Group Discussion 1 - Space laser communications
What is space laser communications?

Advantages
- Low divergence
- High data rate
- Low SWaP
- No regulation!

Drawbacks
- Accurate pointing
- Atmosphere

RF
Laser

National Institute of Information and Communications Technology (NICT)
Evolution of NICT LEO lasercom terminals

2005
OICETS-LUCE
(570 kg, 50 Mbps)

2014
SOCRATES-SOTA
(50 kg, 10 Mbps)

2023
CubeSOTA
(14 kg, 10 Gbps)
Letter to Santa Claus

• 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
Let’s start with…

• How critical is spectrum allocation for RF systems in CubeSats?
• Is it an advantage of lasercom, if RF is needed anyway for TTC?
• Under what conditions lasercom could replace RF completely?
• What is better: own ground station or shared network (service)?
• What should lasercom have to be superior to x-band systems?
• What are the current problems of x-band as a high-speed solution?
• What is the maximum volume allocation for the lasercom terminal?
• Should ADCS be a requirement for lasercom or an added feature?
• Would a Globalstar-like service be a solution for CubeSat lasercom?
• Would lasercom be an enabling solution for CubeSats in deep space?
• Is QKD an interesting technology/service for CubeSats?
• What demand would CubeSat lasercom have commercially?
• What new applications could high-speed lasercom enable?
• …
Thank you!

$v_{LEO} \approx 5 \text{ km/s}$