United Nations Development Programme
Programul Națiunilor Unite pentru Dezvoltare

Invitation to Bid
Amendment no. 1

Ref. no. RFP11/00377 **Date: 07 July 2011**

Subject: RFP for the provision of Information and Communication Technology (ICT) services for the Integrated Newsroom Production System for Teleradio-Moldova Company

1. Pursuant to Clause 6 of the Instructions to Bidders, and for reasons specified below, UNDP Moldova is hereby amending the solicitation documents.

2. In view of the questions and comments made by representatives of companies during the Pre-bidding Conference in regards to some technical specifications, and in order to take into account the latest industry developments, UNDP Moldova is hereby revising the Annex IV, Concept and Technical Specifications.

3. All other terms and conditions of the solicitation documents, except as amended herein, shall remain unchanged and shall continue in full force and effect.

Annex IV

Concept and Technical Requirements for

Procurement, Installation and Commissioning of Newsroom Production System
for Teleradio-Moldova Company

20/06/11

GENERAL DESCRIPTION

This specification covers the design, procurement, installation and commissioning of equipment for the News Project of Teleradio-Moldova Company. The equipment will provide the core broadcast facilities for this news production area.

Contents:

A. CENTRAL STORAGE

The contracted company will provide a truly shared media specific storage system (not standard IT SAN) supporting seamless workflow and tight integration between Production Asset Management, Ingest, Playout, Newsroom and non-linear editing systems.

The storage will be capable of dynamic allocation and changes including change of size of a workspace using administration tools, without disturbing normal operation.

The central storage must have true shared workflow features including multiple editors' capture to the same volume and playing the same media file simultaneously. Mac or PC clients should be both supported.

- Working resolution: 30Mbps, 50 Mbps.
- Synchronization with industry standard user management tools (such as Microsoft Active Directory).
- Gigabit Ethernet infrastructure with support for SD via 1 Gb/s.
- Capable of Dynamic allocation and changes during operation including change of size of a user workspace using administration tools
- Requested storage capacity: min 48 TB USABLE.
- Expandable to min. 128TB, about 50 video clients and a storage bandwidth of 4Gb/s
- Protected by RAID5 or mirroring, with auto-rebuild in case of a drive failure.
- All active system components must be redundant and hot-swappable.
- Spare HDD in carrier so that in the event of a drive failure an automatic background drive rebuilds starts, allowing for uninterrupted operation.
- Browser based System Health Monitoring and administration tool.
- Multiple editors can capture at the same volume and can play the same media file simultaneously.
- The system will include a 48 ports switch for connecting the clients, as recommended by the manufacturer. The switch will have 10Gb uplink port.
- A flat panel console kit will be supplied, consisting of 19"monitor, keyboard, pointing device. Standard KVM mounting integrated USB pass-through connector, standard multi-burner drive. Rack mountable, 1RU.
- The shared-storage system must be based on modular, scalable and highly reliable architecture to support for 24x7 hours News operation.

Technical specifications (minimum)	
CENTRAL STORAGE	
Working resolution	SD/HD
Storage	• Configuration contains minimum 2 storage chassis having minimum 64TB capacity • The shared-storage system must be based on modular, scalable and highly reliable architecture to support for 24x7 hours News operation • Capable of supporting protected storage with raid and auto rebuild, protected 3000 hours of media (Media Data rate: 50 Mb/s). minim 48 TB usable • Gigabit Ethernet infrastructure with the support for SD via 1 Gb/s for Windows clients. • 48 TB USABLE

	• Expandable to 128TB capacity • RAID5 or mirroring • redundant and hot-swappable • Spare 1 Hdd Drive in carrier
48-port Copper 1000 BaseX Gigabit Ethernet Switch	• High-performance 1/10GbE access switch optimized • 1-4 Ports 10GigE; (2 port modules must ordered separately)
Flat Panel Console Kit, 1U Rack	• Size: 19.0 inch diagonal • Standard Multi-Burner Drive • Keyboard with Integrated Pointing Device • Rack shippable

B. INGEST

It is required to be a central ingest area dealing with all incoming media both tape and file-based for the News production area. The main principle will be that all media is ingested to a uniform standard format which will then progress seamlessly throughout.

Media is to be recorded or "ingested" into the central shared storage system using Ingest servers controlled by a centrally managed record control system. This should have the ability to connect multiple clients managing the ingest servers as a 'pool'.

The material captured will be then transferred immediately to the central shared storage system and be available within 30 seconds to any of the attached editing clients. The clients are allowed to edit while media is being captured. This allows for a very efficient, fast moving production with simplified quality control as material can be viewed by any of the clients in full quality, sound and vision so that any problems can be identified immediately.

The Recorded media needs to be stored and logged in to a media management system providing a searchable database of all media stored on the central shared storage system.

The central Ingest record manager must be able to initiate scheduled or crash recordings from an incoming line or VTR feeds. Markers or locators can be added from the server panel while capturing media.

As an option, Editors will be able to record media locally using their interface. Media recorded by the editors must be saved to the shared central storage.

Media should be captured directly to the shared storage in given format and updating metadata automatically to the media asset management system.

A method of ingested directly from file based devices such as XDCAM HD must also be proposed.

Notes:
- The Ingest servers should accept incoming signals as SDI with Embedded audio;
- Metadata can be entered using the Central Ingest Record Tool;
- SD servers have to be upgradeable to accept HD-SDI signals with Embedded audio (1080i and 720p).

  - Number of Simultaneous Ingest channels required: 2;
  - Ingest can take place while 4 playout channels are in use;

- The ingest server(s) will support black-burst and tri-level sync and will have redundant power supply;
- Captured media should be first stored on the internal drives and then moved to the central shared storage. When the shared storage destination is full, the server should continue to capture until the internal drives are filled;
- Several ingest servers can be connected to the shared storage simultaneously;
- SD Supported formats: DV25, DV50, IMX30 and IMX50;
- The servers are upgradeable to support HD formats;
- HD supported formats: XDCAM and ACV Intra;
- The servers can be controlled by automation systems using VDCP and MOS protocols;
- One PSU and 1 HDD in carrier will be supplied as spare parts;
- The licenses supplied should allow for minimum 5 ingest workstations and 5 ingest channels to be controlled.

Ingest control:

- A simple interface enables feed capture based on source, destination, time, duration and expiration;
- Automated scheduled recording in advance;
- Capable of on the spot crash and instant records triggering;
- Capable of handling several recording of satellite feeds, microwave relays and ENG material into multiple devices simultaneously;
- Optional – controlling router cross-points;
- Optional – capability of simultaneously generating both high- and low-res material from a single feed.

Stored Media

Source media or “master clips” must be recorded to central shared storage system. Via a network switch all attached editing clients will be able to access, view and begin to edit (or build “sequences”) using this media. The editing process will be 'in place' (the editors will not need to copy the media locally in order to reduce multiple copying of media across the network).

All captured media must be MXF compliant.

Proposed systems are to be checked for scaling in such manner that the bandwidth capability of the storage can sustain simultaneous clients accessing the same source media at the same time using a minimum of 2 streams of 30Mbps each. Spare headroom of 20% is requested on this bandwidth capability.

C. PLAYOUT

Preferably, finished edited sequences should be sent to Playout servers. These servers are dedicated for playout of clips into the News studio production system.

The Playout servers should provide outgoing signals as SDI with Embedded audio and will be upgradable to allow for playout of HD-SDI signals with embedded audio at a later stage (1080i and 720p).

A status window is required to display the progress of the transfer and provide feedback to the user when the clip has successfully transferred to the playout servers.

If the playout is close to the transmission time, a requirement for the system is to be able to play while this media is being transferred (The Playout server can commence playout of the finished item as soon as it starts arriving, it doesn't have to complete the transfer, before going to air).

The Play Out server works with NRCS Edit Software, Newsroom System and Media shared storage to virtually eliminate the time between acquisition and editing. Connected editors' access material seconds after the transfer begins, accelerating time-critical news, talk show, and sports production. When the edits are finished, a single click sends segments to PlayOut Server for playback.

Media clips that have been transferred to the playout servers are played out under the control of simple playout control system which integrates with the offered NRCS. It will need to take a rundown from the NRCS to create the playlist for the video elements of the news programme.

The Playout control must have the ability to connect several clients to be used within the studio gallery to control and monitor the playout. *Please advise other devices that this playout control solution can control such as other studio devices and character generators.*

Clips that don't match the preferred playback format are automatically up, down, or cross converted, and channel output switching between HD and SD eliminates the need to dedicate channels to one format.

Number of Simultaneous Playout channels required: 4 (3 different channels, one of the channels mirrored and run on 2 different physical machines for full redundancy)

A minimum of 1.5 TB of local storage is needed for every server.

Playout servers should be used also as recording devices, controlled by the ingest software described in section B. The playout channels can run safely while 2 ingest channels are used.

Capability of selecting the channel and send to playout from the Edit systems. Several playout servers can be connected together as a virtual server pool and the channels for playout can be assigned using available ports.

The playout server(s) will support black-burst and tri-level sync and will have redundant power supply.

Playout control:

- A simple and intuitive user interface to reduce on-air transmission errors;
- Capable of creating a Playlist manually or loading it from the newsroom computer system

Playback of media must support any of the following modes:
- Manually by the operator;
- GPI triggered;
- Linked with other clips for block play;
- Automatic playback based on the time of day;
- A single PLAY command must initiate playback on two channels (mirrored play) simultaneously.

Required computer should be included with all necessary peripherals (mouse, monitor).

Technical specifications (minimum)		
Ingest and Playout		**Quantity**
Common Server for Ingest and PlayOut		**2**
• Support for automation systems using the VDCP and BVW and MOS protocols • Support for black-burst sync • Automated Capture and Playback • Servers should process no less than 6 channels simultaneously, supporting configurations of 4 play channels and 2 record channels, while 1 channel will be broadcasted simultaneous on 2 separated servers for redundancy • PlayOut Server SD supports DV25, DV50, IMX 30 and IMX50 • The system hardware consists of 4 internal 500 GB drives (minimum), dual power supplies in rack mounted chassis. Rack ears included • Redundant power supply • Minimum of 2 x Ethernet connections to control and configure • **Spare Power Supply** • **Spare 1 Hdd Drive in carrier**		
PlayOut Control Server Software	• Capable of creating Playlist manually or load from the newsroom computer system • Automatic playback based on the time of day • Colour-coded status indicators to highlight the inventory of assets based on • GPI triggered • automatic playback based on time of the day Playback of media must support following modes: • Manually by the operator • Linked with other clips for block play	1
PlayOut Control Server (Rack mountable)	• CPU: o The number of cores – 4 o L3 cache size – 4 Mb o Processor speed (GHz) - 2 • HDD - 3x300GB SATA • RAM - 4GB • DVDRW; LAN; Rack Rails • Expansion Slots 1 or more PCI slots (if triggering playback through GPI) • GPI Card PCI: 8 Reed Relay Output / 8 Isolated Input Digital Interface • Serial Card (VDCP) Digi AccelePort Xr Universal PCI 8-port RS-422 w/DB-25M cable • Under Monitor Display	1

	• Operating System: Windows Server 2008	
PlayOut Control Workstation	• CPU: o The number of cores – 2 o L3 cache size – 4 Mb o Processor speed (GHz) - 3.46 • Video – similar to NVIDIA Quadro FX 580 (512 MB) PCIe Graphics • RAM - 4GB (2 x2GB) DDR3-1333 ECC Ram • HDD - 320GB SATA 7200 • 16X DVD+/- RW, SuperMulti SATA, 1st Drive • FireWire IEEE 1394a 3 Port PCI Card • USB Standard Keyboard and optical mouse • Operating System : MS Windows Professional • Keypad X-keys XD-03-USB keypad • 22-inch Widescreen LCD Monitor	
PlayOut Control Workstation License The System Software comes with one (1) workstations license. The workstation is the control UI for importing, building and playing playlists. Can handle 3 concurrent workstations on one system		1
Ingest Control Server	• CPU: o The number of cores – 4 o L3 cache size – 4 Mb o Processor speed (GHz) - 2 • HDD - 3x300GB SATA • RAM - 4GB • DVDRW; LAN; Rack Rails • Expansion Slots 1 or more PCI slots (if triggering playback through GPI) • GPI Card SeaLevel DIO-16.LPCI: PCI 8 Reed Relay Output / 8 Isolated Input Digital Interface ITEM# 8012S • Serial Card (VDCP) Digi AccelePort Xr Universal PCI 8-port RS-422 w/DB-25M cable • Under Monitor Display TallyMan (or similar) from TSL Systems • Operating System: Windows Server 2008	1
Ingest Control Server ***Capture Control Software***	• Number of Simultaneous Ingest channels required : 2 • Support for template based destination selection for selected channels to capture directly to specific workspaces on the shared Storage. And capable of defining a default location in the event for crash recording. Ingest Control: • A simple interface enables feed capture based on source, destination, time, duration and expiration • Automated scheduled recording in advance	1

D. GRAPHICS (Character Generator)

Broadcast quality, dual channel, SD-SDI compatible, stand-alone unit. The software should provide tight integration with the Newsroom computer server. It must run both with operator or unattended, controlled by the playout automation.

Text and graphics tools include:

- intuitive CG interface;
- unlimited editable layers;
- real time effects such as wipes, pushes, rolls, crawls, slow reveals and dissolves;
- wide range of file import/export formats;
- intelligent capabilities such as shrink-to-fit;
- design features like unlimited fonts and details;
- layer-based motion effects.

Technical specifications (minimum)	
GRAPHICS (Character Generator)	

Chassis Details: Rack-mount system that meets or exceeds the following:	• CPU:
	  o The number of cores – 1
	  o L2 cache size – 2 Mb
	  o Processor speed (GHz) – 3.2
	• RAM - 4GB
	• HDD - 320GB
	• DVD/+R/+RW
	• 1000 BaseT NIC; 4 USB ports
	• Includes Logic Keyboard with Keycaps colored 101-key (English and Russian) and optical mouse.
	• Operating System : Windows Professional English
	• **24-31 Inch Rack Slides**
	• **KVM Extender Kit**
	• **Spare Power Supply**

Real-Time On-Air SD Broadcast Character Generator, Single Channel System	• Broadcast quality character generator with single channel. Text and graphics tools include: intuitive CG interface; unlimited editable layers; real time effects such as wipes, pushes, rolls, crawls, slow reveals and dissolves; wide range of file import/export formats; intelligent capabilities such as shrink-to-fit; design features like unlimited fonts and details; layer-based motion effects. • Single Channel System with SDI Video I/O

E. MEDIA ASSET MANAGEMENT

A Media Management solution is requested to provide an efficient collaborative workflow which logs and tracks all the data that is related to each media "asset". The requirement is for a small media management solution designed specifically for the news production environment.

Capable of multi-res video and audio media asset management with automatic selection of the relevant resolution for the given task should be included.

It should contain tools for automating time-consuming tasks including background encoding, transcoding, and transferring of media.

An open interface (API) for integration with other vendor solutions should be available.
It should support for search, create, and mark new video sequences using new and archived media without switching between active and archived storages.

It must be possible that all media files and metadata are organised in a customizable folder structure based on individual user's preferences.

System must support tight integration and interfaces between Shared Storage System, Ingest, Playout, Newsroom and non-linear editing systems.

It will have a comprehensive set of administration and productivity tools such as:

Search*:* A GUI to be used for searching and organising assets. Users must be able to easily search, navigate and organize assets; work with graphics files; store, track, and modify scripts, spread sheets, or other project-related files and their version histories - all in their native applications. The editors must have a window in to this search engine so that production staff could easily navigate and organize assets, add or modify media objects such as master clips, sequences, and effects or work with graphics files.

Logging & Viewing
The Logging/viewing application is to be used for reviewing, logging video, selecting shots, and adding comments and markers to the relevant video time codes. Markers should be available for video editing software. Any authorised team members can play video and audio.

The offered system will be adapted to the number of users requested by this project and will be expandable. Also, it should have an administration tool to inspect the relationship between elements or assets to prevent accidental deletion of critical media

Technical specifications (minimum)		Quantity

Media Engine Server	• CPU:
	  o The number of cores – 4
	  o L3 cache size – 4 Mb
	  o Processor speed (GHz) – 2
	• RAM - 9GB
	• HDD - 2x250GB
	• Windows 2008 Server OS 64-Bit
		1

Media Indexer Server	• CPU:
	  o The number of cores – 4
	  o L3 cache size – 4 Mb
		1

	○ Processor speed (GHz) – 2 • RAM - 9GB • HDD - 2x250GB • Operating System: Windows 2008 Server 64-Bit • Includes Media Indexer Software	

F. NEWS ROOM COMPUTER SYSTEM

The newsroom computer system (NRCS) provides journalists with comprehensive tools for text based news and script production and has a tight integration with the video production process ensuring that both script and pictures come together as one for a sports or news broadcast.

Typically the chief news editor will hold an early morning meeting with his journalists to identify the top stories that they know about at that time of the day. From this information an initial running order or news "run-down" is created in the NRCS with placeholders for the identified stories. Each story has a unique identifier. Stories can be added or removed from the rundown as the day progresses.

The Newsroom Computer System proposed will have the ability to accept 4 news subscription wire feeds and will have 20 floating clients.

The NRCS Tools will bring together script writing, shot selection, editing, voiceover recording, split-audio editing and audio rubber banding. *Please describe any tools available that would improve the workflow in a journalist environment.*

Please list Teleprompters and graphic devices compatible with the proposed NRCS.

Technical specifications (minimum)		**Quantity**
Servers 2 servers for Data Receiver 2 servers for NRCS	• CPU: ○ The number of cores – 4 ○ L3 cache size – 4 Mb ○ Processor speed (GHz) – 2 • RAM - 4GB • DVDRW • HDD - 3x300GB SATA • LAN; Rack Rails • Operating System: Windows 2008 Server OS 64-Bit	4
NRCS Server Software	• Core Software • Full text search engine • Messaging system, the user portal • Script archiving • MOS integration (Unlimited number of MOS devices) • List Teleprompters compatible with proposed NRCS • Interface for Data-communication Services (Wires, Emails, RSS receiving) • Incorporates video, script and audio editing tools into a single interface • Device control for a full range of third-party video servers and graphics devices is provided through	2

	Play Out Control • NRCS communicates with third-party device controllers through the MOS protocol • Enable everyone clients, journalists and producers to create, view and edit stories and rundowns • Connect via web browser at speeds as low as 9600 bps • Add hundreds of users with no need to reconfigure every time the station, network, or group expands	
License for 20 concurrent journalists workstations	• 20xNRCS Floating clients allows fast, efficient searching through large quantities of text material using indexes	1
Data Receiver Server Software and License	• Data Receiver consolidates the ingest of wires and other stories via serial feed, telnet, email, or by monitoring directories. • 1 x resilient Newsroom Computer System with the ability to accept 4 news subscription wire feeds. • DVDRW • HDD 2x250Gb • Includes Media Indexer Software	2

G. EDITING

Editing clients will work individually or together to craft edit final sequences. Using the media management tool the editor will locate the required assets. The editor will be able to search for media or sub-clips, based on metadata associated with it.

The proposed editor must be specifically designed or optimised for fast moving news and sports operations and provide tight integration to the proposed News Computer System (NRCS). All editing systems will be connected to the Central Storage and will edit using media stored on the central storage, without moving it locally.

The proposed Editing system must support ingest of file based media with automatic metadata checking to the production asset management system. It should be able to edit multiple SD and HD formats, with different frame rates, in real time and mix them in the same timeline.

It has to support XDCAM EX/HD, P2/AVC-Intra, GFCAM formats, QuickTime and MXF OP1A wrapped files

The editors will support a wide range of codecs (pleas provide list) including HDV, XDCAM-HD, XDCAM-EX, DVCPRO HD.

***5 editing systems are required*.** Two of them will be able to ingest SD-SDI and HD-SDI media locally via an external, portable break-out box. HD to SD hardware down conversion should be available in the breakout box.

All 5 editing systems should have video preview in existing video monitors. The PC platforms offered for the editors will be fully compliant with the recommendations of the manufacturer.

All editors will be able to control VTRs.

For compatibility with other applications, the offered graphic card should be similar to NVidia Quadro 2000 and the computer should have min 6GB of RAM.

Technical specifications (minimum)		Quantity

Editing Workstation	• CPU:
	  o The number of cores – 6
	  o L3 cache size – 12 Mb
	  o Processor speed (GHz) – 3,33
	• Video – similar to NVIDIA Quadro 2000 1Gb PCIe Graphics
	• RAM - 6GB (3 x2GB) DDR3-1333 ECC
	• DVD+/- RW, SuperMulti SATA, 1st Drive
	• HDD - 320GB SATA 7200 (1st HDD)
	• FireWire IEEE 1394a 3 Port PCI Card
	• Specialist Logic Keyboard UK Int. with Keycaps
	• Operating System : MS Windows Professional 64 Bit OS
		5

Pair of Speakers	• Nominal Output Power - 40 Watt • Output Level - 101.5 dB • Controls - Volume, Power on/off, Bass	5
22-inch Widescreen LCD Monitor	• 250cd/m2, 5ms, 0.282mm pixel pitch	10
High resolution real time video editing attached to central storage (Software)	• Support SD/HD • Direct edit from tape to timeline • Seamless integration with ENPS, iNEWS, Octopus, and other MOS compliant newsroom computer systems by request. • Color correction for rebalance of improperly shot footage. • Record from tape to timeline and edit directly to timeline without predigitizing. • Operating System : MS Windows Professional 64 Bit OS	5
Portable and powerful digital and analog I/O SD/HD for ingest and preview • Media ingested locally to be available on shared storage to provide collaborative workflow for all the editors • Digital Nonlinear Accelerator that delivers true real-time effects, real-time DV input and output, and professional analog-to-DV media conversion to edit software. • Compact enough to take on location yet powerful enough to serve as the core of a video editing suite; Portable I/O connects to any qualified Windows system via a single FireWire cable, and scales from DV25 to uncompressed SD and HD video. • Connect to facility-class cameras, decks, and digital pipelines with the highest quality professional SD and HD connections. • Features Genlock and Word Clock for video and audio sync with external devices. Simultaneous output to both broadcast monitors and tape. Input and output IEEE-1394, and component or composite as well as S-video signals.		2
Portable and powerful digital and analog I/O SD/HD for preview • HD/SD SDI, HD/SD analog component, Y/C, and composite • Up to five user-selectable simultaneous video outputs – HD and/or SD on HDMI, SDI, and analog • Professional audio inputs and outputs with 5.1 surround sound Monitoring • Genlock – SD analog black burst (bi-level) or HD tri-level sync		3

H. TELEPROMPTER

One teleprompter system will be offered (software, computer boards and controllers only). The monitor, hood, glass and computer exist. The teleprompter system will be compatible with the NRCS system offered and MOS capable. A 5 button desktop control should be present.

Capabilities:
- MOS protocol capable
- PAL/NTSC video out
- Genlock
- Colour options
- Timer options
- Background message option
- Presenter preferences
- Cut & Paste
- Closed caption option
- Microsoft Word and RTF Import and Export

I. ETHERNET INFRASTRUCTURE EQUIPMENT

Ethernet infrastructure equipment should be offered as requested bellow:

UTP Cable Cat 6	1000 meters
Cat 6 UTP connectors	300 pieces
Patch cables, Cat 6, min 1.5m, Giga+	50 pieces
Wall-mounted outlet 80 x 80mm, Giga+, 1 x RJ45/u, Cat 6	50 pieces
Server rack unit • 42U height, • Power Distribution Units • number of ports in PDU - according to the number of power cords needed for the installed equipment. • 2 UPS, minimum 2700 Watts/3000 VA each.	Minimum 2 pieces (could be more if necessary)

Installation and connection related services to network infrastructure is required.

J. PROFESSIONAL SERVICES

TRAINING

The successful Company shall provide maintenance & Operational training on the following:

- specific maintenance training on any equipment supplied by the successful Tenderer
- system and installation overview
- Editor & Operation User Interface Training

The successful Company should organize on-site trainings for 2 maintenance engineers and 10 operational/editing staff. Trainings should be organised locally, in Romanian or Russian language.

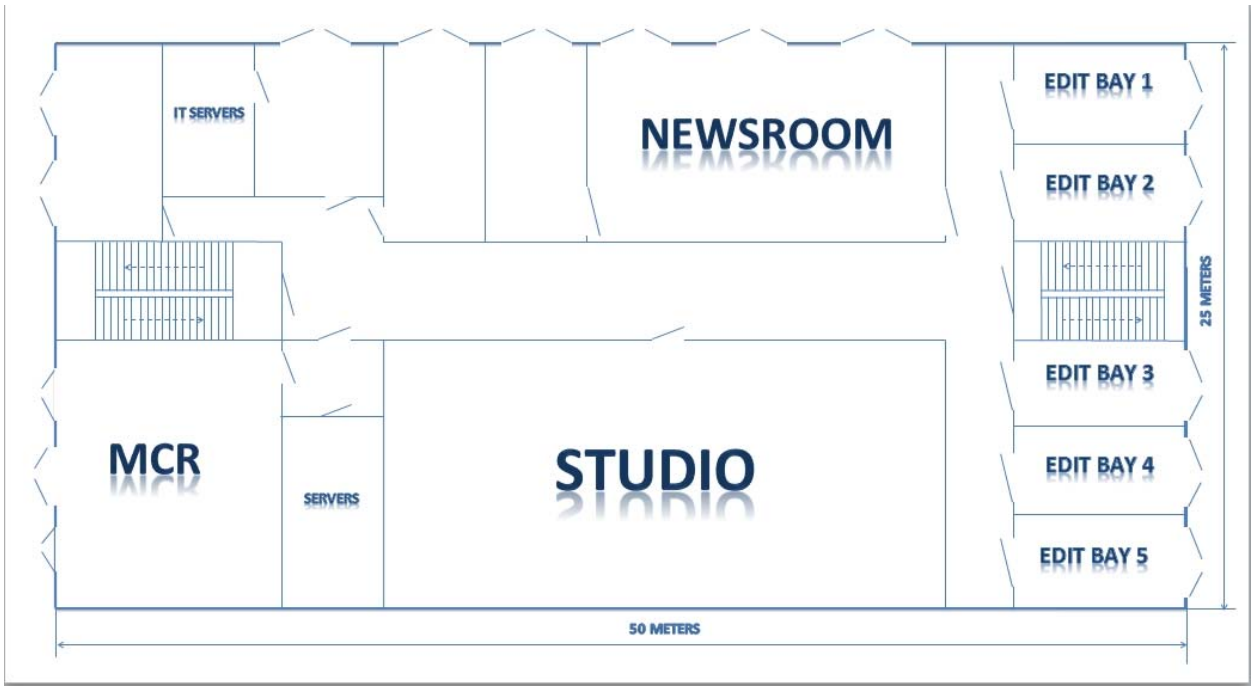
Documentation and support materials should be also accessible in English language.

SERVICES

The Company shall provide a full programme of services including design, installation and commissioning on site in the Republic of Moldova.

The Company should assume that installation services will be required (please, see the figure 1).

Fig. 1 Schematic plan of the 3rd floor (existing News department)



SUPPORT

One year support contract for the complete system to cover hardware as well as software is required. The support contract will include telephone support during business hours, free upgrades of all software components (except for major software releases) and 48 hours advance replacement of faulty parts (not including time requested by customs formalities).

K. FINAL NOTES

ARCHIVE

Media will be archived to digital tape after it has passed through the production process. (The Digital Archive is not part of this Tender and does not exist yet).

A low resolution version of the archived media will be retained on the central storage for searching and viewing within the media management tools.

Future expansion

The proposed system must have the capability to expand in both Storage and Bandwidth. Please describe what is required in terms of equipment and financial effort if another 10 editors/clients will be attached to the system and another 48TB of usable storage added to Central Storage system.