|  |  |  |
| --- | --- | --- |
| itu_logo | **الاتحـاد الدولـي للاتصـالات**  **مكتب تقييس الاتصالات** |  |

|  |  |  |
| --- | --- | --- |
|  |  | جنيف، 4 سبتمبر 2015 |
| المرجع: | **TSB Circular 170** COM 15/HO | **إلى:**  - إدارات الدول الأعضاء في الات‍حاد؛  - أعضاء قطاع تقييس الاتصالات؛  - ال‍منتسبين إلى قطاع تقييس الاتصالات؛  - الهيئات الأكادي‍مية ال‍منضمة إلى الات‍حاد |
| الهاتف: | +41 22 730 6356 |
| الفاكس: | +41 22 730 5853 |
| البريد الإلكتروني: | [tsbsg15@itu.int](mailto:tsbsg15@itu.int) | **نسخة إلى:**  - رئيس ل‍جنة الدراسات 15 ونوابه؛  - مدير مكتب تنمية الاتصالات؛  - مدير مكتب الاتصالات الراديوية |
|  |  |  |
| الموضوع: | **استبيان بشأن سفن مد الكبلات والأجهزة القابلة للغمر** | |

حضرات السادة والسيدات،

ت‍حية طيبة وبعد،

قررت ل‍جنة الدراسات 15 في اجتماعها الأخير الذي عُقد في جنيف من 22 يونيو إلى 3 يوليو 2015، في إطار الدراسات التي ت‍جريها ب‍موجب ال‍مسألة 8/15 (*خصائص الأنظمة الكبلية البحرية العاملة بالألياف البصرية*)، مراجعة التوصية ITU-T G.971 (*ال‍خصائص العامة للأنظمة الكبلية البحرية العاملة بالألياف البصرية*) وت‍حديث التذييل الأول ال‍حالي الذي ي‍حتوي على البيانات ال‍متعلقة بسفن مد الكبلات والأجهزة القابلة للغمر.

ومن ال‍مزمع تقدي‍م التوصية ITU-T G.971 ال‍مراجعة للموافقة عليها في اجتماع ل‍جنة الدراسات 15 في سبتمبر 2016.

ولذا ندعوكم إلى تعديل البيانات ال‍حالية، حسب الاقتضاء، بشأن سفن مد الكبلات والأجهزة القابلة للغمر ال‍مبينة في **الملحق 1** في هذه الرسالة ال‍معمّمة. وإذا ت‍م استبعاد بعض الأجهزة الواردة في القائمة، و/أو إنشاء سفن جديدة ل‍مد الكبلات وأجهزة جديدة قابلة للغمر منذ 2010، يرجى وصفها (باللغة الإنكليزية) على النحو ال‍مبين في **الملحق 2**.

ويرجى منكم إعادة التعديلات ال‍مقترحة إلى م‍حرر التوصية ITU-T G.971 قبل **31 ديسمبر 2015:**

Mr. K. Nakajima  
NTT Access Network Service Systems Laboratories  
1-7-1, Hanabatake, Tsukuba, Ibaraki  
305-0805, Japan

البريد الإلكتروني: [nakajima.kazuhide@lab.ntt.co.jp](mailto:nakajima.kazuhide@lab.ntt.co.jp)

الفاكس: +81 29 868 6142

وأشكركم مقدماً على تعاونكم في ال‍حرص على أن تكون ردودكم دقيقة قدر الإمكان وعلى وصولها قبل ال‍موعد النهائي.

وتفضلوا بقبول فائق التقدير والاحترام.

تشيساب لي  
مدير مكتب تقييس الاتصالات

**الملحقات:** 2

**ANNEX 1**

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

**1.1 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)** |
|  |  |  |  |  |  |  | **DENMARK** *Ships belonging to Tele Denmark* | | | | |  |  |  |  |  |
| ***Peter Faber*** | 1982 | 3680 | 78.35 | Ice 3.8 Summer 5.0 | 13.0 | 7000 | 1 tank  1 hold | 310  230 | 600  400 | 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 ton. |
|  |  |  |  |  |  |  | **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-cation 1999 | 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*** | 1983 rebuilt 2002 | 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. |
| ***Certamen (ex John Cabot)*** | 1966 rebuilt  1998 | 5000 | 96.6 | 7.3 | 12.0 | 8000 | 3 | 600 | 1900 | 24 | 1 × 3.0 | 18 (on the stern) + 6 (on the bow) | 3 | 3 | All | Laying, survey and repair optical fibre systems. |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  | **ITALY** *2) Ships 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. |
|  |  |  |  |  |  |  | **SPAIN** *Ships belonging to Tyco Submarine Systems Ltd.* | | | | | |  |  |  |  |
| ***Teneo*** | 1992 | 4000 | 81 | 5.7 | 14.5 | 4200 | 2 | 500 | 1000 | 20 | 2 × 3.5 | 1 × 9 | 2 × 3 | 1 × 3 | All | Lays and repairs of all types of telephone cables. |
|  |  |  |  |  |  |  | **JAPAN** *1) Ships belonging to Kokusai Cable Ship (KCS)* | | | | | |  |  |  |  |
| ***KDDI Ocean Link*** | 1992 | 11'700 | 133.2 | 7.0 | 15 | 10'000 | Main 3 Spare 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 Pacific Link*** | 1997 | 11'207 | 109.0 | 7.5 | 11 | 10'000 | Main 2 Spare 2 | 2720 | 4500 | 50 | 3.6 | 20 | – | 3.0 | All | Laying by linear engine. Lays and repairs all types of submarine cables. |
|  |  |  |  |  |  |  | *2) Ships belonging to NTT World Engineering Marine Corporation (NTT-WE Marine)* | | | | | |  |  |  |  |
| ***Subaru*** | 1999 | 9557 | 123.3 | 7.0 | 13.2 | 8800 | Main 2 Spare 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 | 6 | 2.5 | 2.0 | All | Lays and repairs for non-powered telephone cable system.  DP, ROV system |
|  |  |  |  |  |  |  | **UNITED KINGDOM** *1) Ships 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.) |
|  |  |  |  |  |  |  | **UNITED KINGDOM** *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. |
| ***Pacific Guardian*** | 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. |
|  |  |  |  |  |  |  | **UNITED KINGDOM** *3) Ships 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** *Ships belonging to Tyco Submarine Systems Ltd.* | | | | | |  |  |  |  |
| ***CS Coastal Connector*** | 1997 Conver-ted in 1996 | 6761 | 92.47 | 7.1 | 12.5 | 25'000 | 3 main 1 spare | 675 (main, total) 70 (spare) | 1600 | 30 | 2 × 3 | N/A | N/A | 2 × 3 | – | The CS Coastal Connector is a stern‑laying design. She is capable of deploying the SCARAB II, SCARAB IV, and Pacific SCARAB I ROVs, as well as the Seabed Tractor. |
| ***CS Tyco Provider*** | 1978, Conver­ted in 1999 | 14'500 | 139.4 | 7.6 | 14.5 | 20'000 | 5 | 3349 | 6000 | 100+ | 2 × 4 | – | – | 2 × 3 | – | The CS Tyco Provider is a stern‑laying design. She is capable of deploying Sea Plow VIII. |
|  |  |  |  |  |  |  | **UNITED STATES OF AMERICA** *Ships belonging to AT&T* | | | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ***CS NIWA (ex. CS Global Link)*** | 1990 | 16'375 | 145.7 | 8.08 | 15 | 10'000 | 3 main, 4 spare | 3258 (main, total)  164 (spare, total) | 6098 | 100+ | 2 × 3.7 | 1× Western Gear Tractor Type | 2 × 3 | 1× trough/ Chute type | – | The CS NIWA is capable of deploying the SCARAB II ROVs. |
|  |  |  |  |  |  |  | **UNITED STATES OF AMERICA** *Ships belonging to AT&T* | | | | | |  |  |  |  |
| ***Gulmar Badaro  (ex. CS Global Mariner)*** | 1993 | 15'638 | 151.5 | 7.8 | 13.8 | 10'000 | 2 main,  3 spare | 2172 (main, total) 447 (spare, total) | 4999 | 80+ | 2 × 3.7 | 1× Dowty 21 pairs | 2 × 3 | 1× trough/ Chute type | – | The Gulmar Badaro is capable of deploying the SCARAB II and SCARAB IV ROVs, as well as Sea Plow VII, Sea Plow VIII, and the Seabed Tractor. |
| ***CS Global Sentinel*** | 1991 | 16'375 | 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 the SCARAB II and SCARAB IV, and Pacific SCARAB I ROVs, as well as Sea Plow VII and Sea Plow VIII. |
| NOTE – Only relatively short cables are laid and only shore-end. | | | | | | | | | | | | | | | | |
|  |  |  |  |  |  |  | **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 main  4 spare | 3258 | 6098 | 152 | 4 | 18 | 4 | 4 | Unlimited | Surface lay, plough burial, maintenance, work class ROV inspection and jet burial. |
| ***CS UAA*** | 1972  Conver-ted in 1996 | 7800 | 133.7 | 6.15 | 13 | 48 days | 3 main  1 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 |  |  |

**1.2** **Submersible equipment**

| **Type of submersible** | **Weight (tons)** | **Overall length (m)** | **Width (m)** | **Height (m)** | **Trenching system** | **Trenching** | **Propulsion** | **Max  operating depth (m)** | **Max pulling tension (tons)** | **Capability** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | **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-advancing buried system CASTOR2*** | 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. | |
|  |  |  |  | **FRANCE** *Submersibles belonging to France Telecom Marine* | | | |  |  |  | |
| ***Remote control submersible Scorpio 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** *1) 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 cable and 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 2 manipulators with line cutters. | |
| ***Plough 2 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 burial Thrusters survey | 1000 (burial) 2000 (survey) |  | Tools include cable cutter, cable gripper and 2 manipulators with line cutters. | |
| ***Underwater vehicle- MARLIN*** | 7.8 | 4.191 | 2.438 | 3.175 | Burial skid | To 1.0 m (Optimized for 0-30 kPa soil) | Hydraulic driven thrusters | 2500 |  | Burial, deburial, inspection. Maintenance and repair. Tools include cable cutter, cable gripper. | |
|  |  |  |  | **UNITED KINGDOM** *Submersibles belonging to Global Marine Systems Ltd* | | | |  |  |  | |
| ***Scarab I – Umbilically tethered ROV*** | 3.2 | 2.74 | 1.82 | 1.52 | Jetting tool | Up to 0.6 m | Thrusters: 2 vertical 4 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 tool Rock wheel cutter Mechanical chain excavator | 1 m 1.2 m 2.2 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 from 0-1100 mm (600-900 mm in 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 burial depth: 1100 mm | Towed | 1000 |  | Simultaneously lay and bury cables and umbilicals at varying depths. | |
| ***Cable Plough 1000 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 from 0-1100 mm (600-900 mm in all conditions) | Towed by surface 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. | |
|  |  |  |  | **DENMARK** *Submersibles belonging to Telecom Denmark* | | | |  |  |  | |
| ***Super Phantom S4-ROV*** | 0.09 | 1.5 | 0.75 | 0.6 | – | – | Thrusters 4 prop fwd/aft 2 prop vertical 2 prop transverse | 300 |  | Inspect cables and other underwater objects. Can also be used to inspect seabed conditions. | |
|  |  |  |  | **JAPAN** *1) Submersibles belonging to KCS* | | | |  |  |  | |
| ***MARCAS-II-ROV*** | Jet tool mode: 8.0 Track base mode: 7.5 | Jet tool mode: 2.9 Track base mode: 5.3 | Jet tool mode: 2.3 Track base mode: 4.0 | Jet tool mode: 3.2 Track base mode: 3.8 | Water jet tool | Up to 1.0 m  Track base mode: 1.5 m | 4 horizontal, 4 vertical and 2 jet thrusters | Jet tool mode: 2500 Track base mode: 2000 |  | Post-lay burial, maintenance of cable. Can survey seabed. | |
| ***MARCAS-III-ROV*** | Jet tool mode: 17.0 | 6.3 | 3.7 | 3.4 | Water jet tool | Up to 3.0 m | Thrusters(8)  4 horizontal, 2 vertical, 2 for standby (redundant) | 2500 |  | Post-lay burial, maintenance of cable.  Can survey seabed. | |
| ***PLOW-II*** | 18.5  Jet tool mode: 20.0 | 9.5 | 5.6 | 5.0 | Plough share  Water jet tool | Up to 3.0 m | Towed by cable ship | 1500 Jet tool mode: 200 | 80 | Simultaneously lay and bury cables and umbilicals at varying depth. | |
|  |  |  |  | *2) Submersibles belonging to NTT-WE Marine* | | | |  |  |  | |
| ***Plough-type 7 Submarine 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*** | 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. | |
| ***MAKO,***  ***ROV system***  ***(C/S VEGA)*** | 8 | 3.8 | 2.5 | 2.9 | Water jetting | Trenching capability 1.5 m | Vertical and horizontal thrusters | 2000 |  | Cable detection & inspection visual survey.  Cable manipulation & cutting.  Cable & repeater burial. | |
|  |  |  |  | **SPAIN** *1) Submersibles belonging to Tyco Submarine Systems Ltd.* | | | |  |  |  | |
| ***ARADO I*** | 12 | 9 | 4.6 | 4 | Plow-share | 1100 mm | Towed | 1500 |  | Bury cable from 19 to 40 mm. Bury repeaters until 380 mm. Velocity 1 m/s. | |
| ***NEREUS*** | 8.5 | 3.2 | 3.4 | 2.9 |  | 1 m | 150 kW | 2000 |  | Repair, inspect and bury all types of telephone cable 2 × manipulating 7 functions. Velocity 3 knots. | |
|  |  |  |  | **UNITED STATES OF AMERICA** *Submersibles belonging to Tyco Submarine Systems Ltd.* | | | |  |  |  | |
| ***PACIFIC SCARAB I*** | 5.48 | 4.27 | 1.83 | 3.05 | Jetting modules | 560 metres/hour. Soil hardness to  100 kPa. | 150 HP Electro-hydraulically powered using 8 thrusters | 2500 |  | PACIFIC SCARAB I Submersible Craft Assisting Repair and Burial is a tethered, swimming ROV capable of operating at depths of 2500 metres. It can locate, inspect, retrieve, and bury submarine cables. | |
| ***SCARAB II*** | 3.45 | 3.7 | 2.1 | 2.3 | 35 HP cable jetter | 255 m/hr depending on soil conditions. Soil hardness to  60 kPa. | Horizontal:  4 × 5 HP electric thrusters Vertical: 2 × 5 HP electric thrusters Aft lateral:  1 × 10 HP hydraulic thruster Bow: 2 × 2.5 HP hydraulic thrusters | 1850 |  | SCARAB II Submersible Craft Assisting Repair and Burial is a tethered, swimming ROV capable of operating at depths of 1850 metres. It can locate, inspect, retrieve, and bury submarine cables. |
| ***SCARAB IV*** | 4.6 | 3.4 | 2.02 | 1.96 | Jetting modules | 530 metres/hour Soil hardness to  100 kPa | 150 HP electro-hydraulically powered using 8 thrusters | 1850 |  | SCARAB IV Submersible Craft Assisting Repair and Burial is a tethered, swimming ROV capable of operating at depths of 1850 metres. It can locate, inspect, retrieve, and bury submarine cables. SCARAB IV is part of the ACMA SCARAB Agreement. |
| ***Sea Plow VI*** | 25.5 | 10.5 | 6.0 | 4.3 | Towed plow system | 1.2 metre burial | Towed by ship | 1000 |  | Sea Plow VI is a towed burial tool employing state-of-the-art burial features. It can achieve 1.2 metre burial depth in up to 1000 metre water depth. |
| ***Sea Plow VII*** | 14.0 | 10.5 | 6.0 | 4.3 | Towed plow system | 1.0 metre burial | Towed by ship.  1 thruster for launches and recoveries | 1400 |  | Sea Plow VII is a towed burial tool employing state-of-the-art burial features. It can achieve 1.0 metre burial depth in up to 1400 metre water depth. |
| ***Sea Plow VIII*** | 19.3 | 9.2 | 5.5 | 3.6 | Towed plow system with water jet assist | 1.5 metre burial | Towed by ship | 1500 |  | Sea Plow VIII is a towed burial tool employing state-of-the-art burial features. It can achieve 1.5 metre burial depth in up to 1500 metre water depth. |
|  |  |  |  | **UNITED ARAB EMIRATES** *Submersibles belonging to E-marine PJSC* | | | |  |  |  |
| ***SMD Plough*** | 15  12 (Submer-ged) | 9  9.8 (Max) | 4.6 | 4.5 | Plough share | 1.5 metre | 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 metre cohesive seabed  2 metre 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 metre | 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/26A  230  VAC/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 |  |  |

**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) | | | | |
|  | | | | |

|  |  |
| --- | --- |
| Contact: |  |
| Affiliation: |  |
| Tel: |  |
| Fax: |  |
| E-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) | | |
|  | | |

|  |  |
| --- | --- |
| Contact: |  |
| Affiliation: |  |
| Tel: |  |
| Fax: |  |
| E-mail: |  |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_