Training of traffic controllers is a growing concern nowadays for all the railway companies in charge of train traffic control. There are over three thousand certified traffic controllers in Adif (with different levels) and it is an ageing workforce. Adif needs to ensure that it is able to replace the traffic controllers at a steady pace as they are retiring as well as provide continuous training for current controllers when moving to a different infrastructure (single vs double track, axel counter based vs automatic block signalling…). In addition to this, the Spanish Government has approved a new set of operating rules that will become effective in January 2017; Adif needs to guarantee that all traffic controllers are aware of the changes introduced in these new rules.

In order to meet these training needs, Adif has implemented a last generation simulator for train traffic control. This simulation system is able to reproduce the behaviour of infrastructure elements like interlocking systems, track circuits or signals, trains and CTC-VDU systems. Additionally, virtual agents have been developed for all the personnel participating in traffic control: traffic controllers, train drivers, signalling technicians, engineering supervisors…

In addition to the technical tasks, the simulation system helps to develop non-technical skills that are critical for safety staff. Communication skills are developed through conversations with the virtual agents, cooperation with other agents is achieved through collaborative exercises and decision making skills are improved by carefully designed exercises with disruptions to ensure that traffic controllers are able to guarantee operations safety and, at the same time, maintain train traffic performance.

Moreover, the simulation system includes an automated assessment system that monitors the actions performed by the trainee to verify that safety is maintained at all times and communication with agents follows the operating rules. In order to develop this assessment system, all the operating procedures have been modelled using a business process modelling tool that is used also for defining the behaviour of the virtual agents.

Adif has designed a web tool that organizes the different training courses based on trainee experience level and infrastructure characteristics. This tool allows the training instructors to develop exercises with different disruptions (dark signals, failed train…) in order to practice the procedures needed to maintain operations and recover from the problem (authorizing to pass a dark signal, sending another train to move a failed train to an appropriate location…). The instructors are able to interact with the exercise at any moment, taking control of the system or even introducing disruptions in real-time.

The simulation system includes train bulletins for authorizing engineering works, authorizing to pass a dark signal and registering braking tests for trains. In addition, the system provides also the train register books for registering special actions like wrong direction movement authorizations or track requests when switching to telephone dispatching.

This presentation will focus on how Adif is using this simulation system to fulfil its training needs with the implementation of state of the art technology.