

The Planets up close and personal

My journey into Planetary
imaging and Pro-Am
collaboration



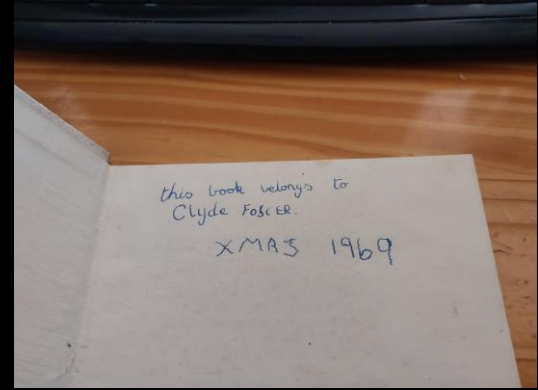
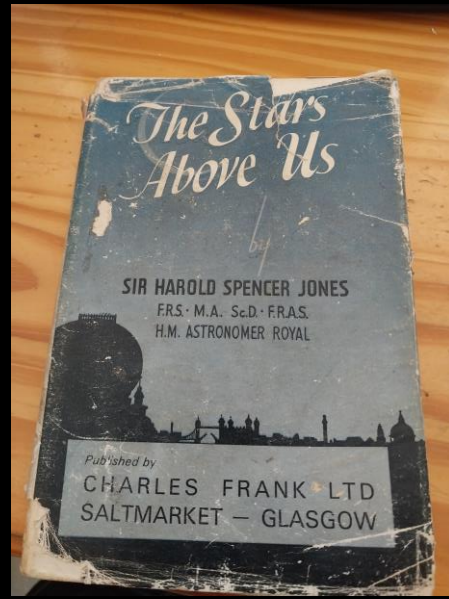
Namibia Scientific Society
23 May 2023

Clyde Foster

*Planetary Astro-Imager and Planetary Specialist,
Astronomical Society of Southern Africa*

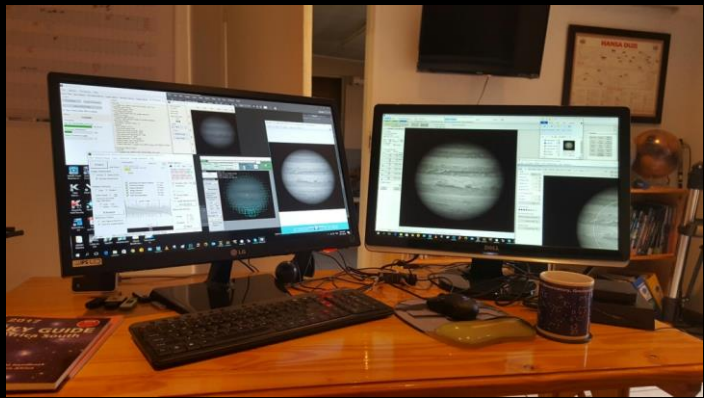
Beginnings

- School project-late '60's in Scotland
- Apollo, spaceflight and Astronomy



A new start- 2014

- Celestron 14" Edge HD.
- Development of my passion for Planetary imaging



Developments 2014-2017



Personal objectives:

- Develop and maintain planetary imaging skills
- Comprehensive monitoring of Mars, Jupiter and Saturn

Two key realisations

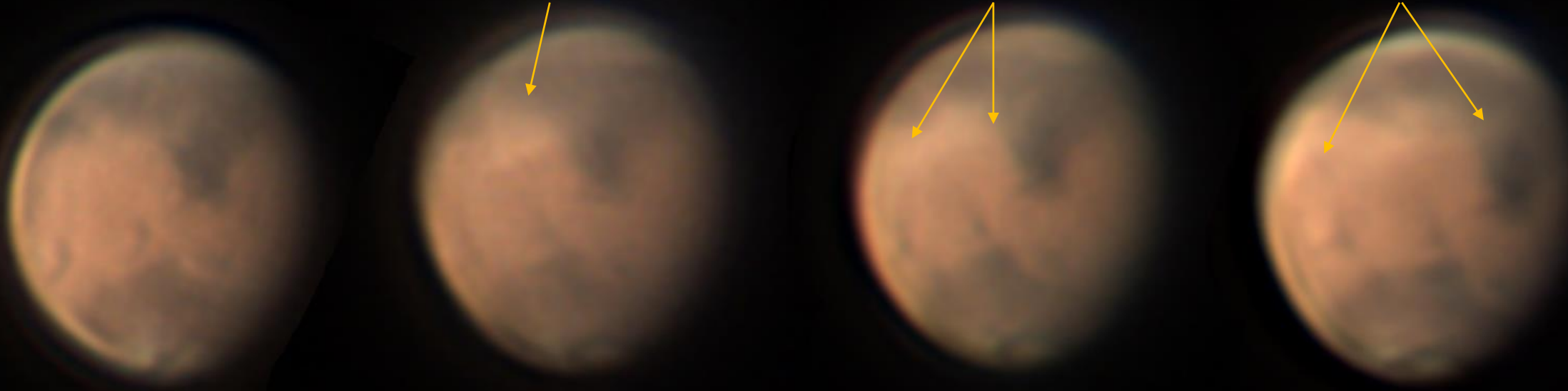
- Wonderful community of planetary imagers around the world
- Collaboration between amateurs and professional planetary scientists



Dust storm initiation

Dust storm expansion

Dust storm dissipation



Dr Richard McKim
BAA Mars section

=====
BAA electronic bulletin
This is an announcements only list - please do not reply to this message.
=====
As Mars becomes difficult to observe even in the early evening from the UK, a bright cloud, probably dust, has been registered in colour images of July 1 submitted by Clyde Foster (S. Africa). The cloud was located in Libya-Isidis Regio, which is one of several well-known dust emergence sites.

Any observations will be appreciated. The region becomes accessible to UK observers over the next few evenings. Please send your observations to me, and good luck with your work!

Richard McKim,
Director, Mars Section

[richardmckim 'at' btinternet.com]

2014 July 2

Mars

Dust storm
30 June to 3 July
2014
Ls 153.7-155.2

355mm HD Edge
f/33, 3x Televue Barlow
ZWO ASI120MC

Clyde Foster
Centurion South Africa

The Planets up close and personal – Namibia Scientific Society

First TV interview- SABC. Schiaparelli probe
October 2016



Rene Vest

The Planets up close and personal – Namibia Scientific Society

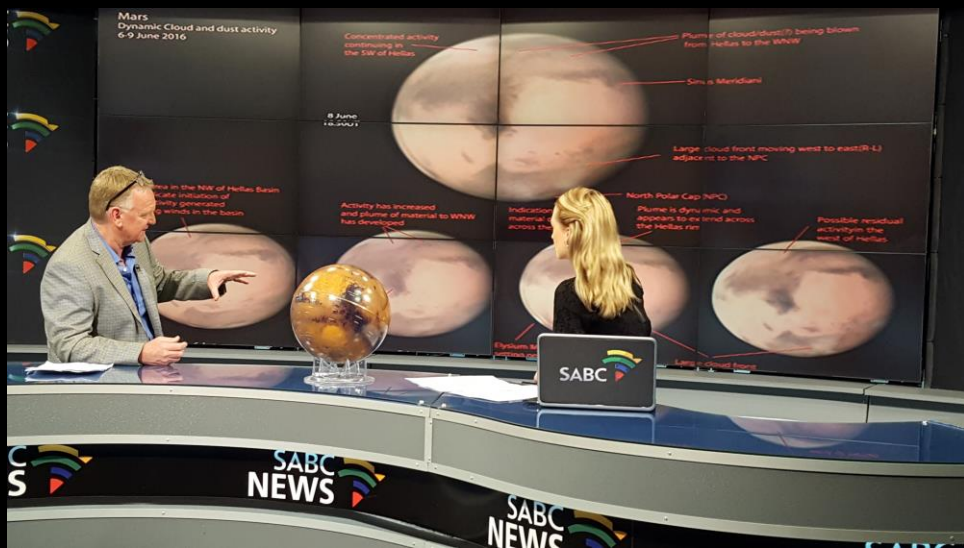
First TV interview- SABC. Schiaparelli probe

October 2016



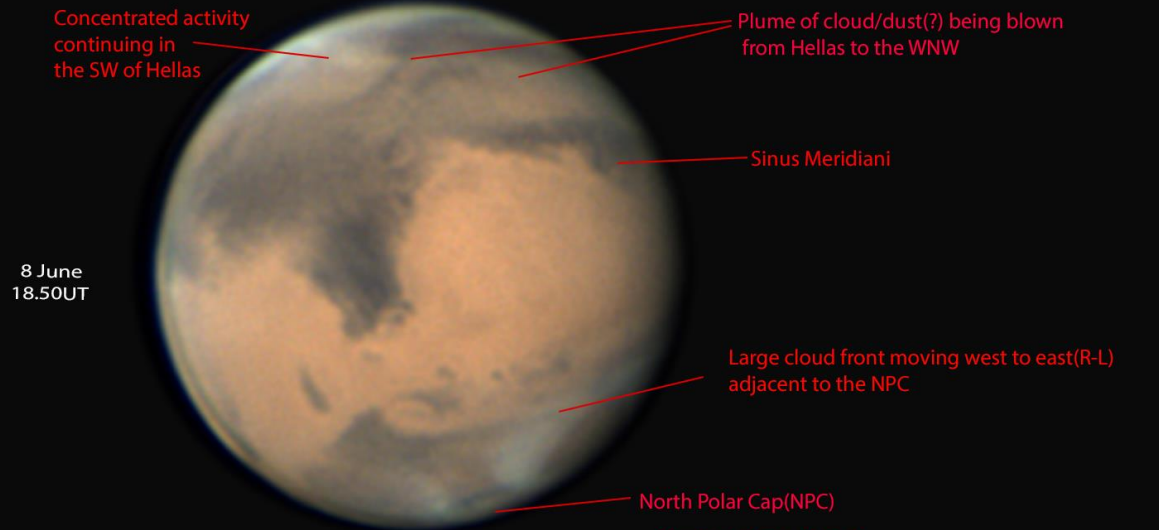
The Planets up close and personal – Namibia Scientific Society

First TV interview- SABC. Schiaparelli probe
October 2016

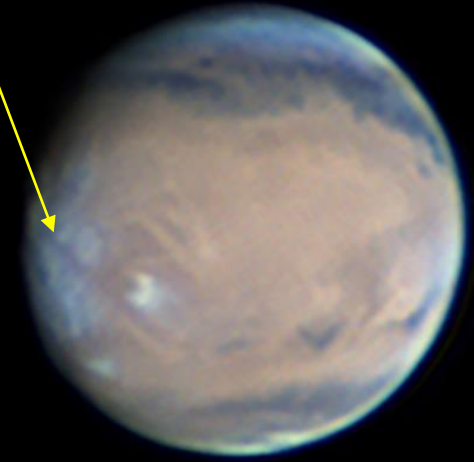


The Planets up close and personal – Namibia Scientific Society

Mars
Dynamic Cloud and dust activity
6-9 June 2016



Orographic cloud formation over the Tharsis volcanos



The Planets up close and personal – Namibia Scientific Society

EPSC 2017- Riga, Latvia



Dr John Rogers(L-BAA) and Dr Glenn Orton(R-JPL)



EPSC 2017 - Riga

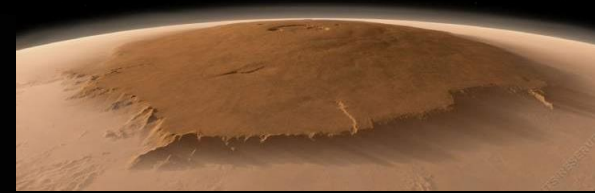


Dr Leigh Fletcher



EPSC 2017 - Riga

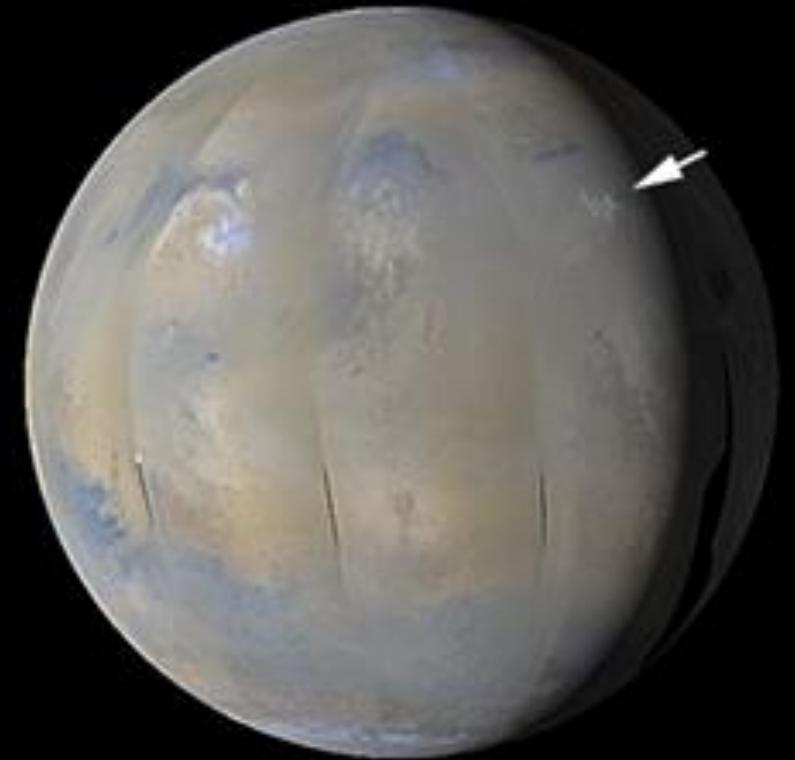
The Planets up close and personal – Namibia Scientific Society



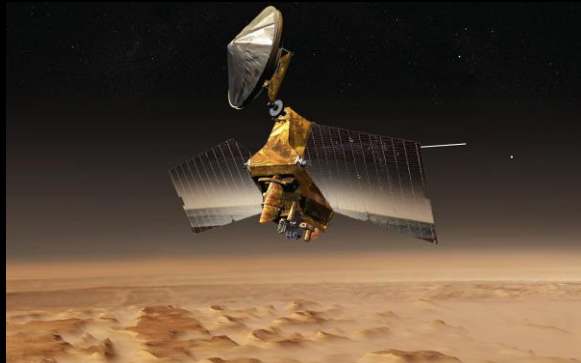
Olympus Mons?



Dr Michael
Ravine. Malin
Space Science
systems

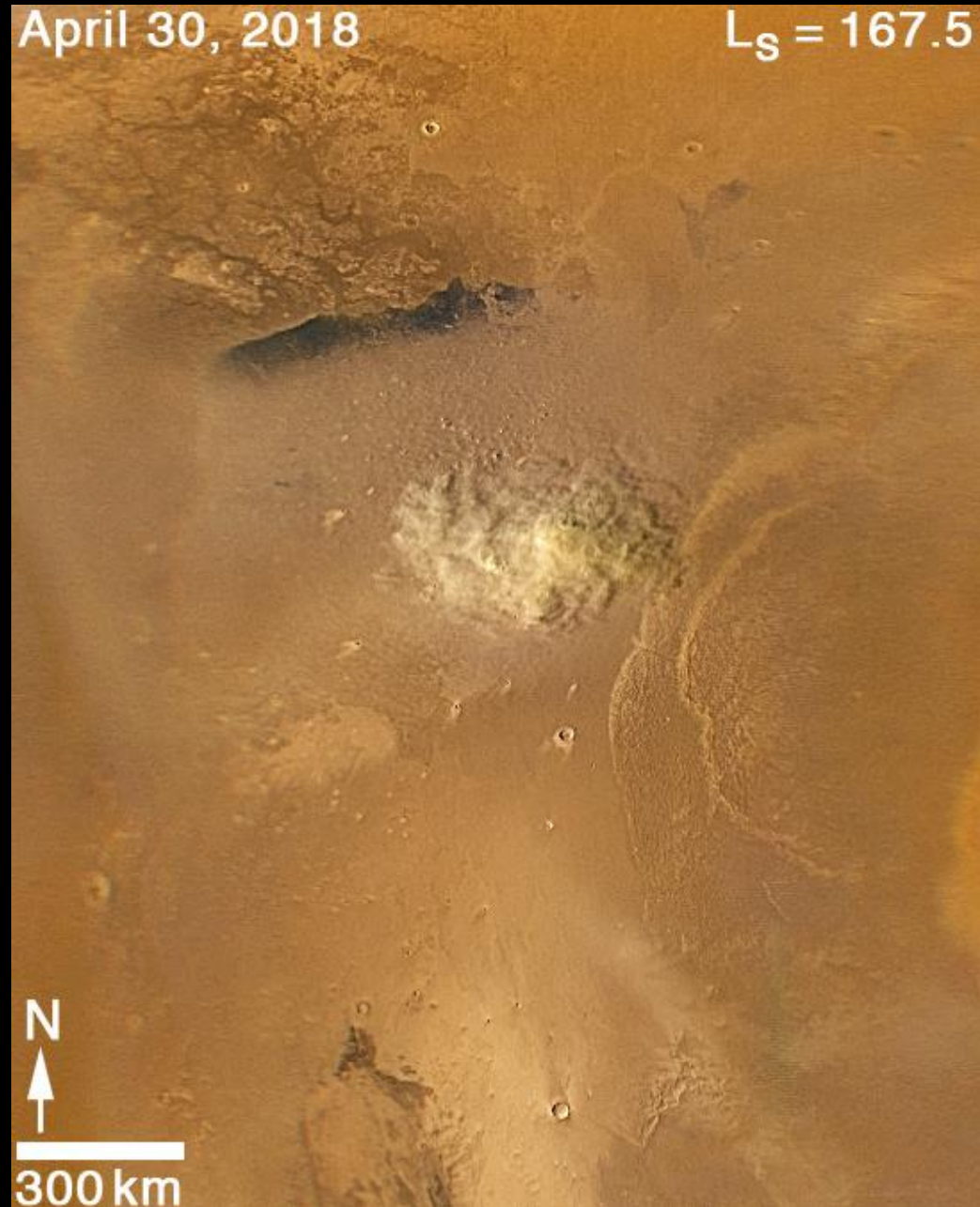


April 30, 2018, CM~191



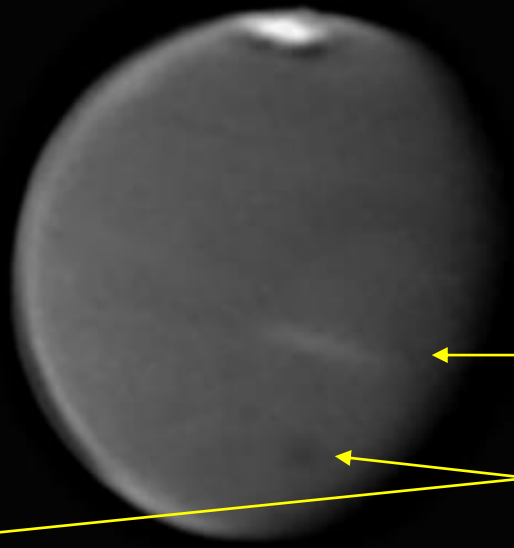
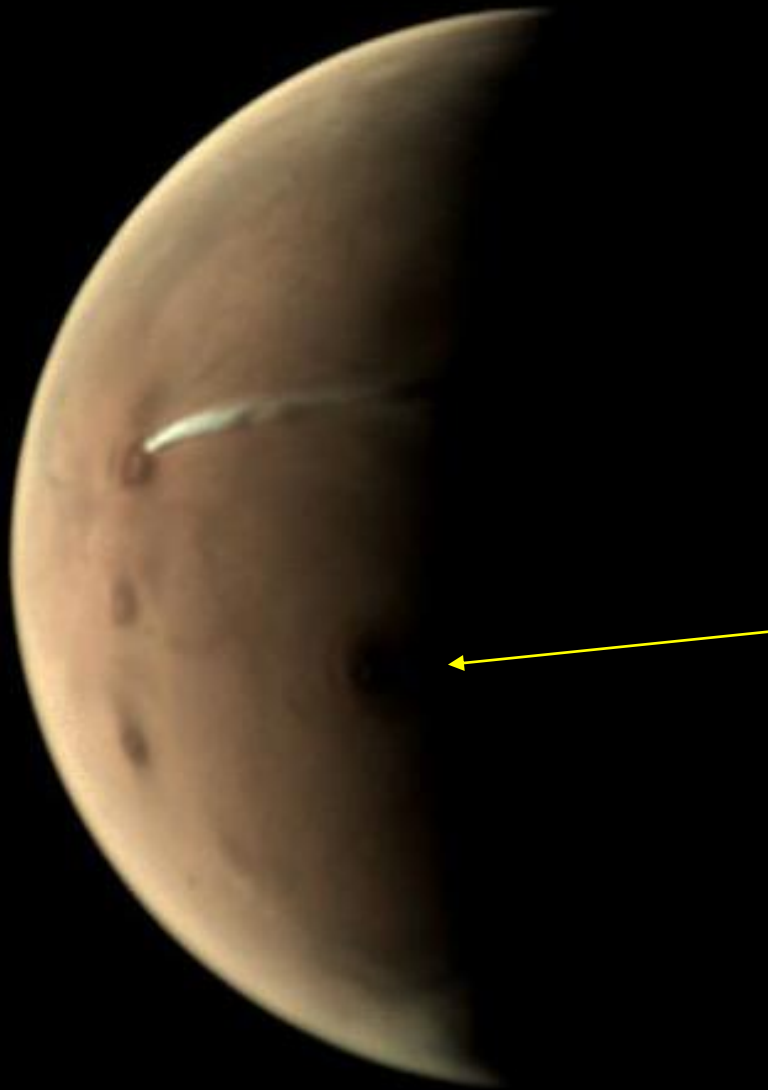
NASA Mars Reconnaissance Orbiter
Dr Bruce Cantor
Deputy Principal investigator
MARCI instrument

Mars Dust
storm April
2018



Credit: MSSS/NASA/
MRO

Arsia Mons linear cloud
October 2018



Arsia Mons linear cloud

Olympus Mons

Agustin Sanchez Lavega
Principal investigator
Mars Express
Wide field instrument



The Planets up close and personal – Namibia Scientific Society

eNCA interviews 2017-2018



The Planets up close and personal – Namibia Scientific Society

Mars

Left: Hubble Space Telescope image 12 May, 2016
Right: C Foster image 2 May 23.22UT, 2016

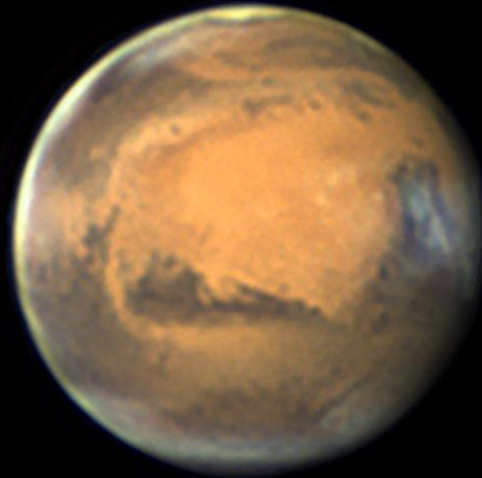


Hubble Space Telescope photo of Mars taken when the planet was 50 million miles from Earth on May 12, 2016.
Credits: NASA, ESA, the Hubble Heritage Team (STScI/AURA), J. Bell (ASU), and M. Wolff (Space Science Institute)

Clyde Foster
Centurion South Africa

Mars

Left: Hubble Space Telescope image 18 July, 2018
Right: C Foster image 29 July 20.07UT, 2018



Hubble Space Telescope photo of Mars taken when the planet was 36.9 million miles from Earth on July 18, 2018.
Credits: NASA, ESA, and STScI

Clyde Foster
Centurion South Africa

Opportunity Rover
Last contact 10 June 2018
Operational since 2004
Original mission program: 90 days



Great Red Spot Flaking 2019

1 June
2242UT



The Great Red Spot in 2019 and its interaction with retrograding vortices as monitored by the amateur planetary imaging community

Clyde Foster (1), John H. Rogers (2), Shinji Mizumoto (3), Andy Casely (4), Marco Vedovato (5)
 (1) Astronomical Society of Southern Africa; (2) British Astronomical Association, London, UK; (3) ALPO-Japan; (4) Independent scholar, Australia; (5) JUPOS team, Italy. <cllyde@icon.co.za>, <jrogers11@btinternet.com>
 with contributions from the JunoCam team (Candy Hansen (PI), Glenn Orton, Tom Momary, Gerald Eichstädt, & J.H.R.) & the JUPOS team (Gianluigi Adamoli, Rob Bullen, Michel Jacquesson, M.V., & Hans-Jörg Mettig) & other leading observers (Anthony Wesley, Christopher Go, Niall MacNeill, Phil Miles, Tiziano Olivetti, & others).



Presentation at EPSC 2019
Geneva, Switzerland

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JOURNALS TOPICS BOOKS OTHER PUBLICATIONS

JGR Planets

Research Article

Jupiter's Great Red Spot: Strong Interactions With Incoming Anticyclones in 2019

A. Sánchez-Lavega, A. Anguiano-Arteaga, P. Iñurrigarro, E. García-Melendo, J. Legarreta, R. Hueso, J. F. Sanz-Requena, S. Pérez-Hoyos, I. Mendikoa, M. Soria, J. F. Rojas, M. Andrés-Carcasona, A. Prat-Gasull, I. Ordoñez-Extebarria, J. H. Rogers, C. Foster, S. Mizumoto, A. Casely, C. J. Hansen, G. S. Orton, T. Momary, G. Eichstädt... See fewer authors

First published: 17 March 2021 | <https://doi.org/10.1029/2020J006686> | Citations: 1

2019 Activity of GRS regions maps/images list
ALPO-Japan + Website & Facebook-TL

No./Obs.	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	Total
C.Foster	5	7	13	19	42	48	25	20	14	15	9	217
C.Go		2	23	9	25	25	18			1		103
A.Wesley			7	9	16	7	8	3	9	9	2	70
N.MacNeill				4	7	2	5	5	9	1		33
P.Miles	7	2	5	1	5		1	1	6			28
A.Casely		1	1	2	5	2	6	1		1		19
B.Macdonald					1	4	3	2	4	4		18
T.Kumamori			1	1	4		5		5	2		18
M.Wong			1	2	4	1	2	1	4			15
K.Suzuki					3	1		1	3	3		11
T.Olivetti		2	2	4	1	1						10
D.Carlish					3				2			8
I.Miyazaki							2		3	2	1	8
J.L.Pereira				2		2	3			1		8
T.Barry			4			2	1	1				8

2019/12/12
by Shinji Mizumoto

NASA Juno mission to Jupiter

- Launch Aug 2011.
- Jupiter arrival July 2016
- 53 day elongated orbit
- Amateur support requested before during and after flyby



Credit: G Orton



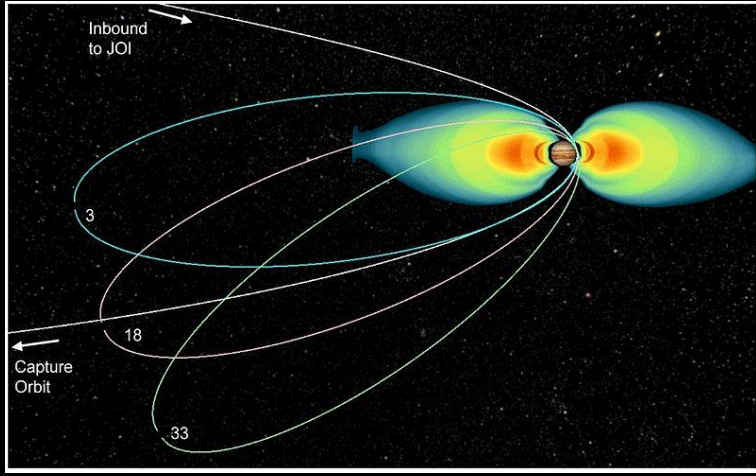
Scott Bolton- Principal Investigator.



Candy Hansen-Co-Investigator, responsible for JunoCam, co-Chair of Science Planning Working Group.



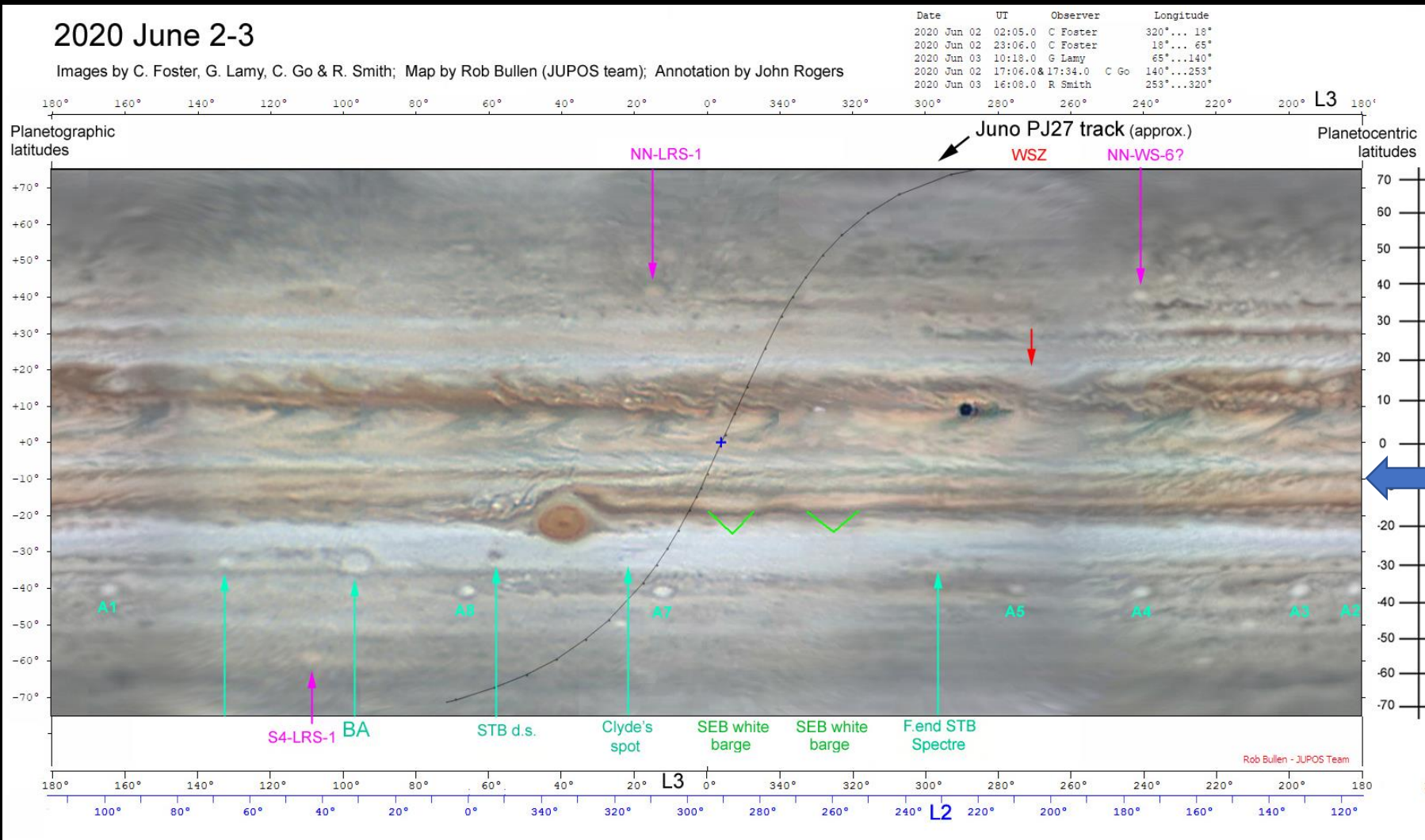
Glenn Orton- Co-ordinate Juno microwave, near-infrared and visible results with each other and with Earth-based observations of Jupiter's atmosphere.



Credit: Wikimedia

Juno Flyby Maps- generated from amateur images

Used to identify any interesting features for imaging by Juno



Multiple amateur images
Used to produce map

Europlanet /BAA/NASA Juno Workshop London May 2018



Clyde's Spot

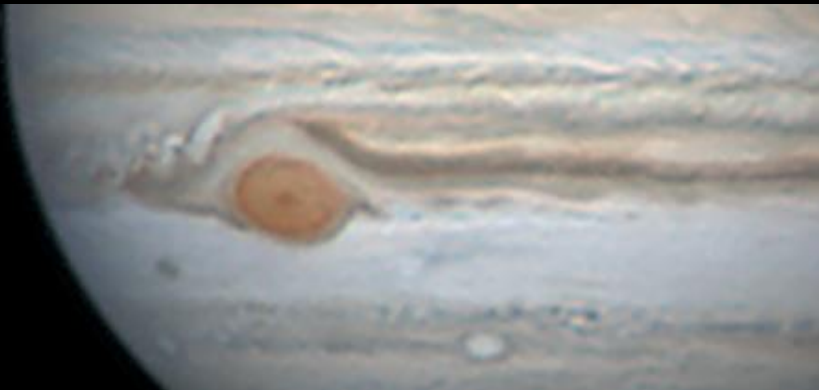
31 May 2020

Jupiter
31 May 2020
00:34 UT
Angular Diameter 44.3"

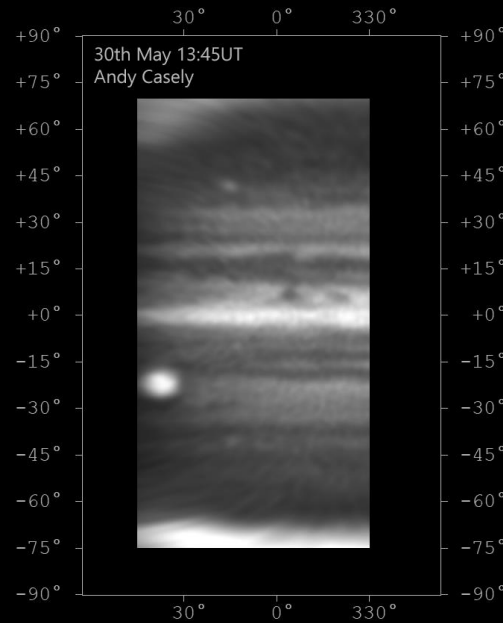
Juno PJ27 track
(equatorial crossing at L3=356)
approx 2 days before flyby



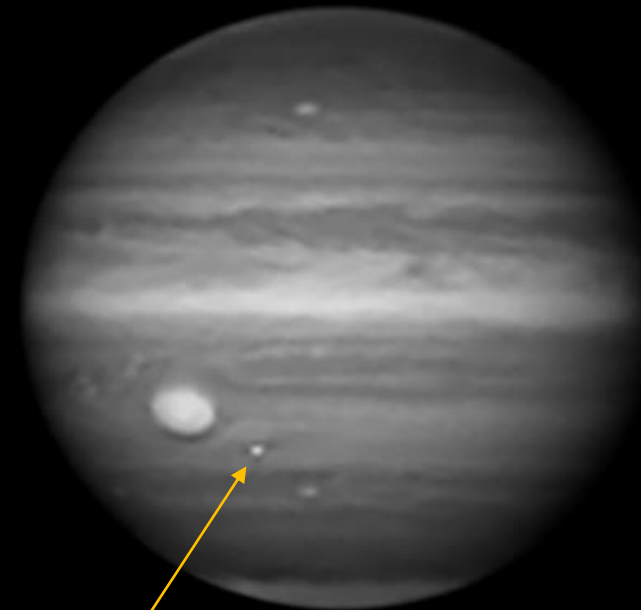
RGB



IR>685nm



Longitudes in System 3, planetographic
Equirectangular projection



Clyde's Spot



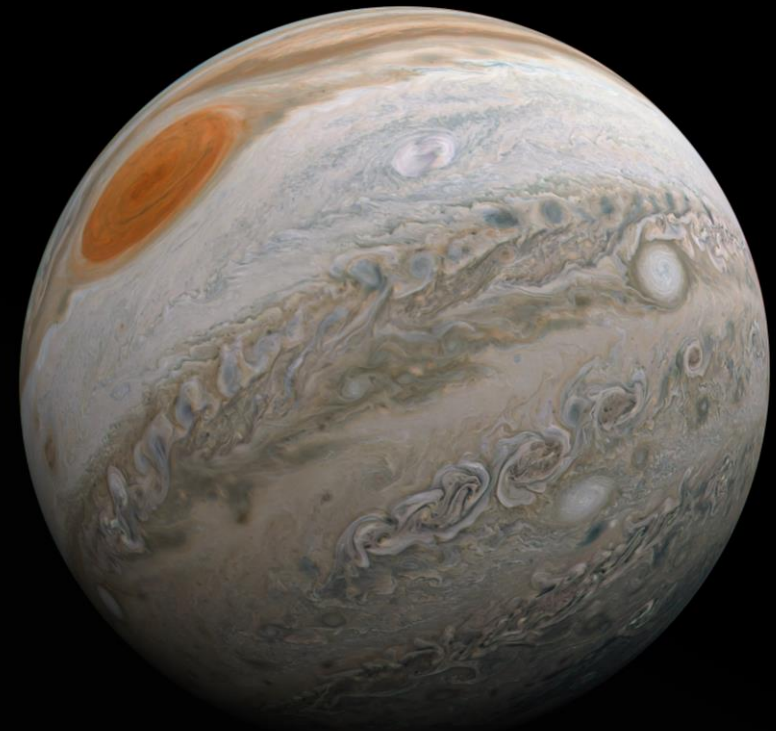
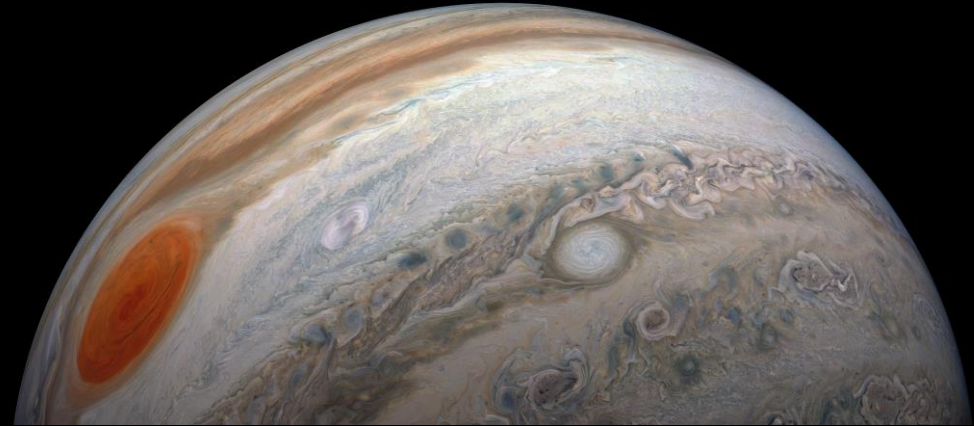
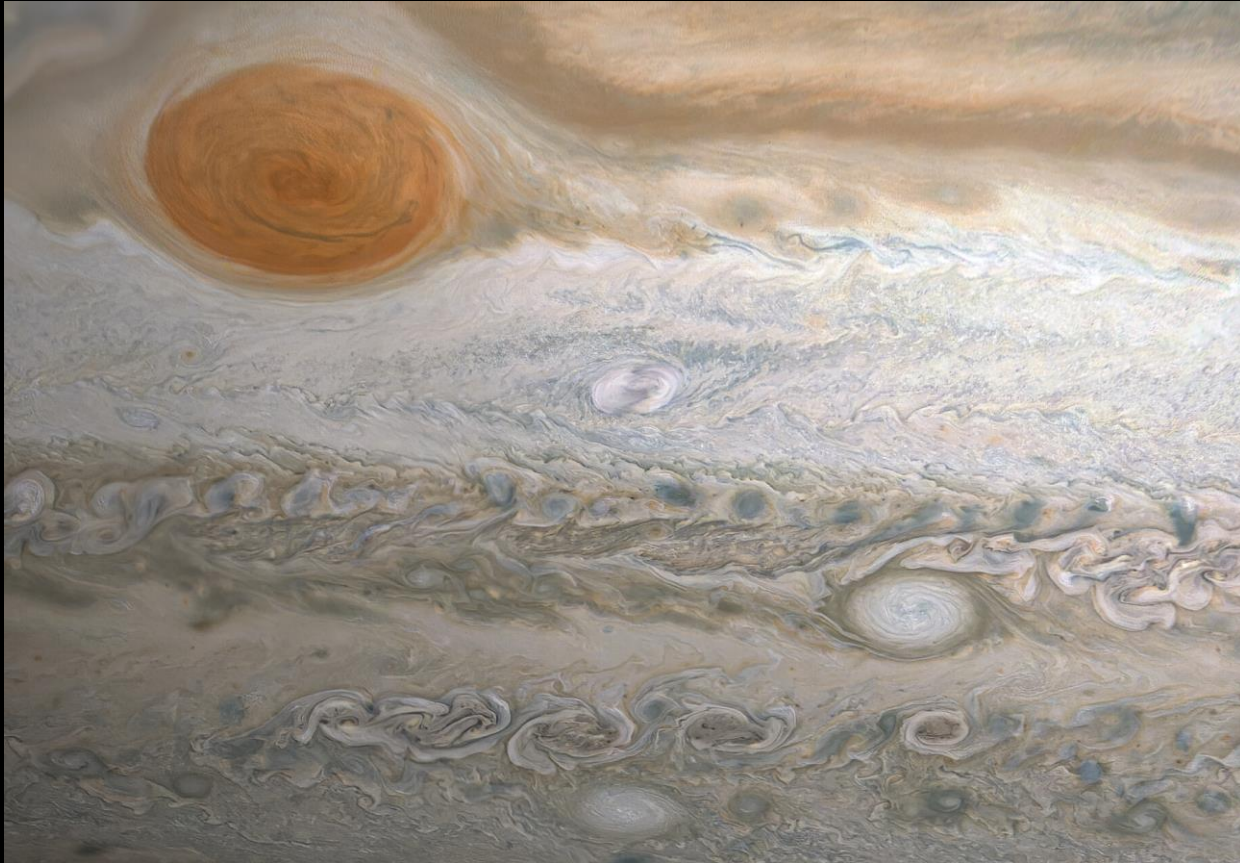
Approximate PJ27 track

Celestron 355mm Edge HD SCT
f/27, 2.5x Televue Powermate
ZWO ASI290MM
ZWO Methane filter(20nm b/w)
2x Binning, resize 1.25x

CH4
00:33.9 UT
I 332 II 302 III 7
6x2 min derotated

Clyde Foster
Centurion South Africa

Juno Perijove 27(PJ27) Flyby- 2 June



Methane band image

Clyde's Spot goes "Public"

The screenshot shows the NASA website interface. At the top, there is a navigation bar with links for Topics, Missions, Galleries, NASA TV, Follow NASA, Downloads, About, and NASA Audiences, along with a search bar. Below this, the main content area is titled "Jupiter" and dated "July 1, 2020". The article title is "Clyde's Spot" on Jupiter, with social media sharing icons for Facebook, Twitter, LinkedIn, and Pinterest. The main image is a detailed, colorful view of Jupiter's atmosphere, showing various cloud patterns and a large, prominent reddish-brown spot in the upper left quadrant. A sidebar on the left lists "Latest" and "Related" articles, including "Clyde's Spot" on Jupiter (7 days ago), "Jupiter's Racing Stripes" (2 months ago), "Churning Texture in Jupiter's Atmosphere" (3 months ago), "High-Altitude Hazes on Jupiter" (3 months ago), "Jupiter Storms Merging" (4 months ago), "Deep Motion" (5 months ago), and "Clouds Up Close" (7 months ago).

The screenshot shows a tweet from NASA's Juno Mission (@NASAJuno) posted 12 hours ago. The tweet text reads: "Amateur astronomer Clyde Foster spied a new feature in Jupiter's clouds...I captured a detailed look at 'Clyde's Spot' when I zoomed by just two days later. #CitizenScience for the win. See more: missionjuno.swri.edu/junocam/think-... JunoCam image processing by Kevin M. Gill". Below the text are two images: a "Discovery Image" showing a full view of Jupiter with a small white dot labeled "Clyde's Spot" and a diagram of the Juno spacecraft's orbit, and a larger, detailed image of the spot. The tweet has 19 replies, 171 retweets, and 621 likes.

Also NASA Instagram and FB, with large number of responses(+20 000)

NASA Youtube

Coverage extended beyond the astronomical media



Carte Blanche 16 August

Your email address [Subscribe](#)

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NEWS PRESS OFFICE BREAKING NEWS FORUM INDUSTRY NEWS

Clyde's Spot – South African amateur astronomer recognised for discovery on Jupiter

Jan Vermeulen 4 July 2020

"Clyde's Spot" is a plume of cloud material erupting above the upper cloud layers of the Jovian atmosphere," said members of NASA's Juno mission team. "These powerful convective outbreaks occasionally erupt in this latitude band, known as the South Temperate Belt." ...

www.90-news.com | jupiter-clydes-spot-08607
New Oval-Shaped Feature Spotted on Jupiter: Clyde's Spot ...

www.nasa.gov | image-feature | jpl | clyde-s-spot-on-j...
"Clyde's Spot" on Jupiter | NASA
Jul 1, 2020 - The new feature was discovered by amateur astronomer Clyde Foster of Centurion, South Africa. ... The spot was not visible in images captured just hours earlier by astronomers in Australia. On June 2, 2020, just two days after Clyde Foster's observations, Juno performed its 27th close flyby of Jupiter.

www.space.com | jupiter-clydes-spot-storm-juno-photo
'Clyde's Spot,' a new storm on Jupiter, discovered by amateur ...
'Clyde's Spot' is a new storm on Jupiter, discovered by amateur astronomer (photos). By Mike Wael 21 days ago. The storm isn't too far from the famous Great Red ...

www.spaceops.com | 2020/07/08 | clydes-spot-on-jupl...
Clyde's Spot on Jupiter Named for South African Astronomer ...
Jul 8, 2020 - On May 31, Clyde Foster was imaging Jupiter with his telescope when he noticed a new oval-shaped spot in an area where several storms, ...

skyandtelescope.org | astronomy-news | amateur-discov...
Amateur Astronomer Discovers "Clyde's Spot" on Jupiter - Sky ...
Jul 9, 2020 - The diligent observations of a backyard astronomer paid off with a planetary discovery on a distant world. Dubbed "Clyde's spot," the find ...

mybroadband.co.za | News | Science
Clyde's Spot – South African amateur astronomer recognised ...
Jul 4, 2020 - Clyde's spot was identified as a vigorous plume of gaseous material erupting above the upper cloud layers of Jupiter's atmosphere. Foster said: ...

astronomynew.com | 2020/07/08 | juno-captures-shar...
Juno captures sharp view of 'Clyde's Spot' on stormy Jupiter ...
Jul 8, 2020 - On 31 May, Clyde Foster, an amateur astronomer of Centurion, South Africa, noticed what appeared to be a bright new spot, a presumed storm, ...

www.zmscience.com | Science
Amateur astronomer finds and christens Clyde's Spot -- a new ...
Jul 8, 2020 - The new storm sits just below and to the right of the Great Red Spot. Image credits: Clyde Foster. Juno orbits Jupiter on an elliptical orbit, so it cooies ...

assa.sao.ac.za | sections | shallow-sky
Shallow Sky (Solar System) Section | ASSA
Clyde's Spot - Clyde Foster. Juno images from last Tuesday's Perijove flyby(PJ27) have been downloaded from the spacecraft and are being circulated, ...

Page 2 of about 297 000 results (0,33 seconds)

www.youtube.com | watch
New Storm on Jupiter | Clyde's Spot: NASA Captures Images ...
NASA's Juno probe recently captured gorgeous imagery of a Jovian storm. It was named after its discoverer ...
Jul 4, 2020 - Uploaded by Videorium's Channel

www.digitrends.com | news | jupiter-clydes-spot-juno
Amateur Astronomer Discovers a Brand New Spot on Jupiter ...
Jul 4, 2020 - It was first spotted by Clyde Foster of Centurion, South Africa, who noticed it while looking at Jupiter through his telescope using a filter sensitive ...

www.pinterest.com | pin
Pin on Juno: Mission to Jupiter - Pinterest
Edge Of The Universe · Planet S · Outer Space · Solar System · Nasa · Clouds · Stars · Clyde's Spot on Jupiter | NASA Great Red Spot, Juno Spacecraft, Edge.

www.pinterest.com | pin
"Clyde's Spot" on Jupiter in 2020 | Astronomer, Nasa jupiter ...
Jul 1, 2020 - This image from NASA's Juno spacecraft captures several storms in Jupiter's southern hemisphere (Figure A). Figure B shows Jupiter as captured ...

www.gizmodo.co.uk | 2020/07 | jupiter-just-sprouted...
Jupiter Just Sprouted a Brand New Spot | Gizmodo UK
Jul 6, 2020 - The largest planet in the solar system has a bright new storm in its southern hemisphere, reports NASA. The cloudy plume, dubbed 'Clyde's spot' ...

blog.addfruit.com | 2020/07/11 | juno-captures-amazn...
Juno Captures Amazing Image of 'Clyde's Spot' on Jupiter ...
Jul 11, 2020 - On 31 May, Clyde Foster, an amateur astronomer of Centurion, South Africa, noticed what appeared to be a bright new spot, a presumed storm, ...

www.ifscience.com | space | amateur-astronomer-discov...
Amateur Astronomer Discovers Jupiter Has A Brand New Spot ...
Jul 7, 2020 - Clyde Foster, a retired chemical engineer and amateur astronomer from Centurion, South Africa, noticed a previously unseen spot to the south ...

www.express.co.uk | News | Science
NASA news: An amateur astronomer has detected a new ...
Jul 8, 2020 - NASA news. This photo was snapped by astronomer Clyde Foster in ... of the new feature, which has been informally dubbed 'Clyde's spot'.

Images for Clyde's spot

juno spacecraft | clyde foster | astronomy | nasa juno | storm | slow | planet

More images for Clyde's spot Report images

Clyde's Spot-A year later

Perijove 33, 15 April 2021

Jupiter
13 April 2021
04:03UT
Angular Diameter 35.5"

Juno PJ33
2 days before flyby

DS7 (Clyde's Spot remnant)
x1.5 resized

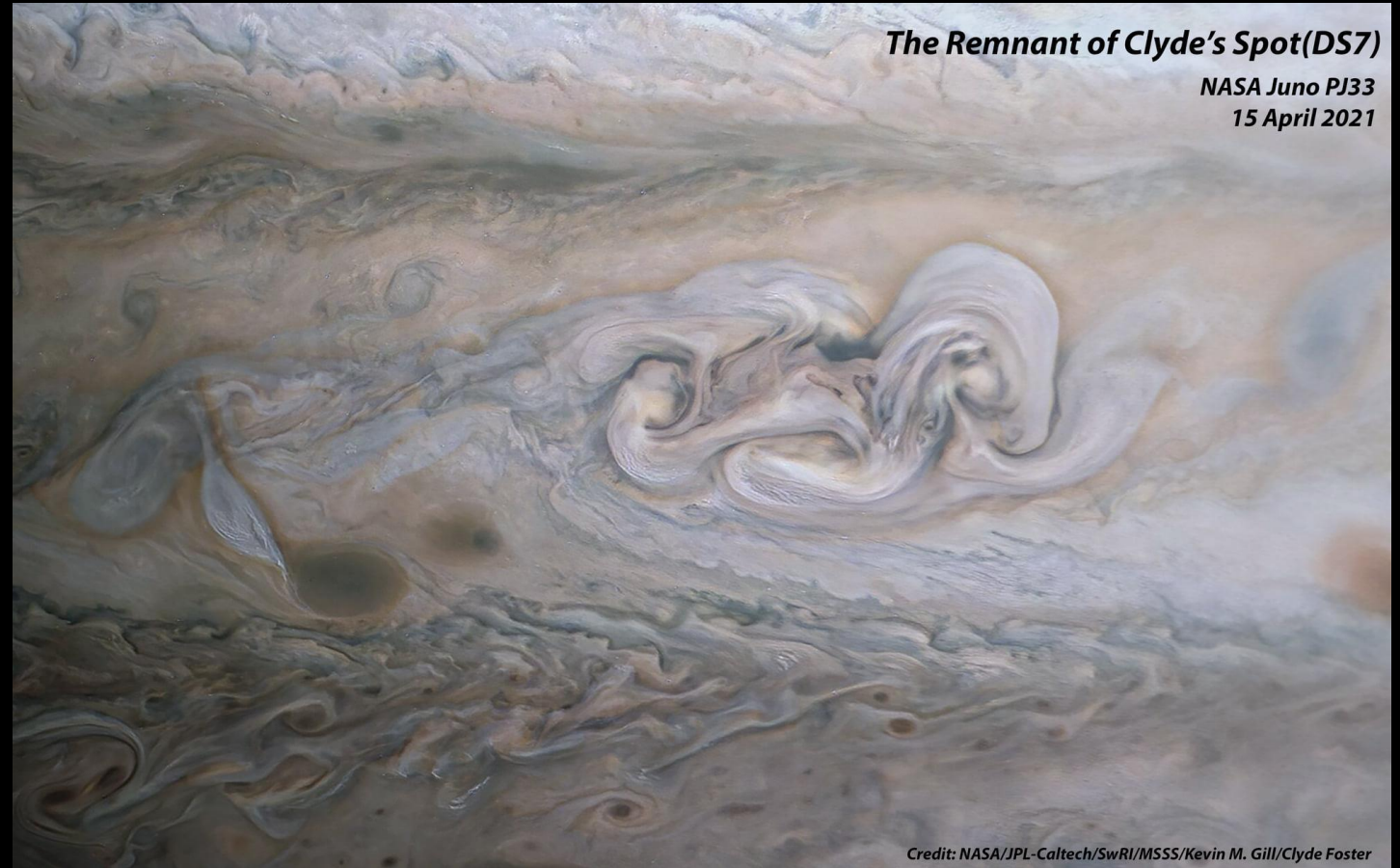
DS7
(Remnant of Clyde's Spot)

Approx PJ33 Track

355mm SCT
f/27, 2.5x Televue Powermate
ZWO ASI290MM
Baader RGB(IR cut) filterset

RGB
04:03.3UT
I 79 II 150 III 300

Clyde Foster
Centurion, South Africa



Clyde's Spot NASA Press release 18 May 2021

The screenshot shows the NASA website interface. At the top, there are navigation tabs: Topics, Missions, Galleries, NASA TV, Follow NASA, Downloads, About, and NASA Audiences. A search bar is on the right. Below the navigation is a 'Jupiter' category header. The main article title is 'Juno Returns to "Clyde's Spot" on Jupiter' with a date of 'May 18, 2021'. There are social media sharing icons for Facebook, Twitter, LinkedIn, and Pinterest. The article features two large images of Jupiter's atmosphere. The top image is labeled 'June 2, 2020' and shows a large, swirling storm system. The bottom image is labeled 'April 15, 2021' and shows the same storm system, but it has become more complex and elongated. On the left side, there is a 'Latest' sidebar with several related article titles and dates.

NASA's Juno Reveals Dark Origins of One of Jupiter's Grand Light Shows
2 months ago

NASA's Juno Mission Expands Into the Future
4 months ago

NASA's Juno Spacecraft Updates Quarter-Century Jupiter Mystery
5 months ago

Juno Data Indicates 'Sprites' or 'Elves' Frenzy in Jupiter's Atmosphere
7 months ago

'Shallow Lightning' and 'Mushballs' Reveal Ammonia to NASA's Juno Scientists
10 months ago

During its 33rd low pass over the cloud tops of Jupiter on April 15, 2021, NASA's Juno spacecraft captured the intriguing evolution of a feature in the giant planet's atmosphere known as "Clyde's Spot."

The feature is informally named for amateur astronomer Clyde Foster of Centurion, South Africa, who discovered it in 2020 using his own 14-inch telescope. On June 2, 2020, just two days after Foster's initial discovery, Juno provided detailed observations of Clyde's Spot (upper image), which scientists determined was a plume of cloud material erupting above the top layers of the Jovian atmosphere just southeast of Jupiter's Great Red Spot, which is currently about 1.3 times as wide as Earth. These powerful convective outbreaks occasionally occur in this latitude band, known as the South Temperate Belt. The initial plume subsided quickly, and within a few weeks it was seen as a dark spot.

Many features in Jupiter's highly dynamic atmosphere are short lived, but the April 2021 observation from the JunoCam instrument (lower image) revealed that nearly one year after its discovery, the remnant of Clyde's Spot had not only drifted away from the Great Red Spot but had also developed into a complex structure that scientists call a folded filamentary region. This region is twice as big in latitude and three times as big in longitude as the original spot, and has the potential to persist for an extended period of time.

The upper image was taken on June 2, 2020, around 3:56 a.m. when the spacecraft was about 28,000 miles (45,000 kilometers) from Jupiter's cloud tops. The lower image was taken on April 15, 2021, at 4:58 p.m. PDT (7:58 p.m. EDT). At the time, the spacecraft was about 16,800 miles (27,000 kilometers) from Jupiter's cloud tops, at a latitude of about 30 degrees South. Another citizen scientist, Kevin M. Gill, processed both images from raw JunoCam data.

JunoCam's raw images are available for the public to peruse and process into image products at <https://missionjuno.swri.edu/junocams/processing>. More information about NASA citizen science can be found at <https://science.nasa.gov/citizenscience> and <https://www.nasa.gov/solve/opportunities/citizenscience>.

More information about Juno is at <https://www.nasa.gov/juno> and <https://missionjuno.swri.edu>. For more about this finding and other science results, see <https://www.missionjuno.swri.edu/science-findings>.

Image data: NASA/JPL-Caltech/SvRI/MSSS
Image processing by Kevin M. Gill © CC BY

Last Updated: May 20, 2021
Editor: Tony Greicius

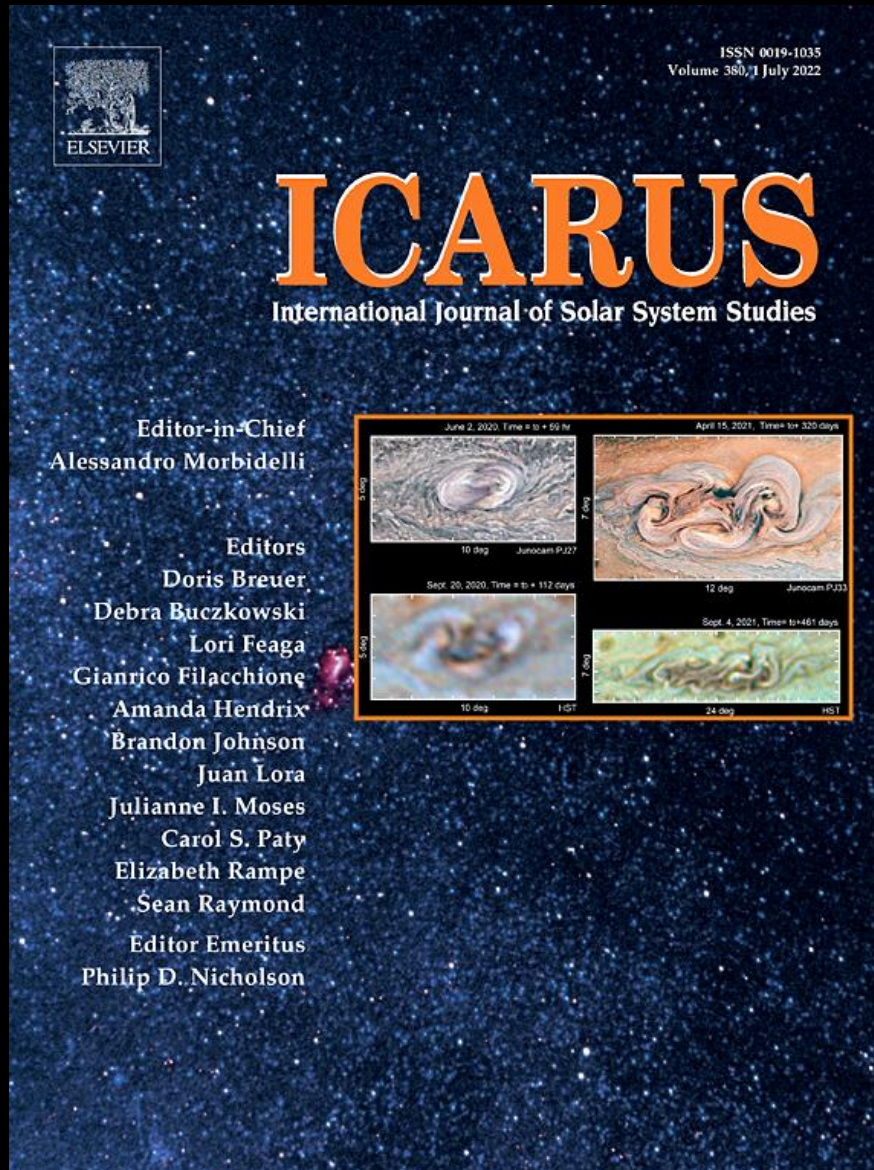
Tags: Jet Propulsion Laboratory, Juno, Jupiter, Planets, Solar System

Read Next Related Article

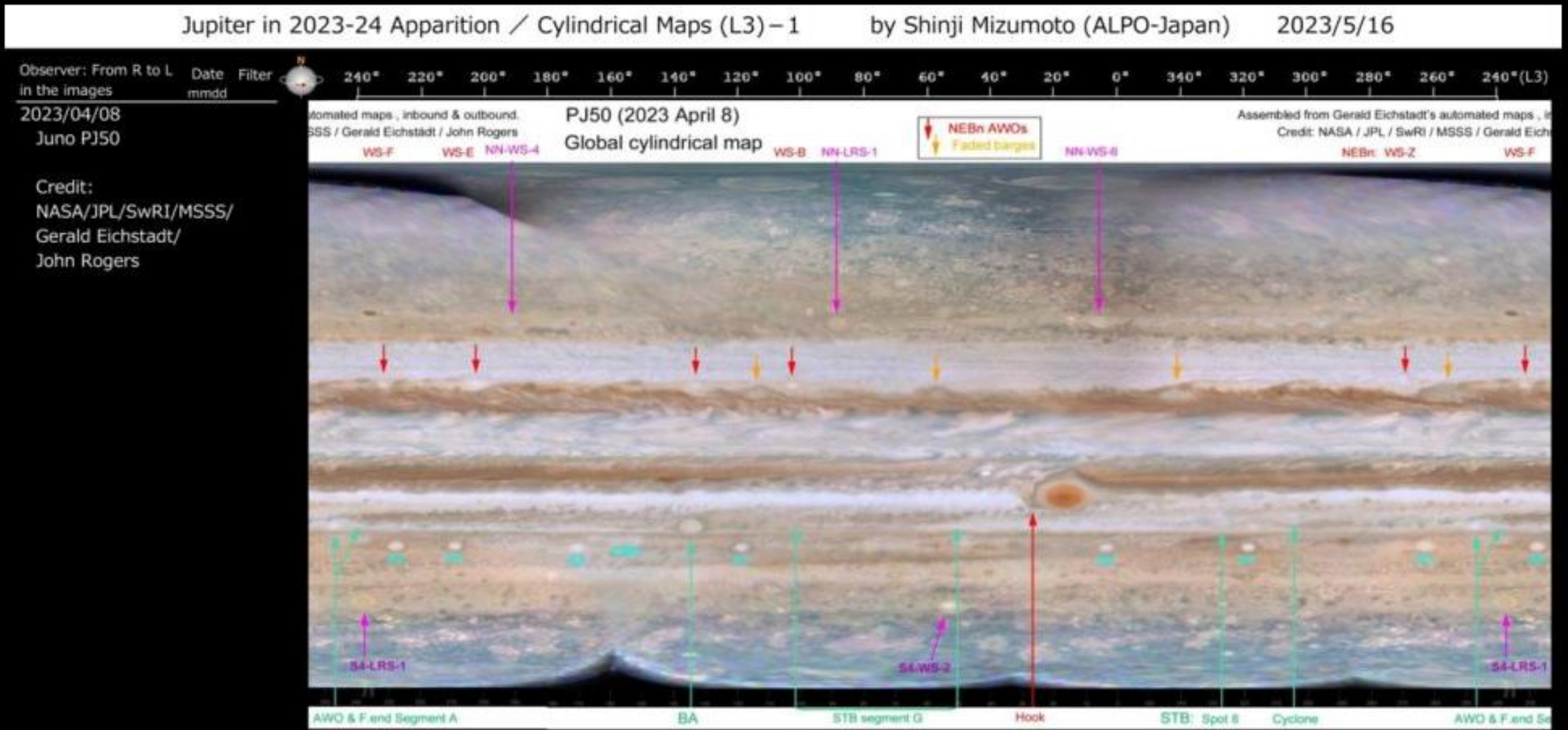
National Aeronautics and Space Administration
Page Last Updated: May 20, 2021
NASA Official: Brian Dunbar

No Fear Act | FOIA | Privacy | Office of Inspector General | Office of Special Counsel | Agency Financial Reports | Contact NASA

Clyde's Spot formalised in Scientific Literature.



Clyde's Spot-Latest(April 2023)



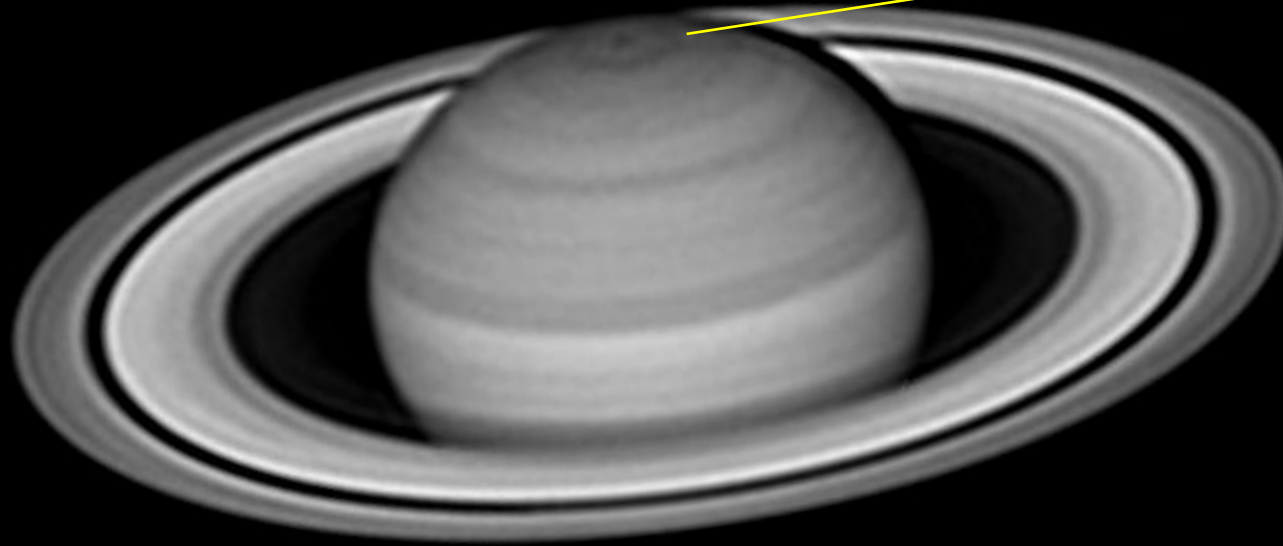
STB Segment G= Remnant of Clyde's Spot

Saturn



SATURN
19 June 2017
19:55UT
Angular Diameter 18.4"
De +26.6

Saturn- Polar Hexagon



SATURN
20 May 2019
23:45UT
Angular Diameter 17.7"
De +23.6

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JOURNALS TOPICS BOOKS OTHER PUBLICATIONS

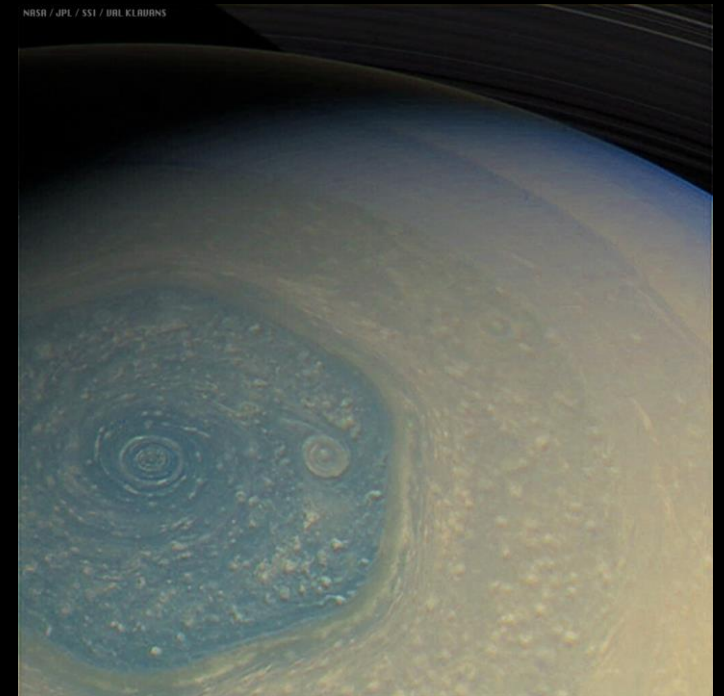
Geophysical Research Letters

Research Letter

Interaction of Saturn's Hexagon With Convective Storms

A. Sánchez-Lavega, E. García-Melendo, T. del Río-Gaztelurrutia, R. Hueso, A. Simon, M. H. Wong, K. Ahrens-Velásquez, M. Soria, T. Barry, C. Go, C. Foster

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The Planets up close and personal – Namibia Scientific Society

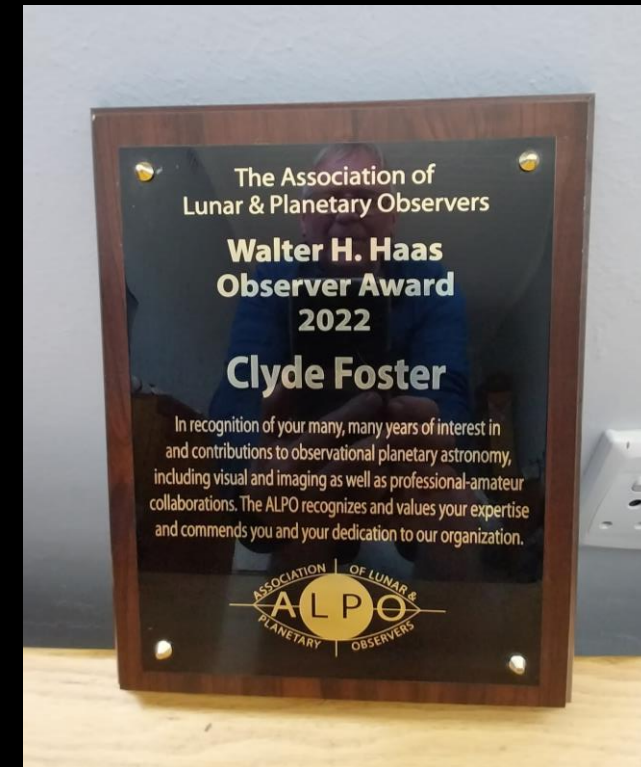
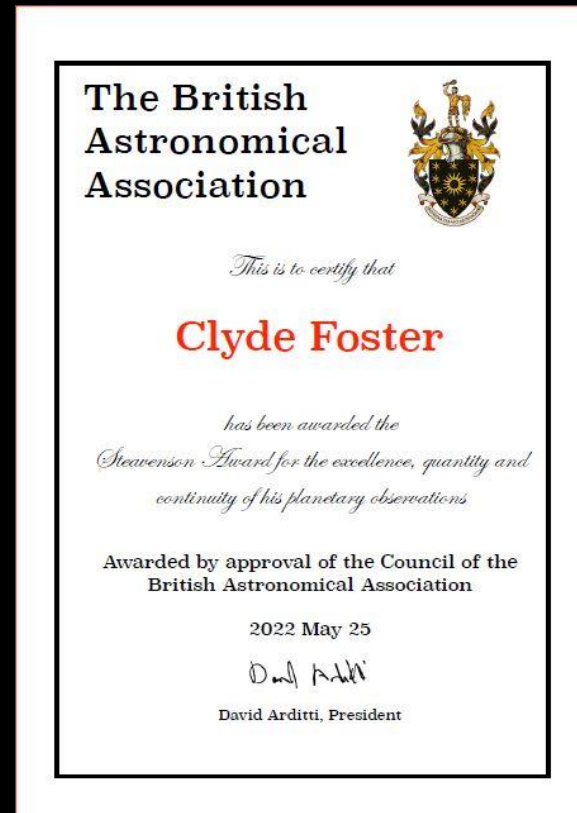
Broader recognition-Awards

ASSA Presidents Award 2019

ASSA Overbeek Medal 2021

BAA(UK) Steavenson Award 2022

ALPO(USA) Walter H Haas Award 2022



Broader recognition-Awards
BAA(UK) Steavenson Award 2022

Diefstal
Cyril se hy sal kom verduidelik bl. 2

Louis Vuitton
De Ruyter sien duur handsakke by rade bl. 11

Beeld
Dinsdag 7 Junie 2022 R15,50

Wêreld
Terroris se hy was net mee-gevoer
Johnson oorleef mosie van wantroue
Carriebeker 'deel van ons DNS', se Strauss

Politiek
Petro: Hulp is nie vir altyd, se Cyril
Roets vertel van rooftog by Spur

Moord
Moord-syfer styg skerp in Gauteng

Wêreld
Johnson oorleef mosie van wantroue

Sport
Carriebeker 'deel van ons DNS', se Strauss

Foto van 'n leeftyd



Clyde's Spot

Amateur-sterrekundige van Centurion vereer

Suzan Ellery

Maanster Clyde Foster in die voorste reël, met 'n teleskoop op die agtergrond, en 'n foto van 'n sterrekundige.

Maanster Clyde Foster in die voorste reël, met 'n teleskoop op die agtergrond, en 'n foto van 'n sterrekundige.

Die sterre by sy verduidelik word deur 'n teleskoop op die agtergrond.

Maanster Clyde Foster in die voorste reël, met 'n teleskoop op die agtergrond, en 'n foto van 'n sterrekundige.

Die sterre by sy verduidelik word deur 'n teleskoop op die agtergrond.

DUBAI

2

Atul **Rajesh**

Guptas gevang

SA moet binne 60 dae vra vir uitlewering

'Moenie hulle gou verweg'

Die informasie in Dubai van die twee broers van die Gupta-familie is 'n groot vraagstuk vir die SA-oorlog.

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incanda MEUBELS

JAARLIKSE UITVERKOPING

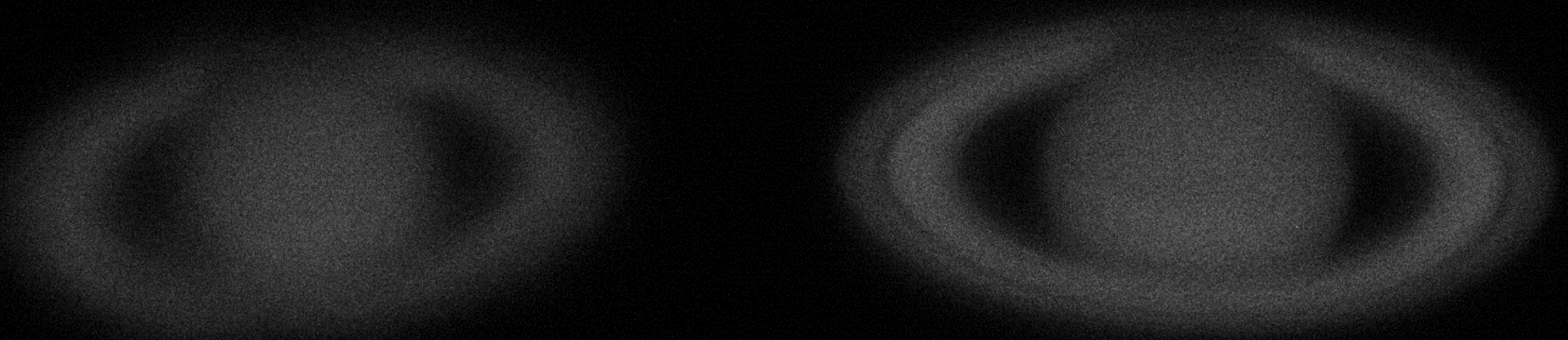
Tot en met 60% afslag
by alle tabelle & aanlyn

Vanaf 16 Junie 2022
Terwyl voorraad hou

Meubels | Dekor | Beligting | Strooikussings | Plante | Matte

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Challenge- Astronomical “Seeing”



A new Chapter- NAMIBIA!



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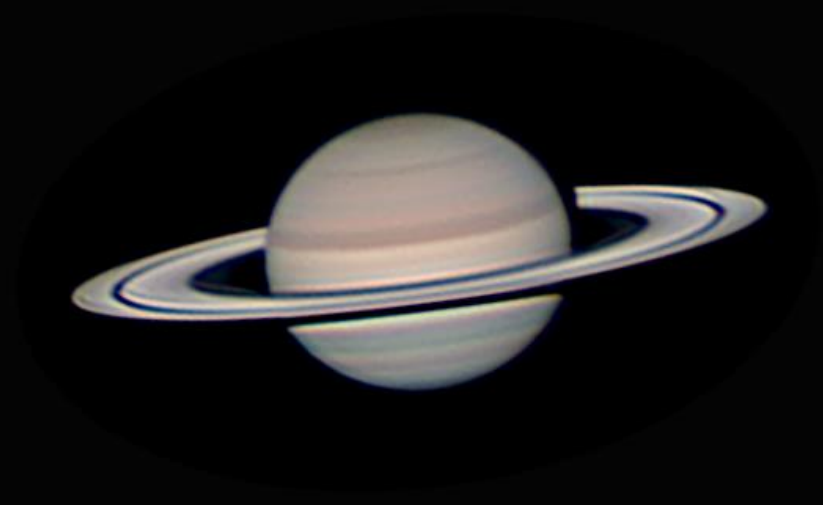


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Saturn
20 April 2023
04:25UT



Celestron 355mm SCT Edge HD
2x Televue Powrmate
ZWO ASI290MM
Baader RGB filterset

Clyde Foster
Oryx Observatory
Farm Goellschau
Khomas, Namibia

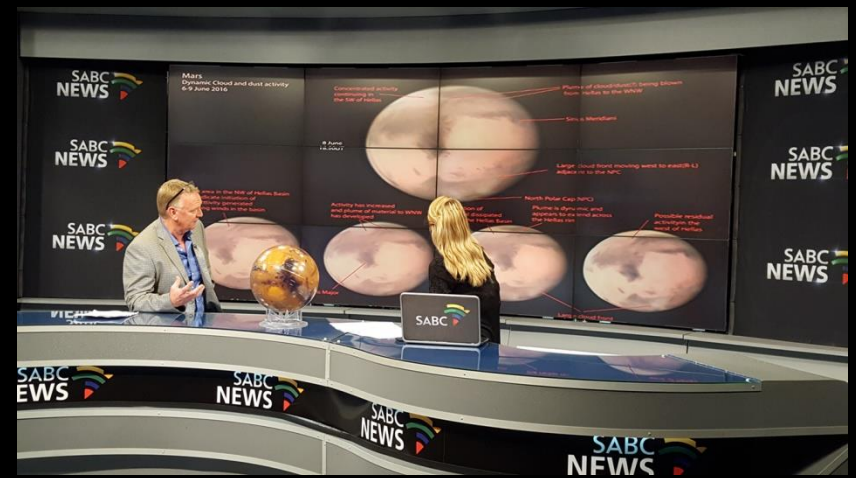
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Thank You!

