

# UNCIO FRAMEWORK

United Nations Committee on Interstellar Objects — A Global Framework for Comprehensive Study of Interstellar Objects

Based on research by Eldadi, Tenenbaum & Loeb (2025) | arXiv:2510.01405

## MISSION

Coordinate global scientific research, maximize observational coverage, and ensure optimal scientific return from ISOs through systematic investigation across cosmochemistry, astrobiology, planetary sciences, fundamental physics, and materials science.

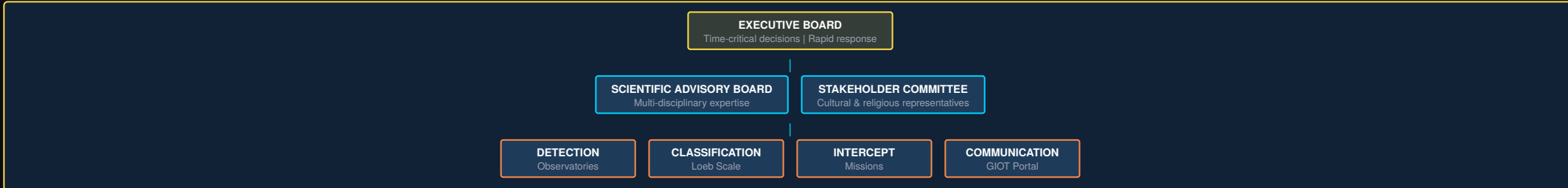
## URGENCY

The Vera C. Rubin Observatory will increase ISO detection from ~3 per decade to potentially one every few months. This dramatic increase demands coordinated international response protocols and classification systems.

## PRECEDENTS

Drawing from successful collaborations like ISS and CERN, UNCIO operates through a dual structure: an executive board for time-critical decisions and a committee for comprehensive stakeholder representation.

## UNCIO ORGANIZATIONAL STRUCTURE



## THE LOEB SCALE (IOSS)

| Lvl | Classification       | Description                             |
|-----|----------------------|---|
| 0   | Confirmed Natural    | Consistent with known natural phenomena |
| 1   | Minor Deviations     | Likely natural variations               |
| 2   | Unusual Properties   | Within natural range                    |
| 3   | Persistent Anomalies | Unexplained trajectory/morphology       |
| 4   | Critical Threshold   | Technosignature consideration begins    |
| 5   | Multiple Anomalies   | Enhanced observation triggered          |
| 6   | Strong Indicators    | Galileo Project deployed                |
| 7   | High Probability     | Full RSMP deployment                    |
| 8   | Confirmed Artificial | Verified non-natural origin             |
| 9   | Confirmed Technology | Definitive artifact ID                  |
| 10  | Global Impact        | Civilization implications               |

Legend: 0-3: Natural (Green), 4-5: Anomalous (Yellow), 6-7: Technosig (Orange), 8-10: Confirmed (Red)

## SIX RESEARCH DIMENSIONS

- Population Census**  
Systematic detection and cataloging to understand formation sites.
- Laboratory Studies**  
Sample return enabling astrobiology breakthroughs.
- Technosignature Discovery**  
Loeb Scale evaluation for technological artifacts.
- Planetary Defense**  
Threat assessment for Earth-approaching objects.
- Materials Science**  
Novel compositions from extrasolar origins.
- Fundamental Physics**  
Isotopic analysis of nucleosynthetic histories.

## CONFIRMED INTERSTELLAR OBJECTS

- 1I/Oumuamua**  
October 19, 2017  
First interstellar visitor. Unexplained non-gravitational acceleration without visible outgassing.  
LOEB SCALE: **Level 4** STATUS: **Anomalous**
- 2I/Borisov**  
August 30, 2019  
First interstellar comet. Normal cometary activity consistent with natural origins.  
LOEB SCALE: **Level 0** STATUS: **Natural**
- 3I/ATLAS**  
July 1, 2025  
Third ISO. Trajectory alignment and size characteristics under investigation.  
LOEB SCALE: **Level 4** VELOCITY: **~60 km/s**

## GLOBAL INTERSTELLAR OBJECT TRACKER (GIOT)

Public portal: [www.interstellar-objects.org](http://www.interstellar-objects.org)

- > Live Status Dashboard with real-time position/velocity
- > Visual trajectories through solar system
- > Daily plain-language summaries
- > "What We Know/Don't Know" format
- > Interactive 3D visualization
- > Observation calendar for amateur astronomers
- > Finder charts for telescope observations
- > Loeb Scale classification for all active ISOs

## ISO RESPONSE PROTOCOL TIMELINE

- Initial Detection**  
**Within 72 hours**  
Classification on Loeb Scale. Activate observation protocols.
- Pre-Perihelion Phase**  
**Days to weeks**  
Maximum observational coverage. Coordinate networks.
- Perihelion Passage**  
**Critical window**  
Definitive classification. Optimal observation conditions.
- Post-Perihelion**  
**Ongoing**  
Level 4+: intercept deployment, sample return planning.