HVAC – Production numbers

Our customer produces Heating, Ventilating and Air Conditioning (HVAC) systems in **5 plants** around Europe. Each plant has **3 production lines** and each line produces about **one thousand of HVAC per day** (in 2 or 3 shifts). The total number of the HVAC produced by our customer in Europe is about **15 thousand per day**.

HVAC – Application specifications

3 cables need to be assembled for each HVAC.

Each HVAC has **8 fixing points** for the cables and **7 connectors** (cables have branches).

Currently the HVAC cables assembly is executed in **3 different manual stations**. 2 of them are used for putting the cables in the fixing points and the third one is used for inserting the connectors.

In the **first station** the operator fixes 2 of the 3 cables taking them from two different baskets.

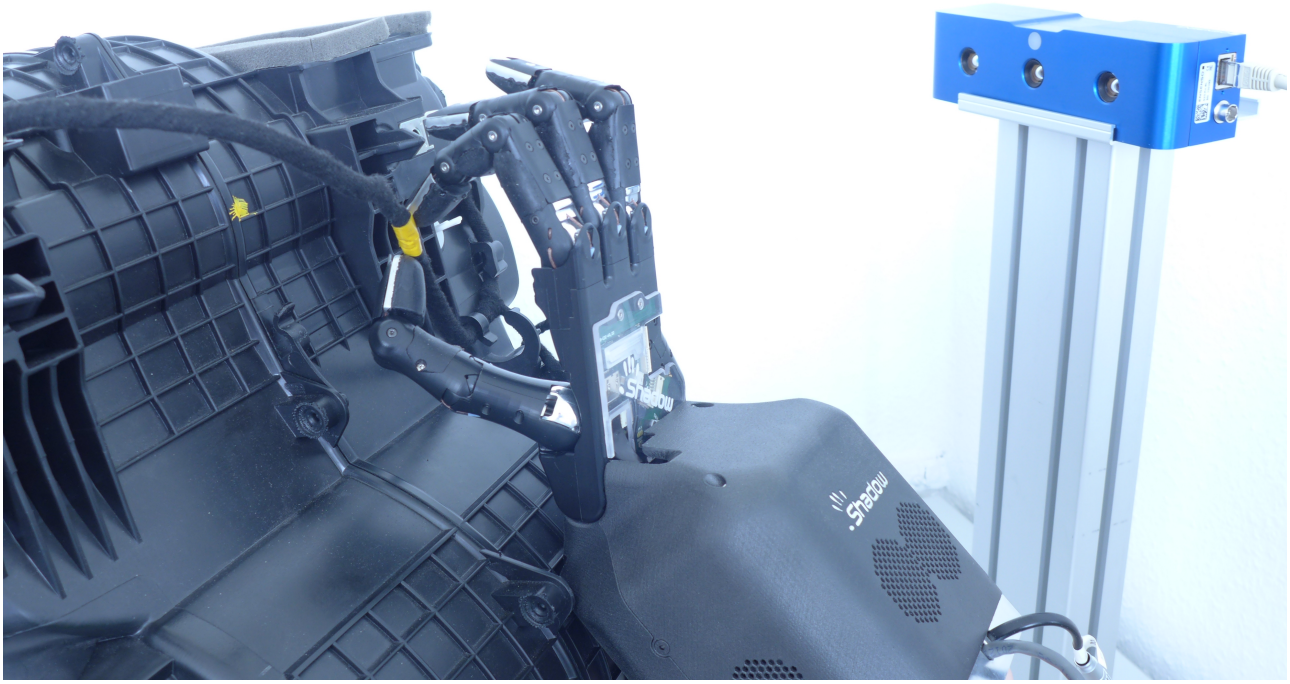
In the **second station** the operator fixes the third cable taking it from a basket.

In the **third station** the operator inserts all the connectors (and makes some screwing operations for assembling plastic parts on the HVAC).

The total cycle time for the complete assembly of the cables (3 stations) is about **2 minutes** (about 40 seconds per station).

HVAC – Evaluation and benchmarking criteria

1. Time required by a non-robot-expert for successfully deploy her/his first robot program
2. Time required by a non-robot-expert for successfully re-program the robot (e.g. definition of new assembly tasks because a new item is going to be produced).
3. Success rate of robot execution against part variances and deviations. Environment conditions in real applications can slightly change from the nominal ones.
    - Variation of HVAC position about **+/- 3 cm**.
    - Pick of one cable from a basket of cables of the same type (cables are randomly positioned inside the basket).
4. Robot execution time (not the main focus of the experiment). Comparing with the manual execution putting a cable in a fixing point should take about **10 seconds**.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