"Hawaiian Starlight"

ESAC, Feb. 26, 2016

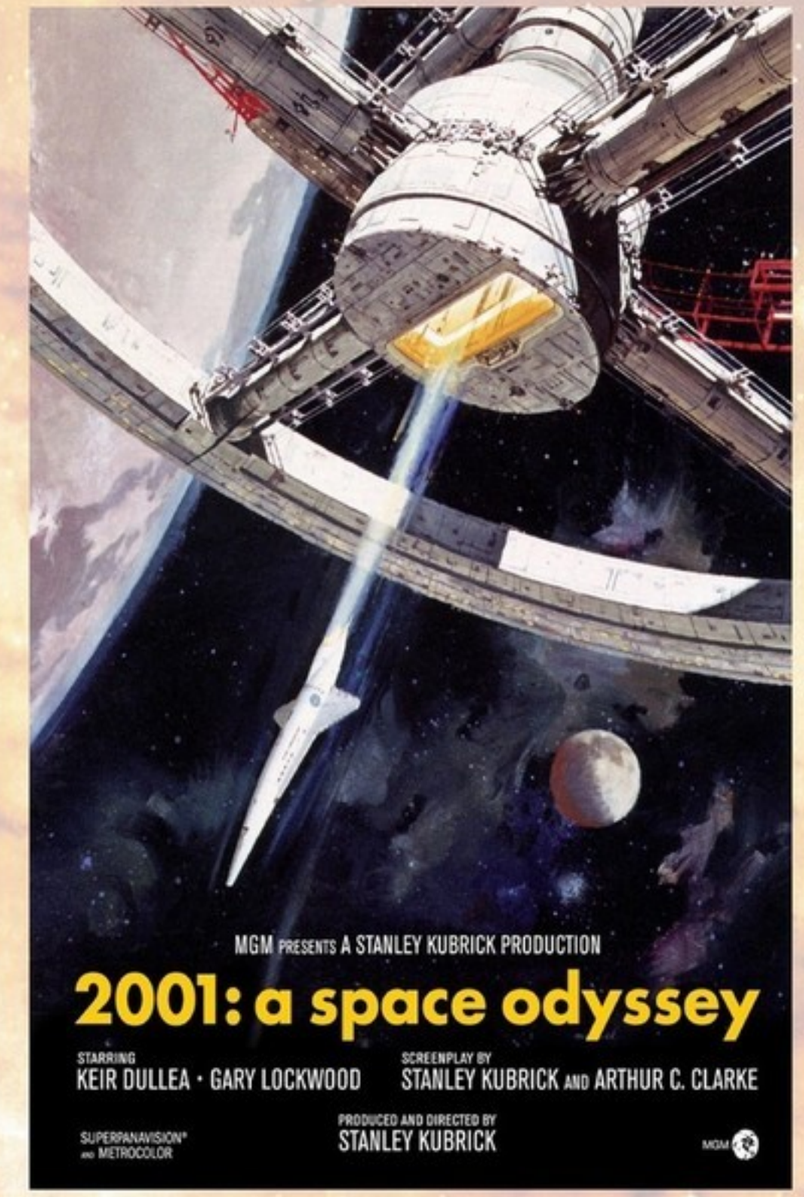
Astronomical images & timelapse cinematography
A film 12 years in the making

Dr. Jean-Charles Cuillandre

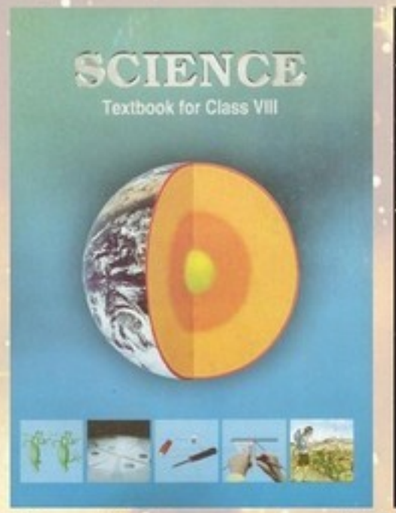
CEA-Saclay / Obs. de Paris / CFHT

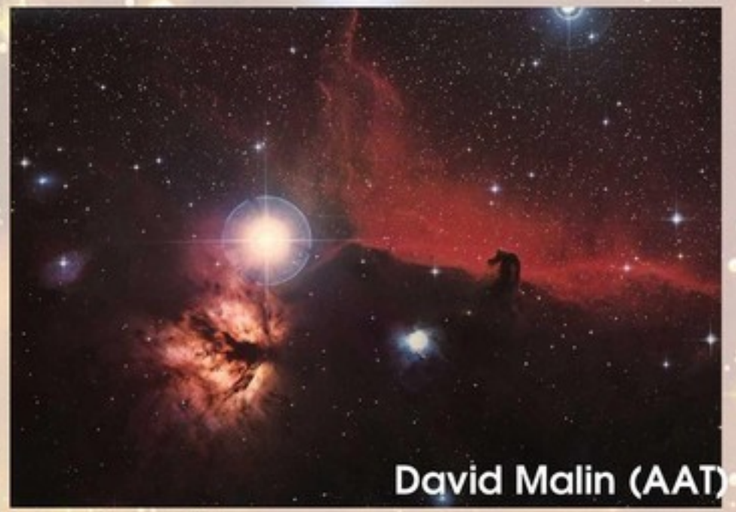
www.cfht.hawaii.edu/hs

The Early Influences



Science–Fiction



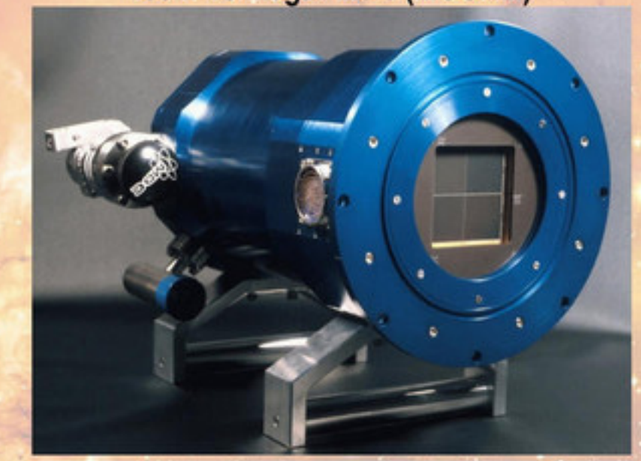


Science illustrations

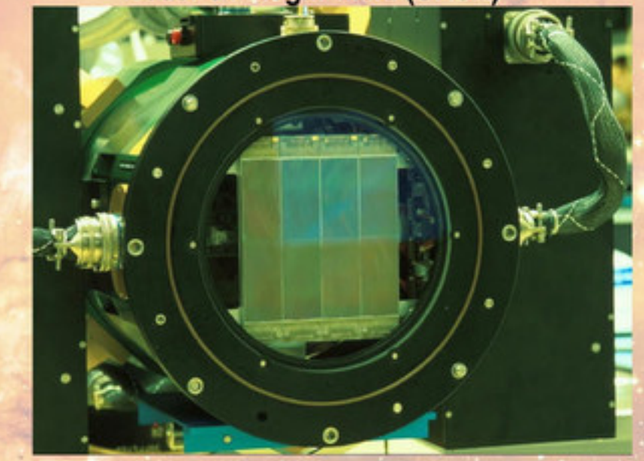
Science on Earth

Wide-field Optical Imaging at CFHT

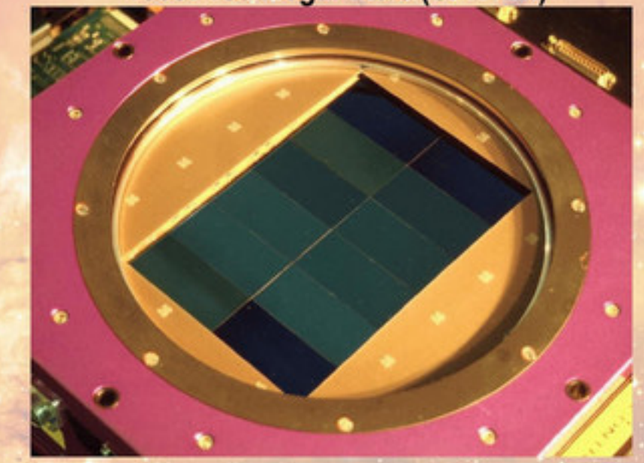
1994: 16 MegaPixels (MOCAM)



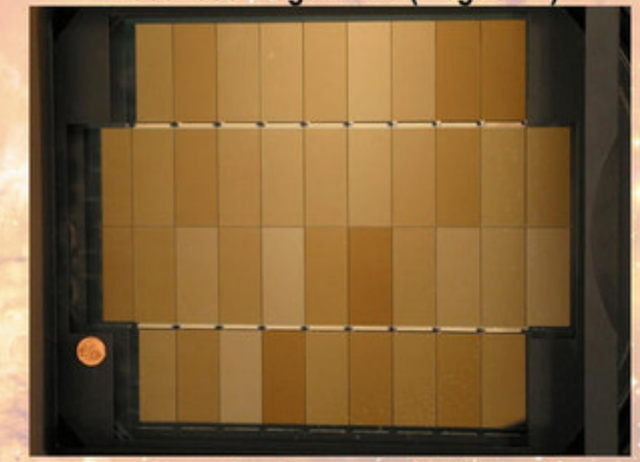
1995: 64 MegaPixels (UH8K)



1999: 100 MegaPixels (CFH12K)



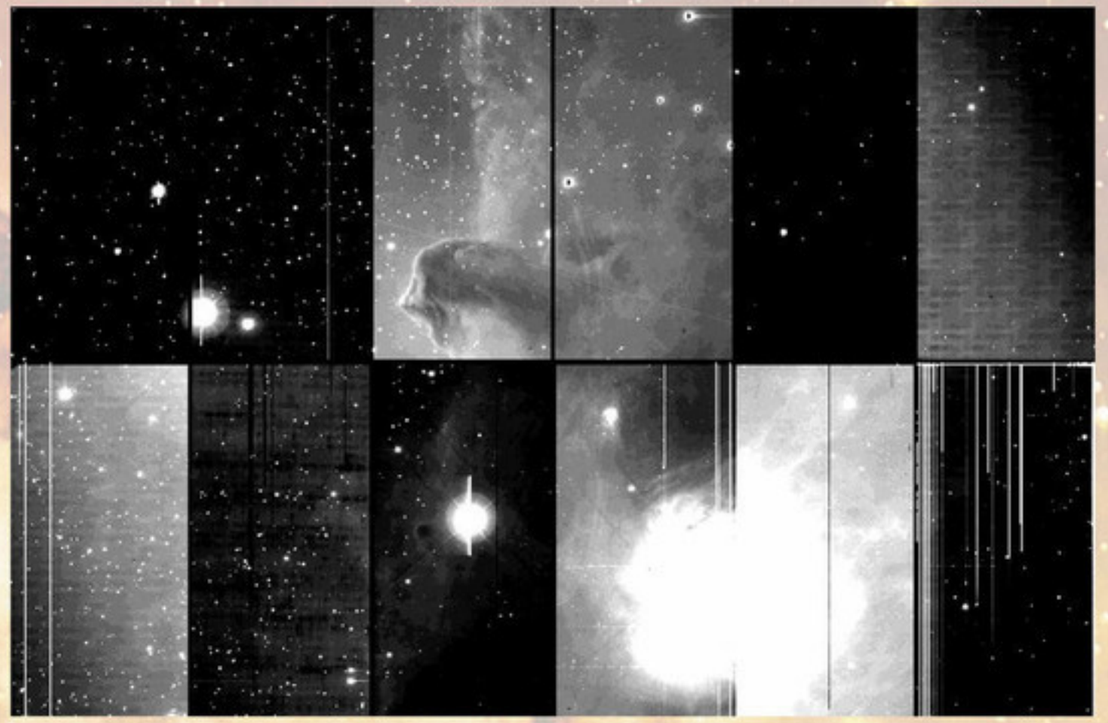
2003: 350 MegaPixels (MegaCam)



New Era in Wide Field Imaging: MegaPrime at CFHT

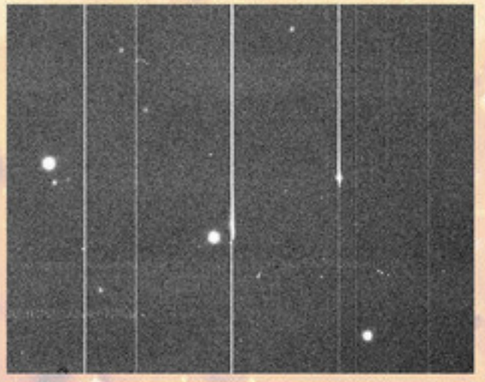
CFHT atop Mauna Kea : a clear view of the Universe

Facing the artifacts



IC 434
CFH12K
V filter
3mn exposure
Raw Frame

Mosaic Gaps

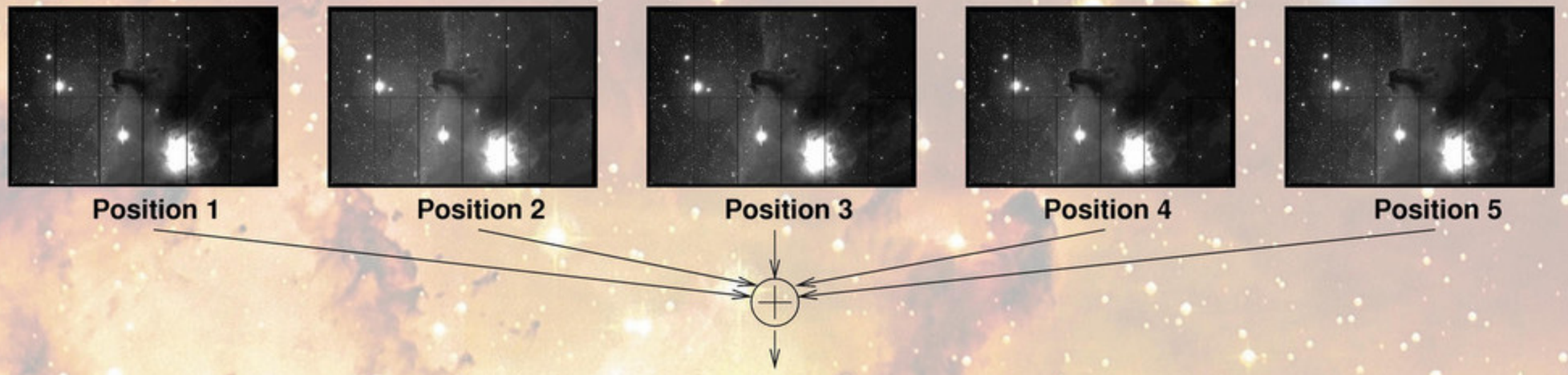


CCD Cosmetic

Satellite tracks

Cosmic Rays

Removing the artifacts

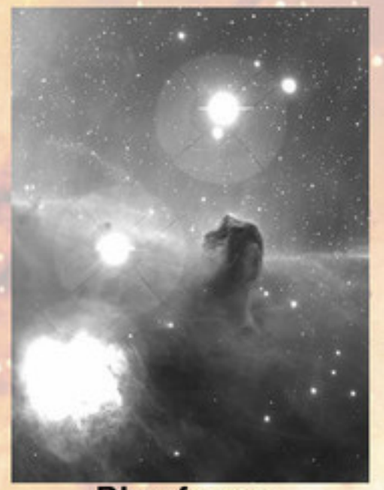


IC 434
CFH12K
V filter
~ 12600 x 8200

Tuning the framing

IC 434 – V frame

Balancing the true colors



Blue frame

Green frame

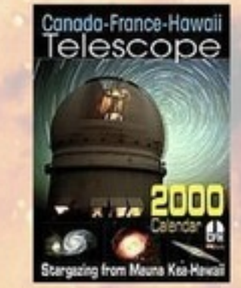
Red frame

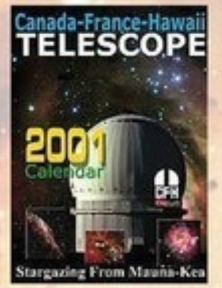
RGB true color frame

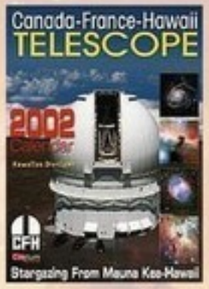
Tuning the colors and contrast

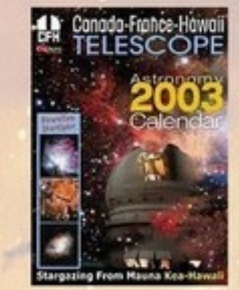
Coelum Astronomia

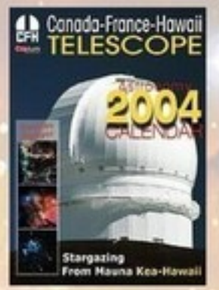
The CFHT–Coelum Wall Calendar

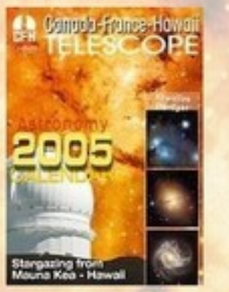


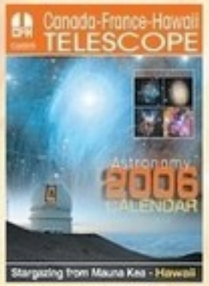


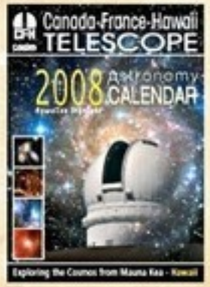


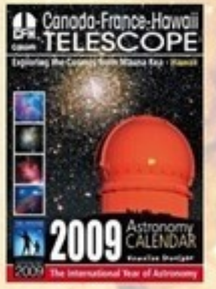


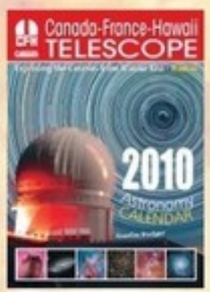


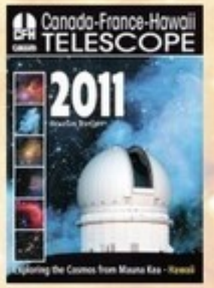












A steady mean to build a large image collection.

A layout refined over the years

The CFHT–Coelum Medium Posters



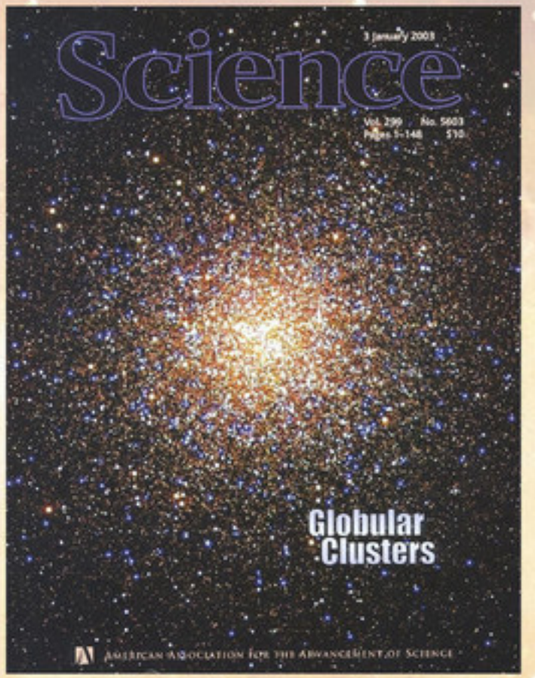


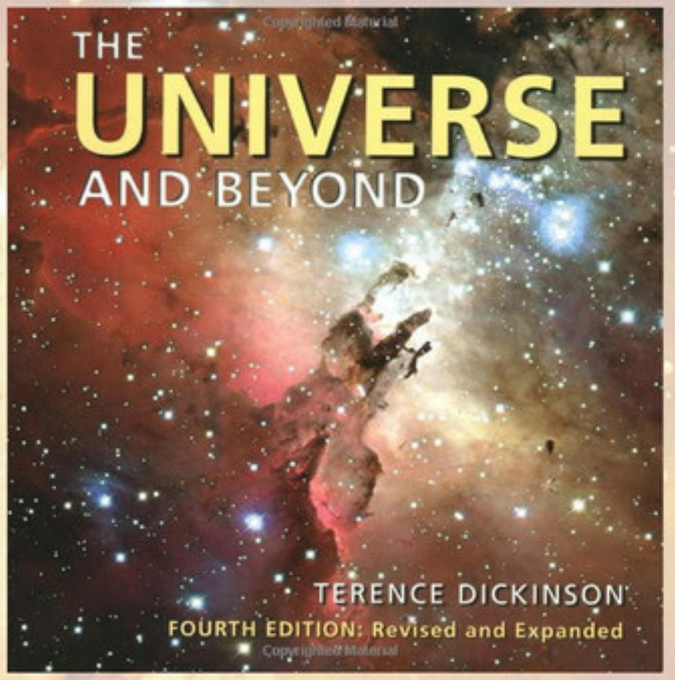


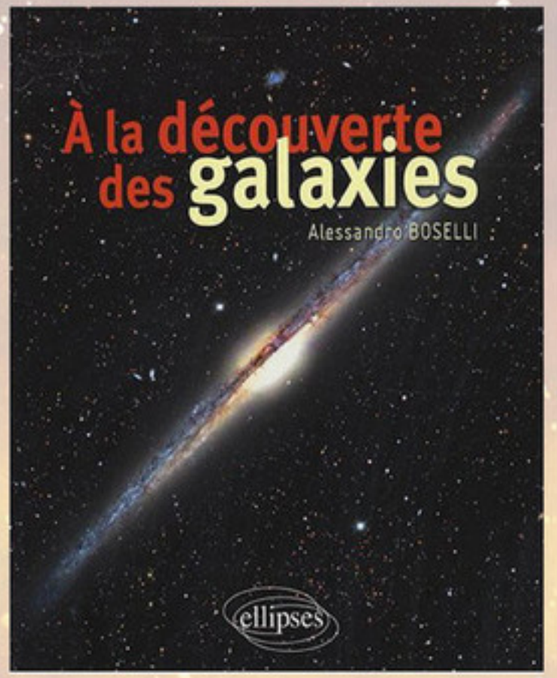



Hawaiian Starlight Posters – Medium: 19x27 in.

Hawaiian Starlight images in the press







An effective way to get the CFHT name out

CANADA POST | POSTES CANADA | DAY OF ISSUE | JOUR D'ÉMISSION

2009 International Year of Astronomy
Année mondiale de l'astronomie

NGC 1532-31 > Gemini Observatory/AURA | Observatoire Gemini/AURA

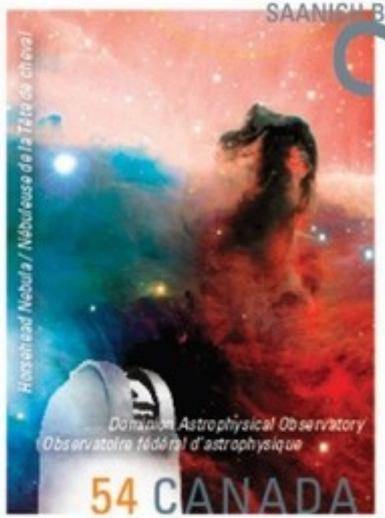
Lowe-Martin
Design > Keith Martin

Horsehead Nebula, Eagle Nebula >
Canada-France-Hawaii Telescope and Cœlum |
Nébuleuse de la Tête de cheval, Nébuleuse de l'Aigle >
Télescope Canada-France-Hawaï et Cœlum
Carina Nebula | Nébuleuse de la Carène > NASA

DAY OF ISSUE
JOUR D'ÉMISSION
2009 | 04 | 02

SAANICH BC

Carina Nebula | The Caterpillar
Nébuleuse de la Carène | La Chenille



2009

DAY OF ISSUE
International Year of Astronomy
Année mondiale de l'astronomie
2009 | 04 | 02

SAANICH BC

0 63491 07203 1

2009

The Orion Nebula through the years

UH8K – 1995

CFH12K – 2003

MegaCam – 2009


BONUS! Sky Guide 2011
16 pages of calendars, eclipses, meteor showers, planets, comets, all you need to know
What is the Sun made of? p. 26
December 2010
Astronomy
The world's best-selling astronomy magazine
NEW RESEARCH
How stars form
Stars change from cold gas to blazing hot fireballs — here's how they do it p. 32
See the nearest stars p. 52
How 5 doomed missions triumphed in the end p. 44
The Orion Nebula (M42) ranks among the biggest and brightest stellar nurseries in our galaxy. In this photo, luminous gas hides most of the thousands of newborn stars.
www.Astronomy.com
PLUS!
Bob Berman on this month's lunar eclipse p. 16
PlaneWave's hot new imaging scope p. 56
Astronomy's editors answer your questions p. 50


BUNGiE
Microsoft
game studios
PROPERTY OF MICROSOFT

Capturing timelapses one still at a time

2001–2003: laptop control + USB download

Time interval > 10s

2003–2013: wired control + internal memory

Time interval > 1s

Compact cameras and digital SLRs

Compact Cameras

Olympus C3040Z
2001–2002
3 Mpx
CCD
6 fr/mn max
(R x 240)
52,000 / 14 Gb

Olympus C5050Z
2003
5 Mpx
CCD
12 fr/min max
(R x 120)
26,000 / 7 Gb

Olympus C8080Z
2004–2007
8 Mpx
CCD
15 fr/mn max
(R x 96)
23,000 / 16 Gb

Digital SLRs

Canon D60
2003–2004
6 Mpx
CMOS
30 fr/mn max
(R x 48)
91,000 / 41 Gb

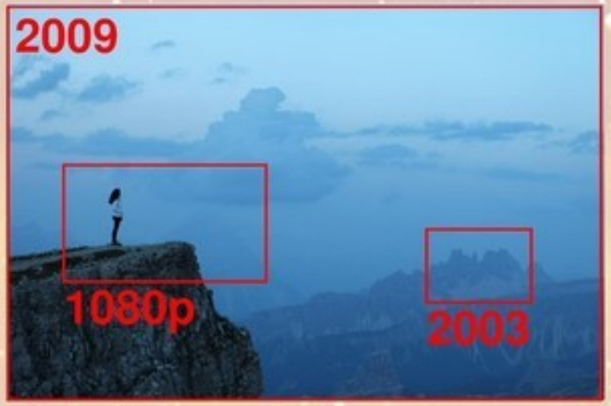
Canon 20D
2005–2009
8 Mpx
CMOS
60 fr/mn max
(R x 24)
38,000 / 40 Gb

Canon 5DMII
2009–2013
21 Mpx
CMOS
60 fr/mn max
(R x 24)
177,000 / 552,000 Gb

Quality glass

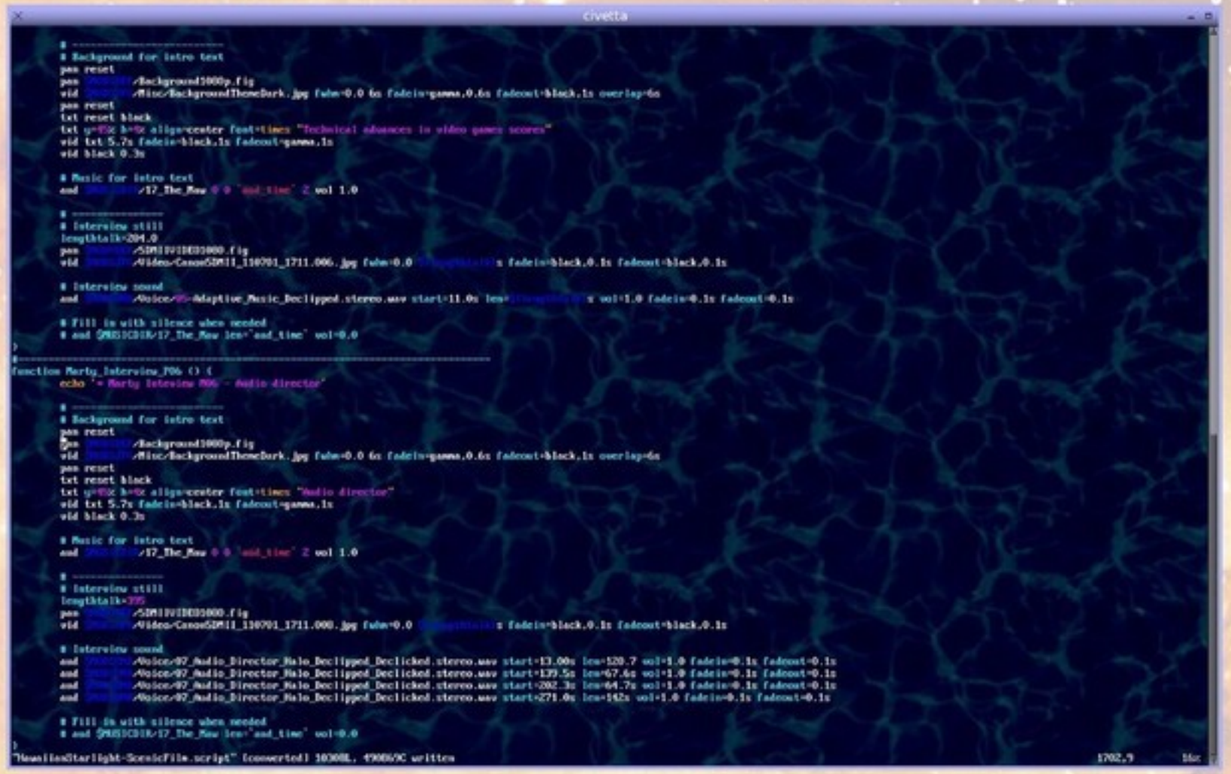
17–35 mm f/2.8 | 28–75 mm f/2.8 | 50 mm f/1.4 | 70–200 mm f/4 | 24–70 mm f/2.8

2003–2009 | 2009–2013

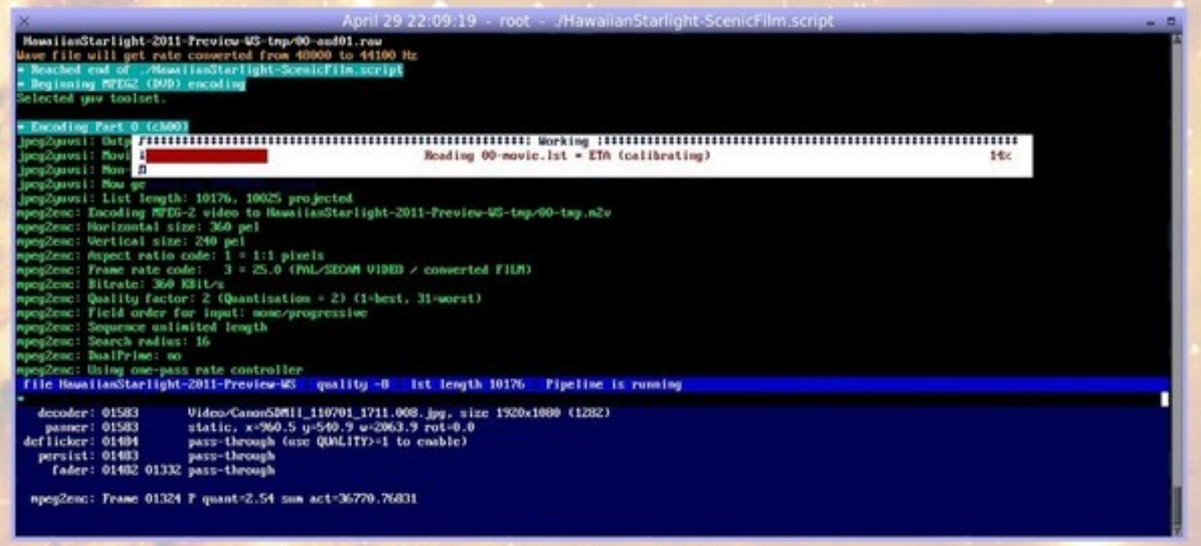


Gain in resolution

A not user-friendly text based video tool



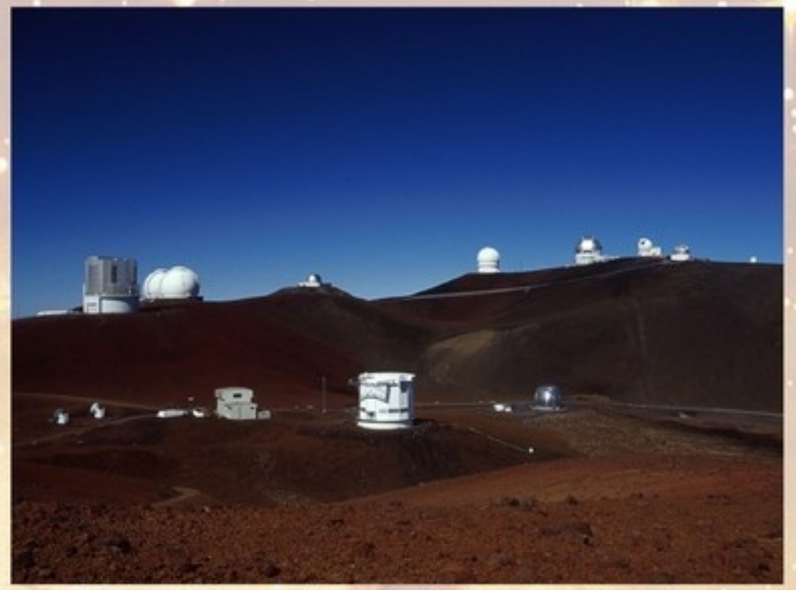
Video&sound editing: a compiled language approach



Multi-threading video&audio pipeline

Mauna Kea's magic through timelapse

The CFHT atop Mauna Kea



The Mauna Kea observatories

Mauna Kea at its most spectacular

Hints of Hawai'i (Big Island)

Martin O'Donnell

HALO

BUNGiE

Hawaiian Starlight, the film