

Canada Research Chair in International Political Economy

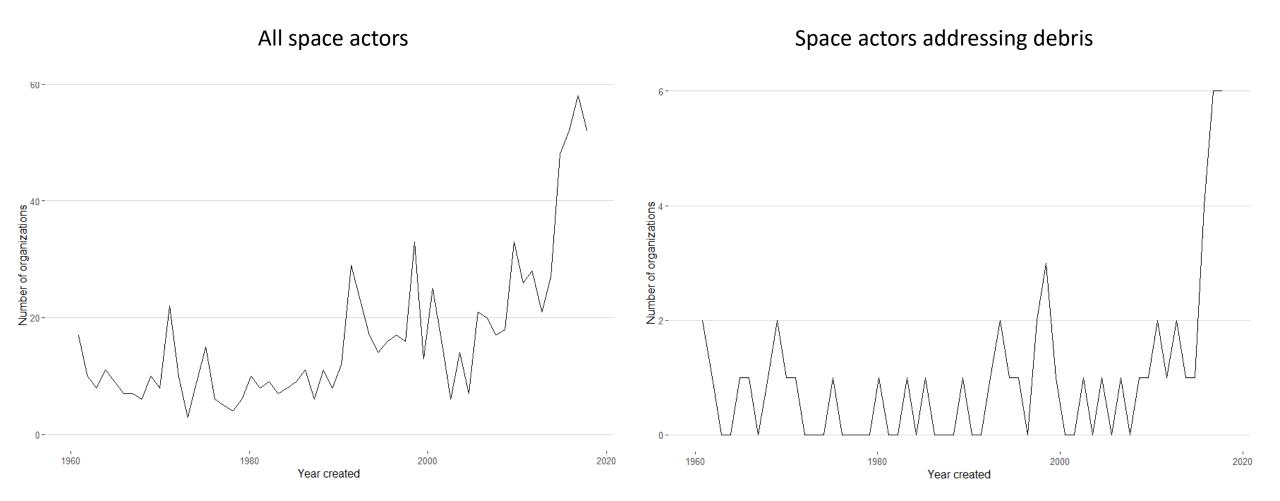
Mapping Space Governance in the Era of NewSpace: Insights from a Novel Dataset

Eytan Tepper & Jean-Frédéric Morin

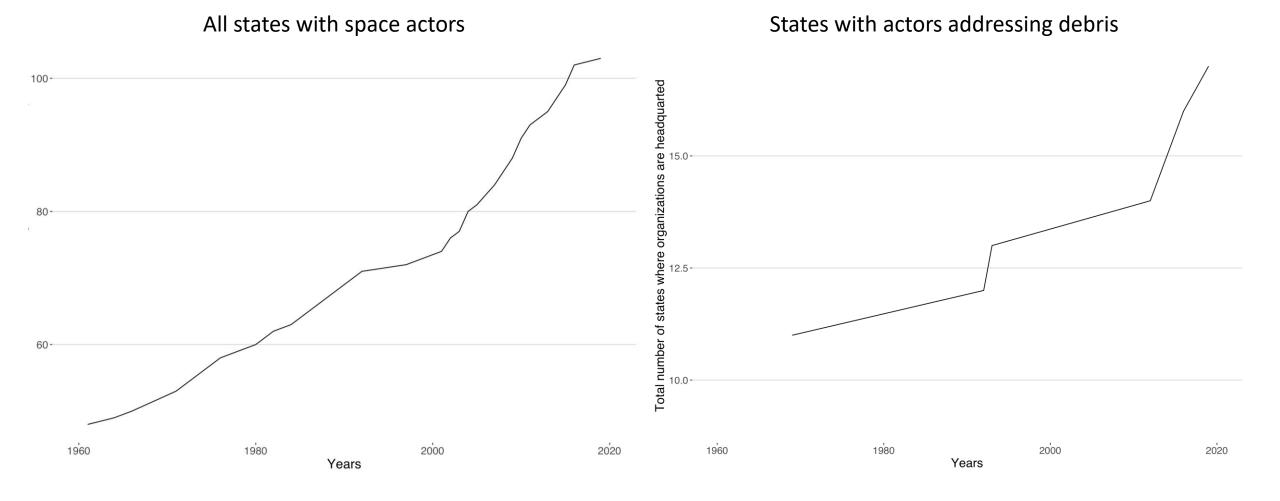
Dataset 1,400+ actors, 1,500+ agreements

В	C	D	E F	G	F	1 1		J	K	L	M	N	0	P	Q	R	S		U	J V		X	Υ	Z	AA	AB	AC	AD		AE	
Excl Ame	endments	common denomination	Full Name English n	name Ty	oe Iss	ue Is	s1 I	lss2	Iss3	Iss4	Iss5	Iss6	Iss7	Iss8	Iss9) Iss1	0 Iss1	1 Iss1	2 Iss	99 Mode	of C Ini	ator Negotiation yeacon	clusion Year	rmination yea	Lineage	Org	Full te:	xt Conversion	comp Doub	ble-checking	
		Outer Space Treaty	Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer		1	1	1	0	0	0)	0	0	0	0	0	0	0	0	0	1 861; 8		1967 N					1	1	1	
		Rescue Agreement	Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launche	ed int	1	3	0	0	1	0)	0	0	0	0	0	0	0	0	0	1 861; 8		1968 N					1	1	1 /	4
T		Liability Convention	Convention on International Liability for Damage Caused by Space Objects		1	9	0	0	0	0)	0	0	0	0	1	0	0	0	0	1	1963	1972 N					1	1	1 /	4
			Convention on Registration of Objects Launched into Outer Space		1 3;5		0	0	1	0	1	1	0	0	0	0	0	0	0	0	1	1962	1975 N					_1		1 /	4
		Moon Agreement	Agreement Governing the Activities of States on the Moon and Other Celestial Bodies		1	1	1	0	0	0)	0	0	0	0	0	0	0	0	0	1	1972	1980 N					_1	1	1 /	4
		Partial Test Ban Treaty (PTBT)	Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water		1	4	0	0	0	1		0	0	0	0	0	0	0	0	0	1 861; 8	3;908 1955	1963 N	/A				1	1	1	4
			Convention Relating to the Distribution of Programme-Carrying Signals Transmitted by Satellite		1	6	0	0	0	0)	0	1	0	0	0	0	0	0	0	1		1974					1	1	1 /	4
			Agreement Relating to the International Telecommunications Satellite Organization (INTELSAT)		1	6	0	0	0	0)	0	1	0	0	0	0	0	0	0	2	863	1971 N				196	1	1	1 /	4
			Agreement on the Establishment of the INTERSPUTNIK International System and Organization of Sp.	oace (1	6	0	0	0	0)	0	1	0	0	0	0	0	0	0	2	908 1968	1971 N	/A			197	_1 /	1	1	4
			Convention for the Establishment of a European Space Agency (ESA)		1	12	0	0	0	0)	0	0	0	0	0	0	0	1	1	2	738	1975			496	134	1	1	1	4
			Agreement of the Arab Corporation for Space Communications (ARABSAT)		1	6	0	0	0	0)	0	1	0	0	0	0	0	0	0	2		1976				24	1	1/	1 /	4
			BULGARIA-CUBA-CZECHOSLOVAKIA-GERMAN DEMOCRATIC REPUBLIC-HUNGARY- MONGO	DLIA-	1	12	0	0	0	0)	0	0	0	0	0	0	0	1	1	2	821	1976					1	_1	1 /	4.
			Convention on the International Mobile Satellite Organization (IMSO)		1	6	0	0	0	0)	0	1	0	0	0	0	0	0	0	2							_1		1 /	4
			Convention establishing the European Telecommunications Satellite Organization "EUTELSAT" (with an	nnexe	1	6	0	0	0	0)	0	1	0	0	0	0	0	0	0	2		1982	1983				1	1	1	4
			Convention for the Establishment of a European Organization for the Exploitation of Meteorological Sat	tellites	1	8	0	0	0	0)	0	0	0	1	0	0	0	0	0	2	738	1986					_1	1 /	1 /	4
			Constitution of the International Telecommunication Union		1	6	0	0	0	0)	0	1	0	0	0	0	0	0	0	2	1548	1992					1	1	1	4.
		IGA	Agreement Among the Government of Canada, Governments of Member States of the European Space Age		1	12	0	0	0	0)	0	0	0	0	0	0	0	1	1	4		1998		335;			1	1/	1	4
	_		Memorandum of Understanding between Indian Space Research Organization (ISRO), Bengaluru and Aryabatha Space Research Organization (ISRO), Bengaluru and Organization (IS	hatta Rese				nces (ARIE	S), Nainital	I for coopera	ation in the f	ield of Space	Situational.			Astrophysics							2020 N								_
			Space debris mitigation guidelines of the Committee on the Peaceful Uses of Outer Space		6		0	1	0	0)	0	0	0	0	0	0	0	0	0	6	2003	2007 N					_1	1	1	4
			THE DRAFT CODE OF CONDUCT FOR OUTER SPACE ACTIVITIES		4 2;3;4		0	1	1	1		0	0	0	0	0	0	0	0	0	1	2007 N/A						1	1	1	4
			ISO 24113 Space systems — Space debris mitigation requirements																				2010 N								
			Guidelines for the Long-term Sustainability of Outer Space Activities of the Committee on the Peaceful	ıl Use	6	2	0	1	0	0)	0	0	0	0	0	0	0	0	0	6	2010	2019 N					1	1	1	4
			Best Practices for the Sustainability of Space Operations		6	2	0	1	0	0)	0	0	0	0	0	0	0	0	0	6		2019 N	/A				1	1	1	4
	_		The Satelite Industry Association space safety principles																				2019								_
			Recommendations on national legislation relevant to the peaceful exploration and use of outer space		4	99	0	0	0	0)	0	0	0	0	0	0	0	0	1	1		2013					1	1	1	4
		A/RES/62/101	Recommendations on enhancing the practice of States and international intergovernmental organizations	s in r	4	99	0	0	0	0)	0	0	0	0	0	0			1	1		2007					1	1	1	4
1			ESA Space Debris Mitigation Handbook																				1999								
			European Code of Conduct for Space Debris Mitigation		4	2	0	1	0	0)	0	0	0	0	0	0	0	0	0	6		2004					1	1	1	4
99	_		The Sustainable Development Goals (SDGs)																												4
			DECLARATION OF THE FIRST MEETING OF EQUATORIAL COUNTRIES		4	99	0	0	0	0)	0	0	0	0	0	0	0	0	1	1		1976					1		1 /	4
			Prague Declaration on Small Satellite Regulation and Communication Systems		6	6	0	0	0	0)	0	1	0	0	0	0	0	0	0	7		2015					1		1 /	4
			McGill Declaration on Active Space Debris Removal and On-Orbit Satellite Servicing		6	2	0	1	0	0)	0	0	0	0	0	0	0	0	0	7		2011					1 /	1	1	4
1			US Government Orbital Debris Mitigation Standard Practices (ODMSP)																				2001					1	1	1 /	4
			Memorandum of Understanding between the National Aeronautics and Space Administration of the Unit	ted S	4	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	4		1998					1	1	1	4
1			NASA Procedural Requirements for Limiting Orbital Debris and Evaluating the Meteoroid and Orbital De	ebris Enviro	nments																		2017	2022				/ 1 /	1 /	1 /	4
1			NASA Process for Limiting Orbital Debris																				2019					1	1	1	4
1			ESA deorbiting/end of mission procedure																												4
			Compendium on mechanisms adopted in relation to non-legally binding United Nations instruments on ou	uter s	4	99	0	0	0	0)	0	0	0	0	0	0	0	0	1	1	2015	2016					1	1	1	4
3			Geosynchronous Orbit CubeSat Operating Guidelines																				2019								
1			Geostationary Earth-Orbiting Satellite Operational Requirements Working group																												
	_		ISO 26872 Space systems — Disposal of satellites operating at geosynchronous altitude																				2010								4
			The Hague Code of Conduct against Ballistic Missile Proliferation (HCoC)		4	4	0	0	0	1		0	0	0	0	0	0	0	0	0	2	2000	2002					1	1	1	4
		see here	UNGA resolution of 1957																												_
			Compendium of space debris mitigation standards				0	1	0	0)	0	0	0	0	0	0	0	0	0	1	2013	2014					1	1	1	4
3			Treaty on the Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force a	against Out	er Space O	bjects																									
		CCSDS	Consultative Committee for Space Data Systems ? (see https://public.ccsds.org/default.aspx)																												
			European Cooperation for Space Standardization																				1993								
			IADC Space debris mitigation guidelines		5	2	0	1	0	0)	0	0	0	0	0	0	0	0	0	1	1999	2002					1	1	1 /	4.
		A/RES/59/115	Application of the concept of the "launching State"		4	11	0	0	0	0)	0	0	0	0	0	0	1	0	1	1		2004					_1	1	1	4
		RES 1721 (XVI)	International Co-operation in the Peaceful Uses of Outer Space		4	12	1	0	0	0)	0	0	0	0	0	0	0	1	0	1		1961					1	1	1	4
		RES 1348 (XIII)	Question of the Peaceful Use of Outer Space		4	99	0	0	0	0)	0	0	0	0	0	0	0	0	1	1		1958				1370	1	1	1	4
			Memorandum of Understanding between the National Aeronautics and Space Administration of the Unit		2	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	4		1998					1	1	1	4
			Memorandum of Understanding between the National Aeronautics and Space Administration of the Unit		2	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	4		1998					1	1	1	ı
			Memorandum of Understanding between the National Aeronautics and Space Administration of the Unit	ted S	2	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	4		1998					1	1	1	4
			Recommandation ITU-R S.1003 Environmental Protection of the Geostationary-Satellite Orbit		6 2;6		0	1	0	0)	0	1	0	0	0	0	0	0	0	7		2010 N	/A	1327;1328			1	1	1	4
			Framework Agreement Between the Government of Canada and the Government of the United States	s of A	1	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	1		2009					1	1 /	1	
			Agreement Between the Government of Canada and the Government of the Union of Soviet Socialist	Repu	4	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	1		1989					1	1	1 /	4
			Agreement Between the United States of America and the Union of Soviet Socialist Republics Concern	ning C	4	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	1		1987					1	1	1	4
			Cooperation Agreement Between the Government of Canada and the European Space Agency		2	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	1		1979					1	1	1	4
			United Nations Resolution 1721 (XVI): International co-operation in the peaceful uses of outer space		4	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	1		1961					1	1	1	4
			UN General Assembly Resolution 1962 (XVIII): Declaration of Legal Principles Governing the Activities		4	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	1		1963					1	1	1	A.
			United Nations Resolution 37/92: Principles Governing the Use by States of Artificial Earth Satellites for	or Inf	4	6	0	0	0	0)	0	1	0	0	0	0	0	0	0	1		1982					1	1	1	4
			United Nations Resolution 41/65: Principles Relating to Remote Sensing of the Earth from Outer Space	е	4	8	0	0	0	0)	0	0	0	1	0	0	0	0	0	1		1986					1		1	4
			United Nations Resolution 47/68: Principles Relevant to the Use of Nuclear Power Sources in Outer Sp	pace.	4	99	0	0	0	0)	0	0	0	0	0	0	0	0	1	1		1992					1		1	4
		Space Benefit Declaration	United Nations Resolution 51/122. Declaration on International Cooperation in the Exploration and Use of	of Ou	4	12	0	0	0	0)	0	0	0	0	0	0	0	1	0	1		1996					1	1	1	4
3			United Nations Resolution 1348 (XIII). Establishing the Ad Hoc Committee on the Peaceful Uses of Ou	uter Space																			1958								
			United Nations Resolution 1472 (XIV). Establishing the Committee on the Peaceful Uses of Outer Spar	се	4 12;99		0	0	0	0)	0	0	0	0	0	0	0	1	1	2		1959					1	1	1	4
3			United Nations Resolution 59/115. Application of the concept of the "launching State"																				2004					1			
			United Nations Resolution 62/101 Recommendations on enhancing the practice of States and internation	nal in	4 3;5		0	0	1	0)	1	0	0	0	0	0	0	0	0	1		2007					1	1	1	4
1			Council of Europe, Recommendation 957 of the Parliamentary Assembly on the Proposal for an Interna			ina Agency			,									,					1983					1	1	1	4
- 1			ISO 23312 Space systems - Detailed space debris mitigation requirements for spacecraft	I		g.guney.																2018 N/A									4
			ISO 20893. Snace systems — Detailed snace debris mitination requirements for launch vehicle orbital																			2017 N/A									

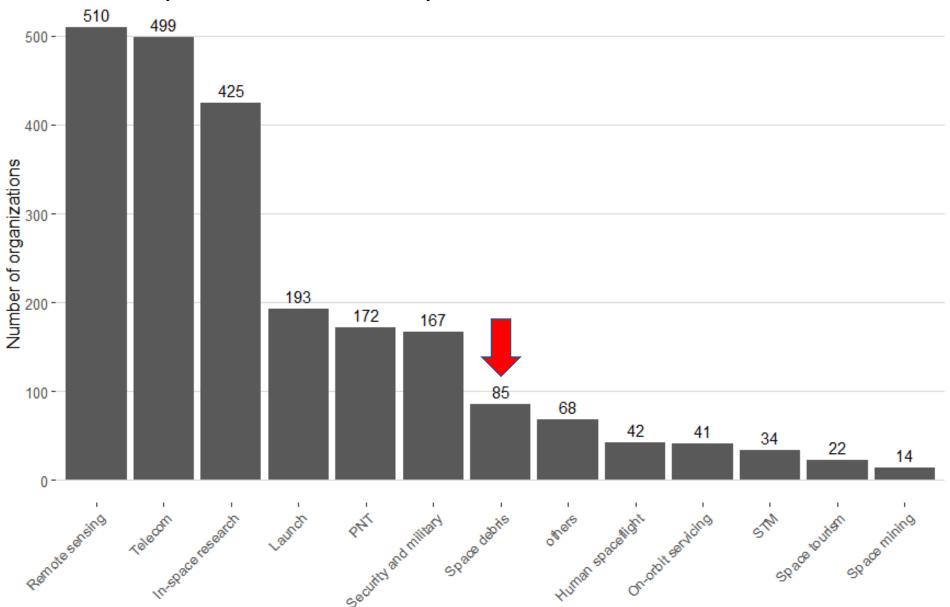
Explosion in new actors in last decade



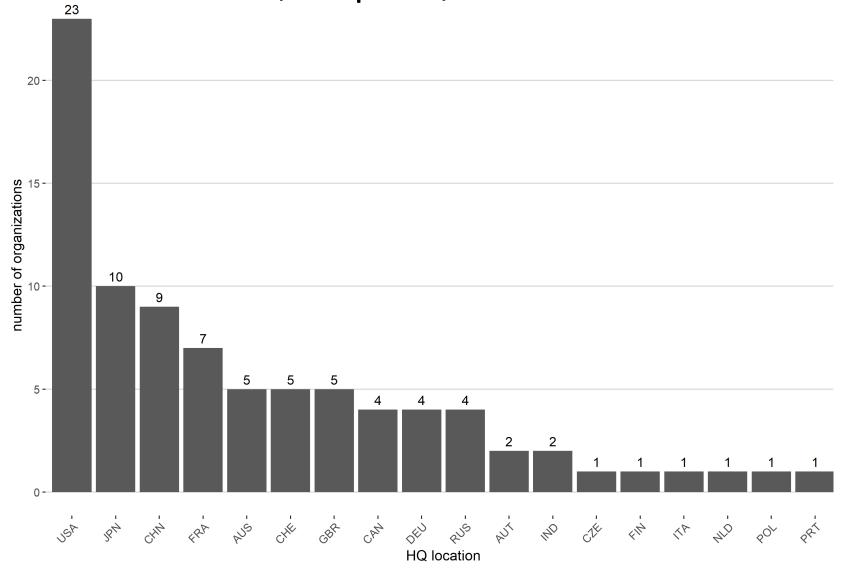
More geographical diversity



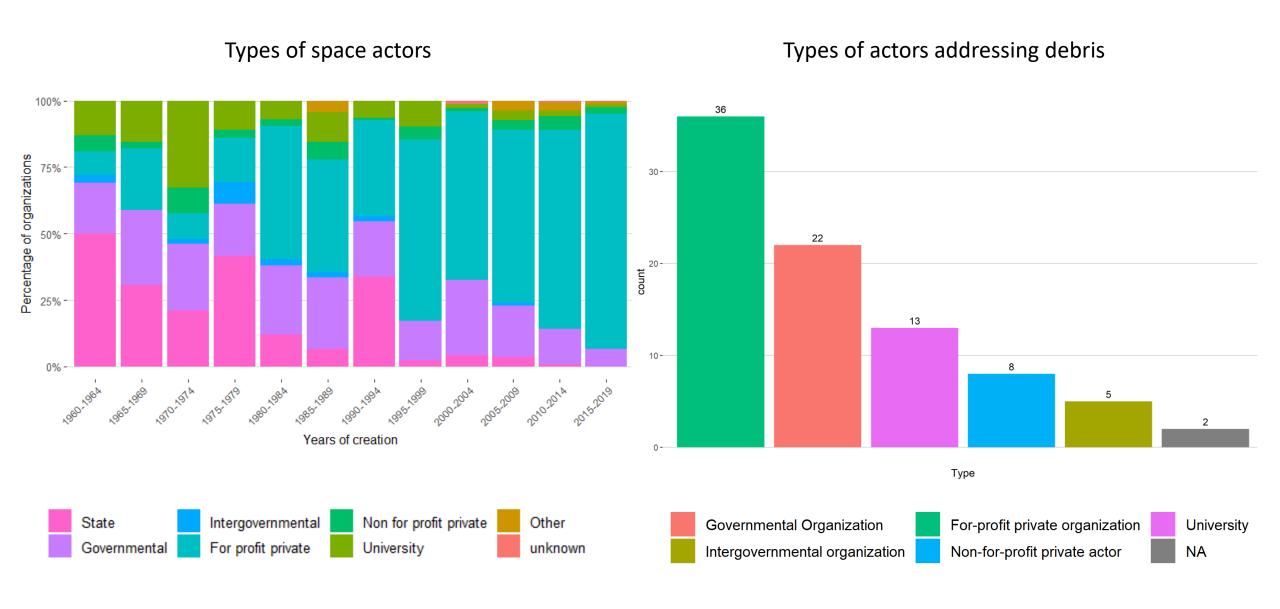
Of 1,400 actors, 85 focus on debris



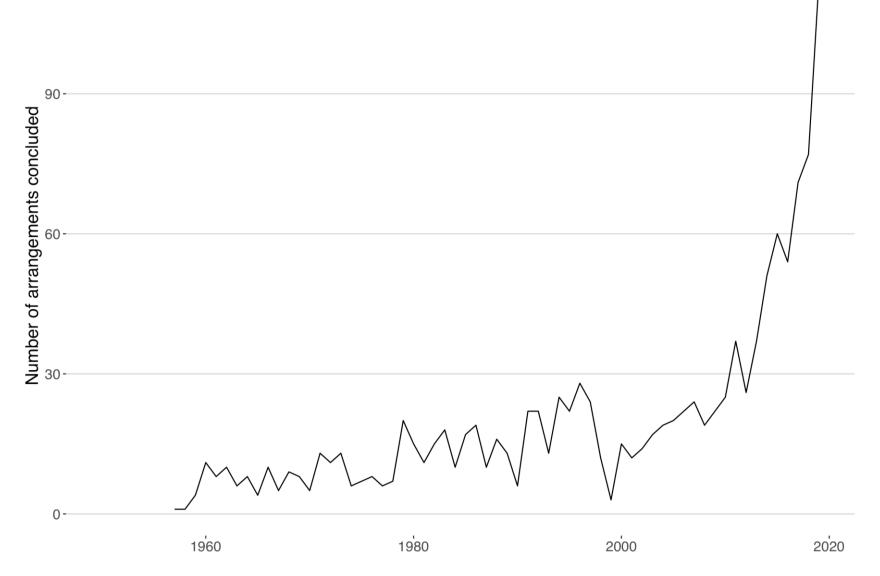
Most organizations working on debris are from the USA, Japan, China and France



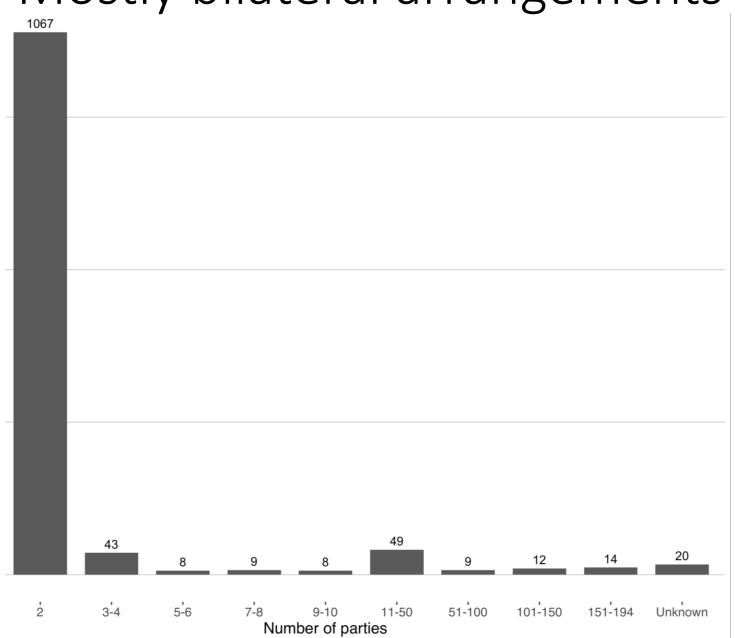
Private sector outpacing governmental



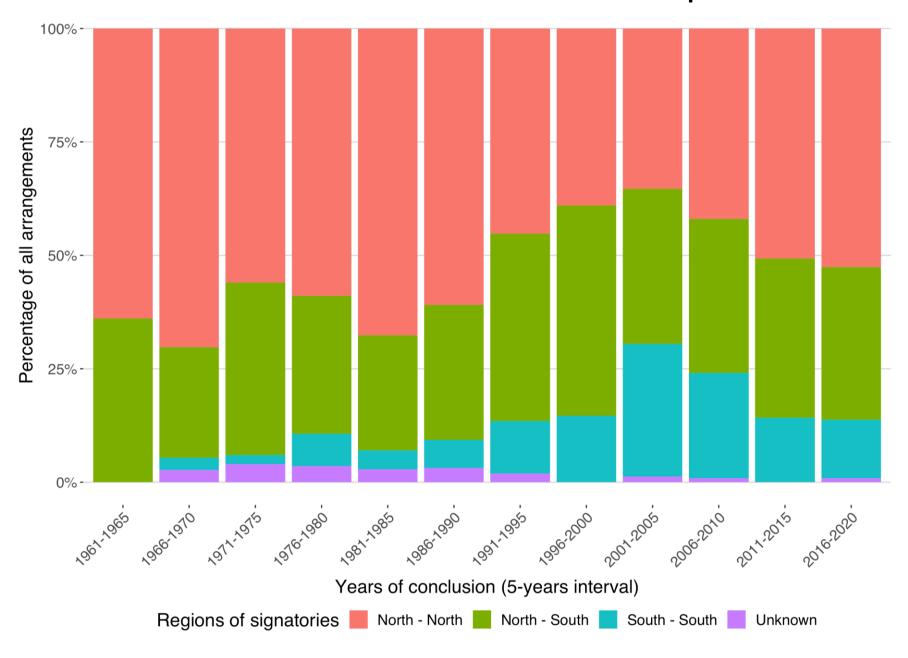
Explosion in number of new arrangements in last decade



Mostly bilateral arrangements

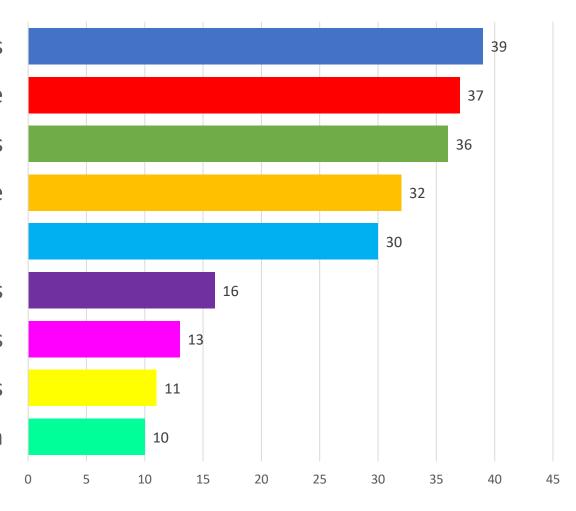


Increase in South-South cooperation



10% of arrangements address debris

Statements on monitoring of space objects Mention objective of sustainble use of space Statements related to the mitigation of debris Mention objective of safe use of space Statements on cooperation related to debris Statements on research related to debris Statements on on-orbit emergencies Statements on removal of debris Statements on liability in case of collision





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Thank you for your Attention!

We'd love to hear from you!

Questions, comments, proposals for collaboration

& if you are willing to be interviewed or share your thoughts

<u>space.debris.governance@pol.ulaval.ca</u> www.institutions.space

Prof. Jean-Frédéric Morin and Dr. Eytan Tepper