

1978

Development of a commercial 110,000-pixel CCD image sensor (Sony)

~ Discrete Semiconductor/Others ~

When converting an image into an electric signal, the CCD image sensor uses a circuit element called a charge coupled device (CCD) to read charges generated from the light by the light receiving element. CCD was invented by Willard Boyle and George Smith of BTL in 1969. Development of CCD image sensor began in 1971 and Fairchild commercialized it as 100×100 pixels in 1975. The focus was on the number of pixels that could support color video imaging and the development of an image sensor that had the light receiving sensitivity required especially for B among RGB.

Sony succeeded in developing a CCD image sensor (2/3 type format) having a practical sensitivity composed of an array of phototransistors with a light receiving area of $13\mu\text{m} \times 6\mu\text{m}$ (horizontal 242 pixels \times vertical 490 pixels = 118,580 pixels). It was commercialized in 1978 as ICX008. In January 1980, the world's first CCD color camera (XC-1) using ICX008 was sold on the market. The XC-1 was mounted on the ANA jumbo airliner, and it was adopted as "Sky Vision" which showed the views of takeoff and landing in the cabin, and it generated a big reaction.

After that, development of CCD image sensor was advanced for miniaturization and high pixelation, and in 1989, a passport size "Handycam" (CCD-TR56) equipped with a 1/2 inch 250,000-pixel CCD image sensor integrating an on-chip micro-lens structure was launched. It became an explosive hit, and full-fledged business of the CCD image sensor began.

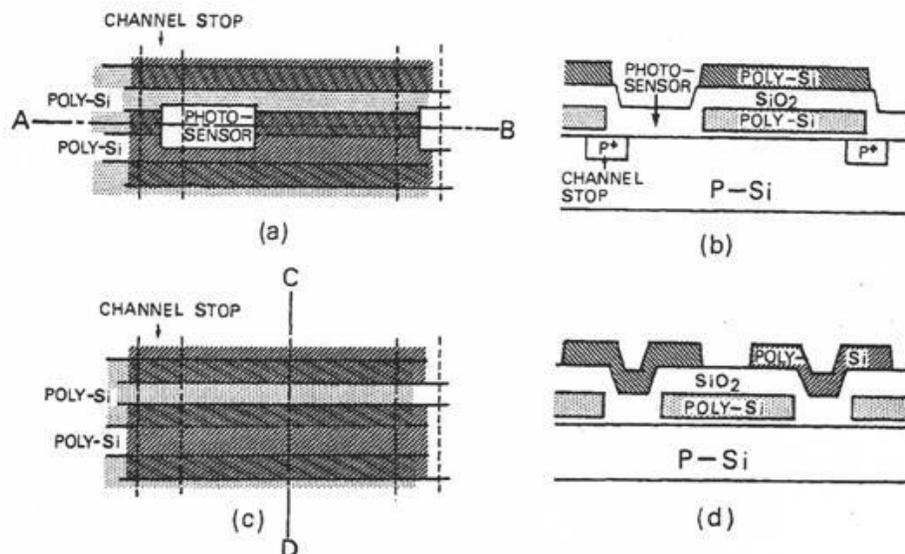
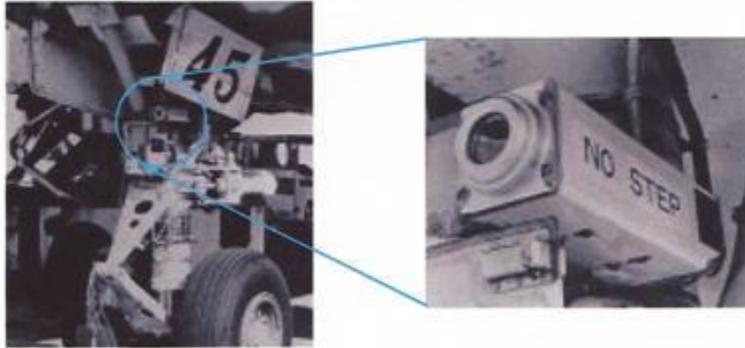


Fig.1: Structure of a 110,000-pixel CCD sensor developed by Sony ^[1]

■写真-8 全日空のスーパージャンボに搭載される
XC-1 (245H × 492V画素) (1980年)



World's first two-chip CCD color camera (XC-1)

■写真-9 爆発的ヒットを記録したハンディカムCCD-TR55に
搭載された1/2型25万画素CCD (1989年)

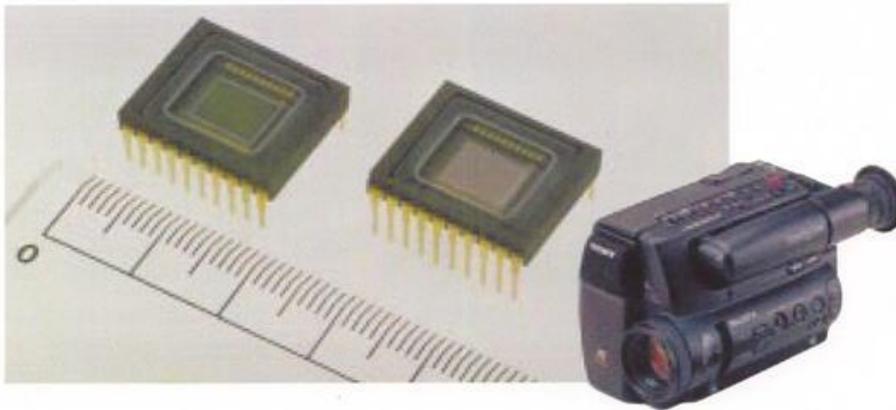


Fig.3: Passport size Handycam (CCD-TR55) equipped with
1/2-inch 250,000-pixel CCD image sensor

Reference

- (1) M. Abe, T. Shimada, C. Okada, T. Ando, Y. Kanoh, T. Hashimoto, & H. Yamasaki, "A CCD imager with SiO₂ exposed photosensor arrays", IEEE IEDM Digest of Tech. Papers, pp. 542-545, (1977)