

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

0-3: Natural 4-5: Anomalous 6-7: Technosig 8-10: Confirmed

SIX RESEARCH DIMENSIONS

- 1. Population Census**
Systematic detection and cataloging to understand formation sites.
- 2. Laboratory Studies**
Sample return enabling astrobiology breakthroughs.
- 3. Technosignature Discovery**
Loeb Scale evaluation for technological artifacts.
- 4. Planetary Defense**
Threat assessment for Earth-approaching objects.
- 5. Materials Science**
Novel compositions from extrasolar origins.
- 6. 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

- 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.	Perihelion Passage Critical window Definitive classification. Optimal observation conditions.
Pre-Perihelion Phase Days to weeks Maximum observational coverage. Coordinate networks.	Post-Perihelion Ongoing Level 4+: intercept deployment, sample return planning.