

**Eco-Wall Rotterdam The Hague Airport**  
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# Eco-Wall

Rotterdam The Hague Airport

Report on the SABRE Makeathon,  
held 7-8 November 2019

final version October 2020



BauHow5



Co-funded by the  
Erasmus+ Programme  
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# **Eco-Wall** Rotterdam The Hague Airport

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TU Delft / BauHow5

Delft, Netherlands

# Makeathon Eco-Wall Rotterdam- The Hague Airport

On November 7th and 8th 2019, the BauHow5 consortium organised a so-called Makeathon at TU Delft in collaboration with Rotterdam The Hague Airport (RTHA). The subject of the Makeathon was the Eco-Wall concept. The Eco-Wall aimed at reducing noise from airport ground operations. The Makeathon was part of the activities of an Erasmus+ sponsored project called Strengthening Architecture and Built Environment Research, or SABRE in short.

## Embedding in the SABRE project

A specific output of the SABRE project focusses on architectural entrepreneurship through testing suitable fast-track formats in second-cycle education to create a new mindset and open up new career paths in creative industries.

That SABRE output builds upon four structured, competitive, rapid and collaborative innovation methods taken from other disciplines/industries, which were all tested for their suitability in the context of Architecture and the Built Environment.

These methods are rarely used within education in the field, while, at the same time, managerial disciplines are looking out for design thinking from the architectural/built environment.

Hence the output aims to overcome the boundaries between disciplines and nurture interdisciplinary collaboration and co-creation.

The applied methods that are investigated are:

- Business Game (originated from Management Schools),
- Design Sprint (originated from Google Developers),
- Makeathon (originated from manufacturing industry),
- Design Thinking Workshop (originated from the creative sector, Ideo).

The SABRE project aimed to target a total of 40 participants for each event, consisting of:

- at least 20 students from study programs in Architecture and the Built Environment
- up to 10 students from other fields
- five stakeholders from creative industries
- five researchers from the alliance partners.

The Eco-Wall Makeathon did meet that requirement.

# Makeathon Process Description

During a Hackathon, people are pitted inside an arena-like setting where competition between the teams is at a high level. Mostly there are money prizes to be won for the first, second and third best idea which is decided by a Jury. The emphasis is on the realisation of an idea, not on the process itself.

A Makeathon focusses on the process of making things together. It is more about the process than it is about the final results. The main drivers for a Makeathon are threefold :

- Having fun creating stuff: creating something new is an exhilarating experience.
- Learning while you go: the best way to learn is to build something
- Increase your network reach: professional and non-professional friendships are easily formed in the right environment.
- During the Makeathon, highly skilled people should be present to help participants out with technical and non-technical matters.

## The Makeathon Process

**Introduction stage:** At the start, there will be an introduction about what a Makeathon is and how the general process will look like.

**Challenger stage:** A so-called Challenger will present the challenge to the public.

**Idea Forming Stage:** The whole group will start forming ideas on solving a particular challenge. These are written down for the entire group to see.

**Idea Selection Stage:** this is where you have to kill your darlings by selecting the best ideas to work on for the duration of the Makeathon. Focus on achievable time-constrained results: A real rocket to the moon will certainly not be a viable idea to work on, but a virtual one might be feasible.

**Team forming stage:** based on the ideas that passed, teams are formed around each idea. Make sure the teams are well balanced, that is to say, that not all technical experts should go in one team. Ask not what a team can do for you, but what you can do for a team.

**Implementation stage:** After selection, the real work can start! You will be offered help through the available technical and non-technical expertise ( the InnovateMates ), so please make use of them!

**Presentation stage:** At the end of the Makeathon there will be some kind of presentation of your results, you will be asked to explain who did what and why you did it. If time allows, you can even elaborate on how you did it.

**Wrap-up stage:** The host of the event will present some concluding remarks. Assignment.

(edited version of the Makeathon description found on: <https://ideeenlab.nl/makeathondefinition/>)

# The SABRE Eco-Wall makeathon

The Eco-Wall makeathon challenged complementary teams to develop concepts that could open up new directions for the development of RTHA and its surroundings.

## Rotterdam The Hague Airport

Rotterdam The Hague Airport (RTHA) is a regional airport located in the Metropolitan Region Rotterdam Den Haag (MRDH). RTHA provides valuable long-distance connections that serve the metropolitan region, both for business and leisure.

Due to its proximity to the residential areas within the city of Rotterdam and neighbouring municipalities, RTHA is also a source of environmental nuisance, noise especially. RTHA aims to improve its neighbourhood by, for instance, reducing the downsides of the airport operation as much as possible.

In this context, a concept called Eco-Wall emerged.

## Eco-Wall

The primary function of that Eco-Wall is to reduce noise. Airport noise consists of many components. The noise that is produced by airborne aircraft is challenging to reduce, other than through the use of more modern, more silent aircraft. The ground-based noise that is produced during testing, taxiing, take-off and landing can successfully be blocked by obstacles such as an Eco-Wall.

An study the Netherlands Aerospace Centre investigated the effectiveness of different configurations of this Eco-Wall. The study concludes that especially two variants of the Eco-Wall have the good potential to reduce ground-based airport noise. It does require solid objects of fifteen to twenty meters tall over a length of two kilometres.

A noise blocking wall is typically a concrete structure. However, a twenty-metre tall concrete wall construction is not exactly "Eco".

## Assignment

Here we get closer to the assignment of the Eco-Wall Makeathon. The aim of the Eco-Wall Makeathon is to develop the concept for a sound-reducing structure that inhabits 'Eco'-features. To accelerate this ideation activity, we pre-formulated four directions the ideation could take: recycle, energise, purify, occupy

**Recycle** - the Eco-wall idea could focus on the use of sustainable or circular materials: like recycled concrete, for instance, produced by this installation here. TU Delft is part of a consortium that engineers that stuff.

**Energise** - the Eco-wall could focus on the production or storage of renewable energy. You could think of PV: harvesting solar energy, or... when most cars are electric they could collectively work as a giant battery.

**Purify** - the Eco-wall could be made of materials to reduce pollutants in the local air. It may sound a bit futuristic, but products mixed or coated with titanium dioxide do have the ability to reduce the level of nitrogen dioxide from the air. This perspective is promising in the light of recently heated discussions on 'STIKSTOF' (nitrogen) in the Netherlands.

**Occupy** - the noise at RTHA can also be effectively blocked by carefully arranged buildings (Eco-Wall alternative 5). Many airports go along with so-called airport cities. Businesses and institutes, often attracted by the identity and strategic location of the airport.

The Makeathon brings together different competences. If the Eco-Wall has to clean the air, then we must maximise the contact between its surface and the atmosphere. At this point facade design and aerodynamics meet.

If the Eco-Wall indeed improves the environmental quality of RTHA's surroundings, then an airport city becomes possible. The airport city buildings can reinforce the functionality of the Eco-Wall. To develop ideas for an RTHA airport city knowledge on airport operations and city development should be integrated.

## Organisation

We organised the Makeathon together with Bureau Bakker, a local architectural services office.

Preparation sessions were organised with RTHA officials together with TU Delft and UCL Bartlett staff.

The Eventbrite platform announced the Makeathon in public. We did announce the Makeathon also at the TU Delft Campus and among BauHow5 partners.

Through the networks of TU Delft and BauHow5, we actively approached participants for the event.

The setup of the Makeathon was:

### Thursday, November 7th 2019

- 09:00 Welcome at RTHA
- 09:30 Introduction
- 10:00 Visiting Eco-Wall site
- 12:00 Transport to TU Delft - Pulse 12:30 Lunch
- 13:30 Afternoon session: ideation 15:30 Visit experts
- 17:30 Food and drinks
- 19:30 Evening session: modelling 21:30 Visit experts
- 23:30 Wrap up

### Friday, November 8th 2019

- 08:30 Morning session: synthesis
- 10:30 Preparing pitches
- 12:30 Lunch and pitches
- 14:00 Discussion on research funding coalitions

## Participants

### BSc and MSc students

- Esther Arensman
- Laszlo Barz
- Ahmed Batman
- Justin Errami
- Dilge Gül
- Santje Heinen
- Linchen Jiang
- Mats Kolmas
- Andrej Marinkovic
- Ruben Meester
- Reinis Melgalvis
- Mickael Minghetti
- Anna Myllymäki
- Kimberley Nguyen
- Akash Pandey
- Tim Raijmakers
- Benan Sahin
- Megan Segeren
- Zhuo-ming Shia
- Brent Smeekes
- Rebecca Smink
- Jelmer Teunissen
- Julian van 't Hooff
- Jelmer van der Saag
- Vincent van Gorp
- Roxanne Vuijk
- Patrattakorn Wannasawang
- Agnieszka Witaszek
- Nadja Znamenskaya

### PhD students

- Ahmed Felimban
- Yasser Qaffas
- Biyue Wang
- Hsinko YU

### Experts

- Inge Crauwels - IBM
- Elif Simge Fettahoglu Özgen - TUM
- Perica Savanovic - Avans Hogeschool
- Zeger Schavemaker - Vialis
- Ruud Ummels - to70
- Frank van der Hoeven - TU Delft
- Siebe Bakker - Bureau Bakker
- Steven van der Kleij - RTHA
- Martijn Lugten - AMS institute (no show)

## Evaluation

After the makeathon was over, we conducted an online questionnaire to understand better if this format fits the architecture and built environment domain. We've received 29 responses to our questions. The first questions were statements. We asked to indicate on a scale from 1 to 10 to what extent the participants agreed with the statements. We concluded with open questions which resulted in informative but unsorted answers.

The environmental challenge that the RTHA poses for its surroundings got conveyed comprehensively.

7,0 / 10,0

The excursion to RTHA did help to get a better understanding of the design challenge.

7,4 / 10,0

The Eco-Wall challenge was sufficiently interdisciplinary.

6,9 / 10,0

Education at TU Delft should focus more on such real-world challenges.

8,5 / 10,0

The workload of the makeathon was acceptable.

8,3 / 10,0

The process was clear.

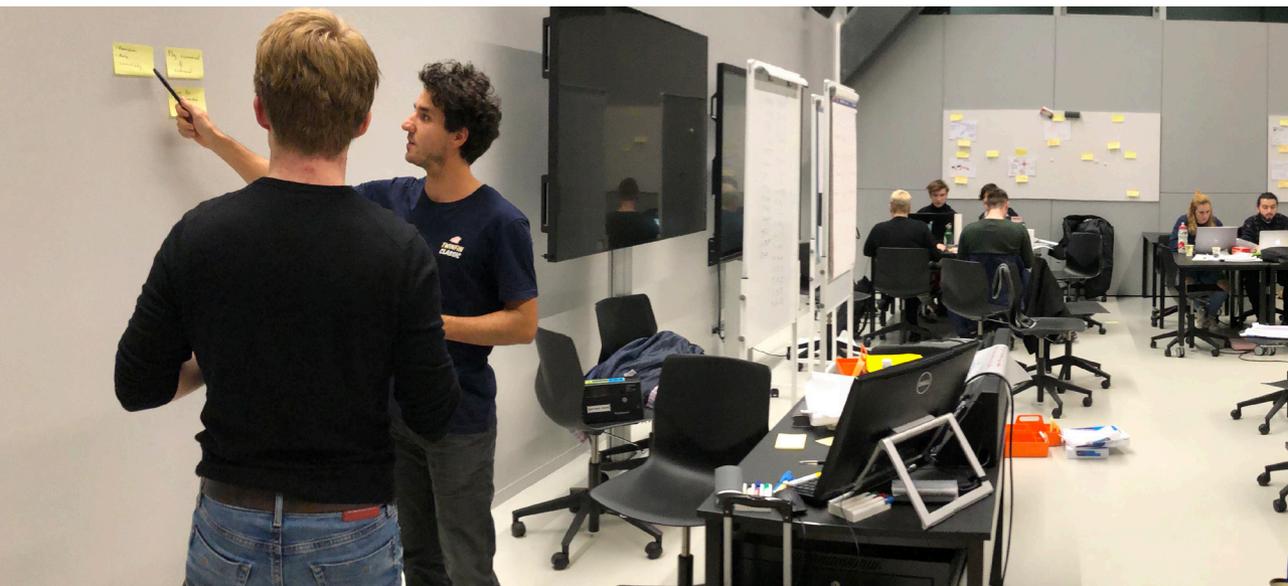
7,6 / 10,0

Makeathons should be used more in TU Delft education.

8,8 / 10,0

The makeathon did foster interdisciplinary collaboration.

7,3 / 10,0



Working with a mixed group of BSc, MSc and PhD students together is a good idea.

8,7 / 10.0

The time slots and working times were sufficient for this exercise.

7,3 / 10.0

The quality of group work did increase during the makeathon.

7,7 / 10.0

I had a strong impact on the development of the group's project.

7,7 / 10.0

I am satisfied with the results.

7,4 / 10.0

I would like to develop our results further.

8,0 / 10.0

I could make use of my skills.

7,9 / 10.0

I learned something new.

8,4 / 10.0

I will use some of the applied methods, skills in my studies.

7,2 / 10.0

Overall, I enjoyed the experience.

8,8 / 10.0



# Is a Makeathon (as a method) working better than the other methods for group work that you have used so far, if yes... could you indicate what aspect worked really well?

Before working with teams, I liked the part we just shouted our ideas and had a brainstorm session with all of us together.

Working more hours in a row helps to keep the flow going, instead of starting up again every day like normal project.

The common brainstorming session already gave a good idea of the group's ideas and skillsets and made it easier to adjust to the general mood of the workshop. The formation of groups by selecting the most interesting concept works miracles for group work, and should definitely be used more. Narrowing down ideas on each round made sure everyone got a chance to present their own, but only the most appealing ones would be picked for further development.

Yes, it gave another feeling, because of the mix with different students.

I've never used any other methods for group work

The division of time worked well, it was a dynamic environment to work in.

Brainstorming for new ideas but it needs further explanations and clearer guidelines.

It is nice to work for a problem for a full day because you really have the opportunity to accomplish a lot.

Yes, if not used too often. I can imagine a makeathon becoming tiring if used weekly for instance. Maybe it's a good idea to use a makeathon at the beginning of a longer project to get started quickly and efficiently. The high tempo and group discussions worked well.

Clearly assigned design choices pushed the productivity.

Although it provided a very different perspective on group work, I do feel that for more technically demanding projects (i.e. the development of an aircraft structure) the Makeathon method is mostly suited to just the brainstorming phase.

Without a doubt I would say a Makeathon is a very usefull learning method. It puts you in a position to quickly and effectively use your knowledge and your intuition on a case. Also the combination of Architecture & Aerospace as well as Bsc and Msc was eye-opening.

The moments when your completely free to think and there are no limits.

I am not sure if better, but certainly it a very interesting way of approach.

It was surprising what a team can achieve in such a short time. Less time for doubt allowed for bolder decision making, which was a nice change from the normal, more scrutinised design projects.

It was nice that there was brainstorming in the beginning with everyone and later groups were made based on the ideas that people liked.

I think the short time worked really well. Now we felt pressure to work really hard and 'win' a contest. I also believe that first creating an own idea and then working on the other ideas is really broadening your visions.

Yes, the aspect that one person choses a project and people can join that specific project if they like it worked really well.

Because there is time pressure you get forced to make decisions and can't spend much time on the details which is good. I think if we would have had more time no new ideas would have come up but

you would just get a little more detailed and better looking presentations.

It also made it a fun way to keep people motivated and enthusiastic.

I think it is an efficient way to come up with some design solutions within a limited time, and I think it is a good method to foster group work.

It helps us focus on one task at a time while pooling in resources from a very diverse background and because of the tight deadline and it is much more fun.

Yes, I think it does. Certainly for a subject for which not everyone has the same background / knowledge.

Because it is only for a short time span you don't get time to get frustrated or annoyed by groupmates.

The small timeslot made it possible to make decisions really fast, which led to a steady design concept. This usually takes way too long in the design process at architecture. I would say that the makeathon was way more efficient.

I find it very effective in terms of generating multiple conceptual ideas in a short amount of time. Then selected a few to develop further.

It's a different approach, makeathons work well as an advanced brainstorm session and for generating a lot of different ideas. There is enough time to test and experiment with different concepts and ideas. So it is a good method to kick off a project, but it would be unwise to do an entire ON course at this pace.

The fact that you need to design quickly and can't be perfectionistic achieves quick results and a smart work ethic. However, the usual 10 weeks of a project gives time to achieve knowledge that a makeathon can't.

Yes, the humane and free interaction between all kinds of students and teachers makes for double the fun and stimulating learning experience!!

Much better than the group work settings that we use currently. The short amount of time, and the long hours really force you to be creative, and it limits the amount of wasted time from overthinking.

# Is a Makeathon (as a method) working better than the other methods for group work that you have used so far, if not... what did you miss?

I did not miss anything.

It is working better, but I wouldn't want to work for so long every day.

As I mentioned before, forming a group around a common interest or idea is always better than random groups. That also simulates a real life working environment somewhat better.

Yes.

We didn't have time to find reference/existing projects, or get a deeper understanding of the social context

I miss choosing my idea because the instructor was giving us the mixed ideas randomly.

It was very nice but the downside is that if you get stuck you will be stuck for the whole makeathon.

For me personally it at times felt a bit rushed. Therefore the groups started working on conclusions where I still needed some time/ research to get my point of views right.

It certainly gave a good way for everyone's own ideas to be included in the final product.

It is very effective but because you are working against time some things will not be as well thought out then when you do take time, for instance in a method or periodic groupwork. You kind of do not get to think twice about a choice you make because you need to be efficient and effective.

It's was very interesting to work with other studies and people of different ages.

It is very very dense, to have around 24hours to undertand the problem, come to ideas and develop them

Normally I take the time to ask what an assignment is really asking, to deconstruct it and discover it's underlying mechanism. Now, there was little time to do this (also because of the implicit, but strict framing by the experts). However, I believe it is very necessary in an academic environment and we still did so, probably in a less serious, more ironic manner than usually.

It was better as group making process was based on the idea you like and not on friends or random

Because everyone was really motivated to produce good products, we could work way more efficient.

Yes.

I missed a feedback or concluding moment. After the presentation there was no discussion or result. I hope to see some results of this Makeathon in the future but it would be great to involve the student while you still have them all together.

Yes, it is as it helps us learn how to work in a tight schedule and focus on one project at a time. Also, because its a real-world problem and you work with a big mix of students its a great learning experience in terms of communication and resource management.

More time to go from the presentation to a final design.

not working better but good for a change. It is fun to see how quickly you can come up with ideas and make them presentable.

It worked better because it leads to a concept really fast. But at a certain point you just have to accept what your concept is and start making products

No particular comment.

Some empty thinking time, to really digest the problem and analyse the weak spots of your own design

I think there was too much group work in the beginning. I think creating individually and sharing together is a more efficient and fruitful way to work than to create and share together. It takes too much time and not every voice is heard.

Yes.

Better structuring of the group based on skills. It worked for most groups but for others there wasn't enough variety to benefit from.

# Assuming we can always do better, what would you advise us to do differently, or more, perhaps less?

Coming up with similar projects that were done and explained about the pros en cons about the projects so we learn from the experience. Besides that, I would like to have more background info before we begin with the makeathon. This way we can read before we show up and there is more context.

Describe at the start how the whole design process will go, from the conceptual designs, to the combination of the ideas and then the presentation.

I think we could've used more guidance on how to utilise our personal skills and disciplines for the group more. Especially BSc students seemed to lack the confidence and initiative to bring in their own expertise and felt slightly snubbed.

The presentation was a little bit boring.

More breaks.

Break the ice from the start by having each student introduce him/herself. Im not sure the word map was useful in the project.

In the design progress, a MAP with identifying the surrounding land use, the main goals of the project, the target group, main points, design location.

Maybe give a clearer overview of the steps during the makeathon.

A clearer explanation of the problems that need designing would help. If the design-task/problem is very clear from the beginning I would know better what to work on. For this project at times I was asking myself why this wall was so needed at that location.

No real feedback.

Maybe, as the Manager of Innovation of RTHA said, make the makeathon a little longer to actually use the results of the makeathon, discuss and reapply them. That would really do the trick I reckon.

Next time a location visit could be more meaningful, because it was more like there was time over so a visit was possible.

To go to the airport was very fun, but i did not get the problem being there.

Less framing and taking a broader look at the role of aviation and the RTHA. Also, be honest about it's motives (it was pretty clear the whole thing was about area development and capitalising on even its negative externalities, but make this subtext discussable). More time working on the exercise and less time plenary time would also be good.

Less brainstorming and more group work.

Maybe there could be a part during your product development where you reflect on eachothers ideas.

More time to work it out further. I had the feeling we stopped half way.

"Make the assignment more interdisciplinair the Eco-Wall was in a way an urban planning assignment. I think the aerospace student did learn a lot from the architecture student in this area but also felt that their skills weren't really used.

Some base materials like detailed location maps and area info is always appreciated and saves time."

I think it could be explained more clearly what is expected as a result in the end from the groups. Due to the lack of explicit explanation, the groups felt lost time to time. Also, I unfortunately didn't feel like I made use of my Aerospace Engineering

education, making the “collaboration of different studies” part of the makeathon feel weak. I think there should be more focus put on making it balanced if people from more than one study are participating.

I would have highly appreciated if there were guidelines on what is expected from members of individual faculty and have certain pre-requisites to join the event instead of a 1st come 1st serve.

As said before, some time after the presentation to work on a final design.

Provide larger pieces of paper.

14 hours on one day is really intense, I would personally recommend to do an extra first day for the introduction into the project and the excursion and focus the second day on the design.

I think it would be nice if there could be more input from the local who is relate to the issue, if the topic of the project is related to real life issue.

Give people the opportunity to work with the idea they prefer, rather than assigning them a concept to work with, which they might not agree with.

I wouldn't necessarily recommend not to do the group work in the beginning, but to not do everything together (I mean especially the thinking of words for the board). First the students think of words, then it's all brought together.

More time to come together and reflect after final presentations. Perhaps do a final revision proposal.

I like the way the groups were split, however it would be useful to make sure there are enough capable people in architecture skills (we had one 1st year BSc, 1 aerospace, and 2 planners so we lacked the skills to present our ideas in a beautiful way.

# We did run a makethon of 16 hours (meaning: two working days). Should we make it longer or shorter, if so: how long or short?

Definitely not longer. This was the maximum.

I think the duration was fine like this.

Duration was perfect and just enough time to come to a satisfactory result.

Its fine.

Longer ( a week).

More time for feedbacks at the end.

it depends on the main targets if it is just concepts or new ideas (that's fine) and it should be 8 hours per day not more. In case of detail concepts may be adding one more day will be good.

Maybe a bit longer to get a more rewarding result. Get out Of 8 concepts, 3 concepts.

I think the length was good. Couldn't have gone on for much longer.

It was the correct length.

Longer if you want a better worked out plan and combine the ideas which each studentgroup created.

The makeathon could take longer, so there is a possibility to work out the ideas a bit more.

Maybe 3 days.

No.

It was a good amount of hours but longer would also be acceptable.

Maybe the first day a little bit shorter and the second day longer. I was really tired the first day in the evening.

Longer.

As mentioned before i don't think making the makethon longer results in better ideas. I think the time we had was good and long enough to stay focused and get the idea across. I do think we could have started the group work earlier, by the time the groups were made everyone was already a bit exhausted.

I think the length was optimal for the amount of work we had to do.

I would make it longer, as it would give us more time to perfect our design and deliver better end product.

3 hours longer.

It could be 4 hours longer maybe, so it is from 9-11 and 9-5. but for the time we had now, the assignment was doable.

I would divide the work into 3 days. First day introduction and excursion. Second day brainstorming, groupforming and concept thinking. Third day presentations.

It depend on the case, but I think between 2 to 3 days is a good set amount of time.

A little longer, maybe spend the whole Friday morning on preparation and doing the pitches in the afternoon

I think the duration is good as is.

Longer. 24 hours seems perfect.

I think it was a good amount of time. Any longer and we would burn out.



## **SABRE / BauHow5**

BauHow5 is a European alliance of five leading research intense European universities in Architecture and the Built Environment. The alliance aims to push the boundaries of current practices in pedagogies, research and practice and raise awareness of the value of research and innovation in Architecture and the Built Environment for the wider benefit of society, economy and cultural life.

BauHow5 Partners are:

- Chalmers University of Technology, Department of Architecture and Civil – Engineering
- ETH Zürich, Department of Architecture
- TU Delft, Faculty of Architecture and the Built Environment
- TU Munich, Department of Architecture
- UCL, The Bartlett

## **RHIA**

Rotterdam The Hague Innovation Airport (RHIA) offers great opportunities for aviation and the regional economy. The innovation programme focuses on the four themes Entrepreneurial, Energy & Environment, Education and Emergency. Together with market parties, knowledge institutes and investors, RHIA strengthens the innovative character of Rotterdam The Hague Airport and, among other things, the socio-economic position of the region.

Workshop results provided as separate download.