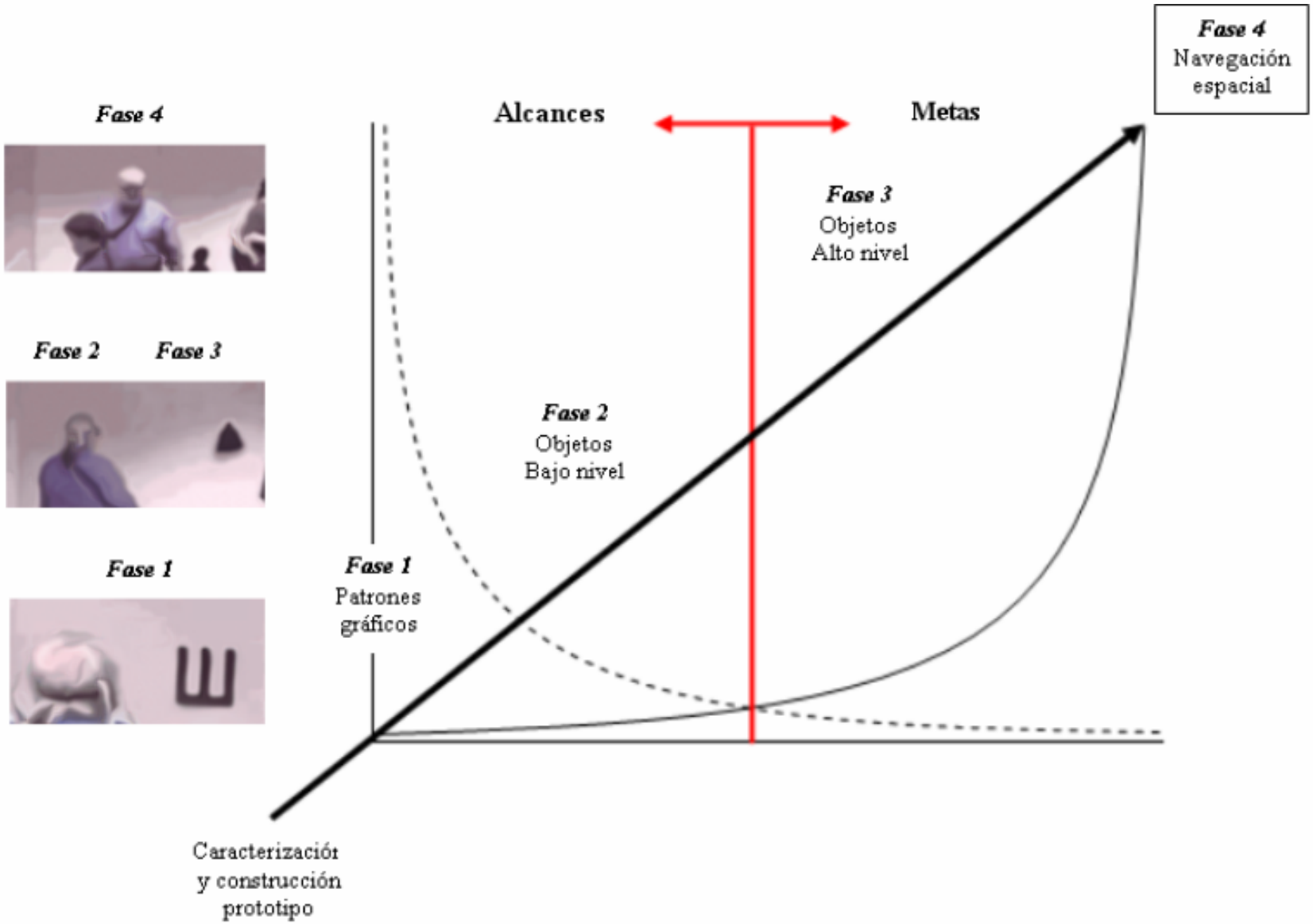
How and what the blind see.

- The plan of work to be done is scheduled into a bi-monthly design, which recruit a pilot group of new blind people to start from a same baseline, upgrading every 2 weeks into a different line of action (Phase) according to the level of difficulty and experience needed.

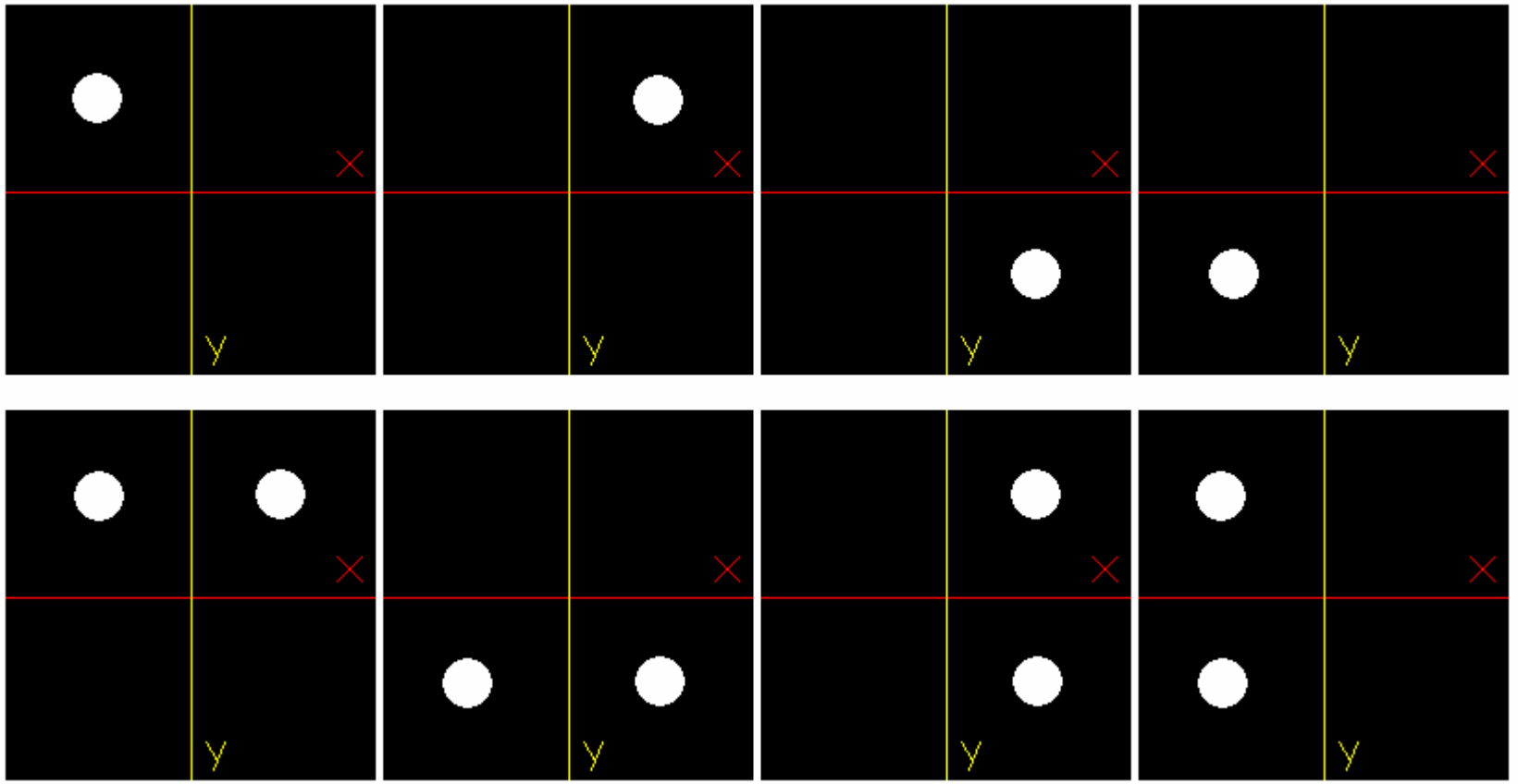

Fase 4
Navegación espacial
Alcances
Metas
Fase 4
Fase 3
Objetos
Alto nivel
Fase 2
Fase 3
Fase 2
Objetos
Bajo nivel
Fase 1
Fase 1
Patrones gráficos
Caracterizació
y construcción
prototipo

Phase 1- Graphic patterns.

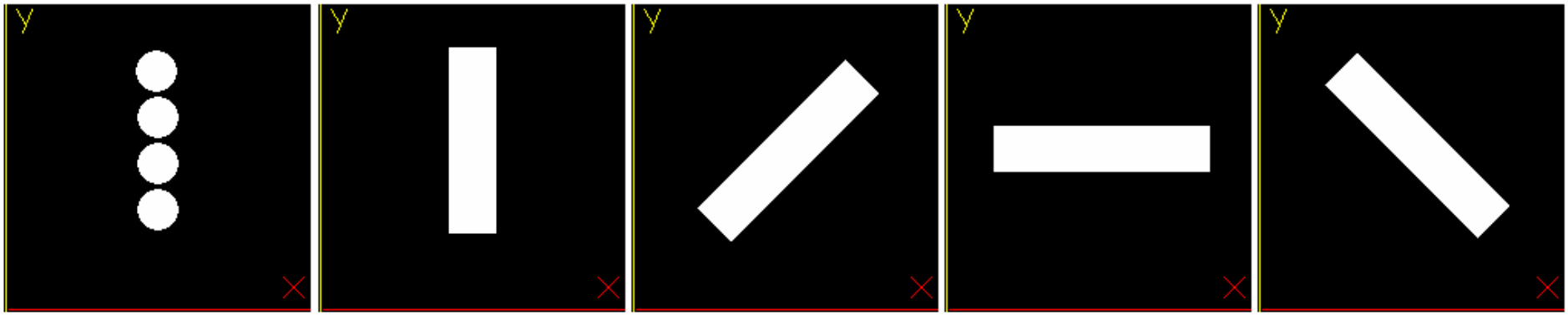
- First, the blind patient learns to identify, discriminate, recognize and understand points presented alternately at various coordinates in the x – y axis.

Reconstrucción de imágenes:

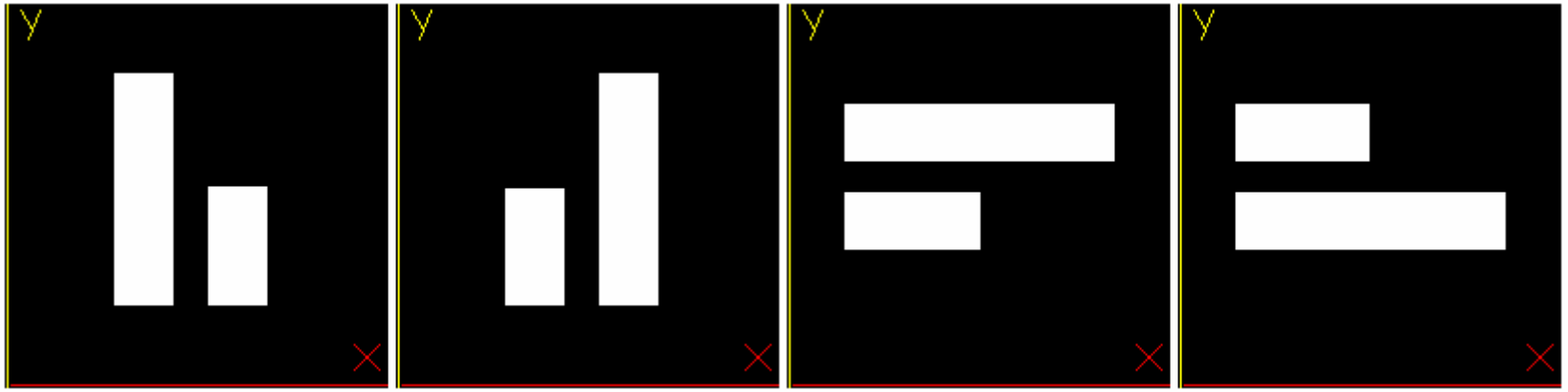
Fase I. Patrones gráficos

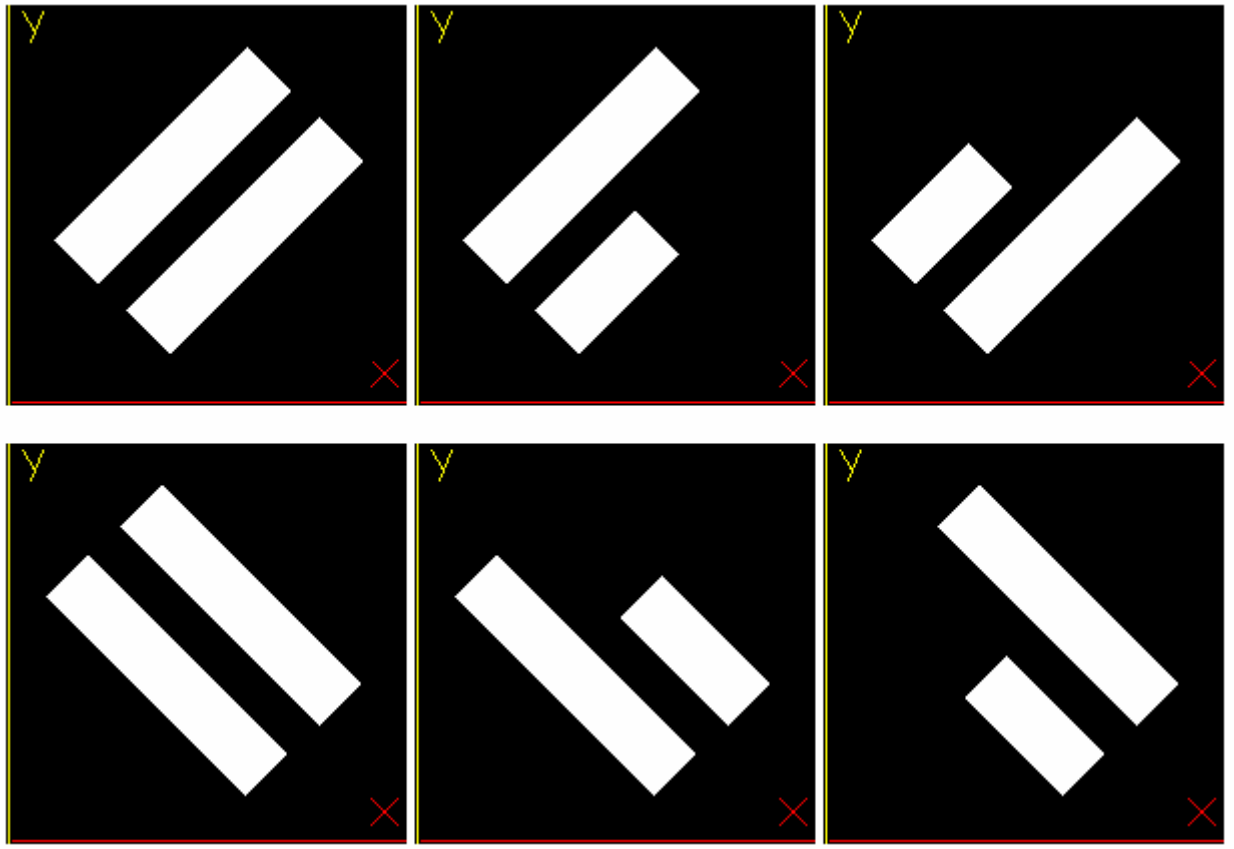


- Then, the blind patient learns to identify, discriminate, recognize and understand a cluster of dots arranged in the form of a line at the different orientations.


Y
Y
Y
Y
Y

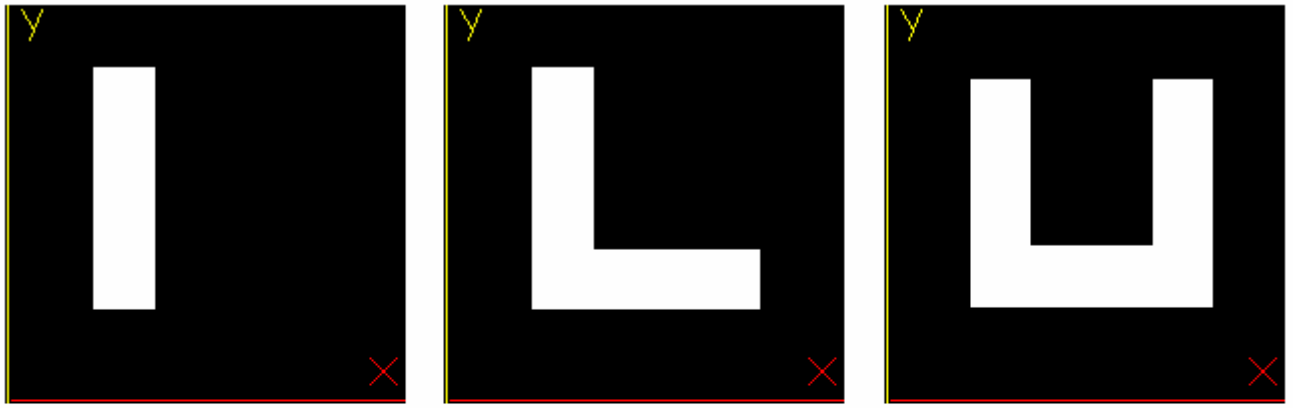
- Finally, the blind patient learns to identify, discriminate, recognize and understand lines with different proportions.

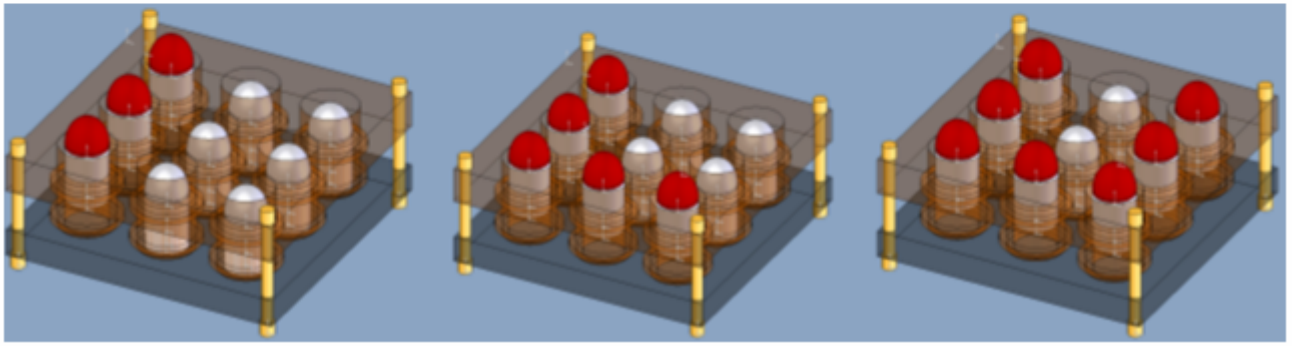

y
y
y
y

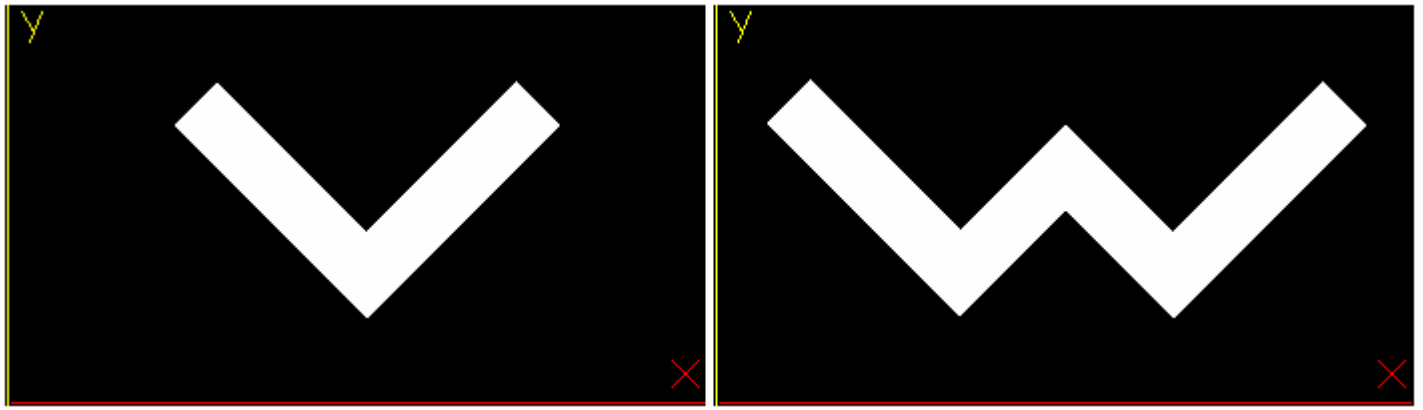

y
y
y
y
y
y

- With this concepts learned, the blind patient is able to identify, discriminate, recognize and understand graphic symbols in the form of letters.

  – When these letters are grouped they outline words, these outline prayers; till the blind patient is capable to read text in real time.


y
x
y
x
y
x



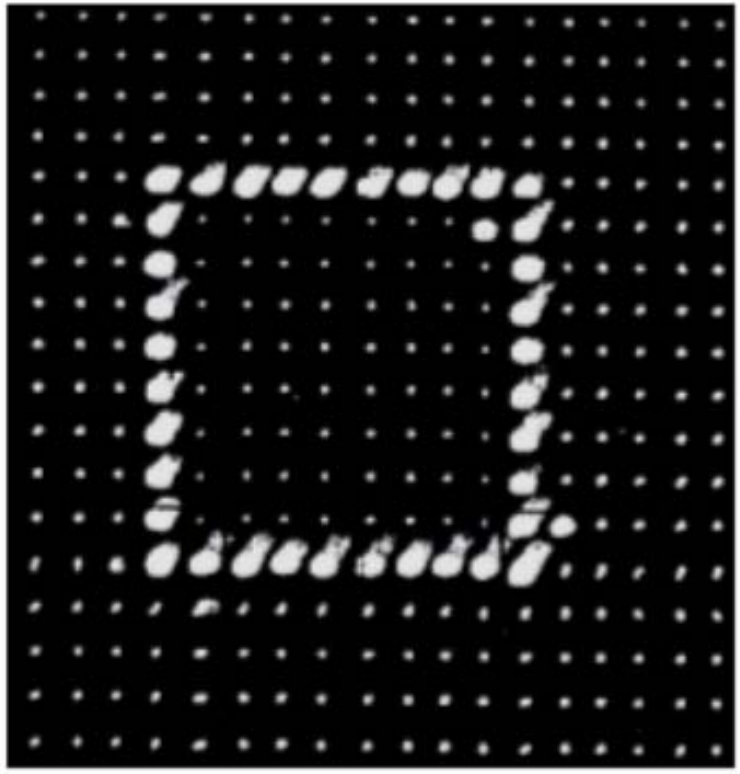

Y
Y

Phase II- Low quality images.

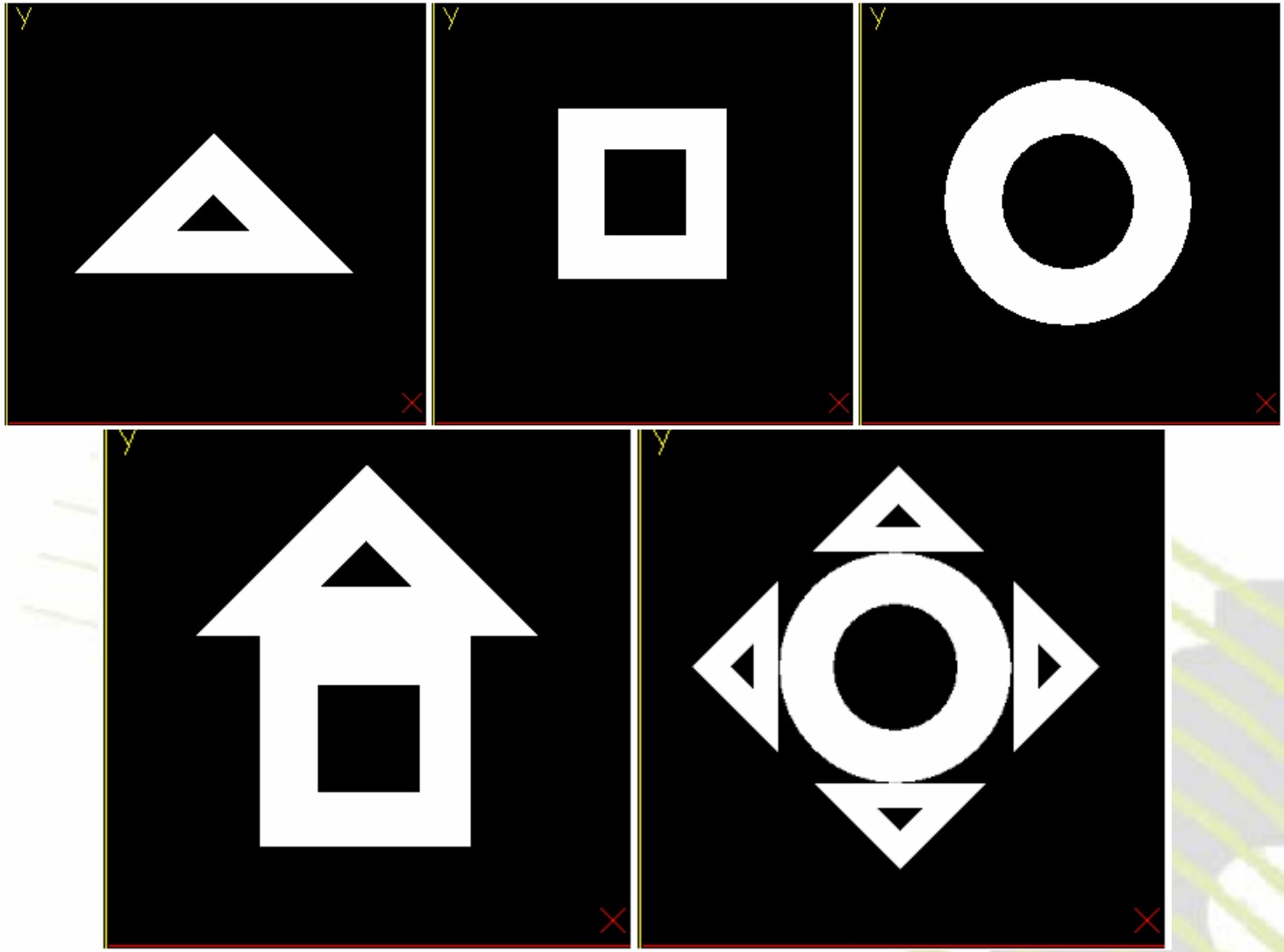
- The blind patient is able to identify, discriminate, recognize and understand basic geometric outlines (triangle, square, rectangle, circle) presented individually and alternating.

Reconstrucción de imágenes:

Fase II. Bajo nivel de objetos

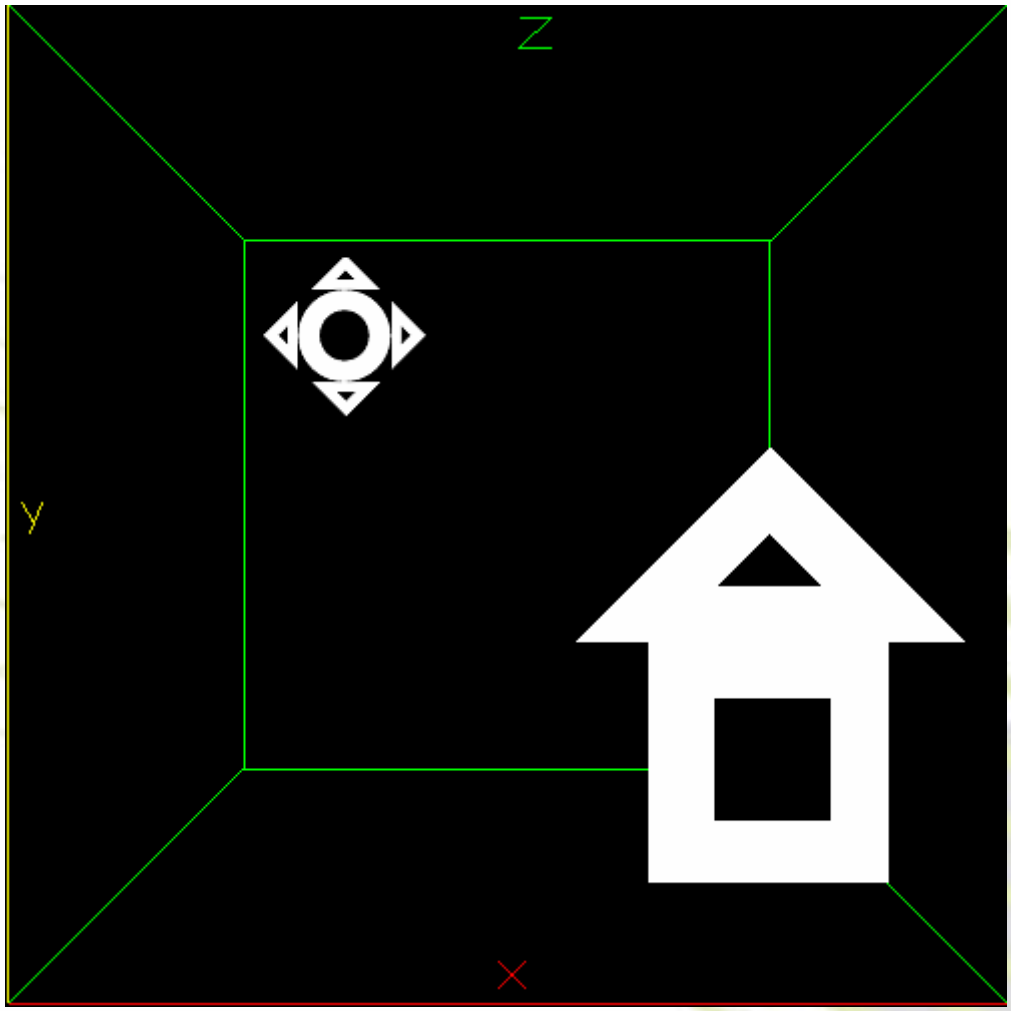


- The blind patient is able to identify, discriminate, recognize and understand simple shapes, reconstructed from the combination of various contours of basic geometries (eg "house" superposition of a triangle on a square, "sun" superposition of a circle surrounded by multiple triangles), as shown in the next scheme.


y
y
y
y
y

- The blind patient is able to identify, discriminate, recognize and understand deep levels when simple figures are presented simultaneously with different proportions in the same visual scene

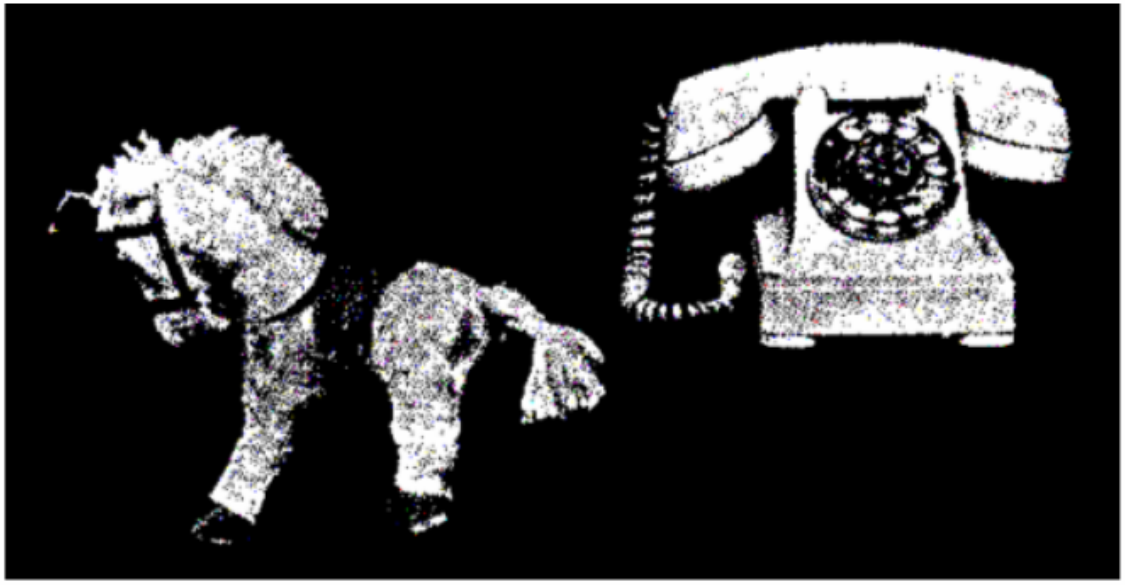
  – As a spectator stand next to a nearby object instance "House", it will be bigger compared with another reference point farthest example "sun“; as shown in the next scheme.


Z
y
X

- The blind patient is able to identify, discriminate, recognize and understand complex shapes, as the number of pixels raise.

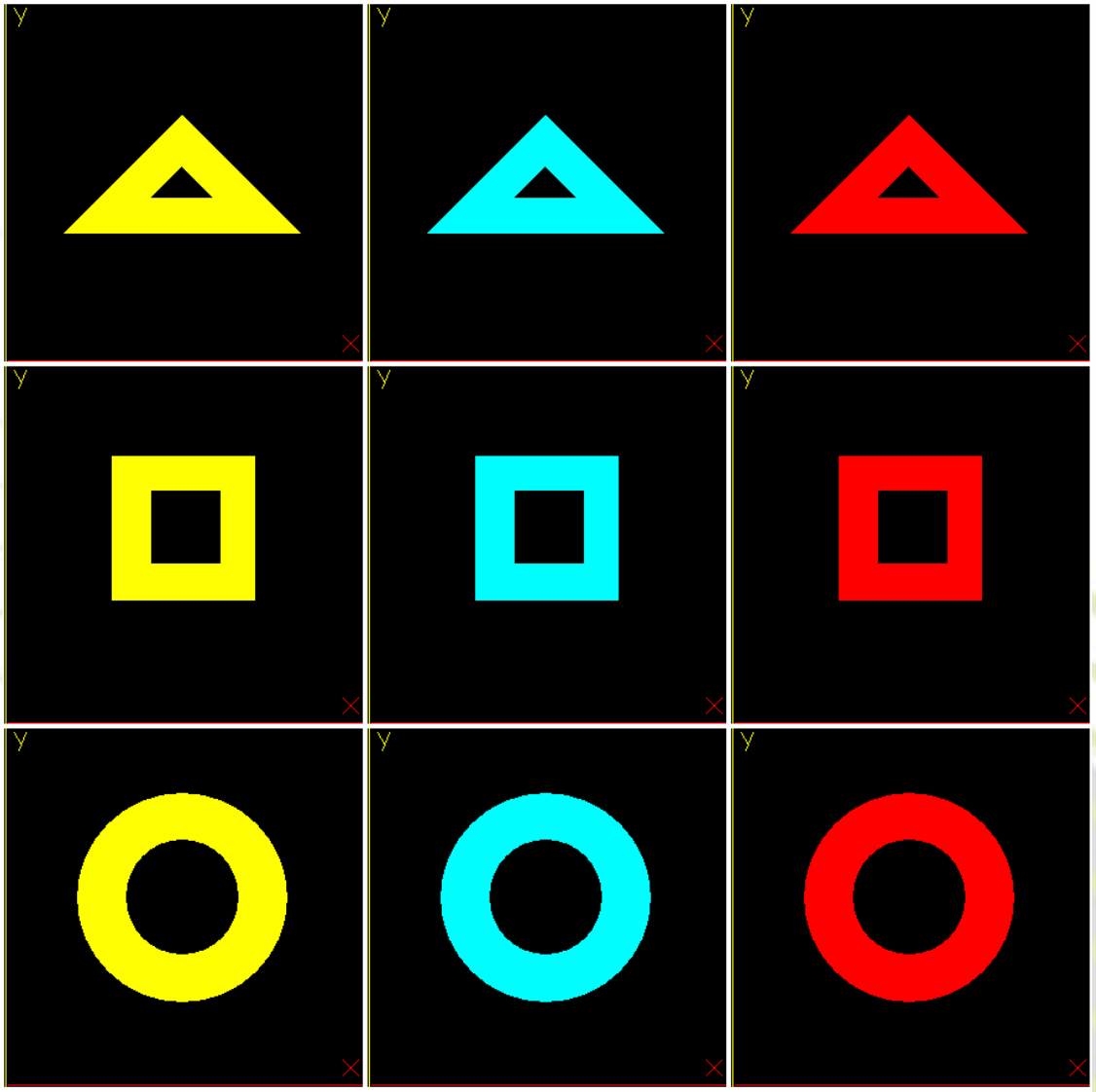
Reconstrucción de imágenes:

Fase II. Nivel intermedio de objetos

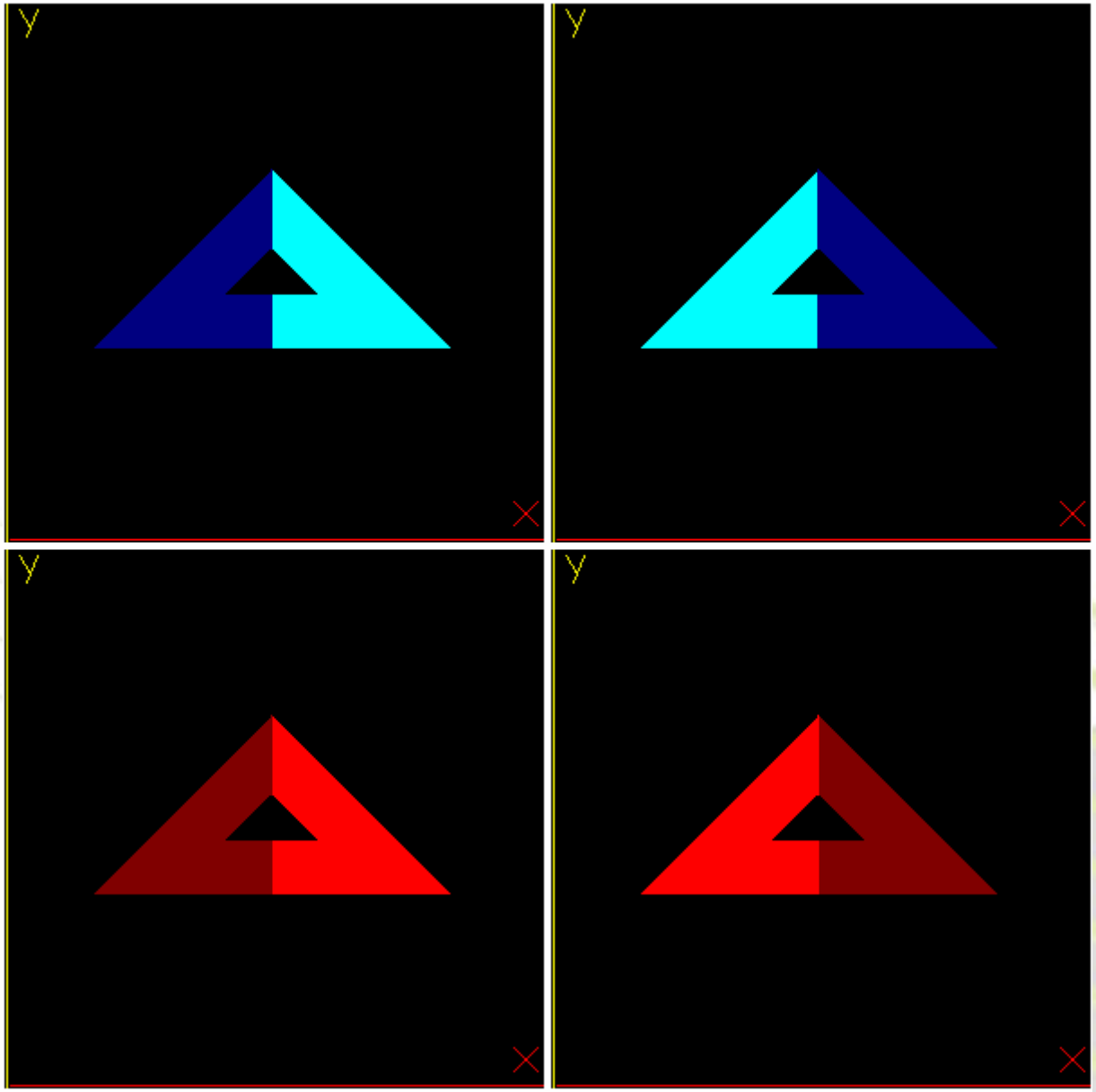


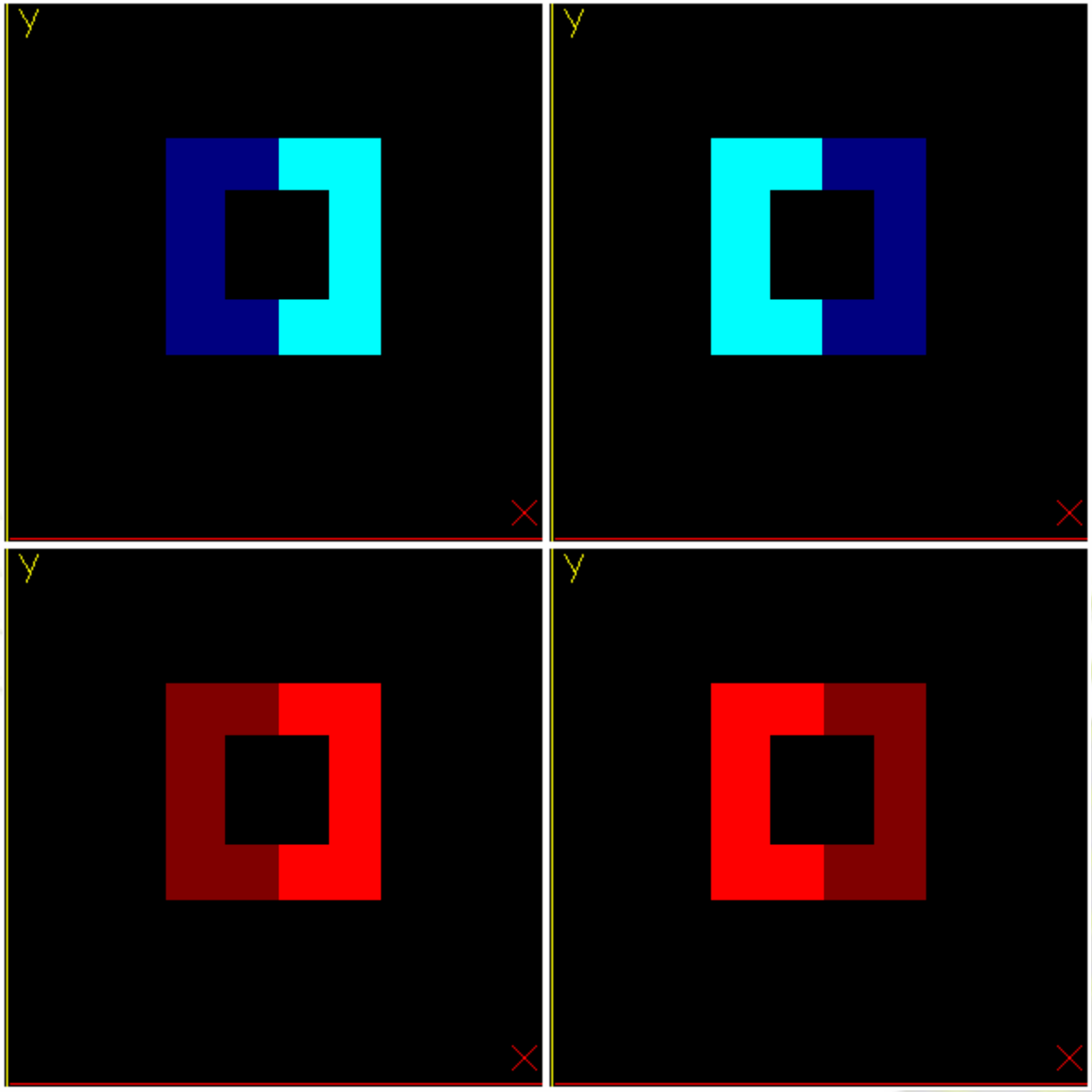
Phase III- High quality images.

- The blind patient is able to identify, discriminate, recognize and understand of colors contained in the basic figures.



- The blind patient is able to identify, discriminate, recognize and understand of the intensities of brightness reflected on the surface of the basic figures.


y
y
y
y


Y
Y
Y
Y

Phase IV- Spatial Navigation.

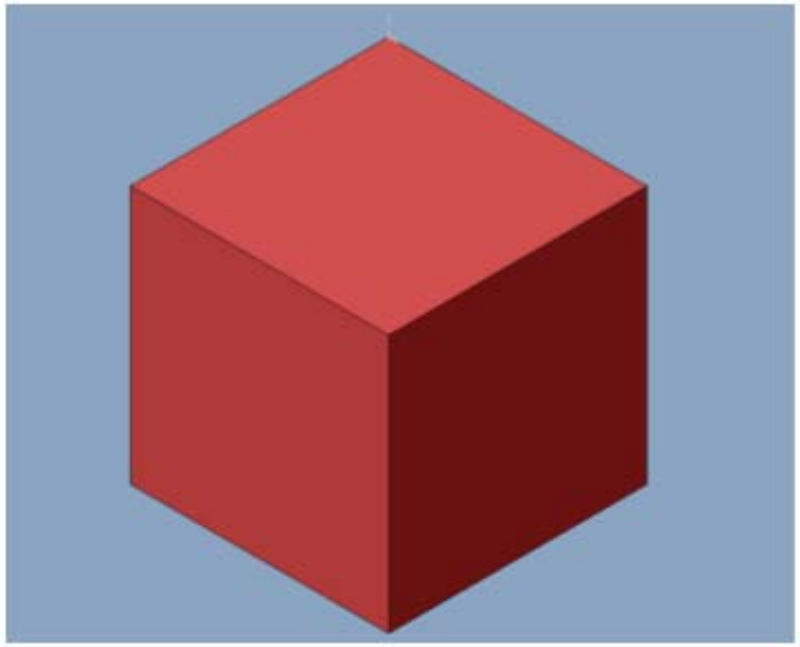
- An essential theme in the area of artificial vision lays on the generation of 3D-environments, in which many objects coexist in continuous movement.

  - For this reason this prostheses considers a high definition matrix capable of reproducing chromatic gammas, depth and movement perception through a double bar system fit into an haptic glove.

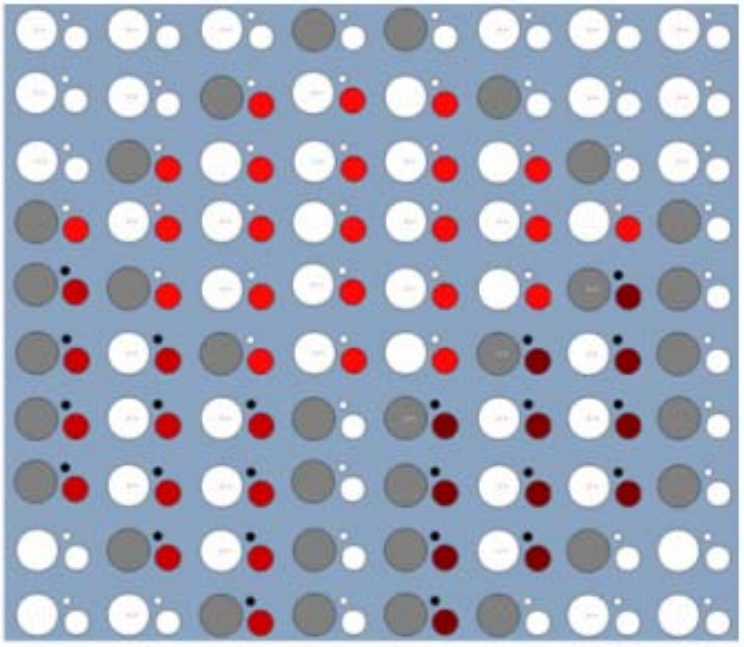
Reconstrucción de imágenes:

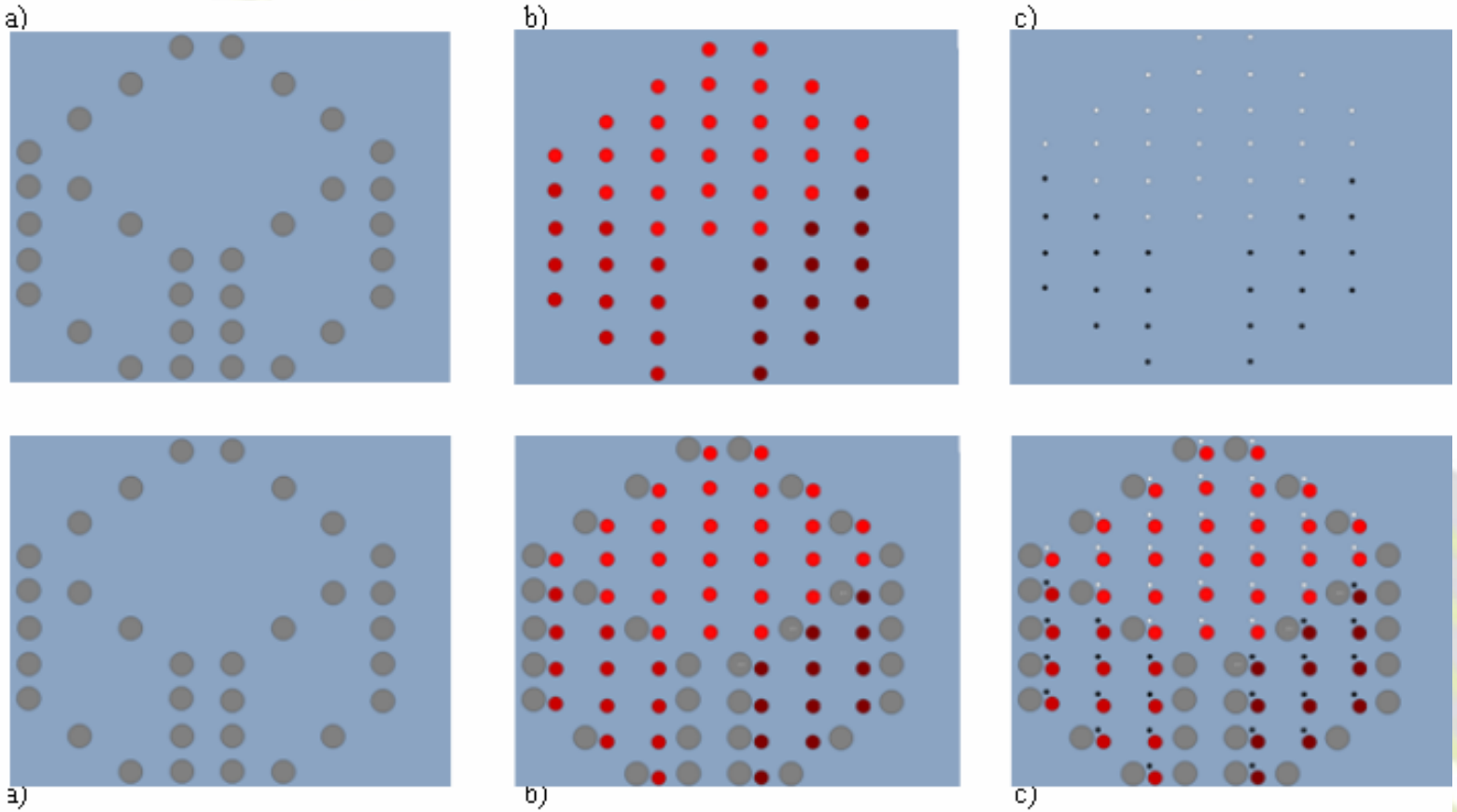
Fase IV. Alto nivel de objetos

a)



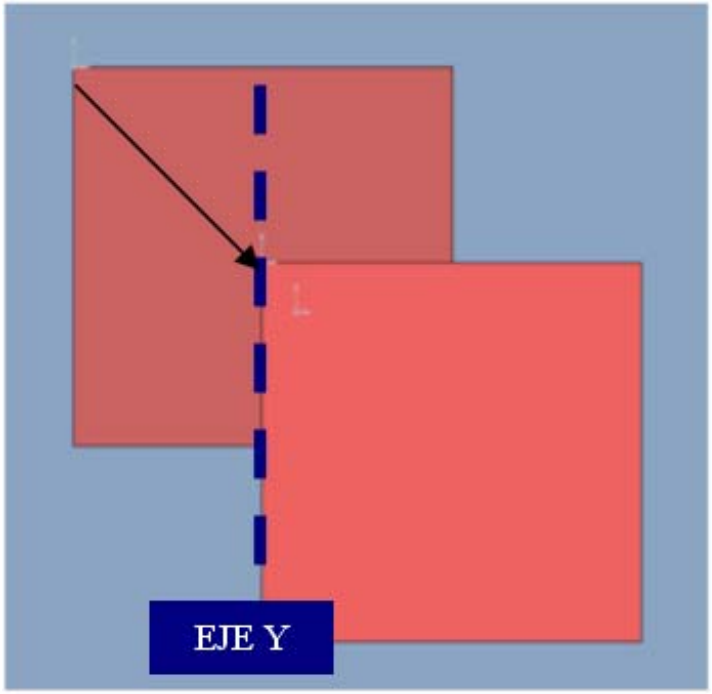
b)



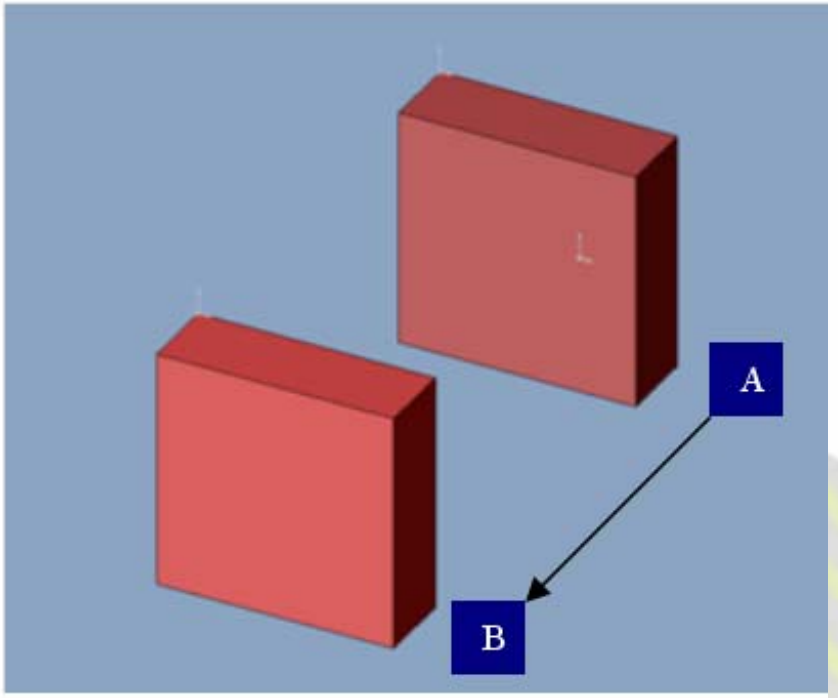

a)
b)
c)
a)
b)
c)

Reconstrucción de imágenes:

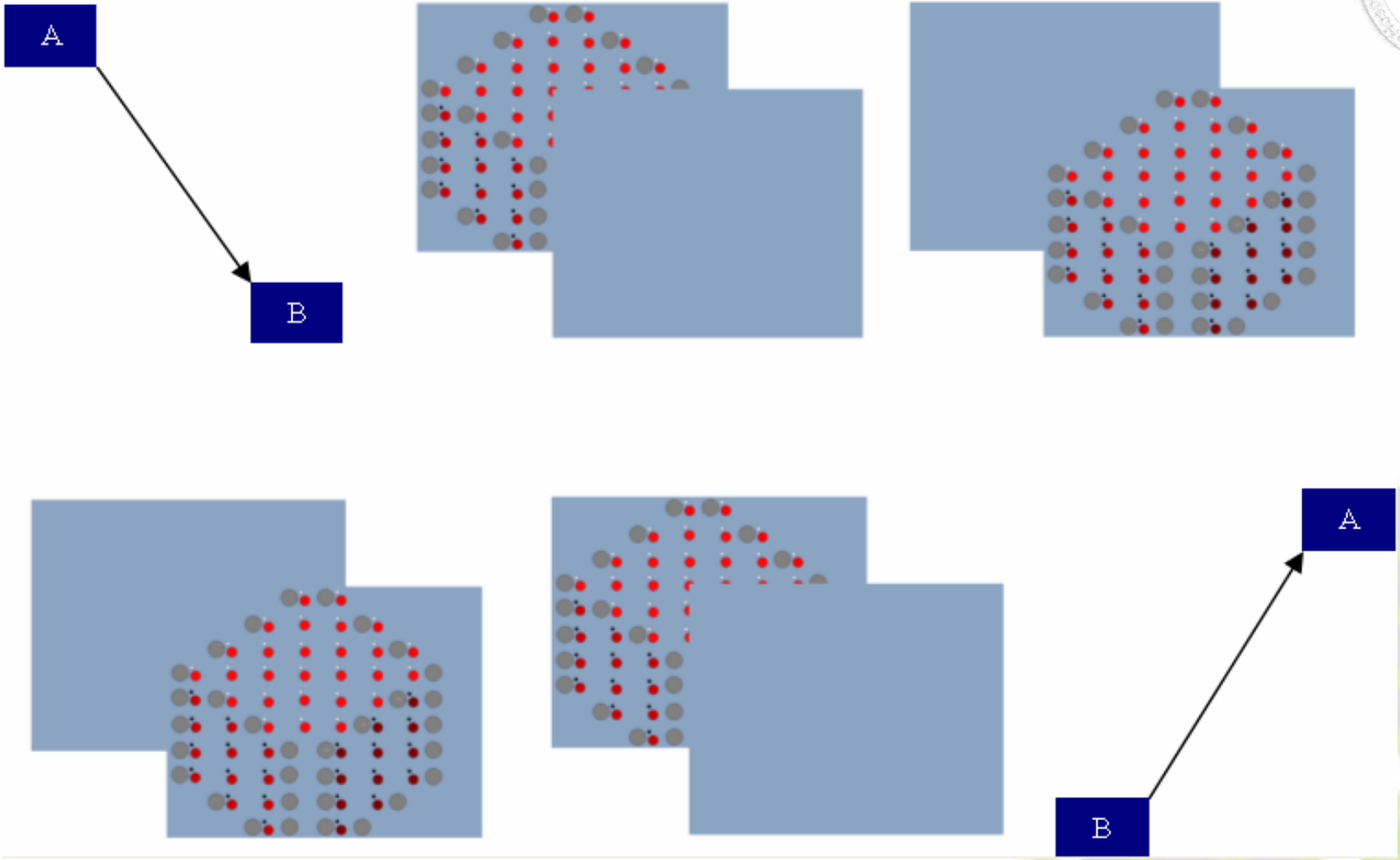
Fase IV. Navegación e interacción espacial.

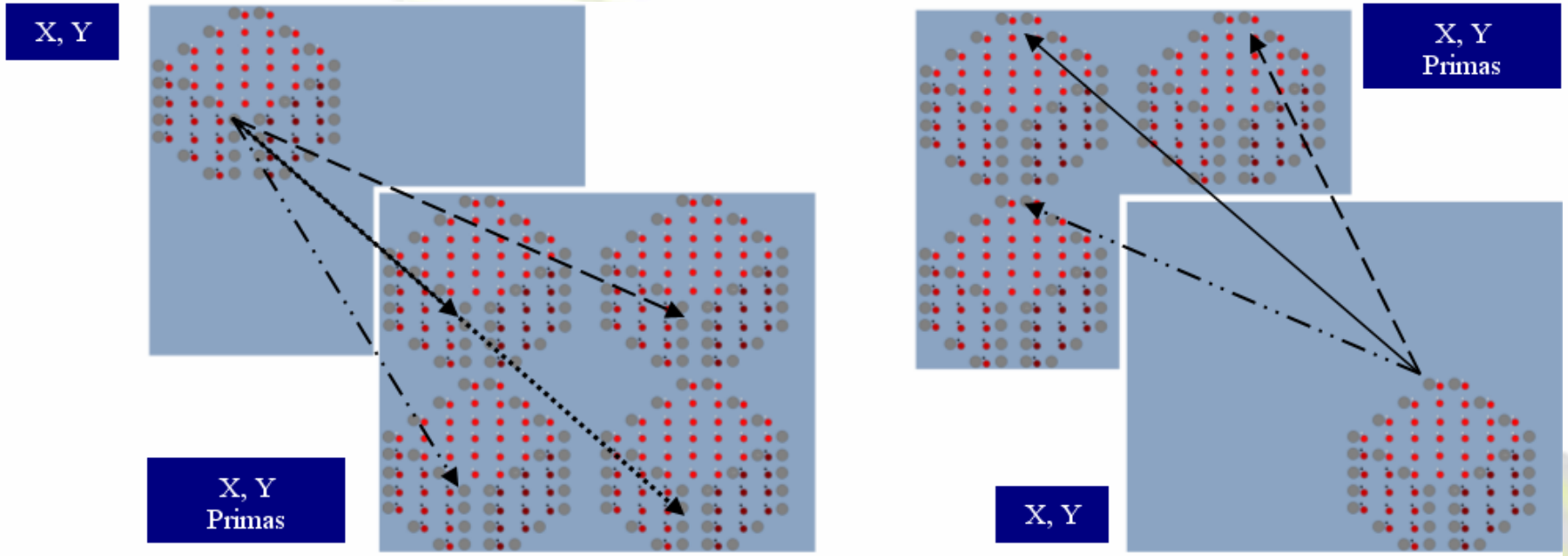


a)



b)

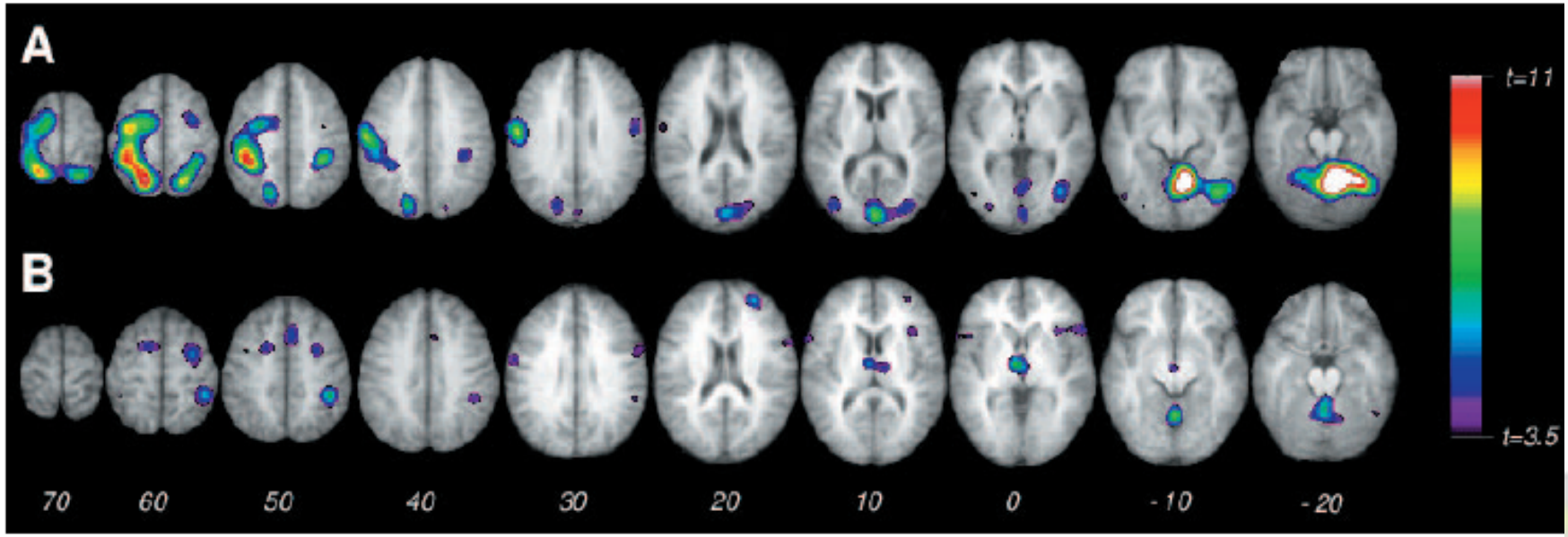

A
B
A
B


X, Y
X, Y
Primas
X, Y
Primas
X, Y

HOW THE BLIND SEE?

- The most outstanding scientific evidence of how the blind see, is found with PET (positron emission tomography, which measures brain activity through its metabolism).

– When you compare the next picture, fig. A (blind patient) vs fig. B (normovisual patient) using the visual prostheses; you can observe that the blind uses its visual cortex (occipital lobe) while the normovisual only uses its somatosensorial cortex (temporal lobe.- tactile perception).

SO THE BLIND SEE TROUGH ITS HANDS.

Percepción visual versus sensación visual: