|  |  |  |
| --- | --- | --- |
| The International Teleocmmunication Union - Connecting the World. | **Международный союз электросвязи****Бюро стандартизации электросвязи** |  |
|  | Женева, 22 мая 2023 года |
| **Осн**.: | **Циркуляр 105 БСЭ** | **Кому**:− Администрациям Государств – Членов Союза− Членам Сектора МСЭ-Т− Ассоциированным членам МСЭ-Т− Академическим организациям − Членам МСЭ**Копии**:− Председателям и заместителям Председателей исследовательских комиссий− Директору Бюро развития электросвязи− Директору Бюро радиосвязи |
| **Тел**.: | +41 22 730 6356 |
| **Факс**:**Эл. почта**: | +41 22 730 5853tsbsg15@itu.int  |
| **Предмет**: | **Вопросник по кабельным судам и погружному оборудованию** |

Уважаемая госпожа,
уважаемый господин,

1 15-я Исследовательская комиссия на своем последнем собрании (Женева, 17–28 апреля 2023 г.) приняла решение о том, чтобы в рамках исследований, проводимых по Вопросу 8/15 (Характеристики подводных волоконно-оптических кабельных систем), пересмотреть Рекомендацию МСЭ-Т G.971 (Общие свойства подводных волоконно-оптических кабельных систем) и обновить существующее Дополнение I, в котором представлены данные по кабельным судам и погружному оборудованию.

2 Пересмотренную Рекомендацию G.971 планируется представить для получения согласия на следующем собрании ИК15 в **2024 году**.

3 В этих целях необходимо ваше содействие для рассмотрения и обновления информации, которая в настоящее время содержится к Дополнении I к Рекомендации G.971. В связи с этим просим вас, при необходимости, изменить существующие данные по кабельным судам и погружному оборудованию, представленные в **Приложении 1** к настоящему циркулярному письму, в котором приведен текст Дополнения I к Рекомендации G.971.

Если указанное в перечне оборудование более не используется и/или если после 2019 года построены новые кабельные суда и созданы новые типы погружного оборудования, просьба представить их описание (на английском языке) в соответствии с **Приложением 2**.

4 Просьба направить всю информацию редактору Рекомендации G.971 не позднее **29 сентября 2023 года**:

 Mr Yuto Sagae
NTT Access Network Service Systems Laboratories
1-7-1, Hanabatake, Tsukuba, Ibaraki
305-0805, Japan
Эл. почта: yuto.sagae@ntt.com
Тел.: +81 29 868 6436

5 Рассчитываю на ваше сотрудничество и надеюсь, что ваши ответы будут максимально точными и поступят к вышеупомянутому редактору до истечения предельного срока.

С уважением,

(*подпись*)

Сейдзо Оноэ
Директор Бюро
стандартизации электросвязи

**Приложения**: 2

**ANNEX 1**
**Data on cable ships and submersible equipment of various countries**

**I.1 Cable ships**

| **Name of ship** | **Year of cons-truction** | **Dis-place-ment (tons)** | **Overall length (m)** | **Draft (m)** | **Normal speed (knots)** | **Range (auto-nomy) (nautical miles)** | **Number of tanks** | **Cable capacity** | **Cable gear** | **Max operating depth (m)** | **Capability** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cable** | **Re-peaters** | **Cable engine** | **Unwinding pulley** |
| **Cubic metres (m3)** | **Weight (tons)** | **Drum(diameter)(m)** | **Linear (pairs of wheels)** | **Bow sheave (diameter) (m)** | **Stern sheave (diameter) (m)** |
|  |  |  |  |  |  |  | **CHINA***1) Ship belonging to* *China Submarine Cable Construction Co.,Ltd.* |  |  |  |  |  |
| ***Feng Yang Hai Gong*** | 2010 | 1916.5 | 57.6 | 2.6 | 10 | - | 1 | 350 | 800 | 3 | - | 10 | - | - | 2000 | FYHG is capable of deploying a 5 m sea plough within WD200 m. |
|  |  |  |  |  |  |  | *2) Ships belonging to S.B.Submarine Systems Ltd.* |  |  |  |  |  |
| ***CS Fu Hai*** | 2000 | 9850 | 105.8 | 12.0 | 12.5 | 45 days | 2 tanks2 hold | 2736.8548 | 52001042 | 96 | 3.0 | 20 | - | 2 ×3.0 | All | Laying and repair optical fibre systems. |
| ***Bold Maverick*** | 2001 | 9850 | 105.8 | 12.0 | 12.5 | 45 days | 2 tanks2 hold | 2736.8548 | 52001042 | 96 | 3.0 | 20 | - | 2 ×3.0 | All | Laying and repair optical fibre systems. |
| ***CS Fu An*** | 1982 | 10380 | 141.5 | 11.6 | 12.0 | 38 days | 3 tanks1 hold | 1200120 | 2394309 | 35 | 2 x 3.0 | - | - | 2 ×3.0 | All | Laying and repair optical fibre systems. |
|  |  |  |  |  |  |  | **DENMARK***Ships belonging to Tele Denmark* |  |  |  |  |  |
| ***Peter Faber*** | 1982 | 3680 | 78.35 | Ice3.8Summer5.0 | 13.0 | 7000 | 1 tank1 hold | 310230 | 600400 | App.10 | 3.0 |  | 2 × 3.0 | – | 4000 | Reinforced for operation in ice-filled waters.A-frame for ROV. Two hydraulic double-drum warping winches. |
| ***Lodbrog*** | 1985/2002 | 12'503 | 143.4 | 8.50 | 16.0 | 10'000 | 6 | 2940 | 5040 | 84 | 2 × 4.0(25 t) | 2 × 6(6 t) | – | 2 × 3.0 | All | Laying/burying and repair of all types of cables (coaxial, optical fibre and power cables).ROV capability, SWL 8 tonne. |
|  |  |  |  |  |  |  | **FINLAND***1)**Ship belonging to Sonera Ltd* |  |  |  |  |  |
| ***M/S Telepaatti*** | 1978 (modifi-cation) | 450 | 42.6 | 3.0 | 12 | – | 1 | – | 350 | – | 2 linear engines with 3 caterpillar tracks on each | 3.0 |  | 300 |  | Laying of all types of telecom cables.Specially equipped for cable route survey and cable repair. Fully automatic autopilot and DP‑system. |
|  |  |  |  |  |  |  | *2) Ship belonging to YIT Primatel* |  |  |  |  |  |
| ***c/s Telepaatti*** | 1978 Modifi-cation1999 | 450 | 42.6 | 3.0 | 10.5 | – | 1 | 250 | 260 | – | – | 2 linear engines with 3 cater-pillar tracks on each | 3.0 | – | 300 | Laying of all types of telecom cables and < 150 mm power cables.Specially equipped for cable route survey and cable repair.Fully automatic autopilot and DP‑system. |
|  |  |  |  |  |  |  | **FRANCE***1)**Ships belonging to France Telecom Marine* |  |  |  |  |
| ***Chamarel (formerly Vercors)*** | 1974 | 11'000 | 136 | 7.2 | 16.0 | 12'000 | 3 | 2425 | 4900 | 144 | 3.0 | 24 | 3.0 | Chute | All | Laying and repair of all types of telecom cables.Burying of cables with plough and 200 kW Hector 4. |
| ***Léon Thevenin*** | 1983 | 6800 | 107 | 6.24 | 15.0 | 10'000 | 2 + 1 | 1420 | 2000 | 11 | 3.4 | 12 | 3.0 | Chute | All | Laying and repair of all types of telecom cables.Burying of cables using 300 kW Hector 5. |
| ***Raymond Croze*** | 1983 | 6800 | 107 | 6.24 | 15.0 | 10'000 | 2 + 1 | 1420 | 2000 | 11 | 3.4 | 12 | 3.0 | Chute | All | Laying and repair of all types of telecom cables.Burying of cables using 250 kW Hector 3. |
| ***René Descartes*** | 2002 | 15'450 | 114.50 | 7.42 | 16.0 | 12'000 | 4 | 3250 | 5500 | 210 | 4.0 | 20 | Aft sheave 3.0 m | Sheave | All | Stem concept cable ship. Laying and repair of all types of telecom cables. Burying of cables with plough and 250 kW ROV Hector 6. |
|  |  |  |  |  |  |  | *2) Ships belonging to Alda Marine* |  |  |  |  |
| ***Ile de Sein Ile de Batz Ile de Brehat*** | 2002 | 18'006 | 140.4 | 8.016 | 15.0 | 15'000 | 2 + 2 | 3000 | 5500 | 202 | 4.0 | 21 | NA | 3.0 | All | Laying and repair of all types of telecom cables.Burying of cables with. 2/3m Rock plough. Sea state 7 A-frame. |
| ***Ile de Ré*** | 1983rebuilt2002 | 12'687 | 143.4 | 7.23 | 16.0 | 11'000 | 3 + 3 | 2900 | 4500 | 84 | 2 × 4.0 | NA | NA | 3.0 | All | Laying and repair of types of cable. ROV to 2500 m. A plough is available. |
|  |  |  |  |  |  |  | **ITALY***1) Ships belonging to Elettra TLC S.p.A* |  |  |  |  |
| ***Teliri*** | 1996 | 6500 | 111.5 | 6.5 | 14.01 | 10'000 | 3 | 2000 | 2600 | 70 | 2 × 3.5 | 18 | 3 | 4 | All | Laying and repair optical fibre systems. |
| ***Antonio Meucci***  | 1987 | 7900 | 114 | 6.5 | 12.0 | 10 000 | 3 | 1500 | 2600 | 80 | 2 × 3.5 | 12 | 3 | 3 | All | Laying and repair optical fibre systems. |
|  |  |  |  |  |  |  | *2) Ship belonging to Prysmian Cavi e Sistemi Energia S.r.l.* |  |  |  |  |
| ***Giulio Verne*** | 1984 | 16'900 | 133.18 | 8.5 | 10 | 7000 | 2 | 2600 | 7000 | 10 | 6.0(55 t) | 1(Pads type 10 t) | – | 6.0 | All | Lay and repair from the stern. |
|  |  |  |  |  |  |  | **JAPAN***1) Ships belonging to Kokusai Cable Ship (KCS)* |  |  |  |  |
| ***KDDIOceanLink*** | 1992 | 11'700 | 133.2 | 7.0 | 15 | 10'000 | Main 3Spare 4 | 2600 | 4500 | 57 | 3.6 | 21 | 3.2 | 4.0 | All | Laying by linear engine. Lays and repairs all types of submarine cables. |
| ***KDDI Cable Infinity*** | 2019 | TBA | 113.1 | 7.1 | 12 | 10'000 | Main 2Spare 2 | 2070 | 4500 | 70 | 4.0 | – | – | 4.0 | All | Laying and repair of all types of telecom cables. Laying of power cables. |
|  |  |  |  |  |  |  | *2) Ships belonging to NTT World EngineeringMarine Corporation (NTT-WE Marine)* |  |  |  |  |
| ***CS Subaru*** | 1999 | 9557 | 123.3 | 7.0 | 13.2 | 8800 | Main 2Spare 2 | 2770 | 4000 | 50 | 4.0 | 21 | – | 3.2 | All | Lays and repairs all types of telephone cables. |
| ***C/S VEGA*** | 1984 | 2293 | 74.3 | 4.5 | 13.0 | 4500 | 2 | 169 | 250 | – | 3.0 | N/A | 2.5 | N/A | All | Lays and repairs for non-powered telephone cable system.DP, ROV system. |
| ***ORION*** | 2013 | 299 | 54.9 | 3.4 | 10.0 | 3708 | 2 | 100 | 200 | N/A | 2.5 | N/A | N/A | 2.5 | 500 | Domestic maintenance purpose. |
| ***KIZUNA*** | 2017 | 8598 | 108.64 | 6.014 | 13.8 | 9500 | Main 2Spare 2 | 1984.18 | 2184.03 | 0 | 3.6 | N/A | N/A | 2.5 | All |  |
|  |  |  |  |  |  |  | **UNITED KINGDOM***1) Ship belonging to British Telecommunications plc* |  |  |  |  |
| ***Sovereign*** | 1991 | 13'018 | 131 | 7.0 | 13.5 | 14'000 | 4 | 2800 | 6200 | 90 | 3.50 |  | 3.00 | 3.50 | All | Lays, repairs all types of coaxial and optical fibre cable.(operated by C&W marine.) |
|  |  |  |  |  |  |  | *2) Ships belonging to Global Marine Systems Ltd* |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Ditto (no plough). |
| ***MV Cable Installer*** | 1980 | 6065 | 89.42 | 5 | 12 | 42 days | 4 | 840 | 1600 | None | 3.0 | 4-track pair | – | 3.0 | – | Repeaterless installation vessel fully DP Cegelec 901 system. |
| ***Seaspread*** | 1980 | 10'887 | 116 | 6.8 | 13 | 65 days | 2 | 1010 | 1701 | – | 2 × 3 | – | – | 3 | All | Lays/repairs by aft drums. Burial by plough. Lays/repairs armoured and lightweight cables. |
| ***PacificGuardian*** | 1984 | 7526 | 116 | 6.32 | 14.0 | 8000 | 3 | 1416 | 3470 | 96 | 3.5 |  | 3.00 | 3.00 | All | Laying by linear cable engine.Lays and repairs armoured and lightweight cables. |
| ***Sir Elic Sharp*** | 1988 | 7526 | 115 | 6.3 | 13.5 | 9600 | 3 | 1416 | 1700 | 96 | 2 × 3.5 | – | 3 | 3 | All | Laying by linear cable engine. Repairs and lays armoured and lightweight cables. Post lay/repair burial by integral ROV. |
|  |  |  |  |  |  |  | *3) Ship belonging to Global Marine Systems Ltd* |  |  |  |  |
| ***MV Cable Innovator*** | 1995 | – | 142 | 8.3 | 14.5 | 42 days | 4 | 4900 | 7500 | 180 | 4.0 | 21 pairs(min) | – | 4.0 | – | Simplex *D*/*P* system.Lays/repairs cables. |
|  |  |  |  |  |  |  | **MARSHALL ISLANDS***1) Ship belonging to TE CONNECTIVITY SUBCOM, SLU.* |  |  |  |  |
| ***Teneo*** | 1992 | 4000 | 81 | 5.7 | 13 | 4200 | 2 | 435 | 1000 | 20 | 2 × 3.5 | 1 × 9 | 2 × 3 | 1 × 3 | All | Lays and repairs of all types of telephone cables. |
|  |  |  |  |  |  |  | *2) Ship belonging to CS Tyco Decisive, Inc.* |  |  |  |  |
| ***CS Decisive*** | 2003 | 16148 | 140 | 8.4 | 13.9 | 25000 | 3 Main | 1138.6 | 8841 |  | 2 x ODIM 4.0 | ODIM 20pair | - | 30T 0.6m2x 50T 1.1580T .046 | - | The Decisive is capable of deploying SubCom's ROVs; Triton STs and SMD Nereus and SubCom's 3 m ploughs up to 80T bollard pull. |
|  |  |  |  |  |  |  | *3) Ship belonging to CS Tyco Dependable, Inc.* |  |  |  |  |
| ***CS Dependable*** | 2002 | 16148 | 139.1 | 8.4 | 13.9 | 25000 | 3 Main | 1138.6 | 8841 |  | 2 x ODIM 4.0 | ODIM 20pair | - | 30T 0.6m2x 50T 1.1580T .046 | - | The Dependable is capable of deploying SubCom's ROVs; Triton STs and SMD Nereus and SubCom's 3 m ploughs up to 80T bollard pull. |
|  |  |  |  |  |  |  | *4) Ship belonging to CS Tyco Durable, Inc.* |  |  |  |  |
| ***CS Durable*** | 2003 | 16148 | 139.1 | 8.4 | 13.9 | 25000 | 3 Main | 1138.6 | 8841 |  | 2 x ODIM 4.0 | ODIM 20pair | - | 30T 0.6m2x 50T 1.1580T .046 | - | The Durable is capable of deploying SubCom's ROVs; Triton STs and SMD Nereus and SubCom's 3 m ploughs up to 80T bollard pull. |
|  |  |  |  |  |  |  | *5) Ship belonging to CS Tyco Reliance, Inc.* |  |  |  |  |
| ***CS Reliance*** | 2001 | 16148 | 140 | 8..4 | 13.9 | 25000 | 3 Main | 1138.6 | 8841 |  | 2 x ODIM 4.0 | ODIM 20pair | - | 30T 0.6m2x 50T 1.1580T .046 | - | The Reliance is capable of deploying SubCom's ROVs; Triton STs and SMD Nereus and SubCom's 3 m ploughs up to 80T bollard pull. |
|  |  |  |  |  |  |  | *6) Ship belonging to CS Tyco Resolute, Inc.* |  |  |  |  |
| ***CS Resolute*** | 2002 | 16148 | 140 | 8.4 | 13.9 | 25000 | 3 Main | 1138.6 | 8841 |  | 2 x ODIM 4.0 | ODIM 20pair | - | 30T 0.6m2x 50T 1.1580T .046 | - | The Resolute is capable of deploying SubCom's ROVs; Triton STs and SMD Nereus and SubCom's 3 m ploughs up to 80T bollard pull. |
|  |  |  |  |  |  |  | *7) Ship belonging to CS Tyco Responder, Inc.* |  |  |  |  |
| ***CS Responder*** | 2001 | 16148 | 140 | 8.4 | 13.9 | 25000 | 3 Main | 1138.6 | 8841 |  | 2 x ODIM 4.0 | ODIM 20pair | - | 30T 0.6m2x 50T 1.1580T .046 | - |  |
|  |  |  |  |  |  |  | **UNITED STATES OF AMERICA***Ship belonging to Transceanic Cable Ship Company, LLC.* |  |  |  |  |
| ***CS Global Sentinel*** | 1991 | 16118 | 145.7 | 8.08 | 15 | 10'000 | 3 main,4 spare | 3258 (main, total)164 (spare, total) | 6098 | 100+ | 2 × 3.7 | 1× Dowty 21 pairs | 2 × 3 | 1× trough/Chute type | – | The Global Sentinel is capable of deploying TRITON ST ROVs, as well as SMD 1.5 m sea ploughs. |
|  |  |  |  |  |  |  | **UNITED ARAB EMIRATES***Ships belonging to E-marine PJSC* |  |  |  |  |
| ***CS Etisalat*** | 1990 | 2221 | 74.7 | 4.5 | 13 | 35 days | 3 | 667 | 600 | 12 | 3 | 6 | 3 | 4 | Unlimited | Surface lay, maintenance, ROV inspection and jet burial. |
| ***CS NIWA*** | 1990 | 16'375 | 145.66 | 8.08 | 15 | 60 days | 3 main4 spare | 3258 | 6098 | 152 | 4 | 18 | 4 | 4 | Unlimited | Surface lay, plough burial, maintenance, work class ROV inspection and jet burial. |
| ***CS UAA*** | 1972Conver-ted in 1996 | 7800 | 133.7 | 6.15 | 13 | 48 days | 3 main1 spare | 3360 | 4500 | 120 | 4 | 18 | 4 | 4 | Unlimited | Surface lay, plough, maintenance, work class ROV inspection and jet burial. |
|  |  |  |  |  |  |  | **REPUBLIC OF KOREA***Ships belonging to KT Submarine* |  |  |  |  |
| ***SEGERO*** | 1998 | 8323 | 115 | 7.8 | 12 |  | 4 | 4500 | 2218 | 70ea | 2 × 4 | 2 × 4 | – | 3.6 |  |  |
| ***Responder*** | 2000 | 8071 | 105.5 | 9.1 | 12.5 | – | 4 | 4790 | 6000 | – | – | – | – | – | – |  |
|  |  |  |  |  |  |  | **MALTA** *1) Ship belonging to J. Ray Mcdermott (Norway) AS Of Oslo Norway (as registered owner)* |  |  |  |  |
| ***NORTH OCEAN 102*** | 2008 | 11680 Gross Tons | 118.97 (length according to Article 2(8) of the International Tonnage Convention | Moulded Draught (Reg 4(2)6.70 | 15 | Not known (N/K) | N/K | N/K | N/K | N/K | N/K | N/K | N/K | N/K | N/K | -- |
|  |  |  |  |  |  |  | *2) Ship belonging to Oceanteam Bourbon 4 AS, Tveitarasveien 12, 5232 Paradis Bergen 1201, Norway* |  |  |  |  |
| ***SOUTHERN OCEAN*** | 2010 | 11014 | 119.07 | 6.85 | 15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
|  |  |  |  |  |  |  | *3) Ship belonging to Oceanteam Bourbon 101 AS, Tveitarasveien 12, 5232 Paradis Bergen 1201, Norway* |  |  |  |  |
| ***BOURBON OCEANTEAM 101*** | 2007 | 8575 | 106.20 | 5.50 | 15 | – | – | – | – | – | – | – | – | – | – |  |
|  |  |  |  |  |  |  | *4) Prysmian Powerlink Services Limited, Chickenhall Lane, Eastleigh, Hampshire SO506YU, United Kingdom* |  |  |  |  |
| ***ULISSE*** | 2010 | 10490 | 115.23 | 5.33 | – | – | – | – | – | – | – | – | – | – | – |  |

**I.2** **Submersible equipment**

Various types of submersible equipment are used to support the installation and maintenance of an optical submarine cable system. Typical examples of submersible equipment include a plough and a remotely operated vehicle (ROV).

A plough is towed by a cable ship and is used to lay the optical submarine cable while burying it.

An ROV is used when a plough is not available. A submersible craft assisting repair and burial (SCARAB) is a type of ROV. ROVs typically enable inspection, repair, and burial.

| **Type ofsubmersible** | **Weight(tons)** | **Overalllength(m)** | **Width(m)** | **Height(m)** | **Trenchingsystem** | **Trenching** | **Propulsion** | **Max operatingdepth(m)** | **Max pulling tension (tons)** | **Capability** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **CHINA***1) Submersible belonging to China Submarine Cable Construction Co.,Ltd.* |  |  |  |
| ***SHARK-600 Submersible Plough system*** | 12 | 11.01 | 4.42 | 2 | Water jet tool | Max burial depth: 5m | Towed | 200 | 25T | Lay and bury all types of cables. |
|  |  |  |  | *2) Submersibles belonging to S.B. Submarine Systems Ltd.* |  |  |  |
| ***SMD MD3*** | 25 | 10.3 | 5.1 | 4.7 | Articulated towed plough system  | 3 m | Towed by ship | 1500 | 80T |  |
| ***SMD Hi- Plough*** | 27 | 10.3 | 5.1 | 7.5 | Injecting/Jetting | Up to 3.25 m | Towed by ship | 200 | 20 T |  |
| ***ROV SEA LION*** | 6.5 | 3.2 | 2.9 | 2.9 | Jet burial tool | 1.5 m | Hydraulic Thrusters &/or tracks | 2500 | 200HP | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***ROV SEA LION III*** | Free Fly17.25Tracked18.4 | 6.5 | Free Fly3.7Tracked5.2 | 3.1 | Jet burial tool | 3.0 m | Hydraulic Thrusters &/or tracks | 2500 | 600HP | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
|  |  |  |  | **FRANCE***Submersibles belonging to France Telecom Marine* |  |  |  |
| ***ELISE2 Submersible Plough system*** | 17 | 7.60 | 2.90 | 2.95 | Ploughshare | Immediate burial up to 1.1 m | Towed by support ship | 1500 |  | Lay and bury all types of cables. |
| ***ELISE3 Submersible Plough system*** | 17 | 7.60 | 2.90 | 2.95 | Ploughshare | Immediate burial up to 1.1 m | Towed by support ship | 1500 |  | Lay and bury all types of cables. |
| ***Self-advancingburied systemCASTOR2*** | 12 | 7.0 | 2.40 | 3.00 | Trenching wheel or chain | Burial of existing cables down to 2 m | Tracked vehicle | 1000 |  | Burial of cables and pipes.Visual inspection. |
| ***ROVs HECTOR 3, 4, 5 & 6*** | 9 | 4.0 | 3.50 | 2.10 | High-pressure water jets | Up to 1.5 m depth | Thrusters(inspection)Back drive(burial) | 2000 |  | Visual inspection, post-lay burial, cable location, cable manipulation, cable cutting. |
| ***Remote control submersibleScorpio 2000*** | 3.4 | 2.9 | 1.5 | 2.11 | High-pressure water jets | Up to 60 cm depth | Thrusters | 1000 |  | Visual inspection, post-lay burial, cable location/manipulation/cutting. |
|  |  |  |  | **ITALY***Submersibles belonging to Elettra TLC SpA* |  |  |  |
| ***Plough Taurus 1*** | 14 | 9 | 4.6 | 4.5 | Plough share | Up to 1 m | Towed by cable ship | 1500 | 50 | Lay and bury all types of cables. |
| ***Plough Taurus 2*** | 16 | 9.5 | 4.5 | 5.1 | Plough share | Up to 1.5 m | Towed by cable ship | 1500 | 50 | Lay and bury all types of cables. |
| ***ROV – Phoenix 2*** | 6.8 | 4.8 | 2 | 2.6 | High/low-pressure jetting | Up to 1.2 m | 8 Hydraulic thrusters | 1000 |  | Visual inspection, post-lay burial, cable location/manipulation/cutting. |
| ***ROV-T200*** | Free-fly mode 6, Track mode 7 | 3.1 | 2 | 2.2 | High/low-pressure jetting | Up to 1.2 m | 4 vertical and 4 horizontal thrusters | 2500 |  | Visual inspection, post-lay burial, cable location/manipulation/cutting. |
|  |  |  |  | **UNITED KINGDOM***Submersibles belonging to Global Marine Systems Ltd* |  |  |  |
| ***Submersible trencher*** | 17.0 | 6.6 | 4 | 3.4 | Fluidization and cutting jets and dredge pump | Up to 1 m depth with cutting and fluidization jets | Three vertical and four horizontal thrusters, track drive differential steering | 274 |  | Trench in existing cableand pipe. |
| ***Submersible Plough system*** | 9.75 | 6.1 | 2.6 | 2.6 | Ploughshare proceeded by disc | Immediate burial of cable on ploughing | Towed by support ship | 900 |  | Lay and bury cable, umbilical and pipe in one action giving full cable protection. |
| ***Remote control submersible 2 off Cirus A&B*** | 3.2 | 3.5 | 2.1 | 2.3 | Water jets | Trenching capability 0.3 m | Thrusters (7) | 1000 |  | Visual inspection, cable location/inspection/deburial, manipulation.Tools include cable cutter, cable gripper and two manipulators with line cutters. |
| ***Plough2 off A&B*** | 14.5 | 9 | 4.1 | 4 | Passive blade | Trenching capability 1.0 m | Towed | 1000 |  | Steerable, repeater burial. |
| ***Remote control submersible ROV 128*** | 7.5 | 2.9 | 1.8 | 2.0 | Jetting tool | Trenching capability 0.6 m | Tracked burialThrusters survey | 1000 (burial) 2000 (survey) |  | Tools include cable cutter, cable gripper and two manipulators with line cutters. |
| ***Underwater vehicle- MARLIN*** | 7.8 | 4.191 | 2.438 | 3.175 | Burial skid | To 1.0 m(Optimized for0-30 kPa soil) | Hydraulic driven thrusters | 2500 |  | Burial, deburial, inspection.Maintenance and repair.Tools include cable cutter, cable gripper. |
| ***Scarab I – Umbilically tethered ROV*** | 3.2 | 2.74 | 1.82 | 1.52 | Jetting tool | Up to 0.6 m | Thrusters:2 vertical4 vectored | 2000 |  | Cable detection and inspection. Visual survey.Cable manipulation and cutting.Debris elimination.Cable and repeater burial/deburial. |
| ***Subtrack – ROV*** | 10.0 | 8.0 (Max) | 3.7 | 3.8 | Jetting tool | Burial to 1.0 m | Electro-hydraulic track drives | 1000 |  | Cable burial and deburial. Inspection.Maintenance and repair. |
| ***EUREKA:Deepwater burial + trenching system*** | 17 (Max) | 5.5 | 4.2 | 3.85 | Jetting toolRock wheel cutterMechanical chain excavator | 1 m1.2 m2.2 m | Electro-hydraulic track drives | 1500 |  | Capable of burying cable, small flexible flowlines and also rigid pipes. Can also debury cable and restore.Visual and electronic inspections. |
| ***Plough 5*** | 14.0 | 9.0 | 4.6 | 3.7 | Passive blade | Variable from0-1100 mm(600-900 mmin all conditions) | Towed | 1000 |  | Simultaneously lay and bury cables and umbilicals at varying depths. |
| ***Plough 6 and 7*** | 14.0 | 9.0 | 4.6 | 3.7 | Passive blade | Max burialdepth:1100 mm | Towed | 1000 |  | Simultaneously lay and bury cables and umbilicals at varying depths. |
| ***Cable Plough1000 mm*** | 14.4 | 9.75 | 4.1 | 3.9 | Passive blade | 1000 mm(Good conditions: 1100 mm;Repeaters/Joints:500 mm) | Towed | 1000 |  | Simultaneously lay and bury cables and umbilicals at varying depths. |
|  |  |  |  | **DENMARK***Submersibles belonging to Telecom Denmark* |  |  |  |
| ***Plough D*** | 13.5 | 9.0 | 4.6 | 3.7 | Plough share | Variable from 0‑1100 mm (600‑900 mm in all conditions) | Towed by host vessel | 1500 |  | Lay and bury telecom cables, power cables and umbilicals.Cables: Up to 120 mmφ (bury).Joints and repeaters:Up to 400 mmφ (pass). |
| ***Plough 7*** | 13.5 | 9.0 | 4.6 | 3.7 | Plough share | Variable from0-1100 mm(600-900 mmin all conditions) | Towed bysurface vessel | 1000 |  | Lay and bury fibre optic cables, power cables and umbilicals. |
| ***Subtrack-Subsea tractor*** | 10.0 | 8.0 (Max) | 3.7 | 3.8 | Jetting tool | Burial to 1.0 m | Electro-hydraulic track drives | 1000 |  | Cable burial and deburial.Inspection.Maintenance and repair. |
| ***Super Phantom S4-ROV*** | 0.09 | 1.5 | 0.75 | 0.6 | – | – | Thrusters4 prop fwd/aft2 prop vertical2 prop transverse | 300 |  | Inspect cables and other underwater objects. Can also be used to inspect seabed conditions. |
|  |  |  |  | **JAPAN***1) Submersibles belonging to KCS* |  |  |  |
| ***MARCAS-IV-ROV*** | Jet tool mode: 17.0 | 6.5 | Jet tool mode: 3.65 | Jet tool mode: 3.0 | Water jet tool | Up to 3.0 m | 4 horizontal, 4 vertical and 2 lateral thrusters | 2500 |  | Post-lay burial, maintenance of cable. Can survey seabed. |
| ***MARCAS-V-ROV*** | Jet tool mode: 8.7Track mode: 9.3 | 5.4 | Jet tool mode: 3.0Track mode: 3.1 | Jet tool mode: 2.1Track mode: 2.7 | Water jet tool | Up to 2.0 m | 4 horizontal, and 4 vertical | 3000 |  | Post-lay burial, maintenance of cable.Can survey seabed. |
| ***PLOW-II*** | 18.5Jet tool mode: 20.0 | 9.5 | 5.6 | 5.0 | Plough shareWater jet tool | Up to 3.0 m | Towed by cable ship | 1500 | 80 | Simultaneously lay and bury cables and umbilicals at varying depth. |
|  |  |  |  | *2) Submersibles belonging to NTT-WE Marine* |  |  |  |
| ***Plough-type 7Submarine cable burying system*** | 21 | 9.1 | 5.1 | 6.0 | – | Up to 2.0 m depth immediate burial of cable on ploughing | Towed by support ship | 1500 |  | Simultaneous or post-lay burial of cable. |
| ***CARBIS-II******ROV system******(C/S VEGA)*** | 8.0 | 3.2 | 2.1 | 2.8 | Water jetting | Trenching capability 1.5 m | Vertical and horizontal thrusters | 2500 |  | Cable detection & inspection visual survey.Cable manipulation & cutting.Cable & repeater burial. |
| ***CARBIS-III******ROV system******(C.S Subaru)*** | 9.0 | 3 | 3.4 | 2.1 | Water jetting | Trenching capability 3.0 m | Vertical and horizontal thrusters | 2000 |  | Cable detection & inspection visual survey.Cable manipulation & cutting.Cable & repeater burial. |
| ***CABRIS-IV ROV system (KIZUNA)*** | 7.4 | 3.6 | 2.2 | 3.3 | Water jetting | Trenching capability 1.5 m | Vertical and horizontal thrusters | 2500 |  | Cable detection & inspection visual survey.Cable manipulation & cutting.Cable & repeater burial. |
|  |  |  |  | **UNITED STATES OF AMERICA***Submersibles belonging to TE CONNECTIVITY SUBCOM, SLU.* |  |  |  |
| ***Arado 1*** | 14.0 | 10.5 | 6.0 | 4.3 | Towed plough system | 1.5 m burial | Towed by ship. 1 thruster for launches and recoveries | 1400 |  | ARADO 1 is a towed burial tool employing state-of-the-art burial features. It can achieve 1.5 m burial depth in up to 1 400 m water depth. |
| ***SMD MD3*** | 25 | 9.3 | 5.0 | 4.4 | Articulated towed plough system  | 3 m | Towed by ship | 1500 | 80T |  |
| ***SMD MD3 DF*** | 25 | 9.3 | 5.0 | 4.4 | Articulated towed plough system  | 3 m | Towed by ship | 1500 | 80T |  |
| ***SeaStallion 1*** | 32 | 13.8 | 5.4 | 5.3 | Towed plough system | 3 m | Towed by ship | 2000 | 100T |  |
| ***SeaStallion 2*** | 32 | 13.8 | 5.4 | 5.3 | Towed plough system | 3 m | Towed by ship | 2000 | 100T |  |
| ***SeaStallion 3*** | 32 | 13.8 | 5.4 | 5.3 | Towed plough system | 3 m | Towed by ship | 2000 | 100T |  |
| ***SeaStallion 4*** | 32 | 13.8 | 5.4 | 5.3 | Towed plough system | 3 m | Towed by ship | 2000 | 100T |  |
| ***SeaStallion SEP*** | 12 | 8.0 | 4.2 | 4.0 | Towed plough system | 2 m | Towed by ship | 1000 | 50 | Sea Stallion SEP is a dedicated Shore End Plough. |
| ***SMD QT800*** | 21 (free fly) 22 (tracked) | 5.4 | 4.6 | 3.3 | Jet burial tool | 3 m | Hydraulic Thrusters &/or tracks | 2500 | 800HP | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***Triton ST213 ROV*** | 6.3 (free fly) 7.0 (tracked) | 3.1 | 2.0 | 2.2 | Jet burial tool | 1.5 m2 m optional | Hydraulic Thrusters &/or tracks | 2500 | 200HP | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***Triton ST214 ROV*** | 6.3 (free fly) 7.0 (tracked) | 3.1 | 2.0 | 2.2 | Jet burial tool | 1.5 m2 m optional | Hydraulic Thrusters &/or tracks | 2500 | 200HP | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***Triton ST215 ROV*** | 6.3 (free fly) 7.0 (tracked) | 3.1 | 2.0 | 2.2 | Jet burial tool | 1.5 m2 m optional | Hydraulic Thrusters &/or tracks | 2500 | 200HP | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***Triton ST216 ROV*** | 6.3 (free fly) 7.0 (tracked) | 3.1 | 2.0 | 2.2 | Jet burial tool | 1.5 m2 m optional | Hydraulic Thrusters &/or tracks | 2500 | 200HP | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***Triton ST273 ROV*** | 6.3 (free fly) 7.0 (tracked) | 3.1 | 2.0 | 2.2 | Jet burial tool | 1.5 m2 m optional | Hydraulic Thrusters &/or tracks | 2500 | 200HP | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***Triton ST218 ROV*** | 6.3 (free fly) 7.0 (tracked) | 3.1 | 2.0 | 2.2 | Jet burial tool | 1.5 m2 m optional | Hydraulic Thrusters &/or tracks | 2500 | 200HP | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***SMD Nereus 3 ROV*** | 8.3 (free fly) 9.5 (tracked) | 3.8 | 3.2 | 2.5 | Jet burial tool | 2 m | Hydraulic Thrusters &/or tracks | 2500 | 300kW | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***SMD Nereus 4 ROV*** | 8.3 (free fly) 9.5 (tracked) | 3.8 | 3.2 | 2.5 | Jet burial tool | 2 m | Hydraulic Thrusters &/or tracks | 2500 | 300kW | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
|  |  |  |  | **UNITED ARAB EMIRATES***Submersibles belonging to E-marine PJSC* |  |  |  |
| ***SMD Plough*** | 1512 (Submer-ged) | 99.8 (Max) | 4.6 | 4.5 | Plough share | 1.5 m | Towrope from surface vessel | 2000 | 50 | Cables from 17 mm to 150 mm diameter. Repeaters up to 380 mm diameter. |
| ***Olympian T2******ROV*** | 10.1 (Skid)10.9 (With tracks) | 5.2 | 2.3 (Skid)3.8 (Track) | 2.9 | Jet burial tool config. | 1 m cohesive seabed2 m non-cohesive seabed | Hydraulic thrusters/tracks | 3000 | 1 | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***SMD ROV*** | 8 (Skid)9.2 (With track) | 3.8 | 3.2 (Skid)3.7 (Tracks) | 2.7 | Jet burial tool config. | 0-1 m | Hydraulic thrusters/tracks | 2000 | 1 | Cable burial and deburial. Inspect cables, seabed and underwater objects. 7-function 2-manipulation cutting and grip. |
| ***Navajo ROV*** | 0.042 | 1.052 | 0.628 | 0.411 | NA | NA | DC brushless thrusters | 300 | Power supply 115 VAC/26A230VAC/13A | High quality video & sonar surveys. Capable of carrying buoyant work skids and manipulators. |
|  |  |  |  | **REPUBLIC OF KOREA***Submersibles belonging to KT Submarine* |  |  |  |
| ***ROV*** | 18 | 5.5 | 3.7 | 3.2 |  | 3 M | 800 HP | 2500 |  |  |
| ***Plough*** | 16 | 9.0 | 4.1 | 4.6 | – | 1.5 M | – | 1500 |  |  |
| ***Burial*** | 19 | 5322 | 4183 | 2977 | – | – | 300 HP | 2500 | – |  |

**ANNEX 2
Questionnaire on new cable ships and submersible equipment**

<Cable ships>

|  |  |  |
| --- | --- | --- |
| Country |  |  |
| Organization |  |  |
| Name of ship |  |  |
| Year of construction |  |  |
| Displacement |  | (tons) |
| Overall length |  | (m) |
| Draft |  | (m) |
| Normal speed |  | (knots) |
| Range (autonomy) |  | (nautical miles) |
| Number of tanks |  |  |
| Cable capability | Cable | Cubic metres |  | (m3) |
| Weight |  | (tons) |
| Repeaters |  |  |  |
| Cable gear | Cable engine | (Drum) |  | (number) x (diameter) |
| (Linear) |  | (pairs of wheels) |
| Unwinding pulley | Bow sheave |  | (diameter, m) |
| Stern sheave |  | (diameter, m) |
| Maximum operating depth |  | (m) |
| Capability (general features and remarks) |
|  |

|  |  |
| --- | --- |
| ContactAffiliationTelFaxE-mail |  |

<Submersible equipment for laying, burial, inspection and so on>

|  |  |  |
| --- | --- | --- |
| Country |  |  |
| Organization |  |  |
| Type of submersible |  |  |
| Weight |  | (tons) |
| Overall length |  | (m) |
| Width |  | (m) |
| Height |  | (m) |
| Trenching system |  |  |
| Trenching capability |  |  |
| Propulsion |  |  |
| Maximum operating depth |  | (m) |
| Capability (general features and remarks) |
|  |

|  |  |
| --- | --- |
| ContactAffiliationTelFaxE-mail |  |