

FIG. 1

AIRCRAFT-UTILIZING DETERIORATION DIAGNOSTIC SYSTEM

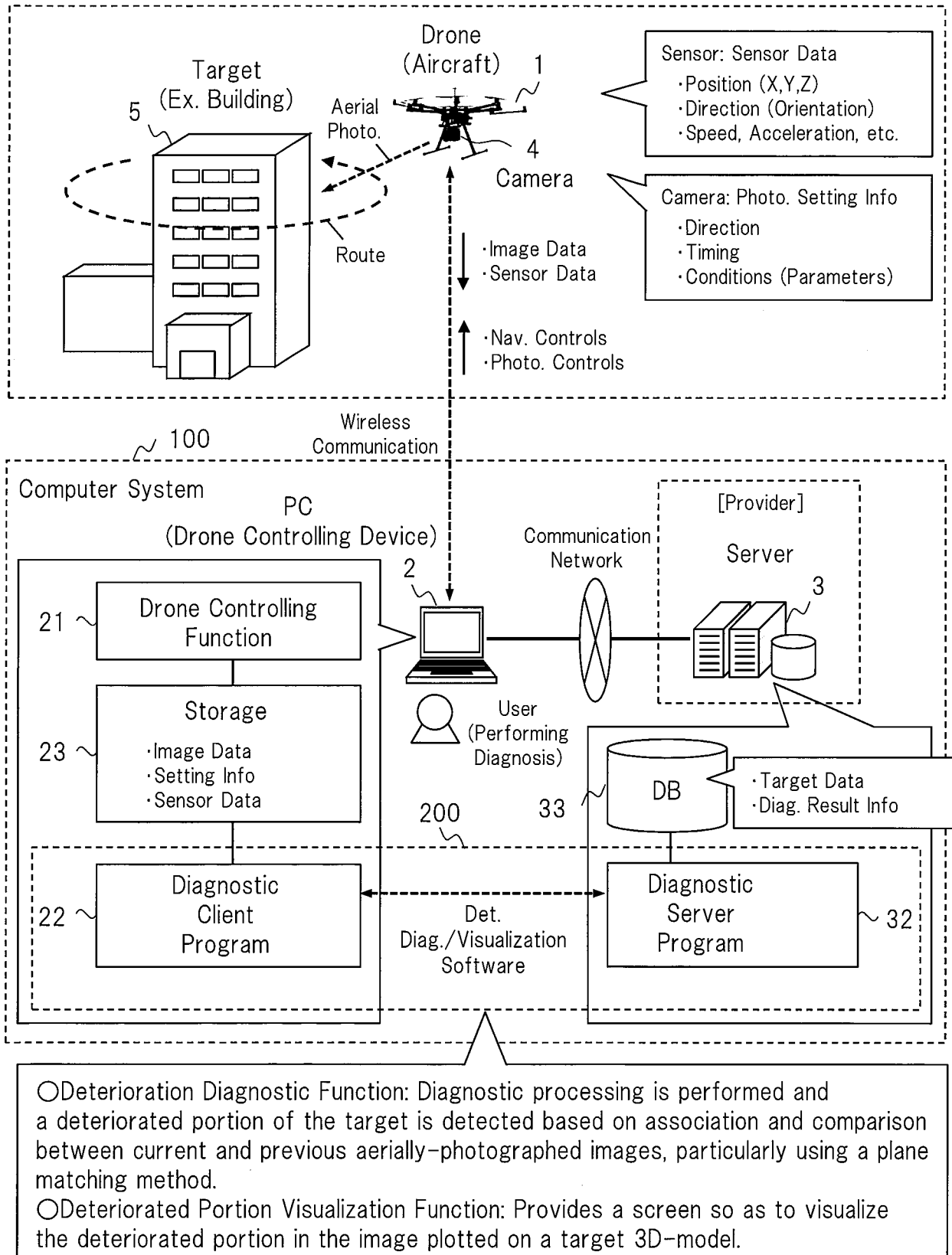


FIG. 2

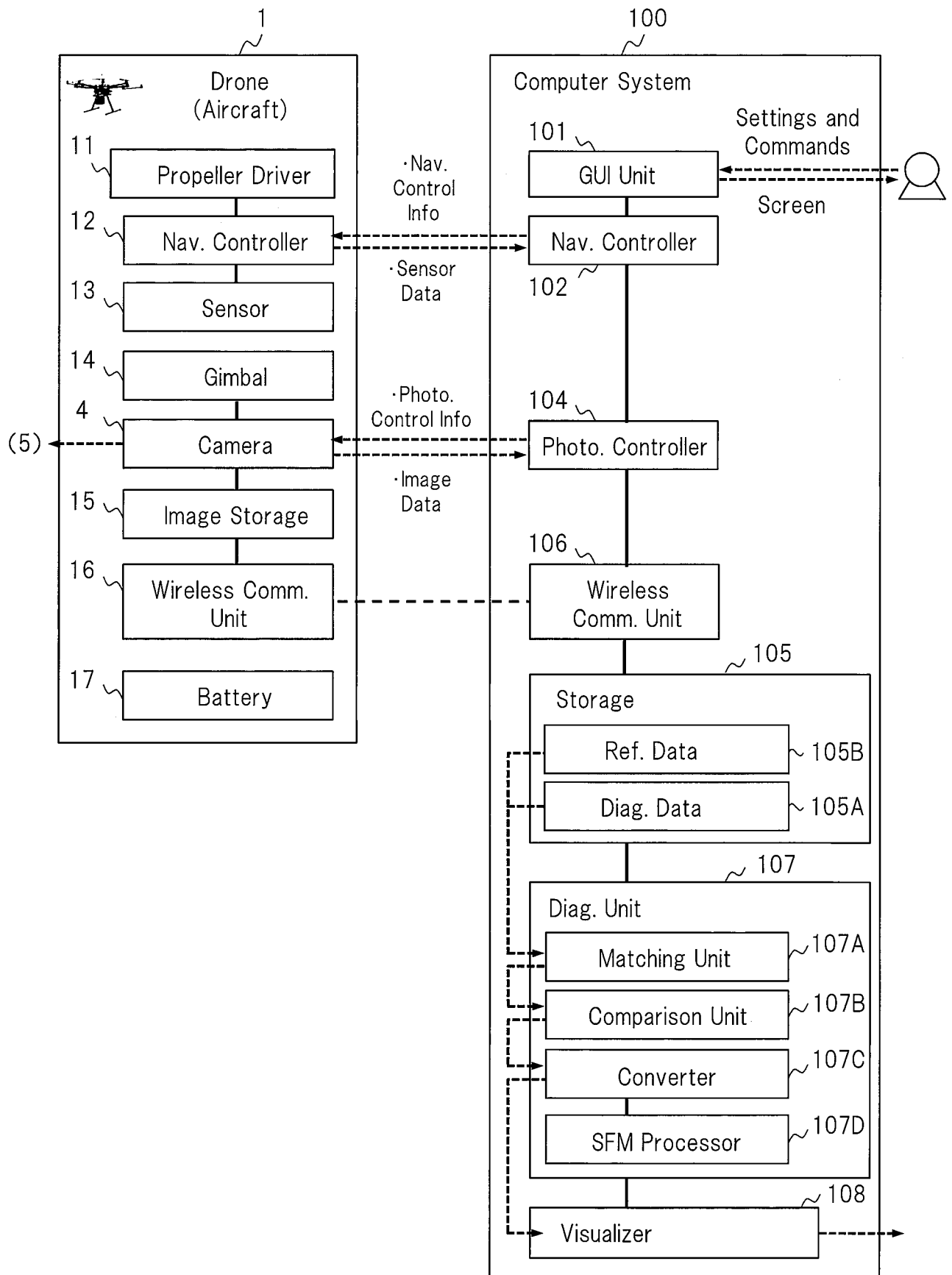


FIG. 3

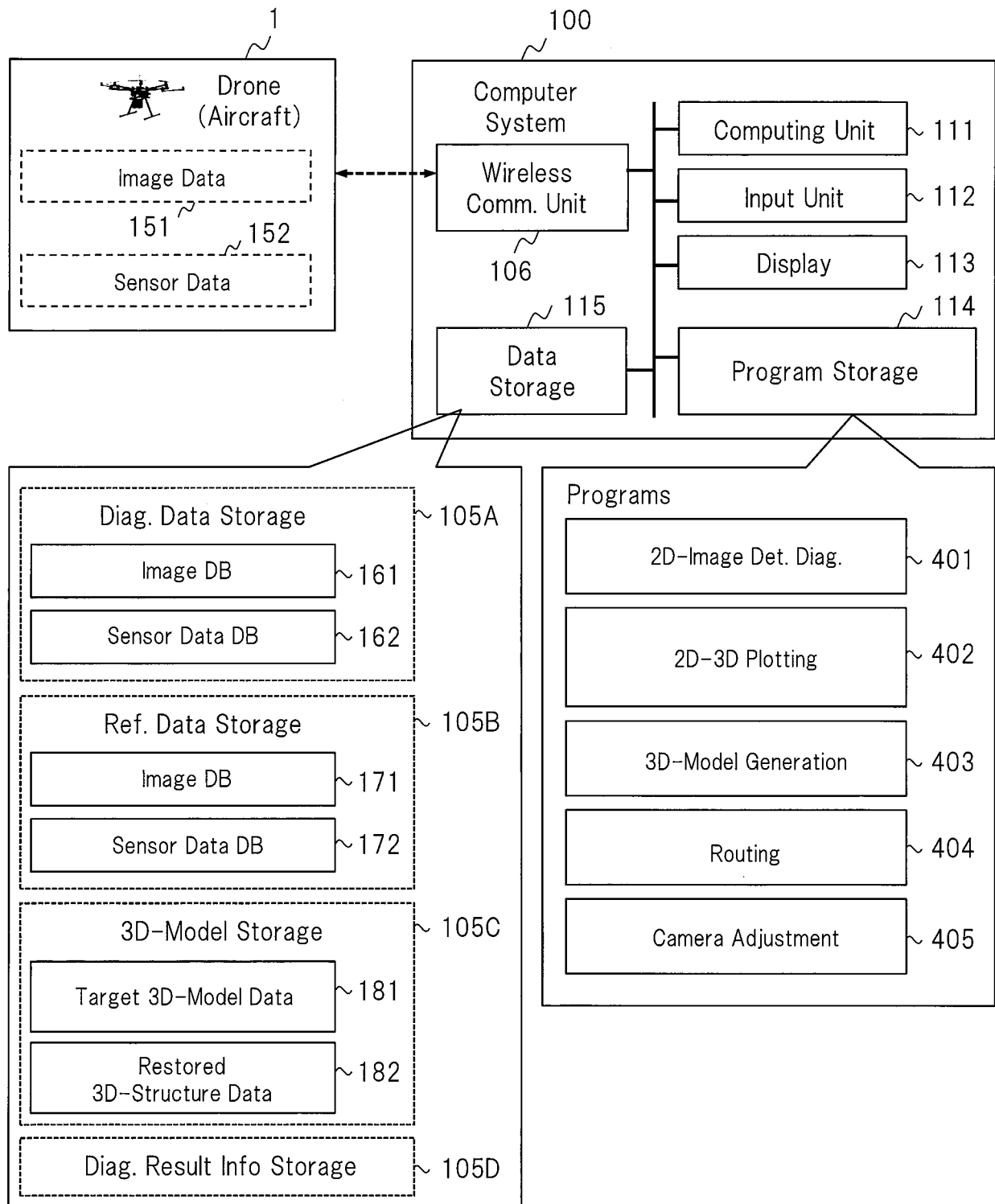
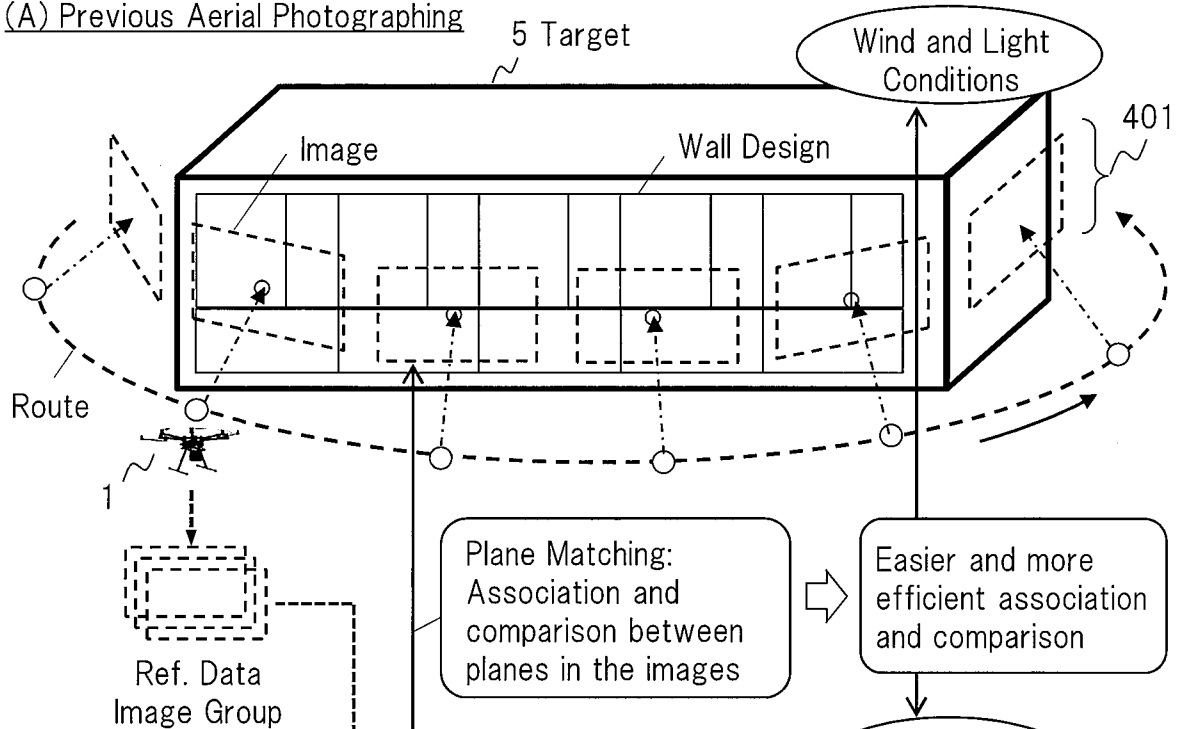


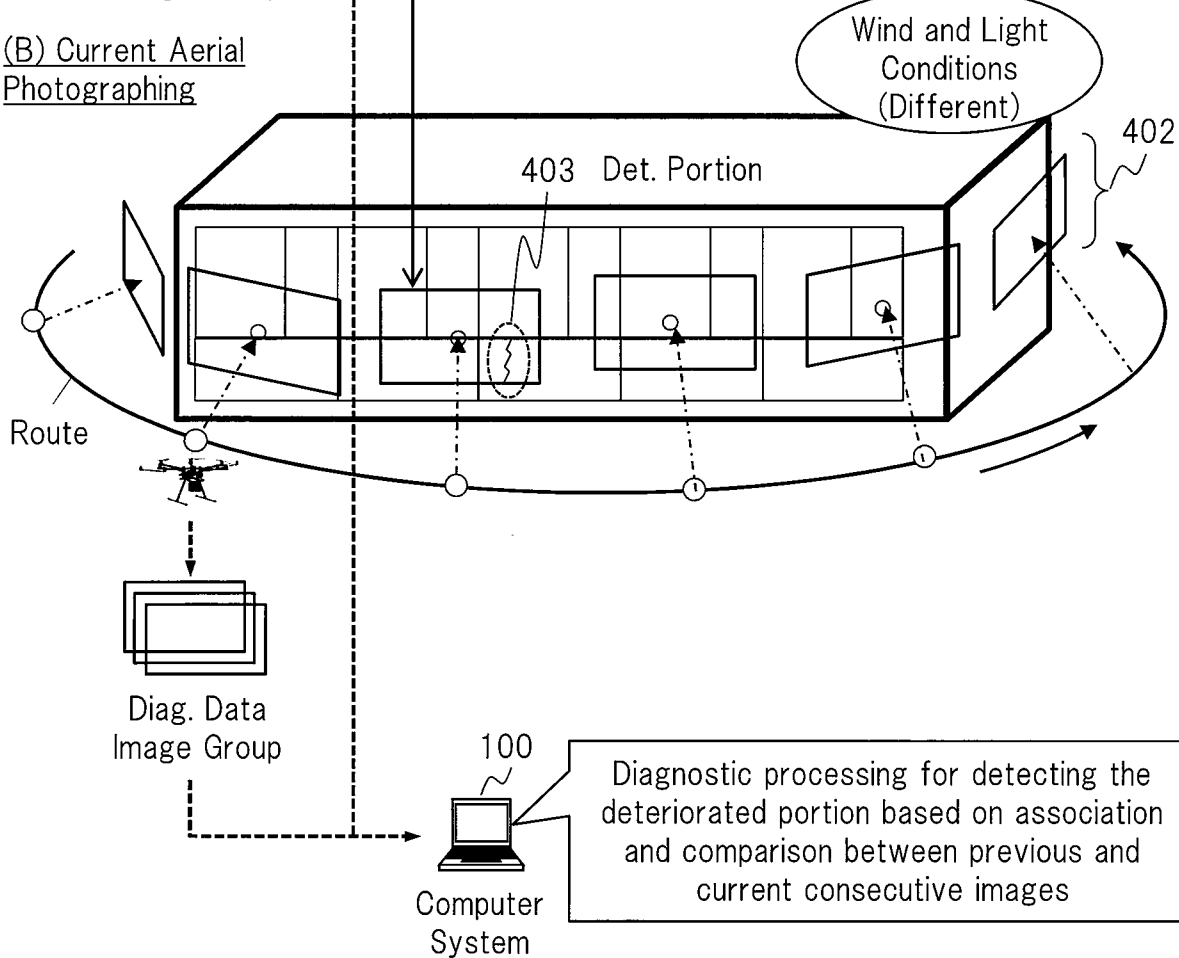
FIG. 4

EMBODIMENT: OVERVIEW (ASSOCIATION AND COMPARISON)

(A) Previous Aerial Photographing



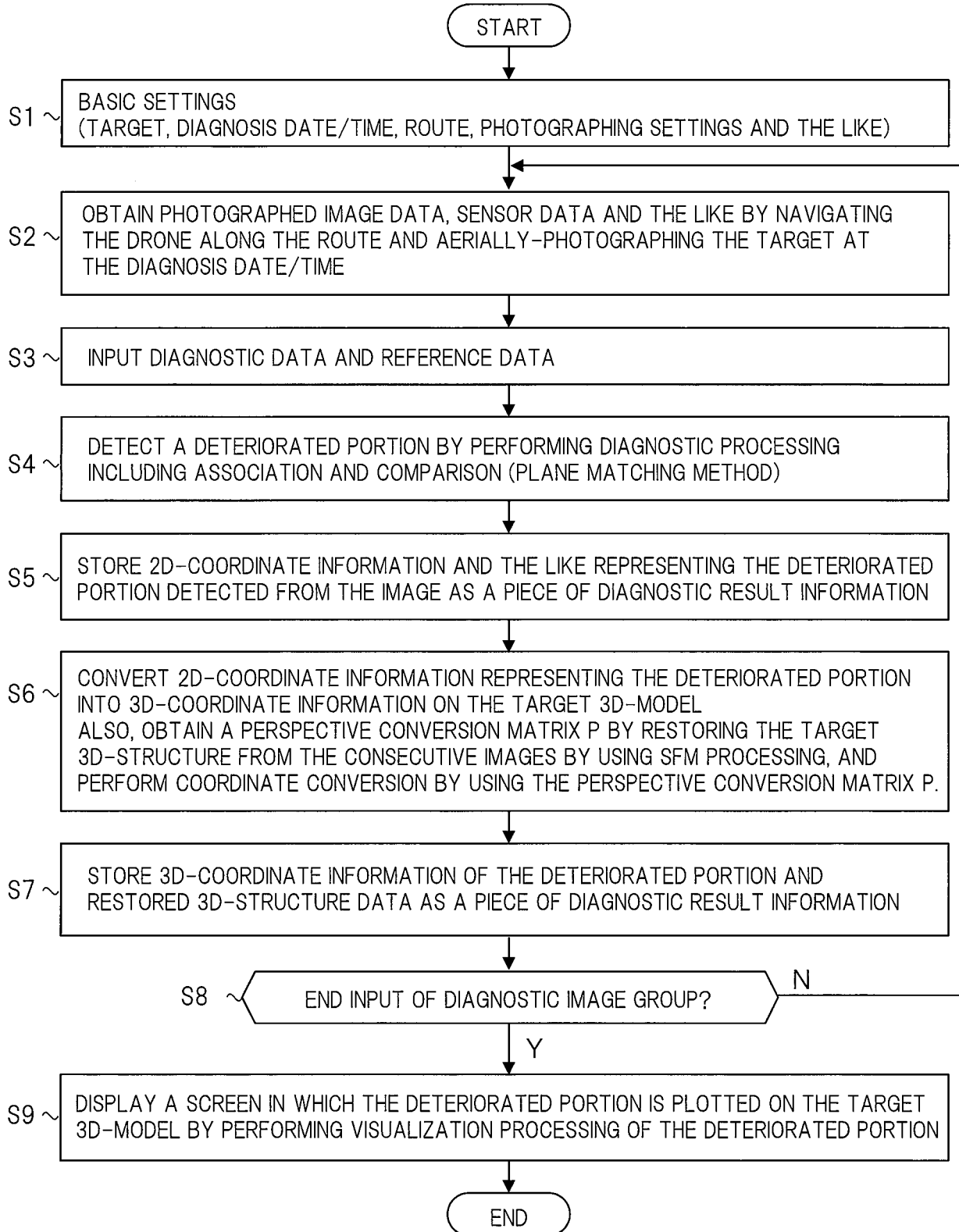
(B) Current Aerial Photographing

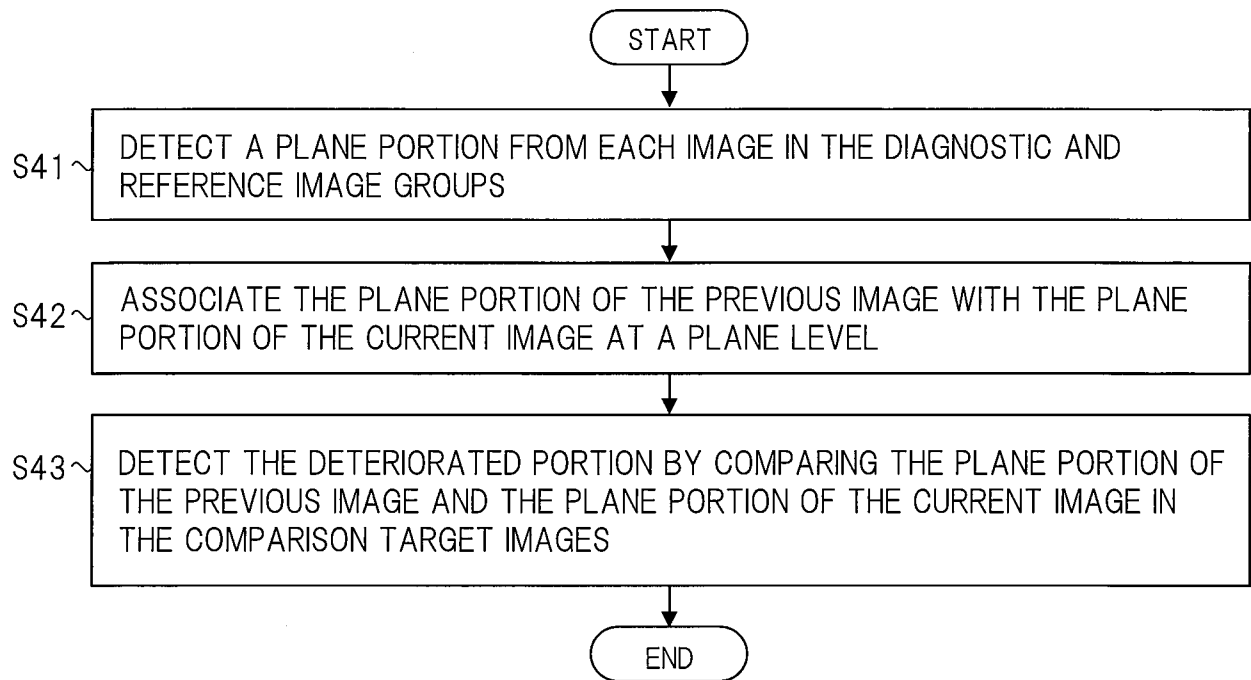


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FIG. 5

BASIC PROCESSING



*FIG. 6*DIAGNOSTIC PROCESSING: PLANE MATCHING METHOD

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FIG. 7

DIAGNOSTIC PROCESSING: PLANE MATCHING METHOD

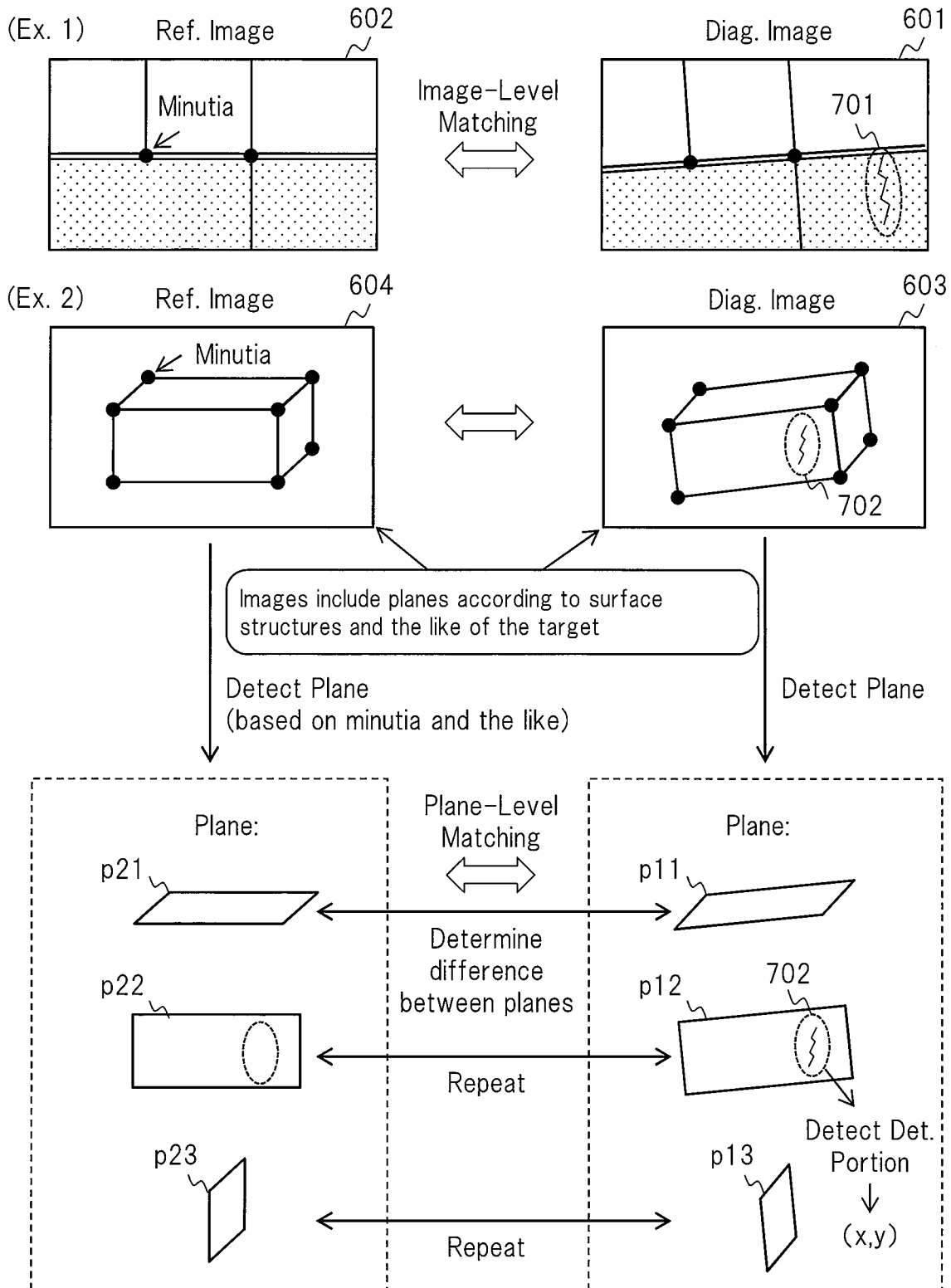
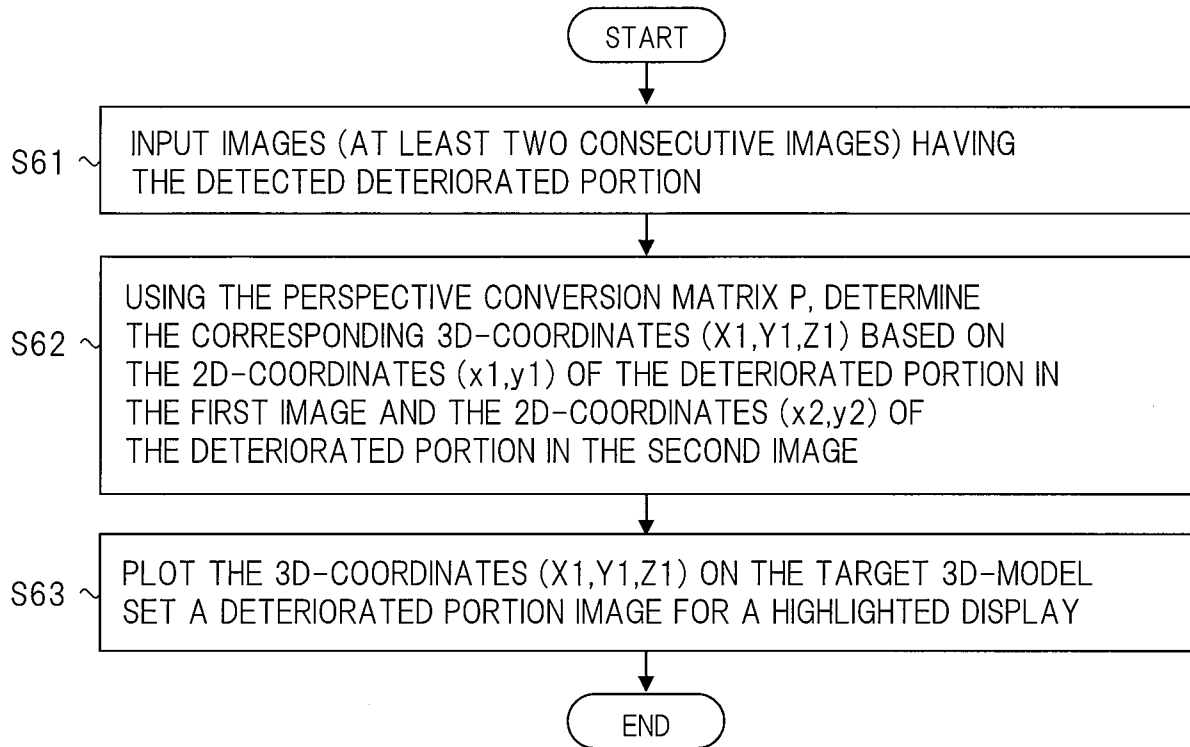


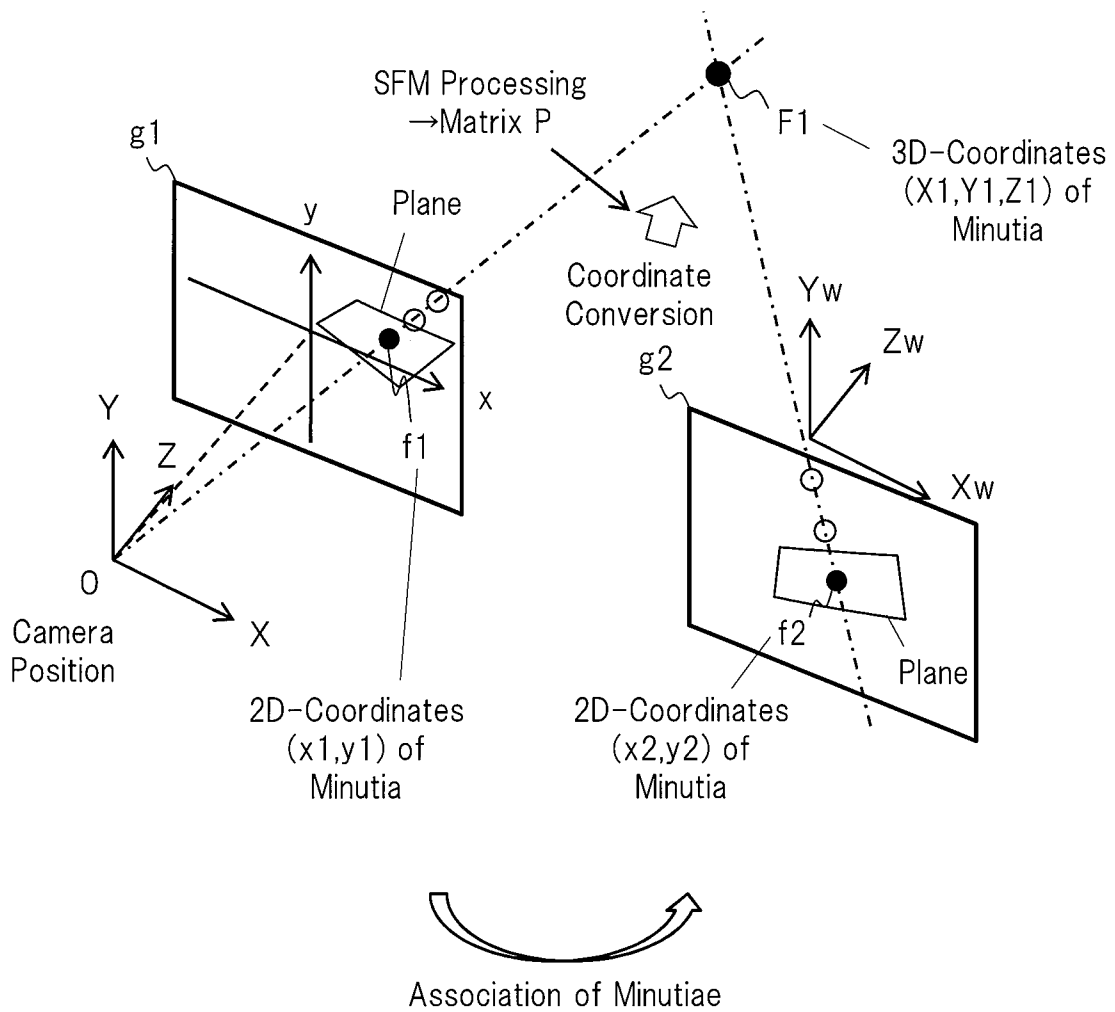
FIG. 8

COORDINATE CONVERSION

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FIG. 9

COORDINATE CONVERSION
(PLOTING FROM 2D TO 3D)



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FIG. 10

MODIFICATION EXAMPLE:
COORDINATE CONVERSION USING PLANE CONVERSION METHOD

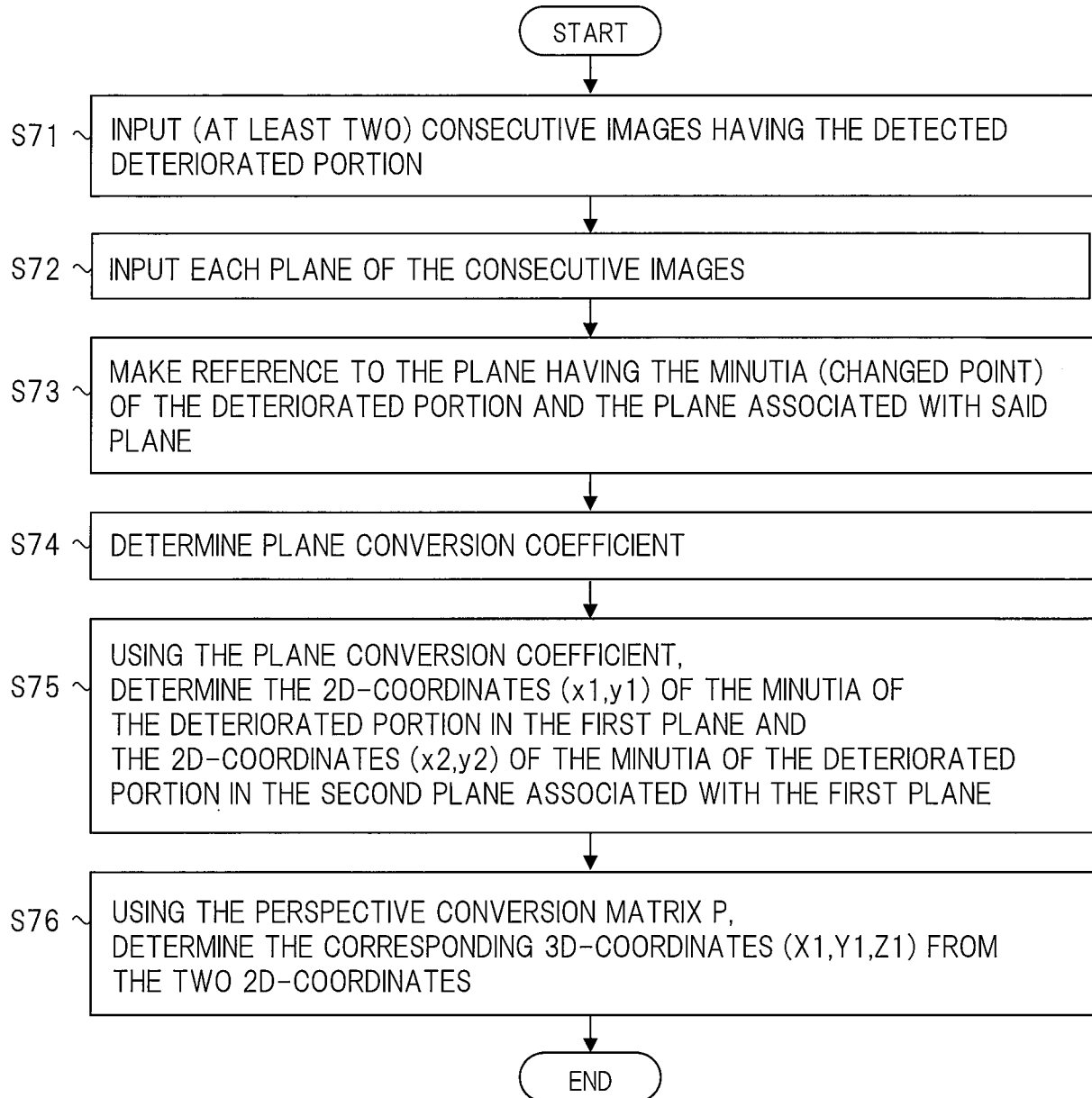
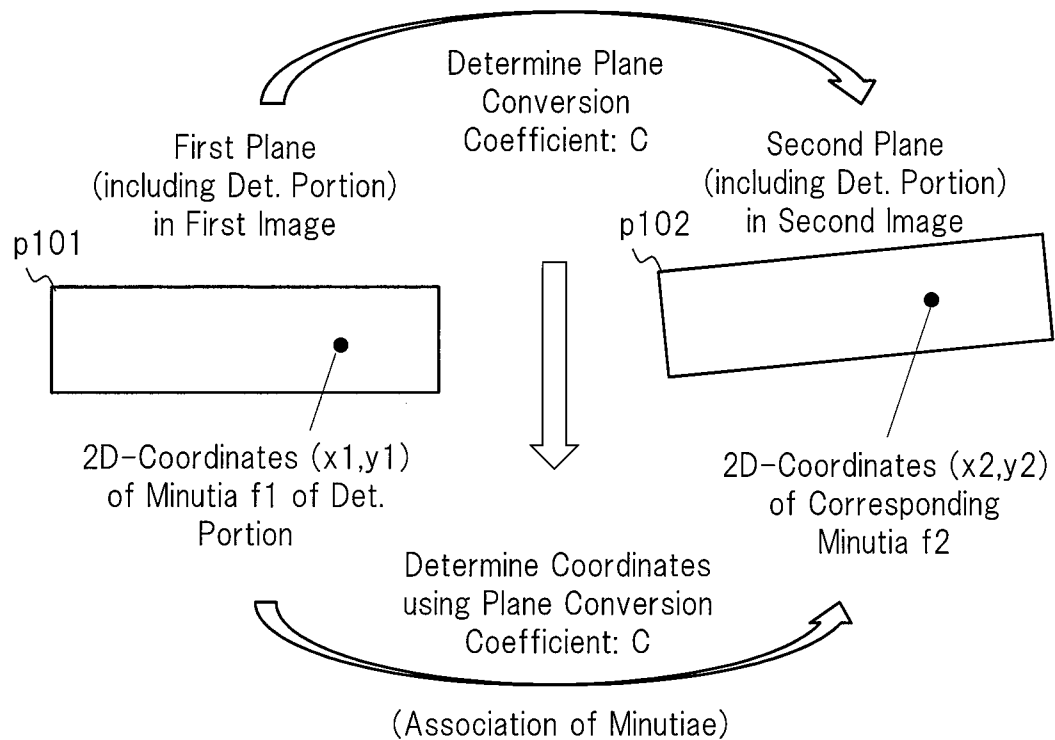


FIG. 11

MODIFICATION EXAMPLE:
COORDINATE CONVERSION USING PLANE CONVERSION METHOD



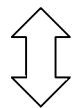
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FIG. 12

DETERIORATED PORTION INFORMATION

(A) Table of 2D-Image Data

Image File	Image Size	Det. Portion ID	2D-Coordinates (x,y) of Det. Portion
001.jpg	6000 x 4000	001-1	(120, 500)
		001-2	(1560, 2440)
002.jpg	6000 x 4000	002-1	(820, 3020)
		002-2	(530,400)
		002-3	(5000,2600)
...	...	...	...
100.jpg	6000 x 4000	100-1	(2200,1030)
		100-2	(50,1340)



Convert

(B) Table of 3D-Model Data

Det. Portion ID	3D-Coordinates (X,Y,Z) of Det. Portion	Corresponding 2D-Image File
001	(100, 200,33)	001.jpg,002.jpg
002	(110,400,40)	003.jpg,004.jpg,005.jpg
003	(200,320,66)	006.jpg,007.jpg
004	(90,15,20)	008.jpg,009.jpg,010.jpg,011.jpg
005	(500,200,160)	012.jpg,013.jpg
...	...	...

FIG. 13

VISUALIZATION OF DETERIORATED PORTION (1)

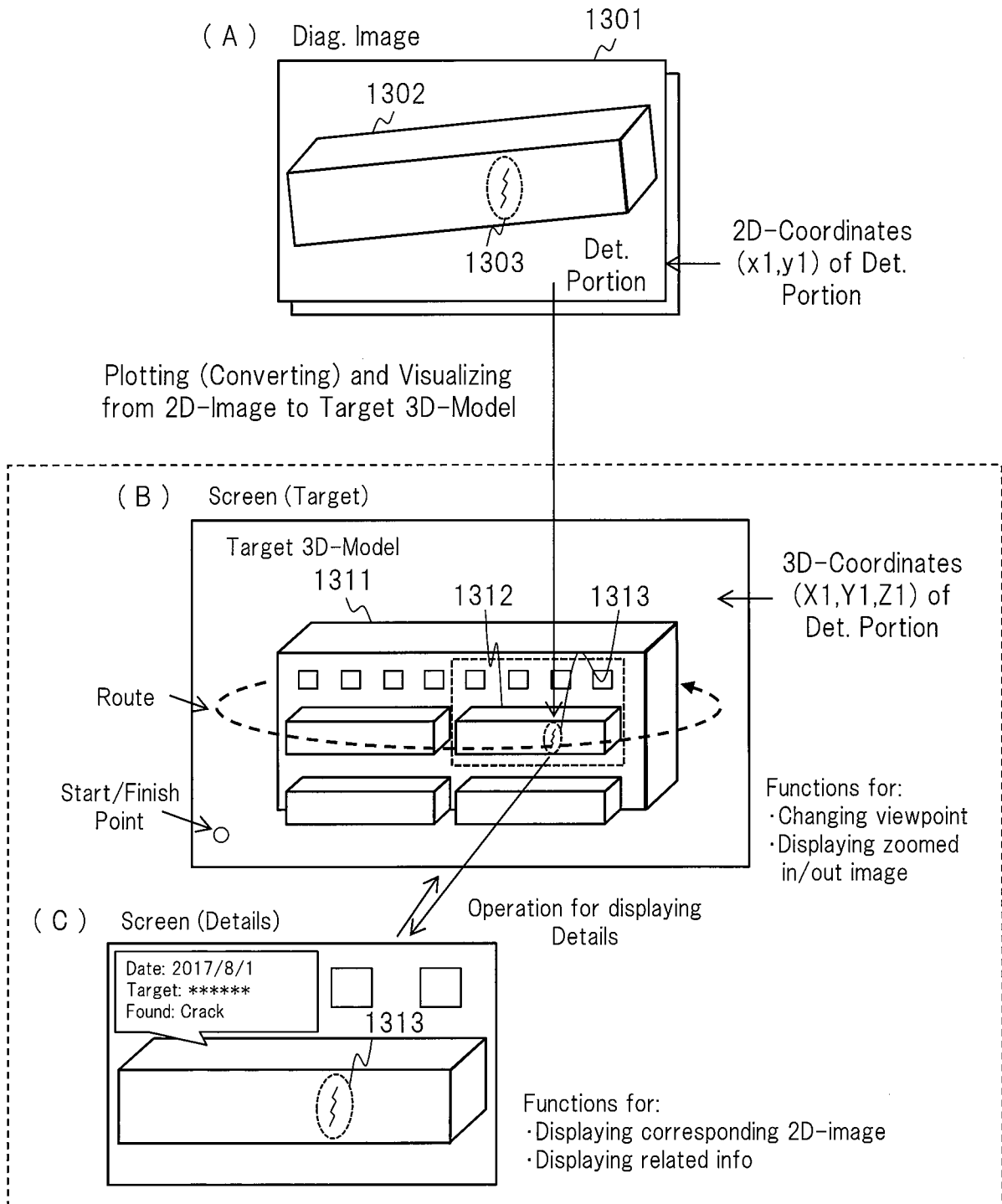


FIG. 14

VISUALIZATION OF DETERIORATED PORTION (2)

Screen (Image Comparison)

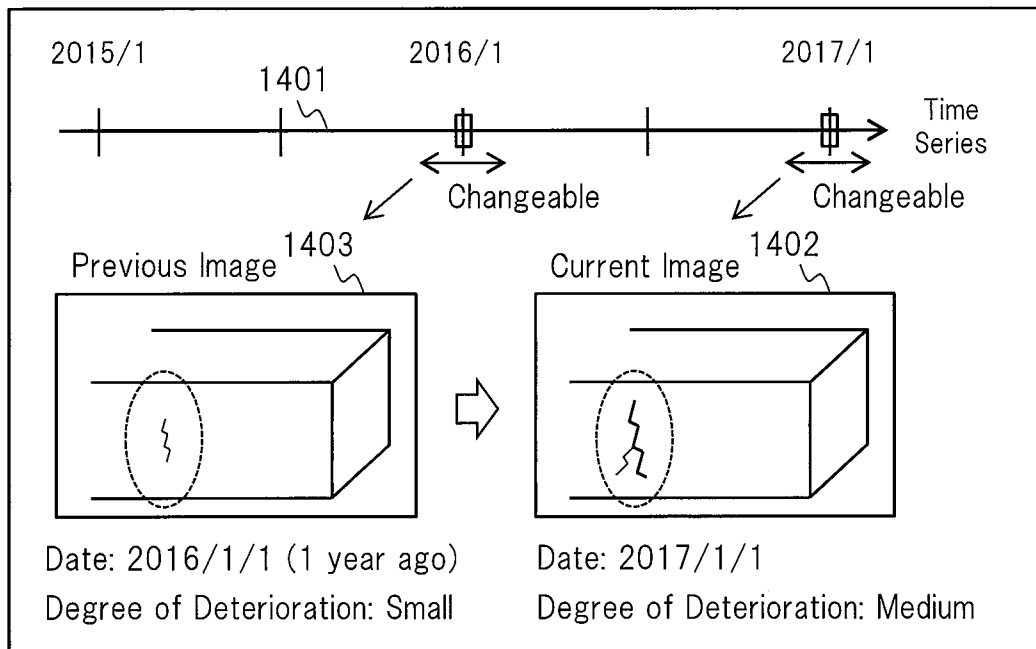
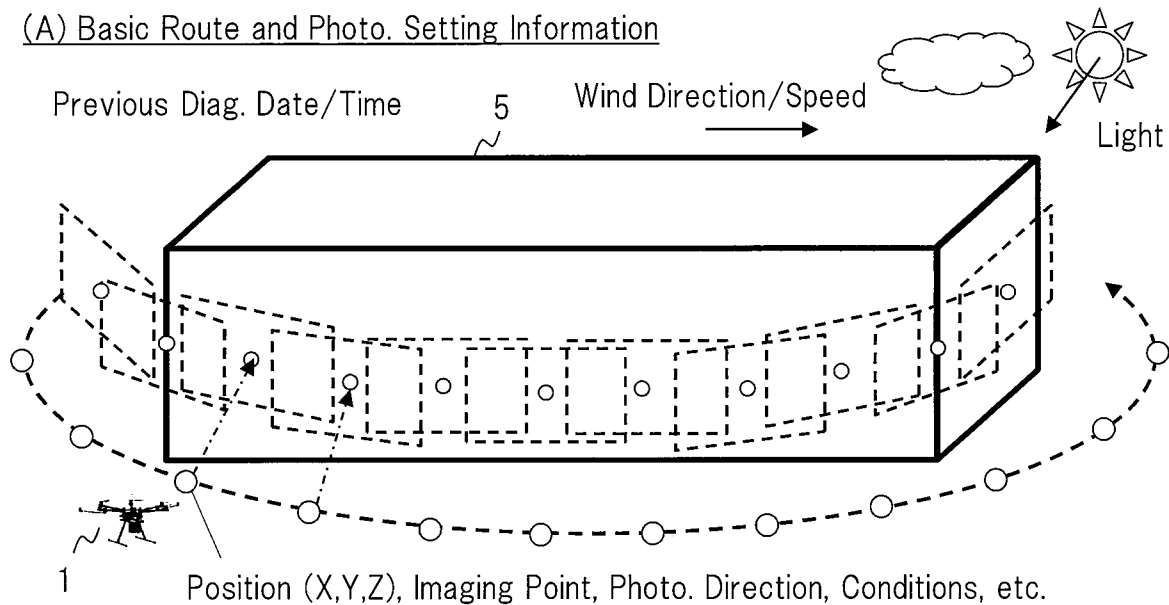
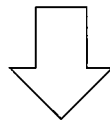


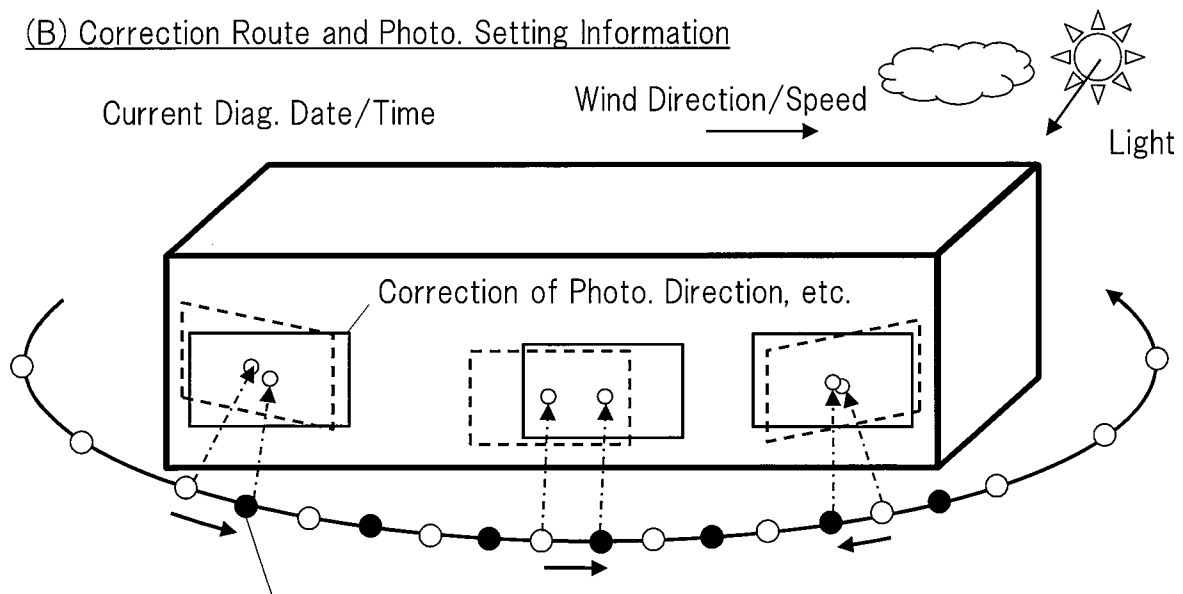
FIG. 15

MODIFICATION EXAMPLE: ROUTING METHOD

(A) Basic Route and Photo. Setting Information

Correction
CalculationGeneration of
Suitable Route, etc.

(B) Correction Route and Photo. Setting Information



Correction of Position, Imaging Point, Photo. Direction, Conditions, etc.

- Ex.: Set the diagnosis date/time to a date/time in which light is more likely to hit
- Ex.: Correct the photographing direction or conditions for regions in which light is less likely to hit
- Ex.: Correct the photographing point and intervals according to wind direction and the like

FIG. 16

ROUTING FUNCTION

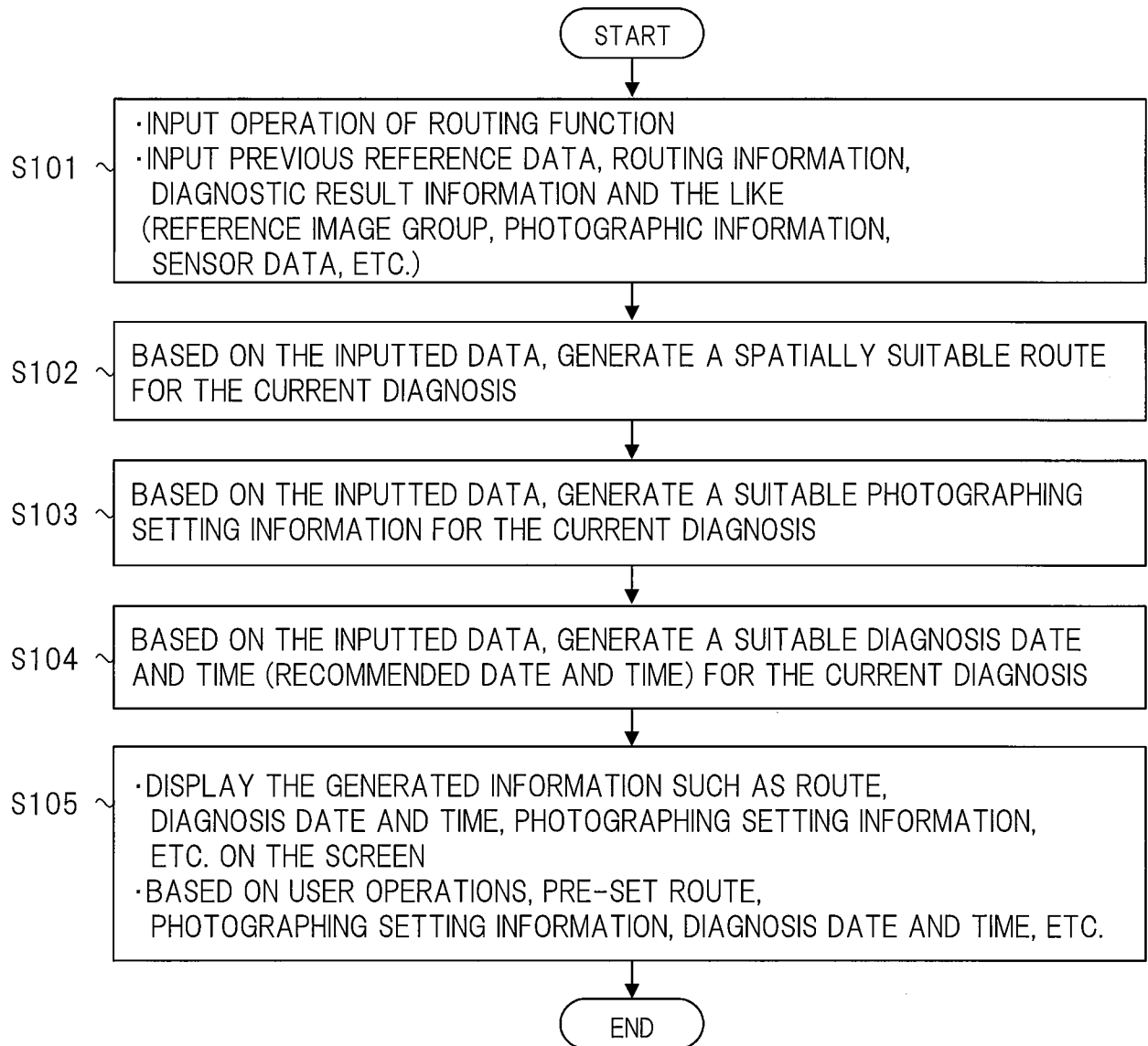


FIG. 17

MODIFICATION EXAMPLE: CAMERA ADJUSTMENT METHOD

During aerial photography, photographing setting information of the camera is adjusted per predetermined point.
 (The photographing direction and the like of the camera are adjusted to a direction in which an overlapping rate is increased such that the current image is as close as possible to the previous image)

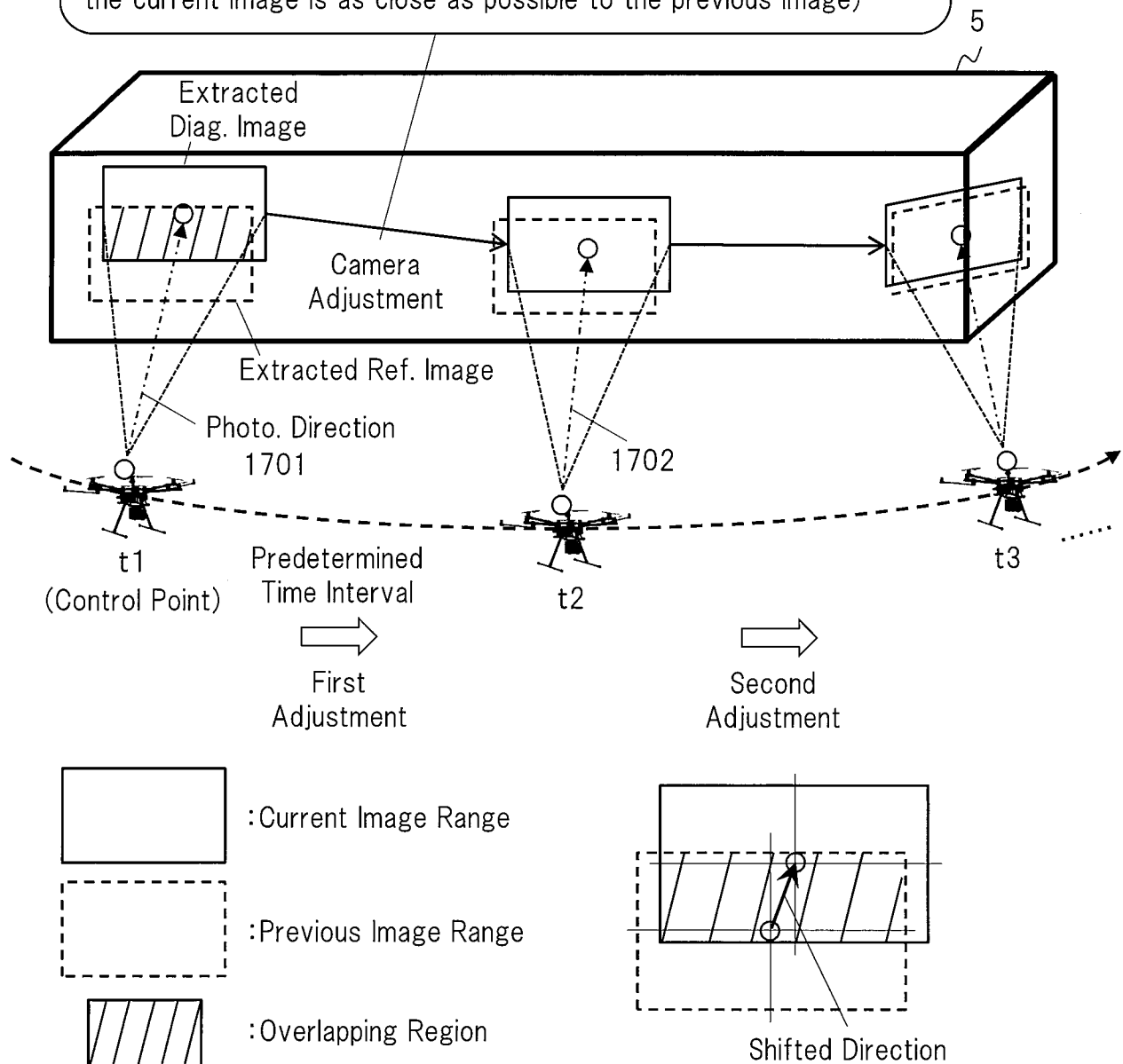
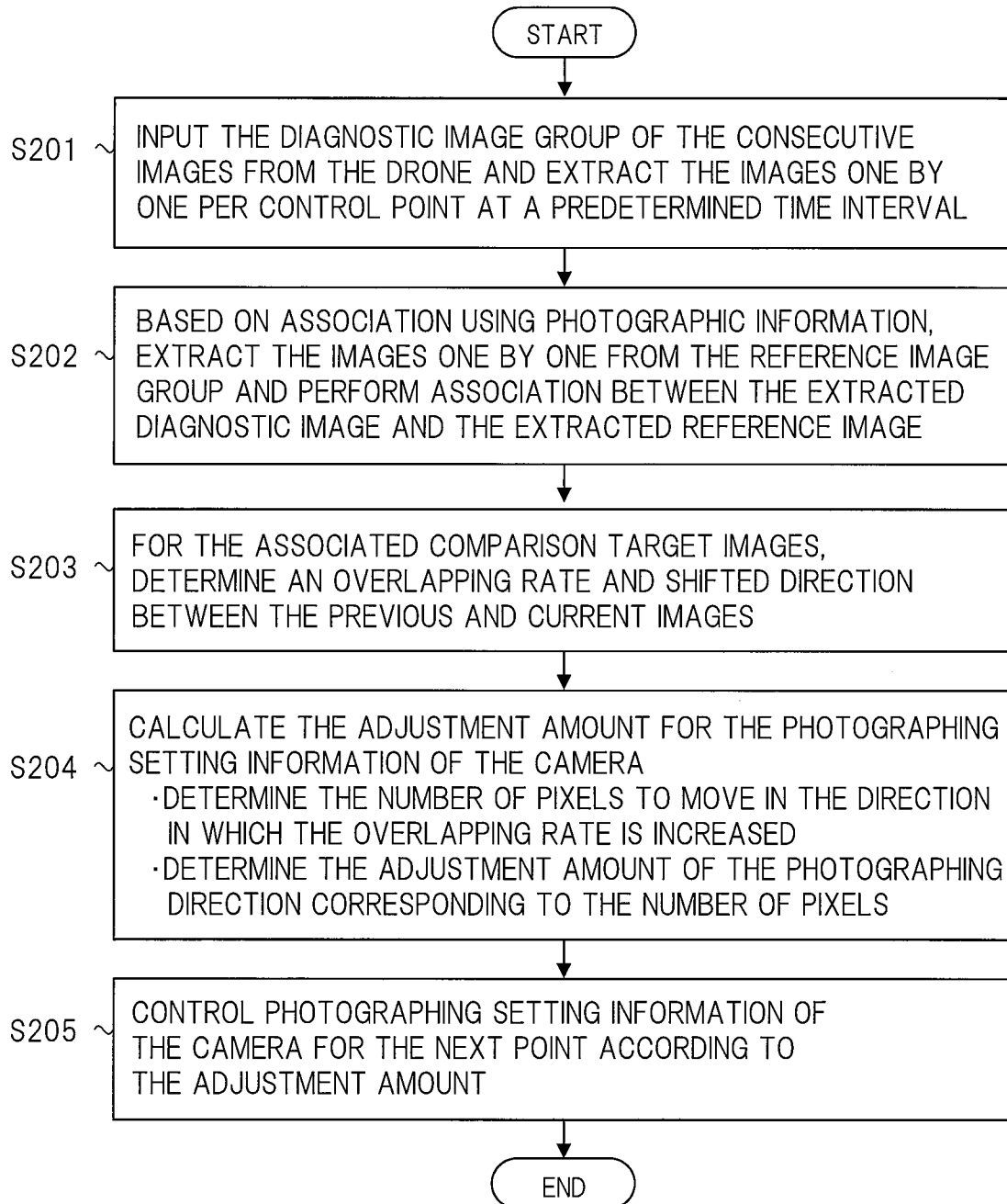
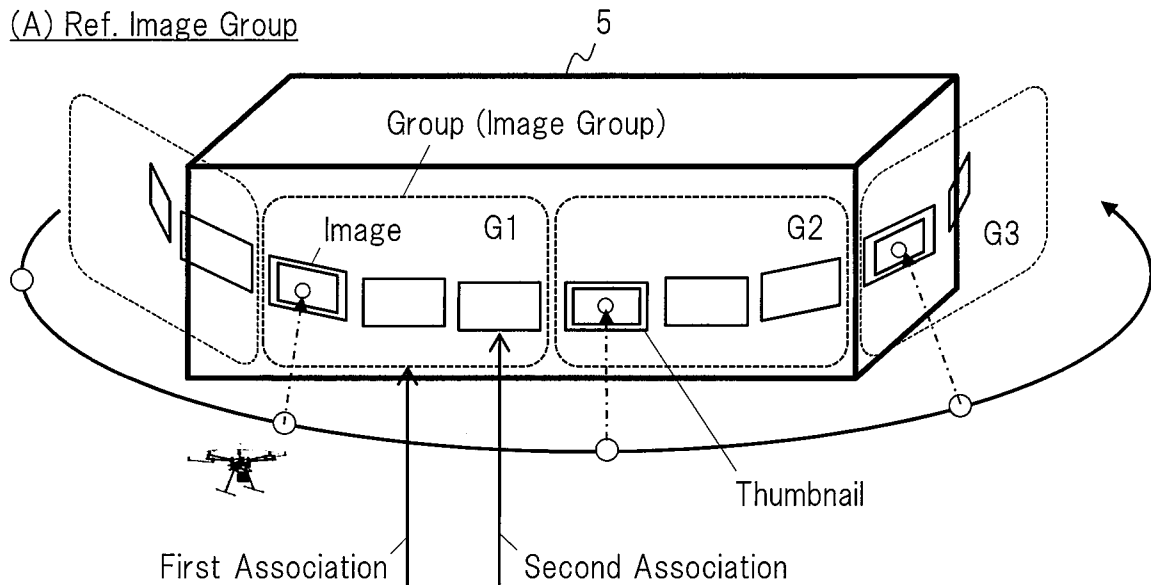


FIG. 18

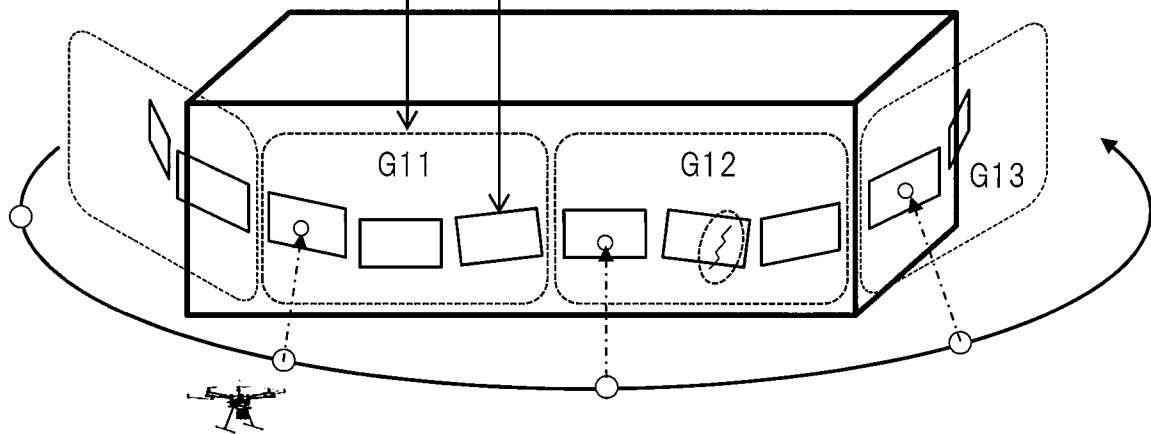
MODIFICATION EXAMPLE: CAMERA ADJUSTMENT METHOD

MODIFICATION EXAMPLE: STEPWISE ASSOCIATION METHOD

(A) Ref. Image Group



(B) Diag. Image Group



○Grouping Settings:

- Group per Target 3D-Model Region
- Group by Photo. Direction, etc.

○Association Processing:

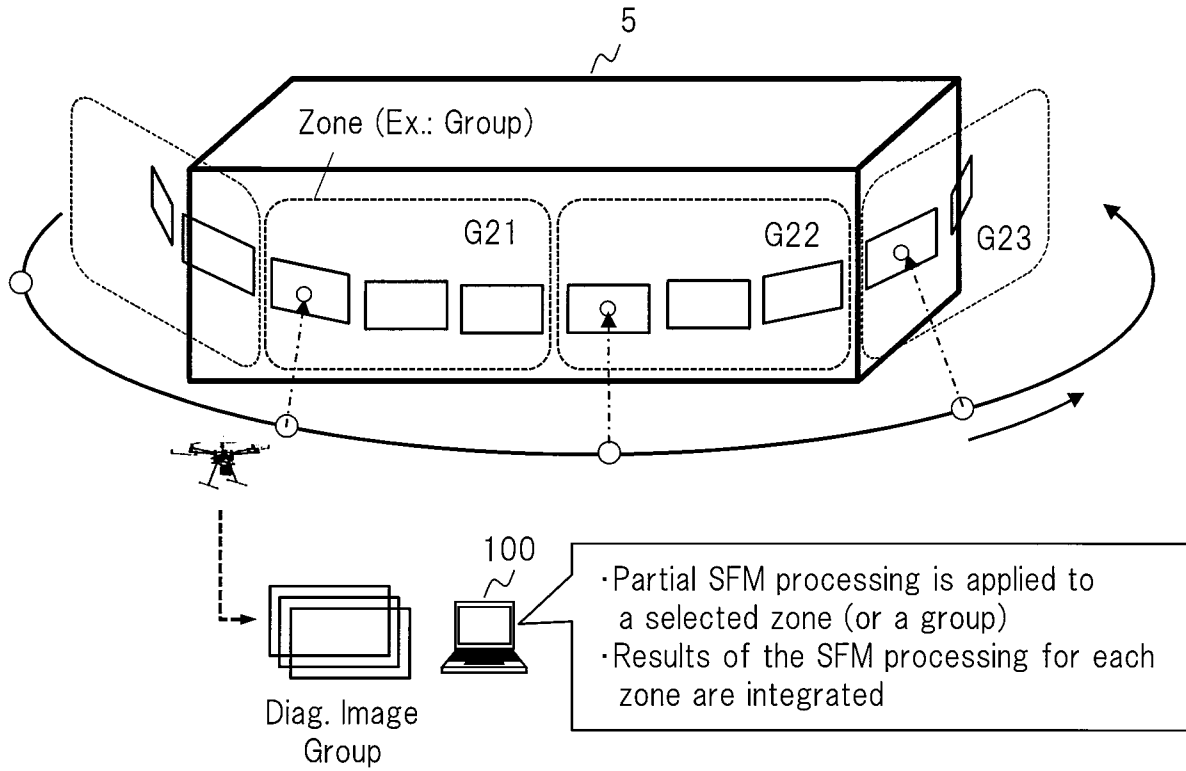
First Association: Association per Group

- Ex.: Using thumbnail information

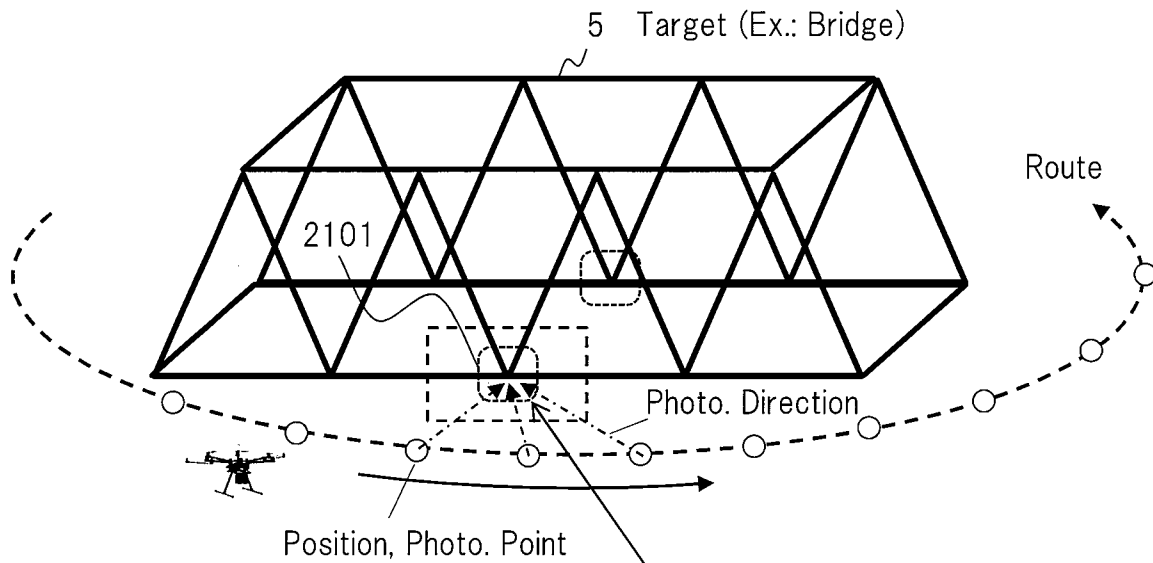
Second Association: Association per Image in Group

- Plane-Level Matching, or
- Image-Level Matching (Minutiae-Based)

FIG. 20

MODIFICATION EXAMPLE: PARTIAL SFM PROCESSING METHOD

MODIFICATION EXAMPLE: PRIORITIZED AERIAL PHOTOGRAPHING METHOD



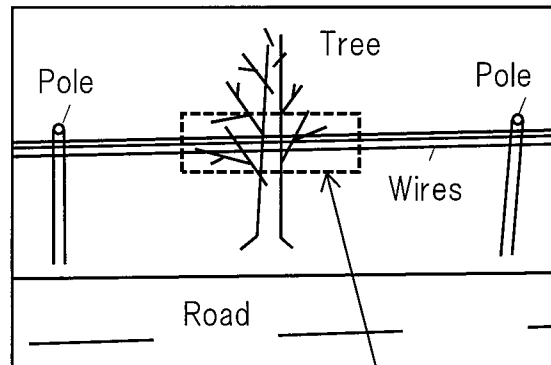
Portion considered likely to deteriorate based on target 3D-model and the like
 → Set as priority portion/region
 → During aerial photographing, the photographing direction and the like are set and controlled such that the camera is directed to the same priority portion at a plurality of consecutive imaging points

FIG. 22

DIFFERENT EMBODIMENT

TARGET: UTILITY POLES AND ELECTRIC WIRES

(A) Aerially-Photographed Image

2D-Coordinates (x,y) of Possible
(Estimated) Contacting Portion

Plotting from 2D to 3D

(B) Screen including Target 3D-Model

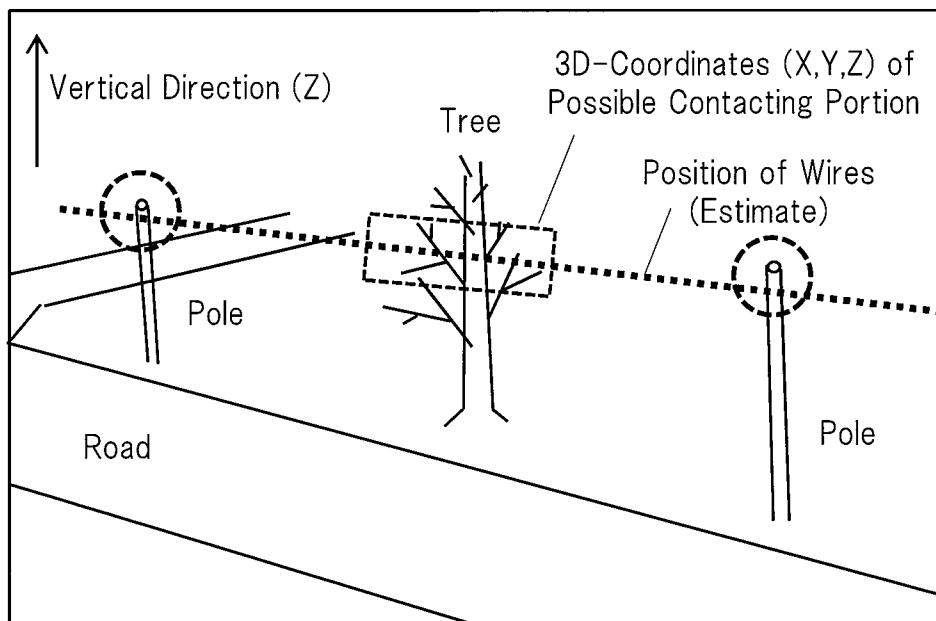


FIG. 23

COMPARATIVE EXAMPLE (1)
METHOD OF DIAGNOSING IN PERSON

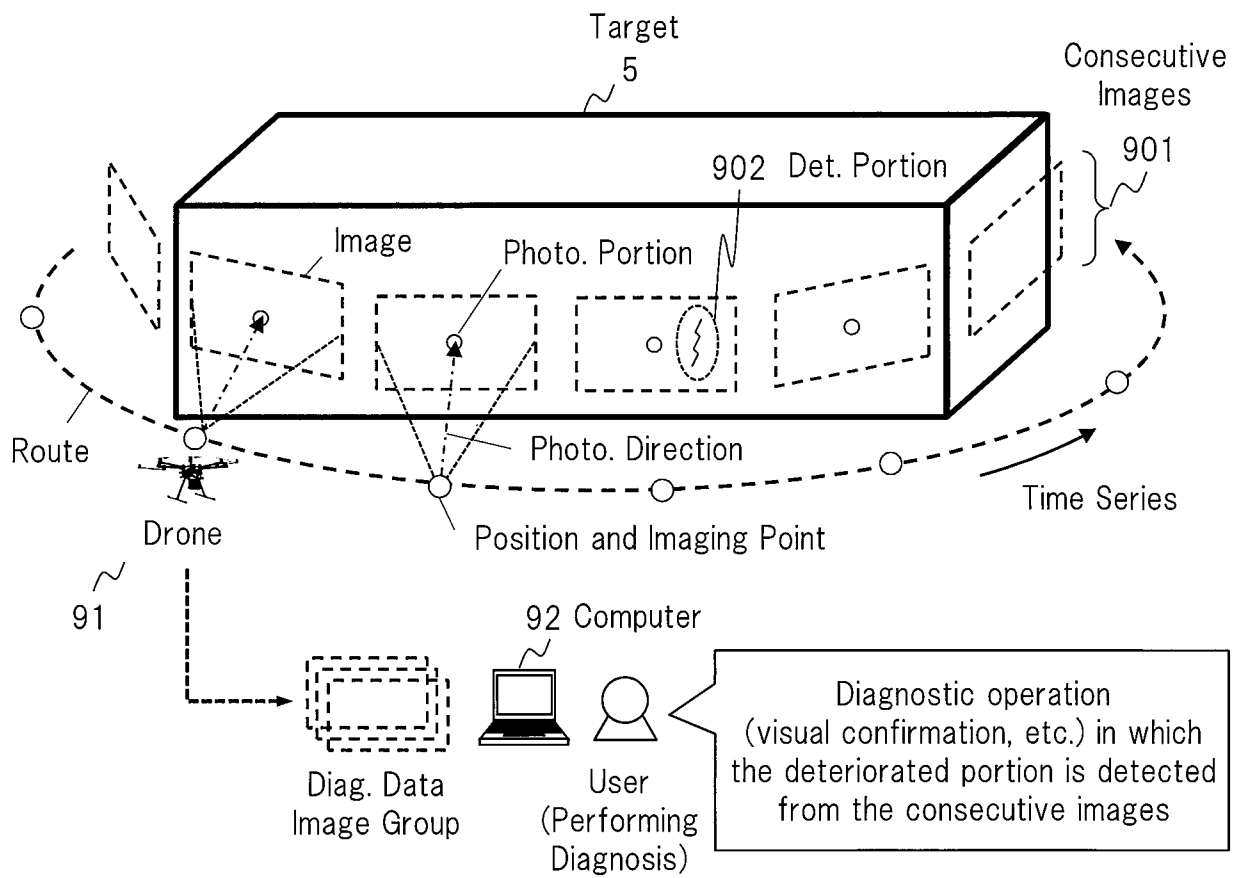


FIG. 24

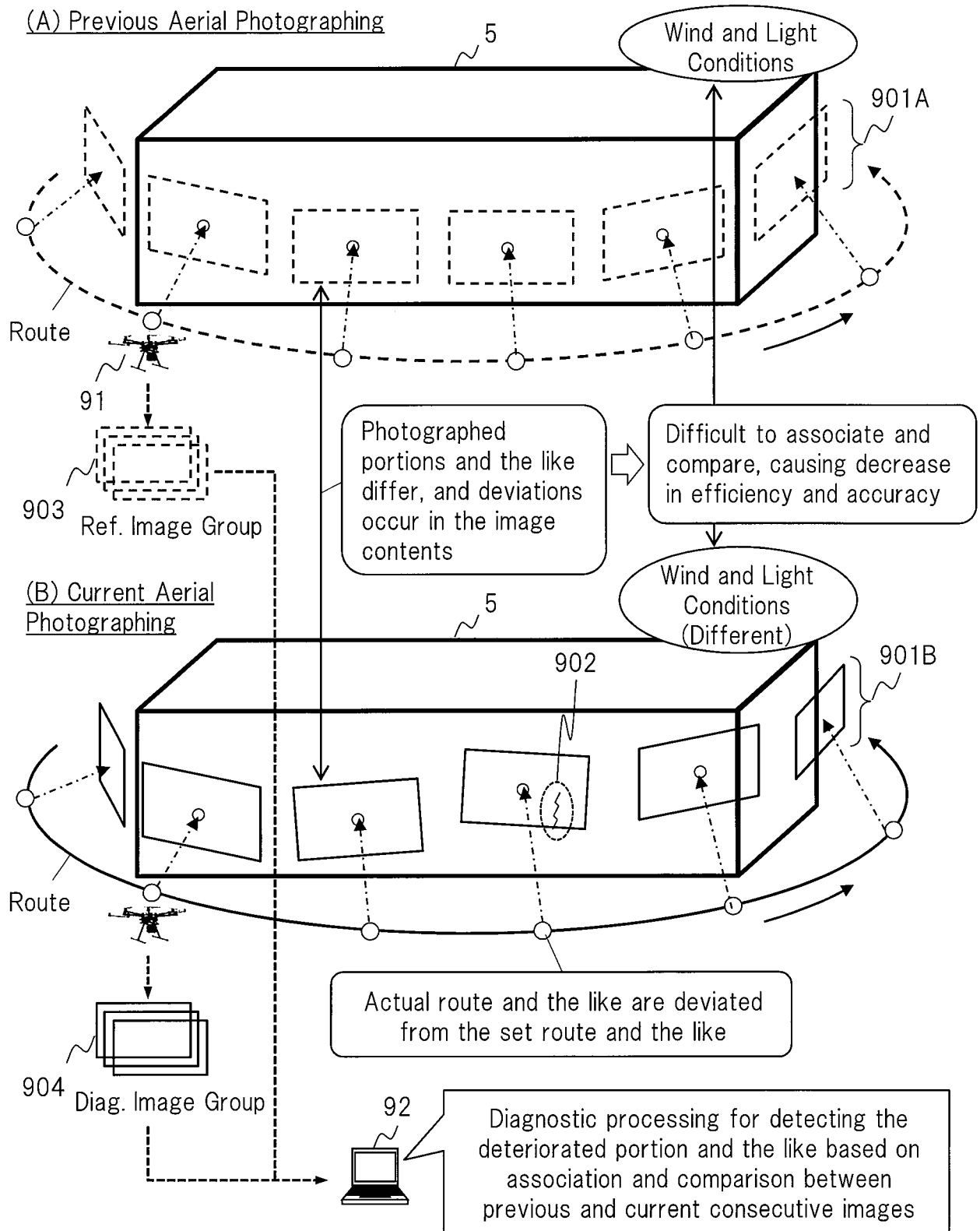
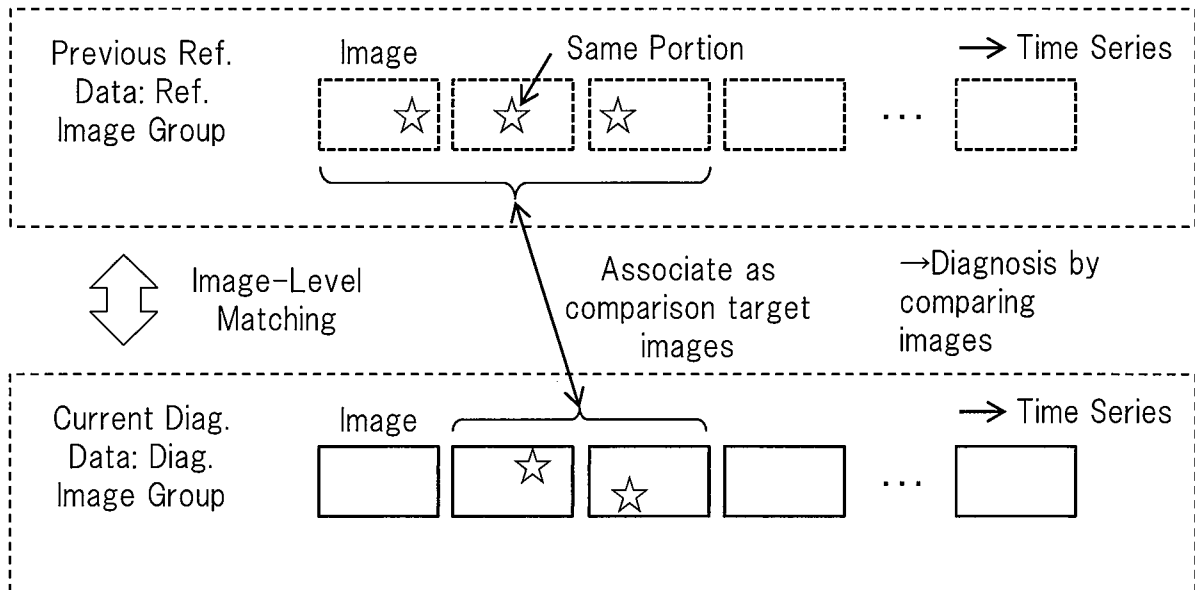
COMPARATIVE EXAMPLE (2)
METHOD OF DIAGNOSING BY COMPUTER

FIG. 25

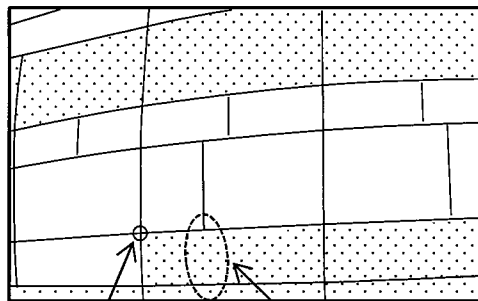
COMPARATIVE EXAMPLE (3)

(A) Association and Comparison between Previous and Current Image Groups



(B) Previous Image Example

Date: 2016/1/1

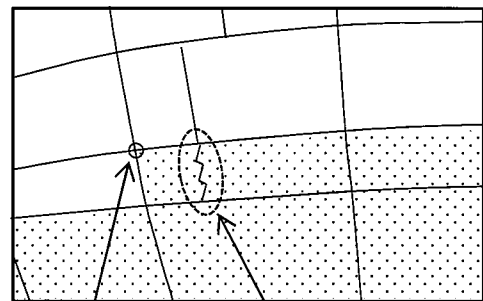


905

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(C) Current Image Example

Date: 2017/1/1



905

906

Associate
 ⇔
 Compare