



# OPTICAL LASER SATELLITE COMMUNICATIONS

PHOTONICS TO ENABLE THE NEXT GENERATION OF LASER COMMUNICATION TERMINALS

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# › OVERVIEW

## OF OPTICAL LASER COMMUNICATIONS

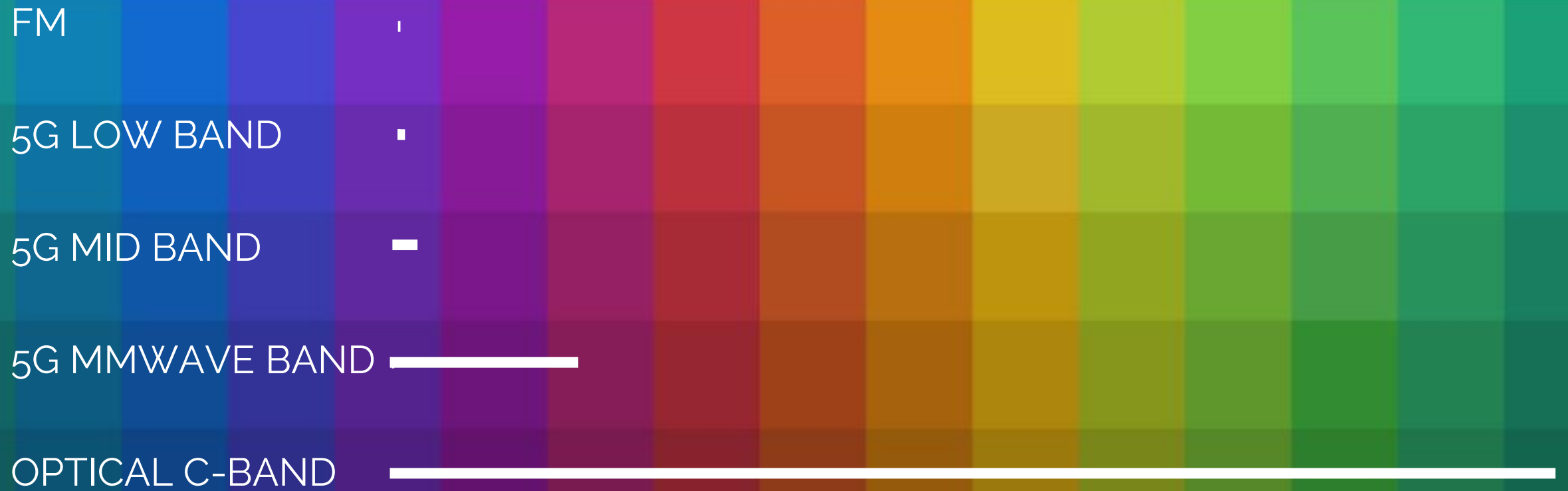
WHY THE BENEFITS

WHAT USE CASES

HOW KEY CHALLENGES

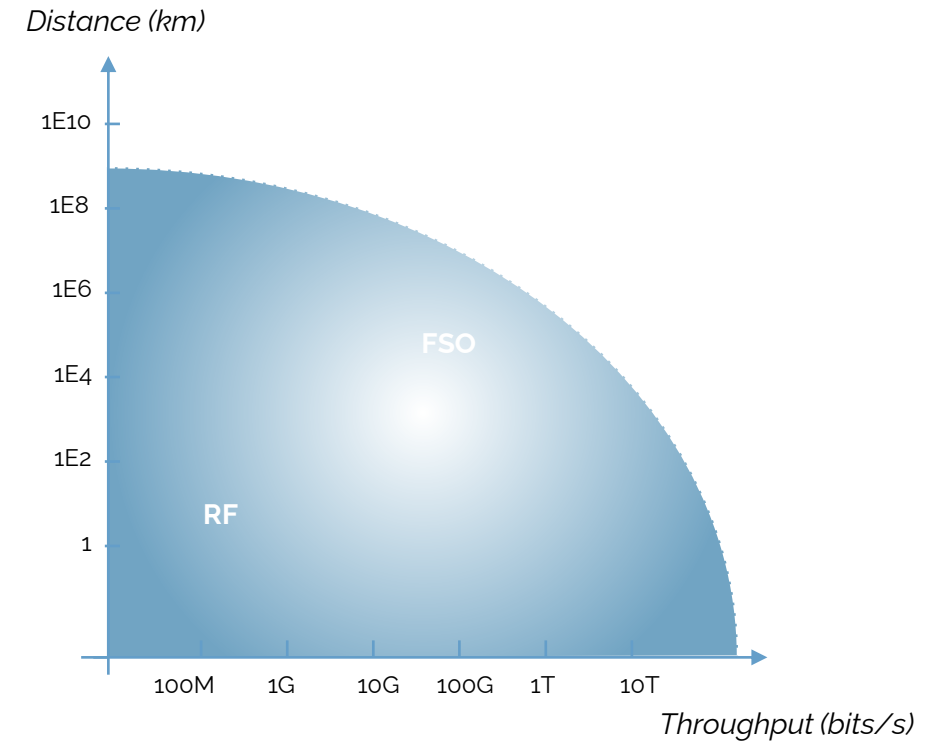
NEXT OPPORTUNITIES

# SPECTRUM COMPARISON



## THE BENEFITS OF OPTICAL LASER COMMUNICATIONS

- High-throughput
- High-security
- License-free
- Low-interference
- Low energy-per-bit
- Ease of installation



# CHALLENGES

## OF OPTICAL LASER COMMUNICATIONS

### PERFORMANCE CHALLENGES

- Availability – limited by weather conditions
- Connectivity – direct line of sight
- Eye safety – limit on transmit power
- Latency – dependent on the distance

### TECHNOLOGICAL CHALLENGES

- Acquisition, tracking & pointing
- Atmospheric turbulence & robustness
- Modem & DSP design for Gbps/Tbps links

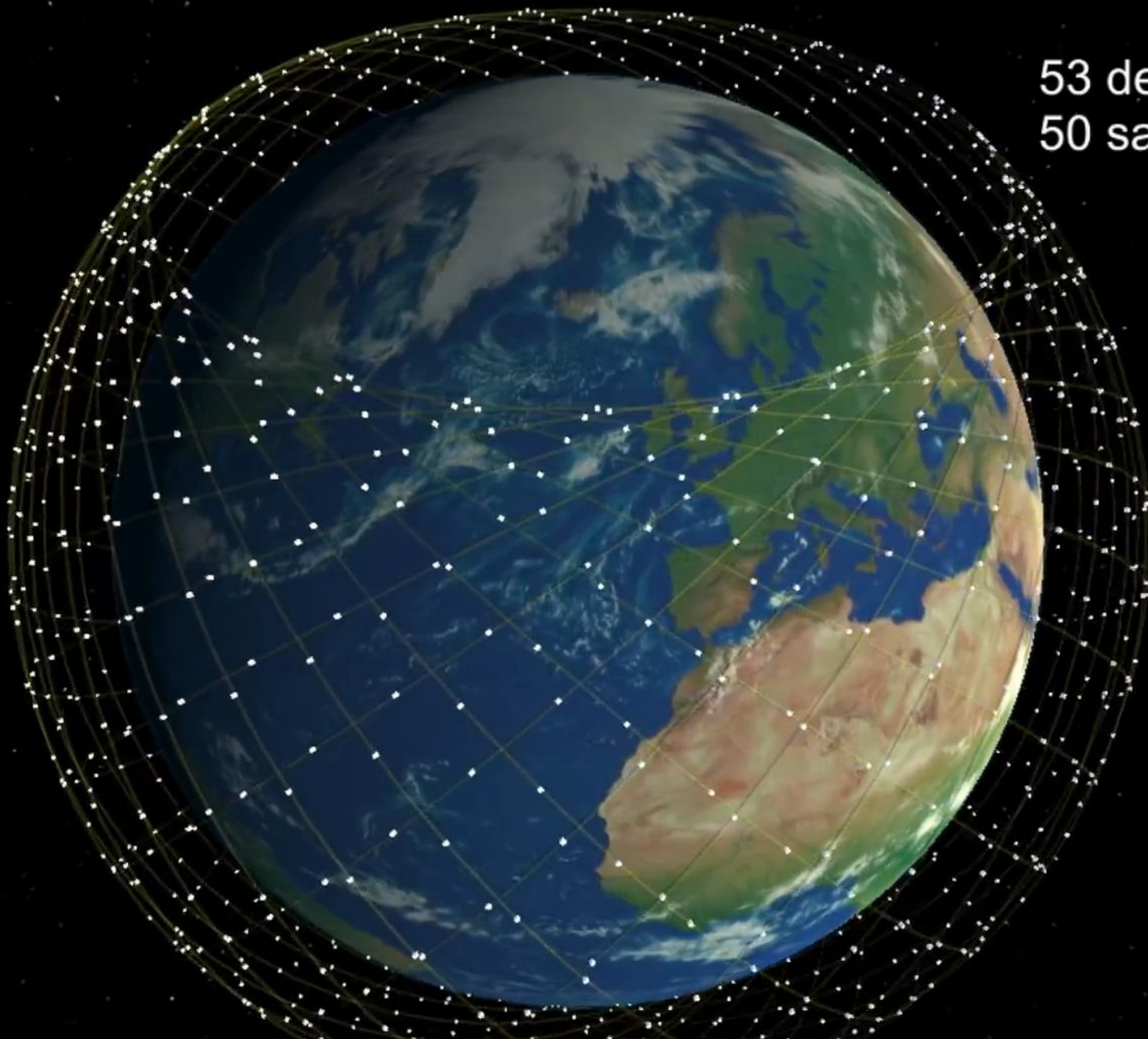






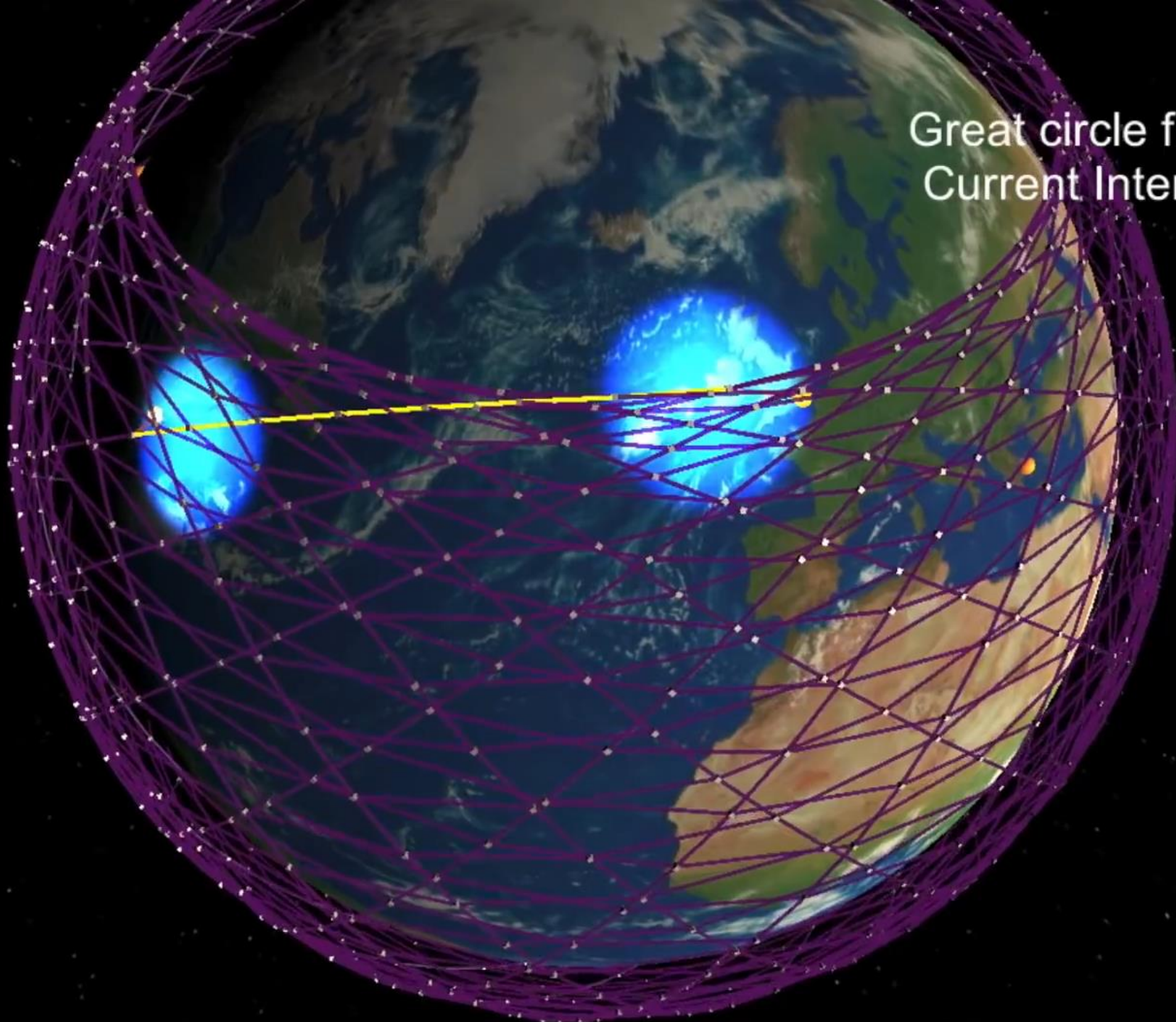
VIDEO ►

32 orbital planes  
53 degrees inclination  
50 satellites per plane  
1150km altitude





VIDEO ►



Sat dist: 7009

Sat RTT: 46ms

Great circle fibre RTT: 55ms

Current Internet RTT: 76ms

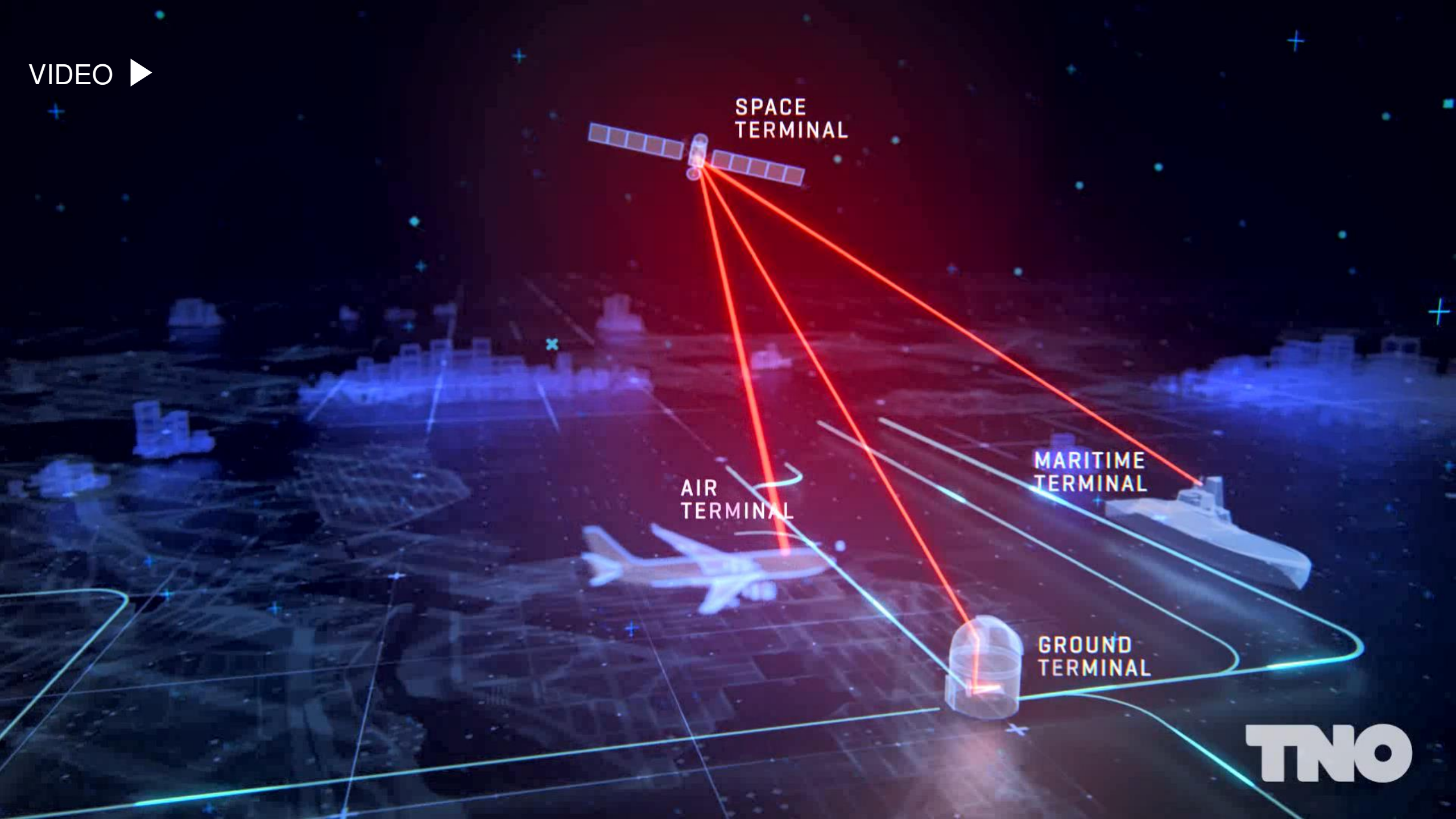


VIDEO ►

TO ENABLE HIGH THROUGHPUT  
OPTICAL FEEDER LINKS,  
CONNECTING GROUND NETWORKS  
TO TELECOM SATELLITES

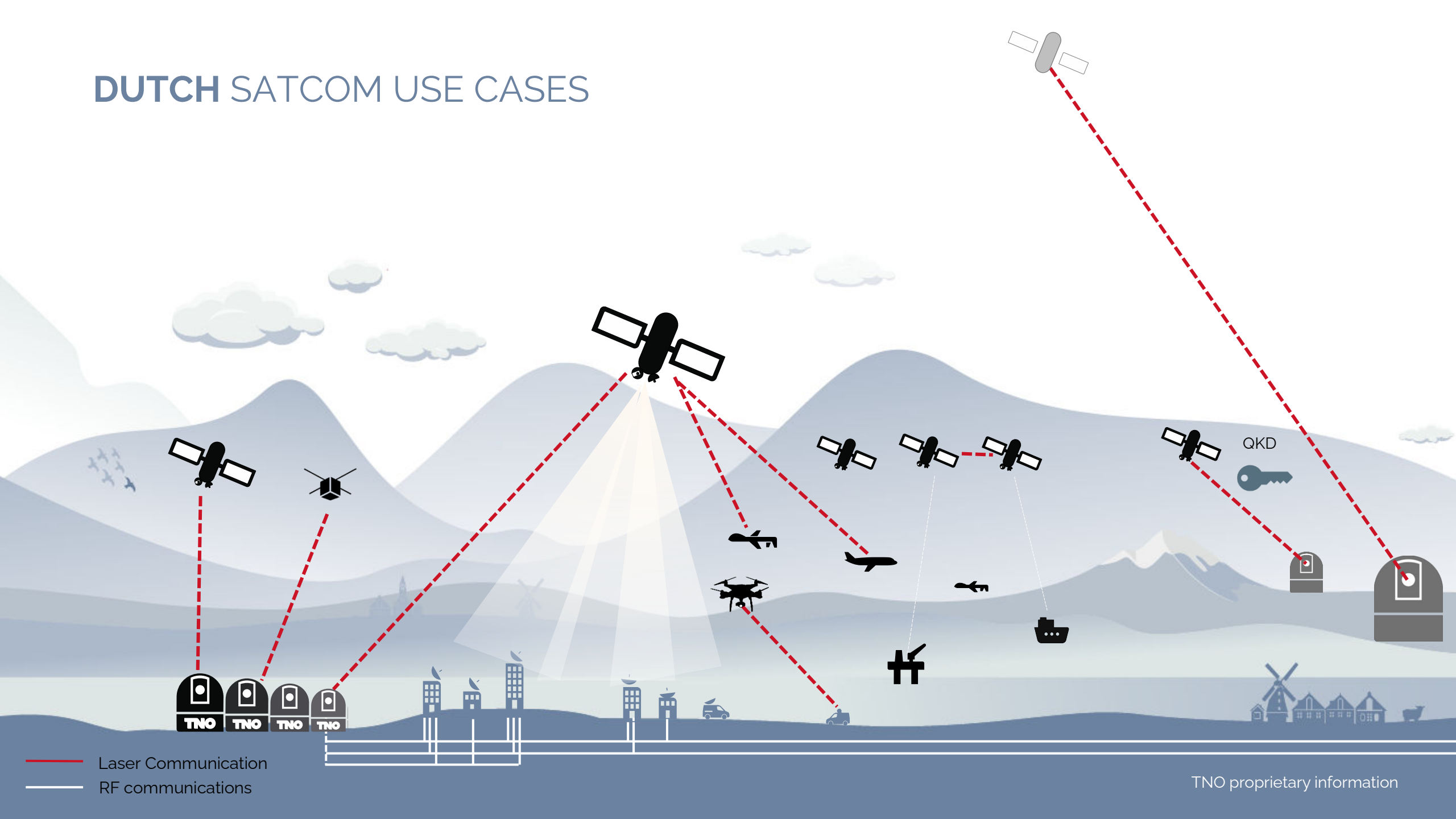
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VIDEO ►



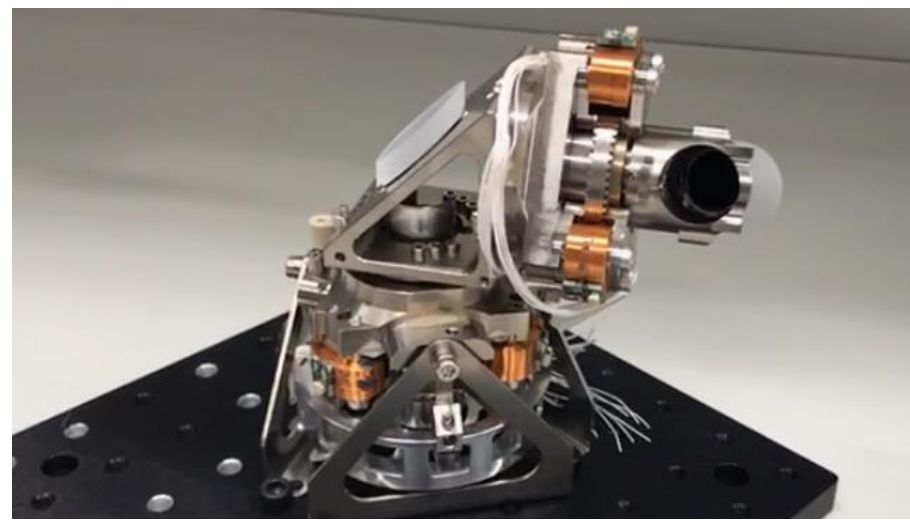
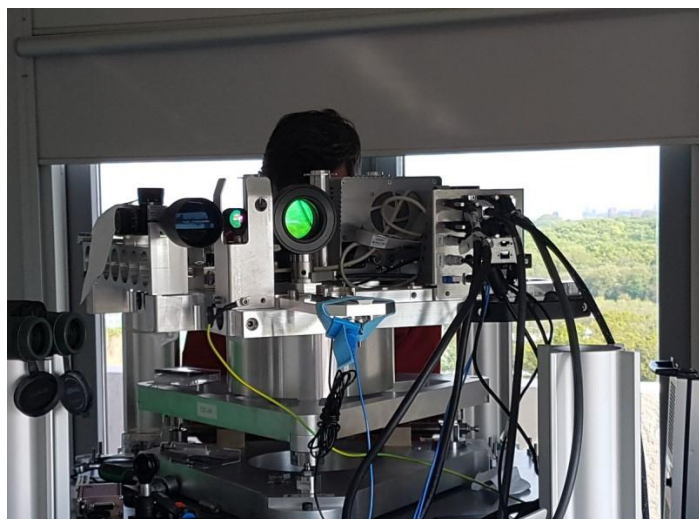
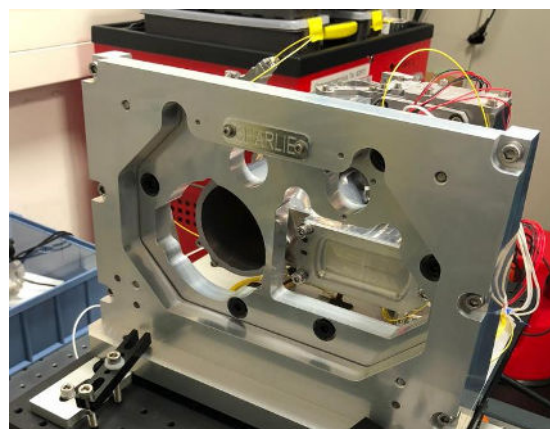
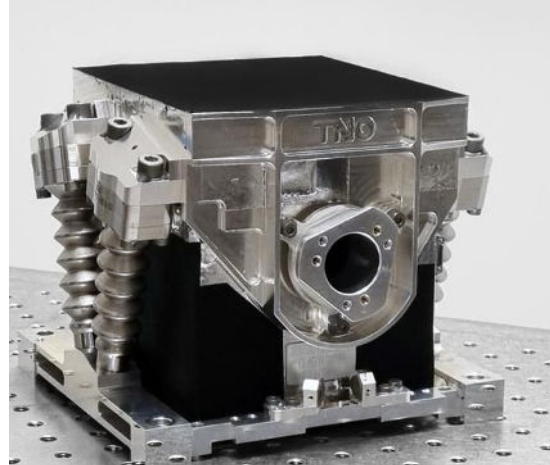
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# DUTCH SATCOM USE CASES

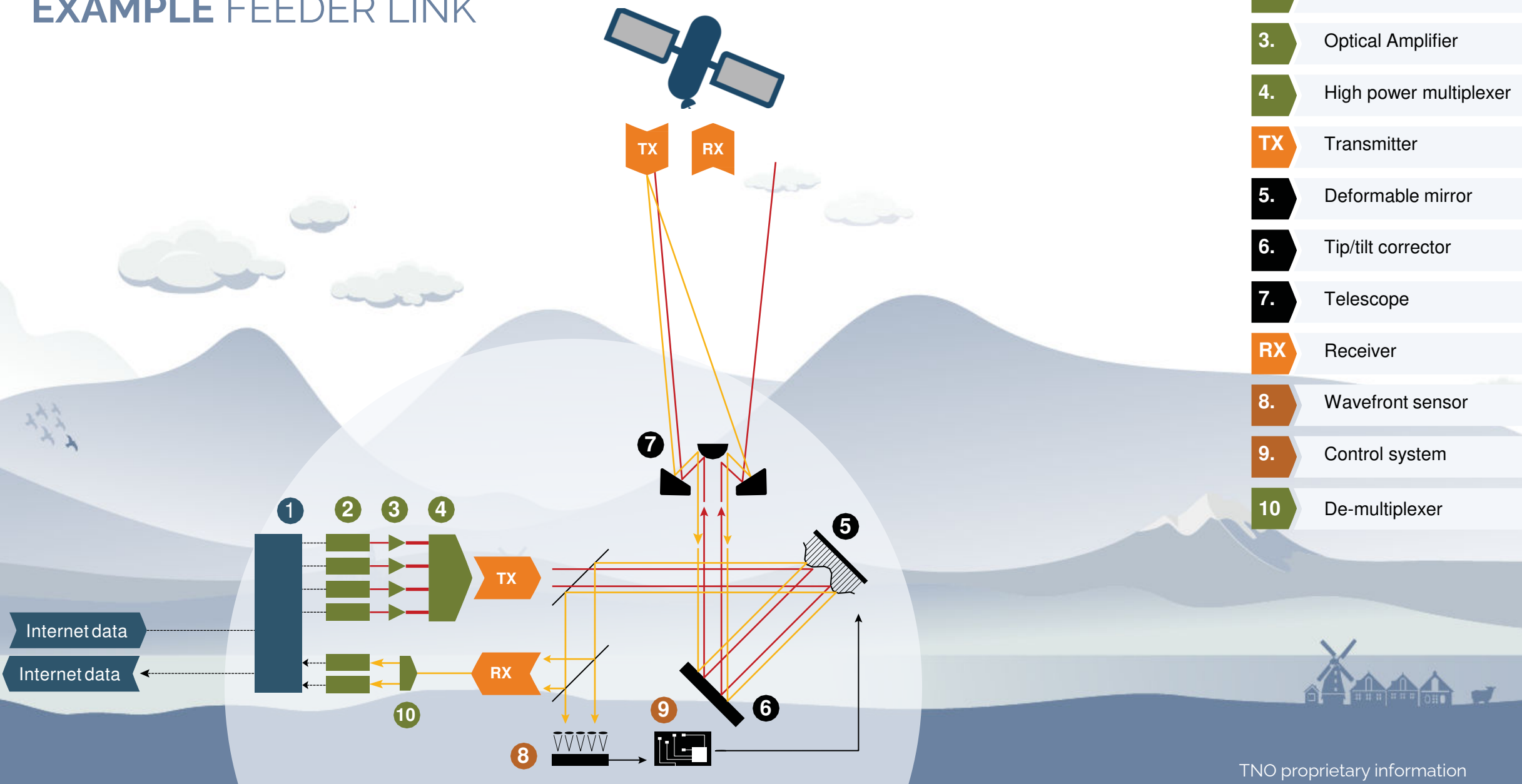


— Laser Communication  
— RF communications





# EXAMPLE FEEDER LINK



- 1. Digital Processor
- 2. Optical Transceivers
- 3. Optical Amplifier
- 4. High power multiplexer
- TX Transmitter
- 5. Deformable mirror
- 6. Tip/tilt corrector
- 7. Telescope
- RX Receiver
- 8. Wavefront sensor
- 9. Control system
- 10. De-multiplexer





**THANK YOU** | Q&A

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