ABSTRACT

PT XYZ is one of the aerospace companies in the southeast asia region. In producing one of its component, namely the forward spar, the constituent parts will be fabricated, stored in the warehouse, and assembled on the assembly line. In the warehouse area, one of the activities that they do is stock management. When observing in the warehouse, the stock of parts in the warehouse sometime doesn't match between in the system and the actual condition in the warehouse. This causes make overstock and stockout. Based on stock data obtained from PT XYZ for December 2022, 57% of the actual system doesn't match with the actual condition in the warehouse. In addition, as much as 20% of the data on all components that make up the forward spar don't have stock. This problem is caused by an error in inputting data to the actual system, there is a queue for recording data, and there is no monitoring system that provides notification regarding the minimum and maximum limits that must be owned in the warehouse. The existence of overstock or stockout will cause increasing the inventory costs. Therefore it is necessary to design a system that can improve data accuracy and reduce inventory cost simultaneously.

In solving these problems, this final project uses a multi-layer approach to the digital twin. This design process will be designed based on 3 main layers in a multi-layer approach to the digital twin. The first layer is the model which will include the logic and algorithms of the system which includes how the system manage and stores data and provide stock-related warnings. To support the stock limit that must be met, then the minimum and maximum stock calculations are carried out using the min-max and EOQ method. The second layer is the signal which includes the transfer of data or information. In the design that is made, the signal will be obtained from the qr-code which will be captured by the camera on the mobile application to be transferred to the website application. For the third layer, namely the interface which is the interaction between humans and machines or between machines. In the design, the human-machine interface is made in the form of a website application display. As for machine and machine interface, the of an API (Application programming interface) is used to connect mobile

application with website application.

After designing the digital twin with a multi-layer approach, the results obtained are an increase in data accuracy by 39% of the data tested at PT XYZ. In addition, by designing the digital twin, it can reduce the inventory cost by Rp. 11.543.553 for all the parts that make up the forward spar in 1 year. This decrease in inventory cost was due to a reduction in storage costs and the cost of shortage of parts due to stock control from a predetermined minimum and maximum limit.

Keyword — ***Digital Twin, Multi-Layer, Data Accuracy, Inventory Cost***