TRACES:
REVEAL THE PERFORMANCE OF YOUR MISSION CRITICAL NETWORK

THE NEED FOR COST-EFFICIENT NETWORK MEASUREMENT

Your people face demanding situations every day. To complete their missions and safeguard themselves and the public, officers rely on continuous access to mission critical communications. Lives depend on voice and data services connecting first time, every time.

However, as a police force, while you do have control of your fleet of radios, you're unlikely to have direct access to your communications network to measure and assess its performance. So the onus is on your team to collect performance data. The two main options to do this are drive tests and user reports.

While there's certainly value in drive testing, there are drawbacks. The drive test is a snapshot of one area, at one time. Changes to the area – from new buildings to more or fewer leaves on trees, radio antenna wear and tear, and even different weather – return different results. So frequent and extensive drive testing is necessary to capture consistent readings and understand wider network performance. But the process is costly and time consuming, with skilled engineers needed to uncover clear insights from complex data. And, once the data is available in a readable format, it could be out of date, as drive testing only provides a snap shot of the network, as opposed to providing a continuous flow of data. Furthermore, with today's budget pressures, the reality is that many drive testing programmes are being scaled back.

The second option, asking users to record faults, also has limitations. To be of value, the data collated by users must include the time, location and type of service incident. Given that officers' minds are on their missions, user reports tend to lack the volume and consistency of data to build a true picture of service quality.

The drawbacks of the current approaches to TETRA network analysis mean user organisations often have to rely on performance data disclosed by their operator. So to gain an independent view of how the network is working, a better way to collate service data is required. To be effective any new approach must provide continuous network analysis, capture a view of the network as subscribers see it and provide automated data interrogation to help reduce costs and enhance operational efficiencies.

TRACES: AUTOMATICALLY COLLATE NETWORK DATA FROM YOUR USERS

To address the requirement for a new approach to network analysis, Motorola Solutions has developed an advanced new application. TRACES provides a central, automated and intuitive platform to collate network data and turn it into clear insights on service performance and coverage issues. Managed by a simple interface, data is captured from two streams – radio error logs and drive tests.

- **Error logs from users' radios:** The TRACES application is unique in its ability to capture error logs automatically as radios are used in the field. This data tracks and builds a picture of network coverage issues

    A record is created by the radio whenever there is a fault, for example a corrupt signal, and stored in the flash memory. This includes the GPS position and sequence of error messages, also known as Downlink Measurement Reports (DMR). When the user finishes their shift, they dock the radio into Motorola Solutions' Integrated Terminal Management platform (iTM[1]) and the data is sent to the central TRACES server while the device's battery charges. The data is consolidated, analysed and presented through eight different report types. These include failure-by-cause for service interruptions (e.g. no coverage), the RF sites serving the radios, frequencies used, signal strengths as measured by radios and more. The data is overlaid on maps, with TRACES compatible with industry-standard Mapinfo software. The maps are available to any scale to show, for example, the 1km² area with the highest number of communication errors.

    With TRACES your people are effectively walk-testing the network daily, with no manual intervention necessary. Moreover, TRACES does not drain network resources, as the data is transmitted via the iTM interface over the Intranet.

IMPROVING COMMUNICATIONS FOR UK POLICE

A UK police force, responsible for policing an area of 5,371 km with a population of close to 900,000 people, has recently used TRACES to check the service level provided by the national public safety network operator.

One of the force's technical support team says: 'Like most organisations, we use drive testing and user reports to assess service. Drive testing is important but we cover a large area and it's not practical to continually drive test the network. User reports have limitations too. When a police officer is on an operation, they don't have time to stop and think about providing the time, location and direction that they are travelling to help IT address the technical issue. TRACES is a good solution as it automatically captures faults from radios as officers go about their work to bypass this issue. It provides a simple way to collect a lot of validation data to complement drive tests.'

Based on the TRACES data, the force:

- Uncovered mast 'neighbouring' issues and possible antenna problems. It is raising these issues with the network operator.
- Was able to see how officers' radios were performing. It has replaced some of the teams' radios with new devices to deliver an improved level of service.

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[1] iTM (Integrated Terminal Management System) is Motorola Solutions' efficient TETRA radio management solution for centralised and automated radio programming, software maintenance and upgrades. To implement TRACES, customers must have drive test data available and/or Motorola Solutions iTM release 4.0 or later and subscriber software MR 5.10 or later.

- **Drive tests:** Drive test data is easily loaded to the TRACES server where it is run through a range of automated report filters. The results are mapped and include intelligence on: the route or trace of the test; direction of travel; signal strength; handover quality; the RF sites serving the radio during the test and whether coverage thresholds are met in predefined areas.

By using Motorola Solutions' TETRA terminals and iTM, TRACES helps you collect and analyse data on any vendors' TETRA network. The technology delivers a range of key benefits.

Insight from TRACES: *Error messages, also referred to as Downlink Measurement Reports (DMR), are recorded by the terminals whenever there is a loss of communication with the network. TRACES visualises the communication failures by location, type, site, channel, ISSI and grid square. Example screen shots are shown below.*
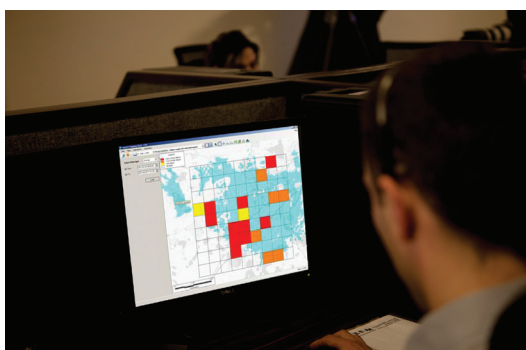
OPTIMISING NETWORK PERFORMANCE FOR JERSEY'S PUBLIC SAFETY USERS

The island of Jersey in the English Channel has a population in excess of 90,000. A popular tourist destination, it hosts over half a million visitors annually. To protect holidaymakers and citizens, Jersey's first response teams and government agencies communicate using an island-wide public safety network. The legacy TETRA network was recently replaced by a new Motorola Solutions Dimetra TETRA system. It is operated and maintained by Communications Services, Jersey Airport on behalf of the States of Jersey Home Affairs Department.

When the new system went live, users reported concerns over coverage holes and service issues. To investigate, Chris Sparrow, General Manager, Communication Services at Jersey Airport, deployed TRACES on the network. He says: 'TRACES appealed as it captures real user data for a true picture of network performance. We quickly saw where the coverage holes were and, importantly, how often our people experienced coverage issues in these areas. From this we could make informed judgements on whether

improvements were required from an operational standpoint. We were also able to upload drive test data from the old network so we could see if user perceptions about the services were in fact true. And, as we make changes, we can see the impact these are having.'

Revisions to the network based on TRACES data include:

- Relocating a hand-over site between base stations that had been inadvertently positioned in the middle of an accident black spot. The result was improved service in this critical area.

- Fixing a base station to remove service glitches where the antenna was too close to the mounting structure.

- Validating that two base stations deployed close to a major population area could provide the planned redundancy should one of the sites fail.

TRACES: ACHIEVING MORE WITH LESS

TRACES' cost-efficient network analysis can help your organisation to maximise its resources by delivering the following benefits:

- **Timely data:** TRACES gathers a timely and clear picture of network performance. So you can flag issues to your operator faster to ensure that network problems do not cause downtime.

- **Validate Operator SLAs:** The depth, timeliness and consistency of TRACES data provides clear evidence of any service level agreement breaches.

- **Improve service quality:** TRACES builds a deeper understanding of network performance. So you can work with your operator to develop an improvement strategy.

- **Cut costs:** TRACES cuts costs in three core areas. First, it reduces reliance on drive testing. Second, the administration required to catalogue and store data is significantly reduced. Third, TRACES translates data into service metrics automatically. So, with simple tuition, non-technical staff can produce detailed reports: insight that previously needed experienced – and expensive – analytics professionals to deliver.

- **Reduce and optimise drive tests:** As TRACES captures such a good picture of the network via radio logs, you can cut drive testing. Indeed, we aim to help customers reduce drive testing by up to 80 per cent. However, where drive testing is

used for more detailed analysis, TRACES helps to optimise its value. With TRACES you have a single system to log, analyse and store drive test data and apply consistent ways to filter it. So as you build libraries of drive test data, you can easily see how the network changes over time. You can also realise more value from legacy drive tests by uploading them to the TRACES server. The data can be easily transferred to the server where it can be automatically evaluated using the powerful analytical tools built into TRACES. In addition, if you have access to the TRACES acceptance tests from when the network launched these can be stored in the TRACES repository. You can then see how far your services have evolved over time.

- **Safeguard your people:** TRACES indicates areas of weak network coverage to aid resource planning. For instance, if you can see service has fallen in certain areas you can protect your people by ensuring they are not sent there alone until the situation is rectified.

- **Optimise your teams' equipment:** TRACES builds a picture of the performance of your radios. And faults reported by error logs may reveal that a user's radio is not working as it should. A replacement device can be arranged to ensure they have the best equipment available to do their job.

TRACES – ELEMENTS OVERVIEW
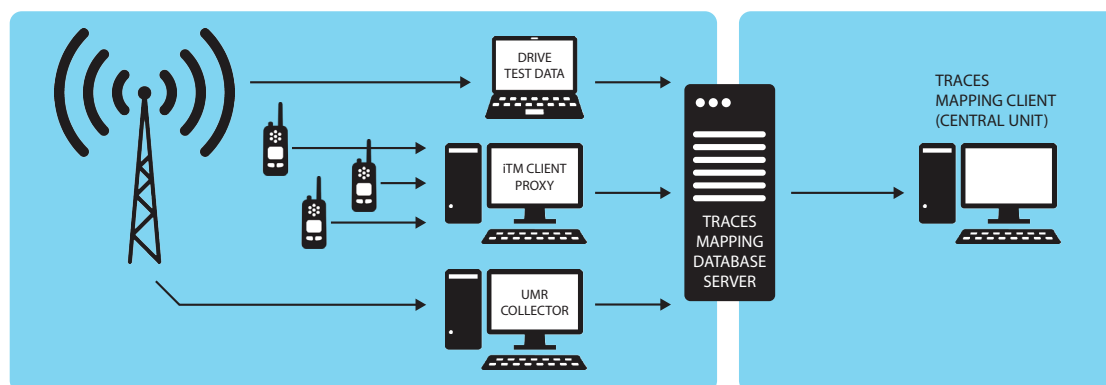
TRACES captures data from two key sources, providing a comprehensive view of coverage issues across the network.

TRACES – TAILORED TO YOUR NEEDS

TRACES is available on a per licence basis. Setting it up is quick and easy through a four-step process. We are with you at every step:

STEP ONE
Service selection: Consultation with Motorola Solutions about the ideal TRACES configuration.

STEP TWO
Install and deploy: The TRACES server is installed and connected to the iTM network. The TRACES client is also installed at the desired location. TRACES can be deployed on any network but Motorola TETRA handsets (operating software version 5.10 or above) are needed to collate TRACES data and dock with the iTM system (note that iTM needs to be version 4 or above).

STEP THREE
Adapt: Adaptations include definition of parameters such as site lists, coverage predictions, geographical and user boundaries.

STEP FOUR
Training: Training is conducted for people using the TRACES interface.

Our experts ensure that TRACES meets your specific assessment and reporting needs to help you gain the most value from your network.

WHY TRACES?

TRACES provides an innovative and rapid way to understand network performance from users' perspectives. The insight validates service level agreements and helps inform discussions with the operator to agree network improvements. TRACES also enables you to catalogue and reuse historical data and optimise information captured from drive tests. And, critically, you can reduce the cost of your validation programme while simultaneously improving the end result.

We can assist you in deploying TRACES and help you analyse the data to make recommendations that optimise network performance. So your teams, which respond daily to uniquely demanding and high-pressure situations, have the best communications available to safely complete their missions.

THE MOTOROLA SOLUTIONS DIFFERENCE

Motorola Solutions is a world leader in TETRA networks. We helped design the standard and have deployed more nationwide public safety networks than any other. As well as helping you optimise your network we provide a complete range of TETRA services. These span professional, integration, support and managed services, complemented by varying funding and operating models.

MANAGED
PROFESSIONAL
SERVICES EXPERTISE ACROSS THE SOLUTIONS LIFECYCLE
SUPPORT
INTEGRATION

For further information on TRACES, please visit: www.motorolasolutions.com/TRACES

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