

AAASeed An introduction Part 1: In the beginning

- What is AAASeed
- Ga Bu Zo Meu



What is AAASeed?



- A generic toolkit for building real-time processes
- Designed for:
 - Video Jockeying & Live Mapping
 Open data visualization

 - Interactive Art installation
- **Open-source** soon (MIT license), **free**
- Created by Mâa, with help from Franz Hildgen Refined over 25 years real-world use
- Stabilized and improved through a European Project (ends September 2025) • https://ArtCast4d.eu **Early Adopters Program**
- AAASeed is build to last https://AAASeed.org

For whom is AAASeed ? Artist



- Compose and assemble blocks on the fly.
- Most blocks handle graphics processes.
- Others manage:
 - input (cameras, sensors)
 - Image analysis
 - Connections between elements
- Create live, graphic and interactive outputs.
- Free License
 - free digital support for generative/interactive artworks.

Who is AAASeed for? Creative Cultural Industries

- Video professionals
 - Control and display videos, images, and text.
- Immersive environments
 - Multi-screen and multi-machine setups.
- Works live with existing tools:
 - Protocols: Spout, OSC, MIDI
 - Software: TouchDesigner, vvvv, Unity, Unreal, Chataigne, OBS studio...
 - Sound software: Max/MSP, Ableton Live, PureData...
- Use cases:
 - Dance, Theater
 - TV, Digital signage, Interactive screens
 - You name it
- Free License

Keep your budget focused on production.

For whom is AAASeed ? Developer



- On the base of an old school robust C++ rendering graph using the very fast and flexible Lua scripting language you can access the low level functionnality: Window system, custom C object, OpenGl, C++ objects, Gl Shaders, OpenCl, OpenCV, Nvidia Flex, dlib, bullet, ...
- A rich lua virtual machine provide

an **interface** to edit and customize realtime processes most of it happen **live** while processes are running **extend and edit on the fly the interface**

For whom is AAASeed ? Student, Hobbyist, Teacher

- Have a rich, fast and complete tool to script graphic ideas on the fly learn and understand 3d graphics experiment and test before going further
- Use shaders
- Live coding
- Teach coding and graphic
- Experiment Mathematics
- An equivalent to processing ?

Need probably some graphic primitives to be added

• Infrastructure for research ?



User point of view



- This a Windows application for now AAASeed_Metal.exe
- Tested against **windows 10 and 11** but should also work on Windows 8,7 even XP.
- It can **run on low end machines** even an executable for non Avx2 Processor (AAASeed_Wood.exe)
- But it likes fast machines and uses the Gpu a lot Graphic Processor Unit Loves NVidia but functions on integrated Intel supports Amd most of the time (getting better on Amd every month)

Shadoks point of view

"In case of problem just pump"

- talking with the **GA**
 - Global Action: the top level
- using **BU**
 - Box User: element of interface
 - **BUS contain one or several BUs**
 - a BU can contain a BUS and so this way a BU can contain other BUs
- Using MEU
 - Module Editable Unit: functional editable blocks sometime represented in their short form the MU: Module Unit
- We lost the **ZO** but we will find it, promised («On a perdu les ZOs»)
- More on this: search Shadoks on YouTube
 - https://www.youtube.com/watch?v=Sla57Zw-FN4
- Thanks to aaaproduction (https://www.aaaproduction.fr/)





IL VAUT MIEUX POMPER MÊME S'IL NE SE PASSE RIEN QUE RISQUER QU'IL SE PASSE QUELQUE CHOSE DE PIRE EN NE POMPANT PAS.



AAASeed An introduction Part 2: Install

- Setup AAASeed on your computer
- Folder structure
- AAASeed Sources



Install 1/4: Required software

Klite Codecs

- handle decompression of video (AAASeed use it through DirectShow until 2025 September at least)
- https://www.codecguide.com/download_kl.htm
- we use klite Mega, but other options should function too
- installed with default options all the way

• 7z

- handle compression and decompression of 7z files
- https://www.7-zip.org/
- Windows 64-bit x64 version
- 7z ... -x64.exe : execute to install

• Visual Studio Code

- text / code editor used by AAASeed by default
 - NotePad++ and Sublime Text 2/3 were used and should still function
 - Flatland/Pref/MASTER/Lua/lua_master/editor
- https://code.visualstudio.com/
- Download for windows
- Use extensions to color code for lua, GLSL, OpenCL
- Use a workspace will the whole AAASeed folder is nice to search and found.

Install 2/4: Other software

• XnView

Image browser with batch and conversion capabilities https://www.xnview.com/en/ MP or Classic

• Wings3d

3d Editor derived from Symbolics/Nendo. Nice export tools to .obj files. https://www.wings3d.com/

• Blender

The Open Source 3d Editor https://www.blender.org/

Install 3/4: AAASeed

- Get files from https://AAASeed.org/files/
- Use the latest Installer

Install with AAASeed_Setup.1.3.1.exe (2025 April)

Need a Reboot the first Time

Download and add libcurl.dll and cpr.dll to <u>AAADII Folder</u>

- No updater for now
 - Update with the latest AAASeed.7z
 - Replace previous AAASeed folder
 - You can rename previous and current AAASeed folders keep different versions if you want

FILES

AAASEED

AAASeed

AAASeed Downloads

PRODUCTIONS -

VIDEOS

MÂA'S CORNER FILES

NEWS

CONTAC

- AAASeed_Setup.1.3.1.exe
 current installer 2025 April 8th
- AAASeed.7z version 2025 April 30th 5pm
- AAASeed_Introduction.pdf
 version 2025 April 30th 5pm
- Main_x64_2025_April.7z separate folder with the DIIs from AAASeed_Setup.1.3.1.exe
- libcurl_and_cpr.7z 2 Dlls added since the installer AAASeed_Setup.1.3.1.exe

• Folders -AAAFo

AFoundation	AAASeed stuff and your work are stored there
-AAADII	Dlls associated (External software libraries), the installer define a system path to it
-AAASeed	What The AAASeed team maintain/update/change, executables are there
-AAAUser	Where your preferences are stored
-APPs_Guest	Where you should save your APPs
-Media	Where you put content (videos, images, sounds) with sub folder by projects
-Install	Associated installers, drivers

• It is possible to install from a local drive / USB Key with no Network. A manual install is possible too

Copying folder and adding the Dlls path to the User or System path)

Install 4/4: Multiscreen

AAASeed supports **up to 6 screens**

On **desktop**

right click menu

Display Settings item

Dialog

- Set Extend desktop mode
- Be careful with the screen aligment Horizontal and Vertical
- Choose the **right resolution**

Was mandatory before 2025 May

Scale all screens to 100% seems ok now, testing

•	New	2
G	Display settings	
1	Personalize	

System > Display

Select a display to change the settings for it. Drag displays to rearrange them.





Install TroubleShoot (Archive)

- If **AAASeed** complains about missing dll other that VCdll
 - Copy the Dll path from the folder where they are
 - Go to PC / Properties / Advanced system settings
 - Environment Variables
 - Then User variable / Path (User or System) / Edit...
 - New
 - Paste path and eventually change order
 - Validate : Ok then Ok then Ok
 - Launch AAASeed_Metal.exe
- If it still complains about some missing VCdll
 - Execute VC_redist_2015_2022exe
- If it still complains about missing VCOMP120.dll
 - Execute vcredist_2013_x64.exe

System > About

MSI-3 GP66 I	MSI-3070-D GP66 Leopard 10UG					PC
Î	Device specificati	ions			Сору	^
	Device name	MSI-3070-D				
	Processor	Intel(R) Core(TI	M) i7-10870H CPU @ 2	.20GHz 2.21	GHz	
	Installed RAM	16.0 GB (15.8 G	B usable)			
	Device ID	AB6C39D5-DC	38-4B62-A2F1-E42C4F6	52D171		
	The last ID	00325-82027-3	32558-AAOEM			
	System type	54 bit operatin	ng system, x64-based p	rocessor		
	Pen and touch	No pen or too.	tioput is available for	this display		
Relat	ed links Domair	n or workgroup	System protection	Advanced s	ystem settings	

Edit environment variable	×
C:\Users\MAA.TOKYO\AppData\Local\Programs\Python\Python311\S	New
C:\Users\MAA.TOKYO\AppData\Local\Programs\Python\Python311\	
%USERPROFILE%\AppData\Local\Microsoft\WindowsApps	Edit
D:\AAA\AAAGaBuZo_DII\Main_x64_2025_April	
C:\Users\MAA.TOKYO\AppData\Local\Programs\Microsoft VS Code\b	Browse
%USERPROFILE%\.dotnet\tools	
D:\AAA\AAAGaBuZo_DII\Main_x64	Delete
	Move Up
	Move Down
	Edit text

AAASeed Folders: Inside

AAASeed folder name can be changed

- Users use this to keep different versions

We call it the start folder

- in lua aaa.dir.get_dir_start()

This is what we maintain and update

- As User/Guest don't store your stuff here
- For developers: this is the Git repository

2 executables

- AAASeed_Metal.exe
- AAASeed_Wood.exe for machine with no AVX2 Extensions
 AAASeed_Metal.exe just crash at start

3 files

- README.md

Detail the install and tree structure

- Document the start sequence
- Preview in VSCode
- ReleaseNotes.md
 - Document the evolution from version to version
- Version.txt

Corresponds to the current version of the installer

AAASeed Folders: Inside more

- AAAAPPs Folder
 - **APP** is like a document

An App \leftrightarrow A **folder** with a file **default.layerss_param** inside Examples, Tutorials...

No way to save an APP for the moment: DUPLICATE FOLDER !!!

- AAAAPPS maintained by the core team
- AAADoc Folder
 - Far from finished (state in 2025 May)
 - Lua API

lua_aaaseed_draw.lua lua_aaaseed_interface.lua

- AAAKernel Folder
 - Developer space

Some resources: lua code, shaders, OpenCl, Fonts, Textures...

- in lua aaa.dir.get_dir_kernel()

AAASeed Folders: going Up

- AAASeed the Startup folder
- AAAUser folder
 - AAAWho.txt made of 3 lines:
 - UserName

Where **global stuff** are saved (pref, master, binds...) in lua aaa.dir.get dir start()

NetName

Where **net stuff** is saved

Yes it is separated from the User stuff

- in lua aaa.dir.get_dir_net()

UserApplicationPath

- Used to build relative path for Application
- **UserName** folders
- NetName folders
- **APPs_User** folder
 - APPs_Guest by default
 - Your APPs, MEU protos, data, shaders.....
- Media folder
 - images, videos, fonts, 3d objects...
 - **Big** files are there

AAASeed Sources

- AAASeed.org
 FILES section
- Developer access git
 - -AAASeed Folder
 - -Lua
 - -APPs

Svn

-AAASeed.exe and dll -C++ -will move to a git request Mâa if you want it

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Revision	Actions	Author	Date	Message					
2929	0	maa	Saturday, April 5, 2025 7:31:08 PM	Add param menu_allow (can help with touch screen). Better protecti	on for dir ar	nd file lua fns r	eceiving null or e	mpty screen ourd	i.
2928	Ö	blap	Thursday, March 27, 2025 10:37:39 PM	Missed GET request for authentication, fixed OAuth argument number.					
2927	Ö	blap	Thursday, March 27, 2025 7:08:51 AM	Full authentication and downloading support for HTTP requests					
2926 🖗 maa Tuesday, March 25, 2025 12:17:55 PM make sure lua file dialog fns return nil when canceled ourfile Jua: refine return in do_dialog fns file_dlg: change get_filenam					_filename_save() re	4			
2925	🚯 🜓	blap	Tuesday, March 11, 2025 2:08:21 AM	Adding HTTP requests functionality, in progress					
2924	()	maa	Monday, March 10, 2025 11:04:07 PM	deal with watchdog again and args passed to main					
2923	🚯 🜓	maa	Tuesday, March 4, 2025 8:05:55 PM	Now AAAUser is search one level up of start dir and a hidden one is used	when not fo	ound. def_imag	e: normal is separa	ated. seed: move lu	
2922	🚯 🜓	maa	Tuesday, February 25, 2025 4:43:24 PM	add gol.set_draw_buffers(). Ni more jump in mouse move at left and top	of windows	. MovieWriter	works for all forma	at/type in because	•
2921	()	maa	Wednesday, February 12, 2025 1:28:43 PM	Restore movie writer, improve boid, add functions() for window title boi	d: change co	mpute_box_ac	cel to make box re	pulse more efficier	r.
2920 🖗 maa Monday, February 10, 2025 1:49:27 PM some process blk() fns have now the net. link index for message and better counter, avoid dialog for bad ip, cvange how we handle bad i									
2919 🖗 maa Tuesday, February 4, 2025 10:23:45 PM random never ending shader loading bug should be solved, graphics bug solved on matrix texture, kinect refined (v1 don't crash) gol lu									
2918	()	maa	Saturday, February 1, 2025 5:25:45 PM	Force_line is now done at the GOL level, deal better with Front and Back	culling / poly	/gon_mode (re	moved an effectiv	e bug. MEMCLEAR	1

AAASeed An introduction Part 3: Baby steps

- Update AAASeed
- First steps
- Flatland Flatland 101
- Multiscreen
- Multiscreen and Flatland
- APPlications



Update AAASeed

- Get AAASeed.7z
 AAASeed.org
 FILES section
- Replace existing AAASeed Folder Reminder

you can rename AAASeed folders current version (May 2025) needs 2 more dlls libcurl.dll and cpr.dll Available at AAASeed.org FILES section Put it in AAAFoundation/AAADll

First steps

- **keyboard** first step
 - w like (w)indow
 switch between window and full screen Module
 - Tab

switch Flatland On and Off Ctrl e like (e)dit flip edit mode (more later on this) see feedback at the top left of Flatland Red LOCK Green Edit leave it as Edit

- Quit, Exit ...
 - Double Esc

Quit with saving global stuff

- Alt F4 or Mouse Right Button/Menu/Exit no save

Quit without saving global stuff require a confirmation





ef(59)Preferences aphics Open Library-> Camera Master-> Flatland-> flatland(36)Flatland Prei 24 -Uraw.. -Character. Background. Render. naae Save... Refresh. lemory Trax Midi OSC Ne Verbose —Factory & Obj... -Misc. 5-MASTER. -Multitouch->



Flatland

- Tab
 - Original AAASeed interface from previous century where the C++ can be seen and used a whole world we will explore later made of c_obj_ui and param
 - $F10 \rightarrow Preferences$

example: change values in Flatland (next slide)

- Ctrl F10 \rightarrow Preferences at start
- Right Mouse Button → Menus
 - in Flatland → param menu
 out Flatland → main menu
- GaBuZoMeu
 Start of Main Menu

- A
- File>APP garden>MEU>Utils>
- Flatland have precedence for events and keyboard Needs to be off to use keys with GaBuZoMeu



>

Flatland 101

- Made of params (for parameters)
- Example: change values character_size_x/y
 - $F10 \rightarrow Preferences$
 - Wheel \rightarrow Scroll
 - Click (left Mouse Button) select / open
 - Click and turn around starting Point change value
 - Double Click edit dialog
 - Keys + -* / change value
 - Ctrl z

undo (only last change)

Reminder

Flatland have precedence for events and keyboard Needs to be off to use keys with GaBuZoMeu So leave it off for now \rightarrow Tab

AAASeed and Multiscreen

- w like (w)indow switch between window and full screen Mode
- Ctrl w circle through all the possible full screen configurations shift go the reverse way



 Ctrl F2 change UI position on screens Shift go the reverse way



• Same principles with more screens (up to 6)

Multiscreen and Flatland

- Flatland by default on left
 - of AAASeed Window which can traverse several screens
- If it is a problem

switch screen position in desktop See install 4/4 Multiscreen or change Flatland position Flatland (Tab) Preferences (F10) **Flatland/Draw** draw_focus_offset_x/y Careful it can make Flatland invisible in some configurations (drawn outside)





APPlications

- Open APP/Application Garden_Base
 - Use Main Menu File/Open or Ctrl o
- File Dialog
 - goto Start folder
 - then AAAApps folder
 - then **Tuto** folder
 - then APP_garden_base
 - open default.layerss_param
 The APP is the folder
 The folder is the APP
 - Bug:

Sometimes you need to open it again

• Name in the window bar



Open GaBuZoMeu App							×
\leftarrow \rightarrow \checkmark \uparrow \frown \land AAAGaE	BuZo > AAAAPPs > Tuto > AP	P_Garden_Base >		~	С		م
Organize 🔻 New folder							(
Name	 Date modified 	Туре	Size				
 AAA_MEU AAA_PROTO Garden Kinect material Skeleton default.layerss_param 	4/6/2025 12:56 PM 9/9/2020 7:46 PM 10/26/2024 11:23 AM 2/5/2025 4:31 PM 10/26/2024 11:23 AM 10/26/2024 11:23 AM 4/6/2025 3:27 PM	File folder File folder File folder File folder File folder File folder LAYERSS_PARAM		1 KB			
File <u>n</u> ame:						Reconnus (*.layerss_param) Open Cancel	>

AAASeed An introduction Part 4: BU first contact

- Basic UI
- BU Box User
- BU Resize Move
- BU StarMenu
- Dialog
- BU Current
- BU More on Resize



Basic UI

• Don't be intimidated

need to get used

UI is efficient.

- Avoid Caps Lock
 it can cause confusion
- F1 or Ctrl h like (h)elp
 Toggle help system
- F2

Toggle GaBuZoMeu UI

• Ctrl F2

Force GaBuZoMeu UI On and move it between screens (see Part 3)

• F3

Toggle rendering process On/Off BU_Alive visualize its state and is Clickable



-lelp the interface is	still active except for the keys used by this help :
F1 or CTRL h : Toggle Arrows Page up/Down	e + - CTRL Mouse Wheel : Size Home End Mouse Wheel : Navigate
AVOID AVOID AVOIE) Caps Lock : it will get you lost
Jse a Mouse or To	uchScreen
GaBuZoMeu	
GA	Global Action
BU ZO	Box User : the interface elements you can interact with unused for now (don't worry we working very very hard on it)
MEU	Module Editable Unit : an encapsulated functional Block
MU	Module Unit : a compact MEU view used to control the execution order
MOUSE	
Left Button Wheel Button	Action Scroll
Right Rutton	Menu



Toggle between two **UI Scales**





BU Resize Move

- Hold Alt
 Transparent
 You can see under
 Blue Flashing Frame
- Click with Alt
 - Move





BU StarMenu, Dialog

JtoB

Click on TutoBU_1 slider

• StarMenu <

Dialog

Also named UIF for UI Fast Context Menu: AAASeed UI by proximity

Context Menu with

- Zones
- Button
- Name of BU at the top
- Example: use **About** button

Flashing Red for attention Move / Resize using Alt as Always Click to dismiss



generete space invader pattern with plenty of option. very useful base MEU to test rendering chain.

BU Current

- Clicked BU
 - becomes current
 - Violet frame 🔶
 - **Receives keyboard input**
- Arrows key to navigate

 need to be refined
 in some cases (2025 May)



BU Resize more

- Alt click move resize
 Alt Arrows Move
 Alt + * / Size
- 3 states:
 - Normal / Full / Mini
- Shortcuts
 - **Double-click**

SpaceToggle Normal \leftrightarrow FullDouble-click top 10%MiniCtrl SpaceToggle Normal \leftrightarrow Mini





AAASeed An introduction Part 5: BU_MONITOR

- Channels
- Alpha
- Click Zones
- StarMenu


BU_MONITOR

Display Image

 when clicked Display information Click zones

• Move/Resize as usual Alt...







1920 x 1080 Red 8

1920 x 1080 RG 8

1920 x 1080 RGB 8

080 RGBA 8

BU_MONITOR Channels

• In fact BU_MONITOR shows textures **Textures have a number of channels** 1 or R for Red showed as greyscale 2 or RG for Red + Green • showed as **yellow** no Blue - 3 or RGB for Red + Green + Blue full color 4 or RGBA for RGB + Alpha like RGB but with transparency/Opacity 0 mean transparent, 1 Opaque different method to display Alpha Regular / Inverse / No See next slide





BU_MONITOR StarMenu

- Click and drag out quickly (Quick drag-out)
 - like any BU where it doesn't appear directly
- Open
 - Load an image via a file dialog at the current bind later on this can choose several files loaded in successive binds
- Save
 - Save the Image to Media/AAASnapshots How it is saved in Flatland/Prefs/Image Save
- Save As
 - idem but via a file dialog
- Print
 - Print
 - How it is printed
 - in Flatland/Prefs/MASTER/Print



AAASeed An introduction Part 6: BU is all you need BUTTON

- SLIDER
- SLIDER_TWO
- SELECTOR
- BU_TEXT



Basic BUs

Click on Train_BU icon



BUTTON SLIDER SELECTOR BU_TEXT





 current BU (reminder) See previous slide receives keyboard violet rectangle navigate with arrows keys





Name Values Dump Doc

- Quick drag-out

SLIDER

- StarMenu
- Slide

Go up in Slide direction Go to external circle External circle \rightarrow change Internal circle \rightarrow no change Intermediate circle \rightarrow interpolate Angle change value the more away from center the more precise Go back to internal circle to cancel Shift \rightarrow lock on closest default value $Ctrl \rightarrow smaller change from start value$ Ctrl Alt \rightarrow even smaller change

colored

0.5

-amme





SLIDER Min / Max

- Min / Max defined for each slider
- Dialog edit
 Double Click or Dialog zone
- Keys

current BU and no Flatland

+ - * /	\rightarrow change		
Enter	\rightarrow inverse		
•	\rightarrow floor intege		
Home	\rightarrow Default		
End	\rightarrow Inactive		
PageUp	\rightarrow Maximum		
PageDown	\rightarrow Minimum		

- Can be **Floating point or integer**
- Can be Constrained by Min/Max bounds



Value Sove Uis



Value

Slide

Min/ove B-Max

No Once

SLIDER

บเง

SLIDER_TWO

- Same but 2 values
- Range / Linear



 Value change depends where you click Closest is selected for interaction Last interacted value receive keyboard input



- Can be Flipped
 Left value bigger than right
 - Can be seen

SELECTOR

- Click
- Keep mouse down
 - Change with position





Access to StarMenu

like BUTTON: Quick drag-out

- Use keyboard as for a SLIDER
 + and mainly
- Multiple selection an option
 display frame around each item



SELECTOR (Continued)

Slide functions for selector too

Go up then angle Shift lock on values Ctrl or Ctrl Alt sensibility

- Keys as usual
 - + * / \rightarrow change **Enter** \rightarrow negate . \rightarrow floor integer Page Down / Up \rightarrow Min / Max

Home / End \rightarrow Default / Default inactive



BU_TEXT

- Editable or not
 Double Click to Edit
- **BU_TEXT INFO**
 - **Yellow** in general display info
- Access to Star Menu like BUTTON and SELECTOR Quick drag-out
- will Evolve
- Dialog will Evolve too
- Virtual keyboard exists but not functional at the moment (2025 May)



Edit Edit In MEU[TutoBU_1	×				
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Edit with a dialog	•		.		
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List sync					
_2 20 LV Ceci est juste	I				
http://www.visitvar.fr/provence-cote-azur/default.aspx any		Descat			

AAASeed An introduction Part 7: Meet more BUs

- Other SLIDERs
 - SLIDER_XY
 - SLIDER_MULTI
 - SLIDER_CURVE
- Composite Bus
 - BUTTON multiple
 - BUTTON menu
- Copy / Paste
- Undo / Redo



Other **SLIDER**s



Composite BUs

- **BUTTON** multiple
 - < | > at the top
 Use a hidden SELECTOR
 Click left or right to change
- **BUTTON** menu



small rectangle at the top
Use a SELECTOR in an optional window
Move window to keep it open
or it disappears after few seconds
Close BU at top right
close the window



Copy / Paste

- Ctrl c / Ctrl v
- Acts on current BU
- Shift extend it

Copy / Paste not ONLY a single BU but a bu_group or a MEU see later need to be refined and documented

Undo / Redo

- Ctrl z / Ctrl y
- Deal with
 - BU values BU size and position
- Unlimited
- One more reason not to be afraid try things then cancel
- Shift Paste Special case (2025 May) treated as a series of individual actions for now instead of a global change

AAASeed An introduction Part 8: More BU

- BU_WIZs
- BU_MESS
- BU_SHOW
- Window GA
- Window BU
- Window GP



Some **BU_WIZ** (Wizard)

- **BU_ALIVE** show/control rendering (toggle with F3)
- BU_FPS Frame Per Second FPS 153 / 145
 - FPS in Flatland: can see fps with no UI
- **BU_TIME** show time 23:26 58
- **BU_EYE** show mouse direction

BU MEM

0

• **BU_CAM** control camear editing



- BU_SEND control synchronization between machines NO SEND
 - show memory usage in MegaByte problem if it increase continuously
- **BU_POWER** show power and plug status
- **BU_BLOB** show number of contacts
- Power : Plugged 92% -1-

BU_MESS

ł	# LUA : BU_CAM viz_CAM :GABU_OBJ unused key 9	
ŧ	ŧ LUA : BU_CAM viz_CAM : did not used key 9	
ŧ	ŧ LUA : GARDEN garden : try to use key 9'	()
ŧ	ŧ LUA : GARDEN garden : do_key(key=9)	Ň,
+	ŧ LUA : do_key(`self=GARDEN garden,`key=9`)	2
+	# LUA : GARDEN garden :GABU_OBJ unused key 9	
ŧ	ŧ LUA : GARDEN garden : did not used key 9	
ŧ	ŧ LUA : GAĮSINGLĖTON : KEY NOT USED 9 '	
	ŧ LUA : GABU.do_key_custom_def() key 9 Unused	

Try Double Click

Key m for (m)essage window / Terminal Scroller is a Slider to move in the history of messages Messages color have a meaning Error

Trackers (devices plugged, sending information to AAASeed: Midi, Camera, Captors...) Debug Info

BU_SHOW (Debug Tool)



More and more **Red** Message for **errors show** there

Accessed in Lua using aaa.show()

Window GA first look

- Global Action settings
- For now
 - UIF (UI Fast for StarMenu) → enable the StarMenu
 On Shift → Enables StarMenu on Shift Click Only
 - Help Show → same as F1 / Ctrl h
 - Grid Top \rightarrow draw a 8x8 unit grid on top of the UI
 - Size \rightarrow set the 2 sizes used by Ctrl Tab
 - Menu Time Alive

how long a button menu stay on

- BU_SHOW Time

how long an element stay in BU_SHOW

- Finger

What I use in these videos to **show the mouse**

- Far draw Less → simplify drawing with mouse distance a way to optimize UI display
- **Only Mouse** → discard multitouch input
- **Rest** will be **detailed later**, mainly used by **developers**
- Ctrl S, Esc/Esc Save it file AAA_Ga.bus in the APP folder



Window BU

- Box User settings
- Most of these Options for developer graphic debug
 - will have a specific tutorial
- Line Width \rightarrow Text line width
- Ctrl S, Esc/Esc Save it

file AAA_Bu.bus in the APP folder



Window GP

• **GP** come from **G**arden **P**arty

first time the MEU/MU interface was used, it was at Garden Party (Utram a french company)

• Mainly drawing switches

use for debug or optimization

• Grid Alpha

transparency of the grid displayed under the UI

- drawn only if superior to 0
- MEU Timings

Toggle MEU timing measurements

if an application render a lot of MEUs it could alter the frame rate, and so, setting it to off will make the rendering faster.

• Ctrl S, Esc/Esc Save it

file AAA_Gp.bus in the APP folder



AAASeed An introduction Part 9: MEU

- MU / MEU
- MEU and Uix
- MEU Bar
- MEU Preset
- MEU StarMenu



MUModule UnitMEUModule Editable Unit



- **MEU** is the base to encapsulate and manipulate functionality
- MU compact part of the MEU

lcon



- slider value is the alpha of the MU / MEU
 Click on slider → StarMenu Slider but also MU
 Click on icon → move
 Alt Click → move/resize
- State and Position of the MU control the rendering order Slider value more than 0 → On control transparency when applicable vertical first: bottom to top then horizontal: left to right orange line shows the rendering chain (more later)



MEU and UIx

- Click on MU icon → MEU in UI5
 UI5 by default
 UI6 Folder/Directory default
- Links show related MEU / MU
- MU StarMenu to choose UI
- MEU StarMenu click on backgound
- Close **BU** at top right
- Red Background \leftrightarrow not rendered
- Uix are technically **BU_MEU**
- Drawing change with distance speed optimization



More on MEU

ightarrow

- MEU is a module of functionality, in computer terms it is an object it usually renders but can be otherwise receives/send data analyses image control a device (e.g. plotter, projector, Dmx, Arduino...)
- 2 main methods (function) are called every frame by a render() method
 - **update** () prepare so draw() will be as fast as possible
 - Draw()
- 1 method is called when the MEU UI is visible
 - update_ui()

MEU real nature, a peek for now

• It is a Lua object

Name is MeuType_InstanceName a lua Script for each Type / Class / Prototype

• It uses a C++ AAASeed Object

a c_obj_ui c_layers or c_module Accessible via its flatland param and some dedicated lua methods

• It lives in a **directory**

Everything is readable and can be edited less and less needed but some like it MEU Bar SUUD 0.032ms Base More Lua Def Both Load •TutoBU_1 **Title** (white or green if current) MEU_name made of type (left) and instance (right): SUUD buttons switches to activate/deactivate Send update UI Update and Draw • 0.032ms Execution time in millisecond • Base More is a SELECTOR named TAB switch between different block of UI

• \times Close button close the MEU UI

MEU BarUi5TutoBU_1Fbo <-->Save ×S UI U D 0.032msBaseMoreLua Def Both Load



Open the **lua** script that the MEU use in an associated text editor

Load only the MEU state

Save only the MEU state

Trigger a **Definition**, in fact a redefinition of the **MEU** (its UI in particular) Trigger a **Definition** and a **Load**

- Fbo Open the used Fbo (more soon on Fbo) in the previous UIx
- $\langle - \rangle$ lets you navigate in the rendering chain (more soon)

MEU Preset

- At the bottom right of the **MEU**
- Load/Save the state of a MEU

in fact load/save the values of included **BU**s

not always all, at the author discretion

- preset defined ↔ green color
- Click Load
- Ctrl Click Save
- Ctrl Alt Click Delete
- Fixed number by MEU Type

defined in the code for now (2025 April)

Developer Note: function meu:get_preset_nb() return 24 end







MEU StarMenu



Click MEU background or MU slider

Slide Adjust the alpha Same as the MU Slider Focus Access to Flatland C part of the MEU Lua Access to the Lua script Using default editor Dir Opens the Instance Folder Uix Choose **BU** MEU for UI Rename Type Name can't be changed Destroy with Confirmation Dialog Instantiate Duplicate Type Name can't be changed

AAASeed An introduction Part 10: Rendering chain

- Rendering chain and BU_RECT
- MU Slider / Alpha
- **BU_RECT**


Rendering Chain and BU_RECT





Rendering chain

- State and Position of the MUs control the execution order
 rendering order when MEU do rendering
- bottom to top, then left to right
- orange line **not a cable** just a **visualisation** of the rendering chain



_DIF



MU Slider for Alpha Opacity/Transparency

- **MEU/MU** slider value more than $0 \rightarrow \mathbf{On}$
- when possible this value is the alpha level of the MEU (Opacity)



Rendering Chain BU_RECT

- First
 - Order of the BU_RECTs
 - Number in Name
 - Change
 - StarMenu
 - Keyboard
 Ctrl Up / Down
- Second
 - Order in the BU_RECT
 - Bottom to top
 - Left to Right





Rendering Chain BU_RECT

BU_RECT value

- multiply MU Value



- Inferior or equal zero \rightarrow Inactive



BU_RECT StarMenu



- Slide to change value Alpha for BU_RECT shown like Slider at the BU_RECT top Red when not 0 or 1 keyboard like a slider
- Insert / Delete
 Ctrl Insert / Del
- Up / Down Order
 Ctrl Arrow Up / Do
- Glue / UnGlue
 Affect MUs inside when moved
 But not when resizing

AAASeed An introduction Part 11: MEU more

- MEU Seen
- MEU Find
- MEU_DIR



MU Seen and MU Search

- 3 Buttons to select MUs we see Hidden Unused Used
 - Hidden display in the hide attribute by MU is on
 - StarMenu on MU
 - Shift Ctrl on Icon
 - Back color is red
 - Unused display the MU having a slider/alpha equal 0
 - Used display the MU having a slider/alpha greater than 0
 - A way
 - to simplify the display
 - To keep MUs around
- Find MU/MEU <
 - Ctrl F like Find
 - highlights matching MUs



MEU_DIR



- Encapsulates other MEUs
 - A way to regroup and control
 - a AAA_MEU Folder
- Render Chain inside
- **Open in UI6** by default
 - More easy to navigate the MU inside
 - to simplify the display
 - While keeping MU around
- No BU_RECT
 - but 2 optional areas A and B
- Can drag MU in and out
 - Ctrl Drag do Instantiate



AAASeed An introduction Part 12: Cameras & Axe

- Cameras
- Axes



MEU Cameras

- No / Once / Owner
 - No: use current camera

last one defined in the rendering chain

 Once: use camera only for this MEU then go back to current rendering chain camera

No

Once

No

Once

Own

cam_index

.3

2 3 4 5 6

5

4

6

- Owner : Own its camera it becomes the current Camera for the Meus following in the rendering chain
- Camera selector
- Button Axe show



Camera Selector



- Click Select
- Ctrl Click Write to
- Ctrl C/Ctrl V
- Copy / Paste

- Shift Click
- Lock / Unlock
- Double Click Edit in flatland

Camera Axes Units

- Right Hand System like OpenGl not left hand
- Z in your face
- 2d : XY facing you
- X | Red left to right
- Y|Green bottom to top Vertical
- Z|Blue back to front
- No unit: Mathematics not physics
 - Back of the pyramid aligned with unit

Camera Edit

- Middle Click → Start Editing
 - BU CAM will manifest if locked
 - BU CAM locked
 - Or camera itself locked
 - When editing
 - Wheel
 - Mouse
 - Middle Click Drag Move
 - Key **o**

 - Ctrl Shift F4
 - **F**4

- Flip (o)rthogonal vs perspective
- Key x X y Y x Z Align front | back
 - Reset

Dolly

Rotate

- **Focus in Flatland**
- Left Click \rightarrow accept edit
- **Right Click** \rightarrow **cancel edit:** go back to start position ightarrow

AAASeed An introduction Part 13: Flatland

- Flatland
- Params
- Edit Param





FlatLand a little deeper

- Tree Made of params ()
- Tab On/Off
- Focus
 - **F10** Preferences
 - Ctrl F10 Start preferences
 - 0 Application
 - Triple n Network preferences
- Key <- -> Navigate in past Focus
- Wheel Scroll



Params

Short for **parameter**

Types for now: bool, integer, float, text, filename Param draw:

 $Box \rightarrow something under$

Big Box \rightarrow **Object**

- Param name Pinkish / Red param \rightarrow Unused
- Param value

for bool OFF ON

Yellow \rightarrow Comment / Sum Up

UI

Click

Space

Left Right

- **Open and Close**
- Move selection up and down Arrow Up Down
- **Right Click** Param menu

Select current param and eventually Open/Close Param menu



Edit params

Mouse

	Bool		Drag left and Right			
		param_trig	Just touch it			
	Integ	er, Float	Click and turn around			
		unlimited				
		Sensibility				
		Ctrl	Slower			
		Ctrl Tab	Even Slower			
		Shift Ctrl	Faster			
		Shift Ctrl Tab	Even Faster			
		Double Click	Edit			
	Text,	Filename				
		Double Click	Dialog			
ey	board					
	Same	as BU				
		+ - * /	Change			
		Enter	Inverse			
			Floor integer			
		Home	Default			
		End	Inactive			
		PageUp	Maximum			
		PageDown	Minimum			

AAASeed An introduction Part 14: Texture and FBO

- Create New APP
- Bank of Binds
- **BU_TEXTURE**
- FBO Frame Buffer Object
- MEU Fbo
- MEU Monitor



APP: Create a new one by folder duplication

- Copy AAAAPPs\Tuto\APP_Garden_Base
- Into APPs_Guest
- Rename APP_Garden_Base
- Open AAASeed
- Open renamed APP

Bank of Bind: 2048 Banks of 32 Binds \rightarrow 65 536 Slots



⁶⁴ banks

Bank of Bind: BU_TEXTURE





Fbo / Frame Buffer Object

• Concept from Computer Graphics

LearnOpenGl.com

- see it as a **Canvas**
 - it is as where we draw

it regroups textures (image) of the same size

- Color attachments, up to 4 in AAASeed
- **Depth** attachment (**zBuffer**)
- Stencil attachment, exist but ignore
- Exposed in GaBuZoMeu

MEU_Fbo

Special MU display

Fbo flashing



Icon changing size

Fbo / Frame Buffer Object

• No Fbo

we draw to the back of the window

• A Fbo

All the sucessive Meu in the rendering chain use it

Until a new one is executed/rendered



MEU Fbo





Color format \bullet

 \bullet

- Channel number R RG RGB RGBA
- **Chanel Format**
 - Integer 8 bits [0,255]
 - Integer 16 bits [0,65535]
- $4 \times \ln t8$ 2 3 16 Fp16Fp32
- Floating point 16 bits, called half 8

2

- Floating point 32 bits
- Attachements
 - Selection
- Attachement active Depth 3
- **Cpu** : transfert from Gpu to Cpu
- Monitor
 - Active \bullet
 - **Click Double**
- Save Trig \rightarrow One frame
- Save \rightarrow Each frame
- Cameras
- Erase
 - How, What
 - **Colors with presets**
 - Trail



MEU Monitor



- Copy and Display current state of current Fbo
- Monitor show selected attachement



• Meu

Show all attachements Select monitor attachement

AAASeed An introduction Part 15: Create MEU

- Core MEUs
- Fun MEUs
- Create MEU
- Import MEU



Core MEUs

- **Fbo** Frame Buffer Object
 - Canvas where we draw
- Monitor
 - Display and copy the current state of the current Fbo
- Dir
 - Encapsulate MEUs
- Video
 - Decompress video in a texture
- **PIP** Picture In Picture
 - Display a texture
- Out
 - Ouput a Texture
- TRAX
 - Plug BU
- Kinect
- Analyse

Fun MEUs

- TK
 - Visualize the Audio
- Displace
 - Displacement mapping
- GeoUV
- Obj3d
- Boid
- Deform like class
- Lua Draw
- ShaMosaic

Meu Window: Create MEU

• Navigate MEU

Prototype

- Create New MEU
- Select by Tag
- Select by Name

Self All P	Proto	MEU nb 103/121									
	l ug										
2d											
3D											
Art											
Camera	-		2054			<u> </u>		A nn		PlabDataat	
CoreGraphic			2054			S		Арр		DIODDelect	
Depreciated			Blur		Boid			Bullet		Cam	
Device			CaptureRect	\times	Clear			Clous		CIPool	
Experimental			ColorCurve		DepthPick	k		Derviche		DigitalProjection	
Generator			Dir		Displace	е		DisplaceCV		DisplacePart	
ImageProcessing		CV	DistField		ExShaderGri	id		ExShaderInstance		FaceTrak	
Input			FaceUV		Fbx			FbxMatte		FieldGene	
Output			Flex		FlexVide	0		FP		Grab	
Dressedurel		<u> </u>	GridSel	$\langle \frown \rangle$	Heva	(\frown	HexCraze		imaAnal	
Proprietary					Invador	è.		Kinoct		Kinoct1	
RenderPass						3		Kineci			
Sound			KinFlipper		KinMove	e		KinMoveAuto		Lidar	
Surface Text			LightPassV1		Lights			Marseille		Materials	
Texture		_	MeshStatic		Mondriar	n		Monitor	▲	MuBegin	
Tutorial			MuEnd		NdcAddBlu	ır		NdcBloom		NdcBranching	
Utility								Add	m	hickness U.I Force	
Meu			se BU		color					adius 1 Turn 1	

Meu Window: Import MEU

- Menu File/ Import MEU
- Navigate to an APP
- Navigate to a MEU folder AAAMEU
- Open

File	>		
APP garden	>		
MEU	>	Rename	
Utils	>	Instantiate	
Open	>	Destroy	
Save as	>	Import	

AAASeed An introduction Part 16 Walking

- MEU Video
- Gain Bias
- MEU PIP
- Ratio and Size
- Translate Rotate Scale
- Blending



MEU Video: Send an Image stream to a texture



- Video Name and folder (Red when a problem)
- Bank / Bind like texture

2 selectors

Click double

- Pick a video for the bind
- Play / Control

In / Out / Clip \rightarrow play a subpart

- / + \rightarrow move in time of Step
- Monitor

•

•

Click double open as separate

Volume Volume 1 Check button with Slider

There is a master Volume Too

- Capture → switch to capture mode more in a separate document
- Video → Flatland (Violet)
- Incrustation

Luminance Incrustation

Inverse \rightarrow inverse the curve

Levels \rightarrow min max levels of inscrustaion

Gain / Bias alter the shape of the transfer curve (more next slide)

- Cpu / Gpu
 - Decompression happens in the CPU Side
 - Where we keep it

bank			bind		
0			0	4	
			8	12	
4		Un:	16	20	
App			24	28	







Gain Bias an electronic heritage



- Input at 0.5 : Bias value
- Low Bias → Push values down
- **High Bias** → Push **values up**

- Double Bias curve (symetry in the middle)
- Low Gain → Push value to middle
- **High Bias** → Push values to extreme

MEU PIP (Picture In Picture): Main



- Display a Texture and handle smooth transition Tex : Next Texture
- Luma (Luminescence) Incrustation
- Swap: Exchange texture and Mask
- Mask

Remap: like incrustation How Grey map to alpha



Incrustation Flip

Luma

- Flip : Inverse the remap
- Mul : Multiply luma by the mask
- See : show only the mask
- Cameras
- Size and Moving setting
- Colors for object, background, offset and Gamma
- Clamp :
- Fuzzy edge / border
- Selector : blending
Ratio and size



TRS ↔ **Translate Rotate Scale**

- This controls what is named in 3D: a **transformation**
- Not moving the camera
- Changing the coordonates of where an object is drawn
 - Developer note

Alter the model (model to world) matrix

- **Combine 3** Types of **transformations**
 - Tra \rightarrow Translate
 - Rot \rightarrow Rotate

Rotation unit in AAASeed are turns $0.25 \rightarrow a$ quarter turn $0.5 \rightarrow a$ half turn $1 \rightarrow a$ full turn

- Sca \rightarrow Scale
- Experiment and understand in which order Tra Rot Sca are performed
- Better keep button TRS Off if transformation is not used

General button allow global TRS use

Individual buttons
allow each tranformation



MEU PIP : Map



Preset

- nb_u, nb_v : number
- U Min Max, V Min Max : stretch the texture
- hexa :
- top_line :
- du, dv :
- offsets :

8

6

4

Blending

mapp	bing_b	lend_r	menu	\times
Min	Max	Add	Sub	RSub
Mul	Screen	Overlay	Darken	Lighten
ColDodge	ColBurn	HardLight	SoftLight	Diff
Exclusion	HSL_Hue	HSL_Sat	HSL_Col	HSL_Lumc
		Add		

AAASeed An introduction Part 17: Out

- MEU Out
- rendering



MEU Out: Display an Image in Ouput



MEU Out: Display an Image in Ouput





MEU Out: Display an Image in Ouput



Rendering



AAASeed An introduction Part 17: Plugging

• MEU Trax



MEU TRAX





- 1 : open the trax
- Plug : plug it to something
- Control : gain bias threshold
- Visualize input



• Out setting

1	0	Range	Out	1	Inv
Plug	No				x
2	0	Range	Out	1	Inv
Plug	No				x
3	0	Range	Out	1	Inv
Plug	No				X
Midi	0	Ran	qe	1	Inv
Plug	Ch	1 1	Cle	or F	robe

Range In

0

Plug PIP_1 transfo1.Tra_y Inv

X

Ch

V Sinus

GB

Thr

Filter

Remap 0

ose O

Gain

Threshold T

Min I

Up 0.2



AAASeed An introduction Part 18: Plugging

• MEU Trax



Doc Window

- Documentation
- Lua inspector

Info	# LUN : 180_D0C (Doc : 80Effip_ful_poge_and_min10 y : 184/4/S118784/88 # LUN : Nouse grabbed # LUN : 80_D0C (Doc : will be current bu now # 1110 : Nouse grabbed					
Show						
Private All Public	AAACAM	APP	APP_FACTORY	APP_GP		
Global	BALUE	BDD_CLEAR_SCREEN	BDD_FBX	BIND_TEX		
GaBu Classes	BLOB	BLOBS	BOID	BU		
	BU_ALIVE	BU_BLOB	BU_CAM	BU_COLOR		
	BU_CREATE_MEU	BU_DOC	BU_EYE	BU_FPS		
	BU_KEY	BU_LIST	BU_MAAEB	BU_MEMORY		
	BU_MENU	BU_MESS	BU_MEU	BU_MONITOR		
	BU_OBJ	BU_PB	BU_POWER	BU_RECT		
	BU_SEND	BU_SHADING	BU_SHOW	BU_TEXT		
	BU_TEXTURE	BU_VIZ	BU_WATCH	BU_WINDOW		
	BU_WINDOW_LIST	BU_WWW	BUI	BUP		
	BUS	BUS_CTX	BUSS	BUTTON		
	CALAGE	CELT	CHANGER	CHANGERS		
	COLOR_REF	CREATURE	DATAGRID	EVENT		
	Add BL	J				

Lua example



- Example of drawing with lua using OpenGl directly
- The concept looks like processing

iterative process

How to deal with errors

Flatland / Pref(F10)/ Master / lua / error_trig_editor



Shader StarMenu





- Min/Max : Off/On
- open the shader code

Vertex

Geometry

Fragment

Compute

reload : reload the shaders used

AAASeed An introduction Part xx: Fun

• MEUTK



MEUTK



MEU MuBegin / End

- Use for multipass at first
- Make loops
- Camera



- Q&A for users and artists
- Shaders
- Scripting

File system Raw Approch

• AAADoc

lua_aaaseed_draw.lua

lua_aaaseed_interface.lua

• AAAKernel

wher developer working on the core works

- Visual code workspace
- AAAUser
 - Duplicate folder
 - Rename it
 - Rename User
- APP

Create a New App just for you Duplicate an existing one Quick navigation in it

AAASeed Slides Topics to add

- Libs used
- CPU | GPU

transfert GPU

transfert CPU

- Lights
- Shadows

Gbuffer / Multipass