

CH 46 SEA KNIGHT

Assembly instruction

Dear customer,

Thank you for purchasing a product from our firm.

CH 46 SEA KNIGHT is a semi-scale model of the famous American transport helicopter in scale 1:24.

Construction uses components from the proven micro helicopter, the Hornet.

Included in this kit is a new, modern brushless electromotor.

This model is designed for intermediate and advanced RC heli pilots.

You can fly the model indoors or outside with max. Wind speed 3m/s.

Control of Sea Knight is similar like classic RC helicopter.

This model is not a toy and employs rotating parts representing an instant source of danger.

Technical data:

Rotor diameter	490mm
Length of body	565mm
Total length	890mm
Distance between axes of rotation	400mm
Flight weight	680-820g by battery
Weight without batteries	580g
Weight without batteries and canopy	450g
Flight time	5-15min by battery

Required radio components:

7 channel transmitter with Heli functions

7 ch. micro receiver, for example MS027, 028, 029 -35, 40, 72Mhz

6x micro servo, of the **same** type and make, recommended for example MS 15, code no.MS006

2 gyros, recommended for example MS24

Brushless motor controller at least 15A,2a bec – recommended for example MS023

Power aku 10x NiMh 1000mAh MS032 or 3xLiPol 1500-2000mAh

Operating microprocessor for control function MS025

Warning.

To ensure you get the best from your CH 46 Sea Knight, please follow the instructions carefully.

Apply the CA glue or 5 min. epoxy. Glue designated parts only.

Assembly procedures are described in this manual using detailed pictures and diagrams.

Attention to detail in assembly, adjustment and maintenance will influence the quality, safety and longevity of the model.

This RC model helicopter is not a toy. The rotating parts represent an instant source of danger. Never use broken parts. Use the model only in places suitable for flying.

Step 1. Main body

Parts list :

E500 Spine	1x	E501 Frame front	2x
E502 Frame rear	2x	E504 Frame middle R	1x
E503 Frame middle L	1x	E520 Undercarriage pipe	1x
E506 Bearing block	7x	E507 Front undercarriage leg block-2,8mm	1x
E535 Undercarriage leg holder	2x	E517 Cap head bolt M2x16mm	26x
E056 Nut M2	31x	E536 Nut pipe	2x
E511 Motor holder	1x	E509 Anti rotation 2x30mm	2x
E560 Connecting shaft 3x295mm	1x	E561 Inner part of drive connection	1x
E562 Outer part of drive connection	1x	E510 Motor EM400/24/CH46-No.MS010	1x
E512 Motor bolt	2x	E567 Stabilizer gearwheel	2x
E052 Grub screw M3x3mm	2x	E034 Cap head bolt M2x5mm	15x
E067 Stopper ring	1x	EL0360 Bearing 3x6x2mm	7x
E115 Pin 1x10mm –hardened	2x	E563 Pinion gear 3mm	1x
E564 Pinion gear 4mm	1x	E565 Main gearwheel	2x
E063 Hex key 1,5mm	1x		

Follow the pictures for step 1.

- 1) Install the bearing L0360, to all seven bearing blocks E506.
- 2) Push the anti rotation E509 to two bearing blocks E506 and glue.
- 3) Fix the bearing block E506 to the rear frames E502 with the cap head bolts E517 and the nuts E056, **do not tighten yet**. Use the nut pipe E536 on the front bolt for later fixing of the canopy. Use Loctite or similar to fix the bolt with the nut pipe. For better access fix both servos to the rear frames before completing, use bolt E034 and nuts E056. Tighten it delicate.
- 4) Push the undercarriage pipe to the middle frames E503 E504 and install the bearing blocks E506 with bolts E517 and nuts E056. **Do not glue and tighten.**
- 5) Install both servos to the front frames E501 with bolts E034 and nuts E056. Tighten carefully.
- 6) Install the bearing blocks E506 to the front frames E501 with bolts E517 and nuts E056. Do not tighten yet. Fix nut pipe E536 to the upper bearing block with glue.
- 7) Complete the front, middle and rear frames, push to the spine E500 and fix it with bolts E517 and nuts E056.
- 8) Check that the installation is perfectly level, and lightly tighten all nuts and bolts, except for the lower bearing block on the rear frames, and both bearing blocks on the middle frames. **NOTE** There are openings for checking the gearing that must not be obstructed.
- 9) Install the undercarriage pipe E520, the middle frames need to be perfectly in the middle of the length of the undercarriage pipe. Check the perpendicularity of the undercarriage pipe E520 to spine E500. Fix the jointing between frames E503, E504 and the undercarriage pipe E520, use CA glue or epoxy.
- 10) Install front undercarriage leg block E507 to the lower part of front frames. Use bolts E517 and nuts E056. Opening for the hole must face the front.
- 11) Install and glue the undercarriage leg holder E535 to the undercarriage pipe E520, opening for bolts has to be normal to the surface.
- 12) Slide the pinion gear E563 onto the connecting shaft E560 and anchor it with pushing the pin E115 to prepared openings.
- 13) Put connection shaft with installed pinion gear E563 in bearing in blocks E506 in direction from rear to front.
- 14) Slide the stopper ring E067 with grub screw E052 on the connecting shaft E560, from front. **Do not tighten.**
- 15) Slide the inner part of drive connection E561 onto the front part of the connecting shaft E560, **do not glue.**
- 16) Fix the motor holder E511 on the motor E510 with bolts E512.
- 17) Put the pinion gear E564 on the motor shaft E510 and fix it with pin E115 pushed into the prepared openings.
- 18) Put the outer part of drive connection E562 with pin E052 on the motor shaft E510. Lightly tighten.
- 19) Install motor E510 between front frames. In this installation is needed to put inner part of drive connection E561 on outer part of drive connection E562, loosely fix the motor into the frames with bolts E517 and nuts E056. Do not tighten allowing for later positioning of gearwheels.
- 20) Check the length of connecting shaft E560 and pinion gear E563. If it is ok attach connecting shaft to the inner part of drive connection.
- 21) Put the main gearwheels E565 together with stabilizer gearwheel E567 use bolts E034 viz. pc. 3. on step 5. Tighten it carefully.

Step 2. Rotor heads assembly

Parts list:

E055 Cap head bolt M2 x 8mm	4x	E566 Main shaft CH-46	2x
E074 Stabilizer anti rotation arm	2x	E075 Rotor head	2x
E076 Blade grip	4x	E077 Threaded insert	4x
E082 Elastic member	6x	E115 Pin 1x10mm Hardened	6x
L0265 Bearing 2x6x2,5mm	8x		

Follow the pictures for step 2.

These parts are assigned for completing both rotor heads. The procedure for construction of both of the rotor heads is exactly the same.

- 1) Insert pin E115 into the anti rotation arm E074 so their ends line up with the bottom surface. The pins can be glued in their proper position although this is not essential.
- 2) Install the metal inserts E077 into rotor head E075 openings from outside and glue it.
- 3) Install to complete stabilizer anti rotation arm E074 onto the main shaft E066 in such a way that the openings for the pin E115 are aligned, check by sliding E115 in and out. The holder fits onto the shaft tightly. We recommend slightly rounding off the low outer edge of the cylindrical part of E074 for easier insertion of the o ring E082. -see further steps.
- 4) Insert the rotor head E075 from the bottom onto the main shaft E066 so pin E115 can fix all three parts together. This enables the rotor head to swing. The joint E115 must be inserted completely and should not extend beyond the edges of E075.

- 5) Push the elastic members E082 into the free space between the rotor head E075 and stabilizer anti rotation arm E074. Use rounded tools to prevent damaging the elastic members. Rotate the rotor head around the E115 joint several time to position the elastic members properly.
- 6) Insert two pairs of L0265 bearings into the blade grips E076. The bearing block must face inside the holder (balls are visible from outside). If the bearings are not oriented properly, the blade grip can get loose!
- 7) Fix the completed blade grips E076 onto the rotor head E075 using bolts E055. Tighten the bolts very carefully. Use the Loctite or similar to fix the E055 bolts. **Attention!** Do not allow Loctite to get in to the bearings. Blade grips must be able to move absolutely freely.

Step 3. Stabilizers

Parts list:

E052 Grub screw M3x3mm	4x	E071 Collective horn	2x
E072 Stabilizer lever	2x	E073 Stabilizer bed	2x
E083 Grub screw M3x4mm	4x	E147 Flybar	2x
E148 Stabilizer paddle (standard)	4x	L0260 Bearing 2x6x2mm	4x

Follow the pictures for step 3.

For assembly of the stabilizer of the rear rotor advance by the pictures. The assembly of the stabilizer of the rear rotor is a *mirror image* of the stabilizer of the front rotor, i.e. Stabilizer lever E072 and Stabilizer paddles E148 are reversed, (both in relation to the stabilizer of the front rotor). **NOTE!** The rear rotor rotates clockwise and the front rotor rotates counter clockwise.

- 1) Insert the L0260 bearing into the stabilizer lever E072.
- 2) Insert the stabilizer lever E072 into the stabilizer bed E073 and tighten the grub screws E083 so block is fixed into the stabilizer holder and can swing freely without play.
- 3) Insert the collective horn E071 onto outer edges of the stabilizer lever E072 and join both parts by inserting the Flybar E147. The stabilizer lever must be right in the middle of the Flybar!
- 4) Install the grub screws E052 into the metal rings in the collective horn E071. Check the stabilizer symmetry and carefully tighten the grub screws E052. **Attention!** If excessive force is used, the Flybar will bend.
- 5) Mount the stabilizer paddles E148 onto the Flybar E147 so the total length of stabilizer is 290mm. The paddles must be parallel to the collective horn E071 and to each other.

Step 4. Rotor head completion

Parts list:

E052 Grub screw M3x3mm	2x	E058 Bolt M2x8mm	8x
E067 Stopper ring	2x	E021 Ball link	10x
E079 Ball link short	4x	E070 Connecting rod	4x
E092 Swash plate CP	2x	E078 Bolt M2x12mm	4x
E020 Fork with pin	6x		

Follow the pictures for step 4.

The rear rotor is a *mirror image* of the front rotor, i.e. the orientation of the Blade grips E076, i.e. the Blade grips E076, on the rear rotor, are installed so that the *balls joints* of the grips are on opposite sides of the Rotor Head E075, in comparison to the front rotor. **NOTE** - The pictures shows how the rear head should be assembled.

- 1) Assemble the connecting rods using the ball link E021 and E079 and the bolt E058. Adjust the connecting rods' length to 20mm - see pic.5. The correct rod length is very important for correct pitch range.
- 2) Slide the complete stabilizer assembly onto the main shaft E566 so the sockets in the stabilizer bed E073 link with the pins E115.
- 3) Install the connecting rods E070 on the ball joints of the stabilizer horn E071. Pay attention to the correct orientation of the rods – follow the picture.
- 4) Slide from the bottom the complete swash plate E092 onto main shaft and fix the opposite ball joints on the upper swash plate to the connecting rods E070.
- 5) Using the connecting rods assembled in step 1, connect the ball joints on the stabilizer block E072 to the ball joints on the blade grips E076.
- 6) Insert the stopper ring E067 with grub screw E052 so the flange for bearing faces down.

Step 5. Helicopter completion

Parts list:

E088 GFC Main rotor blades	2pairs	E531 Front undercarriage leg	1x
E534 Rear undercarriage leg	2x	E530 Undercarriage wheel 20 mm	6x
E532 Axis of undercarriage wheels	3x	E533 Grub screw M3x20mm	3x
MOS4 Scotch tape double-faced	1x	E539 Fixing rubber	2x
E538 Coupling bolt M3x3mm	1x	E537 Coupling bolt M2x20mm	1x
E052 Grub screw M3x3mm	2x	E521 Mounting plate 60x30mm	2x

Follow the pictures for step 5.

- 1) Fix the stopper rings E067 on both main shafts E566 use grub screws E052 -see picture. Distance between the stopper ring E067 and the stabilizer anti rotation arm E074 in rotor head must be 30mm. Fix the grub screw in stopping rings E067 use Loctite.
- 2) Slide complete rotor heads onto the bearing blocks. Clockwise rotating head to rear side and anticlockwise rotating head to front side.
- 3) Install the completed main gear wheels E565 with stabilizer gearwheel on the shaft and fix it with Grub screws E052 and glue. At the same time is necessary to specify axial play of the shafts in the bearings. It must rotate absolutely freely.
- 4) Put up the slack of the gearing on the rear rotor and then tighten the bolt which fix the bearing block. Gearing must rotate easily and without any noise.
- 5) Put up the slack of the gearing on the front rotor same like on rear one.
- 6) Tighten both bearing blocks between middle frames, **Note!** The main shaft E560 cannot be bent. Tighten the bolts which fix the bearing blocks in the frames.
- 7) Push close the stopper ring E067 on connecting shaft E560 to bearing in the front block in the middle frames and tighten the grub screw E052-sensitively. Take up the clearance same like on rotor shafts viz. Pic. 3.
- 8) Fasten the mounting plates E521 on front part of spine E500 use bolts E517 and nuts E056 which are remain from step 1.
- 9) Complete the rear undercarriage legs E534 with undercarriage wheels E530 and axis E532.
- 10) Complete the front undercarriage leg E531 with wheels E530 and axis E532.
- 11) Put the grub screw M3x12mm E533 into the thread in upper side of all three undercarriage legs. Use Loctite or epoxy. Screw the undercarriage legs onto the holders E535 -rear, and E507 -front.
- 12) Complete the steering connecting rod of ball link E021 and fork with pin E020 connected by bolts 4x M2x8 E058, 1x M2x20 E537 and 1x M2x35 E538. Screw the rods tentatively for later adjustment.

Step 6. Electronics assembly

Part list:

Processor	MS025	1x
Gyro	MS024	2x
Motor speed regulator, for example	MS023	1x
7 ch. Receiver ,for example	MS027/35Mhz, MS028/40Mhz, MS029/72Mhz	1x
Servo, for example MS15	MS006	6x

Follow the pictures for step 6.

- 1) **Rod assembly:** Unscrew all bolts holding the arms on servos and take the arms off.
- 2) Screw four complete rods E020, ball links E021 and bolts EM2x58 so the length of the rod from axis of opening for ball to pin axis is 29mm. Put two rods onto the front balls on both swash plates E092 and put one rod onto the ball on the right side of front swash plate. Put the fourth rod onto the left ball on rear swash plate.
- 3) Screw together the rod made from the ball link E021, fork E020 and coupling bolt M2x20 E537 on length 42mm and put it onto the left ball on front swash plate.
- 4) Screw together the rod made from the ball link E021, fork E020 and coupling bolt M2x35 E538 on length 58mm and put it onto the right ball on rear swash plate.
- 5) **Gyros installation:** Install the gyro for stabilization around vertical axis (stabilization course of flight) on right side of spine E500-see pic., use double-faced adhesive tape. Set the sensitivity of gyro on 100%.
- 6) Install the gyro for stabilization around horizontal axis (stabilization of elevator) on bottom of Spine E500, use double-faced adhesive tape -see pic. Set the sensitivity on 50% by trim. It is non necessary to fix the trim if you will set the sensitivity from transmitter. -for steps 5 and 6 see gyro installation manual.
- 7) **Processor:** Glue the processor to the holder of electronics E52, use double-faced adhesive tape.
- 8) **Motor speed regulator:** Glue the regulator to electronics holder E521. -see pic. Use double-faced adhesive tape MOS4.

- 9) **Receiver:** Glue the receiver on the right side of the middle frame E504 use double-faced adhesive tape. -see pic. The antenna must be fixed without any contact with rotors and cabling of other parts rc system!
- 10) **Servos** are installed. Except servos which control the front balls of both swash plates. These two servos install later. **Attention! All servos should be the same type and make. The distance of attachment of all rods on servo levers must be the same, if not, there will be unwanted differences in control, with wrong control of functions.** For MS15 there is a distance of 10mm between attachment of connecting rods on the servo levers and the axis of lever rotation.

Step 7. Connection and activation of RC system

- 1) Connect the speed control connector to the throttle channel of the receiver. There must be a connector with corresponding type and polarity on the regulator. It helps to cover the contacts on the motor because of the fault. Do not join up the motor yet for safety.
- 2) Connect the gyro of stabilization around vertical axis to the receiver to course of flight channel.
- 3) Connect the gyro of stabilization around horizontal axis to the receiver to elevator channel.
- 4) Connect the inputs of processor connectors to the receiver -see processor manual.
- 5) Connect connectors of all servos to outputs of processor - see processor manual.
- 6) **Transmitter configuration:** Select mixing type HELI in system H1 for control of Helicopter, so that the transmitter works as a classic 4.ch. transmitter, with servo control correlated with gas/pitch control working through a common control 3 with 6th ch. If you use the RC collection FUTABA there is no need to fix the basic system of deflection control. -see processor MS025 manual.
- 7) Before switching on the receiver to power, install the crystal of the same frequency as crystal in transmitter.
- 8) After basic transmitter configuration connect the battery to the regulator. **Attention!** You must wait for the gyros calibrate -see gyro manual. After this it's possible to move the model.
- 9) All controls and trims on transmitter set to neutral positions and control of throttle set to 50%in the middle of deflection. This will establish the neutral position of all the servos.
- 10) Put the servos on the lever -two arms in horizontal position perpendicular to rotor shafts. After correct locate positions of levers cut off opposite useless ends of levers and fix it with bolts.
- 11) Install all rods into the middle openings in levers so 10mm from axis of lever positioning.
- 12) Connect both servos of elevator control with rods and after establishing to right position of cyclic, glue the servos on the right side of the front and rear frames on appointed site-see pic., use double-faced adhesive tape MOS4. Cut the lever on the servo which control the right side of front cyclic desk located behind the elevator servo so the lever has no unwanted contact with this servo.
- 13) After connecting the rods and activation of RC check the deflection by the picture and if it is needed reverse the transmitter function.
- 14) Check the gyro reaction. Gyro must react against the movement of the model.
- 15) **Setting of the rod length:** Check the setting of controllers in neutral position must be both cyclic in neutral position. For control of inclination pitch angle use protractor. You can change the angle by the length of the rod. **The pitch angle in neutral position is up to pilot. The pitch angle in normal position should be moving in range from 0 to 3degrees. Attention! The pitch angle must be same on both rotors.**
- 16) The pitch range should be -2 to +12 degrees. It is possible to set the pitch range and amount of deflection on the transmitter.
- 17) **The use of the pitch gauge.** Cut out both parts of protractor and bend it -see pic. The cutting must be precise especially in section of slit for putting the protractor on blade grip. The precision of measure is proportional to precision of making the meter. Put both parts of protractor on angular parts of both grips. There must be almost no gap. Subtract setting on the scale. Protractor can be used with or without installed blades.
- 18) **Motor connecting.** After activating RC set and preliminary adjustment it is now possible to attach the wiring from speed control to the motor. Control the rotating of the blades after fixing the cables. When you are looking at the model from above the front blades must rotate to the left(counterclockwise) and the rear blades to the right(clockwise). If it is rotating the other way around it is needed to switch any two of three power wires on the motor. Read the speed control manual carefully before connecting and activating. **Attention! Handle the model with extreme caution when the motor is connected to power. Unwanted start up on the rotor can injure somebody or damage the model. Do not leave the motor connected to power without your presence. Do not switch off the transmitter when the battery is connected to the motor and never connect the motor to the battery if the transmitter is off.** Make sure that the speed control brake is not activated before assembling the rotor blades.
- 19) After right configuration of the regulator start the model to the operating speed (1800-2100rev/min.) and check that the rotor blades are not shaking. If it is needed put a little piece of scotch tape on the stabilizer paddles until the shaking disappears. If the shaking is severe there is a fault in adjustment of the rotor head.
- 20) **Rotor blades installation.** Install rotor blades E088 to the grips use bolts M2x12 E78 in collection of parts no.5. Install rear rotor blades clockwise and screw the bolts onto the grips from above, front rotor blades anticlockwise and screw the bolts onto the grips from bottom. Blades must be tightened so it can move forward - backwards but must not tilt.
- 21) For final balancing of the rotor head system you can use the same method as in step 19.
- 22) **Regulating of rotor blades tracking.** Spin the system to the operation speed and observe the track of rotors. The

blades of both rotors must hold the track if not it is needed to do the correction of angle of attack on length of rods between stabilizer holder E072 and blades grips E076. You must do the correction steps in ½ of turn increments. The tolerance of track is 5mm. **Attention!** Only perfect regulated and balanced rotor system can fly without any problems.

Step 8. Regulating and test-fly

You can use some function on RC set for better setting of the flight parameters. Ideal case is using the transmitter with processor and 7ch. Receiver which can change some parameters to control the model during the flight without manual regulating.

Attention. Only a good working and adjusted model can fly.

- 1) **The mixing of the opposed pitch to elevator.** For better model response on control of the elevator and quick forward flight which is allow by putting the gyro to the elevator control there is a processor in the model equipped of function of mixing opposing pitch on both rotors with elevator control. It is needed to ensure the dimension of the mix deviation around the setting of gyros. This function is connected on 5th channel. The function can be on sliding or rotary controller. The mix can be set without controller by the pilot and it can be set permanently. By the options of the transmitter pilot can switch the flight modes. For each flight mode can be set each value. When you hold down the controller the attack angle must be lower on the front rotor and higher on rear rotor. -if not you must reverse the 5th ch. **Attention!** On this system of rotor heads the swash plate is moving the other way around. Swash plate is moving down when the attack angle is bigger and up when attack angle is lesser.
- 2) **Sensitivity of elevator gyro control:** For control of sensitivity of gyro you can use control on transmitter on 7th ch and assign it on rotary or sliding controller. It is suitable to limit of max and min level of sensitivity gyro control during flight. It is needed to do practical flight tests to find these limits. The basic setting of gyro for test flight is 40% of total deviation of channel for gyro control.
Too small sensitivity of gyro setting: The model is restless and it is necessary to adjust the course. On starting to forward flight the model may dive slightly. This happens because of the aerodynamic character of this helicopter.
Too high sensitivity of gyro setting: The model will start to sway after lift off around the vertical axis. It is important to land immediately. Reduce the sensitivity on gyro and try it again.
- 3) **The setting of the mix between elevator and rudder.** The sequence of the attack angle change by the controlling of the elevator is the change of the power relation between rotors. This disturbs the balance of moment of torsion.-modern start to rotate around vertical axis.
For this reason it is necessary to set the mix between elevator and rudder on the transmitter. Relation measure of mix depends on mix of opposing pitch to the elevator. The basic tuning of mixing: 100% elevator : 50% ruder -the elevator is in mix as a controlling function(master) and the rudder as An affected function(slave). It must be set - when you push the elevator down must the front swash plate underlay to the right and rear to the left, when you pus the elevator up the opposite should occur. If the model turns left when pushing the controller down it is needed to raise the relation of mixing rudder to elevator and contrary. The setting of this mix is ok if the model stays in the same course and does not turn when you put the elevator controller up and down.
- 4) Before the first flight check if all functions of your model are according to the scheme of the picture. Check the center of gravity with installed battery, installing of all rotating parts of the model, all parts and cables are not it the contact with the rotors.

Flying and performance characteristics:

The first test flight and basic settings: Do the test-flight without the canopy installed for easier access to mechanical and electronics parts. Install the canopy only when you are sure that the model is absolutely under your control. Ideal place for fly-test is hall , gym or large room without any obstruction. After correct adjustments the model will fly as a classic arranged model except with more sensitivity on elevator. There can be an aerodynamic interference between rotors in starting the forward flight because of mixing opposing pitch to elevator relationship. This situation you can control by the pushing down on the elevator or just push the acceleration. This effect is directly proportional to adjustment of the model, position of centre of gravity and setting the mix relation of pitch and gyro sensitivity of elevator.

Test-fly of the model:

Set the parameters in hovering mode. After right setting in this mode you can then continue to make the settings for forward flight.

- 1) Install a fully charged battery, switch on the transmitter, connect the battery, wait till gyro is recalibrated and activate the speed control if it is needed.
- 2) Check the movement and direction of all servos and swash plates. If everything is ok you can slowly lift off . Do the correction of accelerating as the rotor speed is in specified limit(1800-2100rev/min)
- 3) Watch the tendency of the model movement. Using the trims you can adjust the movement tendency of the model. It

is not possible that the model will be without any tendency at low height (>50cm). The reason is the flowing of the air from the rotors.

- 4) Elevate movement of model can be regulated by the setting of the mix-see step 1. Keep this setting of mix because if it is changed the movement tendency will be changed also.
- 5) The rotating tendency of the model around vertical axis depends on the control of the elevator, to eliminate this tendency adjust the mix in the transmitter .
- 6) Set the max. sensitivity of the elevator settings. For max. stability of the model set the highest sensitivity of this gyro.
- 7) Gyro sensitivity of rudder can be set at max if it is MS24 and not problematic. If the model is oscillating around vertical axis sensitivity must be reduced.
- 8) After setting of all parameters it is possible to tune the deviation of the other controls on the transmitter by the pilot's needs.

A properly tuned model could be flying forward without any problems.

Step 9. Canopy completion

Parts list:

E550 Canopy	1 pair	E554 Wings	1pair
E551 Front plastic window 50x25mm	1x	E555 Plastic washer	13x
E552 Screwed case of crest	1x	E556 Bolt 1,6x4mm	15x
E553 Window sticker set	1x	E557 Sticker set	1x
E034 Cap head bolt M2x5mm	2x		

Follow the pictures for step 9.

- 1) Both parts of canopy are made from plastic. Cut the canopy out. -see pic.
- 2) Cut out the openings for undercarriage legs. -see pic.
- 3) Cut out the openings for rotors in front and rear pylon on canopy.
- 4) Cut out the openings for installation of the canopy crest on both rear faces on front pylons.
- 5) Cut out the openings for battery on both sides on canopy bottom.
- 6) Cut out the openings for front window on both sides of canopy.
- 7) Glue the plastic washers E555 use CA -see pic. on the fitting on right side of canopy.
- 8) Try to put both sides of canopy together. Truncate the fittings if it is necessary.
- 9) Drill both parts of canopy together where the plastic washers are glued. The diameter of the openings for bolts E556 must be 1,5mm. Attention! Watch the canopy if there is no deformation.
- 10) Glue the front window E551 to the right side of canopy only! from inside. Truncate the fittings if it is necessary.
- 11) Cut out the wings E554 -see pic.
- 12) Glue the wings on the fuselage use CA. Watch alignment.
- 13) Drill the openings (3mm) for undercarriage legs to the bottom of wings.
- 14) Unscrew all three undercarriage legs from the kite.
- 15) Put the both sides of canopy on the kite and screw it together.
- 16) Screw the undercarriage legs on the bottom of wings.
- 17) Drill the opening (3mm) for undercarriage leg to the bottom on front of model.
- 18) Check the setup of the canopy by kite. Drill the openings (2mm) for holding the canopy use two bolt E034 M2x5mm.
- 19) Cut out the crest of the canopy.
- 20) Glue the screwed case of crest E552 onto the front side of rear pylon use CA on one side of canopy only! , put the crest on and drill the opening for the belt E556.
- 21) Take the canopy off for painting.

Canopy painting:

Use the paint for lexan canopy. This kind of the paint can be use like a base paint and than can be used the nitro or acrylate paint in wanted color.

- 1) Choose the color scheme by the manual. There is the sticker set E557 for the model in three schema of color.
- 2) Cover the windows use the sticker set E553.
- 3) Clean the canopy using a mild cleaner.
- 4) If you want to have dark windows paint it from inside.
- 5) Spray the outer side of window after drying the inner side. You can use the base color if you do not have the lexan color. Cover the parts which you do not want paint use a normal paper. The scotch tape can take off a piece of paint so do not use it.
- 6) When the canopy is dry take off the cover of windows.

7) Put the stickers E557 on the painted canopy -see pic.

You can improve the scale appearance of the model by installation of details -exhaust, input shields and dished windows -see pic.

Troubleshooting:

<u>Problem</u>	<u>Reason</u>	<u>Solution</u>
Rotor vibrates	Rotor blades not tracked Blade bolts too tight Bent main shaft Stabilizer not symmetric Bent Flybar Damaged rotor blades	Adjust Loosen the bolts a bit Replace the shaft Adjust stabilizer symmetry Replace Flybar Replace the blades – always the complete set.
Improper swash plate Control	Wrong transmitter setup Too tight ball links and movable system elements Joints bent (or not moving free)	Check and adjust Loosen the links carefully Replace

As we do not have any control over on how the kit is assembled or used, MS Composit will not be held liable for any damage caused by the usage of any MS CH-46 product.

The MS composit team wishes you many happy flights with the CH-46 Sea Knight.