Dock-Warehouse Management System

Dock warehouse management in-short manages distribution of products from shipper and carrier to destined stops. Shippers store the products in the warehouse in the form of storage units. Warehouses have a certain number of docks to load the trucks of carriers.

Challenges:
- Scheduling access to different docks.
- Reducing carrier traffic and ambiguity in timings.
- Tracking of orders.
- Agreement between Shipper and Carriers.
- Management of multiple stop points.
- Intractability may cause substantial financial losses.

Problem statement:
Shipper needs to transport goods that are produced by the manufacturing unit to the customers. Shipper notifies the carrier about the amount of goods to be transmitted and its respective destination. Carrier sets up an appointment and is acknowledged by the shipper.
$SU1, SU2, ...SUn$ are the different storage units inside the warehouse. $D1, D2, ...Dm$ are the docks which facilitate the movement of goods from storage units to the trucks. The number of docks available are less than the number of storage units present that is $m <= n$. Therefore a total of m trucks, $T1, T2, ...Tm$ can be scheduled at a time leaving behind trucks $T(m+1), T(m+2)...$ waiting to access the docks. There usually exist only 2 gates to enter the storage facility, entry point, G1 and exit point, G2. This increases the need for scheduling the trucks, so as to avoid unwanted queues, waits and traffic.

Stopping points S1,S2,S3...Sk are generally far from each other and also the warehouse, so we need to track them.

The problem lies in coordinating operations between storage units, the items stored and dock stations. In the same way, synchronize free slots of dock with appointments by the carrier.