CLAIMS

1. ~~A virtual space connection device used in a~~ A system that virtually connects a first space and a second space with each other by transmitting, to the second space separated from the first space ~~to each other by transmitting,~~ a first picked-up image signal obtained by picking up an image ~~pickup~~ of the first space by a first imaging unit in the first space ~~to the second space side~~, receiving, from the second space, a second picked-up image signal obtained by picking up an image of the second space by a second imaging unit in the second space, and projecting, ~~by a second projector, an image based~~ on ~~the first picked-up image signal received from the~~ a first ~~space side onto a second~~ projection target unit ~~having~~provided with a ~~second~~first camera hole for ~~a second~~ causing the first imaging unit to pick up ~~an~~the image of the ~~second~~first space ~~at the second space side, and~~

~~transmitting a second picked-up image signal obtained by image pickup by the second imaging unit~~ in the ~~second space to the~~ first space ~~side, and projecting, by a first projector~~, an image ~~based~~ on the basis of the second picked-up image signal received from the second ~~space side onto a first projection target unit having a first camera hole for the first imaging unit to pick up an image of the first space at~~ space by a first projector, the ~~first space side, the virtual space connection device~~system comprising:

a region setting section ~~configured to set a specific output region~~that sets, as a search region, a region on which the image is projected by the first projector and which is surrounded by a plurality of end sides, the region including the first camera hole ~~in the first projection target unit on a basis of a result~~, and sets, as a specific output

region, a region surrounded by the plurality of ~~picking up an image~~ end sides after at least one of the plurality of end sides of the search region is moved toward the first ~~space by the first imaging unit~~camera hole;

~~————~~ a signal processing section ~~configured to generate~~that generates post-processing image data by performing~~,~~ image signal processing on the second picked-up image signal~~, image signal processing~~ in such a ~~manner~~way that a luminance value of ~~an~~the image projected onto the specific output region by the first projector becomes equal to or smaller than a specific value ~~set in advance~~; and

~~————~~ a device control section ~~configured to make~~that causes the first projector ~~perform~~ to project the image ~~projection based~~ on the basis of the post-processing image data~~.~~.

~~————~~ wherein the region setting section:

sets, as a first luminance region, a region surrounded by the moved end side after any end side among the plurality of end sides of the search region is moved toward the first camera hole, and an other end side;

sets, as a second luminance region, a region other than the first luminance region in the search region;

causes an image with a first luminance value to be projected on the first luminance region, causes an image with a second luminance value to be projected on the second luminance region, the second luminance value being higher than the first luminance value; and

sets the specific output region on the basis of a plurality of image patterns projected on the first luminance region and the second luminance region in accordance with the movement of the any end side.

2.– The ~~virtual space connection device~~system according to claim 1, wherein

~~the specific value is such a value that the luminance value in the specific output region is equal to or less than a predetermined value.~~

~~3. The virtual space connection device according to claim 1 or 2, wherein~~

the region setting section sets the specific output region ~~of the first projection target unit on a basis of a comparison between a calculated value based on a luminance of a picked-up image in the first picked-up image signal and a predetermined threshold value~~by performing, for at least the one of the plurality of the end sides of the search region, processing of setting, as the end side of the specific output region, the moved end side when an amount of incident light to the first imaging unit exceeds a predetermined amount of light upon movement of the any end side toward the first camera hole.

~~4.~~ 3. The ~~virtual space connection device~~system according to ~~any one~~claim 1, wherein the region setting section executes:

processing of ~~claims 1~~calculating a first flare metric value representing the amount of incident light to ~~3,~~the first imaging unit on the basis of the first picked-up image signal obtained by the first imaging unit with the image that has the first

luminance value being projected on the search region by the first projector, calculating a second flare metric value representing the amount of incident light to the first imaging unit on the basis of the first picked-up image signal obtained by the first imaging unit with the image that has the second luminance value being projected on the search region by the first projector, and calculating a determination threshold using the first flare metric value and the second flare metric value;

processing of calculating a third flare metric value representing the amount of incident light to the first imaging unit on the basis of the first picked-up image signal obtained by the first imaging unit with the image that comprises the first luminance region with the first luminance value and the second luminance region with the second luminance value being projected on the search region by the first projector; and

processing of setting the specific output region including the first camera hole from the search region on the basis of a comparison between the third flare metric value and the determination threshold value.

4. The system according to claim 3, wherein the region setting section:

calculates, in accordance with a plurality of image patterns projected on the search region by the first projector, each of the plurality of image patterns having a different boundary position between the first luminance region and the second luminance region from each other, a plurality of the third flare metric values on the basis of the respective first picked-up image signals of the plurality of image patterns obtained by the first imaging unit; and

sets the specific output region by comparing each of the plurality of calculated third flare metric values with the determination threshold.

5. The system according to claim 3, wherein the region setting section calculates the first flare metric value and the second flare metric value on the basis of luminance of each pixel of an imaging element of the first imaging unit in the first picked-up image signal.

6. The system according to claim 5, wherein the region setting section calculates the first flare metric value on the basis of a value obtained by performing weighting according to a distance from a center of the imaging element of the each pixel on the luminance detected from the each pixel.

7. The system according to claim 3, wherein:

when:

the first flare metric value is defined as BL;

the second flare metric value is defined as WH;

a coefficient by which the first flare metric value is multiplied is defined as a;

a coefficient by which the second flare metric value is multiplied is defined as b; and

$a + b = 1$,

the a and the b are set so as to be $a > b$; and

the region setting section obtains, as the determination threshold, a value calculated from $a \times BL + b \times WH$.

8. The system according to claim 1, further comprising~~:~~

a condition determining section ~~configured to determine conditions~~ that determines a condition within the first space on ~~a~~the basis of a result of analysis processing on the first picked-up image signal, ~~wherein~~

wherein the region setting section sets the specific output region ~~according to~~in accordance with the ~~conditions~~condition within the first space determined by the condition determining section.

~~5. The virtual space connection device according to claim 4, wherein~~

~~the condition determining section determines whether or not there is a person within the first space on the basis of the result of analysis processing on the first picked-up image signal, and~~

~~the region setting section sets the specific output region when it is determined that there is no person within the first space.~~