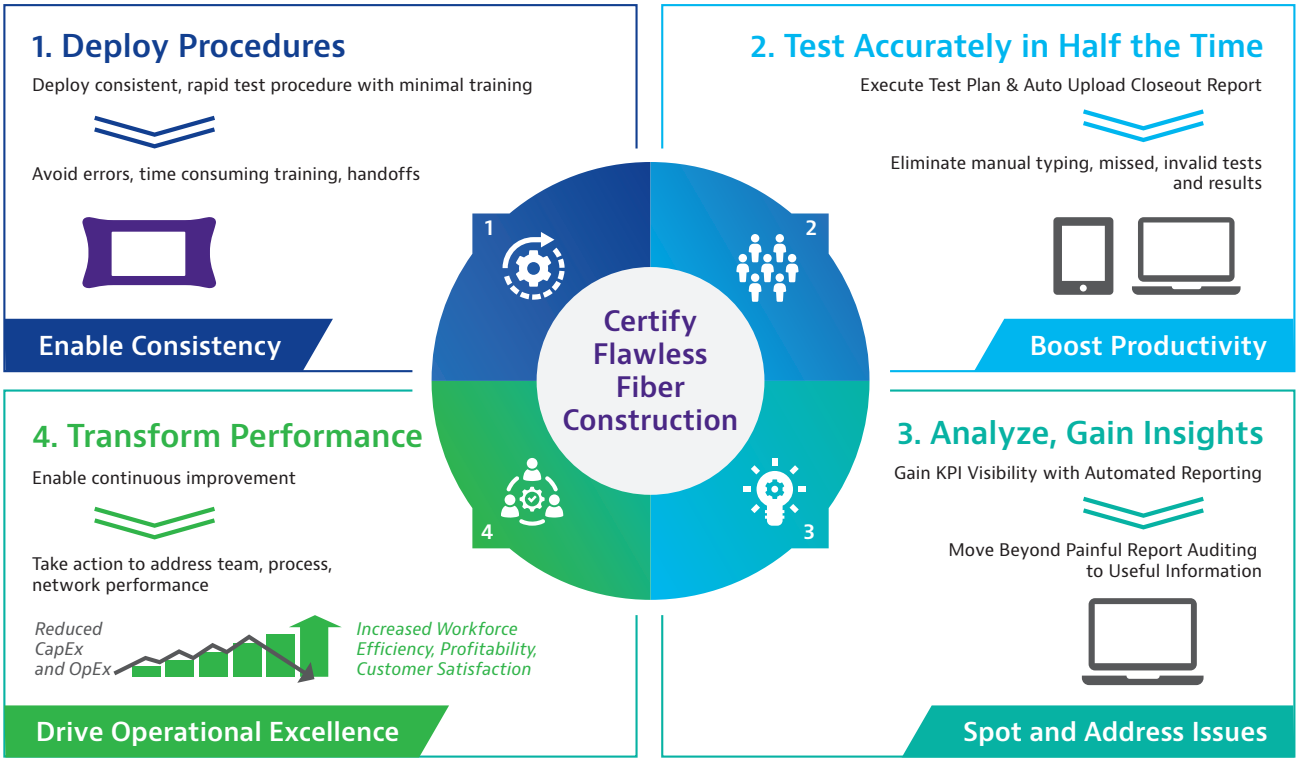
VIAVI Solutions

Case Study

Transform fiber construction certification with the VIAVI StrataSync Test Process Automation (TPA) Suite

Overcome test procedure and certification challenges to enable your team to efficiently build, activate service and maintain a quality network. We will use a fiber construction certification use case to illustrate how the StrataSync™ TPA Suite can transform test procedures in all networks, including fiber, HFC cable, xDSL, Ethernet business and 5G wireless networks. Four key process stages illustrated below allow you to certify flawless networks.



How Do the Test Process Automation Tools Help You?

Job Manager:
Plan and Assign Jobs with Guided Procedures and Automated Job Reports

- Allows jobs with a detailed test plan to be created, assigned and sent to a tech's instrument
- Associates tests to specific job workorder
- Sequence of individual test tasks grouped together in a single job
- Instrument UI displays step-by-step task instructions, progress and results

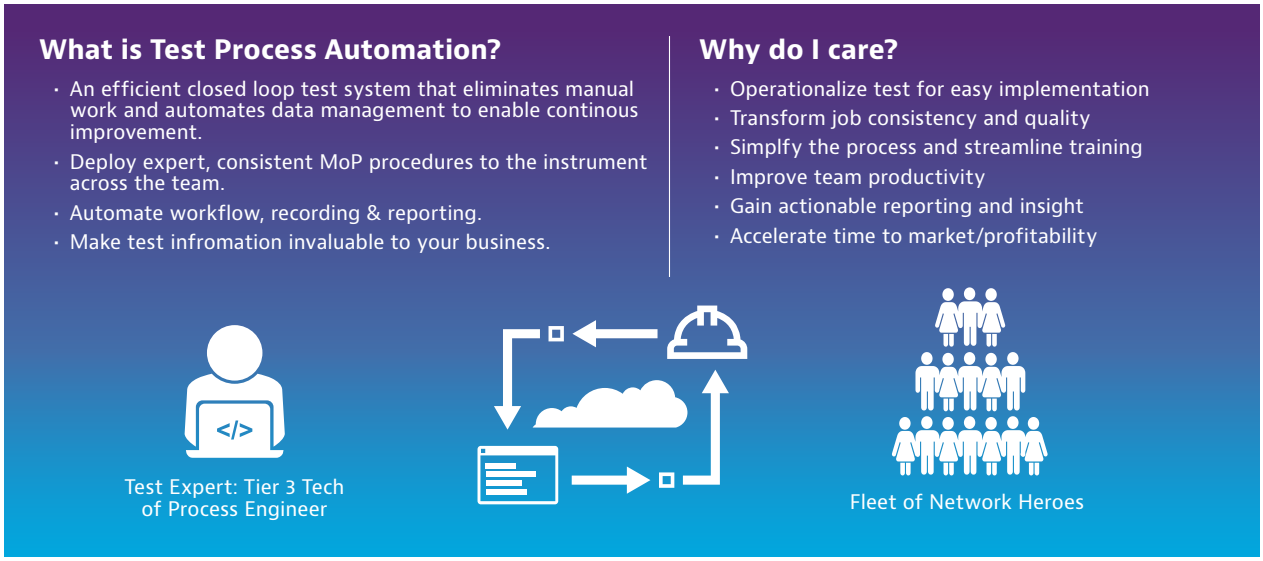
VIAVI Mobile Tech App:
Operate Instruments and Execute App to App Sharing with a Mobile Device

- Synchronization – test plans, test data closeout reports, instrument configuration, firmware update, and software options
- Mobile App – IOS and Android
- App to App sharing to any compatible App
- Test device and mobile device file management
- Enriches test results with workflow audit details – geolocation data, time stamp, and multimedia attachments (pictures, signature capture)

StrataSync Cloud Services:
Manage Assets, Store Job Plans, Tech Assignments and Test Analytics Dashboards

- Enables centralized test process management and back office integration of process / data to eliminate repetitive tasks, enable efficient jobs, and produce real-time rapid reporting
- Organize and push configurations, firmware, software revisions to instrument
- Auto collects and creates KPI dashboard reporting of test results
- API for job workorders coming from ticketing system
- API for test data to ticketing system
- Team organization to allow reporting by team, region, contactor, etc. for complex jobs such as high fiber count cable construction or 5G
- Scales from free account to custom analytics + dashboards
- Real-time sync between instruments, mobile + server

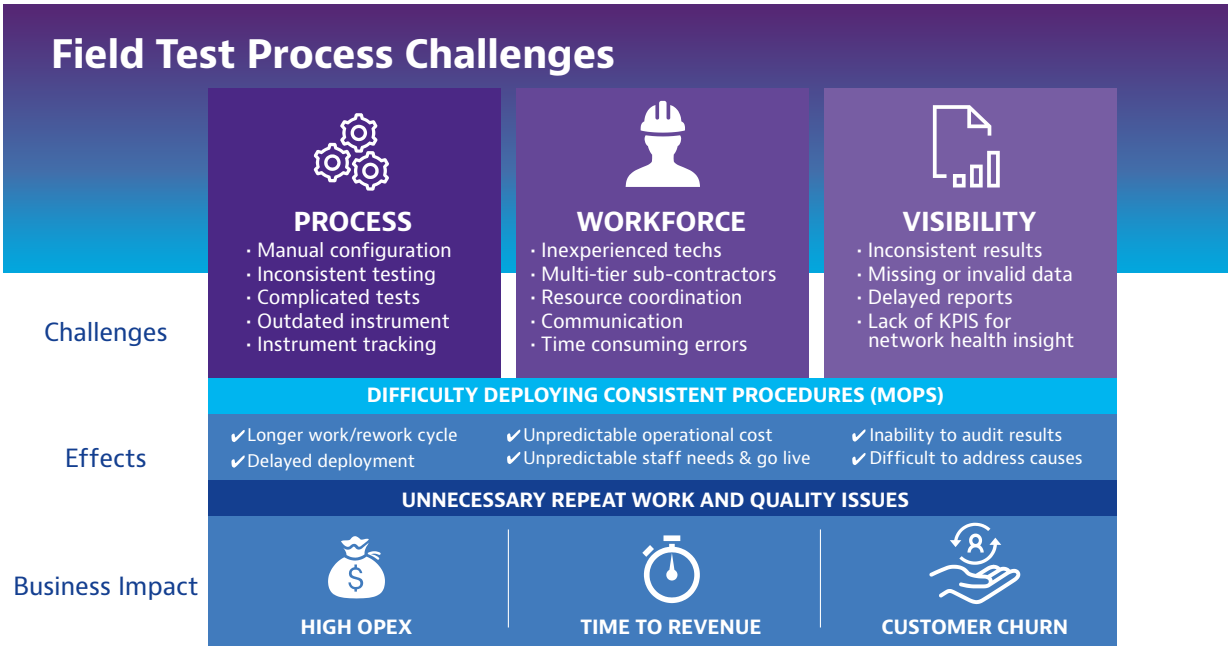
Let's consider a cooperative, automated TPA process.



Organizations struggle to efficiently deploy Methods of Procedure (MOP) to test teams and ensure process compliance. The results include:

- Errors compound throughout the field test work
- The network is not built or documented consistently
- Teams NEVER turn test data into meaningful information to help address network issues

A structured closed loop test process resolves these challenges.

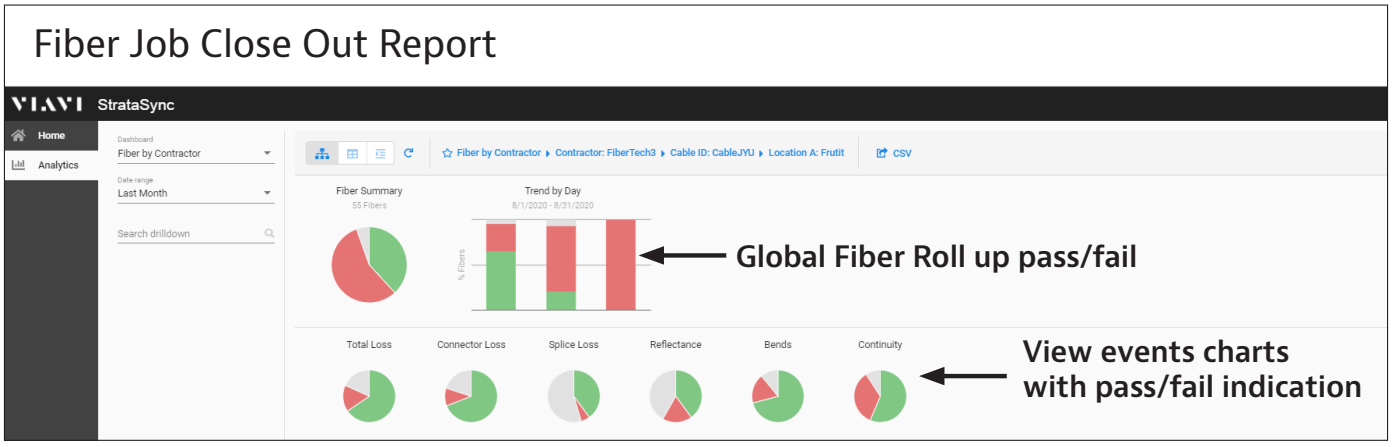


StrataSync TPA helps transform the vicious cycle of junk in, junk out to provide valuable insight so that you can make transformational business impact across the network lifecycle from build, to service activation, to maintenance.

Use Case: Applying StrataSync TPA to Accelerate Your Fiber Construction Certification Process

Let's examine how a closed loop TPA system can accelerate a high fiber count cable construction certification use case to ensure a well built, fully certified fiber cable that would be typical in two scenarios:

1. **Building high speed, long-haul point-to-point networks:** Techs need to join thousands of fibers and certify a cable for high speed service by ensuring fiber signal transmission is not impaired.
2. **Constructing high speed access networks for Cable TV (DAA), telco (PON/FTTX) and wireless (C-RAN, 5G) service:** Techs need to ensure access trunk networks don't suffer from loss or faults that impair the optical budget due to many splices and connectors.



Complex, repetitive, monotonous tasks lead to mistakes causing faults to be built into a network. Every fault built into a brand-new fiber link, reduces transmission capacity, introduces latency and causes bit errors. Ultimately operators compensate by over-building extra capacity or repeating repairs with subsequent truck rolls, reducing profitability for both contractors and network operators. StrataSync TPA is a solution to operationalize test, gather KPIs and avoid errors, and help all parties involved in the construction process to meet their needs.

- A network operator needs networks to be built to specification and delivered on time
- A construction contractor wants to satisfy the customer, do the work once without rework and settle payment immediately
- All parties need to capture test information by fault type, fiber, cable and team to enable reporting on fundamental link quality metrics (like total cable loss, connector and splice loss, reflectance, bends and continuity) as well as high level progress/performance KPI so everyone can meet their goals

High Fiber Count Construction Use Case:

How do you ensure every fiber link is built correctly and certified ready?

3 Tests / Fiber X 6912 fibers in the cable = 20,736 tests per cable …

Assigned, performed and reported by multiple individuals.

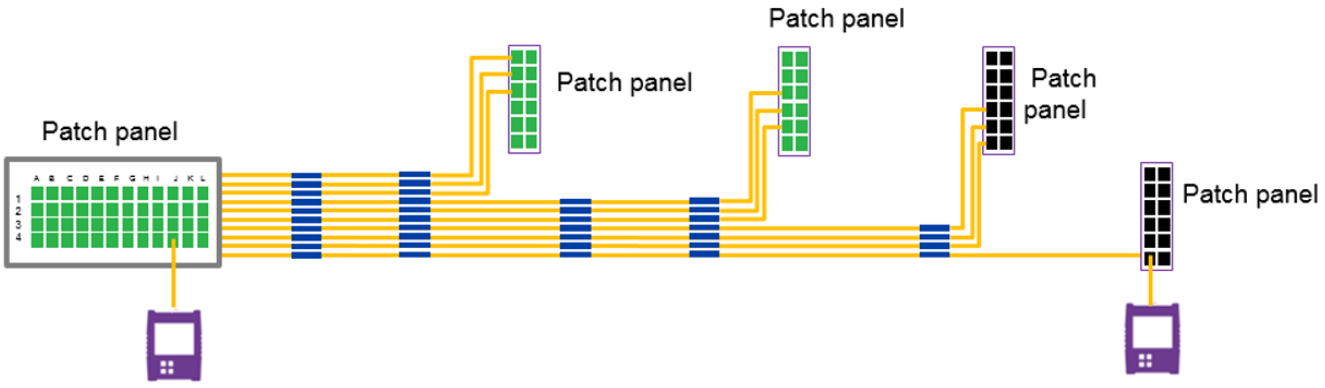
Task: Build and certify a high fiber count trunk link with 3 test functions per fiber including:

1. End face connector inspection
2. Fiber strand continuity
3. Full OTDR bidirectional characterization including link loss/ORL

Common project management elements include:

- **What** certification tests and sign-off documentation are required
- **How** to perform the certification procedure requirements (Methods of Procedure = MOP)
- **Where** the work is to be done including a list of jobs by cables/fibers to certify

We need to ensure the fiber cable is free of bends, breaks, bad/dirty connectors, poor splices and physical defects that cause excessive optical loss/optical return loss. We also require complete fiber continuity without fiber mismatches and labeling errors. We'll execute tests with one instrument under loopback conditions if distances permit or two instruments as illustrated below. Using the VIAVI TestPro OTDR Application, we can correlate bidirectional OTDR test results done from two ends.



Test Procedure Steps	Fiber Construction Goal	Risks to Avoid
Network Location inventory check	Verify/document correct network test point/fiber port before test	Testing the wrong location creates rework and erroneous inventory documentation/KPIs
Inspection	Ensure every end face connection is clean before connection	Dirt damages the glass and is the top cause of reflectance loss
Continuity	Ensure all fibers are connected correctly without cross connections as cable sections are spliced together	Light and signal will not transmit correctly to intended end point
Link Loss/optical return loss	Ensure link loss is within tolerance and loss margin can accommodate degradation	Too much loss will lead to signal transmission, service activation issues and rework
Link certification/fiber characterization and corrective rework	Test and certify the final fiber construction, verify expected loss events (connectors and splices) comply. Generate closeout reports including network inventory details.	Uncorrected faults (macro-bends or poor splices and connectors generates link loss/ORL, creating transmission issues)

The Team: Who is involved and what do the team members need?

It takes a broad team to deliver new fiber networks. Let's consider how each role benefits from TPA. An efficient, coherent team incorporates contractors and sub-contractors ensures consistent process, real time reporting and network visibility to make projects profitable.

Role	Test Responsibilities	Challenges	TPA Benefits
Process Engineer	Develop construction and test procedures	Ensure procedures are implemented	Facilitates structuring an easy, guided process that is verified systematically
Project Manager	Manage project schedule and resources	Determine compliance for build certification, track progress and calibrate schedule	Project progress visibility and build quality certification. Ensure no one submits erroneous data to avoid service activation failures/rework/delays
Tech Field Manager/ Contractor Manager	Assign job workorders and report on progress	Balance test time with accurate test procedures technicians can execute with minimal training	Simplified job management and assignment that ensures accurate procedure compliance and reporting
Field Technicians	Execute tests and job close out reports	Learning to execute the job correctly on the first site visit	Simplified tasks, reduced time and manual work per job including automated fiber labeling documentation, test set up, post test close out reporting, reduction of errors and missed tests that generate repeat site visits
Auditor	Audit network construction and reporting	Comprehensive verification of build quality due to voluminous inconsistent test results and sample audit approach	Consistent test results (through MOP compliance) and automation enable exhaustive audit improving build quality and viable link yield
Executive Network Operations Manager	Roll-out major network service upgrades	Delivering quality services on time on budget	Real time progress visibility, automated KPI reporting. Reduction of lifecycle network cost

Before and After: Let's compare.

Role	Process Before Test Process Automation (TPA)	Process After Test Process Automation (TPA)
Project Manager	Email jobs spreadsheet list to sub-contract project manager who re-distributes via email to the tech project managers	Create and assign Jobs in Job Manager to a tech instrument or organization /contractor through StrataSync automated job and test plan process assignment
Field Tech/Contractor Manager	Train techs on MoP in meetings, classes, on the job[1] Allocate jobs to techs via paper or email spreadsheets	**Time savings:** guided process sent to instrument
Field Technicians	Setup test tool configs and apply correct pass/fail criteria for each fiber X the number of fibers[2]	**Time savings:** Download StrataSync test plan with pass/fail limits to instrument.
Field Technicians	Refer to job list (paper or laptop). Manually perform highly repetitive tests and store results on instruments[3,4,5]	Execute guided Job Manager test plan; auto generate closeout report tagged with GPS/ time stamp
Field Technicians	Results transferred back to field tech or contractor manager (USB, DropBox, FTP, email, etc.)[6,7]	**Time savings:** Job closeout reports automatically created and uploaded to StrataSync
Field Tech/Contractor Manager	Create closeout reports. Update job spreadsheets and email to PM[7]	**Time savings:** done automatically
Project Manager	Consolidate/track job progress spreadsheets[8]	**Time savings:** done automatically
Auditor	Sample spot check closeout reports to validate design/certification compliance[9] and validate results with network tests	**Time savings:** StrataSync auto audits results against assigned jobs to reduce audit effort by providing closeout with verified GPS/time stamp
Project Manager	On-going report generation and email distribution to Executive Operations Manager	**Time savings:** StrataSync dashboards show real time project progress, status info or other KPI
Contractor and Project Manager	Disagreement delays job close out satisfaction	**Time savings:** Agreement, signoff on closeout reporting, payment
Executive Operations Manager	Hours of meetings investigating progress and network quality issues	**Time savings:** Daily visibility using automatic dashboards

Assumptions for the fiber construction certification process before TPA are included below. If a step contains errors, the test information data is invalid.

[1]Techs/Contractors remember all procedures steps

[2]Techs/Contractors setup test equipment correctly

[3]No errors occur entering job ID/ticket numbers per test by test location

[4]Test results are saved with correct file names for each test

[5]No fraudulent test results storage is carried out

[6]No results files are lost while being retrieved from test equipment

[7]There are no errors entering or associating test results to job ID ticket numbers

[8]No mistakes made manually updating job spreadsheets

[9]Spot check audits of closeout reports and the network catches substandard, erroneous certification errors

Process transformation after:

Save 50% of total job time across the entire team's activities and drastically reduce rework and truck rolls. Facilitate team communication hand offs, and cooperation with accelerated, improved build quality.

TPA Workforce Efficiency Gains Add Up

How much time could you save with *Test Process Automation and accurate reporting*? How many more jobs per day could you do?

+20% time managing asset updates and deploying MoPs and training via instrument sync

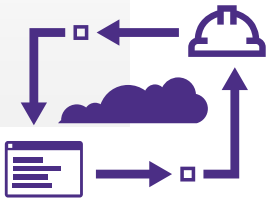
+90% hours technicians spend setting up their instruments

+30% effort assigning jobs with sync to technician

+50% reporting progress with dashboards and centralized storage

+25% reduction in repeat work with jobs done right the first time

+10% of the time planning jobs and managing network staff



To learn more about fiber construction certification scenarios, we invite you to read our fiber construction test blogs at the below links or see the VIAVI TPA page.

FIBER CONSTRUCTION, PART 1: COMPARING TRUE BI-DIRECTIONAL ANALYSIS AND LOOPBACK TESTING
FIBER CONSTRUCTION, PART 2: HOW TO IMPROVE EFFICIENCY AND ACCURACY WHEN CERTIFYING PON
FIBER CONSTRUCTION, PART 3: CERTIFYING PON WITH UNBALANCED SPLITTER ARCHITECTURE
FIBER CONSTRUCTION, PART 4: THE RISE OF DWDM IN ACCESS NETWORKS

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