Developing Ship Plans from Photographs

Most Ship Modelers will, at some time or other, become interested in making a model of a ship that has been photographed, but for which drawings are not available. To draw model plans from photographs is not a trivial problem. This is because a camera operates on the principle of geometric perspective, as does the human eye.

Perspective has been extensively studied, and it can be shown that dimensions taken directly from a photograph generally are not true dimensions, and that the same true dimension will yield different measurements, depending on where it is in the picture.

A common problem in Architectural drafting is to develop a 3-dimensional perspective drawing from a floor plan and side elevations. The procedure for doing this is well documented in text books. The ship modeler has exactly the opposite problem. He wants to develop deck plans and outboard profile views, starting with a perspective drawing or a photograph. The procedure is illustrated in the drawing that follows. It is straight forward, but care must be taken in doing it. A barge is used in the example for simplicity.

1. Get a large copy of the photo and tape it to the drawing sheet.
2. Note that parallel lines in a perspective drawing (or photo) will converge. Therefore extend the parallel lines in the photo until they cross. This will happen at two points labeled V1 and V2. These are called vanishing points. Due to irregularities in manufacturing of the camera and its lens, you will find that if you do this for several lines, they will cross at slightly different points. If so, locate a central point among them and consider that to be the vanishing point.
3. Connect the two vanishing points together with a straight line. This line is called the horizon.

4. Locate the center of the photo and draw a vertical line. The sighting point will be somewhere along that line.
5. Draw a line parallel to the horizon line at a convenient distance above it. The exact distance does not matter. This line is called the picture plane.
6. Project the vanishing points vertically to the picture plane. (Points P1 and P2)
7. Use a triangle to locate point SP on the sighting point line such that lines from SP to points P1 and P2 form a 90 degree angle.
8. Project points from the photo vertically to the picture plane. Then draw rays from SP through these points to the points on the deck view. Note that the general orientation of the deck view is the same as that of the lines from P1 and P2 to SP.
9 In the two point perspective just described, vertical lines can be measured directly at the picture plane.
10. Having done all this, you have a correctly proportioned drawing, but what is the scale. This can be determined if you have a dimension from another source such as overall length, or is there is an object in the photo of known height such as a person.