

Essentials of End-User & System-Level Control Design & Programming for Presentation and Videoconference: Part 1 – The User-Level

Submitted to INFOCOMM.ORG by S. R. Sharer – Communication Design Group Inc.: July, 2006

General Introduction: Many companies have been and are, at this time and for the anticipated future, deeply engaged in the deployment of high-level sophisticated integrated systems to be used simultaneously for presentation and videoconference communications within large, medium, small-group and individual spaces, and for typical and atypical applications. While these systems are being designed around the common fundamental elements that are standard and traditional, they have also begun to make use of new and more powerful technologies in every effort to “advance & enhance” the effective efficiency of the end-user community for whom the systems are deployed.

As a discussion of REMOTE CONTROL - This document will not re-state all of the discussion points and design integration fundamentals of traditional Remote Control Design. These fundamentals are known and are well-taught by other professionals. This document will concentrate on certain specific issues and elements of Control Systems Design* & Control Systems Programming* (* these are two very different aspects of developing a Control System) for video communications / videoconferencing, and the role these will directly play in the matters of:

- **ease-of-use** in any presentation-to and operation-by any end-user (including those who are not at all familiar with the systems or procedures), *and*
- **managed input and system configuration** selections & choices, *and*
- **overall redundancy or reliable-system(s)-recovery** in the face of certain system, network or component failures.

Ultimately, this document, along with a thorough understanding of the principles that are part of any solid and properly configured integrated solution, may serve as a guide for anyone responsible for mapping-out, specifying, integrating, configuring, designing and programming the functional Control Systems for visual presentation and videoconference space(s) and systems.

Please Note: Though portions of the Control System functions we are about to discuss will be familiar to those experienced in this aspect of systems integration and design, and even though portions of our discussion will have “generally accepted and deployed” functionality commonly seen in many integrated control systems applications (inside your own company and in other companies), **some of the integration and programming processes and functions detailed within this document have no generally known precedent** (at-least none that are known to this writer) in any application or implementation that is-now or has-been in-use at other companies or within other specialty systems. There may be examples out there, but none that we at CDG Inc have encountered. *This means that there will be some degree of exploration into configurations and programming flows that are totally unique to the finished systems* and for which there are no known “templates” to work from. The nature of this, along with the complexity of some of the operational elements we will outline for the Control Systems, may require you to invest added time and money to develop, modify and fully test prior-to any actual deployment within a working enterprise system or space.

Element #1: Functionality for the End-User

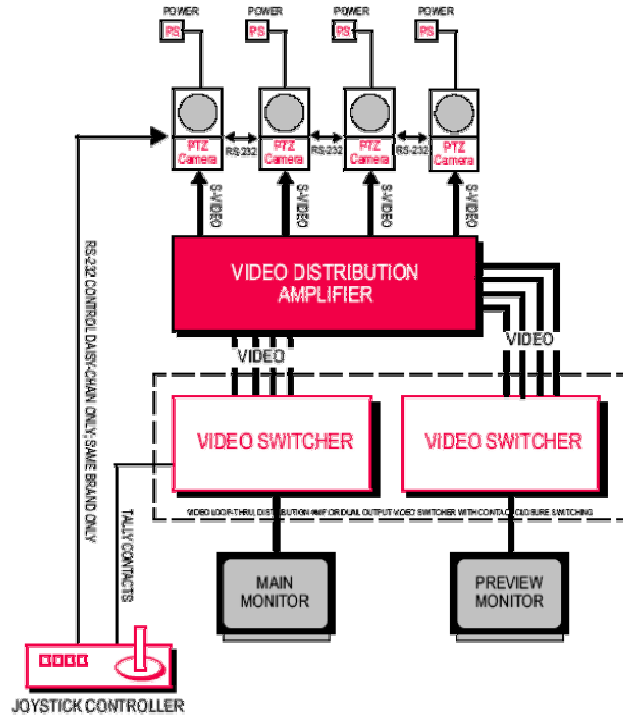
This is perhaps the most important element, at least in terms of the perception of the utility and usability of any VTC systems. For the purpose of this discussion we will make every effort to affirm the fundamental essentials of **Simplicity, Reliability, Background Intelligence** and “**Recovery**”-**from-Failure** (a.k.a.- “**Redundancy**” – [see-also other CDG Inc. INFOCOMM.ORG - submitted document that is dedicated to detailed discussion of the general topic of (and proper planning- for) “Redundancy”]).

Simplicity: First and foremost we begin by stating that the best control is no control. By this we mean that an ideal approach to the control of these spaces and systems is one that requires little or no conscious thought or actions on the part of the end-user(s). **The goal is not** to build & present a user interface on bigger display screens with more buttons but, rather, to deploy as few “button commands” as possible that would require the end-user to initiate an action by reading and selecting from many button-actions in order to achieve a predictable and consistent required temporal result. To achieve this minimalist approach for the Systems Control we must consider the use of alternative supporting elements to the traditional “control card frame and LCD touch-panel button interface”.

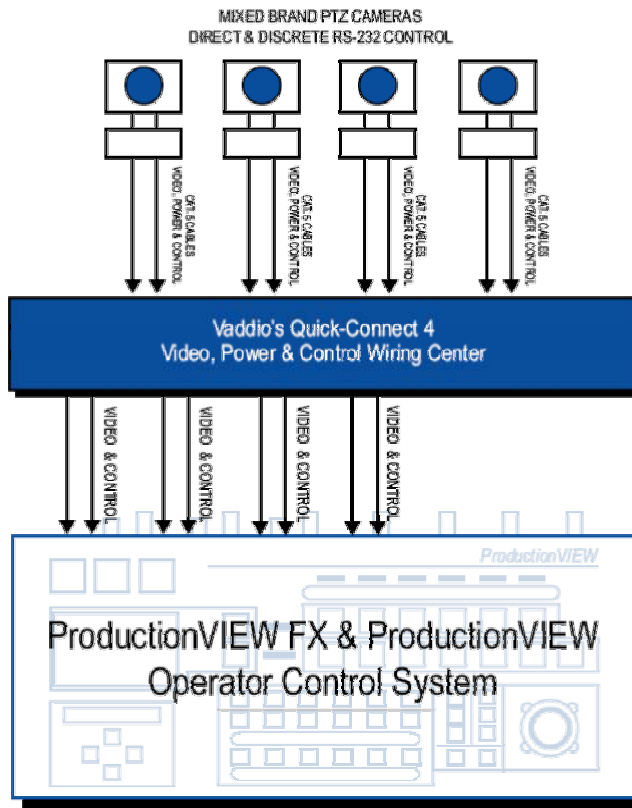
It is possible that some spaces and systems that you will be deploying could make good use of items like the Vaddio Inc. TrackVIEW, ControlVIEW, AutoVIEW IR, StepVIEW, TouchVIEW and MicVIEW system(s) (*or similar products of other brands*). **These systems attempt to minimize the required user “thought & selection” of control functions by taking advantage of the natural actions and behaviors of people who occupy the space with the intent of making use of the communications elements (they intend to deliver a local MS-PowerPoint-based presentation or conduct a VTC-based meeting, etc.)**. The Vaddio StepVIEW, for instance, is a system of mats (exposed or hidden under the room carpeting) that will trigger camera presets when stepped-on, and the AutoVIEW IR is a series of IR Motion Sensors to accomplish the same thing, based not on pressure (stepping on the Mat) but on movement through the field of pickup for the IR-based Motion Sensor. Finally - As the name implies, the MicVIEW triggers presets based on sound-pressure from a microphone or set of microphones. A typical blended configuration application of these might look like what we see below on the next few pages (simplified and not to scale).

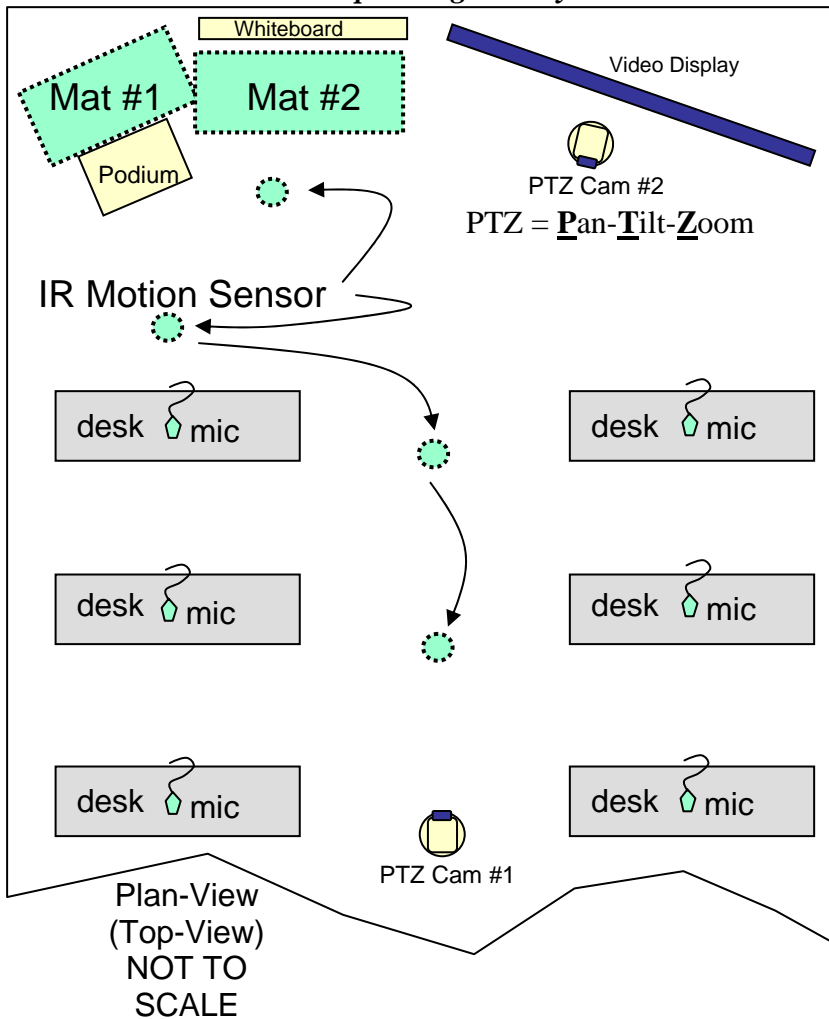
[PLEASE NOTE: Throughout this document, and while discussing the possibilities of using various other supporting methods as a means to augment our traditional LCD Touch-panel approaches (in an effort to reduce the required conscious input on the part of the human end-user(s) of the systems), we will also make some notes and provide details related to a few of the considerations involved in general interface design, room design, signal distribution and establishing proper camera presets. Even though these topics are not necessarily a central part of this document they play an integral role in Control System functionality and effectiveness as it relates to videoconferencing.]

We will first consider some of the Vaddio Inc. sample configuration flows for their components (similar types of systems will have similar configurations), and then we will use some very simple CDG Inc. illustrations to further our discussion.



and



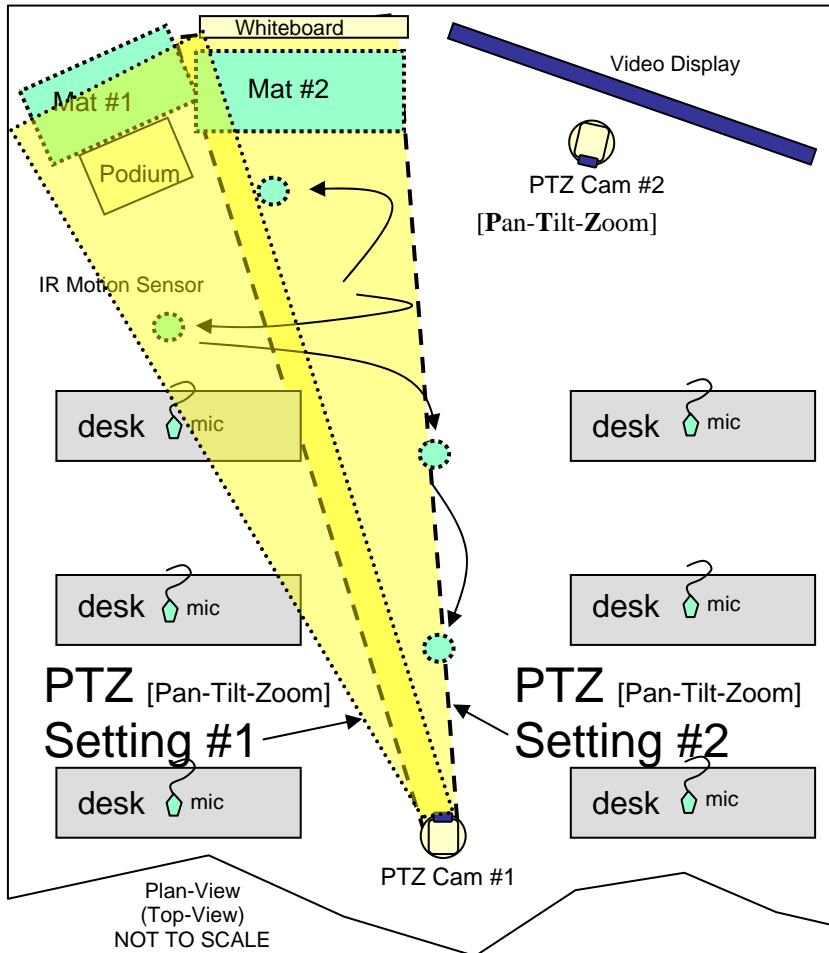


Though this is a greatly simplified (and not at all a “build-to”) example, this illustration will assist us in furthering and deepening this portion of our discussion.

In the above example we have a small-to-medium-sized meeting or class lecture room that has a single display screen, two (2) P-T-Z (Pan-Tilt-Zoom) Cameras, six (6) desks and a podium. Within the space we also see two (2) Mats, four (4) IR [InfraRed] Motion Sensors and six (6) desktop Microphones. Each of these can be set to trigger a Camera Preset, with each preset to include the functions of Pan, Tilt, Zoom, Focus, Brightness, Contrast, Backlight and any other control function for the camera and camera image.

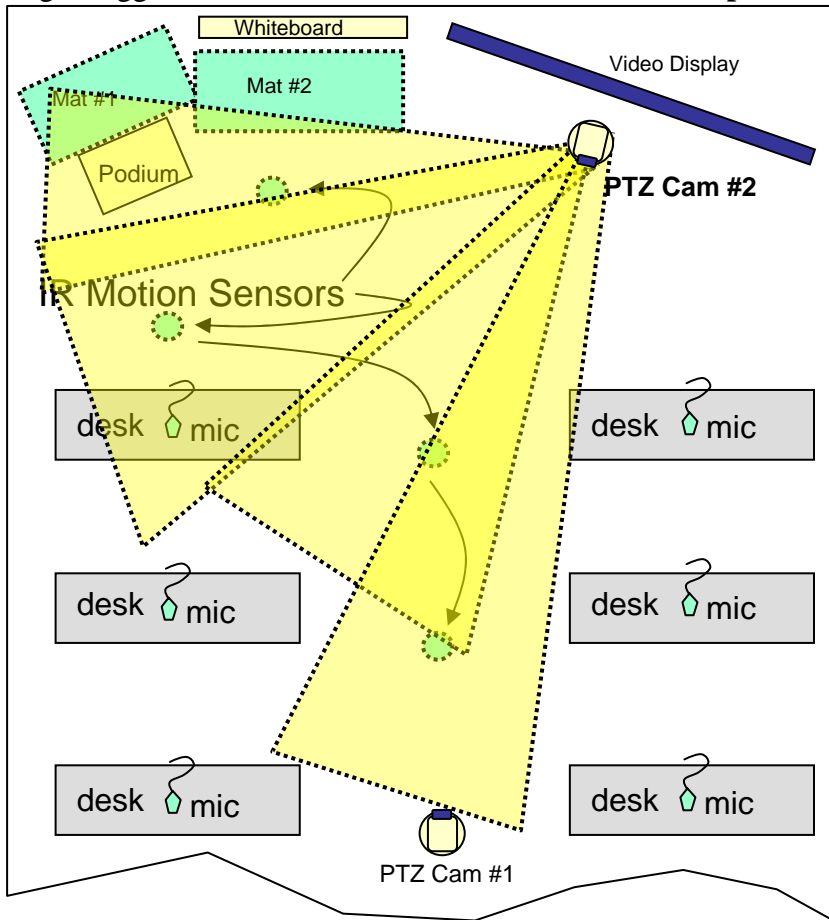
Ideally, this layout would have been generated from careful observations of the normal day-to-day activities of the people using the space. Detailed notation of typical traffic patterns and the relationship of these to what is referred to “Ad-Hoc Opportunistic Interactive Communications” (a new and growing science of the dynamics of random and planned human interaction) will go far towards placing the “control” for the camera positioning and video image management into the background. **Using the approach of adding some fully automatic functionality into the Control System would mean:**

No longer would a presenter or participant be required to actively push-a-button or select a “trigger”. *No longer* is there a need to have a specialized camera operator in the space, changing the camera positions and adjusting the image qualities in a real-time manner. **Simply stepping on a Mat, walking through the field of “view” of the IR Motion Sensor or speaking into a microphone** will automatically reset the camera view(s) to the optimized settings and correct position (to specific preset positions & image-quality settings). **For instance**, stepping on the Mats would issue commands for the following:



System & Room Design Note: There is overlap between the horizontal fields for the two (2) different Zoom levels for these presets. This must be planned carefully so as not to lose sight of the person / “human target” during the presets. Likewise, the Zoom settings establish a horizontal field of view that is wider than necessary to contain a single person. This is done in order to allow some shifting and wandering by a person without constant adjustment to the camera source. **Remember:** ANY changes, including even the slightest Control System PTZ movement or image adjustment of a camera source, will be interpreted by the VTC encoder (the box that performs digitizing and compression of the video signal) as “important”, and this will cause the encoder to “talk” or “send-packets more frequently”, an unfortunate action in the face of IP network connectivity (IP networks count on “bursts” of data, not constant full bandwidth data from a terminal or endpoint / encoder). Also Note: In this example (above) the presets do not “switch” sources from one camera to another, but merely manipulate a single device.

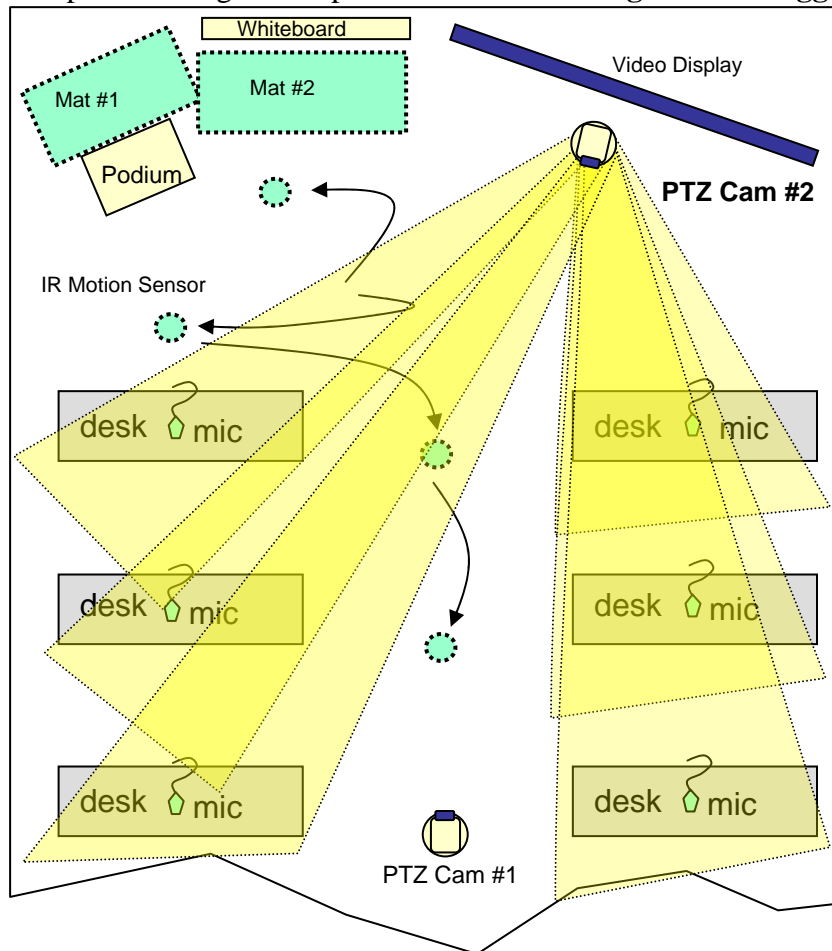
If a presenter or teacher is walking away from the Podium / Whiteboard area this might trigger a switch to PTZ Camera #2 and then to presets from IR Motion-Sensors:



As previously noted: There is overlap between the horizontal fields for the four (4) different Zoom levels for these presets. This is essential and must be planned carefully so as not to lose sight of the person / “human target” for the presets. The Zoom settings establish a horizontal field of view that is also wider than necessary to contain a single person. This allows some shifting and wandering by that person without also requiring constant non-stop re-adjustment to the video camera source device & signals.

These IR Sensors could be operating in-tandem with the Pressure Mats, and both could, additionally, be operating along with the triggers that are received from the Microphones. In other words, there is not “a single” mechanism to call-up a camera position and setting (or any other “preset”). There are several mechanisms (the three we are discussing here plus any LCD Touch-screen button interface that might accompany these that also allows modification, adjustment-to, or over-ride-of these settings). **The result: Redundancy** (one type of sensor can be used to “back-up” another), **Simplicity** (the end-users do not have to do anything but “meet” or “present”), and **Flexibility** (the Presets can be re-assigned and the sensors can be moved around at-will [within reason]).

The preset configuration possibilities when **using the Mic triggers** might look like:

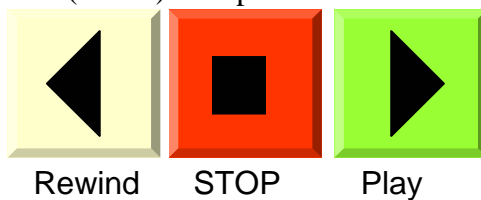


Furthermore – When it comes to considering other means by which elements of the systems can be controlled beyond the traditional LCD button-panel touch-screen: The above-listed cooperative mechanisms are not the only elements that might be considered during design and development. Every effort should be made to determine the efficacy and applicability of other even more advanced means of control, up-to and including Voice-Command and Gesture-Recognition / Control. (**NOTE:** You must be cautious here, since many of these technologies and their accompanying software-based intelligent mechanisms are in *extremely* early phases of research & development, and are not at all mature enough to meet the criteria you might set here for predictable, reliable and redundant operation. ***Great amounts of time and money could be lost*** following one of these other paths without expert informed reasoned scrutiny of the predicted viability of the technology and of the company that offers it for use. [We at CDG Inc. have lost several tens-of-thousands of dollars purchasing & testing just one of these technologies that did not deliver as specified and promised by the manufacturer]) **That being said** - Any element or mechanism that can simplify the method by which the system receives and acts-upon a “command” must be explored* in the effort to simplify the presentation of any control elements to the end-users and build “intelligence” into the control layer. *["**explored**" does not always mean actually "**purchased and implemented**".]

Reliability: Suffice it to say that the elements of any control systems that are to be implemented for any integrated business and organizational mission critical presentation and videoconference communication must be 100% reliable. That is a “given”. It serves our purposes here, however, to explore the meaning of the word “reliable” within the context of this specific discussion (the end-user layer of control system design & programming).

We can define “reliable” in a couple of different ways. One definition would state that the term “reliable” means “without-failure”. In other words, the system elements will perform, and always perform, and will never “fail” in any electronic (hardware) or logical (programmed) manner. O.K. – simple enough. *But is it enough?* What do we really mean by our use of the word “fail”? **Another approach to the term “reliable”** is derived from associating this term with another term – “predictable”. Why? “Failure” can mean “not working at all”, or it might mean “working at the electronic + comm-levels [OSI Layer 1-6], but with unexpected and undesirable results at the higher end-user level [OSI Layer 7]”.

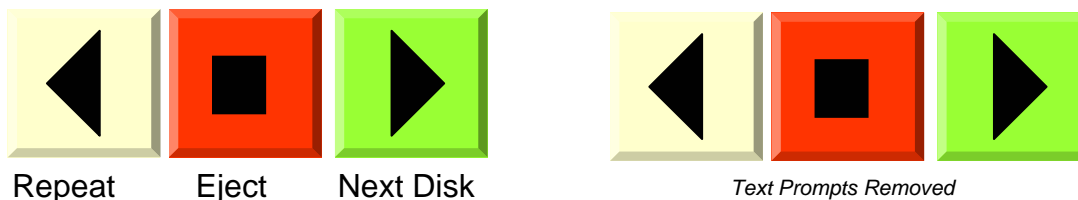
In Essence: It is one thing for a system to execute a command or series of commands as requested (through a button-press or other means discussed in the sections above). **It is an entirely different matter** to state that the actual result of the command execution will be a system or data “state” that would normally and reasonably be anticipated or expected by an end-user. *For instance:* If a user is presented with relatively common buttons like these (below) on a panel that is labeled “DVD Player Control” or “VCR Control”...



...then we might reasonably believe that the End-User will interpret these buttons as the functions of “Rewind”, “STOP” and “Play”, and that most people will be successful in actually operating the DVD or VCR Player using these buttons. If we remove the textual word prompts (not necessarily a good idea), even if it forces a user to “guess” a bit ...



...we could probably still count on *nearly* everyone who is encountering these commonly familiar icon buttons to successfully “Rewind”, “Stop” and “Play” a DVD or VCR tape. **Suppose, however,** that these buttons were actually assigned their functions as follows:

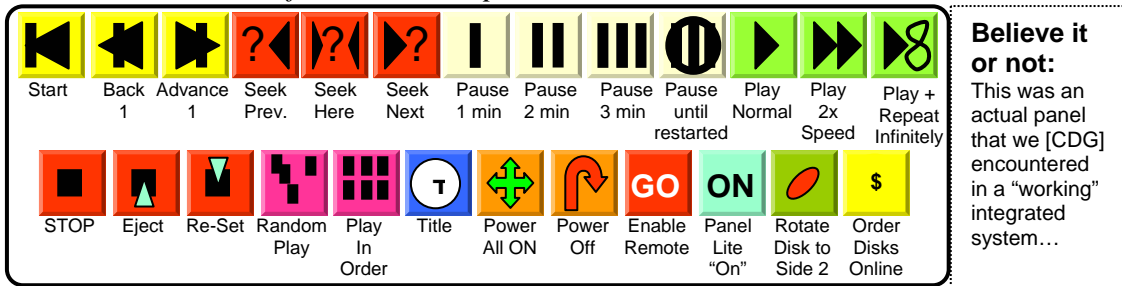


In this case I think we can all agree that most [if not all] typical end-users would be confused. Using the non-text-labeled buttons, most people would be quite surprised that when pressing what looks like a common green “Play” button [as it appears on

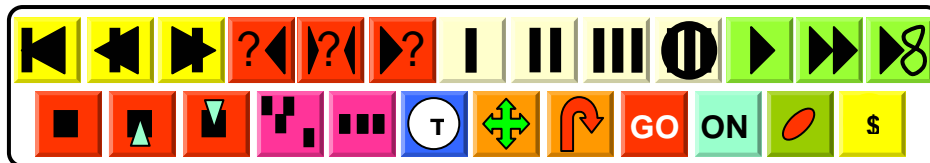
hundreds of other devices that this end-user encounters every day] **this means that the disk or tape does NOT “Play”** but, instead, the disk suddenly ejects and a second disk or tape in the carousel is inserted in the Player unit and loaded or queued-up, waiting to be played. **In other words, it is important not only that “something happen”** when we command the system [and essential that something on the panel or screen indicate to the end-users that “things are in process” (such-as “Starting DVD...Please Wait”) (more on this later)], **it is even more critically important that what “happens” also makes sense and is what we** (as end-users) *expected to happen*. Care must be taken to use icons that are familiar, culturally and regionally neutral, concise and consistent, and even greater care must be taken to make certain that the actions that are elicited from commanding the system are the actions that we can reasonably and commonly anticipate or expect will happen as a result of issuing a specific command or command sequence.

Additionally - it is essential that we present only the action options that the end-user actually needs. More than that creates mental overload and confusion.

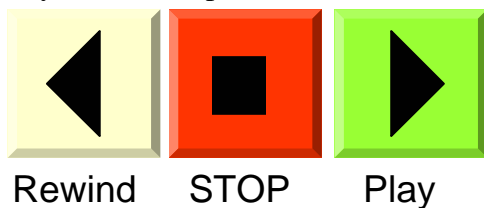
For instance: An “unfortunate” sample “DVD PLAYER” control screen:



I think we can agree that this panel is all but unusable by anyone except the system creator (and possibly not even by that person). This layout, and the selections for functions [represented by *nonsense graphical elements*], did more to intimidate and confuse than it could possibly do to enhance, inform and assist the end-users. **It is also worthwhile mentioning** that the designer who actually thought the above panel was appropriate for the “DVD Player” control-options also determined in their own mind that it would be even more efficient when the end-user was presented with a **“cleaner and neater” version** like:



Now ... Given the fact that in many [if not most] instances end-users will simply want to “Play”, then “Stop” and/or then “Rewind” [or then change] a disk or tape...



... why would anyone attempt to provide dozens [if not hundreds] of command buttons on a single page of an LCD Touch-panel?

Is it “just-in-case” the simple non-technical end-user needs to perform factory-level service on the DVD unit itself? [Note: If you answered “yes”, please re-read the previous question. Twice.] ***Beyond that*** – why was there any compulsion to make-up obtuse new “icons” instead of using standard and familiar icons representing standard and anticipated functions? **In VTC system control, for instance**, when operating a camera P-T-Z [Pan-Tilt-Zoom] function, a left-pointing arrow labeled “Left” and a right-pointing arrow labeled “Right” says [in nearly every language] that pressing one of these will cause the camera to move either “Left” or “Right”, and says it with greater precision than almost any other graphical depiction I can imagine. ***I once commented, in order to make this very point***, “Gee...on this control-screen layout you are showing me here I really have no idea what a pin-striped 3-dimensional red-colored dot with a picture of a little yellow cartoon dump-truck in the middle of the dot with the dumper-bed of the truck filled with purple cotton ear-swabs actually means. The meaning of this is ...‘elusive’ to me, especially when a button like this appears on a control screen labeled “Camera Presets”...”.

Also – Remember to use “familiar” icons, and take your cues from the real-world that people normally inhabit. We should look at the day-to-day experience of most users. The layout and icons that are normally found on a cellular telephone, a standard desk phone and in a Web browser are where we should search to then find and select icons and terms that are most familiar to the end-users. **Likewise: Once we select text or icons from these other environments, when we put them to work in our own control environment – REMEMBER – the “functions”, as commonly understood by an average end-user, must remain the same.** “Back” in a browser or cell-phone means “previous” or “go-back” or “return to where I was just before this”. “Close” or “Cancel” both can mean “clear this item off my screen” or “end my present access or use-of this function”. “Stop” means “Stop the current activity or action immediately”. “Forward” means “Advance to next” or “Go forward”. “Dial” means “Dial this number or the highlighted Directory entry”. “Disconnect” and “Hang-Up” mean the same thing. In videoconference, “Mute” always means “eliminate this audio signal (the one I am sending at the moment)” and “Privacy-Mute” means “eliminate ALL audio from my unit going out to other units (not just the one that I am currently sending)”, **though to many people “Mute” also means “stop all audio from being sent out of my system, including my microphone / voice”.** “Master-anything” or “anything-Master” means “everything in this category”, like “Master Volume” [volume ‘up’ or ‘down’ for all audio signals] and “Brightness Master” [changes the brightness of the final video signal for ALL inputs and / or outputs, not just the one you are viewing at that particular moment].

Suffice it to say that a clear analysis must be made of how people (*everyday users*) “interpret” any of these common functions-words-icons, and then this knowledge must be transferred into our own work on our local system control interface and button-screens. Extensive observation, plus on-going tests and inquiries, are essential to make certain that our (the designer or programmer) interpretation or definition of any function-or-word-or-icon matches precisely with the interpretations of the end-user community.

(“Precise matching of meaning” is Control System DESIGN, not “Programming”)

Additionally – It is critical for us to select -“out” any true odd-ball interpretations.

If there is a person who complains, “But – this is wrong for me. I have always thought of

‘up’-as-‘down’ and ‘down’-as-‘up’ since when I was a child because my parents used to let me swing on the hammock with my head hanging over the side upside down and I would pretend that the world was completely reversed and I still do and so...” - - these types of interpretations need to be *discarded immediately as completely off-the-charts*.



Another element to keep in mind when laying out a “Reliable” and “Friendly” control panel or series of “screens” is that, to a human being, repeated use of a single element on multiple screens is acceptable and comfortable only as long as each instance of the element ALWAYS appears in the same place (i.e.- the same exact geographic location on the control panel screen). For instance – If there is a plan to have a “Master Mute” button on the four different screens of: 1. VTC dialing and connection control screen, 2. Presentation PC screen, 3. DVD control screen, and [finally] 4. Camera control Preset screen, then this button must look the same and be in the exact same location on each one of these screens, and it must behave the same (provide the same resultant action) when it is selected. (this is Design & Programming)

Most would believe that this subtle human-insistence on “commonality of location” is based on minimizing the annoying end-user confusion that’s caused when having to hunt-down a button that is constantly “moving around” (appearing in different places on different screens). This is actually not the underlying reason. Scientifically, the real difficulty is that humans psychologically and emotionally associate “change” with “import” [*meaning*]. If we have a “Mute” button that looks and *appears-to* act the same on different screens, but the button is located in [even slightly] different positions or places on those screens, the human will begin to distrust their own previously derived or acquired understanding of the meaning and functions of the button. The human will subliminally think, “If this one button moved to a new position when I changed screens, it *must* have changed in some meaningful way, and movement alone is not meaningful in and of itself. Since it looks the same (color-label-size-etc.), then it probably has a different result when pressed (different resultant functionality) **that I haven’t been told about**, since that is the only thing remaining that has any potential for being ‘different’ in each instance of this button”. Even when this is factually untrue, emotion and “inner-feelings” (“intuition”) will almost always trump reason and logic, especially if the situation the end-user finds themselves in is already charged with any emotional energy (like the feelings, energy and emotions often present in people before-during-and-after a very important local or videoconference-connected meeting).

Finally – To conclude our discussion of “Reliability” for now - Each icon chosen to create an integrated interface for end-user control of a greater sophisticated system should [I would say “must”] have one and only one (1) meaning. This results in an interface that is easiest for the human end-user to successfully and comfortably navigate (this makes many people feel the system is “friendlier” and is a “helpful” toolset). If an upward facing arrow in one screen means “Up”, and in another screen the exact same arrow means “Eject” and in a third instance the exact same arrow means “Quit and Go-Back One Screen”, this is a problem. End-users will either abandon the interface (too confusing), or they will use only a very small percentage of the interface (to minimize fear and confusion), attempting to actively avoid repeated-instances of the icon, thereby

often restricting their potential use of many valuable and necessary elements provided by the full visual communication system. **People self-limit their depth-of-use of the systems (no matter what the cause) for many reasons, and in this example it's all in the fear of being personally highly uncomfortable in their own understanding the true (“one” or “commonly correct”) meaning of any command icon** (the arrow). They become fearful that a lack of understanding on their part increases the potential that they (the end-user) will make a mistake and “look foolish” in front of others (a result that people find neither “friendly” nor “helpful” to their communications or careers).

Even sophisticated icon-driven interfaces that have been around a very long time and that have undergone extreme scrutiny do not always succeed in avoiding re-use of icons and may often create possible “double-meaning” (and confusion).

For instance – let's examine the difference between  and  on the MS-Word toolbar (actual screen-grabs, realistically sized, are represented here). Both icons are eerily similar to one another, and they are located side by side on the toolbar on my PC, but apparently have absolutely nothing to do with each other. In fact - they share no common functions. One means “Spin” and the other means “Scroll-bar”. Which is which? ‘Spin’-*what*? And, since I already have a scroll-bar on the right, what does “Scroll-bar” really mean?

Moving along...

In addition to using the word “predictable” to help define “reliable”, we can make use of [already have made use of] another pair of words – “friendly” and “helpful”. We have already indicated that these describe an important aspect of the control system representation to the end-user. As we have seen in the discussion elements above, the simplified delivery of standardized and easily recognized icons, along with minimizing the actual number of icons used and the number of definitions assigned to any one icon, can go a long way towards presenting a control panel screen to the end-user that is both “friendly” and “helpful”, one that they will not “fear” – one that they can “trust”.

Another thing to keep in mind is that this control system access point (*the LCD touch-panel or the handheld remote control*) is the front-end [OSI Layer 7- Application Layer] to the completely integrated sophisticated videoconference & presentation system, and **this control access point is actually the first potentially “intelligent”-layer that any end-user encounters when interacting-with [“using”] the equipment.**

Most Control System function, and any hardware designed to provide some sort of command-and-control functionality, has some ability to provide what we will refer to as “Background Intelligence”.

Certainly, the level of sophistication of this “intelligence” is dependent on many elements – amount of memory, type of central processor, load on the system, software operating system, input-output capabilities, etc – and, if “lacking” in one or more of these categories, some systems may have virtually no extra available “intelligence” beyond the base-level that is used to perform the essential control functions of receipt and execution of fundamental command strings (“Play DVD”, for instance).

When we are implementing and working with systems that are more capable than performing simple basic functions, however, we can exploit this untapped and unused intelligence for many things, especially to efficiently aid and assist the end-user.

Our motive for making use of this potentially available intelligence mechanism to *proactively* aid the end-user community is two-fold.

First - The more that the control systems can “intelligently assist” [be “helpful”-to] the end-user, the “friendlier” the systems will seem, and this improves the quality of the experience of the end-user, bolstering their confidence in this form of communication.

Second – Every question that the control system can answer immediately, reliably and successfully for the end-user, no matter how seemingly small or insignificant, is another question that does not end up coming into the queue in the already busy and often over-tasked Technical Support Command Center for the video enterprise.

For Control-System *Design* and Control-System *Programming*

(remember - *these are not the same functions*) **this means a requirement** for evaluating the complete integration of the full presentation and videoconference system, understanding the typical and fundamental daily uses, gaining knowledge of the profile and ability-level of the end-user communities (done by actually observing the end-users and making scrupulously detailed observations of their activities and behaviors), and then asking and addressing the most commonly anticipated frequent processes, difficulties and questions **before** the system [or entire space] is even completed, commissioned and is released for use to the end-user community or application stakeholders.

It is CRITICAL to Also Note 3-Essential-Points:

- 1.** Since we have stated here (in “**Second**” above) that activities at the Videoconference Command Center are directly impacted by the quality of planned and programmed interactions between end-users and the systems, **NO** design & programming control decisions should be made without thorough discussion with the person or persons responsible for managing, operating and delivering Technical Support to the end-user community.
- 2.** This series and set of analysis (detailed above) are NOT performed on a one-time basis only at the inception and initial commissioning of a space or system. A clearly defined and scheduled program of constant re-evaluation, observation, audience polling and feedback is necessary and essential in order to make certain that the interface keeps-up with the changing maturity levels and unanticipated needs of the individuals in the end-user community. Neglecting to re-visit the interface on a planned and properly documented regular basis sets the stage for systems that slowly [and insidiously, almost imperceptibly] become “un-useable” over time, greatly reducing end-user satisfaction & success and increasing the daily Technical-Support burden.
- 3.** Again - - Control System *Design* is **NOT** Control System *Programming*.

Background Intelligence – As noted - This means taking advantage of the available [unspoken-for] memory, the software tools, the I/O [Input/Output] and native processing capability of the Control System and putting them [collectively] to use. We can use this “intelligence” to our advantage for several different applications, but we will begin with making use of it, initially, to benefit the end-user in direct and meaningful ways.

System Intelligence Applied Directly to End-User Assistance: It is best if we “think-this-through” from the activities and subsets of actions that occur within a videoconference communication and presentation space.

For Example:

Let’s start from an empty or unoccupied room and follow a few of the progress-steps as the room becomes occupied and people elect to use (or elect not-to use) all [or only portions] of the technology-driven capabilities that are integrated and resident there:

- **A person or group enters the room.** Acknowledging that this might happen for many reasons where there is no intent to make use of the resident technology systems (perhaps it is merely someone arriving to clean the space), perhaps this act alone does not initially “trigger” any intelligent assistance by the controllers. *The exception to this* might be if we determine it would be helpful to place the lighting for the room on a motion-sensor master array. This would turn the lights “On” automatically when someone enters the room, and turn them “Off” if the presentation / VTC system is not energized and there is no motion “sensed” in the room after an appropriate time-out period (30-minutes).

(This would help to reduce energy consumption and also improve useful lamp-life.)

- **If, however, this entry is then accompanied by** contact with the presentation systems technology components or tools, the control system can be designed to ask some initial questions. FOR EXAMPLE: These might include (but not be limited to) the following:

a. Do you wish to turn the Power “ON” for the room technology components?

Yes...No [If the answer is “Yes”, then display a message* for the period of time it takes the system, including elements like the video projector, to actually power-up, warm-up and be ready to provide the user a “working” system.] For instance: *After the “Power-ON” sequence has begun and it’s ‘on-the-way’ to providing the ability to see video on-screen, display a message on the control panel that says “Projector Is Warming Up... Please Wait A Moment ...” with a countdown timer on the screen. (*see paragraph below that is boldly entitled “**AN IMPORTANT LESSON IN CUSTOMER SERVICE AND INTERACTION WITH USERS**” to learn more about this and other on-screen message prompting.) When the countdown timer has ended and the system is ready for use, show a message on the control screen: “Thank you for your patience – Touch here to continue”, and *then move-on to the next series of options / questions.*

b. Do you wish to make a local-only presentation? Yes...No [If “Yes”, then present the screen that applies to local presentation and (if appropriate) automatically switch the PC image onto the display projector / device(s). Provide an on-screen prompt that asks if they intend to use a resident-room-computer or if they will be using a temporary laptop connected to the system. If they answer “Room PC”, then provide on-screen assistance to tell them about adjusting any audio and who to call* if they have any PC related difficulties (the PC Support people should provide a name and number that can be programmed [*see next page]). If they say “Temporary Laptop”, select that input on the

system and await the completed connection of the laptop to the system. Show them a picture sequence for connecting the VGA connector and the audio connector to the laptop, and remind them of the max. resolution [for instance - 1280 x 1024 at 75Hz Vertical Refresh], with a simple verbal outline of where to make these adjustments on an XP Laptop. Additionally, prompt the user with specific “help” answers, *such-as*: that they must connect using the available VGA Cable on the table that then connects to the projector, that they must make certain that the video for the laptop has been “toggled” to send the VGA signal out of the laptop VGA port, and that the common keyboard commands related to this are usually “CTRL Key *plus* F4 or F5” *or* “FN (Function) Key *plus* F4 or F5” on most modern PC’s. Again – advise of a telephone number* and a person to call to get help with this if they have any questions or difficulties.]

***REMEMBER** – **PC** “Help” questions **do not go to** a “**Video**” “Help-Desk”.

c. Do you want to contact someone via voice-phone or video? Yes...No [If “Yes”, then launch the system to the videoconference control screen, and bring up the Main Camera in Self-View mode on the display projector / device(s) with the camera in the “main” full-room preset. Additionally, ask a follow-up question: “Do you wish to dial using the Directory or are you anticipating an inbound call?” If “Directory”, present the Directory page on-screen and advise how to use the arrow keys and the “connect”/“dial” button to actually dial the call. If “Waiting for a Call” and the systems are not set to auto-answer, then prompt them they need to press the “Answer” button when the system “rings” and they see and hear the indicators that a call is being “received” and now must be actively “answered” by the end-user.]

THIS IS BUT ONE-SET OF MANY SUCH EXAMPLES. Every action, process, procedure or combination of actions that can be taken or required-by the end-user must be thoroughly thought-out, documented, put into a flow diagram and analyzed **BEFORE** any “buttons” are built and screens are laid-out. (It’s that Design v. Programming thing again)

WE NOW PAUSE FOR: AN IMPORTANT LESSON IN CUSTOMER-SERVICE AND INTERACTION WITH END-USERS: (and each other)

The lesson here (in what we have just learned in the section-above) **is that we must make every effort to use our own skills, and the systems’ intelligence, to walk users through the step-by-step process of what they want to do**, and we do this from a Command Center (if helping someone “live” on the phone or in-person), **and** with a Control system, in a structured and practiced manner that is friendly, polite, and **that looks at the desires & perceptions FROM THE END-USER POINT-OF-VIEW.**

Likewise – **people are generally very forgiving** (up to a point – there are real limits to this tolerance within the normal human-factors of time-perception in dynamic ad-hoc electronic & real-life circumstantial encounter)

of a short pause or “count-down” that *might* be required to [for instance] warm-up a system component (like a projector) or complete a set of multipoint network connections **if - and only if** – they’re politely, simply & immediately **told** (in <123 milli-sec.):

#1. **what they are pausing for**, and

#2. **how long in-total they will need to pause**, and finally (as the process moves along)

#3. **how much time is left before the end-user can continue** (take the next step(s)).

Again: This applies to real-life personal communication with users, and to the experience the user has whenever they are “face-to-face” with the System Control Interface screens.

ALSO: Remember: End-users do **not** need the underlying technical details of what is “going-on” with the inner-workings of the technical units. They need only the “big-picture” phrases to frame the issue in a non-threatening and encouragingly cooperative manner, and an accurate indicator of how long it is going to take to complete. Likewise – If any sequence that is “commanded” should fail, the user needs to be told that the “This did not properly complete. Please _____” {*go on to give them the “next-step”*}, as-in “Please check your Laptop Connection if you do not see your computer images on the room display screen” (and show them the connector diagram or pictures again) **or give the logical alternative**, as-in: if they are using the system for videoconference and the “call” did not complete because the line or remote system was “busy”, show a message like, “Please select your Directory entry and press ‘dial’ again” – *or* – “The system or person you are calling is currently “Busy” and is not available for your call – Please contact that individual via phone or email to verify your meeting, or alternately please select the blue Video-Help Button for assistance from the Command Center”.

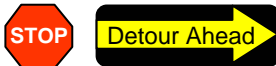
Show them the (a) button... [either show a sample or show the actual menu area and button screen for making a “Help” call from the room-system to the staff in the Command Center]



Sample for this specific discussion only – **not** meant as a prototype of a real button ...

...or show them some other

“next-step” details, remembering to use your on-screen timer and your message of “...here is what is happening now...” method to keep them informed, with appropriate “Thank you for your patience...” statements placed discretely in the programming}}



SINCE WE JUST USED A “BLUE” BUTTON, LET’S PAUSE TO ALSO NOTE:
The Critical Role of Color Selection For Use In Control Systems Interface Design

There is a “psychology” to color, and color has complex relationships with human thought, emotion & physical response, and we ignore its’ potential impact at our peril.

We take this detour because the initial and on-going perception of the “Intelligence”, Reliability and Effectiveness of the system will be greatly influenced by the feelings that it creates in the minds of the end-users, and these “feelings”, though influenced by many elements, are initially influenced, in great part, by the layout selections, especially the color choices, for the actual interface display. While we do not intend to stray far from the discussion of “Background Intelligence in the Control System” and how we can put this to good use in our design of the full Control System and support elements, it is important and educational, at this point in our topic- materials, to pause for a moment and consider some fundamental elements of “color”, after which we will return immediately to our core main discussion topic(s).

Colors often have different meanings in various cultures, and there are no “absolute” hard-and-fast rules that work the same for every human being on earth. Even in Western societies, the meanings of various colors have changed over the years. Today (2006), in the U.S., researchers have generally found the following associations and perceptions accurate for the vast majority of the general population.

■ **Black (In lighting, the absence of light. In pigment, the “presence” of all colors equally / in equal appropriate “amounts”)**

Black is the color of authority and power. It is popular in fashion because it makes people appear thinner. It is also stylish and timeless. **Black is often associated with High-Technology elements and items.** Black also implies submission. Priests wear black to signify submission to God. Some fashion experts say a woman wearing black implies submission or authority. Black outfits can also be overpowering, or make the wearer seem aloof or evil. Villains, such as Dracula, often wear black. Weapons or weapon-systems that are painted black often look sinister, mean and intimidating. **In video**, the level of “black” is visually determined by the apparent brightness of the display surface when viewed under ambient room-light (display devices create “white” or “Light”, not “black” or “Darkness”). That is why the “brightness” adjustment in a video device establishes the “black level”, and “contrast” adjustment establishes “white level”.

□ **White (In light, the presence of the full spectrum of colors [the “complete rainbow”], and (depending how you think about it) in pigment “white” is the “absence” or lack-of color [chroma or color-level of a particular Hue or color])**

Brides wear **white to symbolize innocence and purity.** White reflects light and is considered a summer color. White is **popular in decorating and in fashion** because it is **light, neutral**, and goes with everything. However, white also shows dirt and is therefore more difficult to keep clean than other colors. Doctors and nurses wear white to imply sterility and cleanliness. **White is also burdened** today in our contemporary American culture **with an interesting dichotomy** – it remains the color of the very best and most-expensive fine china (and has been for centuries), but is also (today) the color of cheap disposable paper-plates. **The auto-iris* function of most cameras has a great deal of difficulty if there is too much “white”** in the field of view of the camera and should, therefore, often be turned “off”. (* iris = mechanism for how “bright” to make the video image, like the iris function in your eyes [usually seen as a change in pupil dilation])

■ **Red (a VERY important color, to be used only when fully understood):**

The most emotionally intense color, red stimulates a faster heartbeat and breathing. For the ancient Romans, a **red flag** was a signal for battle. Today, when someone uses the phrase “**raising a red-flag**” they are speaking about an extremely serious and impending situation that requires immediate attention. Because of its visibility to most humans, **stop signs, stoplights, brake lights, and fire equipment** are all painted **red**. In fact – the human eye sees red much easier than it sees blue (except in color-blind people, who actually “see” red as what others would call “green”). Red colors [“warm”] appear to advance towards the eye while blue colors [“cool”] appear to retreat from the eye. That is why tail-lights on automobiles are red and NOT blue – you stop sooner for red tail-lights than you would for blue colored lights of the same size and power (light-output or lumen* level). *[Lumen = one of several units of measure of the amount of light. Others are Lux and Footcandle. The relational formula is: 1 Lux =1 Lumen per square meter =.09673 Ft.Candles]

Red has great significance around the world in every culture, perhaps more than any color we are discussing here, and those within your company or within other organizations who are world travelers, or

people who will videoconference with people from different world cultures, [or those who will host guests from other cultures and who will visit local facilities], **should pay close attention to the following short descriptive statements.**

The ancient Egyptians considered themselves a red race and painted their bodies with red dye for emphasis, and the **modern Egyptians continue to use red** in a significant manner to extol the virtues of their country and society. In **Russia**, red means beautiful. The Bolsheviks used a red flag as their symbol when they overthrew the Tsar in 1917 (that is how red became the color of communism). In **India**, red is the symbol for a brave soldier. In **South Africa**, red is the color of mourning, though it's considered good luck to tie a red bow on a new car. In **China**, red is the color of good luck and is used as a holiday and wedding color. Chinese babies are given their names at a red-egg ceremony. Superstitious people in many cultures think red frightens the devil. A “red-letter day” is one of special importance and good fortune. In **Greece**, eggs are dyed red for good luck at Easter time. To “paint the town red” is to celebrate. Red is the color most commonly found in national flags. In the **English** War of the Roses, red was the color of the House of Lancaster, which defeated the House of York, symbolized by the color white. The “Redshirts” were the soldiers of the Italian leader Garibaldi, who unified **modern Italy** in the nineteenth century. To “see red” is to be angry. A “red-herring” is a distraction, something that takes attention away from the real issue. A “red-eye” is an overnight [often uncomfortable and sleepless] airplane flight. If a business is “in-the-red,” it is losing money. Red is also the color of love (the “heart” on Valentines-Day, for instance, is almost always red, and tradition holds that love is expressed by sending red-roses). Red clothing gets noticed and makes the wearer appear heavier. Since red is an extreme color, red clothing might not help people in negotiations or confrontations. Red cars are popular targets for thieves (and, studies show, are a documented target for some law enforcement officers, thus the phrase “pull-me-over-red” in vehicle paint). In decorating, red is usually used only as an accent. Decorators say that all-red furniture must be perfectly constructed and in perfect condition since it will attract immediate close attention. ***An off-shoot of red, the most romantic color, pink***, is more tranquilizing (**pink** is also known as **un-saturate red**, with “saturation” defined as “distance from white”. Pure-red is considered highly “saturate” – it has no white mixed in with it. Pink is “unsaturated” red, since it is pure red with a great deal of white mixed in with it). Sports teams will sometimes paint the locker rooms used by opposing teams bright pink so their opponents will psychologically lose energy and become more submissive. For the very same reason, some penal institutions are now using pink as the color for all of the inmate outer-wear jump-suits and, in some cases, even for the inmate under-clothing.

■ Blue – Our most important color in Control System User Interface Design, interior design of meeting spaces and videoconference backgrounds, and in clothing worn while communicating via compressed video connections. The most friendly, peaceful and pleasant color for electronic display of live video and graphic images, it is no small coincidence that the default-background in MS-Windows [and for many other software programs] is Blue, and that you get a Blue-Screen when you use a DVD or VCR Menu. Blue is the least amount of any individual color in the video signal (it is only about

23% of the standard composite-color-video signal), but **blue is the color that is most pleasing to human beings when viewed on video** or electronic displays. Manufacturers of these devices and programmers of software products and interfaces know that you will tend to “feel better” about their products if they use Blue liberally in the design. The color of the sky and the ocean, blue is one of the most popular colors. **Blue causes the opposite reactions as red.** Peaceful, tranquil blue causes the body to produce calming chemicals, so it is often used in waiting areas, bedrooms and private restrooms / bathrooms (public restrooms generally make use of yellow, orange, red, brown/tan or white, in an effort to get people to enter, complete their business and then exit in a timely manner, rather than linger in the environment). Blue can also be cold and depressing if not balanced with some warmer accent colors. Fashion consultants often strongly recommend wearing blue to job interviews because it symbolizes loyalty. People engaged in thought-based work are often more productive in blue rooms, though blue also has an impact on the level of physical output an individual can endure. Studies have shown that weightlifters are able to handle heavier weights in blue gyms, and athletes who must run or move rapidly and continuously (basketball, tennis, soccer, hockey, etc.) will be able to sustain a higher level of output for longer periods when performing their sport within a predominately blue environment. Blue is also the reference-color of all standards-based compressed video encoders, and environments that are finished and appointed with this color will result in improved image quality of the encoded video when it is displayed at the far-end of the connection (the video images presented to the far-end will look better, since the encoder does a better job when it “sees” a lot of blue, especially if blue is the background color for all other objects within the field of view of the camera).

Green

Currently [in 2005 and 2006] here in the United States this is the most popular interior decorating color. It is the easiest color on the eye and can improve vision. Many auto dashboards use green for the indicators. Green symbolizes nature. **It is a calming, refreshing color.** People waiting off-camera or back-stage to appear in public or on TV are traditionally seated in "Green Rooms" to relax (though many of these waiting-areas are not actually green anymore). **Hospitals often use green because it relaxes patients.** In the Middle-Ages wearing green symbolized fertility. Dark green is masculine, conservative, and implies “old money”. Even today, however, seamstresses often refuse to use green thread on the eve of a fashion show for fear it will bring them bad luck.

Yellow

Cheerful sunny **yellow is an attention getter. Be careful, however** - While yellow is considered an optimistic color, **people lose their tempers much more often in yellow rooms, and sudden disproportionately vitriolic outbursts can be triggered for seemingly no reason by yellow interiors or even smaller temporary fields of yellow.** Babies will cry much more when placed into predominately yellow environments. It is also critically important to remember that, especially on a video or electronic display, yellow is the most difficult color for the eye to take-in, so it can be quickly overpowering if overused, even to the point of making the viewer feel somewhat nauseous (sick to their stomach) for (in their mind) no apparent reason. Pale yellow [unsaturated yellow] enhances concentration, hence its use for legal pads. It also speeds metabolism.

■Purple

The color of royalty, purple connotes luxury, wealth, and sophistication. It is also feminine and romantic. In pre-revolutionary France only the King and other high-royalty could wear Purple (and only they could wear corduroy, which gets its name from the French words or phrase ‘Cord-du-Roi’ – loosely translated as “Cloth of Royalty” or, more accurately, as “Cloth of the King” [“Roi” means “King”], when the method of weaving the material using purple-threading was first created for the Sun King, King Louis XIV). Purple is also the color of a high-level military decoration (in the U. S. this takes the form of the Purple Heart, the decoration given for being wounded in combat). However, because it is rare in nature, purple can appear artificial. Additionally, it is interesting to note that “Purple Speech” is a phrase occasionally used when indicating “Profanity”.

■Brown

Solid, reliable brown is the color of earth and is abundant in nature (though most hardwood tree-trunks are not brown, they are grey). Light brown implies genuineness, while dark brown is similar to wood or leather. Brown can also be sad and wistful. Men are more apt to say brown is one of their favorite colors. ***Brown is a BAD color to attempt to create in any video or electronic visual display, and usually looks like muddy yellow or green, making the edges of images appear very “soft” to the eyes.***

Of additional Interest:

Colors of the Flag... (Note: A corporate or country Flag is a good template for many designs in visual display backgrounds if care is taken not to let it make the total image too “busy” or cluttered, and if used in a pale or muted fashion. It often elicits warm, helpful, cooperative and loyal sentiments in many people). In the U.S. flag, for instance, white stands for purity and innocence, red represents valor and hardiness, and blue signifies justice, perseverance, and vigilance.

More Colorful “Food for Thought”... While blue is one of the most popular colors it is also one of the least appetizing. The color blue is extremely rare in nature, and edible [non-toxic] blue food is most-rare, especially in natural foods (even blueberries are actually purple, and only recently has a true blue rose been cultivated as a hybrid flower, though there are many other flowers that are naturally Blue). Food researchers and historians say that when early humans searched for food, they learned to avoid toxic or spoiled objects, which were often blue, black, or purple. When food dyed blue is served to research-study subjects, they often show a dramatically reduced or completely lost appetite. Green, brown, and red are the most popular food colors. Red is often used in restaurant decorating schemes because it is a documented appetite stimulant. (You may have noticed that many items in the “impulse-purchase” rack along the checkout lane at the grocery store also use red packaging or labels, and the racks that hold the items are often also red in color or have red trim and red signage).

This, then, ends our detour into a little bit of initial understanding of the psychology of “color”... and we may now turn back to our discussion of using the native and possibly unused available “Background Intelligence” in the Control Systems.

End of Part 1: Essentials of End-User & System-Level Control Design & Programming for Presentation and Videoconference: The User-Level

In Part 2 of this white-paper, we will return again to our discussion of “Background Intelligence”, though, at that point, we are going to step away from our previous focus on the End-User and concentrate, instead, on ways we can use this intelligence to directly influence and impact the performance and reliability, and “fault-tolerance” of the complete presentation and visual communication systems. Through this approach we will, thereby, dramatically [though completely indirectly] impacting and influencing the end-user experiences and general and specific feeling towards the technology and the activities related to engaging the technology. This is the area where we will begin to “chart new territory” and for which there are, as previously stated in our introductory paragraphs, no known templates from which a Control System Designer or a Control System Programmer can work.

*Article copyright- S. R. Sharer & CDG Inc. – June 2006 – all rights reserved.
Submitted for posting on-line by INFOCOMM.ORG by S. R. Sharer – July 2006.*

About the author – Scott R. Sharer [CTS, BA, and MFA] is the Founder, President and Senior Design Engineer of Communication Design Group Inc., located on Tybee Island, Georgia – USA. Scott has been a long-time member and strong supporter of INFOCOMM and is a regular senior professional trainer in INFOCOMM classes related to implementation and use of videoconference and streaming technologies.

CDG Inc. is a Design, Engineering and Consulting Services Company specializing in all forms of video communications and videoconference in business, education and government.



**Over 14 Years of Design, Engineering & Business Consultation
for the Videoconference and Streaming User Community**

For more about Scott Sharer, his background and his work, please visit his on-line profile at:
<http://www.ziggs.com/reg/member/Bio.aspx?uid=1654>