Group Discussion 1 - Space laser communications
• Let’s find out what the CubeSat community would expect from lasercom compared to RF

• The ideal goal is to imagine a hypothetical commercial lasercom terminal that could fill an existing gap in current CubeSat components

• NICT is interested in demonstration missions that prove feasibility of potential commercial products, leveraging risk of private sector
Some discussion points

Main discussion:
• Increasingly amount of data to be transmitted to ground from CubeSats
• The current alternative for high-speed in CubeSats is x-band transmitters
• However, it has important drawbacks: jamming, regulation, limitation
• Lasercom could be another alternative for high-speed communications
• Intensity Modulation and Direct Detection (IM/DD) limit is around 1 Gbit/s
• Beyond that, OGS becomes complex (AO, EDFA, etc.), thus expensive
• With current IM/DD technology, >100 Mbit/s is achievable in a CubeSat
• This will probably be good enough for 90% of CubeSat (LEO-ground)
• We identified this application as the main target for commercialization

Others interesting points:
• Standardization is a key for OGS shared network for site diversity
• For >Gbit/s data rates (microsatellites?), lasercom is the only alternative
• Integrated photonics will be a breakthrough in a few years, but still early
• Lasercom will be a very efficient solution for deep space, but expensive
Lasercom possible commercial product

High-speed LEO to ground

- Data rate: 100-500 Mbit/s (IM/DD)
- Body-pointing based (accuracy < 1 mrad)
- Close loop with ground laser beacon
- 40-cm Optical Ground Station required
- Price ≈ 20k€ (terminal) + 20k€ (OGS)
- ~0.5U (for CubeSats bigger than 2U)
- Potential: miniaturization or higher speed
Thank you!

LEO ≈ 5 km/s