011

HISPA BRICK

magazine

HISPA BRICK

magazine

011

HISPA BRICK magazine

011

ISSN 1989-3698

9 771989 369006

Frontcover by arvo

In this issue of Hispabrick Magazine

6

24

71

85

Editorial

By car_mp

When you spend your time "fighting" for a project, there comes a time when you have to see it advance or you start to ask yourself if it's worth it. Although each number is a surprise in the number of visits, and more and more AFOLS are willing to cooperate, the magazine had to evolve or die.

We considered several possibilities, such as starting to sell it ,...,I'm joking, this is one of the few things that you can bet it will not happen. ,..., We also thought about making it better, but unfortunately for you we are not professional editors,... now that I think about it, we are not even amateurs, so that possibility is ruled out.

So we decided to extend the project and create a kind of community around the magazine. Of course it will be an AFOL community. The first steps have been taken. We have a new logo (designed by Dustin Robbins Digital Dreams). We have begun planning small LEGO events for this year (you will be informed promptly) and we are trying to give a little more color to the magazine.

How do we hope this will evolve? Over the next few issues we hope to aesthetically enhance the magazine, launch a new website, with its forum and everything that surrounds an AFOL community and, finally, organize events and collaborations we can be proud of.

Regarding the current issue, as you can see and almost by accident (believe it or not) we have a series of articles about LEGO and space. It was very hard work collecting stories that has been done, almost entirely, by one of our editors (Jetro), but with the support of the whole team. I hope you like it. You can also see the latest work of the arvo brothers; they have been quiet lately, but only because they were tuning their instruments. There are also many reviews, and many friends who have been interviewed to share their world with you.

For the next issue ... you decide ... as always your ideas and help will be more than welcome.
#

CONTEST WINNERS ON PAGE 45

The Minimoog

¡Smoogy, moogy... MOOOOOOG!

By arvo & Adam Khoury

Anyone who has experienced in their own flesh the sensation of touching a synthesizer, slowly pressed the keys, closed their eyes and heard the delicate and gentle vibration that majestically evolves into something grand and disgustingly grotesque, which is able to thrill even those who got more than an A in their A levels...

.. will know what we are talking about.

We'll maybe it's not that dramatic. If you've ever listened to Junco, Triana or the international José Manuel Soto it's enough. The "moog sound" is something unmistakable for all of those who are avid enthusiasts of both the instruments and the music of the electronic genre, and the brand name is to synthesizers what LEGO® is to constructions blocks.

We aren't the only ones to say so. These bricks are the only ones that can 'appease' the beasts. All the frustration that came from not being able to have certain items is now history. We already did so with the Nord Modular and we can promise it worked. For a couple of months we managed to forget "the real one" and its very presence subdues the desire to own that "strange, red and tiny" device.

The years have gone by, and although the model has changed, al the morbid need to enjoy what we do not even deserve (especially pathological in these cases)... is back!

"A creation worthy only of the gods of beauty"

- New Herald Tribune

It is neither the place nor the time to do a historical overview, but the "Minimoog" is considered by many the most widespread model of all times... so much that last year it celebrated its 40th anniversary with a very special and luxurious edition. Despite its fame, it is one of the synthesizers that, from an aesthetic point of view, you either love or loathe. There is no middle ground, although, like in our case, you can loathe it first and love it later.

The last time we saw so much wood was when Ramón broke his bed imitating Hulk Hogan. He did a great impersonation, but in addition to sleeping on the floor for a couple of days (which suited him fine) he got a splinter that prevented any further imitations.

To us, victims of the 8-bit fanfare, anything short of a DX7 or that did not stink of plastic casing aroused suspicion and even rejection, causing a reaction not unlike what you'd expect of a some chimpanzees who find a GameBoy Color (batteries included) in their cage.

As we were saying, time has gone by and our way of building has changed as well as the way we conceive our models. We've understood that one way to prolong the "experience", i.e. to enjoy the building process more and longer, is to look at each stage in the process as if it were a new construction.

... with its own character and putting the same effort into each one of them. Things that didn't get attention before because they were "hidden" are now equally important and require the same effort dedication and skill.

This idea brought the need to make a new MOC "from start to finish, from inside to outside". The keys needed to work, the modulation wheels and pitch benders as well as every other knob and switch ... everything had to be as real as possible, without losing sight of our motto:

"... if it works, fine, if it's a botch job, ok …but for the love of god!!!...Make it look cool…"

<div align="right">- New Herald Tribune</div>

But what about the sound? would it work, where would it come from? what would generate it? to what degree could it be edited or sequenced?

Not know the first thing about electronics has been a real handicap. The model as originally conceived would have required some circuitry to take up as little space as possible while being readily accessible for activation... absolutely impossible, but it has been possible to integrate some very recent "MIDI nano controllers", capable of transmitting messages for activating tones, opening filters o modulations, making this MOC possible. We've used two of these, one to control the keyboard and another for sound edition.

Without going into too much detail in secondary subjects, it would be convenient to briefly explain that MDI messages are transmitted to a computer which hosts software that communicates those instructions to the real source of the sounds as well as the audio recording device.

Just like in the case of the Kaneda motorbike, the appearance of certain indispensable parts have made this MOC possible, something which is pretty frustrating if you are usually rather short on patience.

In any case, in this way the imitation reaches an even higher level... it's not just about evoking an image, we want to get to the very essence, corrupt its soul and finish off the myth.
... it's time to go for it!!!

Menu of the day: Deconstruction of a MOOG with a LEGO® caramel.

The size of the aforementioned controllers made us realize from the beginning the difficulty of recreating the proportions of the model we wanted to reproduce. It's true that after having demonstrated countless times that the subject of proportions is one we still need to learn a lot about, and since we were conscious that the bigger our determination to respect them the more things tend to get out of hand, we stopped worrying about that little detail and basically concentrated on the mechanisms that would activate the devices.

The first of those is the most visible: the keyboard.

It was the first thing we built, even before the casing! That's how we do things, spend hours upon hours on parts we are not even sure will work or fit... virtually without reference, roughly calculating and fortunately no mayor modifications were necessary this whole part in the general structure of the MOC.

A 32-stud long axle saved us a lot of headaches, allowing us to string together 24 of the 27 keys in one go.

Thanks to the incorporation of brackets it has been possible to adjust the width of the key to what was strictly necessary. The 2x1x2 panels on the sides provide a finish that is very similar to certain keyboard from the 60s and 70s.

Each one of them has its own (soft) suspension and we ended up using three of these axles in parallel, one for each type of key (black and white) and a third to keep the other end of the shock absorber in place. After assembling the system and placing it over the corresponding controller, the separation between keys was adjusted and their height (no two shock absorbers are the same).

The result is a kind of black and white serpent, easy to manipulate, but not very practical if you want to modify anything. In case any change is necessary, a lot of plastic needs to be 'undone' before you get to the part you need to substitute.
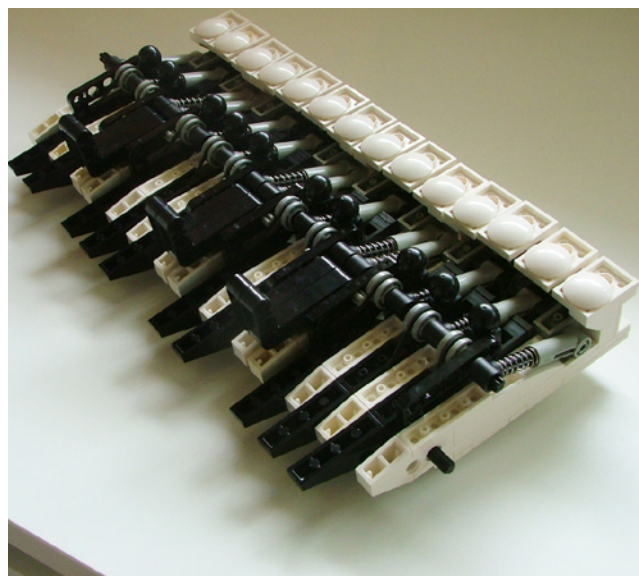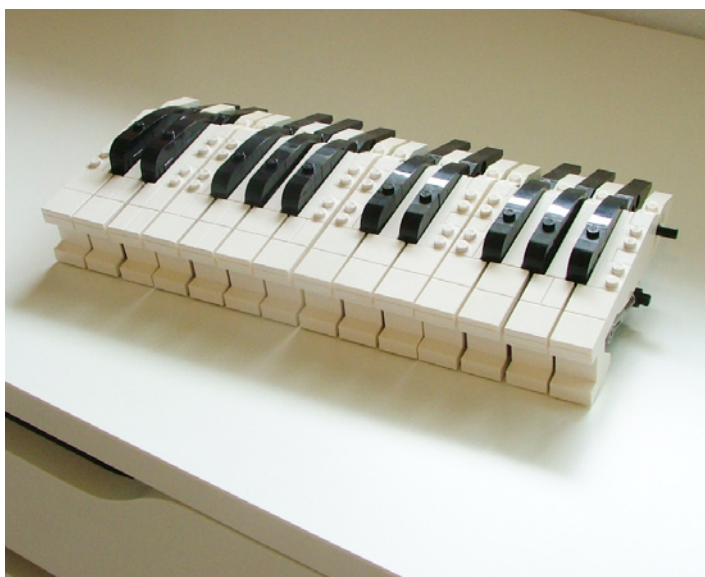
The great length of the axles allows for continuity in the system. The absence of "weak" points or discontinuities in most of the development of the MOC guarantees great reliability in its operation.

Due to the length of the axle, the keyboard is more flexible than it ought to be. To avoid undesired effects it has been fixed in three locations to fix it in its position and reduce deformation.

The three remaining keys were included later using a completely different approach, based on the use of hinge plates.

It was absolutely necessary to reduce the volume of this part as much as possible. Although we like big and stocky MOCs, we were forced to limit the final height of the keyboard so the keys would be at a 'reasonable' height for the overall dimensions of the MOC. Fortunately the controller is less than 2cm thick, which gave us some leeway in the design of the mechanism.

With this part finished it was time to start working on the section that controls modulation and pitch, as well as change of octave, the tone control. Despite the fact that this part includes very few pieces, there was an added difficulty. All parameters are activated by means of press switches, but the normal thing would be to have turning knobs. On the other hand, each turning knob has a different feel, or rather a different response: the modulation wheel stays in the position you leave it, whereas the pitch wheel returns to centre when you let go of it (another spring to be used).

So it was necessary to create a new set of mechanisms that would translate turning into button press.
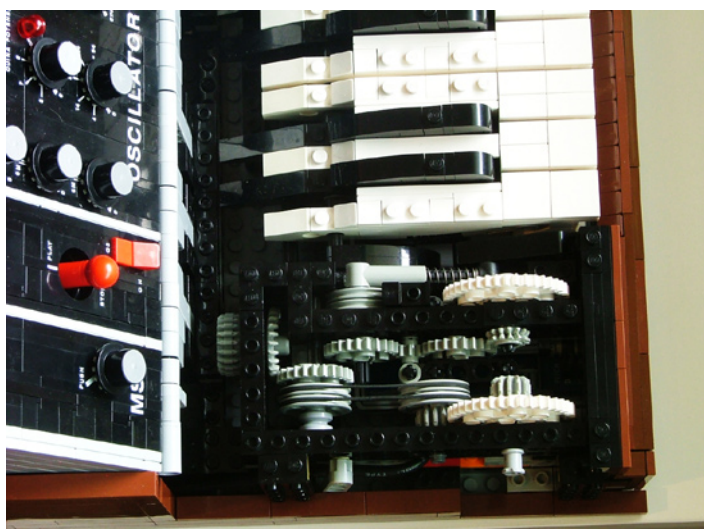
The Technic elements appear to fight for a breath of air, but finally we managed to make them fit. Each time we look at this part we can't help thinking there are really infinite possible combinations, and many of them would be infinitely better, but if we're not able to consider something sufficiently good, we would be sorely tempted to never try to finish the model out of sheer weariness.

Space constrictions were tough with the keyboard, but in this case they turned into a real nightmare. In less than the size of a packet of cigarettes we needed to fit gears, shock absorbers, liftarms and pulleys. All of this need to be reasonable calibrated to obtain the characteristic feel.

The feel of the keyboard and the tone control section is not perfect by a long shot, but a lot better than what we expected from a system built with tiny pieces. It won't serve to play Rachmaninov, but for the Rambo soundtrack... it's a blast.

We are happy about the result and the solidity of the MOC is good enough for it to put up with anything.

It wasn't excessively difficult to give it a finishing that would evoke the Minimoog; after all it's a simple model that is characterised by it basically being a wooden box! SO a little SNOT and some brown was all we needed. We tried to avoid showing studs whenever possible, because although we stopped worrying about that a long time ago, it simply doesn't suit this model very well.

The model is completed with a control panel. The soul of the device, responsible for modifying the sound in real time. In this last stage of the process we found new difficulties. Although space was no longer as much of an issue as it had been before, the configuration of the panel, the choice of parts for the knobs, their distributions, and especially their labelling were true challenges.

This stage of the process started with the construction of the receptacle for the controller, a kind of sarcophagus of Tutan Com'on!! which was built carefully choosing the closing elements to obtain a recess that, without being too heavy, would be as sturdy as possible. In addition, this "box" needed to tilt (on demand, coming out of its flat position, like in the real one) so we included a mega-hinge along its entire length.

On each of the corners different combinations of brackets have been used to ensure a "solid" closure. Inconvenience: any modification requiring the box to be opened would have been more than complicated once the box was closed - in order to open it a very rigorous order must be followed... pretty tedious. Once completed, the weight of the panel is significant. The hinge that was built links parts that need to be strongly united inside the receptacle and in the technical structure that serves as base for the keyboard.

The second controller, the one that corresponds to the control panel, presents a special configuration, mixing faders, knobs and switches. All in all it doesn't have even half the ones on a Minimoog, so it was necessary to choose a configuration that, using all the features of the controller, would reproduce a reasonable similarity with the panel of the real model.

Before choosing the pieces that will serve as knobs but with the distribution decided upon, it is time to build the mechanisms that activate the controller. Fortunately the dimensions of the device are almost to LEGO® size and it was not very difficult to adapt the necessary the gears, wheels, worm gears and liftarms.

We gave ourselves some latitude (quite a bold step considering "who" we are) with the introduction of a small joystick on the left of the panel, in order to make full use of the controller.

It includes buttons for sequencing sound, and

The panel is divided into two sections, each of which is in charge of very specific parameters for generating and modifying sound. The real model has many more elements in its panel, but the distribution is very similar to what was obtained, so the overall look is quite similar to that of the original.

although these do not take part in the generation or modification of the sound, we did not want to leave them out. To this end, and in order to "differentiate" this function from the others, we decided to use this kind of interface, which is well known to players of Gauntlet, Army Mover, Army Moves II and Goody!
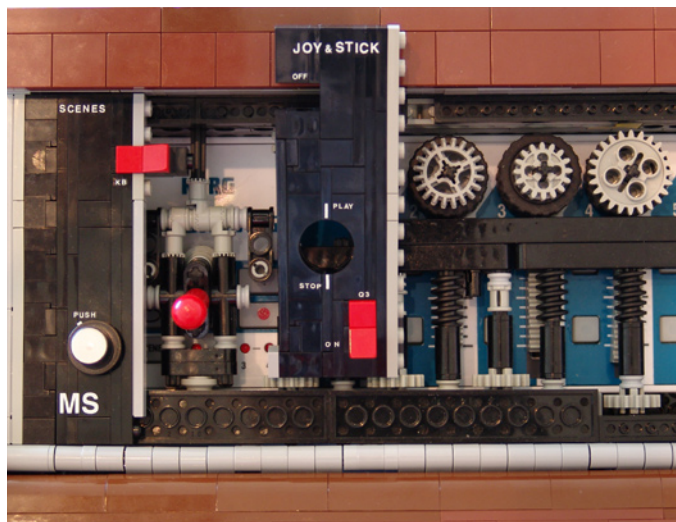
Some elements were resolved almost immediately and directly, others, like the faders, required a system that would transmit the turning of the pot meter to the sliding of the fader on the controller in very little space. Fortunately the worm gears do just that... and much more.

It certainly is rather crazy to slap a joystick on a Minimoog. To make up for the impudence we made it look so fitting to the rest of the elements that we have started to believe it was a mistake not to have one of these on the original Minimoog; it's so beautiful and at the same time so perfect... we love the pureness of it.

As builders who basically look for the aesthetics for its own sake, we were quite worried about finding the right piece to reproduce the pot meters of the real Minimoog. Those knobs are probably the probably the "strangest" ones ever seen on a synthesizer. They are placed on a musical instrument but might as well have been on an oven, an oscilloscope or a grannies coat; their size appears to be designed to control them with your armpits and the metallic finishing clearly indicate they were meant for a fan of trinkets... even so, they are characteristic of the device and without them it would completely lose its identity

Is there any piece that combines all those fatal characteristics? ... all of them!!!, but there is a minifig hat that without being the perfect fit has a very good size, the only drawback, the metallic finishing.

Achieving that final touch became an odyssey that might well deserve an article in "House and Garden".   We tried lots of things and when we thought we had found the final solution we had to start over from scratch. We even tried painting it, and we became so good at it the damned things looked like they were made that way. The texture, glitter and finishing were perfect, no specks, no bubbles, no.... nothing!!

We painted a full set of 22 hats, placed them on the controller to see the effect and fantasied for hours with the result. We put Chronology on full blast and for an instant we could hear the ecstatic audience, almost a trance, they were chanting our names in splendiferous 44.1 KHz stereo. The performance ended, the lights went out and silence flooded our room of less than 10 m2, 9 usable...

...pain...we only felt pain.

No-one warned us, who might have suspected, the pre-technology classes were behind us and upon seeing our mandrill-like hand full (absolutely full) of the damn silver paint... we looked like visitors from the future, but what was most pathetic of all was noticing the metallic smudges in the corners of the eyes on each other's faces... pretending to be Jarre would excite anyone.

So, after a 48-hour wait the pint was completely dry, but any prolonged friction (even if not strong) spoiled the finish we had felt so proud about. It was like inventing a water powered engine, only to discover that after 10 minutes of use... the engine...drowns, of course! it drowns!! HAHAHAha..hahaha.. aaa...

...ehrm..it was painful.

We even built a small "lathe" to paint more quickly and easily. We extracted the paint from markers and applied it with a sponge paintbrush. The process was so ridiculously fast we painted all 22 hats in about 15 minutes.

In the end we decided to use silver coloured stickers - the result is not as spectacular, but perfectly stable. The stickers are printed on vinyl and were produced by a printer who specializes in publicity, not for any special reason, but because we simply could not find anything on the market with a 9mm diameter.

After placing the hats in their respective places the brick building process was finished. The last hurdle was to finish the "printing" of the model. To our disappointment, the "bare" MOC was blander than we had originally imagined, but far from feeling discouraged, we then realized that any "addition" could only make it more beautiful or at least more interesting to look at.

The panel of a synthesizer is, normally, full of printed markers; especially in the analogue models in which each parameter has its own control element. In this respect we had to be extremely careful in choosing a solution which, while being as eye-catching as possible, would respect the pieces to the highest degree.

We studied the following options:

- **Engraving**: just like the pieces that are used as event souvenirs, etc. Evidently this is the most "professional" solution, and, although it has the disadvantage that the pieces cannot be reused, the real disadvantage is finding someone who can do the job. You can't begin to imagine the times we have had to leave specialised companies with burning cheeks; engraving a name on a piece is one thing, but a whole panel with lines, numbers, letters indifferent sizes and orientations is another thing.

If we compare the "painted" hats to the one with stickers, there is no comparison in the "shine", but if you fiddle with the painted ones for a couple of minutes you will soon come to the conclusion that the ones with the stickers are "nicer"

... more than one company owner would have liked to pull a sawn-off shotgun from under the counter to get us out of their property.

- **Silk-screen printing**: like the torsos o customized minifigs. This is an intermediate solution between engraving and using stickers. Again it is not easy to find someone who can do it. We found one person, but the price was more than excessive.

- **Decals**: of the same type used in scale models (we would like to thank pulipuli for his help in this matter, a completely new area of expertise for us, and in which we have found great possibilities and finishing options).

Unfortunately there was an inconvenience that completely ruined our expectations for this kind of solution. We wanted to print white on a black background and the decals that best fitted our "needs" (transparent ones) did not offer good results in those conditions.

- **Transfer paper**: paper with "transferable" letters and numbers. These provide a finishing that is very similar to decals (even better for our needs in this case) and without needing a printer, solvents, knives and paint brushes: just scratch the paper. It is a big advantage that the symbols we needed were only alphanumerical. We just needed to find the right pages with an acceptable font, in a reasonable size, and above all....white!

We had never seen anything like it, but ...what about the internet?

- **Stickers**: of the same type you get with SuperPop, the largest collection of which (in Spain) is owned by a certain "manti" (verified by notary). It was our last option and we'd anything before recurring to it. Their "thickness" makes them an uncomfortable addition, there would be too many of them, to the point where they would cover up the pieces which, after all, should be stars of the MOC
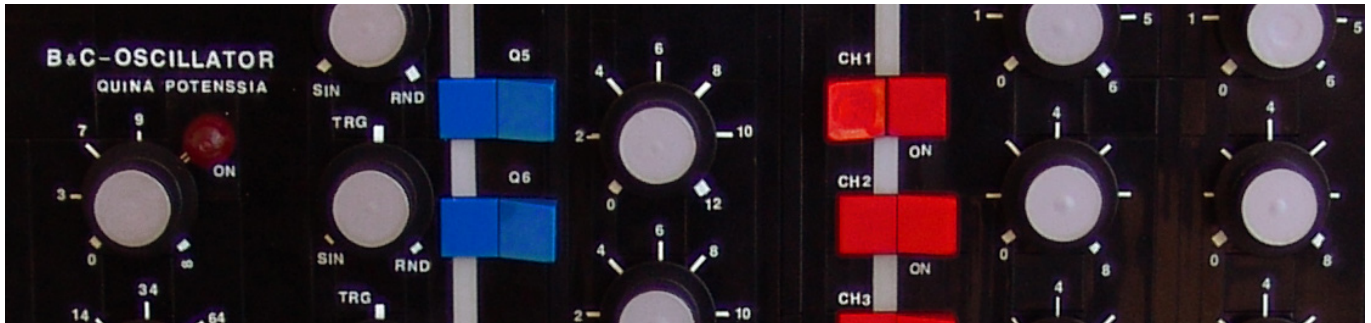
After searching and searching, we finally found some transfer paper that suite our needs pretty well. After considering all options, it was the only option for decorating and finishing the MOC, obtaining a result that was on par with the dedication a project of this scale requires, in which we used many more elements than we are used to.

We really like the final result. We've given continuity to a subject that fascinates us and that we had almost left aside since the NordModular. It has taken us a very long time, the constant interruptions have even made us forget when we started it, but what we do remember is that we wanted a Moog, or at least something that looked like a Moog ... although if we could have both, so much the better ;) ;).
#

Meet the LEGO® CEC Team

In this edition of Hispabrick Magazine we are take a closer look at the CEC Team at the LEGO Group, the people that make up this team and the different areas they cover.

Text by Hispabrick Magazine
Pictures byThe LEGO® Group

CEC stands for Community Engagement and Communications. CEC is a part of Consumer Experiences (alongside e.g. Consumer Service, VIP and LEGO® Club) which is a Business unit in CED (Community, Education and Direct) This unit also includes Direct to Consumer sales (D2C - LEGO Shop online and Brand Retail Stores), LEGO Education and LEGO Digital.

To get a better understanding of what CEC is and how it interacts with AFOLs, Hispabrick Magazine talked to Tormod Askildsen, head of the CEC team.

HM.- When was the Community team set up and why?

TA.- The Community team was starting to take shape back in 1999 after the launch of LEGO MINDSTORMS in 1998. The way the product/technology was "hacked" by a very diverse group of adult users took us by surprise. After the initial shock, we decided to establish contact to this community of very innovative and talented users. Around the same time we started FIRST LEGO® League in collaboration with FIRST and the concept of "user communities" started to become a focus area for me and some of my colleagues.

HM.- What was its initial goal and what resources did the team have?

TA.- I would say that the initial goal was to find out how collaboration with these Lead Users could help us develop better products and also to drive publicity around all the interesting things users did with the LEGO MINDSTORMS technology. We did not really have a dedicated "community team" at that time. A bit later, around 2002 I think, I became part of the LEGO Direct organization. Jake McKee who had reached out to fans in the US from our New York office independent of our work with the LMS community moved into my team and started to drive a much more systematic effort in building relationships to fan groups. That led to e.g. the LEGO Ambassador and LEGO Certified Professional programs in 2005. Around that time, Jan Beyer also joined the team to focus on Europe.

So let's have a closer look at the team, the people who are part of it and their different responsibilities. The CEC team is currently made up of 11 people. They are:

Tormod Askildsen,[T] is head of CEC and as such a member of the

CX (Consumer Experiences) Leadership team. *"In addition to doing my best to support my team doing their best, I spend my time on continuously evolving and driving our strategic consumer engagement agenda with focus on building relationships with LEGO fan groups. These relationships are important to us because LEGO fans (like you) represent a strong passion for the LEGO brand, more than a million of years of building experience and a lot of talent! I am also responsible for the LEGO Certified Professionals program which currently has 13 members."*

Jim Foulds is responsible for relationships with fan groups in North America, Middle/South America and AUS/NZ. Jim is also currently the driver of the LEGO Ambassador program. He cannot do this himself obviously, so most of the team is involved as much as we can.

Kevin Hinkle,the latest addition to the team, is a Community Coordinator with focus on North America specifically reports to Jim.
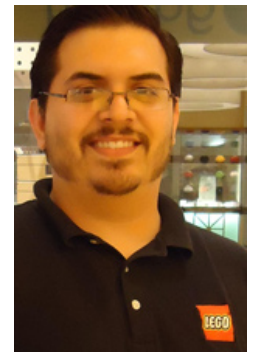
Jan Beyer [J] is responsible for relationships with fan groups in Europe and now also starting to establish relationships with groups in Asia which are growing very fast. In Asia, LEGO offices in several countries are already quite involved in working with fans. The CEC team is working hard to make sure collaboration with fan groups is as consistent as possible globally. Jan is also responsible for the LUGbulk program and he is being supported by **Rikke Zethsen**.

13

Rikke also works with **Camilla Torpe** who is responsible for the *LEGO® Inside Tour* (LIT) and LEGO *Build the Change* events. Camilla started the LIT back in 2005 and this year all three "tours" were fully booked and there is even a waiting list for 2012. LIT is designed to give LEGO fans an extraordinary experience inside the company. Each year the LEGO Group creates an exclusive set for LIT guests. The 2011 "LEGO Molding Machines" set turned out to be extremely popular. *Build the Change* is a LEGO event concept which is focused on empowering children and their families to e.g. suggest changes in their local communities. It is becoming increasingly "popular" among e.g. politicians to involve citizens in their community in dialogue about future development. The LEGO brick is a great tool for these kinds of co-creation projects.

Peter Espersen is the Online Community Lead. **Signe Lønholdt** works with Peter. They are driving an online community project which is still in development and which will focus on all the incredible creations made by LEGO fans.

Steven Canvin is responsible for relationships to the global LEGO MINDSTORMS community. He works closely with everyone else on the team as LEGO MINDSTORS cuts across most fan groups, but at the same time is pretty specific. LEGO MINDSTORMS lead users continue to amaze the team with innovative MOCs.

Andrew Arnold is responsible for PR and Communications across the CED Business area. This includes both internal and external communications. He works with Consumer Experiences, LEGO Education, D2C, LEGO Digital and also other PR colleagues across the LEGO Group.

Lars Silberbauer is the Social Media Strategist. He works with Tormod and colleagues across the LEGO group to evolve their use of relevant Social Media opportunities, learn and drive strategy. Their first initiative in the "Social Media space" was the official LEGO Facebook page which went live in early May. The page was handed to LEGO by a fan.

Social Media:

The LEGO Group has recently released a set of guidelines for LEGO employees who engageme in Social Media on behalf of the LEGO Group

HM.-Why was it necessary to create these rules and which are the most important points?

TA.- Good question. We have created a set of guidelines for LEGO employees who engage with consumers in the online "social space" on behalf of the LEGO Group. These guidelines will evolve and change as we learn more. We created the guidelines to make sure that we use Social Media appropriately and that we act consistently. Consumers see the LEGO group as one company and we need to do what we can to act accordingly. The most important guidelines are the points that related to personal data, children's safety, that we do not "outsource" dialogue with LEGO consumers and that we are open, honest and transparent in our dialogue.

HM.- What does the LEGO Group expect to get from engagement in Social Media and what can it offer?

TA.- We expect to get closer to LEGO consumers on a day to day basis. We expect to learn a lot about the very diverse groups of consumers who share an affinity for the LEGO brand. Rather than just expecting consumer to come to us (visit LEGO.com and call Consumer Service), we also want to have a presence where they are e.g. on Facebook. We do not target children under the age of 13 on 3rd party Social Media sites, but there are lots of parents, teachers, adult and teen fans on these platforms. LEGO.com and LEGO Universe are the primary destinations for kids under 13 and these spaces are moderated 24/7.

HM.- Does the fact that LEGO has decided to take an active part in SM mean that interaction with LUGs is too limited/limiting?

TA.- No, I would rather say that that our interaction with LUGs, which has gradually increased over the years, has shown us that a close relationship to users/consumers is very good for the LEGO business and for the LEGO brand. Not only do we learn a lot from LEGO fans, they are passionate and positive, but they are also our biggest critics. Critical feedback helps us stay on our toes and not rest on our past successes. Also, these relationships contribute to a high level of LEGO fan activity, just look at the events, shows and displays that take place around the world and the enormous amount of user generated content online. When we now start to engage with consumers on platforms like Facebook, it is simply to increase our reach especially towards parents, teens and also many young (and not so young) adults who are not members of or

even know of the LUGs, but still have a LEGO® affinity. Our engagement with consumers on Facebook though will be pretty "light", nothing like the many personal relationships we have with people in the AFOL community.

Ambassador Program:

The Ambassador program has now entered its 9th cycle, although after the profound changes made to the program and the 6-monthly enrolment windows that is maybe not the best way of naming it.

HM.- What fundamental changes have been made in the program to get to the current format?

TA.- When the LEGO Ambassador program started back in 2005, our idea was to let a number of AFOLs (I think it was around 15 of them) act as ambassadors for the LEGO brand towards the public. LEGO Ambassadors were selected by the LEGO Group. Also, LEGO Ambassadors were invited to a series of "top secret" development projects. Therefore, the most important criteria to become a LEGO Ambassador were outstanding building skills and a good attitude towards the public and fellow AFOLs. We have gradually changed this to the current form, which is very different from the initial idea. Today, the LEGO Ambassador forum is a place for LEGO User Groups to have a dialogue with TLG representatives about issues which occupy them. The LEGO Group can also bring issues, questions and projects to the LEGO Ambassador forum. All LUGs (which fulfil the LUG criteria [criteria]) have a right to be represented on the LEGO Ambassador forum and they select their LEGO Ambassador themselves. Initially the LA cycle was 6 months. That was increased to one year. Up to 2010, a new LA cycle started with a new selection of LAs. But from 2010, we changed this to a biannual "open window". This means that during the "open window" period, LUGs currently represented can withdraw from the program or replace their representative. Also, LUGs not represented can enter the LA program if they fulfil the LUG criteria during this "open window."

HM.- What has motivated the change in enrolment windows?

TA.- A couple of things. Primarily because of feedback from the LAs and LUGs saying that replacing almost all LAs each year was disruptive and hurt continuity. Also, moving from the old "cycles" to the "open window" demands much less admin both on the LUGs part and ours.

HM.- Are you satisfied with the way the program is working?

TA.- No, I'm not, simply because we in the CEC team have not been able to be as responsive as we should be. This has actually been a problem for some time now. With the broader and deeper engagement over the past years, our workload has increased quite significantly. We have promised to the LEGO Ambassadors that we will step up, but even with the best of intentions I must admit we have not been able to improve significantly. Having 70 AFOLs from 30 countries, representing clubs, online communities and blogs in one place is wonderful. We know very well there is a value potential there that we are not taking full advantage of.

HM.- What changes would you still like to introduce?

TA.- I think the format is good. Primary improvement will be for CEC to find more resources for dialogue and feedback. The technology can also be improved and we are working

to establish more direct contacts between other LEGO® departments and LEGO Ambassadors.

HM.- How would you like fans to interact with the company and how does the Ambassador program fit into this?

TA.- Ideally, I would like fans to interact with TLG both via central functions in Billund and via local LEGO offices. Even though this works to some extent today, there is a long way to go before we are where I would like us to be. The LEGO Ambassador program plays an important role as being the overall forum that is not "subject specific", but where all kinds of challenges and opportunities can be discussed. But next to the LA forum, I can see a potential for networks between TLG and fans/LUGs which is focused on specific topics like events, innovation, consumer service, etc.

HM.- Why do Ambassadors no longer have the possibility of participating in secret projects like in previous cycles?

TA.- They do, but not because they are LEGO Ambassadors. "Top secret projects" require people with a certain experience and skill set. The primary skill of a LEGO Ambassador is a strong ability to network and dialogue. We expect LEGO Ambassadors to represent their LUG, not just themselves and "have the finger on the puls of the community". In many cases when we are looking for fans to participate in a "top secret project", a LEGO Ambassador might point at him/herself because he/she has the experience and skills required, but in many cases the LA will point at fellow LUG members.

Events:

HM.- What is your policy regarding attending fan events?

TA.- We participate in most larger events where there are

*The official LEGO landing page on **Facebook** went live on May 5, 2011. Andrew Arnold explains: "The page was created by a fan a few years ago and currently has close to 1 million 'likes'. The creator has kindly given us the admin rights and has supported our taking over the page and the community around it with the words: "I would love for LEGO to have an official Facebook page, and since this one has so many people on it already I think LEGO is entitled to it." We are now going to engage actively in further building that community."*
You can indicate that you "Like" the LEGO(R) page by logging into Facebook and writing "LEGO" in the search field. The official LEGO Facebook Page is the first that pops up in the list of search results. Facebook also indicates the page is a 'Company' page, in case you already liked some other page including the LEGO name. the direct address to the LEGO Facebook page is www.facebook.com/LEGOGROUP

many fans and public visitors. Both me and colleagues from the CEC team, but also LEGO people from other parts of the business. We have recently made an agreement with Product and Marketing Development that LEGO Designers to a higher degree should participate in LEGO fan events. But in addition to the larger events, we often participate in smaller events in new areas to support new "startups". Fan organized events are fantastic, we feel extremely privileged to see all the event, show and display initiatives which are pulled off by LEGO fans globally. Last year we know of more than 180 fan organized events which combined attracted more than 2.5 million public visitors! It is precious.

HM.- How do you support fan events?

TA.- Event support has been too sporadic and randomly given up to now, we realize that. Therefore we are working on a support program which should be more consistent and fair globally. We expect to start rolling this out in 2012. We will still not be able to support all event initiatives, but we will work more systematically to ensure that as many LUGs as possible who put their enthusiasm and long hours into organizing events will be recognized.

[T] You can read more about Tormod Askildsen, his work at the LEGO Group and his involvement in the fan community in HBM 003

[J] You can read more about Jan Beyer, how he started at the LEGO Group and how he got involved in Community Development in 005

[criteria] – link to online criteria for the Ambassador Program: http://www.eurobricks.com/forum/index.php?showtopic=47767 #

LEGO® SPACE CLASSIC

Life in Trans Yellow

By Manticore & car_mp

Considered by many AFOLs - among which I include myself - to be on of the mythical LEGO® themes, Space was born, with just a few sets, back in 1978 according to Peeron, although they appear in the 1979 catalogues. They all shared the same particular colour scheme which has been burned into our retinas (gray, blue and trans yellow) and with smiling minifig astronauts, which together have become the identifying mark of the theme.

It was a theme without opposing sides, and of course without weapons or enemies, no matter what we imagined in our childhood playtime to convert virtually anything into weapons for destroying imaginary aliens. The theme was primarily oriented to exploration and investigation. Not even the rockets that appeared in some of the sets were ballistic. LEGO made sure to place satellites on the tips to leave no doubt about their purpose. How naive... The triangular ships provided us with large amounts of new parts, like wedges that presented new challenges to use them in combination with more classical parts. The eternal 918, 924 or 928 are burned into the collective memory of the fans of this theme and they are among the few sets whose parts I have not mixed up with other sets. Who didn't dream of covering the floor of his bedroom with those baseplates with two curious craters? Or what about how playable they were while flying through your house clasped in your happy hands.

But what has made the theme mythical? The truth is that it's hard to pinpoint a single reason.

The fact that the children of those days are today's AFOLs is certainly one of them. The emotional value of these sets makes us remember our childhood with nostalgia.

The fact that over time the Space theme evolved into a number of themes with less continuity and with subjects closer to a struggle between "races" is also a factor. Above all taking into account that those themes coincided with a dark LEGO time when juniorisation of parts reduce the attractiveness of our hobby. It's pity that some very interesting sets were lost because they arrived at a bad time, but that is a different story.

I suppose another factor is how 'balanced' the series of sets was. Although all the sets fitted in with the visual identifiers of the theme, there was an incredible variety of sizes and functions. It didn't matter if you preferred small or large space ships, vehicles for transportation or to collect samples, bases or launch platforms, it was all there, complete with smiling astronauts to remind you that wherever they were, it was a better place. Who doesn't remember those photos in catalogues where are the sets were shown together? It made you want to rob a bank, kick your brother out of the room and build your own space port right there, next to your bed.

And of course there was the logo. "Round" in all senses.

But lets describe the most important sets of this theme. First of all, the differences between European and American catalogues are important, affecting even the numbering, which is completely different in the first series as are the sets on sale. And from that first series, the flag ship cannot go unmentioned. The 928 (497 in the USA) "Galaxy Explorer". The biggest space ship in the first series, it included a small vehicle that could be carried on board, and a small base with four minifigs. A very playable set in all respects and which formed a balanced whole together with the 924 (487) "Space Transporter" and the 918 "One Man Space Ship", both in size and in aesthetics which make it the distinguishing mark of the first stage. Did I say first stage? Yes, and that's another story we'll see later. This triumvirate of space ships was accompanied by two bases, the "Space Commander Center" 926 (493 in the USA with a first version that included a flat baseplate instead of the one with the craters) and
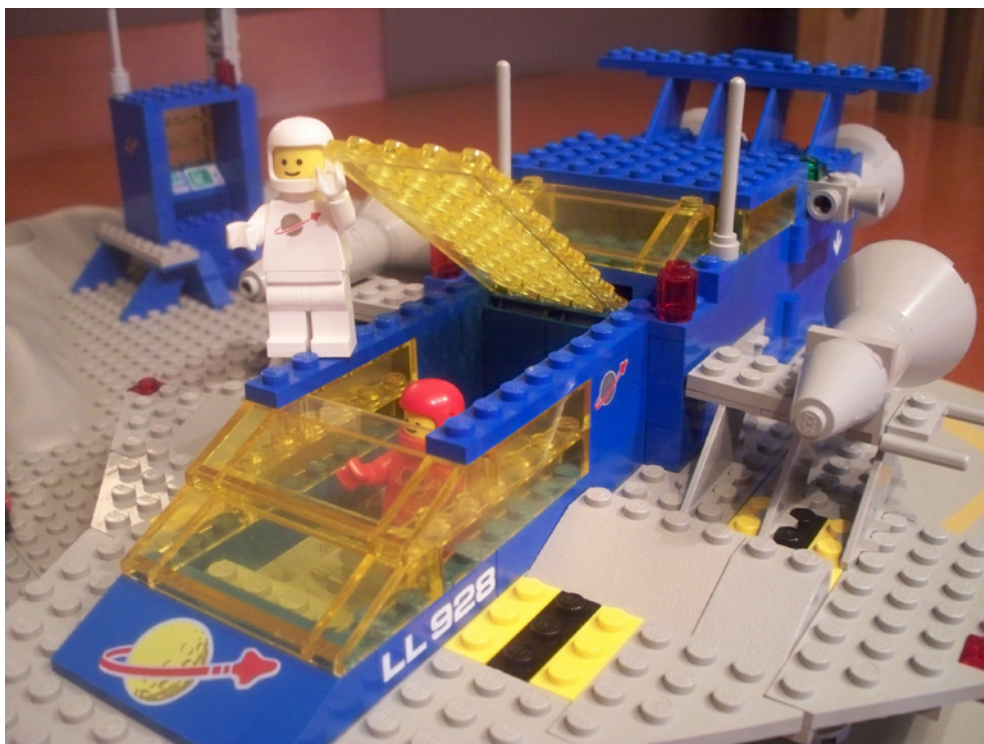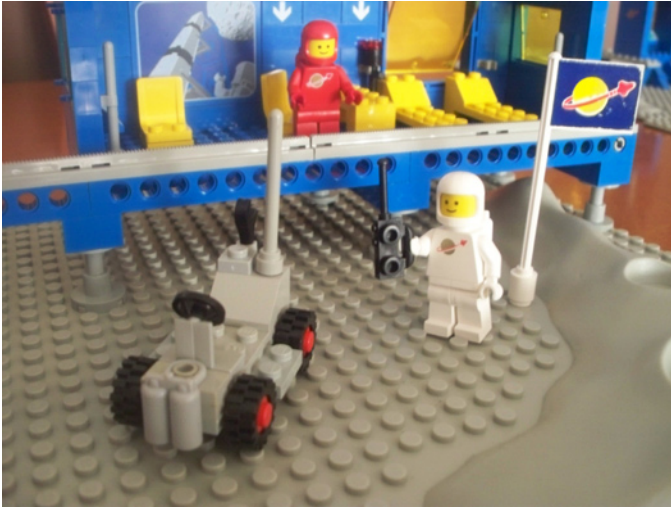
the 920 (483 in the USA) "Alpha-1 Rocket Base" and a number of medium and small-sized vehicles including the 894 (452 in the USA) "Mobile Tracking Station" and the 897 (462) "Rocket Launcher" of which I have fond memories.

There were few novelties in the 1980 catalogue, just a few small vehicles which introduced the possibility of looking for minerals in our new colonies, but little else. It's curious that the novelties of that year are completely different in the American and European catalogues. The first one shows a small ship and a lab on stilts to substitute the vehicles of the European version. And for me, that's where the first stage finishes.

In 1981 for the first time a new colour combination was introduced in the space ships. The 'bodies' of the ships, blue till now, become white, and the trans yellow cabins become trans blue. In the engines, grey is substituted by black. The change is introduced very subtly, with both colour schemes appearing even in a single set, like in the 6927 "Mobile Tracking Station", where the vehicle has the new colour scheme and the base it transports the old one. Maybe the most important sets are the 6929 "Starfleet Voyager", the first to break with the triangular shape of the ships, and the 6970 "Beta-1 Command Base", to me the most mythical of all, which included a small manual monorail and a medium sized space ship of spectacular design.

In 1982, in addition to the appearance of yellow minifigs, the 6950 "Mobile Rocket Transport" came out, using the old colour scheme, but with an original design in which a giant 8-wheeled vehicle serves as a mobile rocket launching platform. The first

impression is that the scale is wrong with respect to other sets in the theme, but having a closer look and taking into account its function you soon get used to it. It's hard not to like the little monster.

In 1983 the first base with the new colour scheme appears, the 6930 "Space Supply Station" and what could be considered the flag ship of the fleet, the 6980 "Galaxy Commander". This ship can be divided into three sections: the front part with cockpit, a base which is transported in the rear and the structure that covers the base during transport. Incredible as it may seem, the 928 is still in the catalogue, for the fourth time, and as spectacular as the first year.
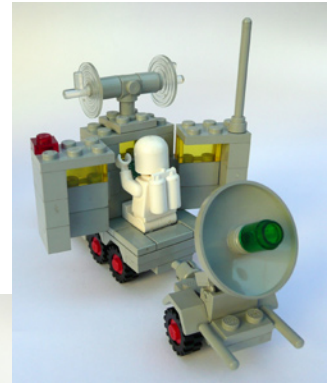
In 1984 the first set with a robot look stands out: the 6951 "Robot Command Center" and the 6971 "Inter-Galactic Command Base". And blue and back minifigs make their appearance.

1985 brings a new colour scheme, with trans green cabins and ships that are mainly grey and black and with little robots at minifig scale. The series starts with the 6952 "Solar Power Transporter" and the 6891 "Gamma-V Laser Craft". But there are still sets with the colour scheme of the original series, the

18

second series and now the third... maybe the begining of the end?

1986 sees the appearance of the 6985 "Cosmic Fleet Voyager". Its colour scheme was a kind of undefined mutation between the first and second series, but the size is very definitely huge.

In 1987 the first sets with light and sound appear. In general, as far as design is concerned, the theme is in free fall and catalogues show the first images of what will become the Blacktron theme. With a completely different colour scheme

and minifigs, it will coexist with the Space Classic sets and the new Space series. This new stage starts with a change in the uniform of the minifigs, the supremacy of white and trans blue and the arrival of the monorail. What a pity that did not come out a little earlier so it would have had the classic colours and minifigs. It would have been the perfect end to the theme.

In my personal opinion, after 1984 few sets can really be considered Space Classic, but there will be those who do not even consider the sets from the second series to be Space Classic as the grey blue trans yellow scheme was abandoned. But that is up to each of you individually. My opinion is clear: 928 forever!
#

Space, the final frontier

Text by Jetro
Pictures by NASA/Bill Ingalls and LEGO® Systems A/S

This year marks the 50th anniversary of human travel in space. It has also been 30 years since the most complex space ship used so far – the Space Shuttle – was taken into service. LEGO® has followed the conquest of space closely from the very beginning. As early as 1964 LEGO launched a Space Rocket (801) and the LEGOLAND Space theme, which ran from 1973 to 1976, featured a rocket base and two moon landing scenes. It took until 1990 before LEGO produced the first model of the Space Shuttle (1682) but since then it has appeared many times and in a variety of sizes. The latest LEGO model of the Space Shuttle has a special added value though: it has actually flown into space on mission STS-134, the final flight for Space Shuttle "Endeavour".

It is not the first time LEGO goes into space. Already in 1999, a LEGO MINDSTORMS model of the Canada space arm was sent up on a Space Shuttle mission with then astronaut Dan Barry. In 2001, another MINDSTORMS model went up as part of the Ultimate Builders Challenge in Germany, Switzerland, and Austria. Also, two astronaut minifigures "hitched a ride" with the Mars rovers Spirit and Opportunity that arrived at the red planet in 2004 [box]. To be completely true, another model of the LEGO Space Shuttle has been in space before, on

mission STS-133, but this time both the LEGO Space Shuttle and a number of other LEGO sets have made it all the way to the International Space Station (ISS) to run a number of experiments, a fact has received ample media coverage, and it will be the first time a LEGO set is built in space.

So how did the LEGO Space Shuttle make it into space, and what will be its mission there? To answer these and other questions we need to go back to the end of 2010.

The LEGO Space Race

November 2, 2010 - Kennedy Space Center. In view of the enormous countdown clock for the launch of Space Shuttle Discovery on mission STS-133, astronaut Leland Melvin, NASA's associate administrator for Education, and Stephan Turnipseed, President of LEGO Education, announced a partnership aim of promoting STEM (Science, Technology, Engineering and Mathematics).

The next day, and again some weeks later, two "Build The Future in Space" events were held at Kennedy Space Center,

LEGO Build the Future Activity.
Photo by NASA/Bill Ingalls

as a warming-up activity. *"It is based on a concept we have created in Community Engagement and Communication called Build the Change"* says Andrew Arnold (CED PR and Communications Manager at TLG). *"It gives kids the opportunity to build the change that they want to see. Typically, we give children a specific challenge from their daily lives and get them to build a solution. We've used it to suggest solutions for new schools, parks, and just recently to get children in Billund to contribute their ideas to how we can develop the town."* In this case children were encouraged to build what they thought a space city would look like.

But that was only the start of the project. The shuttles that went on mission STS-133 were small builds that came from an existing LEGO® Education set . However, the LEGO Space Shuttle that accompanied mission STS-134 was a newly designed model. [1]

Daire McCabe, a LEGO designer who worked on some of the models that went into space, comments: *"During the design process, we tried to stay completely faithful to the real life Space Shuttle by including features like the opening cargo bay, the Canadian Arm and the big engines at the rear of the shuttle. We even created a new element especially for the wings, in order to recreate the shape of the real Space Shuttle as closely as possible."* The model is about 18cm long and is made up of some 60 bricks. It gives a whole new meaning to the term "flying brick" which is popularly used to describe the real Space Shuttle as it returns to earth as a very heavy unpowered glider.

"The main goal we wanted to achieve was to teach kids about living and working in space, and inspire a new generation of astronauts, scientists and engineers. This is how we came up with the idea of including facts about real life spacecraft on the boxes and creating a series of models which we could send to space aboard a real Space Shuttle"

His favourite set in the range is the 3368 Space Center: *"It carries on the heritage of a long line of great LEGO Space themes, keeping some of the classic icons that have come to define LEGO Space, while adding some new, unique touches to bring it up to date."* The set has a large number of cool play functions such as the elevator, refuelling pipe, a large countdown clock and a mission control center, complete with a classic red telephone! It also includes both a male and a female minifig and the top of the big rocket can hold either a satellite or launch one of the astronauts into space. [2]

Experiments and activities

During the STS-133 mission NASA organised a Tweet-up event, allowing a select group of people to interact directly with the crew on board the Discovery. At this same event, Daire McCabe gave a presentation showing some of the sets that would accompany Endeavour on its final mission and explaining some of the concepts behind sending LEGO into space. The largest model that has been prepared is a reproduction of the ISS itself. Building it on earth turned out to be more complicated than expected. The real structure takes up roughly the size of a football (soccer) field, and weighs about 450 tons. The LEGO replica is almost impossible to build on earth. It requires as many as 5 people to hold different parts of it to avoid it coming apart. In space however, in microgravity conditions, no such complications exist. Even so, the set is so big it has been packaged in two separate containers for assembly in the ISS.

Other constructions that have been sent to the ISS include reproductions of parts of the interior of the Space Station and a number of scientific projects that will highlight the differences between how objects behave on earth and in the micro-gravity of space. In total 30 different LEGO sets and experiments have been taken to the ISS and 3 more will follow, likely early in 2012.

It may seem like something trivial, but conditions aboard the ISS need to be perfectly controlled and micro-gravity ads complications that do not exist in other environments. To this end she also participated in the design of the system to avoid any small pieces from floating off into the ISS. In addition to simplifying the construction process (instead of having over 60 small bricks to assemble, the pieces have been pre-built and glued together several larger chunks) special polymer building bags, also called glove-boxes (or 'containment systems' in the NASA jargon)have been designed in order to build inside a transparent bag.

But there is more to this than just building a LEGO set in space for the first time. As NASA puts it in its research summary [3]: *"The construction process and activities with the sets demonstrate the challenges faced when building things in the microgravity environment of space."* One factor is speed. What may seem a simple task in normal gravity on Earth can take considerably longer in the micro-gravity environment of space. Overcoming the clutch power of a LEGO brick may sound trivial to you, but in micro-gravity you cannot use your own weight to overcome that force. There are also other ways in which micro-gravity affects how things work. In addition to the LEGO City Space sets, a number of experiments built by LEGO Education will be tested to show those differences. The building process will be filmed and posted on the LEGO space. com website. This footage will serve as part of an educational package that LEGO is preparing for the classroom and which will include worksheets for the students who will observe how things work in space and then duplicate the experiments in the classroom to see the differences.

In the words of Leland Melvin, NASA's associate administrator for education, *"These projects not only foster creativity but also instil in the young builders a real sense of the engineering and design principles that NASA uses every day. Fun learning activities like these can help inspire kids to become the next generation of explorers."*

Take dimensions. How big is the Space Shuttle? Well, the cargo bay of the shuttle could hold a standard American

School bus. And since the objective of these exercises is to visually demonstrate things, a scale model of just such a bus has been built that can fit nicely inside the cargo bay of the LEGO® Space Shuttle. Space may be vast, but the living and working space aboard the ISS most certainly isn't. Again, to make these dimensions more real to students, the astronauts aboard the ISS will be using a Trundle Wheel to measure some of the dimensions on board the Space Station, so students on Earth can replicate those measurements and see exactly how 'spacious' things are up there.
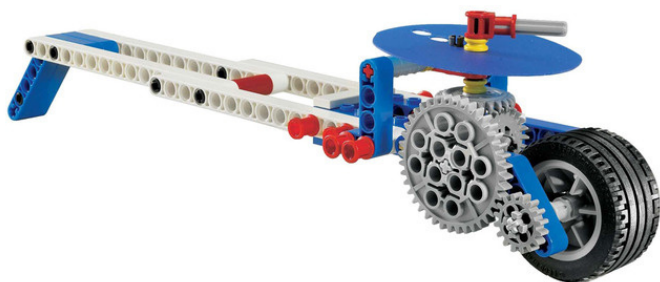
Other experiments are less technical, but still involve getting students to think about the challenges and opportunities of space. A set of six different types of satellites has been sent up. Satellites perform many everyday tasks we have come to rely on, like providing data for weather forecasts, GPS localization, or TV and phone signal carriers.
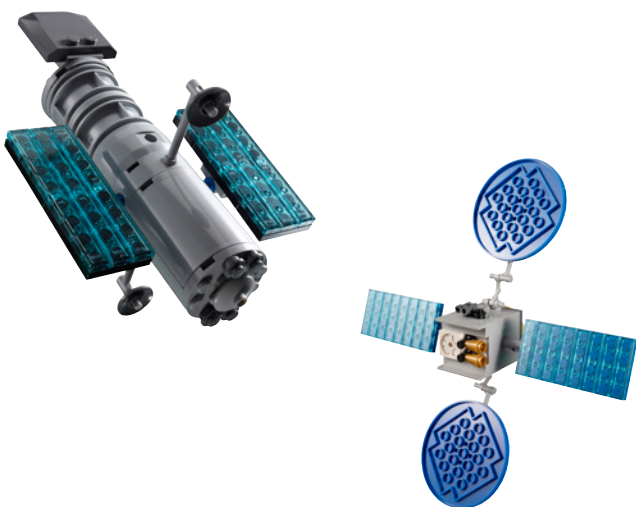
Scale models of ISS living quarters have also been prepared to give an even better understanding of what life is like aboard the space station.

It took some time for the project to take off, first of all literally. STS-134 was delayed several times and so the program could not start when originally planned. But although it was delayed it was not cancelled and the first wave of sets is now in space and the astronauts who will be doing the experiments have been chosen as announced on the blog of LEGOspace. com [3]. On the same website the activities and videos will be published … in due time.

LEGO has made it into space… once again!! and this time it is ready to get more out of it than ever, but the interest LEGO

takes in space doesn't finish here nor is this project in any way 'complete' yet. So keep an eye on the LEGOspace.com website to see what's new and we'll make sure to give you an update in HBM as well when the time is ready.

[1] The LEGO Space Shuttle that went into space on mission STS 134 has been made available as a LEGO set 3367 and is part of the LEGO City Space range. In addition to the shuttle it consists of a Moon Buggy (3365), a Satellite Launch Pad (3366) and a Space Center (3368).

[2] a full interview with Dair McCabe was published in DMAG, some extracts of which have been used in this article.

[3] www.nasa.gov/pdf/538352main_sts134_presskit_508.pdf

[4] Ron Garan, Mike Fossum, Dan Burbank and Don Pettit have been selected for this task and their bios can be accessed through links on the legospace.com website blog.

Thanks to: Andrew Arnold from TLG
Tormod Askildsen for the LEGO Discovery information.
#

LEGO® DISCOVERY

It is not the first time LEGO® includes facts about space with its products. In 2003 LEGO launched the LEGO Discovery series which resulted from collaboration between LEGO and the "Red Rover goes to Mars" project [1] of the Planetary Society [2] which in turn worked together with NASA. For the products of this theme, TLG established a direct relationship to NASA HQ and the Jet Propulsion Laboratory (JPL) [3] and also with Boeing regarding the Delta 2 lift rocket. Similar to the LEGOSpace. com initiative the objective was to stimulate children and young people's interest in space exploration. To this end LEGO chose some of the models that would appeal most to the imagination of its audience, including the ISS, two mars rovers, the moon landing and the Space Shuttle. Inside the instruction booklet of each set significant details of each of these structures were included.

As part of the project, TLG and the Planetary Society teamed up to run a contest to name the two mars rovers. The competition was won by a 9 year old girl from Arizona in the US. She had proposed the names "Spirit" and "Opportunity". As a token of this collaboration, representations" of three LEGO bricks and a LEGO Minifigure are attached to the rovers wit magnets and these are now on Mars!

[1] http://www.planetary.org/programs/projects/red_rover_goes_to_mars/
[2] http://www.planetary.org/home/
[3] http://www.jpl.nasa.gov/

NXT Space Shuttle and Hubble Telescope

The Symbols of the Conquest of Space

Text by Jetro
Pictures by Andy Miluzzi and Matthias Paul Scholz

The Space Shuttle is probably the most complex machine ever built, and one that sparks almost everyone's imagination. It was awe inspiring when it was presented, 30 years ago, and has become iconic in our current conception of space travelling.
The NXT Space Shuttle, though not nearly as big or complex as the original, was built as a tribute to this icon and is remarkable in its own way. Wanna take a ride?

Zwolle, October 2010 – during a brainstorming session at LEGOWORLD, the MCP huddle around Steven Canvin, the LEGO MINDSTORMS Community Manager, to propose and comment ideas. Suddenly someone says: "wouldn't it be great if we could build a cool large scale model or something

we could present and give to NASA!" Almost immediately the Space Shuttle was proposed, with solid rocket boosters (SRB), an external tank (AT), the mobile launch platform and the crawler… no lack of imagination there.

After the initial positive feedback, Andy Miluzzi, who proposed the idea, opened a thread on the MCP forum to poll who would be interested in participating in the project and how it could be carried out. In his own words: *"I have always been a fan of the United States space program (NASA). As I am sure you know, NASA has been critical to many technological advancements we now take for granted. For example, the cordless drill is a direct result of NASA work. As a result, some of the technology behind LEGO® MINDSTORMS has come from NASA.*
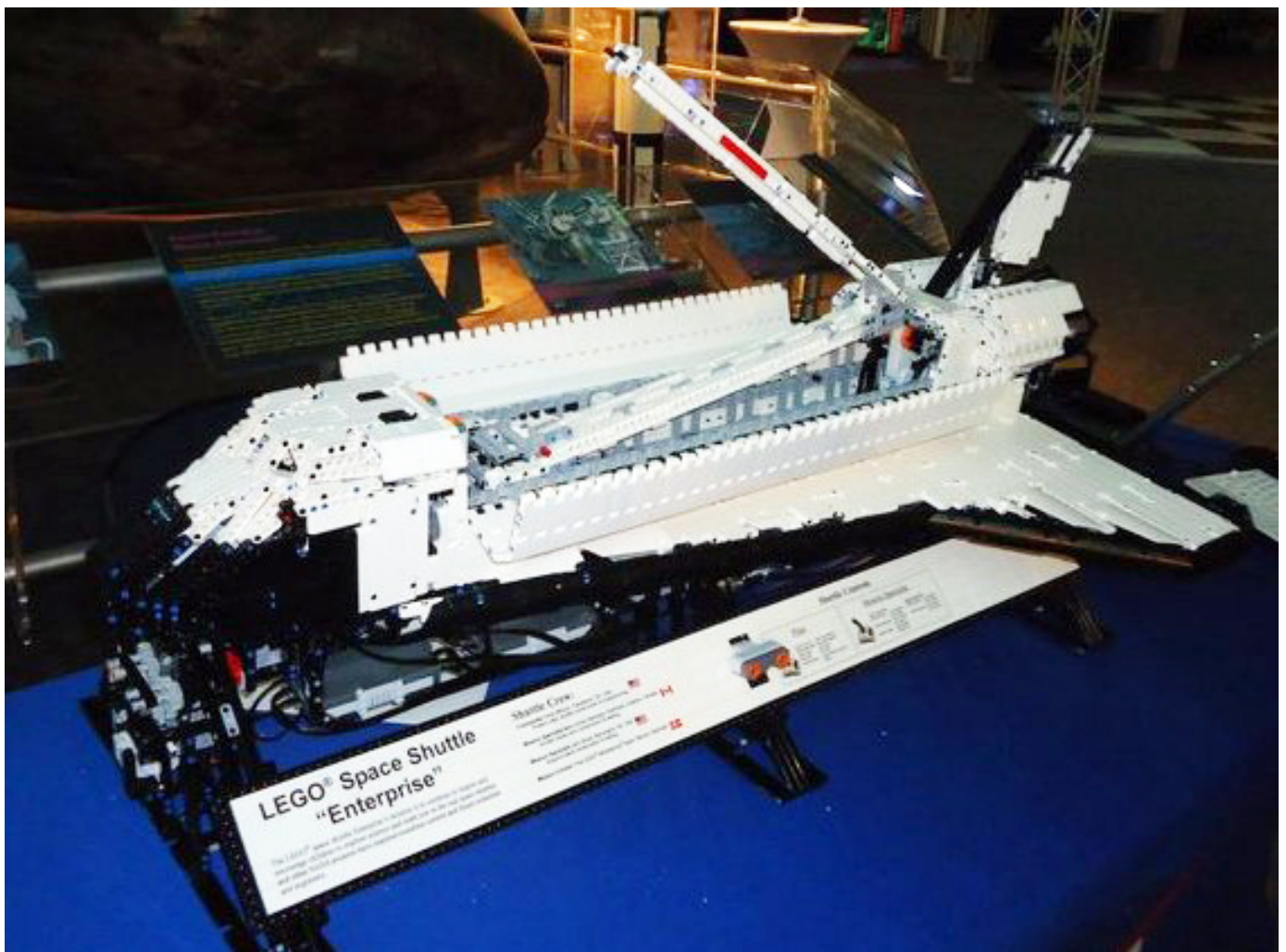
John Brost was in charge of building the support for the shuttle. *"The design changed very little from the initial concept ideas. Basically we wanted a single long beam that the shuttle would attach to. At each end this beam would be attached to a leg that would let the beam rotate, thus allowing the shuttle to "fly". I also wanted the entire structure to be as small & hidden as possible so as not to detract from the shuttle itself. Lastly, I had learned from the last large project I worked on (Monster Chess) how important it was to be able to break things down for transport, so I wanted to design the support stand so it could easily break down & be put together again.*

The design of the beam was going to be central to the design of the stands, so I started there. I quickly discarded a triangular truss design as was too large (cross section) and really didn't have the structural rigidity that was required. My next design, based on the LEGO Technic frame and flat panel pieces, was much smaller and much more rigid. It became the final design for the support beam. However, in testing I found that a single beam of this design wasn't rigid enough to span the shuttle entire length. Therefore, I modified the design to include a third support leg in the center of the shuttle so the beam only had to be half the length.

For the leg I went with a triangular design, again keeping with the idea to make it as small as possible. The use of the turntable pieces and the system for driving them to make the beam rotate is my favorite part of the whole build. A turntable is fixed to each end of the beams. Each support stand has a slot that the other side of the turntable is set into. On the underside of the turntable are four z16 gears that drive the outer ring of the turntable, causing the beam to rotate. These z16 gears are driven through a z24 and worm gear reduction by a NXT motor. This arrangement is duplicated on each end support stand. The central stand is not powered.™

Continued discussions with Andy during this part of the design phase revealed a need for a place to put the 4 NXTs that were to power the shuttle & stand. I realized that I could hang them underneath the support beams where they would actually act as a counter-balance to the shuttle attached above the beam. The nameplate/marquee on the front was a last-minute addition. First and foremost, it gives us a place to put information about the model and thank those that helped out with it. Second it helps to keep the three support legs aligned when installing the support beams during re-assembly.

The stand breaks down into 7 components (3 legs, 2 beams, and the nameplate splits into 2 pieces) and it is a snap to re-assemble. It also functions well, it is able to support and reliably move a shuttle that weighs about 12lbs, while only using 2 NXT motors all while being somewhat small & lightweight so as not to detract from the shuttle itself."

I thought it would be cool to pay tribute to the shuttle fleet, which retires in 2011 and thank NASA for all they have given us." Other motivating factors included that it would be a way to thank NASA for the inspiration they've given to many people over the years through the space program and use LEGO as a way to help continue to inspire kids through the display of this model.

It took some time to take stock of the possibilities and decide what direction the project should take. Building a massive model of course has the immediate wow-factor, but LMS is all about robotics and being able to interact with the model was a first requisite for the design. It takes the crawler on top of which the complete launch stack (Shuttle + SRBs + AT) about 6 hours to cover the 3 miles from the vehicle assembly building to the launch pad and replicating that in scale with LEGO®, although impressive, would hardly be very attractive to watch, and hard to interact with. In the end, the construction team, made up of Andy Miluzzi, John Brost and Marc-André Bazergui, decided to build an interactive model of the Space Shuttle with lighted engines, working flaps, ailerons and rudder and cargo bay doors that open and close to deploy the fully functional Canada Arm.

The shuttle was built without any blueprints. *"To construct the shuttle, I knew the rough dimensions and looked at pictures from shuttle launches and landings"* says Andy, who is a huge NASA fan. *"Much of the design was how I thought of the Shuttle."*

When Marc-André Bazergui was asked to participate in the project he jumped on it. *"I offered to build the Canada Arm – being Canadian myself – and my proposal was promptly accepted. The arm seemed like such a simple idea but I was soon faced with the obvious: it was meant to work in zero gravity! So the goal was to build the longest arm I could before the LEGO gears cracked. This turned out to be very instructive and a fun challenge. Of course, because we are not in space, this LEGO arm can barely lift a minifig let alone Matthias' Hubble telescope!!!*
The key elements where the use of the new 5x7 frames to brace a worm gear onto a large turntable - this turned out to be very strong! I had to put a big weight on my assembly when testing its lift power, as if it was braced into the heavy shuttle. I shipped the arm in sections as I knew Andy would have to shorten my design to fit it into the shuttle, so i made it easy for him!"

The overall dimensions of NXT Space Shuttle are quite impressive: the Shuttle itself was built with around 8000 parts. It is 1 meter long, 40cm tall and has a wing span of 76cm. After extending the Canada Arm the model is about 120cm tall. In all, the model (Space Shuttle, stand and Canada Arm) uses 11 motors, 12 sensors and 6 NXTs. These communicate through RS485 and Bluetooth. The software is written in National

Instrument's LabVIEW. HiTechnic Accelerometer, Gyro, and Color Sensors are used to control the system. It also uses light sensors and touch sensors to limit movements and PF lights illuminate the model.

So exactly how is the model interactive? *"Like any LEGO® Brand kit, we wanted to have a 'play experience"*, Andy describes. *"The model is designed for two people to control the shuttle. They are given a short mission to navigate the shuttle to the International Space Station and replace a broken support. After the pilot has successfully moved the shuttle into position and it is stable, he opens the doors and the arm operator takes over. The arm has to be deployed (an automated process) from the parked position and then it is up to the operator and pilot to ensure the beam is safely placed. Once complete the arm operator has to store the arm and the pilot need to close the doors to prepare for re-entry."*

Not all shows are the same and sometimes how the Shuttle is displayed needs to change. *"Taking the Shuttle to a bigger LEGO show or to a school is a completely different venue. The Shuttle needs to be flexible and allow for both autonomous and unrestricted control. For example, in a school, we can explore how the mechanics of the model work, showing the limits of the sensors and motors. At a larger show, it is much easier to let the Shuttle run itself and look impressive (but it still does some "special functions" when you trip the ultrasonic or color sensors)."*

The model was first presented at Yuri's night (April 16th, 2011), a commemoration of 50 years of space travel, at NASA Langley Research Center. It has since been on display in Local schools, inspiring children to pursue a career in math and science. It has also been to Brickworld and will be shown at a number of other events including the final launch of Space Shuttle Atlantis [1].

Originally the shuttle was also going to feature a scale model of the Hubble Telescope. However, when it became clear that the Canada Arm was not going to be able to lift it, Matthias Paul Scholtz developed it further as an interactive stand-alone model. This allowed not only for choosing an ever bigger scale of the telescope's model (the final model is at approx. 1:25

scale), but also to separate the release date of both models - a very important point considering the tight deadline for the project as well as the fact that special LEGO parts were prepared for the telescope.

So why the Hubble telescope? Matthias explains: *"LEGO robotics in connection with space always has been a special favourite to me. While I never have been that much interested in manned space flight, the idea of sending robots into space keeps bearing a particular fascination for me. So when I was asked to contribute to the LEGO MINDSTORMS NXT Space Shuttle project, instantly the role of the shuttle in transporting unmanned crafts into space came to my mind and I jumped on the occasion to provide something as a payload that had actually been sent into space in the shuttle's cargo bay."*

"Most of the probes that had been transported by one of the various shuttle missions were out of question as they were simply too small to integrate any animation. However, there was one device that did not only meet these very requirements but also holds a fascination that is still unbroken after all its years of service: the Hubble Space Telescope (which incidentally celebrated its 20th anniversary in space at that very point in time)."

Like many other NASA projects, the Hubble telescope has been well documented and much material is available from official NASA sources [2]. Even so there were many challenges in the build. *"A particular challenge in this project was the shape of the real telescope: it consists more or less of two large tubes that are arranged behind each other. Building round structures with LEGO Technic parts alone is not easy. On the other hand, I did not want to use classic LEGO curved bricks which would have increased the weight of the model too much. I ended up with rings of bent beams that provide the latitudinal structure and result in two octagonal "tubes" – a sufficient approximation to the real appearance of the telescope."*

"To make the longitudinal structure, I started with a design that made the tubes an array of these rings simply arranged directly behind each other. This looked quite good, but the resulting structure turned out to be much too heavy and unstable. What's more, it was very hard to attach any devices to it. Consequently, I changed to a more lightweight approach, with the rings only providing a skeleton of the outer hull and longitudinal beams connecting them using the indispensable Hassenpins. The resulting structure was not only much lighter but also much more stable than the first design."

"That way, I was able to attach devices on the inside: the mechanisms that operate the front lid, the antennas and the solar panels. From the pictures one might deduce that the front tube is pretty much crammed with them. This was one of the toughest parts of the building process: designing all these geared devices to work reliably, fit into the octagonal structure and length of the tube and still keep it maintainable from the outside."

"A particular aspect of the model is the colour of the parts used. From the beginning I strived for mimicking the silver-metallic appearance of the original Hubble telescope. There are no silver LEGO beams of the required size and number commercially available; I did not even have enough gray ones at my disposal when I started the project. However, Steven Canvin, community manager at The LEGO Group and sponsor of the project, left no stone unturned to make sure the necessary silver beams were specially produced for this model."
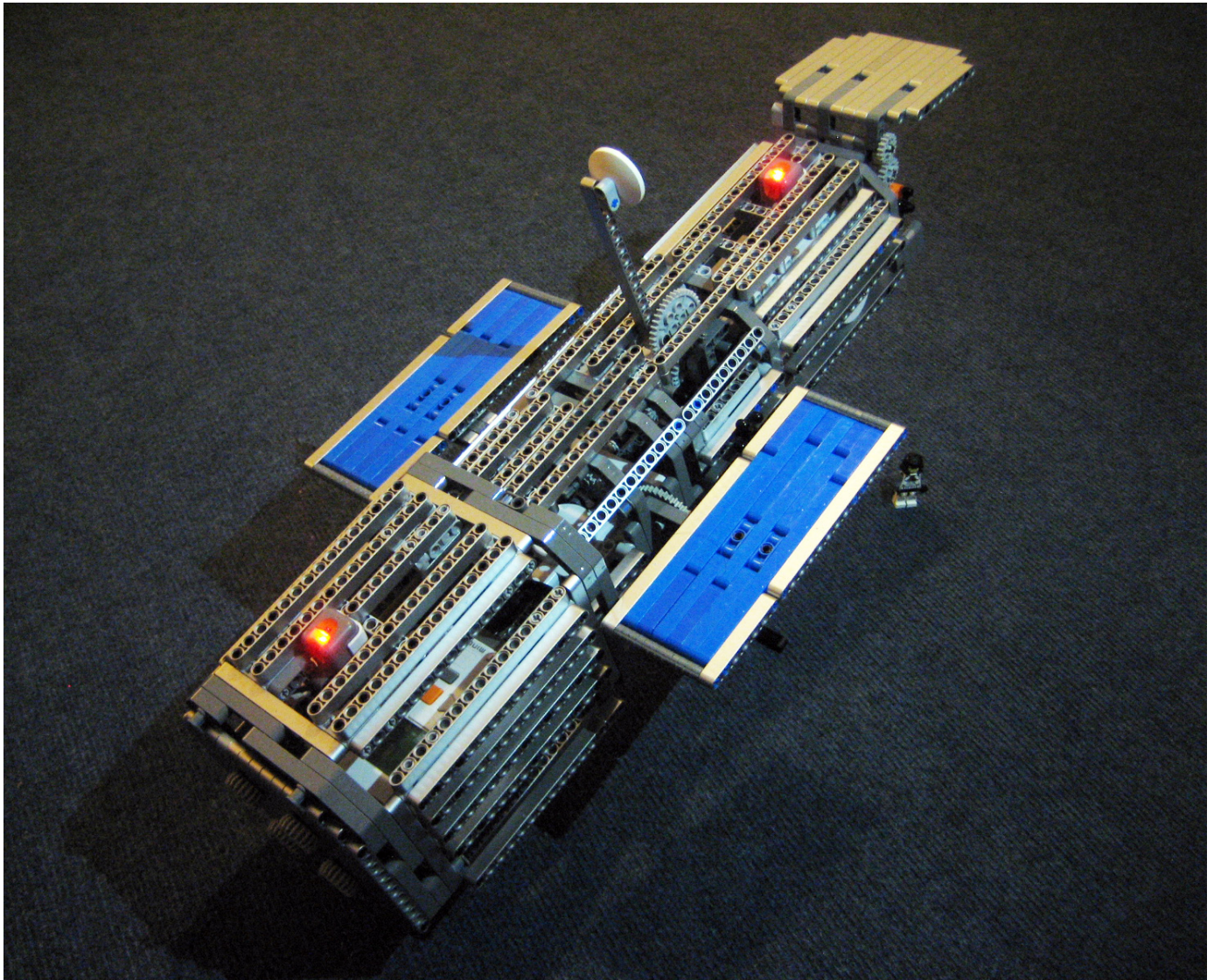
"This was certainly the most challenging NXT project that I did so far, and no doubt one of the most rewarding too. I'd like to take the opportunity to thank in particular Steven "The Captain" Canvin for his ongoing support."

The model of the telescope is 51 centimetres long and 16 centimetres wide, weighs around 3 kilos, and features three NXT motors and two light sensors that are controlled by an NXT.
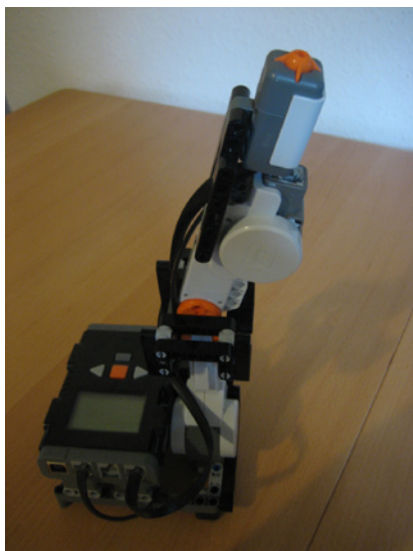
The project is not yet completely finished yet, although the telescope is fully operational and can run in independent mode or be controlled with an NXT remote control. When the project is completed a base will allow the telescope to move in three dimensions, so that visitors can point the telescope remotely into any direction desired. There are also plans for integrating a web-cam into the front of the model in order for the telescope to take pictures and send them to an "earth control station". Due to the state of the project, the telescope model has not been on display yet. However, it will be complete by autumn and will be displayed on several major LEGO® events around the world after that. Interest has been voiced also to permanently exhibit it in technical museums eventually.

As the project advances you will be able to see more pictures and videos of this telescope project on Matthias' website http://mynxt.matthiaspaulscholz.eu/

[1] For a list of locations you can see the NXT Space Shuttle and the LMS Hubble Telescope, please visit our blog or FB page
[2] see http://hubble.nasa.gov/ and http://www.nasa.gov/mission_pages/hubble/main/index.html
#

# Rosetta's comet touchdown: LEGO® in space

By Maarten Roos

An idea

In October 2009 I sent an email to media@lego.com. I had an idea for a series of educational films about Mars exploration, and for one of the films I wanted an engineer and a scientist to build a big Mars Rover out of LEGO®. Well, I never made the Mars films (did not find financial support), but I did film LEGO, a lot of it!

A few days after my first message, I received an enthusiastic reply from Steven Canvin, the LEGO MINDSTORMS Marketing Manager at the time. It was so enthusiastic that I decided to go and visit him.

In the meantime, a science colleague of mine pointed out that people at the European Space Agency (ESA) had been using LEGO for some time to help them plan space mission operations, in particular for the Rosetta mission (http://sci. esa.int/rosetta) and the Venus Express mission (see http://sci. esa.int/venusexpress). So I found Detlef Koschny, a planetary scientist at the European Space Research and Technology Centre (ESTEC / ESA) in the Netherlands, who had been building small models of those missions. A few days before I went to Billund, I managed to visit Detlef, and recorded a short interview with him (LEGO in space mission operations).

The conversation with Steven was short (he seems always in a hurry :-)), but effective. He introduced me to LEGO MINDSTORMS (I had never heard of it) and he said he wanted to develop something using LEGO MINDSTORMS related space exploration, something that can be shown on interactive exhibitions, or used in class rooms, etc.. He gave
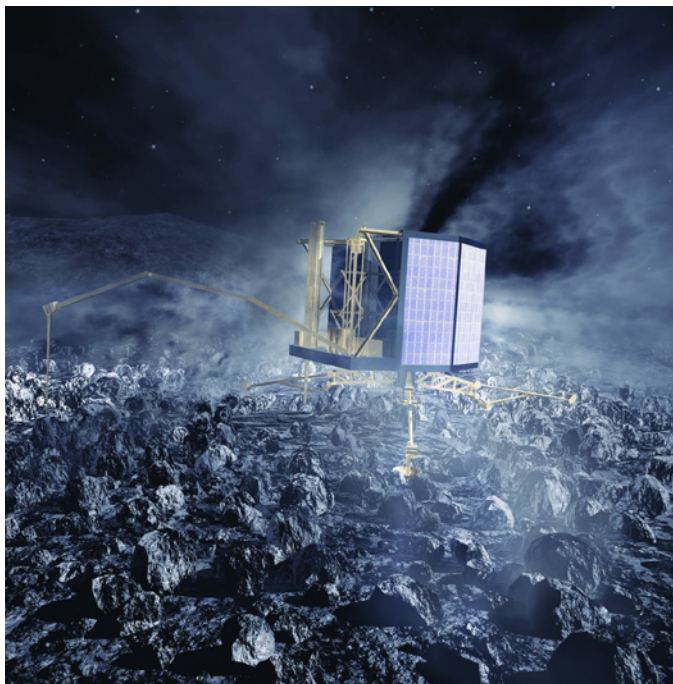
me a MINDSTORMS box and I left. During the 11 hour drive back from Billund to the Netherlands, I thought about our conversation and a concept grew in my mind: an educational kit with LEGO MINDSTORMS, from which students can build a model of a real existing spacecraft that mimics some of the functionalities of that spacecraft. But which spacecraft should it be?

The next day I went to ESTEC again and gave Detlef the MINDSTORMS box. We discussed the idea and Detlef suggested that probably our best bet would be to take the Rosetta Lander: it is small, it can stand (not just orbit around a planet as most other space missions) and it is now on the way with the Rosetta mission to a comet (named 67P/Churyomov-Gerasimenko). Rosetta will arrive at the comet in 2014. If we developed this idea now, and bring the kit on the market, then we could also bridge the three-year long sleeping period that Rosetta would be put into from mid-2011 until mid-2014, and during which no media attention was expected. This way we could keep the mission alive in the minds of the public.

I asked Detlef if he could make something using the content of the MINDSTORMS box. Ten days later I visited Detlef again, and he had indeed built a first model of the Rosetta Lander, together with his son Julius. The model could rotate and had a drilling function, all controlled by the NXT computer. I took my camera out of the bag and recorded another interview with him (The first LEGO MINDSTORMS model of the Rosetta Lander).

With all these ideas and tests in hand, I drafted a project on paper, in order to help find support to make it come true. I first found support at the German Space Agency (DLR), from the people of the communication department. ESA also showed interest and we submitted the project for support from the European Planetology Network (EuroPlaNet) outreach programme. LEGO also entered as a sponsor. Early April 2010 we got a final OK from all these organisations and we were on the way to make our educational kit.

The Rosetta´s Comet Touchdown Kit

At this point in time, we started to create all the elements of the Rosetta's Comet Touchdown educational kit., a kit around the theme of cometary exploration and using LEGO MINDSTORMS. The idea was to officially present it during the European Planetary Science Congress (EPSC), organised every year by EuroPlaNet, one of the sponsors. After that, it would be tested by a class at a school to see how it works in a real learning environment. The target group are students 15 years and older (no upper limit!).

The kit is composed of three elements:

1.- A demonstration model of the Rosetta Lander;
2.- a series of films with background information about comets and the Rosetta mission;

Building the lander model (by Martijn Boogaarts)

A special mail from Steven Canvin came to ask if we could build a functioning LEGO® MINDSTORMS model of a lander that had to show its actions during both a movie shoot and on events. Such a task is not simple, since most of the things you see in the movies are faked, and have to be repeated over and over again.

As a group of expert builders we said "sure we can" even before we realized what the whole assignment would mean. We started by getting information about the real lander and also the requested movements like turning, drilling, measuring the temperature and deploying the landing feet. As a good start you just take all the key elements (motors, sensors and the NXT (computer brick) and just pile them up to determine a basic size of the model. That will help you in developing other parts like the feet. Since the landing gear should be strong, sturdy, deployable and interlocking when fully extended it was important to start with that.

A three legged shape is not easy to build with LEGO since most the structures are square, or 4-side based. As a good thing there is a small pulley wheel with 6 holes, which gave us an option to build three legs around a center column. Eric, Gerrit and I started building with a large pile of technic parts and showing the others what we had invented, trying to impress the others with all the good designs but also understanding that we needed to take the best design in the end. It took us about 20 legs to get to a final version that was
strong, auto interlocking and even had the drills implemented, not with wires, like the real version, but with a differentials.

Since all of us have a good view on what LEGO parts did and still do exist we quickly found that there was a nice part, used about 3 years ago in the mission to mars series, that could act as the drill. A small Bricklink order was placed and a few days later we could implement the good looking drill. After the legs were stable it was time to move on and start with the body, with less than one week to go we still needed to work hard to
get all the functions inside the main hull. As a special feature we wanted to use real LEGO solar panels but unfortunately they did not fit as well as expected and we only had the older green version, since the newer version was not yet available. Some black plates and blue 2x2 tiles looked almost real. For the outreach arm that holds the temperature sensor (a rock drill in the real version) we could not determine how it was done form the drawings and the movie of the moc-up model, so we just implemented a swing with the longest possible axle (16 long) that would still fit inside the lander. Later we learned that it was actually a flat band rolled up like those measurement tapes, and when extended, it would curve like a tube, so it gained all the stability needed to support the weight of the drill. Unfortunately that is not buildable with LEGO parts.

On the first day of the movie shoot we drove to the studio with several boxes full of 2x4 bricks a lander and a large box of assorted spare parts, just in case. This was a really good idea, since we found that we did not implement most of the technical measurement instruments, because we as LEGO builders just did not consider those parts important to build.

While shooting some other parts of the movie we started to build and added 4 more sensor mocs to the lander. While building we discovered that the turning mechanism was not working as expected, resulting in a major inside rebuild. The first shots were already done so we could not change the outside as you would see the difference in the final movie. Just in time we got the model working and we could start making the shots showing its functions. Then it turned out the robot did not perform its functions at the moment they were needed in the film, so we ended up compiling, downloading and starting small sub programs via the Bluetooth link, almost as a remote controlled vehicle.

Building a model like this calls for a lot of creativity, and we were inspired by new ideas designed for true space travel. Remember that the real lander has to work after several years of flight, in a situation that has never been tested before.
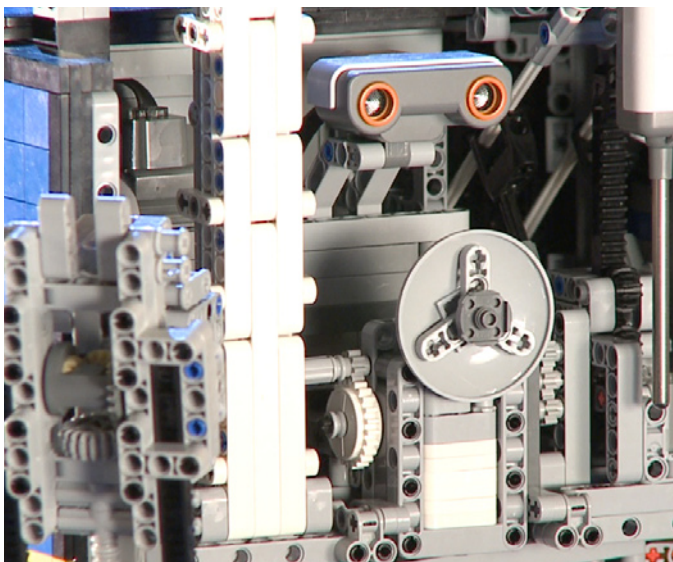
3.- a set of Interdisciplinary Activity Sheets containing suggestions on how to use the kit.

The main film would be about comet research and the Rosetta mission (science and technology) and would feature the demonstration model. So, the demonstration model had to be made. Steven Canvin brought me in contact with Martijn Boogaarts, Gerrit Bronsveld and Eric Steenstra, three LEGO® MINDSTORMS experts, living in the Netherlands. How lucky I was! I visited them late April 2010 and they were immediately full of enthusiasm and said they could make a model. From that day on until the day of the filming of the main film mid July 2010, I went to visit them regularly to see and film their progress. Detlef also came on one of these occasions and showed them his model. I finally edited a 30 minute film of that process, Making the LEGO MINDSTORMS Rosetta Lander.

For the main film, I first wanted to have a huge comet nucleus from LEGO for the background. Already at the very first
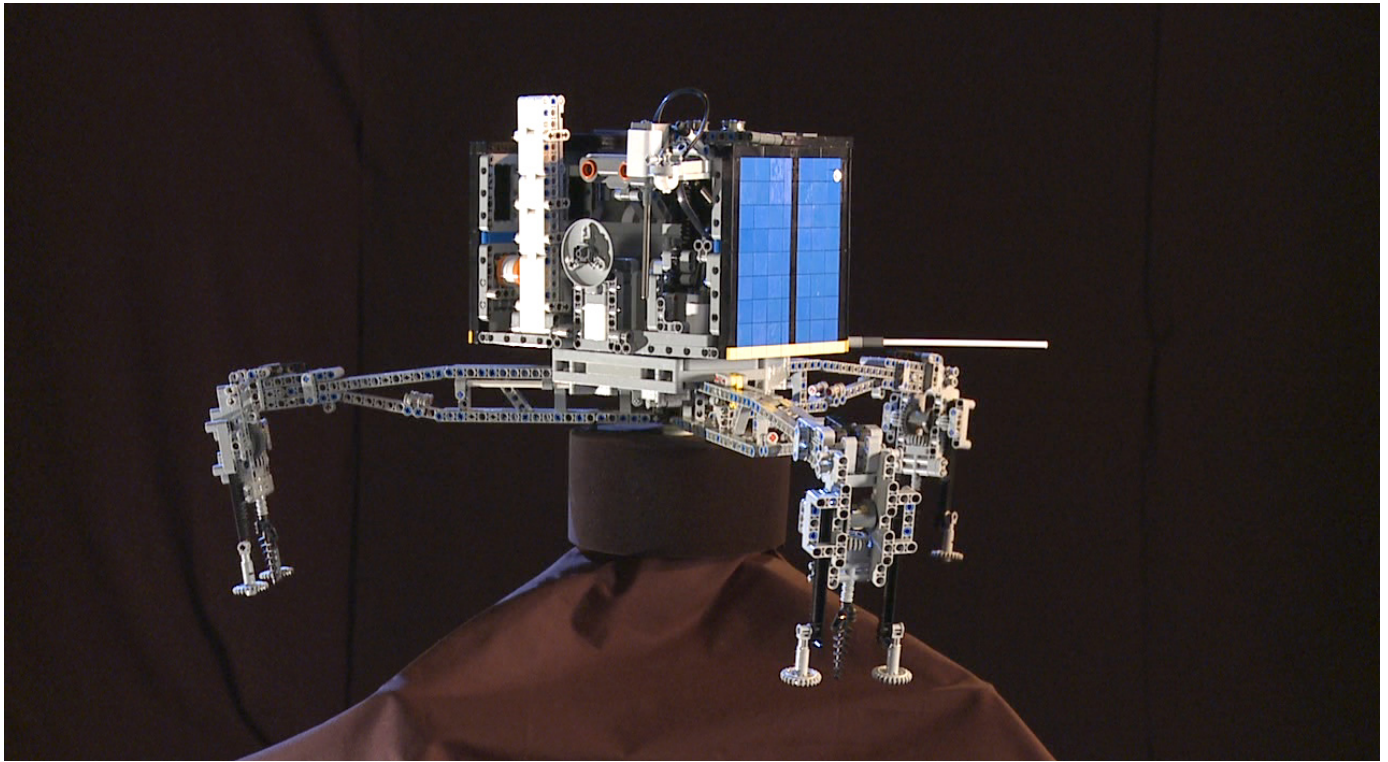
meeting with Martijn, Gerrit and Eric, I realised that that would be rather complicated (and very very heavy!). We found a more interesting solution, namely to make a comet surface landscape out of standard 2x4 LEGO® bricks. We quickly tested this idea by dumping a box of LEGO on the floor in Gerrit's building hut (see the intro of the Making Of film), and we realised that it would work. We just needed the right colours (dark for rocky material and white for the ice). For the film we needed a rather large surface and thus in the end Steven sent us some 40.000+ bricks! The main film opens us with dumping them on the table.

The two film shooting days were very intense, but in the end I got all the necessary material and a film could be edited. In the film planetary scientist Dan Andrews (Open University, UK) and Engineer Ulrike Ragnit (ESA) told the story of the comet and the Rosetta mission. This became the Rosetta's Comet Touchdown film.

The kit was officially presented during the European Planetary Science Congress (EPSC) on September 21, 2010, in Rome. I got a lot of help from local people to organise the event, and I thank everyone involved. Steven Canvin sponsored the event by sending a couple of LEGO boxes.

Twelve student of aerospace engineering (3rd year) and 3 students of design (European School of Design) were interested to participate. By chance Martijn Boogaarts was also in Rome. He brought the demonstration model and participated in the event. Detlef also participated.

The Rosetta's Comet Touchdown film was screened, followed by an explanation by Martijn Boogaarts. The aerospace students were invited to build their own model, while the art students were making a work of art around the theme. They did what they could in a short time (three hours). See the report The kit first tested!

The kit tested

At the moment the kit is being tested by students at two

secondary schools: the Bocage Secondary School in Setúbal, Portugal and the Szechenyi Secondary School in Sopron, Hungary. Both have received the Interdisciplinary Activity Sheets, background materials (technical and science papers, three basic design drawings of the Rosetta Lander, transcription of the text of the main film), LEGO® MINDSTORMS® and LEGO® TECNICS® truck boxes.

In Setúbal, three physics teachers are guiding the students: Filomena Rodrigues, Fayaz Bahadurali and Sérgio Lopes. At this school, a group of about 30 students is working on different aspects of the kit. The students are ages 16-18. The results will be presented to the entire school before the end of the academic year.

The activities are:

- Model building, (15 students);
- Large painting / graffiti on the theme of comets and Rosetta (10 students);
- Comets in History, (1 student);
- Working the English text of the films and writing an essay about it (entire class of 30 students).

In Sopron a group of 16 students (age 15) finished their activities and presented the results to their school in the beginning of April. Several teachers were leading the project: Ágota Lang (physics), Csaba Robotka (history), Gabriella Nagy, Bazsóné (arts), Mónika Stenger, Kovátsné (English). The students divided up in teams:

- The History team (4) did a research on how comets appear in Hungarian culture;
- The Arts team (4) designed a T-shirt for the whole group. The T-shirt shows several elements of related to Rosetta (the Rosetta stone, the spacecraft, and a comet nucleus with the shape of Hungary!);
- The Science team split up into different sub groups:
     a- One group (2) did research on comets, on the history of comet observation and on the instruments of Rosetta orbiter and Rosetta lander.
     b- The other group (3) created an animation with a

software programme called "Imagine Logo" about the trajectory of Rosetta spacecraft to it the target comet 67P/Churyomov-Gerashimenko;

- The LEGO® building team (7) followed their own creative ideas about how a lander should look like. They developed a four leg lander with a square body, containing several instruments: a temperature sensor, a gravitational acceleration measurement device and a gas-sensor.
- One student recorded all our advances on camera (film and photo) and edited a film of the all the activities. This film Have Fun can also be seen on the VIMEO channel.

In addition, since on the Rosetta space probe there are Hungarian instruments and contributions to instruments, they visited the Space Research Group at Budapest University of Technology, who worked on the energy supply of the landing unit, and two other teams at KFKI Campus (Research Institute for Particle and Nuclear Physics and Atomic Energy Research Institute) in Budapest. The scientists gave us short presentations about their work and their instruments and afterwards the students were shown the spare copies of and visited the labs. The results of this test are very positive... [1]

Other events

The LEGO® MINDSTORMS® Rosetta Demonstration Lander was shown on two further occasions

LEGO World Zwolle (October 20/27, 2010)

The LEGO® MINDSTORMS® experts had the Lander demonstration model during the whole week on display at the LEGO World Zwolle (the Netherlands). Maarten Roos had prepared a loop-DVD with Dutch subtitles and the films were showing non-stop on a screen next to the set-up.

Expert Eric Steenstra comments:

We played the DVD every day on the two screens. We have an amplifier for the sound in surround! The barcode visible is a direct link to the VIMEO channel and you can read it using an iPhone or Android phone app. Many people did! The bar-code is of course also made out of LEGO bricks.

We received many nice reactions. A team from National Geographic came and took some images of our creations (and other things at the LEGO World event). They are making a film to be transmitted somewhere in April or May next year.

European Parliament Dinner Debate

On February 3, 2011, Martijn Boogaarts (LEGO® MINDSTORMS® expert) brought the demonstration lander to Brussels into the European Parliament at a dinner meeting about Europe's future role in Solar System Exploration. Maarten Roos prepared 15 copies of the DVD which were distributed at the same occasion. A detailed report of the event is found on the EuroPlaNet website at http://www.europlanet-eu.org/outreach/index.php?option=com_content&task=view&id=321&Itemid=41

Further Developments

The next step it to see how this kit can be implemented on a larger scale. The current status of the testing at schools is positive. A meeting between LEGO, ESA and DLR is scheduled for the near future to discuss it.

[1] The full report on the Hungarian project can be downloaded from: http://www.europlanet-eu.org/outreach/index.php?option=com_content&task=view&id=330&Itemid=84

All the films mentioned in this document are on http://www.vimeo.com/channels/rosettascomettouchdown #

Sandcrawler
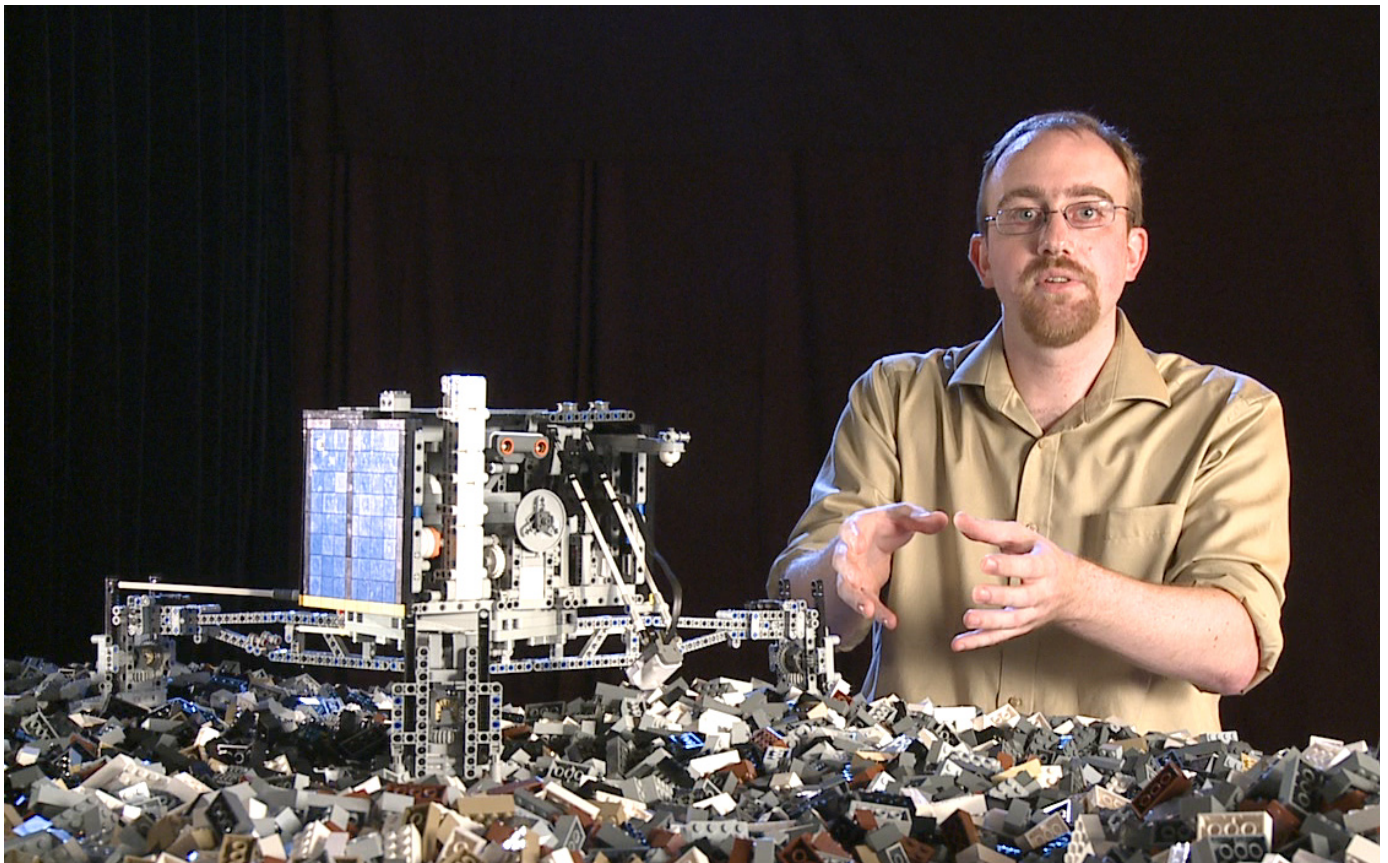
Moving rusty rock

By Hannes Tscharner

Somehow I always liked this slow moving bulky vessel as I saw it the first time in "A new hope". Its clear lines and its massive size stand against the force of the sand and winds, even in the harshest of desert conditions of Tatooine and keeps its small inhabitants safe. It's actually more than just a vehicle, it's a moving town. The Sandcrawler was originally used in its earlier days for mining purposes and was long abandoned before the Jawas rediscovered it as their new mobile headquarters, shops and homes.

More than its adventurous background I love the design, the sharp edges and the proportions of the model, a lot and I have always thought that the Sandcrawler never got as much love from the community as it deserves.

The plan – a monster is born

I was planning the build long before I even put one brick on top of the other. First I bought a copy of the official 10144

Sandcrawler set. It was a fun build and included a lot of playability and fun details, but overall it shows a low level of accuracy compared to the real thing. But there was no holding back for me – I bought the last two copies of the set at a local store on sale – a good start for my MOC! Then I just had to order all other required parts – in the end over 10'000. A packet from Sweden was the furthest away I got my bricks.

Firstly I researched pictures of the original studio filming model. It was easy because this is probably one of the best documented models of the entire Star Wars™ saga. I wouldn't start a project this size if there already existed an unbeatable MOC. Star Wars™ is a quite favored theme (not to say, worn out), so there are some really nice fan models around. I was aiming for a model with new aspects to set my project apart.

It should be both accurate looking – as close as possible to the studio model – but also stocked with fancy features like accurate lightening, power functions and a detailed interior. In the end my goal was to create a model with no compromises!
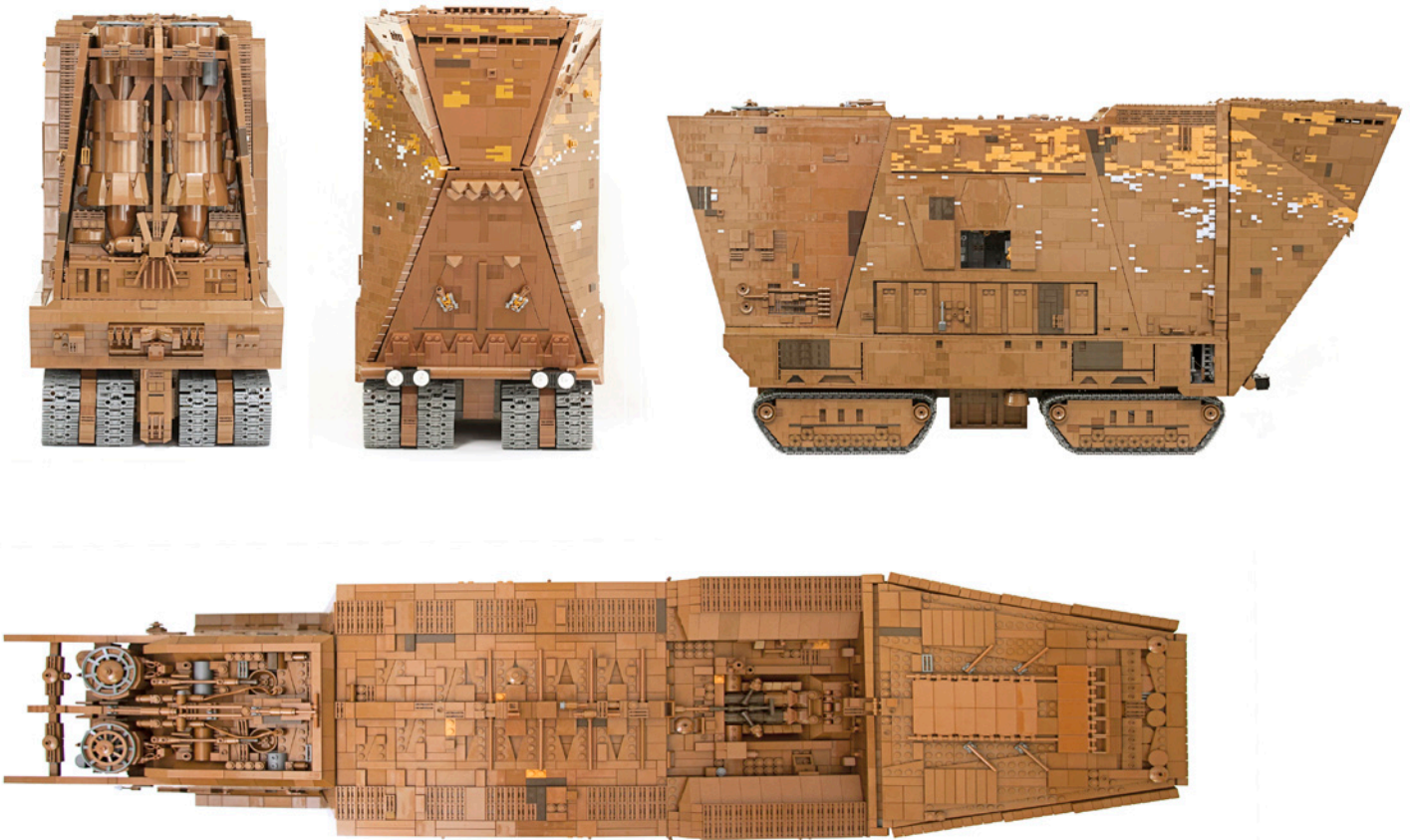
The build – how to become 10 years older in just 9 month

The model itself is not a very complex designed – it is just a big brown box! That was also my first thought, but there are more unusual angles than you may think at first sight. Untill I was finally satisfied with the result, I ended up rebuilding the whole model three times and the most difficult bits many more times during the process. I'd like to tell you more about three important spots:

The back: one of the flashiest details are the two large cylinders, actual the power generators of the vehicle. I found a solution with curved slopes connected with snot adaptors on the greebly base plate. The cylinders are sticking through the roof and ending in different designed fans or exhausts.

The front: the forward sweep of the crawler's body is probably one of the most complex parts of the build. It consists of irregular angles. I had decided to build all panels with bricks instead of using plates – this decision didn't make the whole endeavour easier, not at all! It might sound ridiculous, but achieving the proper angles took me weeks of developing and trial and error.
But I found a solution to link them with multiple hinges and jumper plates and in the end the result was an astonishing sturdy – and more important – accurate front.

Wall pattern: I achieved the rusty and weathered appearance of the walls with different shades of brown and the use of dark orange and bluish grey splashes as seen on the original model. Some of the bricks are placed studs out to add more
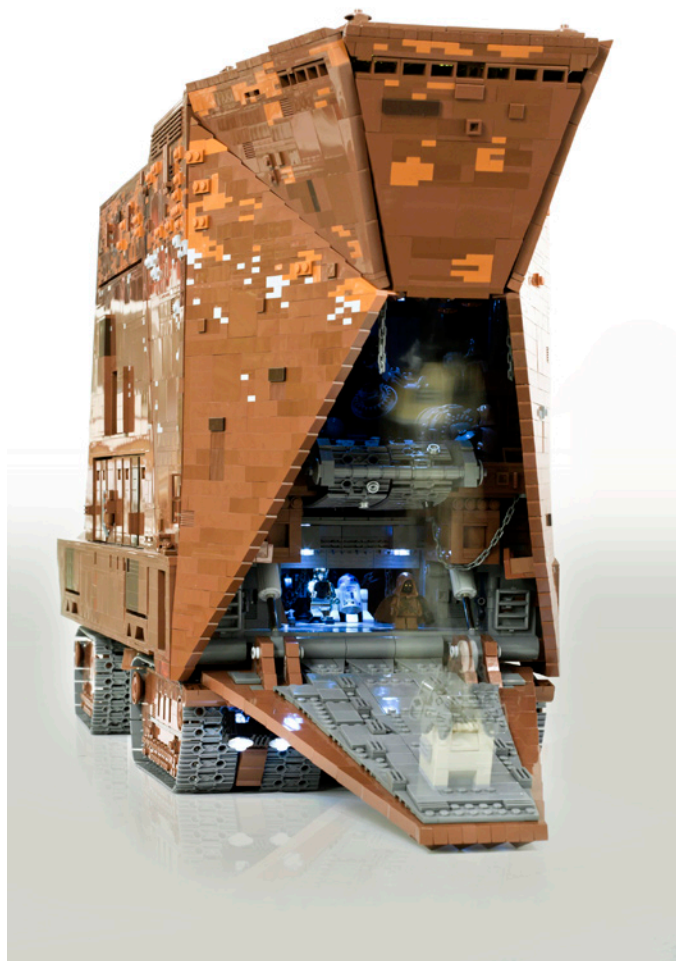
depth. Reddish brown is probably the most inconsistent color – one color, a thousand shades! But for my model that's ideal, therefore it was possible to get a naturally appeal.

The functions – ok, now it becomes crazy

The biggest challenge of the project was to include all the ideas and functions I had for my Sandcrawler. If you are not excited yet, then you will probably be now!

One of the main features was to create a fully working remote controlled driving and steering mechanism powered by 4 geared down Power Functions XL-Motors. Because of the final size of 100.5 cm and the enormous weight this was quite a crazy intend. Not only were there four sets of double tracks, with a total of 360 treads, they had to match on the gearboxes and had to work. I decided to use only official LEGO® parts. So the gearboxes and treads are under high stress and they are running close to the limit of the material. Therefore I had to adapt my concept to include the possibility for an easy maintenance and repair. All crawlers are connected with just two axles to the main frame of the model so it's easy to remove them.

The steering mechanism is designed as simple as possible. Because of the restrictions imposed by weight and length, there was no room for a complex mechanism. Here I took the same technique tanks use in real life: one pair of crawlers is turning in one and the other in the opposite direction, so the Sandcrawler turns on the spot – simple!
The next huge task was to design a working main ramp. The

mechanism had to be compact to leave space for the interior. I used two linear actuators and two M-Motors. Both are hidden in the floor. It was essential to find the right pivot point of the ramp to match all angles nicely together after folding the ramp up.

I also decided to include a working conveyor belt on the second floor, an important detail of the workshop. It carries all charges into the back of the assembly shop and to the smelter. The big crane picks up charges from the main ramp and takes them up to the second floor on the conveyor belt or directly into the back of the main hall.

Interior

The interior is placed in the front half of the model and contains three floors.

From bottom to top:

The storage room: This is where all the droids are kept including R2D2 and C3PO. It's a dark and messy place with junk on the floor and chains hanging down of the roof. The shadows are painting diffuse patterns on the floor.

The workshop: In the front there is the main conveyor belt important for sorting scrap from junk. It leads directly to the glowing smelter. In the back of the workshop there are the second crane for assembly proposes and the tubes on each side of the hall.
These lead to the gallery where the Jawas can control the main crane for handling heavy charges and further to the upper levels of the Sandcrawler.

The cockpit: You want to have full control of the Sandcrawler? Then this is the place to be!

After nine month it's finally done: one of my most ambitious projects. But there is no time to get sentimental – I already have new ideas in mind so let's see what the future brings.

Overview

Minifig scale: 96 cm long, 100.5 cm long (lowered main ramp)
Weight: approximately 20 kg
Part count: over 10'000
Power functions: 4 XL-Motors, 5 M-Motors, 4 receivers, 4 battery packs, 22 LEGO® LED-lights

Powered radio-controlled Functions:
- driving: forward reverse
- steering
- Main ramp: up and down
- Crane: up and down, in and out
- Conveyer belt: forward and reverse

Other features:
-Full interior on three floors in the front half of the model and a detailed cockpit (removable roof)
-Second crane in the back of the workshop, lighted smelter.

Building and planning time: 9 month
#

El Globe Plotter

Drawing the world

Text & pictures by Michael Brandl

The Globe Plotter draws nearly the entire world on a blank white ball. For this robot the coordinates of the continents were prepared as a zigzag line, drawn with a green felt tip pen. After the continents are drawn the robot switches colors from green to black. With this pen the continents are labeled: AS for Asia, AF for Africa, NA for North America, SA for South America and EU for the European Union. After switching to the blue pen the oceans are labeled, PAC for Pacific, ATL for Atlantic, IND for Indian Ocean.

There is a video of the Globe Plotter in action at ….
http://www.youtube.com/watch?v=JNMakRRgSG0

The Globe Plotter uses one NXT intelligent brick on which all the coordinates of the globe are stored. Two motors are used for tilting and rotating the ball. The third motor has two functions. It selects the desired color to draw with and it lifts the pen when not needed.
One touch sensor is attached on the frame to detect the initial position of the three felt tip pens.

When the globe is finished it is mounted on a special holder made out of LEGO Technic elements.

The background:

For many years now I have been working with "spherical plotters" made with LEGO® MINDSTORMS. It is always fun to print some text or drawings onto a spherical object.
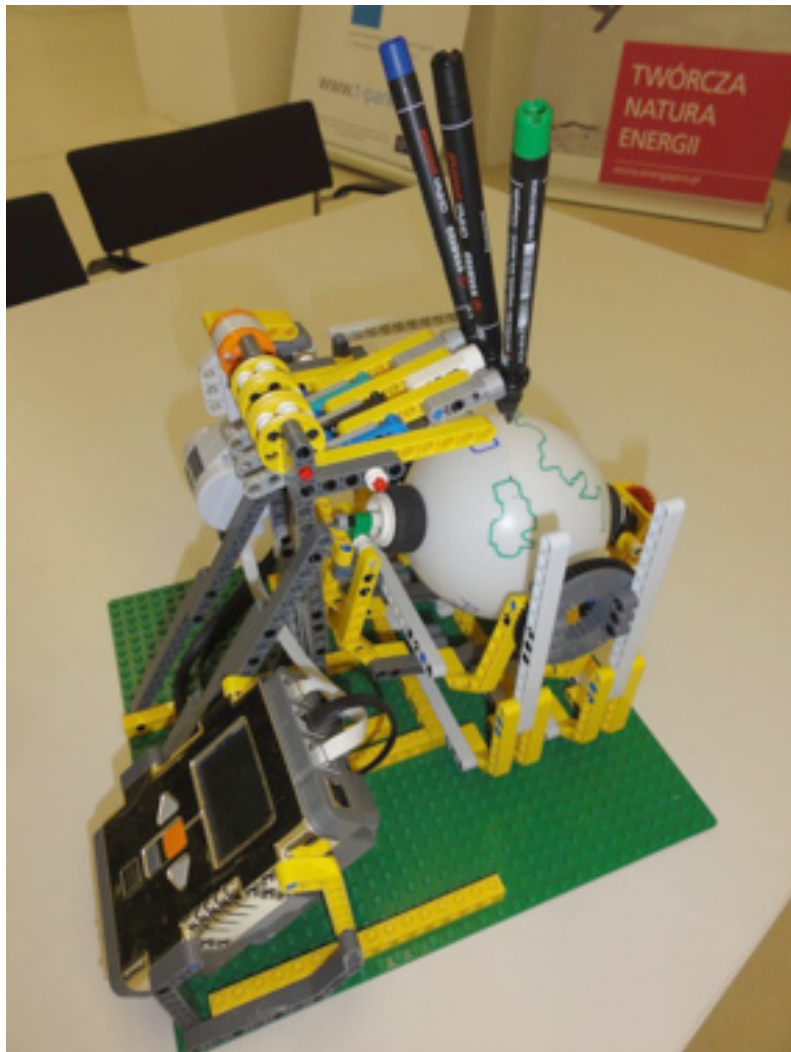
It all started in 2004 with my first **RCX Egg Plotter.**

This robot wrote "HAPPY EASTER" to an egg and has been a great success with all children at exhibitions. It could be built with a single RIS Mindstorms kit plus an additional motor (the RIS kit came with only 2 motors) and to minimize the number of sensors needed it incorporated a stepper motor that was 100% LEGO®.

The egg was turned in 48 steps by a motor that drove a single crank which was held in the lower position by a rubber band. When the motor turned at least 185 degrees and was floated (not simply stopped because that would break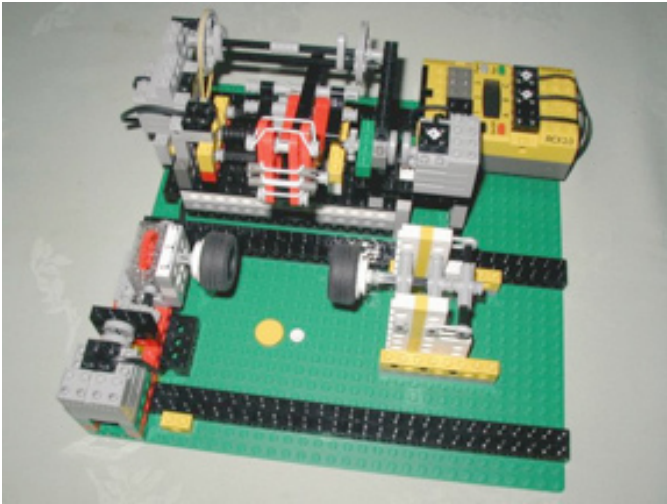 the motor), the rubber band completed the turn to 360 degrees. In this way it was possible to make a full turn using a simple software solution, without the need for additional (touch or rotation) sensors, time after time (leaving enough time for the rubber band to complete the turn).

With the new Mindstorms NXT 1.0 I built the **NXT Egg Plotter** in 2006.

It was built while beta testing the NXT and decided to re-engineer the Egg Plotter, using the elements of a single NXT set. This turned out to be a lot easier than in the previous version as the NXT's servo motors made putting both the egg and the felt pen in their precise position much easier and the NXT-G software allowed for the easy treatment of text files for drawing the different letters.

However, although NXT motors can be programmed to turn with 1 degree precision, they also have quite some slack (partly due to backlash produced between the encoder and the output, and partly because of the way error correction is handled which can result in the motor overshooting before returning to the specified position) so the individual letters could occasionally appear distorted.

In 2008 I enhanced the design of the previous robots and build the **Xmas Ball Plotter**, capable of putting text and drawings on a Christmas balls or Easter eggs.
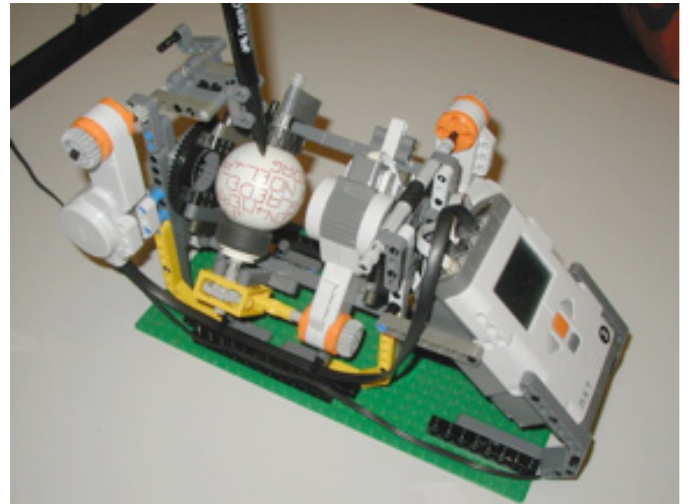
Although the principle is the same, the Xmas Ball Plotter was built in quite a different way when compared to the RCX and NXT egg plotter. Instead of moving the pen from left to right, it is in a fixed position and it is the ball that is rotated and tilted. In this way, the distance and angle of the pen with reference to the ball, is always the same.

During exhibitions, the first Xmas Ball Plotter would write Merry Christmas in five languages (German, English, Danish, French and Dutch) but the program is easy to tweak and virtually any text can be printed on the ball by adding the individual letter descriptions (contained in simple text files) to the text file the NXT-G program draws on to write the words on the ball. After writing each letter the ball is slightly tilted, and in this way the text is written in a spiral.

I have also drawn different designs on blank balls ... a Jack'O'Lantern at Halloween, a Star Wars™ Death Star at a comic convention, Christmas balls with alternating text, Easter eggs with drawings of the Easter Hare, there are no limitations!

Getting the world on a globe

When I built my first Egg Plotter I exchanged ideas with my long time friend and LEGO enthusiast Andreas Dreier. He was particularly helpful in the design of the system to draw letters on the egg. It uses numbers to indicate the direction the pen (or the egg) needs to move:

```
        7  8  9
         \ | /
          \|/
      4 ---+--- 6
          /|\
         / | \
        1  2  3
```

The remaining number are used for the pen up (0) and pen down (5) commands. This idea has served for both Egg Plotters and the Xmas Ball Plotter

If you would like to have a closer look at this technique, the program and building instructions for the Xmas Ball Plotter are available from my website.

It was again Andreas who suggested a way to control the three felt tip pens as part of a brainstorming exercise before building the Globe Plotter.

Getting the world on a globe is quite bit more complex than just drawing letters. Although the principle is the same (using numbers to indicate the movement of the globe and the pen), the drawing is of course a lot bigger. I discussed this with Andreas and he wrote PatternManager, a software that helps create the drawing and letters for the globe and lets you include additional lines to connect all the elements into a complete description of all the movements the robot needs to make in order to complete the drawing on the globe.

The Builder:

Michael "Mike" Brandl is a huge LEGO® MINDSTORMS fan of the early days.
In 1999 he got his first LEGO Mindstorms set and was fascinated by the clever design from the first day on. Since then he has built and published many robot designs as you can see on the website he runs: http://lego.brandls.info

He was invited to be part of the MPD, a select group of people who were invited to beta test the NXT. After that he has continued collaborating with LEGO MINDSTORMS in the MCP.

Mike lives in Vienna, Austria (Europe) and you can find him attending several LEGO exhibitions through Europe during the year...

Andreas Dreier, his long time brainstorm partner, hosts a website for nxtRICeditV2, software that helps you create RIC files that can display stationary and moving images on the display of the NXT. http://ric.dreier-privat.de/Docu/index.htm #

Panzerbricks

10.5cm K18 auf Panzer Selbstfahrlafette IVa "Dickermax"

Text & pictures by Legotron

This is the exclusive presentation for Hispabrick Magazine of the latest Panzerbricks [1] model: the self-propelled gun 10.5cm K18 auf Panzer Selbstfahrlafette IVa "Dickermax."

The first question anyone can ask when you read the name and see the pictures of the vehicle may be, why this tank? First of all because the original vehicle is impressive, also it is unknown, even for fans of tanks and military vehicles, and I'm sure there is no other LEGO® reproduction of this vehicle to date. A little wiki of this new member of Panzerbricks will state that it was a powerful self-propelled gun, built on a modified chassis of a Panzer IV Ausf. A, armed with a 105mm naval gun. It was designed at the beginning of World War II, and it was intended to be used in a hypothetical assault for seizing control of the fortress of Gibraltar by the Wehrmacht in an operation codenamed Felix. The operation was abandoned and the two units built were assigned to an antitank battalion in Operation Barbarossa, the invasion of Russia, were they were intended to act as tank destroyers. Although not built in series, both prototypes were the starting point for future developments, like the well-known Panzerjäger Nashorn or

Marder series vehicles.

Regarding the LEGO model, it is made in minifig assimilated scale but slightly oversized to make it compatible with other Panzerbricks vehicles. When designing, I always work with a side photo and other vehicles in my collection for size reference. Since the minifigs don´t keep the same proportion as the human body, vehicles need to be wider, and that means they grow in height and length so as not to be disproportionate. The advantage of such a small increase of size is the possibility to add portholes, doors and other functional elements which fit with the minifigs.

From the beginning I thought that his bulky appearance would not involve any problem for the design. Moreover, being based on the Panzer IV chassis I've used in several other models, I started with the advantage of having a good starting point and some work already done. But I was wrong: time showed that there were some design problems I had to resolve in order to finish the model correctly.

39

First I made some modifications to the chassis starting at the front, where I placed a single plate instead of the two plates that were used at panzer IV chassis. This single plate reached the combat superstructure, similar to the Hummel and Nashorn models of the Panzerbricks collection [2], but with less sloping and a longer size. I also relocate the drive wheels to fit the new height of the front hull and thus left the chassis ready. Then it was the turn of the combat superstructure, that I built separately, trying to leave enough space to mount the gun. The side armour plates, which are usually the more difficult to build, did not present any problem as they were parallel to the side structure and were fairly easy to attach. Then I built the rear armour plate of the combat superstructure, which practically defined the interior. I left the front armour plate to be built with the gun. I built the gun in two parts, the rear one, with the supports to fit it with the chassis, which allowed it to turn and elevate, and the front one, with the armour plating, barrel and gun mantlet. When I tried to assemble the gun mantlet to the front armour plate of the superstructure I didn't achieve a nice result. I wanted the gun to be in the middle of the joining point, both vertically and horizontally, and in a single LEGO® part. But I had a problem. The better the appearance I achieved the weaker the connection turned out to be, so the building process was stopped several weeks. I tried new ways of building the gun mantlet and the joining point with the front armour plate, but without success. One day, searching the Internet LEGO news, I saw a new bluish light grey piece: the Modified Plate 2x2 with Groove with 1 Stud in Center (according to the Bricklink nomenclature [3]). It was a new LEGO brick I didn't know, at least in that colour, and it was then that I found the solution to fit the gun to the front armour plate. It was perfect. After waiting for the arrival of the piece I proceeded to mount the whole gun. The key piece to build the mantlet was a Technic Driving Ring Extension, and was perfect. This was the part I needed to obtain a perfect mantlet for that gun. After that, I had to complete the shielding plates of the superstructure, but I found a small problem. That part is sloped in several ways, but the space to anchor it to the chassis was very small, since the size of the gun and its support had occupied almost all the available space. A lot of tests were needed to find a way to anchor that part of the armour plate, but finally I managed to find a method to do it. And that was all, the vehicle was finished.

It was a long process, longer than usual, but the MOC has come to a good end. I've used 719 pieces in all, and now I've run out of chain links again, so before beginning a new tracked vehicle I will have to buy many more of them...

References:

[1] Panzerbricks blogs: http://panzerbricks.wordpress.com/
[2] Reference of Panzerbricks' Hummel: http://farm3.static.flickr.com/2552/3844903215_087b83b3ef_o.jpg
[2] Bricklink: Unofficial online LEGO marketplace http://www.bricklink.com
#
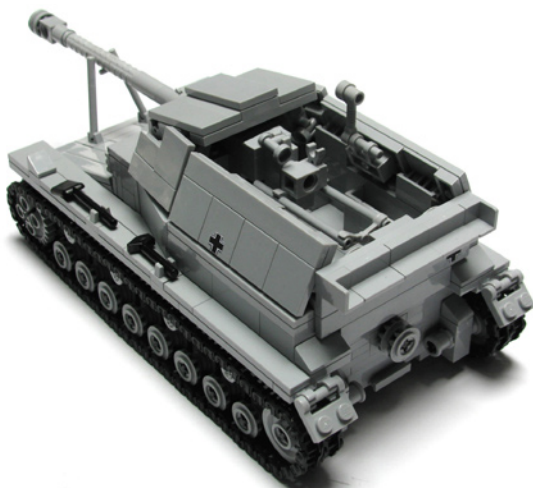
CarsParadise

Firas M Abu-Jaber

Cars Paradise

Text & pictures by Firas M Abu-Jaber
Introduction by car_mp

Because the profession of my father I grew up surrounded by cars and, therefore, car magazines. And in those magazines is where I found the supercars, with amazing performances, aggressive lines and prohibitive prices that I dreamed one day I could drive. Most of those wonders of technology have been recreated with LEGO® more than once, but one of my favorite builders, for the variety and fidelity of his models, is Firas M Abu-Jaber. And since I discovered him in the Internet have been a faithful follower of their cars. So I decided to contact him and ask him to tell us something of the man behind the cars. These are his words.

As a lot of you already know, my name is Firas M. Abu-Jaber, and yes it's my real name. I'm originally from Jordan , I'm from Abu-Jaber family; one of the Christian families here in Jordan . I like cars, sports specially body building, LEGO (obviously).

I'm an adult fan of LEGO and I'm proud of it. LEGO for me is more than just a child's toy, it's more like a kind of art, and I'm obsessed with it. Also I consider it the best toy for children as it improves the creativity inside them.

I've been playing with my little lovely bricks since I was around 3; as my Mom always tell me, I started my journey with LEGO with those huge bricks called Duplo, then when I became around 5, my parents got me my first LEGO Space set, it was from the M-Tron product line, I got a lot of LEGO sets when I was a little kid because my parents were traveling so much around the world, they used to get me LEGO sets from the duty-free zones in the airports, but when they finally came to live in Jordan, they didn't bring me sets as they used to do, because of the expensive prices here in Jordan; taxes and fees here are very high.

I was a huge LEGO Space fan when I was a child, I used to get a lot of M-Tron and space police sets at the time. Then LEGO released the new Model-Team line; I became a big LEGO car and truck fan. I remember my first real-life LEGO car I built was the Lincoln Town-Car, Limousine version. I put it together depending on pieces from the 5590 LEGO set; the helicopter transporter, it was the best thing I built in my eyes at the time.

41

After that I fall in a long dark-ages when I went to the high school, that dark age was because of two reasons, the responsibilities of study and secondly because not a lot of people here in my country accept the idea of playing with LEGO® for an adult, including my parents.

After a long dark-age, I return to my lovely hobby, LEGO. That was in June/2008! That's after my little nephew asked me to build a LEGO bus to put her little LEGO guys (Mini-figs) in it. When my Mom saw it at the time, she was very impressed and told me that I should post it somewhere on the internet so people around the net could see it. I listened to her advice and start Googling around the web about LEGO sites. That's when I discovered that huge online LEGO community. I'm often impressed by the amazing work all around Flickr and MOCpages and other LEGO sites and blogs.

First creation after the dark ages:
http://mocpages.com/moc.php/59810

As for the sets, my jaws dropped to the floor when I first saw the Ferrari FXX set; I find it really amazing as I'm a big fan of Ferrari and Supercars in general. It has to be my favorite set of all times. I got three boxes of that set at that time, that's why all my cars were red at first. And yes; it was the first set I got after the dark ages.

About my favorite themes that I usually build in; obviously it's large scale vehicles, though I sometimes build out of that zone. I love building LEGO creatures, as the two snakes I built to go with my Dodge Viper and Shelby GT500 Super Snake. I also love LEGO buildings, like the building I made to showcase my Lamborghini cars in (it's one of my favorite own creations), also I love LEGO planes; like those John Lamarak always build, I intend to build one as soon as I can. But, I prefer cars all the time.

Back a little bit to my history with LEGO, when I was a LEGO Space fan, I also was a scale model fan; I used to collect Diecast models back then, so now after I return to LEGO

again, I combine the love of LEGO and scale models by building my favorite cars with my lovely bricks, that's why I'm mainly a car builder.

I usually prefer to build in 1:17 scale, around the same scale of the official Ferrari FXX set, though I build in all scales; 10 wide, 14, 16 even minifig scale, and of course I always consider the size of the standard LEGO wheels.

As for the building process, as I mentioned above, I always try to build my favorite real life cars with LEGO. The process of any project for me is simpler than any one could expect. I just sit down and put the pieces together, no planning, no drawings, no LDDs, I just browse the web and download as many pictures as available of the car I want to build, take a deep look at the real car from all the angles, study those curves and try to translate them into LEGO bricks in my head, and finally put the model together. I usually start with the front end of the

42

model, then the doors and the back, last thing is the roof and the interior, engine…etc, it usually takes me between 2 weeks to a month to build the model, but some MOCs took me a lot of time, such as the Transformable Barricade which took me around 3 months . Yes, it's that simple.

For the pieces; I usually and mainly get my bricks from LEGO® sets available on toy stores around me, I tried to order bricks online a couple of times; but it was too expensive, as I mentioned above, fees and taxes are too much in my country. So it's a pain for me to get the pieces, specially that I'm the kind of builder who loves to keep his creations in one piece.

Let's talk a bit about my personal favorite creation; I have a lot of favorites out of my models, the Murcielago, the Ford GT, the Camaro (car mode), the Shelby Super-Snake, the Zonda (new favorite). But the top favorite has to be the Ford GT, as I consider it the most accurate car I've built. Though, I have a big part in my heart for the Shelby GT500 Super-Snake; as it's like my icon which got me to be well known in the community and which was the first MOC to be featured at the great LEGO blog, the Brothers Brick. Also it has been featured on the LAML LEGO talk podcast site as one of the best creations of the year 2008 in the Sculptures category:
http://radio.laml.org/lamlradio-72-2008-in-review/

I was so happy at the time, but I couldn't express my feelings when I saw my LEGO models have been features on a lot of non-LEGO related sites, including:

Topgear:

http://www.topgear.com/uk/car-news/lego-maniac-2009-05-26/
Jalopnik:
http://jalopnik.com/#!5263707/lego-maniac-inspires-us-with-amazingly-detailed-lego-cars
Automotto: 10 coolest LEGO cars
http://www.automotto.com/entry/10-coolest-lego-car-creations/
Autoblog:
http://www.autoblog.com/2009/05/25/childhood-redeemed-lego-artist-creates-jaw-dropping-four-wheele//
0-60mag:
http://www.0-60mag.com/0-60Legacy/2009/05/lego-smorgasbord/
And of course LUGNuts blog:
http://lugnuts-cars.blogspot.com/2008/11/model-team-re-imagined.html

And much more.

It's really great to see a lot of people appreciate your work, specially when they come from the non-LEGO communities, as a lot of you guys here experienced the same lovely feeling in this great community!

For my future projects, nothing special in my mind now, just I'm planning to build a Ferrari since I don't have any in my collection, red classic Ferrari would be nice I think in my collection.
#

Winners of the Star Wars™ Vignette Contest

Pictures by their respective owners

First Prize - Ernesto Carrillo - Mexico

Second Prize
Antonio Bellón - Spain

Third Prize
Sébastien Lapp - France

Scaling Tutorial for Vehicles (II)

Last part of this tutorial that covers the rules for choosing a scale and calculate the dimensions for LEGO® models on wheeled or tracked vehicles, plus some general tips on models.

Text & pictures by Paul Ian Kmiec

4 Tracked vehicles

Tracked vehicles are an exceptional case when there is no determined scale and you are seeking to set one. This is because of three reasons:

- the size of the road / tension wheels doesn't impact the general proportions of the model as much as it does with wheeled vehicles
- the width of both old & new tracks is fixed (although it can be modified to a certain degree; more on this in the section 5)
- the minimal width of a tracked model is usually larger than in case of the wheeled vehicles

First, let's clarify the wheels' issue. It's kind of ironic, but a typical tracked vehicle can have up to 4 types of wheels:

- road wheels (wheels that the vehicle basically stands on; they are separated from the ground only by the tracks, usually have suspension and are not driven)
- tension wheels (the first and last wheels that extend the tracks to their maximum length; they are usually located above the ground and have no suspension, but in some set-ups they act as the first & last road wheels too)
- drive wheels (all the wheels that the drive is directly transferred to; usually the last or the first pair of the tension wheels act as drive wheels, but sometimes a single wheel can act as a tension, drive & road wheel at the same time)
- return rollers (the usually small wheels that support the upper section of the track and keep it from hanging down; they are never driven, they are almost never suspended, and many tracked vehicles don't use them at all)
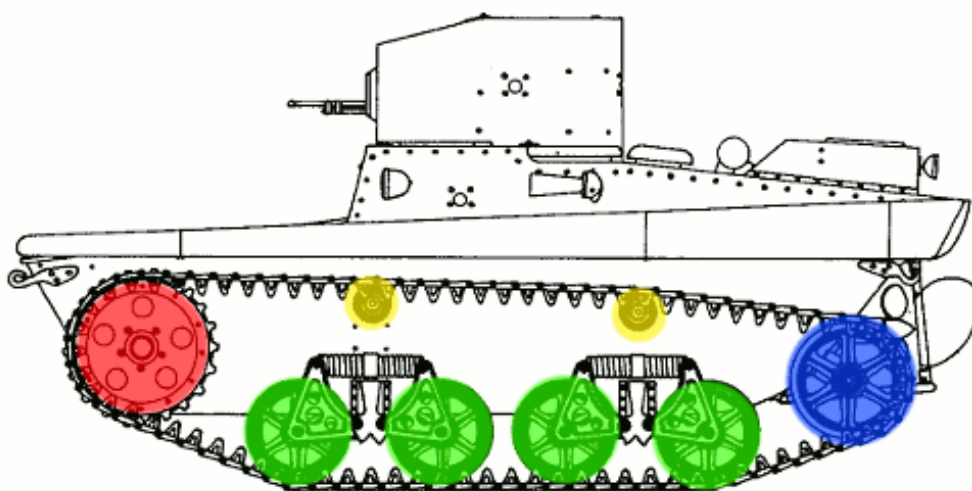
🟡 return rollers   🔴 drive wheels

🟢 road wheels   🔵 tension wheels

47

Let's consider a LEGO® model of a tank to see the importance of these factors. We obviously want our tank to be able to turn as well as to drive straight, so we have to use more than a single motor to drive it (we can use a [subtractor](#) too, but it does almost no difference in terms of width. Since tanks tend to have relatively wide hulls, and we want the drivetrain to use as little space as possible, the best solution is to locate the motors transversely, back-to-back, so that their output axles can go straight into the drive wheels (but there can be some gears in between too). In case of the PF motors which are 6 studs long (both Medium and XL ones) it means that the space inside the hull has to be at least 12 studs wide, plus 2 more studs for the sides of the hull, plus the width of two, sometimes more tracks (2×3 studs for older tracks and 2×5 studs for the newer ones), and eventually plus the width of the side skirts, if present. If we want to build a large model of a modern tank, we will need to use the newer tracks (the older ones look bad with large models) and most likely include the side skirts. Which means: 12 studs (internal hull space) + 2 studs (two sides of the hull) + 10 studs (2 sets of newer tracks) + 1 or 2 studs (depending on how thick we want the side skirts to be) = 25 or 26 studs. Therefore we can safely assume that a large model with newer tracks has to be at least 24 studs wide, not including the side skirts. This is exactly the assumption that determined the scale of my recent tank models, e.g. the [Abrams M1A2](#) and the [Leclerc T6](#). At this scale the newer tracks are usually just as wide as needed, at least for modern tanks, while the diameter of the road wheels should be usually between 3 or 4 studs according to the scale, and even making it 3 studs instead of 4 in my [Abrams model](#) still resulted in a successful construction. Which means that out of the three factors mentioned at the beginning of this section, the most important one is usually the minimum width that complies with technical requirements, and the least important one is usually the size of the road wheels.

Side view of my Abrams M1A2 model, with road wheels 25% smaller than they should be.

Things get a bit different with some other types of the tracked vehicles. The category of construction equipment is particularly filled with diverse tracked vehicles. For instance the tracked bulldozers often have narrow hull – sometimes constituting to less than half of the vehicle's total width. To build a motorized model of such a machine with the older tracks would be nearly impossible, and to build it with the newer tracks would require placing the drive motors side-to-side. In case of PF Medium motors (in most cases well fit to drive a model of this size) it means 6 studs of minimum internal hull width. I went even further with [my Caterpillar D9T model](#) – it had small openings in the sides of the hull, so that the motors would fit into a 6-studs wide hull with just 4 studs of internal width. It was somewhat extreme approach, but again proved successful – and in this model the width of the tracks and the road wheels' diameter have been crucial to determining the scale.

There are many other types of tracked vehicles that we will not consider here – for instance the crawler cranes, the tracked excavators, tractors and loaders – and each of these types has its own specific proportions. While the three aforementioned factors remain essential to determining the model's scale, their individual importance should be considered separately for each type of the vehicle.

5 Tips & tricks

• Including the specificity of the LEGO bricks into the scaling process.

LEGO bricks are very universal and provide great possibilities to explore, but they have their limitations too. For instance some details have to be discarded as to small, because it's difficult to model something smaller than a single stud. Some model-builders cross this border quite successfully, but it usually requires truly masterful skills. LEGO bricks are also generally inaccurate when it comes to modeling some round and oval and irregular shapes. Many builders tend to approximate the challenging shapes with available LEGO bricks rather than try to model them with a perfect accuracy. A number of issues with possible solutions

[Caterpillar D9T model](#) with just 6-studs wide hull. Some viewers are still surprised that it housed 5 motors, a regular battery box and two IR receivers. It had more functions than the legendary LEGO 8275 bulldozer, while being roughly 50% smaller.

48

is listed below.

The steered wheels in LEGO® models rarely have realistic steering geometry. In the real world the steered wheels usually rotate around a vertical axis that goes through their center. In the LEGO world this is possible almost exclusively with the wheels & suspension components from the 8448 set, so most of the wheels usually rotate around the axle located at their side. It means that they need more space to rotate than the real wheels, and thus their mudguards have to be more spacious than their real counterparts. Note the front mudguards of my Tow Truck built around steered & suspended wheels: even though their shape was carefully modeled with multiple small pieces, they are still much larger and more massive than the mudguards of the real trucks.

This beautiful, small model of the Ford GT by a renown model-builder Firas uses custom stickers to separate the white stripes in half, because there are no LEGO parts thin enough. Note the extremely tight mudguards, only present in models that have no steering system nor suspension.

49

The round shapes of the body of one of my hotrods have been only conventionally marked with flexible axles. Even though this technique has been sanctioned by some of the official LEGO® sets, it remains controversial among the model-builders' community.

Many of the existing LEGO wheels have different diameter-to-width ratio than the real wheels; namely, they tend to be wider. It is particularly troublesome for small models and results in some uneasy concessions. This is why these models of trucks built for the Hard Truck Contest held in Russia have two wheels on rear axles while the real trucks have four.

50

• Modifying the width of the tracks.

The standard LEGO® tracks, both older & newer ones, are compliant with many other LEGO parts. Both types can have additional parts added outside to appear wider and larger. The older, 3-studs wide tracks work best with thin plates, while the newer, 5-studs wide tracks work best with Technic bricks.

This acclaimed tractor built by Noddy uses 1x4s plates to make the older tracks slightly wider and more massive. Note that the size of the tracks' treads allows to add plates on every second tread only.

Close view of my Snowgroomer shows the newer tracks with 1x8s Technic bricks attached to every tread. It results in a very strong and robust set-up.

51

• Adapting shape of PF elements to save space.

Some PF elements come in shapes that can be often adapted as parts of the model. For instance the round shape of the PF motors makes them adaptable as side fuel tanks is some vehicles (especially trucks), while the new rechargeable battery can be easily integrated into some brick-built elements where its shape doesn't stand out. Moreover, almost all the PF elements share a common, simple color theme which can be used to make them match the rest of the model.

My Scania dump truck model was driven by two PF XL motors. Having a very limited amount of space to use, I decided to locate these motor in such a manner that they resembled side fuel tanks.
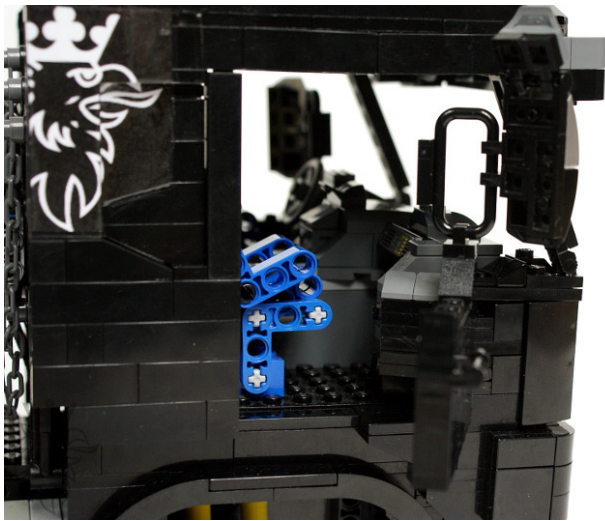
The same Scania model had a PF rechargeable battery located between the seats inside the cabin and fully integrated into the cabin interior, with a matching color theme used.
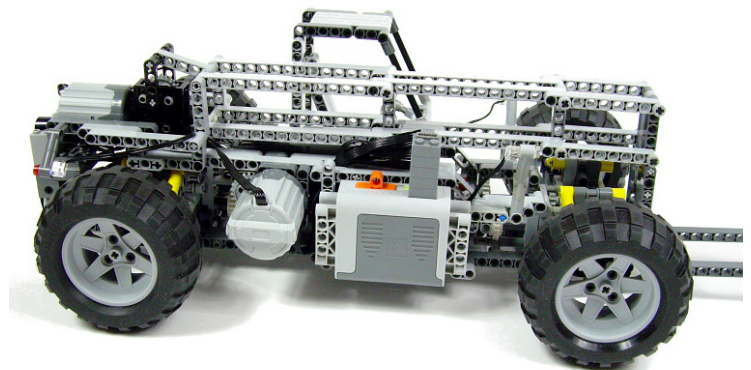
My PF Forklift was intended to have a naked, raw Technic look, but the use of a matching color theme and putting the PF elements in carefully considered places made them look like integral parts of the model.

• Using optical tricks.

This is actually much simpler than it sounds. There are few simple rules: for instance dark colors make models appear more massive. Dark colors also come in handy in those parts of the model where some gaps are difficult to avoid: using black parts in such a place makes the gaps almost invisible. Sometimes you have to choose whether to make a certain part of the model larger or smaller than the scale implies; when doing so, try to estimate what impression will a viewer get from both versions, and pick the more desired one. Example: I have built two models of similar tanks at a similar scale, and with both tanks the diameter of the main gun's barrel implied by the scale was 1.5 stud. It's difficult to make a long, smooth-looking object 1.5 stud thick, so I made the barrel slightly thinner in one tank, and slightly thicker in another. Many people complained about the thinner barrel, but no one complained about the thicker one – this is because it made a threatening impression on the viewers, and this is the kind of impression that is generally expected from tanks.
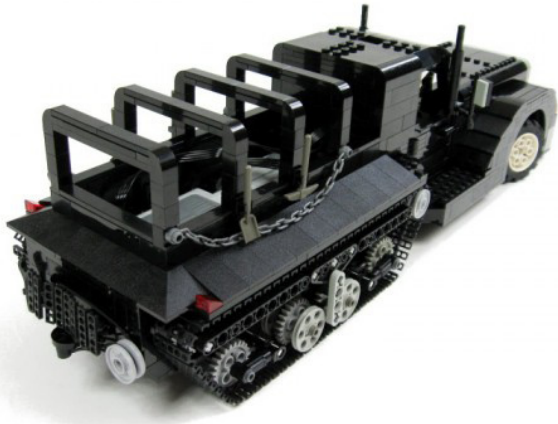
Sometimes a simple trick can make a big difference. My Crusader, a simple half-track truck, was so small that its motors and its battery box could be only located inside its cargo case. When I tried to cover these elements up with some plates, it didn't look like a cargo case at all – in fact, it looked pretty weird. Eventually I left them uncovered on a purpose, so that they would look like an actual cargo being transported by the model, and it had a much better effect.

• Knowing what to sacrifice

This is probably the most crucial skill when it comes to really challenging or feature-packed models. In most cases there are two aspects of a model that have to be balanced: its aesthetics and functionality. Some models are built only for one of these two aspect and ignore the other, but the real art of model-building is to blend these two aspects together seamlessly. Some models, however, require the builder to sacrifice some of one aspect for the sake of another because of e.g. the scale chosen or some technical limitations. The final choice of what is the most important in a given model is up to you, and here are some examples.

My first own model, the LiebherrT282B, didn't look pretty but had a long list of features including a full suspension, 4×4 drive, rear differential lock and even a manual gearbox. To include all of it into a relatively small construction, I decided to make a somewhat funny compromise: the battery box was located inside the cargo case. The case looked fine from the outside and still could be pneumatically elevated, but it was useless because its inside was shallow and had a central opening to fit the battery box in.
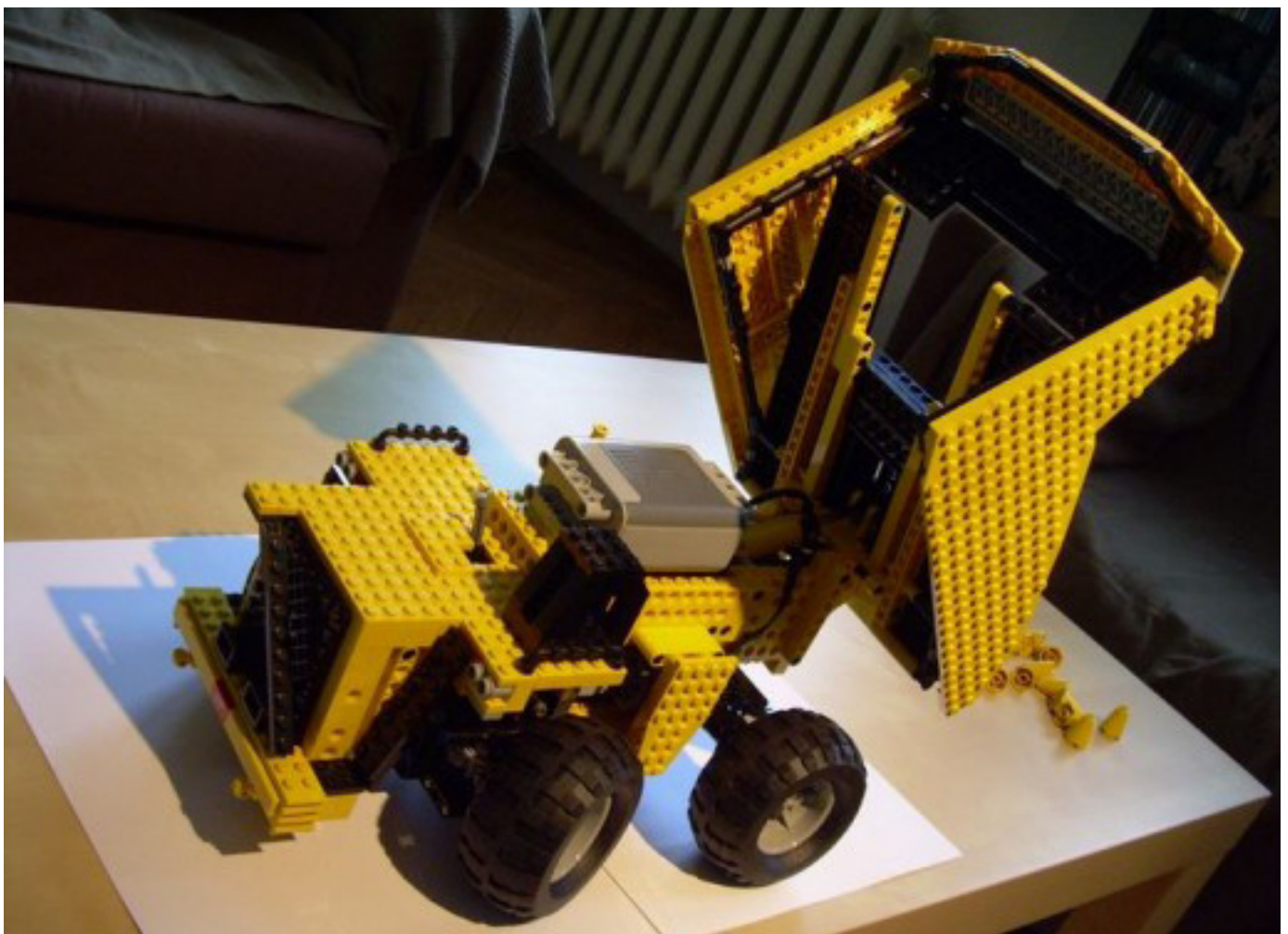
The first model I've ever built, the Mark I tank, was based on a static model created by pepik. It was extremely small and literally built around a battery box. There was no place for any substantial gear reduction, so the model worked fine except it ran at incredible speed. It looked well and maintained the proper proportions, but its functionality was more suited for a F1 car than for a tank.
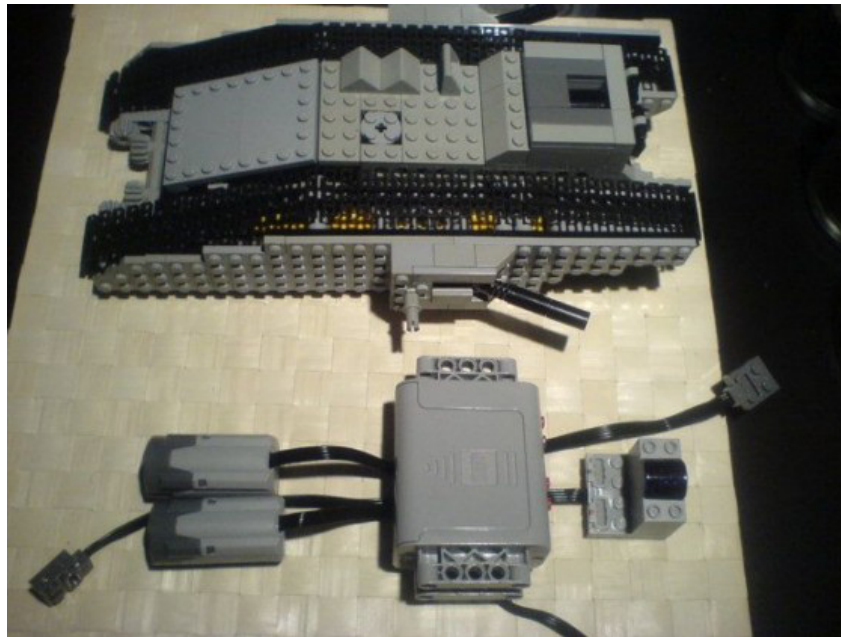
My model of the Liebherr R996 Litronic excavator was small, had no motors in the chassis and half of the hull's inside taken by a battery box. Still, I managed to fit 6 motors in it by placing 3 of them inside its arm. It degraded the look of the arm, but at this scale I could have a bad-looking arm or a completely static arm. Moreover, since the model used linear actuators instead of pneumatics, it has severely simplified the transmission system in the arm.
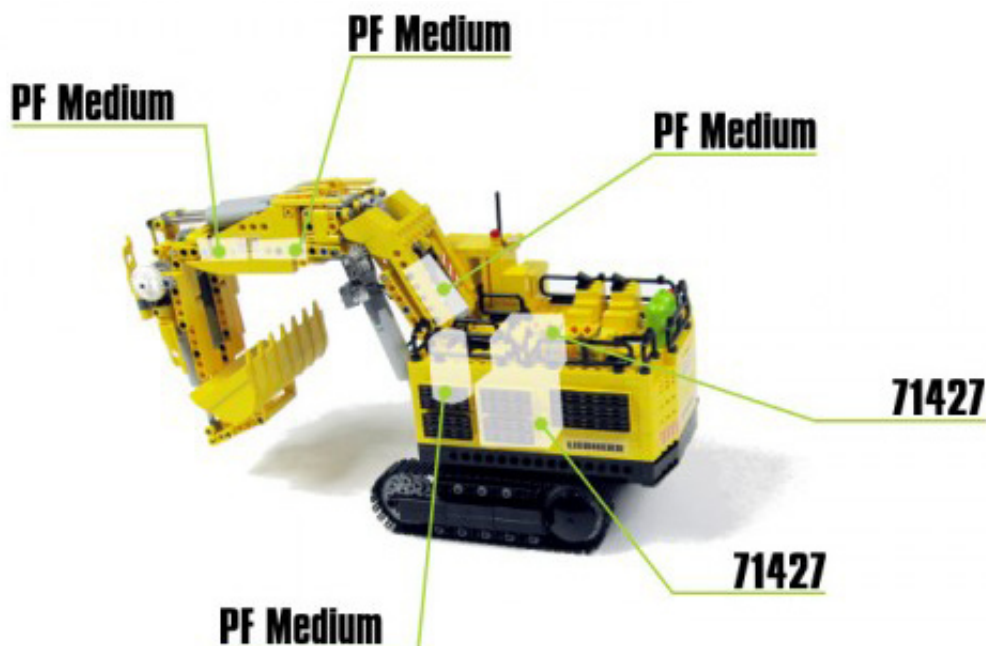
I hope this tutorial was helpful to you. As mentioned at the beginning, there are dozens of model-builders much better than I am, so while the rules explained in this tutorial remain more or less universal, feel encouraged to seek inspiration in the work of other builders. If you have suggestions, corrections etc., please include them in comments.
#

An introduction to Robotics with LEGO® MINDSTORMS (VIII)

Remote Control with LEGO MINDSTORMS

Text &pictures by Koldo

This is the second article in a series of challenges to be solved using LEGO® MINDSTORMS. It will be extended by means of a longer and more detailed manual which will be available on Lroboticas.net where you can already find the complete version of the challenge published in the previous edition of HBM, and which includes building instructions.

Although we normally consider a robot should be capable of carrying out a task autonomously, at times it may be necessary to control it remotely. There are different communication systems to accomplish this: the classical radio control of the remote controlled cars, infra-red control an even over the Internet.

The following challenge will use Bluetooth communications, which requires two NXTs to carry it out.
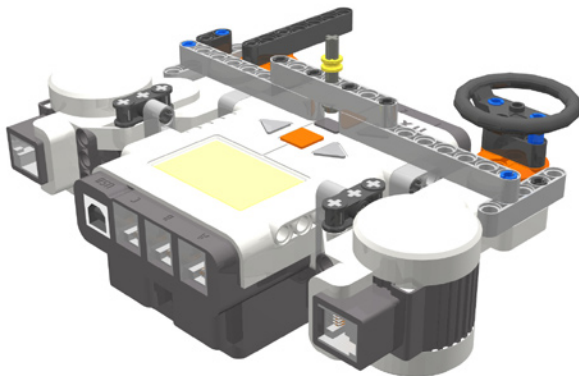
Challenge

An interesting challenge is to build and program a remote control that allows you to remote control a robot in the same way you would a remote controlled car, that is to say, with the following options:

· Turning left or right
· Moving forwards or backwards
· Regulating speed

Next, we will see how to build a remote control capable of controlling turning on a mobile robot. The rest is an option for those who want to go a step further.

Bluetooth Communications

The NXT is equipped with a remote communications system by Bluetooth. The NXT can send and receive text, numerical and logical messages and show a different behaviour depending on the message received.
Up to 4 NXTs can be connected at one time, allowing them to carry out their tasks in a coordinated way. But that does not mean they can communicate freely among all four, there will always be one master who is in command, while the rest are slaves, and can only communicate with each other through the master.

First steps

For two NXTs to be able to communicate they first need to be connected. To do so we need to start by enabling Bluetooth. How do we know if it is enabled? Simply look at the top left part of the NXT screen and if you see the following symbol Bluetooth is activated.
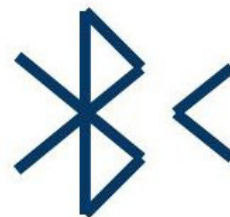
If it is not, we need to use the grey arrows and orange button of the NXT.
After deciding which of the two will be the master we can connect the two NXTs. To do so, we need to look for the slave NXT from the master NXT and connect it to one of the available positions: 1, 2 or 3. Once they are connected, the symbol will look like this.
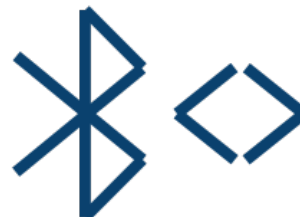
From now on the two NXTs can communicate with each other. NXT-G 2 allows the NXT to carry out this Bluetooth connection task itself.

55

Bluetooth Exercises

Before we start with a real project with Bluetooth communication, let's experiment a little. To this end we do not need to build anything, we simply need two NXTs and we can use the buttons as inputs and the screen and speaker as outputs. Below are a number of exercises, two of which will be solved in this article.

1. Create a program that sends a random numerical value between 200 and 400 so the second NXT can reproduce sound in that range.
2. NXT 1 controls the frequency of the sound NXT 2 emits. Pushing the right arrow increases the frequency at intervals of 10 and the left arrow lowers it. NXT 2 emits the sounds with a length of half a second and half second intervals of silence.
3. The same exercise as before, but the orange button switches between raising and lowering the pitch and making the interval longer or shorter in 0.1 second intervals.
4. The screen of one NXT shows the temperature a second NXT registers outside. If you do not have a temperature sensor, you can use a light sensor to register luminosity.
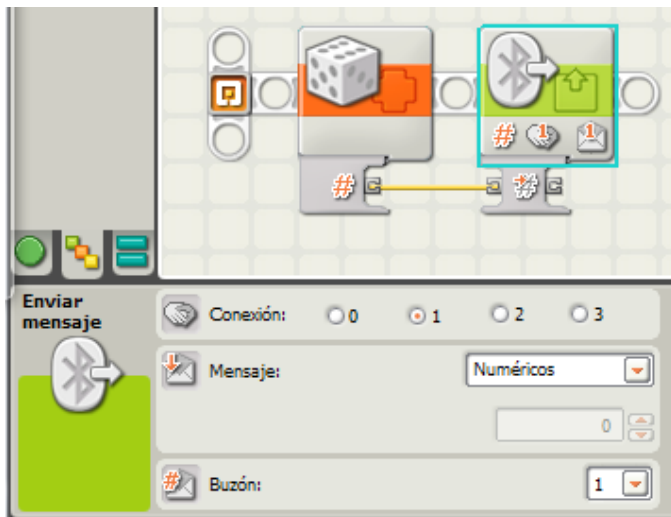
Exercise 1

First, let's have a look at the program for sending the message (NXT master).

The algorithm will be as follows:

1.   Choose a random number between 200 and 400
2.   Send a message that contains this number

The corresponding program will be as follows:

After obtaining a random number between 200 and 400 we will use the **send message** block from the **Action** menu. The message type needs to be adjusted to select a numeric value. You don't need to modify anything else.. The connection number needs to be the same one assigned to the **slave** NXT, in order to identify the recipient. In case the slave needs to send a message to the **master** it has to send it to **Connection 0**.

And now for the receiving NXT (**the slave**)

The receiving NXT must be listening for the message. Let's have a look at the algorithm:

1. Reed inbox 1
2. Play a sound with the frequency indicated in the message
3. Repeat indefinitely
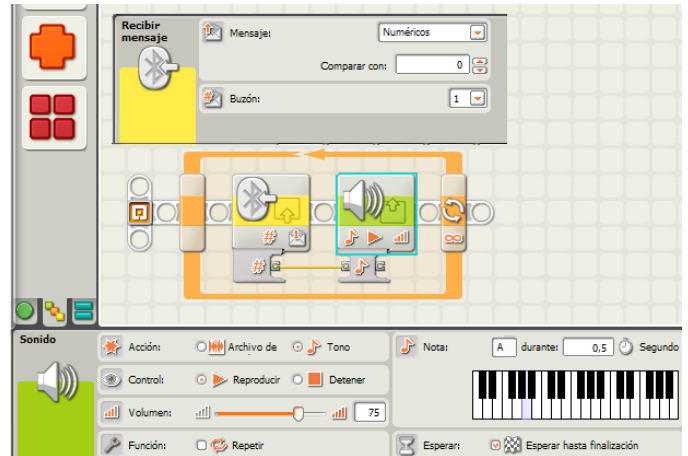
Once both programs have been created we only need to connect both NXTs by Bluetooth, download the programs and run them (for this exercise you need to first start the slave program and then the master).

Improvements

If you have NXT-G 2 it is possible to integrate the Bluetooth connection in the program. The following program adds two new blocks to the previous master program. These are located under Advanced: the Bluetooth Connection block, configured in two different ways. The first one switches on Bluetooth (this block can also be included in the slave program), while the second establishes a connection.

To configure this connection two conditions must be met:

· Both NXTs must have been connected previously so the slave is in the Contacts list of the master
· The master NXT must be on and connected to the PC so the list of contacts appears in the configuration panel as can be seen in the following image.
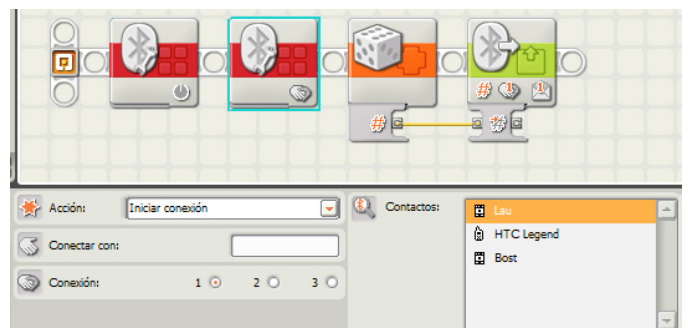

Exercise 2

Let's see how we resolve the second exercise as it is very similar to the first one.

First, let's have a look at the algorithm of the program for controlling the sound (master NXT).

1. Create a variable to store the value of the frequency
2. Assign a value of 200 to the variable
3. Continuously repeat the following steps
      a. If the right arrow is pressed, add 10 to the variable Frequency, if not do nothing.
      b. If the left arrow is pressed, subtract 10 from the variable Frequency, if not do nothing.
      c. Send the value of Frequency by Bluetooth
      d. Add a wait of tenth of a second at the end of the loop to limit the effect of a continuously pressed arrow.

The program will be as follows:
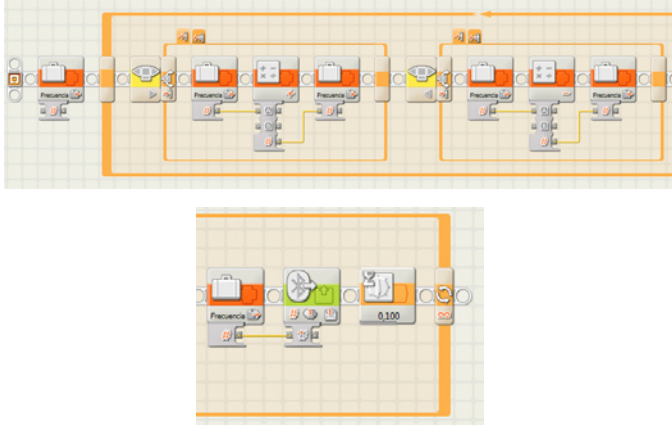
The variable Frequency is created through the option Declare Variables in the Edit menu. In both conditions the False option is left blank.

The program for the slave NXT , the one that reproduces the sound, will have two tasks which are executed simultaneously. The corresponding algorithm is the following:

1. Create a variable to store the value of the frequency
2. Assign a value of 200 to the variable
3. Repeat the following steps
      a. Read the value of the variable Frequency
      b. Play a tone with the frequency that was read during half a second
   c. Wait half a second (silence)

The second task is the one that receives the message and assigns its value to the variable Frequency. The algorithm will be as follows:

1. Repeat the following steps
      a. Wait until you receive a message
      b. Assign the value of the message to the variable Frequency.
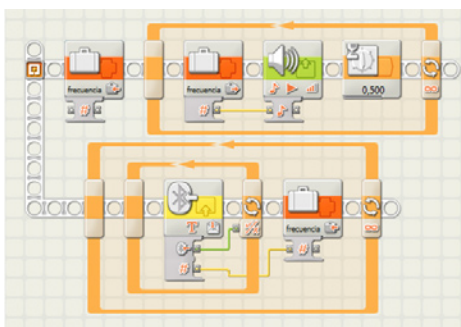
The remote

The remote will have two levers that will help control the touch sensors under it.
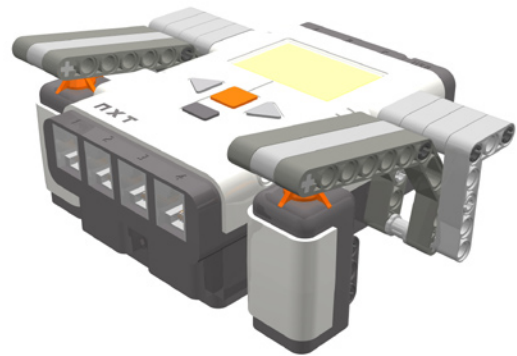
In fact, for such a simple remote as this you do not really need to build anything, as you could simply use the buttons on the NXT itself. The robot we will control is the one from the challenge in the previous edition of Hispabrick Magazine or any other one with a similar motor configuration.
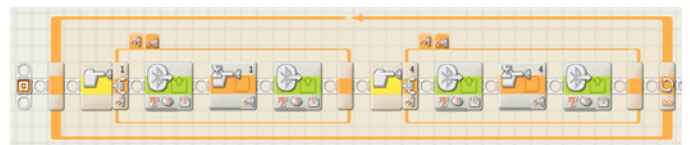
The algorithm for the remote

The remote uses two touch sensors to control the vehicle, the left one connected to port 1 and the right one to port 4. Pressing the left sensor the robot will turn left until you stop pressing and the right one will do the same in the opposite direction.

The algorithm for the remote will be as follows:

1. Repeat the following steps
      a. If Sensor 4 is pressed
            i. Send text message "Right"
            ii. Wait until sensor 4 is no longer pressed
            iii. Send text message "Straight"
      b. If Sensor 1 is pressed
            i. Send text message "Left"
            ii. Wait until sensor 1 is no longer pressed
            iii. Send text message "Straight"

The program will be as follows:

The algorithm for the vehicle will be very similar to the one in exercise 2. It will consist of two tasks, one to control the vehicle and another for receiving and storing the messages.

The first algorithm will be:

1. Create a variable to store the value of the Steering
2. Assign the value "Straight" to the variable Steering so by default the vehicle will go straight.
3. Repeat the following steps
      a. Read the value of the variable Steering
      b. If the value is Straight move forward endlessly
   c. If the value is Right turn right

57

d. If the value is Left turn left

For this last step you can use a switch block to execute one of the operations depending of the value of the variable. In order to be able to do that, you need to uncheck Flat View check box, or else you will only be able to use two options.

For the second task it will be the same as in exercise 2.

1. Repeat the following steps
    a. Wait until you receive a message
    b. Assign the value of the message to the variable Steering.

The program will be like in the following picture:
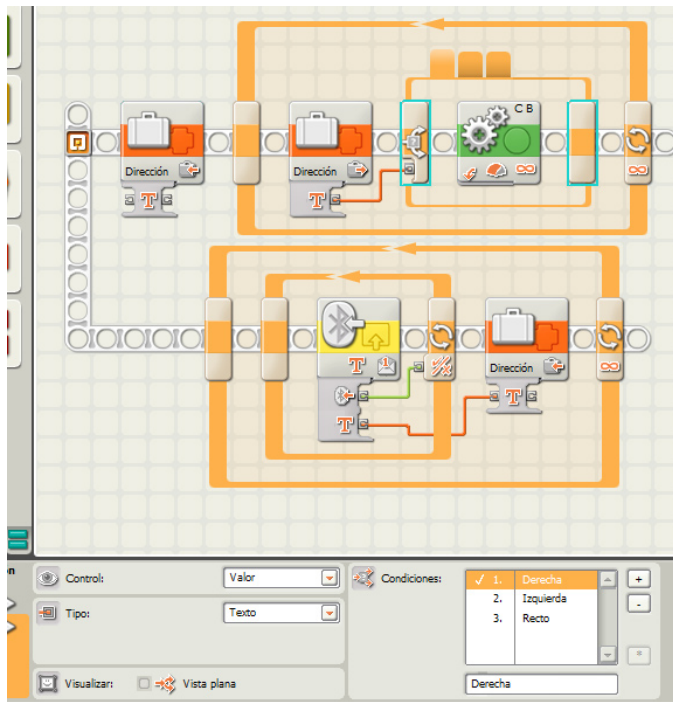
Improving the program

What can be done to improve the program?

1. Add a function to use the orange button to stop and start the vehicle.
2. A motor can be a very interesting complement to control the turning speed. If you connect a lever to a motor, the turning angle can be used to send a power level to the vehicle.
3. A motor can also be used for steering. Using s steering wheel connected to a motor, the amount of left or right turning can be transformed in the turning speed and direction of the robot.
#

LDraw Tutorial Part 11

Willy Tschager

By Jetro
Pictures by Willy Tschager

In the last issue of HBM I explained how to install the most important components of the LDraw set of tools in the absence of an up-to-date installer, well, I hope it has served you in the interval, and I'm happy to tell you that in the meantime an all-new completely up-to-date All-In-One Installer (AIOI) has been released.

To celebrate the fact and to learn a little more about this installer I talked to the man who put it all together, Willy Tschager.

What prompted you to develop the AIOI?

To be frank I never planned to take over the maintenance of the installer from Ahui Herrera, LDraw.org's former Help Desk manager, in the first place. It all started back in 2007. As a follow-up of asking the part authors to sign the contributor agreement it came to our attention that LDraw.org also lacked permission from the programmers whose applications it was distributing via the All-In-One-Installer. As one of LDraw.org's content managers it was my task to gain those permissions and preparing the license you're asked to agree during the installation. In addition I also did some makeover of the banners since David Olofsson - who has done all the graphic stuff for the website – was short of time. No one then expected that it would take some 4 years to get a new AIOI in the pipe. In addition I never dreamt that one day I'd dive into LUA scripting and all the other skills required to get it finally shipped.

In the end the 2010 AIOI is the result of several coincidences: Ahui, with his second child under way, had less time left for LDraw than ever. The software used to compile the installer became freeware for non-commercial use. I already had all legal files needed on my disc and last but not least, it really broke my heart every time I navigated to LDraw's Get-started-page and saw that old AIOI still dated 2006. I stepped in although Setup Factory 9.0, the setup program used for the compilation, has nothing in common with the version used by Ahui and I couldn't use any of his work.

What does the AIOI include?

Short answer: A basic set of the LDraw System of Tools. Long answer: The installer targets users with little or no LDraw-experience, who want to have a quick look around without worrying about all the little hacking required to get the different programs to work flawlessly together. Just setting the correct path to the parts library in a single tool can be a hassle. At least that's what I learned from people who contacted me

through my personal site. With this picture in mind I selected a bunch of essential programs to get most of the jobs done: MLCad as editor (as I'm writing I'm working with Sergio Reano to get his SR3D ready for the AIOI); two viewers - just to offer a bit more choice; LPub, LSynth - if you want to go a step further and finally POV-Ray because many people are eager to reproduce the high-resolution images they see on the web.

Because of the low entrance level I sadly had to exclude L3P. Fussing around with command lines would be the last thing I want to face if I were a "newbie". Also the graphical interface L3PAddOn didn't help out on this because the current version is simply to buggy and despite several tries I couldn't contact its author to get the program fixed. You'll also not find any tools used by part authors such as Datheader or LDDP. People capable of authoring an LDraw .dat file have to – and surely do – know how to set up a system.

Finally it was also important not to leave any trace behind if you decide to uninstall the package – which hopefully never happens because you're just too pleased and taken by LDraw! Therefore much attention was also given to deleting folders and reversing the changes made to the nuts and bolts of the system.

How long did the programming take and what was the most difficult part to overcome?

All in all three month, counting reading the manual (I know, I know, no one ever reads the manual), and learning the setup program. The first version I developed just copied the part files and installed MLCad. Later I added language support and divided the tools into packages, leaving the decision of which programs they want on their hard disk to the users. The last thing was setting paths and registry entries or modifying settings if you select a combination of programs. Luckily I had to make almost no corrections to the beta version I sent to friends within the LDraw community for testing.

Since I'm not a programmer - and still do not call myself one - trying to become a so called "script-kiddy" was definitely the toughest part. I remember spending a week of desperate coding just to get the paths to the LGEO library into some configuration files of POV-Ray. The script snippets that did work wonderfully for MLCad were useless because one of the POV-Ray files was out of standard. I had to come up with a completely different approach – obviously first learning how those new commands actually worked. Most was trial'n'error rather than real understanding.

59

The current version is x32 - will there be a x64 version?

Sure it's a 32-Bit but it runs fine on 64-Bit operational systems in compatibility mode – the parts library and all tools are installed in the "Program files (x86)" folder. Well, you must have administrator rights on your account in order to properly run this installer and once you're going into depth it is best to work around the UAC - User Account Control by allowing programs to write in the LDraw directory. Apart from that and based on the feedback I've got so far, it looks like it does a decent job for what is was created for. The setup software I work with would support installing 64-Bit programs and also a mixed mode is doable, but it requires 64-Bit tools in the first place. As long as there is no editor in 64-Bit a x64 version is out of the question.

What is your planned update cycle?

LDraw.org currently releases updates to the parts library twice or three times a year and I will work along that line – at least for those publicly announced. Nonetheless bug fixes and updates to the programs shall be included immediately in a silent update with no reflection on the version numbering. A shift from LPub 4.0.0.11 to 4.0.0.12 won't change the 2010-03 in the file's title, the 2011-01 parts update will.

The installer is currently available in English, Italian and German. What plans are there for other language versions? Will (does) the installer contain other language specific files?

There is currently a Spanish and Dutch version in the works and I welcome people who want to help out translating the dialogues into their native language. The setup software comes with built-in language support for over 20 languages, so customizing the screens is fairly easy. All you have to do is editing some .xml files in a text or html editor. You're Polish or Japanese(?) – just drop me a line and you're in.

The same is valid for the single programs. Based on the language of your OS the AIOI installs language files if they are available. If you're German or Italian you get my translation for MLCad. If I can find the time someday they'll get an update on LDView too. I could also ship, say, the French or Spanish MLCad language files without translated installer screens, but it doesn't make much sense to include those files with users still having to master the English setup interface.

This is only your most recent contribution to the LDraw System of Tools. Most people will probably associate you with the constant updates to MLCad.ini and in a previous article on LDraw in this magazine I also drew attention to your helper files, particularly the "Easy Rotation" tool. How did you get started with LDraw and what prompted you to contribute?

Back in 1998 I came across an article in a hard-boiled computer magazine talking about LDraw and the very first versions of MLCad and BlockCAD. Later I got in contact with Mike Lachmann hunting a nasty bug in his program. As a consequence I became one of MLCad's primary beta testers.

Back in the nineties I did also some CAD and rendering – on an Amiga 3000 taking 2 or 3 days to calculate a 800x600 in 4096 colors. Writing some missing Classic Space parts with the skills I had was therefore a logical step to do. Nonetheless I had a hard time learning all the specification required to get a part fit to be let "into the wild". My very first part, "3876.dat – Minifig Shield Round" I needed for the virtual version of "894 – Mobile Ground Tracking Station" had to be almost completely rewritten by other authors. LDraw was less organized then: most none-documented rules and much tribal knowledge. Maybe that was the trigger I got into tutorials trying to ease things for other people.

A giant step forward in the use of LSynth has been the complete redesign of the program and the inclusion of easily configurable information in MLCad.ini. Are there any plans for other additions to MLCad.ini that will result in improvements to MLCad??

Since the MLCad.ini only works within the boundaries of the program itself I cannot think of any new features. An example: If you compare Bricksmith for Mac (which also relays on the MLCad.ini) to MLCad, you'll notice that Bricksmith allows the correction of the head's position in case you add neckgear to your minifig. I cannot replicate that behaviour for MLCad because there is no command in MLCad supporting it. All I'm able to do is adding new parts, or in case of LSynth new constraints and synthesises. In short, no improvements in MLCad means no improvements in MLCad.ini.

Sadly things do not look promising. There hasn't been a bug fix for 3.3 for over a year (especially the broken editing feature for the rotation matrix is most annoying for part authors like I am). All initiatives to make MLCad open source have failed miserably and it looks like we have to face another stall for some years.
#
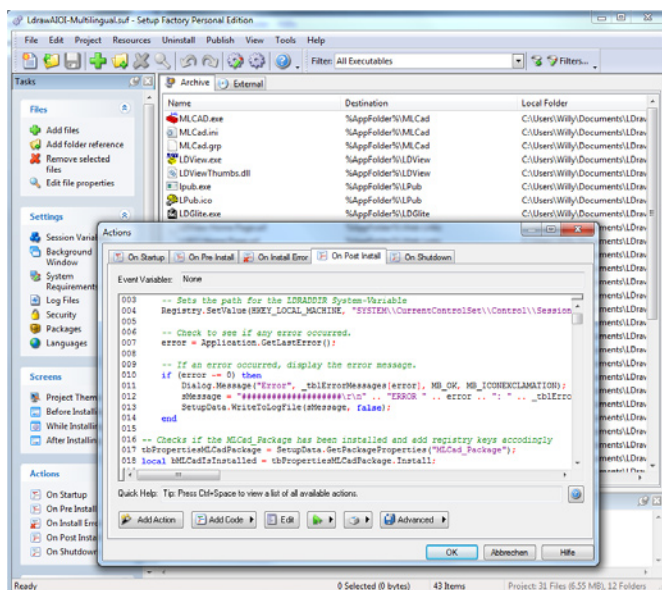
LEGOLAND Discovery Center Berlin

Text & pictures by lluisgib

If you take a walk from the Postdammer Platz to the centre of Berlin and suddenly see a giraffe, you haven't gone mad. It's one of the attractions of the LEGOLAND Discovery Center (LDC) located in the SONY Center building.

If you have been to a LEGOLAND park before you will know what to expect in an attraction of this kind. However, the distribution of the LDC is rather surprising.

You enter through a small kiosk in the central square of the SONY Center. There is a small reception area and a little shop. After passing the ticket office you take a flight of stairs down to the basement.

The first thing you find there is a miniland that is exclusive to Berlin. Of course it is rather small, but the reproductions are spectacular and the light effects that change between day and night transport you right into the display. And there are reproductions of the Brandenburger Tor, the Reichstag and the compulsory reference to the fall of the Berlin wall. The location of the LDC in the SONY Center hasn't been forgotten either.

After the miniland there are other rooms (a total of eight) where children can enjoy taking part in some challenges like sailing radio controlled boats or testing their marksmanship with water in the pirate area. By means of the wagons in the Dragon Quest area, where you can see animated LEGO® models, you get access to the rest of the attractions. Factory, which gives a short explanation of how the LEGO bricks are made, a 4D cinema, jungle adventures or thousands of bricks for building are some of the areas where children can spend hours having a great time.

As in all LEGOLANDs, all the decoration is done with LEGO models, full of curious and funny details. At the exit, there is a shop with a small Pick-a-Brick selection and lots of gadgets, in addition to some sets.

If you plan on visiting Berlin, don't forget to leave a couple of hours for the LEGOLAND Discovery Center. You will see a LEGO® world you could hardly imagine to fit in a cellar and you'll have a wonderful time.

IX Memorabilia Fair at Mungia, Vizcaya

Text & pictures by Legotron

From April 2 to April 3, 2011 the ninth edition of the Collectors Fair was held in Mungia, Vizcaya, organized by the association Bitxikiak (www.bitxikiak.org) Mungia, in collaboration with the local municipality. Again, the organization of the event offered members of the LEGO® exhibit all facilities which allowed it to be the undoubtedly the best of all that have taken place there til now.
This year, the LEGO exhibit featured more attendees than in the previous edition, coming from different locations in Spain, and it showed a greater number of constructions and sets than in the previous edition.

Two rooms were arranged for the exhibition of LEGO® material: one for the Technic® and Mindstorm® constructions and the other one for displays and other MOCs.
The Technic room was organized by J de Château (Jetro), the current LEGO® Ambassador for TechnicBRICKs with the

help of HispaLUG Ambassador V. Lis (Otum). It featured a small GBC circuit, which was one of the most prominent for the visitors, several Mindstorm constructions and some of the latest Technic models, such as the 8043 excavator, which could be seen in operation at various times of the event.

The other room was dedicated to the exposition of constructions by various exhibitors who attended the event. They had a number of stands showing MOCs and dioramas of over 100,000 pieces.

On one side there was a stand with the "Panzerbricks" collection of tanks and military vehicles by A. Bellon (Legotron), which included a dozen new vehicles with respect to those shown in the previous year's edition. Along with this there were several Architecture® sets on display, assembled by S. Del Álamo (Sergilogrono).
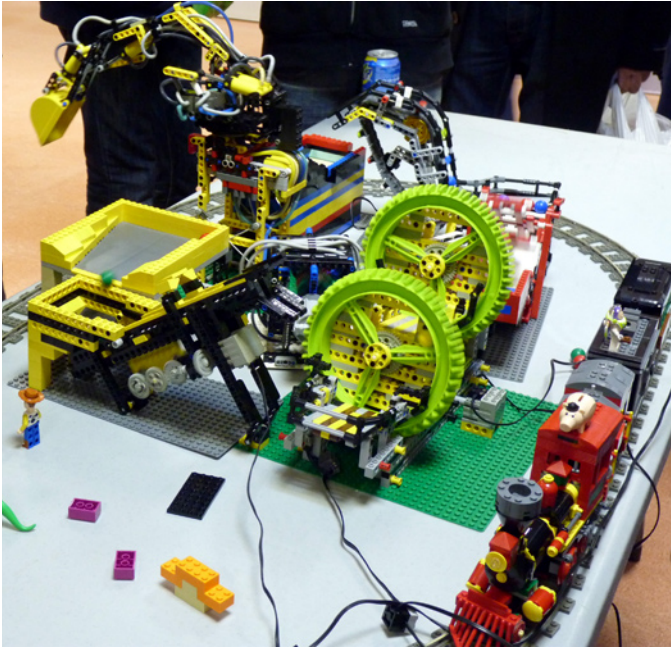
The central table was set up with a City display, by I. Pernia (Koska), S. Del Álamo (Sergilogrono), R. Vaquero (Rafa) and A. Cagigal, which included numerous modular buildings and others designed by their authors, which were surrounded by a running railway, which was the favorite attraction for children. In addition, the display was complemented by a fair area and a beach with all kinds of details around. Right nxt to this there were a number of Star Wars™ sets showing scenes from both trilogies. At the other end of the table a large Imperial hangar was set up, featuring the scene of Darth Vader arriving to his command ship, the Executor. This construction, a veteran of previous editions, was mounted to the fullest extent with all its different modules.

Also highlighted in the exhibition was the diorama of H. Hoexbroe (Hoexbroe), which was a beautiful recreation of a Danish shipyard, a building full of wonderful details that the author did not hesitate to show to those who came to see it, dismounting some of the elements once and again to allow to see the last corner of the construction itself.

In three other small stands different sets of the Atlantis line were on display, built by Alex and Joel, a battle of the Clone Wars™, by R. Vaquero (Rafa) and son, and some Star Wars™ Maxifigs, designed by A. Bellon (Legotron)

The exhibition was a success both for being the one with most attendees related to LEGO® of all editions and the high level of the constructions both in quality and quantity, for the treatment of the organization, which was excellent, and the number of visitors who come to visit the LEGO showrooms.

One detail to note on a personal level was the special award the Association Bitxikiak, organizers of the fair, decided to give me for my efforts in publicizing the fair and coordinating the LEGO event.Thanks!
#
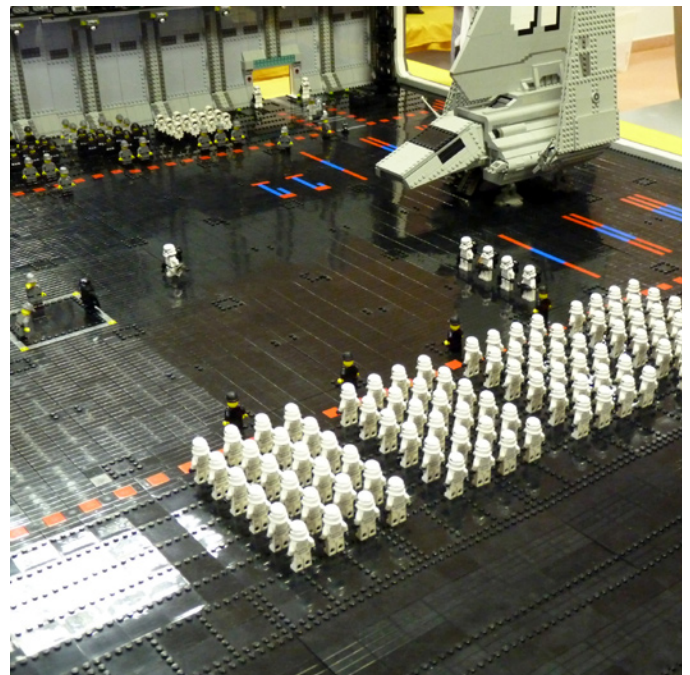
Review 7051: Tripod Invader

Presentation of the Alien Conquest theme

Text by Jetro

Pictures by LEGO® Systems A/S

From a very early stage, space has been a favourite play-theme for LEGO® sets and ever since the classic LEGO Space theme was launched there has not been a single year without some kind of space theme sets in the LEGO catalogues. But this time rather than being 'out there', the aliens have come to visit us.

Laurence Dawes, one of the designers on the Alien Conquest project explains: "The space theme holds an evergreen Appeal. Earlier themes such as Space Police and Mars Mission whisked children out into the farthest corners of the galaxy and created scenarios out there – but we've never brought outer space down to Earth."

One of the outstanding features of the Aliens in this theme is that, in addition to all being green, their brains play an important role in their design. And it's not just the aliens' brains that are important. They have come to harvest human brains. These space creatures have come with their own very peculiar pets – the so-called 'clingers' – who can wrap around minifig heads and control their minds.
Scary? No, great fun!

Another different aspect in this theme is that instead of the usual two sides in this case there are three sides: the aliens, the humans they prey on and the Alien Defence Unit (ADU), dressed in blue uniforms, ready to fight the alien invaders and save the people of Earth.

65

The theme is comes with an accompanying website, on which you can read more about the personality of each of the aliens and ADU team members, see animated presentation of many of the bigger sets and play games [1]

Tripod Invader

In this edition of HBM we'll have a closer look at the Tripod Invader (7051). This set features a small UFO which sits on a three-legged base. It is piloted by an Alien Invader Trooper who uses his sonic gun to immobilise humans so his clinger (official name Pluuvian Brain-Beast) can control their minds. The UFO can also be detached from the tripod to beam any humans in range up and transport them in its prison pod. The pod is connected to the UFO with a single Technic pin, so in theory a full prison pod could be delivered to the mother-ship and exchanged for an empty one. The cockpit is very simple, but two levers serve as control stick.

Judging from the size of his protruding pink brain it would appear Troopers aren't the most intelligent aliens out there. Other aliens in this theme have much more prominent brains. Even so, human brain power is not used to supplement that lack, but, according to the accompanying website, to power their UFOs.

The lower part of the tripod is built almost entirely with Technic parts, which link the radar dishes that serve as "feet" to the vertical column that holds the sonic cannon. Technic axles are used to connect both elements together and with the UFO.

This also allows the UFO to rotate freely on the tripod. The sonic cannon is built on a ball joint that allows it to be easily aimed, a construction that has been previously used in a number of Star Wars™ sets.

The whole construction reminds me vaguely of the invading tripods in War of the Worlds. The Technic parts used in the construction give you enough flexibility to move the legs and let the tripod walk, although hopping it along is certainly easier.

The set also includes a frightened businessman with attaché case. This minifig features a double printed head, with a 'standard' look on one side and a 'scared' look on the other. Also the torso is printed on both front and back and the suitcase is a nice touch.

The stickers in this set – eight in total: four to simulate controls near the sonic gun and the other four to decorate the metallic rim of the UFO – add another comic touch to the set. On his front bumper the alien has a sticker that reads: "WE'VE BEEN TO EARTH'".

Conclusions

Alien Conquest is a space theme with a humorous touch and it is located on Earth. The theme has a slight emphasis on aliens which makes it even easier to combine it with any existing LEGO® City collection, full of brains ready to be harvested. This becomes especially clear if we take a brain-count of the sets: the theme so far (as launched on June 1, 2010) is made up of 7 sets (not counting the battle pack which is not available everywhere or the promotional ADU Jetpack), 2 of which include only Aliens and civilians. In total, these sets include 9 aliens, 3 civilians, and 7 ADU members.

The Tripod is especially interesting as it is the only small set to include one of the clingers. Even though it is not always easy to separate the UFO from the base, this double play option also adds to the sets attractiveness.

The theme will be expanded further in the first half of 2012

[1] http://alienconquest.LEGO.com

Review 7959: Geonosian Starfighter®

Text by lluisgib

Pictures by LEGO® Systems A/S

Set: Geonosian Starfighter
Set number: 7959
Number of parts: 155
Minifigs: 3
Recommended Retail Price: 49,95€

As usual every year, in June the LEGO® Star Wars™ and LEGO Clone Wars™ corresponding to the second half of the year have been presented. There are a number of interesting sets, like the new version of the Millenium Falcon™ or the Podracers™ of Anakin™ and Sebulba™.

To get a closer look at at these new sets we will present one of the new The Clone Wars™ sets. The Geonosian Starfighter™

In 2003 the Geonosian Fighter™ that corresponds to Episode II was launched with set number 4478. This set is very similar to the one that is launched now, but it did not have a cockpit for a minifig. In this 2011 version, which fits in with the cartoon series The Clone Wars™, the ship has been revised and includes new minifigs which are the real attraction of the set.

Aesthetically, the set it very similar to the one from 2003. It is slightly bigger in size, among other reasons because of the addition of a cockpit for the Geonosian who flies it. It is designed in a modular way with a central body and two wings that are attached using Technic pins. There is little else to say about the set; the pictures show it all. Nothing less, nothing more.

Out of three minifigs, two are new (Ki-Adi-Mundi and the Geonosian) and the third i one of the important characters of the cartoon series: Commander Cody. No surprises there as it is the same one that appeared in the 7676 Republic Attack Gunship.
Ki-Adi-Mundi is a new character and stands out because of the peculiar shape of the head, which is a kind of "hair" that is added to the head of the minifig. Although it is one of the TCW minifigs and is a reproduction of the carton character, it is rather well done and makes a nice addition to the Jedi collection.
The Geonosian is different from the ones that appeared in
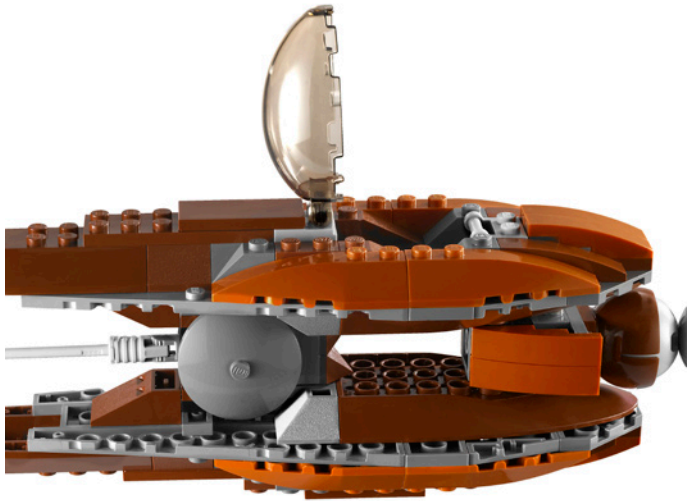
the The Clone Wars™ series which does not attract the same kind of public as the films and the minifigs, though attractive, are not so iconic as to think about buying the set just to get them.

It's an interesting set, and although it isn't spectacular, the mix of a peculiar ship and the new minifigs do make it attractive. However, the price is not in accordance with the set. I hope we won't see similar piece/price ratios in future licensed sets and that we will be able to enjoy many new ships and minifigs to complete our collections.

set #4478. The head is from a new mould and the legs are decorated. Since the Geonosians have so far only appeared in 2003, this ship is a nice opportunity to get one of them.

So far it is a nice set, until you have a look at the price. €49.95 for 155 pieces is pretty steep, especially since it "only" features 2 new minifgs. It's a known fact that the minifigs go a long way to selling sets, but I get the impression that someone overidid it when deciding on the price. It is not a 'cult' ship, but is part of

Review 8068:
Rescue Helicopter

Text by Jetro

Pictures by LEGO® Systems A/S

Set: Rescue Helicopter
Set number: 8068
Number of parts: 408
Recommended Retail Price: 29,95€

The LEGO® Technic assortment is characterised by a large number of cars, trucks and construction equipment. However, there are some other types of vehicles that keep coming back into the Technic assortment and provide the necessary variety.

One of these vehicles is the helicopter, which has been reproduced in LEGO Technic on numerous occasions. The second Technic set I received as a child was the 8844 helicopter, which in additions to the top and back rotors included retracting landing wheels. I remember how tricky it was to get the front and rear wheels properly synchronised, the chain links that were used to operate the rear wheels and how hard it was to make the bent shape of the cockpit with the Axle and Pin Connector Toggle Joint Toothed (4273) that were only loosely held together with half pins. But I also remember how proud I felt when I first completed the model and flew it through the whole house on my imaginary missions.

The 8068 Rescue Helicopter has a sleek and sturdy design, some nice curves which are very easy to build, and the advantage of being designed for rescuing, with a cargo bay that has opening doors and a winch to hoist up victims of a shipwreck. It is ready to spark the imagination of a new generation.

So let's have a closer look at the set.

The inventory

In addition to the standard parts you would expect in any Technic set, there are a couple of things that stand out for tis set. First off there is a considerable number of flexible elements – considerable for a set this size: 4 flexible axles and 3 flexible tubes help to create the curves that are so hard to get with other parts.

Secondly there is the wheel cover that was initially designed for the Ferrari 599 GTB Fiorano (8145). In this set it is used for the tail rotor of both the main and secondary model. It simulates the protected tail rotor of the rescue helicopter very well, but in the case of the B-model – an emergency helicopter – it doesn't quite fit with what you'd expect.

There are also no less than 12 panel fairings used in the set. To be honest, they are very well used in the main model but only four of them find their way into the B-model. They are simply not needed there.

The model also includes two Toggle Joint (87408) – an improved version of the older 48496 – which are wonderful for making compact gear assemblies at 90 degrees, and four black "spacer" pins (87082), one of my favourite parts from last year.
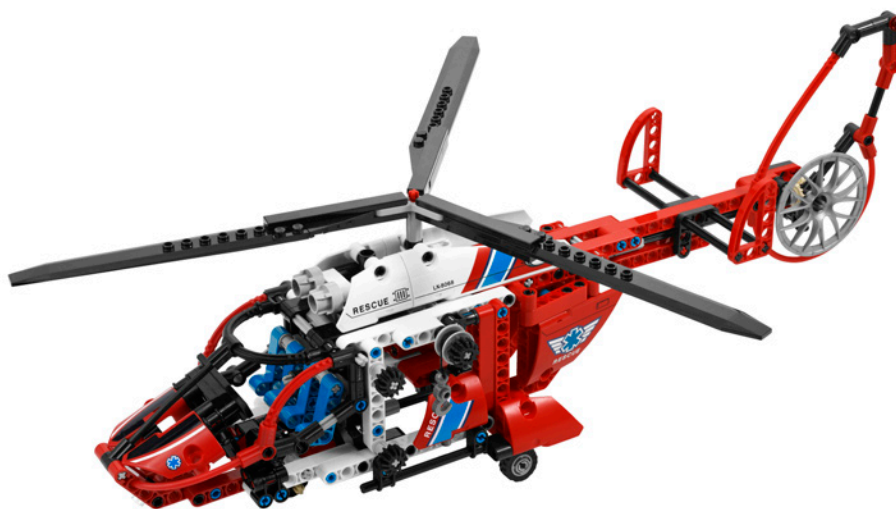
Last but not least, the set has printed instructions for both models (one booklet for each), which makes it a great starter set if you want to introduce someone to Technic – I always prefer having printed instructions to having to download them from the Internet.

Building the main model

The building process is quite attractive. In addition to the structure, one of the first elements you start building is the mechanism for retracting the landing gear, using a worm gear to ensure the wheels will not collapse into the model if not extended completely and strong knob wheels for transmitting the force. A mechanical stop at the front wheel prevents the assembly from going too far in, as does a mechanical stop at the rear wheels in the opposite direction.

Next up is the mechanism for the rotors. Despite the 1:1 gearing the rotor speed you can achieve by turning the 12tooth gear attached to the assembly is adequate (faster might be dangerous). The simple assemblies for the opening doors and the chairs in the cockpit follow, after which it is time to start bending flexible elements to finish the cockpit design.

As noted earlier, the use of panel fairings is not excessive and in some cases especially right, like in those protecting the rear landing gear or in the simple though very effective assembly that simulates the engines on top of the helicopter.

The pulley mechanism (which is repeated identically in the B-model) is so simple it is almost disappointing, but it is very effective. It simply takes advantage of the friction of the long pin with stop bush it is attached to.
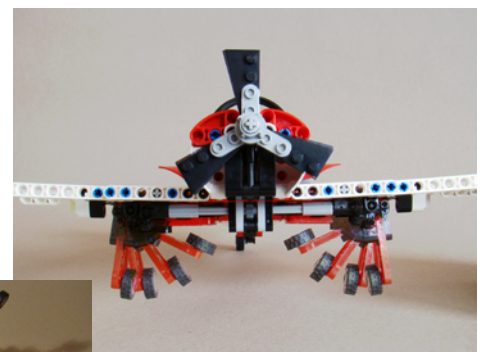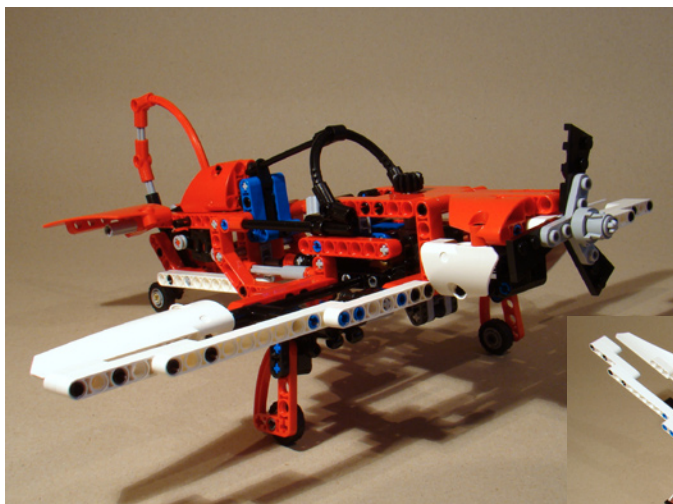
The tail rotor assembly is achieved with a minimum number of pieces, but lends great realism to the model, as do the stabilizers.

The main rotor (which again is used identically in the B-model) contains the only studded parts in the set (not counting the round transparent plates that are used as lights) and the slight offset from the normally odd Technic elements to the usually even System parts lends it additional realism by simulating the inclination of the rotor blades.

The only drawback I find in the construction is a series of 6 liftarm 1x2 thin which are placed next to each other on the same axle and are very hard to separate later.
There is a sticker sheet with 12 stickers, 10 of which are for the Panel Fairings and the remaining two for the control panels in the cockpit (built with two tiles). However, even though the stickers enhance the model, without them it still looks great.

The B-model

The second model in the set is an emergency helicopter. As usual in B-models, it is simpler than the main model and since it is another helicopter it uses virtually the same mechanism, including the winch. In this case there are no opening doors or retracting landing gear and the build is a bit simpler. Nevertheless, the model is again very playable and sturdy

Conclusions:

The 8068 Helicopter set brings a return of a medium scale helicopter in the Technic range. The design of the main model is very close to real life rescue helicopters and the fact that instructions for both models are included in print is definitely a plus. In addition, the relatively large number of panel fairings and some other interesting parts make it a nice addition to an existing Technic collection.

If you want some more inspiration for something to build with the pieces from this set, have a look at the plane Tomas Vit ("Tomik") built. It features turning ailerons and elevator controlled by a stick in cockpit and a retractable landing gear. There are more pictures in his Brickshelf account:
 http://www.brickshelf.com/cgi-bin/gallery.cgi?f=470007
#

Review 8110: Unimog U400

Text by Fernando Correia

Pictures by Fernando Correia and LEGO® Systems A/S

Set: Unimog U400
Set number: 8110
Number of parts: 2048 (plus spares)
Estiamted Retail Price: 180-185€

The Unimog U400 is the most anticipated LEGO® Technic set for 2011. Probably also the most successful at hiding its details, from the leak of the first images to the limited availability of this set.

The package and content

The box guarantees the first contact for itself, of course. It has the usual size and nice look, charasteristic to all the LEGO Technic flagship sets.
Opening the huge lift-up cover we can see all sort of details about the model's electric and pneumatic functions, as well as the different attachments combinations available.

With 2048 parts, this is the biggest official LEGO Technic set

ever released. The box despite being big, comes reasonably full of LEGO parts and of course the huge new tires take their part in the available space...

The bags with the parts are numbered from 1 to 4, which will help the building process for those willing to take advantage of this aid.

● Bags "1" - For the chassis
● Bags "2" - For the cabin
● Bags "3" - For the cargo bed
● Bags "4" - For the front and rear attachments

The building instructions and stickers come according to the new packaging standard for large LEGO sets, in order to avoid frequent damages during transportation as often occurred in the past. This is definitely a great measure and a sign that TLG is willing to listen to the concerns of the fans.

We get included 5 booklets with instructions that follow the numbered bags, but which do not split according to those. So it does not seem made to facilitate shared building this huge set among several family members. This always makes me

71

wonder how the instruction booklets are divided and why so many books as is the current tendency.

Together with the booklets there are also two small sticker sheets (again I wonder - Why not all in one sticker sheet?). Among operation instructions and some warning signs, there are also several references to the Unimog and to the licence with Mercedes-Benz.

As usual, the huge part assortment of the U400 and their respective part numbers is shown on the last pages of the instruction manual. There are plenty of new moulds and existing parts in new colours, as we will see further on.

The new parts

Since this is the 2011 LEGO® Technic flagship and from what we already knew, you may expect to find several new parts within this set.

Let's take a quick look at them.

Probably one of the things you will first notice when looking at this new model is the new and large tires. These fit onto the existing 56 x 34mm wheel (44772) but are definitely larger from any previous existing "standard" tires (non balloon format) for the same wheel. The new tire size is 94,3 x 38R, while the previous largest tires existing for the same wheel were 94,8x44R (Balloon) and 81,6x36R.

Also, a new tire tread was used, more suitable for such heavy duty machines like the Unimog and Off-Road or TrTr vehicles.

From left to right: the Power Puller tire, the new U400 tire, the Large Technic Racing tire and the 81,6x36R tire

Because of the Unimog's large part count, the suspension had to be reinforced to sustain all the extra weight. Thus we got a new "extra hard" version from the existing 9.5L Shock Absorber (2909). You can see all the different versions that currently exist, in the picture below.
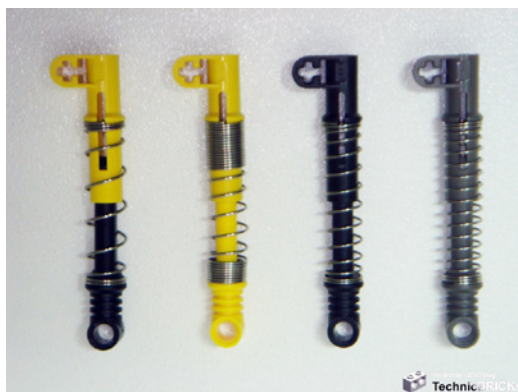

From left to the right: Extra hard, Hard and two variants from the Soft version of the 9.5L shock absorber.

Probably the most anticipated were the new parts used to build the portal axles. These include two new elements, the portal axle gear hub and the 3-pin wheel hub.

Once put together these are joined for life, or almost... At least you should put little faith in ever seeing them apart again! But the design of these parts is so single use specific... that there's probably no need to ever take them apart.

The gear hub design also allows for the usage of different gearing combinations. Double 16t for 1:1 gearing or 8t + 24t for 3:1 gearing which will become very useful for TrTr builders.
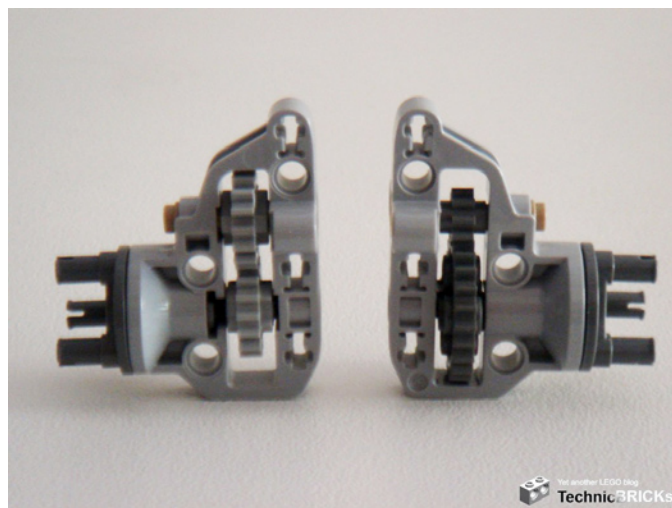
The double bevel gears 12t + 20t will also work, delivering an intermediate 5:3 gear ratio.

We got also two new elements that allow us to simulate a torque tube with LEGO parts, and basically consist of a large ball-joint. Unfortunately and against the expectations, one of these parts comes permanently attached to a C-beam frame, whereas a separate design with two different elements connected through a couple of pins or 2L axles would have been preferred, for a more generic use of these. It remains to be seen if this proposed solution would be stiff enough.

Then we have also a new version of the pneumatic mini-pump, with an increased 1/2L length. This was produced in LBG

instead of the traditional yellow and blue, likely to ease the distinction from its previous counterparts.

Pneumatic pumps used in official LEGO® Technic sets, like 8868 (Air Tech Claw Rig) and 8049 (Tractor with Log Loader), used the Small Pump (x191c01) in combination with a Technic Engine Crankshaft (2853) in order to achieve a 1L displacement. Although the old pump cylinder is capable of a 2L displacement, it doesn't fit within a linear setup over a Technic beam.

In order to achieve a 2L displacement (double stroke) and optimal pump efficiency, some other arrangements might be used, like a bent liftarm (6-4) or even some old school studmore designs. However such arrangements wouldn't fit properly in the Unimog and would also require more space. This was likely the reason for this re-design as the 2L displacement would be very important to achieve maximum power and enough air supply, for smooth operation of the grabber arm.

Finally there is also a pneumatic hose connector, which allows for Pneumatic Power Take-off (PPTO) terminations at the front and rear side of the chassis.
As seen from the first preliminary images, this was initially achieved with already existing parts. However these would not guaranty the required robustness when attaching and removing the hoses from the several pneumatic tools to attach in the Unimog PPTOs. Hence another new part (the blue connector above) was developed for this set, which was already full of new parts.

The parts assortment

Despite an impressive eight new parts developed for one single set, there are also some other parts released in colours never produced before.
The praise goes for all the new set of Technic panels and beams produced in Orange. This was probably the most demanded colour by the AFOLs, to be re-introduced in the Technic assortment. And finally we got eight new orange Technic elements, at once! I think you all agree that probably the most eye catching factor on the new Unimog, it is its distinctive colour scheme, where the huge orange cabin captures the first attention. It is also a great move from TLG to change from the traditional colours used for the Technic sets. Specially the ubiquitous yellow, in almost every official LEGO Technic building machine...

Another example is the large Technic turntable which is now introduced in the LBG/Black colour combination, instead of the usual DBG/Black and the 11x5 Technic panel released in LBG for the first time.

As for the remaining parts I'd say 8110 presents a very good assortment, with a very good balance in terms of diversity of parts and colours. Also the fact that it is a vehicle using both electrical and pneumatic functions, makes it a very interesting purchase, as you can get into one single set, all the parts for building suspensions, electric functions with gears and parts specific to build gearboxes, but also many parts specific for pneumatic functions (including the new ones) and a good amount of panels in one single colour. Many connectors, gears, U-joints, CV-joints, etc...

A fact that's worth to mention is also the presence of two types of differentials in one single set. Two from the newest 3L version (62821) and one older 4L version (6573), which was not used into a LEGO Technic official set, since 2009. The 4L version was recalled because of its 16t gear crown and how it facilitates the transmission design towards the engine.

Of course, in a set with over 2K parts you may also expect to get hundreds of pins and the like...

Regarding the new parts, the main complaint goes for the fact that most of them seem to have a too specific or single-use design (too specialized IMO). It is the case of the gearbox hubs for the portal axles, that AFOLs have been building very successfully and in compact designs for a long time, with already existing parts, delivering the same type of functionality. The C-frame with the attached ball joint is just another example, as already mentioned before.

Even so, it is still a great set to buy, whether you want to initiate into Technic and want to get a huge and diverse amount of parts at once, or you are an experienced builder willing to enlarge your collection.

The building experience

This year's flagship is definitively not the easiest LEGO Technic set to build. The huge part count leads to a long building time, which may turn into a demotivating factor for those not so experienced with LEGO Technic or the youngest, who may lack the required determination to make it to the end. Also some building steps, namely on the axles suspension/ articulation, are sometimes prone to mistakes and require a lot of attention to the details when following the building instructions. There are many places where one can easily make an error along the building process and it also happened with me, more than once... Fortunately I've always detected it in the following steps and did not have to revert many of them, to proceed.

The connection of both frontal and rear pendular axles to the central structure and driveshaft, uses the new large ball-joint parts which are the LEGO implementation of the so called torque tube.

A ball and socket type of joint called a "torque ball" is used at one end of the torque tube to allow relative motion between the axle and transmission due to suspension travel. The torque tube is hollow and contains the rotating driveshaft. Inside the hollow torque ball is the universal joint of the driveshaft that allows relative motion between the two ends of the driveshaft. In most applications the drive shaft uses a single universal joint, which is also the case here, but has the disadvantage that it causes speed fluctuations in the driveshaft when the shaft is not straight.
Since the torque tube does not constrain the axle in the lateral (side-to-side) direction, a Panhard rod is often used for this

purpose. The combination of the Panhard rod and the torque tube allows the easy implementation of soft coil springs in the suspension for ride quality.

Related with the usage of the Panhard rod in this model, there were discussions regarding a potential flaw or a mistake in the building instructions. It happens that the front and rear axles are built slightly different, leading to a small misalignment on the chassis.

The difference occurs because the lower end of the Panhard rod, is connected to the axles in different ways or using two different parts. A perpendicular axle hole and pin connector (6536) on the Unimog rear axle and a perpendicular double axle hole and pin connector (32291) on the front axle. While the correct way seems to be the one used for the rear axle, the front method causes an half stud offset to the live axle making it not straight.

At first sight this may seems to be a mistake, but it is completely intentional and there is a geometrical reason for this. When the suspension is fully compressed, the front axle needs to be centered right underneath the vehicle in order to prevent the wheels from hitting the chassis or the wheel arches, while steered.
When the suspension is fully extended the Panhard rod will make a "circular" movement that pushes the front axle slightly to the right of the vehicle. In the real world the length of the Panhard rod should be the largest possible to minimize this effect.
The advantage of the Panhard rod design is its simplicity and light weight. Its major disadvantage is that the axle movement must necessarily describe the above mentioned arc relative to the body, with the radius equal to the rod length. If it is too short, there will be excessive sideways movement between the axle and the body at the ends of the suspension.
A suspension design that is similar but dramatically reduces the sideways component of the axle's vertical travel is the Watt's linkage. Like other large vehicles with live axle suspensions, the real Unimog uses the Panhard rod as a component of the front suspension where Watt's linkage is not an option. And so also the Technic designers did!

One small detail that I've enjoyed a lot, was the sticker in the bottom of the chassis, with a reference to the "LEGO® System A/S". A clear reference to the company who designed the model, if there was any doubt about this... But after several stickers applied with references to Mercedes-Benz, it makes perfect sense for TLG, to stand their rights...

Likely because this is a licensed model from Mercedes-Benz, for the celebration of the Unimog 60th anniversary, there is no reference at any other sticker, about the LEGO Designer who developed the model. Unlike what has been done in other LEGO Technic sets from the recent years, specially the flagships. But if you don't know I can tell you, this was another model designed by Markus Kossman, who has also designed other large and complex models like the Mobile Crane (8421), Motorized Bulldozer (8275), Front Loader (8265) or yet another more recent Mobile Crane (8053).

The pneumatic functions are driven by an electrical air pump system. Once running it for a short time without operating any of the pneumatic cylinders (thus not consuming any air flow) the generated pressure increases and easily reaches the maximum allowed. Suddenly we start to hear a kind of rattling noise coming from the pump or nearby and I guess the air should start to leak somewhere. Likely from the pump seals, as the generated resistance is not enough to stop or even slow

down the PF M-motor.
In previous sets and MOCs where a pneumatic pump was used, we have seen such kind of pumps driven via a rubber belt or a clutch gear, as it is the case of the motorized version from the recent 8049 (Tractor with Log Loader). I'm not sure whether it should have been the case also here, but I'm confident on the Designers choice and let's hope this won't become a source of problems for this amazing set...

Another solution that may have helped to control the over pressure condition and consequent noise, could have been the use of one air tank (67c01), despite the extra cost this would represent for a set with already a premium price tag...
The Unimog air supply system does not use one to accumulate pressure. The pump is driven by the PF motor and attaches directly to the pneumatic hoses. Let's say the Unimog uses an electric pump instead of a compressor to feed the air circuit. However this should be very easy to MOD if you like to do so, as there is some free space on the right side of the chassis, next to the PF motor. Although an air tank doesn't fit totally in, it should not protrude too much.

After building the cabin and flatbed, the first attachment we build is a grabber that fits either as a front or rear attachment. It is powered from both a PTO (to drive the grabber arm turntable) and a PPTO which supplies air to the several pneumatic cylinders used in the arm (in the boom, dipper and claw).
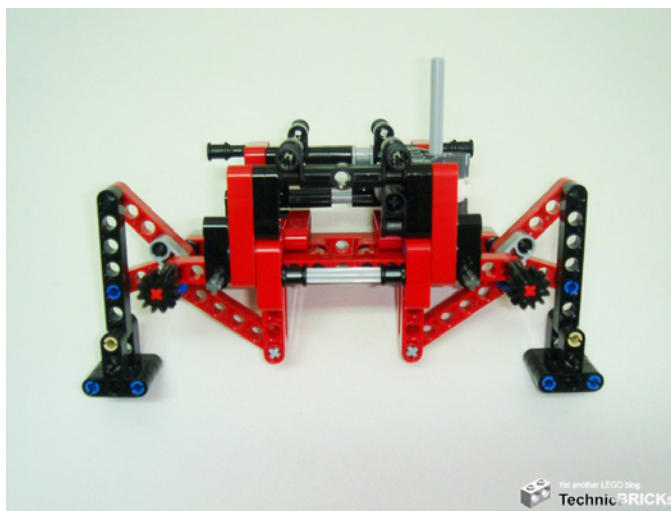
We start building the lower part first, which consists of the manual outriggers or stabilizers and the structure where the grabber itself gets attached.
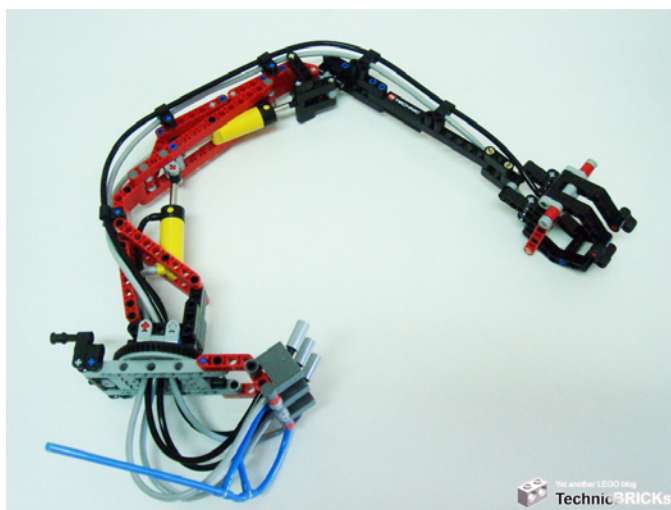
The grabber arm is controlled manually, from three pneumatic valves also located in the upper part of this attachment. By design and to avoid twisting the pneumatic hoses beyond the limits, the grabber rotation is physically limited to a bit less than one complete turn (360º).

The main model includes a second attachment which consists of an electrical winch, that also fits either as a front and rear attachment.

As an electrically operated attachment only, it uses the PTO but the PPTO is left unused.

Functionality and playability

Once the model is built, you get with a plenty of functions to play with. Besides all the winch and the grabber play possibilities with the respective pneumatic and/or electrical functions, there are still some other points of interest in this model. For instance you can tilt the cabin like in real trucks, to uncover and see the L4 engine.

Once laid down, you can fix it by sliding-in the two red long pins with stop bush. These are however of very difficult access.

The suspension is also a source of fun for itself. However you may find it not as hard as it would be advisable. Despite being enough to sustain the model's weight, it is not always hard enough to make the springs instantly to return back in place, when you tilt the model to a side. Hence it is easy to find the whole cabin slightly tilted towards one side. Though the rear outriggers may help to prevent this, when parked!

The B-model

As you might know, the Unimog is a versatile work vehicle, also known for the variety of attachments available to adapt it to different functions and needs.
TLG perceived this as the essence of this vehicle and decided to develop a B-model inline with this characteristic. Hence, the Designers chose to develop another attachment that, along with the Unimog base truck, would constitute the B-model.

In this case it was chosen to design a snow plough that fits to the front. This attachment uses two pneumatic cylinders to raise and tilt the plough, and one additional manually geared function for the fine vertical adjustments. Thus it just uses the front PPTO, leaving the PTO completely unused.
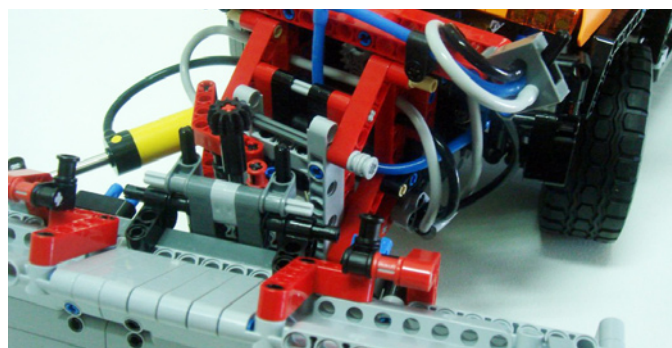
Now it's up to you to create as many as new attachments/tools to the LEGO Technic Unimog, as you like!

The verdict

Although labelled for the 11-16 age range, the Unimog U400 looks definitely targeted for the AFOL segment because of its size, huge part count, complexity and number of functions, to mention just a few.
Things I like: massive introduction of parts in orange; massive reintroduction of pneumatic elements and extended part count; complexity and functionality, at the cost of a higher price than many confirmed to be willing to pay.
In my opinion this set clearly ranks the maximum in most of the categories except regarding in terms of parts innovation. Despite the huge effort and resources probably allocated to design and produce a bunch of new parts, and the adoption of uncommon colours in the LEGO Technic theme up today, it suffers from too much specialized (single use) new parts, as already mentioned earlier in this review.
The gigantic aspect of this set and its huge amount of parts are of course reflected in the final target price. Despite fitting the AFOLs or more simply put, the adult segment, this may turn into a sales disadvantage for mass sales of this product. Only time will tell!
You can find a larger review and videos at: http://technicbricks.blogspot.com/2011/02/tbs-techreview-13-8110-unimog-u400.html
#

Review 8486: Mack´s Team Truck

Text by car_mp

Pictures by LEGO® Systems A/S

Set: Mack´s Team Truck
Set number: 8486
Number of parts: 374
Minifigs: -
Recommended Retail Price: 44,95€

With the launch of the new Cars 2 film, LEGO® and Disney have given this theme a new boost. Up until now, there were only a number of sets available in the Duplo range, and this year a new series of sets have been presented for a target age of 7. In this line there are two kinds of sets. There is the typical set that reproduces scenes from the film, which have been designed as play sets, and the Ultimate Build models which allow you to build some of the main characters in greater detail, although without much complexity since the age range is the same.

With regard to the set at hand, first of all I should highlight the absolutely huge box, excessive by any reckoning, and the enormous sticker sheet which we'll have a look at later. The construction is divided in two booklets. In the first one Lightning McQueen and the tractor unit of the truck are built and in the second one the trailer.

Building Lightning McQueen I am constantly reminded of the LEGO cars from the dark days of LEGO, when the use of large elements reduced any car to half a dozen parts. In this case, two parts suffice to build the bonnet and the eyes/roof of the car. Maybe it was too difficult to reproduce this car at this scale in a way that would make it clearly identifiable without resorting to such big moulds, but I can't overlook how unchallenging this is even for a seven-year-old. On the up-side, it great to see all the pieces of the car are printed and the stickers are used only for the truck. Without a doubt, the car will be the most played

with part of the set and stickers wouldn't have lasted very long.

The tractor unit is a more classical build, with more standard parts, but with lots of stickers. The only thing I'd change in this accurate design are the wheels which appear slightly small for the overall look of the model. Unfortunately the stickers start to invade everything.

The same booklet also has instructions for the flag and the tool-tray, both of which are merely token elements.

The last element is the trailer, which consists of two parts. I must say I like the design and I believe kids will love it as the fact that it can be opened almost completely offers many play opportunities. On the other hand, I don't like the ramp, which is too simple and doesn't allow the car to enter the trailer smoothly as it bumps into the hinges.

Though I do not like them, I must admit that the use of stickers in this kind of model is justified. If you want to be faithful to the original cartoon characters, including all the publicity these race cars carry, this is your only option as printing all those parts would be very costly and elevate the already relatively high price of a licensed set.

Considering the finished set, I believe the result is satisfactory, the building experience is practically zero for someone with a little LEGO experience, but I think it will be sufficient for its intended customers. And on the other hand, the play experience is its strong point.

Acknowledgements: Jan Beyer for the set and LEGO Iberia S.A. for the official images
#

Review 10218: Pet Shop

Text by lluisgib

Pictures by LEGO® Systems A/S

Set: Pet Shop
Set number: 10218
Number of parts: 2032
Minifigs: 4
Recommended Retail Price: 149,95€

"Welcome to the Pet Shop. We have everything you need for your pet". That would be the welcome we'd get from the owner of the pet shop we've built for this review.

It is the first time in a set of this kind that I build two 16-stud wide modular buildings. The only precedent is Market Street, but that consisted of a 16 wide building with a 16 wide porch, so it cannot be considered as two buildings.

For starters, I like the idea of having a shop and a house as I miss having more living space in LEGO® cities.

Building the house

The building instructions are spread over two booklets. Each one serves to build one of the buildings. The bags are separated in 4 groups, 2 for each building.

The first building I built was a house. Once again the minifigs have the classic smiling face. It's a bit odd to see the smiling face with a modern haircut, but I must admit I like it. The building comes with woman wearing red-purple clothes and a painter with blue overalls. Both torsos are decorated on front and back.

I start with the ground floor of the building. The base of the building is three bricks above the baseplate. The lower part is a cellar that can be accessed through a trap door inside at the back. I would like to highlight the rear access which has been made with a Black Window 4 x 4 x 3 Roof with Bottom Panel connected to two Dark Bluish Grey Door 1 x 2 x 3 with Vertical

Handle. Although this combination may have been foreseen it took me by surprise.

The colour scheme is very discreet, using brown, light brown, grey and white. The front has a big window in the same style as the Green Grocer. The lower part is built with two White Brick, Round Corner 3 x 3 x 2 Dome Top inverted. The technique used for placing these parts is very elaborate and it's the kind of technique you won't find a typical set from the catalogue as it can be difficult for children.

There are some stairs with railings to get to the front door. The columns for these railings are skeleton legs. To the left of the door there is a red letter box which has become standard in the LEGO® City, substituting the yellow one that was used some years ago. Above the door there is a decorative cornice made with Brick, Modified 1 x 2 x 1 1/3 with Curved Top y White Minifig, Footgear Ski, an element that was also used for the entrance to the Cafe Corner, and which has been given another opportunity with a completely different placement from before.

For the inside of the ground floor of the house I built several decorative elements, like a sofa, a small table (that open the small trap door that gives access to the cellar) and a classic telephone. The most interesting element is the staircase, which starts straight, but then starts winding towards the end. This last part is built with the same technique used the Market Street. Under the stairs and (obviously) protected by a door, there is a complete toilet. The floor is in two colours and the toilet itself is very well built, with a limited number of parts.

Externally, the first floor is a continuation of the façade of the ground floor. On the inside it has a complete winding staircase which provides access to the attic. The is no decoration... because the painter is busy working. This has been one of those nice little surprises in the set. A painter with his bucket of paint, pail and roller, built with common elements and looking good. There is a Tile 2 x 4 on the unpainted wall, and by placing the painter's roller on it, it looks like he has just started his job of painting the walls white.

The attic finishes the building. Again, there are no outstanding elements. Coming up from the stairs, the first thing you find is a window in trans blue and trans orange that reminds me of the building style of

the holiday houses I used to go to when I was little. There are some 'boxes' that look like the packed possessions of the owner of the house. A small railing protects you from falling down the stairs and there is a door that leads to a small terrace with a minuscule urban garden.

On the outside, the style is classical, built with Dark Red Slope 75 both on the front and the back. To the front there is a small window to the left with Light Stone Grey columns on either side and a Dark Red arch on top. On the right side there is a window that opens, with a green and grey marquee, There is also a white and brown cornice in the style of the rest of the building. The roof of the attic is very simple and almost without decorative elements.

Building the Pet Shop

It is curious that the first thing you build is the house, when the pet shop lends it name to the set. The colour scheme is completely different in this case. This building is done in Tan, Medium Blue, Light and Dark Stone Grey and Black.

The two minifigs that come with it are the shop attendant and a girl. Contrary to the house, the pet shop is at street level. The floor of the ground floor is done with Medium Blue and Tan tiles matching the outside decoration. To make it real pet shop it needs elements on the inside to keep animals and accessories to sell. In this case there are two display cases, one for a dog and the other for a cat. In the one for the cat there is a funny scene, with a hole in the wall from which a mouse emerges, and the cat is ready to pounce on it. There is also a aquarium with a coloured fish and some algae. For the aquarium the 4 stud wide Windscreen (Windscreen 2 x 4 x 2 Vertical, which was much used in the 80s) makes an appearance. In the shop window there is a post with two parrots. Like any shop, this one has a cash register on a counter behind which there are some shelves with accessories like a porcelain frog or a birdcage

The outside of the shop has a door and a large shop window. On top of the door is the air-conditioning unit and above the window a marquee. The sign for the shop is made with normal and modified plates and tiles in blue and white. It's a mix of the techniques use in the Fire Brigade and Grand Emporium.

To the right of the shop there is the doorway that leads to the

flats on the upper levels. In the roof of this doorway there is a lamp to illuminate the stairs which are separated from the shop by a wall. The first part of the stairs is built with bricks and the second part with Stairs 7 x 4 x 6 Straight Open. The second part is build like this in order to allow access to the display case with the dog.

The first floor is a well equipped studio. It has a kitchen with a coffee machine, a sink and an oven with a cooker on top. Next to it there is a fire place to warm the cold winter nights. There also a chair and a table to eat at and a clock on the wall to finish it off. Another flight of stairs leads to the top floor. On the outside it is very simple, but no less attractive for it. Both on the front and the back, there are tan windows and Medium Blue columns. Some small cornices with flowers give the façade a touch of colour.

The attic has only half a floor. The other half allows the chimney from the first floor to rise to the roof. There is a bed as main element for this floor. A white railing protects you from falling to the lower level. There is also a lamp to illuminate the bedroom.
The outside is very similar to the other building, although in this case, the roof tiles are black and the finishings in style with the rest of the building. The windows are a bit more elaborate with rounder shapes and more decoration on the inside, but without overdoing it. Something I don't understand is the use of the Window 1 x 2 x 2 with Rounded Top for windows in modular building, although it has been used since Cafe Corner. This element does not have a glass pane to complement is and the open windows look a bit strange.

The roof has a skylight to provide daylight in the bedroom and a small decorative cornice.

Overall impression

After finishing the two building and putting them together you realise they both have a very realistic design. Aesthetically speaking, the building are rather austere, although the combination of colours and the style of the façades is attractive once you put them together.

In the house I'd like to highlight the large window which, although similar to that of the Green Grocer, breaks the uniformity of the façade. The attic stands out because of the little details, like the window and the terrace with the garden. On the inside the winding stairs and the toilet under the straight stairs stand out. The painter with the roller painting the wall is a beautiful detail.

The pet shop contains more highlights. As all modular building it does not include a single sticker so the "PETS" sign stands out for its design and how it fits in the façade. This façade is simpler than that of the house, but the colours stand out more. The pet shop is completely equipped. Decoration, details, animals, cash register... It's got everything. I especially liked the studio on the upper floor as far as interiors are concerned. With few pieces you can build a fully equipped home. The bed reminds me of the one in Medieval Market Village. Anyway, it fits in nicely with the rest of the decoration.

After placing the building next to the rest of modular buildings (Cafe Corner, Market Street, Green Grocer, Fire Brigade and Grand Emporium) I realised these are a little lower than the others. Far from an impediment, this is something I appreciate as walking through any city you don't normally get completely uniform buildings, especially in the old centres of European cities. I like the fact that they can be place either together or separate as that lend more versatility tom our layouts.

Conclusions

The set is very nice to build. After finishing the first building you can stop to have a look at the details of what you have just built... and then there is still another building to go!

Each time a new modular building comes out I have a look at the pictures and imagine what I'm going to find. When I start building I always find surprises and little details you don't see in the pictures. This ability to surprise is what keeps me 'tense' while building.

In the case of the PET SHOP there have been many small details I have loved. The old style phone built with 4 parts, the rear entry to the cellar of the house, the fully equipped studio, the roller of the painter... There's no end to them!

Together with this review you'll find an interview with Jamie Berard (to whom we are very grateful for his willingness to help us) which will shed some more light on the details of these buildings. We hope you'll enjoy his answers.

As always hours of fun and surprises waiting to be discovered. Modular building have become something that defines the essence of the LEGO® Company. And now for another year of waiting... Patience!

#

Functional test 7287: Police Boat

Text by lluisgib

Pictures by LEGO® Systems A/S and lluisgib

Set: Police Boat
Set number: 7287
Number of parts: 172
Minifigs: 3
Recommended Retail Price: 29,95€

The police boat is part of a series of floating boats that have appeared in the catalogue over the last few years with each new police or fire brigade series. In this case it is the second police boat, after the 7899 in 2006.

Unlike the first two references, this boat (like the one from last year's fire brigade) doesn't have motor. Therefore, in order to do this test I have had to get one out of my collection and I have used the motor of the 4669 set from the Junior Theme of 2004.

For the test I went to the gardens of the Palau Reial in Barcelona which has some fountains where children play with radio controlled boats.

The hull of the boat has two connection points for the motor, one in the center and one astern. I've done the tests with the motor in both positions.

Placing the motor in the central position the boat sails very smoothly. Due to the weight of the motor, the boat lies low enough in the water to be stable. The boat lies perfectly horizontal, and remains so when sailing.

When the motor is attached in the rear position something curious happens. Although there is almost no difference in the position of the boat when simply floating, with the motor engaged the prow (front) lies lower than the stern (rear). You'd expect the opposite to happen, but I suppose the push of the motor causes this phenomenon.

There are two details that stand out and confirm that the playability of the model has been well studied. The first is that not a drop of water has entered the boat at any time, despite the long time it has been in the water. The second is that the stickers have remained unaltered (I must highlight that I applied them some days prior to the test).

It's a good set for the summer, when you take the kids to the pool, so they can play out their own stories and persecutions in the water. It's a pity the motor is no longer included as it is an important element for the playability of the set.

On our website you can see a video of the boat in action.

Acknowledgements: LEGO® Iberia A.S., Joachim Schwidtal and Rosa Seegelken for the set and the official images.
#

Alternative models 7326: Rise of the Sphinx

Text by car_mp

Pictures by LEGO® Systems A/S and car_mp

Set: Rise of the Sphinx
Set number: 7326
Number of parts: 527
Minifigs: 3
Recommended Retail Price: 49,95€

Once again we recover this irregular section in which we present some modest thoughts on the potential of LEGO®, if we were to have only one set at our disposal. In this case we have a look at a set of the Pharaoh's Quest line, the 7326 "Rise of the Sphinx".

The official model is quite interesting and especially very playable, with a vehicle, a secret chamber and a sphinx that can get up and stand. Regarding the colors of the parts, it has plenty of tan and dark tan. As for variety, it has many "slopes",

including colors like dark red or dark blue, and enough small plates.

The first model emerged from the 4 giant tan slopes that the set brings. They are well suited to the closure of a gable roof. However I was surprised at how little grip these pieces have. In the end I built a small mountain hut with a "classic" minivan.

The second model was created trying to exploit the wealth and diversity of hinges that the model brings, and it is a small "mecha" with a certain "classic" look, provided by the grill. Both the dark red and the dark blue parts are very useful to combine with colors such as gray or tan.

The third model emerged accidentally, starting again from the
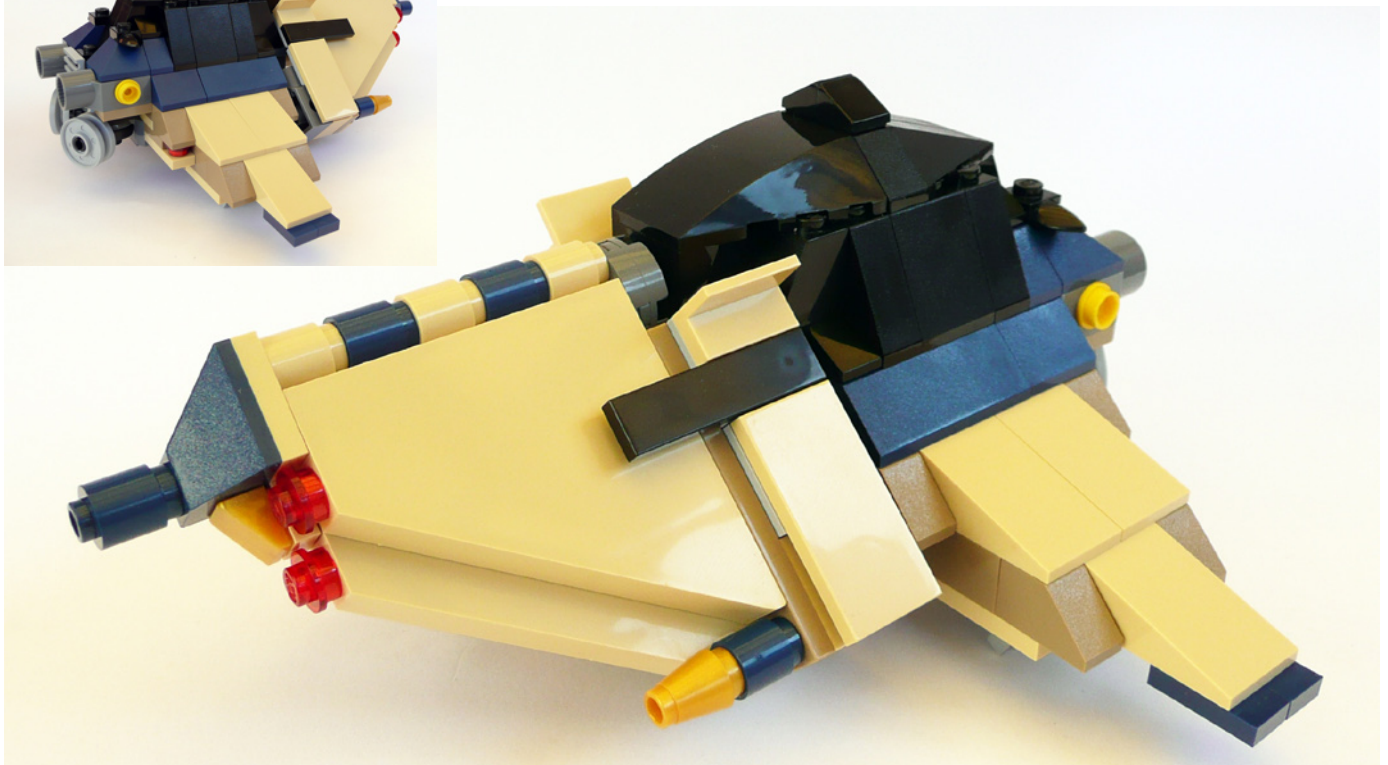
tan slopes. It is a small spaceship. The hardest thing was to get the rotation between the cockpit and nose, achieved thanks again to the large number of hinges. Although not shown in the photos, the landing gear is built with the legs of the minifigs from the set.
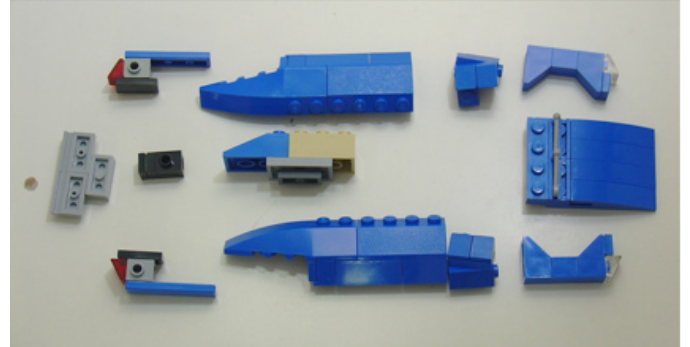
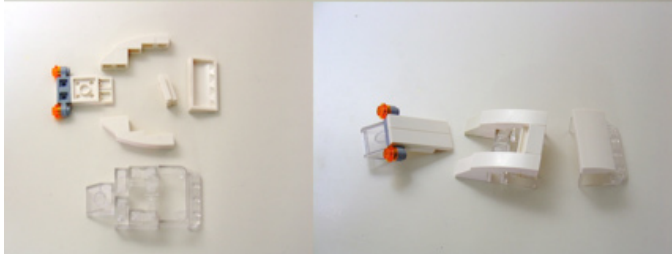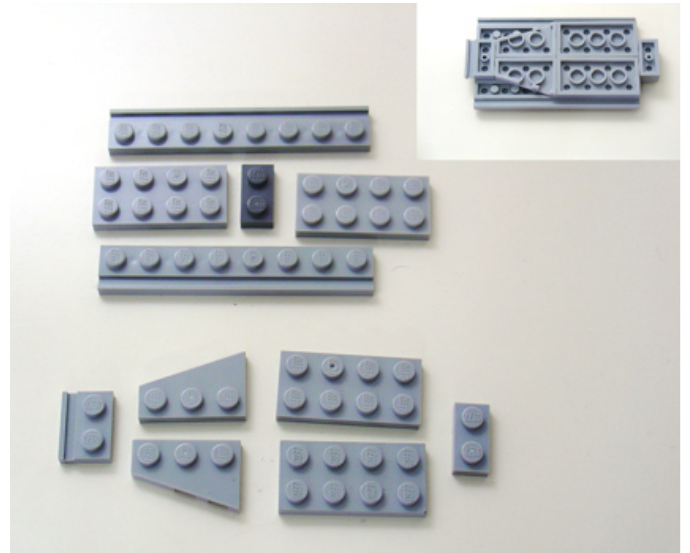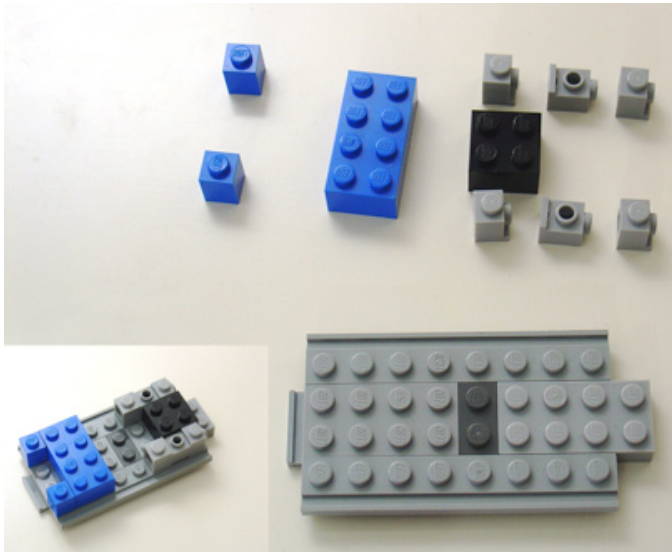I hope you enjoy them.
Until next time

#

Instructions: Citroën DS (1970)

By Hoexbroe
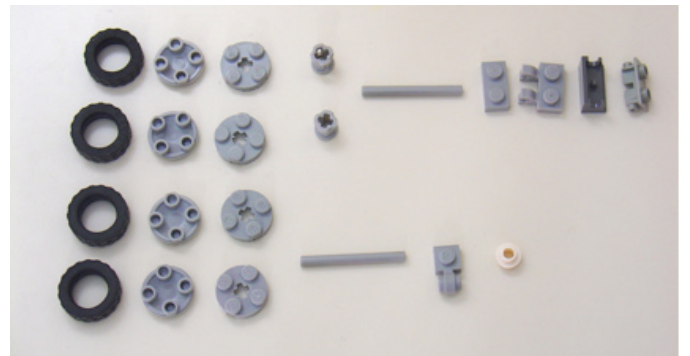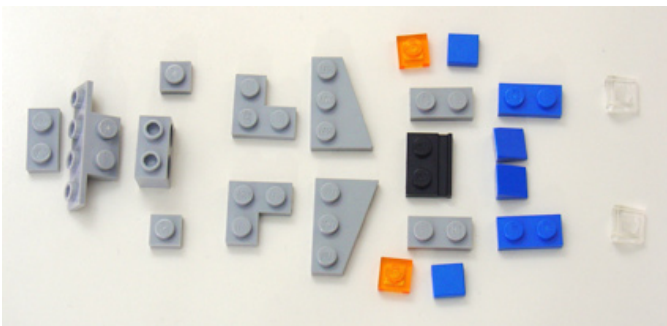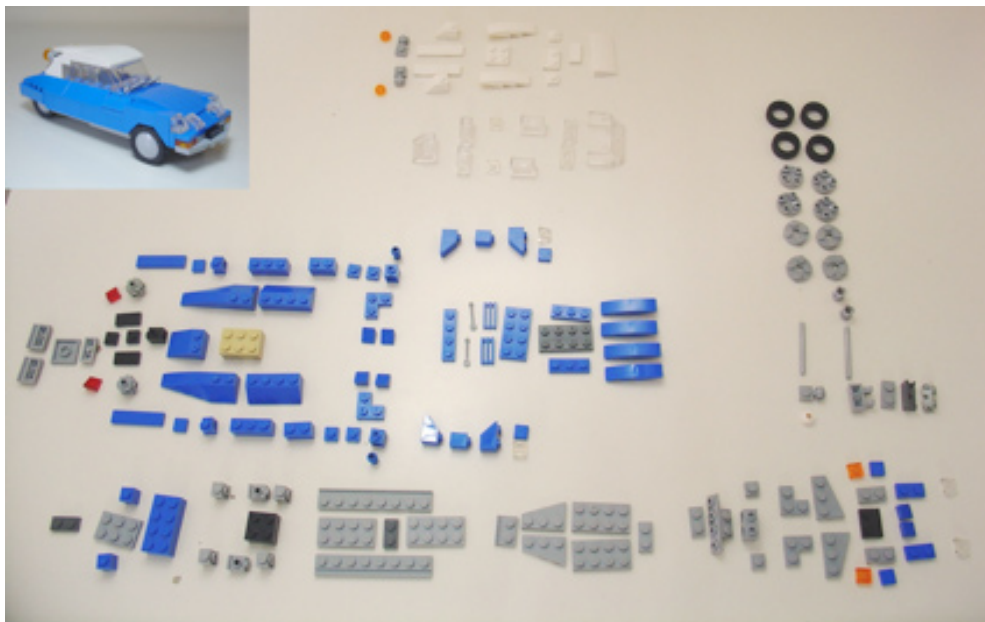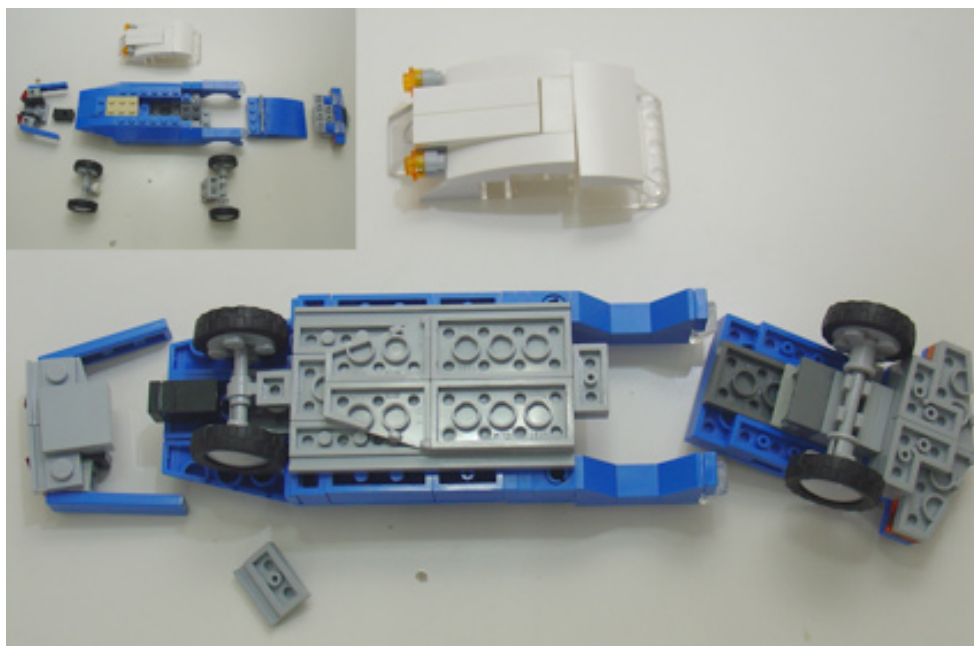
Great creators of the world: Barney Main

A young artist with surprising new ideas about the use of parts and techniques to add realism to his creations.

By Hispabrick Magazine

Pictures by Barney Main

Hispabrick Magazine: ¿Nombre?

Barney Main aka SlyOwl

HM: Age?

BM: 18

HM: Nationality?

BM: English

HM: What do you do normally?

BM: Student - hoping to do engineering at university next year.

HM: When did you first start building with LEGO®?

BM: When I moved on from Duplo! Probably when I was 3 or 4, when I got a box of basic bricks with a few minifigs and trees. But there was also 6581 Dig 'n' Dump, which is still close to my heart. I still remember using the technic axles from it to try and make a Roborider when they came out a few years later!

HM: And your last set?

BM: Hmm... I don't really tend to buy sets anymore, instead Bricklinking the parts I need. I did recently buy my second 10192 Space Skulls - I'm not really a space fan, but I love the parts selection and design of this set.

HM: Your favorite commercial LEGO® building theme?

BM: I think I should probably say pirates, judging by what I tend to build! I probably prefer castle though, as it has more potential, but I also have a soft spot for Technic, even though I'm hopeless at it!

HM: What is your favorite LEGO element and why?

BM: I have a tray of parts that I invariably use when building - headlight bricks, lightsaber bars, clips, travis bricks - but I wouldn't really like to choose between them. Perhaps the 1x2 plate wins out in the end, as I'm always reaching for them to get me out of a mess.

HM: Which part would you like LEGO to produce?

BM: I haven't got a clue! I reckon that if there isn't a part, there's normally a way around it. Truth be told, with the quantity of great new parts that LEGO has been releasing lately, I'm really enjoying what there is, without wishing for more!

HM: How many hours do you spend building with LEGO?

BM: Too many! Probably about an hour a day on average.

HM: What do your family/friends think about this hobby?

BM: They're generally quite supportive, but I have to put up with some mild teasing now and again!

HM: Do you draw or pre-designs before you start building?

BM: I sometimes do an incredibly crude sketch, or even just jot down a few words, to remind myself later what I'd intended to build. Nonetheless, the finished model is rarely anything like I'd originally envisioned! Sometimes I have a model in my mind for month, or even years, and only start once I get a window of opportunity, but much more often I just start building without an idea, and just go with the flow...

HM: If you had to choose one among all your creations, which one would you choose and why? The topics of your constructions are very different lately, where do you find inspiration for these MOCS?

BM: Possibly British Brickie's Break (http://www.flickr.com/photos/27444109@N04/5553445901/in/photostream). It's a departure from my normal building style, but I love building at life-size scale, as there are so many possibilities. I'm also really happy with the way the photograph came out: we had builders outside our house, so I got to use an authentic backdrop! This one was for a contest on MOCpages, and it's contests like this that force me to try things I wouldn't normally, which is why I've been deviating from my normal diet of pirates and castle recently.

HM: The increase of AFOLs and lines like Star Wars™ create new possibilities not imagined before by LEGO®. What do you think about the old school LEGO and the new LEGO?

BM: Whilst I have a huge respect for the classic sets, I think that the modern ones beat them hands-down. The parts, the colours, the minifigs, the construction are just so much better! I think that maybe the classic LEGO ethos was better than the current one - that of stimulating children to build and play from their imaginations, rather than spoon-feeding them. I recall reading lately that Meccano used to put deliberate mistakes in their instructions to encourage children to think for themselves, and this is similar to the sort of thing I that I feel LEGO has lost out on recently.

HM: What do you think about the use of non-official parts (stickers, modified parts, non-LEGO elements,...)?

BM: I'm on the fence on customisation. At heart I'm a purist, but I have meddled in the dark arts a little!

HM: In your MOCS we can see that you like to find alternative uses to almost all the parts in the LEGO repertoire. How did you manage to find these applications? Pure inspiration? Do you play around with the parts until you find a new angle? … Speaking of angles, in your dioramas there are often parts placed in angles that are difficult to obtain with LEGO, but that provide a great effect of realism to the set. How do you make the decision to include these angles in your dioramas?

BM: I wish I knew! When I'm building I just see the need for something and then something clicks in my mind, and I have the solution. Whenever I get a new part, I do make sure that I "get the measure of it" - I try it out in various combinations, seeing what could be done with it, and maybe this helps when I'm trying to think of a way to do something. As adult collections go, mine is relatively small, and this actually forces you to innovate, when you don't have the parts that you want. Similarly, it also forces you to conserve parts whilst building, and this is why I often go for strange angles - it's not that I like building that way, it's just it often uses less parts! For example, when making a rock formation, putting tiles at angles using hinges can supplement using normal slope bricks. Maybe my collection is getting bigger now, but I still build the way I taught myself!

HM: Have you had a Dark Age? Do you think there is something that LEGO could do to prevent many young people from going through that stage?

BM: Not really, I've survived so far! But I can see how easy it is for people to lose their love of LEGO in their early teenage years - as to what can be done about that, I'm not sure. Discovering the online LEGO community was important in keeping me building, so perhaps finding an intermediate between the LEGO.com website and the adult forums that could foster building techniques and relationship skills, readying them for the world of the AFOL, would be a good thing. I can't see it as either a feasible or easy endeavour, however!
#

5 questions to...
Jamie Berard

Senior Designer
Creator Design Team

This time we have interviewed Jamie Berard, one of the designers behind the modular buildings. We have asked him some questions about the Pet Shop, the new set of the modular buildings collection, as a supplement to the review.

- Why were choosen 2 16-stud buildings instead of 1 32-stud?

We've been very careful to make sure the street continues to surprise you guys with a variety of building styles, sizes and themes. The 32x32 layout has worked well for us in that it gave impressive buildings with lots of access to interior space. However, the street was starting to look a bit too 'square' and predictable. By introducing two 16x32 buildings, we can now play around with the look of the street while at the same time delivering a different building experience. It was particularly fun trying to come up with different ways of maximizing interior space. This helped give us the idea for the spiral staircase.

- There are plenty of different shops that can be reproduced. What reason did you have to design a Pet Shop?

The Pet Shop idea came about because of all the new animals which have been developed lately. Harry Potter released new printed owls. Kingdoms gave us chickens and goats. Prince of Persia gave us ostriches and camels. City even had a farm with pigs and cows! Everyone lately seems to be talking about animals. How could we not want to bring some of this fun into the modulars??

- What rules do you follow to choose the colours of the buildings?

We choose to build in a reality-based color palette. It definitely makes life more difficult for us because most elements are available in primary or bright LEGO® colors. However, we really feel it adds to the level of authenticity and also provides a unique opportunity to give fans some bricks in colors they perhaps have never seen before or always wished for.

Each of the modulars is permitted a limited number of color shifts which allows us to use bricks in colors which are not currently being used by other sets. This means we really need

to be smart about which bricks we choose to use to make up the building. We often will go for the most standard bricks because they offer us the most flexibility. The Pet Shop, for example, uses only 4 different shape elements to create an entire building in sand blue.

- In each new modular set the interiors are becoming more detailed, is that the new philosophy for modular sets?

The modulars are developed as an extension of the Creator line. Because of that, many of the Creator guidelines were used in the initial development of the models. Cafe Corner had no interior because Creator houses at the time had no interior. However, as the line has grown in popularity we have evolved the concept so that there is more of a complete experience both inside and out.

Interiors are now a part of the modular concept. We always focus on the exterior first, but then use the remaining budget to fill out the inside as best we can.

- Have you ever thought about a furniture set to complete models like Cafe Corner or Market Street?

Since the Cafe corner, this has been a popular request. It's a bit tricky for us to release a set with just furniture because it would have to take the place of another model. It's tricky to decide: should we make a furniture set or Tower Bridge... furniture or the Winter Toy Shop....Furniture or Emerald Night... It's always a tough choice when we are only allowed to create a limited number of sets each year. So far we've tried to address this suggestion by adding more and more interior to our buildings. From the feedback I've heard, many fans appreciate this.

Many thanks to you and the fans for your enthusiasm for and support of the modular line!

\#
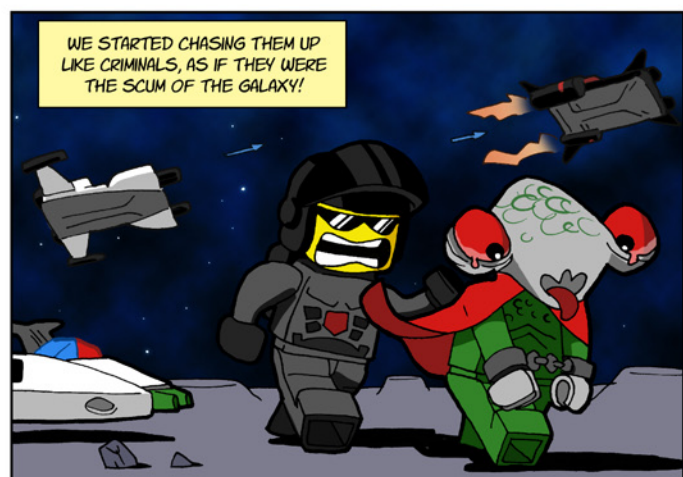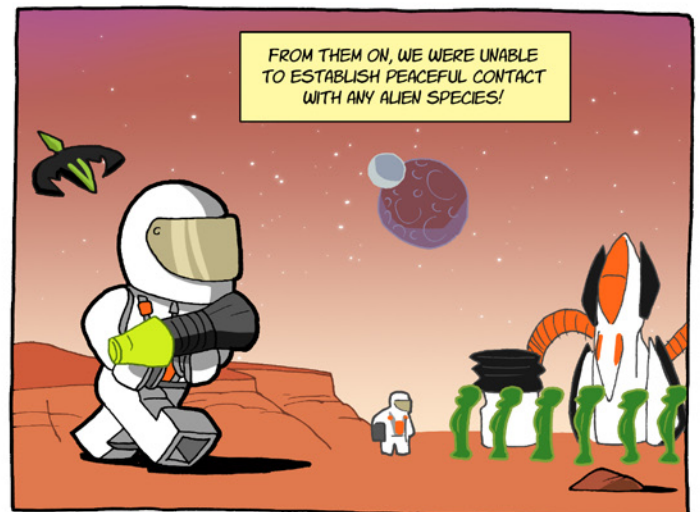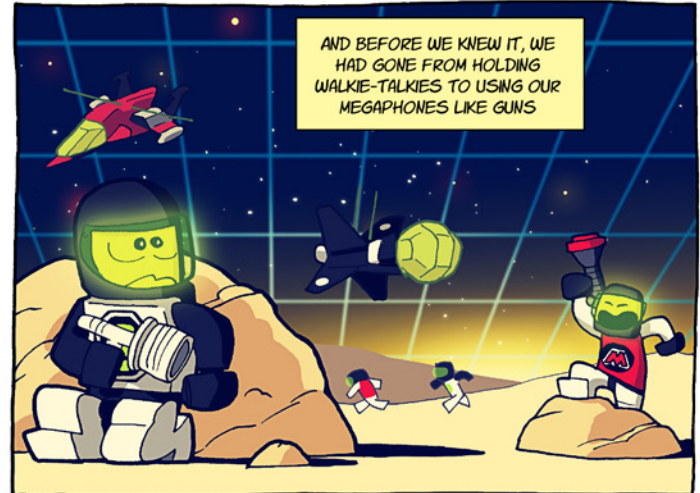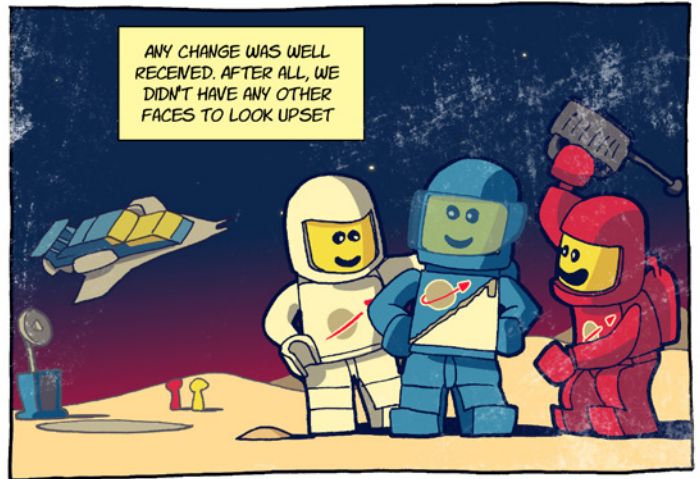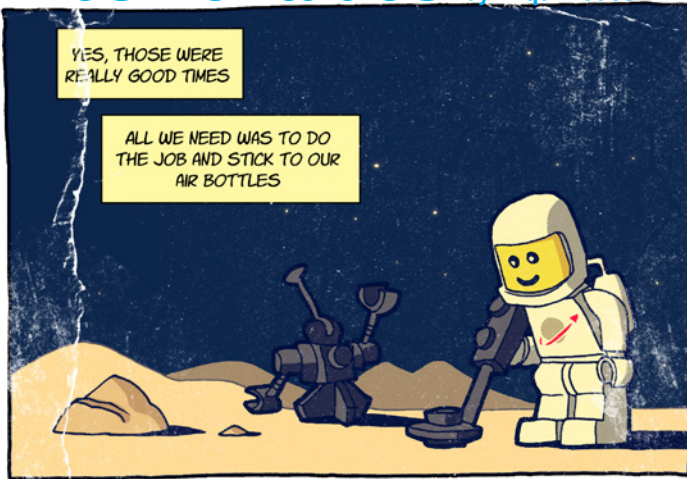
How to collaborate with us

Collaborating with Hispabrick Magazine is very easy, just send an email with your ideas to info@hispabrickmagazine.com and we will help you to "build" your article.

If your language is not Spanish, don´t worry, we will find a solution. Contact us now!

Do you want to be the first to know when we publish our magazine? Send us an email to register@hispabrickmagazine.com

You can also find us here:

facebook

Our collaborators on the Internet

Amador y Ramón Alfaro (arvo)	http://www.brickshelf.com/cgi-bin/gallery.cgi?m=arvo
Antonio Bellón (Legotron)	http://www.abellon.net/lswimperial/
Carlos Méndez (Car_mp)	http://www.flickr.com/photos/carmp/
Fernando Correia	http://technicbricks.blogspot.com/
Firas M Abu-Jaber	http://www.flickr.com/photos/31460192@N02/
Hannes Tscharner	http://www.flickr.com/photos/marshal-banana/
Henrik Hoexbroe (Hoexbroe)	http://www.flickr.com/photos/hxmiesa/
Jesús Delgado (Arqu medes)	http://debiologoadibujante.blogspot.com/
Jetro de Château (Jetro)	http://www.brickshelf.com/cgi-bin/gallery.cgi?m=linmix
José (Satanspoet)	http://www.brickshelf.com/cgi-bin/gallery.cgi?m=satanspoet
Koldo Olaskoaga (Koldo)	http://Lroboticas.net
Lluis Gibert (lluisgib)	http://www.brickshelf.com/cgi-bin/gallery.cgi?m=lluisgib
Paul Ian Kmiec	http://sariel.pl/

HISPA BRICK

magazine

011

ENGLISH EDITION