
WHITE PAPER

ROADMAP TO THE USE OF WEB VIDEO IN SYSTEMS PROJECT MANAGEMENT

Abstract

iPOV has been investigating the use of web video as an industrial tool for nearly a decade, in more than 350 projects for well-known corporations. Simultaneously, iPOV has been very active and innovative in software development, where it has hard-won experience with the problems and challenges of Software and Systems Project Management.

From this combined video and software development experience, iPOV has identified exciting opportunities to apply recent advances in web video and video-sharing technology to the management of systems and software engineering projects. This white paper summarizes key web technologies, identifies three generic roles that they can play, and examines specific examples of application patterns that recur in many software and systems engineering requirements – including many of the requirements for compliance with management best practice standards such as [CMMi](#).

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WEB VIDEO TECHNOLOGIES

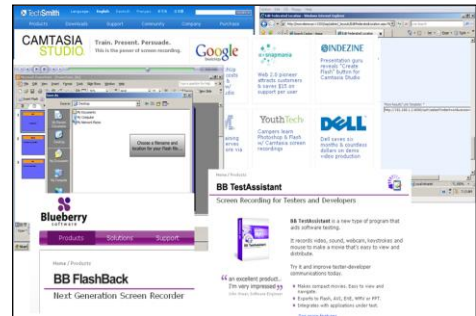
iPOV's experience suggests that a great deal can be accomplished by combining four video tools with tools that are commonly available in most large organizations. This section examines iPOV's four basic tools in detail and briefly identifies several related technologies to which iPOV has successfully integrated.



SCREENCASTING (S)

Screencasting is the Swiss Army Knife of IT/software documentation. A screencasting program runs in the background on the PC and records the computer's display and audio activity into a digital movie. The result is a pixel-perfect movie of all desktop activity.

Screencasting makes it easy to author software and computer documentation and training materials. While there are numerous screencasting products and vendors, iPOV generally relies on the following commercial products:



- [BB Flashback](#) is a workhorse screencast recorder and editor that offers excellent performance, strong compression, and a feature set that is ideal for widespread use. The **recorder-only version is free**, and is iPOV's default choice for applications in engineering, testing, internal training and knowledge sharing.
- [Camtasia](#) is another well-known screencast authoring tool to make eLearning and marketing materials.
- eLearning "rapid authoring" software (e.g., [Adobe Captivate](#), [Lectora](#), and [Articulate Studio and Presenter](#)) bundles strong screencasting features with powerful eLearning authoring tools. While they are preferred tools for the production of LMS-oriented eLearning materials, they are too expensive and complicated to fit the spontaneous, day-to-day operational opportunities that are highlighted in this white paper. Fortunately, they can import many other types of video and most of these tools can generate outputs that are easily integrated into material from other sources.
- [VGA2USB](#) is a hardware device that records from a VGA signal to a digital video file. It is handy for recording industrial controllers and computers where installed software cannot run (e.g., during the boot sequence).
- [Microsoft Remote Desktop](#) is arguably the best Windows tool to operate a remote computer (e.g., a computer where it is too risky to install extraneous software).
- **Desktop Sharing Software** is a generic class of software (e.g., [LiveMeeting](#), [Yugma](#), [dimdim](#), [Sametime](#), etc.) that allow distant collaborators to share views of a given computer. iPOV often uses these tools in conjunction with a screencasting tool (e.g., BB Flashback) to record online sessions.



CAMERA VIDEO (CV)

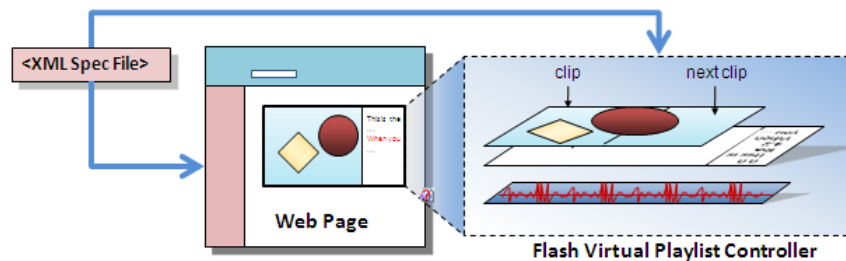
Video cameras are used to record procedures, tasks, presentations, messages and many other events. Cameras can be used on plant floors to record procedures or problems with equipment. They can be used to record classroom lectures or boardroom presentations. iPOV currently recommends two types of cameras:



- **Hard Drive Camcorders (HDC)** – Priced in the \$500 to \$1000 range, these cameras can record many hours of high quality video on built-in hard drives and they make excellent movies in office or plant setting.
- **Solid State Camcorders (SSC)** – A \$100 camera (e.g., [RCA EZ205](#)) can record 2 to 4 hours of 640x480, full-motion video on a 2GB SD chip. The portability, low cost, simplicity and convenience mean that anyone can record useful video with minimal training or preparation. While the video quality is not quite as good as a camcorder, it is more than sufficient to capture technical information.

CO SOLVENT FLASH PLAYER (CFP)

iPOV can dramatically improve the appearance of any video clip by wrapping it in our CoSolvent Flash Player (CFP). The CoSolvent CFP loads before your video into the web browser' Adobe Flash player. With the CFP, iPOV can manipulate Flash animation **on top** of a running video. We can hide blemishes, emphasize features, freeze frame, zoom in to details, insert Flash animations, and more.



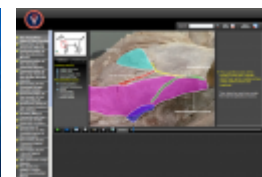
[Self Review](#)



[Overlays](#)



[Picture in Picture](#)



[Canine Dissection](#)

The CFP is effectively a video editing program that is embedded in the Flash Video movie. A specification file dictates the video features, appearance and behavior as the video plays in the user's browser. iPOV can also export the design as a single, **"flattened" SWF file** that can be used or embedded in a wide range of applications. The flattened SWF can even be embedded **inside a standard PDF file**.



CoSolvent COMMUNITY SERVER – VIDEO AND DOCUMENT SHARING

YouTube attracts millions of people to use video for practical, even mundane, communications.

The simplicity and ease of use changes expectations about video quality. When making and sharing video is easy and inexpensive, it's OK to share videos that are not professional – but are merely useful and informative.

Enterprise (i.e. business) video sharing systems must exercise much finer access control and integrate very carefully into the organization's workflow. In other words, enterprise video and document sharing must be an **operational** tool. iPOV has responded to this need with **CoSolvent Community Server**.



CoSolvent Community Server combines flexible image, pdf and file sharing, with the video support capabilities of the CoSolvent Flash Player. **CoSolvent** offers features that are targeted at corporate applications and iPOV provides consulting and support processing services to help client staff integrate **CoSolvent's** capabilities into their value-added operations.

3RD PARTY TOOLS AND TECHNOLOGIES

iPOV has designed and chosen its core video technologies to co-exist well with the complementary technologies that are found in most corporate IT environments.

- **Learning Management Systems (LMS)** – Most large organizations have adopted some type of LMS. iPOV can export any of its published materials as a SCORM 1.2 standard learning object.
- **Document Management Systems (DMS)** – Large organizations rely on document management systems (e.g., SharePoint, Lotus Notes, Alfresco, etc.). iPOV can publish rich media documents that work in these repositories.
- **Video Conferencing (VC)** – iPOV can use screencast recording to capture videoconferencing sessions (from desktop or web delivery) and convert and deliver those recordings as Flash movies.
- **Desktop Sharing (DS)** – iPOV can use screencast recording to capture videoconferencing sessions (from either desktop or web-based systems) and convert and deliver the recordings as Flash movies.

GENERIC ROLES FOR WEB VIDEO IN CMM

From iPOV's experience, web video technologies tend to generate value in three basic roles. These roles are sufficiently broad that they are found throughout the operations of almost any industrial organization, including organizations that are operating according to CMM.



SEARCHABLE VISUAL ARCHIVE

One role for video is to serve as record for visual knowledge and/or visually significant events. Some typical examples:

- **Investigative Archives**– As experts investigate a problem, they can collect and save documents and video recordings about the problem and its solution.
- **Performance Milestones** – Video can be a complete and convincing record to prove that a milestone was achieved, a test was passed, a worker was trained, etc.

iPOV Video Search Tools

Searching archived video is a notoriously tedious activity and deters widespread use. iPOV has developed specialized technologies and processes to make the content within video recordings more easily findable.



(ASYNCHRONOUS) COMMUNICATION

If video can be made and shared quickly, video can support rapid asynchronous communication to explain visually complex topics. For this role, simplicity, speed and ease-of-use are essential characteristics. Fortunately, innovations on the Internet have been addressing these concerns and making great strides.

iPOV & Open Source Video Tools

iPOV is an active user of best-in-class open source video technology. We constantly test new and promising Flash and video applications.



INSTRUCTION

Video recordings of explanations and demonstrations can capture visual details (e.g., construction steps or rare failures) that can be accumulated, adapted and used in eLearning, in the classroom, or as an aid to OJT. To be an effective teaching tool, however, the video should integrate both formal and informal feedback. iPOV is familiar with most of the standard eLearning interaction formats (quizzes, SCORM, AICC, etc.) and has developed tools or procedures to support them.

iPOV SCORM Compliance

iPOV has 10 years of experience in transforming video into multimedia eLearning. iPOV can coach you to capture expert content more effectively and integrate standards-compliant eLearning courses into your LMS.

APPLICATION PATTERNS

Video technologies can be combined to address a wide range of specific operational challenges. With experience from more than 350 projects, iPOV has identified as set of **patterns** that tend to recur frequently in day-to-day operations. As a result, iPOV has developed proprietary technologies and processes to support several common patterns very efficiently. This section describes application patterns that are especially relevant to systems project management. However, iPOV is continually finding new application patterns and our overall list of supported patterns extends beyond these examples and continues to grow.

VIDEO USE CASES (VUC)

Video can record rich information about site conditions, application use cases and system requirements. This visual record of end-user needs can be invaluable when engineers are asked to design a new or replacement system. Video clips can record information about end-user behaviors, their operational environment, existing equipment and current operating practices. For example, a field engineer could record a tour of a remote installation site, along with a running commentary to highlight opportunities and concerns. The recording is shared with the bid/design team and archived for future reference..

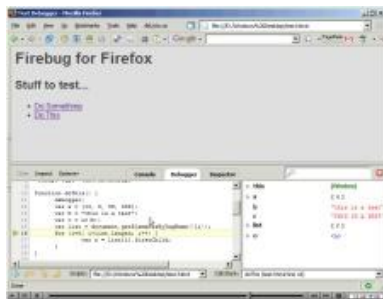
iPOV Video/Document Sharing:

CoSolvent can facilitate sharing and archiving use-case videos.

iPOV Processing Services:

iPOV can receive, organize, edit and tag the raw video to make it more findable and helpful.

ARCHIVED SCREENCASTS (AS)



[Typical IT Screenshot \(non-iPOV\)](#)

Any software engineer can make a technically understandable screencast with a microphone and software. They can record the processes, tasks, events and diagnostics as they appear on a computer desktop. They can explore GUI design issues or explain structural diagrams. They can demonstrate dynamic design

iPOV Searchable Transcripts

iPOV can transcribe the audio commentary and add custom 'metatags'. This will make it easier to find specific contents in a library of archived screencasts

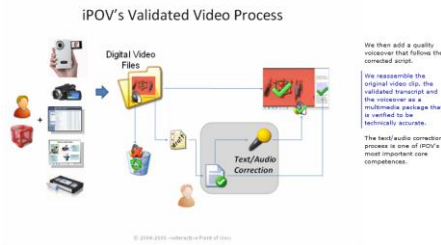
iPOV Video/Document Sharing

iPOV's CoSolvent makes it easy to share the archived materials.

techniques like those in Photoshop. In each case, it is will be easier to “show” how to do something than to write a clear text description. This opens up many opportunities to record computer activity and save it for later reference:

- Code walkthroughs of complicated or tricky code fragments.
- Installation and setup procedures.
- Documenting important troubleshooting or testing sessions

POWERPOINT SCREENCAST (PS)



[PowerPoint Presentation on using Video as a Cross-Cultural Tool](#)

An author can make quickly make a screencast of a PowerPoint presentation to create a “canned” presentation. This reduces the amount of text an author must write. They can

iPOV Subtitles and Voiceovers:
For important presentations, a small amount of coaching can reap big benefits in quality. For internal distribution and archiving iPOV's Video Share for Business is an excellent tool.

often explain concepts more in words than by adding more text and animation to the Powerpoint slides. To pitch new ideas this can be leveraged to produce [“your best presentation everytime”](#). For internal discussions and documentation, the ease of explanation can be leveraged to create fast, simple presentations, letting their words and mouse movements add the details and elaborate more “advanced” concepts.

ARCHIVED INVESTIGATION (AI)



[Investing SharePoint Federated Search](#)

Systems and software projects often create the need for short investigations. Typical investigations might test the feasibility of a design idea, install and evaluate a potential software purchase, run a benchmark test on a possible configuration, etc.

By making screencasts of tests and procedures, and combining those with documents and links to supporting material, a developer can quickly document the investigation so a follow-on developer could pick up the pieces fairly quickly. This record can also give other stakeholders a clearer sense of how “hard” or “easy” the task will be.

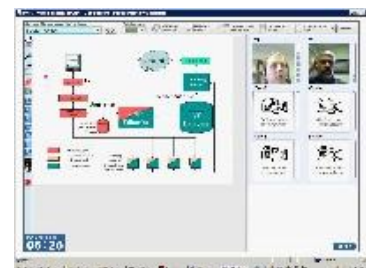
In the accompanying example, iPOV was asked to investigate how Microsoft SharePoint reacts to the OpenSearch standard. It took several days to complete the investigation (including installing and configuring demonstration sites), but it took only a couple of hours to make the screencasts and assemble the web links to bolster the conclusion.

ARCHIVED MEETING (AM)



[Archived Video of Meeting](#)

Any participant at a meeting can use a camera or screencast software to record the proceedings. If the materials are transcribed to make them searchable (as in AS), project decision-making could be visible to a much wider stakeholder audience. This would also allow more accountability.



[Archived VideoConference](#)

VIDEO TO eLEARNING (V2E)



[Original Raw Screencast](#)

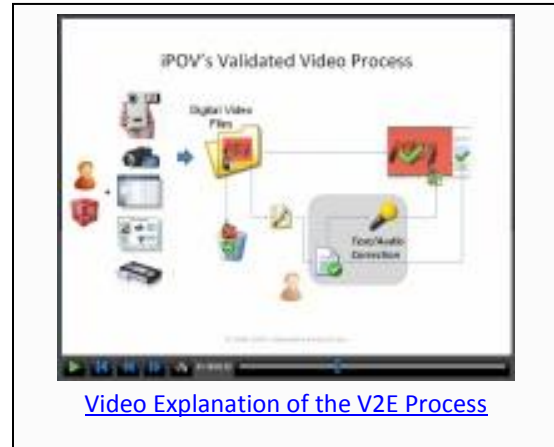


[Finished eLearning](#)

iPOV uses a fast, simple process to convert casual explanations into validated, professional documentation – with minimal demands on the expert’s time.

For systems applications, screencasts (or camera video) are made to record the expert’s expertise completely and informally! The expert spends the absolute minimum amount of time on the task, while most

of the work can be done by skilled, but non-technical, staff. The use of video dramatically reduces the production time and error rate, as well as transferring work from scarce, high-value experts to lower cost personnel.



[Video Explanation of the V2E Process](#)

VIDEO TO TEXT (V2T)

iPOV has found that one of the easiest ways to write a text manual for software is, paradoxically, to begin with a screencast (or camera video) and reverse-engineer the text and still images from the video.



[Video Instruction Manual](#)



[Text and Image Procedure \(pdf\)](#)

This works because the video fully and accurately captures every part of the task and the expert’s informal audio track gives a good starting basis on which to write the final text.

In addition to simplifying and speeding production, this method offers two very important additional benefits. First, most of the work can be done by a non-expert, freeing the expert to perform other, more valuable, tasks. Second, if the recorded action achieved the desired result in the video, the derived manual is highly likely to be accurate – since it is derived from a known correct input.

iPOV Reverse-Engineers Text from Video:

- Transcribe commentary
- Clean grammar
- Rephrase comments as step-by-step instructions.
- Extract still images from the video at critical points in the transaction
- Format the images and step-by-step instructions into a Word manual.

VIDEO TO OTHER REPRESENTATIONS (V2OR)



[Original Expert Video](#)

Video recordings can be a rich source of information to speed the development of more sophisticated multimedia materials. For example, iPOV frequently makes a video recording of an expert working with physical items or writing on a whiteboard or even making handwritten notes. iPOV uses these to guide the production of Flash animations.

iPOV Flash Animation:

Using a recorded video as a guide, iPOV staff can generate Flash animations that clarify and simplify the expert's message or story.



[Derived Flash Animation](#)

The videos to the left illustrate the process in action. The notable feature of this example is the fact that the derived Flash animation was made with no additional input from the expert. The expert did, ultimately, review the material, but could not find any issue or problem with the derived version. In effect, he simply rubber-stamped it.

RICH MEDIA PDF (RMP)



[Download PDF to hard disk to view](#)

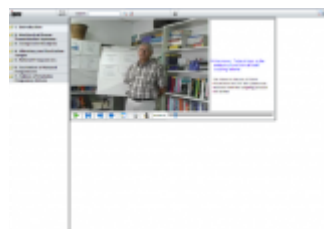
Many organizations would like to utilize more video, but their technical organization is firmly committed to the use of a document management system (DMS) such as Microsoft SharePoint or Lotus Notes. This often means that promising web video formats are impractical.

iPOV has developed software and techniques to embed high-function Flash video clips into standard PDF files that can be stored exactly like any other document file.

iPOV Flattened Flash Movies

iPOV can take any of its video formats and 'flatten' them into a single SWF, complete with sophisticated play controls. Flattened SWFs can be embedded in any standard Adobe Acrobat PDF file and will retain their full functionality – even when stored in SharePoint or Lotus Notes.

EXPERT INTERVIEW (EI)



[Gear Coupling Expert](#)

Video is a surprisingly easy way to capture knowledge from experts who are otherwise busy or unlikely to write formal documentation. Stage a setting where the expert is comfortable and video-record an informal Q&A session that is designed to cover the desired topics. Ideally, the session will include the expert, an interested and persistent questioner and a videographer (although professional camera work is not essential).

iPOV Web Video Search Interface:

iPOV can add a web search engine to any video clip that has an associated transcript. The search tool works a bit like Google:

- The engine filters the transcript to show the places search term hits.
- The user can click on a result and the movie will begin to play at that point.

APPENDIX - APPLYING WEB VIDEO IN SYSTEMS PROJECT MANAGEMENT

In this appendix, iPOV presents an illustrative roadmap to the opportunities for applying web video technology to help meet the requirements that would apply in a typical CMMi compatible management process.

















The fundamental technology and role elements are shown as icons, and the more flexible application patterns are shown by their initials. The darker versions of the icons indicate that there may be an opportunity for transformational change in a given requirement area. The faded versions of the icons indicate that web video might usefully serve a supporting role.

The icons are assigned to a list of software/systems engineering process and CMM-compatible requirements definitions that are roughly consistent with a typical Level 2 or Level 3 implementation in a hardware/software engineering organization.







The basic message of this exercise is to highlight the scope of opportunity for combining newly emerging, low-cost video technology with best practice in systems and software engineering.

LEGEND

TECHNOLOGY

<i>iPOV Technology</i>	<i>Transformational Application</i>	<i>Supportive Application</i>
Screencasting (S)		
Camera Video (CV)		
CoSolvent Community Server		
Flash Enhanced Video (CFP)		
<i>3rd Party Technologies</i>		
Learning Management Systems (LMS)		
Document Management Systems (DMS)		
Video Conferencing (VC)		
Desktop Sharing (DS)		












































ROLES

<i>Role</i>	<i>Transformational Application</i>	<i>Supportive Application</i>
Archive and Search		
(Asynchronous) Communication		
Instruction		
































VIDEO/CMM CROSS REFERENCE AND HIGH LEVEL ROAD MAP

This analysis is a high level review of the possible connections and applications for video in a typical CMM implementation agenda. It is intended to illustrate the potential opportunities, but is still too general to serve as an implementation guide. To arrive at an implemental plan, it would be necessary to drill down into each detailed requirement and, in many cases, it would be necessary to conduct a small pilot project to see whether the technologies are really worth adopting on that area.

Compliance Level Requirements	Tech.	Role(s)	Application Patterns	Comments
1. Project Management				
1.1. Planning and Controlling				
1.1.1. Project Responsibilities			EI	
1.1.2. Project Work Plan			EI	
1.1.3. Scheduling and Resource Planning			EI	
1.1.4. Project Control			VUC, RMP, AM	Video can often act as an additional sensor – bringing more information in a more concrete form to more stakeholders for review.
1.1.5. Management of Control			AM	
1.1.6. Risk Management			EI, AI, AM	Risks are often underestimated if team members have to visualize or imagine them. Video can make some types of risks more visible and assessable.
1.1.7. Commercial Control & Accounting			PS	
1.2. Supplier/Subcontractor Management			EI, AI, AM, AS	Video and CoSolvent can make supplier and subcontractor management easier by making communications clearer and less ambiguous.
1.2.1. "Make-or -Buy"			PS	
1.2.2. Selecting Suppliers			AI, PS	Ask vendors to use screencasts and camera video to prove their claims before contracting with them. Archive the evidence for later reference.
1.2.3. Selecting Subcontractors			AI, PS, VUC	
1.2.4. Contracts with Subcontractors			RMP	Use video where appropriate to clarify the scope of work.
1.2.5. Managing Subcontracts			RMP, AS, AM	Use CoSolvent to supplement vendor communications.
1.3. Project Quality Management			EI, PS	Use screencasts and LMS to ensure that all project members understand QA requirements and best practices.
1.3.1. QA Planning and Responsibilities			AM	
1.3.2. Process Controlling			EI, PS, RMP	Video tools may help to document some of the trickier part of the process plan. Video may also help to make certain requirements more understandable and measurable.
1.3.3. QA Reporting			PS	

Compliance Level Requirements	Tech.	Role(s)	Application Patterns	Comments
1.3.4. Reviews	 		AS,RMP	QA personnel use video where appropriate to document and archive both problems and best practices.
1.4. Project Configuration Management				
1.4.1. CM Planning and Responsibilities				
1.4.2. Project Result Management				
1.4.3. Release Procedure	 		AS	For software projects, low-level configuration tends to create a lot of "little" parameters. Build expert(s) know them so well that they often forget to document them. Screencasting can easily capture those little details.
1.5. Change and Error Management	 		AS, RMP, AM	A screencast of the recognized changes in the released version would be a bulletproof record of the achievement
1.5.1. Change Order Management	 		AS, RMP, AM	Video could make change orders more self-evident and reduce later disagreements – especially with customer and subcontractors.
1.5.2. Error Management			AS, RMP, AM	
1.5.3. Claim Management	 		AS, RMP, AM	Video would be strong evidence to justify or avoid claims.
2. Engineering				
2.1. Project Acquisition				
2.1.1. Market Analysis and Business Development	  		AS, RMP	It is easier to get a customer's reaction to a tangible product than to a concept. Video mockups, possibly Flash enhanced, could help to elicit more accurate feedback.
2.1.2. Acquisition and Feasibility Check	 		PS, V2OR, RMP	Give sales force more visual and self-describing product information. If the feature doesn't exist yet, create a mockup.
2.1.3. Estimation and Bid Calculation			V2E, AM	eLearning may help staff to generate better bids and estimates.
2.1.4. Proposal Development	 		V2E, AM	Share videos of proposal best practice. Make expert interviews for good proposal writers.
2.1.5. Contract Management	 		V2E, AM	Use eLearning to improve contract management.
2.2. Systems Engineering				
2.2.1. Technical Requirements	 		VUC, AS, AI, EI, AM	Use video where appropriate to document technical requirements that are not easily described with text and images.
2.2.2. Requirements Tracing			PS	
2.2.3. Engineering	 		VUC, AS, AI, EI	Use video to communicate about technical problems that are mainly visual in nature (e.g., GUI design).
2.2.4. Reuse			V2E, AS, AI, EI	Record video code walkthroughs for the tricky parts of reusable code.

Compliance Level Requirements	Tech.	Role(s)	Application Patterns	Comments
2.2.5. Patent System			EI	Use video where appropriate to document patent issues.
2.2.6. Customer Documentation	 	 	V2T, V2E, V2OR, PS, EI	Use video as a starting point to generate customer documentation faster, at lower cost and with better quality. Then reuse the video in formal eLearning – possibly fee-based.
2.3. Integration and Test				
2.3.1. Defined Test Phases			EI, AI, AS	
2.3.2. Test Methods	 	 	AS, AI	Use video to define tests thoroughly in advance. Record explanations of parameter setup, run protocols and other details.
2.3.3. Test Planning and Documentation	 	 	PS, AS, AI	Record and archive important tests and share them with key stakeholders.
2.3.4. System Verification	 	 	PS, AS	Record and archive important tests and share them with key stakeholders.
2.4. Project Installation				
2.4.1. Shipment	 	 	AS, EI, RMP, AM	Use video to document customer readiness and shipments at both ends. Use the immediacy of video to ensure that conditions are met.
2.4.2. Erection, Assembling, and Commissioning	 	 	AS, EI, RMP, AM	Use video to document site readiness and installation issues. Use the immediacy of video to ensure that problems are promptly solved.
2.4.3. Acceptance Test	 	 	AS, EI, RMP, AM	Use video to document site acceptance tests.
2.4.4. Team Interaction during Site Installation	 		RMP, AM	Send progress videos back from site to maintain interest and team morale.
2.4.5. Project Closing				
3. Process Management				
3.1. Process Definition and Maintenance				
3.1.1. Commitment to a Standard Process				
3.1.2. Standard Process Model and Tailoring	 	 	V2E, AS, AI, EI	Use video and experts to build awareness and buy-in to standard processes.
3.1.3. Process Database	 			
3.1.5. Systematic Process Maintenance	 		V2E, AS, AI, EI	It may be useful to create video examples for auditor training.
3.2. Training				
3.2.1. Institutionalizing Standard Training	 		V2E, EI, V2OR, V2T	Use rich media and eLearning tools to improve consistency of planning for training.

Compliance Level Requirements	Tech.	Role(s)	Application Patterns	Comments
3.2.2. Developing/Maintaining Standard Training	 		V2E, EI, V2OR. V2T	Use all available tools to generate current, cost-effective training materials.
3.2.3. Scope of Standard Training	 		V2E, EI, V2OR. V2T	Use video and reusable modular eLearning objects to reuse training materials for all constituencies
3.3. Process / Product Measurement				
3.3.1. Personnel responsible for the Metric System			EI, PS	Use eLearning tools to expand pool of people with skills to apply metrics effectively.
3.3.3. Scope of the Metric System for the Process			EI, PS	"
3.3.4. Process Control based on Metrics			EI, PS	"
3.3.5. Project Control based on Quantitative Processes and Product Data				
3.4 Process Improvement and Technological Improvement				
3.4.1. Analysis of Root Cause	 		EI, PS, AM	Encourage developers to use video where appropriate to document technical opportunities and issues.
3.4.2. Systematic Elimination of Causes	 		EI, PS, AM	"
3.4.3. Research and Examine New Technology	 		EI, PS, AM	"
3.4.4. Organizational Improvement Program	 		EI, PS, AM	"
3.4.5. Pilot and Evaluation	 		EI, PS, AM	"
3.4.6. Systematic Rollout throughout the Organization	 		EI, PS, AM	"