

A large, abstract teal graphic on the right side of the page, consisting of overlapping circular and triangular shapes in various shades of teal.

NRK MA-3543/22T

**SYSTEM FOR
WEB-BASED
INTERVIEWS IN
NRK**

1.7.2022

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1. INTRODUCTION

This Procurement concerns the provision of web-based interview services, delivered via the Internet "as-a-service". This is described as use case 2 (in section 2 below). We have also added 3 other use cases to check for alternative solutions to our current WebRTC-services.

1.1. About NRK

NRK is the public broadcasting corporation in Norway with main responsibility to produce and distribute radio and television programs for the entire Norwegian population. Additionally, NRK delivers a comprehensive portfolio of Internet, mobile and text-TV content. With approximately 3200 employees nationwide, NRK is the largest media company in Norway. NRK is characterized by its diversity, which is partly reflected by the fact that over 120 professions are represented among the employees.

In addition to NRK's headquarters at Marienlyst in Oslo, NRK operates from Karasjok with NRK Sápmi. NRK also has regional centres in Trondheim, Bergen and Tromsø, as well as regional offices in Alta, Bodø, Ålesund, Førde, Stavanger, Kristiansand, Porsgrunn, Fredrikstad, Oslo and Lillehammer. Several of the regional offices also have one or more local offices.

The Norwegian Broadcasting Corporation (NRK) offers the Norwegian public a wide range of content with three national TV-channels, 14 national radio-channels and the website nrk.no. The broadcaster is state-owned, and the Norwegian Parliament (Stortinget) has allocated [the mandate and the owner-role to the Ministry of Culture](#).

NRK's mandate is to be a non-commercial, politically independent public broadcaster.

2. HISTORY AND SCOPE

2.1. History

Over the years, our ability to conduct interviews and receive live feeds from remote locations has improved significantly in terms of quality and reach. However, systems used to achieve this remain quite complex in terms of configuration and users often require technical support. Often, physical communication units are not in the right location when needed; and standalone smartphone apps providing conference abilities often depend on personal accounts like Apple ID for installation. When reporting breaking news, there is no time for technical issues and training of the end-user. Furthermore, as it is conceivable the end-user might be an “on-the-scene” witness with a smartphone, having arrived before other reporters – thus driving a need to receive audio and video from a person not necessarily registered or trained as a NRK journalist. The ability to communicate must be natively available and intuitive.

Consequently, NRK is looking for solutions based on [WebRTC](#)¹ for conducting, recording and delivering files of interviews via mobile phones, tablets, laptops and similar.

NRK has a requirement for a user-friendly interface with direct access to the camera/microphone through the browser in a mobile device or a PC. WebRTC is an open standard that enables this. Without the need to install an app or log on with a user, NRK aims to improve coverage of emergent situations by utilizing the tools immediately available to those who arrive the scene before our journalists (e.g. a stream from the smart phone of a first responder or people passing by).

Currently our need for WebRTC is described in 4 use cases (with example of relevant services known to us, but there could be other alternatives adhering to the requirements just as well):

1) WebRTC live with SDI-connection to MCR/Studio (e.g. Quicklink)

Journalist in a studio interviewing someone on a mobile device (live or live on tape). SDI I/O is needed for low latency baseband video/audio integration with our studio through a router in the Master Control Room (MCR). Video and audio from both sides of the call should be available on SDI as full screen (separate) & clean feed (no graphic on top). If multiple parties join the call the system should be scalable to provide multiple outputs (one SDI for each participant).

2) WebRTC cloud recording without the need for an application or studio (e.g. Twilio/Vonage/Incendium)

Journalist on a mobile device or desktop interviewing someone on a mobile device or desktop. Video and audio from both sides of the call should become available as full screen (separate) & clean feed (no overlay graphics) in two editable files, as soon as possible after the interview (e.g. mp4-file with fixed resolution, fixed framerate and fixed aspect for TV or mp3-file for radio). An example of a preferred GUI and an expected workflow is illustrated in the tender’s PDF. Frontend (based on NRK guidelines) and backend is expected to be delivered as a service.

¹ **WebRTC (Web Real-Time Communication)** is a free, [open-source](#) project that provides [web browsers](#) and [mobile applications](#) with [real-time](#) communication (RTC) via simple [application programming interfaces](#) (APIs).

3) WebRTC cloud and local recording in high quality on mobile devices (e.g. Riverside/Squadcast)

Same as use case 2, but an application is allowed to secure high-quality recording on the mobile device (local recording). If there is a way to avoid using an app and still be able to preserve quality on the local recording (regardless of quality on the connection), that would be preferred.

4) WebRTC monitoring /web-preview of SDI-sources from our MCR (e.g. Medialooks VT with WebRTC/SRT from vMix transcoded to WebRTC in Oven Media Engine)

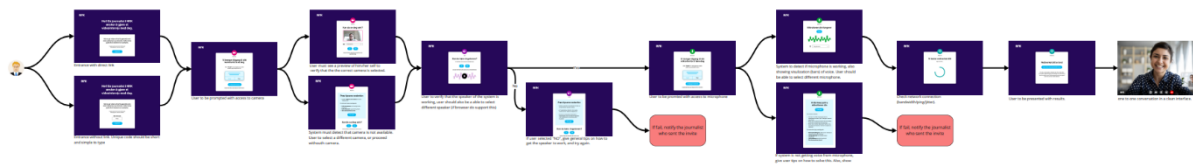
NRK staff involved in production receiving a low latency preview of program output or sources in MCR. SDI input is needed to integrate with our infrastructure in the Master Control Room. SDI can be encoded to IP formats like SRT to utilize cloud or on prem services converting to WebRTC (like Oven Media Engine). The WebRTC streams should be possible to view in the browser without any need for a plug-in or a user registration process. We might also consider app-based solutions allowing for continued playback when the screen is locked (e.g. for return audio on a phone in the pocket). Access to this monitoring solution should be limited to authorized users.

NRKs **current focus** for implementation is **the second use case**. Still, other use cases are highly relevant, and could be next in line for implementation. Most systems provide functionality requested in other use cases; please inform us of relevant options and coming features. A standardization on fewer platforms is preferred for both our users and support.

2.2. Scope of delivery and workflow in use case 2

In connection with news coverage or program production, a journalist needs to conduct a live interview with an interlocutor in the field and have the interview available as soon as possible for use in a production workflow.

The conceptualized workflow (described as “CORE DELIVERY” further in the document) is the following (see PDF for illustration in higher resolution):



STAGE	DESCRIPTION
INTERVIEW PORTAL ACCESS	NRK journalist accesses a personal interview portal in a secure way. The portal including both an interview request module and previous recordings. Access to this portal should be secure, e.g., using single sign-on (SSO via NRK's Azure Active Directory).
CLIENT SETUP – journalist side	Journalist is guided to set up the device properly (with respect to camera, microphone, and headset/loudspeaker) and verify the setup.
INTERVIEW INVITE	Journalist sends an interview invite to the interview in a text message and/or e-mail. The invite link needs to be in a readable short form.
RECEPTION OF INVITE	Interviewee receives the invite containing a unique link that can be opened on a web-browser in the device, showing an interview invitation in clear. It should be unequivocal from the invitation and user interface that NRK is the sender.
CLIENT SETUP – interview side	Interviewee is guided to set up the device properly (with respect to camera, microphone, and headset/loudspeaker) and verify the setup.
CONNECTION	Interviewee connects to the journalist successfully and they can communicate as in a video call.
INTERVIEW WITH RECORDING	Journalist starts the recording (separate and synchronized recordings on both sides) and the interview is conducted.
END OF INTERVIEW	Journalist halts the recording; the separate recorded files are closed.
FILE TRANSCODING	Interview file is transcoded
NOTIFICATION FILE AVAILABLE	Upon completion of the transcoding, interviewer gets notified that the editable file is available for download.

FILE DOWNLOAD	When available, the file can be downloaded by the journalist onto its device.
INTEGRATION with NRK workflow (to be discussed)	File is available for use in the NRK file workflow (with delivery via an API, S3 object, network file transfer or similar).

2.3. Success factors

The workflow described is considered as “**core delivery**” in the way that failure to fulfil a step in a satisfactory way entails that the service will be impractical for use case 2. For other use cases described above optional features can be valued by themselves.

As a guideline, **success factors** for the various stages of the workflow and the service altogether are as follows (non-exhaustive list) -- the service should be:

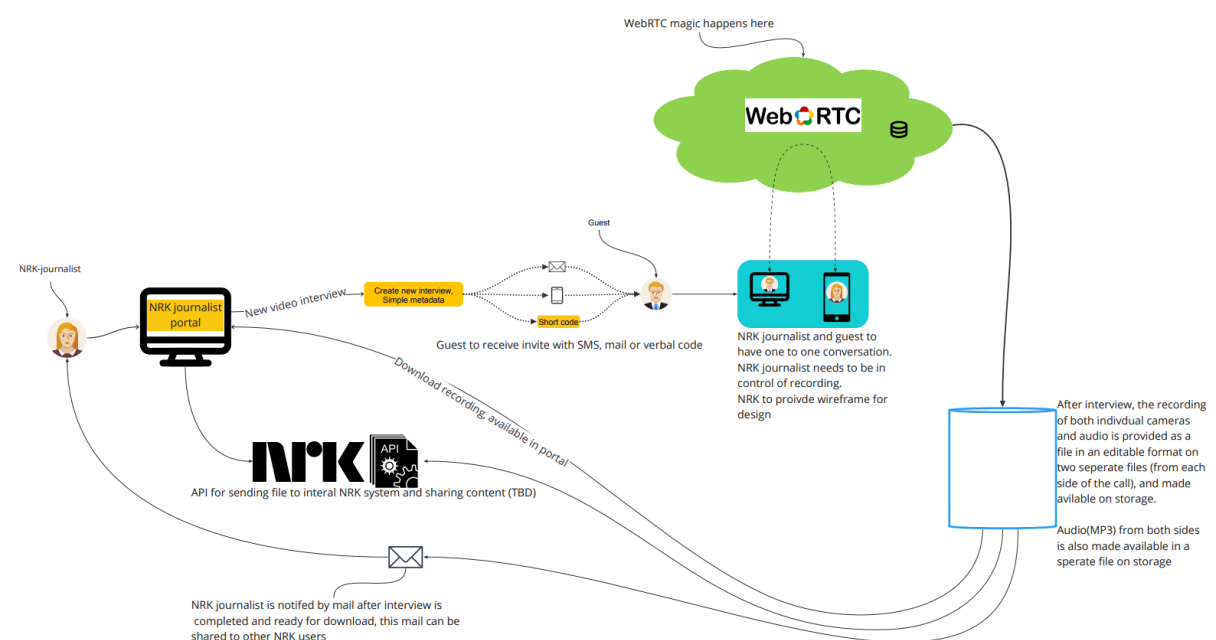
- **Intuitive** (can be used without preliminary instructions to journalists or interviewees)
- **Accessible** (high uptime and designed to handle users with disabilities as described in 3.1.20)
- **Responsive** (connection to servers, establishment of video call, recordings available in time for the use in production etc.)
- **Useable** (good enough quality, acceptable audio/video sync and transmission delay, stability of connection etc.)
- **Resilient** (transmission stability, ability to recover from disruption etc.)
- **Safe** (protected from unauthorized third parties. GDPR requirements should be followed)

The goal for the service is to be “**transparent**” to the users, enabling content production to remain in focus, while the underlying platform is not creating hindrance. A true **indicator** of success will be that the service is used and favoured by NRK journalists.

3. REQUESTED FEATURES

3.1. High value technical features - Core requirements for use case 2

Please see PDF for system-illustration in higher resolution:



	Compliance when contracted (Y, N)	Comments from the supplier
3.1.1 GENERAL SCOPE The service provided gives the possibility to conduct a live interview with high-quality and low-delay between two parties, using a web browser on their mobile devices, laptops etc (based on the WebRTC protocol). After the interview is completed, the recording is available to the journalist in a suitable transcoded version within a short delay		
3.1.2 INTERVIEW PORTAL ACCESS NRK journalist can access a personal interview portal for inviting and conducting interviews and view/download previous recordings. Integration with SSO via NRK's Azure Active Directory is necessary for a secure and controlled access.		
3.1.3 CLIENT SETUP – journalist side Journalist sets up and test camera, microphone and speakers on its client through an intuitive guide		
3.1.4 INTERVIEW INVITE Journalist is able to send an ephemeral (i.e. valid for a limited time only) interview invite via SMS and/or email by providing an international phone number and/or an email address. The service should comprise of necessary gateways.		
3.1.5 RECEPTION OF INVITE Interviewee receives the invite containing a unique link that can be opened on a web browser in the device, showing an interview invitation in clear. The design of the user interface is made in accordance to NRK specification or provided files. The link needs to be in a short form, so it can be typed in a browser manually.		
3.1.6 CLIENT SETUP – interview side Interviewee sets up and test camera, microphone, and speakers through an intuitive guide. The NRK journalist is notified when a client starts connecting.		
3.1.7 CLIENT SOURCE SWITCHING It should be possible to switch between several input/output devices on the setup and during the course of the interview with minimal disruption (e.g. front/back camera, native microphone/speaker or headset on the devices of both parties).		
3.1.8 CONNECTION AND INTERVIEW WITH RECORDING Interviewee connects to the journalist successfully		

and they can communicate as in a video call. The journalist can initiate the recording. Both parties can clearly see that recording is taking place (“REC”-message). Separate recordings of both sides of the interview are initiated simultaneously (one click) by the journalist.		
3.1.9 BROWSER COMPATIBILITY The service is at a minimum be compatible with the top 4 browsers on the market (Chrome, Safari, Firefox, Edge) on mobile devices, laptop etc.		
3.1.10 SERVICE UX QUALITY The service should be of similar quality and reliability to industry standard WebRTC solutions on the market, in terms of (non-exhaustive list) video quality, video/audio sync, delay/round trip time, recovery after disruption...		
3.1.11 CALL RESUME FUNCTIONALITY If one participant is interrupted during a video call, the call can be re-joined. A notice on the participants still connected should state a “please wait” message. Any recordings in progress continue without interruption.		
3.1.12 DEVICE ORIENTATION HANDLING It is possible to rotate mobile devices both on the interviewer and interviewee side (e.g. portrait to landscape mode) without interrupting the recording or the transcoding. The orientation of the video in the recording should be in accordance with the horizontal/vertical orientation of the camera.		
3.1.13 PAUSE AND END OF INTERVIEW It is possible to pause the interview and continue the interview. Upon completion of the interview the recorded file is closed.		
3.1.14 TRANSCODING All recorded files are transcoded to a suitable high quality production format (preferred minimum is fixed 1920x1080, fixed aspect and fixed 25 frames/sec, e.g. h264/AAC codec in an mp4-file and audio only in an mp3-file or a lossless format) and available short time after the completion of the interview. Transcoding to an editable format is preferably started during the recording of the interview to save time. Ideally editing is made possible during the interview and with support for our native production format XAVC in MXF re-transcoding can be avoided. Please specify options.		
3.1.15 NOTIFICATION FILE AVAILABLE The user is notified by e-mail when a recording is available after transcoding to an editable format		

(Notification of the availability of the recorded files in a raw format might come prior to the transcoding).		
3.1.16 FILE DOWNLOAD When available, the file can be downloaded by the journalist onto its device.		
3.1.17 STORAGE AND HOSTING All recorded files are securely stored (i.e. with access restricted to authenticated users only) and available for each user at least for a period of 14 days. After a defined period following the completion of a recording, the recording is automatically deleted from the storage system. NRK is able to explicitly trigger deletion of specific recordings.		
3.1.18 SIMULTANEOUS RECORDING CAPACITY The service can accommodate for at least XX simultaneous interviews (please specify). No recordings can be lost due to capacity issues during an interview.		
3.1.19 TRANSCODING CAPACITY All recordings can be transcoded to an editable format after the interview YY times quicker than realtime (please specify). No recordings can be lost due to capacity issues after an interview. The transcoding capacity scales according to growing needs.		
3.1.20 ACCESSIBILITY It is important that the interface can be used by everyone, both journalists and interviewees, regardless of whether you have a disability or not. The solution should therefore be compliant to the WCAG 2.1 standard on level AA and intuitive, also for screen reader users.		

3.2. Other high value aspects

	Compliance when contracted (Y, N)	Comments from the supplier
3.2.1 SUPPORT AND FEATURE REQUESTS		

The supplier manages and follow up customers feedback and request, such as: critical error reports, bug reports, change requests, new feature requests.		
3.2.2 VERSION CONTROL The supplier accommodates for version control and logging of changes and bug fixes.		
3.2.3 DEPLOYMENT Deploy and version change is done with the lowest possible downtime.		
3.2.4 TESTING A successful functional testing is completed by the vendor prior to user-testing at NRK. Multiple iterations are expected based on feedback from the users (offer should include hourly cost for further development and an expected total adaptation cost).		
3.2.5 STORAGE All recordings are stored in a redundant and safe way adhering to GDPR-requirements and the system should in general follow NRK's IT requirements (TBD) We are currently updating our IT-requirements and will implement these later if needed. The requirements are included in this tender.		
3.2.6 GEOLOCATION Geolocation metadata is stored with the recording.		
3.2.7 QUALITY OPTIMIZATION Tuning to optimize Quality of Experience - QoE (adjustments and priority on framerate, resolution, latency, audio-quality etc)		
3.2.8 ADAPTIVE QUALITY HANDLING Adaptive media transport for bursty, low-bandwidth and best effort network links (no QoS), e.g. on mobile connections, WiFi etc. Should adapt to fixed 1080i50 resolution on the HD-SDI interface in use case 1 (and recorded files in use case 2 and 3).		
3.2.9 CALL MODE Ability to be in session with normal call mode (not only conference mode with loudspeaker on phone)		
3.2.10 HANDSFREE		

Allow use of handsfree (needed in a noisy environment).		
3.2.11 SIP FALLBACK Ability to continue call on SIP-based connection if other options fail.		
3.2.12 OPEN API An open API is provided to ease integration.		
3.2.13 FIREWALL HANDLING Service is made available through firewalls (e.g. STUN/TURN servers). Please specify.		

3.3. Additional options and areas of interest (valued in all use cases)

	Compliance when contracted (Y, N)	Comments from the supplier
3.3.1 SIMULTANEOUS TRANSCODING CAPACITY It is possible to transcode several simultaneous interviews to an editable format during the interview to save time. If an unusually many interviews are conducted in parallel, the exceeding transcoding-jobs should be placed in a queue. No recordings can be lost due to capacity issues during or after an interview. Please specify the number of simultaneous transcoding jobs the system can handle in parallel.		
3.3.2 SIMULTANEOUS EDITING NRK can access a live output with a clean feed of both sides of the interview on SDI, or growing files from the ongoing recording (in an editable format).		
3.3.3 LIVE INPUT AND OUTPUT Live 1080i50 input and output, preferable on low latency rendering through SDI, would provide our MCR with the ability to integrate ongoing interviews in a linear workflow (or speed up the editing process as described in the option “simultaneous editing”). The ability to include sources from streams over robust protocols such as SRT/RIST/Zixi/RUDP in the conference will also be of value.		
3.3.4 WEBRTC MONITORING		

At our MCR, we have access to both sources and program outputs that could be of interest to our crew in production. To be able to provide these SDI-sources as low-latency preview in a browser would be a valued option (and app that keeps running if the device screen is locked. If available, please specify). This feature should be offered if a live SDI-input is a part of the system.		
3.3.5 CLIENT-SIDE RECORDING There is an option to store recordings locally on the device so that the recording-quality is guaranteed regardless of the connection-quality.		
3.3.6 MULTI-PARTY CONFERENCING The system provides the ability to conduct interviews with more than two parties and make the separate recordings available from each participant as described in our requirements (Preferably MCU based). Audio only (MP3) should also be provided as an output (in addition to audio+video in an editable file).		
3.3.7 REMOTE CONTROL OF CLIENT TERMINAL The system provides the ability to control the direction of the camera on the mobile device if possible (please specify limitation on platforms/browsers).		
3.3.8 INSTRUCTIONS ON CLIENT TERMINAL The system provides the ability to send messages and/or voice-command to the client terminal without disturbing the recording or live output.		
3.3.9 ENCRYPTION The system provides the ability to protect the content with encryption both during and after a call (storage). Please specify added cost with encryption.		
3.3.10 THIRD PARTY APP INTEGRATION The system provides the ability to include participants using Teams, Skype, Facetime etc (please specify) and render the participants as separate outputs (live/file similar to WebRTC sources). The same app could also be used for continuous playback of low latency preview when phone is screen-locked (app version of 3.3.4).		
3.3.11 PRODUCTION TOOLS		

The system provides the ability to render multiple high quality outputs (file/live) with composition of elements such as graphics, powerpoint, PiP, clean feed of participants, subtitles etc (please specify) in low latency (SDI / file and LL HLS / chunked CMAF if streaming is possible) and the ability to mix audio and adapt audio return to participants (mix minus).		
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4. AWARD CRITERIA

Competition will be awarded according to the following criteria:

Award Criteria	Weight
Technical Quality of the offered solution	50 - 70 %
Total Price	30 - 50 %

Technical Quality of the offered solution

The evaluation of this criterion will be based on the offer from the contender and of NRKs customer requirement in the specification.

Below is a prioritized list of the sections in the Customer Specification (Appendix 1) that are subject to evaluation under Technical Quality.

3.1.High value technical features – core requirements for use case 2

3.2.Other high value aspects

3.3.Additional options and areas of interest

The core requirements in 3.1 and other high value aspects in 3.2 are more important to NRK than requirements designated as optional in 3.3. Since NRK will rate the overall impression of each chapter / sub-chapter, it will mean that the contender providing the best solution to the core requirements and high value aspects will receive the highest score for this section. If response is “Partial” or a feature is on a “Roadmap”, this will limit your score.

Total price

Evaluation of this criterion will be based on offered prices, price models and other prices described in the contenders bid. The contract time will be time indefinite, but the evaluation of this criteria will be based on the estimated lifecycle cost of the solution over a period of two years.

To compare the contenders' proposals, NRK will estimate the cost of necessary development and/or procurements outside the contenders' proposed solutions required to fulfil the aims of the project. If NRK requires further information from contenders to estimate scope and consequences of these elements, you will be prompted to give such in the negotiations.

Options will also be valued in the offer. For use cases other than use case 2, provision of options may result in an award despite some core requirements remaining unfulfilled. We expect to implement solutions for all use cases, but our primary focus is use case 2 in this tender.

We request the vendors specify an estimated time of delivery. Services that can be delivered with a short lead time are highly valued by NRK – though partial deliveries with further implementation over time may also be acceptable.

5. TENDER RULES

5.1. Procurement procedure

This procurement is carried out in accordance with Norwegian Act of 17th June 2016 with regulations for public procurements. The procurement shall be made by means of an open procedure in accordance with part I of the Regulations for public procurements.

In an open procedure, all interested bidders have the same opportunity to submit a tender offer. There is no pre-qualification.

There will be no negotiations in this tender competition. Hence, it is not possible to change or seek to change the tenders through negotiations. This includes changes to the price, delivery schedule or other conditions that are of significance in the competition. The bidder must therefore submit their best offer by the deadline for submission.

5.2. Confidentiality and disclosure

The contracting authority, the beneficiary and their employees are obligated to prevent others from gaining access to, or knowledge of, information about technical devices and procedures or operating and business matters which for competition reasons should be kept secret, cf. § 3-6 of the "Regulations on public procurements", cf. Public

Administration Act § 13.

The contracting authority acknowledges that the public has the right to access the tender offers and the procurement protocol after the contractor has been chosen, cf. the Freedom of Information Act of 16 May 2006, no. 16, regarding the right of access in public sector agencies, see § 23(3), cf. "Regulations on public procurement" § 7-4.

The contracting authority is obligated to comply with the obligation to provide guidance, cf. the Freedom of Information Act § 11.

If a request for access is made, NRK is committed to make its own assessment of the demand for access against the legal framework.

5.3. Tender deadline

The tender deadline is 22. August 2022 at 12 O'clock Norwegian time. Submit your offer via Mercell.

5.4. Validity period

Tenders must remain valid for three months after the tender deadline, or until a contract has been signed if this takes place before the expiry of the validity period.

5.5. Additional information, communication concerning the procurement.

This procurement will be managed in the Mercell portal. The suppliers will be allowed to access, via the portal, the tender documentation and other correspondence relating to the procurement, and to submit an electronic version of the tender.

Any queries on the tender documentation and other enquiries relating to the procurement must only be submitted via www.mercell.no. Enquiries must be labelled with a case number: "MA3543".

Responses to other enquiries cannot be expected. Attempts to acquire information or influence NRK staff involved in the procurement could lead to rejection or cancellation of the tendering procedure.

Queries received will be reviewed and answers in a general, anonymous fashion and will be distributed continuously via www.mercell.no, from which email notifications to the contacts of all suppliers invited to participate will be generated.

If you have any questions about how to use Mercell, please contact Mercell Support on

+47 21 01 88 00 or by e-mail: support@mercell.com.

5.6. Contract

Please find NRKs standard procurement terms and conditions attached