XPS ChemApp interface for real-time digital twin modelling of metallurgical plants

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XPS has developed an interface to connect, among other tools, GTT's ChemApp dll to Emerson's Plantweb Optics Analytics platform with the purpose of implementing dynamic high-temperature reactor models into the online information system for metallurgical plants. The interface allows, therefore, to create a digital twin of a reactor that can provide real-time estimations of the reactor's performance, compositions, production, etc. When using a thermodynamic-base model of a reactor, the interface requires an input thermodynamic datafile, the ChemApp library and the Plantweb Optics Analytics implementation of the model. XPS interface creates an object oriented library that communicates with Plantweb Optics Analytics, this interface can access ChemApp, a simple mass balance library or other third party library, providing wide flexibility on the different reactors or unit operations that can be integrated. XPS uses Emerson's Plantweb Optics analytics software for full integration of the model into the plant control System, which allows to run the model online with the robustness and cybersecurity associated to an industrial control system and with full interconnectivity with both the Distributed Control System (DCS), the Production Information Management System (PIMS), PI Historian and the Laboratory Information Management System (LIMS). Plantweb Optics Analytics provides sophisticated tools for validation of inputs, filtering of the data and allows to combine AI and ML algorithms for decision making, resulting in a very robust model implementation that requires very low maintenance. XPS has trialed this system on Glencore's Sudbury Integrated Nickel Operations Smelter, where a real-time model of two finishing converters has been running almost continuously for over a year with great success. This implementation has demonstrated to be extremely stable and versatile, capable of handling complex operational modes and situations. This type of models can not only provide real-time advisory guidance to the operators directly into the control room HMI but it is expected that, in the future, control decisions will also be allowed to be made by the model.