TUNNEL **VISION**

AS NIKON PRODUCTS CONTINUE TO FIND A VALUABLE POSITION IN INDUSTRIAL APPLICATIONS, WE FIND OUT HOW NIKKOR LENSES ARE CLEARING THE WAY FOR THE SWISS RAIL SYSTEM.

It's no surprise to learn that due to the mountainous terrain across Switzerland, the country's railway system has a huge number of tunnels. The 3011km network has 307, totalling 259km. Checking the condition of the inside of these tunnels used to be a long, laborious task. Data was collected by manually-operated measuring devices at very low speeds, which occupied tracks that could otherwise be used by passenger trains. On busy lines with high traffic, finding the time to carry out these inspections safely, without disruption was a constant challenge. But now, thanks in part to NIKKOR lenses, this job has just become a whole lot easier.

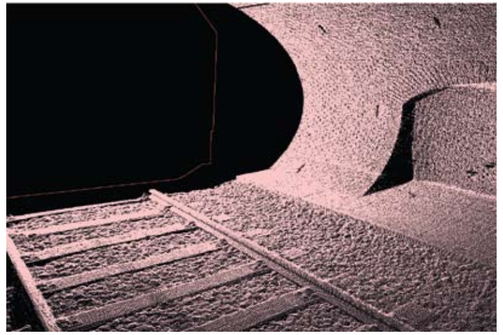
Mermec, an Italian company specialising in technological solutions for rail network maintenance, have developed the T-Sight 5000 High Performance Clearance Gauge and Tunnel Walls Inspection System, which is being used by, amongst others – the Swiss Federal Railway. The system uses laser technology and serves two functions: Clearance Profile Measurement, to ensure the trains can pass safely through the tunnels and Tunnel Walls Inspection, making sure the tunnel is safe, reporting any possible cracks or other damage to the tunnel's structure. The combined action of the two systems enhances inspection and analysis not only of tunnels, but also of bridges, underpasses, poles, walls, tree branches and any other obstacles, which could impede the passage of the train.

The system is fitted to the front of a special diagnostic train, and uses five, special high-speed cameras, and ten unmodified NIKKOR lenses (five AF DX Fisheye-NIKKOR 10.5mm f/2.8G ED and five AF Nikkor 28mm f/2.8D) which take images as the train moves along. Mermec specifically chose NIKKOR lenses for their optical quality and their capability to fit the tough, optical specifications. The T-Sight 5000 produces vast quantities of data – four million points per second are measured and the cameras can acquire 80 megapixel data images. Using an infrared lighting system (in order not to interfere with the driver's view of the track), the cameras' view is reflected sideways by 90˚ using five mirrors mounted on the reverse of the front cover. The images from all five cameras are then stitched together to form a 360˚ view of the surrounding structure. In addition to this, a 3D wire-frame model is also generated from the other set of lenses and recorded alongside the images. The cameras and lenses work at incredible speeds and can capture an image every seven centimetres when travelling at 200km/h (125 mph).

This means there is a minimum of disruption to the passengers and no loss of profit for the rail company by replacing revenue earning trains. It's predicted that this system will revolutionise the rail inspection industry with underground and metro systems especially benefiting.

For more information on the T-Sight 5000, visit **www.mermecgroup.com**
For more information on NIKKOR lenses, visit **www.europe-nikon.com**

Left: The T-Sight 5000 High Performance Clearance Gauge and Tunnel Walls Inspection System, fitted to the front of the special diagnostic train. The AF DX Fisheye-NIKKOR 10.5mm f/2.8G ED lenses can be seen while the AF Nikkor 28mm f/2.8D lenses are hidden.

Right: The system captures an image every 7cm when travelling at 200km/h (125 mph) producing a 3D wire-frame model.

Far right: The T-Sight 5000 in action for the Swiss Federal Railway network.