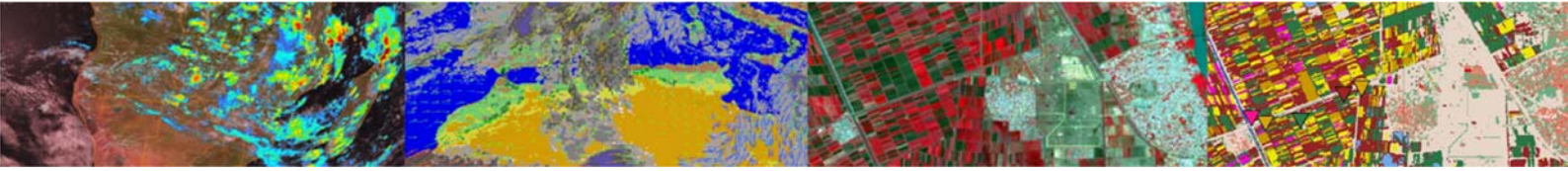
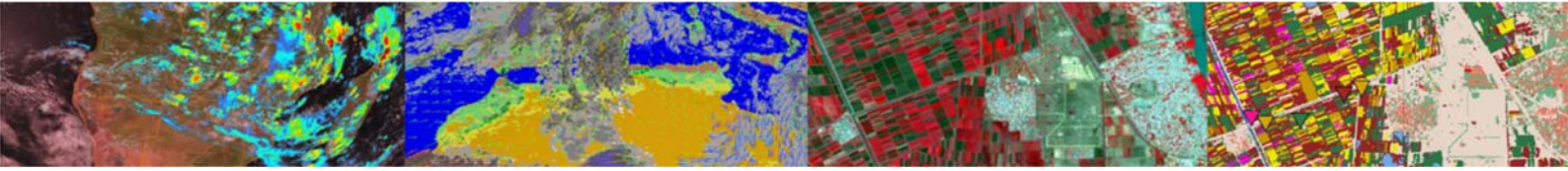


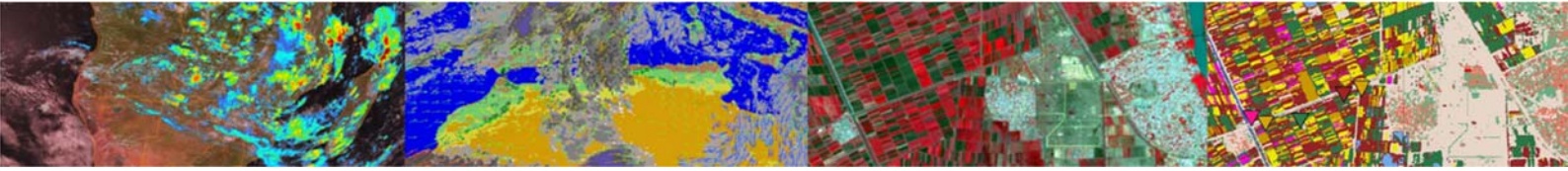
EUMETCast System Component details - Software

Ben Maathuis, 19-02-2021

Dept. of Water Resources, Faculty ITC, University of Twente, Enschede, The Netherlands. Email: b.h.p.maathuis@utwente.nl

© This work is licensed under the Creative Commons Attribution-NonCommercial 4.0 License. To view a copy of this license, visit https://creativecommons.org/licenses/by-nc/4.0/ or send a letter to Creative Commons, 444 Castro Street, Suite 900, Mountain View, California, 94041, USA.





Contents

1 Introduction 2

2 Ku-Band reception 3

2.1 Basic and HVS-1 services 4

2.2 HVS-2 service 5

2.3 EKU and Tellicast Client 5

3 C-Band reception 7

3.1 Africa Service 7

3.2 EKU and Tellicast Client 8

4 Data Management 10

5 Concluding remarks 11

6 References 12

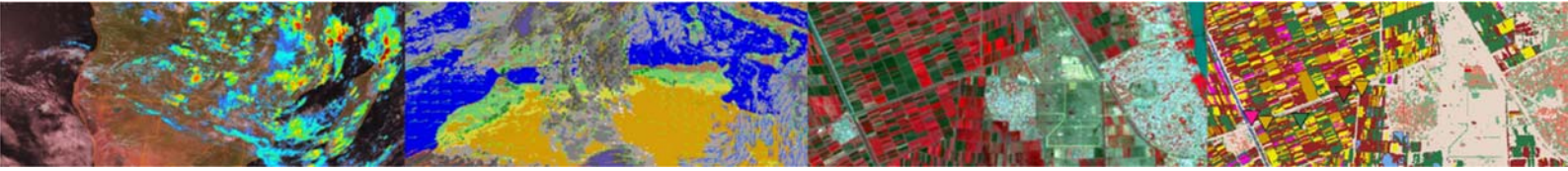
1 Introduction

This document is describing the EUMETCast reception setup at ITC-University of Twente. Currently the following services are operated:

- On Ku-band:
  - Basic Service
  - High Volume Service 1
  - High Volume Service 2 (on a separate reception station)
- On C-band:
  - Africa Service

All data received is transferred to a server, and based on user request the data is stored for different periods of time, some data is deleted immediately, as it is not relevant for the in-house users. Below a picture is shown of the reception room. Some of the systems use scheduled tasks for image visualization and data processing. Attention is given to the installation of the DVB-S2 router / receiver (Novra S300E for Ku Band reception and TBS 5927 for C-band reception), the Eumetsat Key Unit installation and the Tellicast installation and setup. For detailed step by step instructions reference is made to the installation and setup manuals.

Figure 1: Reception room at ITC – University of Twente



2 Ku-Band reception

Some general settings are described in this section which have been encountered while configuring the stations. For Ku-Band reception an offset antenna is used pointed to EUTELSAT 10E, having a reflector dimension of 120 cm (diameter). The coax cable is connected to a splitter situated in the reception room. From there a coaxial cable is connected to a DVB-S2 device (Novra S300E), receiving the Basic Service and the High Volume Service 1 and the other coaxial cable is connected to another DVB-S2 router (also a Novra S300E), receiving the High Volume Service 2. This service is disseminated using another transponder on the same communication satellite. The Ku reception systems have an additional network card to which the DVB-S2 router is connected using a Cat-5 crossover cable.

The ip-address used for the Novra S300E is 192.168.0.11 with default subnet mask (255.255.255.0) and settings can be checked using the MS DOS command from the command prompt window: 'ipconfig /all'. Using multiple network adapters, the interface metric for the Novra router has been set to 1 and the regular network card to connect to the institutes network has been given lower priority (e.g. metric 400). These settings can be applied under the Internet Protocol Version 4 (TCP/IPv4), click Properties and Advanced options. Here also the ip address of the network card has to be specified. When configuring the router, start the system with only the router connected and start the Novra device software. The device should be recognized by the software. If the system is restarted and also the regular network connection to the local network is attached and the Novra device is not recognized, then the Metric has to be adapted, asigning the Novra router the highest priority.

After the DVB-S2 device is installed and the signal from the satellite is received / locked, two other required software utilities are required to be installed, the latest versions of the EKU (eToken) and Tellicast software packages, both using the default installation instructions. Automatic startup of the services can be activated for Tellicast and the Windows Firewall settings should be checked to ensure that Tellicast is allowed through the Firewall.

Step by step configuration is provided in the document: "Novra S300 DVB Receiver EUMETCast Setup Guide". Ensure that the "IP Data" is properly configured and the appropriate PIDs are included, see: https://eumetsatspace.atlassian.net/wiki/spaces/DSEC/pages/700055570/Channels+and+Packet+Identifiers+PIDs.

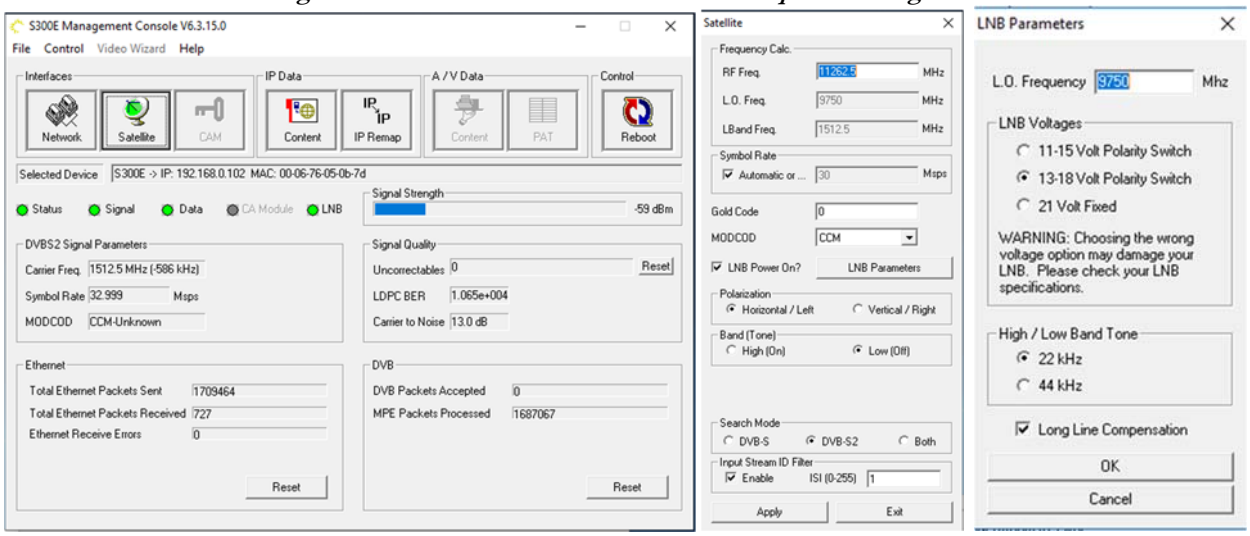
2.1 Basic and HVS-1 services

The Basic and HVS-1 Services are disseminated by the same transponder on EUTELSAT 10E satellite. When using default installation, various Tellicast client shortcuts are transferred to the desktop, like the EUMETCast Bas, EUMETCast HVS-1, etc. The shortcut is providing access to the respective client services and is providing the necessary information regarding the services received. EUMETSAT is providing a batch routine to activate the Tellicast services automatically during start-up of the reception system. If Tellicast is installed using default settings, within the folder "C:\EUMETSAT\EUMETCast" a file 'startup_config.bat' can be executed and the required services can be selected. Furthermore within this folder the central receiver configuration settings are provided, e.g. the 'cast-client_HVS-1.ini'.

Opening the client is based on the following addresses for the BAS and the HVS-1 services respectively:

- BAS: http://localhost:8100
- HVS-1: http://localhost:8200

Figure 2: Basic and HVS-1 Novra S300E reception settings



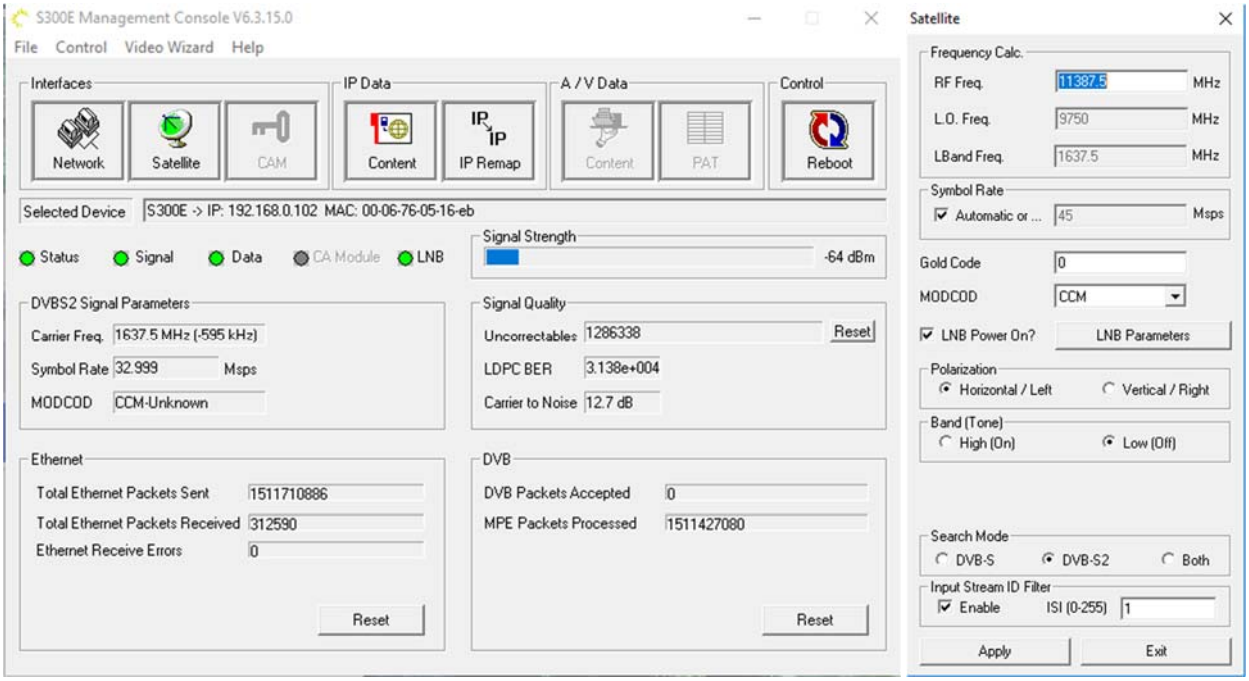
2.2 HVS-2 service

The HVS-2 Service is disseminated by another transponder on the EUTELSAT 10E satellite. When using default installation options, various Tellicast client shortcuts are transferred to the desktop, like the HVS-2. The shortcut is providing access to the respective client services and is providing the necessary information with respect the services received.

Opening the client is based on the following addresses for the HVS-2 service:

- HVS-2: http://localhost:8201

Figure 3: HVS-2 Novra S300E reception settings



Note that LNB parameters are identical for this service, see also figure 2.

2.3 EKU and Tellicast Client

Next the EKU is configured and the Tellicast software is installed. See step by step instructions in the following documents:

- EKU_driver_installation_windows.pdf
- Tellicast_V2.14+_windows_installation.pdf

After having installed the Tellicast Software, e.g. using default installation instructions, 2 directories are created on the root of the system:

- EUMETCAST: with the folder\received\BAS\default and \HVS-1\default, here the incoming data is stored
- EUMETSAT: with the folder \EUMETCast. Here the Tellicast *.ini file is situated which contains the Tellicast configuration settings. Within the \www\eumetsat folder the “Product Navigator” is located.

When all is installed and configured the Tellicast client can be opened using the appropriate localhost address. Here for each of the services the reception of the data can be monitored using various menu items, like ‘Overview’, ‘Statistics’, etc.

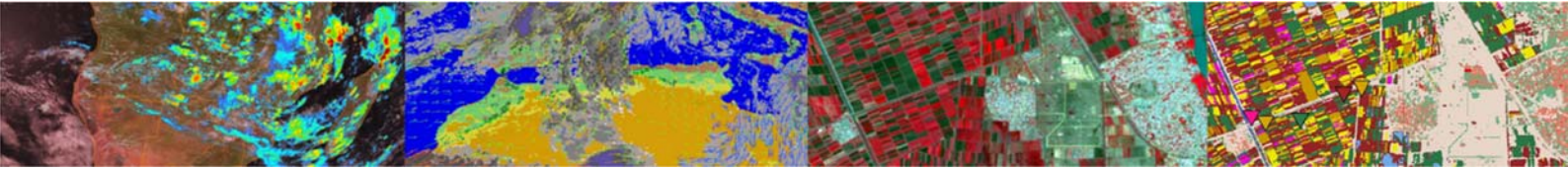
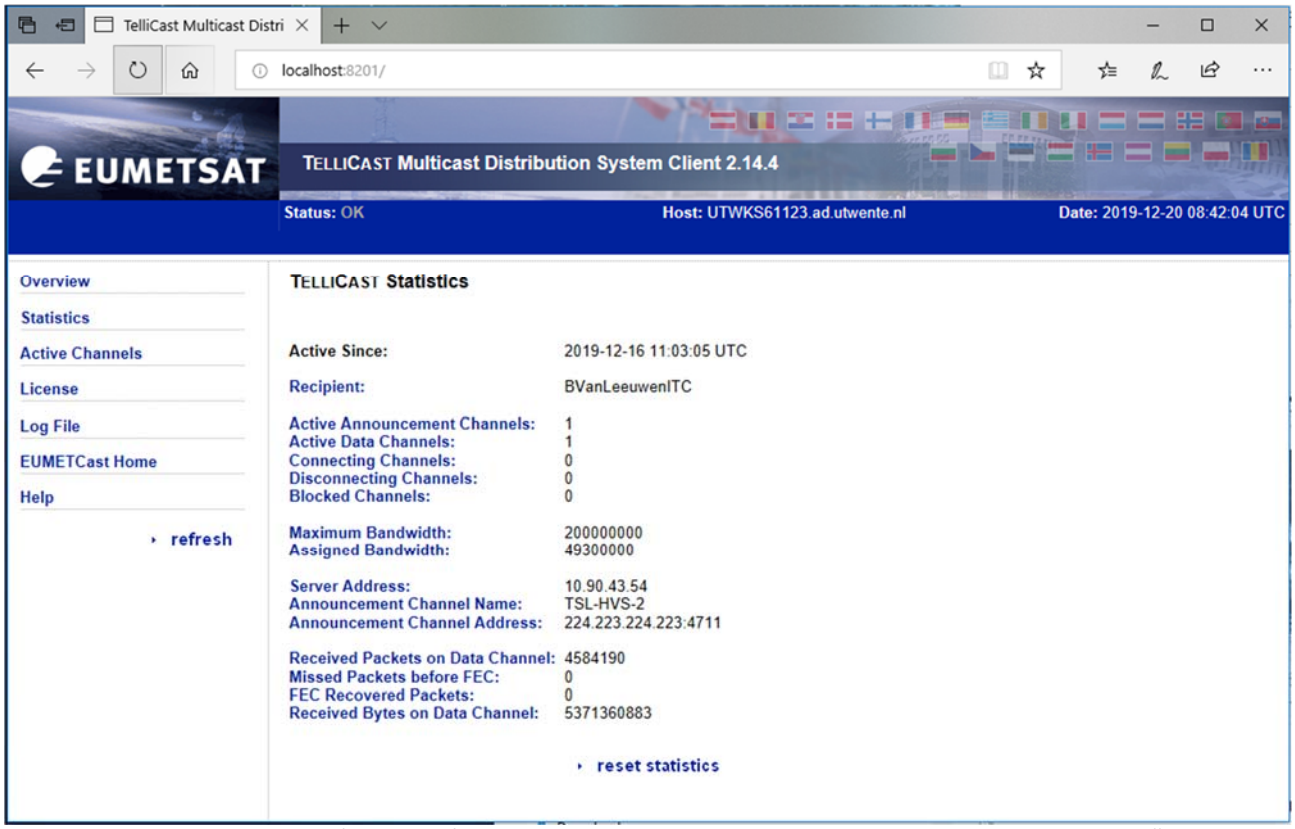
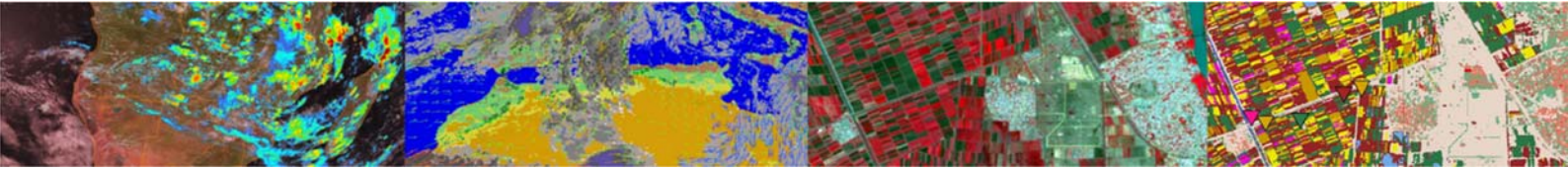


Figure 4: Example of the Tellicast Client, HVS-2



It is important to check the 'Statistics' on a regular basis to ensure that there are not too many "Missed Packets on Data Channel".



3 C-Band reception

At ITC – University of Twente for C-Band reception use is made of a prime focus parabolic antenna, pointed to EUTELSAT at 8 degree West. The reflector has a diameter of 2.4 meter and a C-Band LNB is used.

3.1 Africa Service

The coaxial cable from the C-Band LNB is connected to a TBS 5927 receiver. This receiver is connected to a computer by a USB connection and does therefore not require an additional network card. It is important that the most recent software version of TBS is used, here 'tbs-iptool_v3.0.5.0'. Older versions might cause unexpected compatibility issues, resulting in system failure. Setup of the TBS device is performed through the following steps:

- Installation of the driver, using the TBS tuner driver setup tool (TBS_5927_setup.exe)
- After installation of driver, check the system device manager to see if the device is added under "sound, video and game controller"
- Install the IP-Tool (TBS_IP_TOOL_V3.0.5.3.exe)
- Start 'TBS-IPdata' using the shortcut on your desktop, select the DVB-S2 tuner and press "OK"
- Configure the settings of the DVB-S2 tuner, The following settings should be entered, see also the figure below:
    - From the menu item "Tuner Settings":
        - Select Satellite: 3520 Atlantic Bird 2 (8.0W)
        - LOF1, LOF2: 5150 MHz
        - Switch: 0
        - Diseqc: Diseqc NUL
        - Frequency: 3848 MHz
        - Polarity: Horizontal or Vertical, depending on LNB configuration
        - Symbol rate: 9892 KSps
        - press "Add"
        - press: "Save"
        - Code : 0, Code Type : Root Code and then press "Set"
        - Set MODCODES: 4PSK (QPSK) ¾
        - Now press "Lock TP" to lock the signal
    - From the menu item "IP Over DVB":
        - Add the selected PIDs :
        - Ensure the Hex box is unchecked, and enter a PID value of 100 in the PID value box, and press the Insert PID button.

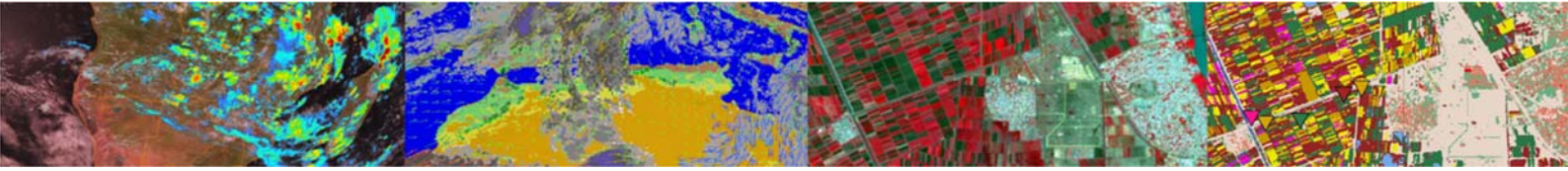
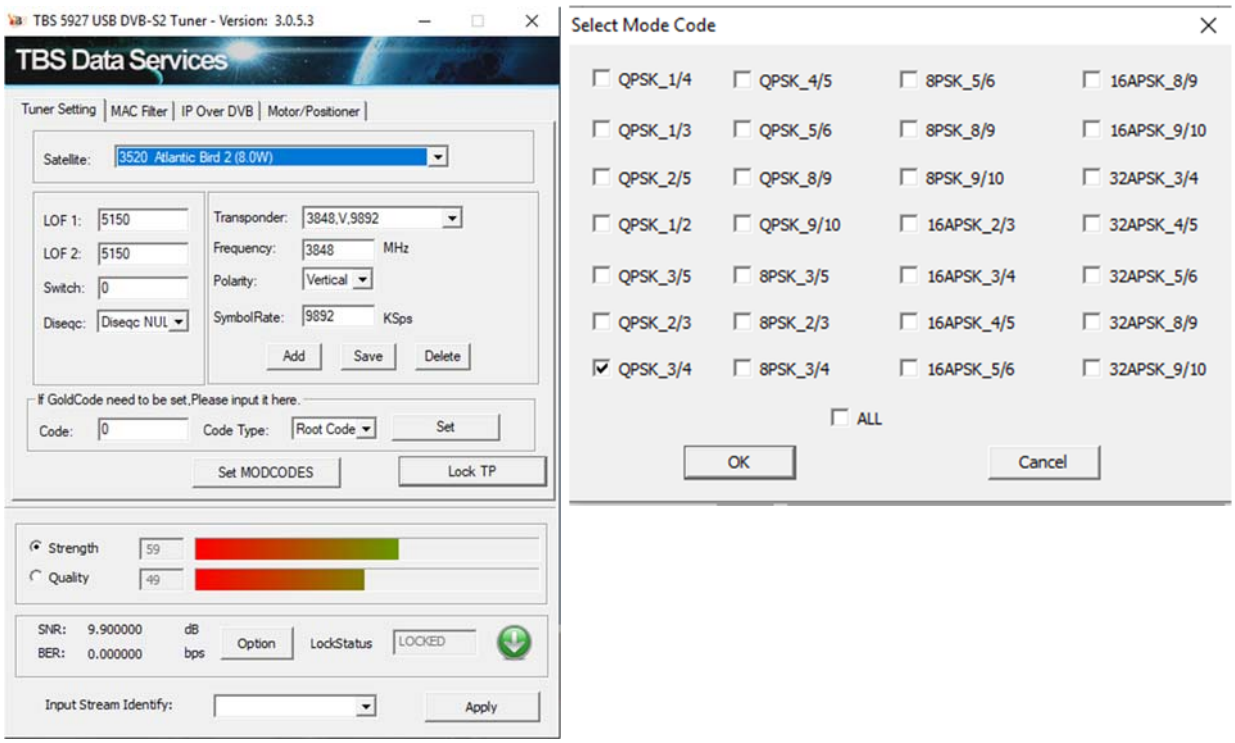


Figure 3: AFR – TBS 5927 reception settings



Finally you have to configure the "Virtual MPE Decoder Adapter". We now need to define the network address of the virtual network card presented by the software so that TelliCast knows where to find its data. Open "Network & sharing Center" . Go to "Change adapter Settings" . Double Click on the "Virtual MPE Decoder Adapter" and select properties, under the Internet Protocol Version 4 (TCP/IPv4), click Properties, for IP address specify '192.168.238.238' and for subnet mask use the default settings, '255.255.255.0'.

3.2 EKU and Tellicast Client

Next the EKU is configured and the Tellicast software is installed. See step by step instructions in the following documents:

- EKU_driver_installation_windows.pdf
- Tellicast_V2.14+_windows_installation.pdf

After having installed the Tellicast Software, e.g. using default installation instructions, 2 directories are created on the root of the system:

- EUMETCAST: with the folder\received\AFR\default, here the incoming data is stored
- EUMETSAT: with the folder \EUMETCast. Here the Tellicast *.ini file is situated which contains the tellicast configuration settings. Within the \www\eumetsat folder the "Product Navigator" is located.

When all is installed and configured the Tellicast client can be opened using the appropriate localhost address (http://localhost:8300). Here for each of the services the reception of the data can be monitored using various menu items, like 'Overview', 'Statistics', etc.

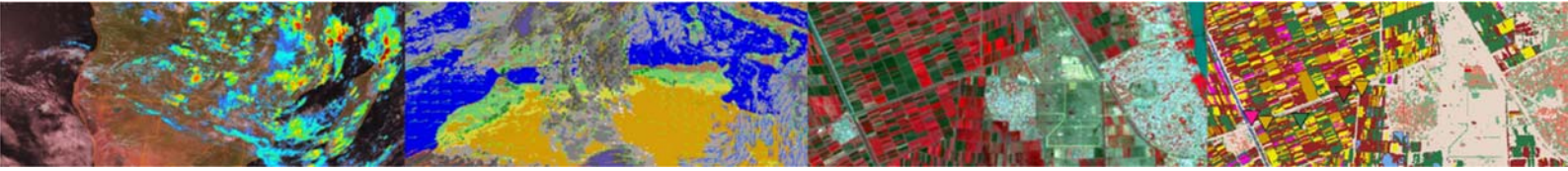
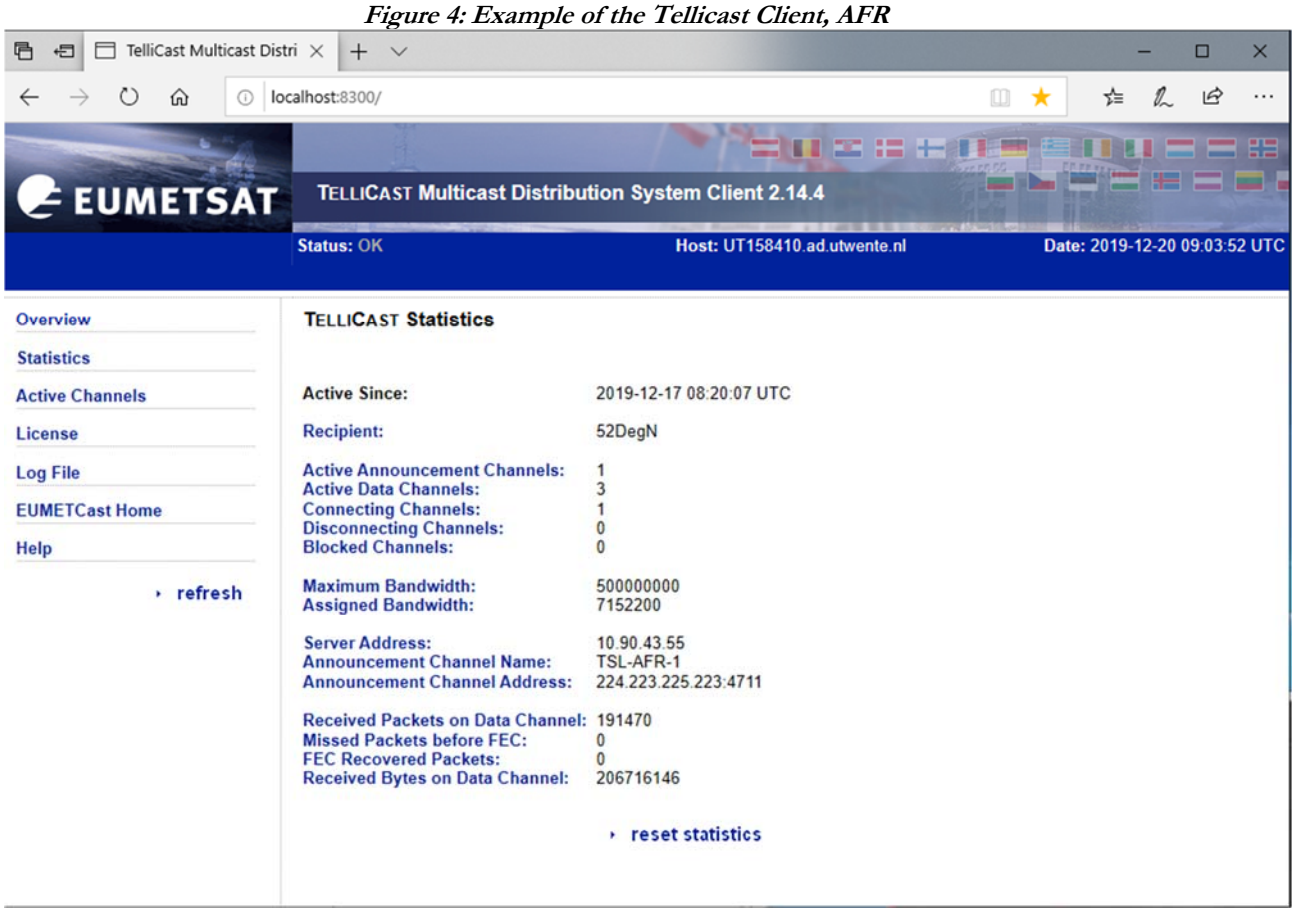
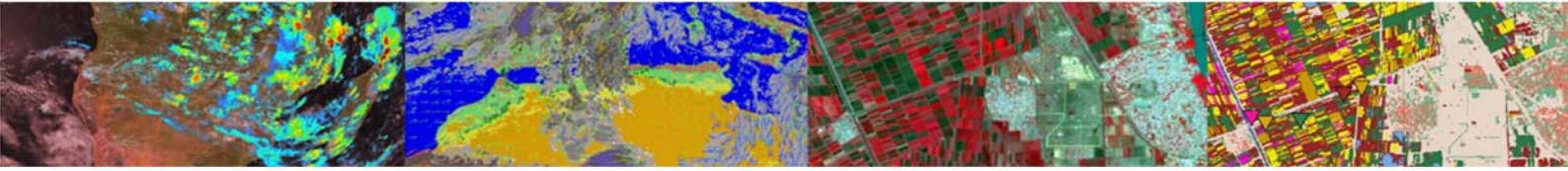


Figure 4: Example of the Tellicast Client, AFR



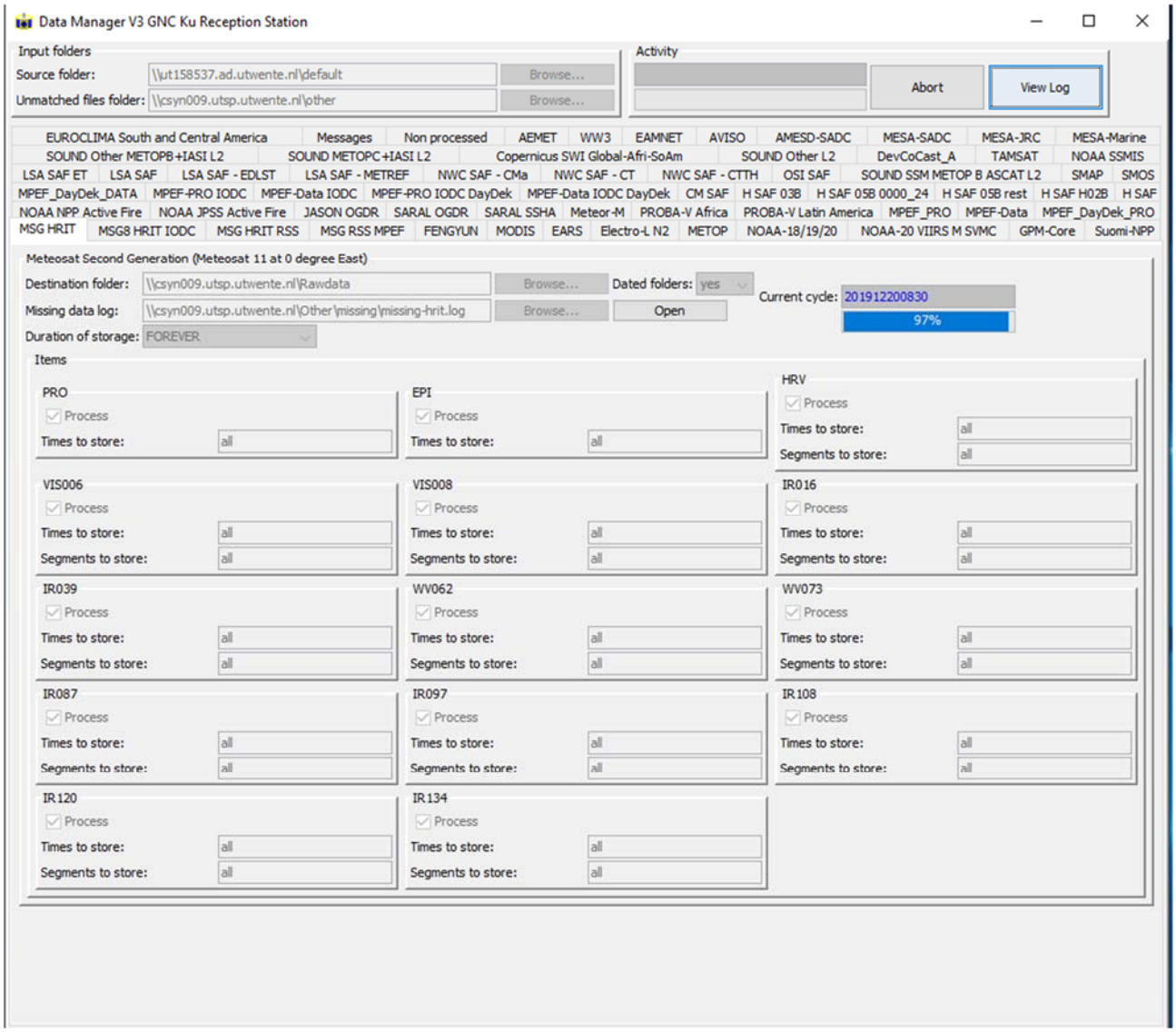
It is important to check the 'Statistics' on a regular basis to ensure that there are not too many "Missed Packets on Data Channel".

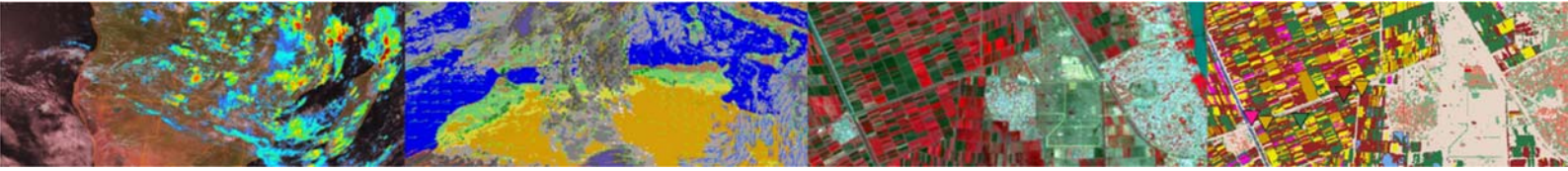


4 Data Management

Once the system is operational, a high volume of newly arrived data will be received on a continuous basis. It is of utmost importance that this is a job well done. As the system operates 24 / 7 an automated data management application is required. At ITC – University of Twente we a are using our own developed "EUMETCast Data Manager". The primary purpose for developing this application is to organize the large amount of data files received. The data that is received on the EUMETCast receiving station must be transferred to computer storage that is independent of the receiving station's disk storage before users can access it. Users are not allowed to work directly with the data on the receiving station, because it should perform its primary task undisturbed, which is to be available all the time for storing the files captured by the (DVB-S2) card.

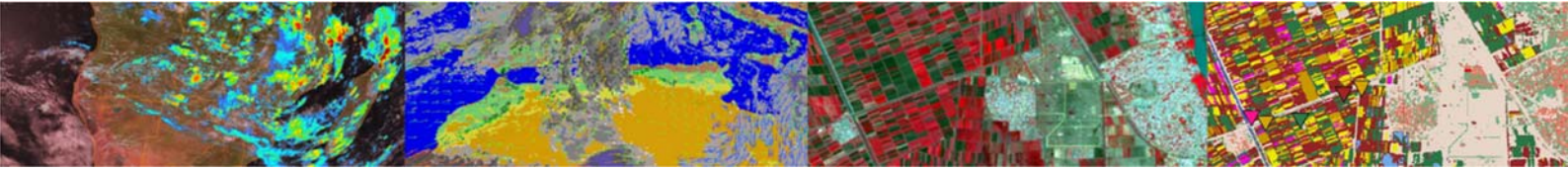
Figure 5: Example of the Data Manager, Basic Service





5 Concluding remarks

Creating your own reception station can be done using off the shelf components. In Africa it is a challenge to acquire the DVB-S2 devices. These can be obtained from web shops though. Pointing the antenna is mostly not a problem as all TV programs are satellite dish based and local vendors can be of assistance. EUMETCast is a system which is continuously evolving. It is important to check if there are new services and the data received are well transferred to a storage server. As the service is continuous, uninterrupted power supply can be an issue!



6 References

Various EUMETSAT resources have been used, like:

EUMETSAT: eToken Driver SAC (9.0) Installation (EKU_driver_installation_windows.pdf)

EUMETSAT: EUMETCast Africa DVB-S2 Migration Setup Guide (v1D Draft - 28 June 2018) (EUMETCast Africa DVB-S2 Migration Setup Guide.pdf)

EUMETSAT: Trouble shooting tips for anyone using the EUMETCast system
https://eumetsatspace.atlassian.net/wiki/spaces/DSEC/pages/697630751/Troubleshooting+articles

EUMETSAT: Tellicast v2.14+ installation guide for Windows (Tellicast_V2.14+_windows_installation.pdf)

EUM TD 15 (2021): TD15 - EUMETCast, EUMETSAT's Broadcast System for Environmental Data. Technical description, Issue v8F, 28 January, 2021. EUMETSAT, Darmstadt, Germany.
https://www.eumetsat.int/media/44096

https://eumetsatspace.atlassian.net/wiki/spaces/DSEC/overview