

Border Control System **TI-BCS**

Border Surveillance System TI-BCS

Radio-controlled surveillance technology for borders and restricted areas

Surveillance Technology

Securing the border

Securing a country's border is not an easy task. Each country's border is an extensive and highly sensitive area which often runs through difficult terrain. Usually it is impossible to continuously monitor the border by personnel only, as the border police force will always be short on personnel for a complete and continuous surveillance. On the other side of the border there are the people interested in passing the border far away from the official border check points. These could be professional smugglers of contraband, drugs and people, as well as illegal immigrants and the occasional trespassers. The set up of fences and walls often does not make sense for either political or financial reasons. Patrolling the border by border police is a personnel intensive effort – and your border patrols cannot be everywhere in any case. Furthermore, the vision of the border patrol personnel is impaired at night: Night-vision-binoculars can improve the border patrol personnel's abilities but still have a limited effect on the security of ones borders.

The solution to monitoring and securing the border at all times is: Appliance of Teleinformatica Wireless Technology

The border control system applies not only one, but various highly sophisticated technologies and consequently our border control system consists of a wide and varying range of detectors and sensors which detect subsonic noise,

movement, thermo images. Special CCTV cameras on unmanned towers, special radar systems, in addition to mobile electronic imaging systems in the field provide a constant data stream to a central command center (CCC).



All communication between such sensors and equipment is carried out by radio communication, in order to minimize the installation effort and to secure an uninterrupted, safe and secure operation.

Surveillance Technology

TI-BCS is designed to allow easy integration into existing structures – this applies for organizational as well as technical integration.

You have segmented your border line already with always one border police detachment being responsible for a specific border segment. Usually several detachments then are reporting to a central headquarter. Our system works similar: The border is segmented into cluster areas. Each cluster area is equipped with an unmanned stationary tower, which is carrying a multi sensor camera head. All towers communicate with the central headquarters, where the Central-Command-Center (CCC) is located. This way, the CCC is in the position to, in real time, control alarms signaled by the different sensors and to act accordingly, e.g. send a local patrol to the spot. The patrol vehicles assigned to each area can be equipped with an electronic imaging system including highly sophisticated

daylight and infrared cameras.



The images are available to the monitoring officer inside the vehicle and, in addition, can be transmitted to the CCC.

Your advantages:

- Central control and command
- Highly efficient deployment of personnel
- Instant alarm in case of any events
- Precise location of the source of alarm
- Immediate images from the point of alarm
- Elimination of hide-and-seek tactics used by trespassers

ALL OF THE ABOVE IS ACHIEVED BY

- Multiple sensor application, using different technologies, such as seismic signals, micro wave signals, infrared images, radar images, electret's cables, acoustic signals, capacity variations to ensure the highest detection rate, whilst reducing the number of false alarms
- Minimal installation costs due radio operation all along the monitoring and communication lines
- Modular concept using stationary, semi mobile and mobile units, allowing easy adaptation to specific requirements
- Integration of manned and/or unmanned aerial vehicles with direct

radio communication links to the ground.

Why Border Control?

Surveillance Technology

TI-BCS is designed

to allow an easy integration into existing structures – this applies for organizational as well as technical integration.

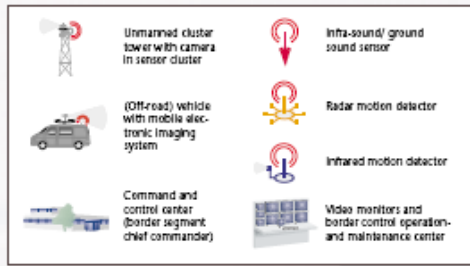
You have segmented your border line already with each one border police detachment being responsible for a specific border segment. Usually several detachments are then reporting to a central headquarter. Our system has a similar functionality:

The border is segmented into cluster areas. Each cluster area is equipped with an unmanned stationary tower, which is carrying a multi sensor camera head. All towers have communication links to the central headquarters, where the Central-Command-Center (CCC) is located. By this way, the CCC is in the position to, in real time, control alarms signaled by the different sensors and to act immediately, e.g. by sending a local patrol to the spot. The patrol vehicles assigned to each area can be equipped with a electronic system including highly sophisticated daylight and infrared cameras. The images are available to the monitoring officer inside the vehicle and, in addition, can to the CCC.

TI-BCS: fully radio controlled border surveillance system

Approximately 8 km max. extension per sensor cluster





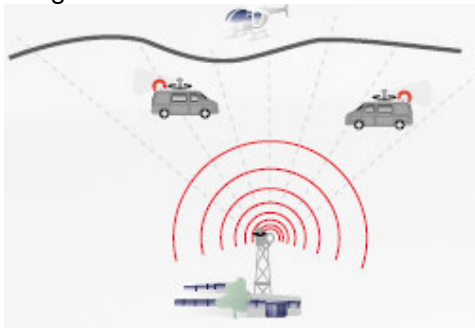
Surveillance Technology

Border models with varying surveillance requirements

Border model A

Patrolled border section with a low temporal and local density of surveillance.

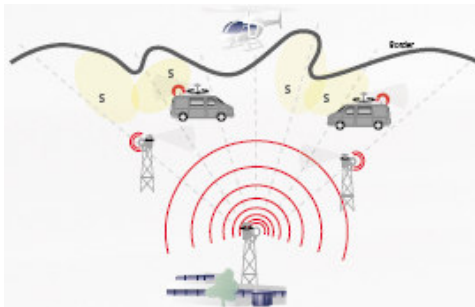
Length of border section: 100 km.



Surveillance Technology

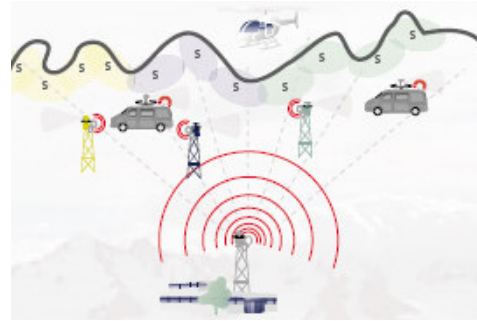
Border model B

Patrolled border section with surveillance centers (low density of surveillance with permanently guarded sectors). Length of border section: 100 km.



Border model C

Permanently guarded border section with temporally and locally unlimited guarding. Length of border section: 100 km.



Sensors

TI-BCS CIR – radar motion sensor



The CIR sensor consist of a group of 6 PIR sensors that are grouped in a circle. This arrangement allows the detection of persons as well as vehicles moving at speeds between 2 and 2000 m/min within a range of 10 to 500 m from the sensor circle. The sensors can be buried in the ground with only the small antenna stump protruding.

TI-BCS LIR – infrared motion sensor



The **TI-BCS** LIR sensor is a focusing infrared sensor for the detection of moving persons and objects up to a distance of 65 m within an opening angle of 6°.

TI-BCS SIR – infrasound sensor



The SIR sensor is a wave sensor for the detection of infra-sound and seismic waves. Depending on the soil conditions and the intensity of the waves generated by moving persons or objects (vehicles), these waves can be detected at distances up to 20 m from the sensor.

TI-BCS – magnetic sensor. The **TI-BCS** magnetic sensor detects metallic items, which are moving into the detection area.

TI-BCS – capacitance and electrets sensor
The **TI-BCS** capacitance and electrets sensors detect items moving into the detection area. Capacitance sensors can detect changes between two vertically positioned electrodes, while electrets sensors can be implemented into mats to step on. Both sensors are particularly suited for securing paths or other hot spots.

Power supply

The sensor's power supply can be any suitable DC voltage between 9 and 15 V. This allows for a broad range of power sources: Often a small near-by solar or wind power generator will be the system of choice, avoiding the need for long distance cabling.

Alarm signalling

The alarm signalling can be transmitted completely wireless: All sensors have communication links to the cluster's tower via radio waves, ensuring that no cables are required. In the event that cable based technologies should provide an advantage over radio communication, fiber optical or copper cable may be integrated.

Central Components

Surveillance Technology

TI-BCS – cluster tower



The cluster tower serves two purposes:

- Radio relay station for the sensor signals from sensors located within the cluster to the command and control center
- Installation tower for multi-sensor head (low lux black & white camera, 4 motion sensors) with pant-and-tilt
The video signal of the camera is transmitted to the command and control center, by radio communication. Vice versa, the command center can control the camera position.

TI-BCS – surveillance vehicle



The surveillance vehicle is equipped with the same multi-sensor head using low lux camera and motion sensors as the cluster tower.

The pictures and videos taken by the camera can be monitored simultaneously in the vehicle and at the command- and control center, each of the operators may control the pant/tilt and other parameters of the camera, ruled only by his assigned authority. The video signals and the remote control unit of the multi sensor head of the vehicle are linked to the command and control using the same radio communication technology as the cluster towers.

The type of vehicle is selected according to the specific project requirements.

TI-BCS – command and control center



The command and control center acts as the receiving station for all alarms and video signals from the various clusters within its range.

The center evaluates all incoming alarms and videos, performs the control and guidance of the field patrol units and, at the same time, surveys and monitors the remote equipment.

Sensors – Infrared Camera (nightvision)



start-up time: < 6 min.
 voltage: 18 ... 35V DC
 power consumption: 20 ... 40 W
 CCIR TV standard output NEDT: < 35mK
 serial interface RS232
 number of active detectors elements: 320x 240
 3rd generation, cooled wide visual field: 25° x 19°
 mean visual field: 6° x 4,5°
 narrow visual field: 1° x 0,75°
 spectral range: 7,5 m ... 9 m

Sensors – CCD Color Camera 1

zoom: 27x optical, 10x digital
 standard: CCIR 625/50 interface: RS232
 number of pixels: 795 (D) x 596 (H)
 signal to noise ratio: 48dB
 power supply: 12 V DC

Sensors – Paint / Tilt Head MSO – 02

automatic movement of paint/tilt head into initial position movement in azimuth range: n x 360° movement of elevation range: ± 40°
 range of speed in horizontal plain: 0,03 – 60° / sec
 range of speed in vertical plain: 0,03 – 45° / sec
 position reading accuracy: 0,01 mrad
 maximum payload: 40kg power supply: 12V or 24V DC
 interface: Ethernet, protocol TCP/IP 10 BaseT, 5x RS232/485

Sensors – Technical parameters of SAMBA LIR

supply voltage: 9,6V
 current consumption (from transmitter SAMBA T):
 1. ALARM: 0,018A
 2. Observation mode: 0,009A
 guaranteed range: 50 m
 max. range: 65 m
 number of detecting PIR sensors: 1
 observation field: 6°
 operating temperature: - 20°C to 55°C
 storage temperature: - 40°C to 70°C
 dimensions: 100 x 80 x 90 mm
 weight: 0,4 kg
 cable length: 1 m
 protection class: IP67
 initialization time after switching on:
 1. connection to SAMBA T: 30s (software adjustable)
 2. time delay after alarm: 4s (software adjustable) transmitting frequency: from 405 MHz to 470 MHz (RF channel assignment by software means one of 128 transmitting channels)
 max. transmitting power: 0,5W
 guaranteed range (transmitter): 1 - 2 km
 max. range (transmitter): 5 - 6 km

Surveillance Technology

Sensors – SAMBA CIR

Purposed for the protection of a target object or similar applications; detection of moving persons up to minimal distance of 10 meters, monitoring of circular area around vehicles, small buildings, etc. with 20 meters minimal diameter.

power supply: 9,6V

battery capacity: 3600 mAh

electric current consumption:

1. initialization after switch on: 0,028 max. 0,035A

2. transmission: 0,120 A max. 0,135 A

3. stand by and pursue mode: 0,008A, max. 0,010AX time of initialization

after switch on: 50s (can be set by PC)

time delay after alarm mode: 8s

(can be set by PC) transmitting

frequency: 405 MHz-470 MHz

(possible to set by PC 128 transmitting frequencies)

power output max. 0,1 W-0,5 W

range of transmitter max: 5 – 6 km

number of PIR detection sensors: 6

field of view: 360°

battery chargers: Standard

SAMBA N1, SAMBA N8

operating temperature: -30 °C ... 55°C

storage temperature: -40 °C ... 70 °C

dimensions: 160 mm x 160 mm

without antenna weight: 1,8 kg

protection class: IP67



TI-BCS

Teleinformatica d.o.o.

Tvornička 3, Sarajevo

Tel.: +387 33 768000

Fax: +387 33 768001

www.teleinformatica.ba

info@teleinformatica.ba

Wireless Broadband Communication System

**The WBCS consists of 4 base
components:**

1. base station (BS)

2. terminal unit (TU)

3. network management (NM)

**Frequencies in accordance with
country bandwidth General plan.**