

# PRODUCTION

## Flexible Material Handling System

Two main modules for material handling tasks in production lines are belt conveyers and AGVs (Autonomous Guided Vehicles). Belt conveyers have good performance with efficiency but they do not have flexibility against layout changes of the production lines. On the other hand, AGVs have contrary characteristics. Therefore we need transporting modules that have both efficiency and flexibility. We propose the AGV modules with the belt conveyer (Fig. 1). Fig.2 shows the photograph of the proposed modules. Two demands can be realized with the cooperation of these modules. Three kinds of cooperation can be considered: (a) Full AGV system: each AGV moves independently and hands over a transported object to/from nearby modules. (b) Hybrid system: several AGVs are connected each other, and move as large AGVs. (c) Full belt conveyer system: many modules are spread between start and goal positions, and the objects are transported over the conveyers. A module-assignment problem was solved, in which they derive adequate disposition of the modules in the working environments and the style of cooperation under demanded flows among any two stations and the number of the modules.

*Keywords:* Material Handling System, AGV, Cooperation

### References

- 1) J. OTA, T ARAI, K. INOUE, R. CHIBA and T. HIRANO: "Flexible Transport System by Cooperation of Conveyor-Loaded AGVs," Proc. of IEEE Int. Conf. on Robotics & Automation, pp. 1144~1150, 2000.

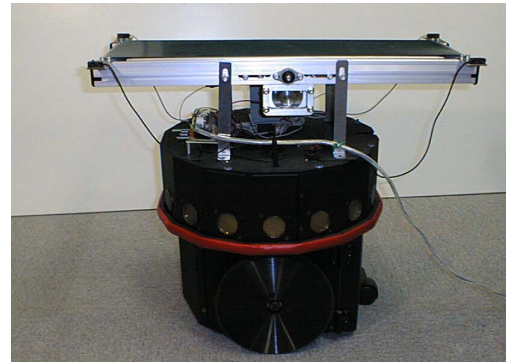
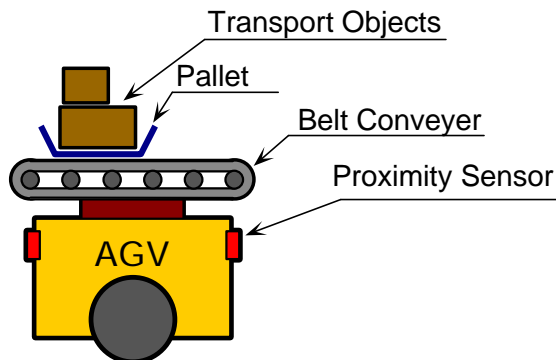
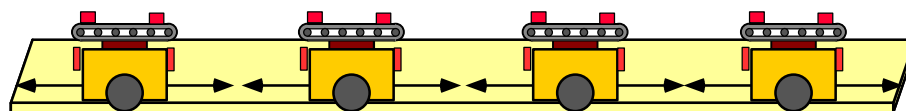
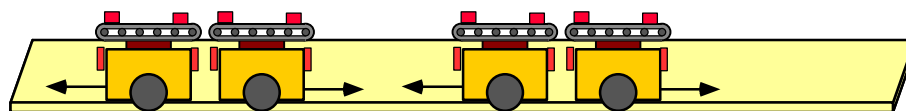


Fig.1 Schematic view of the proposed system

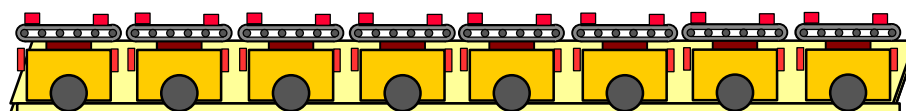
Fig.2 Real system



(a) AGV type



(b) Hybrid type



(c) Full belt conveyer type

Fig.3 Types of cooperation