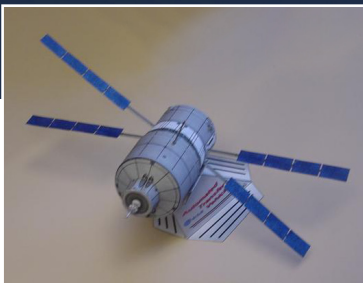
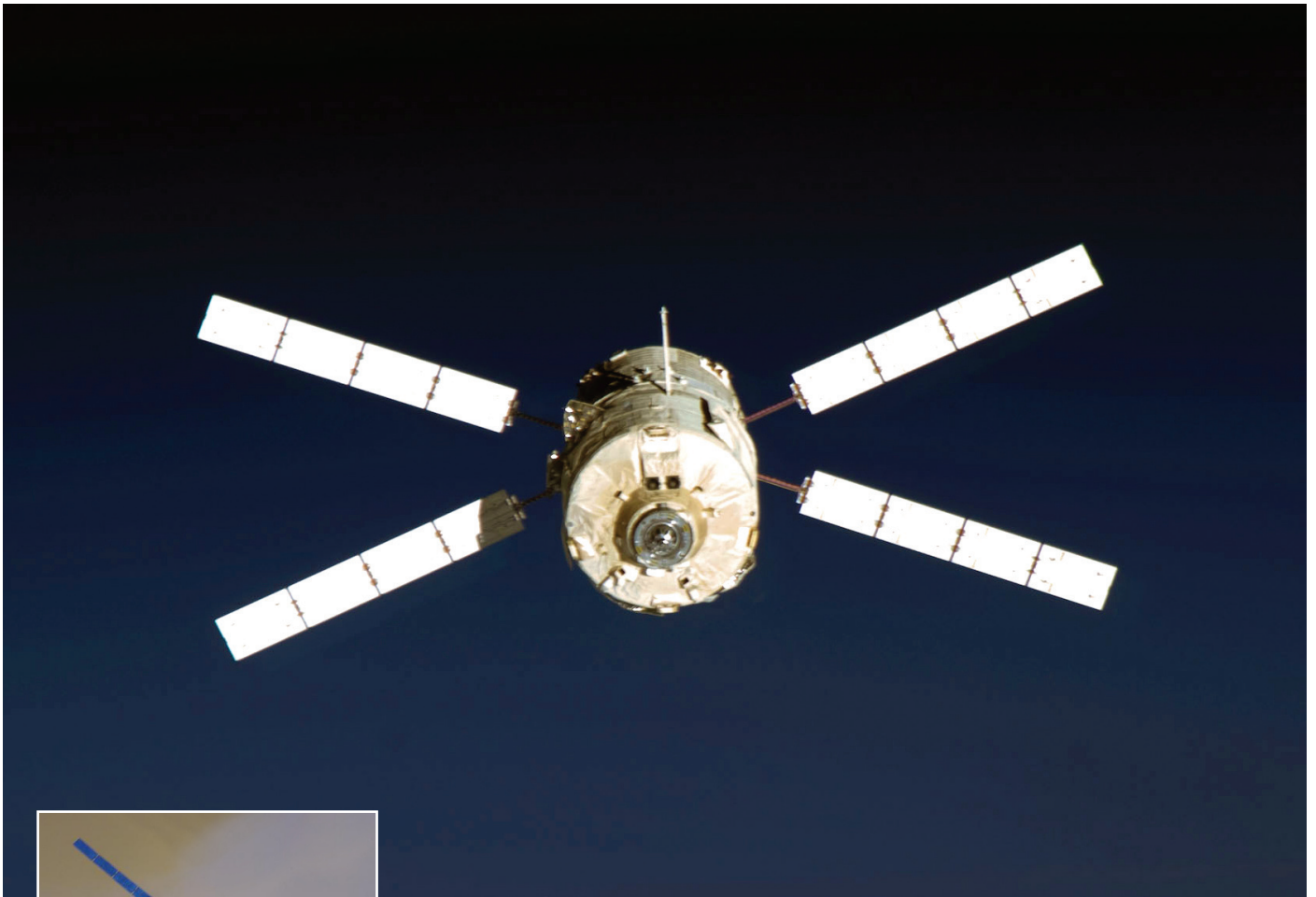


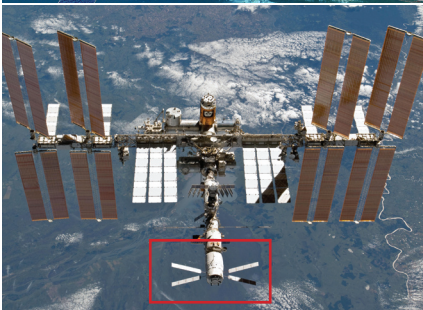
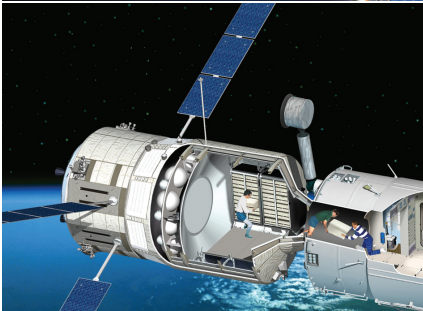
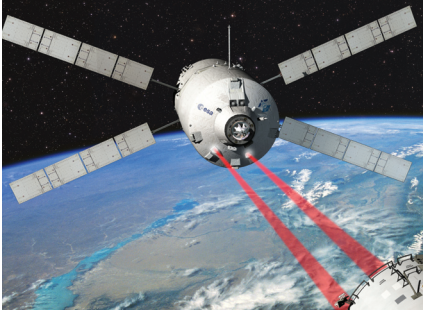
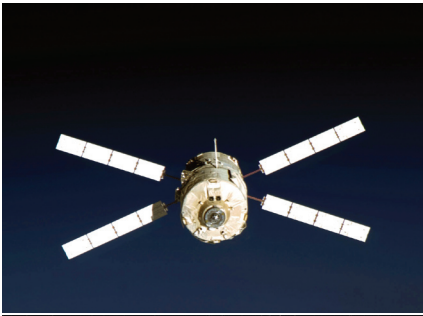
Automated Transfer Vehicle

→ **CREATE YOUR OWN ATV MODEL!**



Scale 1:100

→ AUTOMATED TRANSFER VEHICLE



The ATV is the most complex space vehicle ever developed in Europe, a series of unmanned space transport vehicles essential for ferrying supplies and experiments to the International Space Station and periodically raising the Station's orbit.

Each ATV will carry approximately 1300 kg of 'dry cargo' including 500 kg of food, 80 kg of clothing and spare parts together with tanks of fuel, air and drinking water supplies for the crew. The ATV, launched by an Ariane 5 from Europe's spaceport in Kourou, French Guiana, will separate 70 minutes after lift-off to become a fully automated spacecraft.

A high precision navigation system on board will guide the ATV on a rendezvous trajectory towards the Space Station where it will dock with Zvezda, the Russian Service Module, about 4 days after launch. It will remain there as a pressurised and integral part of the Station for up to six months until its controlled re-entry into the Earth's atmosphere where it will burn up.

ATV-1 *Jules Verne* and ATV-2 *Johannes Kepler* were launched to the International Space Station (ISS) in 2008 and 2011 respectively.

ATV-3 *Edoardo Amaldi* is scheduled for launch in 2012.

→ ATV PAPER MODEL

This is what you will need (picture 1):

A ruler, a Scotch Tape, a pair of scissors, a Stanley Knife, a Glue Stick, an Universal Glue, a cardboard and finally: a Paperclip (unfolded), to bend the cones and cylinders, and a small pin, which will become the RDS at the end.

Let's get started:

1. ATV Main Structure

Important Note:

When assembling the ATV parts arrange the various cones and cylinders such, that the tabs are in line with each other!

The same applies to the arrows that are sometimes printed onto the cardboards parts. These arrows shall also point to the refering tab!

The "Cardboard Parts" (picture 2)

First cut out the ATV Hatch, the Structure between Avionics Bay and Propulsion Module, the Thruster Support and the Cargo Carrier "interior wall".

Use the Glue Stick to glue them to a cardboard, then - after it is really sticking to the cardboard - cut them out.

IMPORTANT: The intermediate part has to be glued onto two cardboards!

The Thruster Support (picture 3)

Take the smaller parts of the Thruster Support and glue it onto the bigger ones to get the final "Thruster Support Arrangement".

The alignment of the parts is such, that the "thruster triangles" stay within the black radial lines of the big support structure (refer: picture 3)!

IMPORTANT: Remember the direction of the arrow

(e.g. draw the arrow on the back of the cardboard)!!!

The Cargo Carrier (picture 4)

Now cut out the Cargo Carrier and form a cylinder out of it. Take the Cargo Carrier "interior wall" and glue it into that cylinder (use the Universal Glue for that task).

You should glue it from the back side as the interior will be visible, when you open the ATV Front End.

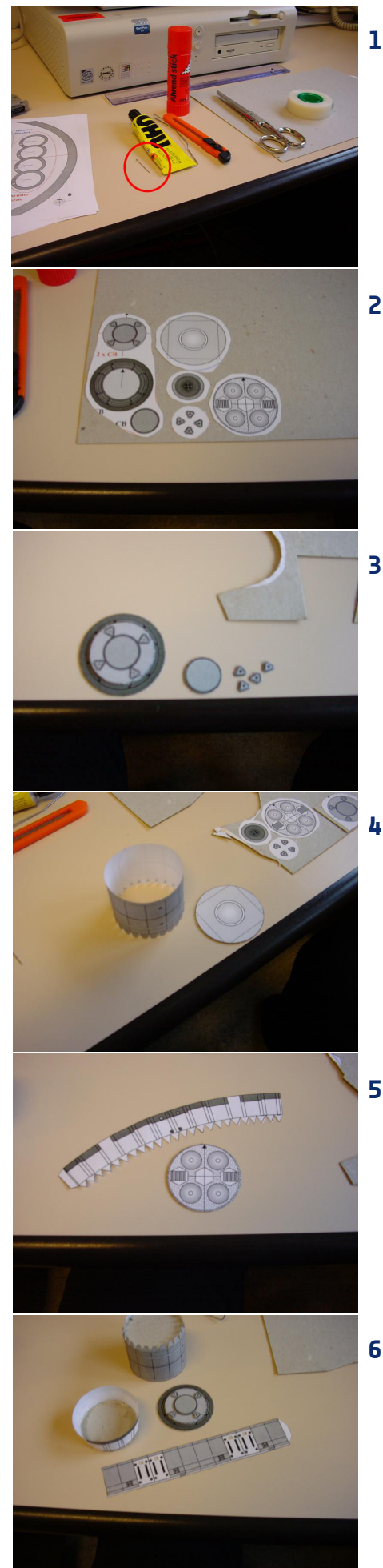
The Avionics Bay (picture 5)

Next one is the Avionics Bay and the Structure between Avionics Bay and Propulsion Module - part.

Bend a cone from the Avionics Bay, glue it and finally glue the Structure between Avionics Bay and Propulsion Module in the end with the smaller diameter.

The Propulsion Module (picture 6)

Last piece of the ATV Main Structure is the Propulsion Module. Make sure you cut out the 4 rectangles with the Stanley Knife before you bend it to a cylinder. Finally glue the Thruster Support into the Propulsion Module, with the arrow pointing to the tab of the cylinder.



7



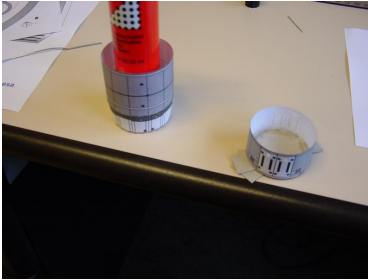
The ATV Main Structure Parts (picture 7)

By now you should have two cylinders and one cone.

Now we will get into the fun stuff of AIV -

Assembly, Integration and Verification ;-),
when we will try to put these three parts together...

8

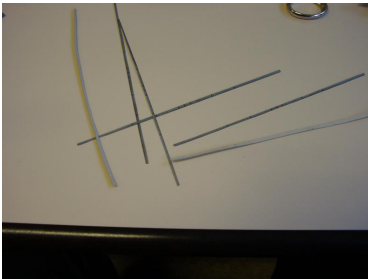


Attach the Avionics Bay to the Cargo Carrier (picture 8)

First we will attach the Avionics Bay to the Cargo Carrier. Do not use too much glue as it might get pressed out. Patience is half of the rent and don't forget to align the tabs of the parts.

Hint: Use the Glue Stick as in the photo to the left to get a tight connection!

9

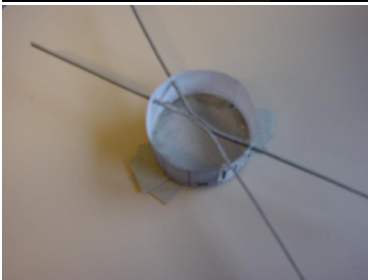


Prepare the Solar Array Support (picture 9)

Before we can add the Propulsion Module the Solar Array Support needs to be inserted (in the four holes).

The easiest way to do it is to cut out 2 cardboard strips (with the appropriate width), and then use the Glue Stick to put the Solar Array Support paper on both sides on.

10



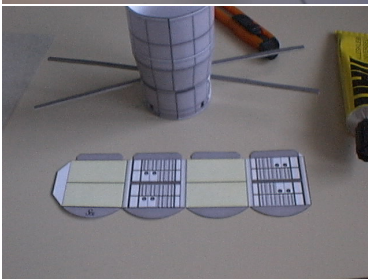
Attach the Propulsion Module to the Avionics Bay (picture 10)

Once this is done, cut the cardboard strips to the correct length and insert them as shown in the picture to the left.

Glue them one to the other (at the yellow/black striped area) and from the inside to the wall of the Propulsion Module.

Finally attach the Propulsion Module to the Avionics Bay.

11



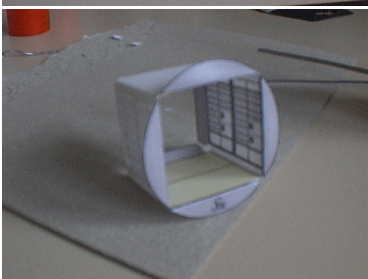
Prepare the ATV Interior (picture 11)

Cut out the ATV Interior and form an open cube out of it (the texture must be on the inside).

IMPORTANT: Glue the tab on the outside!!!

The rectangular gray attachments have to be bended inwards, the curved ones outwards.

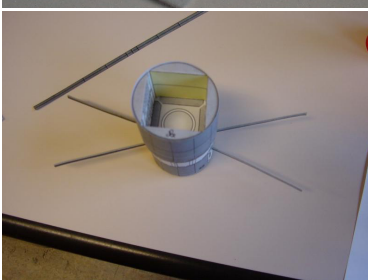
12



The ATV Interior (picture 12)

You should get the following structure
(as in picture 12)....

13



The assembled ATV Interior (picture 13)

Now we'll glue the ATV Interior into the Cargo Carrier.

Put some glue on the rectangular gray attachments (use the Glue Stick) and glue the ATV Interior onto the Cargo Carrier "interior wall" (use the lines as a reference). The small logo shall be at the tab of the Cargo Carrier.

3. ATV Front Part

The ATV Front End (picture 14)

Cut out the ATV Front End and form a cone out of it.

Hint: Use the Glue Stick instead of the Universal Glue!

The ATV Hatch Cone and the ATV Front End (picture 15)

Next one is the ATV Hatch Cone.

Cut it out and bend it to form an open cone.

Attach the ATV Hatch Cone to the ATV Front End (picture 16)

Now we'll glue the ATV Hatch Cone onto the ATV Front End.

Do not use too much of glue and press the two parts gently onto each other, so to prevent damaging the cone.

Remark: The ATV Hatch Cone is not perfectly round, but a bit pushed in at the location of the two Targets.

The Russian Docking System (RDS) (picture 17)

Take the ATV Hatch and cut out the two RDS Cones.

Form two small cones out of them (this may be a task for someone with small fingers ;-)), and push the pin through their centers.

Closer to the end of the pin is the textured cone, the other one is closer to the tip.

The Russian Docking System (RDS) and the Adapter (picture 18)

Put some glue on the center of the ATV Hatch and push the pin through its center, so that 2 cm of the pin will be left over. Adjust the textured cone such that it rests in the first third of the pin length (closer to the hatch) and add some glue on its back to fix it.

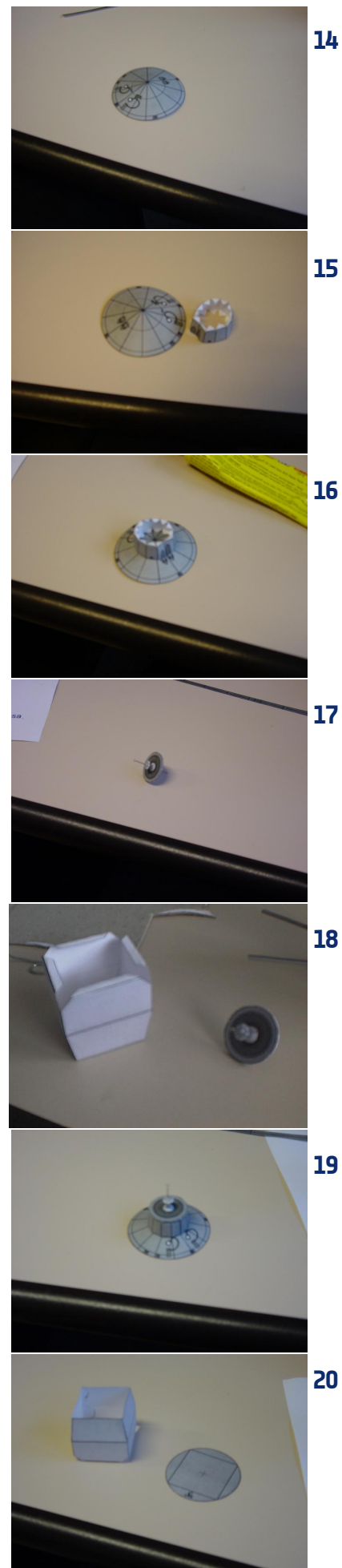
The fully assembled ATV Front End (picture 19)

To the left of picture 18 is the Adapter, used to attach the ATV Front Part to the ATV Main Structure.

While its glue is drying up, glue the fully assembled ATV Hatch onto the ATV Hatch Cone. The pin should extend through the center of the ATV Front End.

The Assembly of Adapter and Adapter Plate (picture 20)

The next step is to glue the Adapter to the Adapter Plate (again: use the lines as reference, such as to obtain the following result).



21



RVS Support (picture 21)

If you can't get enough of filigrane stuff you can try the following: RVS and RVS Support.

Form two small boxes from the RVS Support and glue them onto the marked places on the ATV Front End.

22



RVS Boxes (picture 22)

The same applies to the irregular shaped RVS boxes.

Remark: Although I have included the ATV Star Trackers on Sheet 1, I am not recommending to assemble these parts. They are EXTREMELY small and as such do not add a lot to the realism of the model! They are included on the ATV Hatch Cone as two little dots beside the exclusion segment for the Targets.

23



ATV Front End and Adapter - fully assembled... (picture 23)

Back to the "bigger" parts ;-):

Glue the Adapter Plate on the back side of the ATV Front End (use the Glue Stick for that task). If the pin is long enough it will punch through the center of the Adapter Plate (at the center of the crosshairs). The logo shall be at the tab of the ATV Front End.

24



ATV Front End and Adapter - fully assembled - as seen from inside... (picture 24)

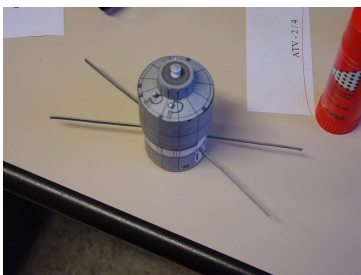
Here you can see the assembly from the "inner perspective".

ATV Front End, Interior and Main Structure (picture 25)

Here is the whole assembly from above and aside (looks already a bit like a spacecraft, right? ;-))...

The ATV Front Part and the ATV Main Structure have to be aligned in such a way that the logos on both structures match!

25

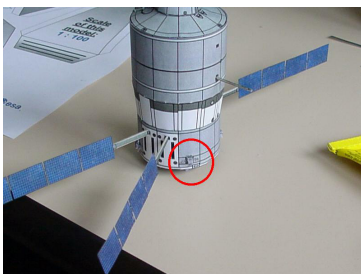


4. ATV RCS / Engines

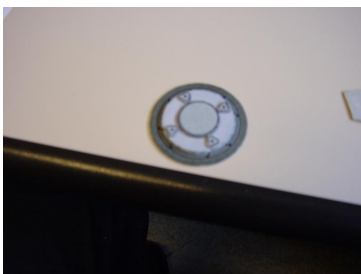
The ATV RCS (picture 26)

Cut out the four ATV RCS parts (with a Stanley Knife) and form out a small box of each of them. Put a little bit of glue in each of the ATV RCS boxes and attach the RCS boxes (according to their number [1/2]) onto the black rectangles of the ATV Main Structure. Align each box in such a way that the two parallel thrusters look towards the ATV Front Part (The part of the RCS box close to the number (on the sheet) shows towards the rear of the ATV).

26



27



The ATV Thruster Support (picture 27)

The next step are the thrusters (Thruster Nozzle).

These will be mounted at the position of each of the four dots of the Thruster Supports (the four Thruster Blankets are part of an earlier ATV design and are not being used for this model).

The ATV Engines (picture 28)

Cut out the Thruster Nozzle parts, shape them into the form of small cones. Use a small droplet of Universal Glue to fix that shape.

Hint: Use the Paperclip to wrap the paper around, to create a cone with a smooth curvature!

The ATV Engines mounted at the rear of the ATV (picture 29)

Position the four thrusters over the marked spots and glue them with a droplet of Universal Glue onto the Thruster Supports...

5. ATV Solar Arrays

The Solar Arrays (picture 30)

Use the Stanley Knife and the pair of scissors to cut away the white paper in between the four elements of a Solar Array.

The "Cover Glass" (picture 31)

Once you have cut out the Solar Array, glue a Scotch Tape over the textured side (covering all of the elements).

This Scotch Tape will simulate the cover glass and provide stability for the Solar Array elements.

Remove the overlapping Scotch Tape.

The four Solar Arrays (picture 32)

Repeat these steps for all four Solar Arrays (the other four Solar Arrays are spares - in case you loose control of the cutting devices ;-)).

Finally glue the Solar Array onto the Solar Array Support, using the outermost black line on the support as reference.

The Antenna Boom (picture 33)

Now we come to the last step; the assembly and attachment of the Antenna Boom.

Glue the Antenna Boom onto the Boom Support and attach the whole assembly to the Cargo Carrier, at the grey square, close to the center of the model, right opposite the tab(s).

Hint: Use a small droplet of Universal Glue for this purpose!

6. ATV Footer

The ATV Footer Parts... (picture 34)

Cut out the ATV Footer parts ("ATV" and "Scale of this model") and glue them together as in the photo to the left.

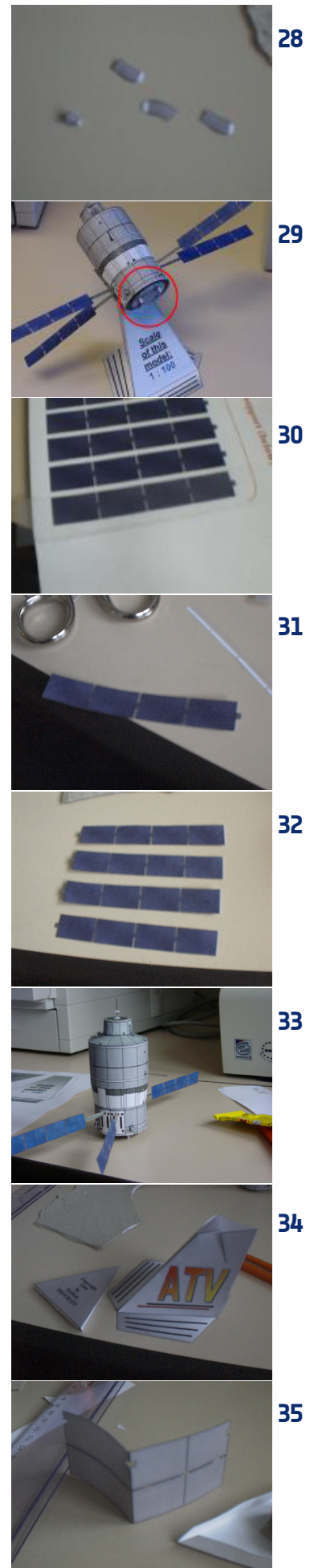
Don't forget to cut along the two lines in the "ATV" part!

Hint: Use the Glue Stick instead of the Universal Glue!

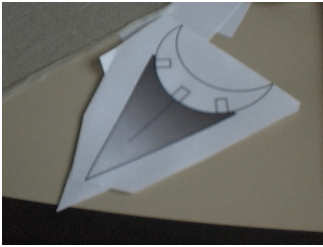
The "Rectangle" (picture 35)

Next one is the rectangular shape.

Cut away the six marked rectangles by using the Stanley Knife.



36



Prepare the "Triangle" (picture 36)

The next part is little bit tricky...

When cutting it out leave a little bit of material around of it, add glue (from the Glue Stick) on one of the triangles and then fold it together.

37



Cut out the "Triangle" (picture 37)

Now cut it out "exactly", removing the remaining material, so that you get a structure as in picture 37...

38



Assembly Sequence of... (picture 38)

Move the triangle's tabs through the three holes of the rectangle...

(picture 39)

... add glue to the tabs (on opposite sides) and glue the tabs onto the rectangle.

39



(picture 40)

Finally add glue to the "free" halve of the rectangle and glue both parts together.

40



The "Copyright" Triangle - Ballast (picture 41)

Now take the "Copyright" triangle and glue a piece of cardboard into it (use the Glue Stick for that task).

At the end glue some sort of ballast onto the cardboard

(e.g. a coin, a piece of lead, etc.), to ensure stability of the ATV Paper Model on its footer,...

41



(picture 42)

... and glue the "Copyright" triangle into the ATV Footer.

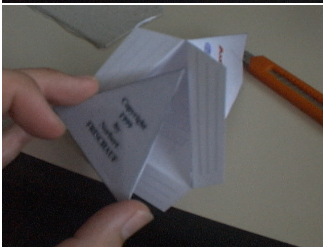
Hint: Use the Glue Stick instead of the Universal Glue!

The ATV Footer - Final Assembly (picture 43)

Now take the triangle and insert it into the ATV Footer, in such a way that the "holes" on the upper edges are closer to the "Scale of this model" side!

These "holes" will be used to fix the model on the footer - by putting one of the Solar Array Support bars into them!

42



43



→ YOU HAVE MADE IT!!

