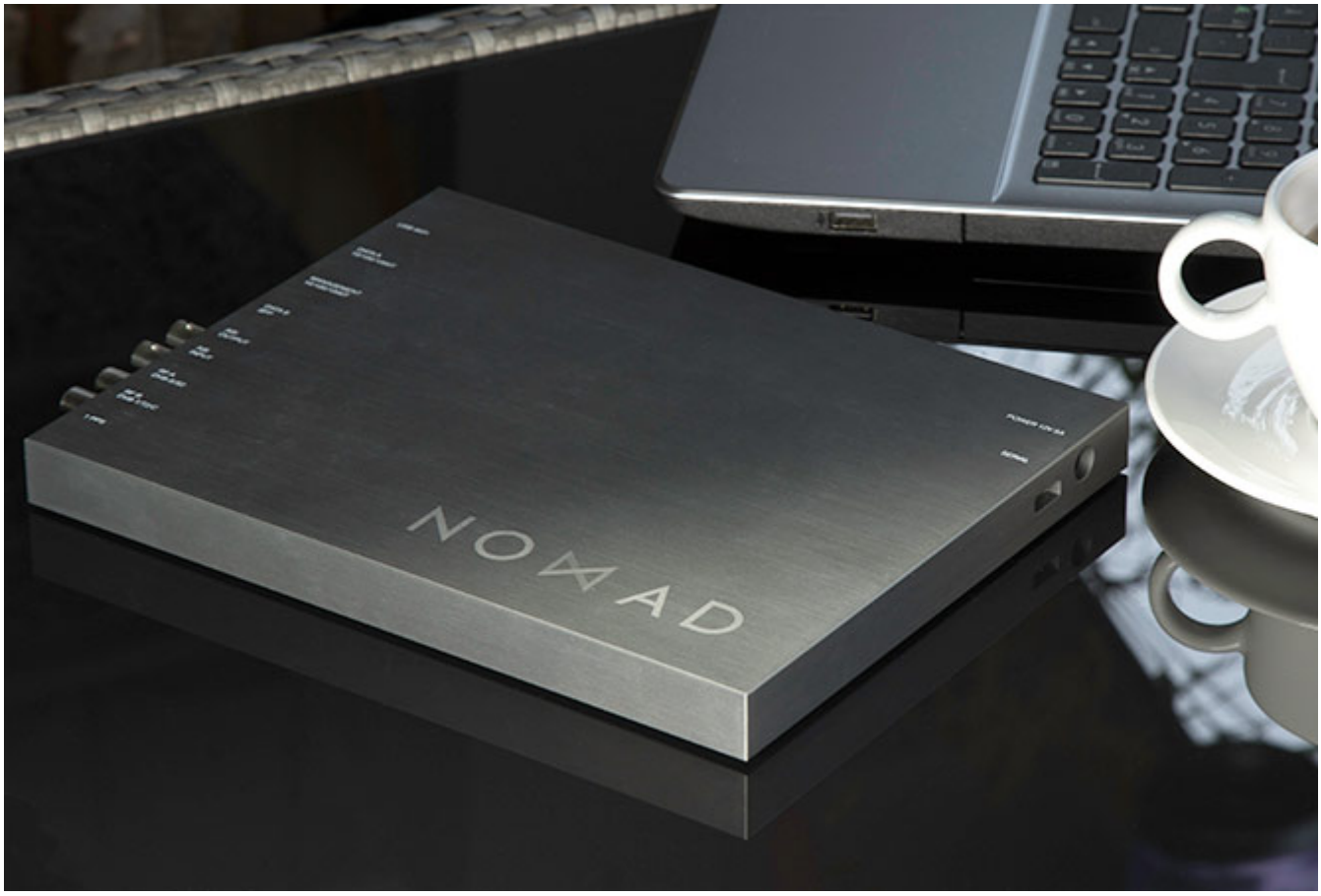
BRIDGE TECHNOLOGIES™

NOMAD Portable



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NOMAD Portable

NOMAD - media professionals' most versatile companion

NOMAD covers all the monitoring needs encountered in hybrid IP multicast, OTT and RF networks. It is the ultimate all-in-one monitoring and analysis solution for the technician on the move.

NOMAD is a breakthrough design with almost every conceivable interface for media signal monitoring and analysis. Featuring optical/electrical Gigabit Ethernet, ASI in/out, DVB-C QAM cable, DVB-T/T2 COFDM terrestrial, 8VSB for ATSC terrestrial, DVB-S/S2 satellite and external 1PPS GPS time-reference, NOMAD can analyse all RF transmitted DVB signals as well as OTT and multicast/unicast IP transmissions.

With comprehensive IP packet analysis tools, NOMAD is ideal for IP transport understanding regardless of media transported. NOMAD also is shipped with the ultimate in user friendly setup. The unit contains a Wi-Fi zone, and by pointing a laptop towards this, NOMAD is ready for use without further configuration.

As technologies become more and more complex, using Nomad will give invaluable insight into modern media signal behaviours without the need for deep operator knowledge of the media technology used.

Cut from a single brick of aluminium, NOMAD sets a new standard for both finish and ruggedness. It is also of very light weight and is the perfect companion to a laptop.

NOMAD ships with extensive functionality for superior digital media understanding right out of the box. Additionally NOMAD has a substantial additional set of extended analysis options, enabling it to outperform the most comprehensive systems on the market in functionality. This also allows NOMAD to be an ideal laboratory tool for desktop analysis in the most demanding environments. NOMAD also sets a new benchmark of affordability in the industry.

Designed to replace old-school PCI cards, USB-based dongles and other laptop-dependent devices, NOMAD is a complete free-standing unit with its own CPU and can be left to monitor signals by itself without the need for a host system.

Choose your NOMAD

The probe comes in two varieties, NOMAD and NOMAD-PRO, and features three independent gigabit Ethernet ports. One RJ45 for management, one SFP for electrical/optical connectivity and a second

RJ45 for media connectivity. The NOMAD further supports ASI in/out, QAM cable, DVB-T/T2 COFDM terrestrial, DVB-S/S2 satellite and an external 1PPS GPS time-reference. NOMAD also is shipped with the ultimate in user-friendly setup: The unit contains a Wi-Fi zone, and by pointing a laptop towards this the NOMAD is ready for use without further configuration.

NOMAD

The base NOMAD supports signal monitoring on its IP, ASI and RF interfaces. Up to 10 IP multicasts can be monitored concurrently. Monitoring of up to 10 HLS/DASH OTT streams is included. TR 101 290 analysis is activated on the ASI, DVB-T/T2 and DVB-S/S2 interfaces and on one of the 10 IP multicasts. Support for T2MI analysis and SCTE35 cue-tone logging and alarming is included. Advanced RF functionality for the T/T2 interface enables features such as channel impulse response and constellation diagram. Logging of measurement data to factory-installed 32GB flash card is included. Monitoring of up to 4 concurrent incoming Secure Reliable Transport (SRT) feeds. Capable of transmitting up to 2 SRT feeds.

NOMAD-PRO

The NOMAD-PRO builds on top of the feature set of the regular NOMAD. It expands by including Eii capabilities, enabling the NOMAD-PRO to be managed externally via systems such as the VBC or Skyline Dataminer. Furthermore, the number of concurrent OTT streams that can be monitored is increased from 10 to 20. The number of TR 101 290 engines are increased from analysis on one IP multicast to analysis on up to 25 concurrently

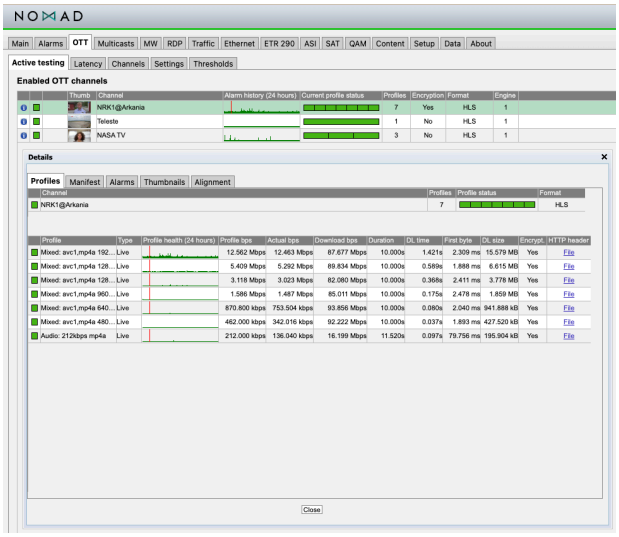
through the BULK-ETR290 option.

OTT MONITORING

The NOMAD incorporates powerful OTT engines for gaining insight into any adaptive bitrate video distribution, particularly in VoD and Live. Supported formats include HDS, HLS, SmoothStream and MPEG-DASH. Each OTT Engine operates autonomously and only requires knowledge of the URL from which the media is being fetched. The OTT Engine then parses the manifest file provided by the origin or edge-server, extract the different profiles served, validates syntax, checks chunk counters and then does the same for the individual profiles. Support for AES-based decryption is included as well as an innovative method for customizing the expected format of the manifest files received.

OTT Active Testing

The OTT option enables monitoring of up to 50 OTT channels. Up to 5 OTT engines (depends on license) can operate in parallel, and each engine licensed allows any channels to be analyzed. Each engine analyses channels in series and can be configured with any number of channels up to the maximum allowed by the license, and the necessary bandwidth is available for the channels you are analyzing. NOMAD comes with 1 default OTT engine (10 streams) and NOMAD-PRO has 2 engines (20 streams). The NOMAD will parse a channel's manifest file, and for a live channel one of the latest segments in each OTT profile's segment sequence will be analyzed. The engine then moves on to the next OTT channel in the channel list defined by the user. For a VoD channel the OTT engine will analyze all segments in the VoD file, one in each round-robin loop. If manifest file parsing or segment analysis reveals an error, an alarm will be raised.

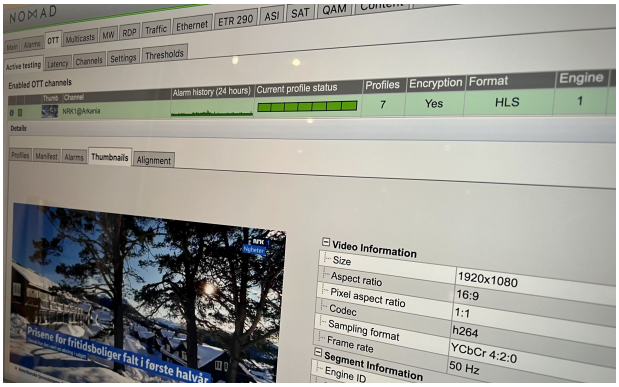


THUMBNAILS AND ALIGNMENT

As with the multicast and RF/ASI monitoring functionality, thumbnails for every OTT channel are displayed if successfully descrambled or available in the clear. These thumbnails can then be clicked through to for each profile, along with associated data (actual bitrate, expected bitrate, etc) of each profile. Thumbnail update rate is dependent on compression standard and resolution and can be adjusted by the user. The Alignment view shows the user all the profiles for a selected channel with thumbnails and corresponding data.

ORIGIN SERVER CDN MONITORING

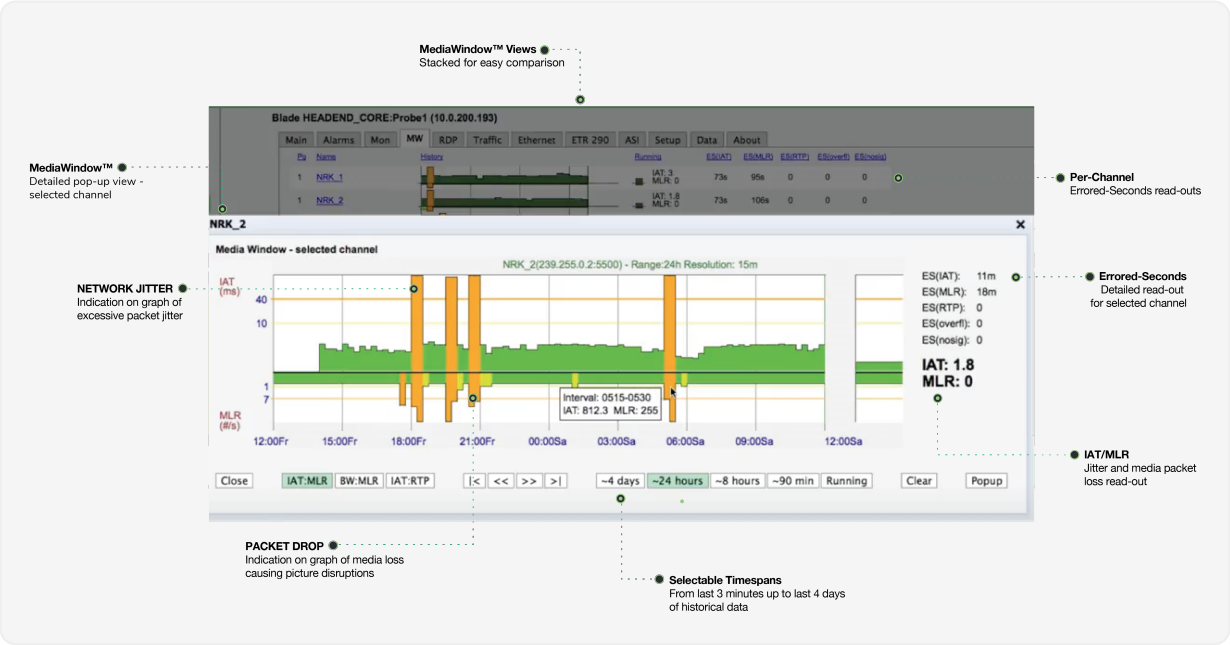
The default number of concurrent OTT/ABR streams included for the NOMAD platform is 10. For the NOMAD-PRO the number is 20. This can be further expanded though licensing. Supported formats include HLS, M-DASH, Shoutcast for radio and RTMP.



PATENTED VISUALISATION

The NOMAD contains unique visualisation technologies such as the MediaWindow™ and the

microETR™. The MediaWindow™ allows the operator to gain key knowledge about the carriage quality of the media multicasts over time selectable time intervals. Color-coded graphs give an intuitive feel for how well the signal behaves in terms of QoS parameters such as packet loss and packet jitter. The microETR™ deals with transport streams and allows for the real-time alarm state of hundreds of media streams to be viewed in a single view. This allows for faults to be spotted and pinpointed in seconds. Together these techniques result in a graphical user interface that is packed with essential information, yet intuitive and easy to read.



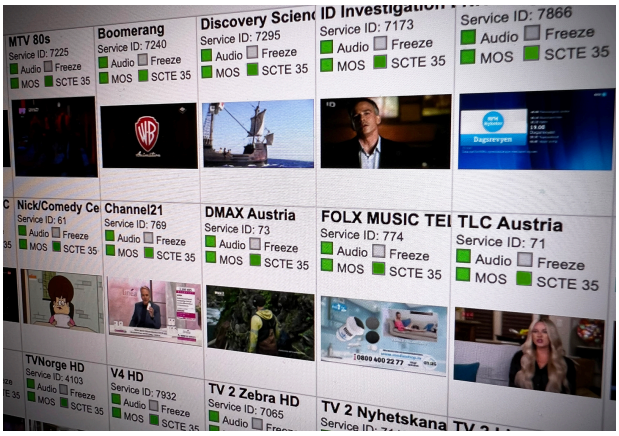
Stream Overview

The StreamOverview functionality, recently introduced to the NOMAD as a software update, represents a new way of obtaining at-a-glance insight into the performance of a single channel, so that it can be assessed and troubleshooted as and when problems occur. It provides a simplified view of each channel in accordance with the needs of first- and second-line problem solvers, providing exactly the data required and nothing more, in a manner that is instantly accessible and

highly intuitive. A high-speed search bar and drop-down list allow for the user to instantly target a problem channel and select it, with that channel's information automatically updated to show all relevant monitoring data for that channel alone. The nature of this data changes according to whether the stream in question is RF, IPTV multicast or OTT/ABR.

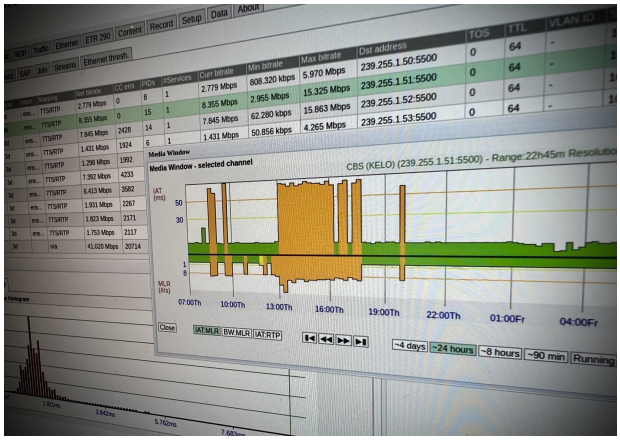
SCTE-104 AND SCTE-35 MARKER MONITORING

The capability of monitoring ad inserts is of particular importance to safeguard the revenue flow of any media operation relying on commercials as an income. Advertising breaks are typically signalled using either the SCTE-104 (uncompressed) or SCTE-35 (compressed) standards. These standards describe messages – or events – that flow together with the main signal telling downstream equipment when to switch in and out advertising content. The NOMAD includes support for monitoring SCTE-104 carried inside ST.2038 and SCTE-35 directly in all the IP and ASI/RF transport streams monitored as all the activated ABR/OTT unicast streams. Events are logged internally in the probe. Relevant alarms are generated in case of erroneous syntax or mismatching timing.



MULTICAST MONITORING

An extensive range of multicast parameters can be displayed at-a-glance, pertaining to IP, TS, Ethernet, RTP and FEC. Associated thumbnails are



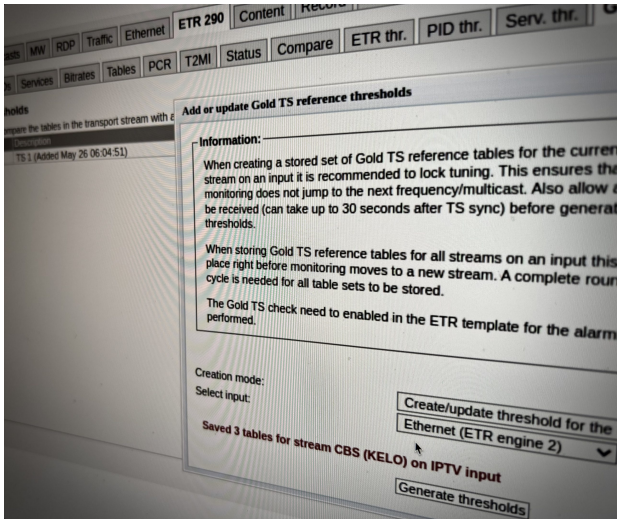
also displayed, which can be expanded to produce a more frequently updated single image – or alternatively, display error information in cases where thumbnails cannot be obtained. For each multicast stream, peak and aggregate values for an extensive range of signal, bitrate and packet data are all displayed, up to a duration of four days, customizable according to the user's priorities. The detection and joining of multicasts into the probe is also facilitated in an intuitive and simple-to-achieve manner. Both IPv4 and IPv6 are supported. Active Multicast scan detection and channel lists via Session Announcement Protocol are also supported.

TESTING ACCORDING TO ETR290

TR 101 290 testing ensures that the interoperability parameters of TS streams – including intervals, section gaps and tables – are all met. The NOMAD has a capacity of one dedicated ETR290 engine per type of interface, be it IP, ASI, DVB-T/T2 or DVB-S/S2. It groups errors into Priority 1, 2 and 3 errors, but further allows for the user to fully customize alarming and adapt the thresholds of various ETR290 components. The number of concurrent ETR290 engines can be extended through license options. NOMAD-PRO has 25 concurrent ETR290 engines through the BULK-ETR290 option.

GOLD TS PROTECTION™

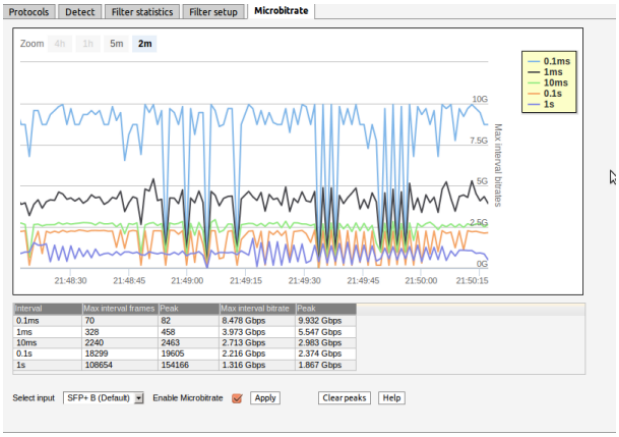
Gold TS protection™ represents an upgrade on the established TR 101 290 standard, including



testing for critical conditions that are not covered under ETR290 testing, whilst also making fault tracking much faster, more accurate and secure. It includes identification of failures – all of which are vital real-world quality assurance elements that have direct effect on end-user subscribers. For operators of digital media services Gold TS saves significant time in setup and diagnosis. Easier setup is facilitated through the use of a much faster calibration process than that associated with ETR290, by capturing an ideal transport stream and setting this as a reference value.

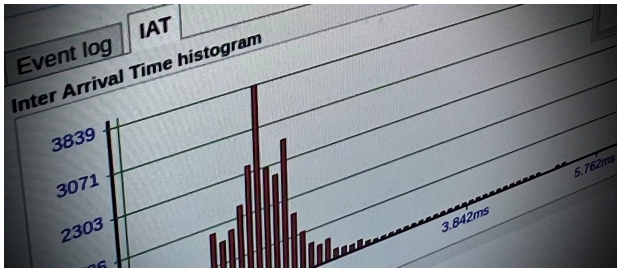
TRAFFIC - MICROBITRATE BURSTING

A common problem in any large enterprise or public network infrastructure is the occurrence of packet bursts. This typically happens due to congestion points and resulting packet queues accumulating inside the Ethernet switches and IP routers making up the network. When the network is used to transport video these aberrations can have a particular adverse effect. This unique functionality allows the network engineer to detect the amount of micro bursting and also trend this over time to spot patterns otherwise very difficult to pinpoint. Microbitrate burst monitoring is available on the NOMAD as a standard feature that also provides features such as PCAP capture and unicast VoD monitoring.



IAT - HISTOGRAM

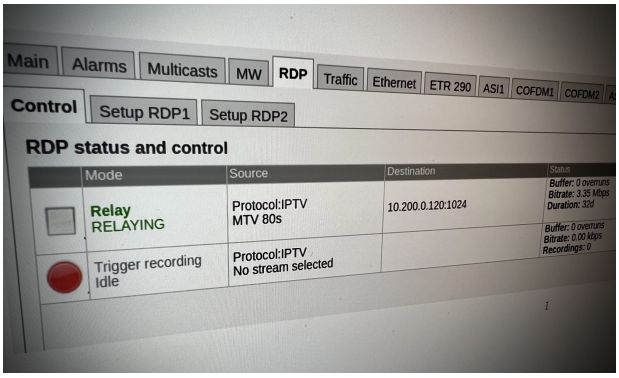
The Inter Arrival Time (IAT) histogram gives you a view of how well the timing of the media multicast



received is over time. It shows an accumulated count of the number of IAT measurements that fall within each presented bin interval. Vertical green lines indicate the maximum and minimum IAT values observed. The user can customize the scales.

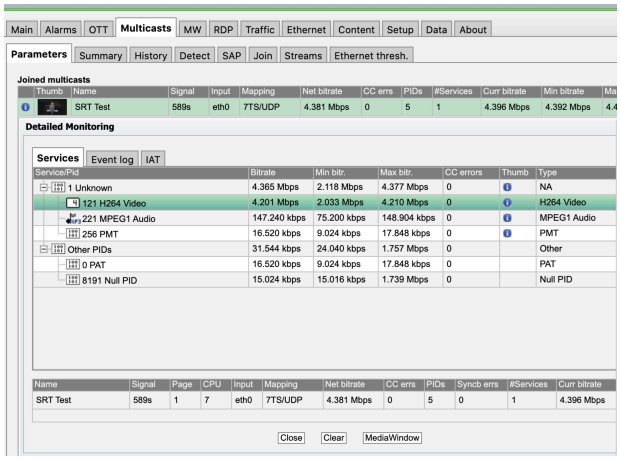
RETURN DATA PATH

With the advent of fully duplex technologies such as IP transportation, new features for allowing remote access to regional ingress signals are vital. Return Data Path allows the operator to record video locally on the probe or re-route live video monitored by the probe to a central location for decryption and further analysis. Recording is initiated either directly by the operator or automatically based on pre-defined alarm trigger criteria. RDP reduces the need for truck rolls and otherwise necessary on-site visits, by making available centrally signals that are normally only available locally. RDP™ also facilitates a simpler descrambling process for scrambled signals, by transporting the stream to the NOC, head-end or anywhere else for visual monitoring. Currently supported protocols for remote relay include UDP and RTP uni/multicast and Secure Reliable Transport (SRT).



SRT CONTRIBUTION AND CLOUD MONITORING

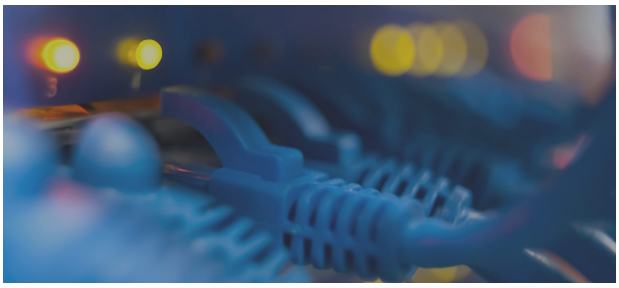
Bridge Technologies is a proud member of the SRT alliance, and recognizes the value that this robust quality, low latency, open-source video



streaming protocol presents to the industry. The NOMAD is capable of receiving up to 4 SRT streams concurrently and forward them to the main monitoring framework for further analysis. This includes MediaWindow™ visualisation, TR 101 290 analysis, content capture and thumbnail mosaic. Key parameters such as round-time and lost-packets are displayed. The NOMAD can also send out two streams formatted as SRT. These are typically used for ad-hoc transport of content for remote viewing and inspection. The NOMAD with SRT support is a standard feature of the product.

C-CAP/L2TP FOR DOCSIS 3.0/3.1

In Cable Networks Remote PHY represents a Distributed Access Architecture option that moves the physical layer from the headend or hub to the edge of the access network, and thus represents an important mechanism for maximizing network efficiency in Hybrid Fiber Coax networks. The NOMAD comes with support for Remote PHY/L2TP-based DAAs for IPv4 and IPv6, allowing for the unpacking and monitoring of multicasts pointed towards PHY CCAP nodes.

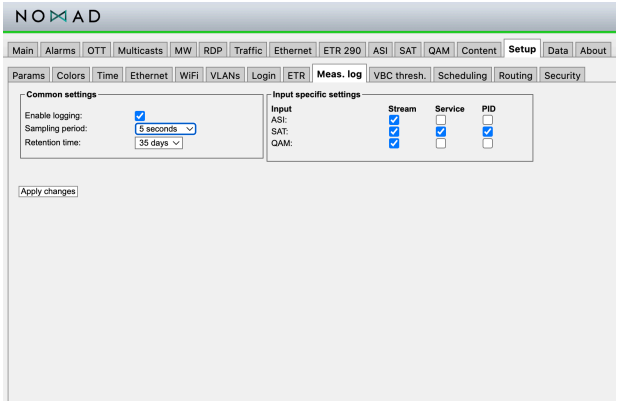


RF ANALYSIS WITH TREND GRAPHS

The NOMAD contains RF trend graphing capabilities on important RF performance parameters such as RF signal level and Modulation Error Ratio (MER). See back in time up to 7 days in time to pick up on intermittent transmission errors otherwise very hard to fault find.

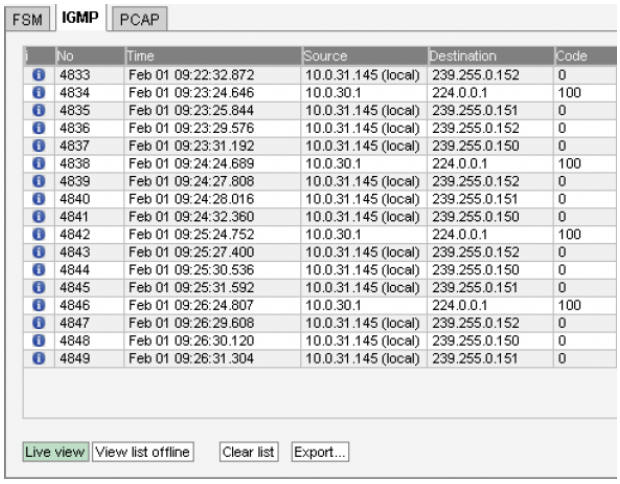
RF PARAMETER LOGGING TO NON-VOLATILE MEMORY

The NOMAD comes with a factory-fitted 32GB FLASH card capable of storing data such as TS recordings, PCAP recordings and RF parameter data logging. By activating parameter logging it is possible to turn the NOMAD into a data logging station capable of storing RF, TS and Service data for up to 35 days back in time. The data logging resolution is user-selectable down to one data entry every 5 seconds. Stored format is CSV for easy export into external software tools such as Excel or Mathlab for further processing.



IGMP protocol analysis

The NOMAD includes as standard IGMPv2/3 multicast logging and analysis functionality, making it a powerful tool for pinpointing hard-to-capture intermittent faults in the field. IPv4 and IPv6 are both supported.



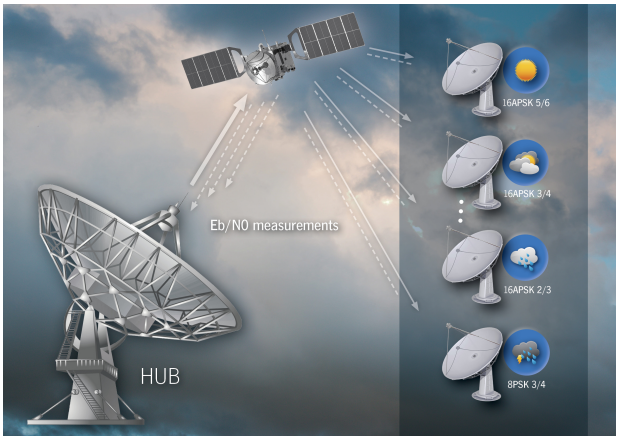
FSM | IGMP | PCAP

No	Time	Source	Destination	Code
4833	Feb 01 09:22:32.872	10.0.31.145 (local)	239.255.0.152	0
4834	Feb 01 09:23:24.646	10.0.30.1	224.0.0.1	100
4835	Feb 01 09:23:25.844	10.0.31.145 (local)	239.255.0.151	0
4836	Feb 01 09:23:29.576	10.0.31.145 (local)	239.255.0.152	0
4837	Feb 01 09:23:31.192	10.0.31.145 (local)	239.255.0.150	0
4838	Feb 01 09:24:24.689	10.0.30.1	224.0.0.1	100
4839	Feb 01 09:24:27.808	10.0.31.145 (local)	239.255.0.152	0
4840	Feb 01 09:24:28.016	10.0.31.145 (local)	239.255.0.151	0
4841	Feb 01 09:24:32.360	10.0.31.145 (local)	239.255.0.150	0
4842	Feb 01 09:25:24.752	10.0.30.1	224.0.0.1	100
4843	Feb 01 09:25:27.400	10.0.31.145 (local)	239.255.0.152	0
4844	Feb 01 09:25:30.536	10.0.31.145 (local)	239.255.0.150	0
4845	Feb 01 09:25:31.592	10.0.31.145 (local)	239.255.0.151	0
4846	Feb 01 09:26:24.807	10.0.30.1	224.0.0.1	100
4847	Feb 01 09:26:29.608	10.0.31.145 (local)	239.255.0.152	0
4848	Feb 01 09:26:30.120	10.0.31.145 (local)	239.255.0.150	0
4849	Feb 01 09:26:31.304	10.0.31.145 (local)	239.255.0.151	0

Live view | View list offline | Clear list | Export...

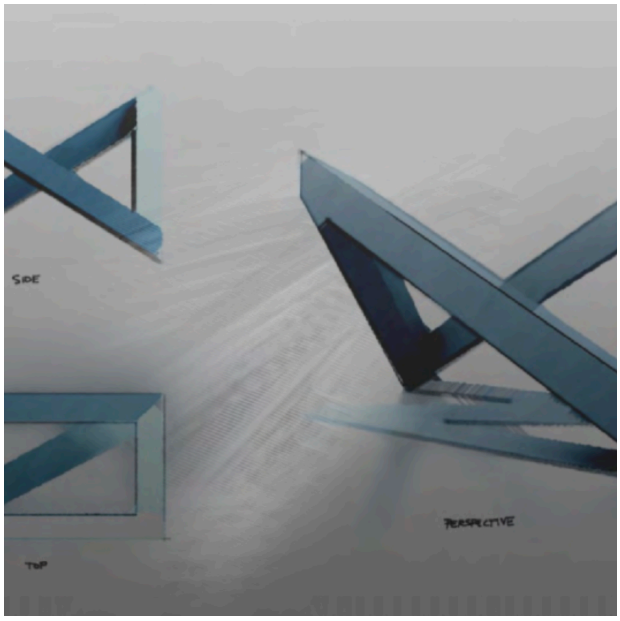
VSAT SYSTEMS

With the rapid growth in the numbers of offshore VSAT systems, and the increasing bandwidth consumption of each installation, a simple, reliable and affordable way of monitoring RF performance is urgently required. NOMAD provides the solution. Capable of analysing RF parameters such as MER, CNR, Eb/N0 and channel power, NOMAD is powerful and highly portable, self-contained and built to withstand the rigours of the offshore environment.



DESIGN

Built from a single piece of high quality aluminium, NOMAD provides the ruggedness necessary in harsh outdoor broadcast and telecom environments, and at the same time provides unprecedented aesthetics and functionality. CNC-milled with a precision down to 10 micron, laser engraved logotypes and a form factor resembling a solid tablet, NOMAD stands on recessed rubber feet, allowing the unit to hover 0,2 millimetres over any surface. All heat from the advanced processors is dispersed through its aluminium chassis, and with exceptional electronics design, the unit is providing amazing abilities for the digital media engineer.



THE NAME NOMAD

NOMAD reflects the technician and the media professional on the move, and the logo is designed to represent the strength, convenience, flexibility, ruggedness, and most of all simplicity of the product. The N icon symbolises monitoring glasses — a real time look into broadcast signal behaviour.

Security — Tacacs+

The NOMAD uses best practices from the IT industry to ensure continued operational stability and the highest level of protection against attack. The NOMAD ensures continued operational stability using HTTPS to secure and encrypt the communications channels, thus practically eliminating the possibility of man-in-the-middle attacks. This provides broadcast facilities with the ability to architect and use IP broadcast capabilities with confidence and ease.

Technical specifications

SPECIFICATIONS

ETHERNET

- 10/100/1000T RJ45 gigabit Ethernet interface for video/data analysis
- SFP port for optical gigabit connectivity
- Optional second RJ45 gigabit Ethernet port
- Web-based management interface
- SSH/TELNET/FTP terminal

- Relay video multicasts to 3rd party targets using RDP
- Laser power received level for fault finding in optical networks

DVB-S/S2 SATELLITE

- Supports DVB-S and DVB-S2 8PSK, 16APSK, 32APSK, GOLD CODES, SIS
- L-band input from 950 – 2160 MHz
- Symbol rate range between 1 – 45 MS/s
- 13V/18V/22kHz and DiseqC 1.0 capable for switch control
- High-end RF performance with constellation diagram and over 20 RF parameters

DVB-T/T2/C TERRESTRIAL & CABLE *(European version only)*

- Supports DVB-T EN 300-744 and DVB-T2 EN-302-755 (v1.3.1)
- Supports ITU.T J.83 Annex A/C for cable networks (QAM16 up to QAM256)
- Frequency range: 43 – 1002 MHz. Bandwidth 5, 6, 7 and 8 MHz
- Channel Impulse Response diagram & constellation diagram for DVB-T/T2

ATSC TERRESTRIAL & CABLE *(US version only)*

- 8VSB for ATSC terrestrial applications
- QAM Annex A/B/C for cable applications
- Symbol rate 0.7-7.2MS/s
- QAM modes 16,32,64,128,256
- Constellation plot

1PPS

- Offers GPS syncronization down to 0.1 us accuracy
- Allows absolute network delay in SFN/T2MI networks to be measured
- Allows absolute Center Frequency Offset measurements on DVB-T/T2

ASI

- ASI input according to EN 50083-9, Annex B
- Supports Burst mode, Spread Mode and legacy M2S
- ASI output with selectable source from ASI, DVB-T/T2/C or DVB-S/S2 input
- Up to 211Mbit/s incoming rate (line speed ASI)

WiFi

- Provides 2.4 GHz Wireless Access Point service
- No setup – Nomad is WiFi Zone
- USB 2.0 IEEE 802.11 b/g/n 150Mbit/s dongle

PHYSICAL SPECIFICATIONS

PHYSICAL

- Dimensions: width x length x height (mm): 180x230x20
- Weight: 0.9 kg
- Power usage (max): 22 Watts
- Power supply: External power unit +12V, 1.8A (included)
- Operating temperature: -20 up to +45 degrees C
- Operating humidity: 5% up to 95% non-condensing
- Initial setup by Wi-Fi, Ethernet or separate USB Type-A cable (included)

ORDERING CODES

NOMAD

NOMAD – Ultra-Portable Probe, contains IP/Ethernet, ASI, Terrestrial (DVB-T/T2), Satellite (DVB-S/S2), Cable (DVB-C) and WiFi interfaces
Includes: IP-OPT (Enables 10 IP Streams *), OTT-ENG-OPT, AEO-OPT, ETR290-OPT, T2MI-OPT, SCTE35-OPT, FLASH32-OPT, VB252-ARF-OPT (European version) (Includes perpetual sw license)
*Max capacity 50 IP Streams per unit.

NOMAD-US – Ultra-Portable Probe, IP/Ethernet, ASI, ATSC Terrestrial & Cable (8VSB/QAM-B/DVB-C), Satellite (DVB-S/S2) and WiFi interfaces
Includes: IP-OPT (Enables 10 IP Streams *), OTT-ENG-OPT, AEO-OPT, ETR290-OPT, T2MI-OPT, SCTE35-OPT, FLASH32-OPT (US version) (Includes perpetual sw license)
*Max capacity 50 IP Streams per unit.

NOMAD-PRO

NOMAD-PRO – Ultra-Portable Probe, IP/Ethernet, ASI, Terrestrial (DVB-T/T2), Satellite (DVB-S/S2), Cable (DVB-C) and WiFi interfaces
Includes: IP-OPT (Enables 10 IP Streams *), EII-OPT, OTT-ENG-OPT, 2nd OTT-ENG-OPT, AEO-OPT, BULK-ETR290-OPT, SCTE35-OPT, FLASH32-OPT, VB252-ARF-OPT *(European version)*
*Max capacity 50 IP Streams per unit.

NOMAD-PRO-US – Ultra-Portable Probe, IP/Ethernet, ASI, ATSC Terrestrial Cable (8VSB/QAM-B/DVB-C), Satellite (DVB-S/S2) and WiFi interfaces

Includes: IP-OPT (Enables 10 IP Streams *), EII-OPT, OTT-ENG-OPT, 2nd OTT-ENG-OPT, AEO-OPT, BULK-ETR290-OPT, SCTE35-OPT, FLASH32-OPT *(US version)*
*Max capacity 50 IP Streams per unit.

NOMAD and NOMAD-PRO OPTIONS

EII-OPT – Allowing the NOMAD and NOMAD-US to communicate with a Northbound interface to a central monitoring and analysis system *(Included in NOMAD-PRO and NOMAD-PRO-US)*

EII-UPGR – Allowing the NOMAD and NOMAD-US to communicate with a Northbound interface to a central monitoring and analysis system. Upgrade

STRM-OPT – Additional concurrent monitoring of IP multicasts (up to 4 additional STRM-OPT can be fitted for a total of 50 IP multicasts)

STRM-UPGR – Additional concurrent monitoring of IP multicasts (up to 4 additional STRM-OPT can be fitted for a total of 50 IP multicasts), upgrade

ETR290-OPT – Additional individual concurrent TR 101 290 analysis on the IP input (up to 7 additional individual ETR290-OPT can be fitted)

ETR290-UPGR – Additional individual concurrent TR 101 290 analysis on the IP input (up to 7 additional individual ETR290-OPT), upgrade

BULK-ETR290-OPT – 25 engines with testing of ETSI TR 101 290, includes GoldTS

BULK-ETR290-UPGR – 25 engines with testing of ETSI TR 101 290, includes GoldTS, upgrade

OTT-ENG-OPT – 1 additional OTT engine, up to a total of 5. One is included by default.Each OTT engine allows 10 services with unlimited profiles to be analyzed

OTT-ENG-UPGR – 1 additional OTT engine, up to a total of 5. One is included by default.Each OTT engine allows 10 services with unlimited profiles to be analyzed, upgrade

VB1G2-OPT – Second 1GBit DATA interface Option

VB1G2UPGR – Second 1GBit DATA interface Option, upgrade

DOCUMENTATION

MANUALS

NOMAD – **DOWNLOAD**

Click below to learn more about compatible technology options:

ETR290™
MediaWindow™
microBURST™
MicroTimeline™

Environmental

Eurovironment
RoHS
WEEE
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