- option to move all television feeds to the background

- right click options
  - radial?
  - iconic pop-up not drop-down list

resizeable windows
list of users (friend list)
right click options for text, voice, video

right click option to bring up windows to another room (home or work)
- how to add rooms to the list (authentication)
- errors, how to bring windows back (verification, rights to windows)

user rights (multiple users in the same room)
  - anonymous rights for unknown users (unauthenticated friends/family, halloween, etc)

video-feeds
  - mute video in-out
  - mute voice in-out

incoming phone calls (don't auto-accept)
  - show video feed of incoming calls (no video out, though)

text, photo list of friends
setting up/altering default pop-up locations
<table>
<thead>
<tr>
<th>&quot;Friend&quot; List</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SoAndSo_1</td>
<td>basic name entry into the list</td>
</tr>
<tr>
<td>SoAndSo_2 (Home)</td>
<td>&quot;home&quot; address of person SoAndSo_2</td>
</tr>
<tr>
<td>SoAndSo_2 (Work)</td>
<td>&quot;work&quot; address of person SoAndSo_2</td>
</tr>
<tr>
<td>🚚 SoAndSo_3</td>
<td>face picture of person SoAndSo_3</td>
</tr>
<tr>
<td>SoAndSo_4</td>
<td>expanded view of person SoAndSo_4</td>
</tr>
<tr>
<td>☑️ Send Text</td>
<td>by clicking on entry, shows options for that person</td>
</tr>
<tr>
<td>☑️ Voice Call</td>
<td></td>
</tr>
<tr>
<td>☑️ Video Call</td>
<td></td>
</tr>
<tr>
<td>SoAndSo_5</td>
<td></td>
</tr>
</tbody>
</table>

**Radial Menu for right click**

- Buttons that perform some function when clicked
- Drop-down menu

**Default incoming call window**

**Phone Call Waiting**

Update: Show name of caller on-screen
Window Control options only appear when pointer is in the area of the controls.

click-and-hold anywhere to drag a screen

edges to resize a screen

1 2 3

1 missed call || no event alerts || current temp: 60°F || 10:07pm

Phone Call Waiting

4

Calling for a close window event such as "close TV channel" will give an overlay to specify which window to close.

Scrolling headline of system news/updates
Calendar and Bulletins

Month_name

Calendar Settings

The Calendar's background can be chosen automatically or from add-on packs/images manually.

Week started on Sunday/Monday/etc is also selectable via settings.

Bulletins

Note bulletins can be placed on individual days.

When clicked they will expand into a new window that will show the details of the note so they can be read/modified/etc.

Notes can be dragged and dropped between days or from the desktop onto a day.

Meta tags can be set so that bulletins can have alarms activated 10 minutes before/on-time/etc, or so that bulletins can be searched by type (tag).

Example expanded bulletin

<table>
<thead>
<tr>
<th>Bulletin Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>meta_tag1, meta_tag2, etc</td>
</tr>
</tbody>
</table>

| Bulletin contents |
## Weather

<table>
<thead>
<tr>
<th>Today</th>
<th>Tomorrow</th>
<th>Day After</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Sun" /></td>
<td><img src="image" alt="Clouds" /></td>
<td><img src="image" alt="Sun" /></td>
</tr>
<tr>
<td>73 °F</td>
<td>41 °F</td>
<td>62 °F</td>
</tr>
</tbody>
</table>

User can set default for how many days are shown at a time and if it is a parts-of-the-day forecast or the parts-of-a-week or etc forecast.

Weather images are changeable by the user to preselected or add-on packages/files.

Each authenticated user of a web can have their own settings for pictures and weather display.

Scrolling headline for weather alerts, position on main screen adjustable via settings.

| tonight | Weather Alert... Hurricane watch in effect until 6pm... |

New window appears on main screen as another option (text not to final scale).

### Weather Alert

Hurricane watch in effect
until 8pm tonight
**Minimal View**

Next Track, Next Artist, Type, Album?

**Expanded View**

This expand tab opens more modular listings to refine choices better, such as my genre, year, rating, etc.

Expand tab from Minimal View expands open the Expanded View, expanding again opens all three windows.

**Currently Playing Pull-down tab**

**Current Playlist Pull-down tab**

Update: Scroll bar? Alternating shades of grey to distinguish rows?
Pointer Control

Z Camera (http://media.gearign.com/articles/855/055511Xids_1.html)
- face location
- chest location
- 5 finger location
- depth (and from it triangulation? [dual camera?])

IR sensor
- requires wearing something
- triangulation easier
- requires multiple devices (IR transmitters/receivers) for multifunction

PDA
- one per room/person?
- annoying to some?
- see page below/above

Tablet
- bulky
- one per room/person?
- storage? lost?

Mouse (Traditional)
- static location (unless wireless)
- one per room/person/house?
- defined location of usage (flat surface)

Shadow Pointer
- requires a backlight
- allows reaching distant objects on screen
- precision?
Text Control

PDA
- pull out keyboard
- see attached

Virtual (Projection) Keyboard (http://www.virtual-laser-keyboard.com/)
- nothing physical to carry/lose
- requires a flat surface (required for a keyboard anyway)
- needs to be visible from projector near/on wall
- camera in-room can adjust keyboard to track users around room (adjust projection size for distance, etc)

Invisible keyboard
- Z Camera (on another page) can track fingers
- requires user to know key layout/finger motions
  - not novice friendly
- no physical feedback for pressing buttons

Holographic keyboard
- possible to generate the image?
  - spinning mirror generation wouldn't possibly work
  - parabolic mirror above/behind floor (outside realm of possibility - not contained in/on wall)
- Z camera (on another page) to track fingers

Autostereoscopic keyboard
- shown on-screen
- auto resize based on distance from screen to keep relative size (using camera)
- requires hands to be visually in front of screen
  - too far away and user needs to type vertically (not comfortable)

- close to wall to touch buttons
- vertical keyboard (uncomfortable)
- possible pointer control (still uncomfortable/inefficient)

Voice
- not 100% accurate
- spell out wrong words??
PDA Control

Pull out keyboard

sturdy + lightweight

modular 3 dimensional positioning unit

virtual keyboard

like that "projectable" keyboard

PDA on armband while typing

holographically-projected keyboard?
auto stereoscopic view? (need to face the wall to see)
The tablet will have a pop-up on-screen keyboard for text input.

The main screen will have a "minimap" of the windows on the actual wall display so that the user can interact with them on the tablet instead of reaching around and pointing at the wall itself.

Secondary functions will also be available on the tablet:

Possible features:
- Button for distinct voice communication (to distinguish between commands and chat)
- Video feeds so that video calls can be taken in private away from the actual wall
- Management of windows to/from other rooms.
Pointer Control and Calibration

- Z Camera
  - Head tracking
  - Chest tracking
  - Five finger tracking w/ depth

- "Frame" of reference in front of the user.

- An initial calibration will be necessary to set up the relative points of control. Essentially the user will reach with their main hand to the four natural corners of reach (or as they prefer) and the system will record them and calibrate them to the four corners of the screen.

- Possible line-of-sight "upgrade"
Right click radial menu

- user-selectable icons and functions
- face photo w/ "sound waves" for audio call
- face photo inside of an eye for video call
- TV-text or photo for opening a new TV Window

Clicking on the bare desktop will bring up the radial menu from which all of the windows will be accessible for opening.

The actual positions of the buttons will be user modifiable, perhaps even adding extra orbits of buttons.

The drop-down menu hasn't been decided what it will contain or if it will even exist.
User Authentication and Priority

Priority

Users will have privileges to access/modify different aspects of the wAll in certain rooms, or while in a room with another person.

A simple Priority List will keep track of who has more control over who when there is a collision of usage.
- Perhaps have settings so a person with lower priority can, for example, move screens around even if there is someone with more priority in the room.
  The person with higher priority could demand full and singular access to the wAll.

Users with priority can "lock" windows (or even the whole wall) manually from anyone else's usage regardless of previously set allowances.

Also, users can "yield" control of the wAll so that if they are the member with highest priority they will temporarily remove themselves from the top or allow others unrestricted access to the wAll (up to their natural allowances.)

Authentication

User authentication will be done mainly by facial recognition which will require some setup during first-time usage.

Voice authentication is secondary to face recognition. (Frequency check, etc.)

Password authentication is essentially the last resort (either via enter a voicecode or textual passcode.)

In a busy environment the system will have to take a sample of the faces in the room from time to time to make sure the system is kept up-to-date of who is who. There are situations where two people could meet and then alter directions in which case the system might swap who is who until facial recognition can re-establish correct identity.

Dim light could potentially effect the authentication system, though the Z Camera doesn’t appear to use light to function.

In terms of people who look alike, voice recognition/passcode will establish original authentication and then body tracking (like usual) will keep them updated unless one of the above mentioned situations occur and the system needs updating.

One possible feature would be to check the relation between user rights, if a user is confused with one other, but both have rights to an action on the wAll, then it can be assumed the action is allowed even though the user isn’t 100% identified.
Voice Commands (TV)

- Windows Creation
  "Open TV"
  "Open new TV"
  "Open new TV Window"
  "new TV Window"

- Change Channel
  "Channel <number>"
  "Channel <number> on Window <number>"
  "Change to Channel <number> on Window <number>"
  "Channel Up"
  "Channel Down"
  "Channel Guide"

  "What's on <channel name/number>" // defaults to last used TV Window

  "up"
  "down"

- Misc
  "display window number"
  "full screen"
  "mute"
  "pause"
  "fast forward"
  "jump to <times>" // user dependent: current window or new window

  "fullscreen window <number>" // text display/picture-in-picture on current window

  "show overlay on windows" // settings for video/audio/both
Call Management Voice Commands

Calling out
"Call <identity>“
"Voice call <identity>“
"Video call <identity>“
"Send IM to <identity>“
"Open IM to <identity>“
"Send text to <identity>“
if there is a home and work version of <identity>
   System will request visually/audio to specify (listing options?)

Calls Incoming (System Popup w/ audio)
"Accept call"
"Decline call"
"Accept Audio" [if the request is for video]
"Accept and request video" [if the request is for audio]
"Accept and move call to <room>“
"Accept audio and move call to <room>“
"hold“
   
   Hold current call or pause notification of connecting call

Call Management
"enlarge“
"increase volume“
"volume up“
"move call to <room>“
"mute“
"mute video“
"hang up“
"disconnect“
"close“
"terminate“
?“hide window“

Call the system by a name to distinguish commands from talking?
"<System name> <command>“ (please optional)
Music Voice Commands

Window Commands
- "Show Playlist tab" "expand Playlist tab"
- "Show current playing tab" "expand Currently playing tab"
- "Close <tab name> tab" "remove <tab name> tab"
- "Show <playlist name> playlist" #opens a window not tab
- "Show artist list" #brings up the modular list window
- "Make <tab name> larger" #increases window size for more content

Control Commands
- "Play <playlist name>" "Play <Track name> by <Artist Name>"
- "Play <Artist name>"
- "Pause" "Stop" "Next" "Previous" "Replay" "Restart"
- "Loop Current" "Loop Album" "Loop Artist" "Loop Playlist"
- "Volume up" "Volume up <number>" "Volume up by <number>"
- "Mute" "Fast forward" "Fast forward <number> seconds"
- "Ban <song name>" "Ban (current)" #add to a list of songs not to play