PRESENTING

THALES ALENIA SPACE
#spaceforlife

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JOINT VENTURE

ThalesAlenia Space
a Thales / Leonardo company

THALES (67%)
LEONARDO (33%)

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THALES ALENIA SPACE OPEN

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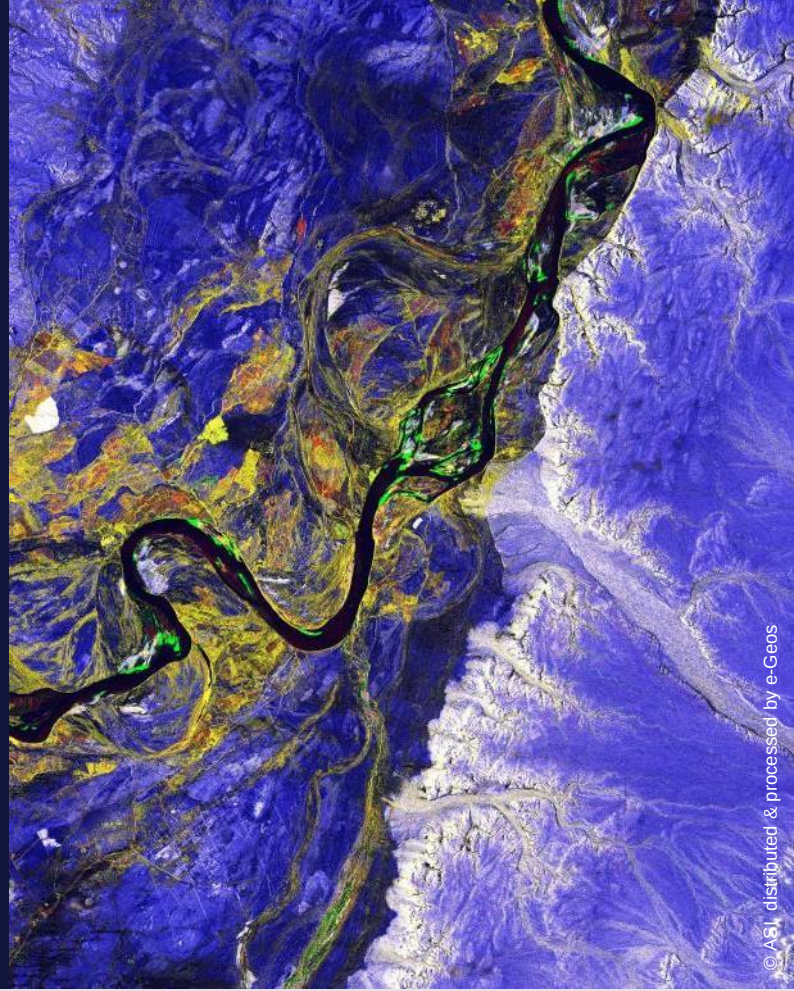
SPACEALLIANCE

Thales Alenia Space teams up with Telespazio to offer a unique combination of expertise covering the entire value chain

System & Services



THALES ALENIA SPACE IN 2021

2.15
BN € SALES

8,900
EMPLOYEES

18 SITES
WORLDWIDE

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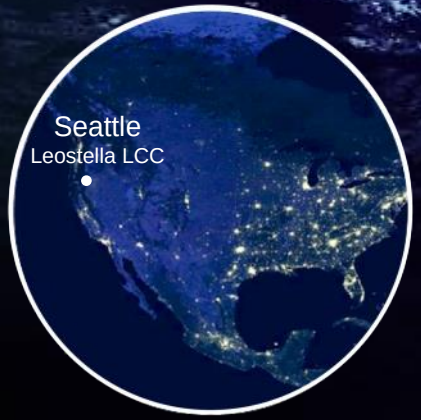
SERVING THE WORLD FROM EUROPE & THE USA



Seattle
Leostella LCC

Belfast
Bristol
Harwell
Leuven
Hasselt
Charleroi
Luxembourg
Warsaw
Stuttgart
Zurich
Toulouse
Gorgonzola
Madrid
Turin
Cannes
L'Aquila
Rome

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PRESENTING

THALES ALENIA SPACE IN SPAIN

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THALES ALENIA SPACE IN SPAIN

1988
YEAR OF FOUNDATION

2500 m²
CLEAN AREA

95 M€
TURNOVER 2021

10%
R&D INVESTMENT

350
EMPLOYEES

600
SATELLITES PARTICIAPTED

4.000
EQUIPMENT DELIVERED

200.000.000
FLIGHT HOURS

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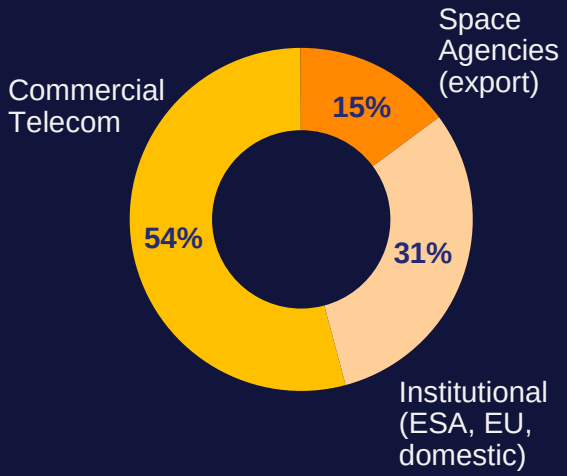
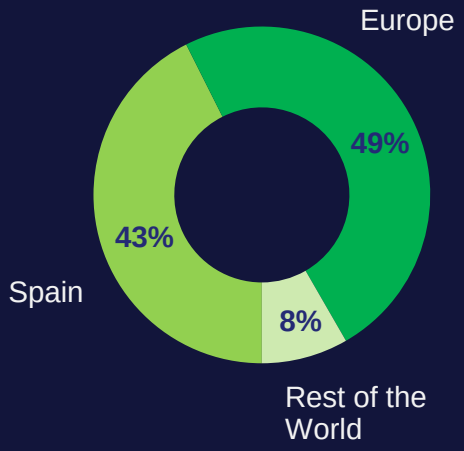
MARKET SEGMENTS

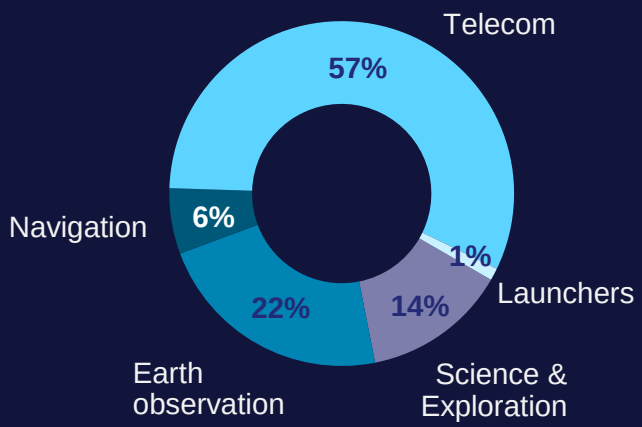
MARKET



CUSTOMER



ACTIVITY



% over turnover 2019 to 2021

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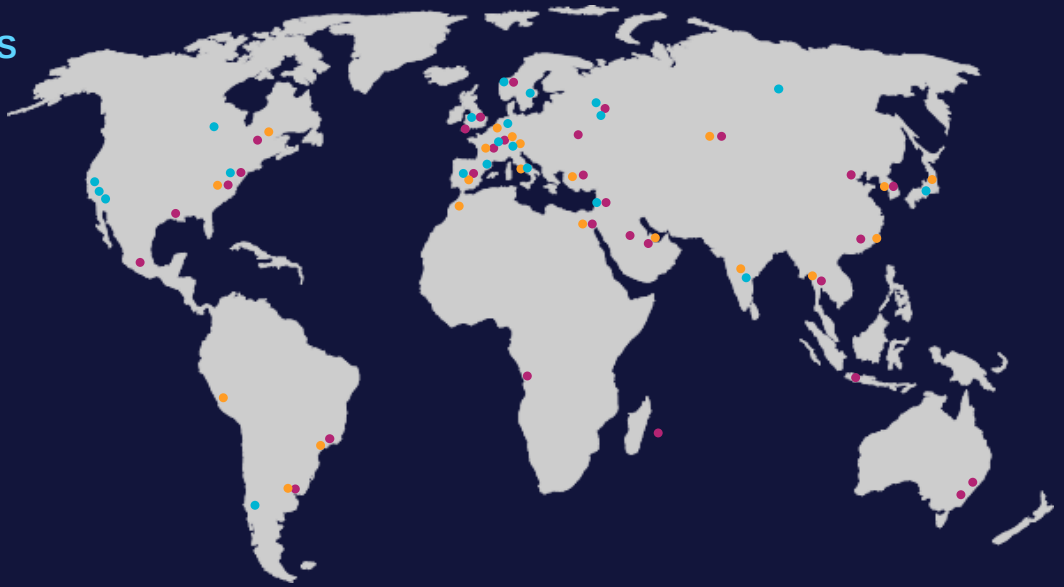
CUSTOMERS

SATELLITE MANUFACTURERS

Airbus
Antwerp Space
Astrobotic
Intuitive Machines
INVAP
ISS Reshetnev
KAI
Khrunichev
Lockheed Martin
Lux Space
Magellan Aerospace
MDA
Mitsubishi Electric
Northrop Grumman
OHB System
QinetiQ
RSC Energia
Space Systems Loral

LAUNCHERS

ArianeGroup
AVIO



SPACE AGENCIES

ASI	CONAE	Eumetsat	ISRO	NASA GSFC
AEB	CSA	GISTDA	JAXA	NASA JSC
CDTI	DLR	INPE	KARI	NOAA
CNES	ESA	INTA	NARSSS	NSPO

SATELLITE OPERATORS

Al Yah Satellite
Amos Spacecom
AngoSat
APT Satellite
Arabsat
Arsat
AsiaSat
Avanti
BTRC
China Satcom
EchoStar
Eutelsat
Gazprom
Globalstar
HellasSat
Hisdesat
Hispasat
Indosat
Inmarsat
Intelsat
Iridium
JSC Kazsat
KT Corporation
Nilesat
O3b
PT Indosat
PT PSN
PT Telekom
Rascom
RSCC
Satmex
SES
SingTel Optus
Star One
Telebras
Telenor
Telesat
Thaicom
Turkmensat
Turksat

#SPACEFORLIFE

SPACE… TO CONNECT

414

Telecom satellites

TO OBSERVE & PROTECT

134

Earth observation satellites

TO EXPLORE

42

Science & exploration missions

TO TRAVEL & NAVIGATE

22

Navigation satellites

ACCESS TO SPACE

18

Launchers & space vehicles

SOLUTIONS SPANNING THE FULL VALUE CHAIN

/// EQUIPMENT

- Radiofrequency / Digital electronics / Data processing

/// SUBSYSTEMS

- TT&C and data transmission
- Optical detection and image processing

/// PAYLOADS AND INSTRUMENTS

- Telecommunication
- Optical observation and science instruments

/// SOFTWARE AND GROUND SEGMENT

- Satellite networks management / Launchers ground segment
- On-board SW / Artificial Intelligence

LEADERSHIP OF COMPLEX SYSTEMS

/// CONSORTIUM LEADERSHIP

- Large industrial consortiums / Subcontractors' management

/// SYSTEMS ENGINEERING

- Architecture definition / Technical analysis and budgets
- Equipment specification

/// MECHANICAL & THERMAL ENGINEERING

- Structures and panels layout
- Thermal design and control

/// ASSEMBLY, INTEGRATION & TEST (AIT)

- Test plans & procedures / Test benches
- AIT in ISO 8 / ISO 5 clean rooms

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PRODUCTION & AIT CAPACITIES

/// EQUIPMENT AND SUBSYSTEMS CLEAN ROOM

- Equipment manufacturing and test (ISO 8)
- Subsystems manufacturing and test (ISO 8)
- Optical detection laboratory (ISO 5)

/// MANUFACTURING MEANS

- Automated warehouse
- SMD assembly and soldering / Varnishing
- Automated inspection

/// TEST MEANS

- Test benches
- Environmental tests: Thermal vacuum / EMC / Vibration

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SATELLITE AIT FACILITIES

///CLEAN ROOM (ISO 8)

- 600 m^2 area
- 12.5 m free height
- 2 bridge cranes (12t capacity)

///AIT OF LARGE SPACE SYSTEMS

- Satellites
- Payloads
- Earth observation and science instruments

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REFERENCES
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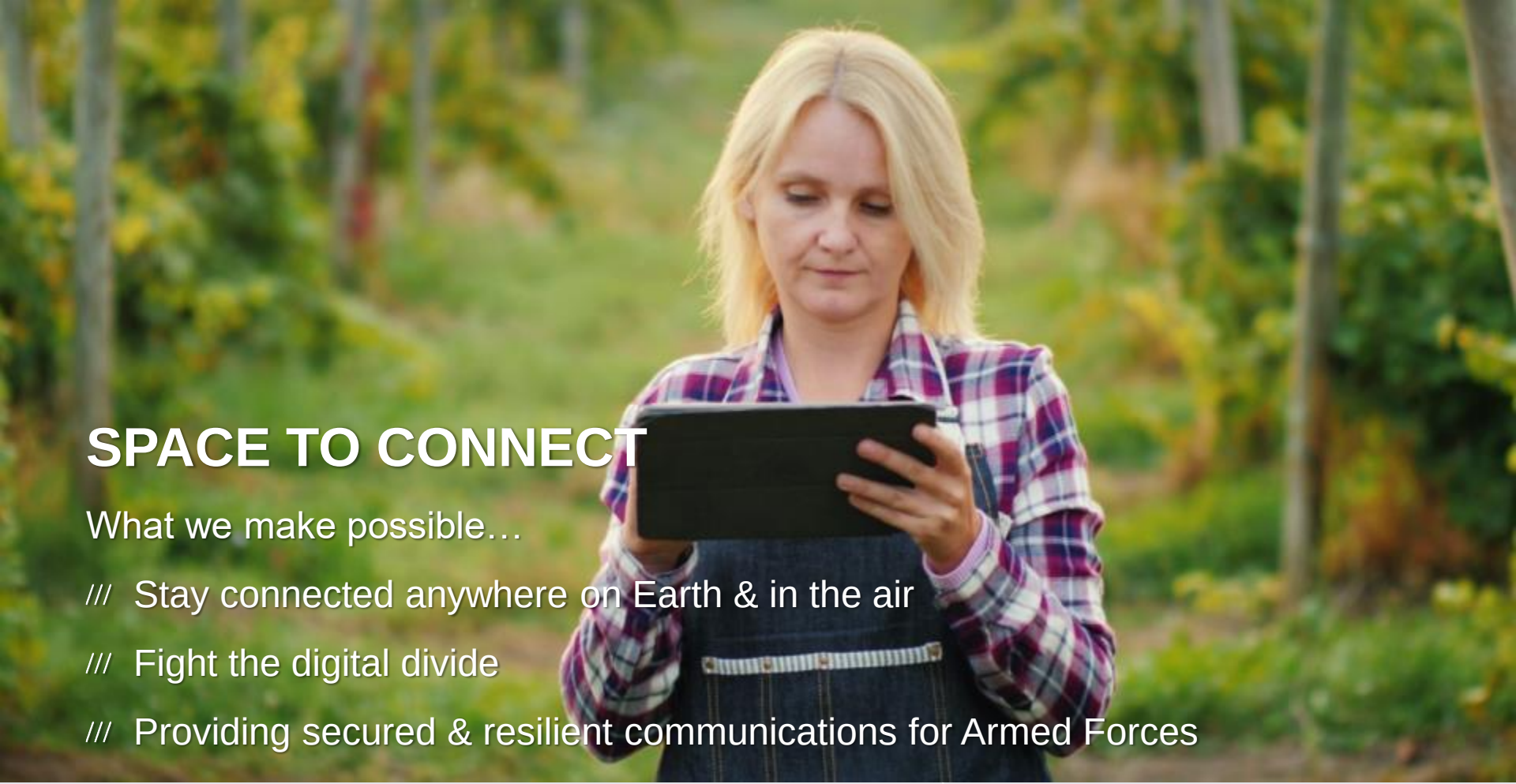

SPACE TO CONNECT

What we make possible…

/// Stay connected anywhere on Earth & in the air

/// Fight the digital divide

/// Providing secured & resilient communications for Armed Forces

SPAINSAT NG

/// SECURED COMMUNICATIONS FOR THE ARMED FORCES

- New generation system for governmental communications
- 2 high-capacity satellites in different GEO orbits
- Services in UHF, X and military-Ka bands

/// Communications payloads

- Leadership of the UHF and Ka band payloads
- Communications Module AIT
- Development of critical units: UHF processor, Hilink, TT&C and radiofrequency units

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HIGH THROUGHPUT AND FLEXIBLE SATELLITES

/// BRIDGE THE DIGITAL DIVIDE / IN-FLIGHT CONNECTIVITY / 5G / DTH …

- Radiofrequency equipment for the communications payloads
- PRODIGE: software-defined digital processors (transparent and regenerative)
- Hilink: high speed service link to control the digitally processed VHTS payloads
- SpaceGate NMS: network management system for the ground segment

Amazonas Nexus

KONNECT VHTS

ASTRA 1Q / Intelsat 41 & 44

- Spacebus NEO: very high throughput satellites (VHTS)
- Space Inspire®: software defined satellites

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CONSTELLATIONS

/// CONNECTIVITY AROUND THE GLOBE

- Thales Alenia Space has built all the satellite communications constellations currently operative: Globalstar 2 / O3b Networks / Iridium® NEXT
- Selected by Telesat to build its Low Earth Orbit broadband 298-satellite constellation Lightspeed™

/// Equipment mass production

- Digital electronics and radiofrequency units
- Technical leadership of the on-board processor (OBP) of Iridium® NEXT, core of the system

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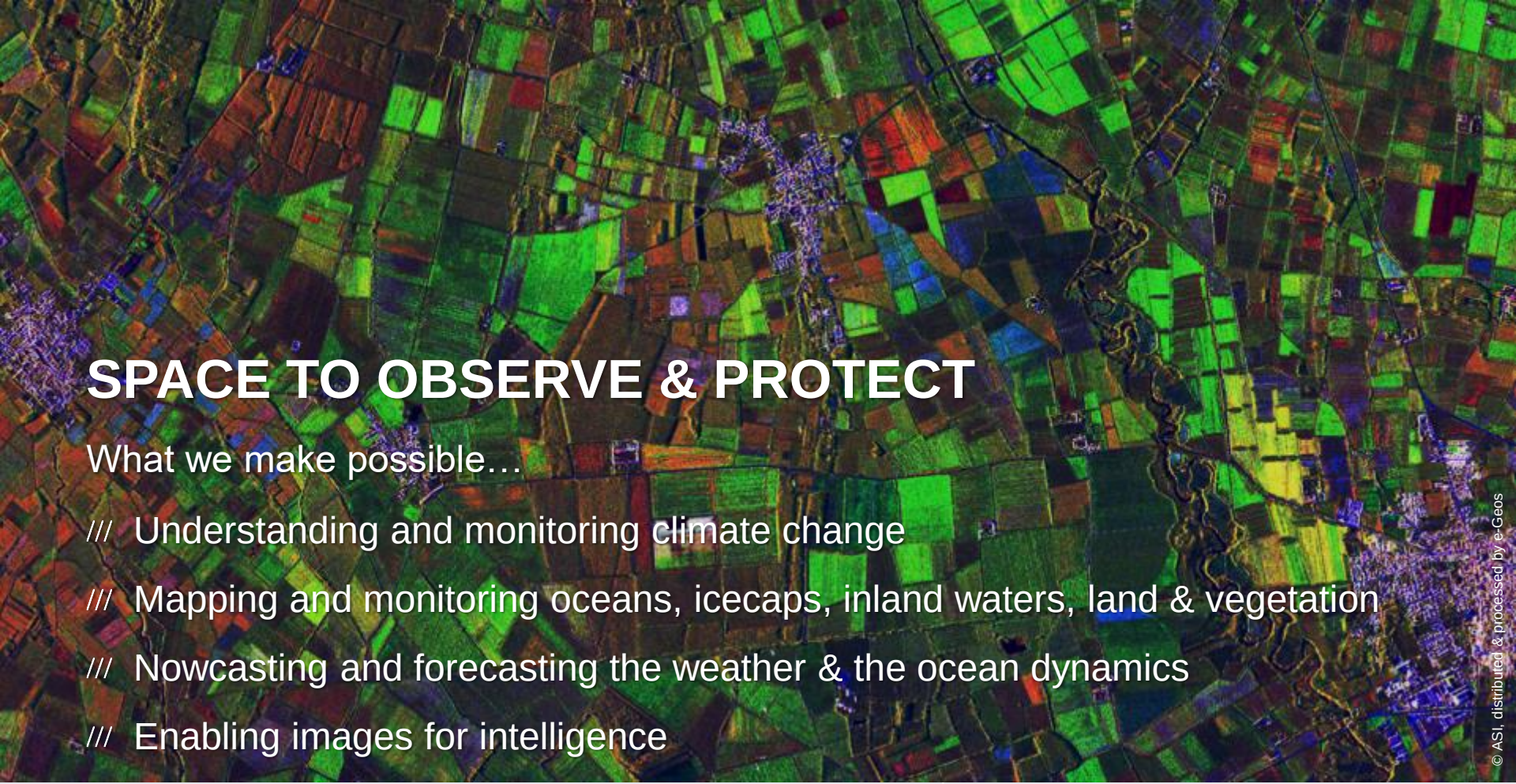

SPACE TO OBSERVE & PROTECT

What we make possible…

/// Understanding and monitoring climate change

/// Mapping and monitoring oceans, icecaps, inland waters, land & vegetation

/// Nowcasting and forecasting the weather & the ocean dynamics

/// Enabling images for intelligence

MTG (METEOSAT)

/// All Meteosat geostationary satellites were built by Thales Alenia Space as prime contractor (1st, 2nd & 3rd generations)

- MTG is the most innovative and complex geostationary meteorological system ever built
- Formed by 4 imager satellites (MTG-I) and 2 atmospheric sounder satellites (MTG-S)
- It will provide 20 years of services

/// Communications & instrument electronics

- TT&C and image transmission subsystems
- Video control units (VCU) and data processing units (DPU) of the flexible combined imager (FCI) and infrared sounder (IRS) instruments

COPERNICUS

/// ENVIRONMENT AND CLIMATE MONITORING

- Thales Alenia Space is prime contractor for Sentinel 1 & 3, CHIME, CIMR & ROSE-L missions; the payloads for Sentinel 6 (Jason-CS), CO2M & CRISTAL; and the image ground segment of Sentinel 2

/// Main supplier of Copernicus

- Participation in Sentinel 1, 2, 3, 5 & 6 and the six Copernicus expansion missions (CO2M, LSTM, CRISTAL, CHIME, ROSE-L & CIMR)
- TT&C and data transmission subsystems
- CIMR radiometer calibration assembly
- Electronics and radiofrequency units for instruments and satellite platforms

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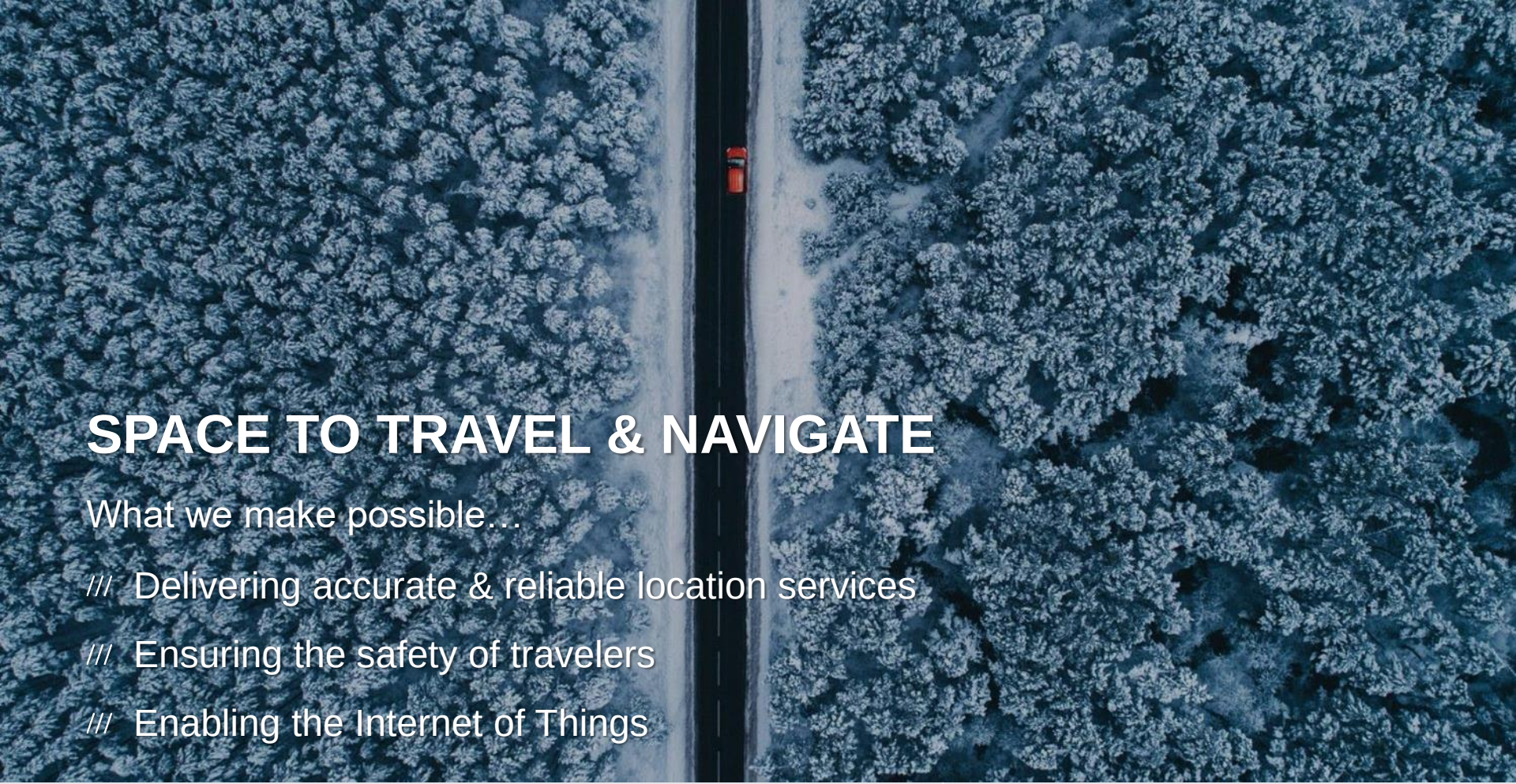

SPACE TO TRAVEL & NAVIGATE

What we make possible…

/// Delivering accurate & reliable location services

/// Ensuring the safety of travelers

/// Enabling the Internet of Things

GALILEO SECOND GENERATION

/// INCREASED ROBUSTNESS AND ACCURACY

- Thales Alenia Space builds 6 second gen. satellites
- Improved service availability and higher accuracy
- Robustness to interference, jamming & cyber

/// Communications & critical technologies

- Satellite core team member as responsible for Communications
- Subsystems: TT&C, inter-satellite links (ISL) and timing (navigation clocks)
- Critical technologies: TT&C transponder (SBAT), ISL processor, C-band receptor (CBAR), clock monitoring and control units (CMCU-II)
- Support to system engineering and AIT

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SPACE TO EXPLORE

What we make possible…

/// Living & working off-Earth

/// Exploring our solar system & understanding our Universe

/// On-orbit servicing

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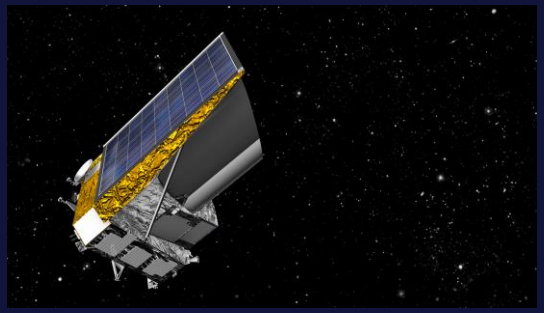
UNDERSTANDING OUR UNIVERSE

/// ASTROPHYSICS AND ASTRONOMY MISSIONS AT THE L2 LAGRANGE POINT

- X and K band communications systems to control the spacecraft and send science data to Earth, at 1.500.000 km distance

Euclid

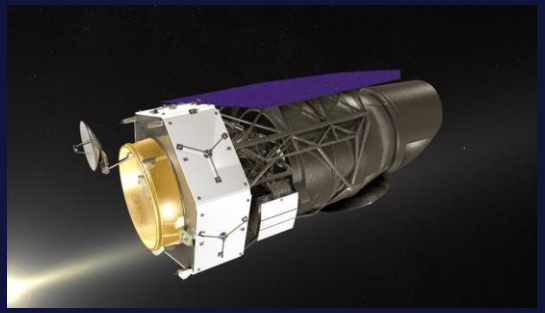


- ESA mission to study dark matter & energy and help understand the accelerated expansion of the Universe

PLATO

- ESA mission to study extrasolar planetary systems, especially terrestrial type planets in the habitable zone

WFIRST



- NASA space infrared telescope (more powerful than Hubble) for astronomy and astrophysics

A NEW ERA IN THE EXPLORATION OF THE MOON

/// ENABLING EARTH-MOON COMMUNICATIONS

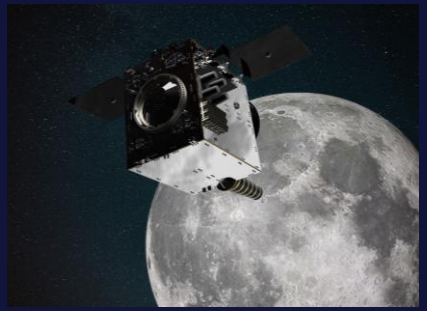
Landers

- Lunar landers for NASA CLPS program
- NOVA-C IM-1 & IM-2 (Intuitive Machines)
- GRIFFIN (Astrobotic)

VIPER

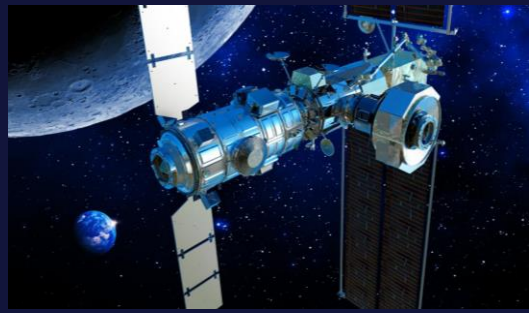
- NASA rover to search for ice water in the south pole of the Moon

Orbiters



- KPLO (Korea space agency, KARI)
- Lunar Communications satellite (Intuitive Mach.)

Lunar Gateway



- Orbital station of Artemis program, laboratory & habitat for astronauts
- Thales Alenia Space is prime contractor of I-HAB & ESPRIT modules, and subcontractor for HALO

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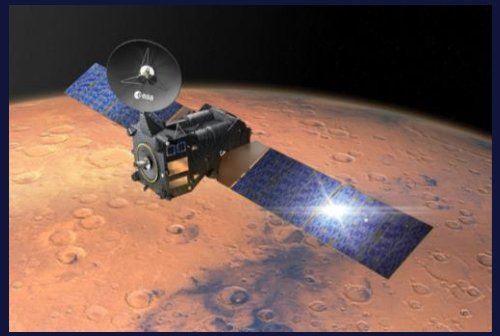
IS THERE LIFE ON MARS?

/// THALES ALENIA SPACE IS EXOMARS PRIME CONTRACTOR & KEY PARTNER IN MSR

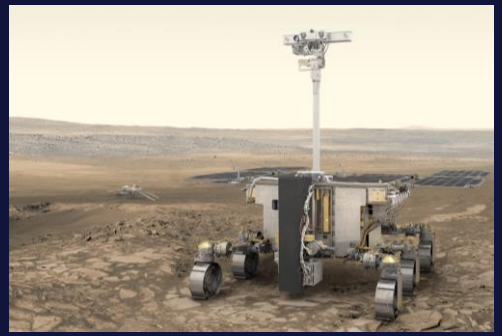
- ADE: actuator drive electronics to control the Rosalind Franklin rover mobility on the Martian surface, the solar panels deployment and the camera movement
- RFDN: radiofrequency distribution networks, for the spacecraft communications with Earth

ExoMars 2016



- TGO orbits Mars searching for trace gases (methane)

ExoMars 2022



- First ESA rover, will analyze soil samples digging 2 meters deep

Mars Sample Return

- International mission to send Martian samples back to Earth

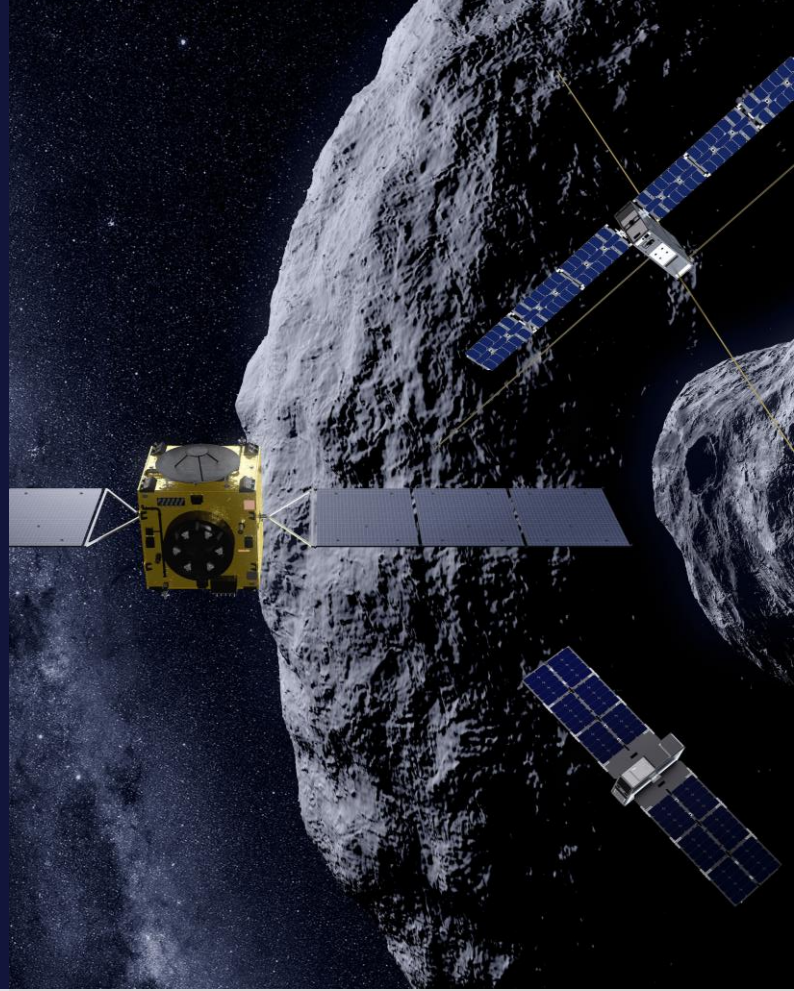
HERA

/// PLANETARY DEFENSE MISSION

- To find out if it is feasible to deviate a hazardous asteroid on a collision course to Earth
- NASA's DART spacecraft will collide with Dimorphos (160 m wide), the smallest of the two asteroids of the Didymos binary system
- ESA's HERA mission will then carry out a detailed, a posteriori analysis of the asteroid's property to determine the impact's effect on its orbit

/// Communications at 500 million km

- Communications system to control the spacecraft and send back to Earth all data collected by the mission



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ACCESS TO SPACE

What we make possible…

/// Launchers to place satellites into orbit

/// Space transport vehicles to guarantee the supply of the International Space Station

© ESA

INTERNATIONAL SPACE STATION (ISS)

/// SECURE COMMUNICATIONS FOR SPACE VEHICLES

- The only European supplier of spread spectrum transponders certified by NASA (TDRSS)
- Facilitating the communications of the cargo vehicles via geostationary data relay satellites, and through proximity links with the ISS during the approach & rendezvous maneuvers

ISS

- International Space Station

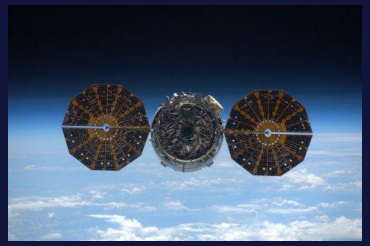
ATV

- European cargo vehicle (ESA)

HTV

- Japanese cargo vehicle (JAXA)

Cygnus



- NASA cargo vehicle

Space Rider

- Future European atmospheric reentry vehicle

LAUNCHERS

/// GUARANTEEING EUROPE'S ACCESS TO SPACE

- New generation of telemetry transmitters for Ariane 6 and Vega launchers
- Extension of the radiofrequency fiber optic communication system for the Ariane 6 launch pad (ELA4) - Interface with the satellites during all phases of the launch

Ariane 6

Vega

Puerto Espacial (Kourou)

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WHAT OUR CUSTOMERS SAY

/// THE SATISFACTION OF OUR CUSTOMERS IS OUR BEST REWARD

KARI (GEO-KOMPSAT-2)

SS/L

CONAE (SAOCOM 1A)

Northrop Grumman (Cygnus): "*Thank you for the exhibited excellence and dedication to the units completion and delivery*"

CNES (CSO): "*Thanks to the whole team for the success of the launch and start of the mission*"

Eutelsat (KONNECT): "*Thanks for the good job performed and the result achieved, which is recognized as not an easy task*"

ESA (Sentinels): "*Thanks for the efforts and the results achieved, involving the management of three different customers*"

SES (SES 17): "*Thanks for the detailed information provided and for the efficiency of the CDR three months in advance*"

Eumetsat, Airbus (MetOp): "*Thanks for the professionalism and the response to the technical issues*"

JPL-NASA (ATV certification): "*This is the best piece of hardware we've ever tested*"

ESA, CDTI (Ingenio): "*You have displayed the full excellence of your company and the quality and personal dedication of each member of the team in all aspects*"

GSFC-NASA (PACE, WFIRST): "*Thanks to the team for an excellent review and wonderful hospitality*"

INPE (Amazonia 1): "*Congratulations for the excellent job*"

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