Société du Grand Paris

Preventing intersection gridlock in Greater Paris
City of Aulnay-sous-bois uses video detectors to prevent traffic gridlock.

Organization:
City of Aulnay-sous-bois

Location:
Aulnay, France
Greater Paris area

Industry segment:
Smart Cities

Application:
Gridlock prevention
Intersection Control
Traffic Data Collection

Mission

The Société du Grand Paris is a public institution charged with the creation of 200km of automated metro and 68 stations: the Greater Paris project (Grand Paris Express), currently the largest urban project in Europe.

In June 2016, Société du Grand Paris launched a call for innovative solutions aimed at minimizing the impact of the construction of lines and stations on road users.

Citilog's solution for the detection and prevention of intersection gridlock was selected.

The City of Aulnay-sous-bois, half-way from Paris center to the CDG airport, was chosen for one of the first implementations of the solution.

The intersection chosen –carrefour de l'Europe- is neighboring the future metro station and is at the crossroad of important local route, N2, N370 but also several major routes A1, A3, A104.

It often undergoes severe traffic gridlocks that cannot be predicted or linked to morning/evening rush hours; and that can last hours before returning to normal.

Solution

The solution was designed in cooperation with the Société du Grand Paris, the City of Aulnay-sous-bois and Conseil Général 93 (regional transportation authority).

6 Citilog XCam traffic sensors were deployed, monitoring the center of the intersection.

The sensors were connected to the local existing traffic controllers through a universal communication interface board using loop-type inputs. This allowed minimizing the work required to reprogram the traffic controller to implement the new control strategy.

The sensors monitor 8 strategic zones on the intersections and detect stopped traffic: 4 zones indicating a pre-gridlock situation, 4 zones indicating an actual gridlock situation. Upon detection of standing traffic, the traffic controller shortens the cycles of the traffic lights in order to reduce the flow of vehicles incoming to the intersection and favor the flows of vehicles leaving the intersection. Once the sensors detect that the standing traffic has been resolved, the cycle of the traffic lights is returned to normal

Citilog

> "Since the installation of the system 6 months ago, the number of complaints from road users to the city has dropped dramatically. Aulnay citizens are now re-using an intersection they had banned from their routes."

Mr. Guillaume Dellong, head of traffic department, city of Aulnay-sous-Bois

Results

Aside from resolving a local problem, the goal of the project was to understand and measure the ability of the system to prevent or mitigate gridlocks.

System performance was measured by comparing the number of traffic gridlock occurrences with the system in operation and with the system disabled across a period of 6 months (09/2017-02/2018).

The sensors are all connected to the internet and to Citilog's CTCloud platform that collects and hosts data. The platform logs all occurrences of gridlocks and displays them in real time on a dashboard. The platform also collects snapshots from the sensors that allow visualizing gridlock situations.

Once installed, the system immediately provided extremely positive results: the overall time when the traffic is saturated was reduced by 50%. In all cases, the early detection of pre-gridlock or gridlock enables returning the traffic to normal in less than 15 minutes (5 minutes in most case; versus hours in the past).
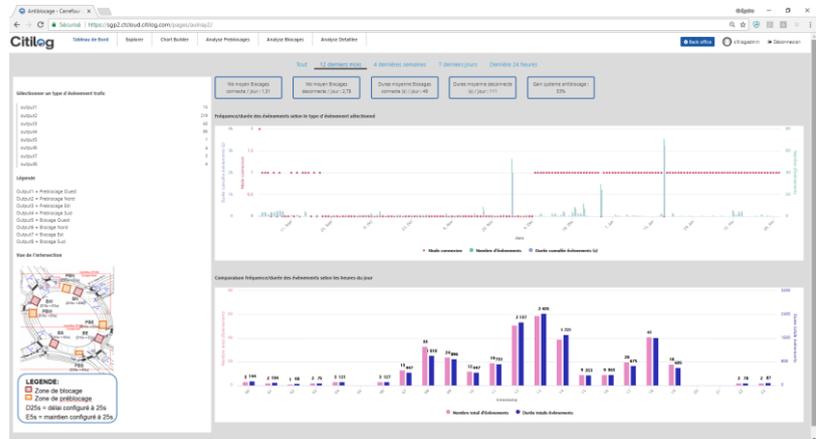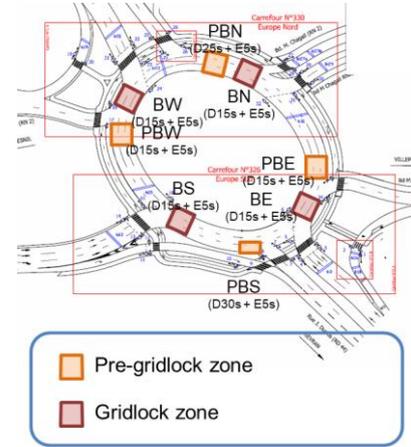
The systems detects on average 2 pre-gridlock situations per day.

During phases where the system was disconnected (for the performance evaluation) several long-duration gridlock situations (multiple hours) occurred.
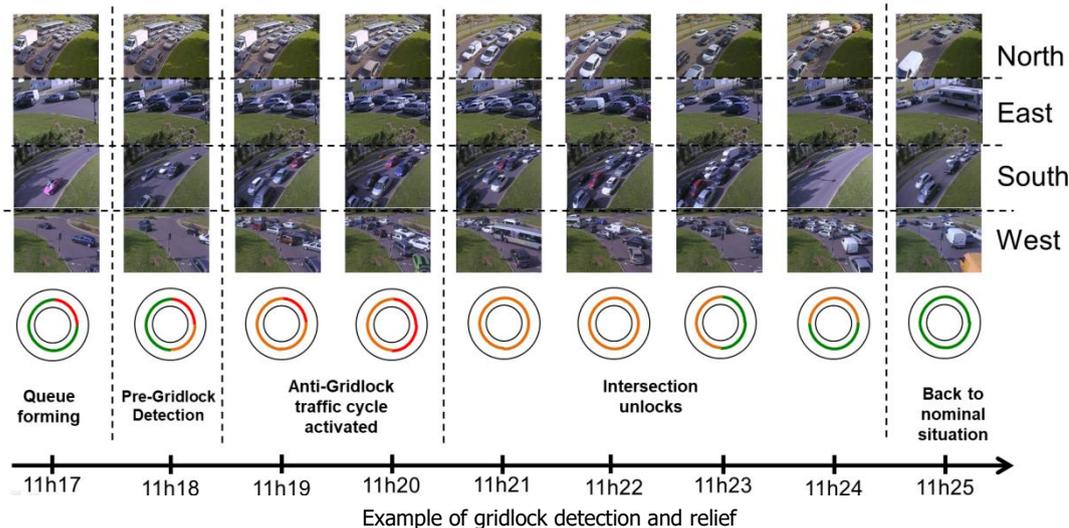
It is important to note that the operation of the system on carrefour de l'Europe has not deteriorated the operation of neighboring intersections, which is absolutely fundamental.

As a result of improving traffic fluidity across the intersection, the city has noticed that local road users are now using the intersection again when they were not considering it a viable option in the past. The number of complaints calls from road users to the city has dropped dramatically as citizens believe the operation of the intersection is "normal".

"The system is extremely efficient to deal with the current traffic, says Guillaume Dellong, head of traffic department. We are eager to see it handle heavier truck flow when the Greater Paris work will start."

Pre-gridlock zone
Gridlock zone

CTCloud platform dashboard

North
East
South
West

Queue forming · Pre-Gridlock Detection · Anti-Gridlock traffic cycle activated · Intersection unlocks · Back to nominal situation

11h17 · 11h18 · 11h19 · 11h20 · 11h21 · 11h22 · 11h23 · 11h24 · 11h25

Example of gridlock detection and relief

Société du Grand Paris

AULNAY-SOUS-BOIS

seine-saint-denis LE DÉPARTEMENT

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