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## **The international trade in launch services : the effects of U.S. laws, policies and practices on its development**

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## ABBREVIATIONS AND ACRONYMS

<i>a fortiori</i>	=	with greater reason
<i>à l'Américaine</i>	=	American-style
a.o.	=	among other (things)
AADC	=	Alaska Aerospace Development Corporation
ABM (Treaty)	=	Anti-Ballistic Missile (Treaty)
ACDA	=	Arms Control and Disarmament Agency
<i>ad hoc</i>	=	concerned with a particular end/purpose or formed/ used for a specific or immediate problem/need
AECA	=	Arms Export Control Act
AFB	=	Air Force Base
AIA(A)	=	Aerospace Industries Association (of America)
ANPRM	=	Advance Notice of Proposed Rulemaking
APMT	=	Asia-Pacific Mobile Telecommunications
art.	=	article
artt.	=	articles
AST	=	Associate Administrator of Commercial Space Transportation
AW/ST	=	Aviation Week & Space Technology
<i>bona fide</i>	=	in good faith
BXA	=	Bureau of Export Administration
<i>c.q.</i>	=	<i>casu quo</i> , alternatively
<i>caveat</i>	=	reservation, qualification
CBO	=	Congressional Budget Office
CBW	=	Chemical and Biological Weapons
CCA(F)S	=	Cape Canaveral Air (Force) Station
CCF	=	Cooperation Forum on Export Controls
CCL	=	Commerce/ Commodities Control List
CDIA	=	Canadian Defence Industries Association
CEO	=	Chief Executive Officer
CFR	=	Code of Federal Regulations
CGWIC	=	China Great Wall Industry Corporation
Ch.	=	Chapter
CIA	=	Central Intelligence Agency
CIS	=	Commonwealth of Independent States
Cl. Ct.	=	Claims Court
CMLR	=	Common Market Law Reports
CNES	=	Centre National d'Etudes Spatiales
COCOM	=	Coordinating Committee for Multilateral Export Controls
COLLOQ	=	Colloquium
COMSAT	=	Communications Satellite Corporation
COMSTAC	=	Commercial Space Transportation Advisory Committee

## Abbreviations and acronyms

Cong.	=	Congress
COO	=	Chief Operating Officer
COPUOS	=	Committee on the Peaceful Uses of Outer Space
CPC	=	Central Product Classification
CRC	=	Coleman Research Corporation
CRS	=	Congressional Research Service
CSLA	=	Commercial Space Launch Act
<i>cum</i>	=	(combined) with, including
CYSA	=	Cape York Space Agency
D	=	Democrat
DASA	=	DaimlerChrysler Aerospace
<i>de facto</i>	=	in fact
<i>de iure</i>	=	in law
Dept of State Bull	=	Department of State Bulletin
DFH	=	Dong Fang Hong (the East is red)
DOC	=	Department of Commerce
DOD	=	Department of Defense
DOS	=	Department of State
DOT	=	Department of Transportation
DTC	=	Defense Trade Controls
DTSA	=	Defense Technology Security Administration
E.C.	=	European Commission
<i>e.g.</i>	=	<i>exempli gratia</i> , for example
e.i.f.	=	entry into force
E.O.	=	Executive Order
EAA	=	Export Administration Act
EAR	=	Export Administration Regulations
ECJ	=	European Court of Justice
ECSL	=	European Centre for Space Law
EELV	=	Evolved Expendable Launch Vehicle
ELDO	=	European Launcher Development Organisation
ELV	=	Expendable Launch Vehicle
emph. add.	=	emphasis added
EPCI	=	Enhanced Proliferation Control Initiative
ESA	=	European Space Agency
ESC	=	European Space Conference
ESRO	=	European Space Research Organisation
<i>et seq.</i>	=	and following (provisions)
EU	=	European Union
F(ed). R(eg).	=	Federal Regulations
FAA 1958	=	Federal Aviation Act of 1958
FAA	=	Federal Aviation Administration
FAR's	=	Federal Aviation Regulations

Samenvatting in het Nederlands - Summary in Dutch

FCC	=	Federal Communications Commission
FEER	=	Far Eastern Economic Review
FY	=	Fiscal Year
G-7	=	Group of 7 (most) industrialized countries
GAO	=	General Accounting Office
GATS	=	General Agreement on Trade in Services
GATT	=	General Agreement on Tariffs and Trade
GD	=	General Dynamics
GEO	=	Geostationary Earth Orbit
GPA	=	(WTO) Agreement on Government Procurement
GPO	=	Government Printing Office
GPS	=	Global Positioning System
GSLV	=	Geosynchronous Satellite Launch Vehicle
GTO	=	Geostationary Transfer Orbit
GWIC	=	Great Wall Industry Corporation
H.R.	=	House of Representatives
HEOS	=	Highly Eccentric Orbit Satellite
HSR	=	History Study Report
(I)IL	=	(International) Industrial List
<i>i.a., inter alia</i>	=	among other things
<i>i.e.</i>	=	<i>id est</i> , that is (to say)
I.L.M.	=	International Legal Materials
<i>ibid.</i>	=	<i>ibidem</i> , in/on the same place
ICBM	=	Intercontinental Ballistic Missile
ICSU	=	International Council of Scientific Unions
<i>id.</i>	=	<i>idem</i> , the same (source)
IGY	=	International Geophysical Year
IHT	=	International Herald Tribune
IISL	=	International Institute of Space Law
ILS	=	International Launch Services
<i>in internationalibus</i>	=	in international affairs
<i>in statu nascendi</i>	=	in state of being born, in state of development
INF	=	Intermediate-Range Nuclear Forces (Treaty)
<i>infra</i>	=	below
INMARSAT	=	International Maritime Satellite Organisation
INR	=	Intelligence and Research Bureau
INTELSAT	=	International Telecommunications Satellite Organisation
IR(B)M	=	Intermediate-Range (Ballistic) Missile
IRS	=	Indian Remote-sensing Satellite
ISRO	=	Indian Space Research Organisation
ISS	=	International Space Station
ITAR	=	International Traffic in Arms Regulations

#### Abbreviations and acronyms

J. Air L. & Com	=	Journal of Air Law and Commerce
J. Space L.	=	Journal of Space Law
JEA	=	Joint Endeavor Agreement
<i>jo.</i>	=	<i>juncto</i> , (taken, read) together with, in combination with
KSC	=	Kennedy Space center
L.	=	Law
LEO	=	Low Earth Orbit
<i>lex specialis</i>	=	special law
LKEI	=	Lockheed Khrunichev Energia International
LM	=	Lockheed Martin
LM	=	Long March
M(c)DD	=	Mc Donnell Douglas
M.o.A.	=	Memorandum of Agreement
M.o.C.	=	Memorandum of Consultations
M.o.U.	=	Memorandum of Understanding
MDE	=	Major Defense Equipment
MEO	=	Medium Earth Orbit
MFN	=	Most Favoured Nation
MLA	=	Manufacturing License Agreement
MM(C)	=	Martin Marietta (Corporation)
MTCA	=	Missile Technology Control Act
MTCR	=	Missile Technology Control Regime
Mtops	=	Million theoretical operations per second
NACA	=	National Advisory Committee for Aeronautics
NAIC	=	National Air Intelligence Center
NASA	=	National Aeronautics and Space Administration
NASDA	=	National Space Development Agency
NATO	=	North Atlantic Treaty Organization
NL	=	Netherlands
NOAA	=	National Oceanic and Atmospheric Administration
<i>nolens volens</i>	=	willy-nilly
NORAD	=	North American Air Defense
NPT	=	Non-Proliferation Treaty
NSA	=	National Security Agency
NSAM	=	National Security Action Memorandum
NSC	=	National Security Council
NSDD	=	National Security Decision Directive
NSG	=	Nuclear Suppliers Group
NSPD	=	National Space Policy Directive
NSTS	=	National Space Transportation System
NYT	=	New York Times

Samenvatting in het Nederlands - Summary in Dutch

OCST	=	Office of Commercial Space Transportation
ODTC	=	Office of Defense Trade Controls
OMB	=	Office of Management and Budget
OSC	=	Orbital Sciences Corporation
OSP	=	Orbital-Suborbital Program
OST	=	Outer Space Treaty (of 1967)
OSTP	=	Office of Science and Technology Policy
OTA	=	Office of Technology Assessment
P(ub). L.	=	Public Law
para.	=	paragraph
<i>passim</i>	=	in various places, here and there
PKM	=	Perigee Kick Motor
PLA	=	People's Liberation Army
PM	=	Bureau of Political-Military Affairs
PRC	=	People's Republic of China
Proceed.	=	Proceedings
PSLV	=	Polar Satellite Launch Vehicle
publ	=	publication, published
Q.	=	Quarter
<i>quid-pro-quo</i>	=	something for something
RLV	=	Reusable Launch Vehicle
RPV	=	Remotely Piloted Vehicle
R&D	=	Research and Development
RSC	=	Rocket System Corporation
<i>res communis omnium</i>	=	a good belonging to all/everybody
RKA	=	Russian Space Agency
R	=	Republican
Sec.	=	Section
SEI	=	Space Exploration Initiative
SELVS	=	Small Expendable Launch Vehicle Services
SES	=	Société Européenne des Satellites
Sess.	=	Session
SIA	=	Satellite Industry Association
SIG (Space)	=	Senior Inter-Agency Group on Space
SLBM	=	Submarine-launched Ballistic Missile
SME	=	Significant Military Equipment
SRM	=	Short(er)-Range Missile
SSI	=	Space Services Inc.
SSTO	=	Single-Stage-To-Orbit
START	=	Strategic Arms Reduction Treaty
Stat.	=	Statutes
<i>status quo</i>	=	the existing state

Abbreviations and acronyms

STS	=	Space Transportation System
SU	=	Soviet Union
<i>supra</i>	=	above
TAA	=	Technical Assistance Agreement
TAA	=	Trade Agreement Act
TCI	=	Trans-Space Carriers Inc.
TIAS	=	Treaties and other International Acts Series
TPCC	=	Trade Promotion Coordinating Committee
TPSC	=	Trade Policy Staff Committee
Trb	=	Tractatenblad
TTCP	=	Technology Transfer Control Plan
U.S.	=	United States
UAV	=	Unmanned Air Vehicle
ULV	=	Unmanned Launch Vehicle
UNCOPUOS	=	United Nations Committee on the Peaceful Uses of Outer Space
UNGA	=	United Nations General Assembly
unpub.	=	unpublished
USA	=	United Space Alliance
USAF	=	United States Air Force
USBI	=	U.S. Space Boosters, Inc.
USC	=	United States Code
USG	=	United States Government
USML	=	United States Munitions List
UST	=	United States Treaty Series
USTR	=	United States Trade Representatives
VAFB	=	Vandenberg Air Force Base
VCSFA	=	Virginia Commercial Space Flight Authority
viz.	=	<i>videlicet</i> , namely
VLS	=	Veiculo Lancador de Satellites
WA	=	Wassenaar Arrangement
Weekly Comp. Pres. Docs.	=	Weekly Compilation of Presidential Documents
WEU	=	Western European Union
WMD	=	Weapons of Mass Destruction
WSJ	=	Wall Street Journal
WTO	=	World Trade Organisation
WTTC	=	World Travel and Tourism Council
ZLW	=	Zeitschrift für Luft- und Weltraumrecht



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MEMBERSHIP INTERNATIONAL ORGANIZATIONS AND  
MULTILATERAL REGIMES

	NATO	“Major non- NATO ally”*	MTCR	Wassenaar	EU	ESA
Belgium	×		×	×	×	×
Canada	×		×	×		
Denmark	×		×	×	×	×
France	×		×	×	×	×
Germany	×		×	×	×	×
Greece	×		×	×	×	
Iceland	×		×			
Italy	×		×	×	×	×
Luxembourg	×		×	×	×	
Netherlands	×		×	×	×	×
Norway	×		×	×		×
Portugal	×		×	×	×	
Spain	×		×	×	×	×
Turkey	×		×	×		
U.K.	×		×	×	×	×
U.S.	×		×	×		
Hungary	×		×	×		
Poland	×		×	×		
Tsjechia	×		×	×		
Australia		×	×	×		
Egypt		×				
Israel		×				
Japan		×	×	×		
Rep. of Korea		×		×		
New Zealand		×	×	×		
Jordan		×				
Argentina		×	×	×		
Austria			×	×	×	×
Brazil			×			
Finland			×	×	×	×
Ireland			×	×	×	×
Russia			×	×		
South Africa			×			
Sweden			×	×	×	×
Switzerland			×	×		×
Romania				×		
Bulgaria				×		
Slovak Rep.				×		
Ukraine			×	×		

\* See ITAR, Amendment of March 15, 1999, Ch. 4, (text to) notes 46 and 47.

## 1998 WORLDWIDE ORBITAL LAUNCH EVENTS

Date	Vehicle	Site	Payload	Operator	Manufacturer	Use	Coml Price	L	M
1/6/98	† Athena 2	Spaceport Florida	Lunar Prospector	NASA	Lockheed Martin	Scientific	\$21-28 M	S	S
1/9/98	v † Delta 2 7925	CCAS	Skyenet 4D	British Defense Ministry	Matra Marconi	Communications	\$45-55 M	S	S
1/22/98	Shuttle Endeavour	KSC	STS 89	NASA	Rockwell International	Crewed		S	S
1/29/98	Shavit 1	Palmachim	Offeq 4	Israel Space Agency	Israeli Aircraft Ind. (IAI)	Remote Sensing		F	F
1/29/98	Soyuz	Baikonur	Soyuz TM-27	RKK Energia	RKK Energia	Crewed		S	S
1/29/98	Atlas 2A	CCAS	SM II 98-01	DoD	Unknown	Intelligence		S	S
2/4/98	v Ariane 44LP	Kourou	* Brazilsat B3	Embratel	Hughes	Communications	\$80-95 M	S	S
			* Inmarsat 3 F5	Inmarsat	Lockheed Martin	Communications			
2/10/98	† Taurus 1	VAFB	Geosat Follow-On	DoD	Bali Aerospace	Remote Sensing	\$18-20 M	S	S
			* Celestis 2	Celestis		Other			
			* Orbcomms 03-04	Orbcomm	Orbital (OSC)	Communications			
2/14/98	v † Delta 2 7420	CCAS	* Globalstars 1-4	Globalstar, Inc.	Space Systems/Loral	Communications	\$45-55 M	S	S
2/17/98	Soyuz	Baikonur	* Spin 2	Sovinformspudnik	Central Specialized Design Bureau (TsSKB)	Remote Sensing		S	S
2/18/98	v † Delta 2 7920	VAFB	* Iridiums 50,52-56	Iridium, Inc.	Lockheed Martin	Communications	\$45-55 M	S	S
2/21/98	H 2	Tanegashima	COMETS 1	NASDA	Toshiba	Communications		F	F
2/25/98	† Pegasus XL	VAFB	SNOE	Univ. of Colorado/NASA	University of Colorado	Scientific	\$12-15 M	S	S
			* Teledesic T1	Teledesic	Orbital (OSC)	Communications			
2/27/98	v † Atlas 2AS	CCAS	* Intelsat 8A F6	New Skies Satellites	Lockheed Martin	Communications	\$90-105 M	S	S
2/27/98	v Ariane 42P	Kourou	* Hot Bird 4	Eutelsat	Matra Marconi	Communications	\$60-75 M	S	S
3/15/98	Soyuz	Baikonur	Progress M-38	RKK Energia	RKK Energia	Mir Re-supply		S	S
3/16/98	† Atlas 2	CCAS	GBS 8	DoD	Hughes	Communications	\$62-85 M	S	S
3/23/98	Ariane 40	Kourou	SPOT 4	CNES	Matra Marconi	Remote Sensing		S	S
3/25/98	v Long March 2C	Taiyuan	* Iridiums 51, 61	Iridium, Inc.	Lockheed Martin	Communications	\$20-25 M	S	S
3/29/98	v † Delta 2 7920	VAFB	* Iridiums 55, 57-60	Iridium, Inc.	Lockheed Martin	Communications	\$45-55 M	S	S
4/1/98	Pegasus XL	VAFB	TRACE	NASA	NASA	Scientific		S	S
4/7/98	v Proton	Baikonur	* Iridiums 62-68	Iridium, Inc.	Lockheed Martin	Communications	\$75-95 M	S	S
4/17/98	Shuttle Columbia	KSC	STS 90	NASA	Rockwell International	Crewed		S	S
4/24/98	v † Delta 2 7420	CCAS	* Globalstars 6,8,14,15	Globalstar, Inc.	Space Systems/Loral	Communications	\$45-55 M	S	S
4/28/98	v Ariane 44P	Kourou	* BSAT 1 B	Broadcast Satellite Sys.	Hughes	Communications	\$70-85 M	S	S
			* Nilesat 101	Egypt Radio/TV Union	Matra Marconi	Communications			
4/29/98	Proton	Baikonur	Kosmos 2350	Russian MoD	Unknown	Military		S	S
5/2/98	v Long March 2C	Taiyuan	* Iridiums 69, 71	Iridium, Inc.	Lockheed Martin	Communications	\$20-25 M	S	S
5/7/98	Molniya	Plesetsk	Kosmos 2351	Russia	NPO Lavochkin	Classified		S	S
5/8/98	v Proton	Baikonur	* EchoStar 4	EchoStar Satellite Corp.	Lockheed Martin	Communications	\$75-95 M	S	S
5/8/98	Titan 4B/Centaur	CCAS	USA 139	DoD	Unknown	Classified		S	S
5/13/98	Titan 2	VAFB	NOAA 15	NOAA	Lockheed Martin	Meteorological		S	S
5/15/98	Soyuz	Baikonur	Progress M-39	RKK Energia	RKK Energia	Mir Re-supply		S	S
5/17/98	v † Delta 2 7920	VAFB	* Iridiums 70, 72-75	Iridium, Inc.	Lockheed Martin	Communications	\$45-55 M	S	S
5/30/98	Long March 3B	Xichang	ChinaStar 1A	Chinese Comm Ministry	Lockheed Martin	Communications		S	S
6/2/98	Shuttle Discovery	KSC	STS 91	NASA	Rockwell International	Crewed		S	S
6/9/98	v † Delta 2 7925	CCAS	* Thor 3	Telenor A.S.	Hughes	Communications	\$45-55 M	S	S
6/16/98	Cyclone 3	Plesetsk	Kosmos 2352-57	Russian MoD	NPO PM	Communications		P	S
6/18/98	v † Atlas 2AS	CCAS	* Intelsat 8A F5	Intelsat	Lockheed Martin	Communications	\$90-105 M	S	S
6/24/98	Soyuz	Plesetsk	Kosmos 2358	Russian MoD	Unknown	Military		S	S
6/25/98	Soyuz	Baikonur	Kosmos 2359	Russia MoD	Unknown	Military		S	S
7/1/98	Molniya	Plesetsk	Molniya 3	Russia PTT	NPO PM	Communications		S	S
7/4/98	M 5	Kagoshima	Nozomi	ISAS	NEC	Scientific		S	S
7/7/98	v Shtil	Submarine	Tubsat-N & N1	Berlin Technical Univ.	Berlin Technical Univ.	Communications	\$0.1-0.2 M	S	S
7/10/98	Zenit 2	Baikonur	Resurs-O1 N4	Russia	VNII Elektromekhaniki	Remote Sensing		S	S
			FASat-Bravo	Chilean Air Force	Surrey Sat. Tech. Ltd.	Remote Sensing			
			SAFIR 2	OHB System	OHB System	Communications			
			* TMSAT 1	Thai MicroSatellite Co.	Surrey Sat. Tech. Ltd.	Remote Sensing			
			WestPac	ElectroOptics Sys./RKA	Unknown	Remote Sensing			
			Tech Sat 2	Asher Space Res. Inst.	Technion Tech. Institute	Development			

v Denotes commercial launch, defined as a launch that is internationally competed or whose primary payload is commercial in nature.  
† Denotes FAA-licensed launch.  
\* Denotes a commercial payload, defined as a spacecraft which serves a commercial function or is operated by a commercial entity.  
LM refers to the outcome of the launch and mission: S = success, P = partial success, F = failure.

1998 Worldwide Orbital Launch Events

Date	Vehicle	Site	Payload	Operator	Manufacturer	Use	Com Price	L	M
7/18/98	Long March 3B	Xichang	Sinosat 1	EuraSpace/Sinosatcom	Aerospatiale	Communications		S	S
7/28/98	Zenit 2	Baikonur	Kosmos 2360	Russian MoD	NPO Yuzhnoye	Intelligence		S	S
8/2/98	v † Pegasus XL/HAPS	Wallops	* Orbcomms 13-20	Orbcomm	Orbital (OSC)	Communications	\$12-15 M	S	S
8/12/98	† Titan 4/Centaur	CCAS	USA 1998-08	DoD	Unknown	Classified		F	F
8/13/98	Soyuz	Baikonur	Soyuz TM-28	RKK Energia	RKK Energia	Crewed		S	S
8/20/98	v Long March 2C	Taiyuan	* Iridiums 76, 78	Iridium, Inc.	Lockheed Martin	Communications	\$20-25 M	S	S
8/25/98	v Ariane 44P	Kourou	* ST 1	Singapore Telecom	Matra Marconi	Communications	\$70-85 M	S	S
8/26/98	v † Delta 3	CCAS	* Galaxy 10	PanAmSat	Hughes	Communications	\$75-90 M	F	F
8/30/98	v Proton	Baikonur	* Astra 2A	SES	Hughes	Communications	\$75-95 M	S	S
8/31/98	Taepo Dong 1	Musudan-ri	Kwangmyongsong	North Korea	Unknown	Unknown		F	F
9/8/98	v † Delta 2 7920	VAFB	* Iridiums 77, 79-82	Iridium, Inc.	Lockheed Martin	Communications	\$45-55 M	S	S
9/10/98	v Zenit 2	Baikonur	* Globalstars 5, 7, 9-13, 16-20	Globalstar, Inc.	Space Systems/Loral	Communications	\$30-40 M	F	F
9/16/98	v Ariane 44LP	Kourou	* PAS 7	PanAmSat	Space Systems/Loral	Communications	\$80-95 M	S	S
9/23/98	v † Pegasus XL/HAPS	Wallops	* Orbcomms 21-28	Orbcomm	Orbital (OSC)	Communications	\$12-15 M	S	S
9/29/98	Molniya	Plesetsk	Molniya 1T-1998	Russia PTT	NPO PM	Communications		S	S
10/3/98	Taurus 1	VAFB	STEX	NRO	Lockheed Martin	Development		S	S
10/5/98	v Ariane 44L	Kourou	* Eutelsat W2	Eutelsat	Aerospatiale	Communications	\$90-110 M	S	S
10/9/98	v † Atlas 2AS	CCAS	* Sirius 3	Nordiska Sat. (NSAB)	Hughes	Communications		S	S
10/20/98	† Atlas 2A	CCAS	* Hot Bird 5	Eutelsat	Matra Marconi	Communications	\$90-105 M	S	S
10/21/98	Ariane 5	Kourou	GBS 9	DoD	Hughes	Communications	\$62-85 M	S	S
			ARD	ESA	Aerospatiale	Development		S	S
10/22/98	v † Pegasus 1	CCAS	Maqsat 3	Kayser-Threde	Kayser-Threde	Test			
10/24/98	Delta 2 7326	CCAS	SCD 2	INPE	INPE	Communications	\$10-14 M	S	S
			Deep Space 1	NASA	Spectrum Astro, Inc.	Development		S	S
10/25/98	Soyuz	Baikonur	Sedsat-1	NASA	Univ Alabama Huntsville	Communications			
			Progress M-40	RKK Energia	RKK Energia	Mir Re-supply		S	S
			Sputnik 41	AMSAT France	AMSAT France	Communications		S	S
10/28/98	v Ariane 44L	Kourou	* AfriStar 1	WorldSpace, Inc.	Alcatel Espace	Communications	\$90-110 M	S	S
			* GE 5	GE Americom	Aerospatiale	Communications			
10/29/98	Shuttle Discovery	KSC	STS 95	NASA	Rockwell International	Crewed		S	S
			Spartan 201-04R	NASA	NASA	Scientific			
			PANSAT 1	Naval Postgrad. School	Naval Postgrad. School	Communications			
11/4/98	v Proton	Baikonur	* PAS 8	PanAmSat	Space Systems/Loral	Communications	\$75-95 M	S	S
11/6/98	v † Delta 2 7920	VAFB	* Iridiums 83-87	Iridium, Inc.	Lockheed Martin	Communications	\$45-55 M	S	S
11/20/98	Proton	Baikonur	Zarya	International	Khrunichev	Space Station		S	S
11/22/98	v † Delta 2 7925	CCAS	* Bonum 1	Media Most	Hughes	Communications	\$45-55 M	S	S
12/4/98	Shuttle Endeavour	KSC	STS 88	NASA	Rockwell International	Crewed		S	S
			MightySat 1	DoD	Orbital (OSC)	Development			
			SAC A	NASA	Barloche	Development			
			Unity	NASA	NASA	Space Station			
12/4/98	v Ariane 42L	Kourou	* SatMex 5	Telecomm Mexico	Hughes	Communications	\$75-90 M	S	S
12/5/98	Pegasus XL	VAFB	SWAS	Smithsonian Astro. Obs.	NASA	Scientific		S	S
12/10/98	Cosmos	Plesetsk	Nadezhda 5	Russia	NPO PM	Navigation		S	S
			Astrid 2	Swedish Natl Space Brd	Swedish Space Corp.	Scientific			
12/11/98	Delta 2 7425	CCAS	Mars Climate Orbiter	NASA	Lockheed Martin	Scientific		S	S
12/19/98	v Long March 2C	Taiyuan	* Iridiums 92, 93	Iridium, Inc.	Lockheed Martin	Communications	\$20-25 M	S	S
12/21/98	v Ariane 42L	Kourou	* PAS 6B	PanAmSat	Hughes	Communications	\$75-90 M	S	S
12/24/98	Cosmos	Plesetsk	Kosmos 2361	Russia	NPO Lavochkin	Navigation		S	S
12/30/98	Proton	Baikonur	Kosmos 2362-64	Russian MoD	NPO PM	Navigation		S	S

v Denotes commercial launch, defined as a launch that is internationally competed or whose primary payload is commercial in nature.  
† Denotes FAA-licensed launch.  
\* Denotes a commercial payload, defined as a spacecraft which serves a commercial function or is operated by a commercial entity.  
L/M refers to the outcome of the launch and mission: S = success, P = partial success, F = failure.

Commercial space transportation: 1998 Year in review, FAA Associate Administrator for Commercial Space Transportation (AST) (Jan 1999).



## SPACE CHRONOLOGY

- |      |     |    |  |
|------|-----|----|--|
| 1957 | Oct | 4  | Sputnik 1 launched from Baikonur cosmodrome, Kazakhstan  |
| 1958 | Oct | 1  | Birth of NASA  |
| 1961 | Apr | 12 | Yuri Gagarin launched from Baikonur  |
|      | May | 21 | President Kennedy announces the Apollo program   |
| 1967 | Oct | 4  | Sputnik's 10 year anniversary<br>Attendance space law lectures Leiden University (Goedhuis)  |
| 1969 | Jul | 20 | Lunar landing Apollo 11  |
| 1972 | Jan |    | President Nixon's decision to develop U.S. space transportation system (STS) 'Space Shuttle' program   |
|      | Apr | 16 | Launch Apollo 17 (sixth and final lunar landing)   |
|      | Oct | 9  | U.S. Launch Assurance Policy   |
| 1973 | Jul | 31 | ESC decision to develop Ariane launcher  |
|      | Sep | 21 | Ariane Development Arrangement (concluded by ESRO/certain Eur governments)   |
| 1975 | Jul | 15 | Apollo-Soyuz link-up   |
| 1978 | Oct | 10 | Civil and further national space policy, Presidential Directive/ NSC - 42  |
| 1979 | Dec | 24 | First launch of Ariane (L01)   |
| 1980 | Jan | 14 | Ariane Production Declaration  |
|      | Mar | 26 | Formation of Arianespace   |
|      | Oct | 30 | ESA (formal birthdate)   |
| 1981 | Jan |    | President Reagan takes office  |
|      | Apr | 12 | First flight of Space Shuttle (Columbia-STS 1)   |
|      | Nov | 2  | Arianespace first commercial launch contract signed with GTE Spacenet (U.S.)   |
| 1982 | Jul | 4  | National space policy, Presidential Directive/ NSC - 42, incl. establishment Senior Agency Group on Space, "SIG-Space"<br>Return to earth of Space Shuttle Columbia (4th flight): shuttle declared operational |

Space chronology

- 1983 Mar 29 Launch of SDI program (Pres. Reagan's "Star Wars" speech)  
May 16 Commercialization of expendable launch vehicles, National Security Decision Directive (NSDD) 94
- 1984 Jan 25 Pres. Reagan announces Space Station program (State of the Union)  
Feb 24 Commercial expendable launch vehicle activities, Executive Order 12,465 designating DOT as launch lead agency  
Establishment DOT Office of Commercial Space Transportation (OCST)  
May 25 Transpace Carriers Inc. (TCI) Sec. 301, Trade Act 1974, complaint against Arianespace  
Oct 30 Commercial Space Launch Act
- 1985 Jan 2 Application of SSI (with OCST) for approval of 60 launches of human 'cremains'  
Feb 13 OCST approval of SSI application  
Jul 17 Determination under Section 301 [re TCI complaint], Memorandum for the United States Trade Representative, The White House  
Jul 30 Shuttle pricing for foreign and commercial users, NSDD 181
- 1986 Jan 28 Explosion Space Shuttle Challenger (STS-25)  
Pres. Reagan's announcement of National Aerospace Plane program (State of the Union)  
Dec 27 U.S. launch strategy, NSDD 254 (based on Presidential Directive Aug 1986)
- 1987 Nov ESA member countries approve Ariane 5 development
- 1988 Jan 5 Presidential Directive on National Space Policy (Reagan)  
Feb 11 The President's space policy and commercial space initiative to begin the next century, Fact Sheet, the White House Office of the Press Secretary (based on NSDD Jan 5, 1988)  
Feb 12 Model expendable launch vehicle commercialization agreement, Dept of the Air Force  
Jul 26 The Community and space, communication from the European Commission to the Council and the European Parliament  
Sep 9 Administration's decision to grant license for AUSSAT/Asiasat export to China, subject to conditions

- Sep 23  
27,28 Cong. Hearings on AUSSAT & Asiasat launches with  
Chin. Long March
- Sep 29 Resumption of shuttle flights (STS-26)
- 1989 Jan 26 U.S. - Chinese launch trade agreement (M.o.U)  
Mar 16 Approval export licenses Asiasat & AUSSAT: entry into  
force U.S.-Chinese M.o.U.  
Jun 4 Tiananmen Square, Beijing  
Nov 2 National space policy, Presidential Directive (Bush)
- 1990 Jan Establishment within State Dept of the Center for  
Defense Trade  
Sep 5 Commercial space launch policy, Presidential Directive  
(Bush)  
U.S. Missile Technology Control Act  
Launch Services Purchase Act  
Nov 16 Executive Order 12735 on chemical and biological  
weapons proliferation, incl. directive for additional  
export control measures
- 1991 Feb 12 U.S. commercial space policy guidelines, White House  
Office of the Press Secretary  
Mar 9 National Space Policy Directive 6: Space Exploration  
Initiative (Bush)  
Apr 30 Approval exports AUSSAT & Freja satellites to China  
for Long March launch
- 1992 Renewal Ariane Production Declaration of 1980  
May 6 US sanctions ISRO & Glavkosmos  
May 18 100th Arianespace launch contract  
Sep 23 The European Community and space, communication  
from the European Commission to the Council and the  
European Parliament  
Oct 23 ESA Council resolution on European space policy on  
launch services
- 1993 Jul 22 EC - Russia launch trade agreement (proposed text)  
Sep 2 Signing of US-Russia launch trade agreement and  
missile export control agreement  
Sep 27 Space launch and missile exports, Presidential Decision  
Directive (“non-proliferation and export control policy”)  
(Clinton)
- 1994 Feb 4 Launch of Japanese H-2 rocket  
Mar 31 Demise of COCOM  
Aug 5 National Space Transportation Policy (Clinton)



Space chronology

	Nov	15	GATS decision European Court of Justice
1995	Mar	13	New launch trade agreement US-China
	Jun		Lockheed Martin & Khrunichev form International Launch Services (ILS) to market Proton & Atlas
	Dec	14	US-Ukraine launch trade agreement
	Dec	19	28 countries, incl. the former COCOM members and Russia conclude new multilateral export control arrangement (Wassenaar)
1996	Jan	30	New US-Russia launch trade agreement
	Jun	4	Failure Ariane 5 maiden flight
	Jul	17	Starsem agreement signed in Moscow by French & Russian governments
	Sep	19	National Space Policy (Clinton)
	Oct	1	United Space Alliance (Lockheed Martin + Rockwell Int'l) assume responsibility for day-to-day space shuttle processing
	Dec	4	The European Union and Space: Fostering applications, markets and industrial competitiveness, Communication from the Eur. Commission to the Council and the Eur. Parliament
1997	Apr	2	Total objects in earth orbit 8.546. of which 2.313 satellites and 6.233 debris (US Space Command
	Sep	23	100th Ariane launch
1998	Oct	17	Strom Thurmond National Defense Authorization Act
	Oct	28	Commercial Space Act
1999	Feb	22	U.S. Government disapproves sale of Hughes commercial communications satellite to APMT
	Mar	15	Transfer of commercial communications satellites from CCL to USML E.i.f. of ITAR amendments
	Sep	30	Oral defense "The international trade in launch services, the effects of U.S. laws policies and practices on its development", Leiden University

## CURRICULUM VITAE H. PETER VAN FENEMA

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- 1971-1973 - Post-graduate studies air and space law, McGill University, Montreal  
- LL.M.
- 1974-1997 - KLM Royal Dutch Airlines, Foreign Relations and Cooperation Bureau  
- 1990-1997 Vice president foreign relations
- Present functions - Adjunct Professor of Law, McGill University, Institute of Air and Space Law  
- Member, Board of Directors, International Institute of Air and Space Law, Faculty of Law, Leiden University  
- Member, Board of Editors *Air and Space Law* (Kluwer Law International)  
- Air Transport Expert for Mediation/Dispute Resolution, ICAO, Montreal