

ENC Data Streamed Directly  
from a Cloud-based  
Infrastructure Specifically  
Designed for Marine  
Navigation

NEW PATHS. NEW APPROACHES

NOAA 2019 Nautical  
Cartography Open House



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- Overview of the Role of the IMO and IHO
- Problem Definition – one SOLAS three different users
- Introduction to ENC Streaming NaAVIC App
- NaAVIC Underlying Principles
- Nautilus Cloud Platform – the Engine
- Summary

- **The International Maritime Organization (IMO)** is the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine and atmospheric pollution by ships.
- International Convention for the **Safety of Life at Sea (SOLAS)** sets minimum safety standards, including safety of navigation provisions in SOLAS Chapter V:
  - requirements to carry suitable up to date nautical charts and publications
  - rules related to **Electronic Chart Display and Information System (ECDIS)** - effectively ECDIS must be type approved, have an adequate backup in place, be adequately maintained, remain compatible with the latest applicable International Hydrographic Organization (IHO) standards and use up to date ENC data

Although the IMO is responsible for establishing all key safety provisions which require type approved ECDIS to be used in conjunction with up to date official ENC data, it is **the International Hydrographic Organization (IHO)** who develops and maintains the portfolio of relevant data standards, including: **S-57** for data content and encoding,

- **S-52** for data rendering,
- **S-58** for data validation, and
- **S-63** for data protection specifically referenced by the IEC testing standard, which verifies an ECDIS against the IMO performance standard.

SOLAS has lead the way....

- Global data coverage and mature distribution ecosystem
- Professional mariners are well aware of all data provisions and are able to benefit from all modern advances
- Emerging S-100 suite of data products and case for real-time data access
- Standards based, Rigorous, Dependable

**One SOLAS, three different user communities**

# One SOLAS, three different users



**SOLAS**

Non –SOLAS  
Commercial &  
Recreational

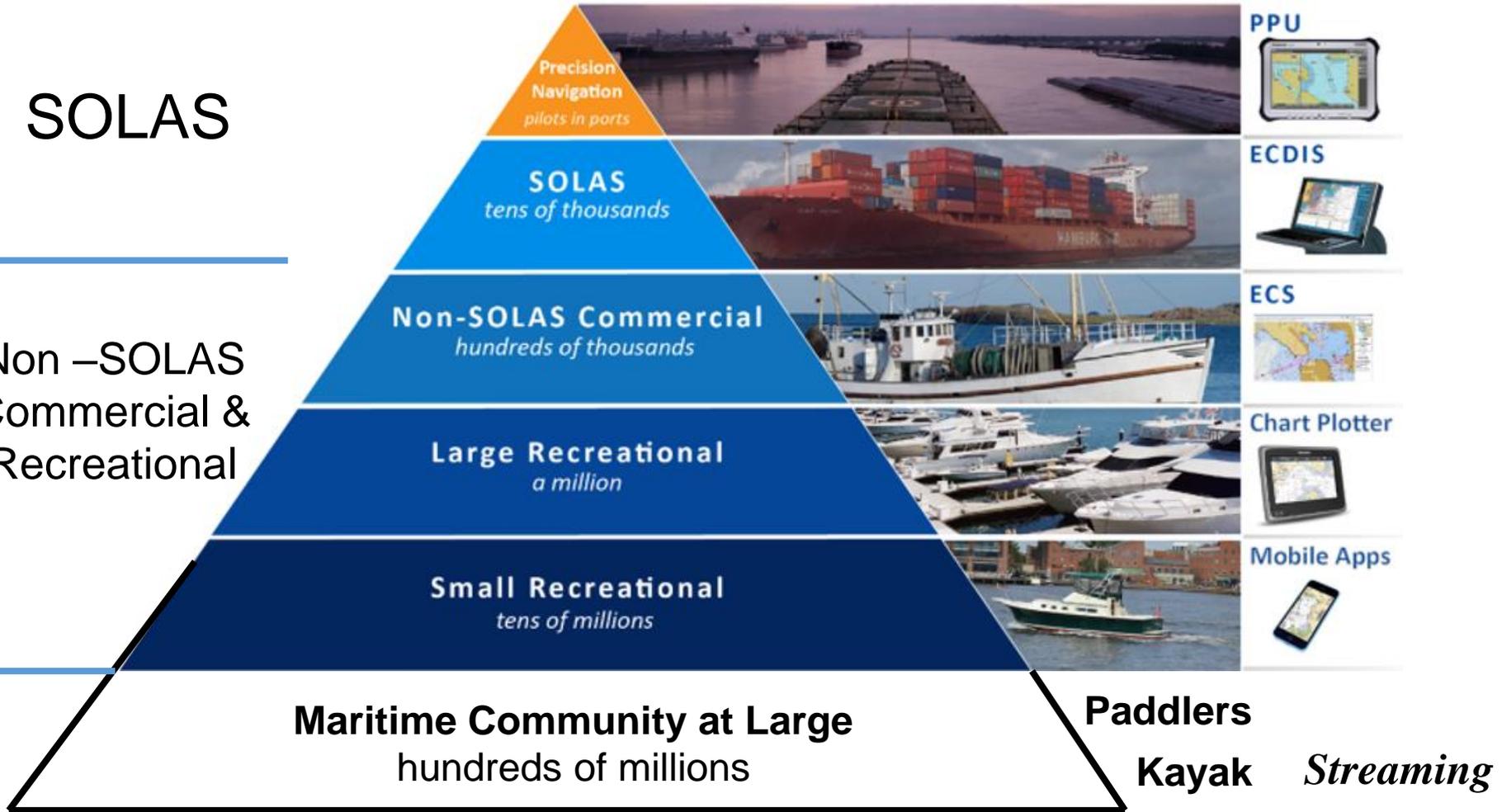
Non –SOLAS  
Maritime Community  
at Large

# Electronic Chart User Base



SOLAS

Non-SOLAS  
Commercial &  
Recreational



*“The Power of the Crowd”*

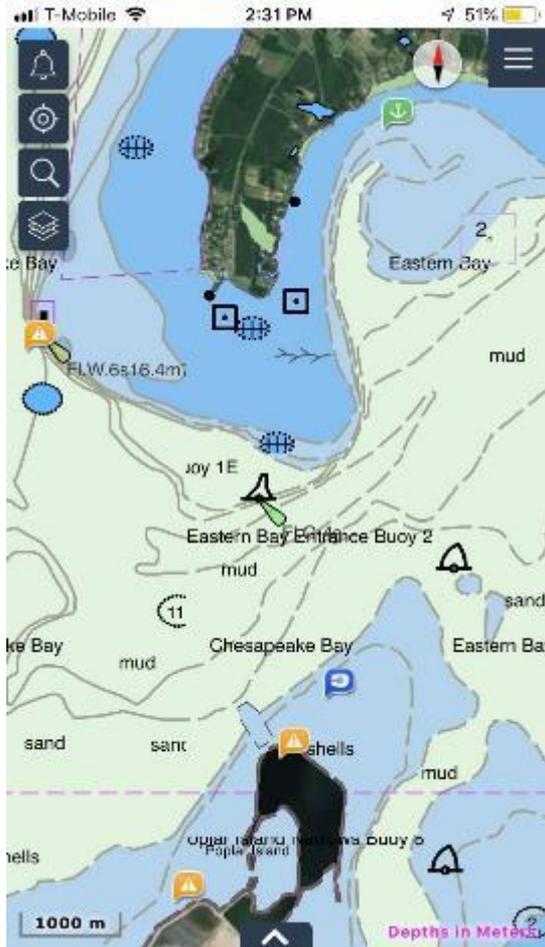
# NaAVIC - Free Mobile ECS App



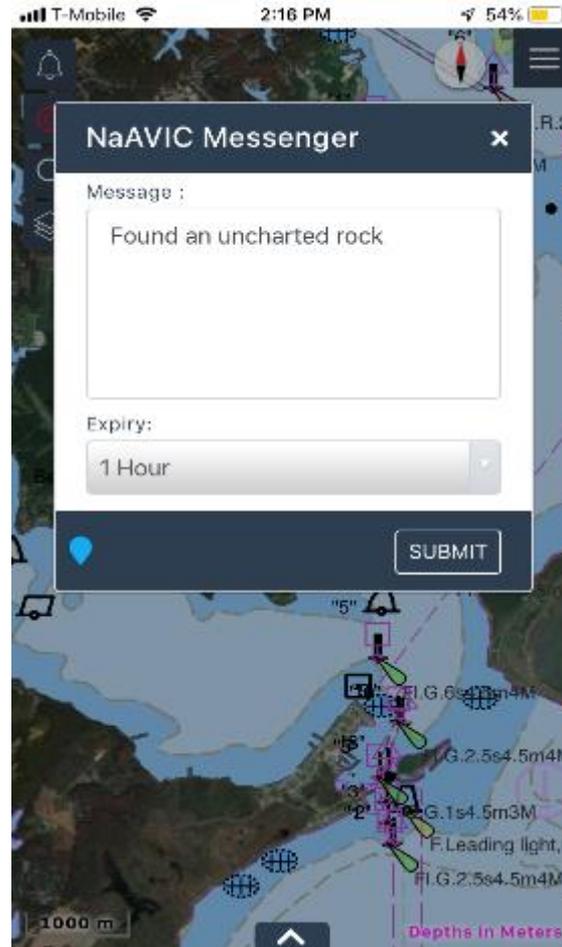
- ECS functionality
- NO DOWNLOADING OF DATA
- NO DISTRIBUTION OF DATA
- NO FILE MANAGEMENT
- HEADACHES
- UP TO DATE ENC STREAMED DATA
- Powered by Nautilus Cloud - native cloud solution streaming data on demand: ENCs, tide and current data, and satellite imagery
- [www.naavic.net](http://www.naavic.net)



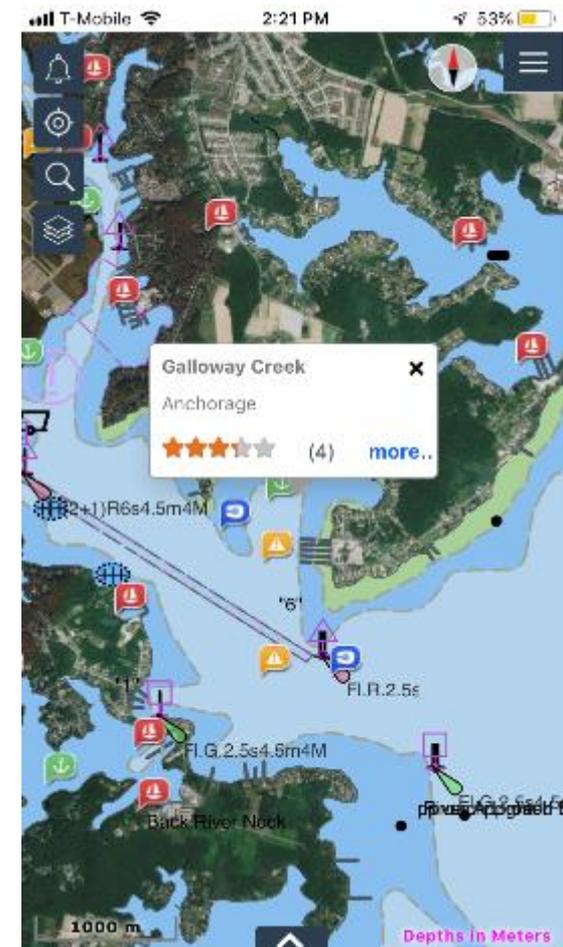
# NaAVIC – Underlying Principles



Enabling



Engagement



Sharing

Three important requirements for ECS data, which are instrumental for safety of navigation, are covered;

1. content,
2. quality
3. updating.

**Nautilus Cloud** is a cloud based infrastructure for Marine Data, Solutions and Services for Government Organizations, Commercial Industry and Consumers

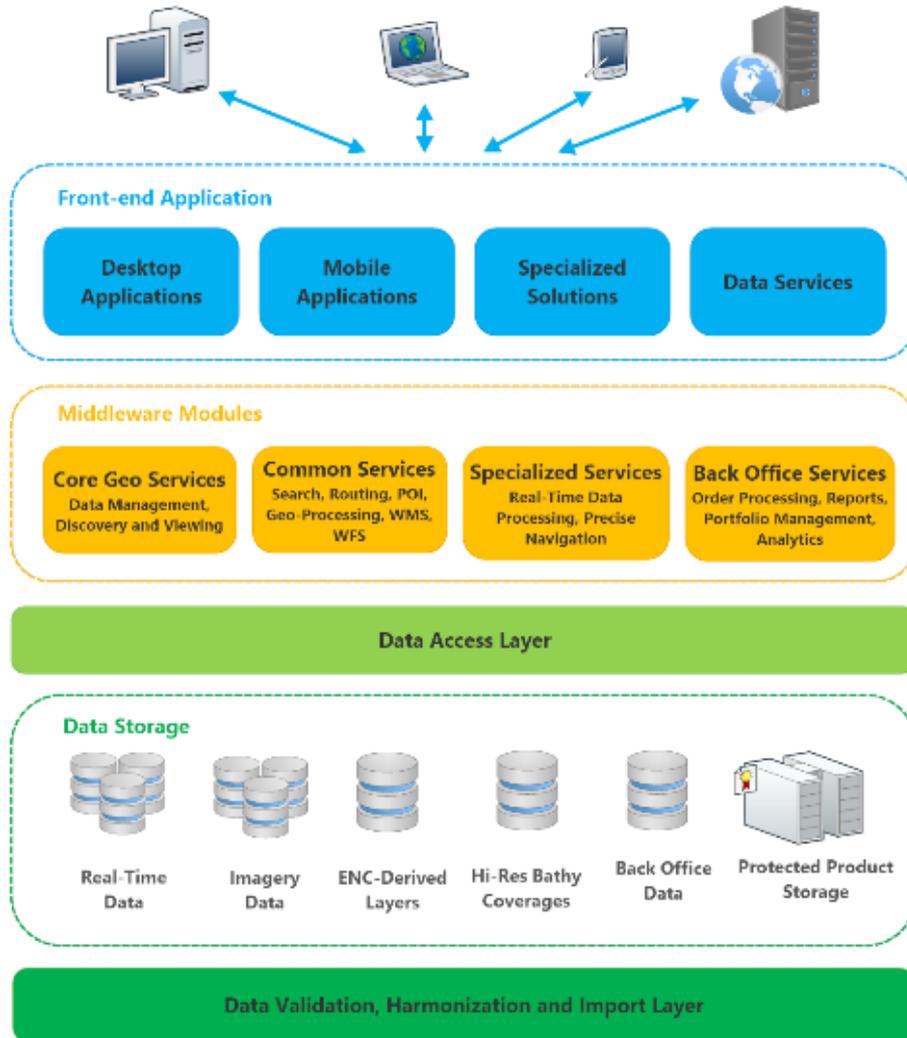
**Government:** HOs, National Institutes, R&D Organizations, Natural Resources, Environmental and Scientific Organizations, Inland Waterways

**Commercial:** Ports, Oil and Gas, Shipping, Dredging, Hydro Survey and Service Companies, Fishing Industry

**Consumer:** Leisure, Sports, Tourism

- Enterprise-grade and fully scalable
- Native cloud solution
- Platform independent
- OGC compliant
- Cloud or self-hosted

# Nautilus Cloud Architecture



Front-end Applications

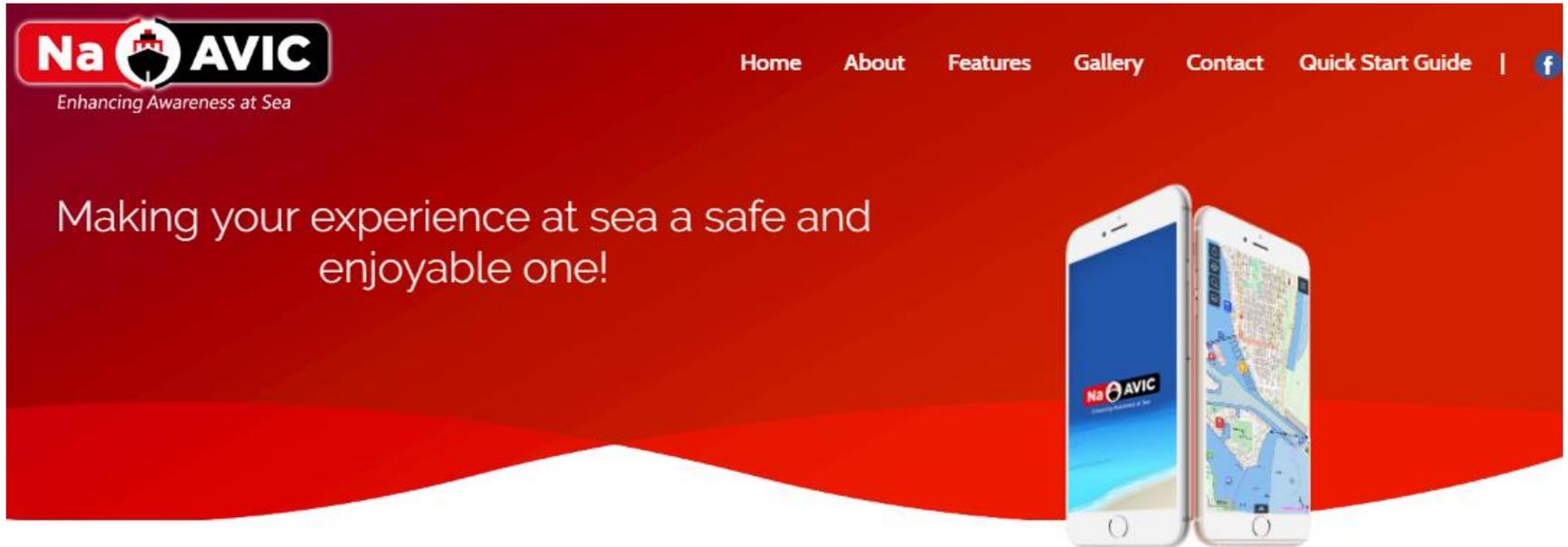
Middleware Modules

Data Access Layer

Data Storage

Validation, Harmonization and Import Layer

- **NaAVIC is a free and downloadable mobile ECS** that represents a new approach to safe navigation where the electronic chart data does not physically exist within the onboard computer but is streamed.
- It **enables** the user community to take advantage of existing rigorous standards created for SOLAS, **engages** the user community with the hydrographic office in facilitating crowd sourced information, and facilitates **sharing** of other data with the marine community
- The system provides a **flexible business model** by facilitating the ability to switch between free and cost-recovery models of data distribution as their requirements dictate using Nautilus, Cloud an enterprise-grade cloud infrastructure for marine data delivery.



The screenshot shows the NaAVIC website interface. At the top left is the NaAVIC logo with the tagline "Enhancing Awareness at Sea". To the right is a navigation menu with links for Home, About, Features, Gallery, Contact, and Quick Start Guide, followed by a Facebook icon. The main content area features the text "Making your experience at sea a safe and enjoyable one!" and an image of two smartphones displaying the NaAVIC mobile application. One phone shows the app's splash screen, and the other shows a map interface.

[www.naavic.net](http://www.naavic.net)

Thank You!