[Grant Agreement No: 609206]

Factory in a Day

D8.13

Periodic reporting on dissemination activities I

Wibke Borngesser, Technische Universität München

12 September 2016

Version 1.0

Start date of project:	01102013
Duration:	48 Month
Classification:	PU (public)
File name:	D8.13_Period_reporting_on_Dissemination_Activities
Project website:	www.factory-in-a-day.eu

Disclaimer:
The work leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 609206. The opinions expressed in the document are of the authors only and no way reflect the European Commission's opinions. The European Union is not liable for any use that may be made of the information.

Change Control

Version #	Date	Author	Organisation
1.0	09.09.2016	Wibke Borngesser	TUM

Release Approval

Name	Role	Date
Martijn Wisse	Coordinator	10 October 2016

Change History

Describe here briefly the reason and type of changes made since previous version.

1.0 = first draft

Table of content

1. Executive Summary

In past six months the dissemination and outreach activities of Factory-in-a-day have been marked by the participation of Team Delft (built upon two partners of Factory-in-a-day: TU Delft and Delft Robotics) in the Amazon Picking Challenge. The successful participation and winning the challenge caused some interest in the activities of Factory-in-day.

Furthermore, we participated in a number of events/trade fairs and conferences, presenting new results of Factory-in-a-day.

Apart from that, the overall strategy for dissemination has not been changed, since there has been no need identified for any actions of that kind. The online media are highly frequented and the main source of information on the project.

2. Events

ICRA 2016 (International Conference on Robotics and Automation) is one of the big robotic conferences. At their Industry Forum our partner PAL Robotics was invited to give a presentation. The topic was “Partnering for modular, open solutions to meet industry needs”. In his presentation, the PAL representative explained how industry can be enhanced by modular robots – linking this to our project, in which modularity is also a key factor.

Figure 1: Presentation of Mr. Vivas at ICRA © PAL Robotics

RoboBusiness 2016 (June 1-3), which took place in Denmark, was the only trade fair in the period of this deliverable, in which Factory-in-a-day had an own booth to show work of the project. The Amazon Picking Challenge team from Delft used the trade fair as a real-world test run for the competition in Leipzig, which took place four weeks later. For this the team – and the other Dutch team to compete in the challenge – did a test run challenge with the same rules as in the actual challenge (only slightly modified due to the fact that both teams had to do some more improvements on object recognition). This demonstration was very well received by the audience.

Figure 2: Booth at RoboBusiness 2016

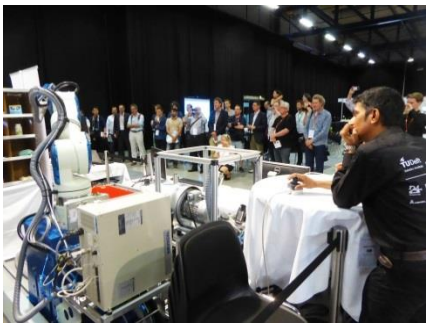


Figure 3: Test run at RoboBusiness for Amazon Picking Challenge

There were also several presentations in relation to the project: Prof. Martijn Wisse gave a presentation on “Increasing the Application of Robotics and automation in EU”, Dr. Mirco Bordignon (Faunhofer IPA) talked about “ROS-Industrial: bringing open-source robotics innovation to the factory floor” and Prof. Jouke Verlinden (TU Delft) on “How Robotics and 3D Printing Enable us to Think Outside

the Box".

The next RoboBusiness in 2017 will be organized by TU Delft in cooperation with the RoboBusiness Europe (April 20-21, 2017). Factory-in-a-day will use this unique opportunity to show results, since this the final year of the project. More details on www.robobusiness.eu/rb/program-2017.

At **Automatica** trade fair (June 21-24 in Munich), Factory-in-a-day was presented through Universal Robots. The company Universal Robots introduced a new concept called Universal Robots+. The early prototype of this system was a result of Factory-in-a-day, which was then subsequently developed by Universal Robots. At the trade fair, the new platform was introduced to the public. UR+ is a "showroom of Plug & Play application solutions offering a new level of simplicity for companies installing their next UR robot application. By choosing accessories, end-effectors, and software solutions from Universal Robots+, both distributors and end users get high security and predictability that applications will run well from the start, saving weeks and months in the integration process from concept to operation of the UR cobots." (from the press release of Universal Robots) We also distributed the press release of Universal Robots on our website.

Figure 2: UR booths at Automatica

Our partner PAL Robotics also had a booth at the Automatica trade fair, which showed some results of Factory-in-a-day. Overall, the trade fair had over 45,000 visitors.

At the beginning of July, the RoboCup took place in Leipzig, part of it was the **Amazon Picking Challenge** (visitor approx. 3500).


Figure 3: The Award for the Amazon Picking Challenge. © Amazon

Team Delft qualified as one of 16 teams for the finals. The competition consisted of two parallel competitions: the Pick Task (pick up number of objects from the shelves used in the Amazon warehouses), and the new Stow Task (taking items out of a tote and putting them into the shelving unit). The teams were judged by time and performance. Team Delft won both categories. They won the stowing task with an impressive 214 points (second: 186 points). The Picking Task had to be decided by a 'photo finish' between Team Delft and the Japanese team PFN. However, Team Delft's first pick was faster than the one of PFN and therefore, they won that part as well.

The role of Factory-in-a-day in the challenge was basically mirrored by the approach of Team Delft. The team (consisting of many team members, who are also working in Factory-in-a-day) tried to apply the basic concept of fast installation time on a real robot. Since the actual robot arm was only delivered shortly before the competition, they could only focus on testing for the Picking challenge and not for the Stowing challenge, as this was carried out for the first time in Leipzig. "We arrived to the competition, installed the system and calibrated it in less than a day. Then we integrated and tested the stowing during a day and a half. The next day we won the Stowing Challenge with an almost perfect scoring", one of the team leaders explained the similarity to the project.

To summarize, Factory-in-a-day has participated in these events in order to present results of the project:

Partner	Name	Date	Location
TU Delft/ Delft Robotics	Amazon Picking Challenge	June 29-July 3, 2016	Leipzig/ Germany
TU Delft/ Delft Robotics/ TU München	RoboBusiness Europe	June 1-3, 2016	Odense/ Denmark
Universal Robots/ PAL	Booth at Automatica	June 21-24, 20016	Munich/ Germany
PAL Robotics	X Barcelona-Pittsburgh Conference (presentation)	May 25, 2016	Barcelona/ Spain
PAL Robotics	ICRA	May 16-21, 2016	Stockholm/ Sweden
Lacquey	Zuid-Holland Instrumentation Event 2016	March 22,2016	Delft/ The Netherlands*[1]

3. Online Media

The website is still the main source of information on the project. The number of visitors is satisfying, despite the fact that the amount of news has fluctuations, depending on factors like new technological developments, deliverables, events or other developments. Nevertheless, there is a constant stream of visitors on the website. The social media channels are still not as strong as we wish them to be, but our Twitter channel, which was established last, is progressing better than other channels.

3.1 Webpage

The website www.factory-in-a-day.eu is regularly updated with news from the project. The website is still frequented very well and used as a source of information on the project.

Total amount of visits 514,961 and unique visitors: 18,088 (March 25 - September 9). On days with little traffic we have on average around 50 visitors, days with high numbers of visitors have around 200-300. On average our website has about 80-100 visitors per day. These numbers show that the website is used to get information on the progress of the project and is the main source of information about the project.

The chart below (Figure 4) shows a unique occurrence of an unusual high number of visits at the end of March and beginning of April. We do not really have an explanation for these numbers. We rather suspect that the sudden increase in visits is a sign for a botnet. A bot net is “a network of computers that have been linked together by malware” (Merriam Webster). The Software used for tracking the visitors on our website states in their FAQs, “…a botnet has decided to visit your site and we have been unable to filter it out. You usually see your visits spike for a few days and then they give up.” This is also supported by the fact that overall number of visitors on the days were not higher than average.

*This event should have been reported in the last Deliverable, but as it was close to the internal deadline, we only mention it here.

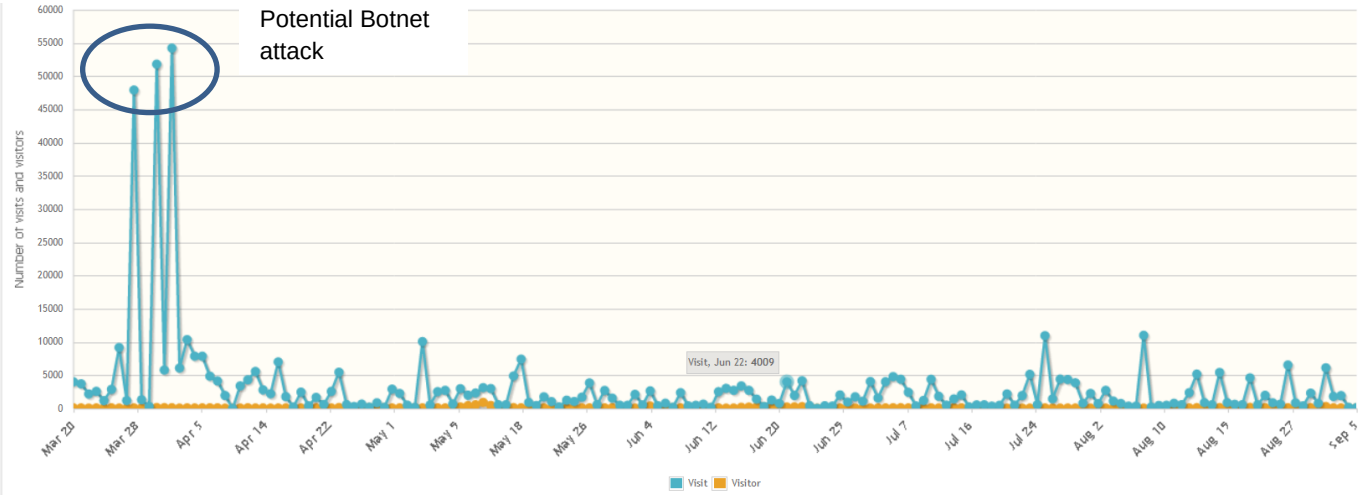


Figure 4: Website visitors from March to September 2016 (blue visits, orange visitors) “Visits” is the number of page hits your site has received. “Visitors” is the number of unique users that have visited your site.

The pages that had most interest from the visitors are: the Project idea, Press material, Partners, Publications and the Quick Overview of the project. This is an ongoing trend that could also be seen in the past reporting periods.

The posts with the most interactions were both about the Amazon Picking Challenge:

- Interview on technical details with one of the team leaders after winning the Amazon Picking Challenge (399)
- Congratulations to Team Delft (a post on winning the Amazon Picking Challenge) (394)

3.2 Social media

Our social media channels are used constantly to upload news, videos, etc. All of these are also available online on our website; we do not have exclusive news on Twitter or Facebook. All statistics refer from the end of March to September 4, 2016. The user numbers are slightly improving, but still not as good as hoped for. The results of Team Delft winning the Amazon Picking challenge showed positive results on the uptake and distribution of our social media activities.

-YouTube:

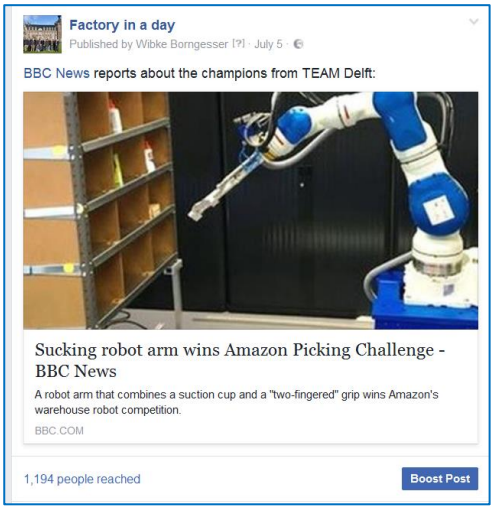
455 views on average for 1:43 min. (compared to 6576 views since the start of the channel) New videos added in the past months as the series illustrating a robot programming interface to build a sequence of motions in order to perform an industrial task. The series consist of 4 videos (54 views so far).

- Facebook:

Daily organic reach[2]: 5366

[2] The number of people who visited your Page, or saw your Page or one of its posts in news feed or ticker. These can be people who have liked your Page and people who haven't. (Unique Users)

The posts with most interactions are both in connection with winning the Amazon Picking Challenge:



1195 people reached

473 people reached

- Twitter:

Follower: 67, interactions 147

Impressions (how many times the tweet showed up in people's feeds): 17,300

The tweets with the most impressions:

- Interview with team leader of Team Delft after winning Amazon Picking Challenge (2240)

- Announcing participation in RoboBusiness (1818)

4. Media Coverage

Most articles published in the past six months are related to the Amazon picking Challenge as part of RoboCup, which a team sponsored by Factory-in-a-day won.

Here is a list of all articles published in different media:

TU Delta: "Delft team enters robot picking challenge", 30.5.2016

FYN TV: On RoboBusiness 2016, 1.6.2016

NPO Radio 1: Amazon Picking Contest: Team Delft, 25.6.2016 (in Dutch)

Robotglobe.org: "Netherlands team Delft wins Amazon Picking Challenge 2016", 2.7.2016

AmazonLogistikblog: "Doppelsieg der Niederlande bei Amazon Picking Challenge", 3.7.2016 (in German)

http://www.nu.nl: Robot uit Delft wint Amazon-sorteerwedstrijd, 3.7.2016

BBC.com: "Sucking robot arm wins Amazon Picking Challenge", 4.7.2016

www.emerce.nl: Delft University of Technology: Team Delft wint Amazon Picking Challenge, 4.7.2016 (in Dutch)

TechRepublic: "Amazon's robot worker challenge won by AI-powered suction arm", 4.7.2016

www.techrepublic.com: Amazon's robot worker challenge won by AI-powered suction arm, 4.7.2016

www.Delftopsontag.nl: Team Delft wint Amazon Picking Challenge, 4.7.2016

http://www.telegraaf.nl: Delftse robot wint Amazon-wedstrijd, 4.7.2016 (in Dutch)

IEEE Spectrum -Automaton: "Team delft wins Amazon Picking Challenge", 5.7.2016

www.theverge.com: Amazon's latest robot champion uses deep learning to stock shelves", 5.7.2016

www.dailymail.co.uk: That REALLY sucks! Watch the incredible 'vacuumbot' blow away the competition in Amazon's roboshopper Olympics , 5.7.2016

theguardian.com: Amazon moves one step closer toward army of warehouse robots, 5.7.2016

www.eurekamagazine.co.uk/: Delft robot arm wins Amazon Picking Challenge, 5.7.2016

www.engadget.com: Amazon Robot Challenge winner counts on deep learning AI, 5.7.2016

www.extremetech.com/: Amazon robots close to replacing the rest of warehouse workers, 5.7.2016

www.cio.com: Deep learning wins the day in Amazon's warehouse robot challenge, 5.7.2016

www.itworld.com: Deep learning wins the day in Amazon's warehouse robot challenge, 5.7.2016

www.geekwire.com: Pick a winner: Dutch robot rises to Amazon Challenge by grabbing and stowing items the best, 6.7.2016

www.automationnet.de: „Team Delft" und Yaskawa gewinnen „Amazon Picking Challenge" (in German), 6.7.2016

www.logistik-heute.de: Wettbewerb: Niederländer überzeugen bei Amazon Picking Challenge, 6.7.2016 (in German)

www.itpro.co.uk/: Dutch robot takes gold in Amazon industrial automation challenge 6.7.2016

www.new-techeurope.com: Team Delft wins Amazon Picking Challenge, 7.7.2016

www.canadianpackaging.com: Dutch robot builders win Amazon warehouse challenge 7.7.2016

www.amazon-watchblog.de: Logistikroboter, 8.7.2016 (in German)

www.zdnet.com: Amazon Picking Challenge: Delft won but even the losing teams are celebrating, 11.7.2016

www.logiestik.nl: 'Pickrobot moet met chaos kunnen omgaan', 1.9.2016 (in Dutch)

5. Newsletter, other printed materials

The external newsletter is sent out roughly twice a year, unless there is real need to inform the reader on developments in between. The latest issue, #4, has been sent out on 17 of May, 2016. So far we have 120 subscribers.

Figure 5: Factory-in-a-day newsletter issue 4

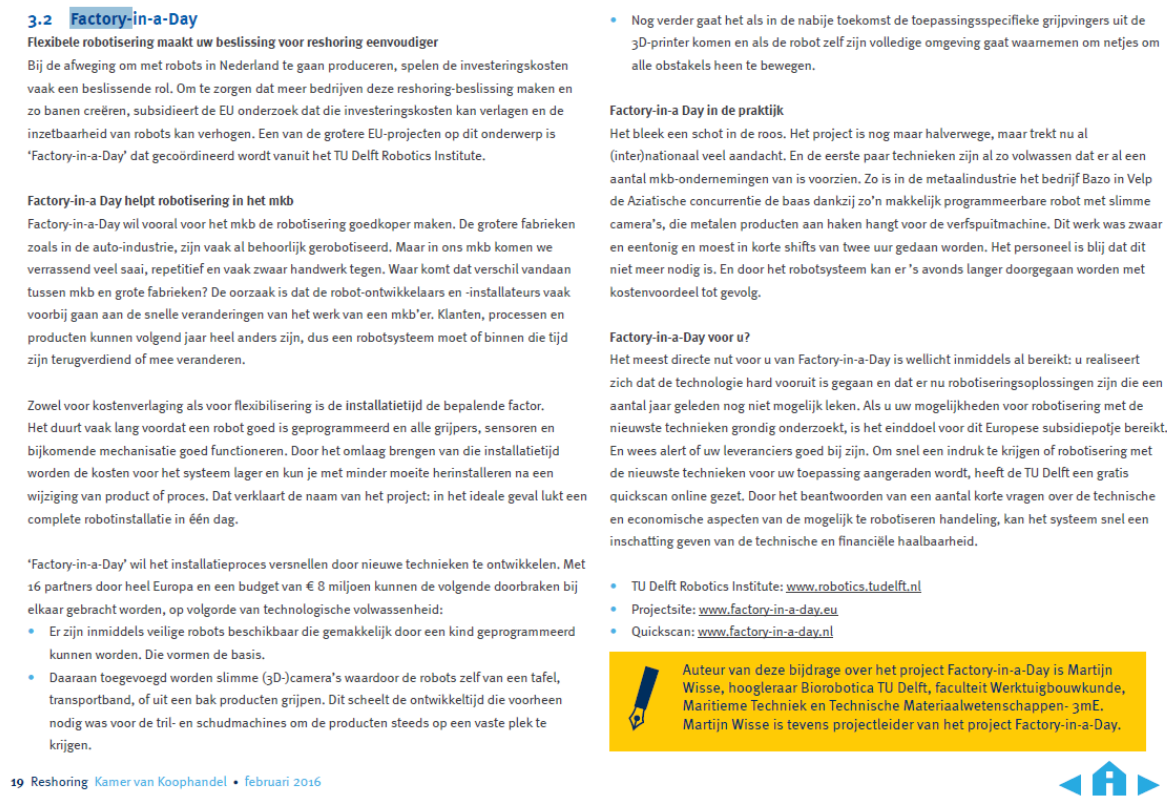
The issue has also been published on the website of ROS industrial: http://rosindustrial.org/news/.

We also contributed two articles to the newsletter of ROS Industrial Consortium Europe (RIC-EU), which is available in print and online. http://rosindustrial.org/news/

As already mentioned before, Universal Robots also published a new company brochure (for Automatica 2016). On the description of Universal Robots+ – a showroom with accessories, software, etc. – is acknowledging the effect of Factory-in-a-day by mentioning the project. The brochure is only available in print and not online.

Figure 6: Universal Robots' new brochure

Furthermore, one chapter in the brochure: „Produceren in Nederlandof in lagelonenlanden? Reshoring en innovatie: informatie, praktijkvoorbeelden, routewijzer“ (in Dutch) was written by Prof. Wisse (see below).



3.2 Factory-in-a-Day

Flexibele robotisering maakt uw beslissing voor reshoring eenvoudiger

Bij de afweging om met robots in Nederland te gaan produceren, spelen de investeringskosten vaak een beslissende rol. Om te zorgen dat meer bedrijven deze reshoring-beslissing maken en zo banen creëren, subsidieert de EU onderzoek dat die investeringskosten kan verlagen en de inzetbaarheid van robots kan verhogen. Een van de grotere EU-projecten op dit onderwerp is 'Factory-in-a-Day' dat gecoördineerd wordt vanuit het TU Delft Robotics Institute.

Factory-in-a Day helpt robotisering in het mkb

Factory-in-a-Day wil vooral voor het mkb de robotisering goedkoper maken. De grotere fabrieken zoals in de auto-industrie, zijn vaak al behoorlijk gerobotiseerd. Maar in ons mkb komen we verrassend veel saai, repetitief en vaak zwaar handwerk tegen. Waar komt dat verschil vandaan tussen mkb en grote fabrieken? De oorzaak is dat de robot-ontwikkelaars en -installateurs vaak voorbij gaan aan de snelle veranderingen van het werk van een mkb'er. Klanten, processen en producten kunnen volgend jaar heel anders zijn, dus een robotsysteem moet of binnen die tijd zijn terugverdiend of mee veranderen.

Zowel voor kostenverlaging als voor flexibilisering is de installatietijd de bepalende factor. Het duurt vaak lang voordat een robot goed is geprogrammeerd en alle grijpers, sensoren en bijkomende mechanisatie goed functioneren. Door het omlaag brengen van die installatietijd worden de kosten voor het systeem lager en kun je met minder moeite herinstalleren na een wijziging van product of proces. Dat verklaart de naam van het project: in het ideale geval lukt een complete robotinstallatie in één dag.

'Factory-in-a-Day' wil het installatieproces versnellen door nieuwe technieken te ontwikkelen. Met 16 partners door heel Europa en een budget van € 8 miljoen kunnen de volgende doorbraken bij elkaar gebracht worden, op volgorde van technologische volwassenheid:

- Er zijn inmiddels veilige robots beschikbaar die gemakkelijk door een kind geprogrammeerd kunnen worden. Die vormen de basis.
- Daaraan toegevoegd worden slimme (3D-)camera's waardoor de robots zelf van een tafel, transportband, of uit een bak producten grijpen. Dit scheelt de ontwikkeltijd die voorheen nodig was voor de tril- en schudmachines om de producten steeds op een vaste plek te krijgen.
- Nog verder gaat het als in de nabije toekomst de toepassingsspecifieke grijpvingers uit de 3D-printer komen en als de robot zelf zijn volledige omgeving gaat waarnemen om netjes om alle obstakels heen te bewegen.

Factory-in-a Day in de praktijk

Het bleek een schot in de roos. Het project is nog maar halverwege, maar trekt nu al (inter)nationaal veel aandacht. En de eerste paar technieken zijn al zo volwassen dat er al een aantal mkb-ondernemingen van is voorzien. Zo is in de metaalindustrie het bedrijf Bazo in Velp de Aziatische concurrentie de baas dankzij zo'n makkelijk programmeerbare robot met slimme camera's, die metalen producten aan haken hangt voor de verfspuitmachine. Dit werk was zwaar en eentonig en moest in korte shifts van twee uur gedaan worden. Het personeel is blij dat dit niet meer nodig is. En door het robotsysteem kan er 's avonds langer doorgegaan worden met kostenvoordeel tot gevolg.

Factory-in-a-Day voor u?

Het meest directe nut voor u van Factory-in-a-Day is wellicht inmiddels al bereikt: u realiseert zich dat de technologie hard vooruit is gegaan en dat er nu robotiseringsoplossingen zijn die een aantal jaar geleden nog niet mogelijk leken. Als u uw mogelijkheden voor robotisering met de nieuwste technieken grondig onderzoekt, is het einddoel voor dit Europese subsidiepotje bereikt. En wees alert of uw leveranciers goed bij zijn. Om snel een indruk te krijgen of robotisering met de nieuwste technieken voor uw toepassing aangeraden wordt, heeft de TU Delft een gratis quickscan online gezet. Door het beantwoorden van een aantal korte vragen over de technische en economische aspecten van de mogelijk te robotiseren handeling, kan het systeem snel een inschatting geven van de technische en financiële haalbaarheid.

- TU Delft Robotics Institute: www.robotics.tudelft.nl
- Projectsite: www.factory-in-a-day.eu
- Quickscan: www.factory-in-a-day.nl

Auteur van deze bijdrage over het project Factory-in-a-Day is Martijn Wisse, hoogleraar Biorobotica TU Delft, faculteit Werktuigbouwkunde, Maritieme Techniek en Technische Materiaalwetenschappen- 3mE. Martijn Wisse is tevens projectleider van het project Factory-in-a-Day.

19 Reshoring Kamer van Koophandel • februari 2016

6. Publications

More publications are expected in the next couple of months/weeks, when the conferences start again.

Argun Cencen, Jouke C. Verlinden, Jo Geraedts**:** “Qualifying the performance of human robot coproduction at a relabeling station”, Eleventh International Symposium on Tools and Methods of Competitive Engineering, 9-13 May, 2016, Aix-en-Provence, France.

7. Conclusion and next steps

The past six months of Factory-in-a-day have been business-as-usual. The dissemination and outreach activities have been on a normal level. The participation in trade fairs and events such as the Amazon Picking Challenge created more attention in the target groups.

The next project meeting in October 2016 will be used to plan the final year of the project in respect to the dissemination, and other ways to exploit the project. This plan will be presented in the next deliverable.