the airplane; a video display unit on the flight deck of the airplane capable of displaying video images; and a computer system programmed to perform the following operations: (a) calculating projected locations of the extremity over ground during movement of the airplane; (b) transforming the calculated projected locations of the extremity into a graphical cue representing the calculated projected locations of the extremity in a frame of reference of the video scene; and (c) causing the video display unit to display the graphical cue superimposed on the video images in fixed spatial relationship to the image of the extremity. The transforming operation is based at least in part on a known spatial relationship of the camera and the extremity.

A further aspect is a method for aiding ground maneuvering of an airplane, the method comprising: (a) capturing a stream of video images that include a changing video scene and a fixed image of an extremity of an airplane; (b) calculating projected locations of the extremity over ground during movement of the airplane; (c) transforming the calculated projected locations of the extremity into a graphical cue representing the calculated projected locations of the extremity in a frame of reference of the video scene; and (d) displaying a video image of the first stream on a video display unit with a graphical cue superimposed on the video image of the stream, the graphical cue representing projected locations of the extremity over ground during movement of the airplane; wherein steps (b) and (c) are performed by a computer system.

Yet another aspect of the subject matter disclosed herein is an onboard system for avoiding collisions between a maneuvering airplane and an obstacle, the system comprising: a video camera mounted to an airplane for generating a stream of video images that include a changing video scene and a fixed image of an extremity of the airplane; a video display unit on the flight deck of the airplane capable of displaying video images; and a computer system programmed to perform the following operations: (a) calculating projected locations of the extremity over ground during movement of the airplane; (b) transforming the calculated projected locations of the extremity into a graphical cue representing the calculated projected locations of the extremity in a frame of reference of the video scene; (c) causing the video display unit to display the graphical cue superimposed on the video images in fixed spatial relationship to the image of the extremity; (d) processing the video image to determine whether an obstacle appearing in the video image is at a location having less than a minimum separation distance from or intersected by any one of the projected locations or not; and

(a) causing said video display unit to display a video image of said stream with a graphical cue superimposed on said video image of said stream, said graphical cue representing projected locations of said extremity over ground during movement of said airplane;

(b) processing said video image to determine whether an obstacle appearing in said video image is at a location having less than a minimum separation distance from or intersected by any one of said projected locations or not; and

(c) issuing an alert signal if a determination is made in operation (b) that the obstacle location is less than a minimum separation distance from or intersected by a projected location of said extremity.

21. A system for aiding ground maneuvering of an airplane, said system comprising:

a video camera mounted to an airplane for generating a stream of video images that include a video scene and an image of an extremity of said airplane;

a video display unit on the flight deck of said airplane capable of displaying video images; and

a computer system programmed to perform the following operations:

(a) calculating projected locations of said extremity over ground during movement of said airplane;

(b) transforming said calculated projected locations of said extremity into a graphical cue representing said calculated projected locations of said extremity in a frame of reference of said video scene; and

(c) causing said video display unit to display said graphical cue superimposed on said video images in fixed spatial relationship to said image of said extremity.

22. The system as recited in claim 21, wherein said transforming operation is based at least in part on a known spatial relationship of said camera and said extremity.

23. A method for aiding ground maneuvering of an airplane, said method comprising:

(a) capturing a stream of video images that include a changing video scene and a fixed image of an extremity of an airplane;

(b) calculating projected locations of the extremity over ground during movement of the airplane;

(c) transforming said calculated projected locations of the extremity into a graphical cue representing said calculated projected locations of the extremity in a frame of reference of said video scene; and

(d) displaying a video image of said first stream on a video display unit with a graphical cue superimposed on said video image of said stream, said graphical cue representing projected locations of said extremity over ground during movement of said airplane,

wherein steps (b) and (c) are performed by a computer system.

24. An onboard system for avoiding collisions between a maneuvering airplane and an obstacle, said system comprising:

a video camera mounted to an airplane for generating a stream of video images that include a changing video scene and a fixed image of an extremity of said airplane;

a video display unit on the flight deck of said airplane capable of displaying video images; and

a computer system programmed to perform the following operations:

(a) calculating projected locations of said extremity over ground during movement of said airplane;

(b) transforming said calculated projected locations of said extremity into a graphical cue representing said calculated projected locations of said extremity in a frame of reference of said video scene;

(c) causing said video display unit to display said graphical cue superimposed on said video images in fixed spatial relationship to said image of said extremity;

(d) processing said video image to determine whether an obstacle appearing in said video image is at a location having less than a minimum separation distance from or intersected by any one of said projected locations or not; and

(e) issuing an alert signal if a determination is made in operation (b) that the obstacle location is less than a minimum separation distance from or intersected by a projected location of said extremity.