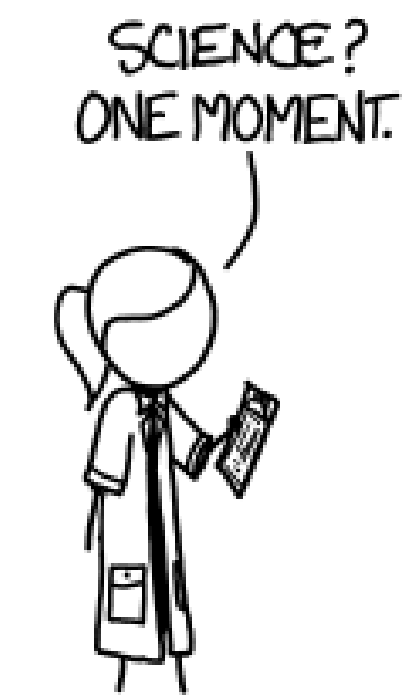
Disintegrating Rockets

Softwarefehler in der Raumfahrt

Carina Haupt
@caha42

```
        default='Y',
        )
    global_scale_setting = FloatProperty(
        name="Scale",
        min=0.01, max=1000.0,
        default=1.0,
        )

def execute(self, context):

    # get the folder
    folder_path = (os.path.dirname(self.filepath))

    # get objects selected in the viewport
    viewport_selection = bpy.context.selected_objects

    # get export objects
    obj_export_list = viewport_selection
    if self.use_selection_setting == False:
        obj_export_list = [i for i in bpy.context.scene.objects]

    # deselect all objects
    bpy.ops.object.select_all(action='DESELECT')

    for item in obj_export_list:
        item.select = True
        if item.type == 'MESH':
            file_path = os.path.join(folder_path, "{}.obj".format(item.name))
            bpy.ops.export_scene.obj(filepath=file_path, use_selection=True,
                                     axis_forward=self.axis_forward_setting,
                                     axis_up=self.axis_up_setting,
                                     use_animation=self.use_animation_setting,
                                     use_mesh_modifiers=self.use_mesh_modifiers_setting,
                                     use_edges=self.use_edges_setting,
                                     use_smooth_groups=self.use_smooth_groups_setting,
                                     use_smooth_groups_bitflags=self.use_smooth_groups_bitflags_setting,
                                     use_normals=self.use_normals_setting,
                                     use_uvs=self.use_uvs_setting,
                                     use_materials_setting,
```

DLR **Deutsches Zentrum für Luft- und Raumfahrt**
German Aerospace Center



DLR?

Deutsches Zentrum für Luft- und Raumfahrt

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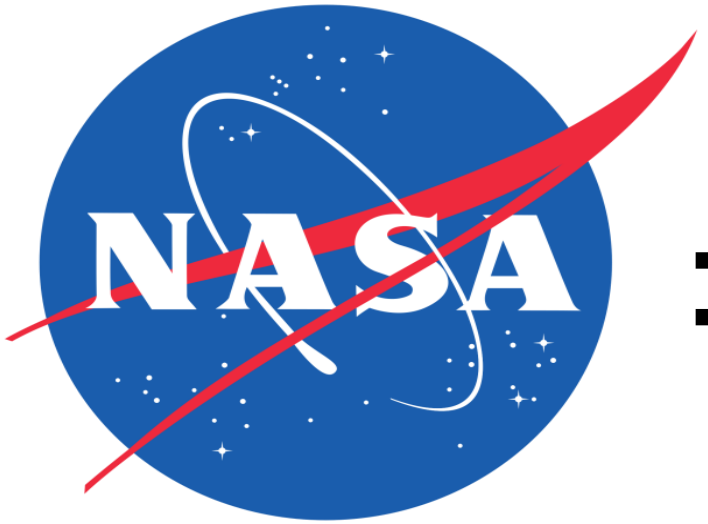

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DLR

“German NASA”*

* Not do be taken completely serious

Ca. 8.200 Mitarbeiter

47 Institute und Einrichtungen

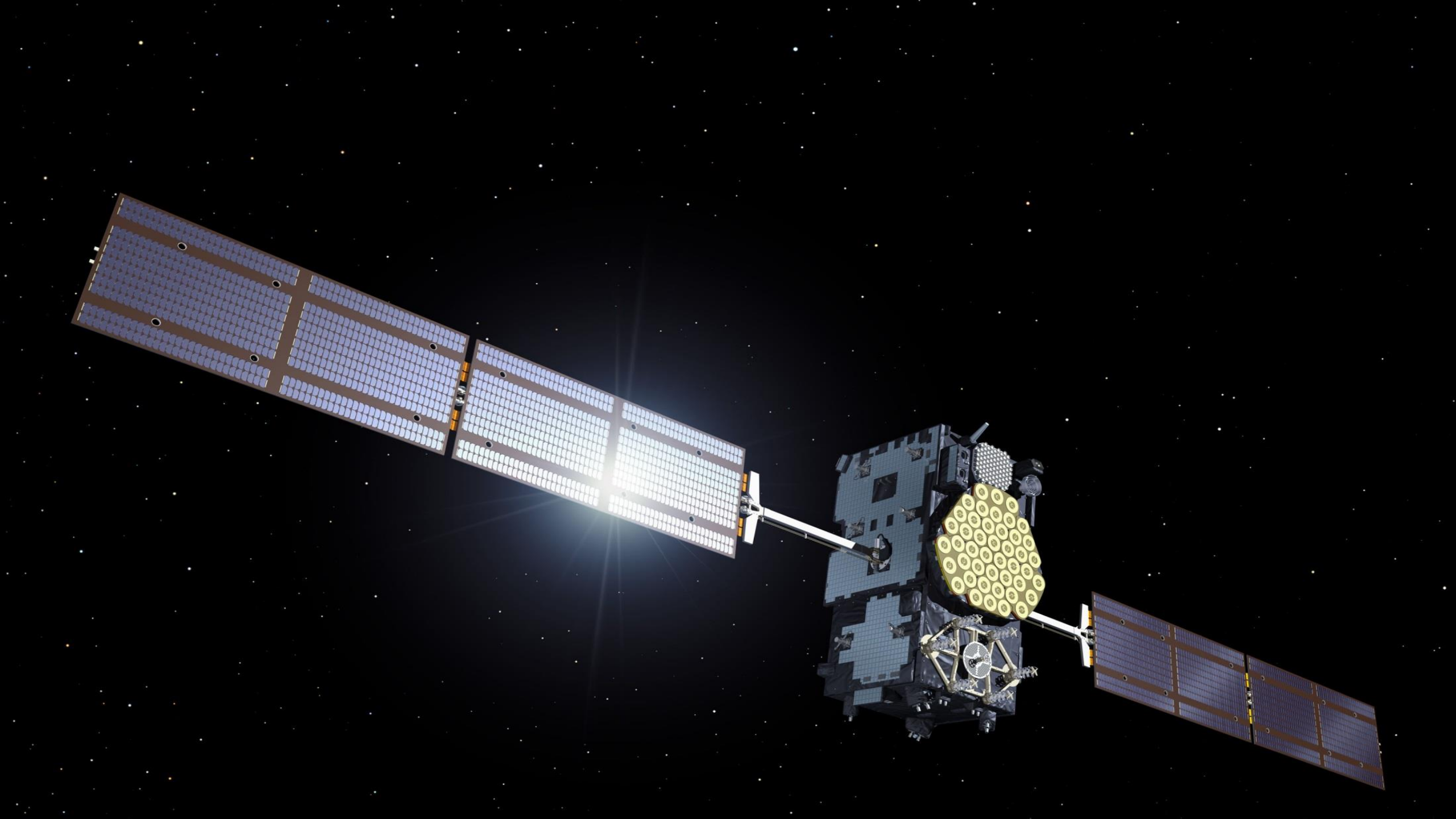
27 Standorte

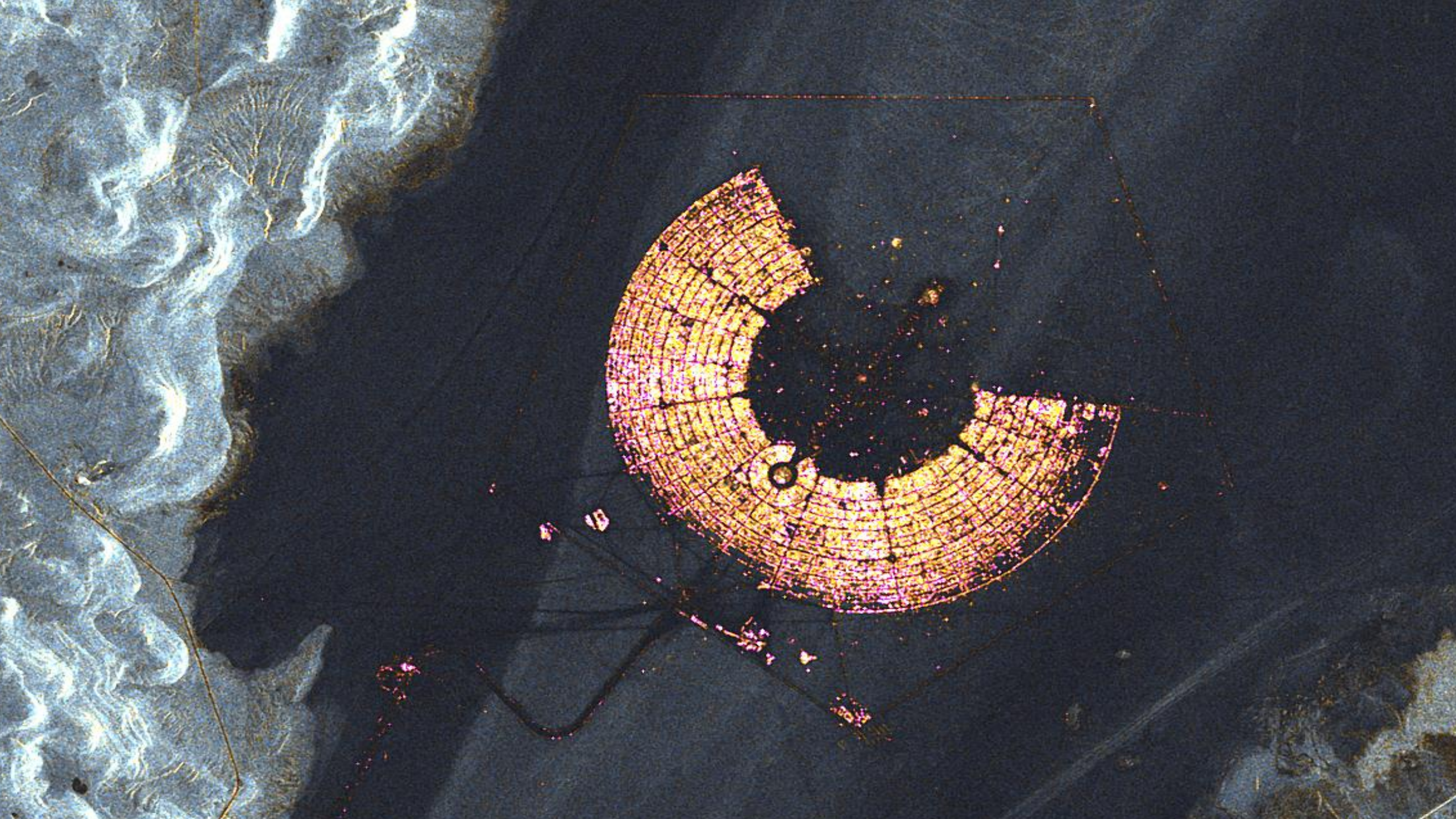
DLR

Das DLR in 2 Minuten


DLR
D-CMET

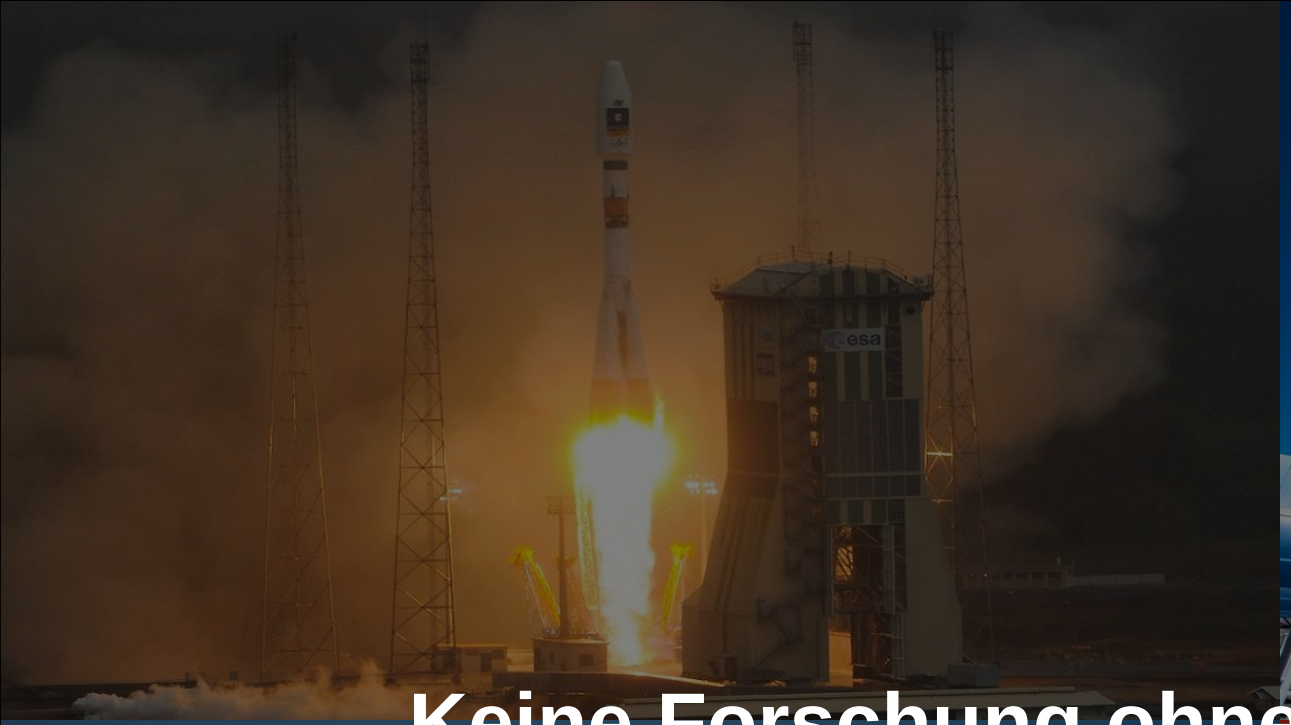

esa






DLR
robomobil@dlr.de

Und wo ist jetzt die Software?



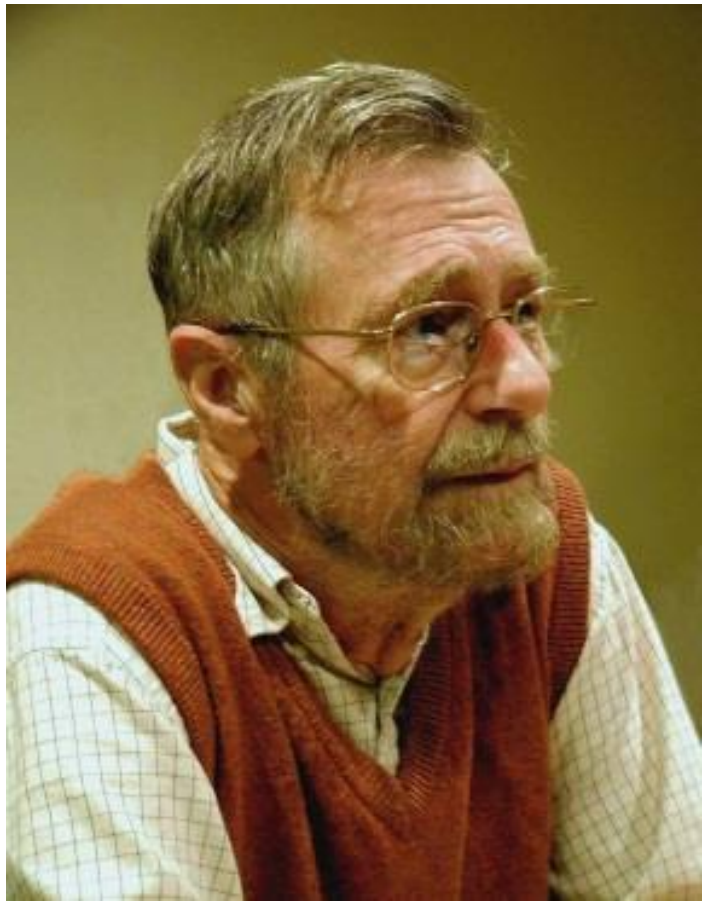
Keine Forschung ohne Softwareentwicklung

Forscher != Software Entwickler

Ist Softwareentwicklung denn so schwierig?

DLR

Die Historie der Softwareentwicklung



Edsger W. Dijkstra, 2002
By Hamilton Richards - CC-BY-SA-3.0
https://commons.wikimedia.org/wiki/File:Edsger_Wybe_Dijkstra.jpg

"... as long as there were no machines,

programming was no problem at all;

when we had a few weak computers,

programming became a mild problem,

and

now we have gigantic computers,

programming has become an equally gigantic problem."

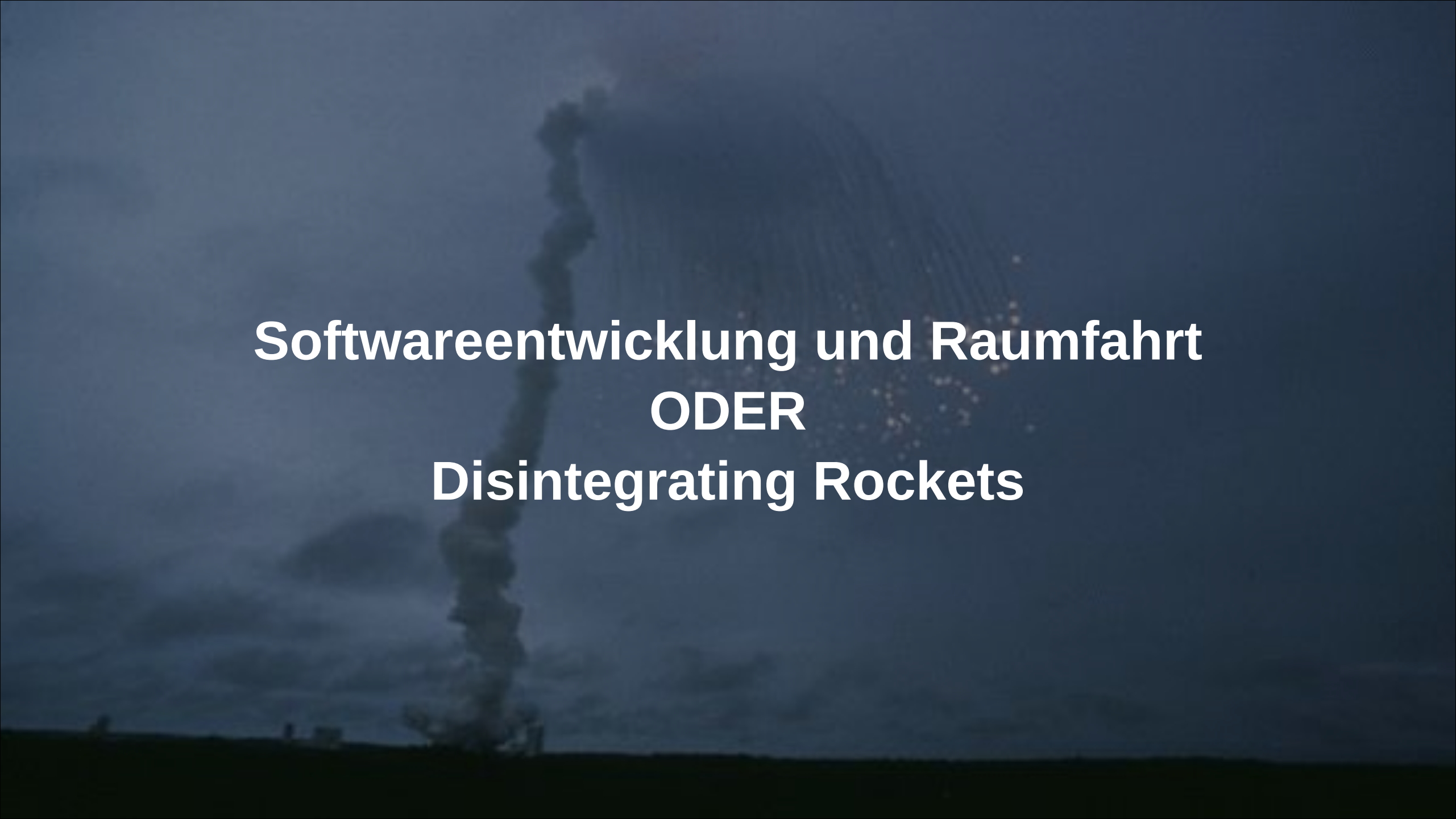
Edsger W. Dijkstras zur Ursache der „Software-Krise", 1972

Die „Software-Krise“ (1960er)

Die Entstehung von Software Engineering

„Zielorientierte Bereitstellung und systematische Verwendung von **Prinzipien**, **Methoden** und **Werkzeugen** für die arbeitsteilige, **ingenieurmäßige Entwicklung** und Anwendung von umfangreichen Softwaresystemen.“

Helmut Balzert, Lehrbuch der Software-Technik, S. 36



Softwareentwicklung und Raumfahrt
ODER
Disintegrating Rockets

Mariner 1 (1962)
Flyby an Venus

Atlas Agena with Mariner 1.jpg by NASA – Public Domain
https://en.wikipedia.org/wiki/File:Atlas_Agena_with_Mariner_1.jpg

Phobos 1 (1988)
Mars, Phobos und Deimos erforschen

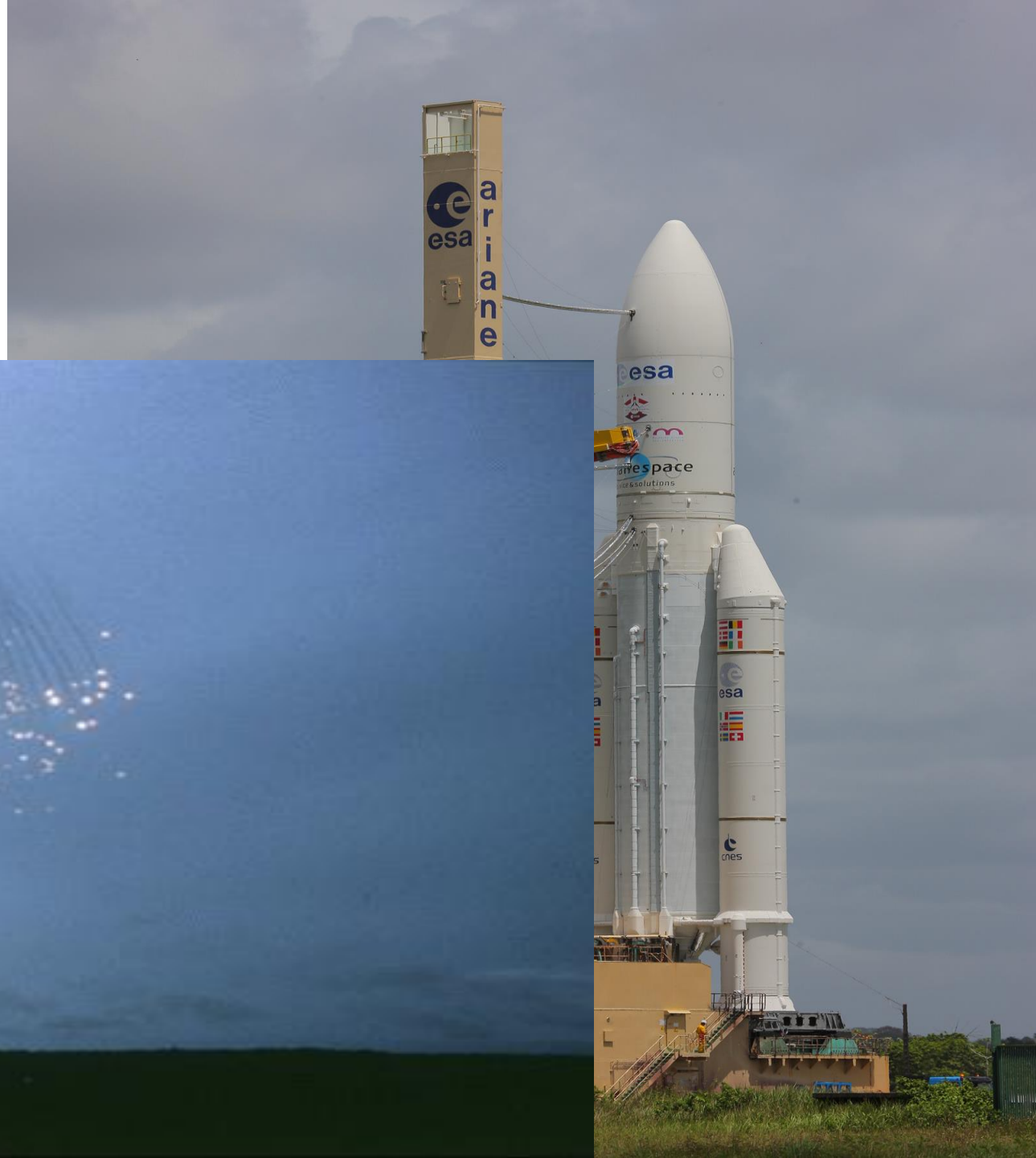
Phobos Marte.jpg by NASA – Public Domain
https://en.wikipedia.org/wiki/File:Phobos_Marte.jpg

Ariane 5 Flight 501 (1996)

Transport von Satelliten in die Magnetosphäre der Erde

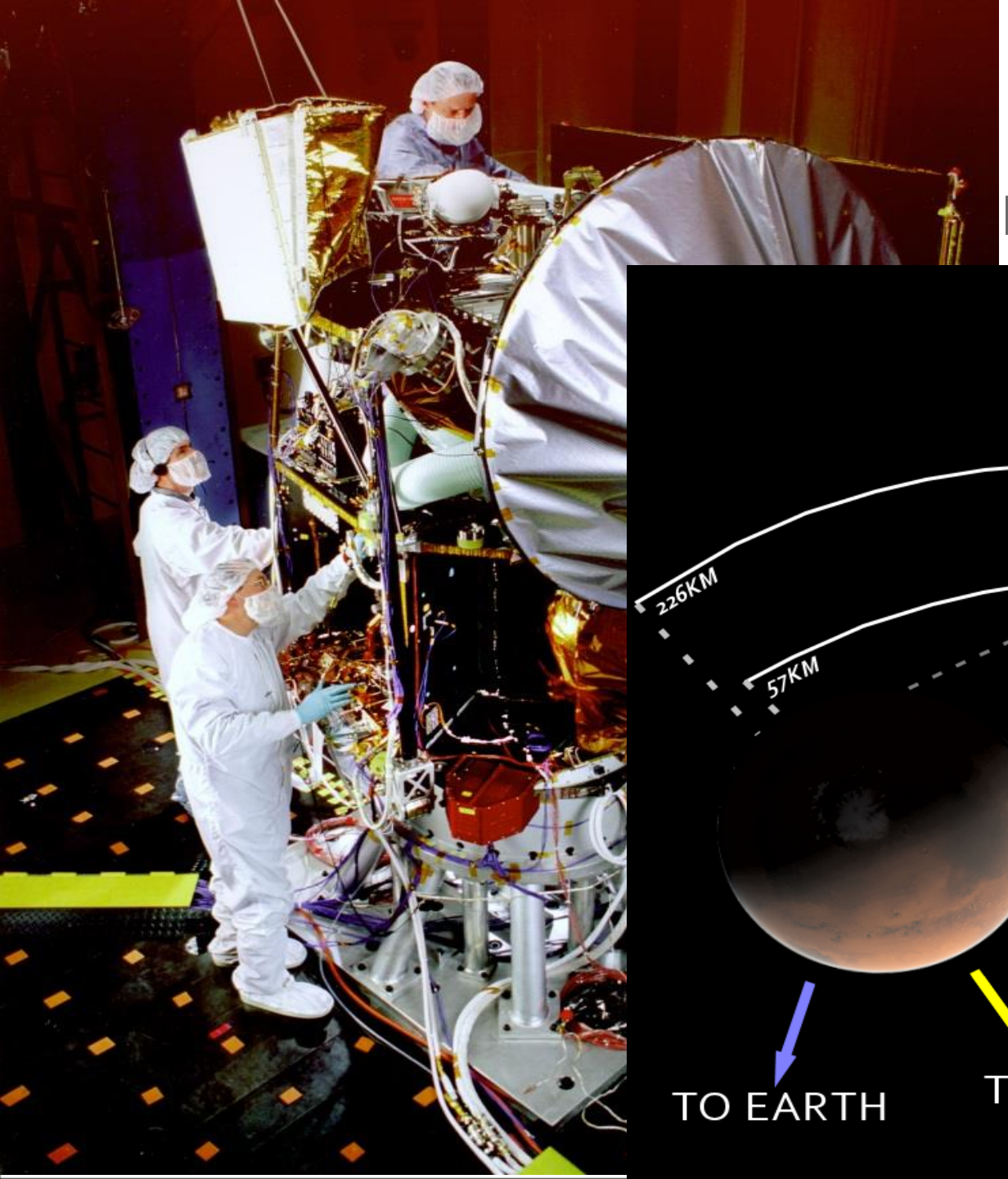
By esa

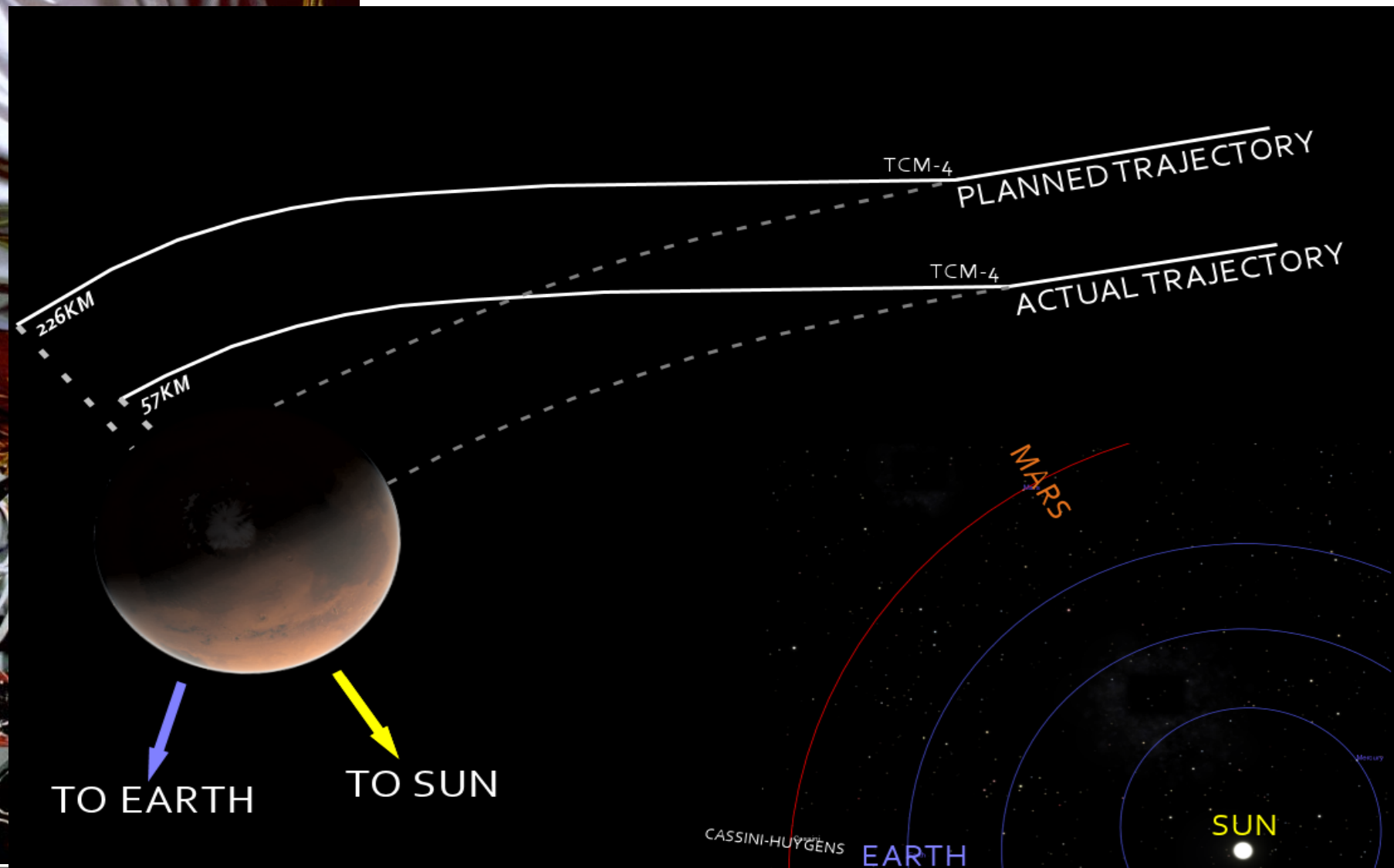
_way_to_



Mars Climate Orbiter (1998)

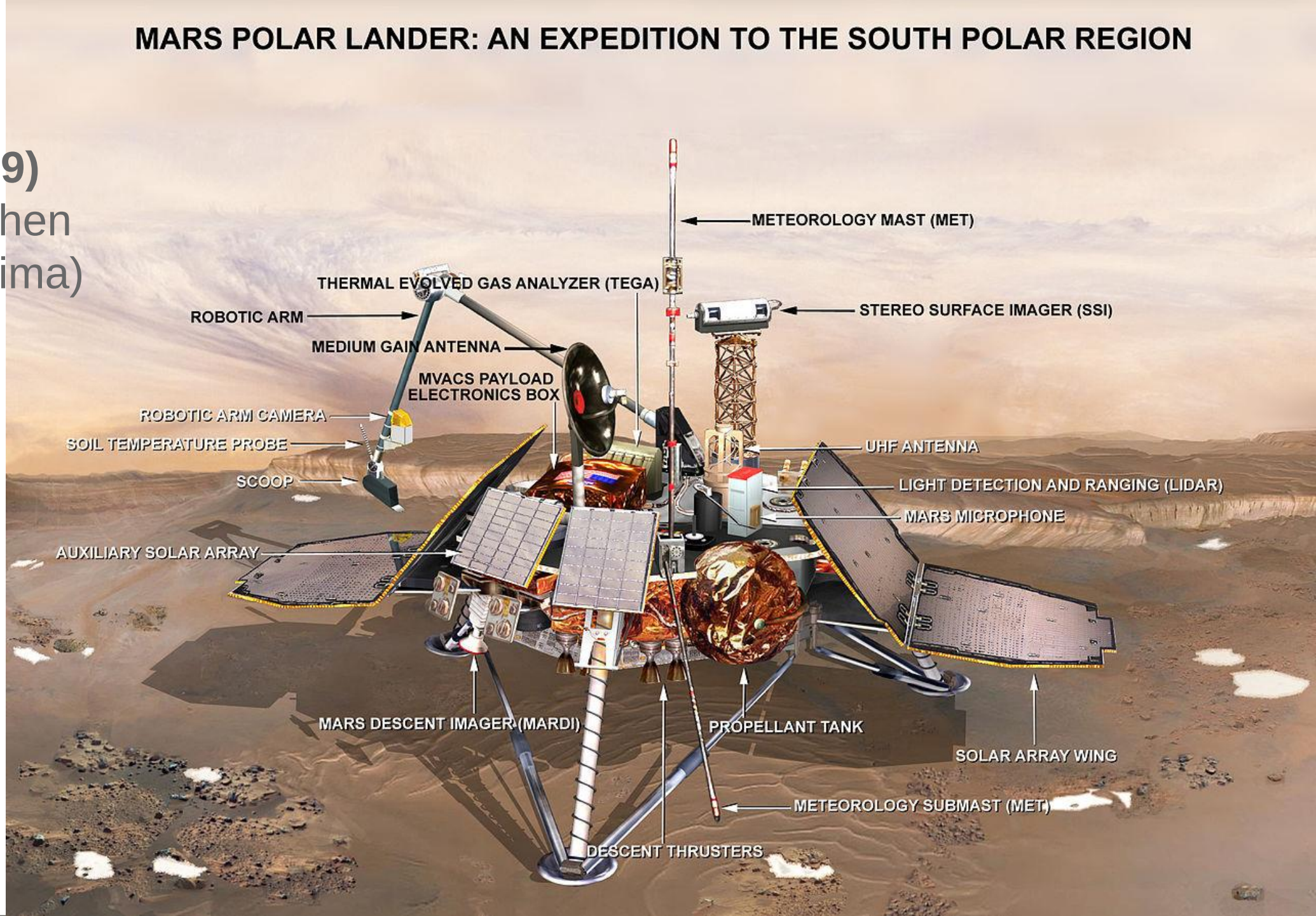
Mars erforschen & Kommunkationsrelay





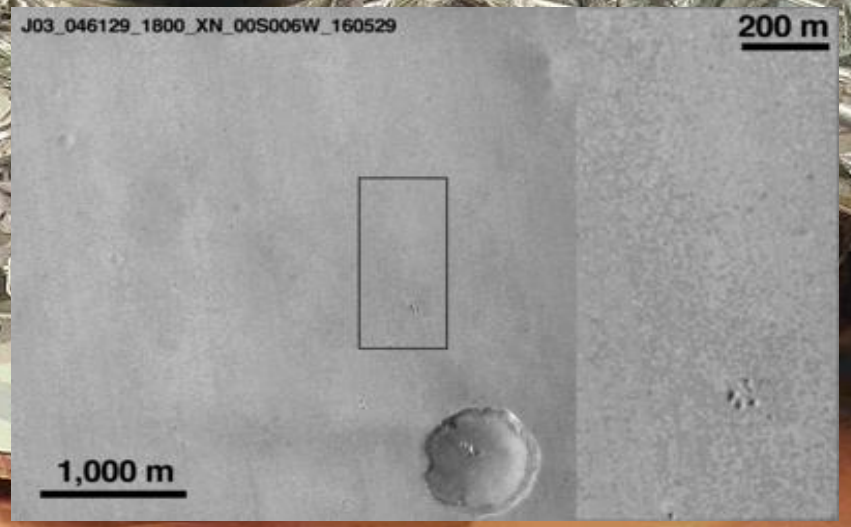
Mars Polar Lander (1999)

Mars erforschen (Erde und Klima)

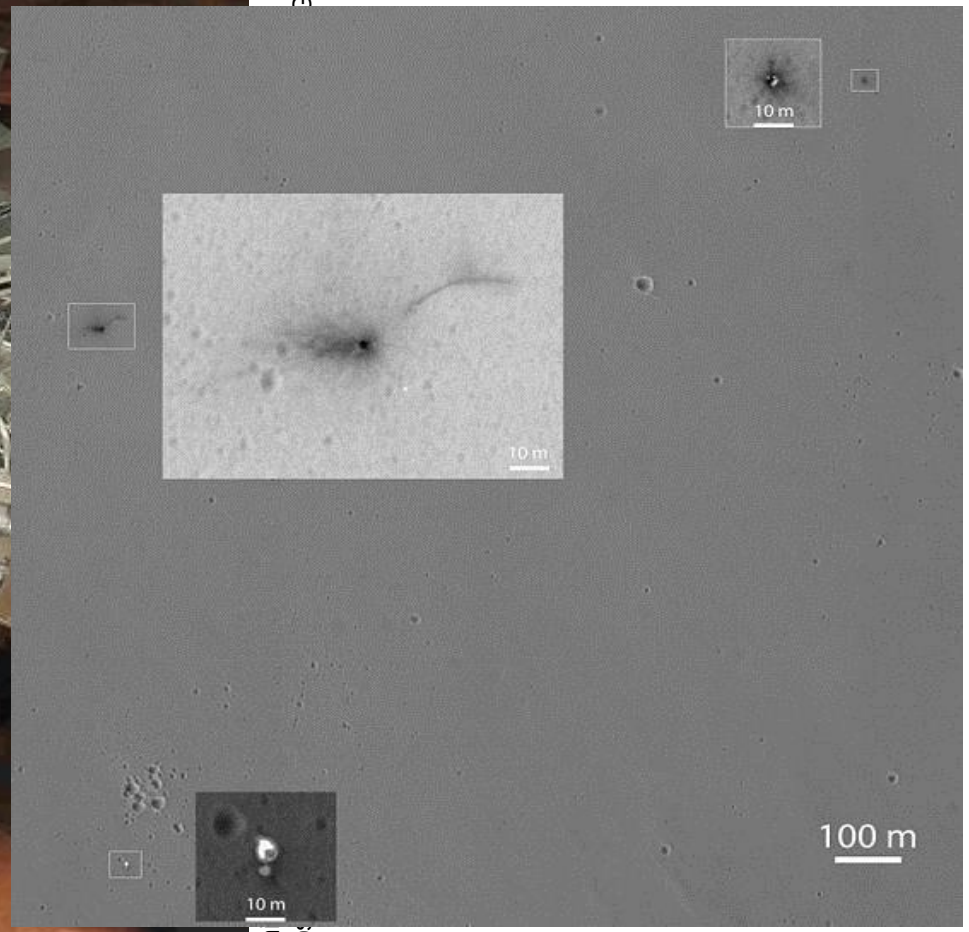


Mars-polar-lander back.jpg by NASA – Public Domain
https://commons.wikimedia.org/wiki/File:Mars-polar-lander_back.jpg

Schiaparelli (2016)
Landung auf Mars

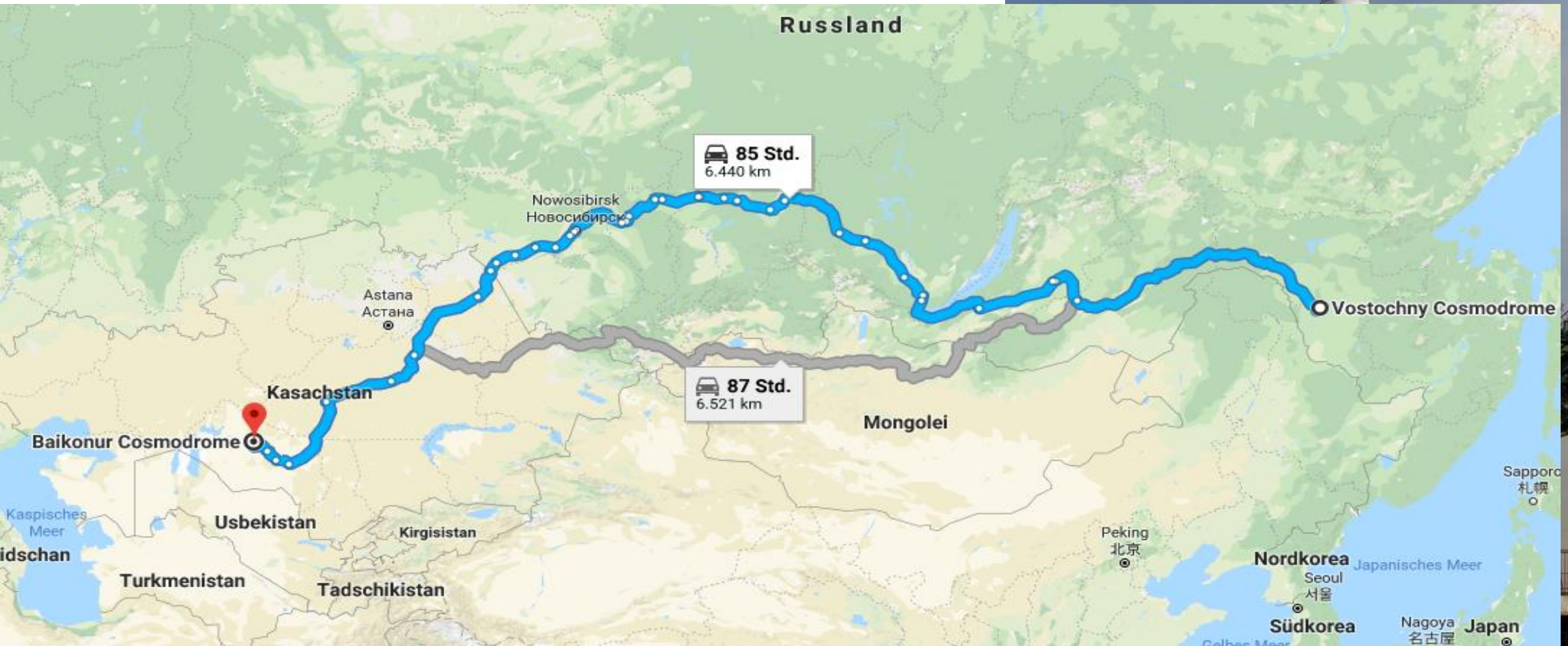


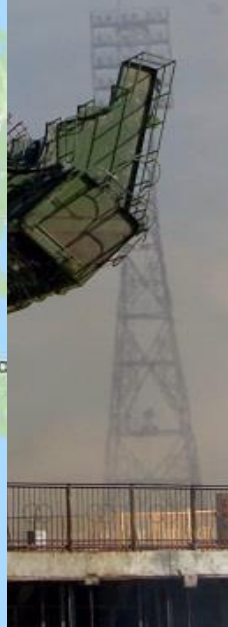
PIA21130 Signs of Schiaparelli Test Lander Seen From Orbit.gif by NASA – Public Domain
https://en.wikipedia.org/wiki/File:PIA21130_Signs_of_Schiaparelli_Test_Lander_Seen_From_Orbit.gif



PIA21131 Closer Look at Schiaparelli Impact Site on Mars.jpg by NASA – Public Domain
https://en.wikipedia.org/wiki/File:PIA21131_Closer_Look_at_Schiaparelli_Impact_Site_on_Mars.jpg

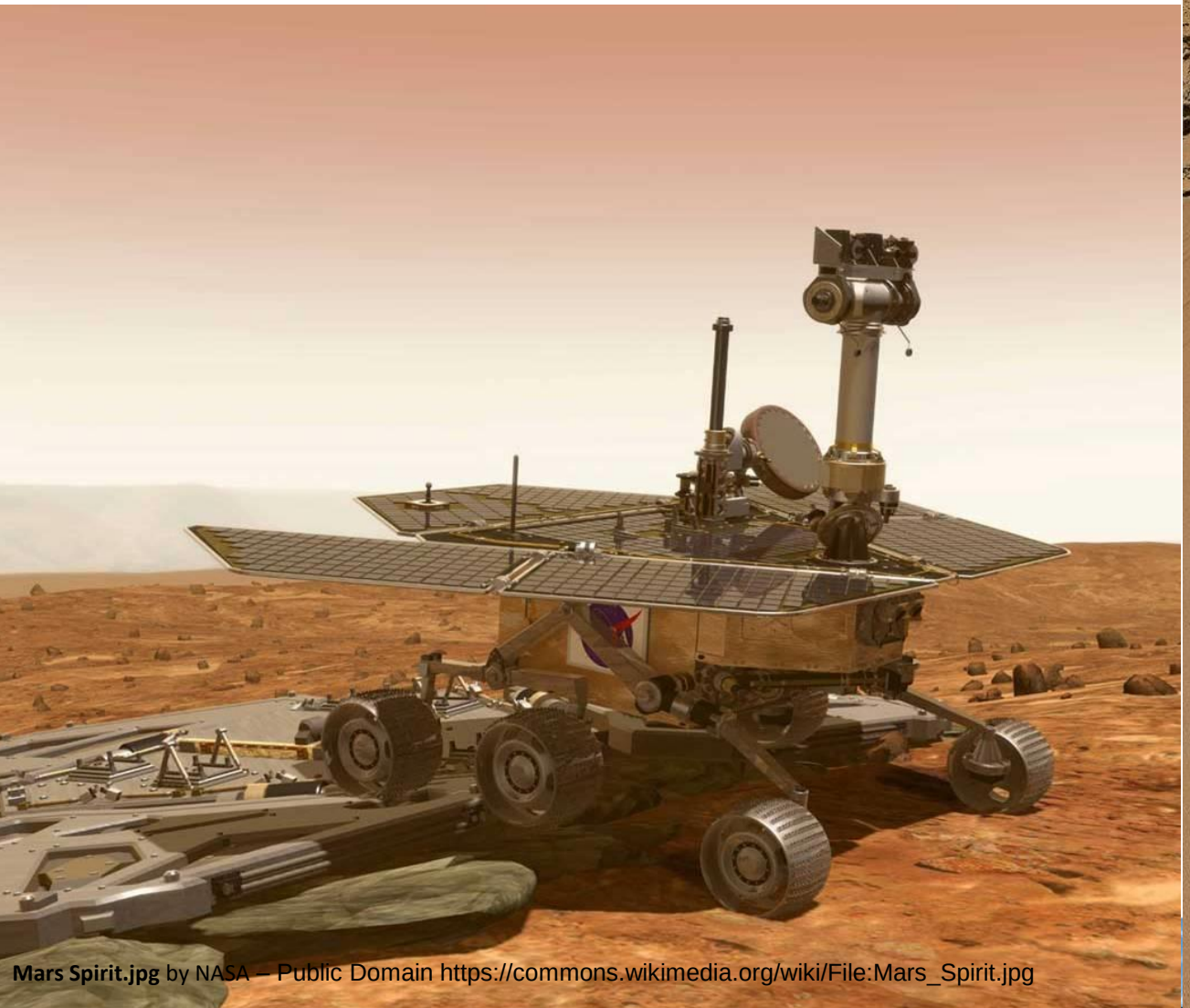
Sojus 2.1b (2017)
Satellitentransport



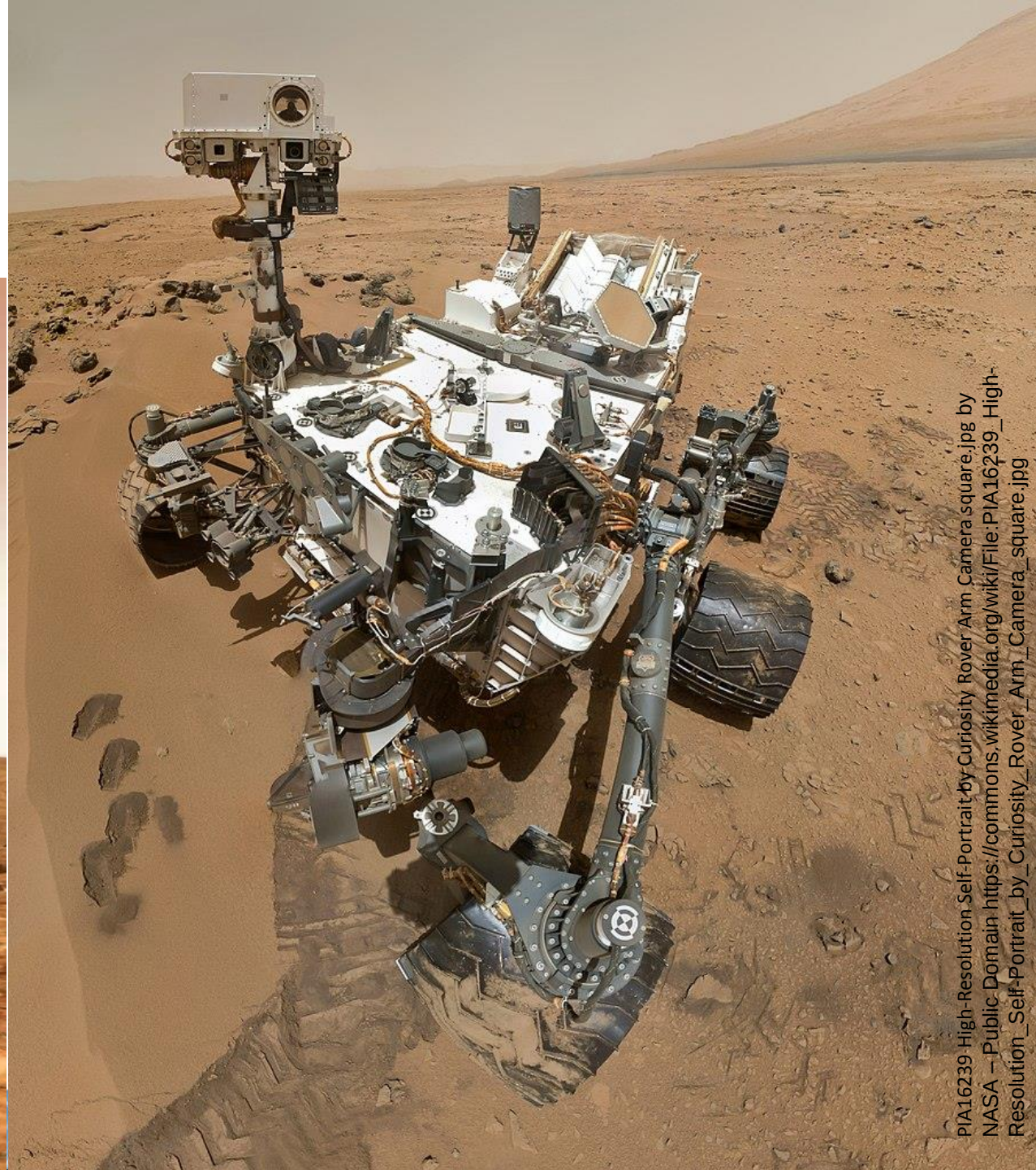


Warum läuft denn immer noch so viel schief?

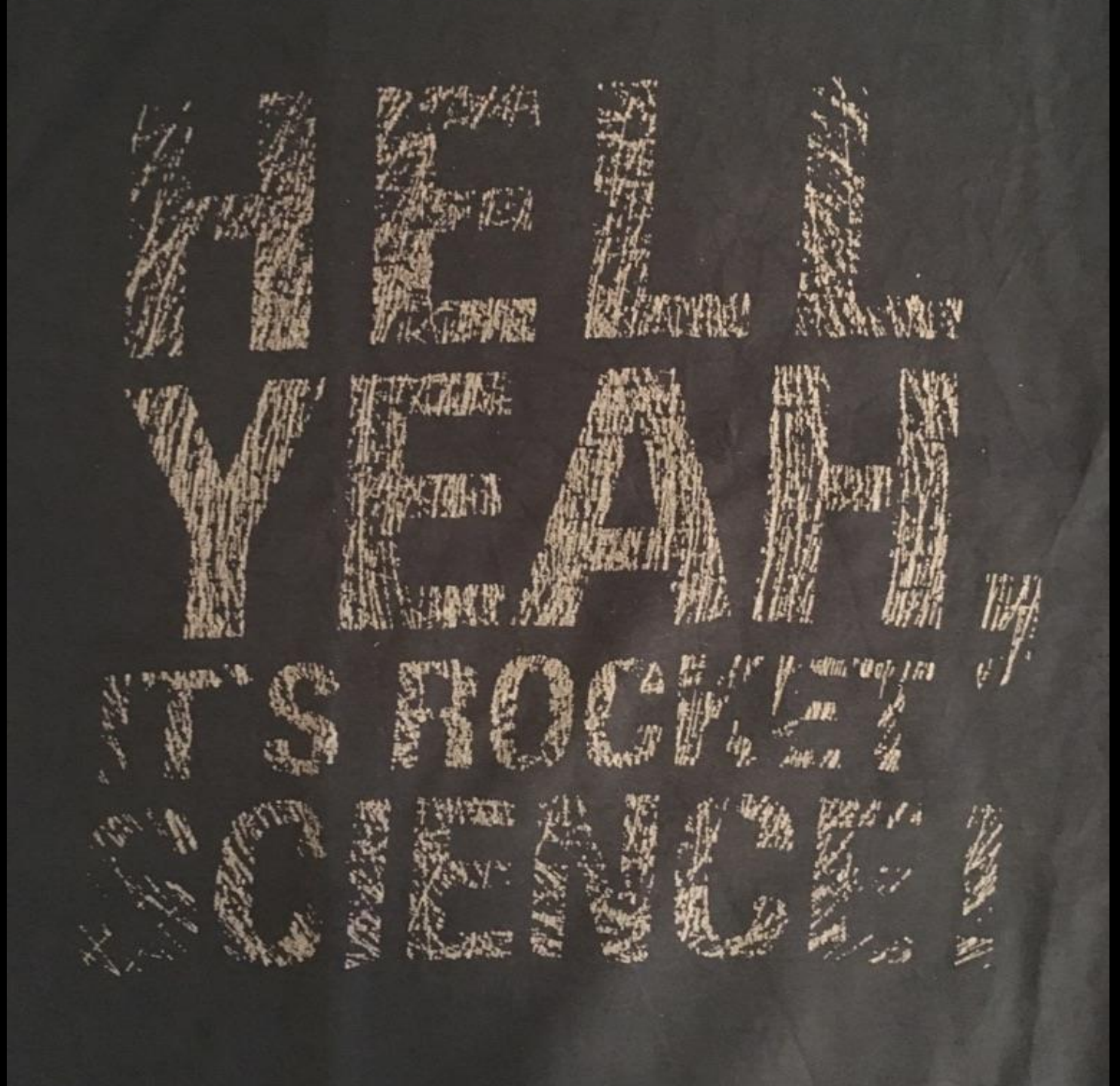
Spirit, Opportunity und Curiosity
Erfolgsgeschichten



Mars Spirit.jpg by NASA – Public Domain https://commons.wikimedia.org/wiki/File:Mars_Spirit.jpg



PIA16239 High-Resolution Self-Portrait by Curiosity Rover Arm Camera square.jpg by NASA – Public Domain https://commons.wikimedia.org/wiki/File:PIA16239_High-Resolution_Self-Portrait_by_Curiosity_Rover_Arm_Camera_square.jpg


HELL
YEAH
IT'S ROCKET
SCIENCE!

Fragen?

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