













high effort in engineering, development, qualification and implementation.

Especially in processes that are similar in all companies, the flexibility of modern robotics can enable standard solutions that are not only rewarding for suppliers due to their number of units but are also highly attractive for the applying industry in terms of implementation effort and costs. What is necessary to get there?

First, the pharmaceutical industry must identify the applications and their requirements. Looking at organizations like ISPE and others this topic gets more and more awareness. It is just a matter of time until the application targets are published.

Second, robotics companies are needed which are engaged enough to envision the selling potential of such applications and willing to deliver the most flexible, most easy to qualify, most easy to install and therefore most competitive robotics application.

The palletizer in fig.2 might not be the most typical pharmaceutical application, especially because it can be applied aside from regulative requirements. Anyhow it is flexible enough so serve the different clients, is already sold in hundreds, is set up in minutes instead of weeks and therefore a good example where "industry" can get if "industry" really wants to!

## Literature

- [1] European Council Directive 89/391/EEC of 12<sup>th</sup> June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work
- [2] Information der Deutschen Gesetzliche Unfallversicherung (DGUV) 213-083; Section 6.2
- [3] Open Innovation Challenge: <https://grants4tech.bayer.com/robotic-competition/>; Bayer AG Corporate Technology & Manufacturing – Innovation Management
- [4] <https://ispe-dach.org/arbeitsgruppen/sig-robotic/>; Results of first constituting meeting 18<sup>th</sup> Dec 2019
- [5] Google Develops Robot Arms that Learn to Pick Up Objects: <https://ai.googleblog.com/2016/03/deep-learning-for-robots-learning-from.html>

All links were checked most recently on 14<sup>th</sup> Apr 2020.