INTERTANKO CHARTERING QUESTIONNAIRE 88 - OIL **Version 5**

1.	**GENERAL INFORMATION**		
1.1	Date updated:	Apr 04, 2022	
1.2	Vessel's name (IMO number):	Stealth Berana (9437672)	
1.3	Vessel's previous name(s) and date(s) of change:	Spike (Dec 15, 2015)	
1.4	Date delivered/Builder (where built):	Jul 27, 2010/Samsung Heavy Industries Co. Ltd.	
1.5	Flag/Port of Registry:	Liberia/Monrovia	
1.6	Call sign/MMSI:	D5WR9/636019903	
1.7	Vessel's contact details (satcom/fax/email etc.):	Tel: +870 7732 57623 Fax: n/a Email: stealthberana@stealth.gr	
1.8	Type of vessel (as described in Form A or Form B Q1.11 of the IOPPC):	Oil Tanker	
1.9	Type of hull:	Double Hull	
Ownership and Operation			
1.10	Registered owner - Full style:	TANKPUNK INC.TRUST COMPANY Trust Company Complex, Ajeltake Road, Ajeltake Island, Majuro, Marshall Islands MH96960 Marshall Islands Tel: +30 2106252849 Fax: +30 2106250018 Telex: Not Applicable Email: maritime@stealth.gr	
1.11	Technical operator - Full style:	Stealth Maritime Corp. S.A. 331, Kifissias Avenue, 14561, Kifissia Greece Tel: +302106252849 Fax: +302106252817 Telex: Not Applicable Email: safety@stealth.gr Web: www.stealth.gr Company IMO#: 1882951	
1.12	Commercial operator - Full style:	Stealth Maritime Corporation S.A. 331, Kifissias Avenue, 14561, Kifissia Greece Greece Tel: +30 210 6252849 Fax: +302106252817 Telex: n/a Email: safety@stealth.gr	
1.13	Disponent owner - Full style:		
Insurance			
1.14	P & I Club - Full Style:	UK CLUB Thomas Miller P&I (Europe) Ltd. 90 Fenchurch Street London, EC3M 4ST Tel: +44 (0)20 7283 4646	
1.15	P & I Club pollution liability coverage/expiration date:	1,000,000,000 US$	Feb 20, 2023
1.16	Hull & Machinery insured by - Full Style: (Specify broker or leading underwriter)	Cambiaso Risso Marine Spa Corso Andrea Podestà, 1 - 16128 Genova Contact : Barbara Cantu Barbara.Cantu@cambiasorisso.com or Andrea Risso Andrea.Risso@cambiasorisso.com Tel: +39 010-5714.489 Fax: : +39 010-5714.374/375	
1.17	Hull & Machinery insured value/expiration date:	32,000,000,000 US$	Jan 14, 2023
Classification			
1.18	Classification society:	Bureau Veritas	
1.19	Class notation:	n/a	
1.20	Is the vessel subject to any conditions of class, class extensions, outstanding memorandums or class recommendations? If yes, give details:	No NA	
1.21	If classification society changed, name of previous and date of change:	Det Norske Veritas, Mar 24, 2020	
1.22	Does the vessel have ice class? If yes, state what level:	No, N/A	

1.23	Date/place of last dry-dock:			Aug 22, 2020/Weihai Cub SY China	
1.24	Date next dry dock due/next annual survey due:			Jul 26, 2025	Jul 26, 2022
1.25	Date of last special survey/next special survey due:			Aug 22, 2020	Jul 26, 2025
1.26	If ship has Condition Assessment Program (CAP), what is the latest overall rating:			No,	
Dimensions					
1.27	Length overall (LOA):				248.96 Metres
1.28	Length between perpendiculars (LBP):				239.00 Metres
1.29	Extreme breadth (Beam):				43.80 Metres
1.30	Moulded depth:				21.00 Metres
1.31	Keel to masthead (KTM)/ Keel to masthead (KTM) in collapsed condition, if applicable:			48.35 Metres	
1.32	Distance bridge front to center of manifold:				82.20 Metres
1.33	Bow to center manifold (BCM)/Stern to center manifold (SCM):			125.18 Metres	123.78 Metres
1.34	Parallel body distances		Lightship	Normal Ballast	Summer Dwt
	Forward to mid-point manifold:		60.92 Metres	61.74 Metres	61.74 Metres
	Aft to mid-point manifold:		23.77 Metres	52.43 Metres	75.06 Metres
	Parallel body length:		84.69 Metres	114.17 Metres	136.80 Metres
Tonnages					
1.35	Net Tonnage:				35,396.00
1.36	Gross Tonnage/Reduced Gross Tonnage (if applicable):			61,341.00	48,758
1.37	Suez Canal Tonnage - Gross (SCGT)/Net (SCNT):			63,224.67	57,927.11
1.38	Panama Canal Net Tonnage (PCNT):				0.00
Loadline Information					
1.39	Loadline	Freeboard	Draft	Deadweight	Displacement
	Summer:	6.12 Metres	14.93 Metres	115,896.90 Metric Tonnes	133,329.80 Metric Tonnes
	Winter:	6.43 Metres	14.62 Metres	112,829.10 Metric Tonnes	130,262.00 Metric Tonnes
	Tropical:	5.81 Metres	15.24 Metres	118,968.40 Metric Tonnes	136,401.30 Metric Tonnes
	Lightship:	18.71 Metres	2.29 Metres	-	17,432.90 Metric Tonnes
	Normal Ballast Condition:	14.14 Metres	6.86 Metres	39,393.90 Metric Tonnes	56,893.90 Metric Tonnes
	Segregated Ballast Condition:				
1.40	FWA/TPC at summer draft:			337.00 Millimetres	98.40 Metric Tonnes
1.41	Does vessel have multiple SDWT? If yes, please provide all assigned loadlines:			Yes 115897 MT 106999 MT 104999 MT 99999 MT 89999 MT	
1.42	Constant (excluding fresh water):				
1.43	What is the company guidelines for Under Keel Clearance (UKC) for this vessel?			1. Ocean passages: 50% of the deepest draught. 2. Port approaches and Confined waters (Including Canal/River transits): 10% of the deepest draught or 0.6m, whichever is the greater Note: In exposed approaches, it may be necessary to increase this 10% under-keel	
1.44	What is the max height of mast above waterline (air draft)			Full Mast	Collapsed Mast
	Summer deadweight:			33.42 Metres	0 Metres
	Normal ballast:			41.41 Metres	0 Metres
	Lightship:			46.06 Metres	0 Metres

2.	**CERTIFICATES**	**Issued**	**Last Annual**	**Last Intermediate**	**Expires**
2.1	Safety Equipment Certificate (SEC):	Aug 22, 2020	Sep 19, 2021		Jul 26, 2025
2.2	Safety Radio Certificate (SRC):	Aug 22, 2020	Sep 19, 2021		Jul 26, 2025
2.3	Safety Construction Certificate (SCC):	Aug 22, 2020	Sep 19, 2021		Jul 26, 2025

2.4	International Loadline Certificate (ILC):	Aug 22, 2020	Sep 19, 2021		Jul 26, 2025
2.5	International Oil Pollution Prevention Certificate (IOPPC):	Aug 22, 2020	Sep 19, 2021		Jul 26, 2025
2.6	International Ship Security Certificate (ISSC):	Aug 22, 2020			Aug 21, 2025
2.7	Maritime Labour Certificate (MLC):	Aug 22, 2020	N/A		Aug 21, 2025
2.8	ISM Safety Management Certificate (SMC):	Aug 22, 2020			Aug 21, 2025
2.9	Document of Compliance (DOC):	Jun 25, 2021			Aug 07, 2026
2.10	USCG Certificate of Compliance (USCGCOC):			Not Applicable	
2.11	Civil Liability Convention (CLC) 1992 Certificate:	Feb 20, 2022	N/A	N/A	Feb 20, 2023
2.12	Civil Liability for Bunker Oil Pollution Damage Convention (CLBC) Certificate:	Feb 20, 2022	N/A	N/A	Feb 20, 2023
2.13	Liability for the Removal of Wrecks Certificate (WRC):	Feb 20, 2022	N/A	N/A	Feb 20, 2023
2.14	U.S. Certificate of Financial Responsibility (COFR):	Oct 06, 2021	N/A	N/A	Sep 30, 2022
2.15	Certificate of Class (COC):	Aug 22, 2020	Sep 19, 2021		Jul 26, 2025
2.16	International Sewage Pollution Prevention Certificate (ISPPC):	Aug 22, 2020	N/A	N/A	Jul 26, 2025
2.17	Certificate of Fitness (COF):	Not Applicable	Not Applicable		Not Applicable
2.18	International Energy Efficiency Certificate (IEEC):	Jul 04, 2013	N/A	N/A	N/A
2.19	International Air Pollution Prevention Certificate (IAPPC):	Aug 22, 2020	Sep 19, 2021		Jul 26, 2025
Documentation					
2.20	Owner warrant that vessel is member of ITOPF and will remain so for the entire duration of this voyage/contract:			Yes	
2.21	Does vessel have in place a Drug and Alcohol Policy complying with OCIMF guidelines for Control of Drugs and Alcohol Onboard Ship?			Yes	
2.22	Is the ITF Special Agreement on board (if applicable)?			Yes	
2.23	ITF Blue Card expiry date (if applicable):			Mar 31, 2023	

3.	**CREW**		
3.1	Nationality of Master:		Russian
3.2	Number and nationality of Officers:	9	Russian
3.3	Number and nationality of Crew:	14	Russian, Filippino
3.4	What is the common working language onboard:		ENGLISH
3.5	Do officers speak and understand English?		Yes
3.6	If Officers/ratings employed by a manning agency - Full style:	Officers: BERNHARD SCHULTE SHIPMANAGEMENT (CYPRUS) LTD. C/O BERNHARD SCHULTE SHIPMANAGEMENT (HELLAS) SPLLC. 6-8 Kifisias Avenue, Marousi, Athens , 15125 Tel: +302106930330 Fax: +302106930333 Telex: n/a Email: gr-smc-man@bs-shipmanagement.com	Ratings: same as officers

4.	**FOR USA CALLS**	
4.1	Has the vessel Operator submitted a Vessel Spill Response Plan to the US Coast Guard which has been approved by official USCG letter?	Yes
4.2	Qualified individual (QI) - Full style:	O'Brien's Oil Pollution Service
4.3	Oil Spill Response Organization (OSRO) - Full style:	National response Corporation 3500 Sunrise Highway Suite T103 Great River, NY 11739 Tel: 1 631 224 9141 Fax: 1 631 224 9082 Email: iocdo@nrcc.com Web: www.nrcc.com
4.4	Salvage and Marine Firefighting Services (SMFF) - Full Style:	Resolve Marine Group Inc. 1510 SE 17th Street, Suite 400, Ft. Lauderdale, FL 33316, USA Tel: +19547648700 Fax: n/a

		Email: info@resolvemarine.com Web: www.resolvemarine.com

5.	SAFETY/HELICOPTER	
5.1	Is the vessel operated under a Quality Management System? If Yes, what type of system? (ISO9001 or IMO Resolution A.741(18) as amended):	Yes IMO Resolution A.741(18)
5.2	Can the ship comply with the ICS Helicopter Guidelines?	Yes
5.2.1	If Yes, state whether winching or landing area provided:	Landing
5.2.2	If Yes, what is the diameter of the circle provided:	13.50 Metres

6.	COATING/ANODES				
6.1	Tank Coating	Coated	Type	To What Extent	Anodes
	Cargo tanks:	Yes	TAR FREE EPOXY	0.5 mtr Upward from Bottom + Deckhead and 2.0 mtrs Downward	No
	Ballast tanks:	Yes	EPOXY	Whole Tank	Yes
	Slop tanks:	Yes	TAR FREE EPOXY HEMPADUR 17630	Whole Tank	No

7.	BALLAST				
7.1	Pumps	No.	Type	Capacity	At What Head (sg=1.0)
	Ballast Pumps:	2	Centrifugal	1,500 Cu. Metres/Hour	25 Metres
	Ballast Eductors:	1	Other	300 Cu. Metres/Hour	10 Metres

8.	CARGO		
Double Hull Vessels			
8.1	Is vessel fitted with centerline bulkhead in all cargo tanks? If Yes, solid or perforated:	Yes, Solid	
Cargo Tank Capacities			
8.2	Number of cargo tanks and total cubic capacity (max% per company policy: 98%, 97%, 96% or 95%) excluding slops tanks:	TNA	123,644 Cu. Metres
8.2.1	Capacity (max% per company policy: 98%, 97%, 96% or 95%) of each natural segregation with double valve (specify tanks):	Seg#1: 41704 m3 (1+4+slops) Seg#2: 43225 m3 (2+5) Seg#3: 42582 m3 (3+6)	
8.2.2	IMO class (Oil/Chemical Ship Type 1, 2 or 3):	N/A	
8.3	Number of slop tanks and total cubic capacity (max% per company policy: 98%, 97%, 96% or 95%):		3,868.60 Cu. Metres
8.3.1	Specify segregations which slops tanks belong to and their capacity with double valve:		
8.3.2	Residual/retention oil tank(s) capacity (98%), if applicable:		
SBT Vessels			
8.3.3	What is total SBT capacity and percentage of SDWT vessel can maintain?	41,125.80 Cu. Metres	36.40 %
8.3.4	Does vessel meet the requirements of MARPOL Annex I Reg 18.2:	Yes	
Cargo Handling and Pumping Systems			
8.4	How many grades/products can vessel load/discharge with double valve segregation:		3
8.5	Are there any cargo tank filling restrictions? If yes, specify number of slack tanks, max s.g., ullage restrictions etc.:	No	
8.6	Max loading rate for homogenous cargo	With VECS	Without VECS
	Loaded per manifold connection:	3,340 Cu. Metres/Hour	3,340 Cu. Metres/Hour
	Loaded simultaneously through all manifolds:	10,000 Cu. Metres/Hour	10,000 Cu. Metres/Hour
Cargo Control Room			
8.7	Is ship fitted with a Cargo Control Room (CCR)?	Yes	
8.8	Can tank innage/ullage be read from the CCR?	Yes	
Gauging and Sampling			

8.9	Is gauging system certified and calibrated? If no, specify which ones are not calibrated:			No,	
	What type of fixed closed tank gauging system is fitted:			Radar Tank gauge	
	Are high level alarms fitted to the cargo tanks? If Yes, indicate whether to all tanks or partial:			Yes, All	
8.9.1	Can cargo be transferred under closed loading conditions in accordance with ISGOTT 11.1.6.6?			Yes	
8.9.2	Are cargo tanks fitted with multipoint gauging? If yes, specify type and locations:			Yes,	
8.10	Number of portable gauging units (example- MMC) on board:			4	
Vapor Emission Control System (VECS)					
8.11	Is a vapour return system (VRS) fitted?			Yes	
8.12	Number/size of VECS manifolds (per side):			2	406.40 Millimetres
8.13	Number/size/type of VECS reducers:				
Venting					
8.14	State what type of venting system is fitted:			High Velocity	
Cargo Manifolds and Reducers					
8.15	Total number/size of cargo manifold connections on each side:			3/400 Millimetres (16'')	
8.16	What type of valves are fitted at manifold:			Butterfly	
8.17	What is the material/rating of the manifold:			Elc. Iso. Welded Carbon Steel pipe/	
8.17.1	Does vessel comply with the latest edition of the OCIMF 'Recommendations for Oil Tanker Manifolds and Associated Equipment'?			Yes	
8.18	Distance between cargo manifold centers:			2,500.00 Millimetres	
8.19	Distance ships rail to manifold:			4,438.00 Millimetres	
8.20	Distance manifold to ships side:			4,600.00 Millimetres	
8.21	Top of rail to center of manifold:			700.00 Millimetres	
8.22	Distance main deck to center of manifold:			2,100.00 Millimetres	
8.23	Spill tank grating to center of manifold:			900.00 Millimetres	
8.24	Manifold height above the waterline in normal ballast/at SDWT condition:			16.20 Metres	8.18 Metres
8.25	Number/size/type of reducers:			6 x 406.4/406.4mm (16/16") 3 x 406.4/304.8mm (16/12") 3 x 406.4/254mm (16/10") 3 x 406.4/203.2mm (16/8") ANSI	
8.26	Is vessel fitted with a stern manifold? If yes, state size:			No,	
Heating					
8.27	Cargo/slop tanks fitted with a cargo heating system?		Type	Coiled	Material
	Cargo Tanks:		STEAM COILS	Yes	Other
	Slop Tanks:		Coils	Yes	Yorkalbro
8.28	Maximum temperature cargo can be loaded/maintained:			66.0 °C / 150.8 °F	57 °C / 134.6 °F
8.28.1	Minimum temperature cargo can be loaded/maintained:				
Inert Gas and Crude Oil Washing					
8.29	Is an Inert Gas System (IGS) fitted/operational?			Yes/Yes	
8.29.1	Is a Crude Oil Washing (COW) installation fitted/operational?			Yes/Yes	
8.30	Is IGS supplied by flue gas, inert gas (IG) generator and/or nitrogen:			Flue Gas	
Cargo Pumps					
8.31	How many cargo pumps can be run simultaneously at full capacity:				3
8.32	Pumps	No.	Type	Capacity	At What Head (sg=1.0)
	Cargo Pumps:	3	Centrifugal	2800 M3/HR	130 Meters 130 Meters 130 Meters
	Cargo Eductors:	1	Other	600 Cu. Metres/Hour	25 Metres
	Stripping:	1	Reciprocating	200 Cu. Metres/Hour	130 Metres
8.33	Is at least one emergency portable cargo pump provided?			No	

9.	**MOORING**					
9.1	Wires (on drums)	No.	Diameter	Material	Length	Breaking Strength
	Forecastle:	0	34 Millimetres		220 Metres	

	Main deck fwd:	0	34 Millimetres		220 Metres	
	Main deck aft:	0	34 Millimetres		220 Metres	
	Poop deck:	0	34 Millimetres		220 Metres	
9.2	Wire tails	No.	Diameter	Material	Length	Breaking Strength
	Forecastle:	4	72 Millimetres	Nylon Multifilament	11.00 Metres	128 Metric Tonnes
	Main deck fwd:	4	72 Millimetres	Nylon Multifilament	11.00 Metres	128 Metric Tonnes
	Main deck aft:	2	72 Millimetres	Nylon Multifilament	11.00 Metres	128 Metric Tonnes
	Poop deck:	6	72 Millimetres	Nylon Multifilament	11.00 Metres	128 Metric Tonnes
9.3	Ropes (on drums)	No.	Diameter	Material	Length	Breaking Strength
	Forecastle:	4	34.00 Millimetres	High Modulus Poly Ethylene	220.00 Metres	84.20 Metric Tonnes
	Main deck fwd:	4	34.00 Millimetres	High Modulus Poly Ethylene	220.00 Metres	84.20 Metric Tonnes
	Main deck aft:	2	34.00 Millimetres	High Modulus Poly Ethylene	220.00 Metres	84.20 Metric Tonnes
	Poop deck:	6	34.00 Millimetres	High Modulus Poly Ethylene	220.00 Metres	84.20 Metric Tonnes
9.4	Other lines	No.	Diameter	Material	Length	Breaking Strength
	Forecastle:	2	60 Millimetres	Synthetic Fibre	220.00 Metres	69.70 Metric Tonnes
	Main deck fwd:					
	Main deck aft:	1	34.00 Millimetres	HIGH MODULUS	220.00 Metres	84.20 Metric Tonnes
	Poop deck:	2	60 Millimetres	Synthetic Fibre	220.00 Metres	69.70 Metric Tonnes
9.5	Winches	No.	No. Drums	Motive Power	Brake Capacity	Type of Brake
	Forecastle:	2	Double Drums	Hydraulic	55.20 Metric Tonnes	Manual
	Main deck fwd:	2	Double Drums	Hydraulic	55.20 Metric Tonnes	Manual
	Main deck aft:	1	Double Drums	Hydraulic	55.20 Metric Tonnes	Manual
	Poop deck:	3	Double Drums	Hydraulic	55.20 Metric Tonnes	Manual
9.6	Bitts, closed chocks/fairleads		No. Bitts	SWL Bitts	No. Closed Chocks	SWL Closed Chocks
	Forecastle:		4	69 Metric Tonnes	8	69 Metric Tonnes
	Main deck fwd:		4	69 Metric Tonnes	12	69 Metric Tonnes
	Main deck aft:		4	69 Metric Tonnes	6	69 Metric Tonnes
	Poop deck:		4	69 Metric Tonnes	12	69 Metric Tonnes
Anchors/Emergency Towing System						
9.7	Number of shackles on port/starboard cable:				13/13	
9.8	Type/SWL of Emergency Towing system forward:				KETA-45F	250 Metric Tonnes
9.9	Type/SWL of Emergency Towing system aft:				KETSP-40A	200 Metric Tonnes
9.10.1	What is size of closed chock and/or fairleads of enclosed type on stern					600 mm x 450 mm
Escort Tug						
9.10.2	What is SWL of closed chock and/or fairleads of enclosed type on stern:					200.00 Metric Tonnes
9.11	What is SWL of bollard on poop deck suitable for escort tug:					200.00 Metric Tonnes
Lifting Equipment/Gangway						
9.12	Derrick/Crane description (Number, SWL and location):				Cranes: 1 x 15.00 Tonnes CENTER	
9.13	Accommodation ladder direction:					
	Does vessel have a portable gangway? If yes, state length:					Yes, 12.00 Metres
Single Point Mooring (SPM) Equipment						
9.14	Does the vessel meet the recommendations in the latest edition of OCIMF 'Recommendations for Equipment Employed in the Bow Mooring of Conventional Tankers at Single Point Moorings (SPM)'?				Yes	
9.15	If fitted, how many chain stoppers:				2	
9.16	State type/SWL of chain stopper(s):				TONGUE TYPE	250.00 Metric

			Tonnes
9.17	What is the maximum size chain diameter the bow stopper(s) can handle:		76.00 Millimetres
9.18	Distance between the bow fairlead and chain stopper/bracket:		3,200 Metres
9.19	Is bow chock and/or fairlead of enclosed type of OCIMF recommended size (600mm x 450mm)? If not, give details of size:		Yes N/A

10.	**PROPULSION**			
10.1	Speed		Maximum	Economical
	Ballast speed:		14.00 Knots (WSNP)	
	Laden speed:		14.00 Knots (WSNP)	
10.2	What type of fuel is used for main propulsion/generating plant:		HSFO and LSMGO	HSFO and LSMGO
10.3	Type/Capacity of bunker tanks:		Fuel Oil: 2,900.20 Cu. Metres Diesel Oil: 219 Cu. Metres Gas Oil: 0 Cu. Metres	
10.4	Is vessel fitted with fixed or controllable pitch propeller(s):			
10.5	Engines	No	Capacity	Make/Type
	Main engine:	1	13,560 Kilowatt	DOSAN MAN B&W 6S60MC-C
	Aux engine:	3	880 Kilowatt	Yanmar Amagasaki, 8N21L-SV
	Power packs:			
	Boilers:	2	25.00 Metric Tonnes/Hour	
Bow/Stern Thruster				
10.6	What is brake horse power of bow thruster (if fitted):		No,	
10.7	What is brake horse power of stern thruster (if fitted):		No,	
Emissions				
10.8	Main engine IMO NOx emission standard:			
10.9	Energy Efficiency Design Index (EEDI) rating number:		N.A.	

11.	**SHIP TO SHIP TRANSFER**	
11.1	Does vessel comply with recommendations contained in OCIMF/ICS Ship To Ship Transfer Guide (Petroleum, Chemicals or Liquified Gas, as applicable)?	Yes
11.2	What is maximum outreach of cranes/derricks outboard of the ship's side:	5.10 Metres
11.3	Date/place of last STS operation:	19 Apr 2020, Kuala Linggi

12.	**RECENT OPERATIONAL HISTORY**	
12.1	Last three cargoes/charterers/voyages (Last/2nd Last/3rd Last):	ESPO CO/ HSFO / VGO Unipec/ Trafigura / Trafigura Kozmino - Panjin Singapore - Zhoushan Singapore - Singapore / Tanjung Bruas
12.2	Has vessel been involved in a pollution, grounding, serious casualty, unscheduled repair or collision incident during the past 12 months? If yes, provide details:	Pollution: No, n/a Grounding: No, n/a Casualty: No, n/a Repair: No, n/a Collision: No, n/a
12.3	Date and place of last Port State Control inspection:	/
12.4	Any outstanding deficiencies as reported by any Port State Control? If yes, provide details:	No N/A
12.5	Recent Oil company inspections/screenings (To the best of owners knowledge and without guarantee of acceptance for future business)*: ** "Approvals" are not given by Oil Majors and ships are accepted for the voyage on a case by case basis.*	EQUINOR TOTAL SHELL CHEVRON P66
12.6	Date/Place of last SIRE inspection:	Jan 25, 2022 / Singapore
12.7	Additional information relating to features of the ship or operational characteristics:	