



Development of Robot-enhanced Therapy for
Children with Autism Spectrum Disorders



Project No. 6113914

DREAM
Development of Robot-enhanced Therapy for Children
with Autism Spectrum Disorders

Grant Agreement Type: Collaborative project
Grant Agreement Number: 611391

**D8.3 Short term exploitation: deployment and
improvements**

Due date: **31/01/2019**
Submission date: **09/05/2019**

Start date of project: **01/04/2014**

Duration: **60 months**

Organisation name of lead contractor for this deliverable: **Softbank Robotics
Europe (formerly Aldebaran Robotics¹)**

Responsible Person: Alexandre Mazel

Revision :

Project co-funded by the European Commission within the Seventh Framework Programme		
Dissemination Level		
PU	Public	
PP	Restricted to the other programme participants (including the Commission Service)	
RE	Restricted to a group specified by the consortium (including the Commission Service)	
CO	Confidential, only for members of the consortium (including the Commission Service)	CO

¹ Aldebaran Robotics' legal name has changed to Softbank Robotics Europe in April 2015. This change is now reflected in the EC Participant Portal.



Contents

1	Overview of the Work Package	5
2	Outline of Deliverable D8.3.....	5
2.1	Description of Deliverable D8.3.....	5
2.2	Description of Tasks 8.4 and 8.5.....	5
2.2.1	Task 8.4 AskNAO Tablet - test and feedback.....	5
2.2.2	Task 8.5 AskNAO Tablet - public second release	5
3	Task 8.4 AskNAO Tablet - test and feedback (M32-M36, SBR, UBB)....	6
3.1	Place of experimentation.....	6
3.2	What we validate ?	6
3.3	Summary of feedbacks	6
3.3.1	Overall feedbacks	6
3.3.2	About the control panel	6
3.3.3	About applications in general.....	7
4	Task 8.5 AskNAO Tablet - public second release (M36-M40, SBR).....	7
5	Dissemination on AskNAO Tablet	9



Executive Summary

WP8 is dedicated to the dissemination and exploitation of the results of the DREAM project to the international scientific community, including the one concerned with providing primary care for Autism Spectrum Disorder children (ASD). Within that frame, deliverable D8.3 aims to report the steps and progresses made towards the short-term exploitation of the DREAM project, and more specifically on the deployment of the Ask NAO Tablet applications for autism therapy, developed by SBR, in testing environment, and the exploitation of the results.

This deliverable first describe the different experimentation activities that took place around AskNAO Tablet, the feedbacks received and some disseminations on the overall project.

About the “YEOCare Autism” Brand Name

During the last update of the description of WP8 tasks, we name the short term exploitation of DREAM YEOCare Autism. During the realization of the task, we decided to change the name to AskNAO Tablet, enabling us to keep the renown of the AskNAO solution, already in the market since 2013.

Thus, in the following document, all “YEOCare Autism” mention have been replaced by AskNAO Tablet.



Principal Contributors

The main authors of this deliverable are as follows (in alphabetical order):

Estelle Bouzat, SoftBank Robotics Europe

Tom Khalaf, SoftBank Robotics Europe

Alexandre Mazel, Softbank Robotics Europe

Revision History

Version 1.0 (26/02/2018): First draft

Version 2.0 (13/10/2018): Added pictures and 3.1

Version 3.0 (15/03/2019): Last edition

Version 3.1 (09/05/2019): Final version



1 Overview of the Work Package

The dissemination and the exploitation of the scientific and technical results obtained in the DREAM project are one of the strategic objectives of the consortium, which is mainly achieved through WP8. This WP aims to disseminate the results of the project to the international scientific community, and more specifically the one concerned with providing care for Autism Spectrum Disorder children (ASD), including therapists and educators. It also aims to facilitate the exploitation of the results of the project, which is at the core of this report

2 Outline of Deliverable D8.3

2.1 Description of Deliverable D8.3

This deliverable summarizes the progress of T8.4 and T8.5 in terms of deployment and steps taken for further improvement of the system developed in T8.3.

2.2 Description of Tasks 8.4 and 8.5

2.2.1 Task 8.4 AskNAO Tablet - test and feedback

Task 8.4 is a follow up task to T8.3 and aims to bring the DREAM solution for exploitation into the deployment, testing and improvement phase. Within this task, experiments and tests have been conducted and feedback was gathered to polish the solution. This has been achieved through collaboration with various stakeholders

2.2.2 Task 8.5 AskNAO Tablet - public second release

On the other hand, task 8.5 has taken into account the feedback from task T8.4 in order to produce a new and improved version of the DREAM exploitation solution, again in close collaboration with various stakeholders, including B2B partners.

The work undertaken within this task has improved the system by adding some new activities which have emerged as a requirement or “should have” component. The control center has been also updated to give access to more useful NAO’s controls. An application of the solution has also been added to help teacher/therapist to create new contents for applications, easily. This has greatly helped the targeted end users, who are often non-technical and are not programmers/developers, to adapt and customize the application.



3 Task 8.4 AskNAO Tablet - test and feedback (M32-M36, SBR, UBB)

3.1 Place of experimentation

Within this task, experiments and tests have been conducted and feedbacks were gathered to polish the solution. This has been achieved through collaboration with various stakeholders, including:

- DREAM's partner UBB
- Hopital de Jour André Bouulloche, Paris 11, France.
- Emotion Robotics: a B2B partners in UK.
- ERM: our B2B partners in France. We've worked with them very closely as they are now the official maintainer of AskNAO Tablet in France.
- French Dijon's Rectorat, which present us various professional contact from their department.
- Various private family with ASD child that we have in our contact

In a near future we also discuss to do next experimentation with:

- Education Delegate from the mairie du 15ieme
- Hôpital de Jour François Truffaut, Alfortville, France.

3.2 What we validate ?

During this experimentation we mainly focus on the following types of questions to validate the solution and to explore the points for improvement:

- Simplicity of setup for therapists.
- How to reduce initial training.
- Children reactions to robots.
- Good way to engage the more severe one.
- Progression of exercise.
- How to create new contents for existing activity.

3.3 Summary of feedbacks

After presentations and experimentations, we receive many feedbacks, some were positive and other negative. In this section we will summarize some negative feedback, as they will lead us to improve the global solution.

3.3.1 Overall feedbacks

The first version of the system was sometimes a bit slow, specifically therapists argue when input is taken from the tablet, it is essential that the response from the robot happens without significant delay. The link between cause and effect is very important when dealing with children on the spectrum. It appears also

3.3.2 About the control panel

When using it, we realize some basic settings were missing, like the ability to change the NAO's speech language. We add also an indication of the NAO autonomous life status and improve information on the application currently installed in the NAO.

3.3.3 About applications in general

In this section we receive interesting feedbacks from therapists: some applications were not positive enough in their feedbacks or were using bad mechanisms for therapy. We receive also some complaints about the delay of some reactions from NAO. Also when child have to interact with the tablet, to keep him focus only usefull buttons must be shown on the screen. Some therapists point us applications were too difficult for severe case, and so are lacking of more difficulty level (progression).

One feedback we also receive is the lack of applications: we have only 12 activities and some use identical mechanisms, so teachers are afraid after some months of usage, children could lost their interests.

Finally we receive some feedback specific to precise application that we take into account in the improvement of the next version of AskNAO Tablet.

4 Task 8.5 AskNAO Tablet - public second release (M36-M40, SBR)

Based on the feedback from experimentation we update the control panel, as it can be seen in Figure 1. We also help ERM to rework on their communication engine to have improve the link between the tablet and NAO. Some tablet interface were also updated and simplified for some activities like Color Hunter, Guess Emotion or Yoga Adventure (cf figure 2).

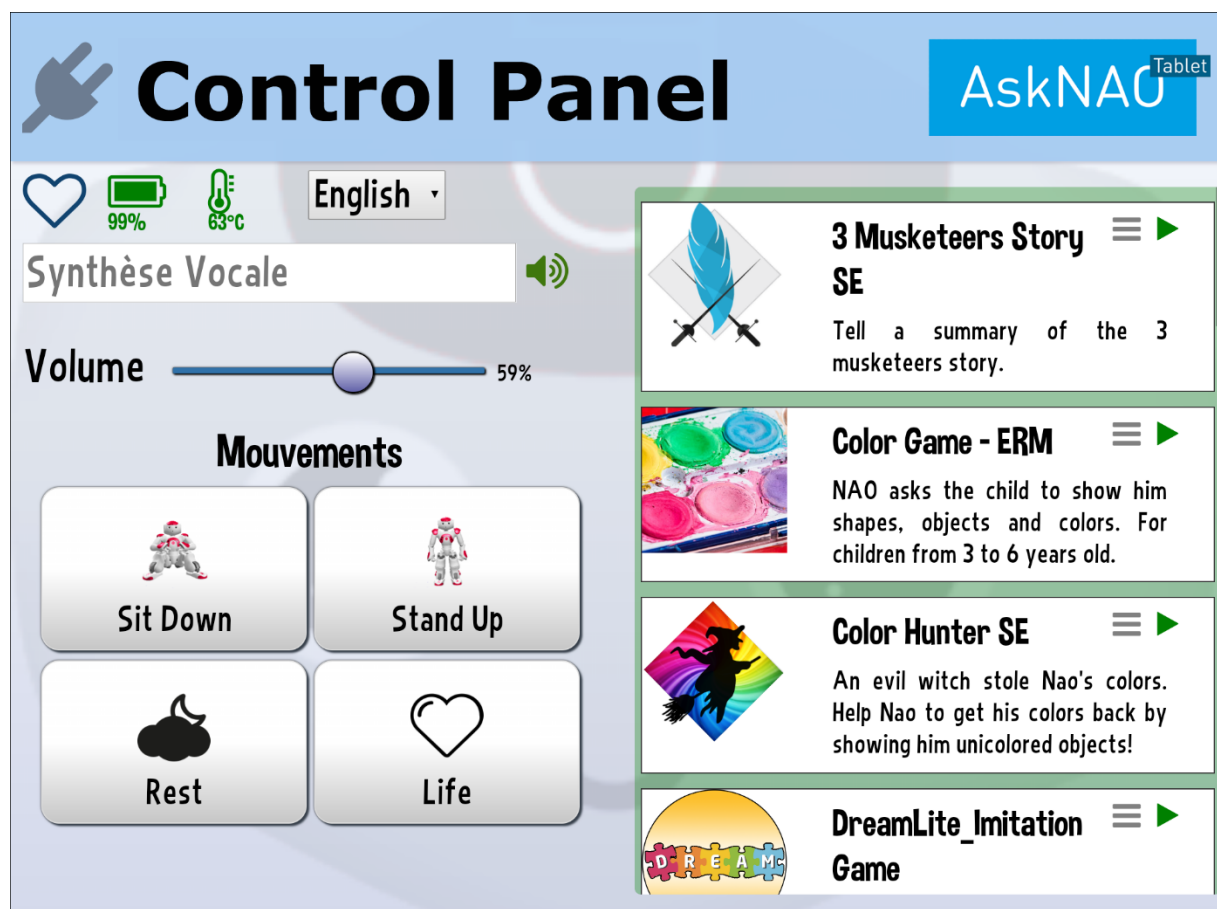


Fig. 1: New Control panel interface

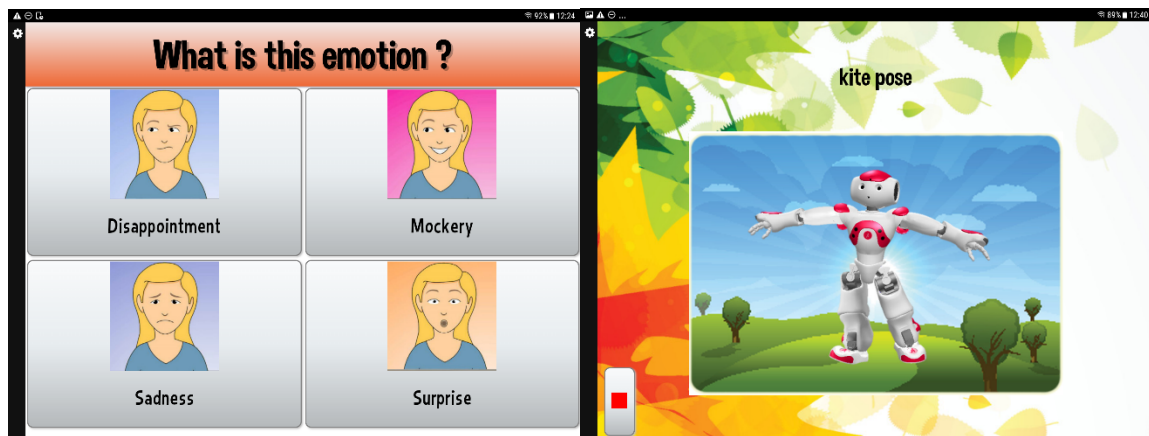


Fig.2: Two simplified activities interfaces

Another great improvement was the complete rework of the « Animal Card Game » into a fully editable application « Card Game », thus any therapist or teacher can do its own version of the game, by using custom content on any fields to engage specifically a child based on its passion or center of interest, and all that without any programming skills, figure 3 shows some screens used for this purpose.

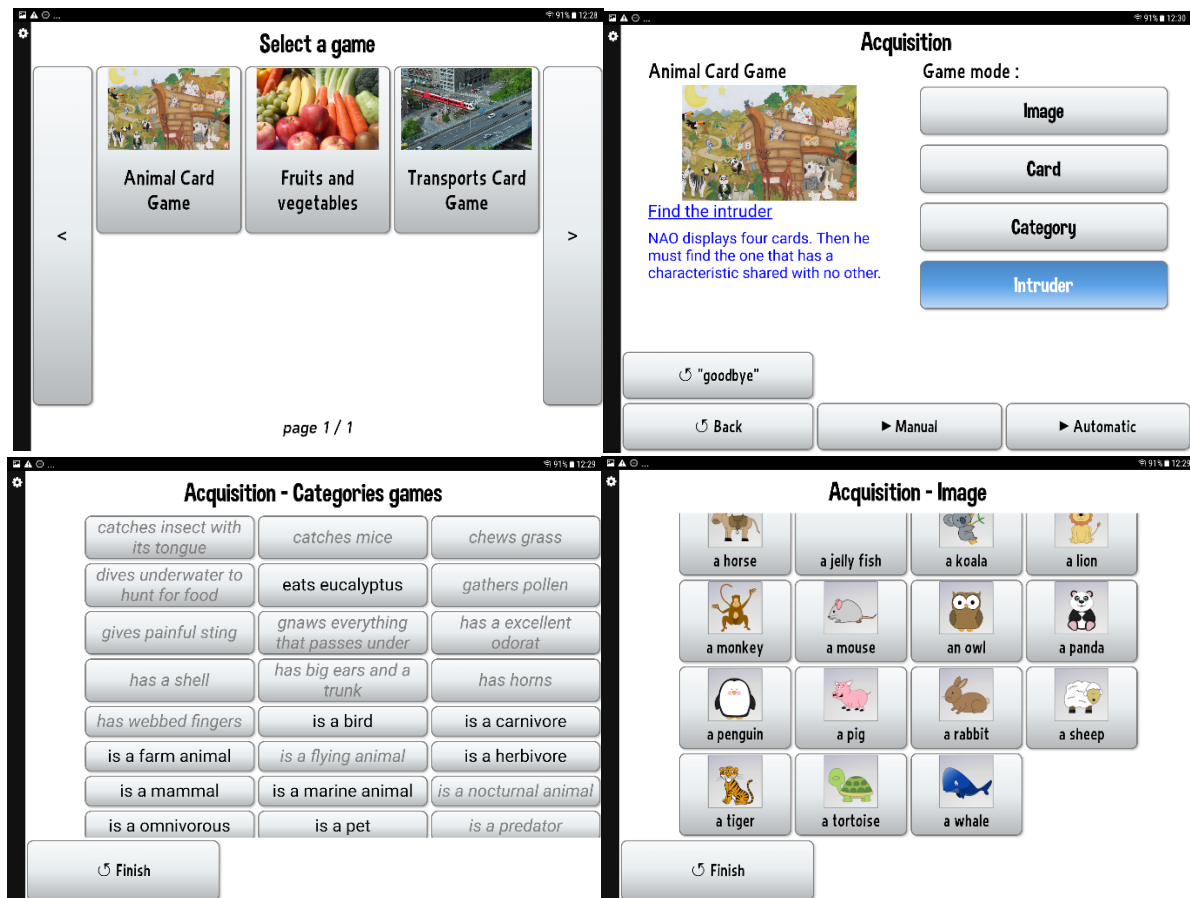


Fig.3: New “Card Game” customization interface

We also start to look for developing new applications for Robot Assisted Therapy. The main idea was to propose new concepts and ideas to enrich the actual AskNAO Tablet software. Among the ideas we have, one of the most appealing application was NAO Blind. So we start to develop this concept to become part of AskNAO Tablet and DREAM Lite. You can refer to the specific section on this application in the deliverable D8.5.

5 Dissemination on AskNAO Tablet

SBR seeks out feedback as much as possible in order to optimize the Ask NAO Tablet applications. These applications are at the core of the dissemination and exploitation process as they are the main product to showcase at events and to test in collaboration with partners. As such, the company participated in events regarding autism and presented its apps to professionals in order to get solid advice on the best path to follow.

Here are some of the events, we participate since April 1st 2017:

- **April 3rd 2017:** [Autism Conference 2017](#) in Salford Manchester (UK): one of the biggest meetings about autism in Europe with more than 150 professionals. The focus was “*Awareness and understanding*”. The objective of the conference was to understand how to develop a more adapted environment for autist people from childhood to adult life. At this occasion, SBRE presented the latest developments of the Ask NAO platform to professionals, schools and distributors who were interested in the outcomes of the DREAM project and the Ask NAO platform. A demonstration of the applications was set up for the entirety of the Conference and videos of the current research were shown. SBRE was thus able to gather feedback from both professionals and distributors regarding the applications that were already delivered (cf figure 4).

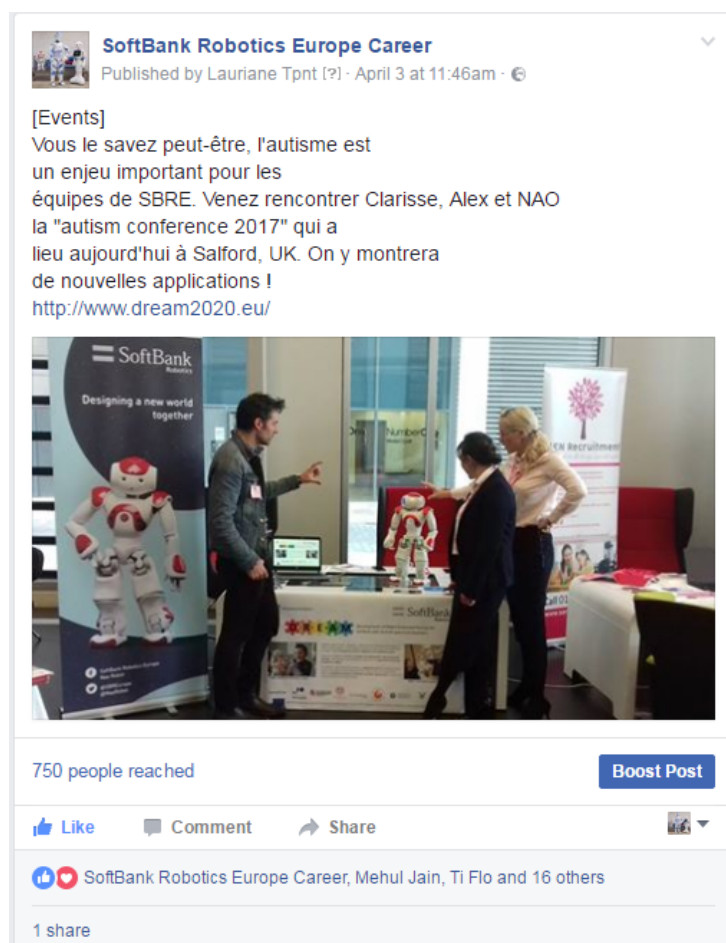


Fig. 2: Softbank Robotics at Autism Conference 2017

- **May 17th 2017:** ORNA 2017: [Autisme et outils numériques](#) - Suresnes (France).
- 2017-2018 : Sharing AskNAO Tablet application with the Dutch UVA research team to help them to conduct experimentation with NAO and children. Their work is under submission to be included in a journal. Current title is :



« Van Straten, C.L., Peter, J., Kühne, R., & Barco, A. (2019). Transparency about a robot's lack of human psychological capacities: Effects on child-robot perception and relationship formation. Submitted for publication. »

- From October 2017, the presentation of AskNAO Tablet and DREAM Lite evolve and join, so all disseminations activities that were then done are summarized in the D8.5 Dream Lite system.

Engaging in such conferences and exchanges enables the company to strengthen the efficiency of the applications being developed and consequently to enhance the future products that will be delivered.

SBR's commitment to the cause of autism is extremely important within the frame of the DREAM project, and as such the company plans to participate in several other events.