

TANDBERG FieldView™
Manufacturing and Complex Product Development
Application Notes



There are several macro-level industry trends in manufacturing and complex product development driving the need and demand for a mobile video collaboration solution:

- **Focus on Core Competencies** - Product development organizations are increasingly focusing on the core competencies of the business. Partners are often used as part of an extended product development team. Communications challenges and potential for error increase with this model.
- **Overseas Engineering and Manufacturing** - Offshore engineering and manufacturing is becoming commonplace, especially in Taiwan, Southeast Asia, China, and India. The high quality and low cost of bringing partners from these locales into development teams are simply too compelling to ignore.
- **Shrinking Product Life Cycles** - Development teams are being asked to deliver products of ever increasing complexity on increasingly aggressive time frames. If the product is late to market, lost profits cannot be recovered.

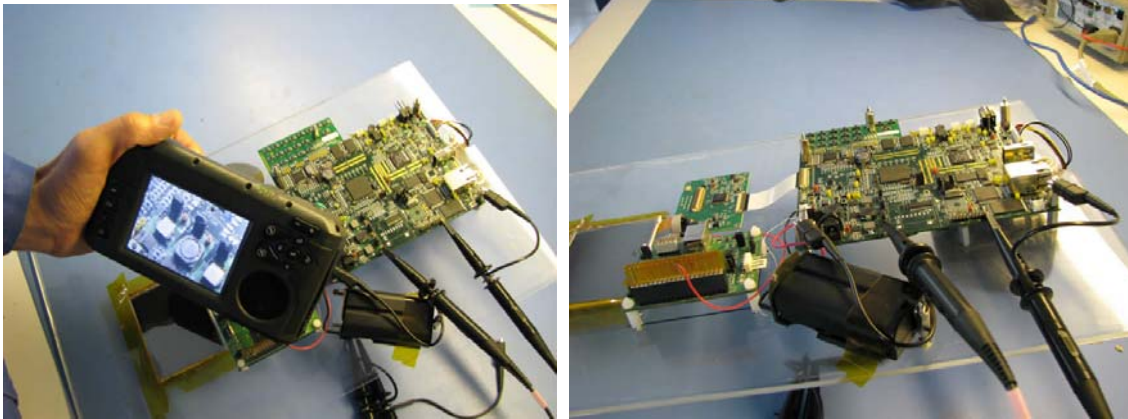
The net result of these trends is that development teams are being challenged to deliver products on record schedules, while simultaneously using a more complex development model that increases the likelihood of errors, miscommunication, unnecessary costs, and program slippage. TANDBERG's Mobile Video Collaboration System, FieldView™ was specifically created to help avoid and deal with this class of problem.

FieldView™ provides the ability to connect specialized experts to either personnel out on the factory floor in all areas of manufacturing or to customer support technicians in the field. From initial idea generation, concept development, and testing, to the manufacturing, implementation and customer support, product developers and program managers can use FieldView™ to extend the eyes and experience of experts around the world. High quality video, still images with 2-way real-time telestration and the ability to discuss them over 2-way audio allows project team members to quickly "see" and consult with remote co-workers or outside resources on issues and problems thereby allowing better decisions to be made faster. Project milestones can be reviewed and approved visually from remote locations during a real-time (or deferred) collaboration session. In addition, annotated images and audio/video files can be archived or streamed at a later date to other parties for review or education purposes.



The Use of TANDBERG's Mobile Video Collaboration System in the Product Development Process

FieldView™ can be used in all phases of the product development process. However, each of the following process stages have one thing in common - they can be streamlined and improved by sharing video content with program team members, and by allowing these individuals to communicate issues and resolve problems in real time from no matter where they are; in the lab, on the factory floor, in an office, on the road or at home.



Design / prototype build

FieldView™ offers manufacturers the ability to enhance their design and prototype build processes. At this point in the process, production-representative devices or systems are required. These devices have several applications including engineering validation testing, qualification testing, regulatory testing, alpha or beta trials, and production validation builds.

When these products are still immature, the processes and techniques required to build them are not well understood and are error prone. It is frequently necessary to consult with engineering or other experts to assist in prototype fabrication. The Mobile Video Collaboration capability of FieldView™ can enable instant communication as soon as a problem arises. Now prototypes can be seen through the design and development steps, allowing program and product managers to quickly evaluate the look and the feel of the product at each stage. Distance and other barriers are eased.

Engineering testing

During this phase of product development informal set of tests are performed on representative prototypes. They can include all (or a subset) of the tests performed in a formal qualification program. Many of the tests are physical in nature (vibration, shock, drop, temperature, and many others) and are performed by engineering support staff.

It is often necessary to consult with design engineering or program management during the set-up and execution of these tests. FieldView™ can be used to consult with these individuals (who are often physically remote) and to create a video archive of applicable tests.

System functional and validation testing

This is a step in the development process where engineering passes the product off to an independent group for validation. In some cases, a portion of the validation program is performed by a third party company. It is not uncommon for dozens of issues and problems to be discovered during this testing.

In many cases, test personnel have great difficulty replicating or explaining the problem. Engineering staff are often diverted away from other activities so that they can develop a clear understanding of what went wrong. FieldView™ provides a mechanism for team members to observe these tests and discuss problem resolution from their desktop.

Qualification testing

FieldView™ fits well into the formal testing program that must be completed before releasing the product to manufacturing. It is rare for any new product to proceed through qualification testing without experiencing one or more failures and the pressure to diagnose and correct problems here is intense. Usually this testing is performed late in the program and any failure can result in a missed deadline for product launch. In some cases, an approved outside qualification lab is used to perform the tests. FieldView™ provides the ability to allow test setups and failures in the lab to be observed and discussed on the PCs of remote team members as soon as they occur.

Communication with External Suppliers

External suppliers are often used to create custom engineered parts or sub-assemblies. On-time and on-spec performance by these suppliers is a critical factor in determining whether or not a program meets scheduling targets. Custom injection molded parts are often a trouble spot, with initial parts not meeting specification or exhibiting cosmetic problems. Significant travel costs and program delays can be avoided through the use of FieldView™ located on-site with the supplier. FieldView™ will allow program managers and engineering leads to view parts before they are shipped and to consult with the supplier as problems occur. This will help avoid the expensive and time consuming process of ship-inspect-reject-ship back.

First Article Inspection

Newly created parts are submitted to a first article inspection process where compliance with drawings and other specifications are assessed. Program pressure is most often intense by this stage of the process. This process must be complete before manufacturing or qualification builds can begin. Normally the process is characterized by inspect-reject-advise-corrective action-resubmit-start again. In a complex program there is a

combination of legitimate rejections and others where the inspector simply needs to consult with an engineering expert to avoid an unnecessary rejection. FieldView™ can be used to facilitate a real-time consultation between the responsible technical authority and the inspector. This will help eliminate unnecessary delays and rejections during this part of the process. In many cases, a successful first article inspection is a significant issue standing in the way of release to manufacturing.

Ideally, especially with third party suppliers the entire first article inspection process can be pushed "upstream" to the supplier using FieldView™ so that failures are identified before the part is shipped. This would reduce time and expense. With the ability to witness inspections performed at the supplier using FieldView™, the need to re-do inspections in-house can be eliminated.

Alpha and Beta Testing

Alpha or beta testing programs are used as a final check before full scale market introduction and an ideal stage in product creation to make use of FieldView™ to help close customers evaluate new products in a real-world situation for the first time. At this stage it is especially important and in everyone's interest for the manufacturer to be in close contact with the customer during testing and to rapidly solve problems as they arise. FieldView™ can be used as a valuable customer support tool during this time. Problems can be viewed in detail and real time discussions can take place on how to solve them.

Production

The transition to volume manufacturing often leads to the need for consultation with various members of the program team. At this stage FieldView™ enables real-time consultation as soon as a problem occurs. For many classes of problems, this consultation will allow production to resume faster than it would otherwise.

Customer Support

Certain product categories require an extensive customer on-site presence for installation and ongoing support. In many cases, even after a successful installation, operating problems and challenges continue to arise. Sample products where this applies include milling machines, robotic SMT pick and place machines, and heavy equipment. Travel costs and customer down time can be minimized through the use of FieldView™ from a shop or factory floor. The benefits derived from this represents a win-win for both the customer and the vendor and, as a result, some suppliers may chose to include FieldView™ as a part of their package every time they sell a system.

The Benefits of Mobile Video Collaboration in Manufacturing and Complex Product Development

Collaborating through the use of LibreStream's FieldView™ Mobile Video Collaboration System drives productivity and profitability for manufacturers by removing the human latency associated with each function and process stage in a number of ways:



Reduction of Product Development Delays - Every new product development program has many (often dozens) points in the process where there is potential for a slippage. Resulting delays can range from less than a day to weeks or months. FieldView™ was created to reduce product development delays and in the process pay for itself many times over.

Reduction of Time-to-Market Delays - Most organizations in manufacturing depend on a steady flow of new products to grow and maintain revenues. Any issue that results in a product development delay will usually mean an associated delay in market introduction. Revenue and margin will be deferred or lost, resulting in an additional cost beyond those encountered in the product development process. Organizations that see themselves as market leaders, who win and lose based upon their new product development performance will especially see the value of FieldView™ is a video collaboration tool which can reduce time-to-market delays.

Reduction of Production Down Time - Production down time is very expensive for manufacturers. FieldView™ pays for itself quickly through the reduction of production down time. This is achieved in many ways including remote troubleshooting and maintenance of production equipment, consultation with a remote expert about an assembly problem, or rapid inspection of a new batch of parts that may be rejected unnecessarily.

Payback can be driven by improved performance on any one of the above or through improvements to a combination of all three. Other types of payback from the use of FieldView™ in the manufacturing process can also occur. These can include:

Avoidance or Reduction of Travel Costs - More often than desired issues and problems ultimately require an experienced senior engineer or production specialist making long trips to where the problem or issue is only to find that after seeing it, a fix or resolution is found within a short period of time. Cost of expensive and often last minute travel as well as the lost productivity associated with it can be another significant benefit of using FieldView™ as an effective collaboration tool.

Scrap Reduction - The scrap costs involved in a bad shipment of parts can be substantial. Vulnerability can be most acute when a new supplier is introduced, or an existing supplier introduces a new process. The cost impact of these surprises can range from relatively minor to very severe. Manufacturers can now make use of FieldView™ to help avoid these costly errors and as "insurance" against negative surprises.

Improved Customer Satisfaction - Although sometime difficult to quantify, many businesses choose to make improved customer satisfaction one of their top priority metrics. FieldView™ can improve an organizations ability to be responsive to its customers, especially for complex products that involve extensive support.

Improved Market Credibility - Slippages in product launch dates can be very damaging to an organization's credibility, especially if important customers are depending on the new product. LibreStream believes many manufacturers will make the choice to invest in FieldView™ because of the convincing case that it can reduce the likelihood or length of such slippages.

Avoid or Reduce "Standing Army Costs" - Some manufacturers penalize their suppliers if late or defective shipments halt production on their line. These "standing army costs" can result in penalties that from \$100s to \$1000s per hour. Use of FieldView™ to rapidly deal with production line problems as they occur can save valuable time and help avoid these charges in many circumstances.