

EXPANDED TERMINOLOGICAL LIST IN ASTRONOMY AND SPACE SCIENCES FROM ENGLISH TO ROMANIAN

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Abstract. In the field of astronomy and its broader scientific context of space sciences, the English and Romanian languages use terms and sentences on various levels of specialization and therefore, accessibility for the general public as well as for the scientists. The flow of scientific data and information is generated in both languages, which raises the subsequent need of a correct equivalence in specific translations from English to Romanian and viceversa. In this respect, this study discusses in a multi-disciplinary context a list of terms and expressions translated from English to Romanian that are nowadays used in the fields of astronomy and space sciences. In these scientific areas, the authors of this article considered the English language as being more specific than Romanian and therefore, they aimed to deconstruct the scientific meaning behind each of these specialized English language entries, and point out through additional comments, the rationality of the translation choice they have made, according to the thinking, the ways of expressing and converging ideas in both languages.

Key words: terminology, astronomy, space sciences, Romanian astronomical terminology, space sciences terminology in Romanian, equivalencing English space sciences terminology in Romanian.

1. INTRODUCTION

The Romanian language is one of the neo-Latin languages directly derived from the spoken ancient Latin, and it is used today by tens of millions speakers worldwide. Romanian is one of the most conservative neo-Latin languages in Europe, being today closer to ancient Latin than to any of the neo-Latin languages in Western Europe. (Bărbulescu *et al.*, 2002, p. 103). Its formation in the Carpathian - Danubian - western Black Sea regions happened during and after the ruling and massive colonization done here by the Roman Empire. The start of this linguistic process that led to the appearance of Romanian language is considered the Roman

Empire's conquest of the Dacian Kingdom (basically, the present day Romania) and the general use of Latin during the Romanization process of the Dacians and, part of this, the massive colonization with Latin speakers in Dacia, since the beginning of the 2nd C. AD (Bărbulescu *et al.*, 2002, p. 97). The formation of the Romanian language deriving directly from Latin, ended in the 9th C. AD when a common Romanian was already spoken in the Carpathians and Danubian regions, including in the Balkans (Bărbulescu *et al.*, 2002, p.103). The specific historical-geographical conditions of the Romanian Countries made the Romanian language generally evolve as an orally transmitted peasant language overlapped by a cultural language of Slavo-Byzantine influence. This combination of geographic position and complicated historical factors kept Romanian still an overall medieval language, poor in technical-scientific words, up to the beginning of the 19thC. (Cătuntu-Caraman, 2015).

2. THE SCIENTIFIC VOCABULARY IN THE ROMANIAN LANGUAGE. ASTRONOMY AND SPACE SCIENCES

Being dominated for centuries by the Ottoman Empire, yet never in history Ottoman provinces, the Romanian Countries experienced a historical delay in connecting to the industrial and technical-scientific revolution. This would have been a source of linguistic borrowings in the Romanian language of modern words and sentences in different fields, including science, technology and nevertheless, astronomy, and a strong incentive to create equivalents of them in Romanian.

A large number of neologisms – the newly created words and borrowings, were introduced from French to Romanian and to a lesser extent from Italian and Modern Latin, during the Modern Age, by the 1848 revolutionary generation and its successors (Buzatu, 2007). From the second half of the 19th C., this process started to change the linguistic stagnation of Romanian and to shape a modern language, including a scientific Romanian vocabulary (Niculescu, 1978).

The creation of modern Romania through the Unification of the Romanian Principalities of Wallachia and Moldova in 1859, started a new stage of the modernization of the Romanian language. New institutions appeared, the Romanian modern culture was gradually created and great progresses were made in all fields, which subsequently determined a diversification of technical-scientific Romanian vocabulary, through the creation or borrowings of neologisms. During the 20th C. (Popovici, 1977) and at the beginning of the 21st C. this process continued, with one critical shift in its evolution that is the orientation in general of the Romanian language to borrow technical-scientific terms from the English vocabulary.

During the 19th C. pioneering stage of modern Romanian astronomy and also in the first decades of the 20th C., the scientific correspondence of the Romanian astronomers with other astronomical observatories, scholars, scientific equipment man-

ufactures and so on was almost entirely written in French. For the field of astronomy, the vast influence of the French culture in Romania during this period, the high popularity of French as a society language in our country, and nevertheless the prevalent Francophile formation of the first Romanian astronomers, represent strong arguments to explain the frequency of borrowing or adapting Romanian words from the French vocabulary.

As the Romanian language, like any other language in the world, is a dynamic cultural and identitary phenomenon, overlapped every day by new scientific vocabulary that emerges worldwide, including in space sciences field, the academic need to set a correspondence in Romanian of these new foreign words and phrases remains a permanent necessity.

In such a context, we propose in the present article, a translation from English to Romanian for over 200 terms in the fields of astronomy and space sciences. For some of them, the authors of this study - a research team of the Astronomical Institute of the Romanian Academy, wrote brief comments to better explain the meaning of those notions.

EXPANDED TERMINOLOGY LIST			
NO.	ENGLISH LANGUAGE TERM OR PHRASE	ROMANIAN LANGUAGE TERM OR PHRASE	COMMENTS
1	robotic mining	minerit robotizat; minerit fără prezență umană	Commercial or scientific extraction and subsequent processing activity of minerals and other raw materials from the mining sites that is done with robotic equipment for different technological phases of the process. (Marshall et al., 2016)

2	lunar settlement; colonization of the Moon	bază lunară; colonizarea Lunii	Scientific inhabiting infrastructure that is intended to be built on the surface of the Moon or below it in order to make possible long term human activities on our natural satellite. (National Aeronautics and Space Administration [NASA], 2024, "Contour Crafting Simulation Plan for Lunar Settlement Infrastructure Build-up")
3	reboiler	refierbator; schimbător de căldură tubular, pentru fierberea unui lichid cu ajutorul aburului	
4	Arjuna; asteroid Arjuna	ateroizii Arjuna; asteroid Arjuna	Arjuna are a group of asteroids in the Solar System having orbits that bring them in the proximity of our planet, therefore being considered as Near Earth Objects (NEOs). (de La Fuente & de La Fuente, 2015)
5	asteroid mining	minerit pe asteroizi; mineritul asteroizilor	Activity considering the future extraction of useful materials by mining on asteroids and on other celestial bodies. (European Space Agency [ESA], 2024, "Asteroid mining")
6	Trojan, asteroid Trojan	asteroid troian	Celestial body that has its revolution around the Sun at Jupiter's Lagrangian points.

7	scattered disc object; scattered disk object (SDO)	obiect din haloul unui disc de materie	Small, icy celestial bodies belonging to a circumstellar disk of matter in our Solar System, frequently found on unstable orbits over time, that are considered a subset of the trans-Neptunian objects. (Oxford Reference, 2024, "Scattered-disk object")
8	accretion disk	disc de acreție	Matter formation organized as a rotational disc around a celestial body like a star, planet, black hole etc.
9	tethered satellite	satelit legat	
10	primitive meteorite	meteorit primitiv	Meteorites containing the matter found at the beginning of our Solar System's nebula condensation.
11	cometary nucleus; comet nucleus	nucleu cometar	As defined by Popovici (1977)
12	outer space; space	spațiu cosmic	As defined by Popovici (1977)
13	mantle	manta	A planetary mantle is a geological layer found on Earth or other planets, situated between other layers, such as the crust and the nucleus. (National Aeronautics and Space Administration [NASA], 2024, "Cut-away Diagram of Earth's Interior")

14	mineral refining	rafinarea minereurilor	Mineral refining is the process that removes all unwanted minerals and separate the desired element from the mined material. (Encyclopedia Britannica, 2024, "Ore")
15	long-period comet	cometă lung-periodică; cometă cu perioadă lungă (peste 200 ani)	Celestial body that has its revolution around the Sun on an elliptical elongated orbit, having an eccentricity close to the unitary value.
16	solar system	Sistemul Solar	As defined by Popovici (1977)
17	sample return mission; sample-return mission	misiune cu retur de eșantion	Space mission that has the goal of returning back on Earth one or more samples taken outside our planet.
18	bow wave	undă de șoc	As defined by Popovici (1977)
19	aerodynamic drag; aerodynamic resistance	frânare aerodinamică; rezistență aerodinamică	
20	Eight Colour Asteroid Survey (ECAS)	baza de date ECAS	ECAS represents a program designed to observe asteroids and other minor planets by using 8 color filters. (Zellner et al.,1985)

21	differential melting	topire diferențială	Differential melting can be observed in astrophysics in various contexts, like during planetary formation, when planetesimals and planet-sized bodies collide and merge to larger objects. The intense heat generated in this process lead to the separation of materials in the new celestial bodies into distinct layers, as the elements in their composition had different melting temperatures. (National Aeronautics and Space Administration [NASA], 2024, "Differentiation")
22	achondrite	acondrit	Achondrite meteorites are meteorites that don't contain the round grain named chondrules, resulted from the solidified molten material during the initial formation stage of the planetary system. (Encyclopedia Britannica, 2024, "Achondrites")
23	angrite	angrit	A rare type of achondrite named after Angra dos Reis meteorite that has no chondrules and consist mostly of titanaugite. (Merriam-Webster Dictionary, 2024,"Angrite")
24	fission hypothesis	ipoteza fisiunii	

25	Oort cloud	norul lui Oort	Oort cosmic cloud is considered to be, so far only in theory, as the source for long period comets and comets that have parabolic and hyperbolic orbits. (National Aeronautics and Space Administration [NASA], 2024, "Oort Cloud: Facts")
26	near-Earth asteroid population; NEA population; population of near-Earth asteroids; population of NEAs	asteroizi din apropierea Pământului (NEA); asteroizi geointersectori; populație de asteroizi geointersectori	As used by Sonka (2020)
27	orbital mechanics; astrodynamics	mecanică orbitală; astrodinamică	
28	Hohmann transfer; Hohmann transfer orbit	transfer orbital de tip Hohmann	The Hohmann transfer orbit is an orbital adjustment employed to transfer an object's orbit towards another object, as long as they revolve around a massive celestial body such as the Sun in our Solar System. (National Aeronautics and Space Administration [NASA], 2024, "Chapter 4: Trajectories")
29	pallasite	palasit	Meteorite that has an inner structure composed by olivine crystals embedded in an iron-nickel structure.

30	co-orbital asteroid; coorbital asteroid	asteroid co-orbital	An asteroid that has a similar orbit with the one of a corresponding celestial body.
31	ecliptic	ecliptică	
32	interstellar dust	praf interstelar; praf cosmic	
33	orbital manoeuvre	manevră orbitală	
34	capture hypothesis	ipoteza capturii	Refers to the capturing of a celestial object by the gravitational influence of another one more massive. (Urey, 1966)
35	angular velocity; rotational velocity; angular frequency vector	viteză unghiulară; viteză de rotație; vectorul frecvență unghiulară	Vector measure that determines the rotation of a celestial object in time, having a circular trajectory, while the center angle is measured by the vector ray projected over a specific time frame.
36	orbital manoeuvre	manevră orbitală	
37	inferred reserves; inferred resources	rezerve deduse; resurse deduse	In astrophysics, it refers to inferring with a specific level of accuracy the mineral resources that could exist on asteroids, moons and other celestial bodies. (Sonter, 1996)
38	far side of the Moon; Moon's far side; dark side of the Moon; lunar far side	partea ascunsă a Lunii; partea întunecată a Lunii; partea îndepărtată a Lunii	As defined by Popovici (1977)

39	C-type asteroid; C-class asteroid; carbonaceous asteroid	asteroid carbonat; asteroid de tip C; asteroid din clasa C; asteroizi ce conțin carbon sau compuși pe bază de carbon	As used by Birlan (1998)
40	lunar base; moonbase	bază lunară	
41	bucket-wheel excavator; bucketwheel excavator	excavator cu cupe	In space exploration, a bucket wheel excavator could be used for the excavation of surface regolith on the Moon, Mars or some satellites and asteroids, from which to extract and produce essential material such as life support substances or propellant. (Muff et al., 2004)
42	selective laser sintering (SLS); laser sintering	Sinterizare Laser Selectivă (SLS); sinterizare selectivă cu laser;	This additive manufacturing technology - Selective Laser Sintering (SLS), will use regolith - the in-situ material resource on various celestial bodies, as a building solution of infrastructures and tools for a long duration stay of the humans on the Moon or Mars. (Despa and Gheorghe, 2011)
43	inner solar system	Sistem Solar intern	Region of the Solar System where are located the terrestrial planets and the asteroid belt.

44	underground mining	minerit subteran	Extraction process through a mining technology of the available raw materials from the subsurface of a rocky celestial body.
45	chondrite	condrită	As used by Sonka (2020)
46	impactor	impactor	A celestial body of a natural or human made origin that is expected to impact another celestial body or it already did.
47	enstatite chondrite	condrită enstatitică	Meteorite containing enstatite mineral formations. Enstatite is a silicate mineral in a group called pyroxenes. See it also as used by Birlan (1998)
48	magnetic beneficiation	purificarea minereului prin separare magnetică	
49	intermediate-period comet; Halley-type comet	cometă cu perioadă intermediară; cometă de tip Halley	Comet with a revolution period around the Sun of about 20 to 200 years.
50	dry grinding; dry milling	măcinat uscat; măcinare uscată	
51	lunar mining	minerit pe Lună	

52	in-situ resource utilization (ISRU)	utilizarea resurselor in-situ	ISRU is an advanced concept aiming to facilitate robotic and human exploration of other celestial bodies such as the Moon and planet Mars, by utilizing the natural resources available at mission destinations rather than relying entirely on supplies transported from Earth. (National Aeronautics and Space Administration [NASA], 2024, "In-Situ Resource Utilization (ISRU)")
53	in-situ consumables production; in-situ consumable production (ISCP)	producerea consumabilelor in-situ (ISCP); producerea materialelor consumabile in-situ	ISCP is a subset of ISRU that involves acquiring, producing and storing fuel for space vehicles and space ships, different gases and water for life support, and other materials that are necessary to generate power, by using resources found at the site of exploration. (Sanders et al., 2000)
54	lunar crust; Moon's crust	crusta lunară	The solid layer on the surface of the Moon that was formed by the solidification of the magma ocean.
55	Jupiter Icy Moons Explorer (JUICE)	Misiunea JUICE - Exploratorul Sateliților Înghețati ai planetei Jupiter	

56	mechanical stress	stres mecanic	Stress in mechanics is a measure of internal resistance when a material is subjected to an external force, causing internal stresses that can lead to its deformation, fracture or break. (Walter and Orrin, 1974)
57	lunar soil	sol lunar	
58	stony-iron meteorite; stony-iron siderolite	meteorit pietros-feros; siderolit pietros-feros	
59	ore body	filon; zăcământ de mineral; zăcământ de minerale	
60	lunar highlands	munții de pe Lună	
61	stony meteorite; stone meteorite; siderite; aerolite	meteorit pietros; aerolit	Stony meteorite fragment comprising silicates and traces of nickel-iron, that reaches the surface of Earth and other celestial bodies. See it also defined by Popovici (1977)
62	speculative reserves; speculative resources	resurse speculative; resurse presupuse; rezerve presupuse	
63	asteroid manipulation	manipularea asteroizilor	Asteroid manipulation is a set of techniques and procedures aiming at modifying the orbit and behavior of asteroids in order to reduce collision hazard with the Earth and for in-situ resource exploitation. (Shan et al., 2016)

64	gravity; gravitational force	gravitație; forță gravitațională	Omnipresent attraction force in the Universe, in different cosmological contexts, in deep space or at the surface of various celestial bodies.
65	near-Earth comet (NEC)	cometă geointersectoare (NEC)	A comet that goes through the vicinity of the Earth when orbiting the Sun, having a perihelion distance less than 1,3 AU.
66	pyroxene	piroxen	Crystalline mineral structure comprising mostly silicone (Si) but also iron (Fe), calcium (Ca) and magnesium (Mg).
67	coma	coma, parte gazoasă de lângă nucleul unei comete	
68	meteoritic bombardment	bombardament meteoritic	Intense natural impacting phenomenon on the surface of a planet or moon done by meteorites.
69	delta-v change in velocity	schimbarea de viteză delta-V; delta-V; schimbarea de viteză	It is a metric used to quantify the amount of propulsion that a space ship needs to reach a specific celestial body (asteroid, satellite, planet) after it escaped from the gravitational pull of the Earth. (National Aeronautics and Space Administration [NASA], 2024, "Chapter 3: Gravity & Mechanics")

70	planetesimal impact hypothesis; giant impact hypothesis	ipoteza ciocnirilor planetoizilor; ipoteza ciocnirilor distructive	Hypothesis describing the array of cosmic processes that led to the formation of the Earth-Moon system.
71	space manufacturing; in-space manufacturing	producție de mărfuri în spațiul cosmic	
72	launching State	stat proprietar/lansator de satelit (SPLS); stat (țară) care a plasat în spațiul cosmic un obiect / ființă; stat (țară) de pe teritoriul căreia s-a lansat în spațiul cosmic	A Launching State is any country that is part of the Outer Space Treaty of 1967 or the Liability Convention of 1972, and sends something into outer space or arranges for it to be sent, or from whose land or facility something is sent into outer space. (European Space Agency [ESA], 2024, "What is a Launching State")
73	space farming	activități agricole în spațiul cosmic	
74	mesosiderite	mesosiderit	Mesosiderites are a class of stony–iron meteorites consisting of approximately equal parts of metal and silicates. (Encyclopedia Britannica, 2024, "Mesosiderite")
75	pressurized module	modul presurizat; modul cu presiune controlată	

76	cryptomaria; lunar cryptomaria	regiune lunară cryptomaria	Lunar cryptomaria is a large plain formed early in the Lunar history by basaltic lava flows into preexisting topographic depressions, that have been subsequently buried by higher-albedo basin and crater ejected material. (Whitten and Head, 2015)
77	remote sensing probe	sondă de teledetecție	
78	dormant comet	cometă inactivă; cometă latentă	A comet whose nucleus has lost its volatile chemical elements and is no longer generating a coma.
79	spaceflight	zbor cosmic; zbor spațial	
80	hard landing	aterizare / aselenizare / amartizare / avenusizare / amercurizare / asolizare dură	
81	scattered disc; scattered disk	disc împrăștiat	It refers to the small celestial bodies that populate a circumstellar disk but they are not aligned with it. (Gomes et al., 2008)
82	thermal rocket	rachetă termică	A thermal rocket produces thrust by using different engine technologies such as by transferring heat to a propellant before expelling it through a nozzle, or by using the process of combustion to heat up gas and expel it. (Turner, 2008)

83	planet	planetă	As defined by Popovici (1977)
84	r-process rapid neutron capture process	proces de captură a neutronilor rapizi	
85	meteoriticist	meteoritician; mineralog specialist în meteoriți	Researcher who does scientific studies on meteorites, meteors and meteoroids, and has an expertise in these objects.
86	lunar gardening; lunar impact gardening	micro-impact lunar de suprafață	Lunar gardening or lunar impact gardening is the process in which the top layer of the Moon's crusts is impacted by interplanetary meteoroids and by micrometeorite subsequent impacts, being over time, stirred and mixed. (National Aeronautics and Space Administration [NASA], 2023, "How is the Moon changing?")
87	asteroid capture	capturarea asteroidului	It can be a natural or artificial process. In nature, an asteroid can be captured on the orbit of a larger planetary body by its gravitational force and become its satellite. An asteroid can be captured artificially by using a specific procedure and technology in order to change or divert its orbit. (Gong & Li, 2015)

88	ice giant planet; ice giant	planete mari înghețate	A massive planet primarily composed of gas chemical elements heavier than hydrogen, such as oxygen, nitrogen, carbon, or sulfur.
89	impact gardening	micro-impact de suprafață cu un corp ceresc fără atmosferă	Impact gardening is the process in which celestial planetary bodies with no atmosphere are impacted by smaller interplanetary objects, causing surface disturbance and eventual biological effects. (National Aeronautics and Space Administration [NASA], 2023, "Surface of Jupiter's moon Europa churned by small impacts")
90	extinct comet	cometă stinsă; cometă inactivă	A comet that has lost the majority of its volatile chemical elements. See it also defined by Popovici (1977)
91	weightlessness; zero gravity; zero-g	gravitație zero; imponderabilitate	A state in physics where no acceleration caused by a gravitational field is noticeable.
92	minimum orbit intersection distance; minimum orbital intersection distance (MOID)	distanța minimă de intersectare orbitală (MOID)	Minimum orbital intersection distance (MOID) is an astrophysical measure commonly employed in the study of asteroids, comets, and other small Solar System objects, to quantify the closest potential approach between the orbits of two celestial bodies. (Hedo et al., 2020)

93	Anthropocene	Antropocen, epoca umană	It refers to an unofficial distinct geological epoch that began when human activities started to have a substantial impact on the Earth, extending up to the present day. (Encyclopedia Britannica, 2023, "Anthropocene epoch")
94	James Webb Space Telescope (JWST)	telescopul spațial James Webb (JWST)	
95	Asteroid Provided In-situ Supplies (APIS)	resurse extrase in-situ pe asteroizi (APIS)	It refers to a new mission concept proposed by NASA and based on an innovative approach called Optical Mining, that aims to harvest and return up to 100 tonnes of water from a near Earth asteroid. (National Aeronautics and Space Administration [NASA], 2023, "APIS: 100MT of water")
96	in-situ propellant production (ISPP)	producție in-situ de carburant	Rocket fuel produced in space by using resources that are available there.
97	main-belt asteroid; main belt asteroid	asteroizi din centura principală	Asteroids orbiting the Sun in the region between Mars and Jupiter of the Solar System.
98	space mission	misiune spațială	Space ship, manned or unmanned, that is launched and travels outside the Earth to explore and collect scientific data.
99	high-grade mineral deposit	depozit de minereu de concentrație ridicată	An economically viable mineral deposit that stands out with its high concentration.

100	KREEP	KREEP, compuși mineralogici găsiți în anumite roci lunare	Acronym derived from types of lunar lavas that include potassium (chemical symbol K), rare-earth elements (REE), and phosphorus (P). (Encyclopedia Britannica, 2023, "KREEP")
101	space weathering	vreme spațială; expunere la condiții spațiale severe	Natural process that alters the physical structure, as well as the optical, chemical and mineralogical properties, of the surface of a celestial body with no atmosphere.
102	near-Earth asteroid (NEA)	asteroid geointersector (NEA)	Asteroid that gets close to the Earth's orbital path, while orbiting the Sun.
103	secondary payload; rideshare payload	sarcină utilă secundară; încărcătură suplimentară	Secondary payload, alternatively termed a rideshare payload, is a smaller-sized payload transported to orbit or on a specific trajectory in Cosmos by a launched spacecraft. (National Aeronautics and Space Administration [NASA], 2023, "SMD Rideshare 101")
104	slow neutron capture process (s-process)	proces tip s; proces de captură al neutronilor lenți	Formation process of the heavy isotopes inside massive stars, through the slow capturing of the neutrons by the nuclei.
105	retrograde satellite	satelit retrograd	The satellite that orbits in the direction opposite to the rotation of its planet. (Encyclopedia Britannica, 2023, "Retrograde motion")

106	impact; event impact	ciocnire; impact; eveniment de ciocnire; eveniment datorat unei ciocniri	Collision between two celestial bodies resulting in detectable or measurable effects.
107	outer solar system	sistem solar extern	Region of the Solar System expanding from the orbit of planet Jupiter far beyond, also including the Oort cloud.
108	Moon's mantle; Moon mantle; lunar mantle; mantle	mantaua lunară; manta	Distinct layer within the Moon's interior, situated right beneath the crust as part of its internal layering.
109	giant planet	planete mari; planete gazoase	A larger planet, compared to the Earth, which is composed of volatile elements. See it also defined by Popovici (1977)
110	chondrule	condrulă; condră	It is a small particle formed in Cosmos at high temperatures as molten silicate droplets, which subsequently solidified in the same environment and aggregated into stony meteorites called chondrites. (Encyclopedia Britannica, 2023, "Chondrule")
111	orbital geometry	geometrie orbitală	Spatial position and orientation of an orbite in relation to a reference set in the Solar System.
112	planetary crust	scoarță planetară	The outermost formation or geological layer of a rocky planet.

113	Roche limit	limita Roche	The distance limit to which a satellite of a massive primary body (star, planet) starts to be dismembered by the tidal forces of this large celestial object. (Encyclopedia Britannica, 2023, "Roche limit")
114	Milky Way Galaxy; Milky Way	Calea Lactee; Calea Laptelui; Drumul lui Trăian	As defined by Popovici (1977)
115	Apollo asteroid; Apollo type asteroid	Asteroidul Apollo; asteroid tip Apollo	An Apollo type asteroid has its orbit similar with that of asteroid 1862 Apollo. (Encyclopedia Britannica, 2023, "Geography of the asteroid belt")
116	micrometeorite	micrometeorit	
117	M-type asteroid; M-class asteroid; metallic asteroid	asteroid de tip M; asteroid de clasă M; asteroid metalic	M-class asteroids are celestial objects that have significant amounts metal in their composition. (Encyclopedia Britannica, 2023, "Spacecraft exploration")
118	Kuiper belt object (KBO); Trans-Neptunian Object (TNO)	obiect din centura lui Kuiper (KBO); obiect transneptunian (TNO)	Celestial object, part of a large group of similar objects, that revolves around the Sun on an orbit beyond planet Neptune.
119	Earth-Moon system	Sistemul Pământ-Lună	Celestial system composed of the Earth and the Moon, interlocked and mutually influencing each other's behavior and properties within this assembly.

120	fusion torch	torță de fusiune	It is a high-temperature plasma concept invented in 1968 that uses a nuclear fusion process in a reactor to break apart different types of materials such as waste, and directly recycle them into usable elements. (Porter et al., 1971)
121	barycenter	baricentru	The centre of mass of a system of two or more bodies. (Oxford Reference, 2024, "Barycentre")
122	reflectance spectrum	spectru de reflectanță; spectru de reflexie	Refers to a spectral display obtained by analyzing the sunlight reflected from the surface of a planet, moon or asteroid across various wavelengths. (Oxford Reference, 2024, "Reflectance spectrum")
123	wet grinding; wet milling	măcinare umedă	Industrial or laboratory process performed in order to reduce the dimensions of a specific solid material by using the abrasive or cutting effects of a liquid substance.
124	celestial mechanics	mecanică cerească	

125	Asteroid Retrieval Mission (ARM); ARM mission	Misiune de colectare-deviere asteroidală (ARM)	The Asteroid Retrieval Mission (ARM) is a space exploration concept in which a robotic mission has the goal of returning a small diameter near-Earth asteroid (NEA), or just a smaller part of a larger NEA, to a stable cislunar orbit. (Mazanek et al., 2013)
126	tumbling mill	moară cu tambur pentru măcinarea materialelor solide	Tumbling mills are rotating drums that are filled with different grinding media in order to grind materials into fine particles. (Beke, 2012)
127	space resource	resursă spațială; resursă din spațiu	Abiotic resource that can be found in space, and eventually be extracted or recovered in situ.
128	conditional reserves	rezerve conditionate	Mineral deposits already identified in the field but left unexploited due to their lack of economic viability in the present conditions.
129	Marangoni effect; Gibbs–Marangoni effect	efect Marangoni; efect Gibbs–Marangoni	Mass transfer along a specific interface, in between regions of different sorts of matter in terms of composition and evolution phases.
130	mining equipment	echipament(e) minier(e); echipament(e) pentru minerit	Complex equipment and tools used in the mining field, such as drilling, crushing, grinding and transportation machinery.

131	stratiform deposit	depozit stratificat	A stratiform deposit on the Earth is a mineral deposit that was formed by the movement of water through a sedimentary strata. (Encyclopedia Britannica, 2024, "Stratiform deposit")
132	planetary atmosphere	atmosferă planetară	
133	Kirkwood gap	lacunele lui Kirkwood	Low-density zones in the Main Asteroid Belt, also called gaps, caused by the gravitational perturbation of Jupiter, and to a lesser extent, by that of other planets. (Encyclopedia Britannica, 2024, "Kirkwood gaps")
134	core drilling; core boring; coring	foraj prin carotare; carotă de foraj	It is the technological process in which a cylindrical sample of a specific material such as a rock is taken by using a special drill bit or barrel. (Collins English Dictionary, 2024, "Coring")
135	ejecta	materie ejectată	Refers to the matter thrown out as from a volcano or geyser or by a meteorite impact. (Merriam-Webster Dictionary, 2024, "Ejecta")
136	hydraulic mining	minerit hidraulic	Mining form based on high pressure water jets used to carve and dislodge rocks and sediments in order to extract the ore.
137	icy moon	sateliți de gheață	Natural satellite that has its surface covered in ice.

138	one-sixth gravity	gravitație lunară	The gravitational acceleration on the Moon, which is approximately 1/6 of that on the Earth's surface.
139	ballast	balast	Material used to stabilize a structure or building and, sometimes, to provide stability or a specific weight to a vehicle.
140	lunar propellant	combustibil produs pe Lună	A concept that aims to produce propellant in-situ on the Moon by extracting oxygen from the lunar regolith, or by generating hydrogen and oxygen from ice deposits. (Landau, 2016)
141	angular acceleration	acelerație unghiulară	The derivative of angular velocity with respect to time.
142	Working Group on the Long-Term Sustainability of Space Activities (LTSSA); LTSSA Working Group	Grup de lucru LTSSA; Grup de lucru pentru sustenabilitatea pe termen lung a activităților spațiale (LTSSA)	UN-COPUOS working group aiming to support long-term sustainability of space activities.
143	solar thermal rocket	rachetă cu propulsie termică solară	A solar thermal rocket is a concept that aims to change the orbit of a spacecraft and ensure its further mobility by collecting solar energy and transferring it through a low-loss optical cable to a thermal receiver, for thrust generation. (Nakamura et al., 2005)

144	planetary system	sistem planetar	A celestial system such as a star and the planets orbiting it.
145	short-period comet; periodic comet	cometă cu perioadă scurtă; cometă periodică	A comet completing its orbit in fewer than 200 years.
146	S-type asteroid; S-class asteroid; stony asteroid	asteroid pietros; asteroid de tip S; asteroid din clasa S	An asteroid generally containing minerals that are rich in silica (silicon dioxide, SiO ₂).
147	Yarkovsky effect	efectul Yarkovsky	A phenomenon that can impact an asteroid or meteoroid of small and medium dimensions orbiting the Sun, as its alternating heating and cooling of the side exposed to the Sun can give this celestial body a specific impulse.
148	ore grade	concentrația minereului	Measure of a specific mineral content extracted from the ore.
149	gravitational interaction	interacție gravitațională	Effect of gravitational attraction between two celestial bodies.
150	terrestrial mining	minerit terestru	
151	lunar maria; maria	mare lunară	Darker plains on the Moon formed as large basins of solidified lava flows. (Encyclopedia Britannica, 2024, "Mare")

152	sonic boom; supersonic boom	bang supersonic; bum supersonic	A sonic boom is caused by the sharp release of air pressure caused by the shock waves created when an object moves in the air faster than the speed of sound. (National Aeronautics and Space Administration [NASA], 2024, "Sonic Booms")
153	dragline; dragline excavator	excavator de dragare	Machinery that uses a cable suspended bucket to excavate, load and unload the material.
154	lunar regolith	regolit lunar	
155	semi-major axis	semi-axa mare	One half of the major axis of an ellipse. See it also defined by Popovici (1977) and Birlan (1998)
156	co-accretion hypothesis; condensation theory	ipoteza coacrecției; teoria condensării	The two terms name a theory suggesting that the Moon and the Earth formed individually, with the Moon orbiting the Earth, by using the gas and dust of the primordial nebula our Solar System originates from. (Encyclopedia Britannica, 2024, "Coaccretion hypothesis") / (National Aeronautics and Space Administration [NASA], 2024, "Where did the Moon come from?")
157	principle of non- appropriation; non- appropriation principle	principiul non-însușirii	The golden rule of the international space legal system underlining that no celestial bodies or any parts of them can become the property of states.

158	speed of sound; sound velocity; sonic velocity	viteza sunetului	The speed of sound waves when passing through an elastic medium.
159	ordinary chondrite (OC)	condrită ordinară (OC)	Type of meteorite belonging to the stony meteorites class and containing chondrules.
160	solar concentrator; concentrator	concentrator; concentrator solar	Device that collects the solar energy and then focus it on a smaller area.
161	Lagrange point; Lagrangian point; libration point; L-point	punct Lagrange; punct de librație	Points in the Solar System that benefit of a relative gravitational stability. See it also as used by Birlan (2014)
162	scientific payload	sarcină științifică utilă a satelitului/sondei spațiale; încărcătură științifică utilă a satelitului/sondei spațiale	Technological elements of a spacecraft used to obtain scientific data and transfer it to Earth.
163	Amor asteroid; Amor	Amor; Asteroid de tip Amor	A near-Earth asteroid type, part of a group of similar celestial objects, with a perihelion between 1.017 AU and 1.3 AU. See it also as used by Birlan (2014)
164	Poynting-Robertson effect	efect Poynting-Robertson	Effect of solar radiation produced by an electromagnetic field on electrically charged particles.
165	interplanetary mission; interplanetary spaceflight; interplanetary travel	călătorie interplanetară; misiune interplanetară; sondă spațială interplanetară	Manned or unmanned space travel generally realized within the same planetary system, and sometimes, having the possibility or purpose of accessing the interstellar space.

166	olivine	olivină	
167	gravitational perturbation	perturbație gravitațională	Deviation effect in the movement of a celestial body due to transitory influence of the gravitational force of another celestial body.
168	ilmenite	ilmenit	Ilmenite is a natural oxide mineral composed of iron and titanium oxide, and the main raw material used in the production of titanium and titanium dioxide from which various other materials are obtained. (Encyclopedia Britannica, 2024, "Ilmenite")
169	extraterrestrial matter; extraterrestrial material	materie extraterestră; material extraterestru	Natural objects presently found on Earth but originating in Cosmos, from the category of meteorites, cosmic dust, solar wind particles or samples taken by space missions.
170	ore	minereu	Natural rock or sediment containing valuable minerals that can be excavated, extracted and used for various purposes.
171	bolide	bolid; meteor foarte strălucitor; stea căzătoare	As defined by Popovici (1977)
172	reflectance spectroscopy	spectroscopie în reflectanță; spectroscopie de reflexie	Technique for the measurement of reflected solar radiation, separately, for each wavelength.

173	carbonaceous chondrite	condrită carbonică	Dark-colored meteorite, friable and having a chondritic inner structure, that is also characterized by the presence of clay types in its composition and a variety of organic compounds but almost no nickel-iron.
174	iron meteorite	meteorit metalic; meteorit feros	Meteorite composed by a mix of iron and nickel.
175	Earth minimum orbit intersection distance (MOID); Earth MOID	distanța minimă între orbita obiectului și Terra (MOID)	The minimum gap between the nearest points on the orbital paths of Earth and an asteroid or comet, typically expressed in astronomical units, and serving as a metric of their spatial disposal. See it also as used by Sonka (2020)
176	gravitation; gravitational attraction	gravitație; atracție gravitațională	Physical force produced by a massive body, in relation to its inertial mass.
177	Kuiper Belt	centura lui Kuiper; centura Kuiper	A large group of small celestial bodies orbiting the Sun beyond Neptune's orbit, whose existence was predicted by the astronomer Gerard Kuiper.
178	lunar magma ocean (LMO)	ocean de magmă lunară (LMO); ocean de magmă	Layer of rocks on the surface of the Moon, initially melted during the formation process of the Earth's natural satellite.
179	cryocooling; cryogenic cooling	răcitor criogenic	Laboratory or industrial equipment that can create a very low temperature environment of about -160 °C or lower.

180	space exploration	explorare spațială	
181	hypothetical reserves; hypothetical resources	rezerve ipotetice; resurse ipotetice	Deposits of mineral resources that could be discovered in the future.
182	proven reserves; proven resources	resurse minerale certe; resurse minerale confirmate	Already known deposits of mineral resources, considered economically viable to be extracted by using present day technologies.
183	gravitational field; gravity field	câmp gravitațional; câmp gravitic	Vector field produced by a massive celestial body that expands around it in space. See it also as used by Birlan (1998)
184	gravity gradient	gradient gravitațional; gradient al câmpului gravitațional	Progression of the gravitational acceleration vector.
185	near side of the Moon; nearside of the Moon; the Moon's nearside; lunar nearside	fața vizibilă a Lunii; fața apropiată a Lunii	The lunar hemisphere always visible from the Earth, due to the orbital spin resonance 1:1 between our planet and our natural satellite. See it also as defined by Popovici (1977)
186	international space law; space law; law of outer space	lege a spațiului; lege internațională a spațiului; lege a spațiului extraatmosferic	International legislation insuring the governance of the outer space - treaties, conventions, UN resolutions, rules and regulations.

187	space-based economy; in-space economy	dezvoltarea economică în spațiul cosmic	Activities aiming to generate development and capitals in outer space by activating and using resources and assets that can be found outside the Earth.
188	mineral processing; mineral beneficiation; mineral dressing; ore dressing	procesarea mineralului; purificarea minereului	Technological process by which specific elements present in the ore are concentrated through separation by physical methods.
189	chemical rocket	rachetă cu combustie chimică	Rocket powered by propellant exposed to exothermic reduction-oxidation chemical reactions leading to its subsequent ignition.
190	meteoritics	meteoritică; știința meteorozilor, meteorilor și meteoritilor	The branch of astronomy that studies meteorites, meteors and meteoroids. (Encyclopedia Britannica, 2024, "Meteoritics")
191	mass ratio	raportul maselor	Ratio between two inertial masses, which can belong to elementary particles, celestial bodies, or it can be the proportion of the propellant mass of a rocket in relation to the total mass of the vehicle.
192	Czochralski method; Czochralski technique	metoda Czochralski; tehnica Czochralski; procedeul Czochralski	Technological method used to produce single crystals.

193	impact crater	crater de impact; crater de ciocnire	Cavity produced on the surface of a planet or satellite by the collision with a meteoroid or asteroid.
194	optical mining	minerit optic; minerit bazat pe lumina Soarelui	Mining and extraction form that uses a technology based on concentrated sun rays in order to obtain substances existing on asteroids and other celestial bodies.
195	lunar orbiter	navă spațială care orbitează Luna	Manned or unmanned space ship orbiting the Moon.
196	nuclear thermal rocket (NTR)	rachetă cu propulsie termonucleară (NTR)	Thermal rocket type based on a nuclear reaction to replace the energy produced by chemical propellants.
197	Drake equation; Green Bank equation	ecuația Drake	The Drake equation is a mathematical formula created in 1961 by the astrophysicist Frank Drake in order to estimate the number of technologically advanced extraterrestrial civilizations in the Milky Way Galaxy, capable of communicating by sending messages in space. (National Aeronautics and Space Administration [NASA], 2024, "Are we alone in the universe? Revisiting the Drake equation")
198	soft landing	așezare lină pe suprafața unui corp ceresc	Landing a space vehicle on the surface of a planet, satellite or asteroid without damaging the space ship or the payload.

199	ejecta blanket	strat de material ejectat în jurul craterului de impact	Material layer of soil, or as the case, rocks, sediments or dust, displaced and projected around an impact crater.
200	terrestrial planet; rocky planet	planetă terestră; planetă telurică; planetă solidă, alcătuită din roci	An Earth-like planet in our Solar System or in other planetary systems discovered in the Universe. In the Solar System, terrestrial planets are considered Mercury, Venus, Terra and Mars. See it also as used by Birlan (2014)
201	space mining; extraterrestrial mining; off-world mining	minerit spațial; minerit în spațiul extraterestru; minerit în spațiul extraatmosferic; minerit în spațiul cosmic	Prospective, extractive and subsequent ore processing activities realized in the outer space.
202	orbital factory; space factory	fabrică în spațiul cosmic; fabrică pe orbită în spațiul cosmic	Production facility built and operated in the outer space, where the manufactured goods are made by using resources available in space.
203	Aten asteroid; Aten	asteroid Atena; asteroid de tip Atena	A near-Earth asteroid and an additional class of asteroids are known under this name, with a semi-major axis lower than one astronomical unit and an aphelion higher than 0.983 astronomical units. See it also as defined by Birlan (1998)
204	Earth mantle; Earth's mantle; mantle	mantaua Terrei; manta terestră	Geological layer of the Earth located in between the crust and the outer core.

205	gas giant planet; gas giant	planetă gigantă gazoasă; gigantă gazoasă	A planet consisting predominately of hydrogen and helium and having an average density lower than any of the terrestrial planets of the Solar System- Mercury, Venus, Terra and Mars.
206	cryogenic propulsion	propulsie criogenică	High efficiency propulsion system commonly used in space exploration, and based on super-cooled propellant that is activated to produce thrust in the combustion chambers of the space vehicle.
207	anorthosite	anortosit	Anorthosite is a plutonic rock resulted from solidified magma and composed predominantly of plagioclase feldspar. (Encyclopedia Britannica, 2024, "Anorthosite")
208	angular momentum	moment cinetic unghiular	
209	subsurface	subsol; sub-suprafață	In astronomy, this refers the geological part of a celestial body that has a soil, located below its surface and therefore, being unexposed to cosmic or atmospheric influences.
210	interstellar medium	mediu interstelar; mediu cosmic	Cosmic matter between celestial bodies, that is generally composed of gas and dust.

In this study, a number of specialized English language terms included in the above table were translated by using their Romanian counterparts already present in the literature. However, for a significant number of English terms in this table,

the authors of this study found no Romanian translation being done so far, and therefore, gave their first version in Romanian, by following the principle of scientific accuracy combined with that of the most direct understanding pathway to communicate their meaning to the readers. Also, when we considered that a specific English term needed further explanatory comments, we briefly gave them in order to avoid any confusion, the “false friends” type of misunderstanding, and critical gaps in understanding. The work of translating these specialized English language terms in Romanian, have closely followed top bibliographic sources, in order to provide a reliable referential vocabulary tool and a best practices approach for other similar translation studies that will be done in the future.

Romanian Astronomical Journal (Dumitrache *et al.*, 2021) is the appropriate Romanian journal which can publish studies related not only to astronomical results, but also studies regarding the history of astronomy (Szűcs-Csillik & Comsa, 2017), education through astronomy (Szűcs-Csillik, 2022), interdisciplinary researches, and, last but not least, studies regarding the translation of new astronomical terms into Romanian. While this journal is published under the patronage of National Committee of Romanian Astronomers and the Romanian Academy, this work of translation of new astronomical terms has a final goal the standardization of newly accepted terms.

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