

eman ta zabal zazu

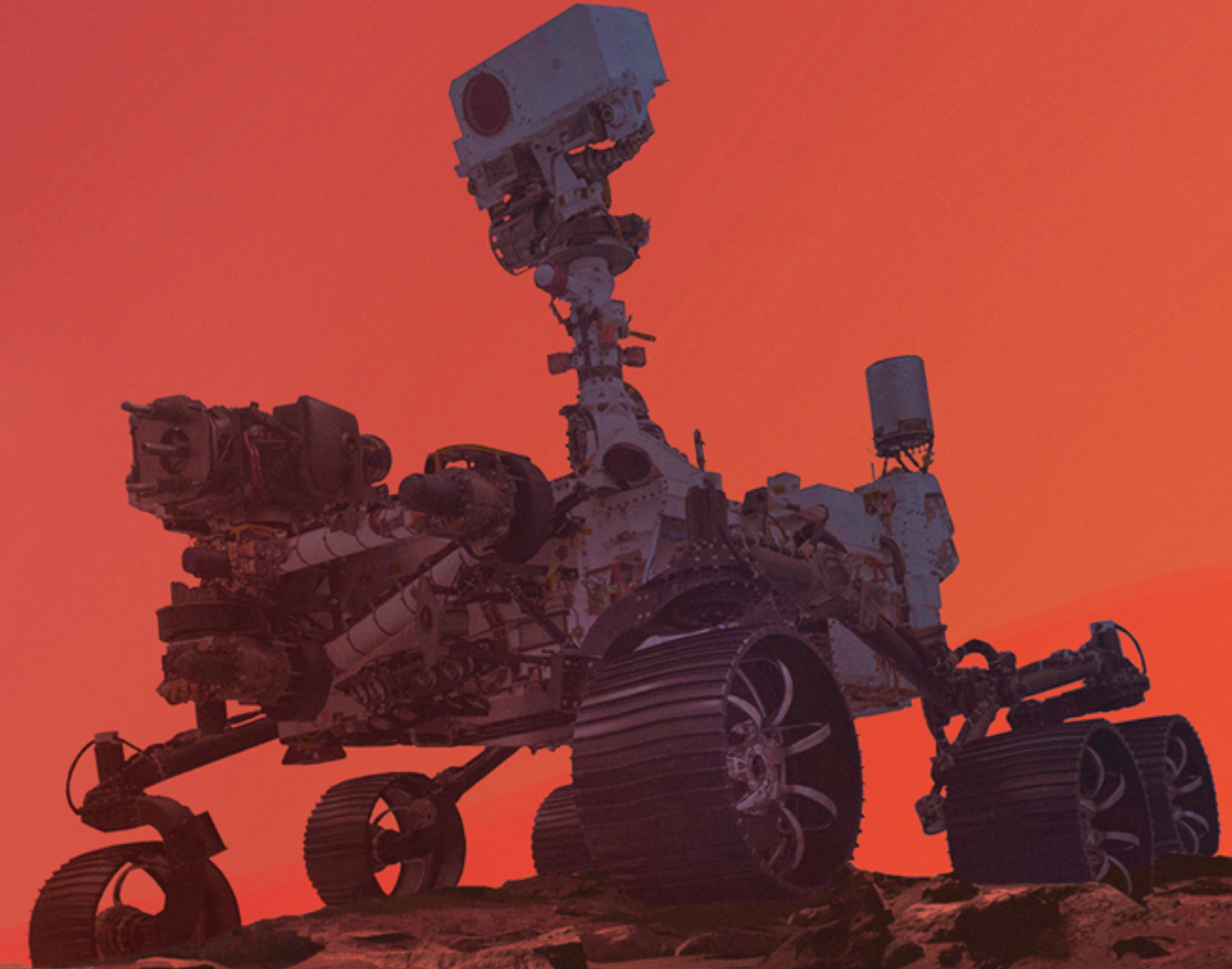


Universidad del País Vasco Euskal Herriko Unibertsitatea

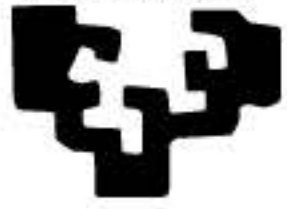


MARS 2020 PERSEVERANCE

NASAREN Perseverance Roverraren marteratzea
Amartizaje del Rover Perseverance de la NASA



eman ta zabal zazu



Universidad
del País Vasco

Euskal Herriko
Unibertsitatea

ZIENTZIA
ETA TEKNOLOGIA
FAKULTATEA
FACULTAD
DE CIENCIA
Y TECNOLOGÍA

Grupo
IBeA

IBeA TALDEA - UPV/EHU

MARS 2020 - PERSEVERANCE
SuperCam tresnan parte hartzea

Juan Manuel Madariaga, Gorka Arana, Kepa Castro, Cristina
García-Florentino, Imanol Torre, Jennifer Huidobro eta kolaboratzaileak



MARTE

Rover Perseverance

Tresnak

Mastcam-Z

Zoomable Panoramic Cameras

SuperCam

Laser Micro-Imager

MEDA

Weather Station

SHERLOC

Ultraviolet Spectrometer

WATSON (Camera)

RIMFAX

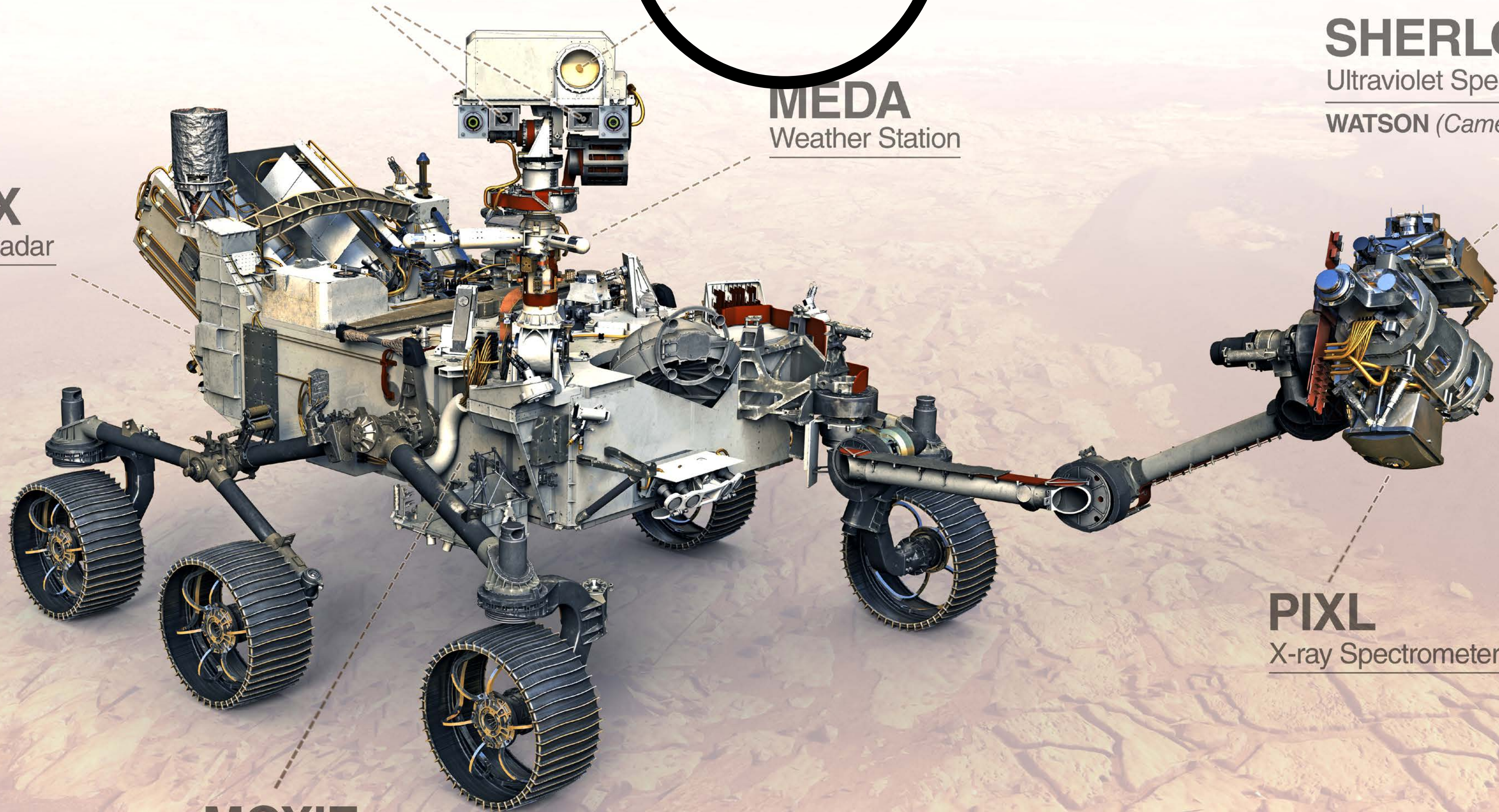
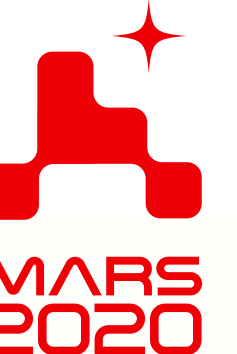
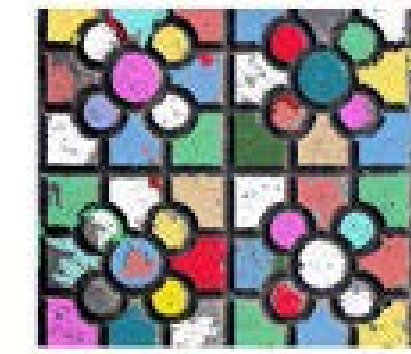
Subsurface Radar

PIXL

X-ray Spectrometer

MOXIE

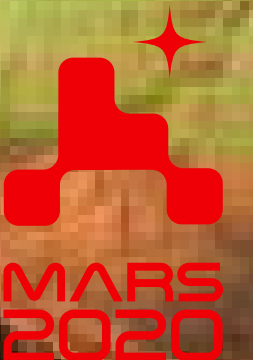
Produces Oxygen from Martian CO₂



MARTE

Rover Perseverance

Tresnak



1C Project Organisation and Institutions

Kevin McCabe, Philippe Cais

OFFICIAL USE ONLY

May be exempt from public release under the Freedom of Information Act (5 U.S.C. 553), exemption and category:

Exemption 3, Statutory Exemption

Department of Energy review required before public release

Name/Org: Kevin McCabe / ISR-4

Date: 21 JAN 2015

Guidance (if applicable): _____

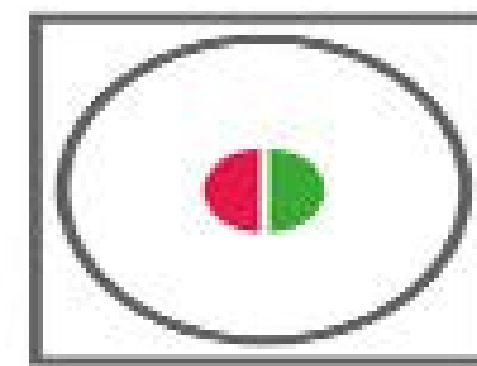
EXPORT

CONTROLLED

INFORMATION

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MARS 2020



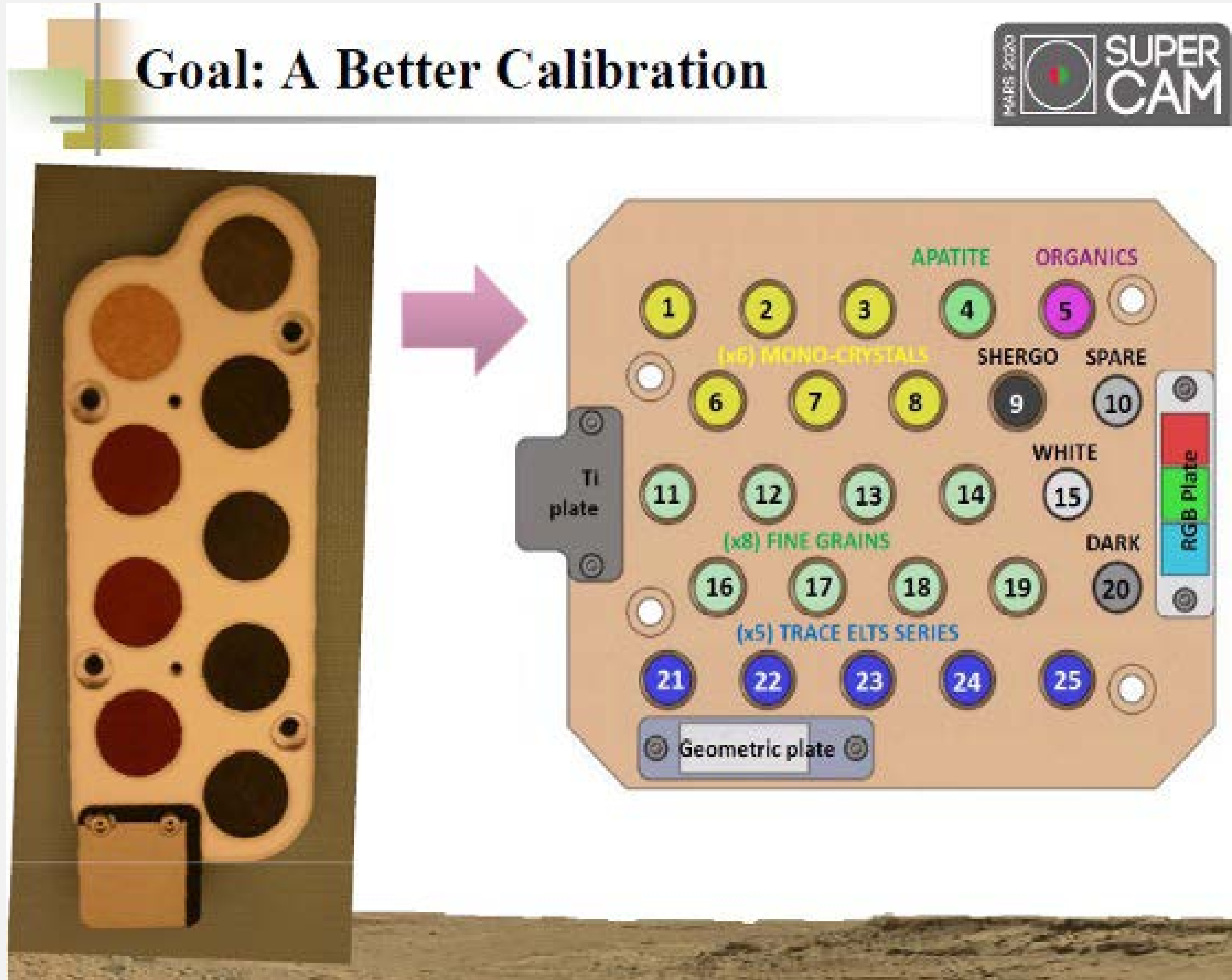
SUPER
CAM

SuperCam Tresnaren Zientzia Taldeko kideak gara
2015az geroztik

SuperCam IAR

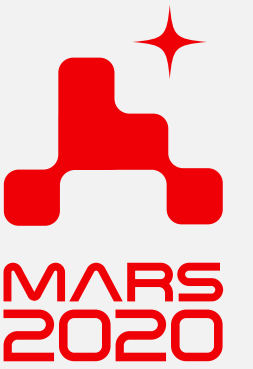
Los Alamos, Jan 29-30th, 2015

SuperCam Calibration Target

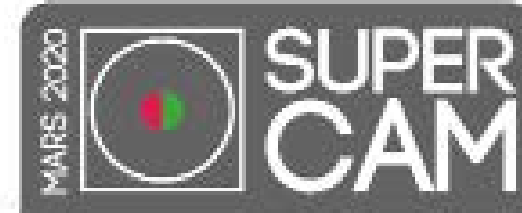


SuperCam Tresnaren
Kalibratze Txartela
eraikitzea enkargatu ziguten

SuperCam Calibration Target

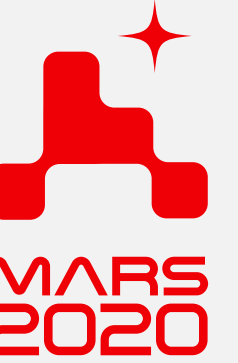


Target Requirements (1/2)



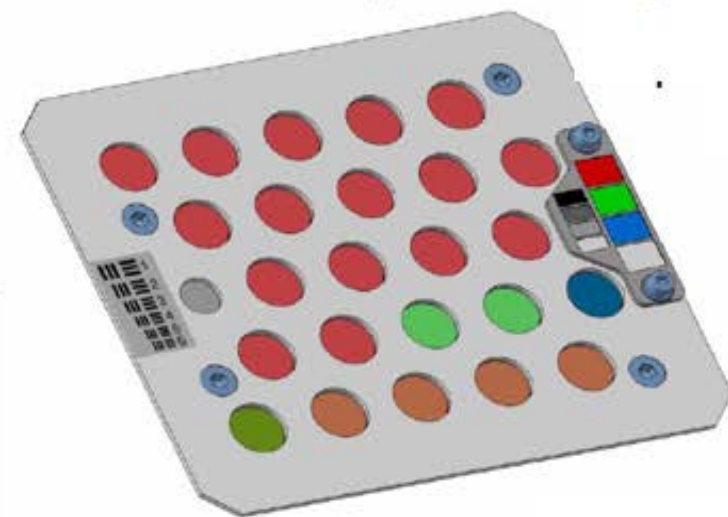
REQUIREMENT	DESCRIPTION	IMPLEMENTATION
REQ-2050	A minimum of 20 calibration targets shall be implemented for LIBS. They should be representative of major rock units.	23 LIBS targets (some dual use)
REQ-2052	Each individual LIBS calibration target shall be able to accommodate > 100 analyses of 50 laser shots each.	Sintered
REQ-2053	At least one target shall use a magnet to collect dust for LIBS analysis.	Two Danish magnet
REQ-2054	Several targets shall be used for the RMI investigation, to check for resolution, the RGB scale, and Grey scale.	OK
REQ-2055	At least one target shall be used for the calibration of the IR capability. It will use a magnet to minimize dust.	2 Spectralon targets
REQ-2056	One Ti target shall be used for spectral calibration with LIBS.	CCAM heritage
REQ-2057	Several targets shall be used for the Raman investigation Their angular extent shall be larger than 2 mrad.	Organics
REQ-2058	One target shall be used for the Raman investigation wavelength and intensity calibration.	Reuse of Ti plate
REQ-2069	All LIBS targets shall be assayed for major, minor, and trace elements at uncertainties typical of XRF (where applicable) or of typical laboratory measurements	Work in Malaga and Bilbao
REQ-2070	All LIBS targets shall be characterized for heterogeneity.	
REQ-2071	All LIBS targets shall produce a consistent LIBS spark.	

Laginen homogeneousuna egiaztatuko dugu Kalibrazio Txartelarekin



SuperCam commitment in Spain

- Calibration targets
 - Mechanical/thermal design
 - Fabrication & Testing
 - Delivery to JPL
 - Sample holder
 - Mechanical/thermal design
 - Fabrication, Assembly & Testing
 - Implementation of Planetary protection requirements
 - Delivery to JPL
 - Calibration working group
 - Participation to global effort
-
- Analytical characterization of cal. Targets
 - LIBS/Raman/IR characterization of cal. Targets
 - Performance tests
-
- Science Co-I.
 - Definition of functional requirements
 - Operations
 - Calibration
 - Data processing
 - Interpretation



Txartelaren Hegaldi
 Eredu Kalibratua 2019ko
 otsailean entregatu genuen

MARTE

Mars2020ko Laginak Biltzeko Lan Taldea



Zientzia SuperCam-en inguruan (UPV/EHU)

2018ko otsailaz geroztik

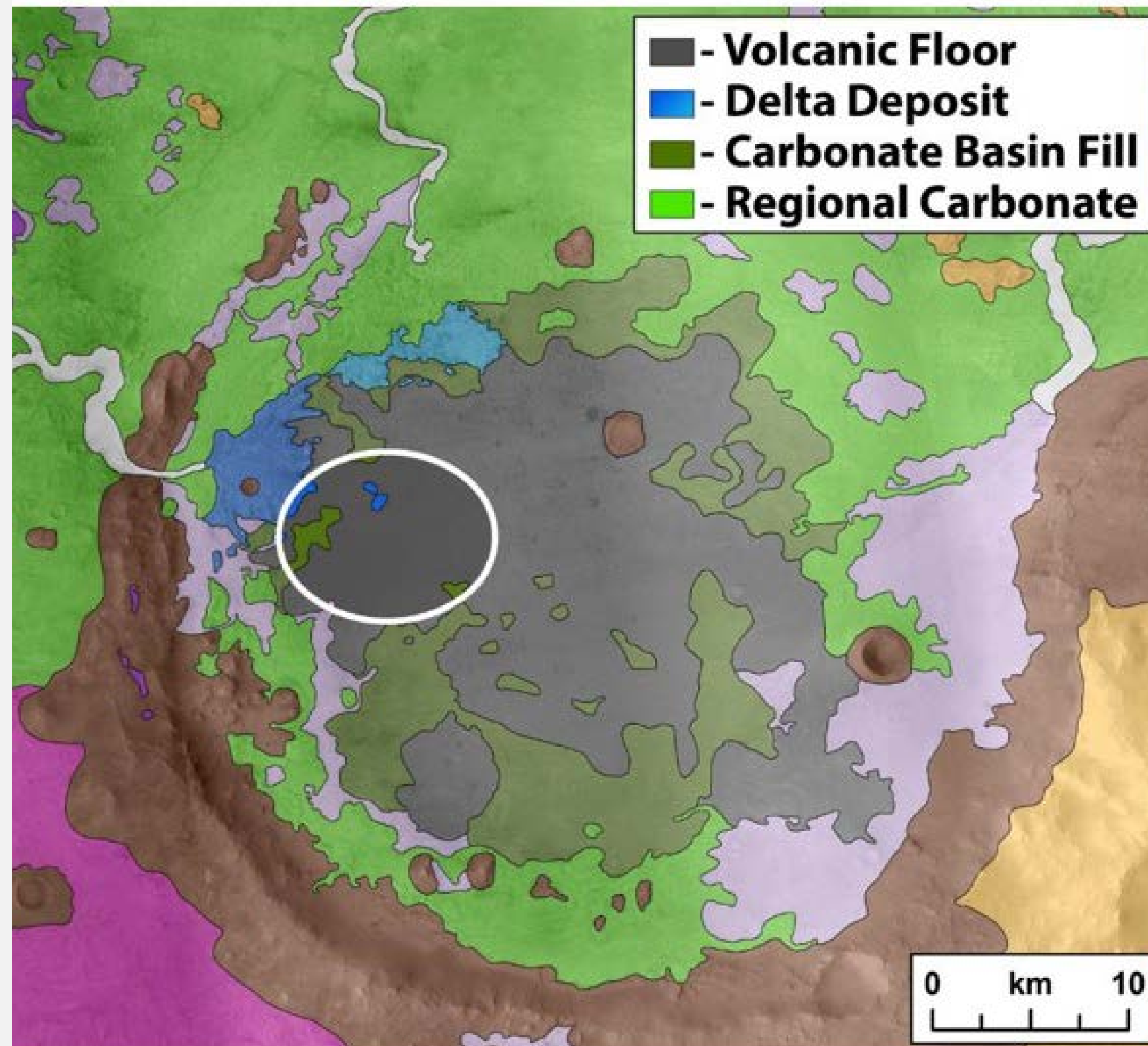
Return Sample Science Working Group (RSSWG) taldeko kideak gara, Marte MSRen (Mars Sample Return) Lagina Itzultzeko Misioan.

2018ko apirilean, ESAk eta NASAk hitzarmen bat sinatu zuten, 2026an abiatuko den MSR baterako misiorako.



MARTE

Mars2020aren Lurreratze Lekuaren Lan Taldea



Zientzia SuperCam-en inguruan (UPV/EHU)

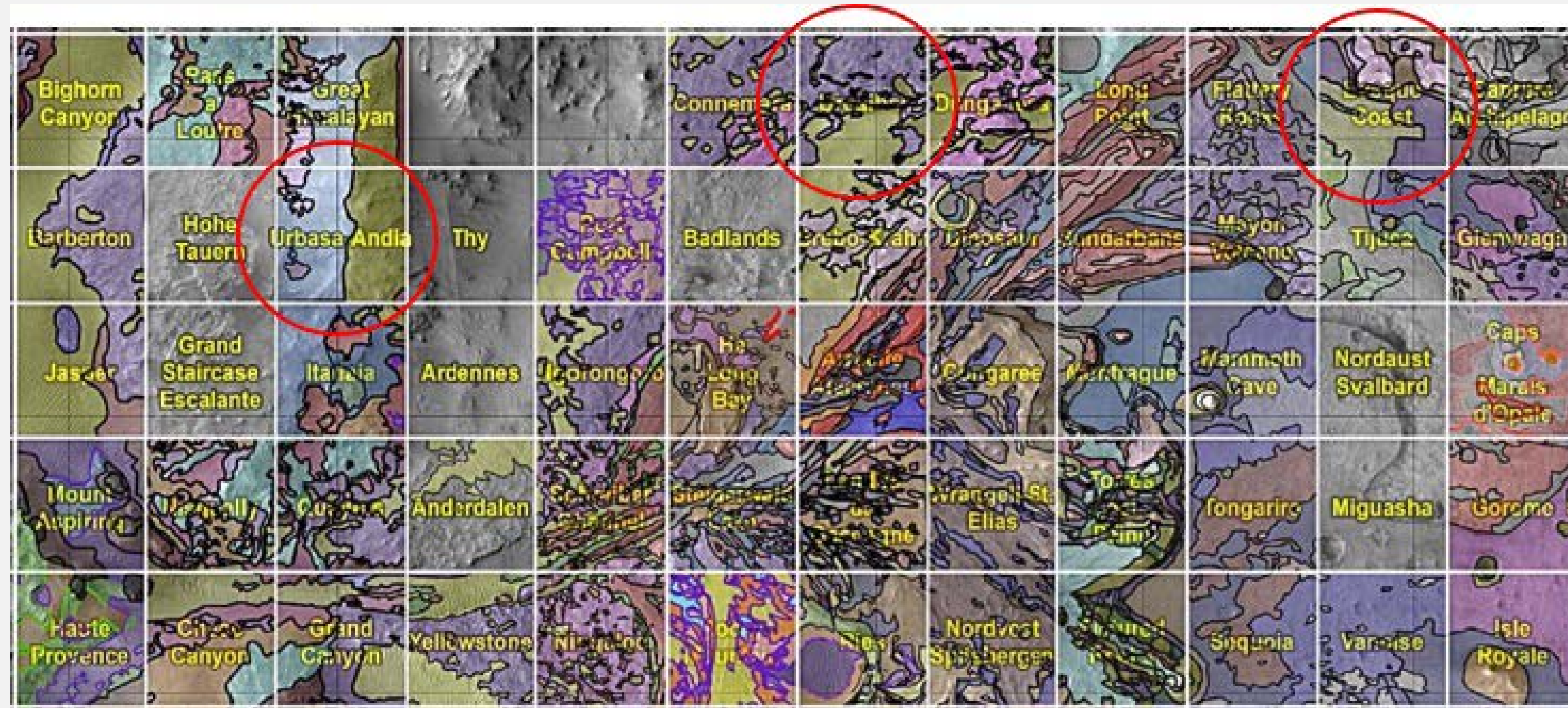
2018ko apiril-urria

Mars2020 misioaren Lurreratze Lekuaren Lan Taldeko kideak gara.

Glendaleko bileran (2018ko urria), Jezero kraterra hautatu zen lurreratze leku gisa, eta Midway, misioa hedatzeko leku gisa.

MARTE

Jezero Kraterra Mapatzeko Lan Taldea



Zientzia SuperCam-en inguruan (UPV/EHU)

2019ko apiril-urria

Jezero Kraterra Mapatzeko Lan Taldeko kideak gara.

Hiru koadranter izena jarri ahal izan genien (Urbasa-Andia, Urdaibai, Volcanoes of the Basque Coast), eta sei koadrante mapatu genituen.

Jezero Kraterra Mapatzeko Lan Taldea



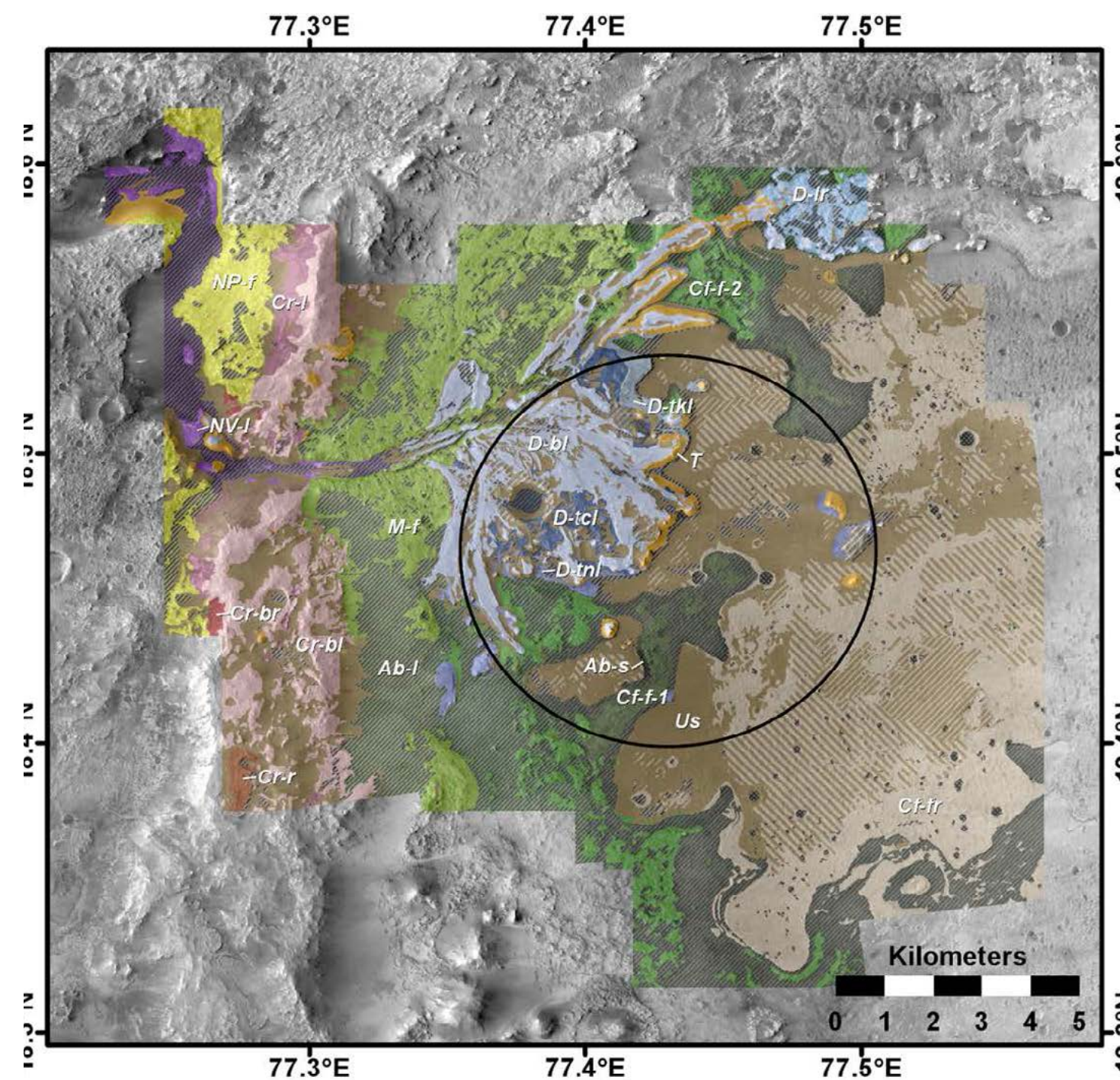
Space Sci Rev (2020) 216:127
<https://doi.org/10.1007/s11214-020-00739-x>



Photogeologic Map of the Perseverance Rover Field Site in Jezero Crater Constructed by the Mars 2020 Science Team

Kathryn M. Stack¹ · Nathan R. Williams¹ · Fred Calef III¹ · Vivian Z. Sun¹ · Kenneth H. Williford¹ · Kenneth A. Farley² · Sigurd Eide³ · David Flannery⁴ · Cory Hughes⁵ · Samantha R. Jacob⁶ · Linda C. Kah⁷ · Forrest Meyen⁸ · Antonio Molina⁹ · Cathy Quantin Nataf¹⁰ · Melissa Rice⁴ · Patrick Russell¹¹ · Eva Scheller² · Christina H. Seeger⁵ · William J. Abbey¹ · Jacob B. Adler¹² · Hans Amundsen¹³ · Ryan B. Anderson¹⁴ · Stanley M. Angel¹⁵ · **Gorka Arana¹⁶** · James Atkins⁷ · Megan Barrington¹⁷ · Tor Berger¹⁸ · Rose Borden⁷ · Beau Boring⁷ · Adrian Brown¹⁹ · Brandi L. Carrier¹ · Pamela Conrad²⁰ · Henning Dypvik³ · Sarah A. Fagents²¹ · Zachary E. Gallegos²² · Brad Garczynski²³ · Keenan Golder⁷ · Felipe Gomez⁹ · Yulia Goreva¹ · Sanjeev Gupta²⁴ · Svein-Erik Hamran³ · Taryn Hicks⁷ · Eric D. Hinterman²⁵ · Briony N. Horgan²³ · Joel Hurowitz²⁶ · Jeffrey R. Johnson²⁷ · Jeremie Lasue²⁸ · Rachel E. Kronyak¹ · Yang Liu¹ · **Juan Manuel Madariaga¹⁶** · Nicolas Mangold²⁹ · John McClean²⁴ · Noah Miklusick⁷ · Daniel Nunes¹ · Corrine Rojas⁶ · Kirby Runyon²⁷ · Nicole Schmitz³⁰ · Noel Scudder²³ · Emily Shaver⁷ · Jason SooHoo²⁵ · Russell Spaulding⁷ · Evan Stanish³¹ · Leslie K. Tamppari¹ · Michael M. Tice³² · Nathalie Turenne³¹ · Peter A. Willis¹ · R. Aileen Yingst³³

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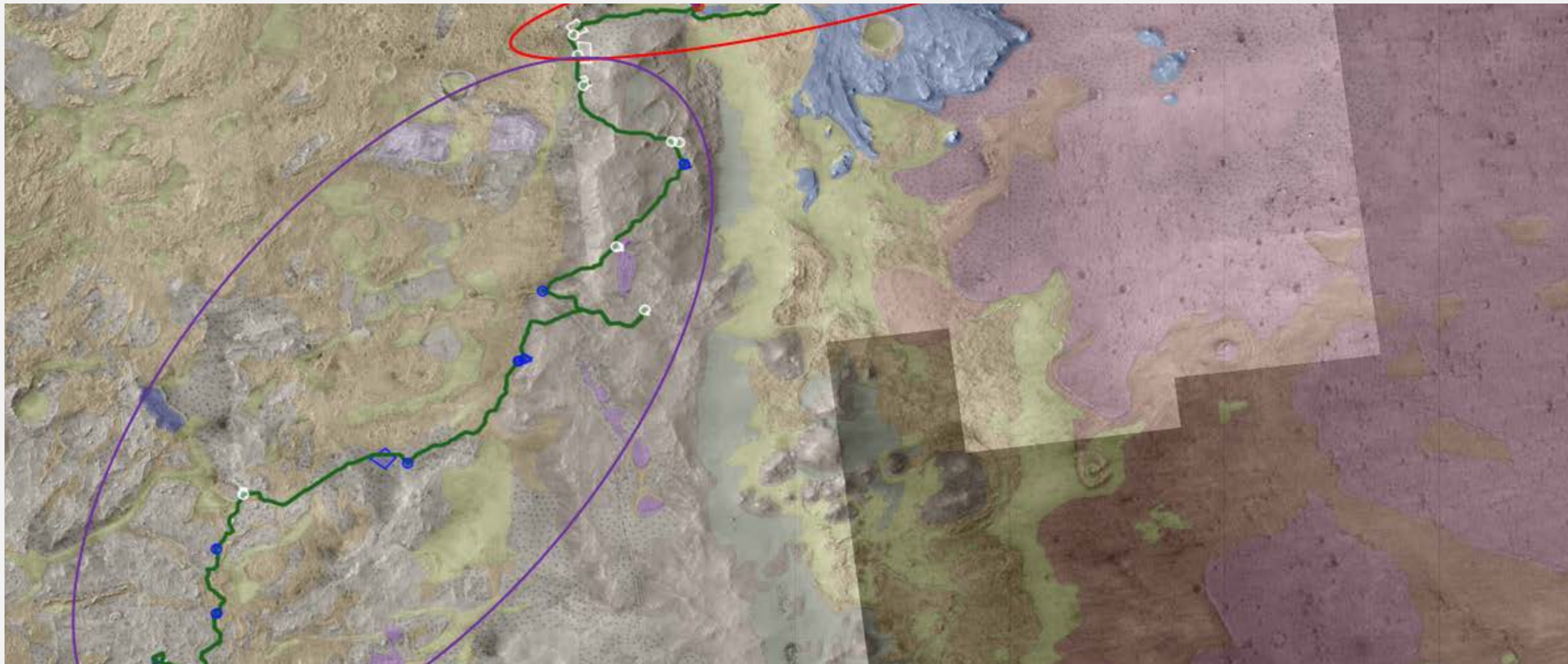
Legend		Surficial Units	
□ Ellipse		Undifferentiated smooth (Us)	Moderate Cover Us
		Aeolian bedforms, large (Ab-l)	Minor Cover Us
		Aeolian bedforms, small (Ab-s)	Talus (T)

Zientzia SuperCam-en inguruan (UPV/EHU)

Informazio guztia harmonizatu ondoren, 2020ko abenduan, Jezero krateraren xehetasunen mapa argitaratu zen, M2020ren helburuak lortzeko intereseko unitate geologikoak adierazita.

MARTE

Perseverancearen ibilbide posibleak definitzeko Talde Estrategikoa



Zientzia SuperCam-en inguruan (UPV/EHU)

2020ko apiril-abendua

Rover-aren Ibilbide posibleak definitzeko Talde Estrategikoan, balizko lau ibilbide zehaztu genituen, **misio nominalerako** eta **misio hedaturako**.

MARTE

Supercam tresnaren Zientzia Taldeak



Zientzia SuperCam-en inguruan (UPV/EHU)

2019ko abenduaz geroztik

SuperCam Tresnaren Hiru Zientzia Taldetan ari gara parte hartzen, eta gure Raman-LIBS-NIR datu basea handitzen, **tresnen arteko kalibratze gurutzatua** egiteko (HORI EZ DA SEKULA EGIN); horrela, ahalik eta informazio gehien lortu nahi dugu fase mineraleri buruz, lagina hartu behar den ala ez erabakitzeko.

Garatutako metodoak balioztatzeko bi material mota erabiltzen ditugu:

- (a) UPV/EHU-n Marteko meteoritoen lagin milimetrikoak ditugu.
- (b) Inguruan Jezeroren analogo bat dugu, Bizkaiko itsaspeko sumendi baten azaleratzeak: Meñakoz, Armintza, Fruiz eta Enekuri.

MARTE

Supercam tresnaren Zientzia Taldeak



Zientzia SuperCam-en inguruan (UPV/EHU)

Zainak Gale kraterrean, eta Meñakozen (behean)
eta Armintzan (eskuinean)

MARTE

Mars2020 / SuperCam Eragiketa Zentroa



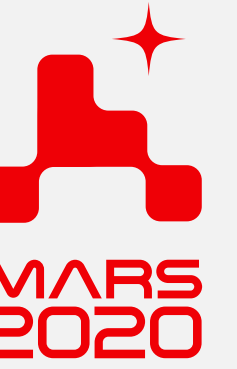
Zientzia SuperCam-en inguruan (UPV/EHU)

Lurreratze lekua erabakitzeko 2018an egindako bileran, SuperCameko ikertzaile nagusiek Eragiketen Tokiko Zentro bat sortzea eskaini ziguten formalki, tresna kontrolatzeko Marten lurreratzen denean eta Misioaren zientziaren alderdian sartzen garenean.

2019ko irailean, Roger Wiens-ek UPV/EHU bisitatu zuen, eta aurreko Errektore Taldeari proposatu zion formalki. 2020ko abenduan, UPV/EHUK areto bat esleitu zigun, Martina Casiano Plataforma Teknologikoan, eta bertan eraiki da.

MARTE

Mars2020 / SuperCam Eragiketa Zentroa



Rover-en datuak
igotzeko eta jaisteko aretoak

Gune publikoa, bertan lan egiten
ikusiko gaituzte eta Marteko
zuzeneko irudiak ikusiko dituzte

