



**UN-GGIM**  
UNITED NATIONS INITIATIVE ON  
GLOBAL GEOSPATIAL  
INFORMATION MANAGEMENT

# Standards Considerations for Member States

Dr. Daniel Roman

UN Subcommittee on Geodesy

ISO TC 211 - AG12, WG1, WG4, WG9



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United Nations Committee of Experts on  
Global Geospatial Information Management

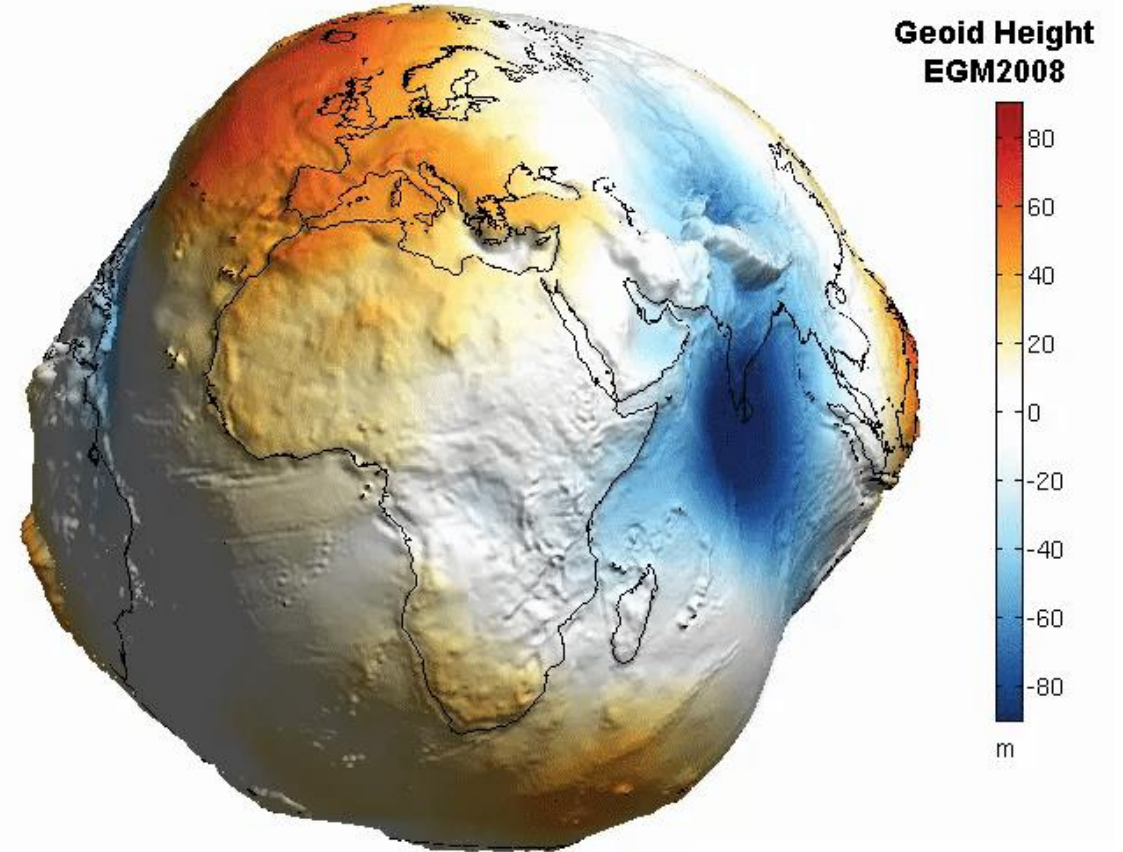
Subcommittee on  
Geodesy

*Positioning geospatial information to address global challenges*

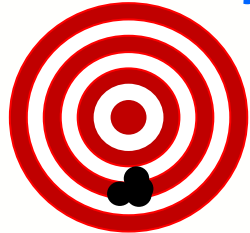
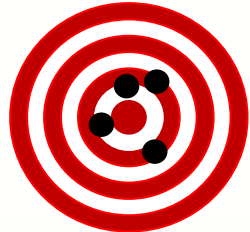
[ggim.un.org](http://ggim.un.org)

# “Joining Land and Sea”

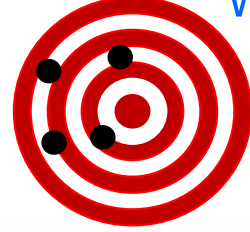
- What does that entail?
- Same CRS/Global models?
- Positioning vs. Navigation
- Positioning on land requirements
- Need for greater *accuracy*



• ITRS



WGS84



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“Positioning geospatial information to address global challenges”

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# UN Resolutions Provide Global Context

## UN GGIM

- **ECOSOC Resolution 2011/24**
- To provide a forum for coordination and dialogue
- Promote global **frameworks**, common principles, policies, guidelines and **standards** ... for the interoperability and interchangeability of geospatial data and services

## GGRF

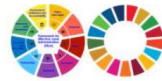
- **UN Resolution 69/266**
- Global Geodetic Reference Frame
  - Implement open sharing of geodetic data, **standards and conventions**
  - Improve global geodetic infrastructure
  - Collaborative Sovereign efforts in cooperation with the **IAG**
  - Build capacity and capability regionally
  - Conduct outreach and communication
- Impetus to align terrestrial domain
- UN GGCE and UN SCoG



# 14<sup>th</sup> Session of the UN-GGIM

New York, USA August 2024

## Forum on the Integration of Terrestrial, Maritime and Cadastral Domains



Current Status in the Consideration of the Integration of the Terrestrial, Maritime, Built, and Cadastral Domains

Why, What, Who and How?

Led by Expert Group on Land Administration  
Supported by Working Group on Marine and Legal Framework, and UN-Global Geodesy  
6 August 2024



## Land - Sea Integration in the Pacific

"Lessons and good practices"

Forum on the Integration of Terrestrial, Maritime, and Cadastral Domains

United Nations Conference Room 4, New York.  
6<sup>th</sup> August 2024

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Forum on the First Joint Development Plan for Global Geodesy

Tuesday 6 August 2024  
11:30 am - 12:45 pm  
Conference room 4 (CR-4 GA Building)  
United Nations Headquarters in New York



**Stronger. Together.**  
United Nations Global Geodetic Centre of Excellence and  
United Nations Global Geospatial Information Management  
Subcommittee on Geodesy

*Co-development of on a paper to address the integration of terrestrial, maritime, built and cadastral domains*



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# Implementation and adoption of standards for the global geospatial information community

United Nations

E/C.20/2024/17



**Economic and Social Council**

Distr.: General  
17 May 2024

Original: English



**Technical Committee 211**  
Geographic Information/Geomatics

**Committee of Experts on Global Geospatial Information Management**

**Fourteenth session**

New York, 7–9 August 2024

Item 15 of the provisional agenda\*

**Implementation and adoption of standards for the global geospatial information community**



**Open Geospatial Consortium**

**Implementation and adoption of standards for the global geospatial information community**

**Note by the Secretariat**

The Secretariat has the honour to bring to the attention of the Committee of Experts on Global Geospatial Information Management the report prepared jointly by the International Hydrographic Organization, technical committee 211 of the International Organization for Standardization (ISO) and the Open Geospatial Consortium, which will be available in the language of submission only from the relevant web page of the Committee of Experts (<https://ggim.un.org/meetings/GGIM-committee/14th-Session>). The Committee is invited to take note of the report and to express its views on the ongoing work of the three standards development organizations in the innovation, adoption and implementation of standards for the global geospatial information community.



**IHO**

International Hydrographic Organization

**Item 15 on the Agenda**



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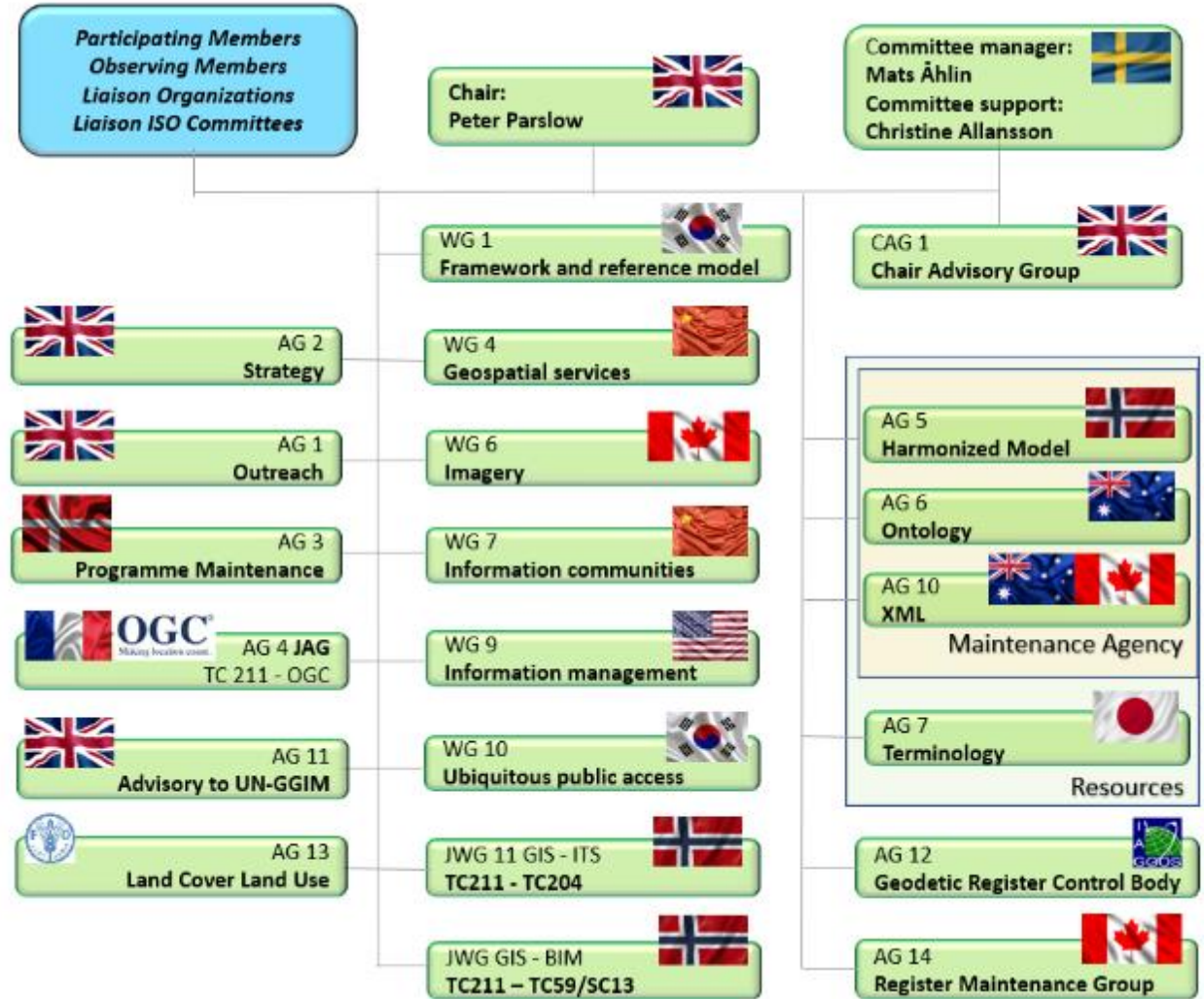
Subcommittee on Geodesy

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# ISO TC 211

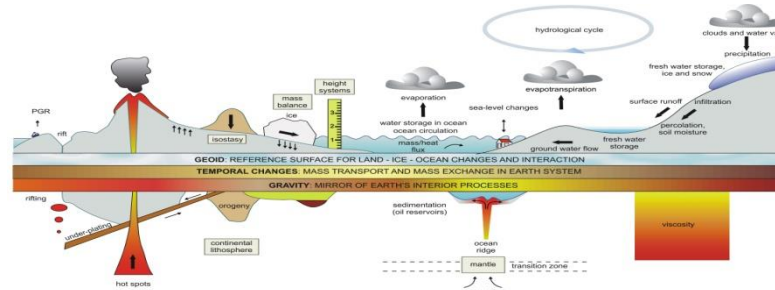
- Select TC 211 Projects
  - 19127 (IR) – ISO GR
  - 19111 (IR) – Referencing by coordinates
  - 19115-2:2019 - Metadata
  - 19161-1:2020 – the ITRS
- TC 20 – aircraft & space vehicles (incl. GNSS)
- TC 204 – Intelligent transportation systems (AV's at sea, on land and in the air)



# IGAG Central Objective: Geodetic Observation of Solid Earth Processes

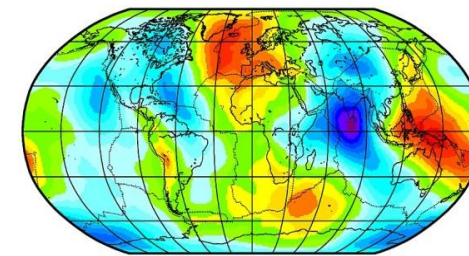
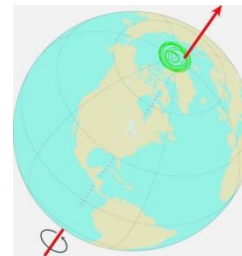
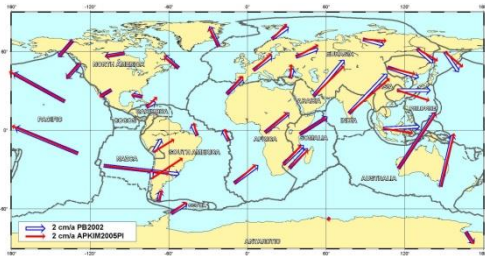
Processes in the solid Earth:  
geodynamics  
(deformation)

Processes in the atmosphere and hydrosphere:  
water cycle



deformations

variations of the rotation and the gravity field



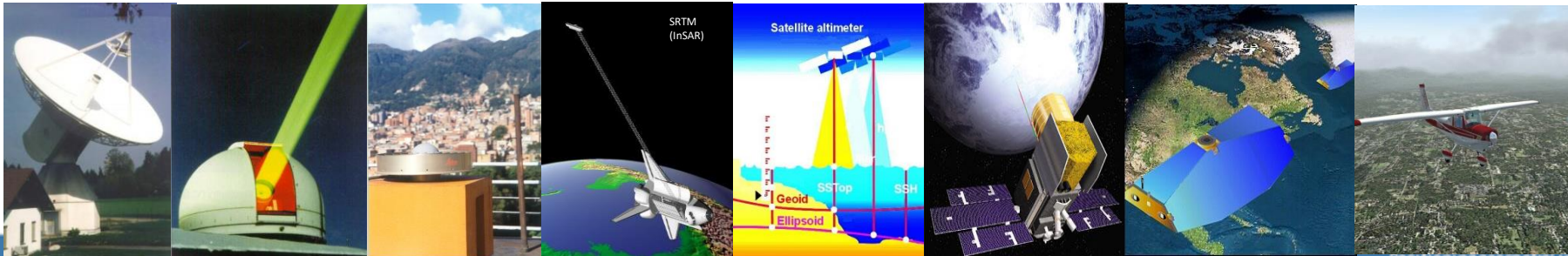
ITRS

IHRS

point positioning

surface scanning

gravity measurement



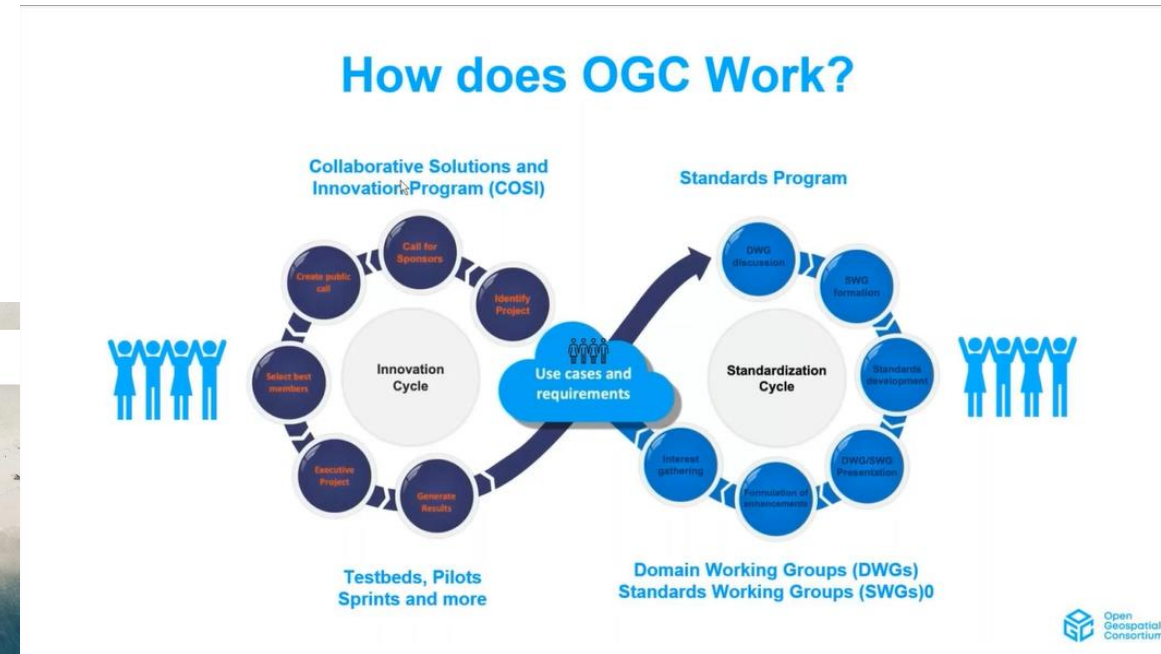
# OGC FMSDI Pilot Initiative

Who We Are | Our Programs | Publications | News & Events

● CALL FOR PARTICIPATION (CFP)

## Grant Applications Open for Pilot Project to Bridge Land and Sea Data

Fifth phase of OGC's multi-year Federated Marine SDI project will explore mechanisms for dynamically transferring data between land and sea paradigms with as little loss as possible.



## GGXF

- Geodetic data Gridded eXchange Format
- netCDF – based
- => Ocean models



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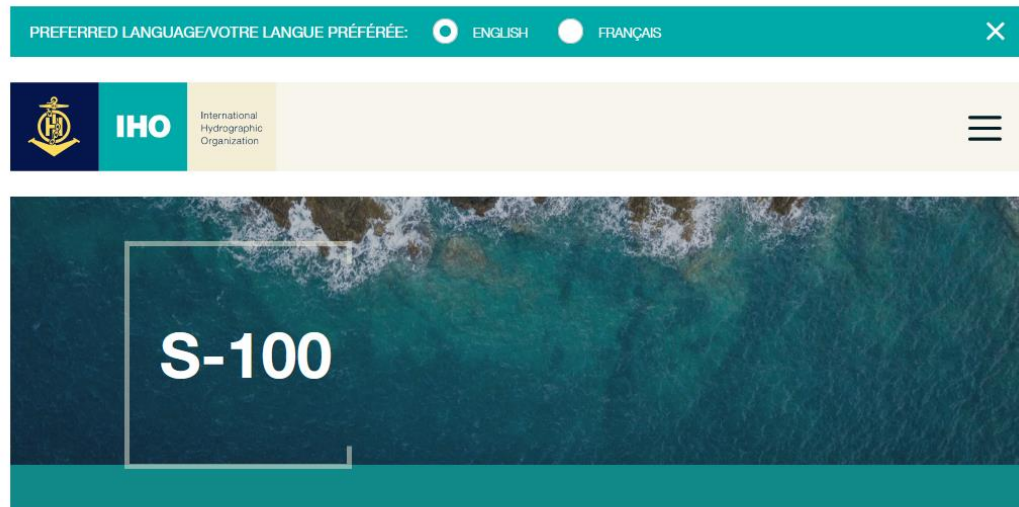
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# IHO Standards

## S-100 Universal Hydrographic Data Model

## IHO Paper S-100WG 6-06.6 Sweden 2022



- *ITRS vs. WGS84*  
*“However, the ambiguity between various versions of WGS84 used for geographic coordinates probably, at some point, will become a hinder for the use of more accurate positioning services for navigation.”*
- **That day is coming very soon**
- ISO 19111:2007 vs ISO 19111:2019
  - Static vs. Time dependent
- EPSG vs ISOGR



# CRS Registry

## EPSG GR

GeoRepository

Home | EPSG Dataset | Support Documentation | About Us

Contact | GIGS | IOGP Geomatics

### EPSG Geodetic Parameter Dataset

#### About the EPSG Dataset

The IOGP's EPSG Geodetic Parameter Dataset contains definitions of coordinate reference systems and coordinate transformations which may be global, regional, national or local in application. It is maintained by the Geodesy Subcommittee of the IOGP Geomatics Committee.

The EPSG Dataset is the de facto standard in the geospatial industry, initiated in 1985 and first made public in 1993, as described in the [History of the EPSG Dataset](#). For more information about its content and usage, see the [Guidance Notes](#) under "Support Documentation".

Recent changes to the data can be viewed in the [EPSG Dataset Release History](#).

To request changes to the EPSG Dataset see [EPSG Dataset Change Request Help](#).

#### About registration

To gain access to the EPSG data through these web pages, you must agree to the [Terms of Use](#) by registering on this site. Once logged in, you will have access to additional functionality and may also manage your account including your subscription to EPSG updates.

To register, you must enter your email address (visible to IOGP) and password (not visible). This information is not used outside this site, nor is it passed on to any third party.

Click [here](#) to register.

#### About this site

This site contains the master EPSG Dataset. Its data model

Text Search

Please login or register to include deprecated (invalid) items, search remarks and export results.

Map Search

## ISO GR

### ISO Geodetic Registry

Viewing register as of 2024-09-16 14:14:42 UTC

Home

#### Welcome to ISO Geodetic Registry

Quick search across all items

The ISO Geodetic Registry is a structured database of coordinate reference systems (CRS) and transformations that is accessible through this online registry system. The Register includes only systems and transformations of international application. It does not include all possible coordinate reference systems and transformations.

This Registry is provided under the auspices of [ISO Technical Committee 211](#) on geographic information/geomatics and conforms to the following ISO standards:

- [ISO 19111:2007](#) (Spatial referencing by coordinates)
- [ISO 19127:2019](#) (Geodetic register)
- [ISO 19135-1:2015](#) (Procedures for item registration -- Part 1: Fundamentals)

Work is also underway to upgrade the Registry to conform to the recently revised ISO 19111:2019 standard, which includes support for dynamic datums and geoid-based datums.

**July 2022:** ISO/TC 211, OGC and IOGP have jointly published the "[Guide to Coordinate Reference System \(CRS\) Resources](#)". The guide describes basic information and the intended purposes of the three authoritative CRS registers: EPSG, ISO Geodetic and OGC CRS registries, for the user community.

#### Register system update

As of mid-September, the ISOGR has been updated to a new and more efficient register

Browse

Item classes

- > Datums
- > Coordinate reference systems
- > Coordinate operations
- > Coordinate systems
- > Other

Proposal history

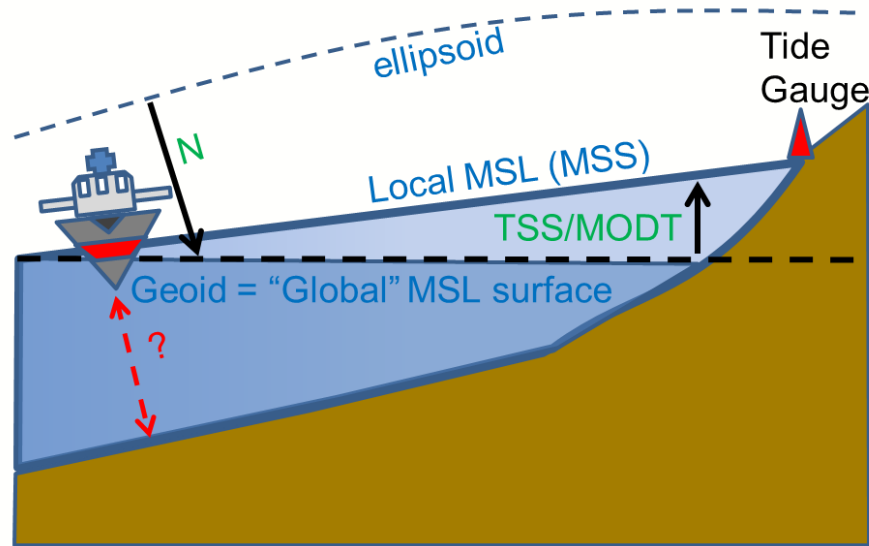
- Prp. 2024-09-16: Correct extent typos i...
- 2024-09-04: Migrating extent infer...



# Vertical Surface Relationships

$$h = H + N \quad \text{or} \quad H = h - N$$

$$\text{Geoid} + \text{TSS} = \text{LMSL}$$



- **h: ellipsoid height**
  - Above/below ellipsoid surface/datum
- **H: orthometric heights**
  - Above geopotential datum (geoid)
  - Geoid  $\approx$  Global MSL (MSL)
- **N: geoid height**
  - Height from ellipsoid to geoid
- **Local Mean Sea Level (LMSL)**
  - Mean Sea Surface
- **Topography of the Sea Surface (TSS)**
  - Height from MSL(geoid) to LMSL(MSS)

# THANK YOU FOR YOUR ATTENTION<sup>3</sup>

Contact info

[Dr. Daniel Roman](#), NOAA's National Geodetic Survey



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