candid

group of companies

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OUR PROFILE

Candid is a European-based development and manufacturing company providing systems integration & solutions, specializing in designing, developing and marketing of ANPR application software and ITS. Our management team has been working in the ANPR technologies industry since 1998. Based on the highest accuracy LPR Engine, we provide a full range of secure and sophisticated capabilities for ANPR applications, including speed control, electronic tolling, access control, parking system and red light enforcement. Our system components meet the highest industry standards.

All projects completed by Candid are turnkey, and always include training for clients in the use and maintenance of the system once online. Candid's policy is to prepare clients for independent management and maintenance of our systems.

Candid's products and research are on the cutting edge of technology for data, imaging and traffic applications. We combine our know-how and intellectual property with those of our partners. Our solutions are used by MENA countries, the UAE Government, the Dubai Police, the Abu Dhabi Police as well as by public companies in Saudi Arabia. Flexibility – our software applications and processes are flexible and can be tailored to meet specific OEM and Prime Contractor requirements. For maximum performance in demanding ANPR Traffic solutions choose Candid.

OUR SERVICES

SYSTEM INTEGRATION

It is a basic requirement towards state-of-the-art informatics solutions that they must be able to communicate, receive and share information with different systems. Our practical knowledge - both in development and project leading - makes it possible to successfully manage complex informatics projects. With the use professional knowledge of marketleading technologies and devices we assure our partners' support on the highest level.

CONSULTANCY

Our company uptakes tasks of designing and developing products and creating complex integrated solutions. Based on this we have a very wide view of managing full informatics projects. With our knowledge we can support projects from the designing period through the efficient and cost-effective execution.

APPLICATION DEVELOPMENT

The goal of our service is to develop and execute professional informatics systems that support our client's business processes. Our company has a great experience mostly in the development of safety and traffic techniques, and of complex database integrations. While executing our projects we use those environments that fit best to the client's needs..

MAINTENANCE

The support of systems after installation gets more and more attention today's, due to the increasing value and complexity of informatics investments. Our company often delivers 7x24 systems which requires emphasized attention of maintenance. Adapting to the requirements we provide flats rate, distance monitoring, or customized services to our partners. Our service includes works that require hot-line phone support or on-site appearance at any location.

SOLUTIONS

ANPR SYSTEMS

This system is used for the recording of vehicles passing by a particular location where the control set is installed. The international abbreviation ANPR refers to Automatic Number Plate Recognition.

The camera at the control point captures a high resolution picture, from which it is possible to separate letters and numbers, and sends them to the command-control centre. In this way it is possible to instantly detect and locate stolen, unregistered or in some other way suspicious vehicles.

This system can also be used for control of access by vehicles to zones with limited access rights (city areas closed to traffic such as congestion zones, yellow lanes in urban areas, pri-vate and public parking lots, etc.)

The control points are equipped with a number plate recognition system, which consists of a high-resolution camera and a computer running image-processing software.

The system operates according to the following concept:

High resolution cameras capture the number plates of vehicles at the control points. The data on number plates and the captured vehicle image is recorded in the local database and compared with information from the central vehicle database. The connection between the control point and the unified conotrl centre is achieved via a wireless network (a TETRA network) or eisting optical network, depending on the needs of the client and architecture of the existing system.

In the event that the information about the colour or type of the vehicle does not match the information from the database, or the vehicle does not have valid number plates, the nearest police patrol is notified at once.

The system can also be used for the detection of traffic violations - passing through red lights, speeding, movement in a prohibited direction, etc.

An additional optional feature of this system is pattern recognition - recognition of a vehicle of interest or group of such vehicles at any location in the system. When a suspicious vehicle is recognised and flagged in the centre the entire system is notified and it is possible to recognise and detect the passage of that vehicle anywhere in the system.

TRACKING + FLEET MANAGEMENT SYSTEM

The Automatic Vehicle Location System enables tracking of the current position of a vehicle, the stsate of the vehicle and its movement history. Each vehicle is equipped with a GPS receiver. This receiver has a GSM modem used for communication with the control centre and a microprocessor for processing and storage of data. The primary communication method is via the GSM network, using GPRS and SMS. With additional equipment it is possible to leverage the user's existing communication infrastructue.

Positioning

The centre can send an inquiry teach vehicle and establish the current and last valid position. This position is displayed on the map. Depending on their needs the user can order any number of geographic maps of various regions and to different scales. Information on speed and direction can also be received.

Tracking

A route which the vehicle must take in a certain time period can be defined. That information can be stored in the GPS device inside the vehicle, so that if the vehicle leaves the planned route the system can detect this. In this event the operator or the GPS device can carryout a number of pre-defined activities, including immobilisation of the vehicle.

State

Information on the status of internal sensors in the vehicle is available through a set of digital connections to the GPS device. For example, the operator can establish whether the engine is running or whether the panic button is on.

Sending commands to a vehicle

An operato with appropriate authority can execute any activity on the vehicle by using digital-outputs on the GPS device. Actions that can be carried out, depending on the devices connected to the digital outputs are, for example, immobilisation of the vehicle's engine, locking the doors, activating the horn, etc., all with a single command.

Alarming and notification

The GPS device in the vehicle can be programmed to send an alarm or notification to the cen-tre whenever certain conditions are met. The system can determine the region, time interval, maximum speed or a combination of all these.

Generating local log in vehicle

Just as the GPS device can be programmed to send alarms and notifications, it can also be programmed to register time, position and status in the local memory of the in-vehicle de-vice. These records can be downloaded by the control centre at the request of the operator or automatically, as pre-defined, for later review. This possibility is provided for devices which do not provide GPRS connectivity.

PRODUCTS

Vector
OCR engine

Compass ITS
Open ITS Platform

SekurZone
Number Plate Recognition System

Mobo
Mobile LPR Camera

Mobo Camera
Mobile LPR Camera

FalconEye 2MP
LPR Camera AIO

FalconEye 6MP
LPR Camera AIO

Speed Hunter
Camera Based Speed Enforcement

Protrac
Vehicle Tracking System

eRDM
Dynamic Railway
Diagnostic System

eRTM
Rail Temperature
Measurement System

Vector
OCR engine

FEATURES

- High accuracy and speed Candid OCR was developed for exceptionally high rate of number plate reading (95%+). The image processing of ANPR software library is remarkably fast.
- Build your own ANPR system Candid OCR was designed for system integrator companies who want to build there own ANPR system and they need an accurate and flexible software tool for recognizing licens plates. OEM version are available as well.
- Country independent OCR technology Candid OCR recognizes any license plates containing Arabic, Latin, characters. It provides plate color and country ID. Special personalized license plate reading: vanity plates, prestige plates or private custom number plates.
- Hardware independent technology OCR runs on various kind of computer systems (desktop, embedded, etc). It can be linked to any type of camera equipment (even third party camera). Our dedicated ANPR cameras are recommended for image capturing.

TYPICAL APPLICATION ENVIRONMENTS

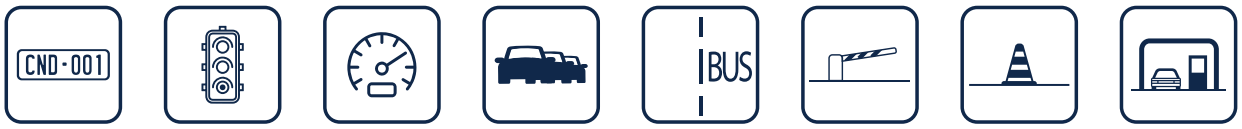
- Highway Toll Collection/Speed enforcement
- Vehicle Access Control/Entrance Admission
- Vehicle Theft Prevention/Detection
- Traffic Monitoring/Bus lane or red light enforcement
- State Border Surveillance/security monitoring
- Public/private car park management/automation
- Airport/harbour cargo management/control

An innovative technology for toll collection, traffic surveillance, traffic management and many other projects where accuracy, speed and automation are essential objectives. The core technology is specially designed and developed to be easily integrated into complex intelligent traffic applications. Due to its outstanding technology, its high accuracy
rate, the speed of image processing and its adaptability.

The software can execute continuous license plate reading even at vehicle speeds of up to 250km/h.This feature is especially important in convicting speed limit violators or for use in automatic toll collection projects, just to mention a few.

Compass ITS

Open ITS Platform



Number Plate Recognition | Red Light Violation | Speed Enforcement | Congestion Charging | Bus lane | Access Control | Road Enforcement | Toll Enforcement

Compass ITS has been designed following years of research driven by our customer's needs to create an application which suits all.

Monitoring traffic and identifying offending or wanted vehicles by using rules pre-defined by the user. This application can be used to reduce congestion, identify offenders, speed enforcement, access control and many more.

Parking Lot

- Highly customizable
- Easily integrate with existing systems

Traffic Monitoring

- Follow and detects different groups of vehicles
- Customizable traffic areas, follow the current vehicles within the defined areas
- Congestion charging

Access Control

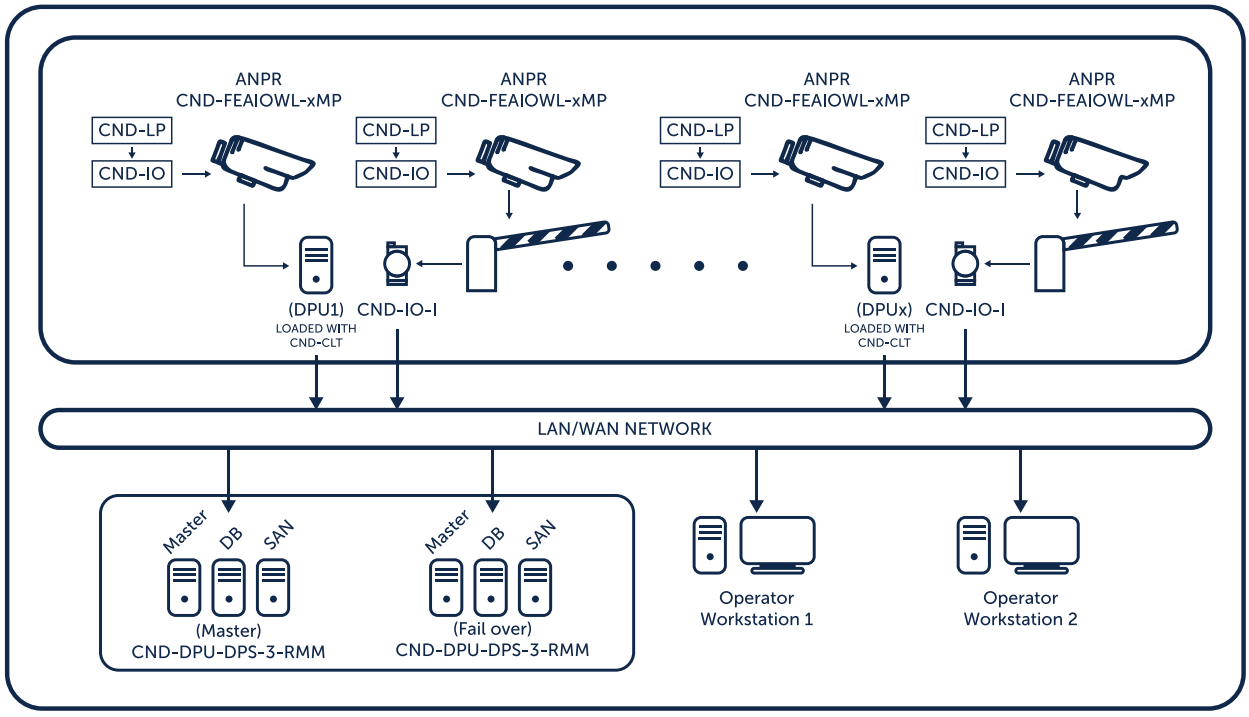
- Highly customizable rules for access based on groups, roles, time zones and access points
- Multiple images (vehicle, number plate, driver) from passing vehicles

Enforcement

- Weight and speed measurement
- Red Light Violation
- Bus Lane enforcement
- Toll enforcement

Generic Features

- Number plate detection
- RFID tag support
- APIs available for integration
- Scalable architecture from single application to clustered, load balanced enterprise environment
- High availability
- Open platform integrated with PSIM, CCTV, UVSS and Access Control System
- Support alarms, notifications on SMS or email
- Support SNMP
- Use standard maps to show detection locations
- Attachable fixed or mobile detection clients
- Bilingual interface
- Comprehensive audit log
- Send notifications on component failures to the responsible staff members
- Vehicle color recognition
- Vehicle brand and manufacturer detection
- Vehicle categorization (sedan, truck, bus, etc.)
- Vehicle verification based on number plate data



SekurZone

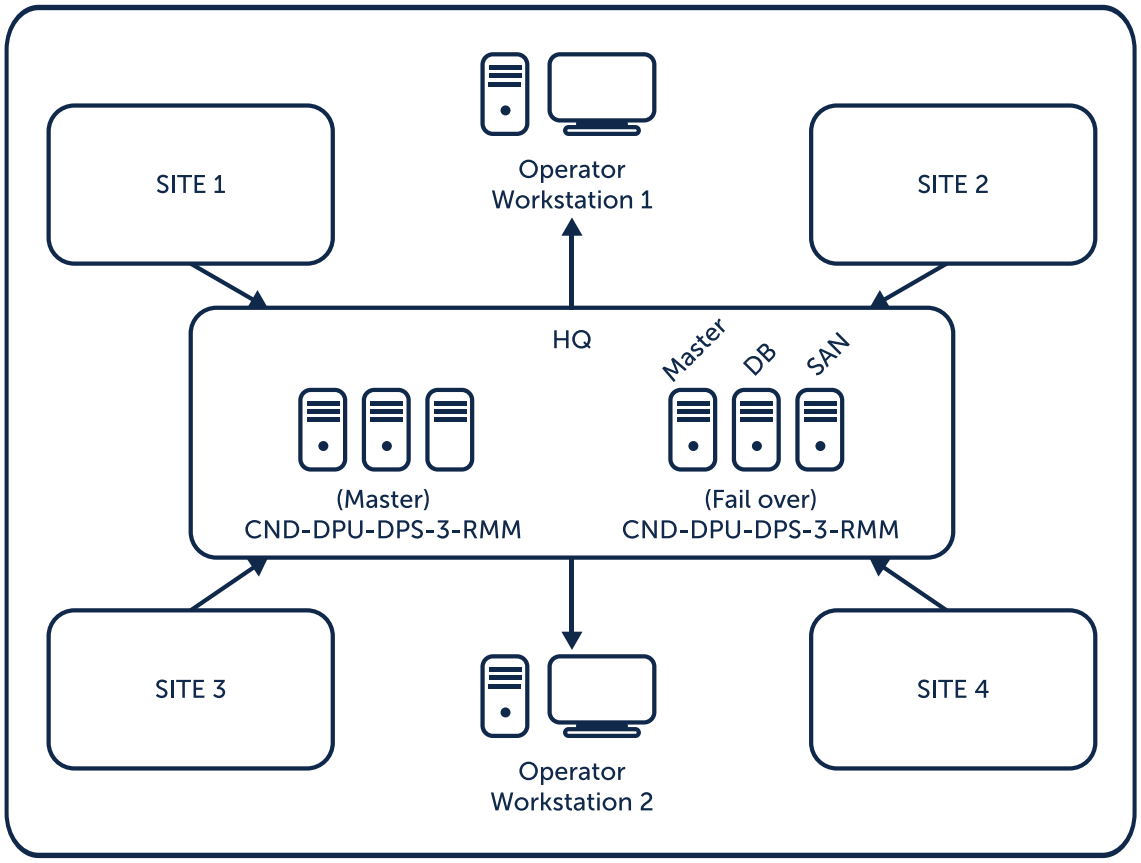
Number Plate Recognition System

With proven experience in ANPR software, Candid has developed the next generation of ANPR software to provide information at all times and under all conditions.

SEKUR ZONE is a versatile, powerful and easy-to-use Automatic Number Plate Recognition software. SEKUR ZONE offers optimum performance when used with our own number plate recognition cameras sensor with built-in LED infra-red illuminators but also provides rapid and 95% accurate number plate recognition when used with suitable conventional CCTV cameras.

SEKUR ZONE runs on standard PCs equipped with videocapture board(s) and Microsoft Windows. SEKUR ZONE is also the first ANPR software which flawlessly runs on Windows and will operate with multiple camera systems. The number plate recognition algorithm locates the number plate within the vehicle image and im-mediately reads the vehicle registration number (VRN). A record is logged to the PC, comprising a precise date and time stamp, the alphanumeric VRN and the camera and/or lane number and location, plus images of the relevant vehicle and its number plate "patch".

- Multilingual Interface (English / Arabic)
- First Automated Number Plate Recognition (ANPR) System for reading Arabic Number Plates
- Pictures of Driver and Number Plate are taken and saved with each entrance and exit transaction
- Secure access control based on Number Plate and ability to restrict entrance/exit of vehicles such as stolen or wanted vehicles
- Stolen Cars Alarm to notify the entry of stolen or wanted car
- Employee Car Identification to allow access without any permission
- Remote monitoring of Cars movement at any of the Gates
- Query and Reports to view all movement of a particular vehicle


SITE 1
Operator
Workstation 1
SITE 2
HQ
Master
DB
SAN
(Master)
CND-DPU-DPS-3-RMM
(Fail over)
CND-DPU-DPS-3-RMM
SITE 3
SITE 4
Operator
Workstation 2


24 hr. Parking
exit only
enter here/no full size vans
stay right
pull ahead
PARK
12.67
PARK
CANDID

Mobo

Mobile LPR Camera

Number plate recognition

Wireless

2 megapixel sensor

The **Mobo** application is the software core for your mobile traffic monitoring and plate recognition system which allows you to track stolen or wanted vehicles while on the move, without obstructing the traffic flow.

Mobo runs on a touch enabled device inside your monitoring car, it controls the mounted camera with or without the built-in joystick and it can integrate into a Sekur Zone system as well.

FUNCTIONS	
IMAGE CAPTURE	Image capturing optimized for plate recognition with high resolution camera
AUTOMATIC PLATE RECOGNITION	Arabic licence plate reading (0-150 km/h) with very high recognition rate of 95% plus.
DOCUMENTATION	The system is capable of recording, storing and forwarding the images of the events in automatic mode
WIRELESS COMMUNICATION	Via Wi-Fi connection, 3G and 4G
DATABASE CONNECTION	Online: permanent connection with Wanted databases Offline: comparing with database saved to the device
NIGHT RECORDING	Image capturing at night and in poor visibility circumstances with controlled white led panel

FUNCTIONS	
SPECIAL CAMERA	• Resolution: 1080P • Image capturing: 20 FPS • Picture format: H264 • White Led • Operating range: - 20°C - +50°C
SPECIAL CONSOLE	• Minimized size • Ergonomic adjustibility • Joystick

FUNCTIONS	
DATA EXPORT	In .XLSX and PDF format Exportable lists: • List of observed vehicles • Full event list
DATA IMPORT	From .XLSX format Importable lists: • List of wanted vehicles

Mobo Camera

Mobile LPR Camera

Features

- 1/2.8" Panasonic New Generation CMOS
- Smooth operation and captures uid motion at 30/25 frames per second with 2Megapixel in 1920x1080 pixel resolution
- Advanced Auto Focus algorithm to improve focusing accuracy even in the most challenging low-light, low-contrast environment with x20 optical zoom
- Min.illumination - Color : 0.5 lux , BW : 0.1lux Color DSS : 0.002 lux , BW DSS : 0.001 lux
- All weather, lightweight, high impact aluminum diecasting weather-proof
- IP66 outdoor housing
- Built-in wiper system for constant load and reduced noise
- Built-in Super IR LED 30pcs (IR distance 200m in manual focusing)
- Smart IR response by Auto light control (100steps)
- Using Http common port for entire TCP/IP Protocol Suite (RTP/RTSP, SNMP, UDP, SMTP)
- Industry leading lowest network latency of 200ms/1920x1080pixels
- Integrated Web server for camera parameter setting

Applications

- Toll Application
- Parking Enforcement
- Highway Enforcement

FalconEye
LPR Camera AIO

2 megapixel sensor

Onvif camera

Number plate recognition

Day / Night function

Tolling system

Jurney Time Measurement

Congestion Charging

Access Control

Airport and Harbor Logistics

Traffic Security Monitoring

Bus and Red Light Enforcement

Border Control

FEATURES
1/1.8" 2MP CCD sensor
White Light or IR Led 6pcs (Up to 100m)
Fanless design with rugged full metal casing
IP66 rating
Operation condition from -35°C to +80°C
Built in OCR
Onvif compliant

LENS	
LENS TYPE	Vari-focal Lens
ZOOM RATIO	3.8x
FOCAL LENGTH	4-18mm
APERTURE RATIO	F1.4
ANGLE OF VIEW (D, H, V)	137°×110°×82°~31°×25°×19°
S/N RATIO	60dB

CAMERA FUNCTIONS	
DAY & NIGHT	Yes
WDR/BLC	Yes
GAIN CONTROL	0-36dB
WHITE BALANCE	Auto/Manual
SHUTTER SPEED	0.001ms~33ms adjustable

FalconEye

LPR Camera AIO

6 megapixel sensor

Onvif camera

Number plate recognition

Day / Night function

Tolling system

Jurney Time Measurement

Congestion Charging

Access Control

Airport and Harbor Logistics

Traffic Security Monitoring

Bus and Red Light Enforcement

Border Control

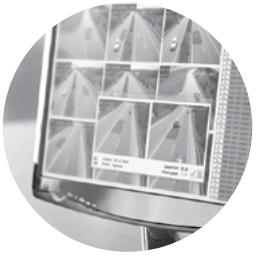
FEATURES
1" 6MP CCD sensor
White Light or IR Led 6pcs (Up to 100m)
Fanless design with rugged full metal casing
IP66 rating
Operation condition from -35°C to +80°C
Built in OCR
Onvif compliant

LENS	
LENS TYPE	Fix Lens
FOCAL LENGTH	16mm
APERTURE RATIO	F1.6
ANGLE OF VIEW (D, H, V)	54.3°X44.2°X33.5°
S/N RATIO	60dB

CAMERA FUNCTIONS	
DAY & NIGHT	Yes
WDR/BLC	Yes
GAIN CONTROL	0-36dB
WHITE BALANCE	Auto/Manual
SHUTTER SPEED	0.001ms~33ms adjustable

Speed Hunter

Camera Based Speed Enforcement



Verifiability | Speed Enforcement | Accuracy

Speed Hunter is capable of measuring the speed of any vehicle in real-time, and it sends automated and customizable alerts in case the speed limit has been exceeded.

The application can be used with existing, installed ONVIF cameras. Vehicle speed can be measured in up to three parallel lanes and from the recovered data, automated statistics can be produced.

Feature list

- Speed Measurement
- Real-time speed display
- 3-lane monitoring and enforsment
- Accuracy 95%
- Customizable alerts: Configurable alert levels | Small black square Email and SMS alerts
- Traffic Counting
- Automated statistics
- Filterable video archivea
- User management, authorization level setup
- Customizable video export

Server for processing 16 lane

CND-DPU-DPS-3-RMR

- Gigabit Ethernet
- 16Gb RAM
- Intel Xeon E5-2620v3
- Windows server 2012

Client for 16 lane

- Gigabit Ethernet
- 16Gb RAM
- Intel Xeon E5-2620v3
- Windows server 2012

Protrac
Vehicle Tracking System

Main functions of the Protrac

GPS and GPRS based monitoring and tracking system, which forwards the signals of the vehicle alarm to monitoring station and user phone numbers, as well as reports in SMS the actual position with coordinates at the effect of a phone call to the module.

Collecting the vehicle's traffic data and data of the peripheries and sending to server system, thereby making available the services of the system. Car alarm signal forwarding to monitoring station through the internet and to mobile phone by SMS.

Individual alarming functions, e.g.: position change supervision at stopped engine (towing), alarm initiated by input contact and signalization of all these to monitoring station through the internet and to mobile phone by SMS.

Real time vehicle position report in SMS with coordinates, at the effect of a phone call or a command SMS sent to the module.

Security function with local alarm initiation against GSM and GPS signal jamming.

Main Features

- GPRS data transfer
- Built-in GPS receiver
- WEB interface
- Connectable to car alarms
- Programmable through USB and IP
- Web display on Google Maps™ surface
- Private POI management, speed and fuel diagram, route report, vehicle uptime report, refueling report
- Low operational cost
- Visualization and log of the position and route
- Separation of business/private vehicle usage
- Evaluation of speed, parking, duration trip, etc.
- Sends SMS containing the current vehicle position and its traffic data
- At the effect of events:
  - Forwards car alarm signals to monitoring station
  - Sends SM o the user's phone
- Independent alarm functions, e.g.: supervises changes of the position when engine is not running, alarms initiated by contacts on the inputs




eRDM

Dynamic Railway Diagnostic System

Rail | Weighing | Deffects in wheel geometry | Axle rupture

SOLUTIONS

Candid has created state-of-the-art and cost-effective solutions to help the stakeholders of the railway transportation ecosystem overcome the challenges of providing safe and efficient transportation.

Integrating the most advanced measurement and telecommunication technologies, Candid offers its **Railway Diagnostic** product line, including the **eRDM – Dynamic Railway Diagnostic System**.

INCREASED SAFETY	**Detection and alarm on derailment-hazardous** (dangerous) dynamic load **conditions** of the passing trains.
OPERATING COST REDUCTION	**Detection, trend-monitoring and alarm on railcar-, and infrastructure-damaging conditions** of the passing train that results in: • **The preservation and lifetime extension of** both the infrastructure and the rolling stocks by reduced and controlled wear and tear. • **Decreased maintenance costs** by **predictive maintenance** based on the provided trend-data.
BUSINESS EFFICIENCY AND PROFITABILITY	• **Effective traffic management** due to adaptive speed limitations, based on the detected dynamic load conditions. • **Increased utilization** by **predictive maintenance** based on the provided trend-monitored data. • **Increased income by selling trend-monitored data** for predictive maintenance purposes to other parties of interest. • **Quality-based tolls and payment**s based on the provided trend-monitored data. • **Real weight-based tolls and payments** and real-time checking of the contracted weights with high accuracy and efficiency even at high train speeds.
ENVIRONMENTAL PROTECTION	**Controlled noise-, and vibration-emission** using defective wheel detection and trend-monitoring.

FUNCTIONS

TRAIN-, AND RAILCAR-WEIGHING
- at train speeds of **up to 160 km/h**
- with an **accuracy of 2%** (TÜV Certified)

SPEED MEASUREMENT with an **accuracy of 1%**

TEMPERATURE MEASUREMENT (optionally)

DAMAGE & DERAILMENT PREVENTION

Detection, trend-monitoring & alarm of:
- **Improper loading of axles, bogies-** and **railcars**
- (overloading and all kinds of asymmetrical-loadings)
- **Axle rupture**
- **Bogie suspension defect**
- **Wheel geometry defects** (oval, eccentric, flat or polygonal wheels)

For all alarms and warnings multiple-level threshold limits can be set by the Operator.

IN-MOTION WEIGHING

Using numerical analysis of the dynamic wheel-loads measured by the eRDM system, the static weight of the railcars can be determined with high accuracy. Comparing the measured values with the available freight protocols the eRDM system is able to verify the contracted freight in real-time, and send alert messages when overloading is detected. It also provides an alternative to weighbridges but way more cost-effectively, even at high train speeds.

DETECTION AND DIAGNOSTICS

The eRDM system is able to detect and diagnose several defects of the passing train. Using trend-monitoring of the bogie-suspension or wheel-geometry conditions over time, it is possible to accomplish the maintenance of the rolling stocks on a predictive basis instead of conventional regular inspections. Predictive maintenance significantly reduces the idle time of the service, thus reduces operational costs and increases utilization.

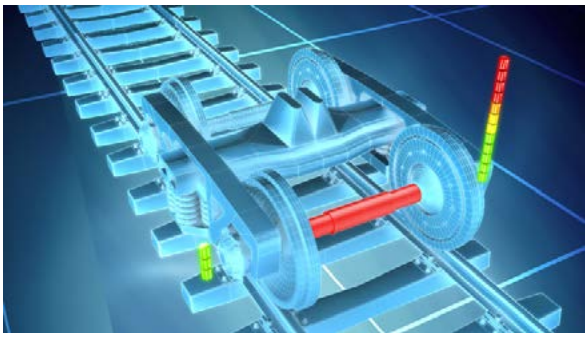
Improper wagon loadigs

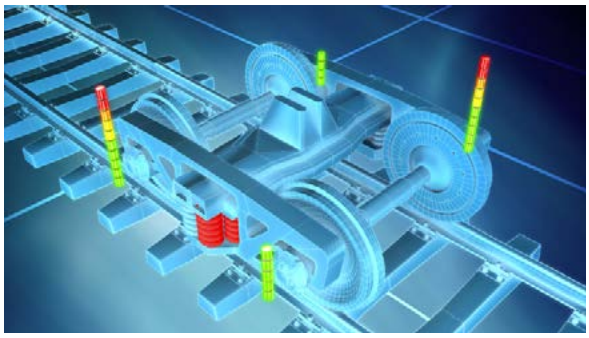
Overloading

Overloading may cause derailment hazard, and might be damaging both for the infrastructure and the rolling stocks.

Assymetric load conditions

Various asymmetrical load conditions of a railcar: left-right, front-rear, twisted wagons, symmetry within one bogie, etc.



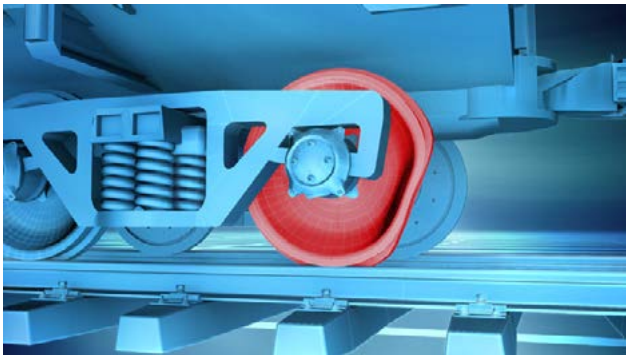


Axle rupture

Running with ruptured axle is one of the most dangerous condition for a train, therefore its detection has fundamental importance in aspect of derailments. Axle rupture typically results in extreme asymmetrical load distribution between the wheels within the damaged axle.

Bogie suspension defect

The fatigue of the suspension springs of the bogies also pose a derailment hazard as it typically results in an asymmetrical load distribution.



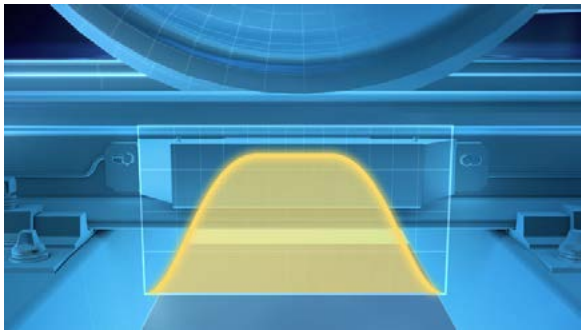
Defects in wheel geometry

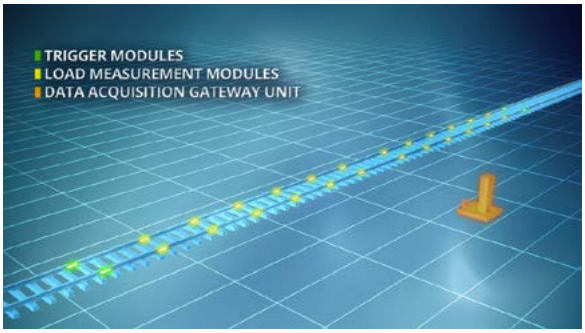
The geometrical deformation of the wheels causes periodic transient extra-loads, which might be damaging both for the infrastructure and for the rolling stock suspension and bearings. The eRDM system records the high resolution load response signal of each wheel and analyses the wheel shape.

SYSTEM DESCRIPTION

eRDM is a highly integrated wayside digital sensor network system, with high resolution recording of the dynamic load response of each wheel of the passing train.

The dynamic load measurement is based on load measurement modules containing high accuracy, proprietary strain-gauge sensors integrated with high performance digital signal processors.





System architecture

The measurement section is composed of 12 pairs of load measurement modules and 2 pairs of train detection trigger modules to start the recording, all mounted on the web of the rail, and interconnected with a high speed digital communication cable.

The measured high resolution load response signals are sent to the data acquisition and communication module located near the measurement section. The module has a battery equipped power supply and a wide area network connection (GSM, GPRS, HSPA, DSL etc.) The system analyses the measured axle-time profile using the offline vehicle database. The data acquisition module can be accessed by local Ethernet or Wi-Fi terminal by service maintenance personnel.

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Several wayside eRDM systems can be integrated into a redundant high availability diagnostic server solution. The server collects, stores, processes, and analyses the measurement results and sends the alarm and warning signals to client computers installed in operational stations. The central system can be accessed by various web browser applications.

Calibration & self-calibration

Calibration can be accomplished with wagons measured on high precision weighing systems. The service interface of the eRDM system manages the entire calibration process. The system performs regular self-checking and self-testing functions by comparing the measured and collected offline technical data of locomotives.

SERVICES

Candid offers highly customized turn-key software development services for the integration of the eRDM system central diagnostic server into the IT system of the railway operator for integrated monitoring and alarm functionality.

FEATURES

- Bi-directional measurement and detection
- Automatic and continuous self-calibration function
- Automatic and continuous self-diagnostics with remote maintenance function
- High-reliability with a redundant system architecture (12 pairs of measurement modules)
- Noise-immunity through integrated digital signal processor in each load measurement module
- High resolution load response analysis with proprietary, high bandwidth digital communication
- End-to-end data security of measurement values with state-of-the art secure digital architecture
- Customized software integration into railway operator IT system
- Comprehensive diagnostics from single wheels to full train with automatic alarm functions
- Real-time train identification
- Low power consumption: can be powered from the signaling system; no need for overhead cable supply
- Battery powered UPS for enhanced availability
- Can be installed on most common existing rail systems cost-effectively, no need for special understructure
- Available also as Service on BOO basis

eRTM

Rail Temperature Measurement System

ADVANTAGES

eRTM Wireless Rail Temperature Measurement System increases traffic safety and because it increases energy efficiency, it also lowers operational costs.

FEATURES

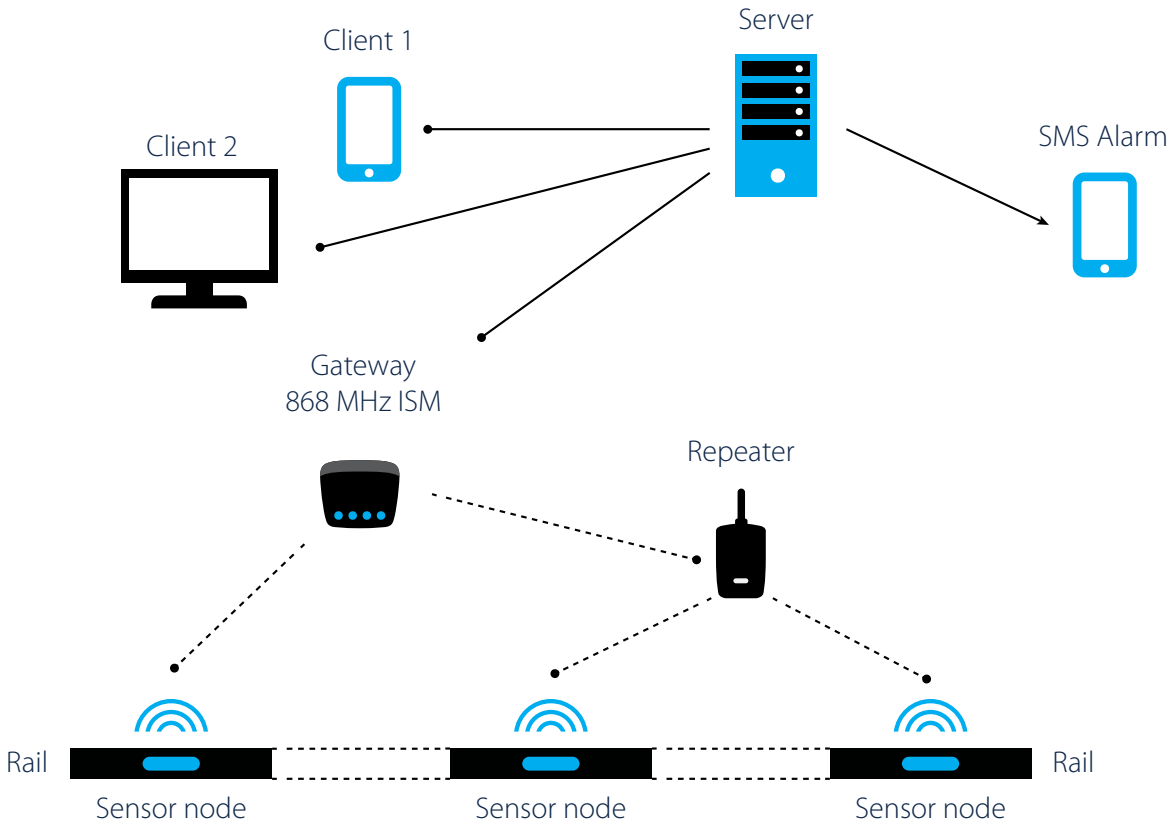
- Thermistor-based measurement of inner rail temperature
- Automatic self-diagnostics and continuous remote maintenance function
- Embedded electronics in each measurement module for noise-free high-accuracy measurements
- Wireless communication between on-site system elements - cost effective installation
- Secure data transmission via GSM/GPRS/HSPA/LTE or DSL/Fiber
- Customized software integration into railway operator IT system
- Low power requirements. Battery operated sensors, system Gateway powered from 230V.
- Battery powered UPS for the on-site gateway unit for enhanced availability
- Cost-effective installation on existing rail-track types without the need for traffic limitation, special
- understructure, or severe alterations in the rails
- Available also as Service on BOO basisDriver presses call button

SYSTEM ARCHITECTURE

The eRTM system is a **wireless, battery-powered sensor network** for real-time monitoring of rail-temperature, and thus, rail-stress distribution. Recordings are based on the measurements of thermistors mounted to the web of the rail. By applying **mesh technology**, repeaters allow the deployment of a wireless network covering large rail-track distances. Rail temperature is measured and data is sent periodically to the gateway unit.

The gateway module performs local data processing and logging, and transmits the results to the central diagnostic server and data center via broadband communication network. The gateway unit can be accessed via local Ethernet or WiFi terminals by service maintenance personnel.

Multiple wayside eRTM systems can be integrated into a redundant high availability diagnostic server solution. The server performs system wide data processing and evaluation, trend analysis, prediction, data storage and sends the alarm and warning signals to configured operational clients. All system functions are available and visualized through the central system, which can be accessed by various web browser applications.



SELF- & REMOTE-DIAGNOSTICS

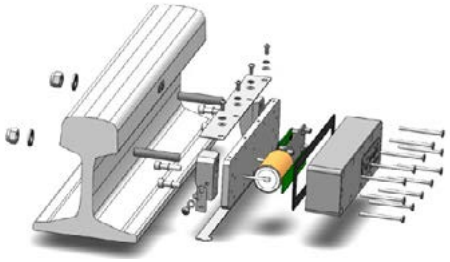
The status and the availability of all system components - including the batteries - are monitored continuously, and an alert is sent to the Operator automatically in case of any problem with the operation of the measurement system, or when the batteries are close to depletion and need to be replaced.

SERVICES

Candid offers highly customized turn-key software development services for integrating the eRTM system central
diagnostic server into the IT system of the railway operator for integrated monitoring and alarm functionality.

FUNCTIONS

Wireless Rail-Temperature Measurement system with



- measurement accuracy of ±1°C
- thermistor response time of < 1s
- battery duration of > 3 years

along with monitoring, prediction and alarm functions.

All warning and alarm threshold limit values can be set by the Operator.

BENEFITS

INCREASED SAFETY	**Derailment prevention** by **detecting, predicting**, and alarming on potential **rail-buckling conditions** in summer-time operations.
OPERATING COST REDUCTION	**Preservation and lifetime extension of** both the **infrastructure** and the **rolling stocks** with derailment prevention. **Energy savings** by measurement controlled railway-switch heating in winter-time operations.
BUSINESS EFFICIENCY AND PROFITABILITY	**Effective traffic management** with optimized duration, localization and extent of speed limitations, based on real-time rail-track temperature conditions and predictions. **Effective maintenance** planning by predicting rail defects and failures related to temperature variations, and by scheduling stress-free periods for rail-track maintenance.
ENVIRONMENTAL PROTECTION	**CO_2 reduction** by energy savings.

TECHNOLOGY PARTNER

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