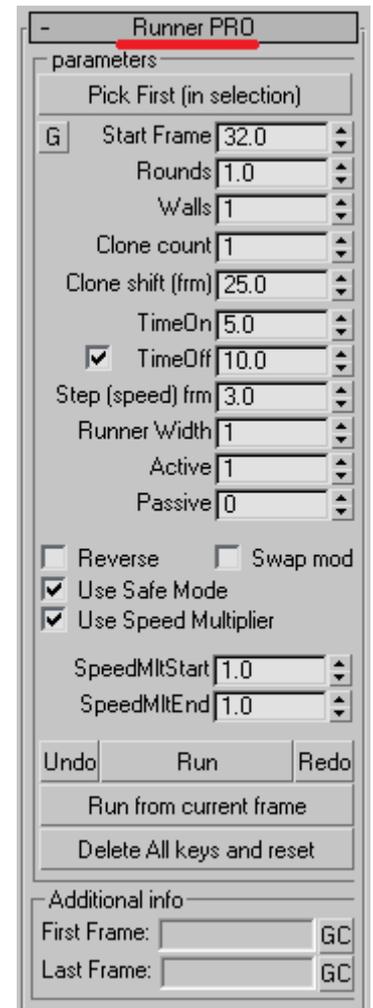
This is the place where the main water effect generator algorithm, based on valve operation, is situated. Here you can create a variety of different effects for the so-called "running wave".

Parameters

This section include all necessary parameters to setup a generator algorithm for "running wave"

- **G** – an abbreviated form of "Get". Left click with the mouse to upload the current frame number to the Start Frame.
- **Start Frame** – frame number from where the algorithm starts working. Make sure that you have set this value to the proper frame before proceeding with the algorithm.
- **Rounds** – a number of cycles to be performed by the algorithm
- **Walls** – a number of "wave crests"
- **Clone Count** – if the value >1 then next wave will run at the distance specified as Clone Shift.
- **Clone Shift (frm)** – number of frames through which the next wave starts running.
- **TimeOn** – number of frames used for a working valve.

- **TimeOff** – number of frames used for valve closing (if low setting is used, the valve will close immediately; otherwise the turn-off animation will be gradual).
- Uncheck the box, if you want the valves stay open.
- **Runner Width** – a wave step width. Which is to say, a number of valves in a group (wave) to be opened simultaneously at every following step.
- **Active** – number of "working" valves. It is used in pair with Passive to achieve the effect when, first, a number of active nozzles are working and then a number of passive nozzles.
- **Passive** – number of "turned-off" valves.
- **Reverse** – allows to reverse the algorithm in opposite direction
- **Swap Mode** – a mode of animation in which the even and odd nozzles switch on and off alternatively.
 - **Swaps** – number of full repetitions. Work of odd nozzles followed by even ones is called a repetition.
 - **TimeOn** – active time for a nozzle group
 - **TimeOff** – passive time for a nozzle group (simply totaled with TimeOn, without fading, if Use Speed Multiplier is OFF)
 - **CrossFrame** – number of frames in which the operation of positive and negative nozzle groups is combined. Which is to say, a number of frames, where they work simultaneously. The value can be positive, zero or negative.
 - **Runner Width** – a width (i.e. quantity) of nozzles in a group.
 - **Passive** – a number of passive nozzles after each group of nozzles.
 - **Use Safe Mode** – reset the state of each nozzle group before the first start (birth rate 0, start speed 1)
 - **Use Speed Multiplier** – if checked, initial particle animation speed keys will be activated. (for gradual animation)
- **Use Safe Mode** – for new users. If checked, the program will always create a zero frame (nozzle in passive state) before any step of the algorithm.
- **Use Speed Multiply** – for advanced users. If checked, the program will use both the birth rate and start speed frames for particles. It allows to achieve a more gradual and smooth animation.
- **SpeedMltStart** – start pressure in circuit pumps (the algorithm first frame)
- **SpeedMltEnd** – end pressure in circuit pumps (the algorithm final frame)
- **Undo** – press this button to discard the last change (repeats the standard Undo button)
- **Run** – start the algorithm
- **Redo** – returns the last undo action (repeats the standard Redo button)
- **Run From Current Frame** – starts the algorithm from the current frame (i.e Start Frame value will be ignored)
- **Delete All Keys And Reset** – deletes all start speed animation and birth rate frames and sets a zero frame in passive state. i.e. birth rate = 0, start speed = 1.



Additional info

The first and last frame numbers are displayed in these fields.

- **First frame** - the first frame number that was used during algorithm execution.
- **Lst frame** - the last frame number that was used during algorithm execution.
- **GC** – stands for "Go and Copy". Left click with the mouse to move the current frame to the selected place (Go). Right click with the mouse to copy the selected frame to the clipboard (Copy).

Fly Text (old version)

This algorithm is intended to generate a water scene of your fountain with an individual control of each separate water spray nozzle. i.e. a separate adjustable pump.

Such animation is usually characterized by a greater smoothness.

We don't need to go deep in details with this algorithm because it is just for testing and will be replaced in later versions. However, it can help you achieve certain results.

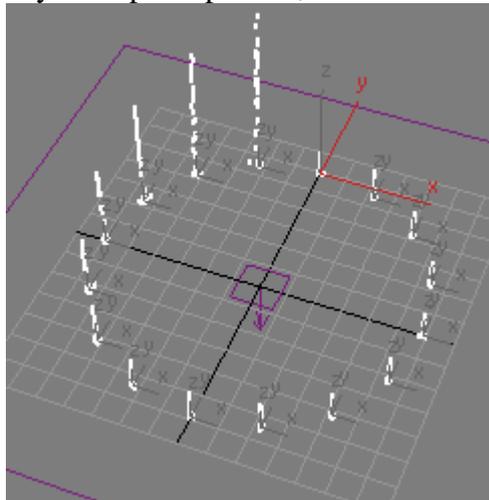
Switch to  mode and then to . This is the first thing you should do. Otherwise, the algorithm won't work (unfortunately, this is a known error, which will be patched in next version).

Select a chain of nozzles to work with before you start animation rendering. Each water spray nozzle is processed in the order it was added to your selection.

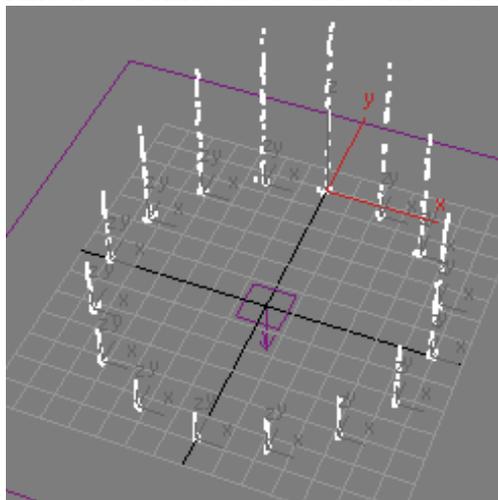
I give a few examples for basic parameters below. Let's review just the first two modes. They are used to imitate a wave running by moving the nozzles up and down.

- **Wall width** – a number of nozzles that covers 1/2 wave width.
- **Walls count** – a value to define a number of waves in your animation
- **Loop walls** – Set this parameter, if a closed shape is used for water outline (e.g. circle). Otherwise, the program will render the animation in which the start and end points of the nozzle chain will not coincide. Please, refer to the example below.

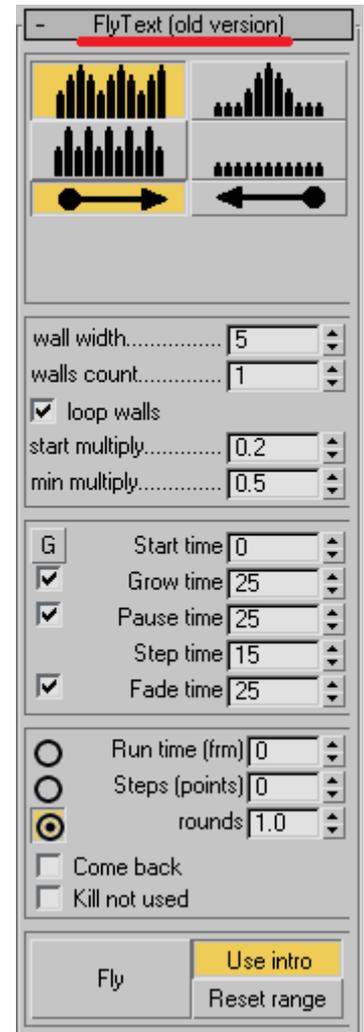
If you skip Loop walls, the wave will look like this:



And now comes the look it will be after we have defined the Loop walls:



- **Start multiply** – min. pump capacity (when rendering the animation, this value is applied to passive nozzles instead of switching them off).



- **Min multiply** – pump capacity at the moment of imitating the wave trough.
- **G** – uploads the current frame number in Start Time field
- **Start time** – start frame for animation rendering
- **Grow time** – time interval (in animation frames) during which the water scene is starting to grow (appear).
- **Pause time** – time interval (in animation frames) during which the water scene becomes "frozen" before it starts moving (animation).
- **Step time** – time interval (in animation frames) during which the movement shifts from one nozzle to another. That is, the bigger is the value, the smoother/longer animation being generated will be. On the contrary, the smaller it is, the faster animation should appear.
- **Fade time** – time interval (in animation frames) during which the water scene is fading away (all water jets will decrease till the ground level) after the animation is complete.
- **Rounds** – number of full circles per wave in the rendered animation.
- **Came back** – if checked, the wave, after reaching the end of chain, will go back in opposite direction.
- **Fly** – starts the algorithm to generate the animation.

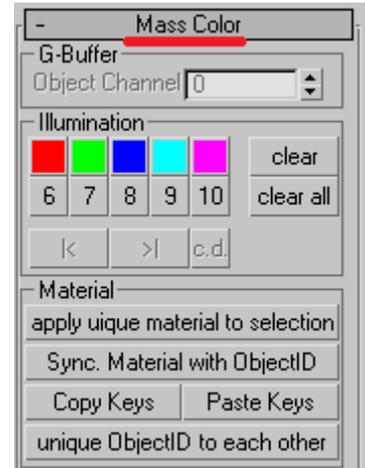
Mass Color

This tab is required to animate lighting simultaneously at different water outlines.

This module works absolutely the same way as ObjectID modifier. In case with modifiers, the user has a limited choice because he cannot change the properties of these modifiers at the same time, if several copies of the same modifier are applied to the selected objects.

Mass Color removes this restriction. Now, you can select multiple nozzles (particle systems), to which different copies of ObjectID modifier are applied, and manipulate them simultaneously. Meanings for all buttons can be found in Object ID Modifier section.

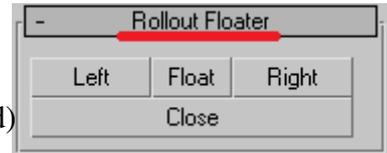
In Mass Color, unlike ObjectID modifier, you can see as "unique ObjectID to each other" button becomes active. This button is used to apply a unique copy of ObjectID modifier to the selected nozzles (particle systems).



Rollout Floater

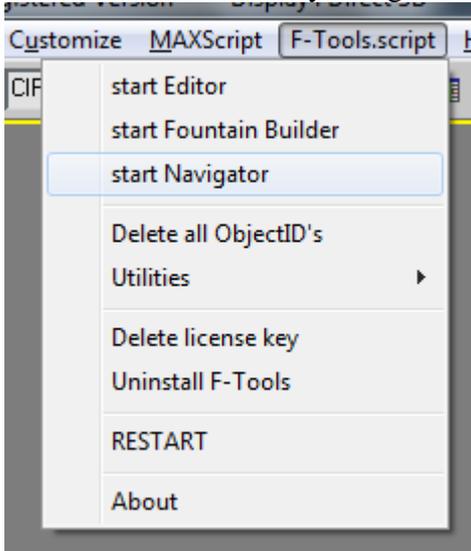
Here you can control the way the FTools:Editor panel is displayed on the screen.

- Left – attaches the panel to the left edge
- Float – leaves the panel unattached (you can freely move the module around)
- Right – attaches the panel to the right edge
- Close – closes the panel



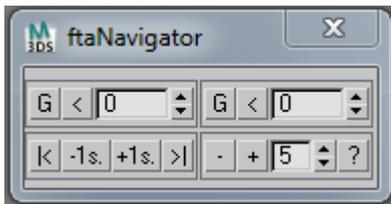
Navigator

Use this module for easy navigation through the screen.



Here you can memorize the frame number and return to this location later, if required.

The module window is shown below:



There are two similar sets of buttons to the right and left above. They have the same functionality. Each button can be used to memorize the current frame and put us back into it.

- **G** – copy the current frame number into the field
- **<** - go to the specified frame, which number is put in the numeric field.

Below, there are two more button groups. The left group provides the movement forward and backward along the animation scale with one second per step:

- **|<** - go backward to the previous full second
- **-1s.** – go backward to one second
- **+1s.** – go forward to one second

- >| - go forward to the next full second

The button group to the right also helps navigating through the timescale. You should indicate the number of frames to go through in the text field.

- - - go backward through the indicated number of frames
- + - go forward through the indicated number of frames
- ? - copies the current frame number to the clipboard

ObjectID Modifier

How does the lighting animation works in FTools.script?

For color animation FTools.script uses a mechanism based on animation of the ObjectID value. This gives certain advantages.

First, animation process is rather simple and clear.

Second, the user has a possibility to independently setup every color that will be used in his animation.

Third, the user can edit color settings even after the animation is programmed (for we are not animating the color itself, we are dealing only with the value to which this specific color should be applied).

Thus, we do not animate the color itself. We animate just the ObjectID number to which the program will automatically insert the color during the rendering process.

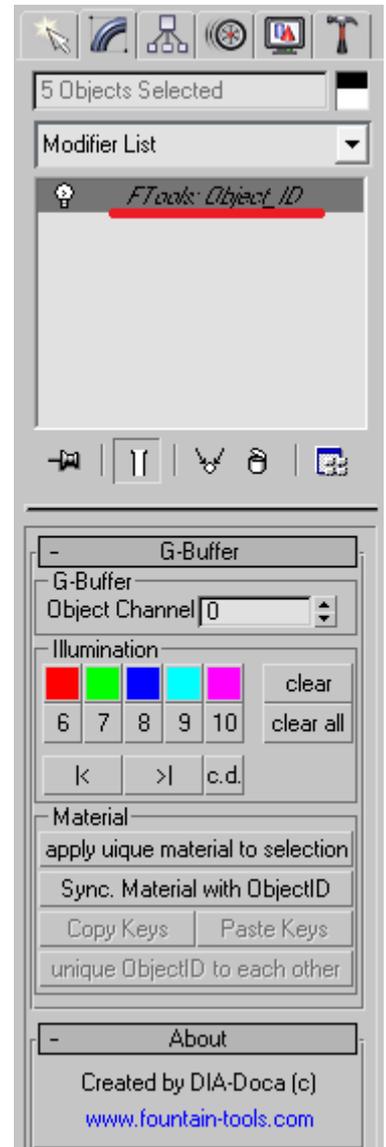
We should make settings in "Environment and Effects" - in "Effects" (main menu – Rendering – Effects) in order to get a glowing halo effect around water jets.

Click Add... and choose "Lens Effects" from "Add Effects" list. "Lens Effect Parameters" will open and you'll see "Glow" effect that we should use to draw a halo around the water spray nozzle, thus, creating the water lighting effect.

Move "Glow" from the left list to the right one. Moreover, you should select a separate "Glow" for each color that you want to use in your fountain animation. Check "Object ID" values according to color numbers. Open "Options" tab and then go to "Glow Element" settings to do this. Now, each "Glow" effect will describe the required color.

By default, FTools.script considers the following color numbers:

- ObjectID:
1. Red
 2. Green
 3. Blue
 4. Cyan
 5. Purple



Lighting animation principle

For a start...

Use "FTools: Object_ID" on one or few nozzles. This is the first thing you should do. You should also remember that the nozzles change their color only together, if the same modifier copy is applied to the group.

Thus, if you consider that the different nozzle groups should change colors independently, then you should apply unique identification for each of them.

By default, if you used Fountain Builder to create water outlines, a unique copy of the modifier will work on the whole shape, not on separate nozzles.

Select nozzles to which you want to apply "Ftools: Object_ID" and then open Modify panel for settings. Parameters will be active, if you have selected the nozzles with the same copy of the modifier.

G-Buffer Group

In G-Buffer group you can see Object Channel value for the current frame. This value will be processed by the renderer in the current frame, and this value will be used to search for Glow Effect during the visualization (right Glow list, which we have already discussed above).

This parameter can be animated alone as any other numeric parameter in 3DS MAX. However, there is an easier way.

Illumination Group

Illumination group has ten square buttons that correspond to the range of ObjectID values from 0 to 10, from left to right.

Right click with the mouse on the button to open color selection window. This color is set as a basic color for a nozzle. It is recommended to use very faint colors. For example, if you want to make a red lighting, then choose a red but almost wight color here< while in Glow settings you can set a pure red color.

Warning! It is important that you have full access rights to FTools.Script folder to save selected values to files (for they are saved to external files, which may be write-protected for common users).

Other buttons in Illumination group:

- **Clear** – deletes the current key frame for lighting (you should be on this frame to delete)
- **Clear All** – deletes all key frames for lighting (in selected modifier)
- **I<** - go to next key frame
- **I<** - go to previous key frame
- **C.d.** – call for a dialog with key frame values of lighting.

Material Group

FTools Modifier: Object_ID works only combined with a special material that can be applied to the selected particle system together with the application of the modifier itself to this group. All lighting animation keys available in the modifier are copied to this material. The difference is that the modifier contains ObjectID value, while the material saves a nozzle color in key frames. Color is taken from settings that are called with a right click on color animation button, as we know form above.

It may happen that the two nozzle group will have one copy of the material but the different copies of modifiers during operation. Press "Apply unique material to selection" to make a correction. However, there is nothing to worry about, if you missed this thing. Nobody will notice it, really, at the end of animation rendering.

If it did happen that you use FTools materials on the nozzle group and yet have not defined the animation keys for lighting (for example, you have applied a new material to the selection by accident), then, by pressing Sync. Material with ObjectID, you will copy all keys from the modifier to the material.

There are no other settings needed for animated lighting of your fountain at work.

