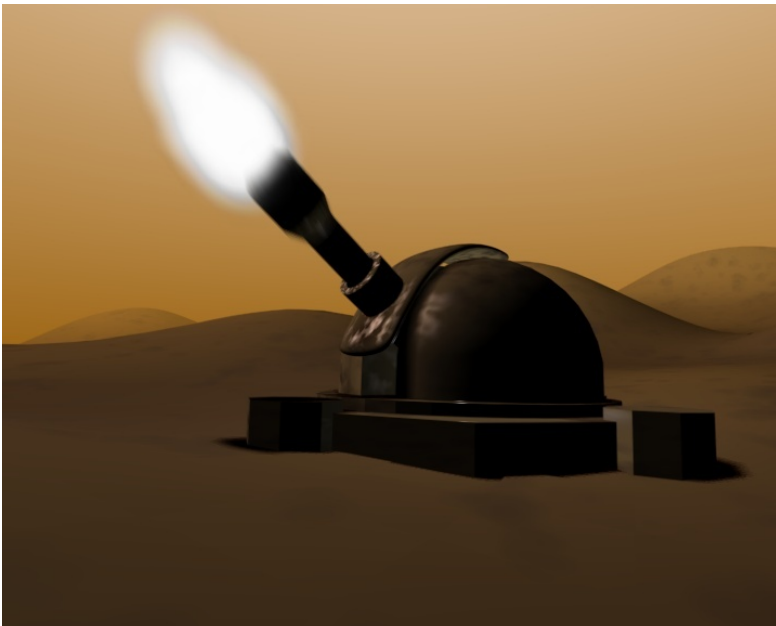
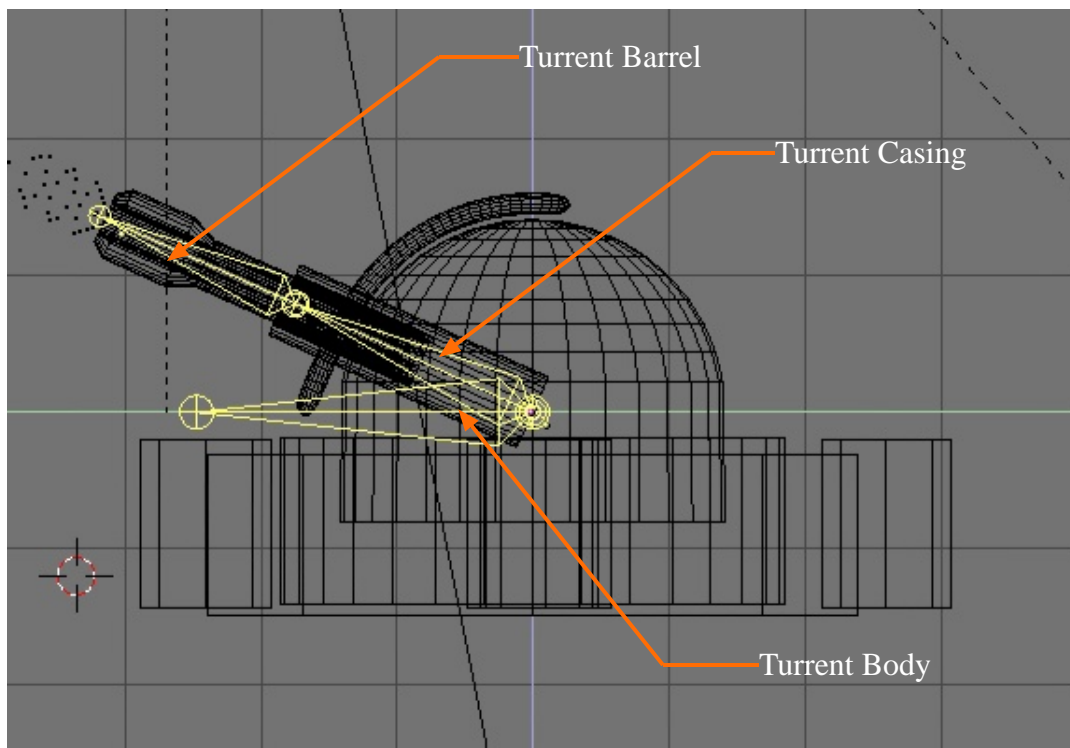


# *Gun Turrent*



Learn to create an animated gun turrent with target tracking, camera shake and recoiling barrel. This tutorial uses armatures, actions and also manipulation of ipo curves.

1. Add an armature with three bones. See Fig 1 for the placement of the three bones. Place the cursor near the origin and then press shift-s and snap the cursor to the grid exactly. Start the armature from there. Add the first bone. This will point out to an empty target and control the movement of the base. Press **esc** to stop adding bones. Then select the circle end of the bone closest to the origin. Add another two bones here using **spacebar-add-armature**. So finally you should have three bones in the one armature. Name the bones using whatever name structure you like and deselect IK on the 3rd bone.



*Fig 1. The placement of the three bones.*



*Fig 2. Make sure IK is off for the third bone.*

2. Add two empties. One functions as a target that the barrel aims towards. The other acts as a reference for the Turrent body to track. Add the Turrent empty in line with the bone that will track it. This makes sure that the turrent body will track without moving in odd ways. Name one Target and the other Turrent. It can help to view the names on screen sometimes. To do this select an empty and goto edit **F9** and press the **drawtype->name** button.

3. Now it is time to add constraints. Add a copy location constraint to the Turrent empty. Goto the constraint button ( the next one after the edit button ) and select **add->Copy Location**. Choose Target as the object. Deselect the Z axis location copy. So now the empty will follow the target everywhere except the Z-axis.

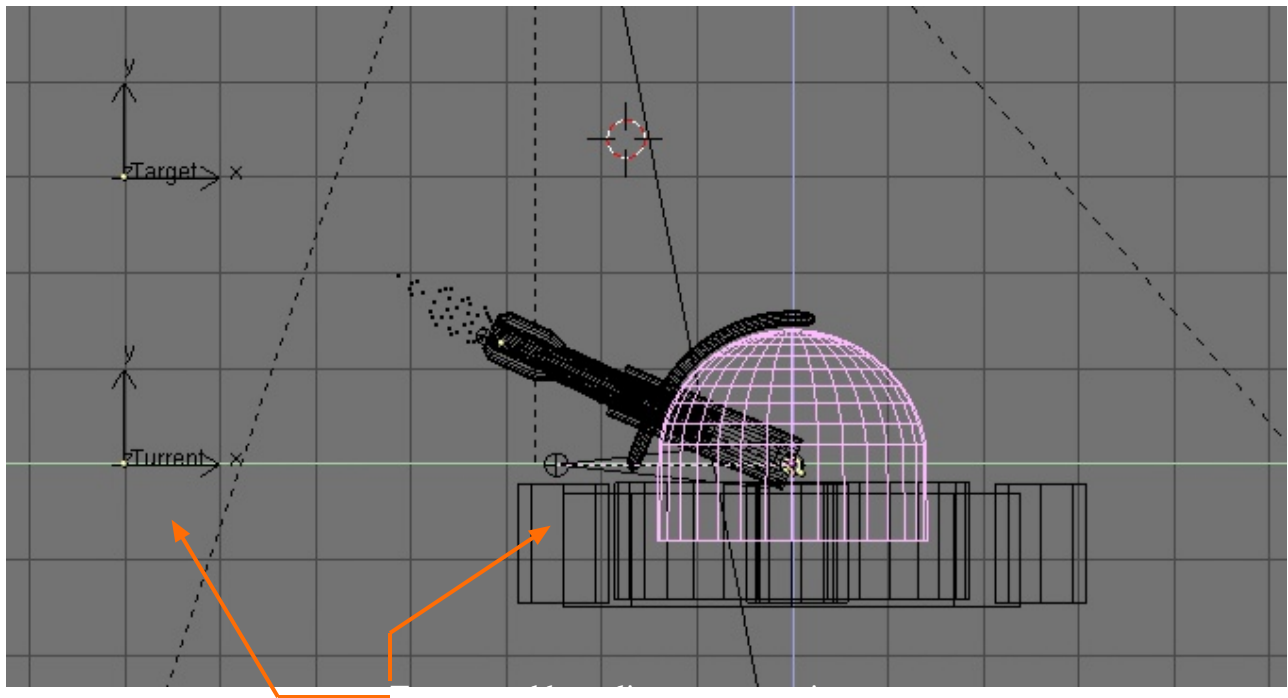
4. Select the armature and go into pose mode **Ctrl-Tab**. It is important to add these constraints in pose mode. Add two more constraints:

**Turrent Body Bone:** **add->track to** and choose the Turrent Empty as object

**Turrent Casing Bone:** **add->track to** and choose the Target Empty as object.

So the Turrent body bone will follow the Turrent empty everywhere (but the Turrent Empty can only move on the X and Y axis) and the Turrent Casing Bone will follow the Target.

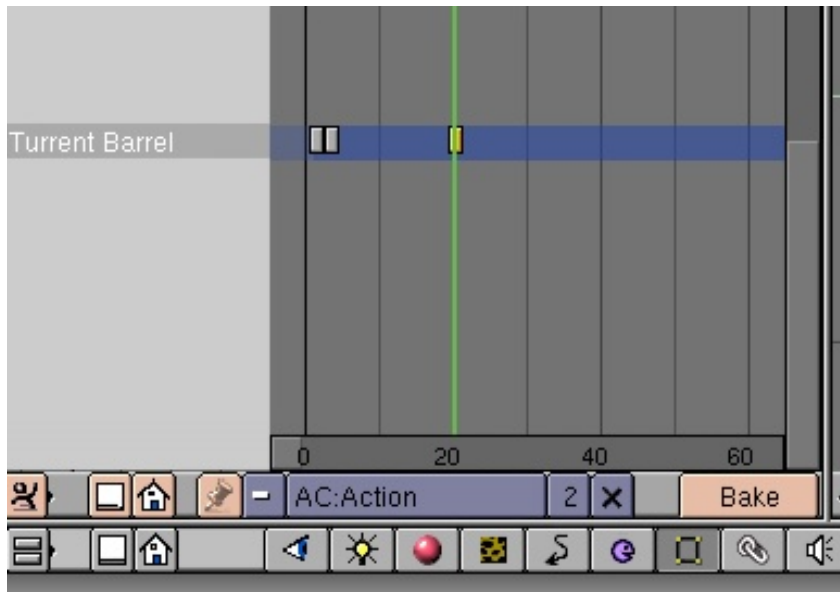
5. To see how the armature works just by itself open the armature only file and check it out. Below is a shot of the gun turrent fully rigged.



*Fig 3. The gun turrent fully rigged. Note the position of the two empties.*

6. Parent the Turrent Body mesh to the Turrent Body bone. Select the Mesh and shift select the armature. Press **Ctrl-P**. Choose bone as object and select the turrent body bone. Parent the Turrent Casing to the Turrent Casing Bone. Parent the Turrent Barrel to the Turrent Barrel Bone. In the example file some extra meshes have been parented to different parts. Just parent meshes to bones that move in the correct way for the part.

7. It would be good to add a barrel recoil as the cannon shoots. Time to add an action to the scene. Go to the action editor and move the time back to one. Select the armature and go into pose mode **Ctrl-Tab**. Select the Turrent Barrel bone and insert a keyframe i-key for loc. Move two frames forward and then move the Turrent Barrel bone back so that the Barrel acts like a recoil. Select the first frame action and press **shift-d** and copy to frame twenty. Using this method you can easily customize the barrel recoil to suit the type of animation. i.e Fast recoil for small fast gun or very slow fire for large planet busting gun.



*Fig 4. The action window showing the three frames of the barrel recoil action.*

8. Select the three frames with box select **b-key** and press **shift-d** to duplicate them. Drag them on the timeline to where you want the gun to fire. Make a note of where the gun fires. In this example the gun starts to fire at frames 1, 26, 49 and 76.

9. Now select the target empty and add some keyframes, having the target move around. If you are doing scene with the gun firing at an object parent the Target Empty to the object.

10. To add the final touches to the scene animate the camera shaking as the gun fires and also a muzzle flash. To add a muzzle flash add a mesh in the shape of a flash and choose halo as the material type. On every frame where the gun fires (1,26,49 and 76 in this case) add an alpha material keyframe for the halo material. Add another keyframe a few frames afterward where the alpha returns to zero again. So you have an animated material where the alpha increases quickly from zero up to the preferred value. It then returns again to zero where the material is not visible.

11. Camera shake can be quickly added by inserting keyframes for locrot after the gun has fired. By adjusting slightly the position and rotation of the camera on every keyframe, a shaking effect can be achieved. If pressed for time, just add ten keyframes for locrot with variation and then copy with **shift-d** and place on every keyframe where the gun fires.

12. The source blend file includes an example of this type of setup. Use it as a base to tweak the animation and improve it.