

VSim2 – Functional Requirements List

Last updated 9/28/2016

1. PRIORITY ENHANCEMENTS (These must happen!)

GENERAL OPERATION / NAVIGATION

A. Goal: Introduce additional navigation options

1. OSG: Add elevator and strafe capabilities to flight simulation mode (e.g., holding down the ALT key while holding down the left mouse button and moving the mouse up and down or side to side would result in an elevator or strafe motion)

B. Goal: Expand loading capabilities and reduce overall .vsim file size

1. ALMOST DONE. Add additional loaders (definitely .obj, .3ds, kmz, an direct SketchUp import if possible), but we still need to get .dae working
2. Add way for user to designate units of the model that repopulates the navigation settings so that they work properly for the model in question (eye height, zoom, acceleration factor, etc.) ... maybe a menu box connected to Open Model?
3. Add scan for duplicate textures (and update/delete calls or however that needs to work internally to make a smaller .vsim file)
4. Add texture compression on the saving of VSim files
5. Speed up save of .vsim file (why does it take so long?)

C. General enhancements

1. Add ability to increase scale for LODs ... this is a three-part fix ... first is to make it work ... second is to link it to its keyboard shortcut ... third is to implement the LOD scale in the Navigation Settings.
2. Change configuration of the 'File' drop down menu to separate the Save and Export/Lock functions for clarity. (Formerly on list as the second prompt when saving and locking a narrative or ER file, essentially an ARE YOU SURE? moment)
3. Confirm and possibly correct where VSim gets information on default programs to use when launching embedded resources (in the Sandbox, users can't change the default and sometimes it's not set at the most desirable option ... this could be a problem in other lab-like situations)
4. Implement the rendering options and advanced settings in the Navigation Settings.

5. Add advanced settings including environmental changes (ala uSim ... environmental lighting control and aerial fog, particle systems, real-time shadow casting, WATER!, etc.)
6. Edit the Help menu to only include critical items for user (e.g., navigation modes, etc.)
7. Add 'how to begin/use this software' info on initial launch (as overlay on top of the current blank screen?)
8. Expand the 'model info' section of the content creator settings to include space for discussion about the modeled environment (e.g., history, context, importance)
9. Expand the Image Maker to allow additional output file sizes (currently only screen size)

D. Goal: Redesign the time slider

1. Make time slider control window more legible, with central time in different color or larger (or something), possibly demarcating on slider the different time zones
2. Add 'Next' and 'Previous' buttons to the time slider and associate them with keystrokes

NARRATIVES

E. Goal: Enhance the narrative capabilities (general operations)

1. Add code to govern the display of the thumbnails in the Narrative Editor: while playing, the visible nodes should track progress; when editing, it should stay on active node after changes are saved from the Node Editor; reset back to first node when a new narrative is selected
2. Add general narrative transition settings at onset of narrative creation so basic defaults can be set upfront (e.g., time on nodes and transitions, citations; see notes from Claire's DH199 work)
3. Add an option to automatically add node numbers for citation purposes (this should show on either or both the thumbnails and the node itself)
4. Add path mechanism as alternative to using keyframes to establish route for a narrative, includes the ability to set eyepoint along that path, edit path, and ability to attach to said path while controlling gimbal and speed
5. Add ability to go backwards on a narrative (currently only allows forward movement)

F. Goal: Improve VSim's ability to handle text, backgrounds, and images on the narrative nodes (Node Editor)

1. Introduce basic layout options (i.e., the ability to adjust the spacing between lines, to have bulleted lists, to control the word wrap and how that happens relative to the background)
2. Add the ability to change text style after the fact
3. Allow the movement of text/textboxes using arrow keys for more precise adjustments (and/or show and allow changes with XY coordinates?)

G. Goal: Simplify working with fonts (Node Editor)

1. Locate a small suite of open-source fonts that will work on both Windows and PC and include them in VSim (confirm choices with Lisa; this replaces dependency on system fonts); if this is not feasible, change the fonts in all four of the styles in the Node Editor to default to Arial (so that it works out of the box with both Windows and Macs),
2. When a narrative is saved, save the active Font and Color settings as a part of the narrative. Load them back into the Font and Color settings either when the Narrative Editor is launched or when the Node Editor is launched (i.e., when the user is about to make changes to the narrative)

H. Goal: Enhance the narrative transitions (Narrative Editor)

1. Automatically add an appropriate icon to the overlay to signal that the node has been set to pause until 'P' key is pressed
2. Add expanded functionality for transitions and timing of overlay information (timing, ability to display text before and after node itself, etc.)

EMBEDDED RESOURCES

I. Goal: Enhance the content creator's ability to set, control, and manage ERs (see DH199 work)

1. Add a simplified way for managing ERs (necessary for when there are hundreds of resources)
2. Add the ability to re-order resources (they currently display in the order in which they appear in the ER file; this made developing the Karnak publication very difficult)
3. Add the ability to automatically number resources for citation purposes
4. Add the ability to 'go to' a resource's trigger center and viewpoint (possibly through the ER dialog box)
5. Add in HPR comparison to Auto Launch (so that it only launches if the user's xyz hpr is within some algorithm of the resource's xyz hpr) ... (Big task ... this is the stuff of the SUI paper and should only be implemented when we have a GOOD solution)

J. Goal: Enhance VSim's ability to handle text on the ERs

K. Goal: Enhance the user's experience with ERs

1. Add a toggle to show/hide icons (or glowing red spheres) that mark the center of the trigger zone for the resources so that users can find them; these markers could change color after a user has accessed them

2. Change locking mechanism so that it's possible to lock only the established categories and all ERs in those categories instead of the whole file ... this would allow peer reviewers and secondary scholars to add their own categories and would facilitate in-world mark up
3. Add ability for user to see source and copyright information on the ERs
4. Add a legend toggle on the ER bar. When set to show, a box would show the ER categories and their designated colors (requested from a test user of the Digital Karnak package)
5. Add the ability to associate resources with a specific binary switch state. (Discuss first ... we now have the ability to associate with a year range, but not binary switch state ... this could be as simple as adding an extra setting in the resource menu and running a comparison before the display of the resource, but VSim doesn't currently save switch names so it will be hard to do for binary switches)

2. DESIRABLE ENHANCEMENTS (These would be nice)

GENERAL OPERATION / NAVIGATION

A. General enhancements

1. Change time slider so that it's onscreen rather than through the menu? Maybe as a pop-up that can be turned on or off? (If the above isn't feasible, after using the time-slider, could the VSim window automatically activate so the viewer doesn't have to click the simulation window to re-engage with the model?)
2. Time Slider ... can we associate with narrative node? (Also on list of possible changes to Narratives above)

NARRATIVES

B. General narrative enhancements

1. Expand the portion of the description visible in narrative info when locked (currently only three or four lines show, thus requiring extremely short descriptions)
2. Add the ability to print the nodes from a narrative (essentially this would be like printing PowerPoint slides and would print the nodes/keyframes with overlay information two to a page; see also request for ability to print ERs)
3. Expand path mechanism to include path manager menu, ability to attach objects to path (with offset, speed, starting/stopping/pausing), replay path, generate off-line video from recorded path, etc. (See USim and Claire's DH199 work)
4. Add the ability to arrange images and text boxes (set forward/set backward)
5. Node Editor: Add in space between the font styles and the Image bar on the menu bar (to differentiate between them more)
6. Add the ability to set speed for narrative in addition to seconds between nodes (walking pace, 6 miles per hours, etc.)
7. Narrative Editor: Add ability to associate a node with specific date on time slider. (I think this would require the (1) addition of a radio button and entry field for a date on the node options menu, (2) addition of a check routine when the 'Edit the Resource' window pops up to know whether to grey out the date option or not, (3) a change to the Narrative export so the date is saved, and (4) a change to the Narrative play function so that when you first hit a node there's a date comparison and the geometry is changed if necessary.) Should this also include being able to associate with a specific binary switch?
8. Node Editor: Ability to add/edit borders around images
9. Narrative Player: More text on display for each narrative title within its menu bar icon? (Currently shows portion of narrative title and author info)

EMBEDDED RESOURCES

C. General embedded resource enhancements

1. Add the ability to print ERs, either all or by category
2. Add the ability to set both a trigger center and a viewpoint (would be used to match model to a file or URL image ... currently we only have a single center)
3. Add icons or text with file extensions for each ER that will indicate what will happen when the resource is launched (similar to our re-position signal)
4. Add the ability to graphically adjust the anchor location and trigger zone (and/or make the setting for the activation zone more meaningful ... I think it's currently in 'units')

3. MINOR FIXES / BUGS (Fix if enhancements don't)

MINOR FIXES

A. General enhancements

1. Change font size on 'About > About VSim' display (not critical, but it's too large and sort of embarrassing ... it seems to be around 18 and could easily drop to 12)
2. Move 'Current Coordinates' so that it's the last item on the About menu
3. Add HPR to the About -> Current Coordinates listing
4. Clear any .ere, .nars, and overlays when opening new models
5. Read and save text bits in .flt files related to binary and time slider switches
6. Correctly interpret animations in .flt files and save them in .vsim files (they are read now, but not saved)
7. Correctly interpret DOF nodes in .flt files and save same in .vsim files (don't appear to work at all now ... may be a loader issue and requires additional testing)
8. Add file filters for the Mac version on Open and Import functions (in testing, users were unsuccessfully picking random file types when trying to import ER files)

BUGS

B. Bugs related to general operations

1. CRITICAL BUG FIX: Crashes easily from button mashing ... how to bullet proof software from bad user behavior?
2. VSim freezes when returned from being minimized (can re-activate by initiating and then immediately cancelling the creation of a new narrative)
3. One 'drops' through the model if adding ERs while in ground mode in WASD navigation
4. Older versions of Mac OS don't allow images on nodes (10.7.5 and less ... do we care?)
5. The Mac version can't open COLLADA files ... don't know what that's about, but it didn't work on the three versions of the Mac OS that we tried.

C. Bugs related to the narratives (some of these may vanish on the re-vamping described above)

1. CRITICAL BUG FIX!!! Need to fix the hiccup in long arching movement from one node to the next. (To see behavior, play Hiccup.nar with Fallingwater model ... there are three hiccups in this short sequence.) It seems to happen on 180 turns that moves that cross the 0.0.0 line, but that may or may not be the issue.

2. When saving a narrative, at the question to lock the narrative (options: YES or NO), the user should be given an option to CANCEL that just voids the save action (currently, hitting ESC at that screen locks the narrative ... this is bad)
3. When saving and locking a narrative or ER file, the lock flag should ONLY be set for the version being saved, not the active version in memory (currently, saving a locked version sets the lock flag and the user can't save a subsequent unlocked version)
4. The overlay of the first node of a narrative is bypassed when that narrative is played from the Narrative Player
5. Node Editor: Check for and block use of huge images on overlay ... suggest that file be downsampled or linked to as an embedded resource instead. (System crashes with large files)
6. Crashes when user double clicks on an item in the Node Editor

D. Bugs related to the embedded resources (some of these may vanish on the re-vamping above)

1. See narrative bugs above for actions related to saving locked versions of files, including ER files
2. NOTE: rethink how we handling locked ER files (currently strips out the file type)
3. ERs: When unlocked, 'Edit' shows full resource description; when locked, that should change to 'Info' and allow the details to be seen (now, once locked you can't see author/source or rights) ... alternatively, maybe these things should be added to the 'more' display
4. There is a moment of runaway acceleration after re-engaging with the model after working with the Embedded Resources or switching between navigation modes 2 & 3
5. ERs: enable Ctrl + A (shortcut for select all) in description box & Authors/Source
6. ERs: expand number of 'undo' steps allows with Ctrl + z (in descriptions ... it only goes 1 step back now)
7. ERs: When editing a resource that's an annotation, the blank bit when you browse for a file should be grayed out
8. ERs: Enforce the title character limit

4. COMPLETED THINGS TO TEST

A. Shift to Qt Widgets (herein is a list of issues/requests that should solve)

1. Address retina display issue ... considering the range of computer screen resolutions and projection systems, how to best deal with screen resolutions of 2880x1800 (15" MacBook Pro (3rd generation)) and higher
2. Add a slider/progress bar to both the Narrative Player and Editor (ala YouTube videos; this is critical as a faster way to move through nodes is much needed); include a node count (e.g. '3 of 49'); a slider is also needed in order to move faster through the Embedded Resources.
3. Introduce the ability to rescale node information when the simulation window is resized. (This is a big task ... would involve change to way we assign text size (would need to shift to % of screen size), and how we record the position text and image elements ... research how Unity handles this with their Canvas Scaler: <http://docs.unity3d.com/Manual/script-CanvasScaler.html> (If impossible, think about set screen sizes (a user comment))
4. Revamp the way the Node Editor handles text so that it can accept copy-n-paste of bibliographic entries and retains formatting (i.e., it can accept accent characters and display style information like italic and bold)
5. Enable basic shortcuts across the text features (e.g., select all, undo, cut, paste)
6. Introduce a side scroll (or similar mechanism) for when text elements are longer than their text box allows
7. Refine the users' ability to manipulate the background screen of a text element. This includes adjusting the edge of the background screen relative to the text.
8. Add a slider to the Embedded Resource display (e.g., a faster way to move through the resources); similar to Narrative item E.1.
9. As per the request for narratives, add the ability to handle italic, underline, accent characters, and bold in ERs. It should be able to accept copy-n-paste of bibliographic entry and retain formatting
10. Adding a scroll bar on the side so that the ERs can contain longer texts (also requested for narratives)

B. Bugs that will be fixed with the shift to Qt Widgets

1. When user edits existing text element, the background block should retain its current dimensions and position; grow or shrink at bottom to accommodate change in text size (it now resets to original size and shape)
2. After a narrative has been saved and reloaded, the text elements cannot be edited ... the formatting goes crazy.
3. CRITICAL BUG FIX: Each time the Embedded Resource file is loaded it generates a new 'osgText::Text' entry in the Drawables section of the resource ... problem is that it saves this when the file is saved and these begin to build up. (We stripped these extra entries out of our

work-in-progress Karnak embedded resource file and it went from 613,468 lines (16.5MG) down to 93,644 (2.3MG)!

4. CRITICAL BUG FIX: Embedded Resources: currently strips out commas in the text portion of the resource prior to display on screen ... needs to be changed so that commas are displayed in the text, most critically for resource descriptions. (We also saw this problem when long text passages were added to the narrative nodes and Xinli already fixed it there ... may be able to repurpose her fix.)
5. CRITICAL BUG FIX: When a title includes a character, VSim replicates it each time the ER is edited (e.g., if title includes "&" it will read as "&&&" after editing)
6. NEED TO FIND REPRODUCABLE CAUSE ... the display of ERs when there are many and the right button gets lost beyond the edges of the simulation window (maybe connected to above)
7. ERs: the number of resources listed under each categories on the thumbnails are all positioned differently, should be centered (or somehow consistent)
8. ERs: Ability to force breaks on long strings of unbroken text (like URLs)

C. Things that have been completed and need to be tested before getting deleted from the list

1. DONE. Change the branding overlay to use the same text/image menu and features as the Node Editor (currently uses an older version of the node editor that doesn't include the delete and edit buttons, and doesn't lock image proportions)
2. DONE. Change the lighting invoked by 'L' (Shft 'l') is be a fixed source (now like a flashlight)
3. DONE. Change the subtle gray outline that indicates which node is selected to something more visible
4. DONE. Change the color for Heading 1 to white, and change the color for Heading 2 to dark gold (RGB: 224, 147, 31)
5. DONE. Change display of ERs so that the title color is always white (now it changes between white and the category color when you switch between "more" and "less")
6. Keep window at the front after launch (it always goes to the back of the stack if multiple windows are open)
7. DONE. Crashes when you make a new narrative and press '>' without adding any nodes
8. DONE. Crashes when user presses 'Edit' with nothing selected in the Node Editor (or there's no nodes at all)

5. CHANGES TO CONSIDER (Maybe next round?)

A. General and Narrative-related new feature requests

1. Complete image and offline movie maker ... continue on work done by XinLi ... revised specs to be written ... must include options to hide screen bugs and branding overlay on video
2. Resource manager and resource manager menu (ala uSim RC files). This would track component files ... and allow settings for 'import at launch' and 'import now.' Is this desirable?
3. Relative paths for .ere file resources? Is it possible to add this? Is it desirable?
4. A few options for skies? (Removes the need for sky domes)
5. Map? (People often ask for these, but I'm personally on the edge)
6. Compass? (Requested by a user, but hard for generalizable software)
7. Avatars or animated scenes? (Suggested by a few users)
8. On-line? (I'd argue no)
9. Quizzing feature? (Suggested at DH2013 tutorial)
10. Learning module for moving through space in 3D simulation (Suggested at DH2013 tutorial)
11. Navigation: Add a jump or bird's eye view keystroke (recommended by one test user)
12. Add export and import of style settings for users that want to set styles for a series of narratives; this should include any custom colors in use
13. Time slider from spreadsheet? (ala Google Earth; important for models other than .flt)
14. Node Editor: Add in free form 'pencil' and options to change width, color, and opacity?

B. ER-related opportunities to consider and discuss

1. Opportunities to link to definitions and other information from within the ERs themselves (recommended by a user; might be difficult)
2. ERs: Ability to merge multiple .ere files
3. ERs: Sort search results? (Desirable by category? Title?)
4. ERs: Ability to display a single resource in multiple locations (is this desirable?)
5. ERs: Ability to visually change the scene to better identify the referent of the ER (Highlight? Lowlight? Glowing icon?)
6. ERs: Launch resource only after movement in model (Is this desirable? It was Scott's suggestion)
7. ERs: Ability to control the timing of their display (is this really desirable?)
8. ERs: Mechanism for making narrative nodes show up as embedded resources (this would allow overlay text and images to appear within the simulation window rather than default programs, but would require sophisticated view comparison)

9. ERs: Sound?

(By which I mean resources that are sound files and something more sophisticated than launching one file after another ... spatially organized with software to handle overlaps and relative volume that adjusts according to distance from point of origin, and accommodates multiple sound files at once (both narration and effects), fading as one moves away from resource, forcing sound player to back layer (instead of covering simulation window), etc.)

And when we're all done: push to GitHub (and send Lisa info on how to share that information with potential programmers)