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تقرير

للعرض على السيد المهندس / مدير إدارة التحركات

الموضوع:

أعمال اللجنة المشكلة بالأمر الإدارى رقم (١٣٠) لسنة ٢٠٢١ لوضع المواصفات الفنية للمرحلة الأولى لمنظومة المساعدة الملاحية ATON (Aid to Navigation) التى تعمل بنظام AIS لمتابعة الشمندورات لطرحها على الشركات المتخصصة بمعرفة إدارة التموين.

الإجراءات:

- وافق السيد الفريق/ رئيس هيئة قناة السويس على المذكرة وارد رئاسة رقم٣٤٦٢ بتاريخ ٢٠٢٠/٨/٢٤ لتوفير نظام تعريف الى ATON يعمل بنظام AIS لمتابعة الشمندورات.
- صدر الأمر الإدارى رقم (١٣٠) لسنة ٢٠٢١ بتشكيل لجنة من السادة:
  - المهندس / أحمد حمدى محمود الجزار
  - المهندس / وليد محمد إبراهيم موسى
  - الربان / أشرف رمضان صالح أحمد
  - المهندس / محمد أحمد السيد الدالى
  - المهندس / أمير حسن محمد زيتون
  - المهندس / أحمد محمد على موسى
  - المهندس / محمد الدسوقى على الدسوقى
  - المهندس / أحمد إبراهيم حسين على
  - المهندس / أحمد صبرى شرف الدين

وذلك لوضع المواصفات الفنية للمرحلة الأولى لمنظومة المساعدة الملاحية ATON (Aid to Navigation) التى تعمل بنظام AIS لمتابعة الشمندورات لطرحها على الشركات المتخصصة بمعرفة إدارة التموين.

- إجتمعت اللجنة وتم وضع المواصفات الفنية لشراء عدد / ٣٦ وحدة ATON تعمل بنظام AIS [illegible] وتركيبهم فى القطاعات الثلاثة لقناة السويس.

قسم المراقبة الإلكترونية	
صادر رقم : 814	بتاريخ :2022-10-10
☑ المراكز والكاميرات الملاحية بالاسماعيلية	☑ المراكز والكاميرات الملاحية ببورسعيد
☐ الرادارات - مراقبة إلكترونية	☑ المراكز والكاميرات الملاحية ببورتوفيق
☐ التوقيتات والأرصاد - مراقبة إلكترونية	☐ المكتب الفنى - مراقبة إلكترونية
☐ تطوير البرامج - مراقبة إلكترونية	☐ الامن الصناعي - مراقبة إلكترونية
☐ صيانة الحاسبات - مراقبة إلكترونية	☐ السكرتارية - مراقبة إلكترونية
☐ القوي - مراقبة إلكترونية	☐ الافراد - مراقبة إلكترونية
☑ المتابعة - مراقبة إلكترونية	☐ التامين الأرضي - مراقبة إلكترونية

المرفقات:

١. موافقة السيد الفريق/ رئيس هيئة قناة السويس على المذكرة وارد رئاسة رقم ٣٤٦٢ بتاريخ ٢٠٢٠/٨/٢٤.
٢. الأمر الإدارى رقم (١٣٠) لسنة ٢٠٢١.
٣. المواصفات الفنية المطلوبة لمنظومة المساعدة الملاحية AtoN (Aid to Navigation) تعمل بنظام AIS.

الرأى: مرفوع إلى سيادتكم للتكرم بالاطلاع والموافقة على تحويل المواصفات الفنية لعدد / ٣٦ وحدة AtoN (Aid to Navigation) تعمل بنظام AIS كمرحلة أولى إلى إدارة التموين لطرحها على الشركات المتخصصة.

والأمر مفوض لسيادتكم،،،

وتفضلوا بقبول وافر الاحترام،،،،

رئيس اللجنة
مهندس
(أحمد حمدى محمود الجزايرلى)

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الإسماعيلية في ٢٤/٨/٢٠٢٠
الإدارة : التحركات
رقم الملف : ٢/٦١٤
تلفون : ٣٢٩٧٢٢٢ - ٣٢٩٧٣٣٣ - ٣٢٩٧٢٢٢ / ٠٦٤ الإسماعيلية
فاكس : ٣٩١٤٧٨٤ - ٣٩١٤٧٨٥ / ٠٦٤ - ٠٢
بريد إلكتروني info@suezcanal.gov.eg

ديوان عام قناة السويس
مكتب تاريخ إدارة الرئاسة
وارد رقم ٣٤٦٢ عام
التاريخ ٢٤/ ٨/ ٢٠٢٠

تاريخ ٢٧ / ٨ / ٢٠٢٠
الرقم ٣٣٥٥

مذكرة

الموضوع : مرفوعة للعرض على السيد الفريق أ.ح رئيس هيئة قناة السويس بيده أ.م

تأشيرة سيادتكم على مذكرة الإدارة القانونية وارد رئاسة رقم ٣٢٨٣ بتاريخ ٢٠٢٠/٨/١١ أوافق بالنسبة للبند ثانياً بإستحداث آلية دقيقة يمكن معها توضيح كيفية وقوع الحادث وإثبات الخطأ إلى المتسبب .

الإجراءات :

- وردت صورة مذكرة الإدارة القانونية وارد رئاسة رقم ٣٢٨٣ بتاريخ ٢٠٢٠/٨/١١ بخصوص تنفيذ الحكم الصادر في الدعوى رقم ٢٤ لسنة ٢٠١٥ تجارى كلى بورسعيد الصادر من محكمة بورسعيد الإبتدائية برد كامل المبلغ المستقطع من ملاك السفينة Mol Presence لتسببها في فقد شمندورة الهكتم ٩٢ البيضاء بالميناء المحورى بالتفريعة الشرقية بتاريخ ٢٠١٣/١٢/١٣ .
- نحيط علم سيادتكم بالآتى :

- هذا الحادث تم في عام ٢٠١٣ ولم يكن هناك وسائل أو آليات للتعرف على فقد الشمندورات إلا بالمرور الدورى على الشمندورات أو نظام إستعادة الصورة الرادارية Video Back .
- يوجد بإدارة التحركات حالياً عدة وسائل يمكن بها تحديد السفن المتسببة فى حوادث للشمندورات بالقناة أو الخاطس وهى :

١- إستعادة الصورة الرادارية Video Back والتى تحدد السفينة المتسببة فى حادث غرق أو فقد أو إصطدام بشمندورة .

٢- تم تزويد بعض الشمندورات بفوانيس ملاحية مدمجة مزودة بشريحة تليفون محمول GSM منذ عام ٢٠١٥ ولكن هذا النظام غير مطبق على طول القناة والخاطس وذلك بسبب عدم وجود تغطية من شبكات المحمول لعدم تغطية القناة بالكامل بأبراج تقوية لإرتفاع تكاليف إنشاؤها خاصة بالخاطس وقناة السويس الجديدة وهذه الشرائح تقوم بإرسال رسائل إنذار للآتى :

إنخفاض جهد الشحن للبطارية Low Battery voltage
الفقد من الموقع Off Station
حالة الشحن Charge Statues
التصادم Impact Alarm

Radwa

29.8.2020

- يتم المرور الدورى من قبل أقسام الإدارة (بورسعيد – الإسماعيلية – بورتوفيق) كل فى قطاعه على الشمندورات لمراجعة حالتها الفنية أو تغيير الأبراج أو الفوانيس والإبلاغ عن فقد أى شمندورة بالقطاع .
- تم طلب توفير نظام تعرف آلى ATON لمتابعة جميع الشمندورات يعمل بنظام GPS بالميزانية الإستثمارية للمهمات الخاصة بالإدارة للعام المالى ٢٠٢٠/٢٠٢١ ولكن تم تأجيله وهذا النظام يقوم بإرسال جميع الإنذارات والحالة لأى شمندورة على طول القناة ومتابعة تحرك أى شمندورة عن مكانها نتيجة إصطدام أو غرق ...إلخ ومعرفة زمن الحادث والمتسبب فيه كما يساعد السفن العابرة على تجنب الإصطدام بالشمندورات فى القناة والقاطس .

المرفقات :

- صورة المذكرة وارد رئاسة رقم ٣٢٨٣ بتاريخ ٢٠٢٠/٨/١١ .
- صورة نموذج طلب نظام التعرف الآلى ATON والتوصية بتأجيله وعدم الموافقة على توفيره .

الرأى :

مرفوع لسيادتكم للتكرم بالإحاطة والموافقة على قيام إدارة التموين بطرح نظام التعرف الآلى ATON يعمل بنظام GPS لمتابعة الشمندورات لتوفيره وذلك لإمكان المتابعة الدقيقة للشمندورات على طول القناة وإمكانية تحديد زمن وموقع الحادث والمتسبب فيه وذلك لتحديث النظام الحالى لمتابعة الشمندورات .

وتفضلوا سيادتكم بقبول فائق الاحترام

مدير إدارة التحركات

(مهندس / عصام مصطفى ضبش)

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هيئة قناة السويس

أمر إدارى داخلى
رقم (١٣٠) لسنة ٢٠٢١

تشكل لجنة من السادة الآتى أسماؤهم:

• المهندس / أحمد حمدى محمود الجزار	المراقبة الإلكترونية رئيسا
• المهندس / وليد محمد ابراهيم موسي	المراقبة الالكترونية
• الربان / أشرف رمضان صالح أحمد	تحركات الاسماعيلية
• المهندس/ محمد أحمد السيد الدالى	المراقبة الالكترونية
• المهندس/ أمير حسن محمد زيتون	اللاسلكى والمساعدات الملاحية
• د. مهندس / أحمد محمد على موسى	المراقبة الالكترونية
• المهندس/ محمد الدسوقى على الدسوقى	المراقبة الالكترونية
• المهندس/ أحمد ابراهيم حسين على	تحركات الاسماعيلية
• المهندس/ احمد صبرى شرف الدين	الشئون الفنية

وذلك لوضع المواصفات الفنية للمرحلة الاولى لمنظومة المساعدة الملاحية AtoN (Aid to Navigation) التى تعمل بنظام AIS لمتابعة الشمندورات لطرحها على الشركات المتخصصة بمعرفة إدارة التموين.

وشكرا،،،

مدير إدارة التحركات

مهندس

(عصام مصطفى صقر)

Suez Canal Authority Buoys Monitoring by AIS ATON

Within the strategic plan of Suez Canal Authority (SCA) to secure and enhance the safety and efficiency of navigational vessel traffic inside the Canal, SCA is planning to install AIS ATON Compatible with currently installed SCA AIS system.

SCA is seeking for covering 36 buoysas phase 1 in the following Areas:

- Inside Canal.
- Port Tewfik Waiting Area.
- Port Said Waiting Area.

1. Objectives

- Provide an aiding to navigation service in all weather conditions.
- Track the accurate real time position of the Buoys.
- Monitor the real time health status of the AIS ATON, its batteries and solar cells.
- Warning SCA control center with the vessels that are in risk to collide the buoys.
- Warning SCA control center about the buoys that are off position.
- Identifying the vessels involved in collision with the buoys.

2. Requirements

2.1 General

- AIS ATON coverage is the responsibility of the Bidder, Bidder should confirm that all installed AIS ATONs will be covered in the system using current AIS system shore stations exist and Buoys can be monitored all the time and in different weather conditions, Bidder must guarantee delivering all the AIS ATONs generated messages to the nearest SCA shore AIS base stations regardless the weather conditions or any interference.
- Bidders should submit their references in Egypt and qualifications for execution of similar projects
- ATONs real time position transmitted should appear accurate and normally on standard AIS systems installed on vessels / shore control centers
- AIS Aton vendor should have representative in Egypt

- Bidder should have a man power service in Egypt that has all the technical experience and maintenance support (if needed) for the provided ATONs

- Bidder is invited to make a site survey before introducing the proposals. SCA will inform the bidder with suitable survey dates. SCA will provide the necessary on site facilities to accomplish the survey.
- SCA's requirements stated in this document are considered as main guide lines for any bidder proposal with flexibility for the bidder to add any equipment's that fulfill the required function after discussing it with SCA technical team.
- Bidder should mention in the proposal all the hardware and software needed with quantities (BOQ) to fulfill the required functions; any needed hardware components that is not mentioned in this document but needed to fulfill the requirements should be stated and provided.
- Bidder is responsible for the authorization, license and approval with the AIS-ATONs by the local license authority and / or other relevant body. Approval applications should include the identified MMSI for each AIS-ATON.
- Any application specific messages (message 6) need to be registered with an international maritime organization.
- AIS ATONs installation, operation and testing should conform to "IALA Guideline No. 1098 On the Application of AIS-ATON on Buoys" , "IALA Recommendation A-126 On the Use of the AIS in Marine Aids to Navigation Services".
- Bidder is responsible for the integration of all the project elements and fulfilling all the objectives stated in this tender.
- Any requirements from SCA to provide and facilitate should be stated as a part of their offer.
- Bidder must supply complete datasheets for all the supplied items to be approved by SCA.
- Bidder must provide a complete set of manuals including installation, troubleshooting, Maintenance and technical user manuals for each proposed item.
- SCA approves the project time schedule by the bidder.

- All System components should be passed the tests as mentioned in the standards; Certificates of these testes should be submitted.
- SCA will provide bidders with any needed information about current installed AIS system and the target buoys, for more helpful information on buoys system you can visit SCA official site"https://www.suezcanal.gov.eg/English/Navigation/Pages/RulesOfNavigation.aspx""Rules 0f Navigation chapter VII Buoyage System start at page 131.
- All the parts and equipment used in the outdoors should comply the standard rated outdoor using and housing specs. The equipment installed on buoys should be housed against submersion in water and sudden collision impact with water surface, dust, humidity, rain, ..etc. .
- All software and Operating systems should be the latest versions and lifetime licensed.
- All system components should be from well-known brands in the world market with origin (USA-West Europe -Japan -Canada-Australia).
- The bidder shall offer recommended spare parts to keep the ATONs running with a minimum down time accompanied with a reason for the recommended spare parts.
- Aton should be compatible with current AIS Shore stations (Kongsberg RX610 receivers currently installed), Bidder should confirm that RX610 receivers will receive properly all Aton messages (21,8,6,12,14) and this will be main item in the acceptance tests.
- Vessels passing by Buoys shouldn't affect VHF signal from AIS Aton.
- Proposal should be itemized for each component in the system and software modules.
- During guarantee period, in case of Buoy Maintenance or accident, the original Buoy will be permanent replaced with another one of same type (in case of type change Bidder will be notified before with enough period to provide a detailed installation diagrams for installing the ATON on new Buoy, to be approved by SCA)
- Appendix A contain necessary information about Current AIS System.
- Appendix B contain Buoys Locations.
- Appendix C contain Buoys Design.

- Appendix D contain Buoys Photo.

2.2 AIS-ATON

- Don't support RTK
- RATDMA mode Type 3 AIS-ATON conform with ITU-R M.1371, IEC62320-2 , IALA A-126.
- Transmitting power: up to 12.5 w (adjustable).
- Support AIS messages 6, 7, 8,12,13,14,20,21,25.
- Support transmission of virtual ATON targets.
- Support chaining to extend transmission for the remote ATON.
- Transmit time for message 21 should be configurable, the standard transmission period is 3 minutes.
- Frequency: 156 to 162 MHZ.
- Low power consumption.
- Support two external plug-in ports for sensors

2.2.1 VHF Antenna

- It is required to be hermetically sealed marine VHF-type.
- Frequency range between 156 to 162 MHz, SWR <1.5.

2.2.2 GNSS

- Integrated with GNSS Receiver that can receive signals from all four GNSS systems: GPS, GLONASS, Galileo, BeiDou and corrected from Satellite Based Augmentation System SBAS (EGNOS) with accuracy up to 1 meter.
- Preferred built-in GNSS antenna. In case of external antenna, it should be weather resistant, hermetically sealed, marine GNSS antenna.

2.2.3 Solar power system

- Designing solar power system for ATONs should conform to IALA.
- Can be self-contained within the ATON or separately attached depend on Buoy design.
- Solar cells should be installed to minimize seasonal effects and Buoy rotation.

- Battery capacity should be able to keep ATON in operation 24 hours for 6 days without being charged from solar cells on normal operation.

2.2.4 Enclosure

- Watertight enclosure rated at level IP68 that can withstand weather conditions, temperature, vapors and water submerging.
- Enclosure holes fitted with IP68 rated glands and connectors.

2.3 Collision

2.3.1 Collision sensor

- Integrated to the AIS-ATON or attached to one of the external plug-in ports.
- Can differentiate between real vessel collision and other conditions like sea turbulence, hitting waves, buoy rotation and maintenance boat parking.
- Collision sensor should be protected against submersion and sudden hit with canal surface.

2.3.2 Collision Risk detection

- ATON should have a configurable collision risk zone; with minimum 20 meters' configurable distance.
- ATON should be able to detect the vessels that enter the collision risk zone.
- ATON should send safety message alarm (message 12) to the detected vessel that enter the risk zone
- Real collision detected by collision sensor should send specific message (message 6) to the configured SCA AIS receivers.

2.4 Buoys off position Detection

- Atons should be configured with the off-position distance threshold around each buoy; the minimum configurable distance 10 meters

2.5 AIS-ATON Data Monitoring

- ATON status should be sent in application specific message (message 6) that includes (Voltage data, Current data, Battery status/alarms, solar status, built in integrity test failure) based on a configurable interval.
- ATON should send data connected to the external ports in application specific message (message 6) based on a configurable interval.

2.6 ATON configuration

- Bidder is to provide and install software application(s) to enable the technician to configure Aton through wired, VDL and wireless methods.
- ATON can be configured through wired interface like RS232 or USB, VDL commands through base station (remotely) and any wireless method like Wi-Fi or Bluetooth (on site).
- Configuration methods (wired/wireless) should be protected against unauthorized access.
- Software should allow the technical to configure the following:
  - ✓ MMSI.
  - ✓ Name and type of Navigation Aid.
  - ✓ AIS type (Type1 or 3).
  - ✓ Type of electronic position fixing device.
  - ✓ Guard ring (off-position alarm).
  - ✓ Collision risk ring (collision risk alarm)
  - ✓ For type 1: Transmission interval, Slot allocation.
  - ✓ Virtual Atons, Synthetic Atons, Real Atons.
  - ✓ Transmit position reports for virtual or synthetic Atons.
  - ✓ Dimensions of the Buoy.
  - ✓ Message 21 broadcast interval.
  - ✓ Message 6 payload.
  - ✓ Message 12 for approaching and colliding vessels.

3. Installation

- ATONs Installation on Buoys will be done by the SCA engineers and technicians crew under the complete supervision and responsibility of the bidder representative to carry out the project installation, commissioning and start up.
- ATON installation on buoys should maintain its buoyancy and stability characteristics.
- Bidder must provide a detailed installation diagrams for installing the ATON on each buoy type (Appendix C) and SCA has to approve them.
- Any preparation for the ATON installation on buoys should be stated clearly by the bidder.
- Bidder will provide all materials, equipment, fixtures, cables and supplements needed for installation (tools, cables, connectors, housing …etc).
- All the cables used on buoys should be marine outdoor cables and connectors (UV light resistance, resist harsh weather conditions, wide operating temperature range, water proof,…etc).
- All the cables, joints and connectors should be sealed firmly using heat shrink tape.
- Installation of AIS ATON shouldn't affect currently Installed Lantern light field of view by vessels and its clear view to the sky for solar cells.
- AIS ATON solar cells should be installed in place in clear view to the sky.
- Safety consideration for all components including Antennas and cables against collisions and submersion.
- Bidder will do all the initial configuration of the ATONs.

4. Interface with SCA software

- SCA will develop the software module that will compile the AIS-ATON messages, so SCA require from the bidder to deliver the following in the proposal:
  - Message 6 format that indicate the collision detected by collision sensor installed on the Buoy and connected to AIS Aton.

- Message 6 format that contain Voltage data, Current data, Battery status, alarms, solar status and built in integrity test failure
- Message 12 format that contain the approaching and colliding vessel.

- Testing the Interface with AIS Aton such as successfully receive and compile Message 6 and message 12 and messages carry proper data in time will be main item in the acceptance test.

5. Hardware

No	Item	Brand / Origin	QTY
1	AIS-ATON transceiver type3 (solar cells, enclosure, collision sensors)	USA-West Europe -Japan - Canada-Australia	36
2	Rack mounted workstation	HP-Dell	2
3	Client workstation with 24" Monitor	HP-Dell	6
4	SHDSL	USA-Europe -Japan -Canada-Australia	4
5	Laptop	HP-Dell	3

Minimum hardware specs

✓ **Rack mounted workstation**

- 3 to 5 GHz Intel Xeon processor ,6 core
- Redundant Power Supply
- KVM Cable: VGA to VGA/USB compatible with "workstation" and "KVM switch (Black Box KVT419A)"
- 32GB (4X8GB) DDR4 of RAM internal memory.
- DVD R/W Drive.
- 2X1G Ethernet ports.
- 1X256GB SSD hard disk.
- 1X1TB SATA 7200 rpm hard disk.
- Video Output :DP or HDMI.
- VGA output: built in OR external card OR (converter from Workstation output video port to VGA).
- Rack mounting Kit.

- Rack height: 1U.

✓ **Client workstation**

- 3 to 5 GHz Intel core i7 processor11th generation,8 cores.
- 8 GB of RAM internal memory.
- DVD RW Drive.
- 1G Ethernet port.
- 1X256G SSD hard disk.
- 1X1T SATA hard disk.
- Graphics: NVidia4GB 4 ports, DP or HDMI.
- Monitor:
  - LED 24", FHD 1920X1080.
  - Ports: 2 ports, DP and HDMI.
  - 24/7 heavy duty.
- Optical USB mouse and keyboard.

✓ **SHDSL**

- Ethernet interface: 4X100 mbps RJ-45 interface.
- SHDSL interface: 2 ports.
- Connectivity Distance: 5 km.

✓ **Laptop**

Used for Aton wireless/wired configuration, at least have the following specs (smooth performance is responsibility of the bidder):

- 3 GHz Intel core i7 processor 11th generation.
- Windows 10 or 11 pro (64bit) OS.
- Internal memory: 16 GB DDR4 of RAM.
- SSD Storage: SSD 1 TB.
- Graphic card with suitable memory at least 2GB to perform its function.
- Display: 14" FHD (1920 x 1080).
- Ports:

  1USB 3.2Gen 1 port with Power Share.
  1 Universal audio port.
  1 HDMI 2.0 port.

- Wireless: Intel® Wi-Fi 6 + Bluetooth 5.2.
- 1G Ethernet port.

6. Addressed Messages

- Bidder should take into consideration that SCA shore stations contain **Receivers with no transmission capabilities** and no **Real MMSI** currently assigned (virtual one assigned)
- Addressed messages that need acknowledge from SCA stations for example message 6 and message 12 should be configured to be sent for configurable number of times (one or more) or Bidder can propose other recommended solution for this issue
- Bidder should specify whether Addressed messages example message 6 and message 12 can be sent to Receivers with virtual MMSI or need Real MMSI to be assigned for receivers
- If possible Bidder should specify whether one Global MMSI can be used for all receivers (more than one SCA shore station in Aton coverage area can receive the message)

7. Warranty

- All equipment and software delivered by the bidder are warranted to work in good condition and function according to the specifications for a period of two years starting from a successful end of the reliability period.
- Two-month reliability period for the whole project after SAT.
- During the guarantee period, if any part or unit which may be damaged, deteriorated or found defective as a consequence of unsuitable material, faulty design, bad manufacture or inadequate workmanship, should be properly repaired or replaced by the Bidder for free.

8. Training

The supplier should arrange Training courses for Suez Canal Authority crew as follow:

1.1 **Technical Training course abroad** (on the manufacturer premises) for **four** Engineers, Training should include Administration, installation, Maintenance, troubleshoot problems and operation procedure system for period (**Ten days**)

1.2 **Technical Training course abroad** (on the manufacturer premises) for **Six Technicians** on detailed system installation and hardware maintenance and troubleshooting for period **(Seven days)**

9. Acceptance Tests and Inspection

Suez Canal Authority will delegate **Three Inspectors** to carry out the inspection of all equipment and Software under the order before shipment at the manufacturer premises for **(Seven days)**

Bidder shall provide a Factory Acceptance Test (FAT) scope which will be executed by SCA inspection team and a Site Acceptance Test (SAT) plan, including detailed test procedures for all functions described in this document.

All test documents (FAT & SAT) shall be submitted to SCA one month before the due date of the test for approval. The Bidder shall provide any test and measurement equipment needed during tests.Acceptance test should include testing the Interface with AIS Aton

Appendix A

1) Base Stations

No	Site name	Reciever Model	Current GPS	QTY	Type	Notes	connectivity
1	Port fouad	Kongsberg RX610	31° 15'16.32" N 32°19'17.16" E	2	Receiver only	Installed and working on tower	Ethernet fiber to PortSaid control center
2	Kantara	Kongsberg RX610	30°51'31.65N 32°18'51.66E	2	Receiver only	Installed and working on tower	Ethernet fiber to Ismailia control center at Irshad building
3	Irshad Building	Kongsberg RX610	30°35'19.6N 32°16'58.39E	2	Receiver only	Installed and working above irshad building	Locally connected to server room
4	New marine	Kongsberg RX610	30°35'19.46N 32°16'58.42E	2	Receiver only	installed and working but at irshad site and may be in future installed on original site which not exist yet original site GPS: 30°35'15.17"N 32°19'41.64"E	Locally connected to server room
5	Kabrit	Kongsberg RX610	30°15'34.82N 32°30'04.69E	2	Receiver only	Installed and working on tower	Ethernet fiber to Ismailia control center at Irshad building
6	Port Tewfik	Kongsberg RX610	29°56'32.5N 32°34'06.12E	2	Receiver only	Installed and working on tower	Ethernet fiber to PortTewfik control center

Appendix B

1) Ismailia Section Buoys

Additional missions and devices installed on the buoy	Coordinates	Bouy type	Lantern Type	Location	Color	Position
Radar reflector	30° 48 ' 21.17" N 32° 18 ' 58.84"E	Resinx	VEGA	canal	Red	Km 51
Radar reflector	30° 48 ' 19.9" N 32° 19 ' 13.74"E	Resinx	SLC 415	canal	Green	Km 51.027
Radar reflector	30° 43 ' 23.11" N 32° 20 ' 18.49"E	Resinx	SLC 415	West channel	Red	Km 61
Radar reflector	30° 43 ' 6.4" N 32° 20 ' 39.69"E	Resinx	SLC 415	West channel	Green	Km 61.144
Radar reflector	30° 42 ' 28.4" N 32° 21 ' 1.19"E	Resinx	SLC 415	East channel	Red	Km 62.25
Radar reflector	30° 42 ' 29.83" N 32° 21 ' 11.12"E	Resinx	SLC 415	East channel	Green	Km 62.25
Radar reflector	30° 36 ' 55" N 32° 19 ' 18.73"E	Resinx	SLC 415	West channel	Red	Km 73
Radar reflector	30° 36 ' 52.16" N 32° 19 ' 27.26"E	Resinx	SLC 415	West channel	Green	Km 73
Radar reflector	30° 33 ' 12.26" N 32° 18 ' 21.8"E	Resinx	SLC 415	West channel	Red	Km 81
Radar reflector	30° 33 ' 15.8" N 32° 18 ' 33.23"E	Resinx	SLC 415	West channel	Green	Km 81
Radar reflector	30° 30 ' 53.13" N 32° 20 ' 6.37"E	Resinx	SLC 415	West channel	Red	Km 86.3
Radar reflector	30° 30 ' 56.33" N 32° 20 ' 14.8"E	Resinx	SLC 415	West channel	Green	Km 86.3

2) Port Said Section Buoys

Additional missions and devices installed on the buoy	Depth of water	Coordinates	Buoy model	Lantern model	Location	Lantern Color	Location in (HM-KM)
Battery box, pilot sign and radar reflector	30m	31°22.71'N 32°23.58'E	17m³	Sealite SL 310	Port Said East branch)(	Yellow	H M 150
Battery box, pilot sign and radar reflector	25m	31°21.92'N 32°23.34'E	17m³	Sealite SL 415	Port Said East branch)(	Red	H M 135
Battery box, pilot sign and radar reflector	25m	31°22.00'N 32°22.99'E	17m³	Sealite SL 310	Port Said East branch)(	Green	H M 135
Battery box, pilot sign and radar reflector	22m	31°19.26'N 32°22.24'E	17m³	Sealite SL 415	Port Said branch)(	Yellow	H M 83
Battery box, pilot sign and radar reflector	25m	31°19.13'N 32°22.11'E	17m³	Flotex ML 155	Port Said West branch)(	Red	H M 80
Battery box, pilot sign and radar reflector	22m	31°19.30'N 32°21.85'E	17m³	Flotex ML 155	Port Said West branch)(	Green	H M 80
Battery box, pilot sign and radar reflector	22m	31°19.05'N 32°22.44'E	17m³	Sealite SL 415	Port Said East branch)(	Red	H M 80
Battery box, pilot sign and radar reflector	22m	31°19.10'N 32°22.19'E	17m³	Sealite SL 415	Port Said East branch)(	Green	H M 80
Battery box, pilot sign and radar reflector	22m	31°18.53'N 32°22.28'E	11m³	Flotex ML 155	Port Said East branch)(	Red	H M 70
Battery box, pilot sign and radar reflector	22m	31°18.58'N 32°22.05'E	11m³	Sealite SL 415	Port Said East branch)(	Green	H M 70

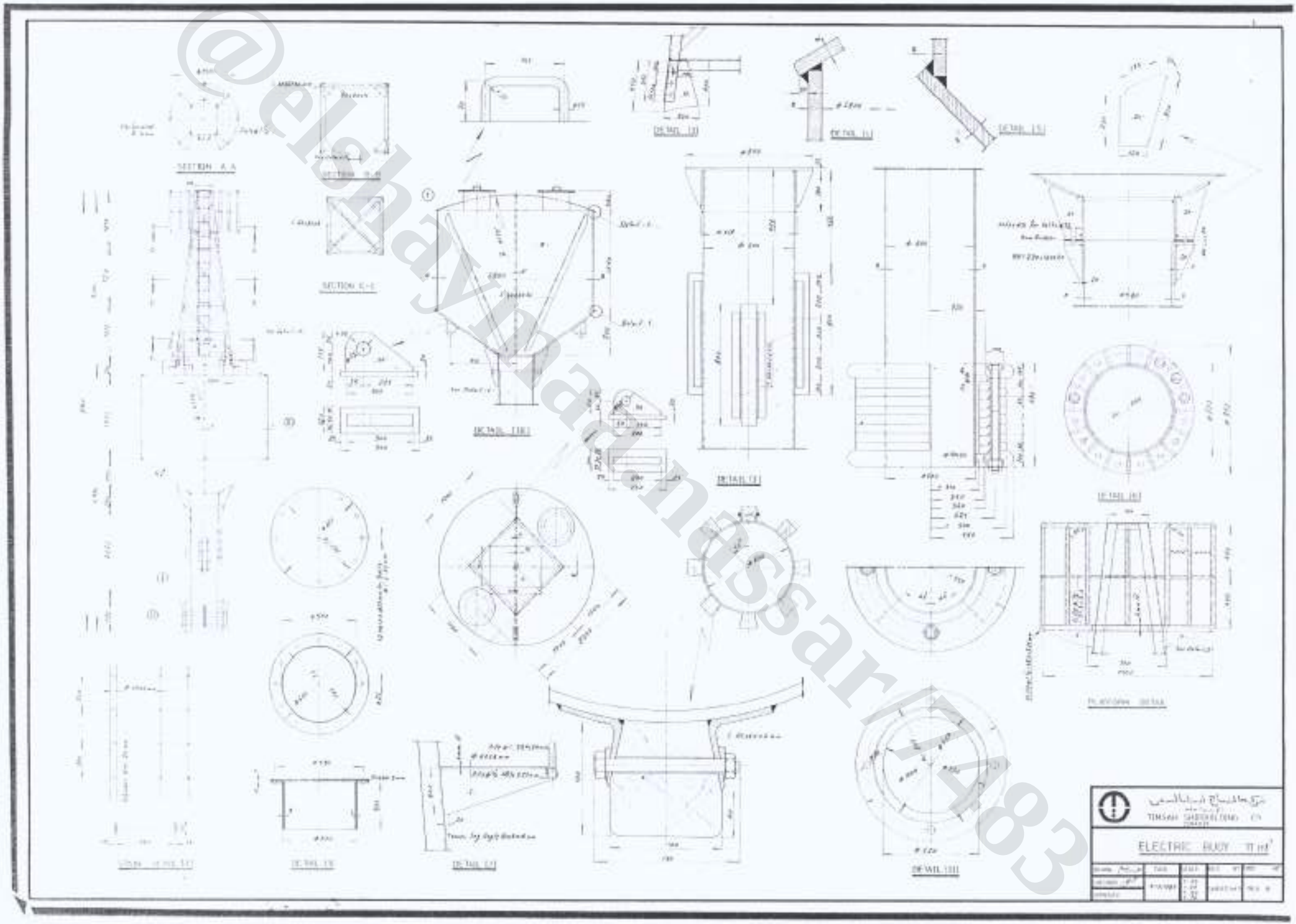
Battery box, pilot sign and radar reflector	20m	31°11.41'N 32°20.3'E	11m³	Vega Vip5X	*Port Said Rotation circle)(*	Red	K M 6 . 8
Battery box, pilot sign and radar reflector	15m	31°06.71'N 32°18.57'E	RESINEX	Vega Vip5X	*Island head Ras Elish*	White	K M 17.05

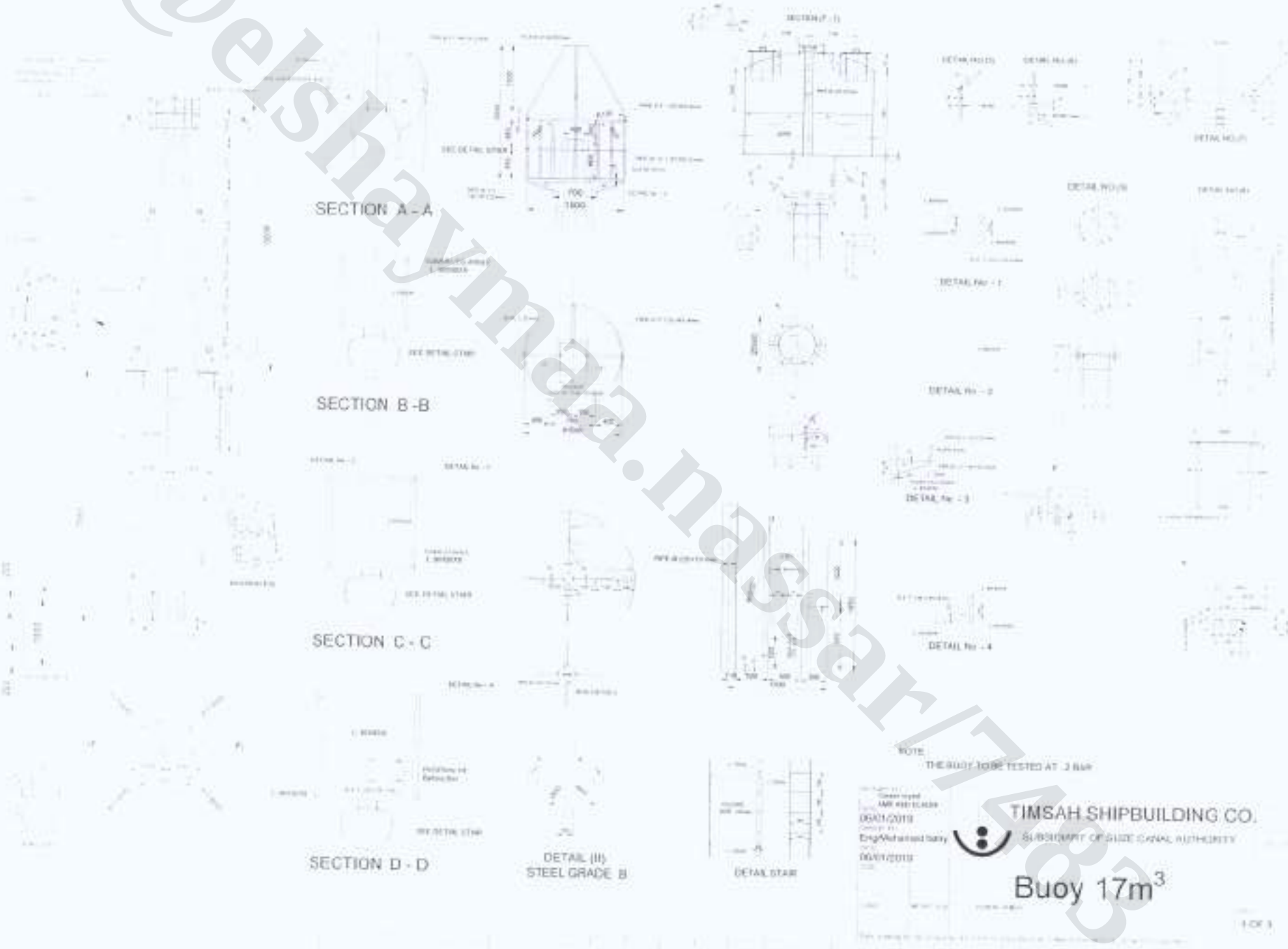
3) Port Tewfik section Buoys

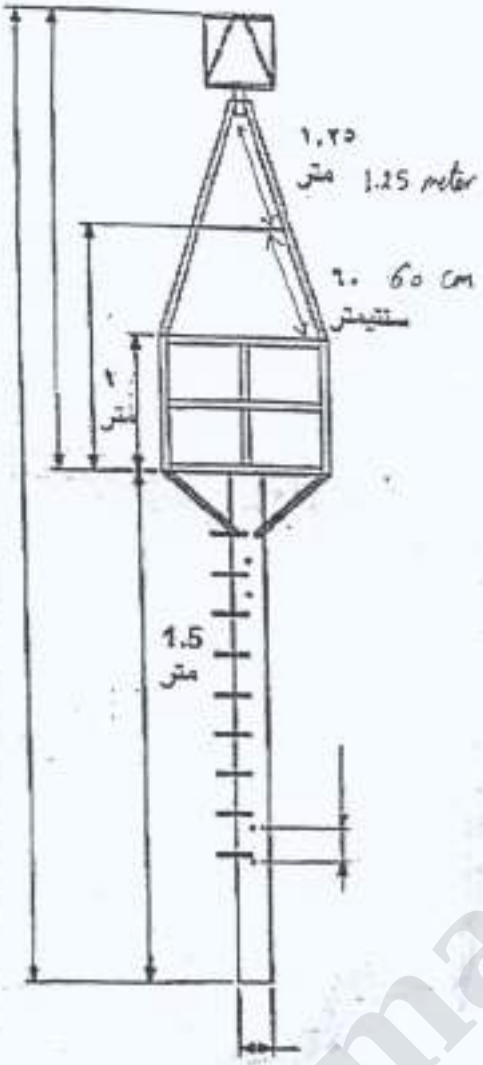
Buoy site	color	existence place	Lantern model	Type of buoy	The coordinates		Depth of water
					Longitude	Latitude	
HM24	red	Suez berthing area	VEGA (VLB-S)	Cylindrical 17 m	32°32.5 E	29°54.212 `N	16 m
KM 162.15	red	Entrance of canal	VEGA (VLB-S)	Cylindrical 17 m	32°33.028 E	29°55.522 `N	15 m
KM 162.15	green	Entrance of canal	VEGA (VLB-S)	Cylindrical 17 m	32°33.278 E	29°55.412 `N	15 m
KM 130.9	red	canal	FLOATEX MLISS	Resinex	32°33.967 E	30°11.786 `N	11.5 m
KM 130.9	green	canal	FLOATEX MLISS	Resinex	32°34.088 E	30°11.845 `N	11.5 m

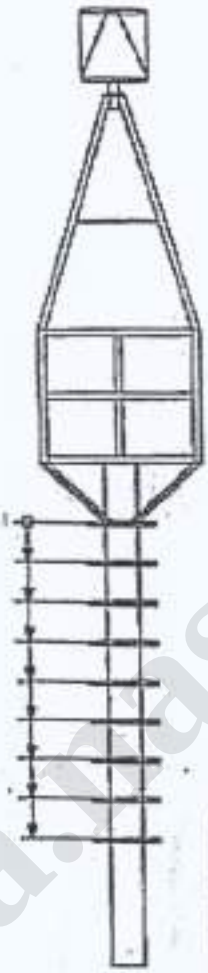
KM 123.8	red	canal	SEALITE(SLC-415)	Resinex	32°31.78 E	30°15.001 `N	11.5 m
KM 123.8	green	canal	FLOATEX MLISS	Resinex	32°31.940 E	30°15.127 `N	11.5 m
KM 122.100	red	Eastern branch	FLOATEX MLISS	Resinex	32°30.88 E	30°15.51 `N	11.5 m
KM 122.100	green	Eastern branch	SEALITE(SLC-415)	Resinex	32°30.92 E	30°15.63 `N	11.5 m
KM 114.2	red	canal	SEALITE(SLC-415)	Cylindrical 11 m	32°26.20 E	30°17.04 `N	16 m
KM 114.2	green	canal	SEALITE(SLC-415)	Cylindrical 11 m	32°26.48 E	30°17.20 `N	16 m
Southern Lighthouse	yellow	canal	FLOATEX MLISS	Cylindrical 17 m	32°26.21 E	30°17.03 `N	17 m

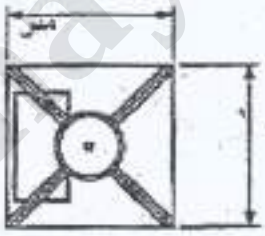
Appendix C









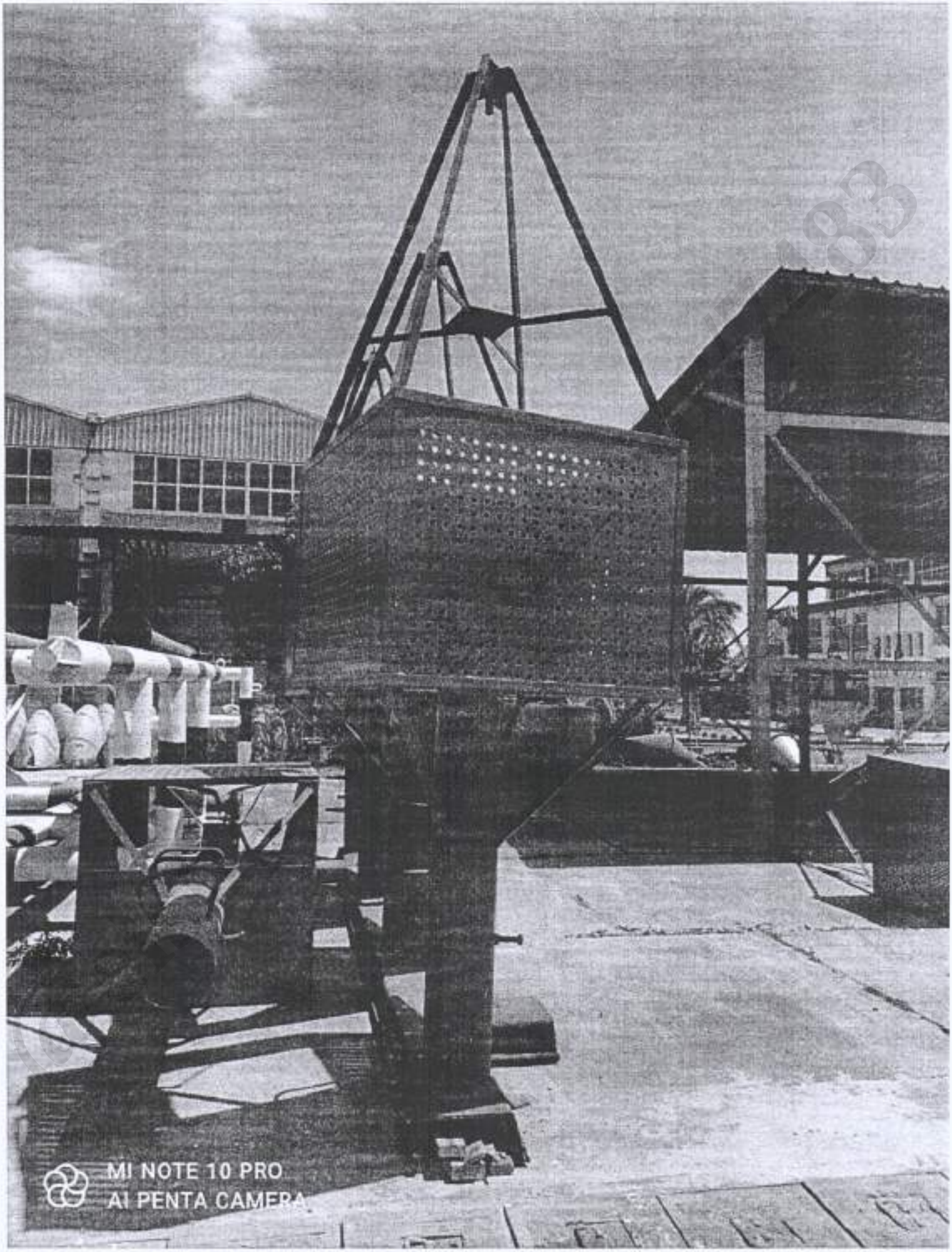


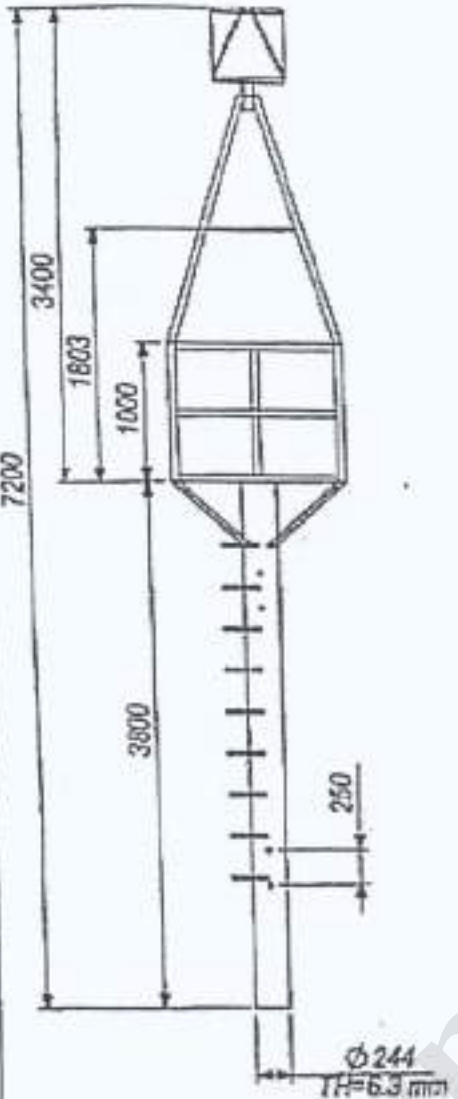
SEAMLESS STEEL PIPE

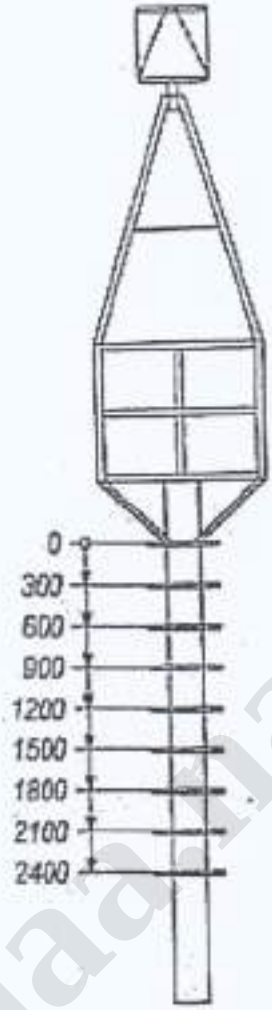
BOLTS AND NUTS GALVANIZED

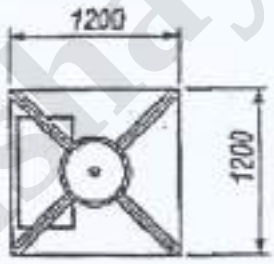
HEAVY DUTY MARINE PAINTS

RESINEX SINCE 1961 MARINE TECHNOLOGY	RESTRICTED AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF RESINEX TRADING S.r.l. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF RESINEX TRADING S.r.l. IS PROHIBITED.	WEIGHT: 260 kg	DRAWN: D.GAVIOLI	TURRET SEGMENT OPTION
			CHECKED: M.SUARDI	
			APPROVED: P. ZANNI	DWG N° 17323/15 REV. 0
	TOLERANCE +/- 5%	SCALE: 1:50	DATE: 03/02/2015	


MI NOTE 10 PRO
AI PENTA CAMERA







SEAMLESS STEEL PIPE

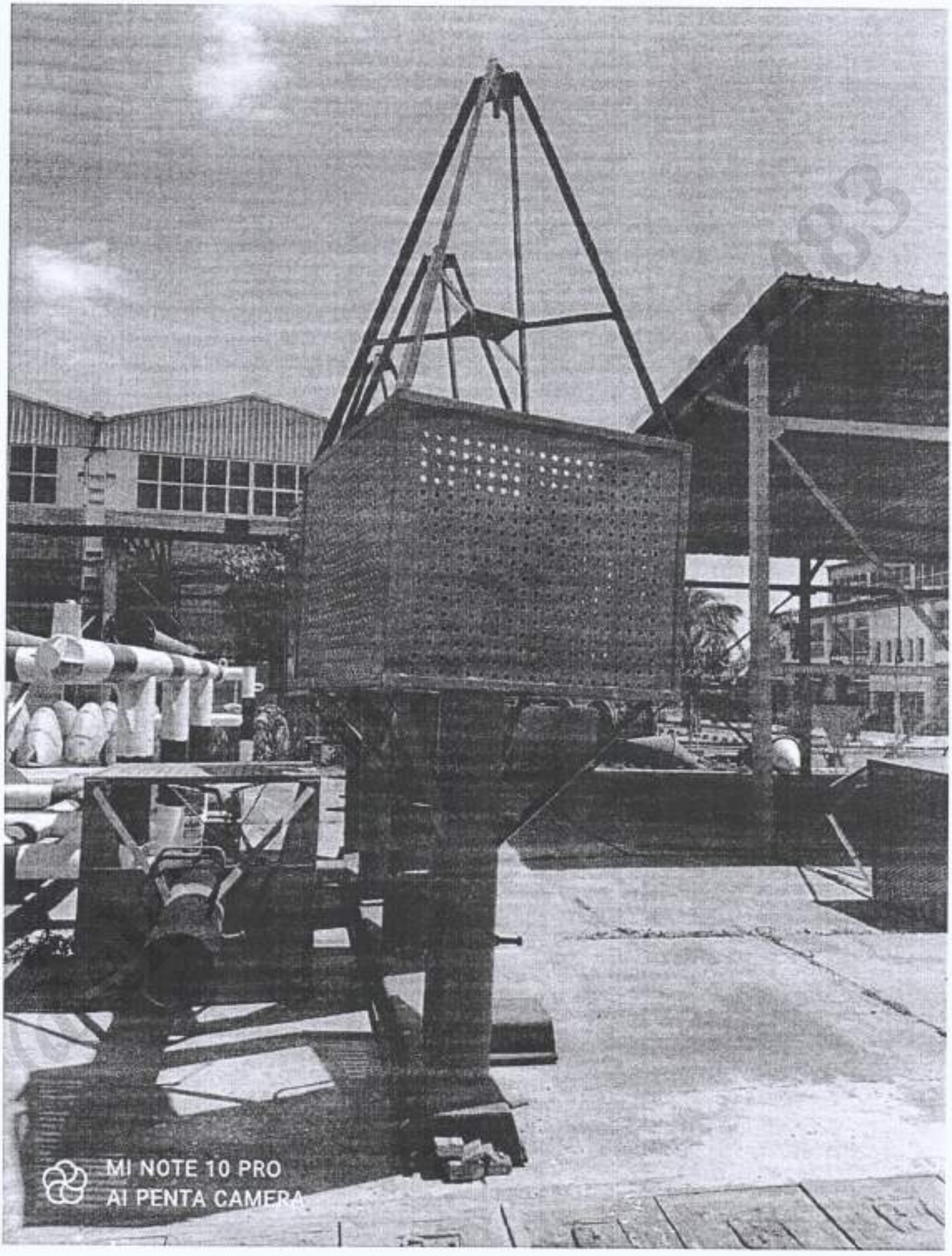
BOLTS AND NUTS GALVANIZED

HEAVY DUTY MARINE PAINTS

RESINEX
SINCE 1961 MARINE TECHNOLOGY

TOLERANCE +/- 5%

WEIGHT: 250 kg	DRAWN: D.GAVIOLI	TURRET SEGMENT OPTION
	CHECKED: M.SUARDI	
SCALE: 1:30	APPROVED: P. ZANNI	DWG N° 17323/15 REV. 0
	DATE: 03/02/2015	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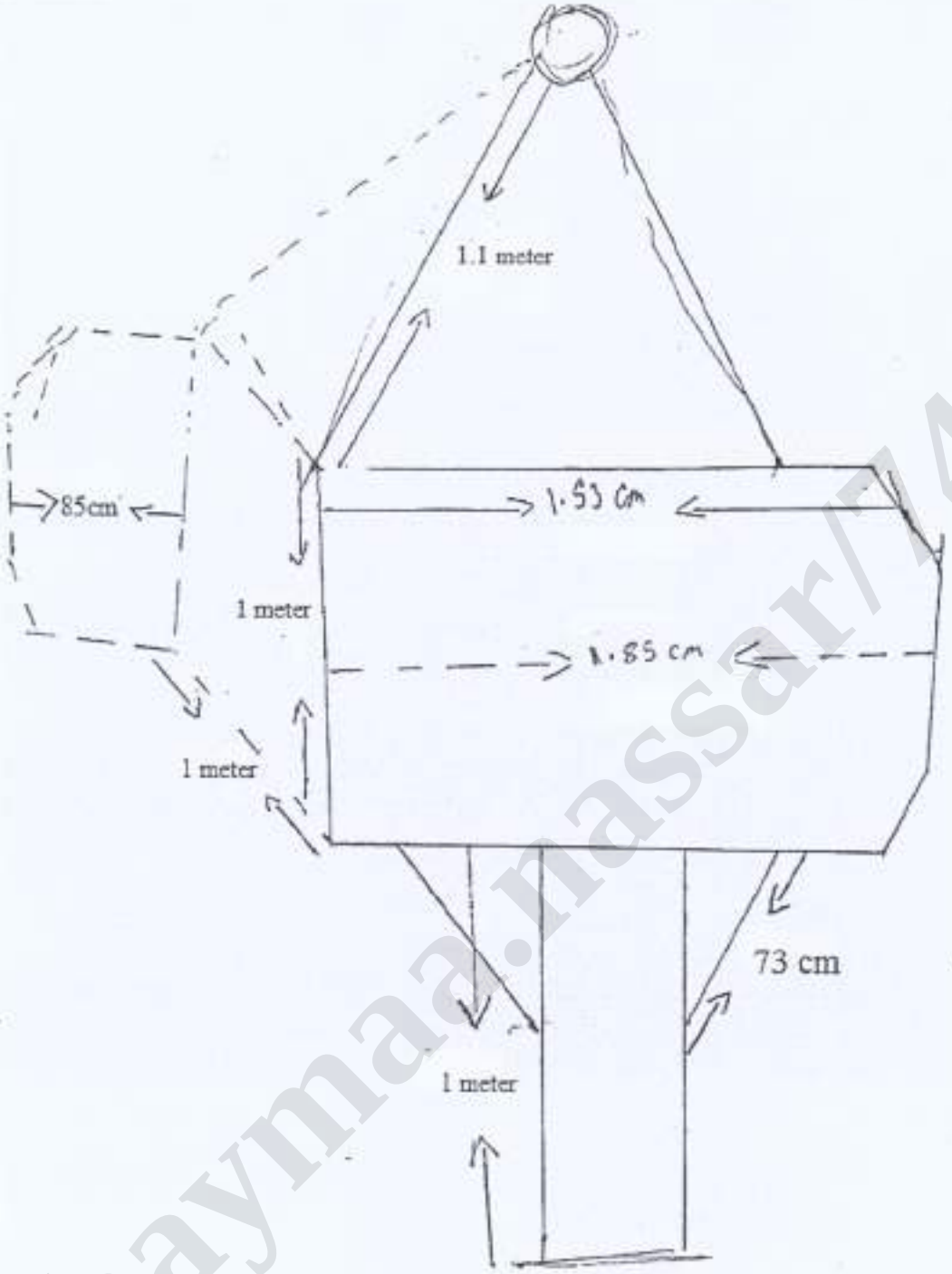
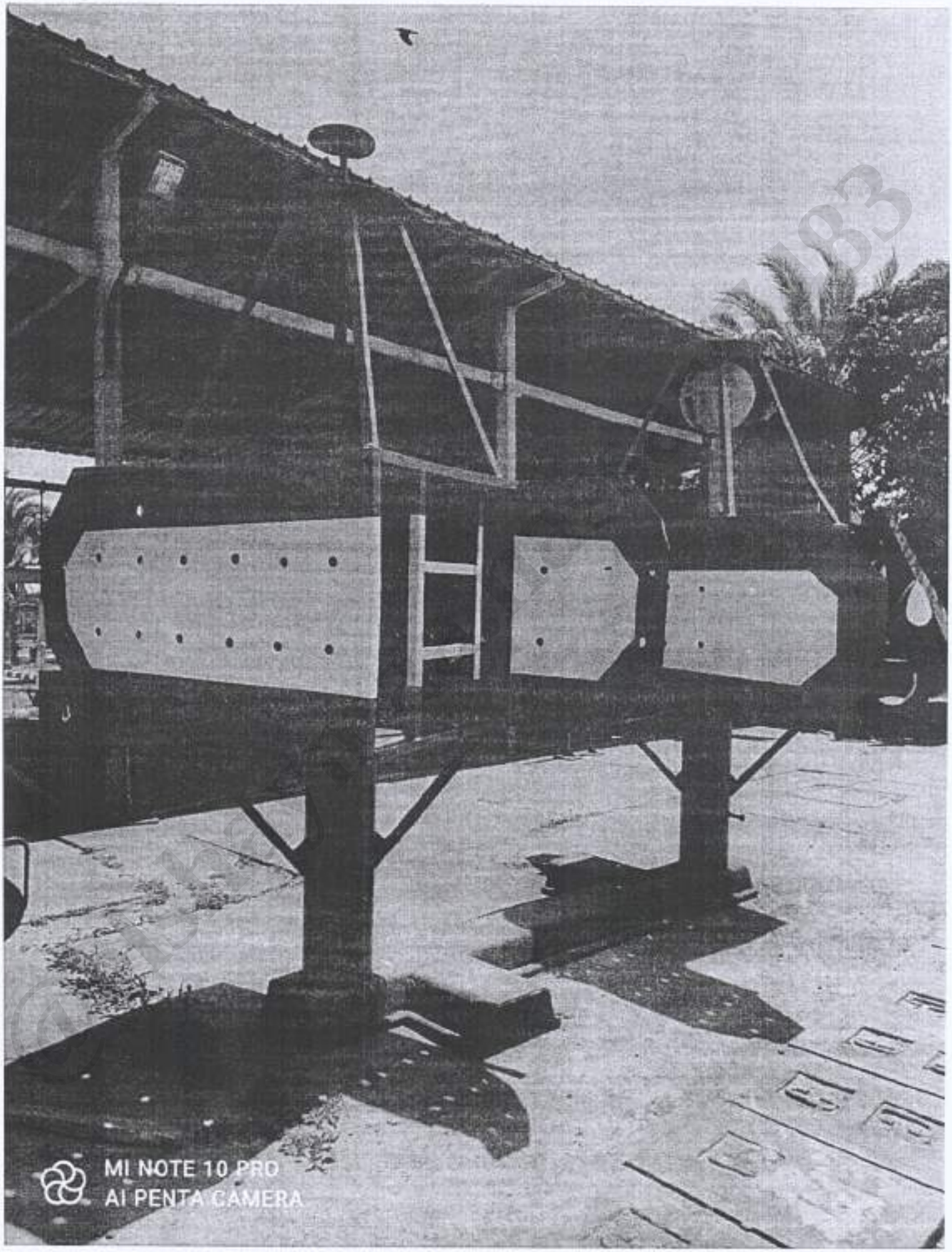
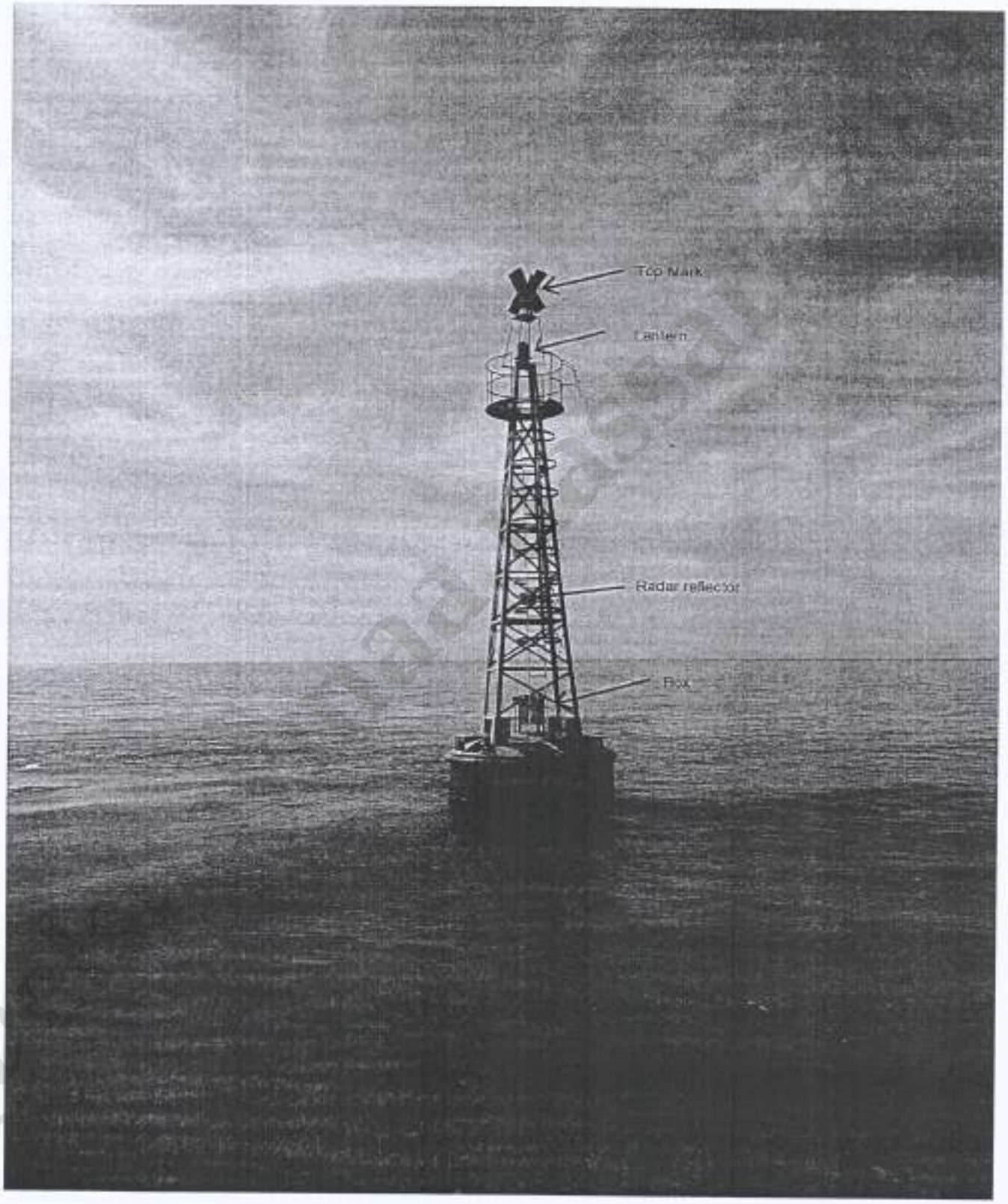



MI NOTE 10 PRO
AI PENTA CAMERA

Appendix D

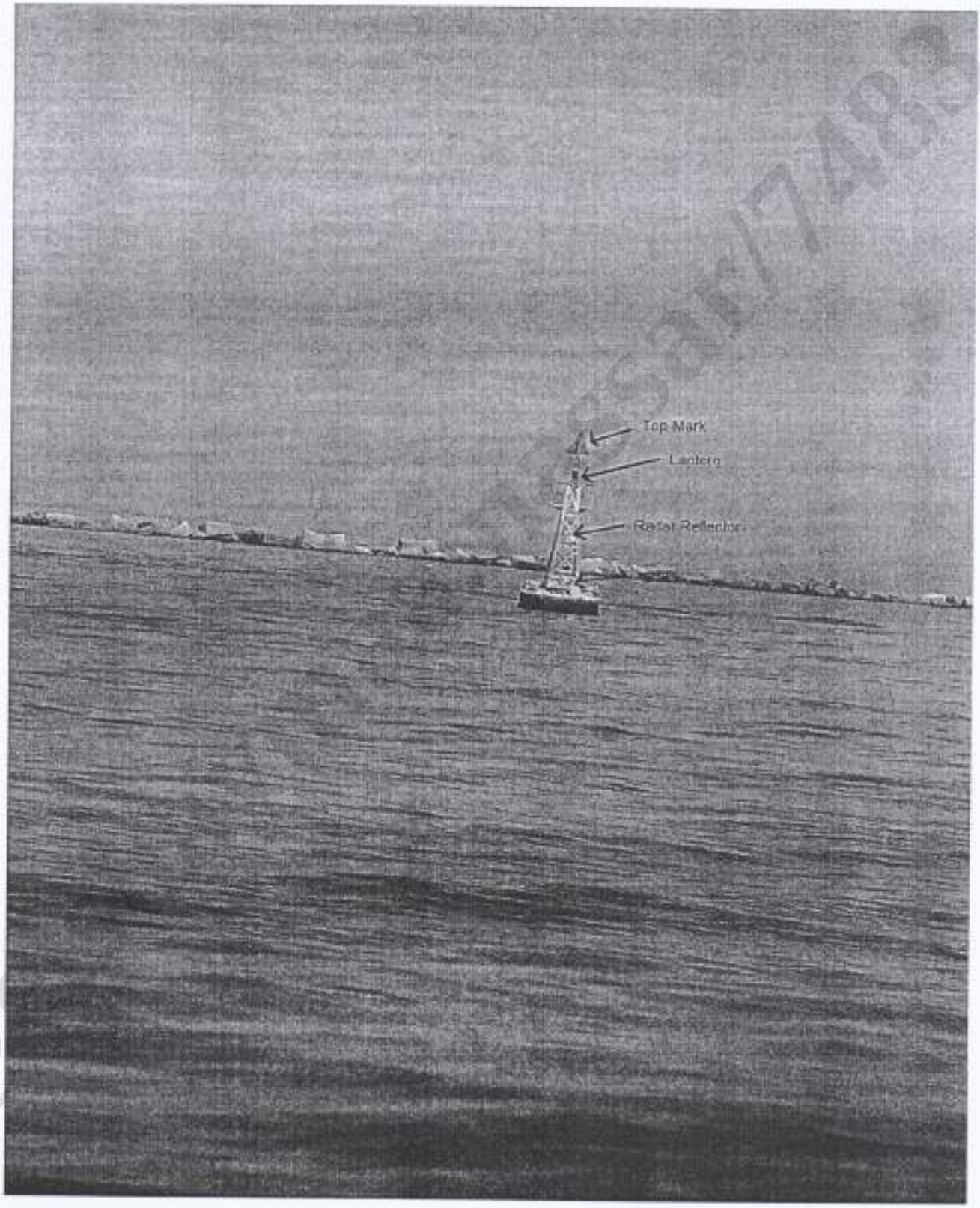
17M³ BUOY SPECIFICATIONS (CHECK DESIGNS APPENDIX C)

1. *THE HEIGHT OF THE BUOY FROM THE WATERLINE TO THE TOP OF THE TOWER ABOUT 9.20 M.*
2. *THE HEIGHT OF THE BUOY FROM THE WATERLINE TO THE END OF THE TAIL PIPE ABOUT 6.30 M.*
3. *DRUM DIAMETER (ROTATION) ABOUT 3.20 M*


Top Mark
Lantern
Radar reflector
Box

11M³ BUOY SPECIFICATIONS (CHECK DESIGNS APPENDIX C)

1. THE HEIGHT OF THE BUOY FROM THE WATERLINE TO THE TOP OF THE TOWER ABOUT 4.40 M.
2. THE HEIGHT OF THE BUOY FROM THE WATERLINE TO THE END OF THE TAIL PIPE ABOUT 4.70 M.
3. DRUM DIAMETER (ROTATION) ABOUT 2.8 M .


Top Mark
Lantern
Radar Reflector


Radar reflector
Lantern
Lantern