



AKARI-100

AtoN AIS Unit

An AIS transponder developed specifically for Aids-to-Navigation

Akari-100 is Zeni Lite second generation AIS transponder for use on buoys, beacons and lighthouses, combining proven AIS technology from Saab TransponderTech with Zeni Lite's aids-to-navigation experience.

Akari-100 broadcasts the aids-to-navigation AIS message, Message 21. It also automatically monitors correct operation of the light and power supply, and tracks buoy position. Serial ports allow other equipment such as weather sensors, or tide gauges, to input data for transfer over the AIS network, using AIS Message 6 or 8.

With the mandatory carriage of AIS by SOLAS vessels, and the smaller bulk and lower power drain of **Akari-100**, it is the logical choice to replace expensive and power-hungry racons on modern aids-to-navigation.



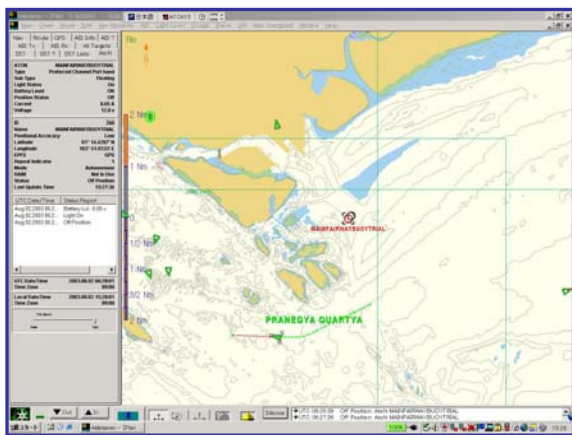
Easily installed

Akari-100 operates with any 12-Volt or 24-Volt DC lantern. The unit accepts input voltages ranging from 10VDC ~ 28VDC. It contains special software to minimise power drain, so that in many cases, no extra power system capacity will be needed on the aid-to-navigation. No connections to the inside of the lantern are needed.

Akari-100 simply connects quickly and easily to the 12-Volt or 24-Volt DC power supply. Separate antenna units handles GPS and AIS signals. External packaging to IP-67 allows **Akari-100** to be installed on any fixed or floating aid-to-navigation. On a buoy, the main unit may be mounted in any convenient location, with only the GPS and AIS antennas needing to be near the top of the buoy tower.

Complies with IALA and ITU requirements

Akari-100 complies with all ITU and IALA requirements for AIS messages from aids-to-navigation.



Aids-to-navigation monitoring software

New software allows the aids-to-navigation authority to monitor the operation and position of aids-to-navigation fitted with **Akari-100**. The software is based on Zeni Lite "Akari-ECS" monitoring software or alternatively ICAN "Aldebaran-II" charting software and may be run on a PC under the Microsoft Windows™ operating system. The PC may be linked to an existing AIS base station or base station network, or it may be used with a stand-alone AIS base station unit such as the Saab TransponderTech R40.

In the event of light failure, low battery voltage, or buoy off-station, the software alerts an operator, either directly or via email or cellular phone. It also stores event data for later analysis.

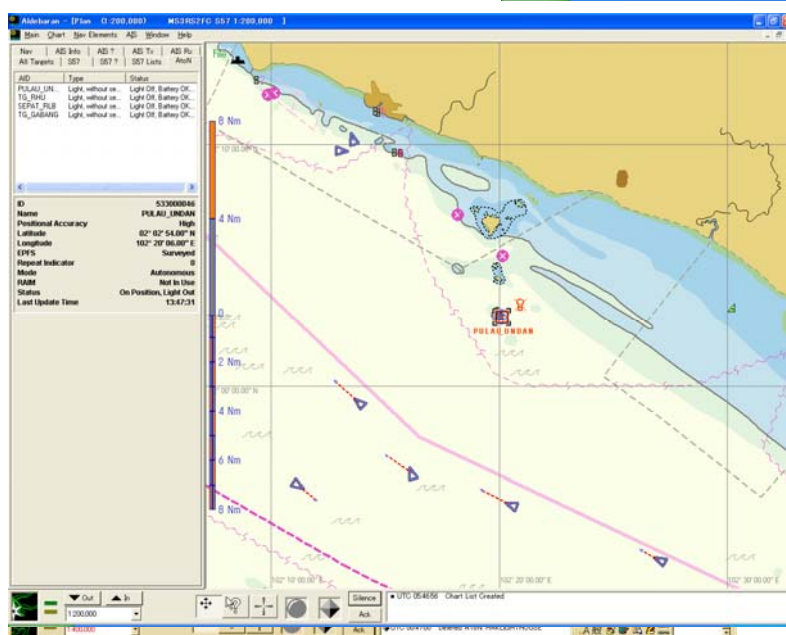
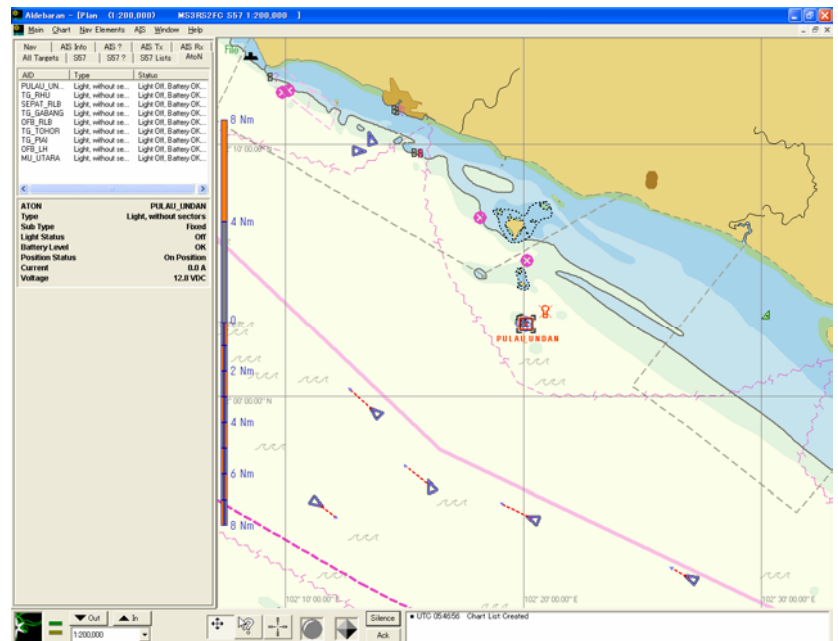
The Zeni Lite **Akari-100** is a second-generation AIS unit for aids to navigation such as buoys and beacons, and for weather and tidal stations, wind-farms, oil and gas platforms, etc.

Akari-100 broadcasts AIS digital messages for display on ECDIS or ENC on ships or at VTS centres. Messages are in international standard format. The display on the ENC or ECDIS depends on the ship's equipment, but typically an aid to navigation is shown as an icon with the name of the aid, and an on or off station flag for buoys, and weather and tidal data is shown as an icon with data in a pull-down window.

Display of Message 6

AtoN Monitoring

ATON	PULAU_UNDAN
Type	Light, without sectors
Sub Type	Fixed
Light Status	Off
Battery Level	OK
Position Status	On Position
Current	0.0 A
Voltage	12.8 VDC



Display of Message 21 AtoN Information

ID	533000046
Name	PULAU_UNDAN
Positional Accuracy	High
Latitude	02° 02' 54.00" N
Longitude	102° 20' 06.00" E
EPFS	Surveyed
Repeat Indicator	0
Mode	Autonomous
RAIM	Not In Use
Status	On Position, Light Out
Last Update Time	13:47:31

Akari-100 can operate in either RATDMA mode or FATDMA mode. This setting and all other functions are programmable via a dedicated configuration port.

Product features

- ❑ **Akari-100** includes a BSH-certified AIS RF unit with two receivers, operating on both AIS frequencies, and a high power transmitter.
- ❑ When used on AtoN, **Akari-100** broadcasts AIS aid to navigation Message 21 for use by shipping, clearly identifying the aid by name, and MMSI number. The exact aid position is given, and buoys are identified as on-station or off-station.
- ❑ AtoN lantern monitoring. Highly accurate measurement of battery voltage and lantern current. Lantern on and off times. Programmable monitoring intervals. Operates with any 12-Volt or 24-Volt DC lantern.
- ❑ **Akari-100** checks buoy position against nominal position and allowed swing radius. Sets flag in AtoN AIS Message 21 if buoy is off-station. Sends alert message to aids to navigation maintenance centre if buoy is off-station or if lantern or power supply malfunctions. All data date-time stamped. Allows aids to be monitored without any extra equipment at the aid or on shore, and without message charges.
- ❑ Accepts data stream from weather and tidal instruments, reformats data as necessary, and broadcasts international standard AIS meteorological and hydrological message.
- ❑ Inbuilt wave height sensing – no external sensor needed. Allows a buoy equipped with **Akari-100** for navigation, to also measure and broadcast wave height data.
- ❑ As an optional feature, the **Akari-100** can store and forward data from ships in vicinity, for remote surveillance outside the range of shore stations. Forwarding can be by AIS link or by satellite, etc.. Ideal for remote lighthouses or offshore buoys.
- ❑ Extensive digital input and output capability. Internal processing capacity for any input data. Monitoring and control of aids to navigation or other systems.
- ❑ Choice of RATDMA or FATDMA operation. FATDMA operation gives lower power drain and is available when a nearby AIS base station reserves message slots for the **Akari-100** unit.
- ❑ DGPS beacon receiver available as internal option.
- ❑ Cast alloy housing with EMC O-ring seal and water-tight connectors, all to IP-67. No need to open housing for unit installation or removal.

<u>SPECIFICATIONS:</u>		
Contents.	Descriptions.	
Dimension	L: 320 mm W: 320 mm H: 120 mm	
Weight	Approx 8.0 kg	
Main material	Aluminum	
Color of enclosure	Yellow	
IP grade	IP67	
Operating temperature	-15 to +55 degree Celsius	
Reverse polarity protection	Provided	
Lightning protection	Provided	
Power supply	10 to 28VDC	
Power drain on 12VDC	Peak	Less than 7A
	Operating	Approx 200mA
	Sleep	Less than 50uA
GPS receiver	L1, C/A code, 12ch	
GPS antenna	5VDC Max 100mA	
DGPS receiver	RTCM SC-104, MF	
DGPS antenna	5VDC Max 100mA	
		Optional

Antenna Coaxial Connectors (Water-proofed)	VHF	N Female	50ohm	
	GPS	TNC Female	50ohm	
	DGPS	BNC Female	50ohm	
Internal AIS transponder	Saab TransponderTech AB, R4 transponder (BSH certified with STDMA patent licence)			
AIS transmit channel	AIS1: 161.975MHz AIS2: 162.025MHz			
AIS transmit power	2W(Low power) or 12.5W(High power) selectable			
AIS transmit mode	FATDMA or RATDMA selectable			
AIS message	Message 6	Addressed binary message (For A to N monitoring)		
	Message 8	Binary broadcast Message (For Meteorological & Hydrological Data)		See Note 2
	Message 12	Addressed Safety Related Message		
	Message 21	Aids to Navigation Report		
Contents of AtoN monitoring in message 6	Position status, Lantern status, Battery status Lantern voltage, Lantern current			
Status check interval	Configurable 1,3,5,10,15,20,30, and 60 min			
Transmit interval	Configurable 1,3,5,10,15,20,30,60, and 120 min			
Sensible lantern	DC lantern	Voltage	10 to 36VDC	
		Current	0 to 25A	
	AC lantern (Optional)	Voltage	90 to 240VAC	
		Current	0 to 25A	
Measurement accuracy	Voltage	Approx 0.1V		
	Current	Approx 1% of full-scale		
	GPS	50m 2DRMS		
	DGPS (optional)	5m 2DRMS		
External port	Digital Input	4 ports		
	Digital output	4 ports		
	AUX1	RS-232C		
	AUX2	RS-232C or RS-422/485 selectable		
Status display	4pcs of small LED on PCB			
Application	<ul style="list-style-type: none">Weather and Tidal data monitoringWave height data monitoring			See Note 3.
Accessory	<ul style="list-style-type: none">Power supply cable with plug Cable length: approx 1.5mConfiguration cable for Config portSpare electrical fuseAKARI-Config (Software for MS-Windows)			See Note 4.
Reference classification	<ul style="list-style-type: none">ITU-R M 1371-1 Technical Characteristics for a Universal Shipborne Automatic Identification System Using Time Division Multiple Access in the VHF Maritime Mobile BandIALA Guidelines On The Universal Automatic Identification SystemIALA Recommendation on AIS for Aids to Navigation (Draft) [IALA Recommendation A-126 Edition 1.0 03-09-2003]			
Information correct at the time of printing, though subject to change without notice				

Notes on above tables

1. We recommend use additional arrester on out side AKARI.
2. Need optional weather, tidal, and related sensors.
3. Optional function for floating buoy only.
4. Enable connect to Com-port (RS-232C) of your personal computer.

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AKARI-100

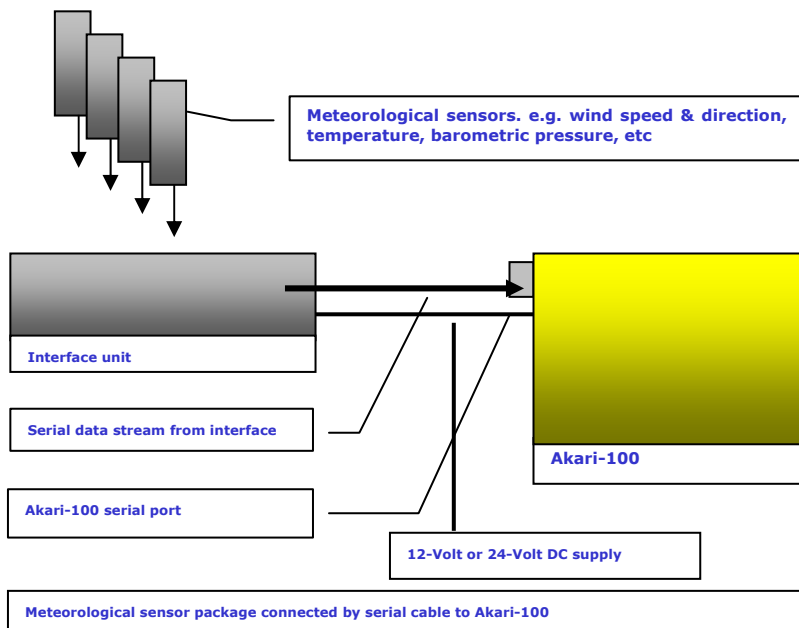
AIS Weather Station

Akari-100 – AIS transponder for meteorological data acquisition and AIS broadcasting

Akari-100 is Zeni Lite second generation AIS Aids to Navigation transponder technology combined with a rugged meteorological and environmental sensor package to give an automatic AIS weather station that may be fitted to fixed or floating platforms.

When used on aids to navigation platforms, the **Akari-100** also monitors the aid to navigation and can transmit AIS Message 21 for use by vessels within range. Status of the system power supply is continually checked, and data returned to shore via AIS Message 6.

The **Akari-100** is designed to allow direct connection of 1 or 2 meteorological or hydrological sensors, or a number of sensors connected via an interface unit:



AIS module for Akari-100 system.



Aids to navigation, both fixed and floating, make excellent platforms for the Akari-100 Weather Station.

Fixed or floating installation

The **Akari-100** system is suitable for installation on buoys or fixed structures. Power drain by both the sensor package and the AIS module is minimised by special hardware and software. Exact power drain depends on the AIS message frequency. Zeni Lite will be pleased to prepare an energy budget based on your data requirements.

When an aid to navigation is used as the platform, all the benefits of the Akari-100 aids to navigation transponder are also available, both for navigation safety and aids to navigation management.



Sensors:

Akari-100 may be fitted with the following sensors.

Group 1 sensors

- Wind speed
- Wind direction
- Barometric pressure
- Air temperature
- Relative humidity

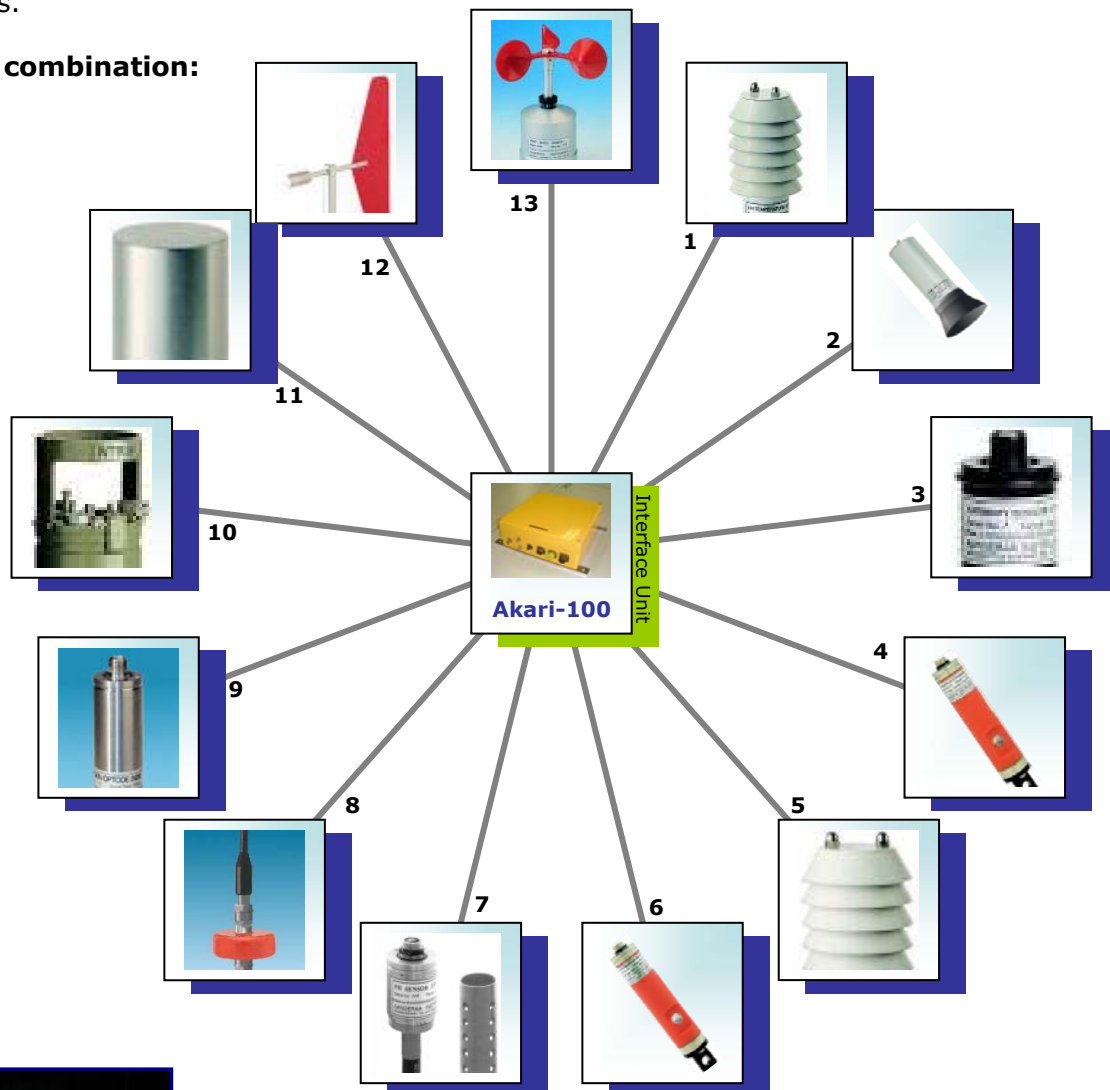
Group 2 sensors

- Current speed
- Current direction
- Sea surface temperature
- Water level [tidal height]
- Wave data

Group 1 sensors may be installed easily in almost any location.

Group 2 sensors may require special consideration. Consult Zeni Lite to discuss your particular needs.

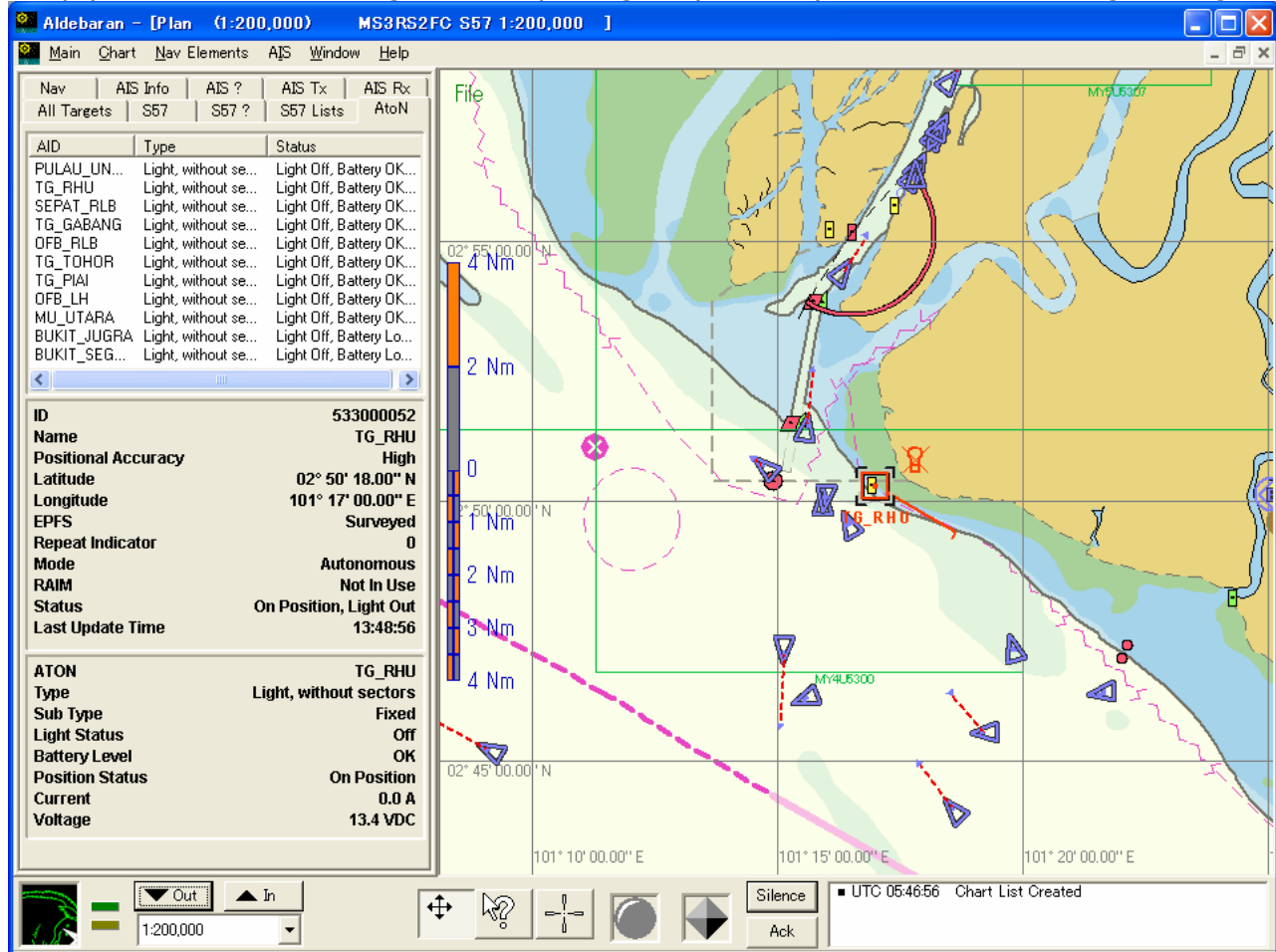
Or a combination:



System Configuration:

- | | |
|-----------------------------|-----------------------------|
| ① Air Temperature | ⑩ Wave Height & Wave Period |
| ② Sound Velocity | ⑪ Air Pressure |
| ③ Water Transparency | ⑫ Wind Speed |
| ④ Water Temperature | ⑬ Wind Direction |
| ⑤ Humidity | and |
| ⑥ Conductivity / Salinity | ⑭ Current Direction |
| ⑦ pH | ⑮ Wave Direction |
| ⑧ Current Speed & Direction | ⑯ Oxygen Optode |
| ⑨ Oxygen Percentage | ⑰ Turbidity |

An Electronic Navigation Chart identifying a number of Lighthouses & Resilient Beacons (Spar Buoys) fitted with Meteorological and Hydrological (Weather) Sensors broadcasting Message 8.



Message 6 – Aton Monitoring

ATON	TG_GABANG
Type	Light, without sectors
Sub Type	Fixed
Light Status	Off
Battery Level	OK
Position Status	On Position
Current	0.0 A
Voltage	13.2 VDC

Message 8 – Weather Sensors

Target	TG_GABANG
Latitude	02° 40' 54.00" N
Longitude	101° 29' 12.00" E
Time of Tx	15:39
Average Wind Speed	7 kts
Wind Direction	262°
Wind Gust	7 kts
Air Temperature	26.8°
Relative Humidity	81%
Air Pressure	1008 hPa
Water Level	N/A
Surface Current Speed	N/A
Surface Current Direction	N/A
Water Temperature	N/A

ID	533000054
Name	TG_GABANG
Positional Accuracy	High
Latitude	02° 40' 54.00" N
Longitude	101° 29' 12.00" E
EPFS	Surveyed
Repeat Indicator	0
Mode	Autonomous
RAIM	Not In Use
Status	On Position, Light Out
Last Update Time	16:17:01

Choice of software for display:
Zeni Lite "Akari-ECS" or
alternatively, ICAN "Aldebaran II"

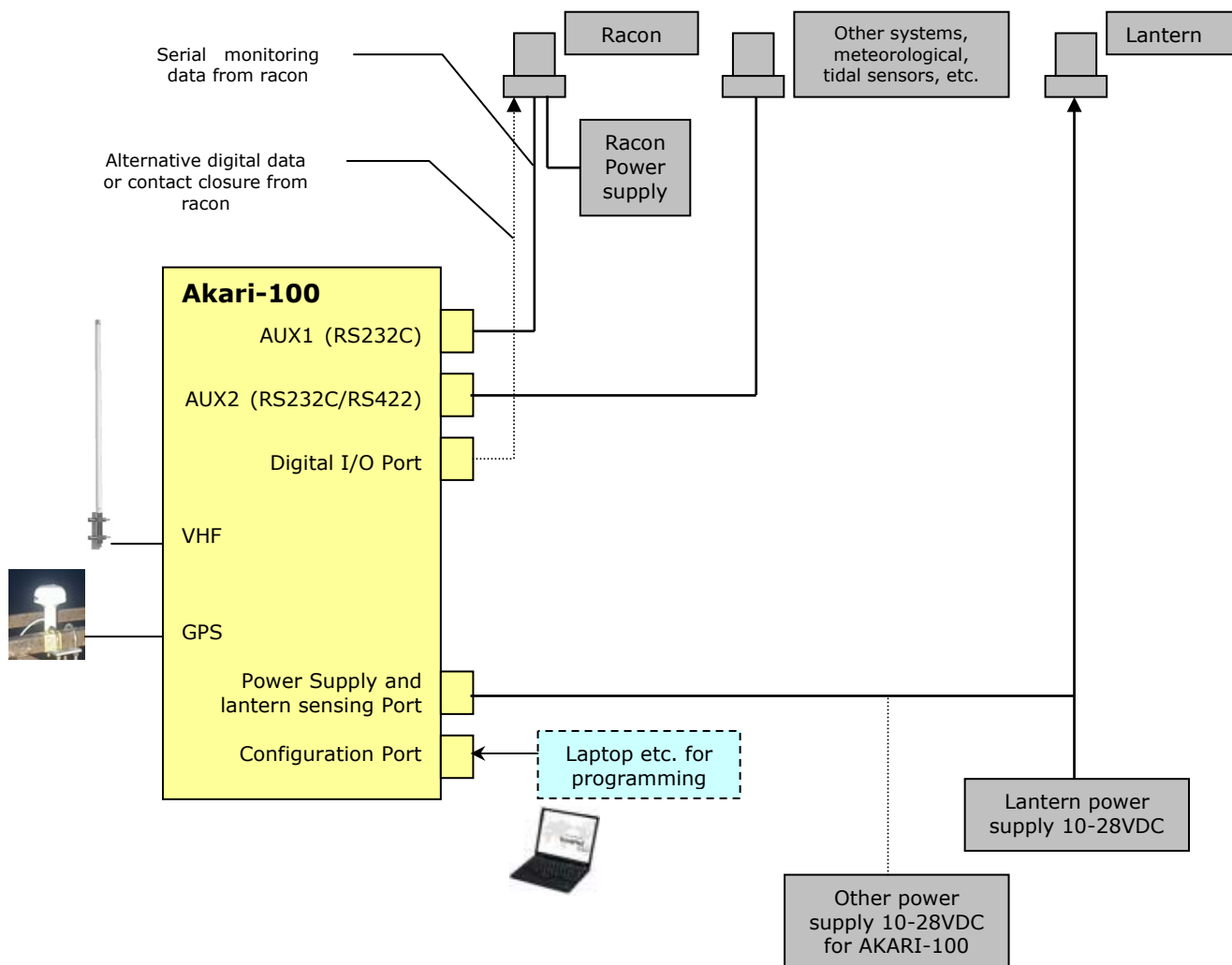
Displays aids to navigation status in
charted and tabular formats

Includes Access data store for
record-keeping, and analysis.

Message 21 – AtoN Information

Zeni Lite Akari-100 AtoN AIS unit – Single-line diagram installation examples

Typical installation with lantern, racon, and other equipment such as meteorological or tidal sensors, or another AtoN system



Note:

Review Akari-100 brochure for detailed technical specification

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