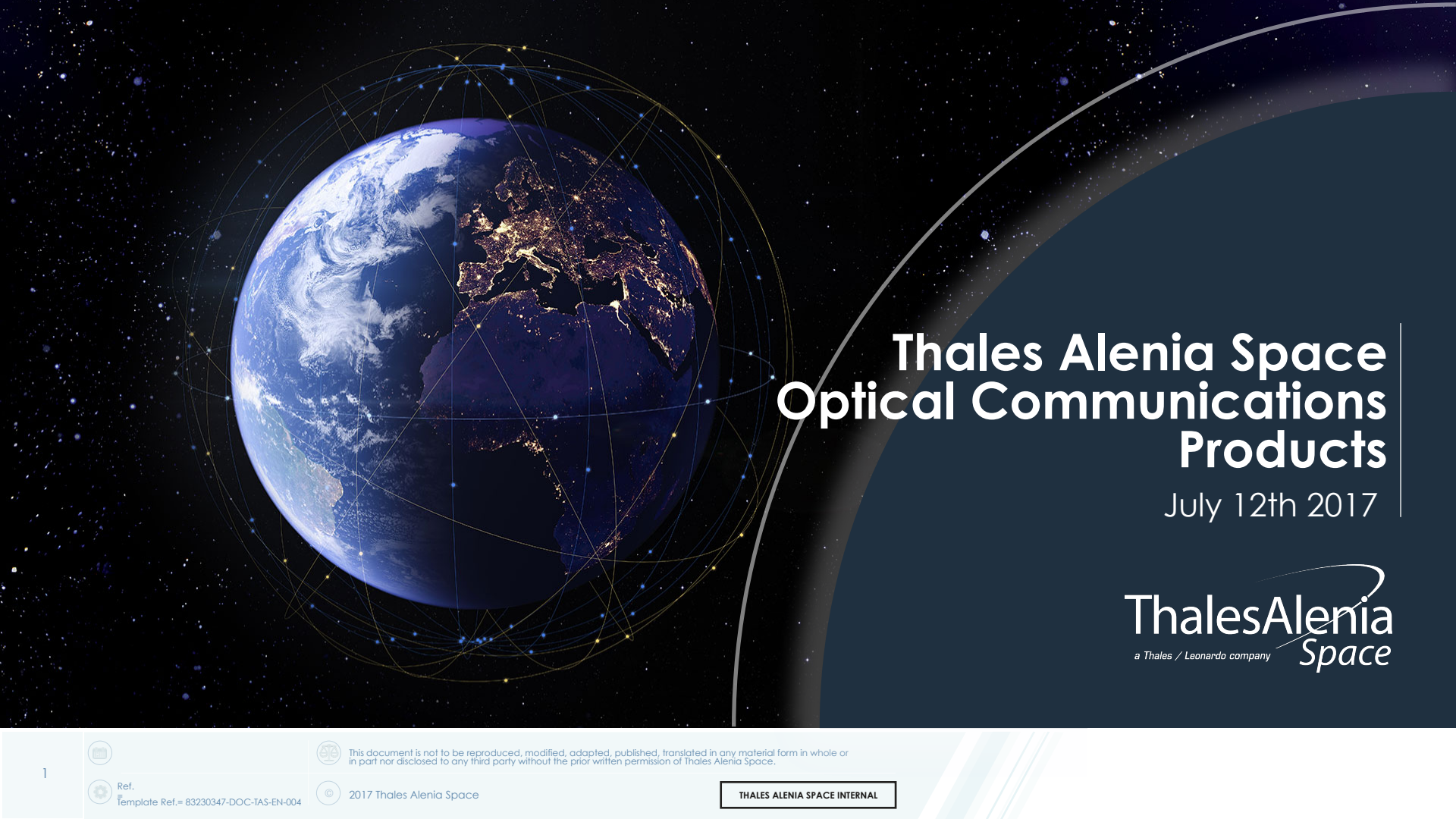




Thales Alenia Space Optical Communications Products

July 12th 2017

ThalesAlenia
a Thales / Leonardo company **Space**



Use cases for Space-based Optical Communications

1 Optical Inter Sat link

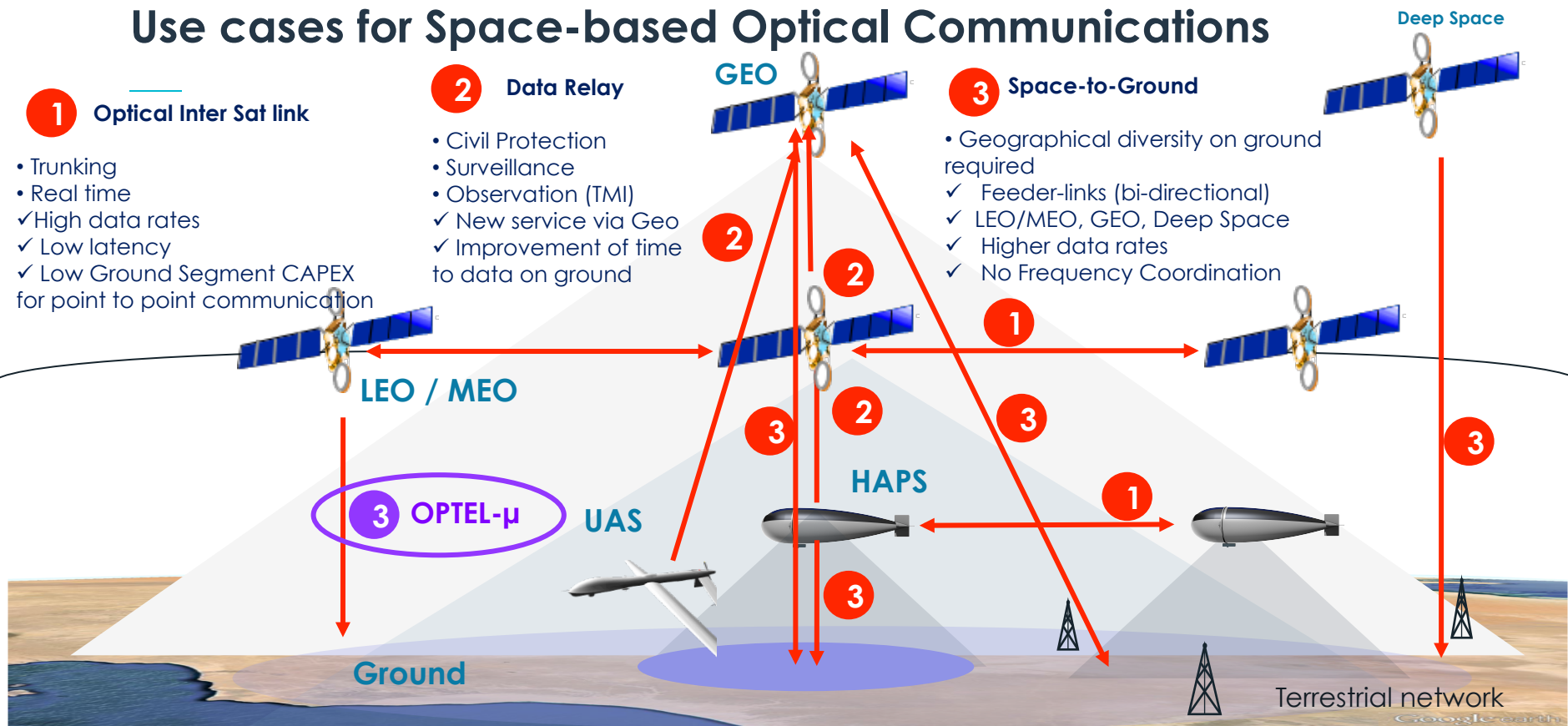
- Trunking
- Real time
- ✓ High data rates
- ✓ Low latency
- ✓ Low Ground Segment CAPEX for point to point communication

2 Data Relay

- Civil Protection
- Surveillance
- Observation (TMI)
- ✓ New service via Geo
- ✓ Improvement of time to data on ground

3 Space-to-Ground

- Geographical diversity on ground required
- ✓ Feeder-links (bi-directional)
- ✓ LEO/MEO, GEO, Deep Space
- ✓ Higher data rates
- ✓ No Frequency Coordination



OPTEL-μ[®]

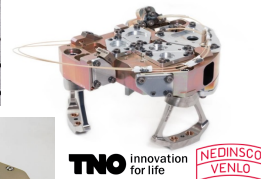
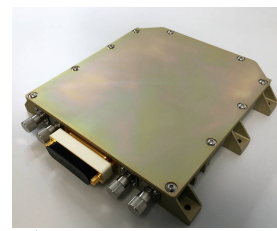
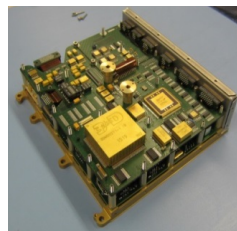
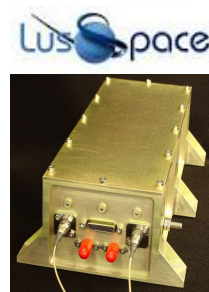
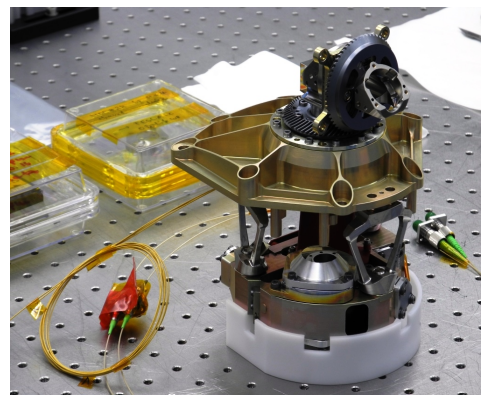
Optical downlink to increase the mission data return for small satellites (target: high performance imaging systems)

System consisting of a Space Terminal (8kg, 8l, 45W) and a Ground Terminal (0.6m telescope) for 2Gbps data rate

Modular design for large customer base and for evolutions (technology and applications)

Development carried out in the frame of ARTES with a team of European Partners

High data security and shorter implementation timeframe (no need for frequency filing)

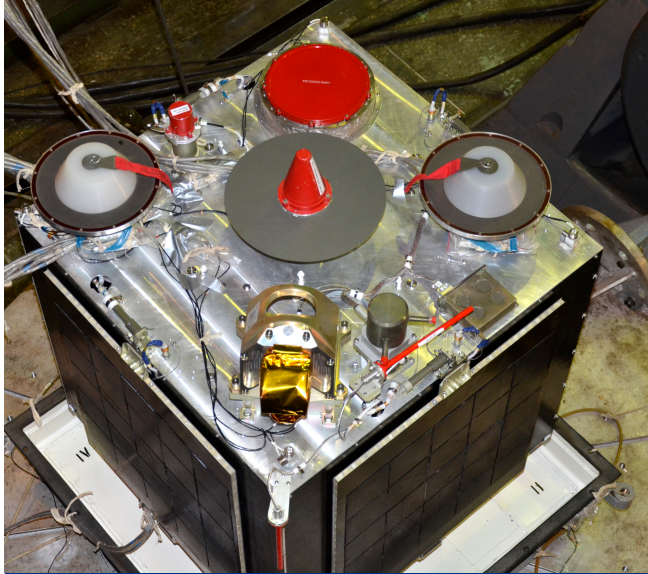


 Gooch & Housego

A development reaching completion and a product getting available!



OPTEL-μ[®]: getting ready for In Orbit Demonstration



STM integrated and tested on the satellite



Ground Prototype in set-up and testing

Many building blocks available for other applications

Use cases for Space-based Optical Communications

1 Optical Inter Sat link:

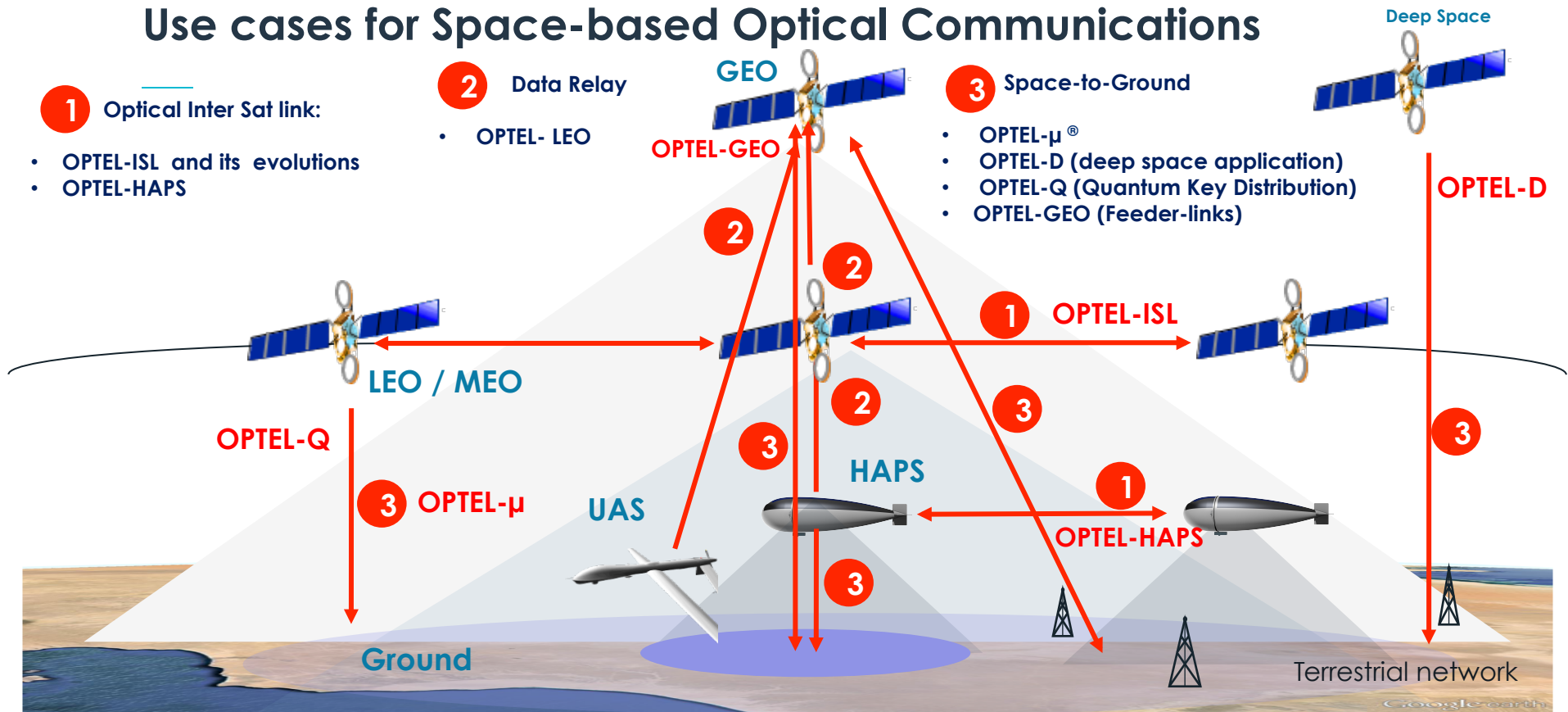
- OPTEL-ISL and its evolutions
- OPTEL-HAPS

2 Data Relay

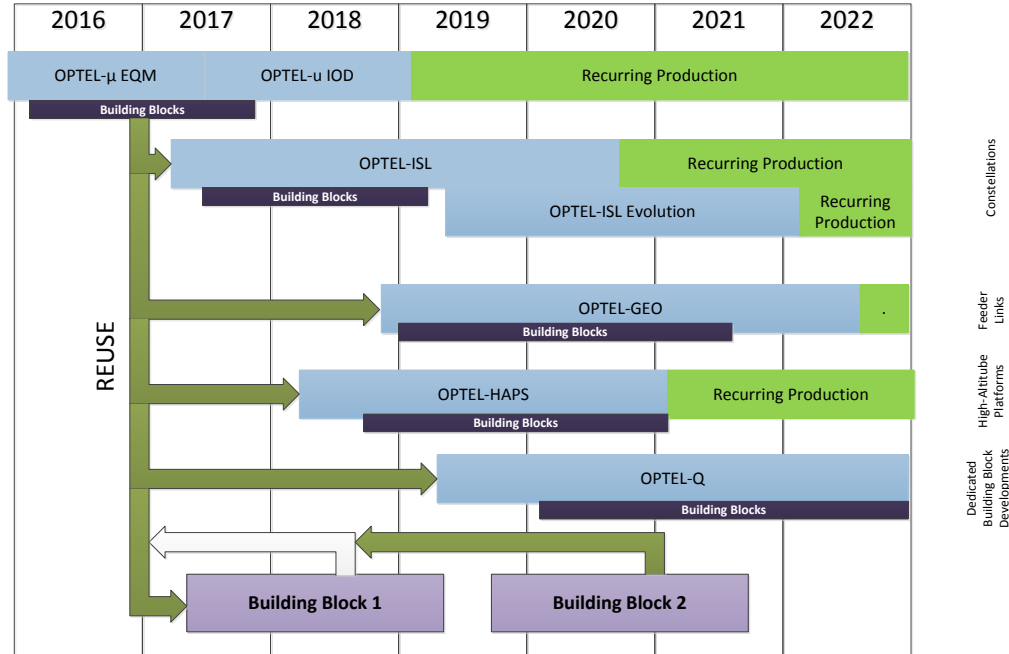
- OPTEL-LEO

3 Space-to-Ground

- OPTEL-μ[®]
- OPTEL-D (deep space application)
- OPTEL-Q (Quantum Key Distribution)
- OPTEL-GEO (Feeder-links)



Development in a market driven approach



A development reaching completion and a product getting available!

Building Blocks

Hardware elements

Processes

Verification competences

People

Partners



Foundation elements for a design to cost which needs to meet the Customer's business case



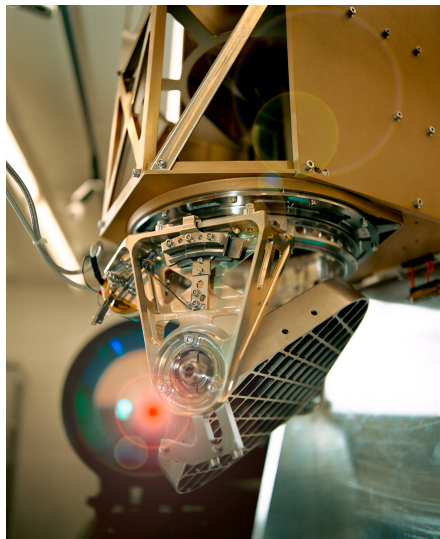
Challenges in product development

Recurring and Non-Recurring costs

Schedule

Industrialization

ScyLight one of the means to support industries with building blocks and challenges!





Thank you !