estimating measurement data on scattered waves radiated from the measurement area in relation to waves that are incident on the measurement area when the condition in the measurement area is known is called a forward problem and easy. However, obtaining the condition in the measurement area when measurement data on scattered waves is known is called an inverse problem and is not easy.

[0006]

When an object moves in the measurement area, the Doppler effect causes a difference between the properties of waves transmitted to the measurement area and the properties of scattered waves received from the measurement area. Accordingly, it becomes difficult to analyze these relationships. That is, when an object moves in the measurement area, it becomes difficult to image the object with high accuracy using measurement data of scattered waves.

[0007]

In view of this, embodiments of the present disclosure provides an imaging device or the like that is capable of imaging a moving object in the measurement area with high accuracy.

[Solution to Problem]

[0008]

According to one aspect of the present disclosure, there is provided an imaging device including: a plurality of transmitters that each transmit a wave to a measurement area; a plurality of receivers that each receive a scattered wave of the wave from the measurement area; and an information processing circuit that images an object in the measurement area using measurement data of the scattered wave. In imaging the object, the information processing circuit: derives, using the measurement data and a velocity vector of the object, a scattering field function that receives a transmission position of the wave and a reception position of the scattered wave as input and outputs an amount of the scattered wave at the reception position; derives an imaging function that receives an imaging target position as input and outputs an image intensity at the imaging target position, and is defined using an amount output from the scattering field function in response to inputting the imaging target position into the scattering field function as the transmission position and the reception position; and images the object in the measurement area using the imaging function. In deriving the scattering field function, the information processing circuit reflects in the scattering field function that a wavenumber of the scattered wave changes from a wavenumber of the wave due to a Doppler effect corresponding to the velocity vector.

[0008a]

Accoring to another aspect of the present disclosure, there is provided an imaging method including: transmitting, by each of a plurality of transmitters, a wave to a measurement area; receiving,

by each of a plurality of receivers, a scattered wave of the wave from the measurement area; and imaging an object in the measurement area using measurement data of the scattered wave, wherein the imaging of the object includes: deriving, using the measurement data and a velocity vector of the object, a scattering field function that receives a transmission position of the wave and a reception position of the scattered wave as input and outputs an amount of the scattered wave at the reception position; deriving an imaging function that receives an imaging target position as input and outputs an image intensity at the imaging target position, and is defined using an amount output from the scattering field function in response to inputting the imaging target position into the scattering field function as the transmission position and the reception position; and imaging the object in the measurement area using the imaging function, and the deriving of the scattering field function includes reflecting in the scattering field function that a wavenumber of the scattered wave changes from a wavenumber of the wave due to a Doppler effect corresponding to the velocity vector.

[0009]

These general or specific aspects may be implemented as a system, a device or apparatus, a method, an integrated circuit, a computer program, or a non-transitory computer-readable recording medium such as a CD-ROM, or any combination thereof.

[Advantageous Effects of Invention]

[0010]

According to embodiment of the present disclosure, it is possible to image a moving object in the measurement area with high accuracy.

[Brief Description of Drawings]

[0011]

[FIG. 1]

FIG. 1 is a conceptual diagram showing a one-dimensional multistatic array antenna.

[FIG. 2]

FIG. 2 is a conceptual diagram showing the relationship between a transmission point and a reception point in a plane.

[FIG. 3]

FIG. 3 is a conceptual diagram showing an example of coordinates relating to a semi-two-dimensional array antenna.

[FIG. 4]

FIG. 4 is a conceptual diagram illustrating the relationship between a plurality of transmitters, a plurality of receivers, and a flying object.

[FIG. 5]

FIG. 5 is a conceptual diagram showing a coordinate system