



COMPANY PRESENTATION

2020

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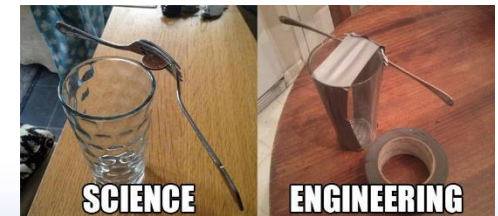
sales@mhztechnologies.co.uk



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- ✦ **Main Business** : Accurate Time and Frequency sources - Atomic Clocks
- ✦ **Founded** : At 1994 by Mr. Benny Levy and Dr. Avinoam Stern
- ✦ **Ownership** : Private company : 50% Founders, 50% RAFAEL (since 2011)
- ✦ **Workforce** : 50+ employees – 60% engineers and physicists





To specialize in developing and manufacturing highly accurate time and frequency products for military and commercial applications which combine high performances in harsh environmental conditions using the most advanced technology to fully meet and exceed our customers demanding requirements



Products Families

Rubidium
Frequency
Standards
Clocks



Nano Atomic Clock



AR133/AS133



Ruggedized AR133/AS133



MIL-STD GNSS
Disciplined
Rubidium
Systems



AR51/AS51 - Family



GNSS
Disciplined
Rubidium
Systems



AR7X/AS7X - Family

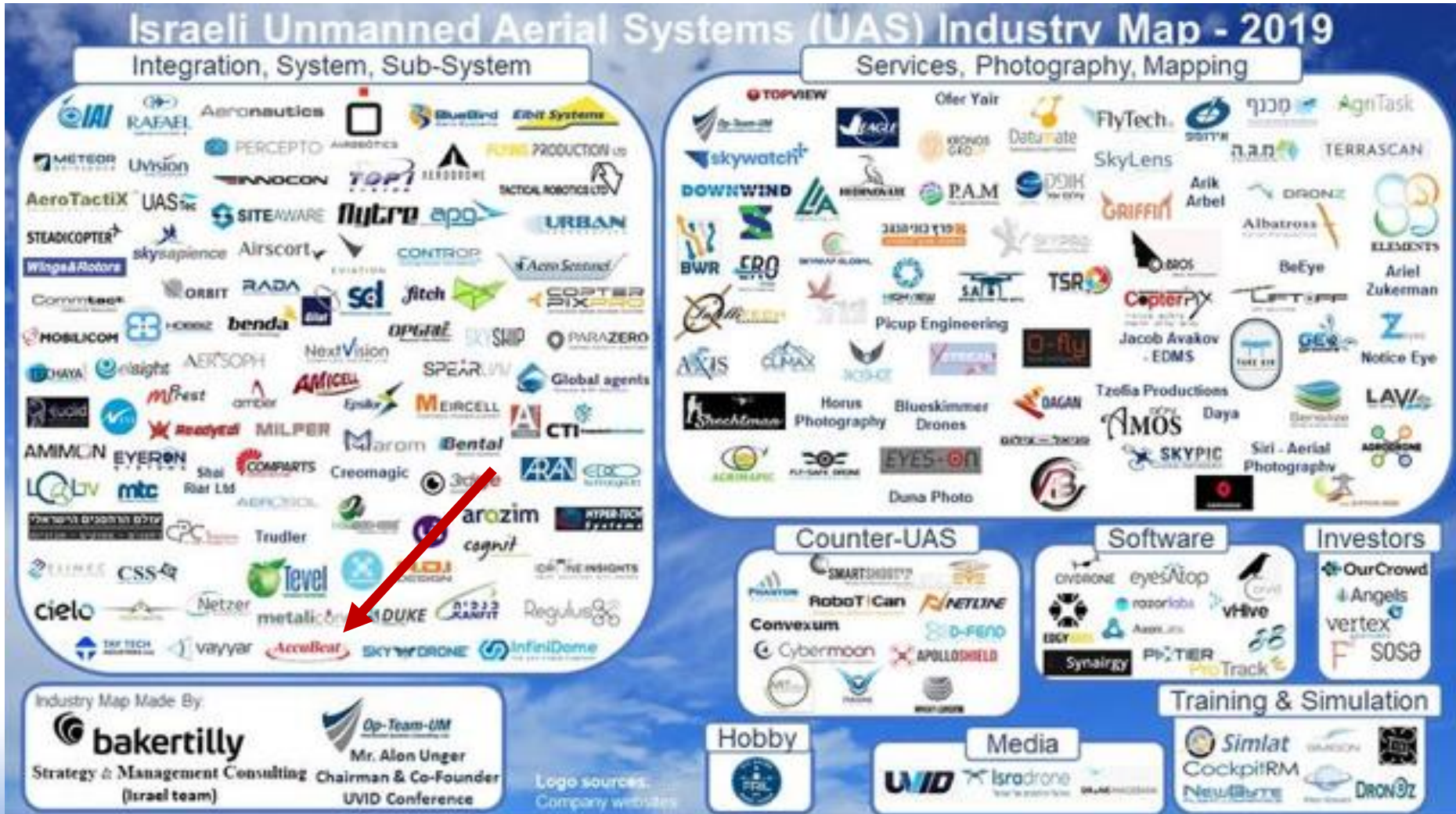




Different uses for Military app.

- ✦ Communication Systems
- ✦ Navigation (GPS & more) systems
- ✦ Elint, Comint & Electronic Warfare systems
- ✦ Multi-Static / Bi-Static Radar
- ✦ C5I - Command, Control, Communication Computers, Cyber
- ✦ Telemetry, Test Fields
- ✦ Identification Friend-or-Foe (IFF) systems
- ✦ Roadside explosive charge
- ✦ GNSS Spoofing Detect
- ✦ Cyber Attack Analyzing

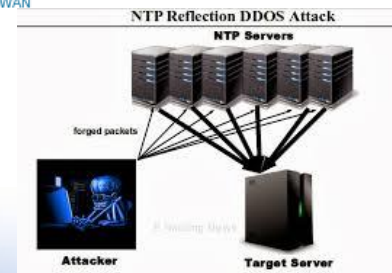
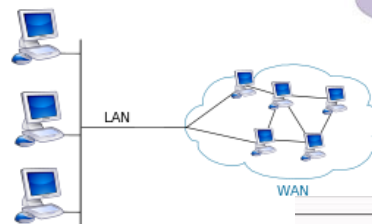
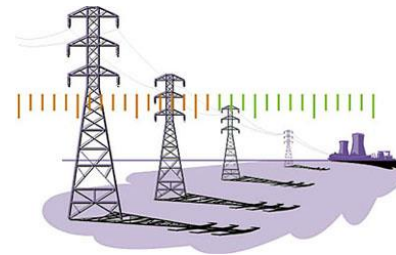






Time synchronization for HLS

- ✦ Cellular Base Stations
- ✦ Wire-line communication
- ✦ Power / Utility
 - ✦ Power generator synchronization
 - ✦ Fault detection – time tagging
 - ✦ Utility Fault Location
 - ✦ Network synchronization
- ✦ Civil Navigation
- ✦ Gas Infrastructure
- ✦ Banks & Stock Market
- ✦ WAN & LAN networks
- ✦ Transportation (Train, drones..)
- ✦ NTP Server for Cyber Attack Analyzing



Main Customers



U.S. AIR FORCE



Partnerships and Joint Projects

- The Technion and Bar-Ilan University



The NAC (Nano-Atomic-Clock) based on CPT (Coherent Population Trapping) technology, a very small size, low power Rubidium Frequency Standard

- Rafael 

Developing Ultra miniature MEMS physics package for NAC 2 (Nano Atomic clock – phase 2)

- Ben Gurion University



Ultra-stable Atomic Clock based on cold atoms



- ✦ AS 9100 - Aerospace Standard (Rev D)
- ✦ Great appreciation from US Government
- ✦ Qualified for Galileo ground stations
- ✦ Great appreciation from RCI & Boeing
- ✦ USAF Metrology Calibration Lab reports amazing performance
- ✦ CNES (France Space Agency) reports excellent performance
- ✦ Graded at 100% Quality and Reliability
by the Israel MoD for 12 years continuously
- ✦ Several Customer Testimonials



Appreciation from customers

AccuBeat is qualified by the USAF to be the sole supplier of Rubidium-Frequency-Standard model AR61A for various strategic forces.



**Rockwell
Collins**

A letter from the Program Manager:
To AccuBeat Team,

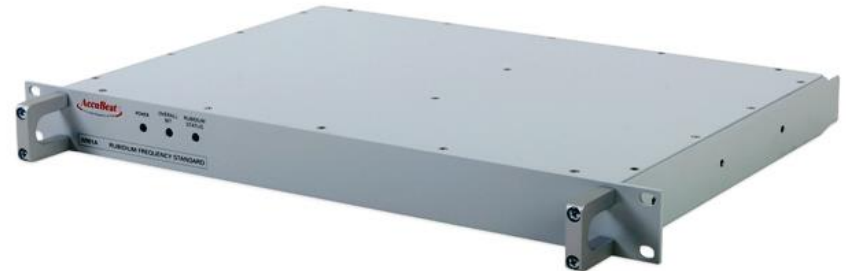
... AccuBeat is recognized as a superior supplier of frequency standards that delivers a high quality product within schedule and budget.

Supplier to Galileo

Qualified for Galileo Ground Stations



- Qualification of Rubidium Frequency Standard model AR81A was done with **Thales Alenia Space Italy (TAS-I)** and supervised by **TAS-F** and **ESA**
- The unit complies with all requirements and exceeds some by large margins
- AccuBeat is a **sole qualified supplier**



Model AR81A

Ultra Stable Oscillator for JUICE – Jupiter Icy Moon Explorer

The mission will study the moons of Jupiter as potential habitats for life



ADEV – $5E-13$ @ 1-1000 Second
RAD – HAD for deep space



Primary Clock

Based on Cold Atom

- ✦ Accuracy and stability 10^{-14} (1ns per day)
- ✦ 19" 3U
- ✦ Engineering model at 2019



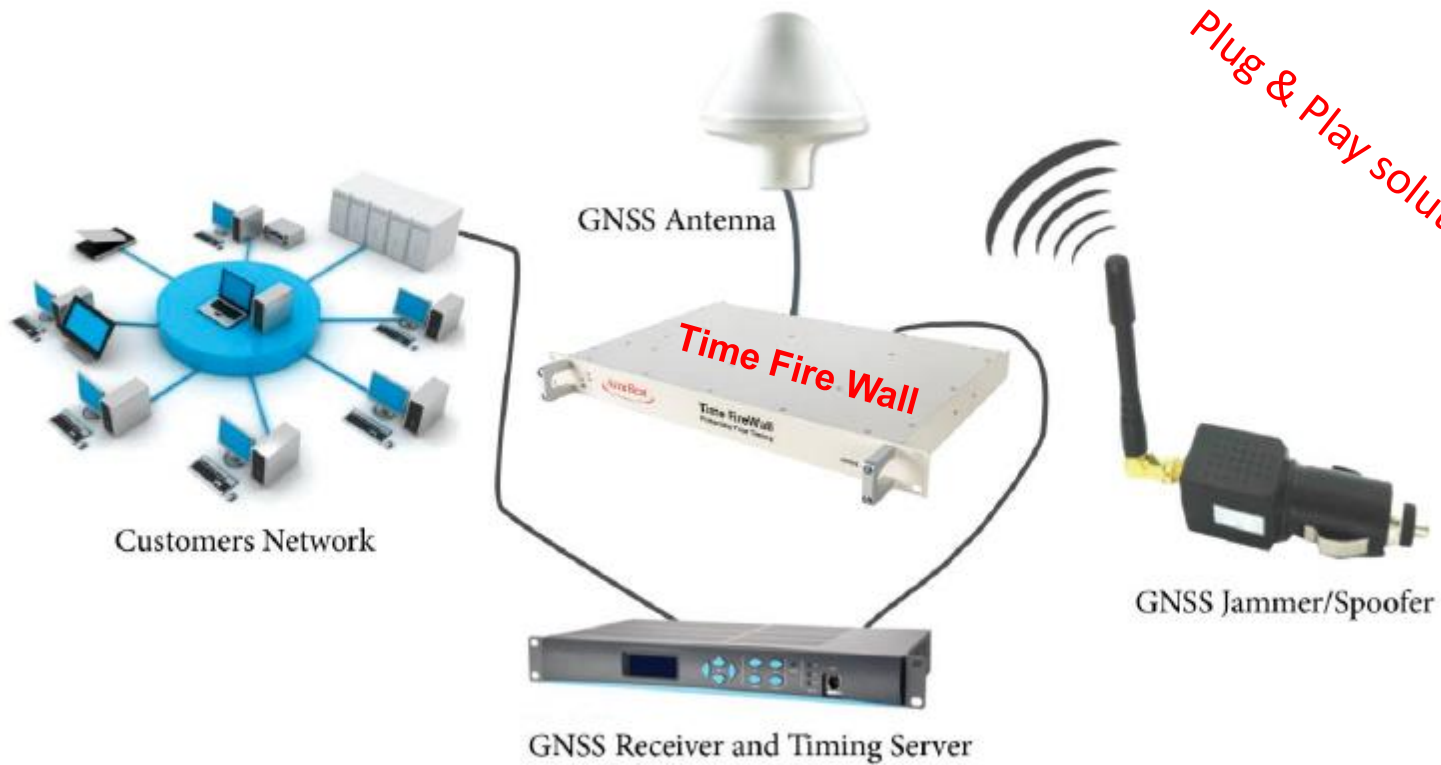
Securing GPS/GNSS against Jamming and Spoofing attacks



Time Fire Wall™

Protecting Critical Infrastructure in a GNSS Denied & Spoofed Environment

Patented innovative solution for critical infrastructure



Quality innovation award

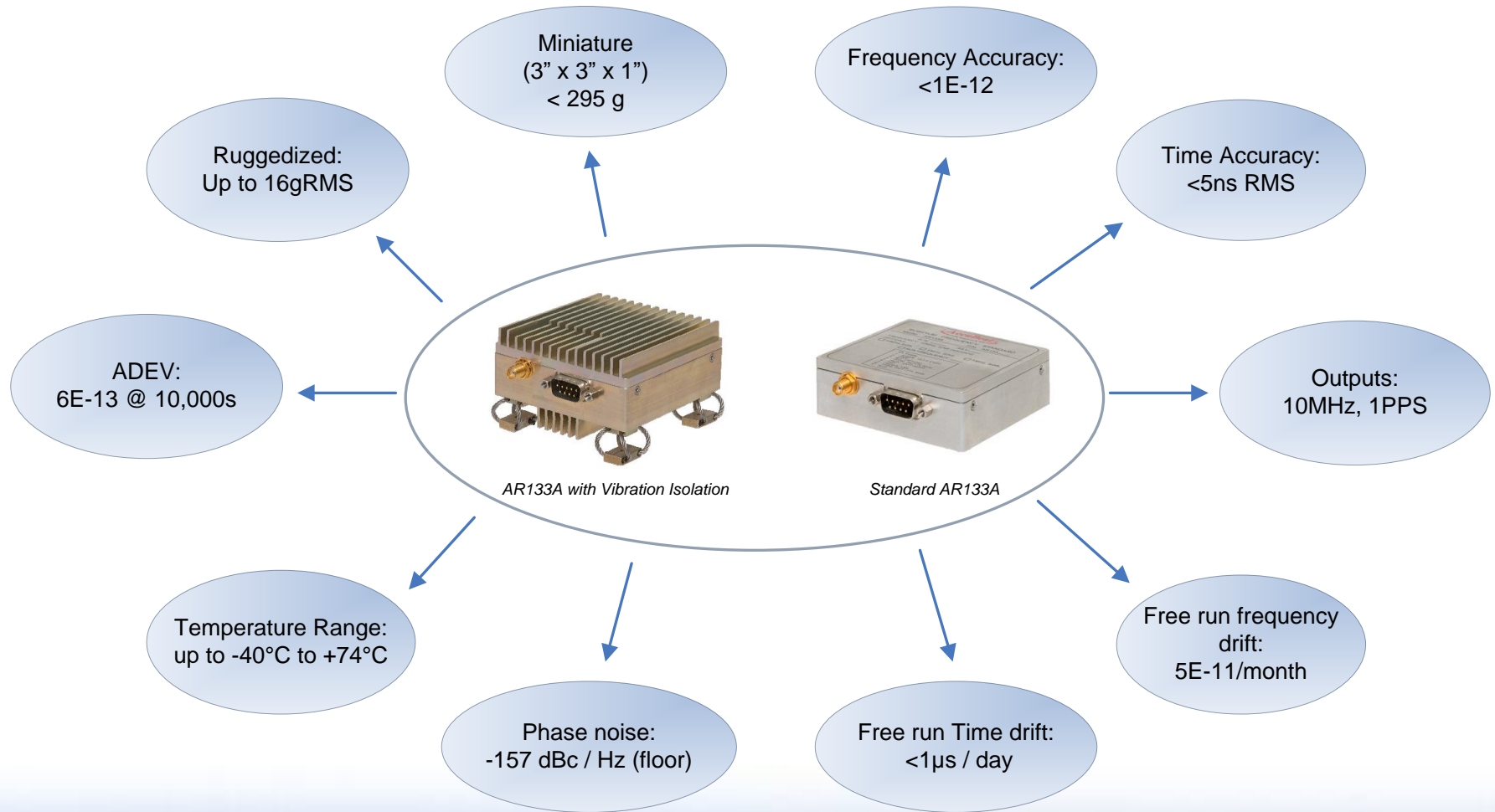
- ✦ AccuBeat was awarded the Israel Quality Award for its patented Time FireWall™
- ✦ AccuBeat represented Israel in the 2017 International competition
- ✦ First In The Category:
Business Innovation Award for Small and Medium Companies





OUR PRODUCTS

AR133A Rubidium Atomic Clock



NAC – Nano Atomic Rubidium Clock



Portable RADAR



UAV's



Man packed Radios



Weapons

For Low Power Mobile Applications

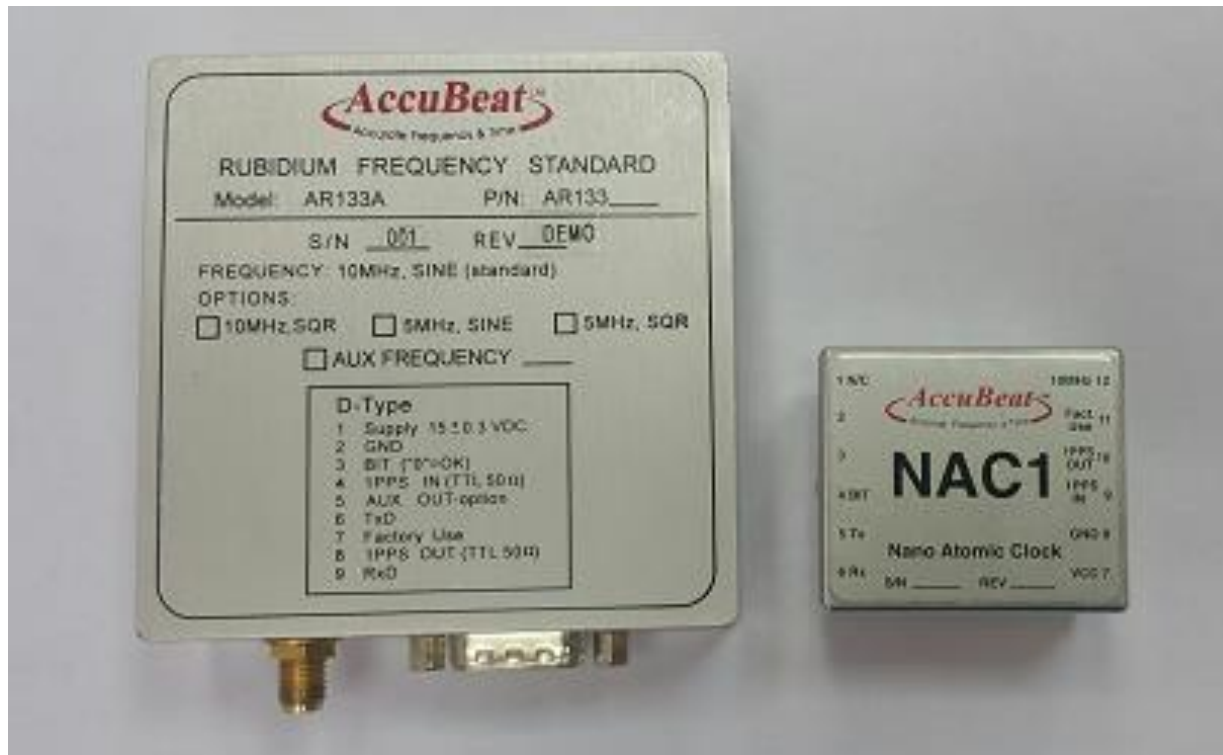
NAC – Main Characteristics



- Phase noise (floor): -150dBc / Hz
- Power Consumption: < 1.2W
- Size: 32cc (41.1mm X 35.3mm X 22 mm)
- Aging: <3E-10/month
- Temp Stability: $\pm 1E-9$ / -20°C to 65°C
- Outputs: 10 MHz , 1PPS
- Supply voltage: 3.3 VDC
- RS232 interface for monitoring and control
- ROHS Compliant

NAC1 Specifications

NAC vs. AR133



GPS - Rubidium Clock systems

for military applications
Airborne, Shipborne & Land platforms



AR51A-09



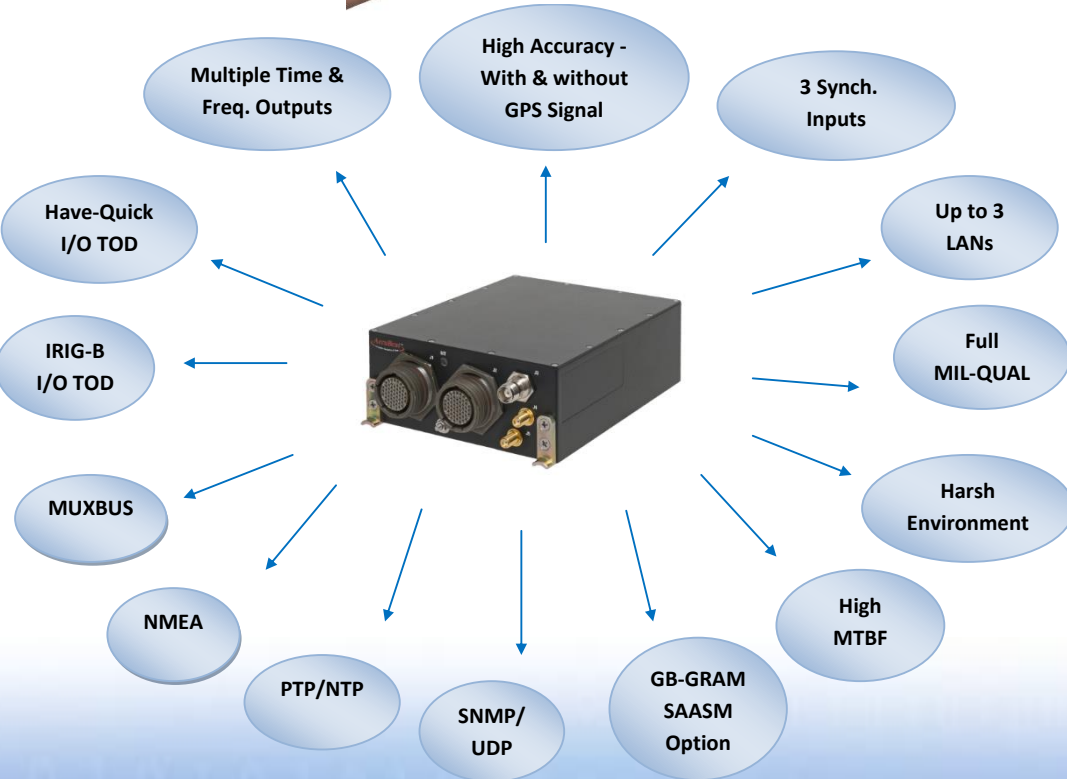
AR51A-07



AR51A-07 with vibration isolator

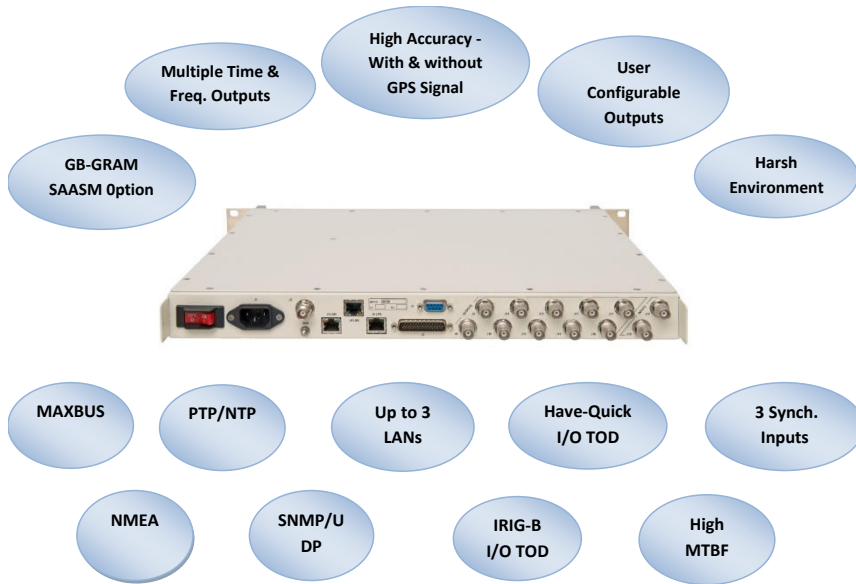


AR51A-07 with external battery



GPS disciplined – Rubidium/OCXO Clock systems

*for commercial &
Ground fixed military stations*



AR76/77A
Multi Functional Clock System



AR71 Compact System

Portable Atomic Clock for GPS demine Zone

Portable Atomic Clock for Time and Frequency dissemination



Calibration Suitcase

Portable Atomic Clock for dissemination of Time and Frequency

Key Features

- ✦ Portable Rubidium Atomic Clock
- ✦ Internal rechargeable backup battery
- ✦ Power supply: 110/220 VAC, 11-32 VDC
- ✦ Outputs:
 - TOD: Have Quick, IRIG B (option)
 - 1PPS
- ✦ Inputs:
 - TOD: Have Quick, IRIG B (option)
 - 1PPS
 - GPS antenna
- ✦ Set of Cables



AR50

Docking Station



Thank you for your attention

Contact :

Aftab Khan

MHz Technologies Ltd

sales@mhztechnologies.co.uk

+44 2076601036

+447506111382