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
What is UNISEC-Global?

• University Space Engineering Consortium (UNISEC)-Global is an international NGO, consisting of local-chapters across the world. Established in 2013, and accepted as permanent observer by UNCPUSOS in 2017.
• Its primary objective is to help create a world where space science and technology is used by individuals and institutions in every country, rich or poor for peaceful purposes and for the benefit of humankind.
• Has provided hands-on satellite training program, conferences and competitions

15 Local Chapters and 135 universities from 40 countries with 47 POC
The 2030 Agenda for Sustainable Development

Key Principle: No one will be left behind.

"By the end of 2030, let’s create a world where university students can participate in practical space projects in all countries."

Need wise strategies, partners, collaborators and supporters.

6th UNISEC-Global Meeting will be held at ISU Strasbourg, France in Nov 19-21, 2018
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

• 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
[10min 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 Satellite with 1 Antenna
35-65 Min / day

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

SP1200 Main Unit

CRU Type-C1

Cable 1
İTÜ-SSDTL COMM LAB with StellarStation
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)

<table>
<thead>
<tr>
<th>Time</th>
<th>Batt Volt</th>
</tr>
</thead>
<tbody>
<tr>
<td>04:59:40</td>
<td>7.61</td>
</tr>
<tr>
<td>05:00:40</td>
<td>7.61</td>
</tr>
</tbody>
</table>

**Graph:**

- **X-axis:** Time (04:59:40 to 05:00:40)
- **Y-axis:** Batt Volt (7.61 V)

**File Path:**

D:\Amateurfunk\UBAKUSAT\ubakusat_12052018_0458.kss
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
• 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
Questions?
Thank you
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