

Telecommunication and IT systems for drilling units

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Foreword

The NORSOK standards are developed by the Norwegian petroleum industry to ensure adequate safety, value adding and cost effectiveness for petroleum industry developments and operations. Furthermore, NORSOK standards are, as far as possible, intended to replace oil company specifications and serve as references in the authorities' regulations.

The NORSOK standards are normally based on recognised international standards, adding the provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry. Where relevant, NORSOK standards will be used to provide the Norwegian industry input to the international standardisation process. Subject to development and publication of international standards, the relevant NORSOK standard will be withdrawn.

The NORSOK standards are developed according to the consensus principle generally applicable for most standards work and according to established procedures defined in NORSOK A-001.

The NORSOK standards are prepared and published with support by The Norwegian Oil Industry Association (OLF), The Federation of Norwegian Industry, Norwegian Shipowners' Association and The Petroleum Safety Authority Norway.

NORSOK standards are administered and published by Standards Norway.

Introduction

This edition replaces edition 2. This NORSOK standard is updated in accordance with NORSOK T-100. The standard is expanded and also covers IT systems.

The following subjects are new or updated:

- facilities for integrated operations, see clause 14 and annex C;
- information technology (IT) security, see clause 7;
- wireless LAN requirements, see 8.2;
- QoS and priority policy, see 10.2;
- WAN accelerators and optimizing, see 10.3;
- guidelines band width allocation for voice, see 10.5;
- guidelines band width allocation for video, see 10.6.

1 Scope

The purpose of this NORSOK standard is to outline the necessary data- and telecommunication services needed onboard a drilling unit in order to fulfil the operator's requirements for voice, data and video communication between the drilling unit and the operator's communication networks, regardless of distance to shore. It also forms the basis for achieving cost reduction by combining drilling contractor's and operator's needs for similar services.

This NORSOK standard does not address any aspects regarding the drilling unit's own operational needs or any requirement with which the drilling unit shall comply in order to meet mandatory requirements. The complementary onshore facilities are not dealt with in this NORSOK standard.

2 Normative and informative references

The following standards include provisions and guidelines which, through reference in this text, constitute provisions and guidelines of this NORSOK standard. Latest issue of the references shall be used unless otherwise agreed. Other recognized standards may be used provided it can be shown that they meet the requirements of the referenced standards.

2.1 Normative references

IEEE 802.3,	Standards defining the Physical Layer and Data Link Layer's
IEEE 802.11,	Standards carrying out wireless local area network in 2.4, 3.6 and 5 GHz frequency bands
NORSOK T-100,	Telecom subsystems

2.2 Informative references

NORSOK S-002,	Working environment
H.323,	Communication protocol for internet telephony (both voice and video)

3 Terms, definitions and abbreviations

For the purposes of this NORSOK standard, the following terms, definitions and abbreviations apply.

3.1 Terms and definitions

3.1.1

can

verbal form used for statements of possibility and capability, whether material, physical or casual

3.1.2

C-band

satellite frequency band 6 GHz uplink/the band 4 GHz downlink

3.1.3

central equipment

equipment which is the operational hub of individual subsystems

3.1.4

collaboration room

meeting room with display and videoconference functionality

3.1.5

contractor

service company (3rd party) - operator providing various services (i.e. measurement while drilling, cementing, telecommunication provider) to the operator and drilling contractor

3.1.6

drilling contractor

rig owner or rig manager - operator providing the drilling unit and associated services to the operator

3.1.7**drilling unit**

vessel furnished with drilling equipment which main objective is to drill exploration/production wells

3.1.8**equipment**

individual functional unit

3.1.9**integrated operation**

the use of information communication technology to create effective work processes, to facilitate better and faster decisions for management of oil and gas assets

3.1.10**Ku-band**

satellite frequency band 14 GHz uplink/the band 12 GHz downlink

3.1.11**may**

verbal form used to indicate a course of action permissible within the limits of this NORSOK standard

3.1.12**operator**

operating oil company

3.1.13**operation room**

permanently manned collaboration facility to support current operation

3.1.14**shall**

verbal form used to indicate requirements strictly to be followed in order to conform to this NORSOK standard and from which no deviation is permitted, unless accepted by all involved parties

3.1.15**should**

verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required

3.1.16**subsystem**

assembly of equipment within complete systems, which fulfils a certain operational task

3.1.17**technical room**

equipment room

3.2 Abbreviations

AV	audio and video equipment
CCTV	closed circuit television
EX	electrical equipment in hazardous areas
GSM	global system for mobile communication
HSE	health and safety executive
HVAC	heating, ventilation and air conditioning
IEEE	Institute for Electrical and Electronic Engineers
IO	integrated operation
IP	internet protocol
IT	information technology
KVM	keyboard, video and mouse

LAN	local area network
LCD	liquid crystal display
N/A	not applicable
PABX	private automatic branch exchange
PC	personal computer
PL	phase lock (to non-audible code)
QoS	quality of service
SOIL	Secure Oil Information Link (oil and gas secure collaboration network in Norway).
UHF	ultra high frequencies
UPS	uninterruptible power supply
VLAN	virtual local area network
VRF	virtual routing and forwarding
VSAT	very small aperture terminal
WAN	wide area network
WiTi	a class of wireless local area network (WLAN) devices based on the IEEE 802.11 standards

4 Functional requirements

4.1 General

The drilling unit shall be equipped with suitable facilities (as shown in Figure 1) for data- and telecommunication services between the drilling unit and operator's communication networks. See also information details shown in Figure 1.

4.2 Responsibilities

The drilling contractor will be the main responsible for the data -, telecommunication and network infrastructure according to an agreement with operator.

Overall system

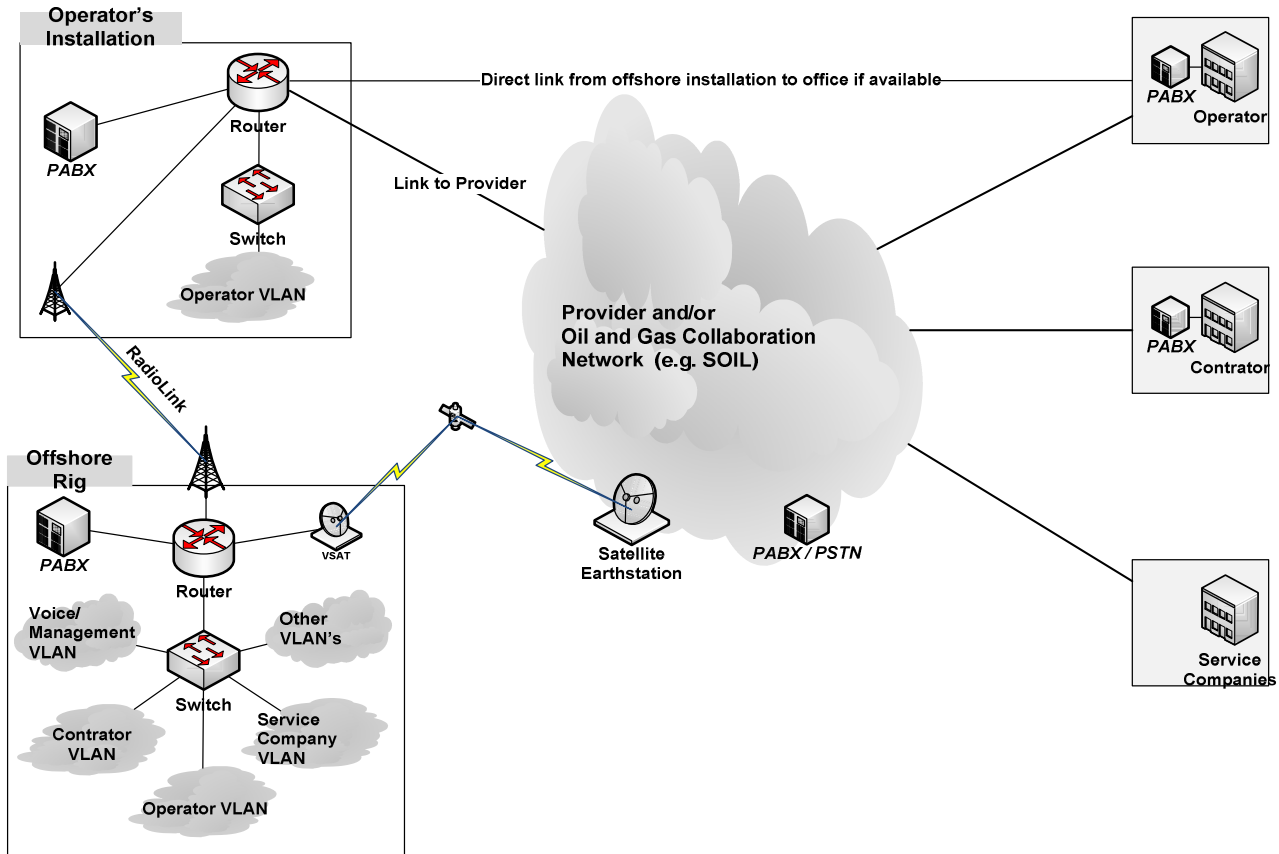


Figure 1 – Principle drawing

5 Basic functions

5.1 Power requirement

Telecommunication and data systems and equipment shall be powered from an UPS source or sources. Telecommunication and data systems and equipment shall be individually controlled by the drilling unit's shutdown system. Capacity of the UPS shall be at least 2 h calculated according to NORSOK T-100.

5.2 Documentation

The following requirements apply to documentation:

- a) the drilling contractor is responsible for providing, updating and maintaining all relevant documents and certificates related to IT, telecommunication and network infrastructure;
- b) the documentation shall be available in electronic format, e.g. portable data format;
- c) the following documentation shall be available onboard:
 - 1) data and telephone distribution network single line diagram;
 - 2) list of IP subnet and virtual LAN allocation per party;
 - 3) ethernet switch port allocation – only patching information, not VLAN documentation;
 - 4) router access list - confidential information. Access lists available in router config, included a backup version;
 - 5) radio frequencies;
 - 6) UHF radio repeater stations antenna cabling diagram;
 - 7) UHF coverage diagrams;
 - 8) CCTV coverage and external interfacing;
 - 9) drilling system monitor;
 - 10) wireless local area network (WLAN) coverage diagram.

5.3 Process/ambient conditions

Environmental conditions shall be in compliance with the equipment manufacturer's specifications.

5.4 Operational requirements

Easy access shall be arranged to reroute/reconfigure data or telephone channels without interrupting other traffic within the network.

5.5 Maintenance requirements

Maintenance shall be carried out in accordance with recommendations provided by the equipment supplier(s).

5.6 Isolation and sectioning

Easy access shall be arranged to isolate a data or telephone connection in order to fault trace the system.

6 Telecommunication equipment room

The following items should be located onboard in a central telecommunication equipment room:

- a) PABX;
- b) satellite terminal (modem, antenna control unit, etc.) ;
- c) available space for one 482,6 mm (19 in) wide standard rack with ventilation for heat dissipation (minimum height: 42 units) for drilling contractor's/operator's multiplexer(s), router(s), hub(s), switch(es), modem(s) etc.;
- d) available space for one spare 482,6 mm (19 in) wide standard rack (minimum height: 42 units) for contractor's/operator's file and/or database server(s). Alternatively, in lack of space, the rack for the server(s) may be located in or near the radio room;
- e) main distribution panel for office data and telephone network, which shall be located in same or adjacent rack(s);
- f) available space for radio link equipment in case a radio link will be required, including
 - 1) outside equipment facilities,
 - 2) space for radio directional link antenna for any direction,
 - 3) installed low loss coaxial cable for these antenna position.
- g) IO equipment may be located to a dedicated IO equipment room.

7 Information technology (IT) security

7.1 General

The security features have to be able to support basic privacy requirements for all parties.

7.2 Requirements

The following requirements apply:

- a) the access to the network shall be controlled. No unauthorised equipment shall have access to the network;
- b) controlled access to services so that only legitimate users and information can pass through the network;
- c) transport of data between systems and users offshore and onshore shall be confidential;
- d) computer equipment should only be connected to the equipment owner's own local area network unless otherwise explicitly approved by operator to ensure parties' security policy is maintained, e.g. regarding virus protection;
- e) access to the telecom equipment room shall be limited to telecom personnel, preferably by keeping the door(s) locked;
- f) routing between networks shall be agreed upon before doing so.

7.3 Recommendations

VLANs should be secured by using one of the following methods:

- access lists;
- VRFs;
- firewall;
- network access control;
- other relevant technologies.

8 Local area network (LAN)

8.1 General

A common office data and telephone cabling network shall be provided. The office data and telephone cabling shall be in accordance with NORSOK T-100. Cabinets containing servers, personal computers or other network components shall have data outlets (minimum two). When switch(es) is(are) installed, fibre cable(s) should be used.

8.2 Requirements

The following requirements apply:

- a) the LAN includes cabling and networking equipment. The media technology shall be ethernet according to IEEE 802.3. Switching technology shall be used to provide network connectivity;
- b) all network elements should be prepared for fibre optic ports;
- c) for areas designated for temporary containers, hook-up junction boxes for fibre optical cables should be installed. Fibre optic cables from containers shall be terminated in the most suitable fibre switch;
- d) the LAN network shall be configured in such a way that the LANs for operator, drilling contractor and other contractors can be logically separated on any location, including containers and living quarter;
- e) it is the drilling contractor's responsibility to provide all LAN cabling required by the operator and contractors, as well as LAN cabling for own use. All cable cores should be terminated in both ends;
- f) wireless LAN, if installed, shall be compliant with IEEE 802.11. It should support VLANs and encryption. The coverage area and purpose has to be agreed upon between operator and drilling contractor;
- g) the routers should be equipped with
 - 1) interfaces for fast ethernet (minimum two),
 - 2) interfaces for external satellite and radio links (minimum two),
 - 3) interface for public branch access (minimum one),
 - 4) analogue phone interface for fax etc. (minimum two).

Each working place shall be equipped with minimum 4 outlets for data/telephone connection, see NORSOK T-100.

8.3 Options

For infrastructure on drilling units backbone cabling should be single mode fibre or multi mode fibre to enable high speed data transfer, see NORSOK T-100.

9 Communication links

9.1 General

Radio link and/or VSAT should be used to enable communication from the drilling unit.
When radio link is used as main communication, alternative communication shall be available.

9.2 Requirements

The following requirements apply:

Radio link

- a) The radio link terminal transmission capacity shall be minimum 2 Mb/s. Other band width requirements shall be defined by the operator. Radio link can be delivered both by operator or drilling contractor.
- b) Locations for point to point space diversity antennas for any direction should be prepared and cable-trunks should be available.
- c) The operator is responsible to provide the radio frequency license through the national telecommunication authorities (in Norway this is the Norwegian Post- and Telecommunications Authority).

Satellite

- a) The satellite equipment shall be prepared for Ku-band or C-band according to regional coverage and national telecommunication authority requirements (in Norway this is the Norwegian Post- and Telecommunications Authority).
- b) The satellite space segment capacity shall be at least 512 kb/s in both directions.
- c) The satellite terminal equipment and space segment capacity shall be easily upgradeable to 2 Mb/s, without replacing the VSAT antenna. Coverage area is within the Norwegian continental shelf.
- d) The drilling unit shall be prepared for two different satellite antenna locations giving satellite coverage for any drilling unit orientation.

Common requirements

- a) The onshore communication capacity shall be at least equal to the contracted band width to the offshore unit.
- b) Communication services from the drilling unit shall include access to oil and gas collaboration network and Internet.
- c) Operator and drilling contractor shall provide necessary requirements and approval for internet use.
- d) The equipment used shall be in accordance with the rig units zone classification requirements (EX requirements).

9.3 Recommendations

The following recommendations apply:

- a) the communication from the operator and the contractors to the drilling unit should be through an oil and gas collaboration network, e.g. SOIL. Optional access through dedicated access;
- b) the communication link to shore should be shared by all parts onboard to make full benefit of the highest peak capacity;
- c) the link from the drilling unit should be connected through the operator's network to oil and gas collaboration network;
- d) the termination of voice traffic should either be, see clause 11:
 - 1. the operator's PABX on the platform;
 - 2. onshore at the operator's premises;
 - 3. routed to drilling contractor's PABX;
 - 4. routed to rig service provider.
- e) wireless LAN can be implemented as a carrier service between vessels drilling unit and platform for data- and telecommunication for voice and data traffic, see LAN for technical requirements;
- f) public mobile systems (i.e. GSM) can be implemented as an alternative transmission route;
- g) redundancy.

Rig routers should include functionality to reroute/tunnel traffic automatically through an alternate path through oil and gas collaboration network, if the main route is broken.

10 Wide area network (WAN)

10.1 General

WAN is the connectivity from the offshore unit LAN to shore.

10.2 Requirements

The following requirements apply:

- a) the network equipment shall support IP;
- b) QoS shall be supported. The standard used shall be referred to and documented. Table 1 gives minimum requirements. Extended QoS models with several classes can be used, but shall be compliant with Table 1, and the provider shall be able to preserve QoS tagging throughout the network.

Table 1 - Prioritization of WAN traffic

Traffic	Priority	Precedence
Voice	High	5
Video/realtime traffic	Medium	4
Business applications (e.g. drilling systems, personnel onboard systems)	Low	3
Other traffic/internet traffic	Best effort	0

10.3 WAN accelerators

WAN accelerators can be used to optimize traffic. If separated routing domains are used, one accelerator is needed per routing domain.

10.4 Extranet services

Firewalls, access-lists and/or separated routing domains can be used for extranet services.

10.5 Guidelines for band width allocation for voice

Minimum band width per voice call:

Nominal ethernet band width = 31,2 kbps (G.729 recommendation)

Band width requirements for voice equals $N \times 31,2$ kbps.

10.6 Guidelines for band width allocation for video

10.6.1 General

Minimum requirements for video conferencing equipment should support H.323 and/or session initiation protocol.

10.6.2 Rig on very small aperture terminal (VSAT)

Recommended minimum band width for video conferencing is 256 kbps + 20 % overhead.

According to this recommendation overall band width has to be increased compared to the minimum 512 kbps requirement.

10.6.3 Rig on radio link

Recommended minimum call speed for video conferencing is 768 kbps + 20 % overhead.

According to this recommendation overall band width has to be increased compared to the minimum 512 kbps requirements.

10.7 Guidelines for band width allocation - realtime data

Operator and drilling contractor are responsible for assigning necessary capacity for real time data traffic. Minimum band width per session should be no less than 128 kbps.

NOTE Band width need to be further clarified by operator.

11 Private automatic branch exchange (PABX)

11.1 General

The telephone exchange shall provide internal and external voice services. The drilling contractor shall provide telephone handsets for all parties.

11.2 Requirements

The following requirements apply:

- a) audio conference phone for drilling supervisor and conference room;
- b) possibility to allow direct dial in mapping to all telephone extensions;
- c) direct dial-out should be assigned to specified positions onboard according to the specifications;
- d) the telephone system shall be manageable to prioritise and block lines in case of an emergency situation in accordance with drilling contractor's provided emergency procedure for the drilling unit.
The prioritised lines should be implemented by pre-emption on busy link, i.e. the PABX seizes resources used by lower precedence call during higher precedence call set-up;
- e) operator and contractors telephone services should be provided through the PABX system(s) onboard the unit;
- f) hotlines (i.e. a call to a pre-defined number or extension automatically set up when the phone is picked up or a direct-call button is pressed, which gives congestion free lines) should be available.

11.3 Recommendations

The following recommendations apply:

- a) interface between network and PABX should be digital;
- b) the PABX should be remotely configurable through IP and ethernet port (or through an IP-to-serial-port conversion unit);
- c) the public address and alarm system and the UHF system should be accessible from the phone sets through the PABX onboard, see NORSOK T-100;
- d) rerouting of telephone numbers in emergency should be possible.

12 Audio and video entertainment

12.1 General

Entertainment system shall be in accordance with NORSOK T-100.

If the LAN is used for audio and video distribution, the network shall be designed for audio and video communication.

12.2 Requirements

The following requirements apply:

- a) the drilling unit shall have at least four television channels of operator's choice (typically including domestic channels);
- b) television and radio entertainment reception shall not influence the decision on communication link used, i.e. satellite or radio link.

13 Ultra high frequencies (UHF) radio

13.1 General

The UHF radio system shall comply with NORSOK T-100.

Contractor shall provide UHF coverage in the office area.

13.2 Requirements

The following requirements apply:

- a) radios to be according to the Norwegian Post- og Teletilsynet and other national authorities requirements;
- b) radios has to be EX approved;
- c) drilling contractor shall supply UHF portable radios. Each set shall consist of
 - 1) one intrinsically safe (Ex. approved) transceiver with 16 programmable channels. Ten of the channels shall be the official marine channels 1 to 10. The other shall be programmed according to the operator's requirement, or if the drilling contractor has applied for private channels, these shall be used,
 - 2) one headset suitable to be attached to the helmet,
 - 3) one push to talk button,
 - 4) one belt and carrying case,
 - 5) monophone,
 - 6) spare batteries.
- d) the radio operator shall also sign in and out of each portable radio set per shift per crewmember;
- e) sufficient battery chargers shall be placed in suitable area for charging the transceivers set;
- f) the drilling unit should have a radiating coaxial cable drawn in the concealed area to ensure that it is full radio area coverage inside and outside (in accordance with NORSOK T-100);
- g) the radiating coaxial cable should be hooked up to a repeater for bringing the signal airborne (coverage in accordance with NORSOK T-100);
- h) the UHF radio system shall be interfaced to the public address and alarm system to ensure that all personal wearing transceiver sets receive alarm and emergency announcements (in accordance with NORSOK T-100);
- i) a label shall be attached to the portable radio set, describing the use of the UHF channels.

13.3 Recommendations

See Table 2 for recommended channels. Both 12,5 kHz and 25 kHz channel spacing may be used. New radio sets shall be for 12,5 kHz channel spacing.

Table 2 – Recommended channels

Channel selector	Description	Transmit	PL	Receive	PL	Purpose
1	Marine UHF 1	467,5500		Simplex		Open official marine channel, use crane to ship.
2	Marine UHF 2	467,5750		Simplex		Open official marine channel, use crane to ship.
3	Marine UHF 3	457,5250		Simplex		Open official marine channel, use crane to ship.
4	Marine UHF 4	457,5500		Simplex		Open official marine channel, use crane to ship.
5	Marine UHF 5	457,5750		Simplex		Open official marine channel, use crane to ship.
6	Marine UHF 6	467,5250		Simplex		Open official marine channel, use crane to ship.
7	Deck		Yes	Duplex	Yes	To be used by the deck hands and crane operator during lifting operations.
8	Drilling		Yes	Duplex	Yes	To be used by the drilling crew and people who interact with them.
9	Other		Yes	Duplex	Yes	This channel is reserved for use when simultaneous activity takes place, e.g. diving.
10	Safety/fire		Yes	Duplex	Yes	This channel shall be used for exercise and communication for the fire team.
11	Marine UHF 7	467,5375		Simplex		Open official marine channel 12,5 kHz channel.
12	Marine UHF 8	467,5625		Simplex		Open official marine channel 12,5 kHz channel.
13	Marine UHF 9	457,5375		Simplex		Open official marine channel 12,5 kHz channel.
14	Marine UHF 10	457,5625		Simplex		Open official marine channel 12,5 kHz channel.

14 Facilities for integrated operations

14.1 General

The objective of this clause is to set minimum technical requirements for solutions required for Integrated operations on modern mobile drilling units prepared for IO operations.

Older rigs, not prepared for IO in the design phase, will have to implement IO operations as agreed between operator and drilling contractor.

14.2 Integrated operations

Rigs supporting IO shall be equipped to support more effective work processes and work practices enabled by information and communication technology – integrated operations.

This means that the rigs should be prepared for integrated operations by means of cable trays, cabling, power, HVAC, use of available space etc.

In general the following facilities shall be available (see also Figure 2 for further details):

- a) operation room and/or collaboration room;
- b) nearby technical room to host IT equipment in order to increase health and safety executive conditions in operation room;
- c) necessary cable trays between technical room and dedicated IO area.

The following recommendations apply:

- a) silent office(s) should be equipped as standard workstation, see NORSOK T-100;
- b) all dedicated IO facilities (e.g. operation room, collaboration room, silent room) should be located in close vicinity of each other, and offices such as Company man's office and tool pusher's office.

14.3 Technical specifications

14.3.1 Layout

Typical rig office layout is shown in Figure 2.

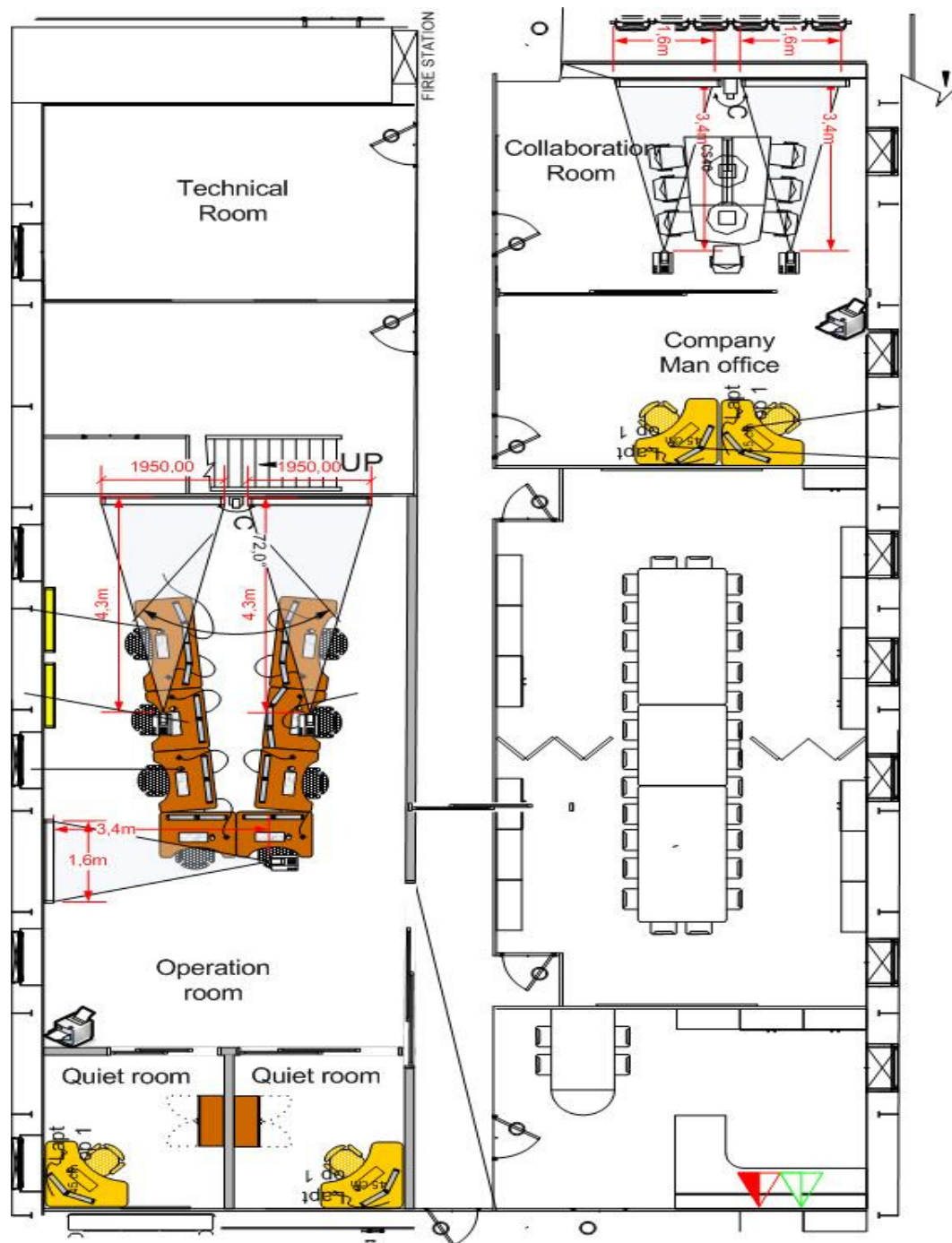


Figure 2 – Typical rig office area layout

14.3.2 Collaboration room

The collaboration room should be minimum 6 m x 4 m x 2,4 m (LxWxH). Lights in the work area should be optimized for both individual work and videoconferencing and should be possible to control from a central control panel. If possible, the work area should have data floor.

Furnishing and Company specific technical equipment (e.g. videoconference, canvas, electronic whiteboard, Company PCs, etc.) should be provided by Company. Cabling, lighting and infrastructure to the work area should be provided by drilling contractor.

The infrastructure in this room should be as follows:

- a) one conference telephone;
- b) CCTV facilities (selection of camera only);
- c) LAN and WiFi;

- d) for indication of power outlets, data outlets, cabling requirements etc., see Table 4 and Table 5;
- e) working conditions (e.g. ventilation, temperature and noise) should be in compliance with NORSOK S-002;
- f) HVAC requirements according to Table 3.

14.3.3 Operation room

The operation room will be permanently manned (24/7) by personnel relevant for the current operation. The room will be used by Company personnel and service Company personnel. The intention is that Company personnel and service Company personnel should be co-located in the same work area (instead of being located in different offices and containers) to improve communication and collaboration. This room should host minimum eight workstations.

Furnishing and Company specific technical equipment (e.g. videoconference, canvas, electronic whiteboard, Company PCs and so on) should be provided by Company. Cabling, lighting and infrastructure to the work area should be provided by drilling contractor.

The size of the work area should be minimum 8 m x 6 m x 2,4 m (LxDxH). Lights in the work area should be optimized for both individual work and videoconferencing and should be possible to control from a central control panel. If possible, the work area should have data floor.

The infrastructure in this room should be as follows:

- one phone for each work station;
- remotely controlled UHF;
- CCTV facilities (selection of camera only);
- LAN and wireless LAN;
- prepared for additional cabling from contractor's sensor acquisition systems;
- for indication of power outlets, data outlets, cabling requirements etc., see Table 4;
- working conditions (ventilation, temperature and noise) should be in compliance with NORSOK S-002;
- HVAC requirements according to Table 5.

14.3.4 Technical room

The technical room shall be located adjacent to and the same level as operation room and collaboration room in order to avoid heat and noise and for easy access.

Drilling Contractor shall build frames for rack in technical room and the area should be large enough for five racks of size 80 cm x 80 cm x 200 cm (W x D x H). Access from two sides of the racks. Experience from previous installations proves the total effect of the AV racks to be minimum 17 kW to 18 kW. HVAC shall be sufficient to prevent heating.

14.3.5 Walls

The walls shall be able to support the weight of the LCD screens.
Operator to provide measurements.

The sound reduction between rooms shall be minimum 35 dB.

14.3.6 IO technical requirements

Calculations are based on eight workstations in the operation room.

14.3.7 Network cabling, wireless LAN and electricity

Table 3 indicates the need for network outlets, electricity outlets and cabling. This information should be used as a guideline.

NOTE Electricity outlets are defined as socket with 2 outlets, 10 amp and 240 V.

Table 3 – Network and electricity

Area	Electricity outlets	Network outlets	Office data cabling between equipment and technical room (for extenders)	Comments
Operation room	20	18	80	
Collaboration room	10	8	22	
Company man room	13	8	20	
Quiet room	4	6	4	
Technical room	12	Switch fiber connection		Need a fibre connection between Company technical room and suppliers' technical room.

All cabling shall be provided and pulled by drilling Contractor. All cabling shall be terminated.

14.3.8 Special cabling for equipment

Special cables require available space in cable trays from technical room to collaboration and operation room.

Table 4 indicates the need for special cabling.

Table 4 – Special cabling

Area	cables	Comments
Operation room	6 speaker cables/ 10 signals cables	
Collaboration room	6 speaker cables/ 6 signals cables	
Company man room	6 speaker cables/ 4 signals cables	
Technical room	n/a	

All cabling shall be provided by Company and pulled by drilling contractor. All cabling shall be terminated.

14.3.9 Ventilation/cooling requirements

Table 5 indicates the power usage for the technical equipment.

Table 5 – Power

Area	Power	Comments
Operation room	4 kw	
Collaboration room	2 kw	
Company man room	3,5 kw	
Quiet room	0,6 kw	
Technical room	17,5 kw	

The concurrency can be set to 60 %.

14.3.10 Uninterruptible power supply (UPS)

UPS shall be dimensioned to handle projectors, PCs, local KVM and equipment in racks, with references to power consumption in Table 5.

14.3.11 Closed circuit television (CCTV)

Access to CCTV shall be available according to 14.3.

In addition CCTV should be available in Company man's office (full functionality), and to onshore locations (selection of camera only).

14.3.12 Ultra high frequencies (UHF)

The offshore UHF solution shall be remotely available from onshore.

Annex A

(informative)

Recommended responsibility sharing between drilling contractor and operator

A.1 Responsibilities

A.1.1 General

The drilling contractor will be the main responsible for IT, telecommunication and network infrastructure, even if the drilling contractor is not the actual owner of the drilling unit.

A.1.2 Requirements

The following requirements apply:

- a) the responsible for the external communication to the drilling unit depends on whether it is through a radio link or a satellite space segment;
- b) when a radio link is used, the operator shall provide radio link equipment and frequencies;
- c) the drilling contractor shall provide telecommunication from an access point onshore to the drilling unit when a satellite link is used;
- d) the drilling contractor shall provide the data network and telecommunication infrastructure and all radio, telephone and fax services onboard the drilling unit;
- e) telephone and network equipment (e.g. central and distributed switches, media converters, routers, PABX) shall be provided, operated and maintained by the drilling contractor;
- f) drilling contractor shall provide a focal point of contact;
- g) services shall be provided to all parties.

A.1.3 Options

The drilling contractor may provide the services themselves or by a third-party communications provider, if not explicitly stated otherwise.

A.1.4 Acceptance test

To confirm functionality and inter-operability of systems and equipment from different vendors, acceptance test procedures should be in place.

A.2 Documentation

A.2.1 Requirements

The following requirements apply:

- a) the drilling contractor is responsible for providing, updating and maintaining all relevant documents and certificates related to IT, telecommunication and network infrastructure;
- b) documentation shall be available onboard for all parties who need to know, and onshore at drilling contractor's premises;
- c) documents shall be submitted to operator upon request.

A.2.2 Options

N/A

A.2.3 Recommendations

N/A

A.3 Applications

A.3.1 Requirements

The following requirements shall apply:

- a) drilling contractor shall provide online access and printing facilities for the DaWinci helicopter booking application, available through Oil & gas collaboration network, when operating at the Norwegian shelf;
- b) drilling contractor shall provide internet access as a transport medium for third-party through drilling contractor;
- c) internet access to the world wide web shall be provided through drilling contractor proxy server.

A.3.2 Options

Catalogue service through oil and gas collaboration network for telephone numbers and e-mail addresses may be provided.

A.3.3 Recommendations

N/A

A.4 N/A

A.5 Service provisions

A.5.1 Requirements

Qualified personnel shall be available onboard to take care of the operator's local operation, e.g. radio operator to take care of the scheduled computer server backups.

A.5.2 Options

N/A

A.5.3 Recommendations

Qualified personnel should be available onboard for installation and first-level and preventive maintenance of the telecommunication and computer equipment and cabling (including outlets).

Contracts should be established between operator and drilling contractor, operator and oil and gas collaboration network, drilling contractor and oil and gas collaboration network and third-parties and oil and gas collaboration network, describing services provided.

The contract between operator and drilling contractor should define a committed and reported service level from drilling contractor.

A.6 Service level

A.6.1 Requirements

Drilling contractor to provide round-the-clock customer interface which shall consist of the following:

- a) receive and give priority to fault reports and problem handling, including feedback and follow up relevant communication link, network equipment, local network on the drilling unit, and/or operator provided items;
- b) access to operational status within drilling contractor's supply (e.g. communication link, network equipment, local network on the drilling unit);
- c) activate/de-activate telephone lines from operator's emergency organization to the drilling unit when requested to do so.

A.6.2 Options

N/A

A.6.3 Recommendation

A service level agreement should be established, describing responsibilities for drilling contractor, operator and communications provider, naming contact persons and describing procedures for mobilizing, operating and demobilizing the drilling unit.

The basic elements should be as follows:

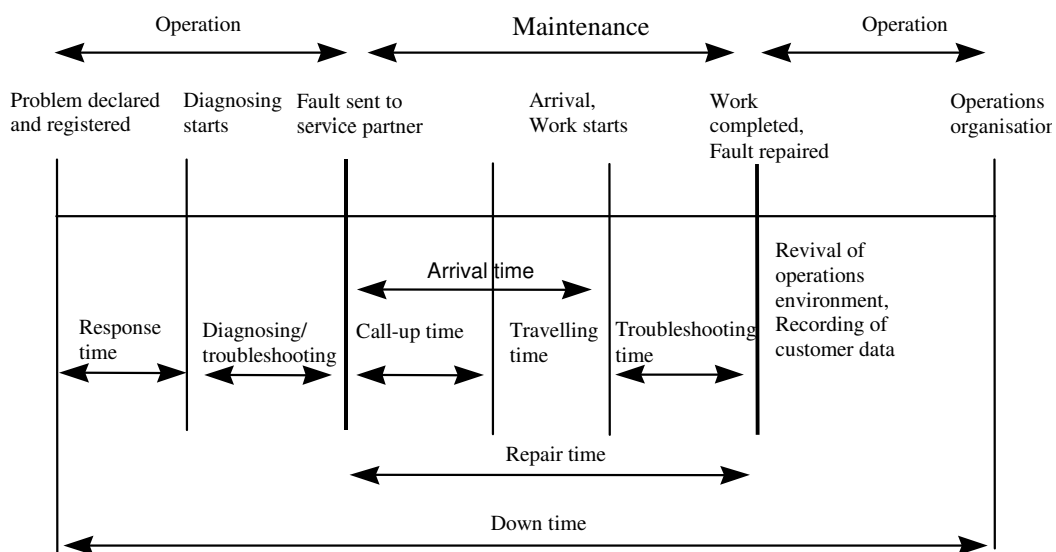
- a) available round-the-clock (24 h a day, 7 days a week);
- b) response time customer requests during office hours: by phone: 20 s and by fax or e-mail: 2 h;
- c) access to and management of the IT infrastructure;
- d) user perceived network availability from the drilling unit: 99,7 % for any month;
- e) severity level 1 problem resolution: response time: 0,5 h, mean time to repair (remote operation): 2 h;
- f) severity level 2 problem resolution: response time: 1,0 h, mean time to repair (remote operation): 4 h;
- g) change requests: User account: 24 h, configuration change: 8 h, band width: 5 working days, new carrier service: 15 working days;
- h) the basic issues covered should be
 - 1) a single point of contact for IT support (IT customer support) should be established between operator and third parties or to the delegated communications provider,
 - 2) access to and management of the IT infrastructure (documentation, monitoring, diagnostics and repair, configuration, security management, IP address allocation),
 - 3) access to and management of the telephone system (documentation, monitoring, diagnostics and repair, configuration, maintaining numbering plan),
 - 4) access to and management of the operator's business application services, e.g. user administration, server operation,
 - 5) access to networking services, e.g. internet and oil and gas collaboration network.

A.7 Severity levels

Severity level 1: Critical problem, including security issues, which makes the UnitNet services unavailable for one or more units.

Severity level 2: Degraded, but operational with reduced performance or quality.

Service definitions



A.8 Terms and conditions

A.8.1 Requirements

The following requirements shall apply:

- a) the provided communication and IT services regarding operator and third-party can be included in the daily rates, including assistance during mobilisation, demobilisation and unit move;
- b) if operator decides to establish a direct radio link between the drilling unit and another platform installation instead of a satellite link, the daily rates shall be reduced accordingly.

A.8.2 Options

N/A

A.8.3 Recommendations

N/A

Annex B (informative) IP Subnet address allocations

Subnet allocation

For small nets:

Subnet mask: 255.255.255.224 (32 addresses per subnet) or 255.255.255.240 (16 addresses per subnet)

For larger nets:

Subnet mask: 255.255.255.128 (126 addresses per subnet) or 255.255.255. 0 (254 addresses per subnet)

Allocation by example:

Allocated to	Subnet No	Subnet addresses	Hosts from	Hosts to	Broadcast address
Drilling contractor	0	194.248.53.0	194.248.53.1	194.248.53.30	194.248.53.31
Drilling contractor	1	194.248.53.32	194.248.53.33	194.248.53.62	194.248.53.63
Operator	2	194.248.53.64	194.248.53.65	194.248.53.94	194.248.53.95
Operator (spare)	3	194.248.53.96	194.248.53.97	194.248.53.126	194.248.53.127
Contractor 1	4	194.248.53.128	194.248.53.129	194.248.53.158	194.248.53.159
Contractor 2	5	194.248.53.160	194.248.53.161	194.248.53.190	194.248.53.191
Contractor 3	6	194.248.53.192	194.248.53.193	194.248.53.222	194.248.53.223
Spare	7	194.248.53.224	194.248.53.225	194.248.53.254	194.248.53.255

Annex C (informative) Responsibility matrix

The responsibility matrix is mainly to be considered a guideline which aims at establishing the various responsibilities and focus areas with regards to implementing facilities for integrated operations in addition to establishing which Company is responsible for each of the focus areas.

Item name	Design	Engineering	Procurement	Installation	Test	Commissioning
Facility upgrade	Operator	Operator/Drilling contractor	Drilling contractor	Drilling contractor	Drilling contractor	Operator
Furnishing	Operator	Operator	Operator	Operation and maintenance contractor/contractor for new builds	Operator	Operator
Lighting	Drilling contractor based on requirements from operator	Drilling contractor based on requirements from operator	Drilling contractor	Drilling contractor	Drilling contractor	Operator
HVAC	Drilling contractor based on requirements from operator	Drilling contractor based on requirements from operator	Drilling contractor	Drilling contractor	Drilling contractor	Drilling contractor
Power/UPS	Drilling contractor based on requirements from operator	Drilling contractor based on requirements from operator	Drilling contractor	Drilling contractor	Drilling contractor	Operator
Satellite communication	Drilling contractor based on requirements from operator	Drilling contractor based on requirements from operator	Drilling contractor	Drilling contractor	Drilling contractor	Operator
Radio link	Operator	Operator/Drilling contractor	Operator	Operator/Drilling contractor	Operator/Drilling contractor	Operator
Telephony	Drilling contractor	Drilling contractor	Drilling contractor	Drilling contractor	Drilling contractor	Drilling contractor
Network (LAN and patch panels)	Drilling contractor based on requirements from operator	Drilling contractor based on requirements from operator	Drilling contractor	Drilling contractor	Drilling contractor	Operator
WiFi	Drilling contractor based on requirements from operator	Drilling contractor based on requirements from operator	Drilling contractor	Drilling contractor	Drilling contractor	Operator
AV equipment	Operator	Operator	Operator	Operator	Operator	Operator
AV cabling	Operator	Operator/Drilling contractor	Operator/Drilling contractor	Operator/Drilling contractor	Operator/Drilling contractor	Operator/Drilling contractor
Crestron room control system	Operator	Operator	Operator	Operator	Operator	Operator
PCs	Operator/contractor	Operator/Contractor	Operator/Contractor	Operator/Contractor	Operator/Contractor	Operator/Contractor

Item name	Design	Engineering	Procurement	Installation	Test	Commissioning
Monitors	Operator/contractor	Operator/contractor	Operator	Operator	Operator	Operator
KVM Switches/extenders	Operator/contractor	Operator/contractor	Operator	Operator	Operator	Operator
Printers	Operator/contractor	Operator/contractor	Operator/contractor	Operator/Contractor	Operator/Contractor	Operator/Contractor
Front display solution	Operator	Operator	Operator	Operator	Operator	Operator
UHF	Drilling contractor based on requirements from operator	Drilling contractor based on requirements from operator	Drilling contractor	Drilling contractor	Drilling contractor	Operator
CCTV	Drilling contractor based on requirements from operator	Drilling contractor based on requirements from operator	Drilling contractor	Drilling contractor	Drilling contractor	Operator

The operator responsible for installation is also responsible for tagging and documentation.

