4T2 Content-Analyser

RF and MPEG Transport Stream analyser application for the Windows operating system

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Time-line / history

- 2009 internal project „MPEG Transport Stream analyser“ for ABC 4T2 portable and rack-mount measurement receivers

- 2009 4T2-Rack with 4T2 Content-Analyser delivered with IP, and ASI inputs (>100 installations at Italian RAI, main sites, 24/7 monitoring with SNMP remote control)

- 2010 4T2 Content-Analyser to work with XTASI-ASI modules (laptop-use)
- 2010 default configuration for 4T2-Portable 3rd generation
- 2011 4T2 Content-Analyser to work with XTASI-RF modules
  DVB-T/T2 RF-measurements, Constellation, Impulse Response, Level, ...
- 2012 4T2 Content-Analyser to work with XTASI-S2+ modules
  DVB-S/S2x RF-measurements, Constellation, Level, ..., Multi-Stream
- 2013 full compatibility with 64bit Windows operating systems
- 2014 version 1.1 with flexible user interface features
- 2015 latest version 0.10 with streamlined user interface
- 2017 added Teletext, Subtitles, GOP Structure,..
- 2018 added Round Robin analysis through ABC Scheduler application

Time-line / history

key functions on transport stream level

- Analysis of MPEG-TS PAT, PMT Program Association, and Map Tables
- Analysis of DVB-specific Service Information (CAT, SDT, EIT, NIT, TOT, TDT)
- Analysis of ATSC-specific Service Information (MGT, STT, TVCT, EIT, ETT)
- Visualisation of SDT Service Description Tables
- Visualisation of NIT Network Information Tables
- Visualisation of MIP Mega-frame Initialisation Packets
- Visualisation of PID Packet Identifiers and associated bit-rates
- Visualisation of bit stuffing
- Visualisation of time repetition intervals of tables defined in TR.101.290
- Analysis and visualisation of first, second and third priority errors according to TR.101.290

enhanced functions on TS level

- Analysis of DVB T2-MI Modulator Interface
- Measurement of PCR Program Clock Reference Jitter
- Content decoding, based on Software Defined Video SDV,

  including H.262 SD/HD, H.264 SD/HD and H.265 QRes/SD/HD/UHD material
- Monitor-wall feature with audio bar-graphs
- Detection of black and freeze conditions of services in the Transport Stream
- Detection of audio mute condition of services in the Transport Stream
- Teletext and DVB-Subtitles decoding
- GOP structure analysis
- Triggered capture of TS to disk in presence of errors (pre/post trigger time adjustable)

enhanced functions on TS level (contd.)

- Measurement of multiple Transport Stream sources

  (through multiple instances of the program running at the same time)
- Remote capability with full SNMP support following the DVB MIB, including Traps
- Input support for XTASI-S2 & XTASI-RF & XTASI-ASI, or 4T2 hardware
- Input support for RTP & UDP packet protocol, or files
- Comprehensive logging features with powerful sorting capabilities
- Raw data analysis with smart packet-trigger, and bit dependencies checking
- Smart Packet trigger with expression editor
- Interface to relay alarm contacts with expression debugger
- Forwarding of transport stream to IP, File, or ASI output

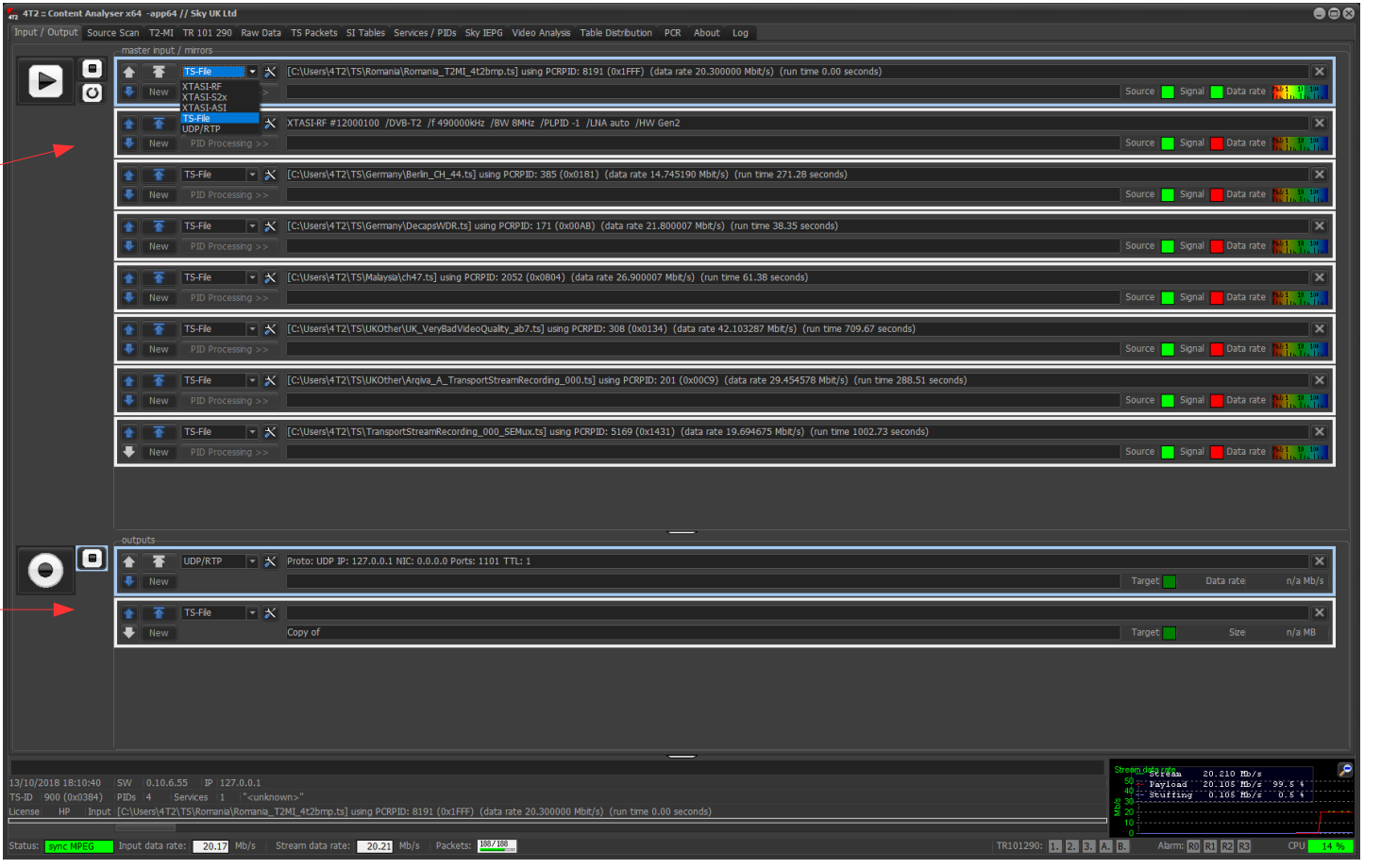
Versatile input and forwarding options

Inputs

- IP udp /rtp
- File playback
- XTASI ASI input
- XTASI DVB-T/T2 input
- XTASI DVB-S/S2 input

Outputs

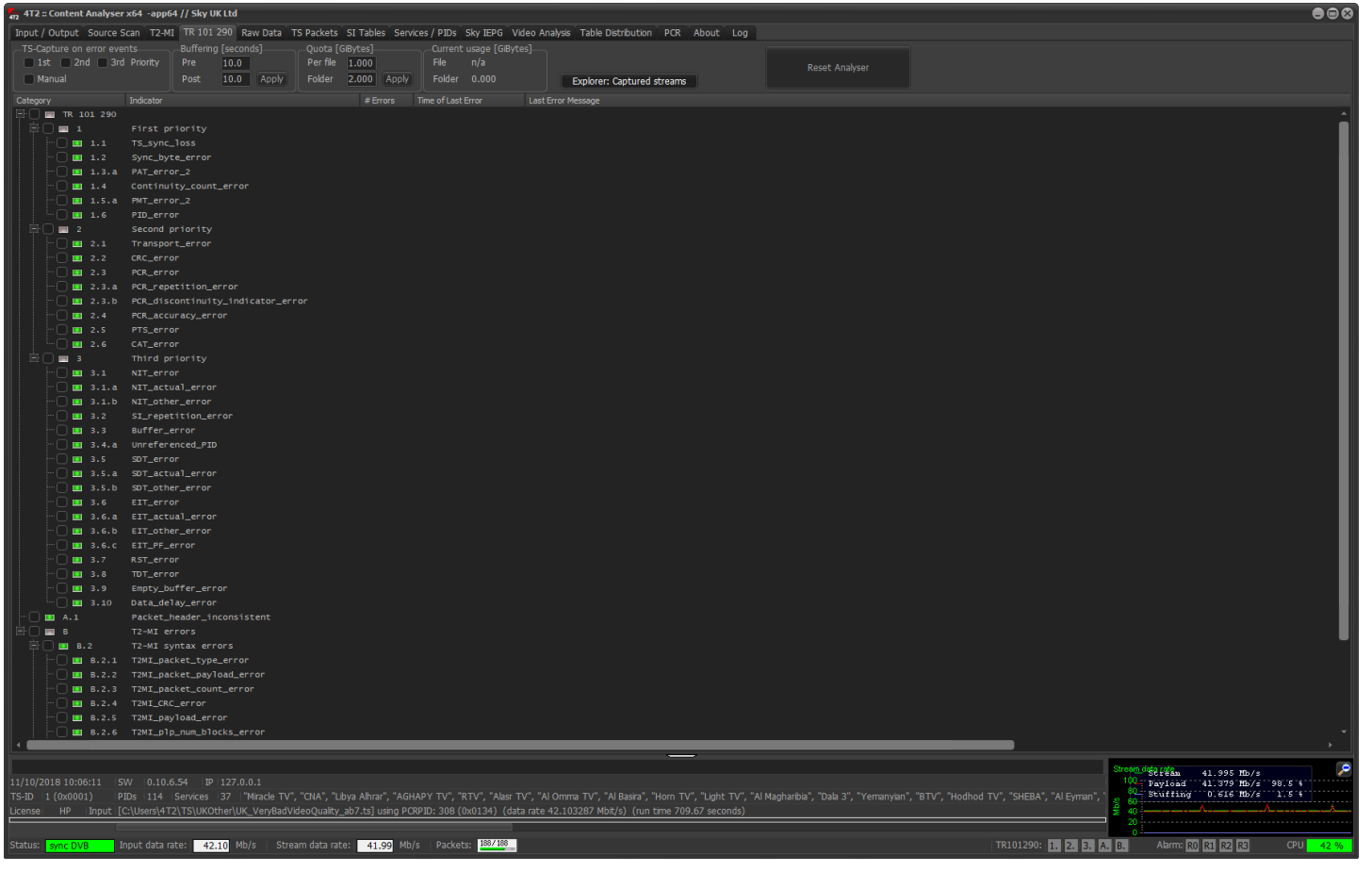
- udp/rtp streaming
- File recording
- XTASI ASI output



TR.101.290 monitoring & stream capture

Evaluation of TS following TR101290 1st, 2nd, 3rd priority (including T2-MI extensions)

- Groups, or individual error measurements
- All errors are logged with date and time of occurence
- Selection can be used as trigger for Stream Capture
- Pre and post trigger capture
- Adjustable quota for current file and overall storage



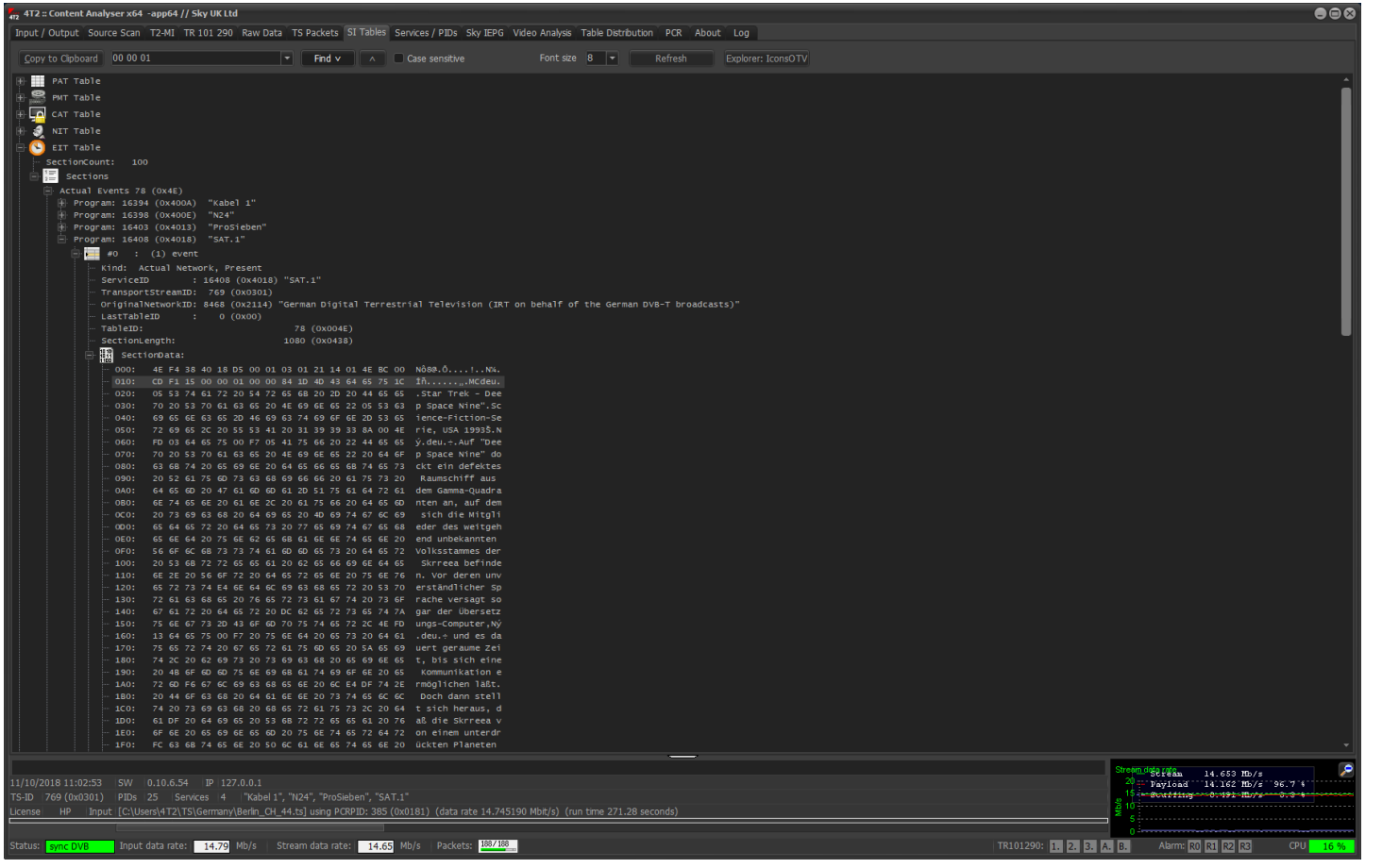
SI-Table analysis

(all inputs)

Display of the service information tables (SI) with:

- find function
- comprehensive tree exporting options
  - all SI-tree
  - sub-tree
  - individual entries

SI of DVB, ATSC, and ISDB supported



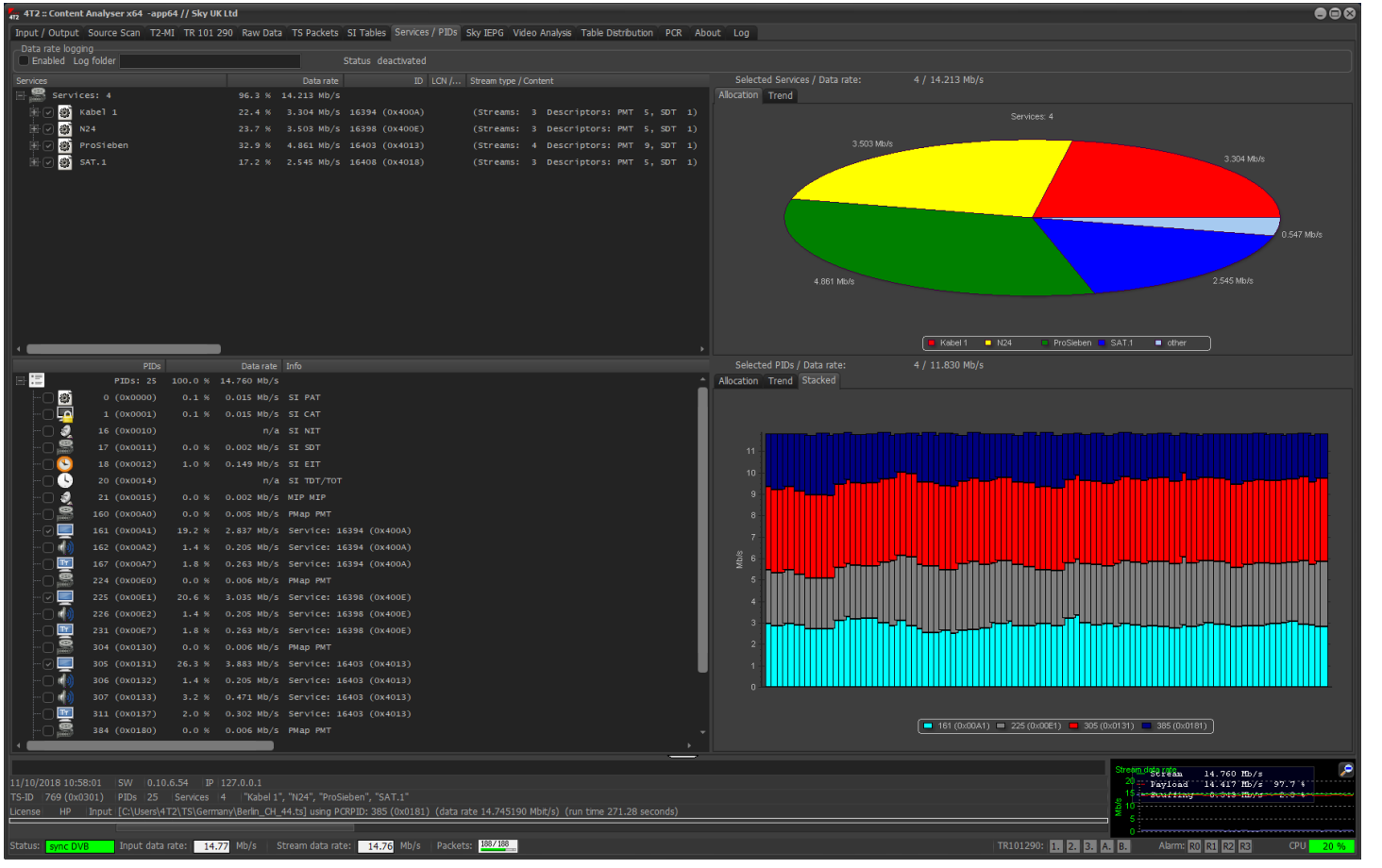
SERVICES PIDs analysis display

(all inputs)

- Data-rate displays with virtual and logical channel numbers sorted by services and PIDs
- Pie-chart allocation or trend of Services

- Service-sorted view displays all PIDs that make up a service

- PID-sorted view with corresponding data-rate display as Pie, Trend or Stacked



MultiViewer

(all inputs)

decoding of services in transport stream

- Black/freeze detection
- Moving video or thumbnails
- Audio bar-graphs and Loudness measurements
- EPG current/next analysis

- GOP Structure Analysis

- DVB-Teletext
- DVB-Subtitling

- H.262, H.264, H.265 SD, HD and UHD

DVB-T specific RF measurements

(XTASI-RF)

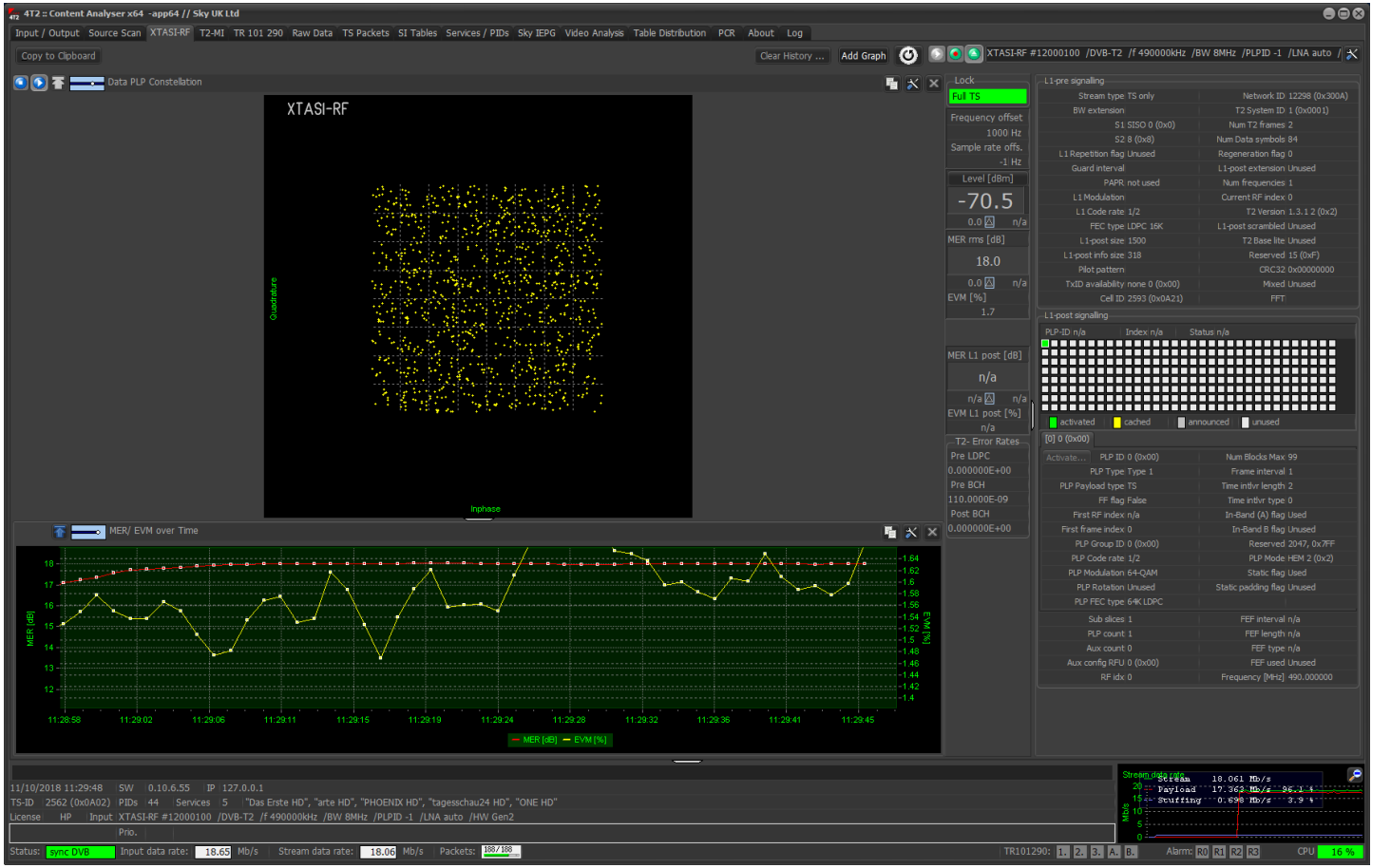
Constellation, Impulse-Response, Spectrum graphical displays

MER/EVM, BER, Level over time graphs

Calibrated level, field-strength with antenna correction factor

MER, EVM, BER before, and after Viterbi and Reed-Solomon

Decoded TPS information >42dB MER performance



DVB-T2 specific RF measurements

(XTASI-RF)

Constellations
L1 post and
Data-PLP,
Impulse-Response,
Spectrum displays

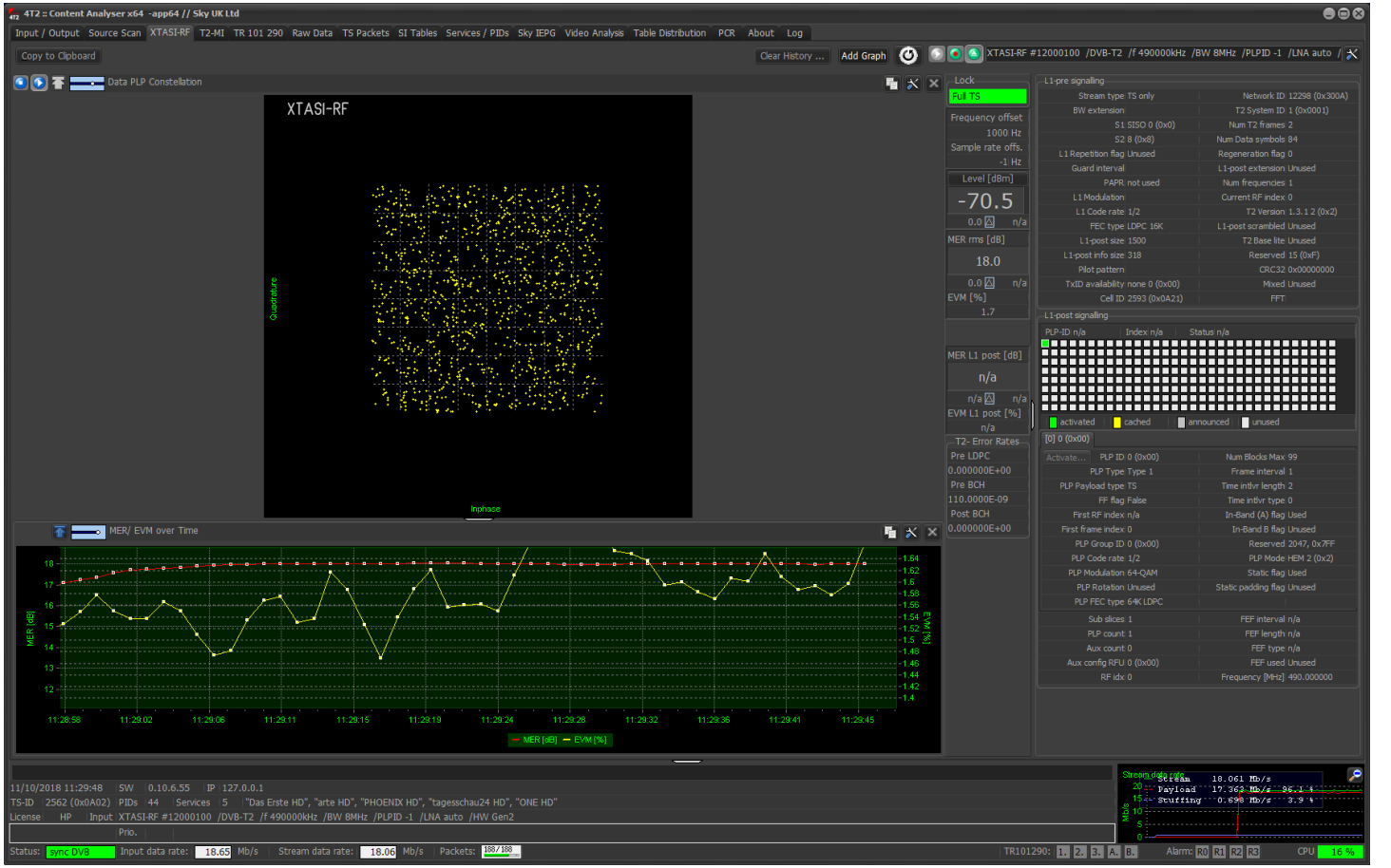
Level, MER, EVM,

BER before LDCP, and BCH

L1-pre, and L1-post
decoded information

Data logging
Data export

>42dB MER performance



DVB-S specific RF measurements

(XTASI-S/S2)

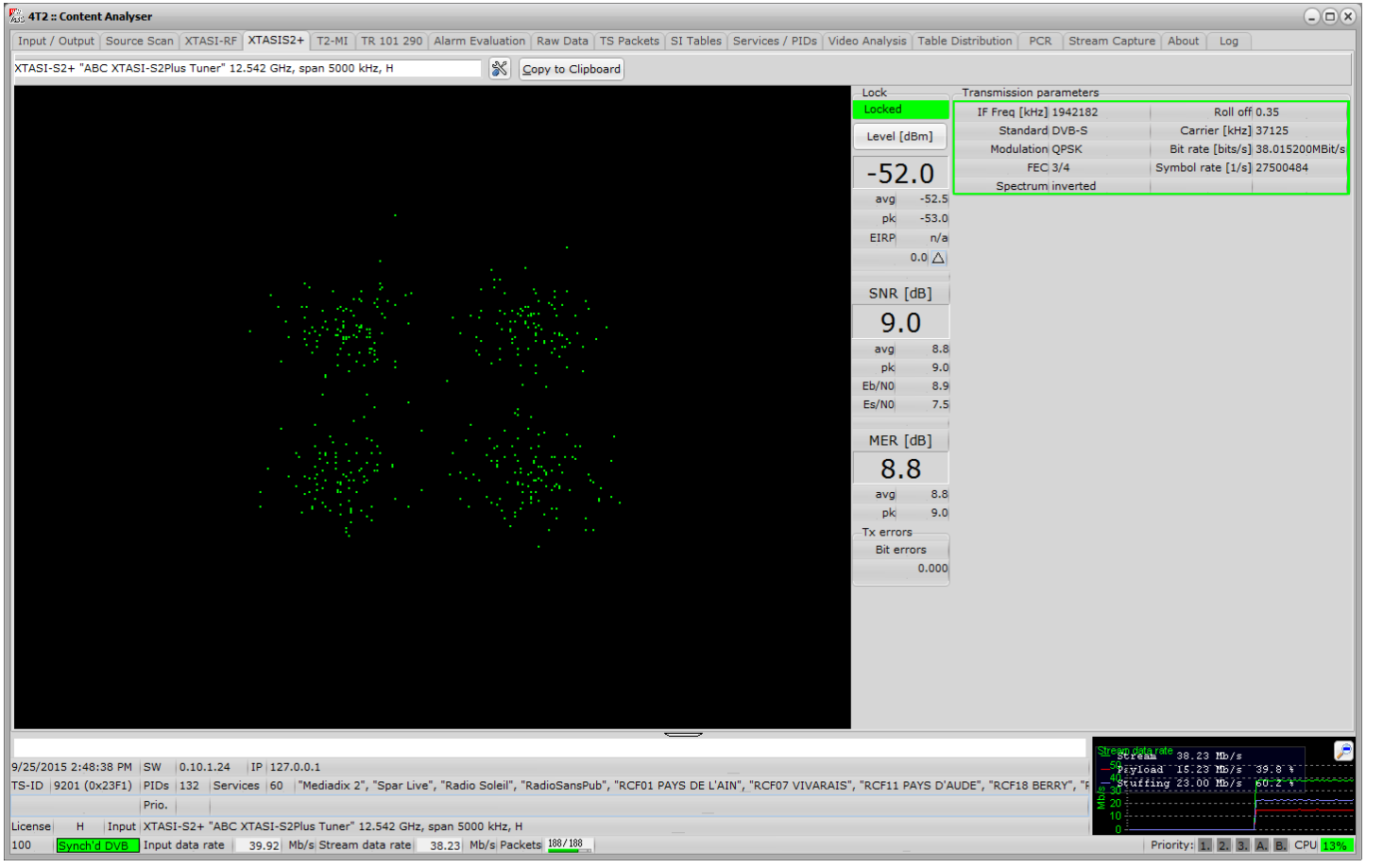
Constellation graphical display
QPSK

Viterbi and Reed-Solomon FEC

Level measurement

SNR, MER, Eb/N0, Es/N0 measurements

Bit errors



DVB-S2 specific RF measurements

(XTASI-S/S2)

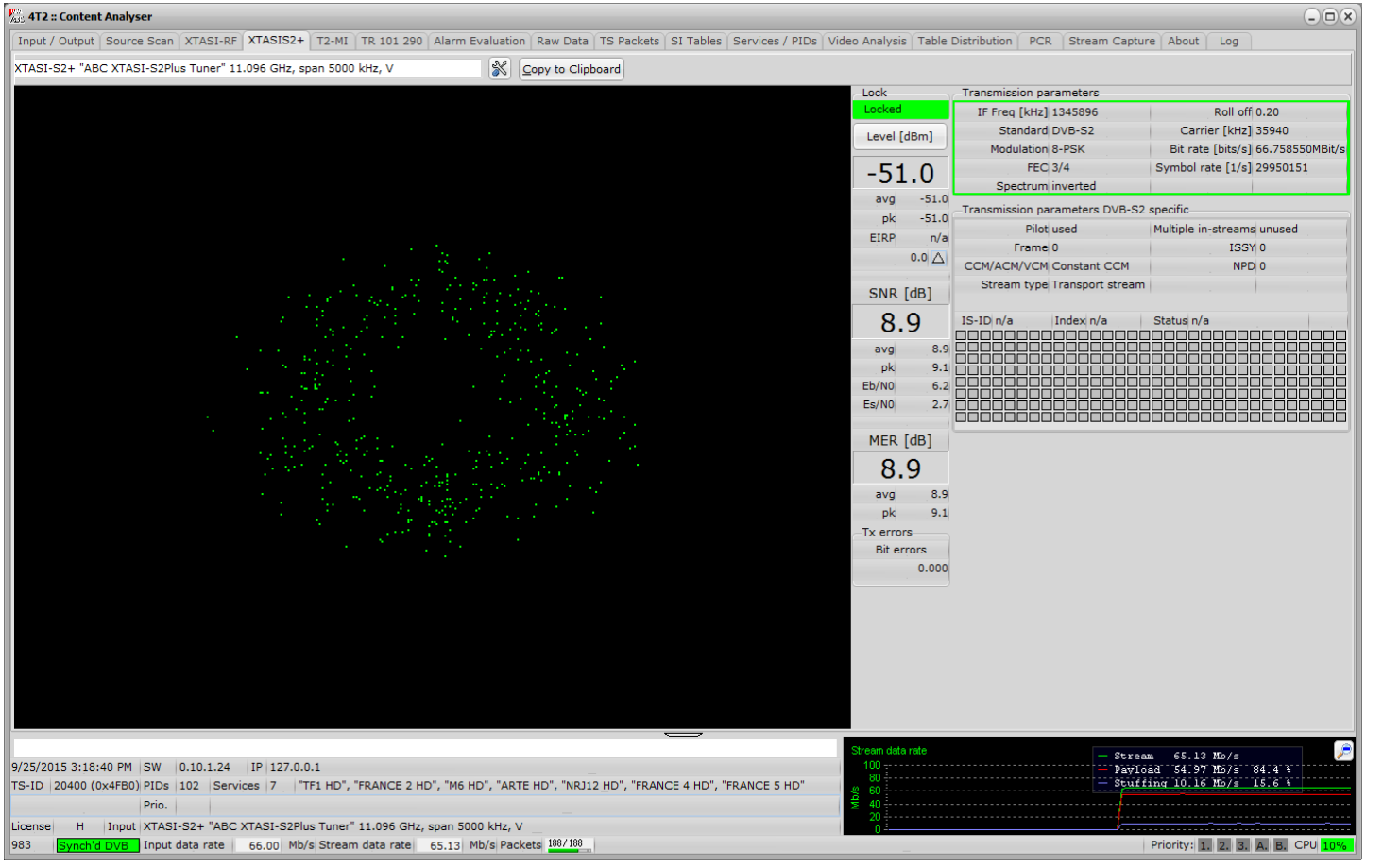
Constellation graphical display
QPSK+, 8 APSK+,
16 APSK+, 32 APSK+

CCM, ACM, and VCM
Multi-Stream

LDCP and BCH short and normal mode

0.2, 0.25, 0.35 Filter Rolloff support
Level measurement

SNR, MER, Eb/N0, Es/N0 measurements
Bit errors



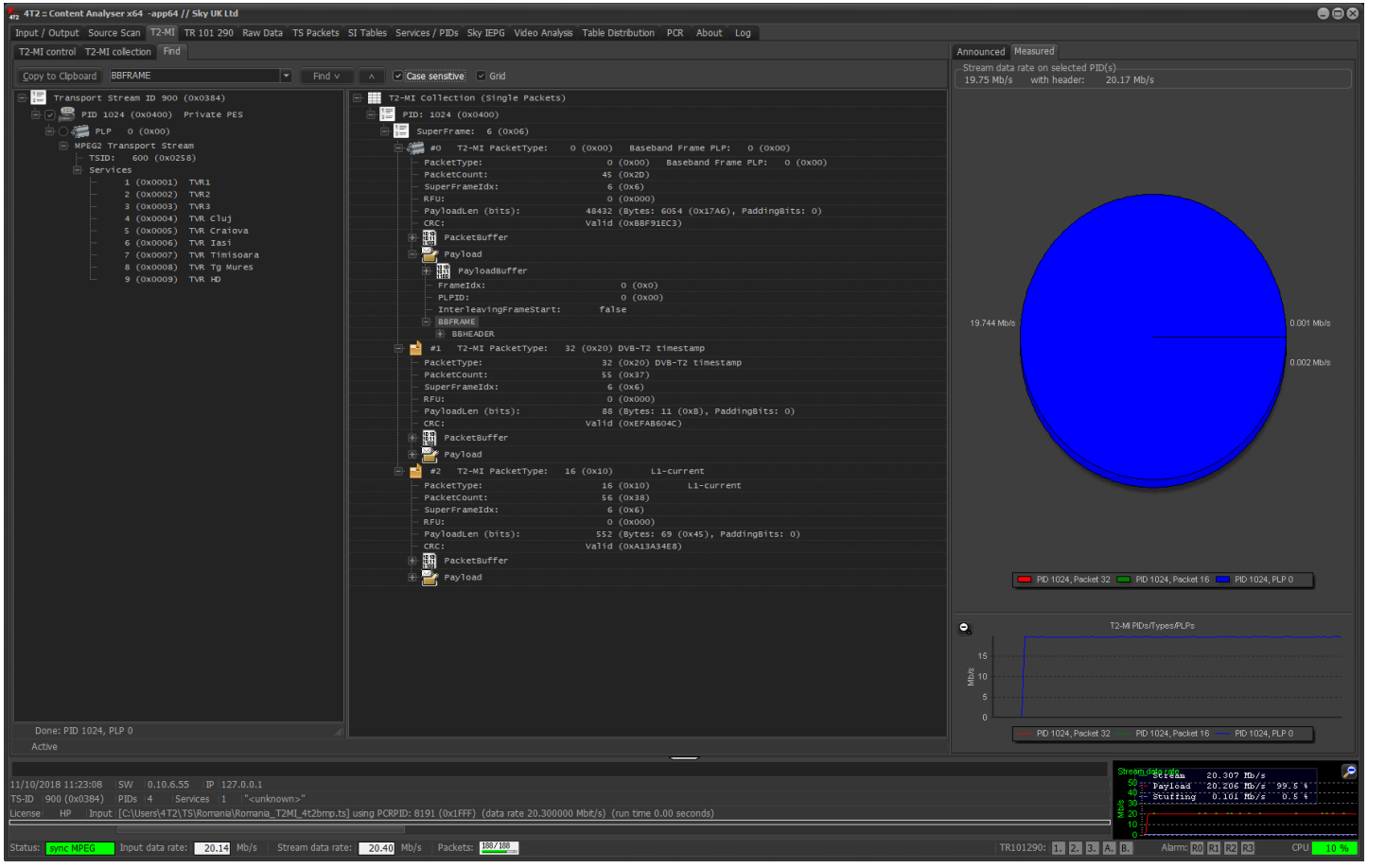
T2-MI decapsulation and analysis

(DVB-S2, ASI, IP inputs)

Modulator interface real-time analyser

De-capsulation of embedded single-, or multi-program transport streams

Re-routing into Content-Analyser for visualisation and analysis

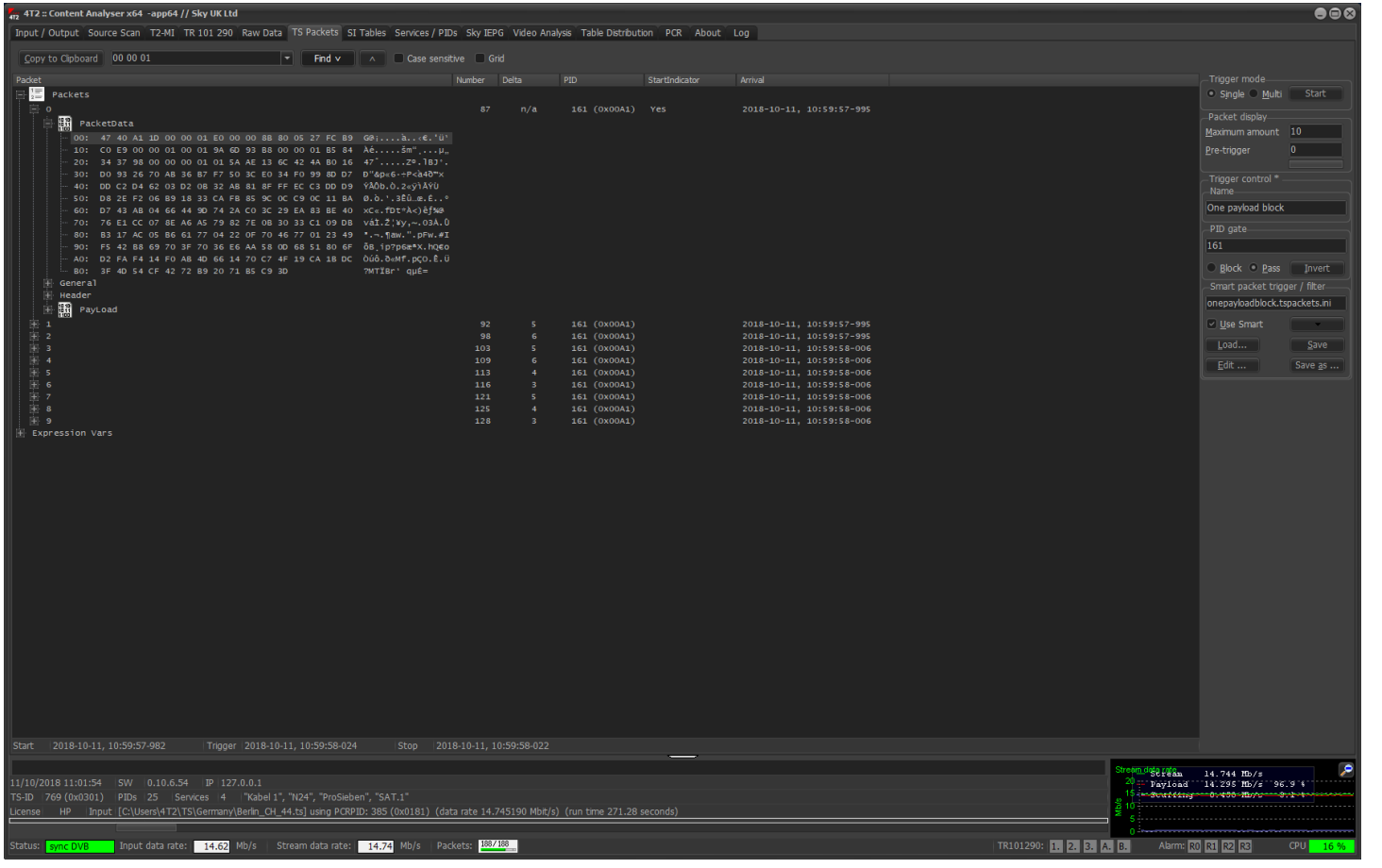


TS Packets expert function

(all inputs)

Sophisticated packet filtering with multiple trigger variables and filter expression editor

Unique and powerful tool for finding problems in the transmission chain and in multiplexers



PCR

(all inputs)

Powerful menu for finding PCR related problems from Jitter, to drift, and time-stamping

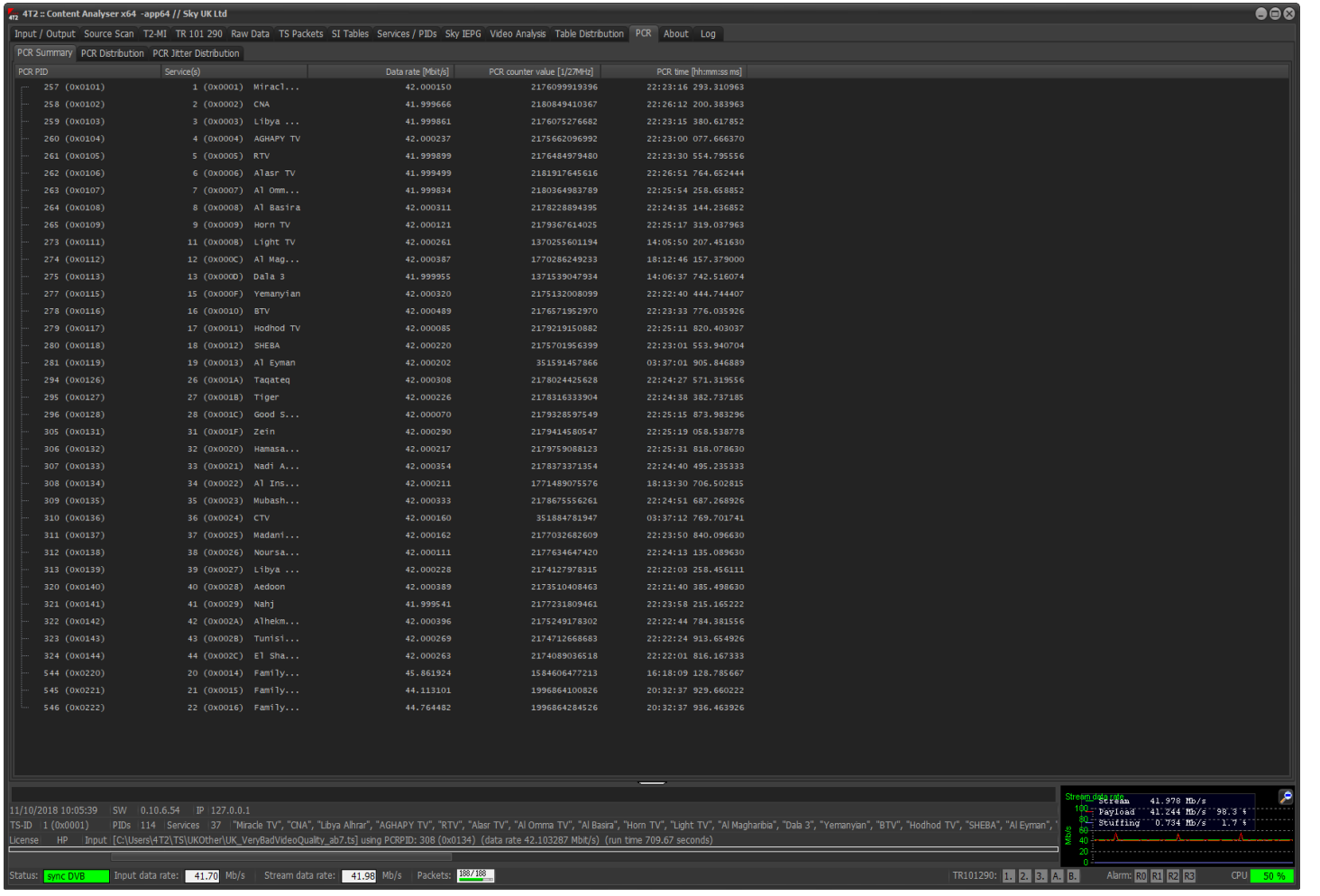


Table and PCR Distribution

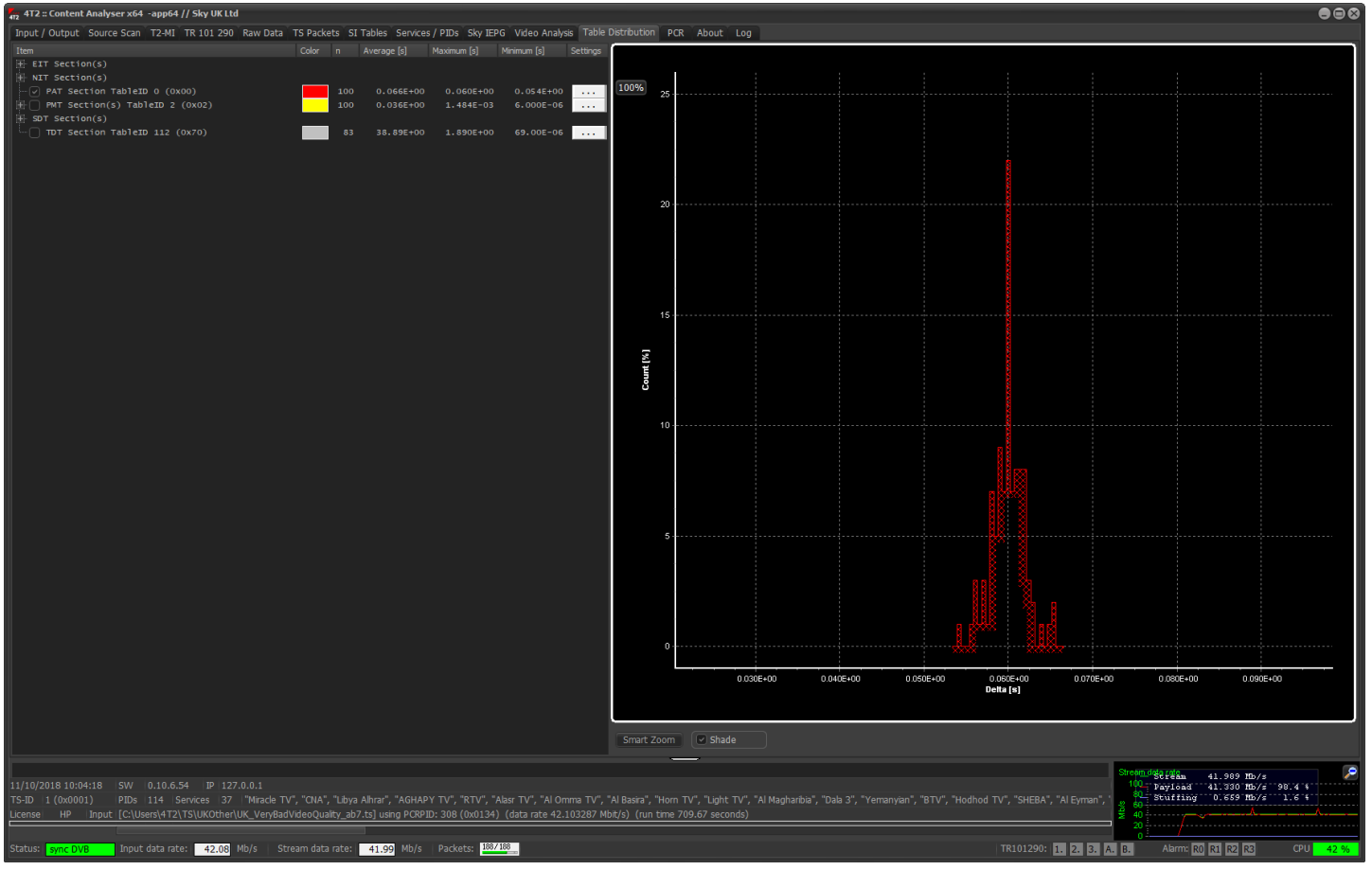
(all inputs)

Distribution of SI-tables in the Transport Stream

Selection is arranged through individual services

Individual tables can be selected and the repetition rates are displayed in form of a histogram

Smart-zoom assists on positioning the histograms



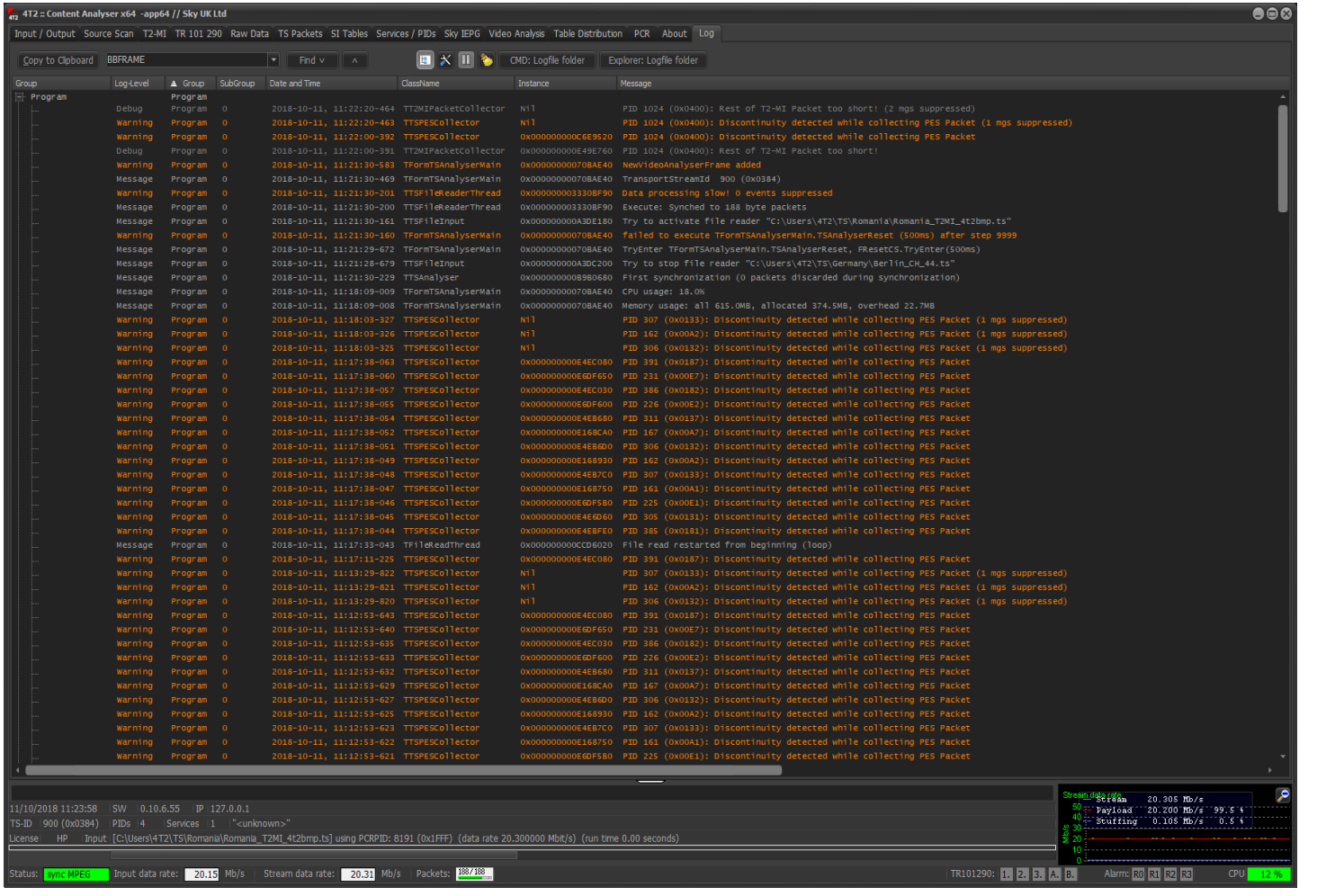
Log

(all inputs)

Most comprehensive logging system with integrated find and sorting features

Automated logfile storage with integrated garbage collection

Easy logfile post-processing available on-the-fly using Windows tools



further information available at
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