Universität Bremen

Kapitel 4: Projektpraxis

Episode 2: Projektbeispiele in der Raumfahrt

Dr. Michael Sölter
Gastreferent
Astrium GmbH, Space Transportation

eGeneral Studies: Projektmanagement

cc BY NC ND

Übersicht der Lerneinheit

Episode 1: Besonderheiten von Projekten in der Raumfahrt

Episode 2: Projektbeispiele in der Raumfahrt

Episode 3: Diskussion

CC BY NC ND

Lernziele der Episode 2

Lernziel 1:

Sie können erläutern, woraus sich der Bedarf für Projekte in der Raumfahrt ergibt.

Lernziel 2:

Sie können Beispiele für Projekte zum Transport von Gütern in den Weltraum erläutern.

Lernziel 3:

Sie kennen Projektebeispiele für die bemannte Raumfahrt.

cc BY NC ND

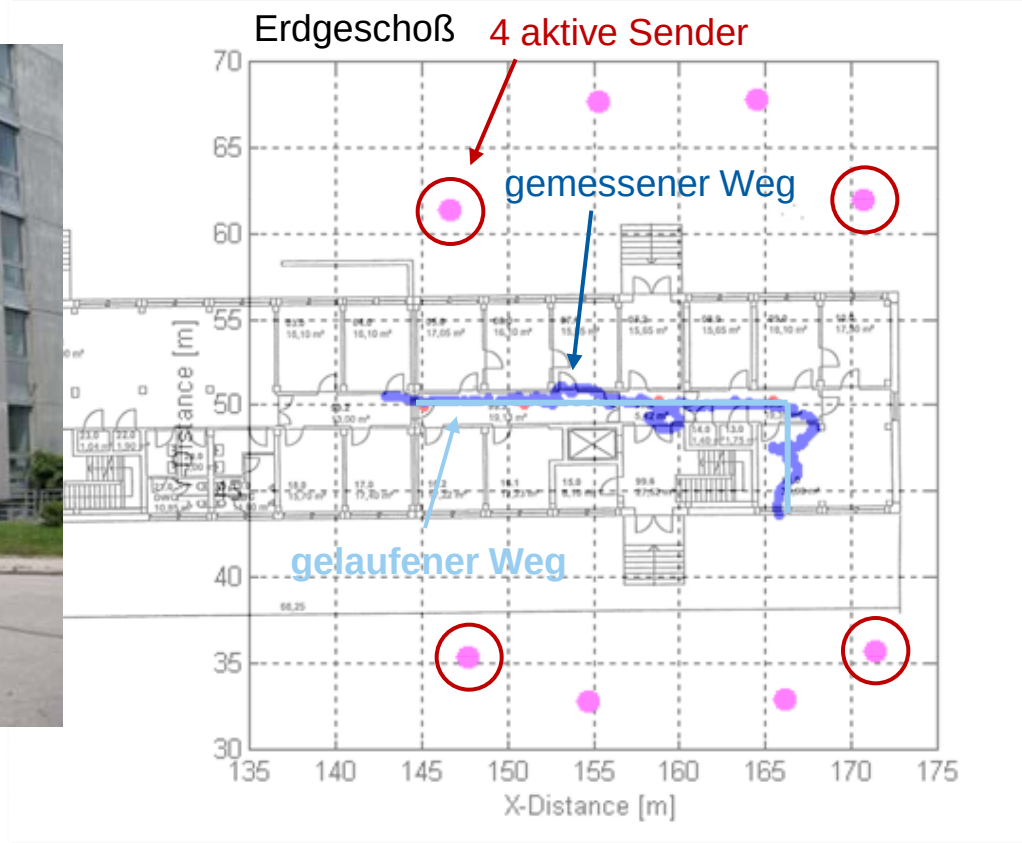
Overview – Need of Projects

- Navigation
- Communication
  - Civil
  - Military
- Earth Observation
  - Science
  - Commercial
  - Weather
- Science
- Space Transportation
- Manned Space

cc BY NC ND

Navigation (indoor)

- Measurements in complex concrete construction with coated windows
- Distance transmitter - buildings on several hundred meters increasable



CC BY NC ND

Navigation

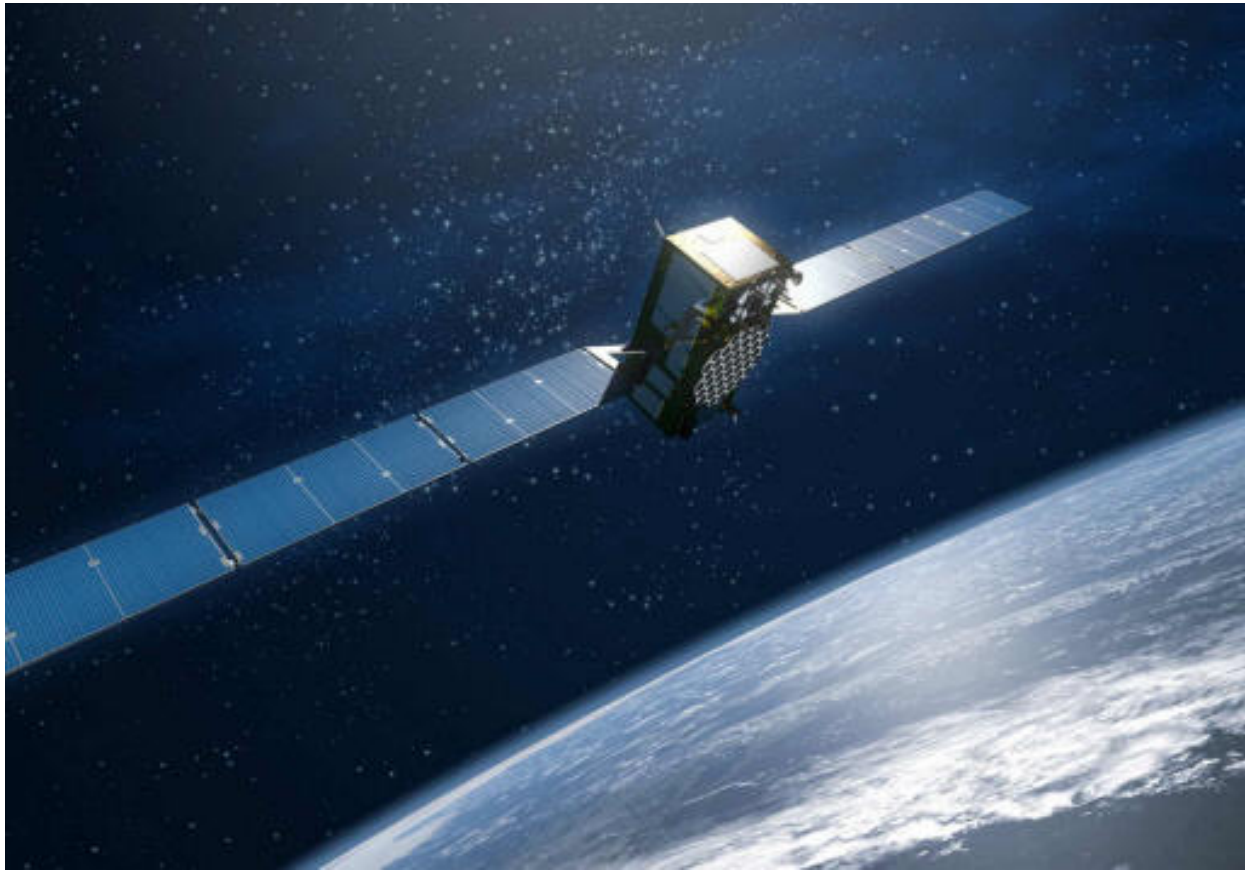
The activity of navigating - of lat. navigare (lead a ship), consists of the following subranges:

- Determine the geographical position by localization
- Compute the optimal way to the goal and
- Lead the vehicle to this goal, thus above all a holding of the optimal course, possibly with consideration of the leeway.

Quelle: http://de.wikipedia.org/wiki/Navigation

cc BY NC ND

Galileo



Navigation

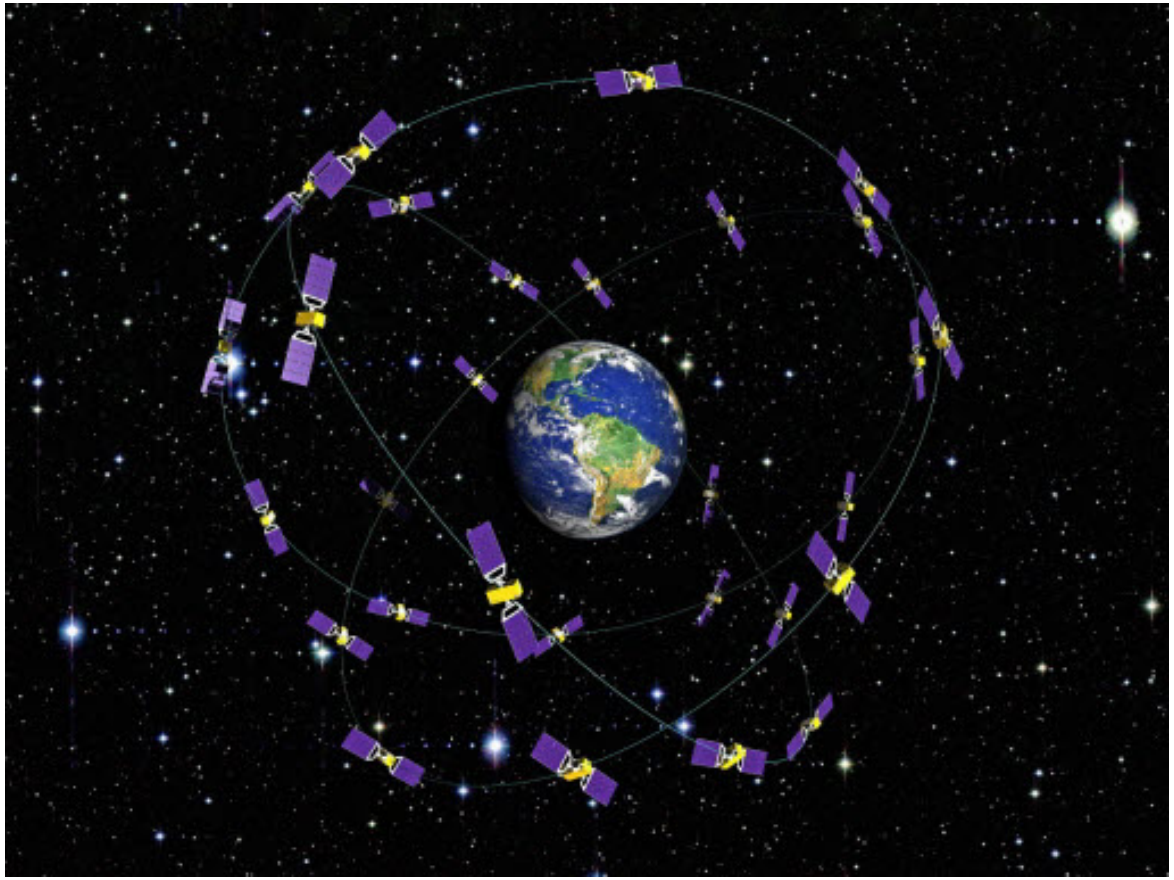
CC BY NC ND

Galileo

Navigation

CC BY NC ND

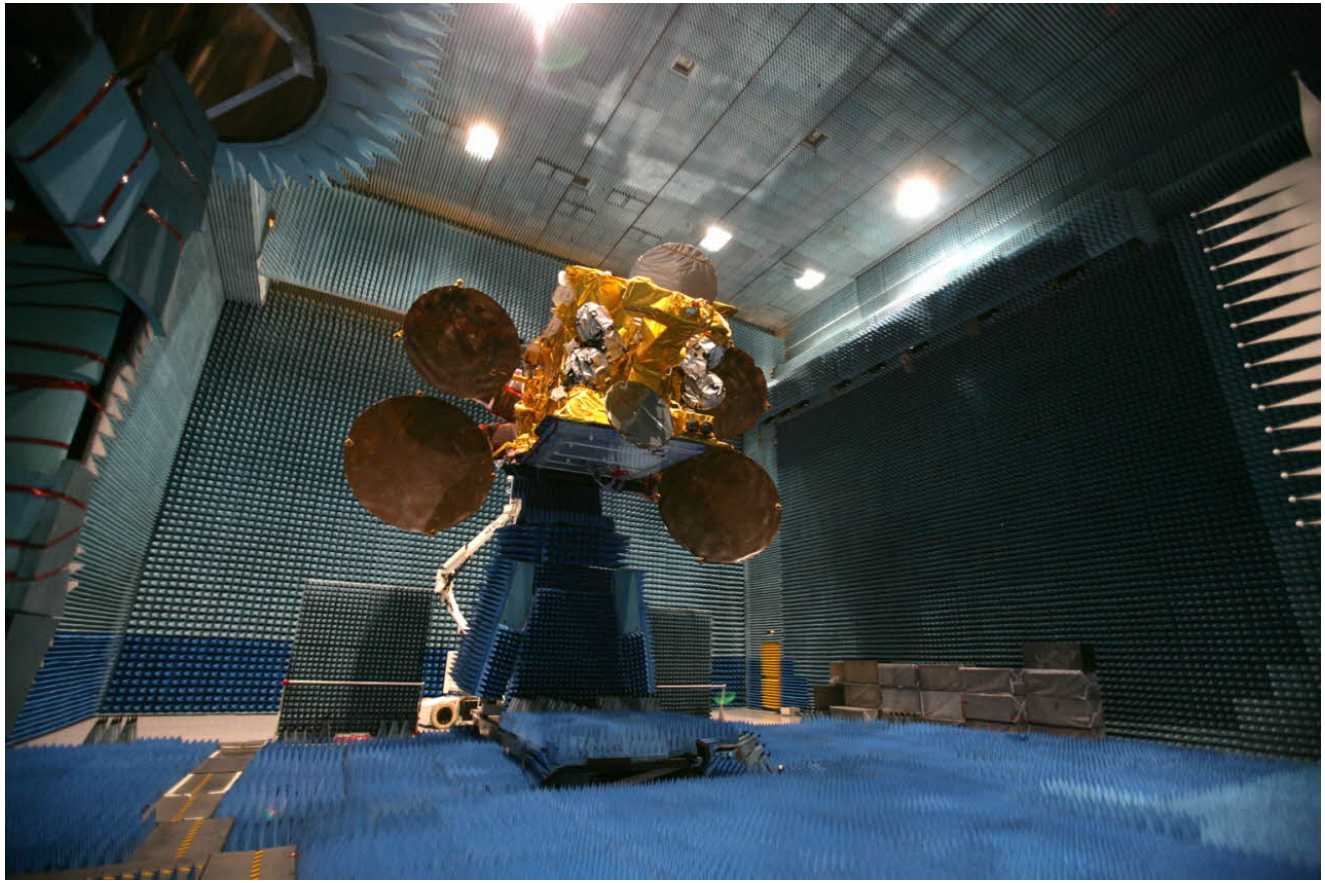
Galileo



Navigation

CC BY NC ND

ASTRA 3B



Communication (civil)

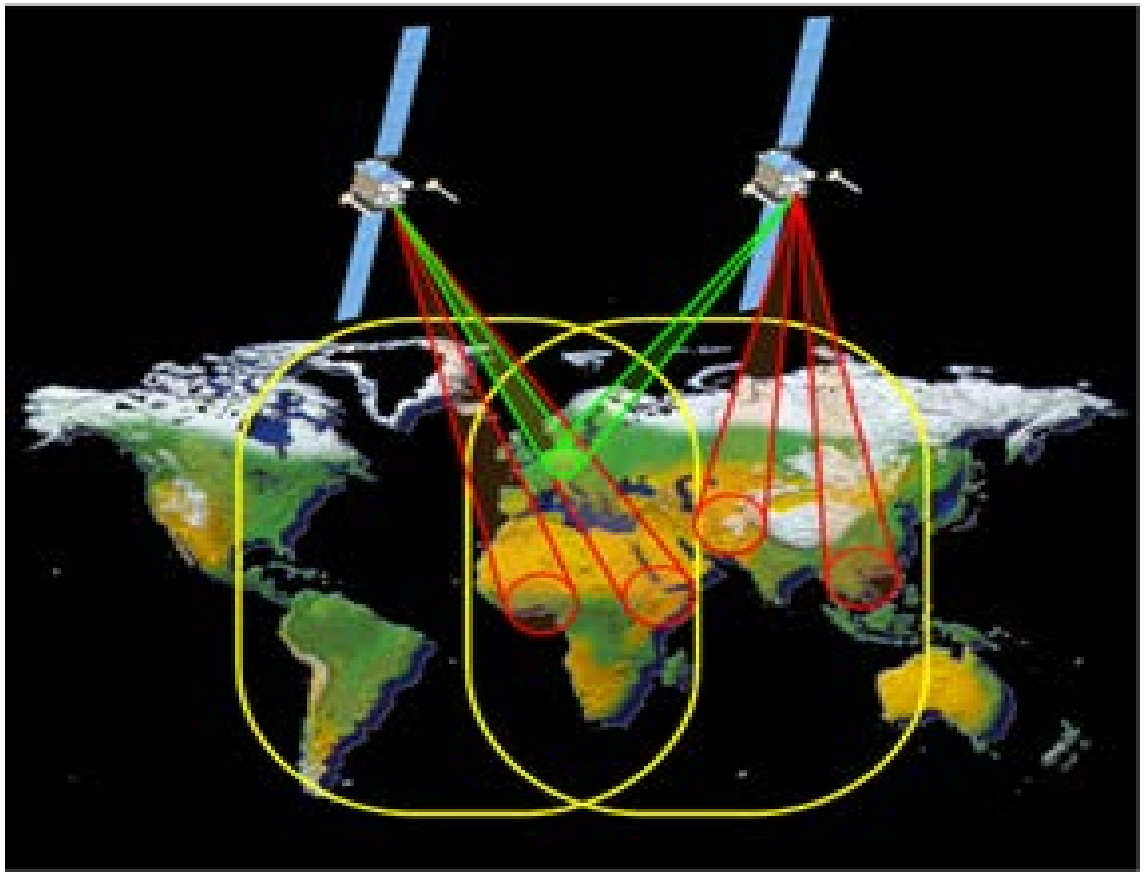
CC BY NC ND

ASTRA 3B

Communication (civil)

CC BY NC ND

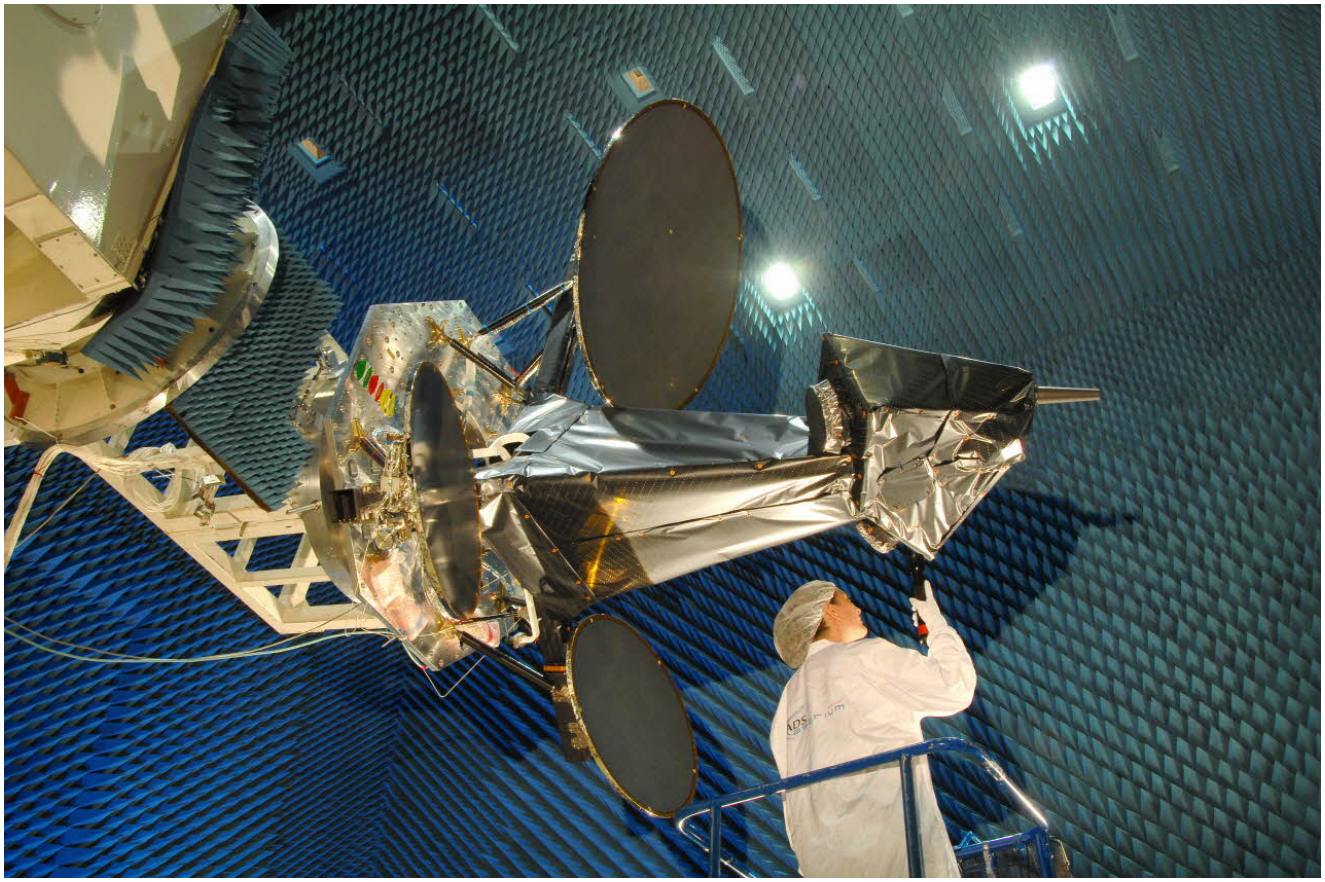
SATCOMBw



Communication (military)

CC BY NC ND

SATCOMBw



Communication (military)

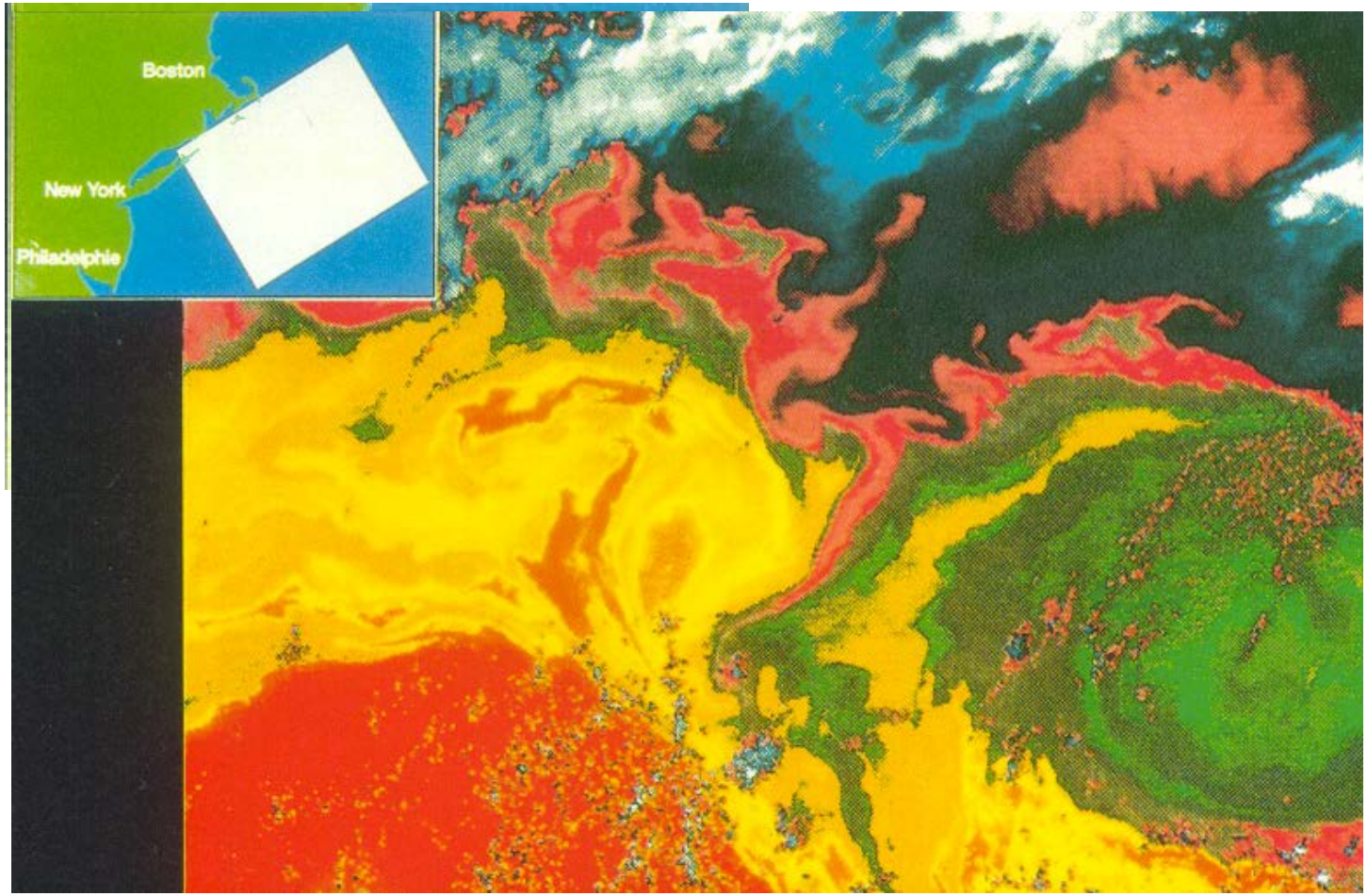
CC BY NC ND

SATCOMBw

Communication (military)

CC BY NC ND

Science Satellites

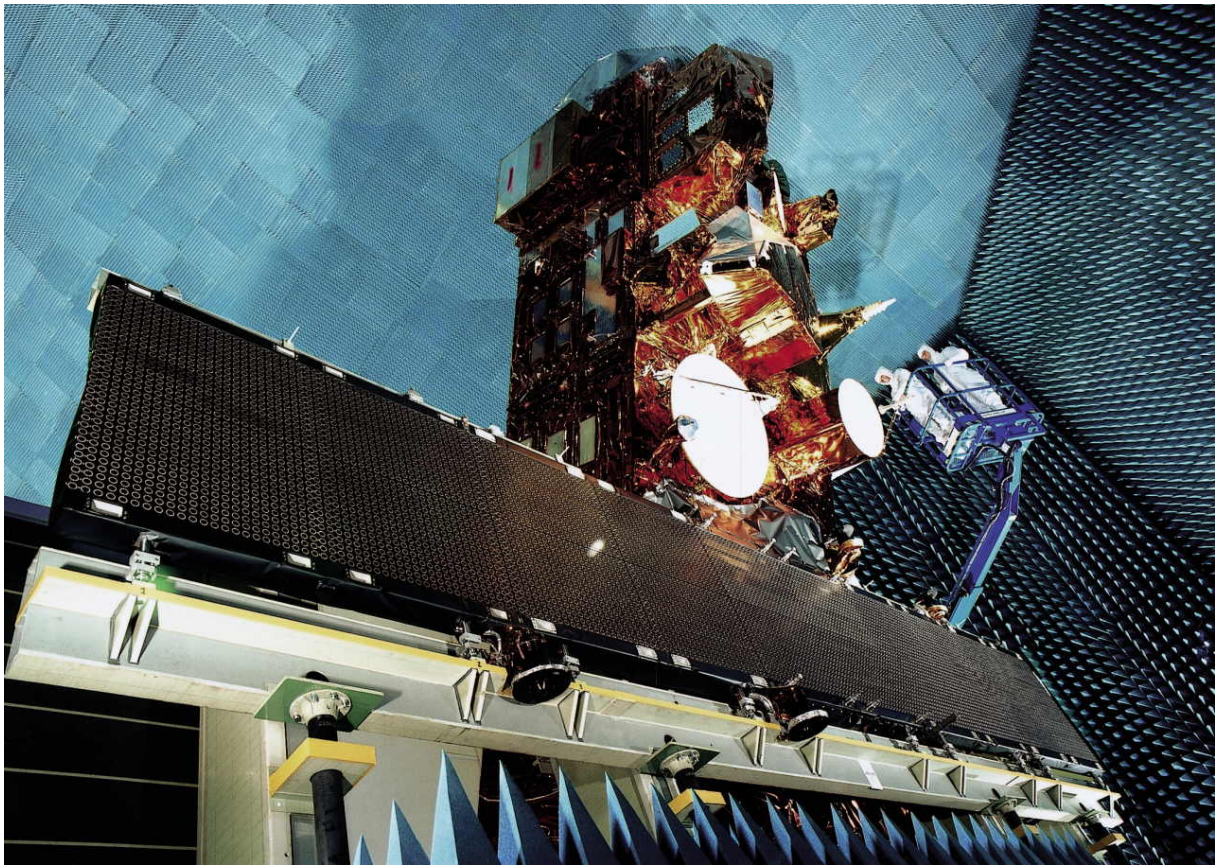


Encountering of Gulf and Labrador current before the American coast

Earth Observation

CC BY NC ND

ENVISAT



Earth Observation: Science Satellites

CC BY NC ND

ENVISAT

Earth Observation: Science Satellites

CC BY NC ND

ENVISAT

Earth Observation: Science Satellites

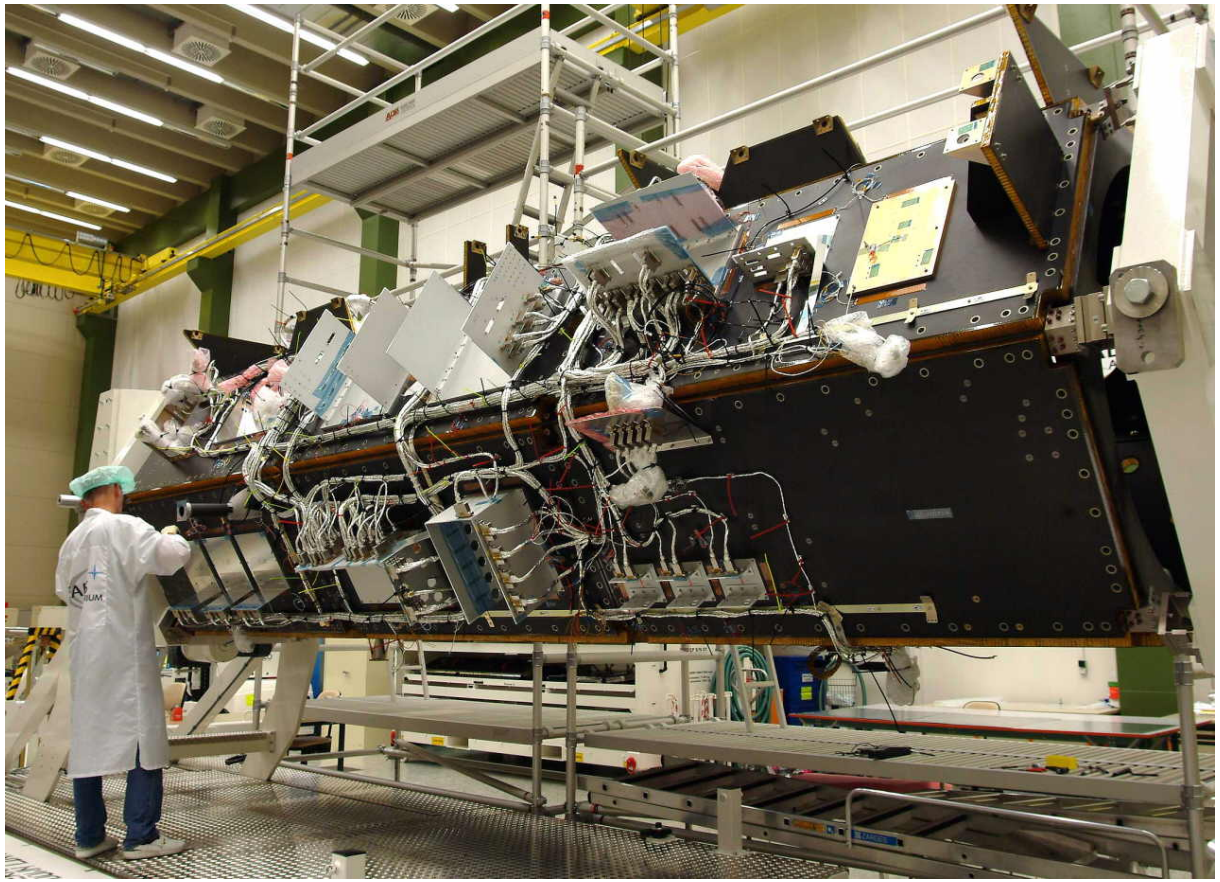
CC BY NC ND

ENVISAT

Earth Observation: Science Satellites

CC BY NC ND

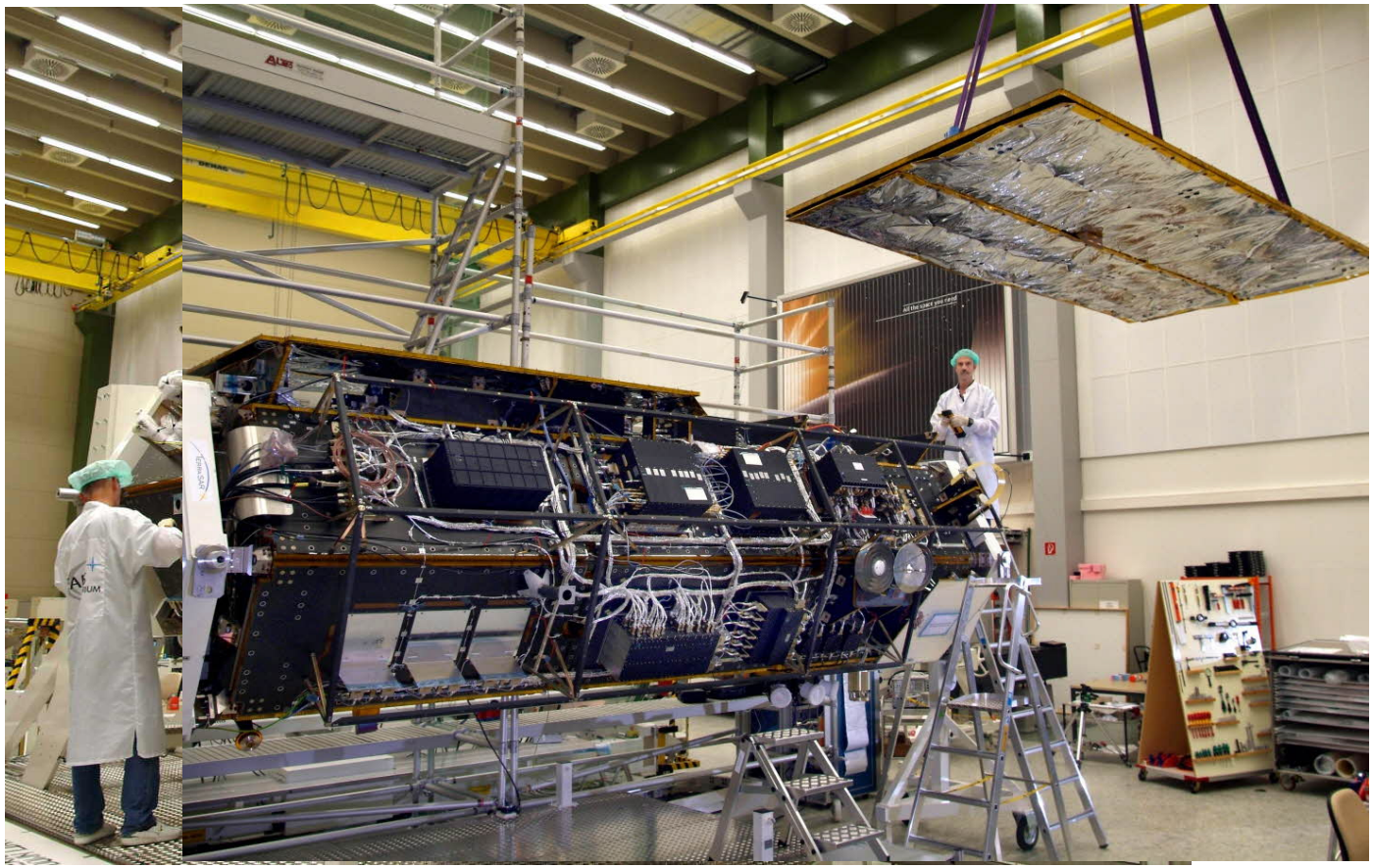
TerraSAR / Tandem-X



Earth Observation: Commercial Satellites

cc BY NC ND

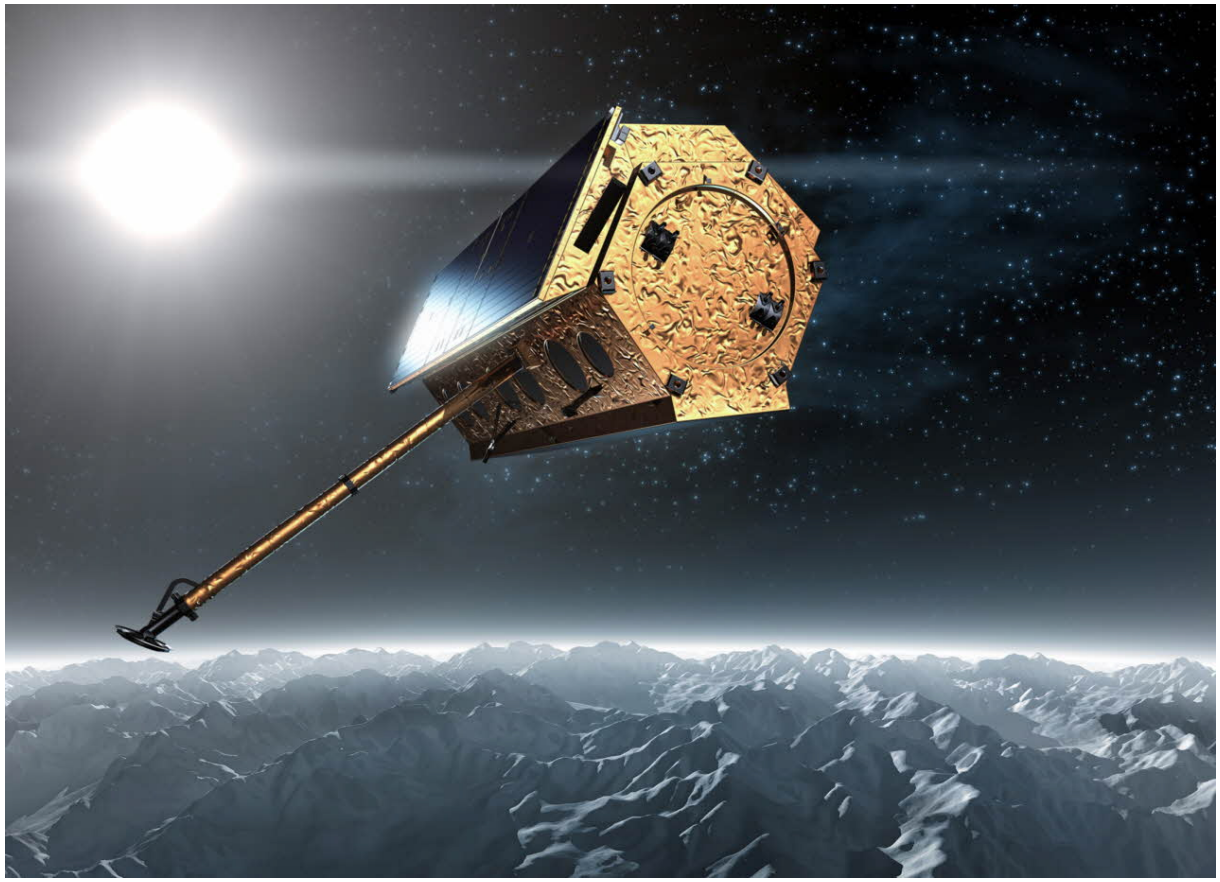
TerraSAR / Tandem-X



Earth Observation: Commercial Satellites

CC BY NC ND

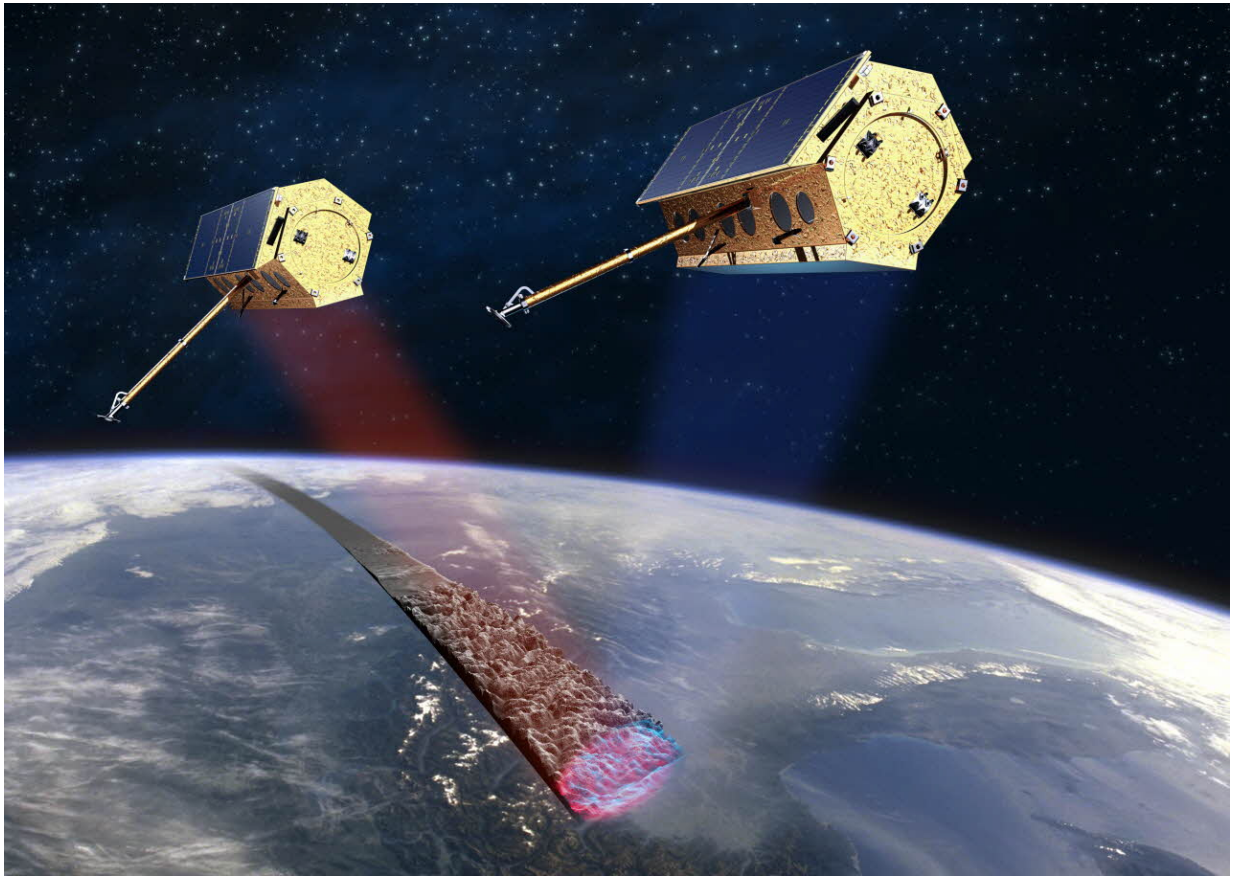
TerraSAR / Tandem-X



Earth Observation: Commercial Satellites

cc BY NC ND

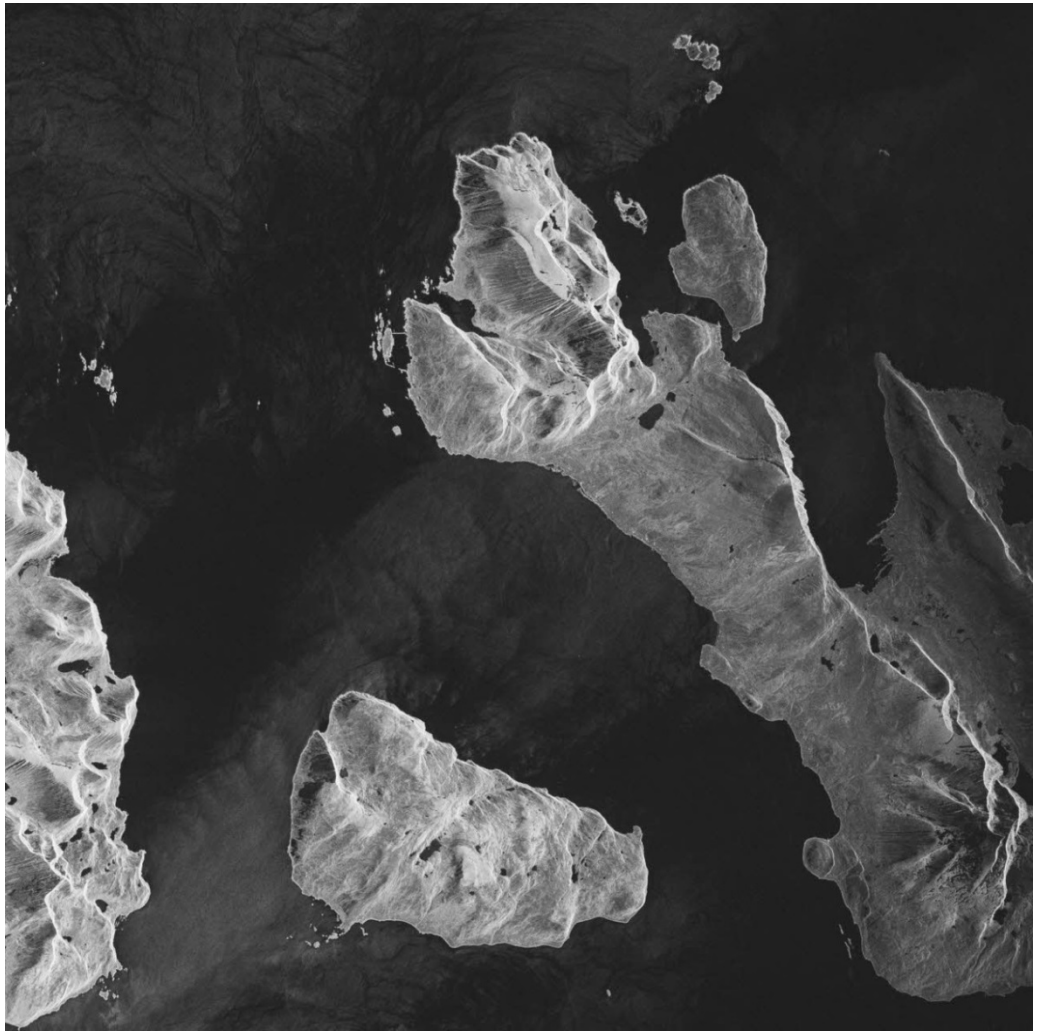
TerraSAR / Tandem-X



Earth Observation: Commercial Satellites

CC BY NC ND

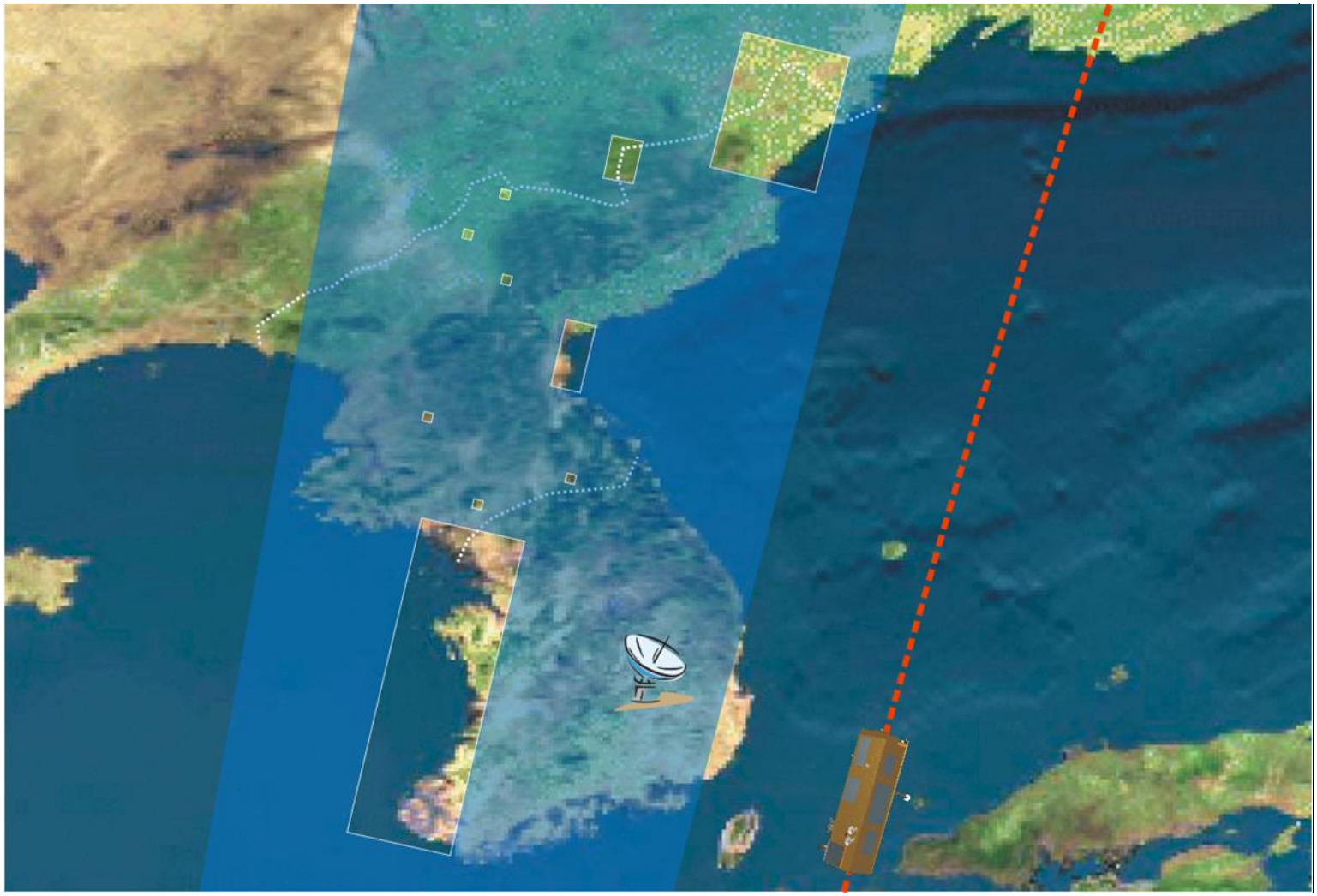
TerraSAR / Tandem-X



Earth Observation: Commercial Satellites

CC BY NC ND

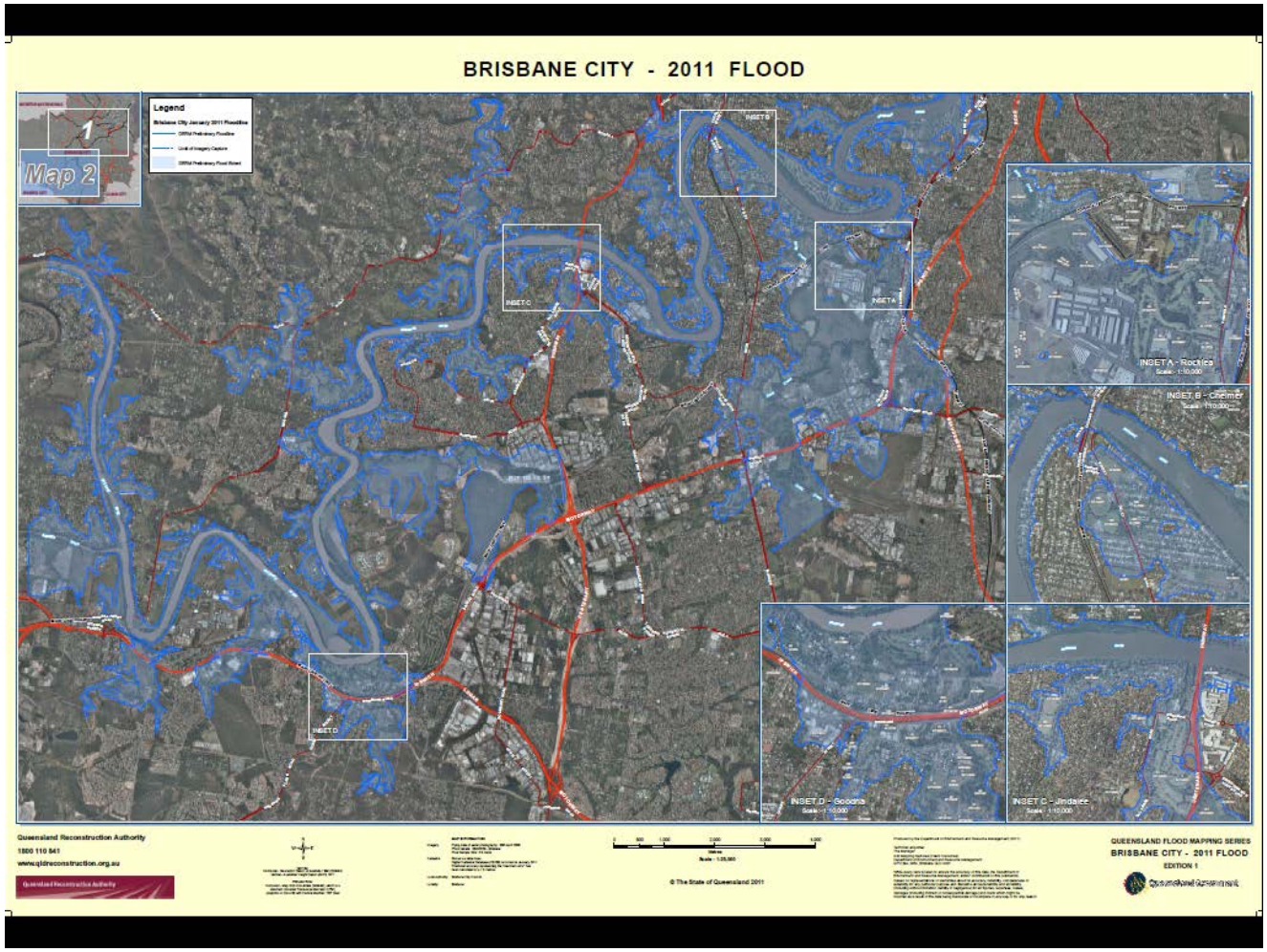
TerraSAR



Earth Observation: Commercial Satellites

CC BY NC ND

Commercial Satellites



Earth Observation

Quelle: http://www.qldreconstruction.org.au

CC BY NC ND

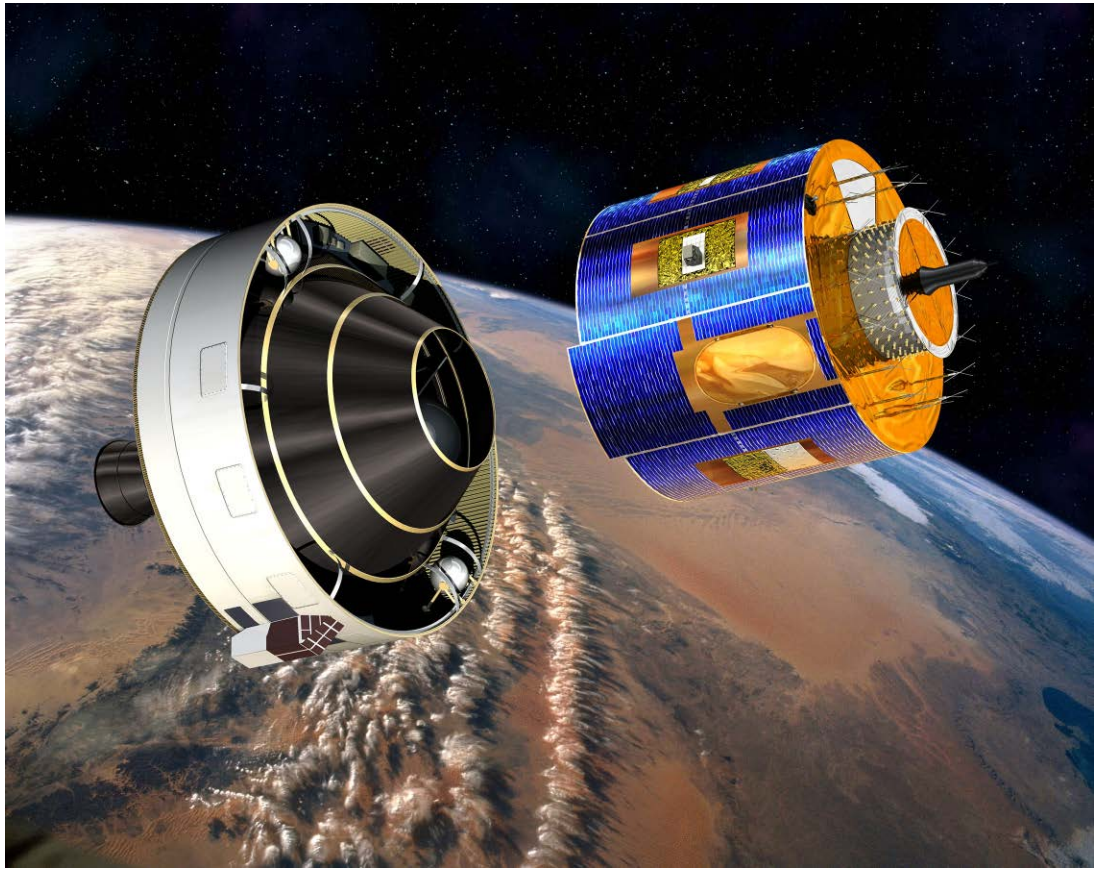
METEOSAT

Earth Observation: Weather

Quelle: ESA

cc BY NC ND

METEOSAT



Earth Observation: Weather

Quelle: ESA

cc BY NC ND

METEOSAT

Earth Observation: Weather

Quelle: ESA

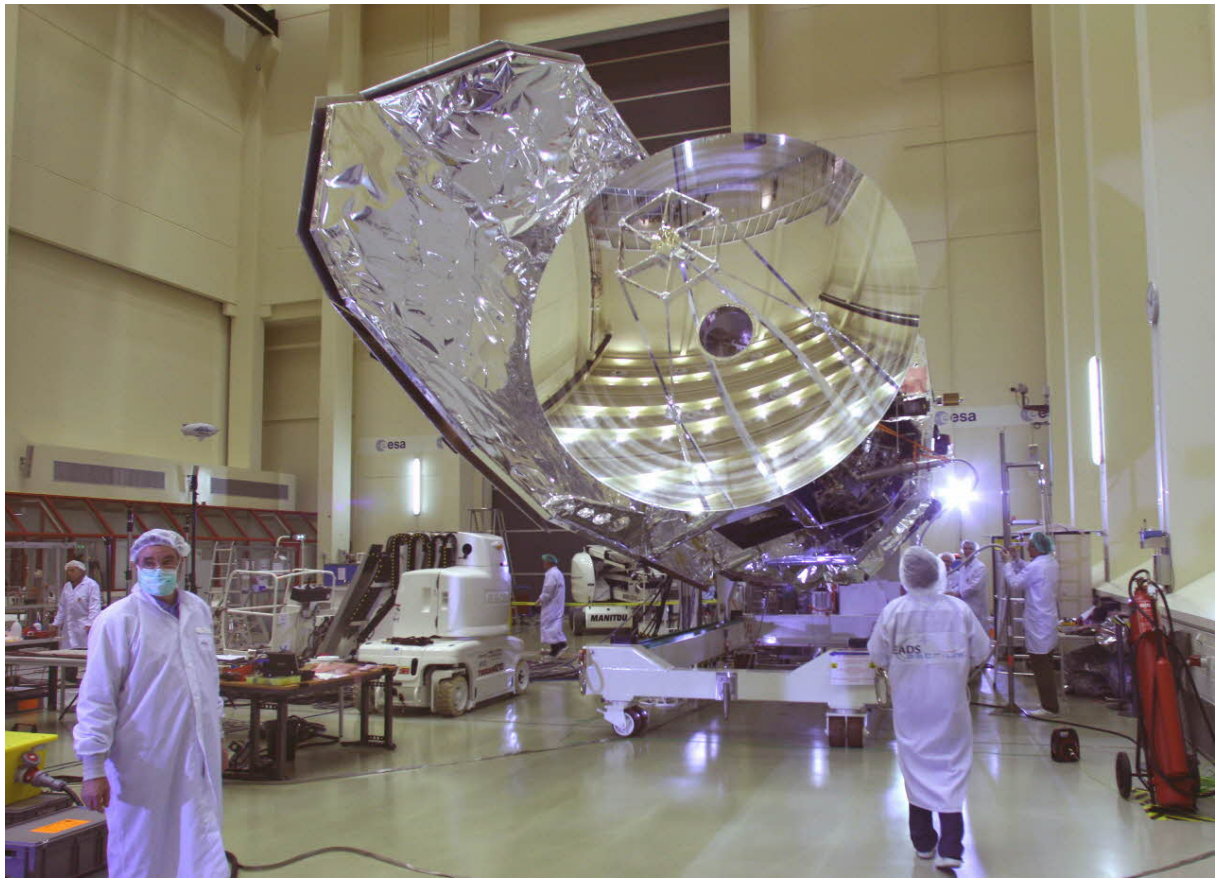
CC BY NC ND

Herschel

Science: Deep Space

CC BY NC ND

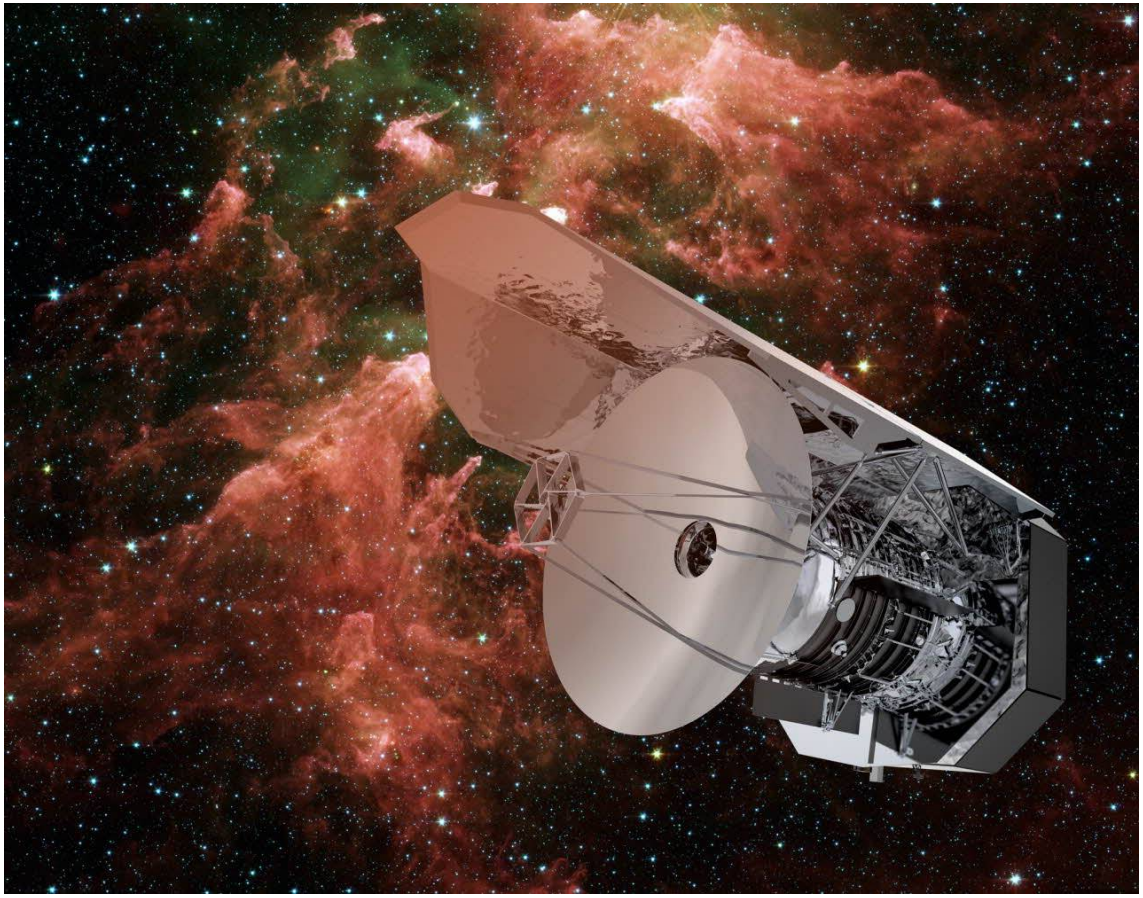
Herschel



Science: Deep Space

cc BY NC ND

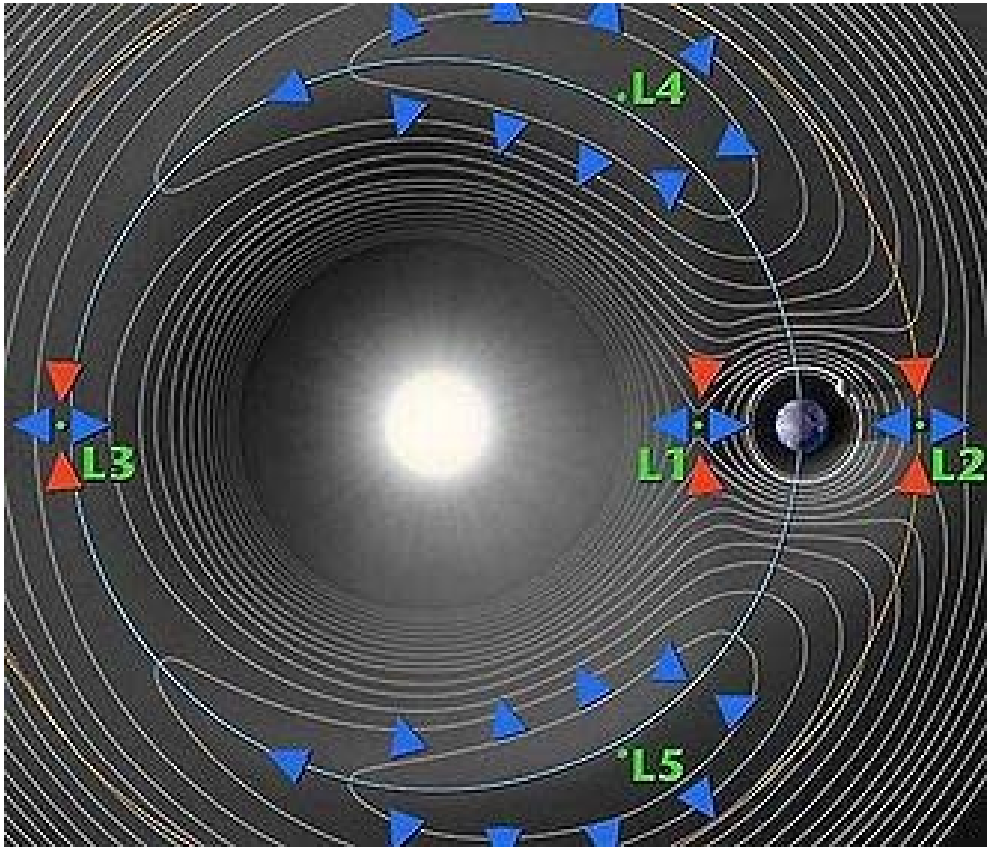
Herschel



Science: Deep Space

CC BY NC ND

Herschel/ Planck



Herschel and Planck are positioned in the Lagrange point L2.

This point is about 1.5 millions kilometers outside of the Earth's orbit. At this point the two satellites are permanently in the earth shadow.

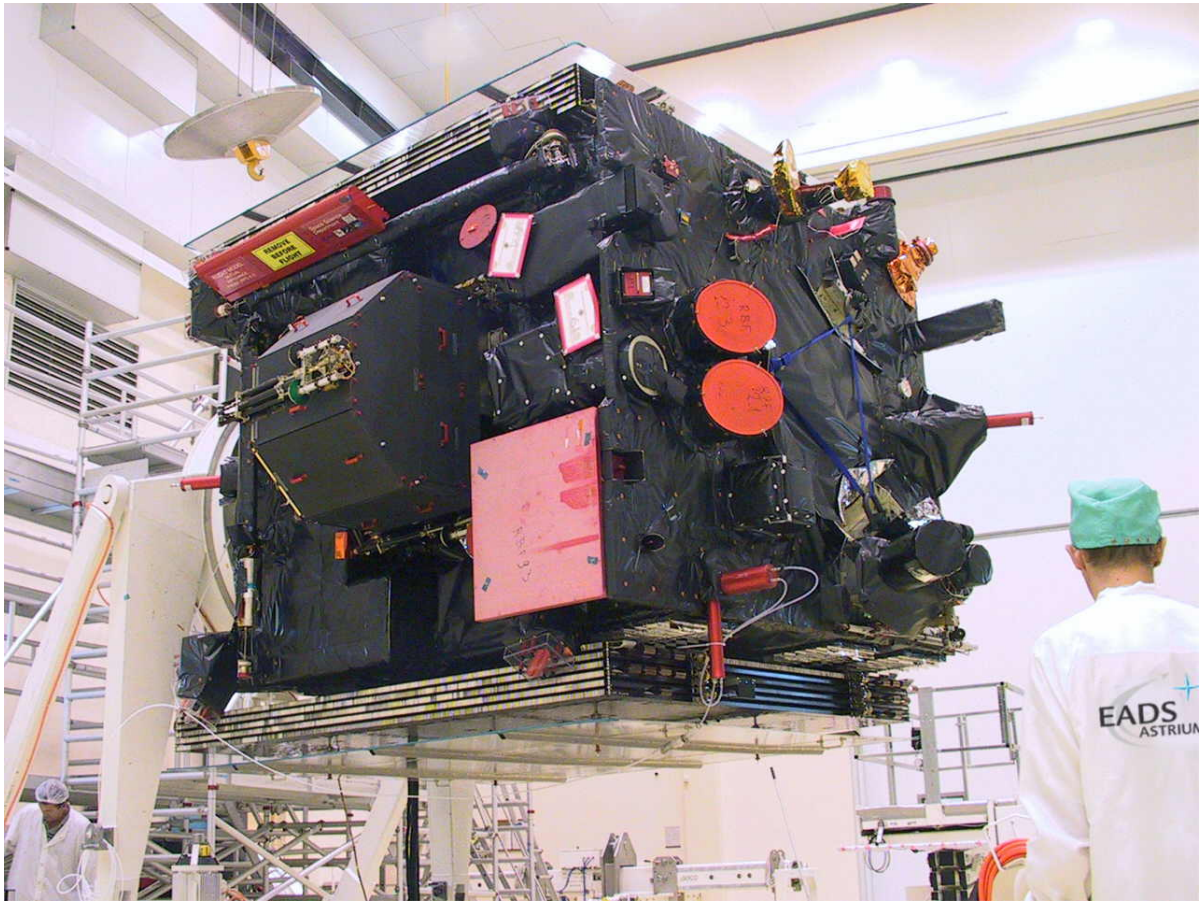
Ariane exposes Herschel and Planck after 1900 seconds.

The two satellites „screw themselves “then into the L2.

Science: Deep Space

cc BY NC ND

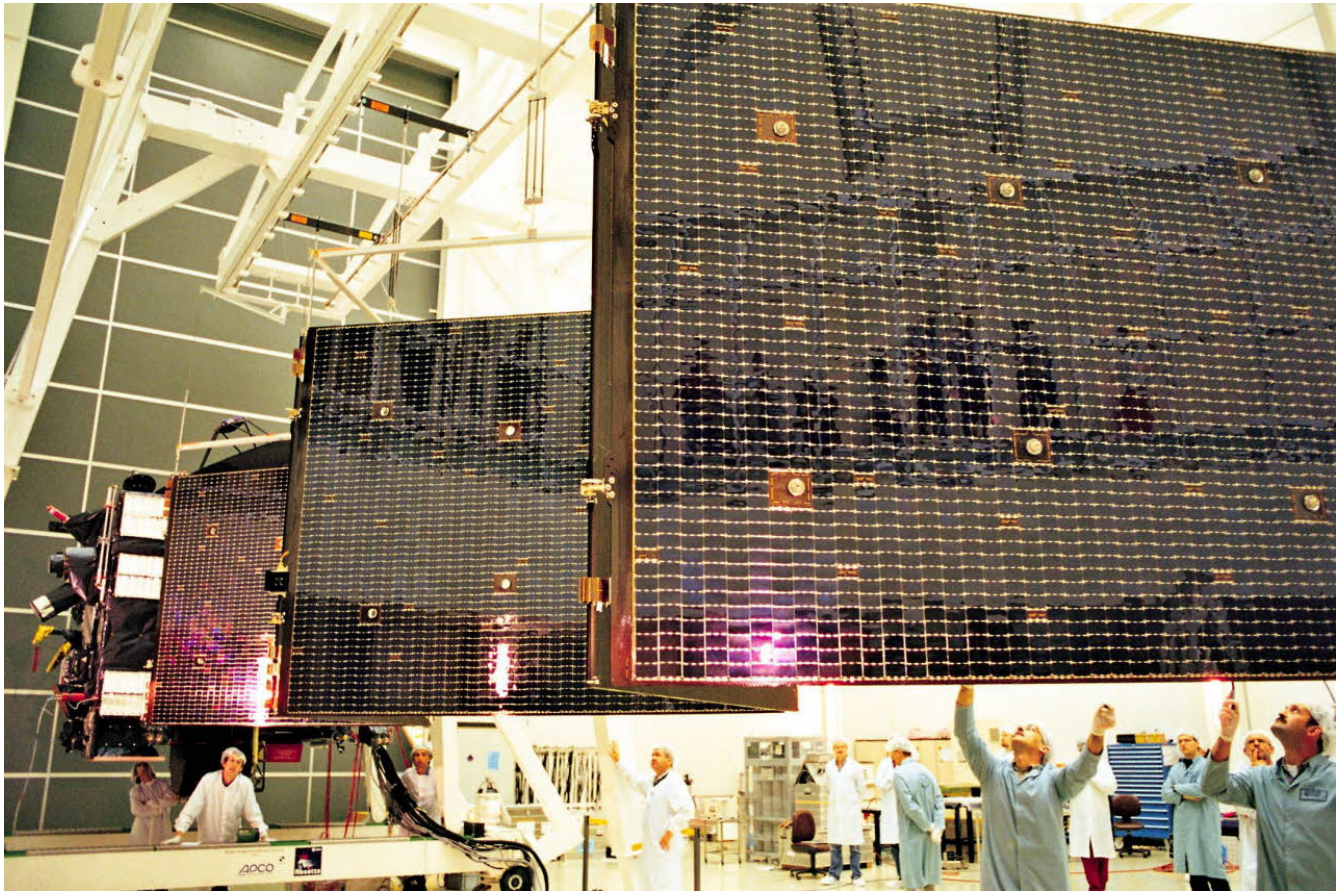
Rosetta



Science: Deep Space

BY NC ND

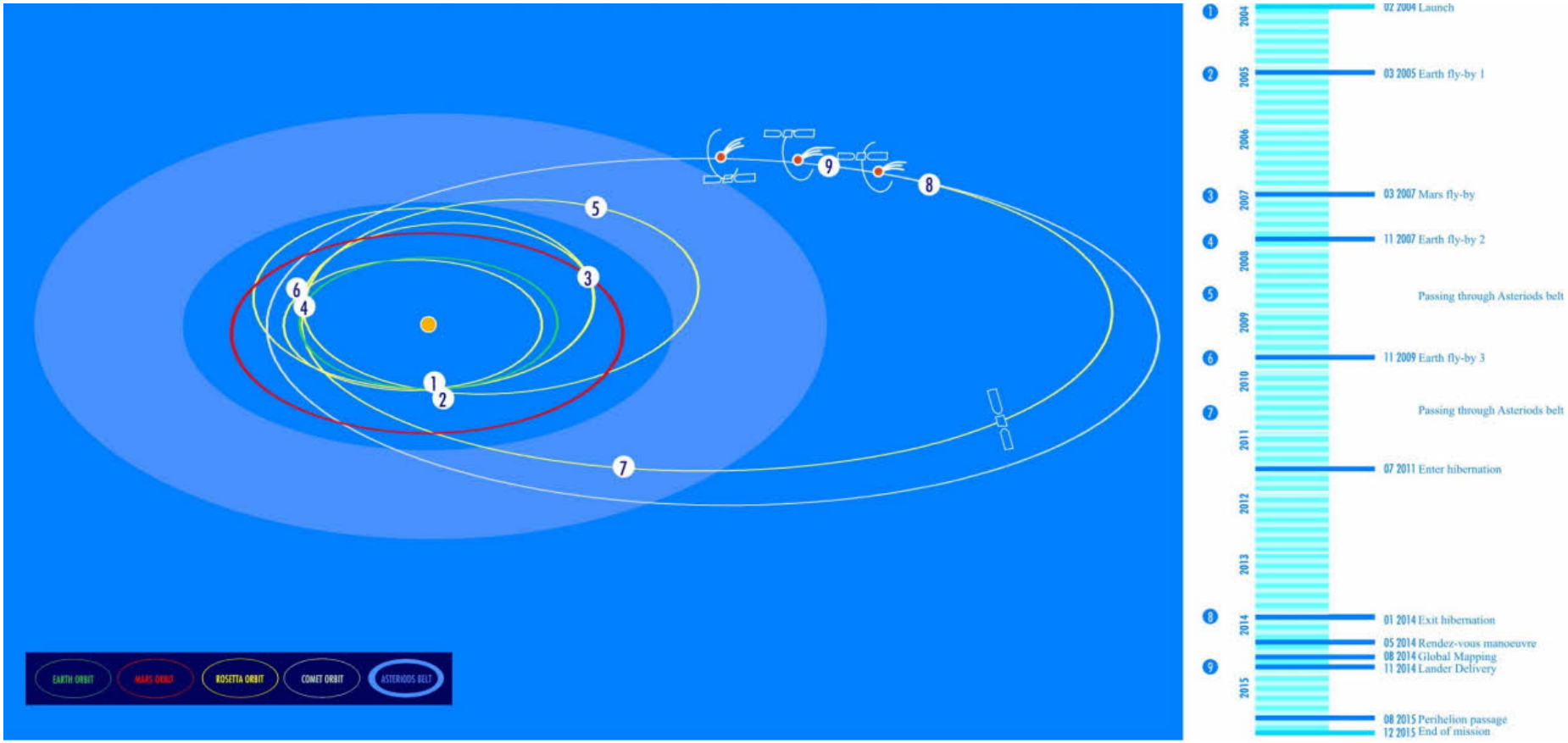
Rosetta



Science: Deep Space

CC BY NC ND

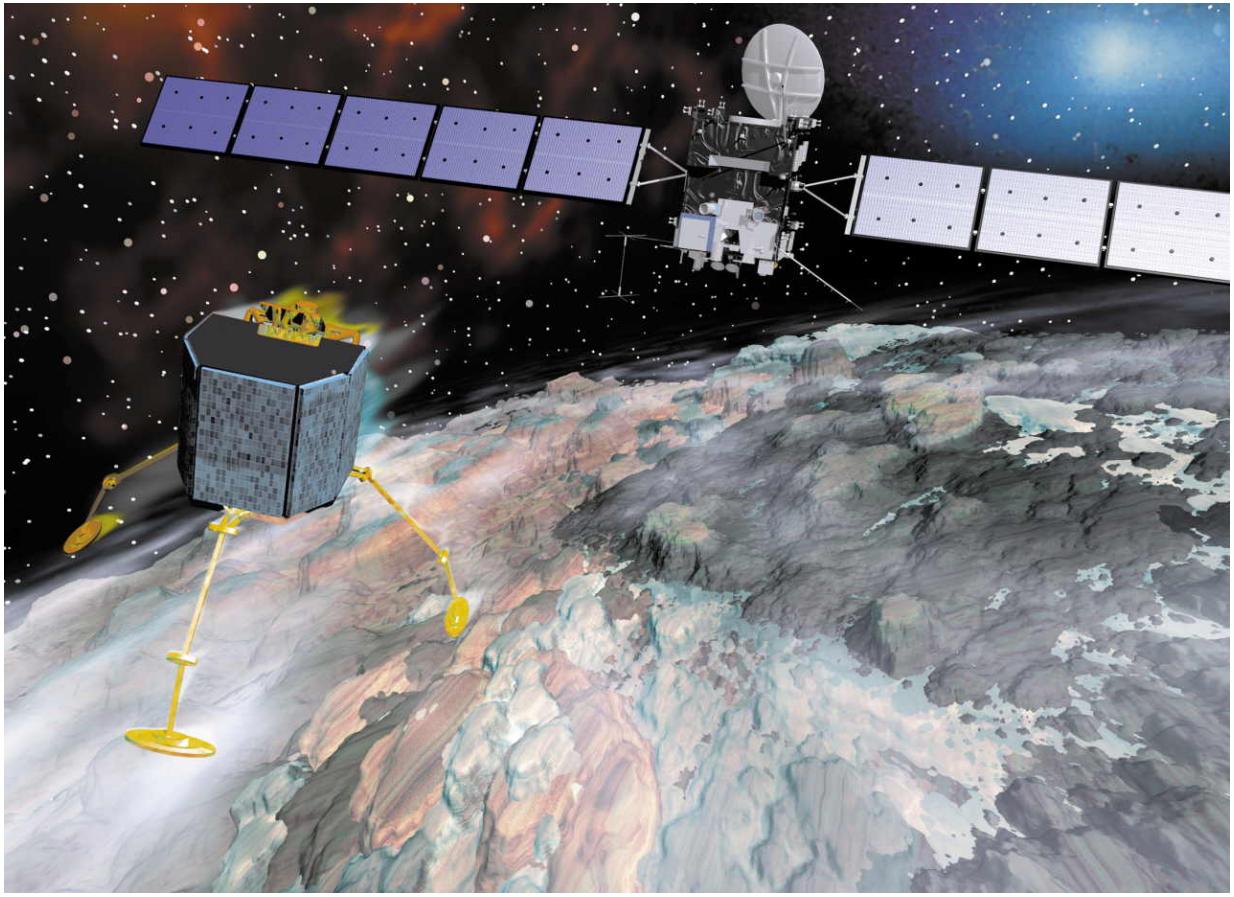
Rosetta



Science: Deep Space

CC BY NC ND

Rosetta



Science: Deep Space

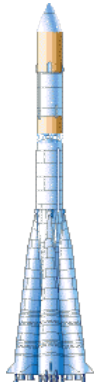
CC BY NC ND

European booster rocket family

Ariane 5 ESC-B

Ariane 5 ESC-A

Ariane 5



Soyuz Starsem

Rockot

Vega

GTO Capability (Double Launch)

12 t	10 t	6 t			
					LEO Capability
> 20 t 300 km - 51° 6			2,5 t / 5 t 1.400 km	1,1 t 700 km	1,5 t 700 km

The launch by the example of a ARIANE 5 flight

Space Transportation

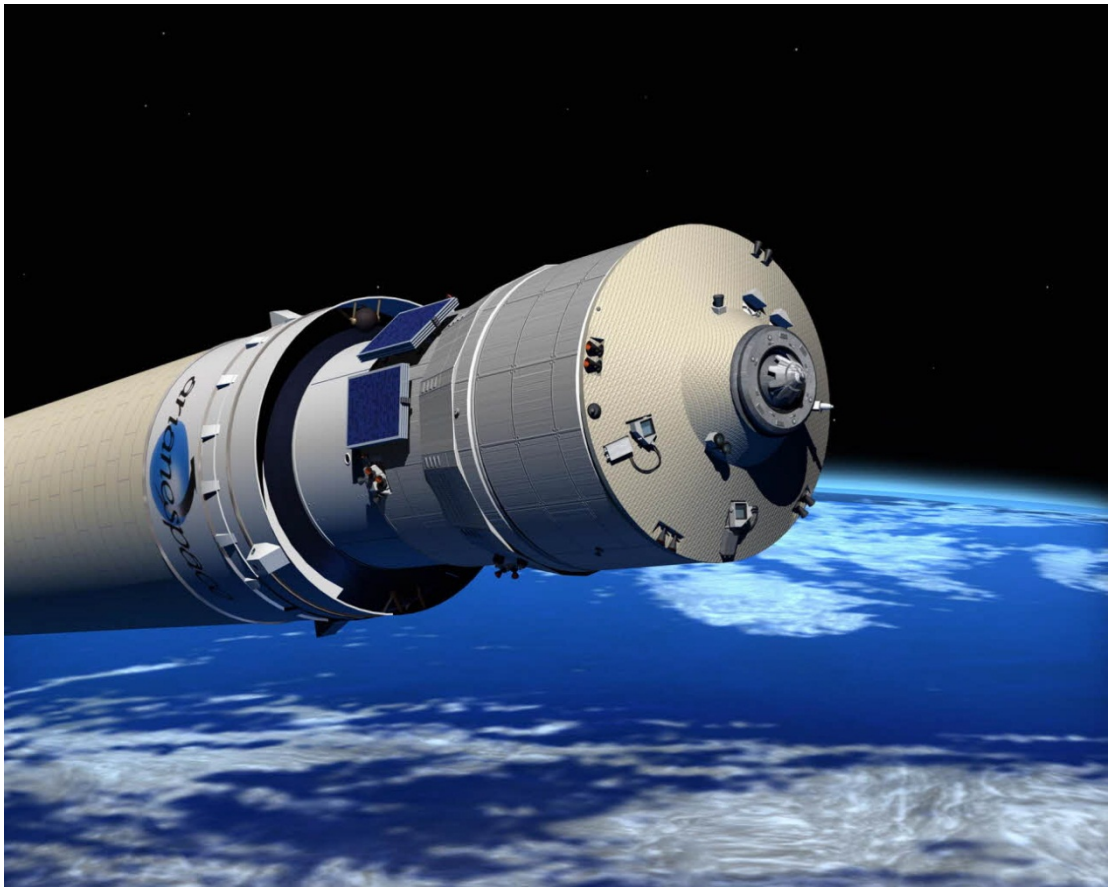
BY NC ND

ATV

Space Transportation

CC BY NC ND

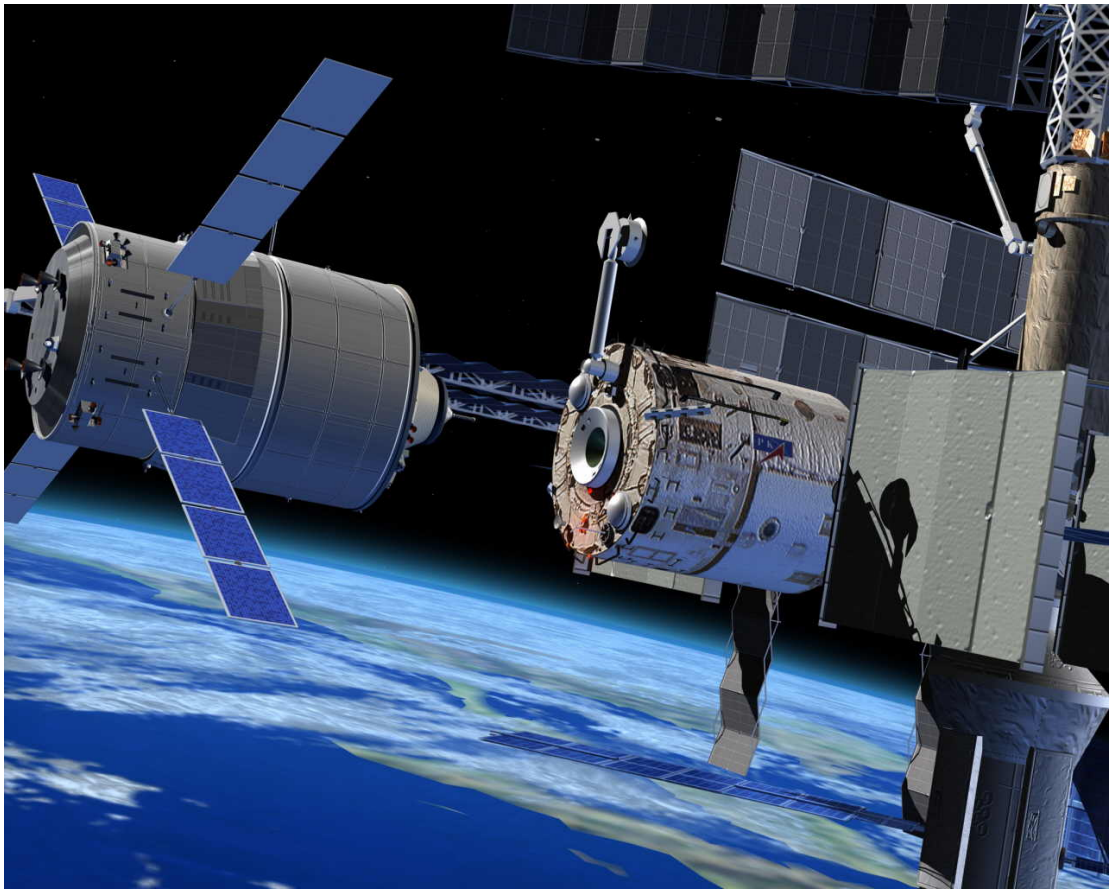
ATV



Space Transportation

CC BY NC ND

ATV



Space Transportation

CC BY NC ND

Columbus

26.03.2009
ISS present configuration -picture taken from the dedocked shuttle Discovery, STS 119

Manned Space

Quelle: http://i.usatoday.net/tech/graphics/iss_timeline/flash.htm

cc BY NC ND

Abbreviations in this Lecture

ATV	Automated Transfer Vehicle
DLR	Deutsches Zentrum für Luft- und Raumfahrt e.V. (German Aerospace Center)
ESA	European Space Agency
ISS	International Space Station
NASA	National Aeronautics and Space Administration
PPP	Public Private Partnership
SME	Small Medium Entities

CC BY NC ND

Web-links und Data Sources for this Lecture

Earth Observation Data
http://www.zki.caf.dlr.de/intro_de.html

Media Archive
http://www.esa.int/

Satellite Visibility
http://www.heavens-above.com

Arianespace Video Archive
http://www.videocorner.tv/index.php?langue=en

ISS History
http://i.usatoday.net/tech/graphics/iss_timeline/flash.htm

cc BY NC ND

Aufgaben für das Selbststudium

1. Seit einiger Zeit werden privat finanzierte Raumfahrtprojekte wie Virgin Galactic diskutiert. Erläutern Sie, vor welchen Herausforderungen insbesondere privat finanzierte Projekte standen, stehen oder stehen können.

2. Welche zusätzlichen geplanten Raumfahrtprojekte sind Ihnen bekannt. Gehen Sie auch auf Besonderheiten der jeweiligen Projektbeispiele ein.

3. Gibt es besondere Unterschiede zwischen Raumfahrtprojekten, z.B. hinsichtlich der Finanzierung (privat vs. staatlich) oder hinsichtlich der planenden und ausführenden Organisation (NASA, ESA, Roskosmos, CNSA)? Wenn ja, welche?

CC BY NC ND

Gastreferent

Dr. Michael Sölter
Certified Senior Project Manager, Level B

Astrium GmbH, Space Transportation
TD32 Defence and Security
P.O.Box 28 61 56
28361 Bremen
Germany

Tel.: +49 (421) 539-5314
Fax.: +49 (421) 539-285314
mobile: +49 (171) 550 5306
Web: http://www.astrium.eads.net
eMail: mailto: Michael.Soelter@astrium.eads.net

Vielen Dank für Ihre Aufmerksamkeit!

In Kooperation mit

Universität Bremen

ZMML
Zentrum für Multimedia in der Lehre

IPMI
Forschungsgruppe Innovation und Kompetenztransfer

GPM Deutsche Gesellschaft für Projektmanagement e. V.

CC BY NC ND