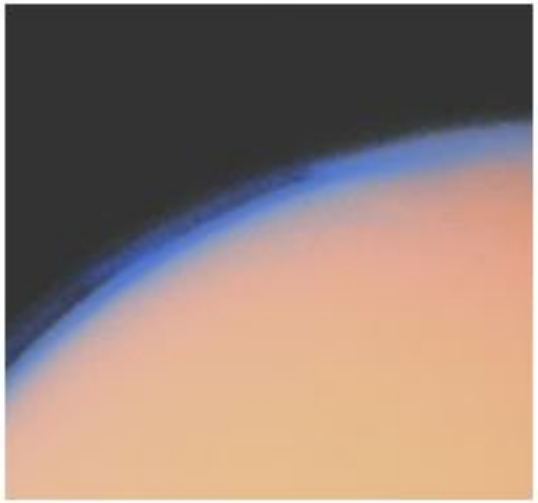
Titan's atmosphere



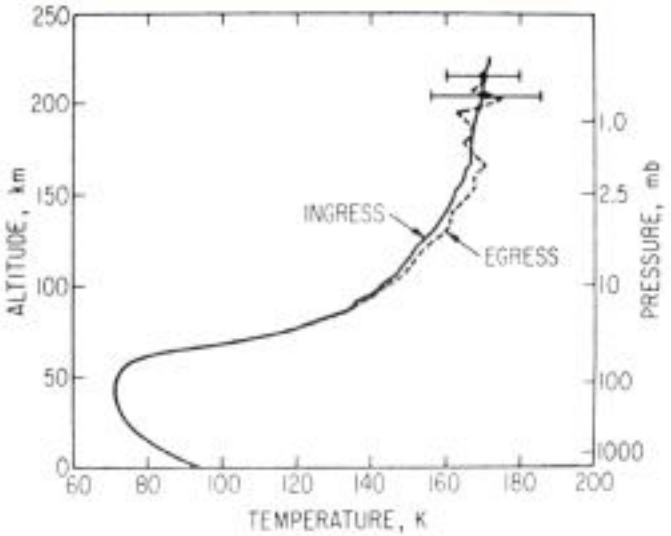


Fig. 1. Temperature profile from Voyager 1 (Lindal et al. 1983).

- $P_{Titan\ orbit}$ = 15.9 days
- $P_{Saturn\ orbit}$ = 29.4 years
- Tilt = obliquity = 27°

- Bulk density = 1.88 g cm^{-3}, similar to Callisto and Ganymede (~50% ice, ~50% rock)

- Atmospheric Composition:

N_2	0.77 – 0.92
Ar	0.05 – 0.17
CH_4	0.03 – 0.07

other hydrocarbons and nitriles

- Haze produce by photo-dissociation of CH_4

- $T_{surface}$ = 94 K, $P_{surface}$ = 1.5 bar.
  Tropopause at 42 km, T = 71 K
  Scale height in troposphere = 20 km

- May have strong super-rotating winds.

Imaging Titan's lower atmosphere & surface

Hubble Space Telescope
17 Oct. 1994

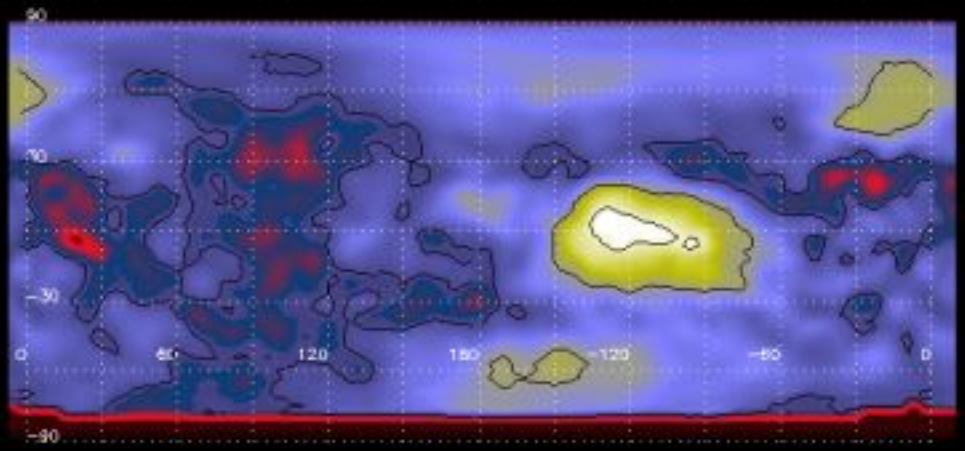
850LP filter
CML = 75° W

Keck 1 / NIRC speckle
23 Oct. 1997

K' filter (1.95-2.29 _m)
CML = 76° W

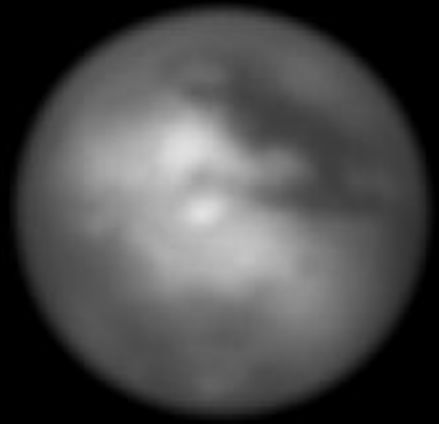
Keck 2 / NIRSPAO
3 Dec. 2001

K' filter
CML = 67° W



Keck 2 / NIRC2
24 Dec. 2003

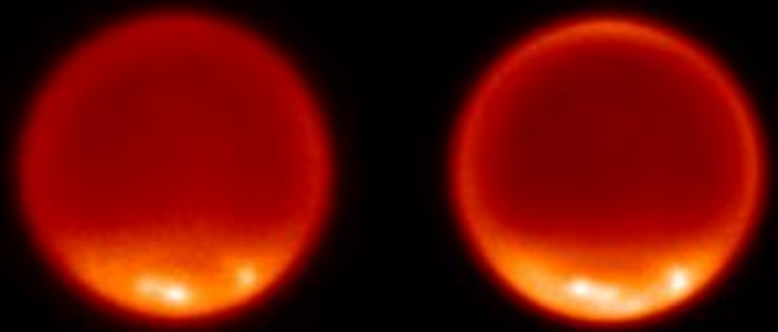
K' filter
CML = 69° W



Variability of south polar clouds

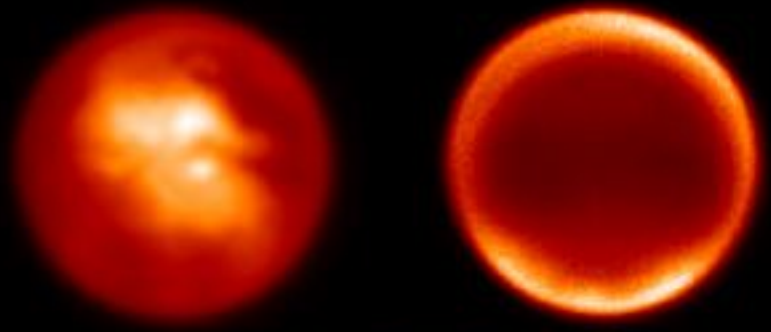
Keck 2 AO / NIRC2

21 Dec. 2001
H_2 (2.11-2.14 _m)
Roe *et al.* 2002

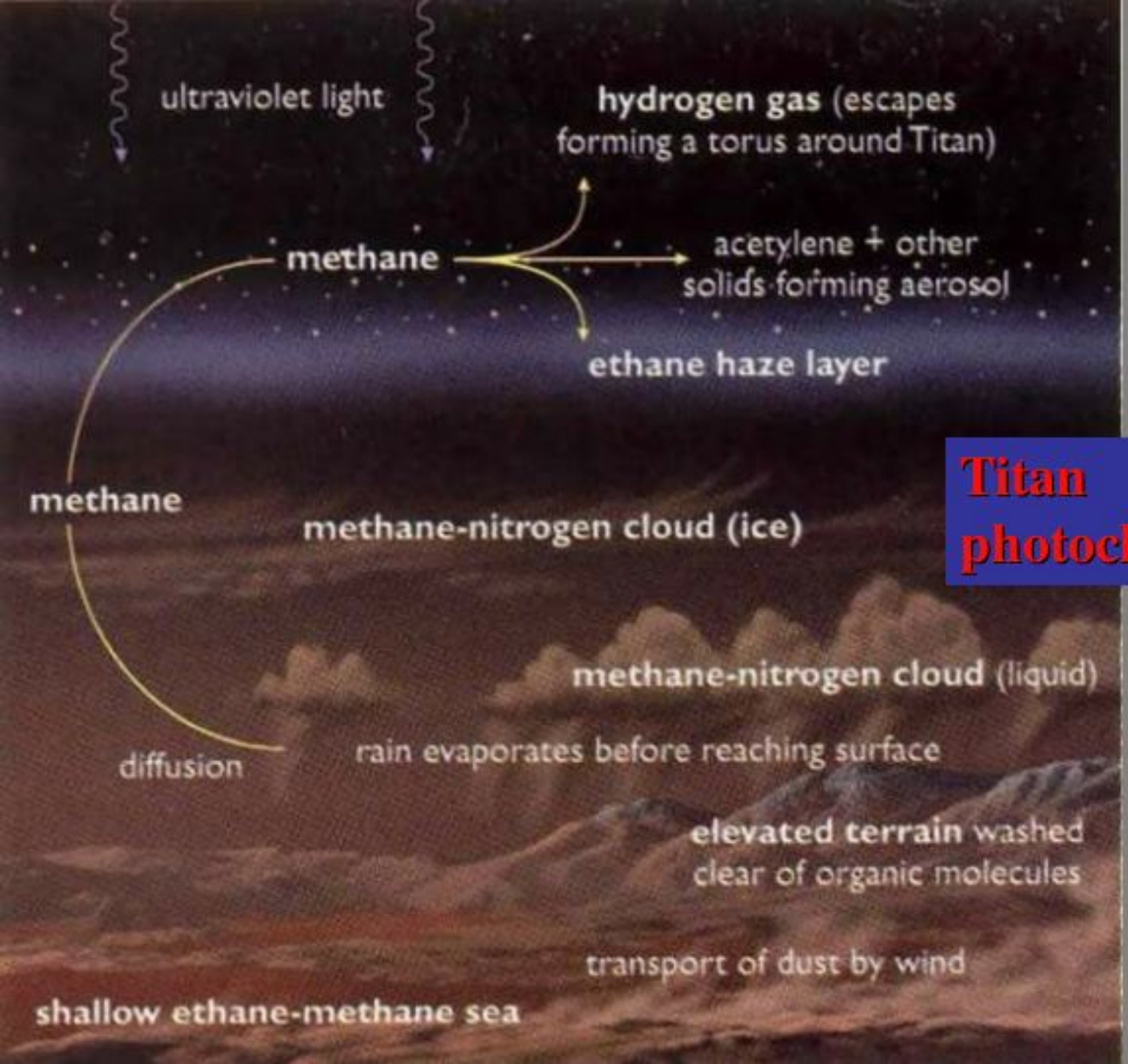


9:40 UT 12:15 UT

25 Dec. 2003
K' (1.95 – 2.30 _m)
H_2 (2.11-2.14 _m)



2003 Dec. 25 06:31 UT



Titan photochemistry


ESA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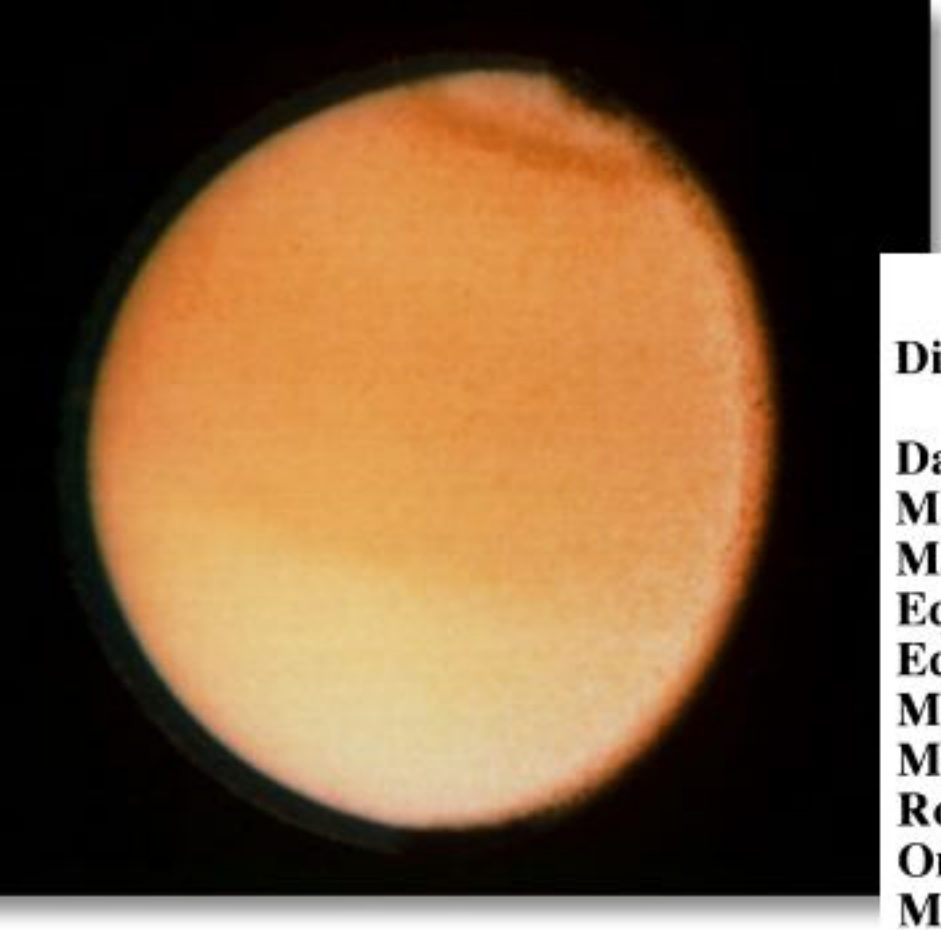
Saturn's Satellites and Ring Structure

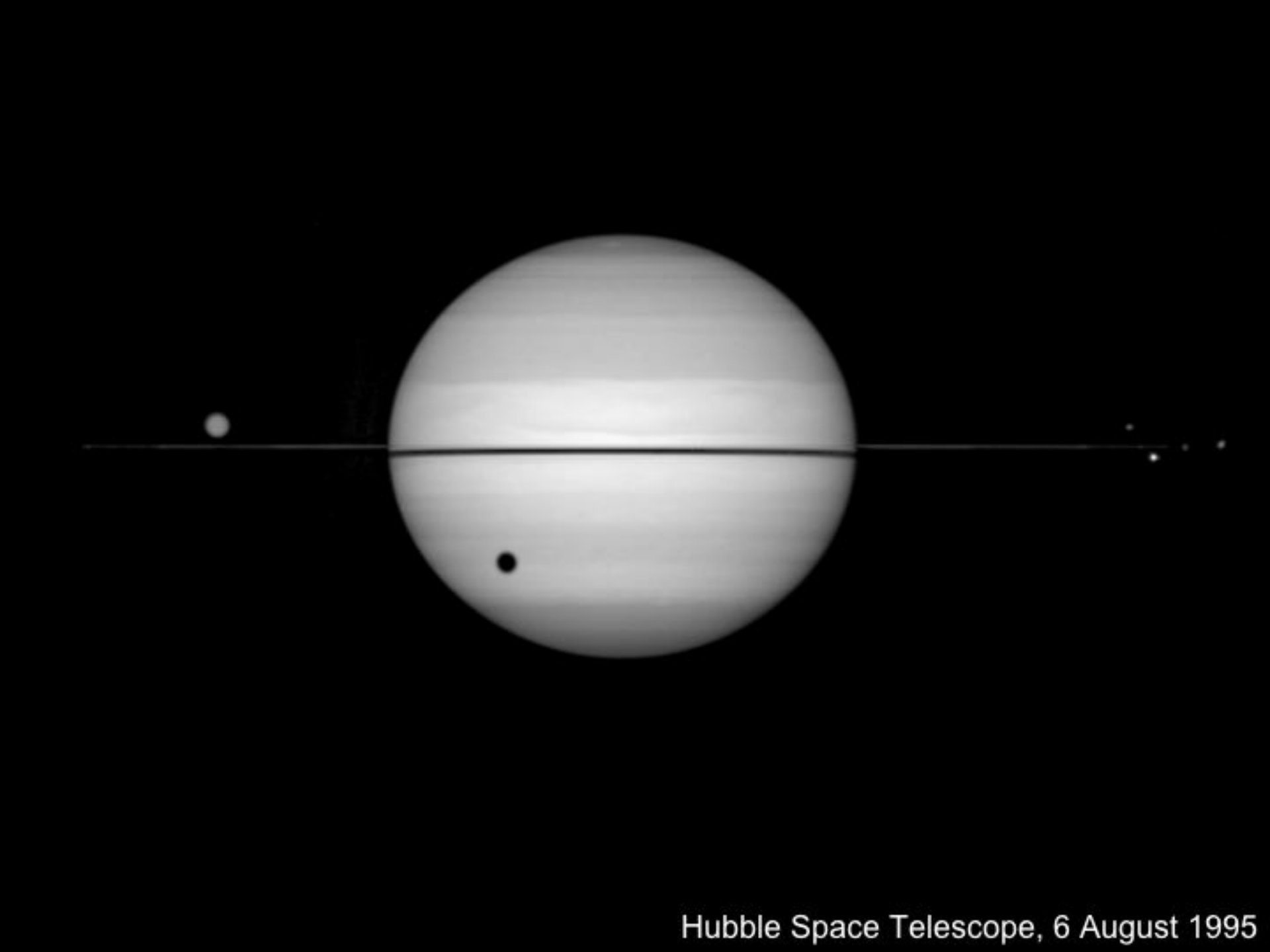
Titan



Taken by Voyager 2
in 1981

Discovered by	Christiaan Huygens
Date of discovery	1655
Mass (kg)	1.35e+23
Mass (Earth = 1)	2.2590e-02
Equatorial radius (km)	2,575
Equatorial radius (Earth = 1)	4.0373e-01
Mean density (gm/cm^3)	1.88
Mean distance from Saturn (km)	1,221,850
Rotational period (days)	15.94542
Orbital period (days)	15.94542
Mean orbital velocity (km/sec)	5.58
Orbital eccentricity	0.0292
Orbital inclination (degrees)	0.33
Escape velocity (km/sec)	2.65
Visual geometric albedo	0.21
Magnitude (Vo)	8.28
Mean surface temperature	-178°C
Atmospheric pressure (bars)	1.5

A regular, large, satellite orbiting 20 Rs from Saturn


Hubble Space Telescope, 6 August 1995