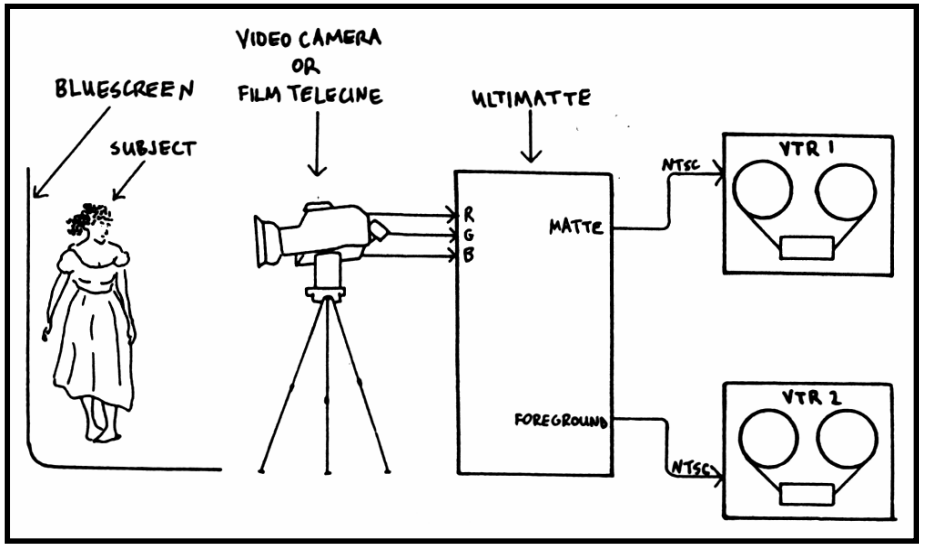
“Pulling a Matte” - Matte Creation

- **From digitized images**
  - **Blue-screen matting (Petro Vlahos)**
    - **Separate blue background from foreground image**
  - **Video or chroma-keying**
    - **Range of chromaticities marked transparent**
  - **Image processing**
    - **Set of colors marked transparent, region growing ...**

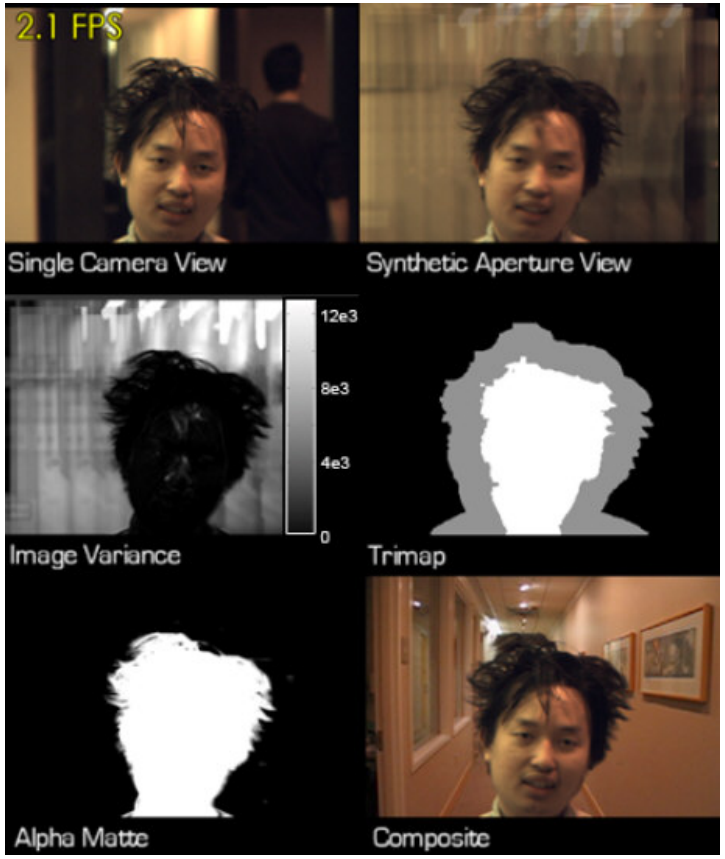
Pulling a Matte Using Blue Screening



Sportvision's 1st-and-10 line

- chroma-keys off green grass (or other colors)
- hard if uniforms match background (markings, snow,...)
- must track cameras, know shape of field (it's not flat!)

Matte extraction is an active research area



- **Natural Video Matting using Camera Arrays,**
  N Joshi, W Matusik, S Avidan,
  Proc. SIGGRAPH 2006

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- **From computer generated images**
  - **Coverage**
  - **Transparency**

Porter-Duff Compositing Algebra

Operation	F_A	F_B
Clear	0	0
A	1	0
B	0	1
A over B	1	$1-\alpha_A$
B over A	$1-\alpha_B$	1
A in B	α_B	0
B in A	0	α_A
A out B	$1-\alpha_B$	0
B out A	0	$1-\alpha_A$
A atop B	α_B	$1-\alpha_A$
B atop A	$1-\alpha_B$	α_A
A xor B	$1-\alpha_B$	$1-\alpha_A$

$$C' = F_A C'_A + F_B C'_B$$

OpenGL `blendfunction`
Specify src and dst F's

0, 1,
As, Ad, 1-As, 1-Ad,
min(As,1-Ad),
Cs, Cd, 1-Cs, 1-Cd,

Painting – how are each of these strokes done?