



USING THE GPS-BASED CPAT FLEX INGRESS DETECTION SOLUTION

A white paper on how to capture return path
ingress events and drastically reduce mean
time to repair



Capture Return Path Ingress Events and Reduce Subscriber Downtime from Days to Hours to Minutes with the GPS-Based Ingress Detection Solution from the CPAT FLEX Continuous Monitoring System

SUMMARY

Return path ingress is transient, and makes detection a constant struggle for cable operators. Therefore, current detection methods translate into tremendous technician time loss, compromised customer confidence and significant revenue loss.

A study carried in 2017 across several MSOs showed that while cable operators monitored events in the VHF and UHF bands, they were missing out on 25% of return path ingress cable network impairments.

Effigis exclusive GPS-based technology enables technicians to localize ingress within a few meters. This solution combines wireless, portable detection tools that are connected in real-time to a cable network maintenance management software.

The CPAT FLEX Ingress Detection Solution reaches an unparalleled level of detection speed and accuracy. Operating in continuous monitoring mode based on user-friendly, wireless and web-based devices and applications, the solution lowers the mean time to repair from days to hours, while reducing truck rolls and repair technician time from hours to minutes. It can work as a stand-alone or value-added complement to existing proactive network maintenance (PNM) platforms and full-band capture cable modems.

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INTRODUCTION

Balancing Network Reliability and ROI

With the rapidly growing demand for digital voice, data, and high bandwidth multimedia applications like OTT streaming, cable operators face major deployment challenges that can affect service delivery and network reliability.

Keeping pace with subscribers' expectations while managing churn and operational expenditure forms a prime challenge for operators. Indeed, according to a study performed by Effigis on a two-way cable plant in 2017, lack of network reliability is the single-most influential factor causing dissatisfaction in the cable television industry. Consequently, technical operation management and senior executives are continuously looking for tools to decrease anomalies within their network.

Return path ingress is a major source of network impairment, right next to LTE leakage and way before mid-band. Therefore, maintaining a competitive edge in new broadband services will depend on cable operators' ability to rapidly and effectively detect, locate, and overcome ingress within their networks.

Current detection methods rely on a process that takes from several hours to days to achieve. They are labor-intensive, time-consuming, and some disruptive to subscribers. These methods lack the ingress detection and management tools that help cable operators maintain an efficient and reliable network. The results can translate into significant revenue losses —especially when it compromises customer confidence.

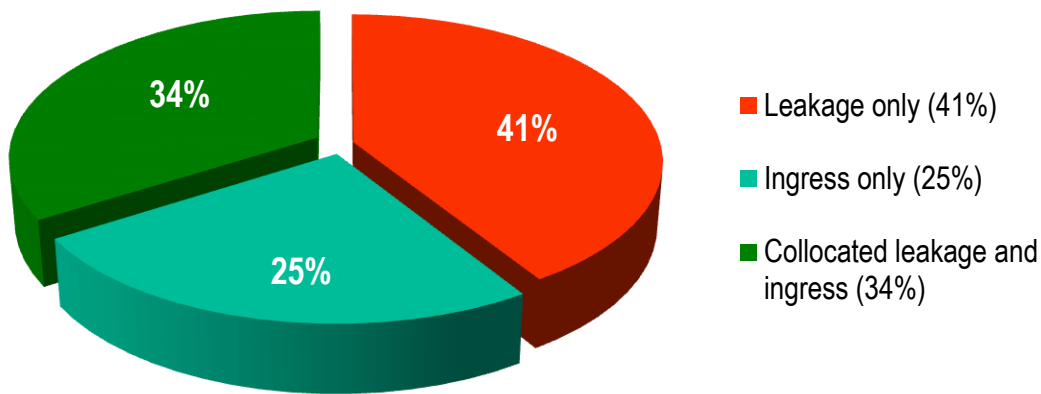
BACKGROUND INFORMATION

Impairment Distribution across Ingress, Mid-Band, and LTE

The rules relative to cable leakage reporting compliance currently require operators to monitor leakage in the aeronautical band or mid-band. However, the benefits of monitoring additional frequency bands are huge, namely because of the widespread use of cellular occupying the 600/700 MHz band and the extended upstream spectrum of DOCSIS 3.1 (up-to 204 MHz), which requires additional shielding integrity monitoring capabilities.

For the first three months of 2017, Effigis used its dual-band leakage and ingress detection platform to monitor mid-band, LTE band and return path ingress events within its customer base networks. The compiled data demonstrated that together, mid-band and LTE leaks excluding ingress represented 41% of network events, while collocated ingress and leakage events accounted for 34% of all events. Incorporating the ingress detection platform enabled the capture of an additional 25% of the return path ingress events, thus increasing network reliability and decreasing subscriber downtime.

FIGURE 1
Return Path Ingress, LTE Leakage, and Mid-Band Results



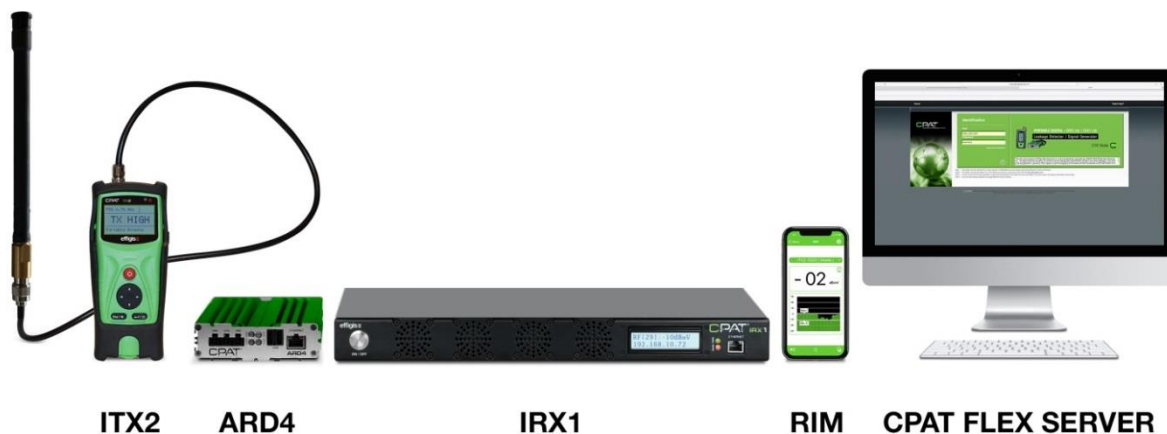
The above chart illustrates that the traditional leakage-only detection process fails to capture at least 25% of return path ingress impairments. The CPAT FLEX Ingress Detection Solution corrects this failure.

INGRESS DETECTION SOLUTION

Ingress Patrol, Find & Fix, and Event Assignments with CPAT FLEX

Combining state-of-the-art hardware and software, the CPAT FLEX Ingress Detection Solution is the only GPS-based ingress monitoring system on the market. Its exclusive technology enables it to automatically detect, record and dispatch ingress events. The solution is comprised of five components, equally serving the needs of patrol technicians, repair technicians, and cable network managers in terms of mobility and ease of use. It is designed to significantly reduce detection time while optimizing vehicle assignments through the cable network.

FIGURE 2
The CPAT FLEX Ingress Detection Solution



ITX2 – Portable Ingress Radio Transmitter

The **ITX2** portable ingress radio transmitter continuously transmits an efficient high power ingress test signal with minimal impact in the upstream band of a cable network. It helps technicians to find the source of ingress, as it pairs with the real-time ingress monitoring mobile application to locate ingress impairments within meters. This level of accuracy dramatically reduces the “find” time out of the “find-and-fix” equation, thus diminishing subscriber downtime related to ingress impairments. Whether the transmitter is installed in the patrol truck or carried by the repair technician, the signal it emits travels all the way to the head-end. It is ultimately transferred to the CPAT Web web-based software for post-processing.

ARD4 – Autonomous Recording Device

The **ARD4** autonomous recording device is installed in the patrol vehicle. It is a powerful mobile, wireless communication hub. It autonomously records and transmits events to the manager’s CPAT Web in real-time via cellular or Wi-Fi, including the ingress, leakage, and position data points. Its GPS-based technology and unrivaled accuracy make it unique in the marketplace. The module’s wireless options and communication ports provide all the flexibility required to configure its mobile communication setup. Once connected to the ITX2 portable ingress radio transmitter, it works in continuous patrol mode, automatically recording GPS data points and enabling the ITX2 transmitter firmware updates.

IRX1 – Head-End Ingress Receiver

The **IRX1** head-end ingress receiver is the single fixed component of the Ingress Detection Solution. Installed at the headend/hub location, the receiver detects the return path test signals transmitted by the ITX2 portable ingress radio transmitter across the entire network. By analyzing these signals, it identifies the origin of capture points on the network. It then sends all relevant information to the manager’s CPAT Web, which in turn will precisely log the geographical location of capture points.

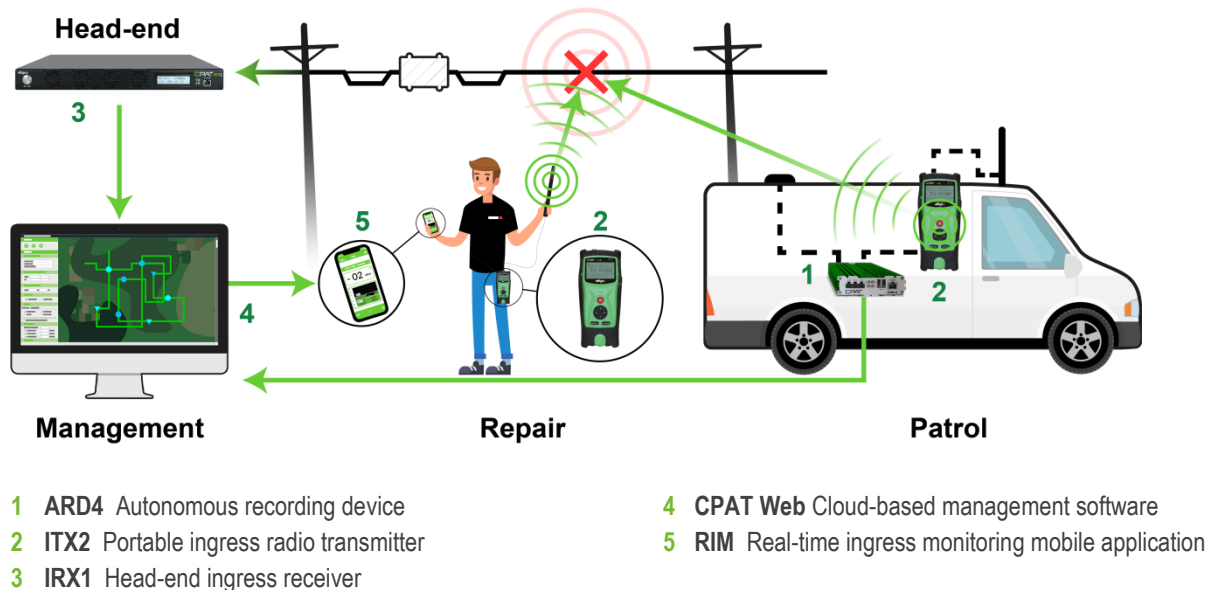
RIM – Real-Time Ingress Monitoring Mobile Application

The **RIM** is a real-time ingress monitoring mobile application available for both iOS and Android. By means of this application, the repair technicians can gain access, from the palm of their hand, to close or open events that have been assigned from the CPAT Web. A signal-strength display helps them quickly locate the ingress source. Once the repair work is done, the application enables them to close an event and add new ones, with the information automatically being updated in the CPAT Web on the manager’s end.

CPAT Web – Cloud-based Management Software

The **CPAT Web** software helps managers optimize truck rolls and accelerate the resolution of cable customer issues. It maps the position of vehicles, ingress and leakage events. It includes a work order module that sends all event-related data on the assigned repair technician’s mobile application. Reporting capabilities support decision-making, assisting in the analysis of short term and historical data, detection and repair trends, as well as PNM activities. The software is also customizable to best suit the manager’s needs in terms of control alarm preferences, repair rules, field device usage, and activity monitoring. Last but not least, its fully open architecture allows to link software’s content to any PNM platform.

FIGURE 3
The Ingress Detection Workflow with CPAT FLEX



CASE OF INGRESS DETECTION AND TROUBLESHOOTING

The Transient Nature of Ingress and Need for Quick Detection

Upstream noise is a constant challenge for cable network maintenance and service techs. All technicians test for ingress, which can come from anywhere in the network, but most likely from the location of a leak, typically from cable subscriber's premises. Ingress is very transient when originating from an electrical source. For this reason, technicians need a test tool that detects and displays ingress quickly while they are still onsite and within reach of the capture point on which to work.

Detecting Ingress as it Happens with Existing MSOs' Tools

The CPAT FLEX smart ingress detection tools, namely the ITX2 transmitter and IRX1 receiver, are a valuable complement to the MSO's network PNM platforms and full-band capture cable modems. Radiofrequency impairments occur sporadically based on environmental, electrical and mechanical issues that impact customer experience and contribute to churn. While cable modem termination systems may roughly see upstream ingress or common path distortion, the smart ingress tools can be used to find out exactly within meters where these disturbances enter the network, reducing mean time to repair from hours

to minutes. The CPAT FLEX GPS-based advanced technology and data collection algorithms eliminate the guesswork for network operations center personnel, as the system correlates data to help guide network technicians right onto those network disturbances, as they happen.

Benefits of Introducing the CPAT FLEX Ingress Detection Solution

KEY TAKEAWAYS

- Capture of an additional 25% of return path ingress events;
- Unrivalled accuracy of ingress detection when repair technicians need it –on-site;
- Mean time to repair down from hours to minutes, and subscriber downtime from days to hours;
- Smarter truck rolls and reduced cable customer churn through network reliability; and;
- Value-added complement to MSOs' existing PNM platforms and full-band capture cable modems.

CONTACT INFORMATION

If you would like to experience the CPAT FLEX Ingress Detection Solution and the value it can bring to your cable network, please call or write to us. Our specialists will be pleased to answer all your questions.



SALES AND SUPPORT TEAM

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