GLOBAL ANTENNA SHARING PROJECT for achieving Sustainable Development Goals

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A UNISEC-GLOBAL PROJECT

The Global Antenna Sharing Project initiated by

• Kyushu Institute of Technology, UNISEC-Japan

in collaboration with

• Istanbul Technical University, UNISEC-Turkey

with support of InfoStellar, Japan
Main Goal of Project

- Efficient use of *Micro/Nano Satellite systems (constellations)* *(300 placed in orbit in 2017)*
  - *Sharing resources*
  - *Helping less developed institutions to reach higher levels*
  - *Increased usage time of expensive systems (ground stations)*
  - *Reduced downtime*
  - *Better use of systems*
  - *Get ready for your satellite before you launch it!*

- *help yourself help other*
how we can help SDGs...?

https://sustainabledevelopment.un.org/sdgs
Satellites Communication

Function of Ground Station

- Pointing to a satellite (Satellite tracking)
- Send telecommand to satellite
- Receive telemetry/mission data from satellite
- Process RF signal (Mod/Demodulation, Coding/Decoding)
Limitation of Communication Time

- Limited communication time window in LEO
- Average communication time = 40 minutes/day
- Require long time to download payload data

40 min/1 day
[10 min x 1 pass x 4 times]
Antenna Sharing

• Increase the number of tracking antennas

By connecting more antenna
Time Resolution Increases!
Advantage of Many Antennas

1 Antenna
1 Satellite with 1 Antenna
35-65 Min / day

Many Antenna
1 Satellite with 7 Antenna
145 Min / day

Time resolution increase up to 3 time!!
A solution: StellarStation

A cloud-based software platform that connects satellite operators with antenna owners, solving both the problem of insufficient satellite access time and unused antenna idle time.

The process is simple:

• Share your antenna’s idling time and get credits.
• Use your credits to access other antennas around the globe.
• Exchange your credits for cash, or buy additional credits for even more antenna access time.
Graphical User Interface
A new standard for satellite ground stations

• Flagship product, StellarStation. Reshape the satellite operation scene in three major ways:

1. Shifting the paradigm to antenna sharing, opening up large numbers of antennas for use and dramatically increasing access

2. Solidifying satellite communications into a standardized system so that this increased access can be seamlessly utilized

3. Creating a real-time transmission environment for satellites, thus lowering the barrier to entry on satellite operations
space development for everyone

• Building this new ecosystem for ground station networks, we hope to open the door for previously unachievable space development.

• Space for everyone!
StellarStation Amateur

• Built on the StellarStation platform, StellarStation Amateur provides free LEOP support for amateur UHF band satellites.
• Use StellarStation Amateur to access invaluable telemetry data and schedule passes using member worldwide antenna network during a critical phase of launch and satellite operations.
İTÜ-SSDTL VHF/UHF GS

ANTENNA
Additional Equipment for Antenna Sharing
İTÜ-SSDTL COMM LAB with StellarStation
Istanbul Technical University (ITU) Space Systems Design and Test Lab.
Stellar Station Installation Proposal
Proposal of integration

- ANT M2 2MCP22 (VHF)
- ANT M2 436CP42UG (UHF)
- LNA Mirage KP-2 (UHF)
- LNA Controller KP-2
- Coax RFS LCF-12-50J

- TRX TS-2000
- SCS Tracker DSP-TNC

- Audio/AFSK/PTT
- Serial
- USB

- USB-Serial
- [Cable A]
- [Cable B]
- [Cable C]
- [Cable D]
- [Cable E]
- [Cable F]

- CRU-C1
- Local PC HRD v5

- StarPass1200
- Power supply 100-240 Volt

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- Infostellar add-on
- Item # (described in the next page)

- ITU Facility
GSN Device

- **Receiver**
  - Satellite downlink signal reception
  - Output in IQ data (raw data)
  - Centralized demodulation and decoding are done by software defined radio (SDR) at Central Server.

- **TLM transfer**
  - Transfer IQ data or processed data to Central Server

- **Transmitter (optional)**
  - Satellite uplink signal transmission
  - Encoded and modulated IQ data from Centralized SDR at Central server and transmits uplink signal to satellite.
How use our GS network?

Go to: https://www.stellarstation.com/amateur
and Sign up for an account
Select satellite and download data

Use web based GUI to:
- Download telemetry (Raw Data) from satellites
- See available passes across the world
- Demodulate / Decode in the cloud and view the Telemetry in browser.*

* To be available
Re-processing satellite downlink data

The satellite downlink data can be re-play and processing by using **SDR#** and **GNU radio**

* To be available
Downloaded Data

Batt Volt (V)

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How to join the Global Antenna Sharing Project with your Antenna

• Contact us to get a template of MoU.
• Review the MoU and make revisions that you deem necessary.
• Fill out Antenna Configuration Questionnaire: [https://goo.gl/forms/FNYypPrzHNR1V5vu2](https://goo.gl/forms/FNYypPrzHNR1V5vu2)
• A Block Diagram of your ground station is required to be sent.
Further Benefits

UNISEC-Global provides Information and help on:

• How to operate a satellite

• Regulations and frequency coordination

• Ground Station Network Access

• Frequency Sharing
WHAT?

• How can ease and increase participation in the GS network
• Interaction with others (Satnogs!)
• Other points to consider?
Questions?
Thank you
Contact

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