Analytic Drawing of 3D Scaffolds (Supplemental Images)
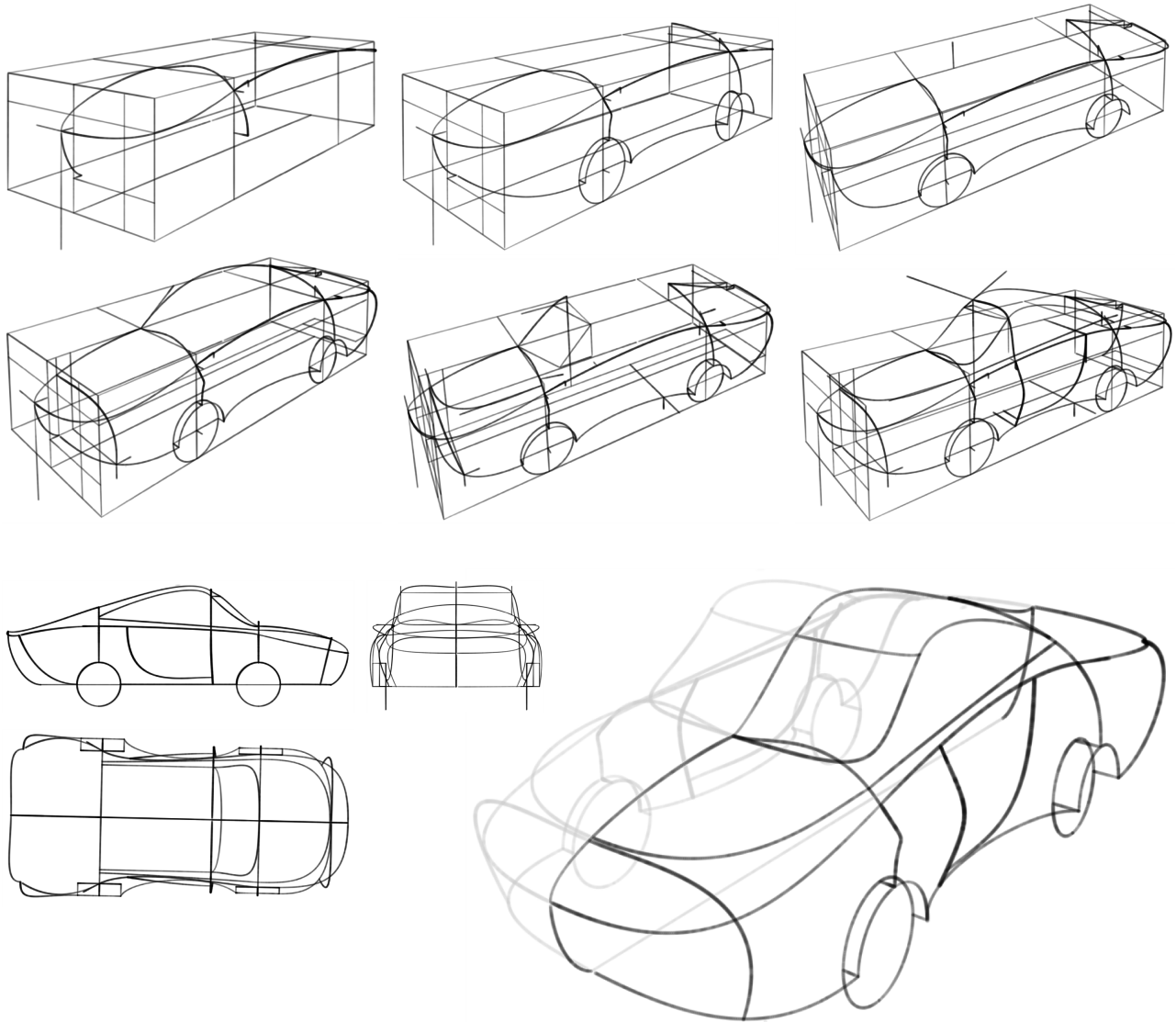
Ryan Schmidt[1,2]   Azam Khan[1]   Karan Singh[2]   Gord Kurtenbach[1]
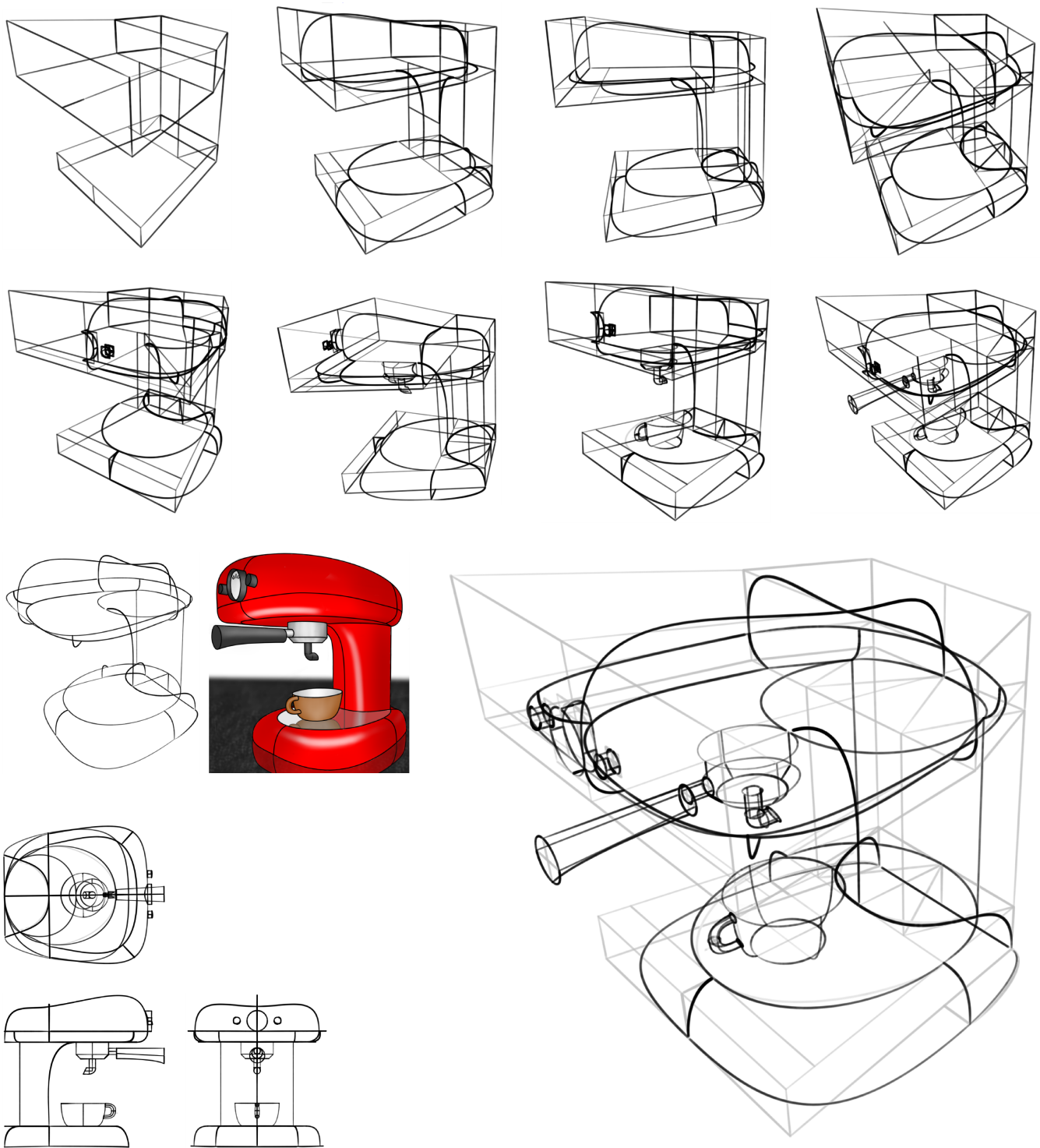
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1 Construction Histories

Figure 1: *This car model was sketched by the first author in a 3-hour session. The long, sweeping non-planar feature lines running the length of the body are some of the most complex curves we have drawn in our system. Since the car is symmetric, only one half of the curve network was sketched.*

Figure 2: *This espresso machine was designed by the first author over two drawing sessions, and is the most detailed model we have created. First the basic form of the body was created, and then details were added. Next we selected a viewpoint and added image-space silhouette curves. Finally, we used a computer painting tool to "render" an image using traditional hand-rendering techniques common in visual design.*
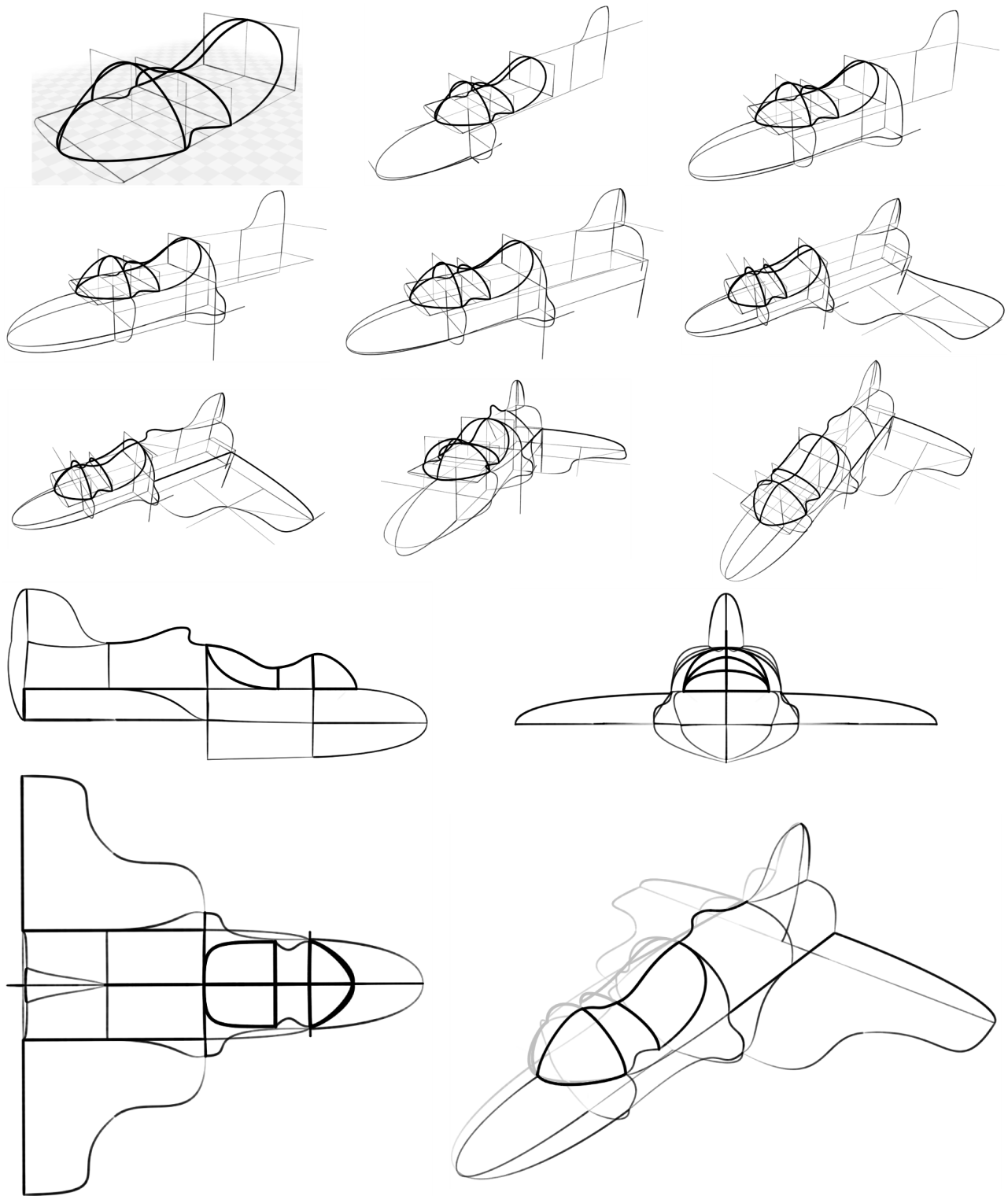
Figure 3: *We re-used the initial 3D form in the top right as the cockpit for this fighter jet model, and drew the body around it in a one-hour session.*
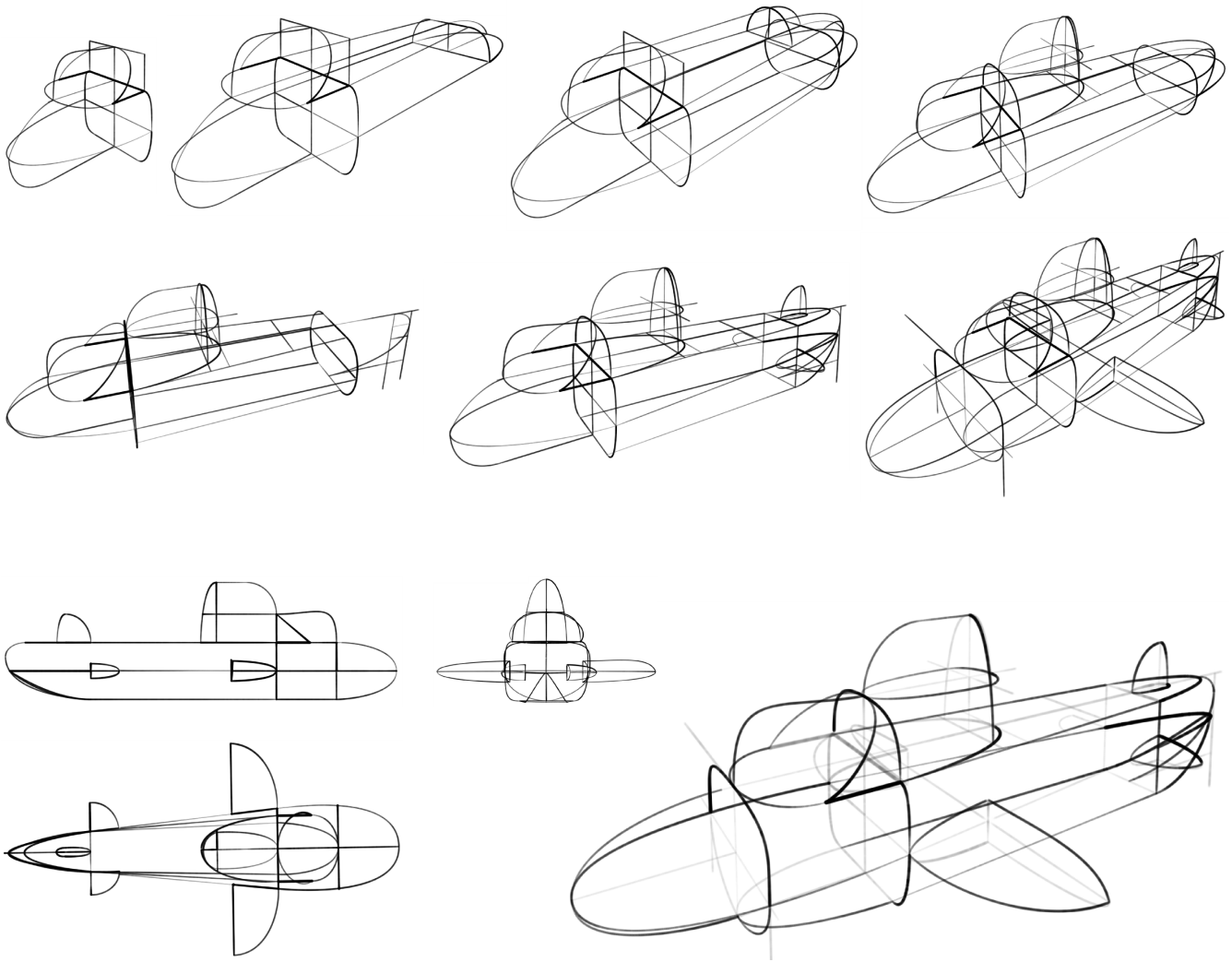
Figure 4: *This submarine model was sketched in a two-hour session, using a very early version of the system. Mirror-symmetry support was not yet available, but it is relatively simple to locate mirrored scaffold points. Compared to later examples, the complexity of the curves in this model is quite low - most are elliptic arcs.*

2 Additional Material
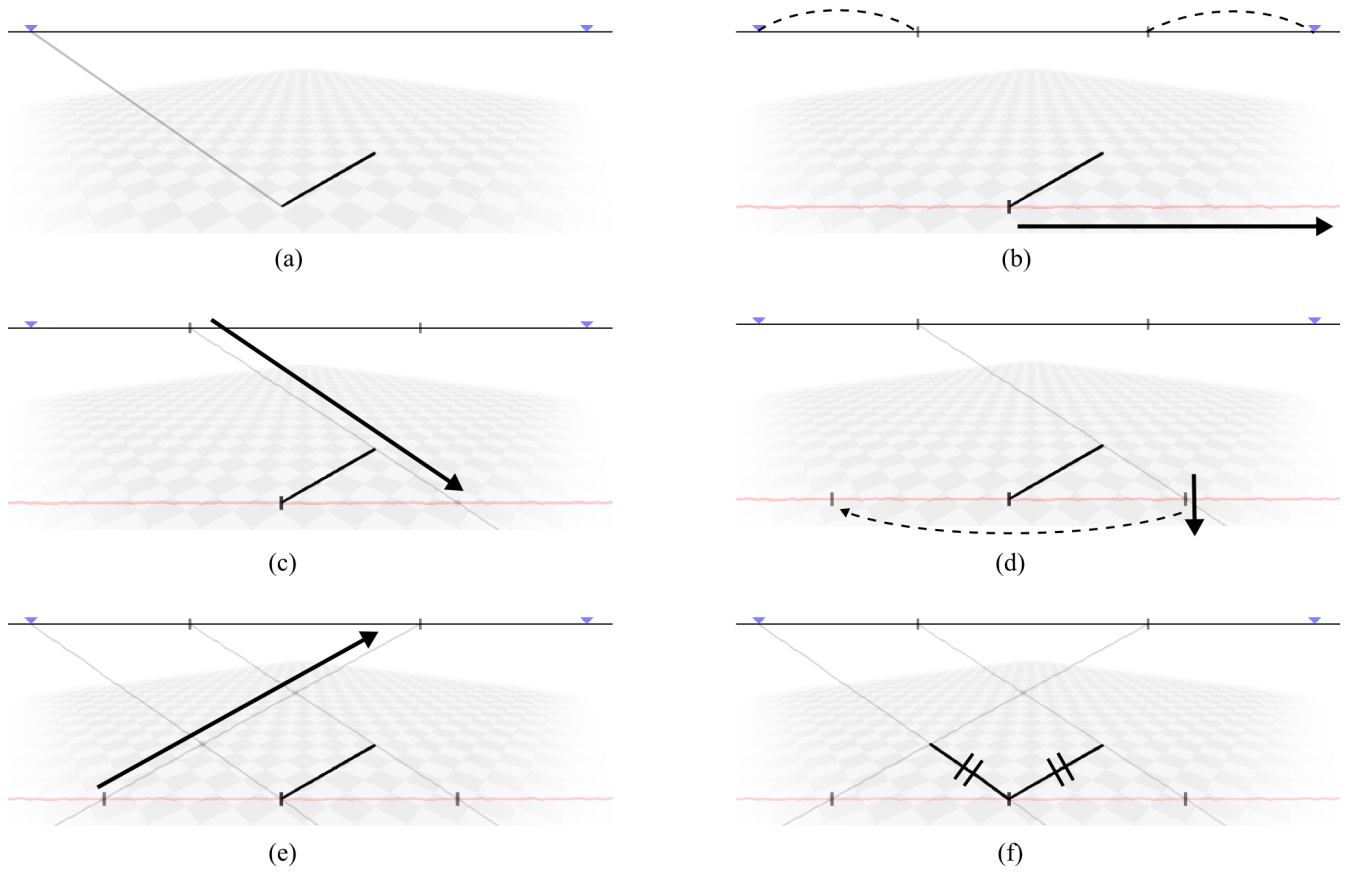
Figure 5: *This figure illustrates the* measuring point *interaction briefly mentioned in Section 2.3 of the paper. A Measuring point is a vanishing point defined by a 3D direction which is itself defined relative to another vanishing point. This direction can be constructed in a plan view using intersecting circles (See [Ching 1997]). The user first adds a guideline from a segment vertex (a), and then draws a second guideline parallel to the image plane through the near vertex of the segment. The system recognizes this action and, for each visible vanishing point, computes measuring points and adds them as small ticks on the horizon line (b). The intersection of the image-space guideline and a guideline from the left measuring point through the far edge vertex (c) defines a dimension on the image-space guideline. A small tick gesture across the image-space line mirrors the dimension about the near vertex (d). Intersecting a line from this mirrored point to the right measuring point with a guideline from the near vertex to the left vanishing point defines a perpendicular segment (e). This segment is the same length as the original segment (f). Since the image-space guideline is not foreshortened, any arbitrary dimension can be transferred between the two perpendicular directions. However, we found that the number of steps involved, and the difficulty in remembering which guidelines were supposed to be intersected, made this technique highly inefficient in practice.*