

HDR workflow precision and steps

JCTVC-U0047 / m36277

Ideal (unsigned) integer precision for representing linear light

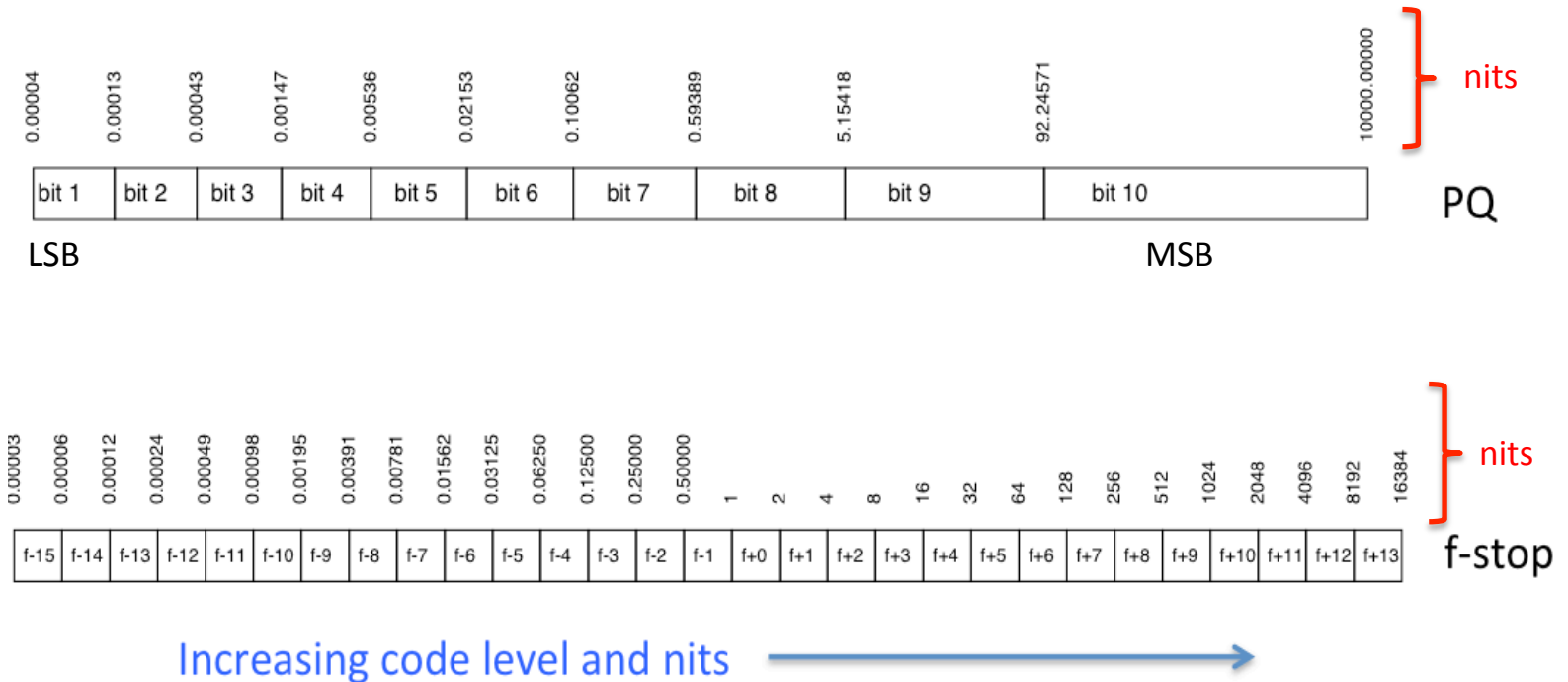
$$R = \log_2 \left(\frac{EOTF(\text{Scale}(10\text{Bits}, \text{MaxCodeLevel}, \text{VideoFullRangeFlag}))}{EOTF(\text{Scale}(10\text{Bits}, \text{MinCodeLevel} + 1, \text{VideoFullRangeFlag}))} \right)$$

$$R = \log_2 \left(\frac{EOTF(\text{Scale}(10, 940, 0))}{EOTF(\text{Scale}(10, 65, 0))} \right)$$

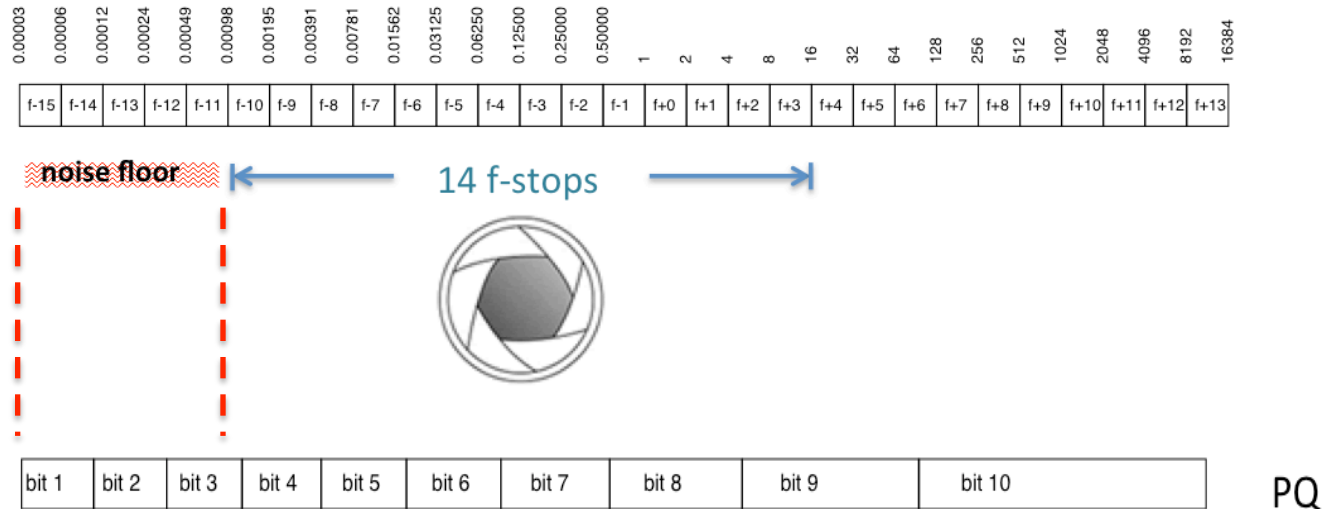
$$R = \log_2 \left(\frac{EOTF(1.0)}{EOTF(1/877)} \right)$$

$$R = \log_2 \left(\frac{10,000 \text{ nits}}{0.00005 \text{ nits}} \right) = \log_2(200,000,000) = 28 \text{ bits}$$

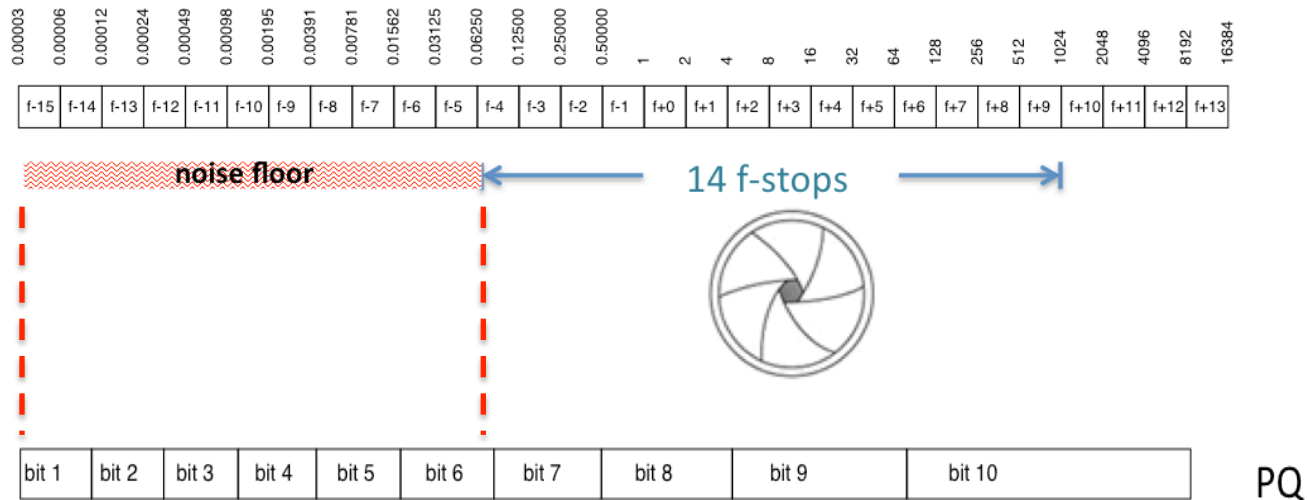
Alignment between 10-bit PQ and intensity f-stop (28-bit linear light)



Dark scene capture (0.0001 to 10 nits)



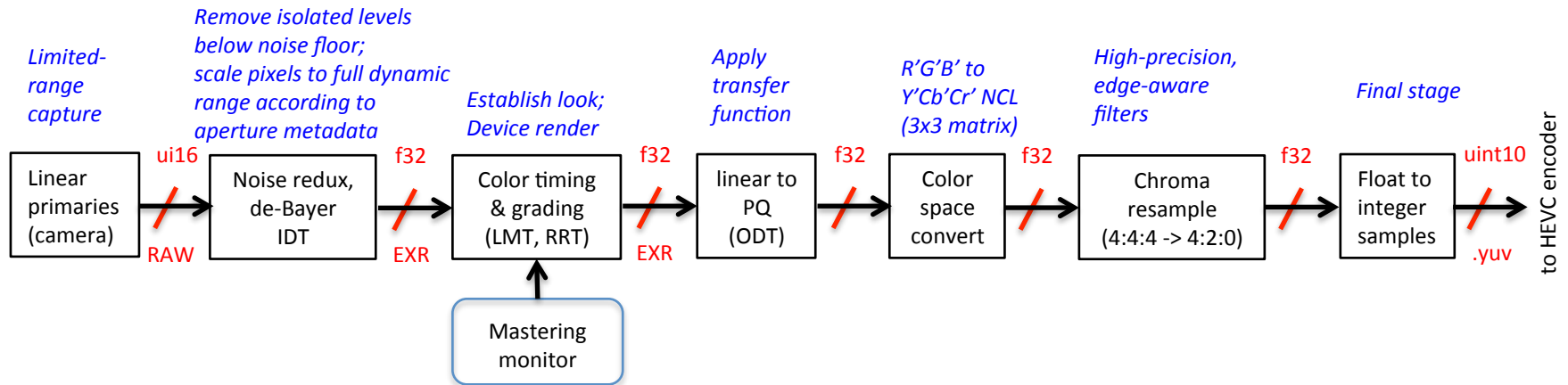
Bright scene capture (0.05 to 1000 nits)



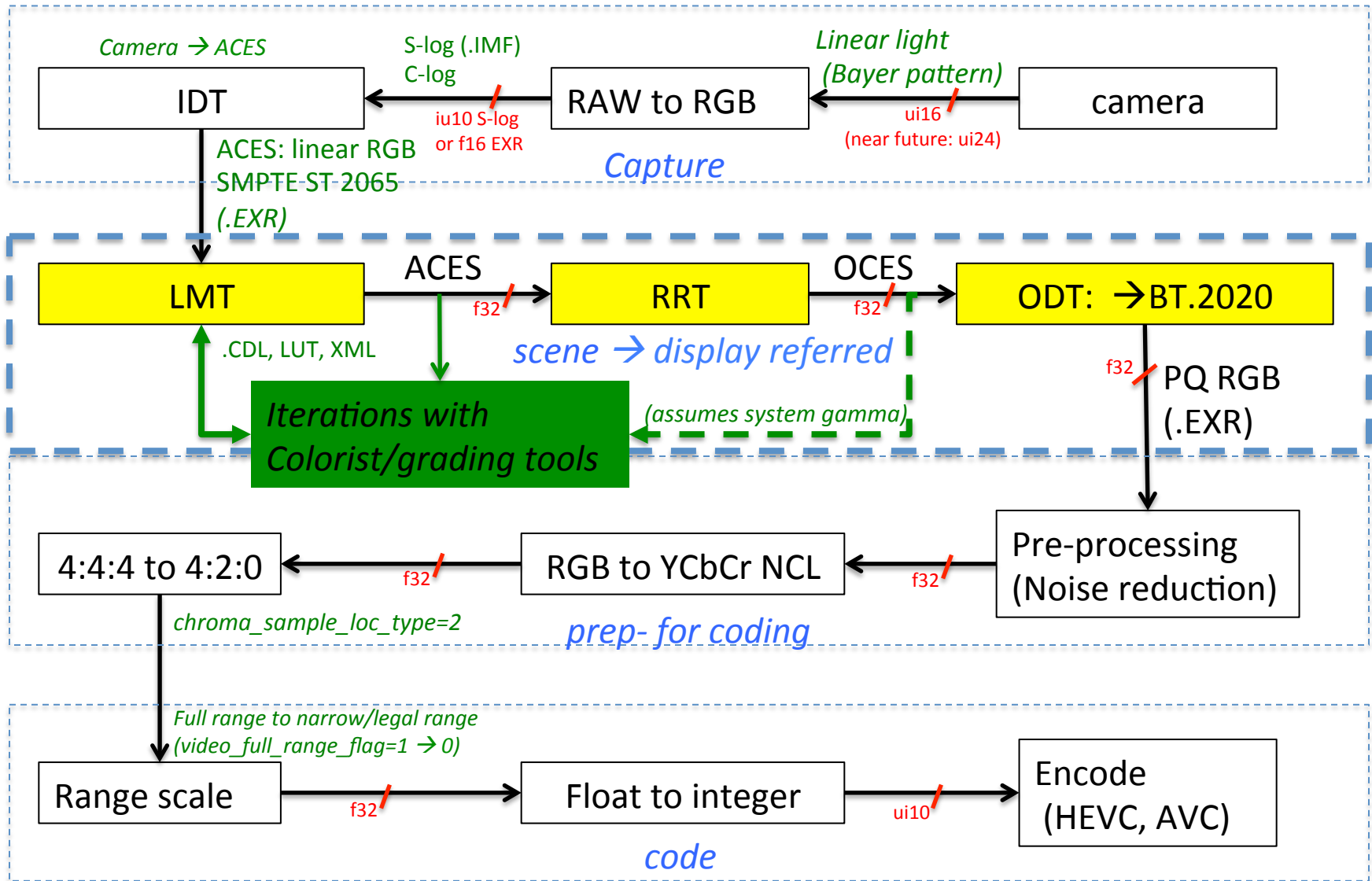
Estimating noise with orig-denoised dif

JCTVC-U0044 noise reduced clip	Luma channel $\text{Log}_2(\text{Sqrt}(\text{MSE}))$ <i>bits</i>
AutoWelder	2.83
BalloonFestival	2.03
BikeSparklers	3.00
FireEater	2.15
MagicHour	2.44
Market	2.44
ShowGirl	2.56
Tibul	2.18
WarmNight	2.45

Signal flow path from capture to HDR10

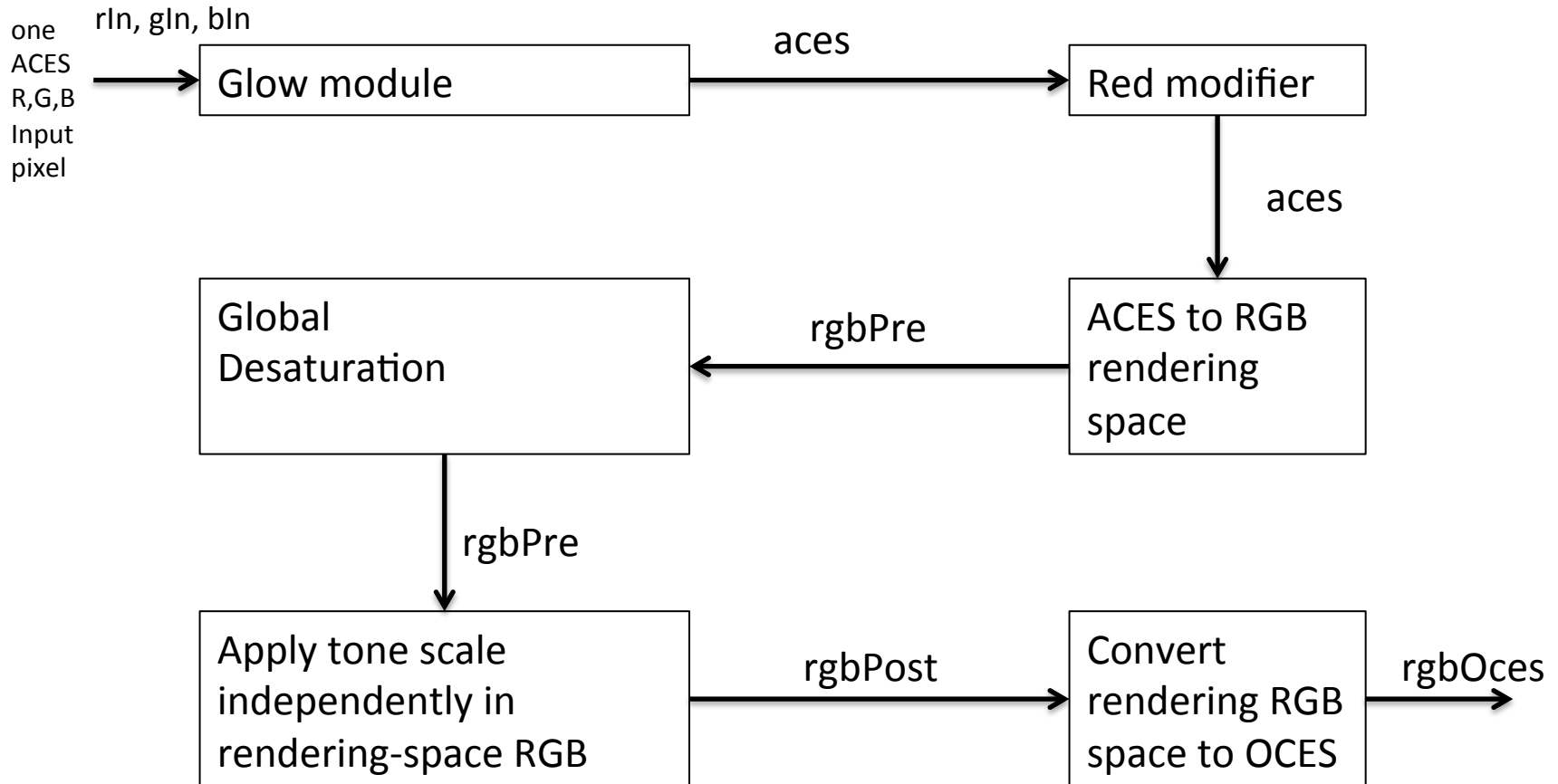


Studio HDR Workflow today



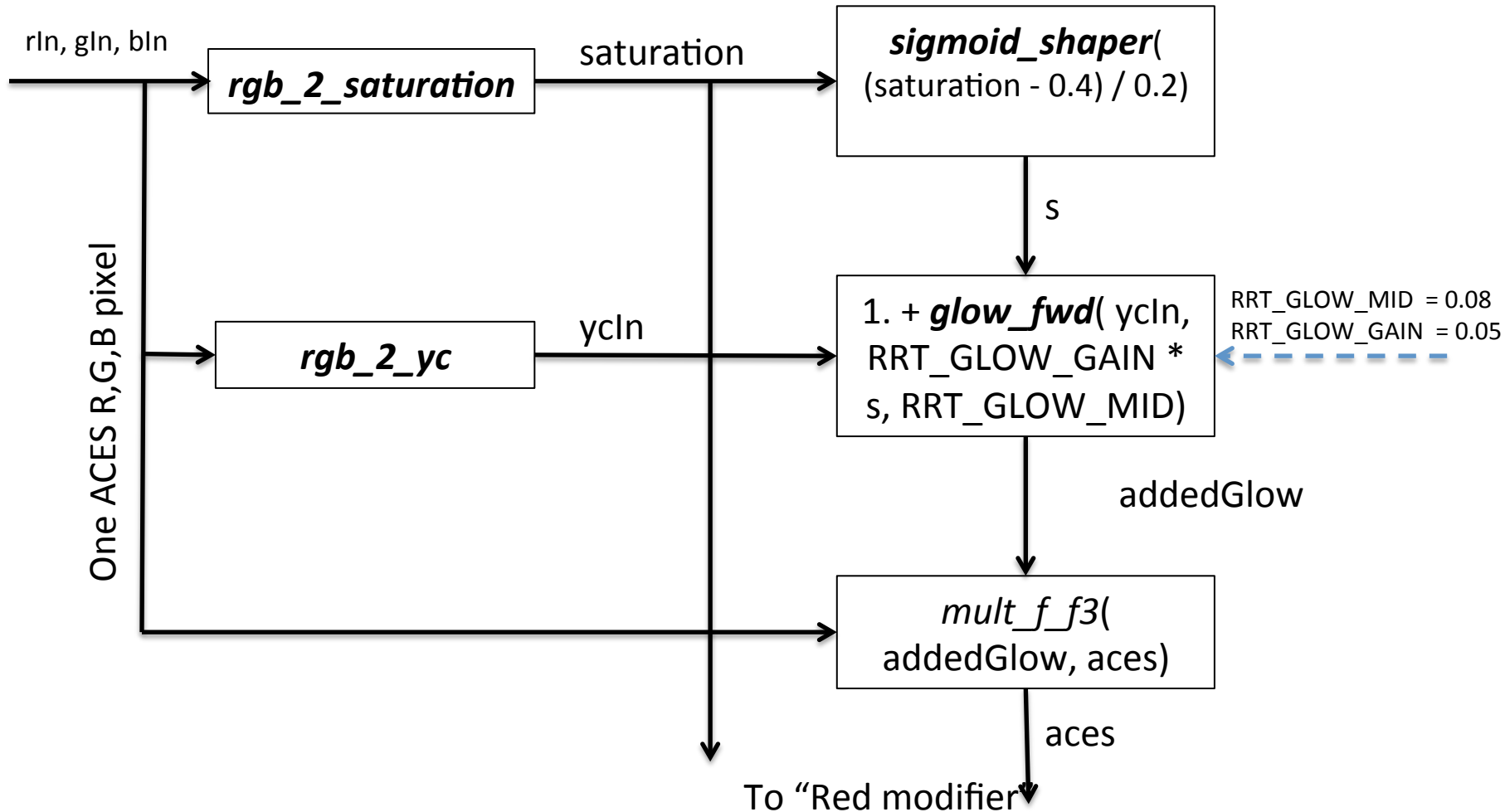
ACES RRT v1.0: overview

<https://github.com/ampas/aces-dev/blob/master/transforms/ctl/rrt/RRT.a1.0.0.ctl>



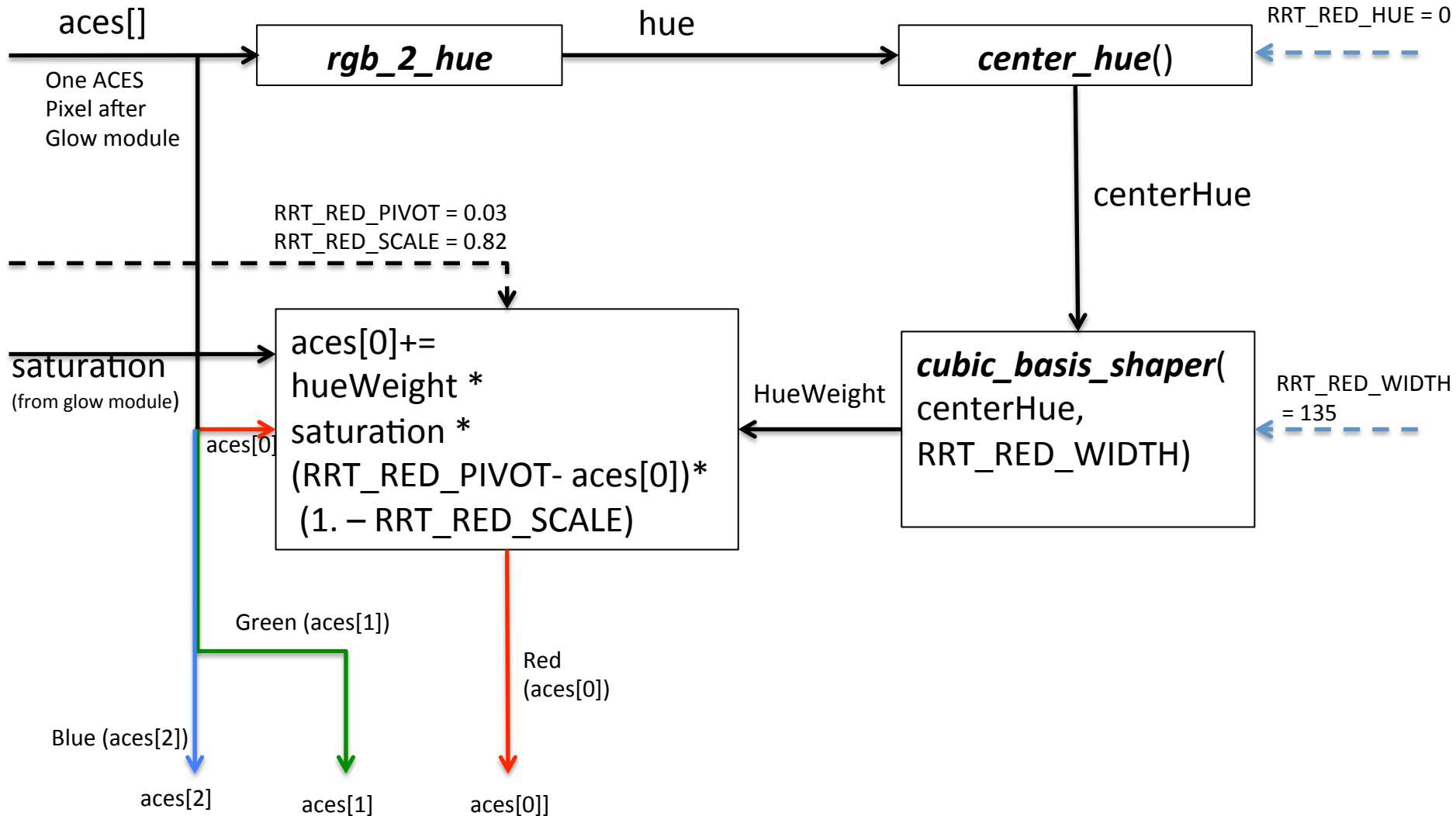
RRT: Glow module

<https://github.com/ampas/aces-dev/blob/master/transforms/ctl/rrt/RRT.a1.0.0.ctl>



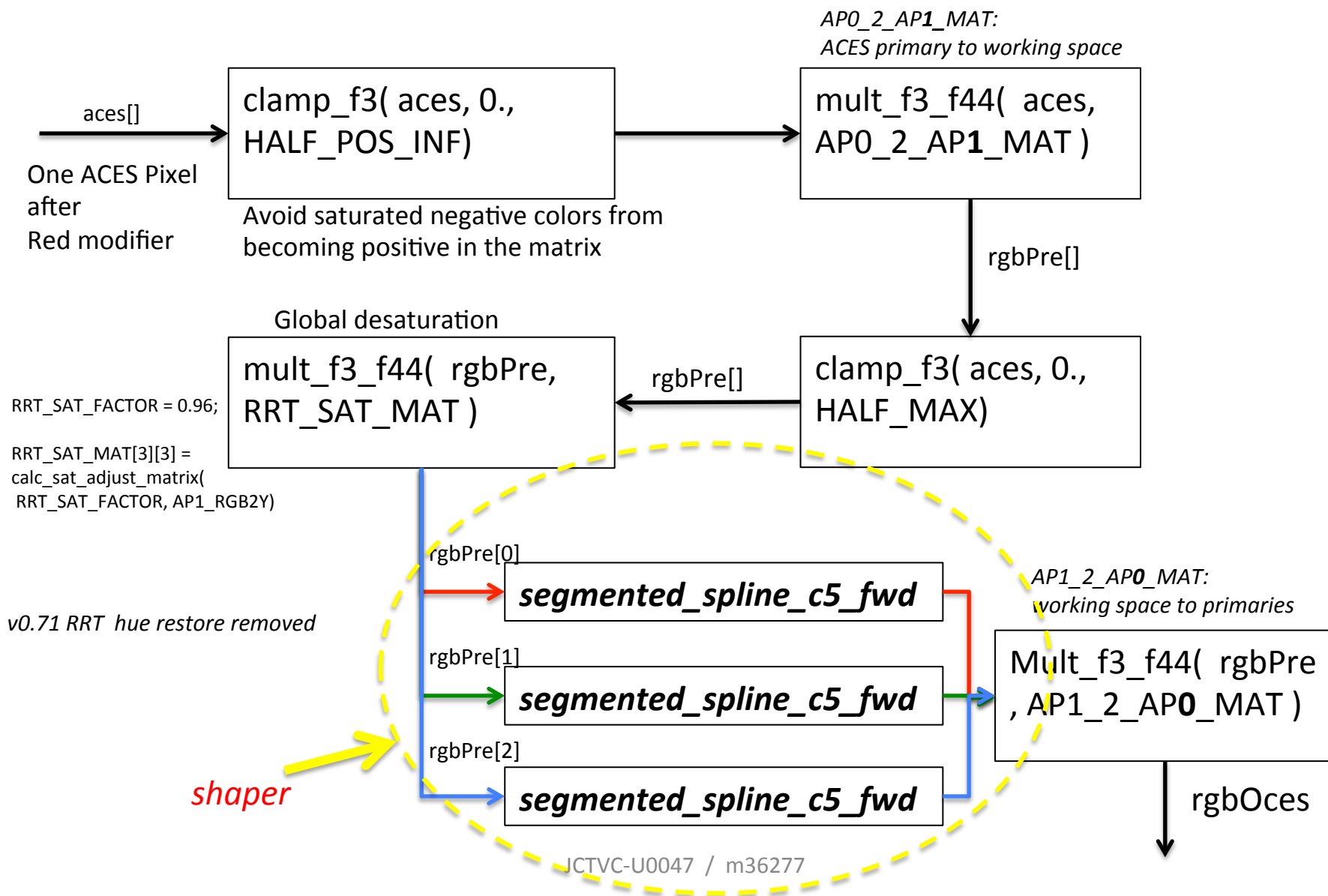
RRT: Red Modifier

<https://github.com/ampas/aces-dev/blob/master/transforms/ctl/rrt/RRT.a1.0.0.ctl>



RRT: Apply Tone scale

<https://github.com/ampas/aces-dev/blob/master/transforms/ctl/rrt/RRT.a1.0.0.ctl>



ACES Output Device Transform (ODT)

https://github.com/ampas/aces-dev/blob/master/transforms/ctl/odt/hdr_pq/ODT.Academy.P3D60_PQ_1000nits.a1.0.0.ctl

